STILLWATER RIVER WATERSHED ACTION PLAN AND INVENTORY

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Acknowledgements

The Stillwater Watershed Project would like to gratefully acknowledge the following people for their help with various aspects of this Watershed Action Plan:

- Stillwater Watershed Project Joint Board
- John Kaiser – Darke and Miami Soil & Water Conservation District
- Jeff Thomas – ODNR, Division of Soil and Water Conservation
- Tim Brunswick – Darke Soil and Water Conservation District
- Doug Steinbrunner – Darke Soil and Water Conservation District
- Scott Costello– ODNR Division of Forestry
- Lynn Holtzman – ODNR Division of Wildlife
- Mike Ekberg – Miami Conservancy District
- Brukner Nature Center
- Jerry Ballard – ODNR Scenic Rivers
- Mike Lucas – Miami Valley Regional Planning Commission
- Harold Watters – Miami Co. OSU Extension
- Bob Miltner – Ohio EPA, Division of Surface Water
- Dale White - Ohio EPA, Division of Surface Water

A special thank you goes to John Kaiser, Darke GIS/Wildlife Specialist, for his hard work in developing the maps for this watershed action plan and inventory.

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List of Acronyms Used

ASA	Agricultural Security Areas
BMP	Best Management Practices
BOD	Biological Oxygen Demand
CAFO	Confined Animal Feeding Operation
CRP	Conservation Reserve Program
DEFA	Department of Environmental Financial Assistance
EWH	Exceptional Warmwater Habitat
FSA	Farm Service Agency
GIS	Geographic information System
GPS	Global Positioning System
HSTS	Household Sewage Treatment Systems
HUC #	Hydrologic Unit Code Number
IBI	Index of Biological Integrity
MCD	Miami Conservancy District
MCP	Miami Comprehensive Plan
MIwb	Modified Index of Well Being
MVRPC	Miami Valley Regional Planning Commission
MWH	Modified Warmwater Habitat
N	Nitrogen
NAWQA	National Water Quality Assessment Program
NPS	Non Point Source Pollution
NPDES	National Permit Discharge Elimination System
NRCS	Natural Resource Conservation Service
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OSUE	Ohio State University Extension
P	Phosphorous
QAPP	Quality Assurance Project Plan

QHEI	Qualitative Habitat Evaluation Index
RM	River Mile
SQM	Stream Quality Monitoring
SWAT	Soil and Water Assessment Tool
SWCD	Soil & Water Conservation District
SWP	Stillwater Watershed Project
TMDL	Total Maximum Daily Load
USGS	United States Geological Service
WWH	Warmwater Habitat
WWTP	Wastewater Treatment Plant
319	Section 319 of the Clean Water Act
305(b)	Ohio Environmental Protection Agency Water Quality Report

Plan Endorsement

We, the supporters of the Stillwater River Watershed conservation efforts, on this day of January 2005, do hereby approve and agree to pursue implementation of this Watershed Action Plan prepared and written by the Stillwater Watershed Joint Board.

The Stillwater Watershed Project Joint Board has strived to develop a watershed action plan that is reflective of the public input gathered. The development strategies were designed to create a plan adaptable, flexible and usable by the community in the process of continuing the success of the Stillwater Watershed Project.

Chapter I. Defining the Watershed

Introduction

Rivers are only as clean as the water that flows into them. Historically, water quality has been addressed by focusing on direct discharges to the river from industry and wastewater treatment plants, which are called "point sources" of pollution. Although the Clean Water Act of 1972 put significant controls on point source pollution, the Nation's surface waters are still not fishable, swimable, and drinkable, goals set by the EPA in the clean water act.

As more point sources of pollution are being addressed with technology and regulatory controls, a shift in thinking about pollution prevention has occurred. While point sources of pollution can be regulated because the point source is a discrete pipe or outlet, a significant amount of pollution comes from the land that drains into a lake, river, or stream. This drainage area is called a watershed and may include many smaller streams. By looking at the watershed system as a whole, other sources of water impairment have been identified. As water moves across the land towards the nearest body of water, it picks up soil, chemicals and nutrients. Runoff from urban areas, discharge from failing septic systems, and agricultural runoff are all potential sources of pollution. Because this pollution does not come from a visible pipe or outlet, it is called nonpoint source pollution. Both point sources and nonpoint sources of pollution must be addressed to have significant, positive, long-term impacts on water quality.

The Stillwater River Watershed encompasses some of the richest farmland in Ohio, but the soil of these farms is eroding away at an average rate of two tons per minute. The farmers in the watershed are among the leaders in Ohio animal husbandry, both in the numbers of animals and the income they produce, but all of those animals are contributing nutrient and biological pollution to the watershed at an average rate of two pounds of manure per minute. The Stillwater River Watershed is home to many clusters of homes in pastoral settings, but these homes contribute effluent to the watershed at an average rate of

two gallons per minute.

Two hundred fifty miles of streams drain the Watershed, but most of those streams have been modified and channelized to carry the water moved by a vast network of agricultural drainage tile that helps to keep this area an agricultural leader. Before Ohio was settled, over a third of the watershed was wetlands and wet areas, but after thorough drainage in order to access the rich soil, the percentage of wetlands in the watershed has been reduced to less than one percent.

In order to successfully manage pollutant loads, both point and nonpoint sources of pollution must be addressed on a watershed-wide basis. It is the goal of the Stillwater Watershed Project (SWP) to address water pollution throughout the watershed and help the Stillwater River become a model of the Clean Water Act ideal—a river whose waters are fishable, swimable, and drinkable—while ensuring the economic and natural resource assets of the river are not compromised.

The Watershed Action Plan

The Watershed Action Plan outlines the Stillwater Watershed Project's goals for protecting and enhancing the quality of the Stillwater River and its tributaries. It is a long-range plan that includes what is now known about the watershed and concrete suggestions for water quality improvement. The document that you are reading is meant to be a work in progress. Just as our ideas of how to protect water quality have changed over the past 50 years, so our ideas will continue to improve in the future. It is the hope of the Stillwater Watershed Project that this plan will be as dynamic as the aquatic systems it is meant to protect, changing and adapting to new realities.

What Can You Find in this Watershed Action Plan?

The contents of this Action Plan are designed to give a full picture of the Stillwater River Watershed, its land use, population, and natural resources. It will cover:

- The physical definition of the watershed, such as where it is located and what incorporated areas are within its boundaries
- The demographics of the watershed, such as educational levels and economic patterns
- General watershed information
- Information about the history and structure of the Stillwater Watershed Project and its legal status
- A detailed physical description of the watershed, including information about soils, flora and fauna, water resources ad land use
- The cultural resources of the watershed
- Detailed problems statements listing watershed impairments, their causes, and proposed restoration and implementation goals

The Stillwater River Watershed

The Stillwater River, hydrologic unit code (HUC) 05080001, is located in southwestern Ohio and its watershed drains 673 square miles in Darke, western Miami, and northwestern Montgomery Counties, Ohio, and east-central Randolph County, Indiana (Appendix A, Map 1). Approximately, 279,066.5 acres (67.7%) of the Stillwater River Watershed are located in Darke County and 93,176 acres (22.8%) in Miami County. The Stillwater River has its headwaters in northwest Darke County near the Ohio-Indiana border and flows southeast into Miami County, where it turns south to its confluence with the Great Miami River in Montgomery County just north of downtown Dayton. The main channel of the Stillwater River is 67 miles long with approximately 226 miles of tributaries. The elevation change is from 1,037 feet at the source to 753 feet at the mouth for an average fall of 4.2 feet per mile. Appendix A, Map 2 illustrates river miles.

What is a HUC?

A watershed address consists of a name and a number (for example, Stillwater River watershed, 05080001). The 8-digit number is a **Hydrologic Unit Code** or **HUC**. Hydrologic units are watershed boundaries organized in a nested hierarchy by size, somewhat like Russian nesting dolls. They range in size from two to sixteen digits long, with smaller numbers representing larger areas. Adding two digits to a HUC represents another, smaller, hydrologic area that is part of the larger area's watershed.

The Stillwater River's major tributary is Greenville Creek (HUC 05080001-110), which flows eastward through the center of Darke County to its confluence with the Stillwater River in Miami County, draining 201 square miles of the watershed (including Indiana). Other significant Stillwater River tributaries and their drainage areas are: Swamp Creek (HUC 05080001-100), 64 mi^2; Ludlow Creek, (HUC 0508001-140) 64 mi^2; and Painter Creek, (HUC 05080001-130) 48 mi^2. About 30 other perennial tributaries are in the watershed with drainage areas ranging from 2 to 25 square miles. Table 1 lists all of the 14-digit HUCS in the Stillwater River watershed. Appendix A, Map 3 illustrates 14-digit HUC boundaries.

Table 1: 11- and 14- digit USGS Hydrologic Unit Codes for the Stillwater River Watershed

HUC-14	HUC-11	ACRES	SUBWATERSHED NAME
05080001 090 010	05080001 090	9207	Stillwater River #J
05080001 090 020	05080001 090	8922	South Fork Stillwater River
05080001 090 030	05080001 090	7090	Stillwater River #I
05080001 090 040	05080001 090	7331	Woodington Run
05080001 090 050	05080001 090	7331	Stillwater River #H
05080001 090 060	05080001 090	12086	North Fork Stillwater River
05080001 090 070	05080001 090	9123	Boyd Creek

05080001 090 080	05080001 090	12533	Stillwater River #G
05080001 100 010	05080001 100	24435	Swamp Creek #B
05080001 100 020	05080001 100	12724	Indian Creek
05080001 100 030	05080001 100	3341	Swamp Creek #A
05080001 100 040	05080001 100	13429	Stillwater River #F
05080001 100 050	05080001 100	12169	Trotters Creek
05080001 100 060	05080001 100	11588	Harris Creek
05080001 110 010	05080001 110	3912	Greenville Creek #D
05080001 110 020	05080001 110	5437	Dismal Creek
05080001110030	05080001 110	13661	Kraut Creek
05080001 110 040	05080001 110	5207	Greenville Creek #C
05080001 110 050	05080001 110	16645	West Branch Greenville Creek
05080001 120 010	05080001 120	6494	Greenville Creek #B
05080001 120 020	05080001 120	18920	Mud Creek
05080001 120 030	05080001 120	6472	Bridge Creek
05080001 120 040	05080001 120	23537	Greenville Creek #A
05080001 120 050	05080001 120	7032	Dividing Branch
05080001 130 010	05080001 130	6264	Stillwater River #E
05080001 130 020	05080001 130	22675	Painter Creek
05080001 130 030	05080001 130	7883	Little Painter Creek
05080001 130 040	05080001 130	22567	Stillwater River #D
05080001 140 010	05080001 140	19924	Ludlow Creek #A
05080001 140 020	05080001 140	6207	Hog Run
05080001 140 030	05080001 140	14795	Ludlow Creek #B
05080001 140 040	05080001 140	10942	Stillwater River #C
05080001 140 050	05080001 140	10861	Brush Creek
05080001 140 060	05080001 140	15194	Stillwater River #B (Including Mill Creek)

05080001 140 070	05080001 140	16809	Stillwater River #A

Incorporated Areas

The Stillwater River Watershed, although primarily rural, does encompass the following incorporated areas (Table 2):

Table 2: Incorporated Areas Within the Stillwater River Watershed

County	Incorporated Area	Township
Darke	Ansonia	Brown
	Arcanum	Twin
	Bradford	Adams
	Gettysburg	Adams
	Greenville	Greenville
	Pitsburg	Monroe
	Rossburg	Allen
	Union City	Jackson
	Versailles	Wayne
	Wayne Lakes	Neave
Miami	Bradford	Newberry
	Covington	Newberry
	Pleasant Hill	Newton
	Laura	Union
	West Milton	Union
	Potsdam	Union
	Ludlow Falls	Union

Special Districts

There are several different special districts located within the Stillwater River Watershed. Table 3 describes the special districts and Table 4 illustrates the School Districts in the watershed. Darke and Miami Counties each have Agricultural Districts and Solid Waste / Recycling Districts as well.

Table 3: Special Districts in the Stillwater River Watershed, Darke and Miami Counties

Special District	Purpose
Darke Soil & Water Conservation District	To analyze the natural resource needs and design and implement programs that preserve, protect, develop and utilize these resources in the most prudent and ethical ways.
Miami Soil and Water Conservation District	Committed to provide quality conservation assistance to the people we serve.
Miami Conservancy District	Protecting lives, property, and economic vitality by providing unfailing flood protection, preserving water resources, enhancing river corridors and conserving valuable land with in the Great Miami River Watershed.
Miami County Park District	To acquire and manage outstanding natural resources for the purpose of preservation, conservation management, education and passive leisure activities for the people of Miami County.
Darke County Park District	To acquire and preserve land areas possessing special natural and historical features and to manage and maintain these resources for the benefit of its residents through appropriate educational and passive recreational programs and activities.
Brukner Nature Center	Brukner Nature Center is organized exclusively for charitable, educational and scientific purposes. As a non-profit organization, Brukner endeavors to provide meaningful experiences that emphasize natural history and the environment for the people in and

	beyond Miami County.
Miami Valley Regional Planning Commission	The Miami Valley Regional Planning Commission (MVRPC) is a voluntary association of numerous local governments and non-governmental organizations surrounding Dayton Ohio. These organizations work together to understand and address the public policy trends, issues and questions that face our region.

Table 4: School Districts in the Stillwater River Watershed, Darke and Miami Counties

SCHOOL	COUNTY	CITY
Ansonia	Darke	Ansonia
Anthony Wayne ECC	Darke	Greenville
Arcanum	Darke	Arcanum
Bradford	Darke/Miami	Bradford
Covington	Miami	Covington
Franklin - Monroe	Darke	Pitsburg
Greenville	Darke	Greenville
Milton Union	Miami	West Milton
Mississinawa Valley	Darke	Union City
Newton Local	Miami	Pleasant Hill
Tri-Village	Darke	New Madison
Versailles	Darke	Versailles

Special Designations

The Stillwater River and Greenville Creek System was designated Recreational on July 1, 1975 and designated scenic on October 14, 1980 and April 27, 1982, making it Ohio's eighth scenic river (Division of Natural Areas and Preserves, 2004). Designated sections include the Stillwater from Riffle Road Bridge in Darke County to its junction with the Great Miami River in Dayton (58 miles) and Greenville Creek from the Ohio border to its confluence with the Stillwater (35 miles). Recreational segment - Englewood dam to confluence with Great Miami River. Approximately 83 miles are designated scenic, and 10 miles are designated recreational.

NPDES Phase II Stormwater Communities

Under the National Pollutant Discharge Elimination System (NPDES) program, every city, county, construction site, and industrial business is required to obtain a permit showing that they are not causing harm to nearby streams. Large urbanized areas are required to be permitted under Phase I. There are no Phase I communities in the Stillwater River watershed. Phase II Stormwater Communities are smaller urbanized areas.

Currently, there are no NPDES Phase II Storm Water Program communities located in the Darke County portion of the Stillwater River watershed. The community of Greenville is set to implement NPDES Phase II in 2007.

In Miami County, the City of West Milton has contracted with the Miami Conservancy District to administer Phase II compliance. The Stormwater management program put in place by MCD outlines the six minimum control measures that are expected to result in significant reductions in pollutants discharged by Miami Conservancy District

The six minimum controls are:

1. Public Education and Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The City of Covington, also in Miami County, is expected to implement Phase II in the next five years.

Demographics[1]

General Demographic Data

The Stillwater River watershed is a mostly rural, agricultural area with limited cultural diversity. Over 98.1% of Darke County residents and 95.8% of Miami County residents self-identify themselves as White. This is in contrast to the population of Ohio as a whole, where only 75% of Ohioans identified themselves as White. Also in contrast to the rest of Ohio, the population of the Stillwater Watershed is not as well educated: while 21% of Ohioans hold a Bachelor's degree or higher, approximately 10% of Darke Countians hold a Bachelor's degree or higher, and approximately 16% of Miami Countians hold a Bachelor's degree or higher. The lack of educational achievement has influence over what types of businesses choose to locate in the Stillwater Watershed, and in this watershed the main types of employment are farming, precision production, craft and repair, and operators, fabricators, and laborers (MVRPC 2001).

The population of the Stillwater Watershed is also slightly older than the population of Ohio as a whole. The median age in Darke County is 37.4, and the median age in Miami County is 37.7, while the median age for the state of Ohio is 36.2. The median household income for Darke County is $39,307, and the median income for Miami County is $44,109. The median Ohio household income is $40,956. The difference in income between Darke and Miami Counties can be explained by the fact that Miami County also has a more educated and urban population.

Population Levels

The 2000 population in the Darke/Miami County portion of the watershed was 65,101 with a density of 97 people per square mile. The City of Greenville, which is the County Seat of Darke County and is located in the west-central part of the watershed, has a population of 13,294 and is the watershed's only city. Another 19,781 people are in 16 incorporated villages with populations ranging from approximately 200 to 4,600. The largest villages are: West Milton (4,645); Covington (2,559); Versailles (2,589); Arcanum (2,076), Bradford (1,108), and Union City (1,767), and Pleasant Hill (1,134). These seven villages have a total population of 14,744. Another 5,037 people are in nine smaller villages with populations of 200—1000 each. Table 5 illustrates the population change in the townships over 1960 – 2000 as well as the percent of the watershed in each township. Table 6 illustrates the population change over 1960 – 2000 in the incorporated areas. Taken together, the incorporated areas account for more than one-half of the watershed population, bringing the rural population density to about 50 people per square mile. Two-thirds of the watershed's population is in Darke County.

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1 Except where otherwise noted, population data is taken from the 2000 U.S. Census, which can be found online at www.census.gov.

Table 5: Population Changes in the Stillwater River Watershed, Darke and Miami Counties (MVRPC 2001, MCP 1998)*

Township	Percent of township in watershed (est.)	1960	1970	1980	1990	2000
ADAMS	100	1653	1578	2024	2044	2125
ALLEN	37	360	356	333	293	268
BROWN	100	933	887	932	932	901
BUTLER	27	328	355	399	370	351
FRANKLIN	100	1243	1237	1341	1267	1206
GREENVILLE	100	3381	3469	4471	4439	4831
HARRISON	17	174	177	216	218	221
JACKSON	90	970	1053	1668	1235	1161
LIBERTY	83	895	857	834	784	798
MISSISSINAWA	10	89	85	86	80	78
MONROE	75	793	879	1023	980	962
NEAVE	100	1035	1311	2288	1771	1302
PATTERSON	36	525	363	354	365	339
RICHLAND	100	897	862	924	906	862
TWIN	60	659	742	1021	973	947
VAN BUREN	100	1100	1311	1741	1652	1573
WABASH	7	62	51	49	48	51

WASHINGTON	100	1035	1074	1390	1311	1382
WAYNE	100	1332	1295	1621	1576	1760
YORK	100	698	627	569	557	523
MIAMI COUNTY						
MONROE	11	277	449	646	733	673
NEWBERRY	100	2469	2783	2735	2746	2897
NEWTON	97	1689	1864	2003	2090	2153
UNION	99	3283	4604	5014	4901	4626
WASHINGTON	2	36	33	37	40	36
				Total Population		**32,026**
* Municipalities are not included in these figures						

Allen, Franklin, Liberty, Mississinawa, Patterson, Richland, Wabash, and York Townships have lost population since 1900, maintaining an almost steady decrease through the century (MVRPC 2001). The population of these areas has dropped due to both the continued dominance of farming and the smaller size of their incorporated areas. Washington Township has maintained a somewhat steady population, because of its location in relationship to Greenville Township and other employment centers. Adams, Brown, Butler, Harrison, Jackson, Monroe, and Van Buren Townships have recorded gains since the 1930's primarily due to growth of incorporated areas and their proximity to major transportation routes linking them to employment centers in Dayton, Richmond, and Miami County. Newton and Newberry Townships in Miami County have experienced a slight increase in population. There were population gains centered on Greenville, Versailles, and Arcanum; however, population loss was prevalent in farm-oriented townships and small villages lacking central wastewater treatment facilities (MVRPC 2001). The community of West Milton in Miami County has had a significant increase in population as urban areas of Miami County, such as Troy, continue to expand and push population outward.

Table 6: Population Changes by Incorporated Area in the Stillwater River Watershed (Darke and Miami Counties; MVRPC 2001, MCP 1998)

Incorporated Areas	Township	1960	1970	1980	1990	2000
Darke County						
Ansonia	Brown	1002	1004	1267	1279	1145
Arcanum	Twin	1678	1993	2002	1953	2076
Bradford	Adams	113	107	97	87	74
Gettysburg	Adams	443	526	545	539	558
Greenville	Greenville	10585	12380	12999	12863	13294
Pitsburg	Monroe	394	462	460	425	392
Rossburg	Allen	295	275	260	250	224
Union City	Jackson	1657	1808	1716	1984	1767
Versailles	Wayne	2159	2441	2384	2351	2589
Wayne Lakes	Neave	N/A	N/A	N/A	671	684
Miami County						
Bradford	Newberry	1288	1240	1172	1111	1034
Covington	Newberry	2473	2575	2610	2603	2559
Pleasant Hill	Newton	1060	1025	1051	1066	1134
Laura	Union	526	464	501	483	487
West Milton	Union	2972	3696	4119	4348	4645
Potsdam	Union	282	311	289	250	203
Ludlow Falls	Union	273	292	248	300	210
					TOTAL	**33075**

Economic Patterns

Five major economic sectors contributed $2.4 billion to Darke County's 1997 receipts. In descending order of receipts, these sectors are manufacturing, wholesale trade, retail trade, agriculture, and service industries (barbers, physicians, theaters, and other non-goods services). Agricultural receipts for 1997 accounted for 10% ($247 million) of the total receipts, more than twelve times the 0.8% statewide

contribution of agricultural products. Figure 1 graphically illustrates the relative importance of each sector as a percentage of the total receipts.

Figure 1: Relative economic importance of each sector as a percentage of the total receipts.

Source: 1997 Censuses of Manufacturing, Wholesale Trade; Retail Trade; Service Industries; & Agriculture

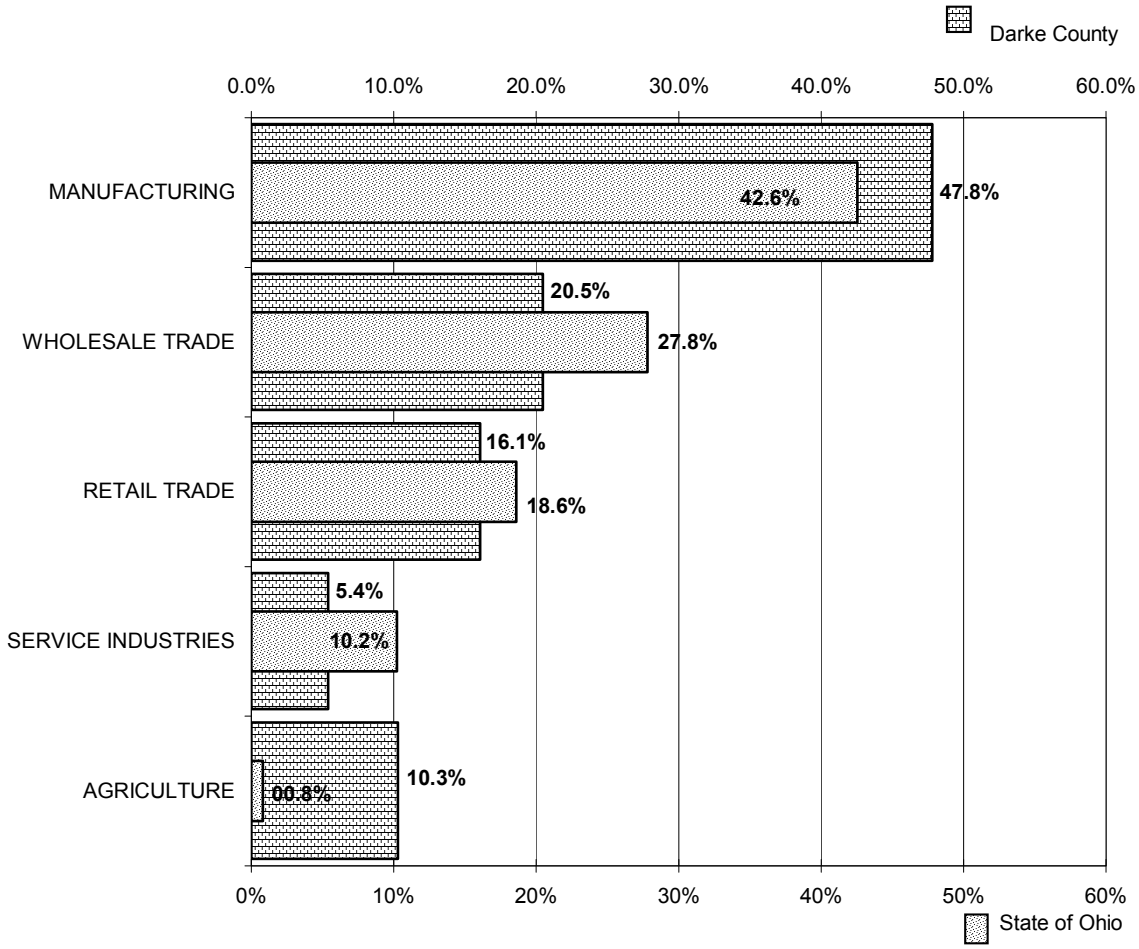


Table 7 shows the breakdown of agricultural receipts in Darke County and the State of Ohio. Of the nearly $250 million in receipts for Darke County in 1997, 70% were received from livestock. By 2000, total agricultural receipts declined 10% to $220 million. 68% of the County's total receipts were from livestock and poultry. Forty-four percent of the total County agriculture receipts resulted from poultry and other livestock sales, followed by hogs, dairy products, and cattle. For comparison, the proportions of State agriculture receipts were the opposite of Darke County, with only 40% of the $4 billion total agriculture receipts from livestock. Figures 2 and 3 graphically present the 2000 crop receipts data and the livestock and poultry receipts data for Darke County. Of the 1,728 farms, 1,028 (60%) reported net cash

gains averaging $38,819 and 700 farms (40%) reported net cash losses averaging $18,551.[9]

Table 7: Breakdown of agricultural receipts in Darke County and the State of Ohio.

MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD Darke County and State of Ohio, 1997 & 2000						
	DARKE COUNTY, 1997		DARKE COUNTY, 2000		STATE OF OHIO, 2000	
AGRICULTURAL PRODUCT	RECEIPTS ($1000's)	% of Total Receipts	RECEIPTS ($1000's)	% of Total Receipts	RECEIPTS ($1000's)	% of Total Receipts
ALL CROPS	$74,395	30.1%	$69,587	31.5%	$2,653,890	60.3%
CORN	$71,092	28.8%	$29,012	13.2%	$732,556	16.6%
SOYBEANS	$35,563	14.4%	$28,994	13.1%	$831,770	18.9%
WHEAT	$4,646	1.9%	$4,542	2.1%	$151,315	3.4%
OTHER GRAINS	$144	0.1%	N/A*	N/A*	N/A*	N/A*
VEGETABLES, SWEET CORN AND MELONS	$703	0.3%	N/A*	N/A*	N/A*	N/A*
NURSERY & GREENHOUSE CROPS	$1,502	0.6%	N/A*	N/A*	N/A*	N/A*
HAY, SILAGE & FIELD SEEDS	$983	0.4%	$1,477	0.7%	$96,947	2.2%
TOBACCO AND OTHER CROPS		0.0%	$5,562	2.5%	$841,302	19.1%
ALL LIVESTOCK, POULTRY, AND THEIR PRODUCTS	$172,673	69.9%	$151,014	68.5%	$1,750,714	39.7%
HOGS & PIGS	$31,480	12.7%	$29,069	13.2%	$330,081	7.5%
CATTLE AND CALVES	$8,771	3.6%	$7,074	3.2%	$309,948	7.0%
DAIRY PRODUCTS	$17,383	7.0%	$17,905	8.1%	$558,936	12.7%
POULTRY AND POULTRY PRODUCTS	$114,670	46.4%	$96,966	44.0%	$551,749	12.5%
SHEEP, LAMBS AND WOOL	$138	0.1%	N/A*	N/A*	N/A*	N/A*
OTHER LIVESTOCK AND THEIR PRODUCTS	$232	0.1%	N/A*	N/A*	N/A*	N/A*
TOTAL CROPS AND LIVESTOCK RECEIPTS	**$247,068**	100.0%	**$220,601**	100.0%	**$4,404,604**	100.0%

9 *1997 U.S. Census of Agriculture; Table 4. Farms with expenses equal to receipts are included as farms with gains.*

Figure 2: Market Value of Crops- Darke County 2000.

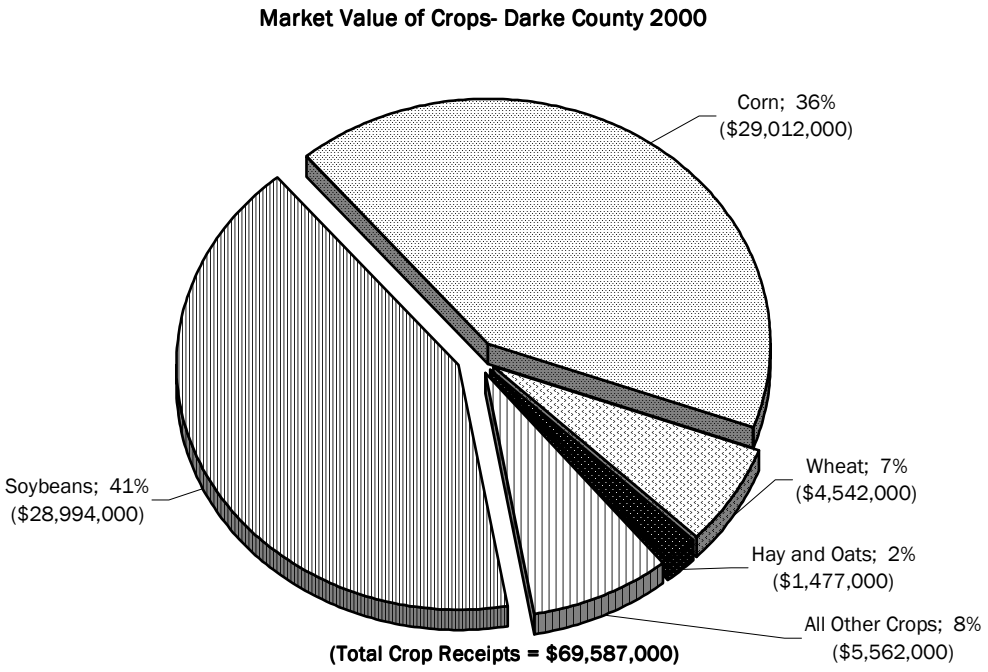
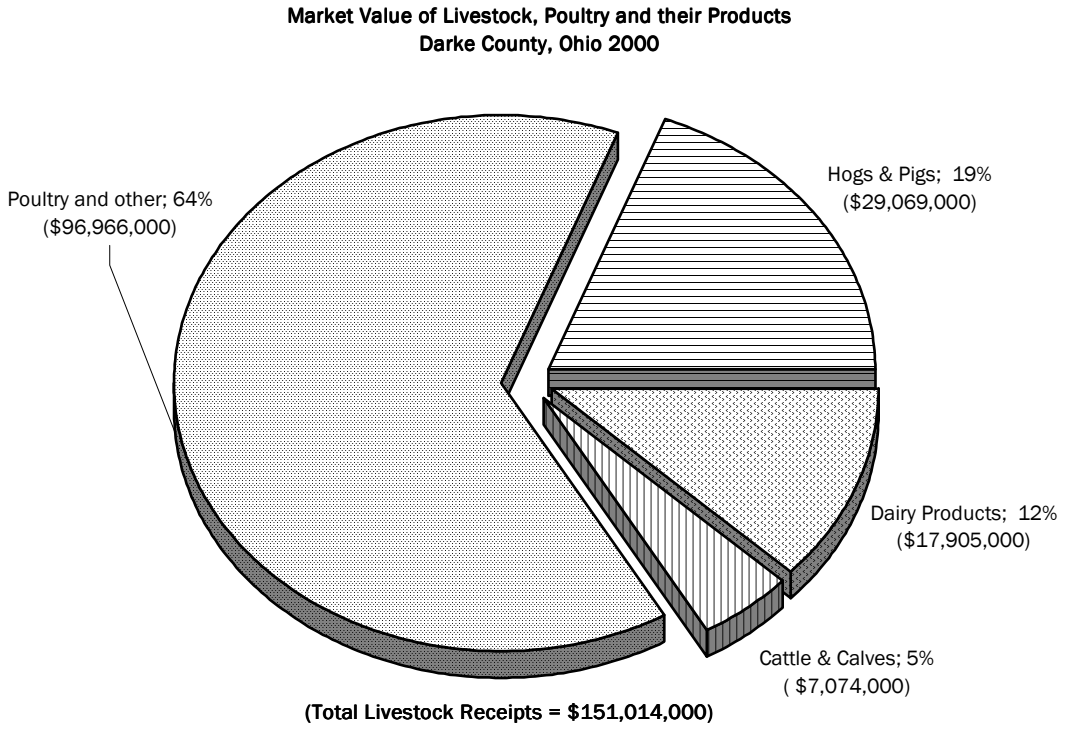


Figure 3: Market Value of Livestock, Poultry and their Products



Historical Watershed Protection Efforts

In 1990, the Darke and Miami Soil and Water Conservation Districts (SWCDs) initiated the watershed project due to the large number of livestock operations, high percent of highly erodable cropland, and the nitrate alerts that were occurring in the Village of West Milton. In order for this project to work the Darke and Miami SWCDs made sure that it had local support. Several public informational meetings were held to gain support of the project.

The SWP received its first funding in 1993 in the form of an Ohio Environmental Protection Agency, 319 Non-point Source Grant. Refer to Appendix A for a complete list of all the funding sources. The focus program area includes the portions of the Stillwater River watershed that lie within Darke and Miami counties. The rationale for doing this is that 75% of the watershed is located in these counties.

In 1993, the first Stillwater River Watershed Protection Plan was developed. This plan was used as a guide for the Joint Board of the Stillwater Watershed Project to achieve their goals and objectives. It was a comprehensive plan that included the physical and demographic setting of the watershed, potential sources of pollution, nonpoint source pollution potential ranking and the goals and objectives of the SWP. This plan also delineated and prioritized twenty-eight drainage units in the Stillwater River watershed to address their resource concerns. This plan was revised in 1995. In 1997, The Upper Stillwater River Watershed Plan and Environmental Assessment and The Lower Stillwater River Watershed Plan and Environmental Assessment were prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566. These documents provided an overview of the water quality problems in the Stillwater River Watershed. In 1998, The Stillwater Riparian Area Enhancement Plan was developed to address protection of riparian areas in the Stillwater River Watershed. This plan was a result of the ODNR NatureWorks Streambanking Program occurring in the Stillwater River watershed. This program involves a partnership with the Joint Board of the Stillwater Watershed Project, Darke Co. Park District, Miami Co. Park District, and the Darke and Miami SWCDs.

Chapter II. Watershed Plan Development

The Stillwater Watershed Project

To insure that the Stillwater River will be enjoyed by future generations, the Stillwater Watershed Project (SWP) was formed through the cooperation of local citizens, government agencies, municipalities, and organizations. We believe a functioning watershed is essential to the human, environmental, and economic health of our community. Our vision is that all watershed residents and visitors will benefit from an abundant supply of clean water. We are "Working together to protect our water resources."

Mission Statement

To improve, protect, and restore the quality of water and natural resources in the Stillwater River watershed through collaborative planning, monitoring, and voluntary education and financial assistance programs.

Objectives

- Advocate the proper best management practices (BMPs) to reduce nonpoint source pollution from all potential sources that may include agricultural, residential, and commercial.
- Promote the proper manure application and management in the high livestock drainage units.
- Develop and offer public educational opportunities regarding the proper management of septic systems.
- Encourage riparian area and wetland restoration by offering technical and educational opportunities regarding relevant watershed management.
- Sustain cooperation between agriculture, residential, and commercial interests in order to enable a partnership towards the common goal.

Structure, Organization, and Administration

The legal structure of the Stillwater Watershed Project is two-fold. The 16-member Joint Board of the Stillwater Watershed Project is under the fiscal advisory of the Darke Soil and Water Conservation District. The non-profit organization, Stillwater Watershed Project, Inc., is under the fiscal advisory of the Stillwater Watershed Project Board of Directors. The Stillwater Watershed Project pursues state and federal funding, where as, the non-profit organization, Stillwater Watershed Project, Inc., pursues local funding.

The Stillwater Watershed Project

The sixteen-member Joint Board of the Stillwater Watershed Project is the governing body of the Stillwater Watershed Project. The Joint Board is a group of diverse stakeholders that take a genuine interest and concern in the water quality in the Stillwater River watershed. Table 8 lists the members of the Joint Board. All members must reside or own land within the Stillwater River Watershed, or, if representing an agency or organization, have jurisdiction in the watershed. No more than 8 members can represent government agencies. To be considered a member of a representing government agency, the member must be a full-time employee of that agency, and the member's primary source of income must come from that agency. A quorum constitutes a least 8 Joint Board members, of which at least 3 are SWCD Supervisors. If a tie should result the SWCD Supervisors will have the deciding vote. The five elected offices are Chairman, Vice-Chairman, Secretary, Treasurer, and Public Relations, and can only be occupied by SWCD Supervisors. Joint Board Meetings are held the second Tuesdays of February, May, August, and November at 9:00 in the morning, with meetings alternating between Darke and Miami Counties.

Table 8: List of 2005 Joint Board Supervisors

Name	Affiliation
Larry Royer	Darke SWCD Supervisor/Landowner
Keith Arnett	Darke SWCD Supervisor/Landowner
Melvin Stucke	Darke SWCD Supervisor/Landowner
Brian Cron	Miami SWCD Supervisor/Landowner
Dan Batdorf	Miami SWCD Supervisor/Landowner
Hugh Trimble	Ohio EPA
Jerry Eldred	Miami County Park District
Roger Van Frank	Darke County Park District
Jon Everman	Darke FSA
Ed Everman	ODNR, DSWC
Steve Foster	OSU Extension
Mandy Daniels	Farm Bureau
Tim Warner	Darke Co. Farmer
Gaynor Millhouse	Miami County Landowner Representative
Tim Swartztrauber	City of West Milton
Jerry Ballard/Scott Costello/Doug Maloney	ODNR, Scenic Rivers, Forestry, Wildlife

A 90 member Advisory Council of the Stillwater Watershed Project was also formed to assist in educating the community and protecting the water quality in the Stillwater River Watershed. This advisory council meets quarterly. Table 9 is a list of organizations represented on this advisory council.

Table 9: Organizations Represented on the SWP Advisory Council

Agriculture for a Clean Environment, Inc. (A.C.E.)
Brukner Nature Center
City of Greenville
Darke County Commissioners
Darke County Farm Bureau
Darke County Park District
Darke Soil and Water Conservation District
Local Watershed Citizens
Miami County Beef Producers
Miami County Commissioners
Miami County Farm Bureau
Miami County Health District
Miami County Park District
Miami County Planning and Zoning
Miami County Pork Producers
Miami Soil and Water Conservation District
Ohio State University Extension, Darke and Miami Counties
Ohio Department of Agriculture
Ohio Department of Natural Resources: Division of Forestry Division of Natural Areas and Preserves Scenic Rivers Program Division of Soil and Water Conservation Division of Watercraft Division of Wildlife

Ohio Environmental Protection Agency
Stillwater Aquifer Protection Association
Stillwater Bass Club
Stillwater River Association
Stillwater River Basin Council
Top of Ohio Resource Conservation and Development Area
Township Trustees
U.S. Farm Services Agency (formerly ASCS), Darke and Miami Counties
U.S. Natural Resources Conservation Service (formerly SCS)
Village of Covington
Village of Versailles
Village of West Milton

The Stillwater Watershed Project, Inc.

The non-profit organization, Stillwater Watershed Project, Inc., was formed out of the Stillwater Watershed Project in 2001. The goals and objectives of the non-profit organization are the same as the Stillwater Watershed Project's; however, the membership targets local landowners and is not concentrated on "agency" members. The Stillwater Watershed Project, Inc. is managed and represented by the Stillwater Watershed Project Board of Directors. Membership is available to individuals with an interest in supporting the mission of the Stillwater Watershed Project, Inc. Membership can be individual, family, or corporate and is available upon receipt of annual dues. Each membership has one voting privilege. See Appendix B for more details on the Bylaws of Stillwater Watershed Project, Inc. and membership form.

Encouraging Public Understanding

Each year the Stillwater Watershed Project presents multiple educational efforts in order to increase public understanding and participation in the Watershed Action Plan. Many of these efforts are undertaken because of advice given by the Joint Board and the Stillwater Advisory Council, and because of the perceptions of those involved in our visioning process.

Education and Outreach

The Stillwater Watershed Project has been involved with a variety of educational activities since the project started in 1993. Through the education and outreach, the project has gained insight to stakeholder concerns in the watershed. These concerns have been used to guide this plan. There has been an excellent response by

stakeholders at education and outreach events. Table 10 illustrates a list of annual education and community outreach activities that have been conducted.

Table 10: Annual educational events sponsored by the Stillwater Watershed Project

Educational Program	Time of Year Event is Held	Target Audience	Average Attendance
Conservation Tillage Breakfast	February	Farmers	34
Lawn Care / Septic System Educational Workshop	April	Local Landowners	42
Darke Educational Canoe Float	June	Local Landowners	67
Miami Educational Canoe Float	September	Local Landowners	60
Stillwater Trash Clean Up	June	Local Landowners	84
Conservation Tour	June	Local Landowners	18
Crop Diagnostic Workshop	July	Farmers	18
Fetters Test Plots & Field Day	August	Farmers	54
High School Canoe Floats	September	High School Students and Teachers	40
Quarterly Newsletter	Quarterly	Local Landowners	2000
Storm Drain Labeling and Water Festival	October	Urban Residents	130

Stillwater Watershed Project Public Perception Surveys

In order to gather additional input from the local community about watershed problems, public perception surveys were distributed at the Darke and Miami County fairs during the years 2000-2003. 119 surveys were received. Table 11 shows the tallied survey results.

Table 11: Results from the public perception surveys given out at the Darke and Miami Co. fairs 2000-2003.

AGE RANGE:							TOTAL
UNDER 12	AGE 12-17	AGE 18-35	AGE 35-65	OVER 65			
10	8	25	57	19			119
8%	7%	21%	57%	16%			
DO YOU LIVE IN THE STILLWATER WATERSHED?							
YES	NO	DON'T KNOW					
90	17	8					116
78%	15%	7%					
CONDITION OF THE WATER QUALITY IN THE WATERSHED							
EXCELLENT	GOOD	FAIR	POOR	EXTREMELY POOR			
5	55	37	12	4			113
4%	49%	33%	11%	4%			
WHAT IS THE #1 WATER QUALITY PROBLEM IN THE WATERSHED? (CIRCLE ONLY ONE)							
FARM CHEMICALS	EROSION / SEDIMENT	LAWN CHEMICALS	INDUSTRIAL WASTE	SEPTIC RUNOFF	LIVESTOCK WASTE	NONE	
41	23%	11	20	8	13	9	126
33%	18%	9%	16%	6%	10%	7%	
WHICH ACTIVITIES WOULD YOU PARTICIPATE IN? (CIRCLE ALL THAT APPLY)							
CANOE FLOAT	CONSERVATION FIELD DAY	ADODT CONSERVATION PRACTICES	STREAM CLEAN UP	MAKE A MONETARY DONATION	WATER QUALITY MONITORING		
48	25	30	24	12	16		

Stillwater Watershed Project 10th Anniversary Visioning Process

In 2003, the Joint Board of the Stillwater Watershed Project went through a visioning process. The following questions were asked:

- What are we doing well?
- What do we need to work on?
- How do we improve those things that are not working as well as they could be?

Six categories were used to answer the above questions. The results from this visioning process are listed below:

What are we doing well?

Education: high school canoe floats, workshops, Fetters field day, newsletter, no till promotion, septic & lawn care meetings, public awareness

Incentive Programs: cost share, NatureWorks Streambanking, test plots, No till

Evaluation: Use of GIS for data organization & linkage to sub watershed

Other: Organized & well diversified, Joint Board Meetings make good decisions

Funding: State & National recognition, successful in getting grants, 319 grants, So far local & state funding has been adequate

What do we need to work on?

Education: Education in the schools, Should develop a website, Expanding incentive programs, Build volunteer programs

Incentive programs: If possible, aim a portion of the cost sharing towards septic system/education, Need to allow some "creative" projects, don't limit to stated programs.

Public Relations: Getting public participation, Must get State Reps, Senators, County Commissioners, Get the word out in watershed about the group, more awareness of septic systems, More news articles, Need to develop & offer programs for town/city residents. Partner with governments for this.

Evaluation: GIS/GPS, Chemical monitoring could be better, Need good water sampling & evaluating data, focus on water quality sampling to demonstrate to the financial supplies the results of the watershed. We need to know if change is really happening.

Funding: More stable source of funding, private source, trustees etc. Getting Darke Co. Commissioners to give their share of cost, Need to build membership base & develop an endowment fund for the watershed.

How do we improve those things that are not working as well as they could be? (The number corresponds to how many participants saw this category as important.)

*Public Relations (*15) Regular column in newspaper (Early Bird, Stillwater Advertiser, Advocate), University students help w/media, articles, TV – Booker' Beat on Channel 2

*Funding (*8) Work w/Park District & their volunteers (how do they get funding)

Monsanto, BASF – Education program, Target City of Dayton for funding

Volunteer Programs (4) Water monitoring, Watershed Stewards

More Stable funding (3)

Build Membership Base (3)

Target Urban Residents (2)

Get into more schools (2)

Watershed Partners

Agriculture For A Clean Environment, (A.C.E)

Agriculture for a Clean Environment, or A.C.E., is a group of farmers, organized as a non-profit organization, for the purpose of promoting environmentally sound practices in the production of a safe, stable and economic food supply for present and future generations. This organization was developed out of the Stillwater Watershed Project in 1994. This organization is influential in promoting best management practices in the watershed. The following are the objectives of this organization:

- Create awareness with the general public and governmental officials regarding modern agricultural practices that are used in maintaining our abundant food supply.
- Develop educational programs, field days and activities that create a greater appreciation of agricultural and environmental issues.
- Provide accurate information to our schools to advance the understanding and appreciation of agriculture's interdependence with the environment.
- Demonstrate land use practices, which protect natural resources and enhance agricultural competitiveness.
- Provide a forum for the exchange of ideas and concerns affecting agriculture in the Stillwater River watershed.
- Provide member representation on environmental issues affecting agriculture.

Active members are individuals who own farmland and/or operate a farm in the Stillwater River watershed (Darke and Miami Counties) with an interest in supporting the mission of the organization. Membership can be individual or family. Each membership has one voting privilege. Associate members include anyone who

supports the mission of the association, whether they are individuals, business or corporations but do not live within the Stillwater River watershed. Associate members have no voting privilege. Currently, A.C.E. has 32 active members. These members are active in promoting best management practices, available cost share programs administered through the SWP, and sponsorship of the biannual canoe floats and southern test plots that compares no-till to conventional tillage funded through the SWP. A nine member Board of Directors who are elected at the annual A.C.E. banquet governs A.C.E.

Ohio Scenic Rivers Program

The Scenic Rivers Program is a branch of the Ohio Department of Natural Resources, Division of Natural Areas and Preserves. The Scenic Rivers Program began with the passage of the Scenic Rivers Act of 1968. The goal of this program is to preserve the natural and historic qualities of Ohio's finer streams so that both present and future generations will be able to experience their natural beauty and values. In 1972, the Scenic Rivers Act of 1968 was amended to include wild and recreational categories. The name of the Act changed to the Ohio Wild, Scenic, and Recreational River Act. This Act requires a 10-member advisory council. This council represents local officials, landowners and conservation organizations appointed to each designated river to oversee the preservation and protection efforts.

In 1975, the Stillwater River was designated recreational from Englewood dam to the confluence with the Great Miami River. A total of 10 miles are designated recreational. A recreational designation is defined as a river that is easily assessed and has development located around it. On October 14, 1980, the Stillwater River and its largest tributary Greenville Creek became Ohio's eighth scenic river. Designated sections include the Stillwater River from Riffle Road Bridge in Darke County to the Englewood dam in Montgomery County and Greenville Creek from the Ohio-Indiana state line to the confluence with the Stillwater River. Approximately, 83 miles are designated scenic. A scenic designation is defined as a river with little evidence of humans, although occasional homes, villages, roads and bridges can be seen from the river. Also, the river may run through agricultural areas.

Chapter III. Watershed Inventory

Physical Description of the Watershed

The following information was gleaned from many sources, and covers the basic physical features of the watershed. In this section you will find information about the geological features, soils, geologic history, biological resources, water resources and land use. All of these factors must be taken into account when planning for watershed protection and recovery.

Geology [2]

The geology of a watershed can impact a stream or river in many ways. The mineral composition of the underlying bedrock can cause changes in water pH, the basic topography and soil types will determine how erodible the watershed soils are, and the glacial history gives clues as to the formation of topological features.

Topography and Geological Features

The Stillwater River watershed lies in the Indiana-Ohio Till Plains section of the Central Lowland physiographic province. Most of the watershed is nearly level, with almost 75% of the land having a slope of 2% or less. About one-fourth has slopes of 2-6%, and less than 2% has a slope greater than 6%. Slopes in the 6-12% range are mostly found in the northern quarter of Darke County where they are associated with a glacial moraine in the townships of Allen, Mississinawa, Patterson, Wayne, and York. Moraines are low ridges of glacial till that were carried southward by the glacier and deposited directly on the surface of the land when the glacier stopped or slowed. Smaller areas with 6-12% slopes exist in the southwest portion of the watershed and along the larger streams. Because of the large size of the Stillwater Watershed, a topographical map of the entire watershed must be very large to show any detail. Copies of selected portions of the watershed are available by calling the SWP office. The topographical information layer is also included on this CD for those who have access to GIS software.

Soils

Glacial till is the dominant geologic parent material of the soils of the watershed. It is a mixture of boulders, gravel, sand, silt, and clay that was carried southward by the last (Wisconsin) glacial advance and deposited directly on the surface. Glacial meltwater washed sand and gravel out of the till, filling the major streams with outwash deposits. Sand and gravel also occur as kames in areas where they were deposited within subglacial streams. Some outwash areas are capped with silty

[2] Unless otherwise noted, all geological information is from the Darke County Soil Survey, and the Miami County Soil Survey, available from the Darke and Miami Soil & Water offices respectively. In the first revision the plan will be updated to include SSURGO soil data.

sediments. The bedrock of the watershed is Cedarville Dolomite. This bedrock is exposed in some valleys of Greenville Creek and the Stillwater River.

The somewhat to very poorly drained Crosby-Brookston soil association and the well drained to somewhat poorly drained Miamian-Celina-Crosby association together account for 60% of the watershed and are the dominant associations in the southern two-thirds, south of the Stillwater River. The somewhat and very poorly drained Blount-Pewamo association and the somewhat poorly, moderately well drained, and very poorly drained Blount-Glynwood-Pewamo association account for 36% of the soils and are the dominant associations north of the Stillwater River. The Crosby-Treaty and Eldean-Eel-Medway association account for the remaining 4%.

Because sedimentation is of major concern to watershed protection efforts, the locations of highly erodible land (HEL soils) are important. **Table 12** lists the percentage of HEL soils in the various 14-digit subwatersheds. A map of the locations of the HEL soils can also be found in Appendix A, Map 4.

Table 12: Percentage HEL Soils by Subwatershed

Subwatershed Name	Total Acres	HEL Soils Acres	Percent HEL Soils in Subwatershed
Boyd Creek	9110.4	317.3	3.5
Bridge Creek	6462.9	1161.2	18.0
Brush Creek*	10854.9	472.8	4.4
Dismal Creek	5427.7	373.6	6.9
Dividing Branch	7023.3	283.8	4.0
Greenville Creek A	23511.5	2348.4	10.0
Greenville Creek B	6484.9	853.1	13.2
Greenville Creek C	5199.4	951.5	18.3
Greenville Creek D	3905.2	142.3	3.6
Harris Creek	11576.1	1317.7	11.4
Hog Run	6200.7	285.1	4.6
Indian Creek	12708.3	1491	11.7
Kraut Creek	13638.3	1433.7	10.5
Little Painter Creek	7874.7	19.3	0.2
Ludlow Creek A	19904	583.1	2.9
Ludlow Creek B*	14781.6	69.3	0.5
Mud Creek	18892.4	3631.1	19.2

North Fork Stillwater River	12069.3	2027.4	16.8
Painter Creek	22649.6	238.7	1.1
South Fork Stillwater River	8907.7	593.4	6.7
Stillwater River A*	16800	0	0.0
Stillwater River B*	15183.7	151.4	1.0
Stillwater River C	10934.4	746.4	6.8
Stillwater River D	22549.8	1105.2	4.9
Stillwater River E	6259.5	157.9	2.5
Stillwater River F	13416.2	2743.4	20.4
Stillwater River G	12518.3	1091.1	8.7
Stillwater River H	7321.4	248.1	3.4
Stillwater River I	7079	494.3	7.0
Stillwater River J	9192.7	367.2	4.0
Swamp Creek A	3337.7	791.6	23.7
Swamp Creek B*	24409.3	2845.1	11.7
Trotters Creek*	12159.6	1790.3	14.7
West Branch Greenville Creek	16618.8	2830.8	17.0
Woodington Run	7319.9	101.2	1.4
Totals	**412283.2**	**34057.8**	**8.3**
*Note: 100% of soils data was not available for this subwatershed			

Glacial History[3]

The Stillwater Watershed was glaciated more than once. The most notable glaciations were caused by the Illinoian and Wisconsinan glaciers. The deposits of the Illinoian glacier, 130,000 to 300,000 years old, were covered by the deposition

[3] A map of Ohio's glacial history can be found online at http://www.dnr.state.oh.us/geosurvey/pdf/glacial.pdf (2/4/05)

of the Wisconsinan glacier. The deposits of the Wisconsinan glacier serve as the parent material for most of the soils in the watershed, and are 14,000 to 24,000 years old. Glacial outwash carried sand and gravel out of the advancing glaciers. This sand and gravel was deposited in major streams.

Biological Features

Fish

According to the Ohio EPA (1999) Stillwater River Basin TSD, the fish community sampled in the Stillwater River was rated Very Good to Exceptional from its confluence with the Great Miami River. The lower 30 miles of the mainstem of the Stillwater River supports one of the highest populations of river redhorse in the State (OEPA 2001).

Upstream from the town of Ansonia the fish community declines drastically due to poor habitat, and low dissolved oxygen concentrations spurred by a combination of nutrient and organic enrichment. The Index of Biotic Integrity (IBI) and the Modified Index of Well Being (Miwb) are scores based on the performance of the biotic community. Figure 4 plots the IBI and Miwb scores by river mile for the Stillwater River. The greatest improvements in fish community quality occurred in two reaches, one downstream from Ansonia to Swamp Creek, and the other downstream from the West Milton Waste Water Treatment Plant. Local farmers attribute improvements downstream from Ansonia to Swamp Creek to the increase in the adoption of the best management practice no-till. According to OEPA's 1999 TSD, the limiting factors for further improvement of the headwaters of the Stillwater River are habitat destruction and land-applied manure.

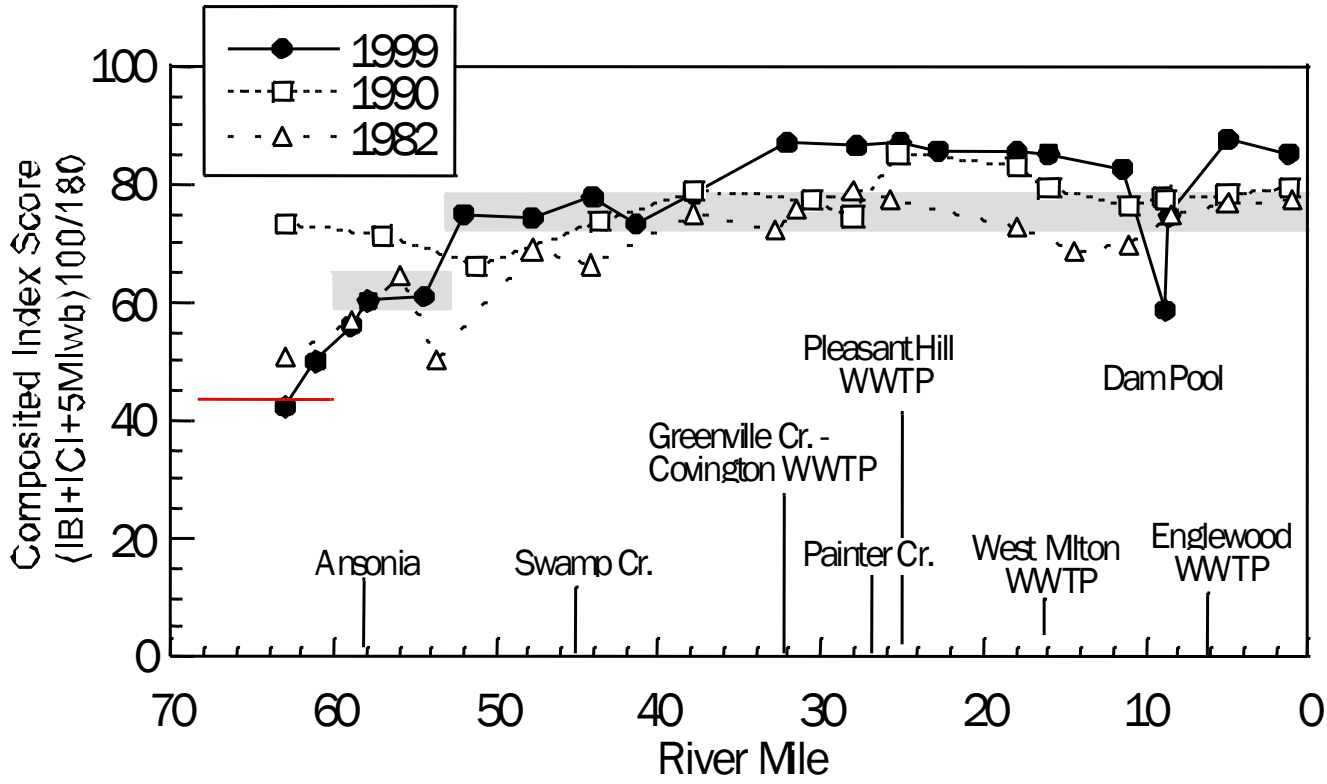
Table 13 illustrates the fish found in the Stillwater River watershed. This list was developed during the 1999 OEPA Biological and Water Quality Study in the Stillwater River watershed.

Table 13: Fish Found in the Stillwater River Watershed

GIZZARD SHAD	ROSYFACE SHINER	BLUEGILL SUNFISH
CENTRAL MUDMINNOW	ROSEFIN SHINER	ORANGESPOTTED SUNFISH
GRASS PICKEREL	STRIPED SHINER	LONGEAR SUNFISH
NORTHERN PIKE	SPOTFIN SHINER	PUMPKINSEED SUNFISH
QUILLBACK CARPSUCKER	SAND SHINER	GREEN SF X BLUEGILL SF

SILVER REDHORSE	MIMIC SHINER	GREEN SF X PUMPKINSEED
BLACK REDHORSE	SILVERJAW MINNOW	LONGEAR SF X BLUEGILL SF
GOLDEN REDHORSE	FATHEAD MINNOW	GREEN SF X LONGEAR SF
SHORTHEAD REDHORSE	BLUNTNOSE MINNOW	GREEN SF X HYBRID
RIVER REDHORSE	CENTRAL STONEROLLER	HYBRID X SUNFISH
NORTHERN HOG SUCKER	STRIPED SH X ROSYFACE SH	YELLOW PERCH
WHITE SUCKER	STRIPED SH X SILVER SH	BLACKSIDE DARTER
SPOTTED SUCKER	CHANNEL CATFISH	LOGPERCH
CREEK CHUBSUCKER	YELLOW BULLHEAD	JOHNNY DARTER
COMMON CARP	BROWN BULLHEAD	GREENSIDE DARTER
GOLDFISH	BLACK BULLHEAD	BANDED DARTER
GOLDEN SHINER	STONECAT MADTOM	RAINBOW DARTER
HORNYHEAD CHUB	TADPOLE MADTOM	ORANGETHROAT DARTER
RIVER CHUB	BLACKSTRIPE TOPMINNOW	FANTAIL DARTER
BLACKNOSE DACE	WHITE CRAPPIE	LEAST DARTER
CREEK CHUB	BLACK CRAPPIE	SAUGER X WALLEYE
SOUTH. REDBELLY DACE	ROCK BASS	MOTTLED SCULPIN
REDSIDE DACE	SMALLMOUTH BASS	BROOK STICKLEBACK
EMERALD SHINER	LARGEMOUTH BASS	BLUEGILL SUNFISH
SILVER SHINER	GREEN SUNFISH	

Figure 4: Fish Population Health by River Mile



Birds

Brukner Nature Center, a private, nonprofit nature preserve, located in the Stillwater River Watershed, conducts a check off list of birds they have seen in the watershed. This list includes migratory birds. Table 14 contains a list of birds seen in the watershed.

Table 14: Birds Seen in the Stillwater River Watershed

PIED-BILLED GREBE	DOUBLE-CRESTED CORMORANT	GREAT BLUE HERON
GREAT EGRET	GREEN HERON	CANADA GOOSE
WOOD DUCK	MALLARD	BLUE-WINGED TEAL
TURKEY VULTURE	OSPREY	BALD EAGLE
NORTHERN HARRIER	SHARP-SHINNED HAWK	COOPER'S HAWK
BROAD-WINGED HAWK	RED-TAILED HAWK	SANDHILL CRANE
AMERICAN KESTREL	RING-NECKED PHEASANT	NORTHERN BOBWHITE
KILLDEER	SPOTTED SANDPIPER	AMERICAN WOODCOCK
ROCK DOVE	MOURNING DOVE	BLACK-BILLED CUCKOO
YELLOW-BILLED CUCKOO	EASTERN SCREECH OWL	GREAT HORNED OWL
BARRED OWL	COMMON NIGHTHAWK	WHIP-POOR-WILL
CHIMNEY SWIFT	RUBY-THROATED HUMMINGTON	BELTED KINGFISHER
RED-HEADED WOODPECKER	RED-BELLIED WOODPECKER	YELLOW-BELLIED SAPSUCKER
DOWNY WOODPECKER	HAIRY WOODPECKER	NORTHERN FLICKER
PILEATED WOODPECKER	EASTERN WOOD-PEWEE	ACADIAN FLYCATCHER
ALDER FLYCATCHER	LEAST FLYCATCHER	EASTERN PHOEBE
GREAT-CRESTED FLYCATCHER	EASTERN KINGBIRD	HORNED LARK
TREE-SWALLOW	N.ROUGH-WINGED SWALLOW	BANK SWALLOW
BARN SWALLOW	BLUE JAY	AMERICAN CROW
BLACK-CAPPED CHICKADEE	CAROLINA CHICKADEE	TURFED TITMOUSE
RED-BREASTED NUTHATCH	WHITE-BREASTED NUTHATCH	BROWN CREEPER
CAROLINA WREN	HOUSE WREN	WINTER WREN

GOLDEN-CROWNED KINGLET	RUBY-CROWNED KINGLET	BLUE-GRAY GNATCATCHER
EASTERN BLUEBIRD	VEERY	GRAY-CHEEKED THRUSH
SWAINSON'S THRUSH	HERMIT THRUSH	WOOD THRUSH
AMERICAN ROBIN	GRAY CATBIRD	NORTHERN MOCKINGBIRD
BROWN THRASHER	CEDAR WAXWING	EUROPEAN STARLING
WHITE-EYED VIREO	SOLITARY VIREO	YELLOW-THROATED VIREO
WARBLING VIREO	RED-EYED VIREO	BLUE-WINGED WARBLER
GOLDEN-WINGED WARBLER	TENNESSEE WARBLER	NASHVILLE WARBLER
NORTHERN PARULA	YELLOW WARBLER	CHESTNUT-SIDED WARBLER
MAGNOLIA WARBLER	CAPE MAY WARBLER	BLACK-THROATED BLUE WARBLER
YELLOW-RUMPED WARBLER	BLACK-THROATED GREEN WARBLER	BLACKBURNIAN WARBLER
YELLOW-THROATED WARBLER	PINE WARBLER	PALM WARBLER
BAY-BREASTED WARBLER	BLACKPOLL WARBLER	CERULEAN WARBLER
BLACK & WHITE WARBLER	AMERICAN REDSTART	PROTHONOTARY WARBLER
WORM-EATING WARBLER	OVENBIRD	NORTHERN WATERTHRUSH
LOUISIANA WATERTHRUSH	KENTUCKY WARBLER	CONNECTICUT WARBLER
MOURNING WARBLER	COMMON YELLOWTHROAT	HOODED WARBLER
CANADA WARBLER	SUMMER TANAGER	SCARLET TANAGER
NORTHERN CARDINAL	ROSE-BREASTED GROSBECK	INDIGO BUNTING
EASTERN TOWHEE	AMERICAN TREE SPARROW	CHIPPING SPARROW
FIELD SPARROW	SAVANNAH SPARROW	FOX SPARROW
SONG SPARROW	LINCOLN'S SPARROW	SWAMP-SPARROW
WHITE-THROATED SPARROW	WHITE CROWNED SPARROW	DARK[EYED JUNCO
RED-WINGED BLACKBIRD	EASTERN MEADOWLARK	RUSTY BLACKBIRD
COMMON GRACKLE	BROWN-HEADED COWBIRD	BALTIMORE ORIOLE
PURPLE FINCH	HOUSE FINCH	COMMON REDPOLL
PINE SISKIN	AMERICAN GOLDFINCH	EVENING GROSBEAK
HOUSE SPARROW		

Mammals

Table 15 lists the mammals found in the Stillwater River watershed. Wildlife Biologist, Lynn Holtzman, ODNR, Division of Wildlife created this list.

Table 15: Mammals Found in the Stillwater River Watershed

RACCOON	GRAY FOX	VIRGINIA OPUSSUM
WHITE-TAILED DEER	LITTLE BROWN BAT	NORWAY RAT
GROUNDHOG	COYOTE	SHORT-TAILED SHREW
EASTERN COTTONTAIL RABBIT	MINK	LEAST SHREW
GRAY SQUIRREL	EASTERN MOLE	SKUNK
FOX SQUIRREL	DEER MOUSE	SOUTHERN FLYING SQUIRREL
RED SQUIRREL	MEADOW VOLE	LONG-TAILED WEASEL
EASTERN CHIPMUNK	WHITE-FOOTED MOUSE	LEAST WEASEL
BEAVER	MUSKRAT	RED FOX

Macroinvertebrates

Marcroinvertebrates are organisms that lack a backbone, but are large enough to see with the naked eye. Macroinvertebrates are collected in riffle areas of the river primarily because these areas possess the necessary habitat in which to exist. The riffles provide macroinvertebrates with an excellent source of shelter, food and a constant flow of water for high dissolved oxygen. By monitoring the presence, quantity and diversity of these macroinvertebrates, we are better able to assess water quality and to observe first-hand any changes that are occurring to the stream environment.

Since the Stillwater River and Greenville Creek are designated as a State Scenic River, the ODNR, Scenic Rivers Programs has a stream quality monitoring program (SQM) set up to assess presence, quantity and diversity of these macroinvertebrates. The SQM program was developed in 1982. Volunteers sample the same stations every year for aquatic insects, crustaceans, clams, snails and other organisms. This data ensures that no Ohio scenic river falls under apathetic eyes. There are eight

sampling stations set up along the Stillwater River and five sampling stations set up along Greenville Creek. Refer to Table 16 for locations of these sampling stations.

Table 16: Scenic Rivers Stream Quality Monitoring Stations for the Stillwater River and Greenville Creek

SITE NAME	STREAM NAME	RIVER MILE
DeWesse Park Access	Stillwater River	1.6
Aullwood Farm	Stillwater River	8.6
Wheellock Gravel Pit Access	Stillwater River	14.0
Brukner Nature Center	Stillwater River	21.17
Covington Dam Access	Stillwater River	32.3
Stillwater Prairie	Stillwater River	37.4
Stillwater Beach	Stillwater River	41.1
Schroder Road Access	Stillwater River	51.2
Covington-Gettysburg Bridge	Greenville Creek	3.0
Gettysburg Cemetery	Greenville Creek	10.6
Greenville Pet Cemetery	Greenville Creek	22.0
Fisher-Dangler Road Access	Greenville Creek	28.9

The following information was taken from the *2001 Stillwater River and Greenville Creek State Scenic & Recreational River: Stream Quality Monitoring Annual Report* provided by ODNR, Scenic Rivers Program:

An assessment of the estimated counts of the number and types of species collected generates the Cumulative Index Value (CIV) for the site on a given date. Field assessment results are used as basic indicators of long-term changes in a river's macroinvertebrate community and help Scenic Rivers staff identify pronounced stream quality problems.

Table 17 identifies the macroinvertebrates collected and their general tolerance to pollutants. Pollution-intolerant organisms, such as those listed in Group I, require unpolluted, high quality water in order to survive. Pollution-tolerant organisms, such as those listed in Group III, are extremely tolerant of deteriorated water conditions.

Table 17: ODNR, Scenic Rivers Group Taxa Table for Macroinvertebrates

Group I Taxa	Group II Taxa	Group III Taxa

Pollution Intolerant	Moderately Tolerant	Pollution Tolerant
Water Penny Beetle Larvae (WP) Mayfly Nymphs (MF) Stonefly Nymphs (ST) Dobsonfly Larvae (DO) Caddisfly Larvae (CD) Riffle Beetle Adult (RI) Other Snails (OS)	Damselfly Nymphs (DA) Dragonfly Nymphs (DR) Crane Fly Larvae (CF) Beetle Larvae (BL) Crayfish (CF) Scuds (SC) Clams (CL) Aquatic Sowbugs (SW)	Black Fly Larvae (BF) Aquatic Worms (AW) Midge Larvae (MI) Pouch Snails (PS) Leeches (LE)

Relative stream health is determined once the variety of macroinvertebrates is sampled. CIV values of 23 or greater indicate *Excellent* stream quality and the presence of a large diversity among all three taxa groups; CIV values of 17-22 indicate *Good* stream quality conditions with slightly lower diversity among organisms but significant Group I taxa still present; CIV values ranging from 11-16 suggest *Fair* stream health, greatly reduced numbers of Group I taxa as well as little or no diversity among organisms; and CIVs of 10 or less reflect *Poor* stream health with few to no Group I organisms present, considerable numbers of Group III organisms present and little to no diversity.

Factors impacting stream health and macroinvertebrate populations include habitat, pollution and stream flow imbalances. A closer look at each of these factors as they exist at a stream site provides insight to the possible problems directly affecting the diversity of these organisms. Deterioration or lack of habitat, such as poor or embedded substrate (stream bottom), deprives the organism of a place to live. Sewage, commercial and industrial discharge, and storm water run-off from urban and agriculture areas are only a few forms of pollution affecting our streams. Pollution becomes a problem anytime the amounts are too great to be removed by the turbulent action of the riffle or absorbed by plant tissues. Lack of adequate stream flow allows water temperatures to fluctuate beyond the organisms' ability to respond. Or, streams may flood so quickly due to drainage of the watershed that the organisms are scoured from their homes during high flow.

Tables 18 and 19 represent the average Cumulative Index Values (CIVs) for each Stream Quality Monitoring reference station sampled on the river during 2001. In addition, the table uses symbols (◆) to indicate those macroinvertebrates found to

be present at least once during the year at the respective reference station. Each macroinvertebrate is identified by a 2-letter code given in Table 17.

Table 18: Stillwater River, Average CIV

STATION	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
1.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	27
8.6	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆		◆	◆		◆	29
14	◆	◆	◆	◆	◆	◆	◆			◆	◆	◆	◆	◆		◆	◆	◆		◆	25
21.7	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆		29
32.3	◆	◆		◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆		◆	◆			28
37.4	◆	◆	◆		◆	◆	◆	◆		◆	◆	◆		◆	◆	◆	◆	◆		◆	24
41.4	◆		◆		◆	◆		◆			◆			◆			◆			◆	20
51.2		◆		◆	◆	◆	◆			◆	◆	◆		◆	◆		◆				10

Table 19: Greenville Creek, Average CIVs

STATION	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
3	◆	◆			◆		◆	◆		◆	◆	◆		◆	◆			◆			20
10.6	◆	◆		◆	◆	◆	◆	◆		◆	◆	◆		◆	◆			◆			21
13.8	◆	◆			◆		◆				◆	◆		◆	◆		◆	◆			13
21.25	◆	◆	◆		◆	◆	◆				◆			◆	◆		◆	◆			26
28.9	◆						◆				◆							◆			10

In 1999, the OEPA conducted a Biological and Water Quality Study on the Stillwater River Watershed. In this study 60 macroinvertebrate sites were evaluated using the quantitative Invertebrate Community Index (ICI) metric scoring system. An additional 83 sites were evaluated with qualitative samples based on a multiple habitat composite collection using dip nets and handpicks. A total of 338 macroinvertebrate taxa were collected at 143 sites. Table 20 lists the taxa collected:

Table 20: Macroinvertebrates Collected by OEPA During the 1999 Biological and Water Quality Study on the Stillwater River Basin (OEPA 2001)

TAXA NAME	# OF TAXA	GENERA/SPECIES	TYPE
Mayflies	33	Acerpenna pygmaeus	intolerant (sensitive)

		Pseudocloeon propinquus	intolerant (sensitive)
		Diphetor hageni	intolerant (sensitive)
		Paracloeodes sp.3	intolerant (sensitive)
		Nixe sp.	intolerant (sensitive)
		Stenonema exiguum	intolerant (sensitive)
		Brachycercus sp.	intolerant (sensitive)
		Brachycerucus sp.	rare
		Hexagenia bilineata	rare
Stoneflies	3	*Neoperla clymene* complex	intolerant (sensitive)
		Agnetina capitata complex	intolerant (sensitive)
Caddisflies	35	*Protoptila* sp.	intolerant (sensitive)
		Neophylax sp.	intolerant (sensitive)
		Mystacides sepulchralis	intolerant (sensitive)
		Caeratopsyche slossonae	coolwater specie
		Glossosoma sp.	coolwater specie
Dipterans	9	*Antocha* sp.	intolerant (sensitive)
		Corynoneura celeripes	intolerant (sensitive)
		Thienemaniella taurocapita	intolerant (sensitive)
		Cladotanytarsus vanderwulpi group	intolerant

		Type 5	(sensitive)
		Stempellinella sp.	intolerant (sensitive)
		Albabesmyis simpsoni	rare
		Labrundinia maculata	rare
		Stempellina sp.	rare
		Chelifera sp.	rare
Mussels	12	*Anodontoides ferussacianus*	intolerant (sensitive)
		Strophitos undulates undulates	intolerant (sensitive)
		Lasmigona compressa	intolerant (sensitive)
		Lasmigona costata	intolerant (sensitive)
		Amblema plicata plicata	intolerant (sensitive)
		Lampsilis ventricosa	intolerant (sensitive)
Dragonfly	1	*Didymops transversa*	rare
Alderfly	1	*Nigronia fasciatus*	rare
Midges	7	*Zavrelimyia* sp.	rare
		Eukiefferiella devonica group	rare
		Parametriocnemus sp.	rare
		Polypedilum aviceps	rare
		Micropsectra sp.	rare

		Paratanytarsus n. sp. 1	rare

Reptiles and Amphibians

Table 21 lists the reptiles and amphibians found in the Stillwater River watershed. This list was created by Wildlife Biologist, Lynn Holtzman, ODNR, Division of Wildlife.

Table 21: Reptiles and Mammals Sighted in the Stillwater River Watershed

SNAPPING TURTLE	RED-SPOTTED NEWT
EASTERN BOX TURTLE	AMERICAN TOAD
PAINTED TURTLE	NORTHERN SPRING PEEPER
EASTERN SPINY SOFTSHELL	GRAY TREEFROG
NORTHERN WATER SNAKE	BULLFROG
EASTERN GARTER SNAKE	GREEN FROG
BLACK RAT SNAKE	NORTHERN LEOPARD FROG

Trees and Shrubs

Table 22 lists the trees and shrubs found in the Stillwater River watershed. Service Forester Scott Costello of ODNR, Division of Forestry and Doug Steinbrunner, District Technician for Darke SWCD created this list.

Table 22: Trees and Shrubs Found in the Stillwater River Watershed

American Plum	Cottonwood, Eastern	Oak, northern red
Alternate-Leaf Dogwood	Dogwood, Flowering	Oak, pin
Sargents Crabapple	Douglas Fir – Evergreen	Oak, shingle
Ash, Green	Dogwood Red Osier-Shrub	Oak, swamp white
Ash, White	Downy Juneberry	Oak, white
Ash, Blue	Eastern Hemlock	Osage-orange
Ash, Black	Elderberry, Shrub	Paperbirch - Deciduous
Austrian Pine, Evergreen	Elm, American	Pawpaw
Bald Cypress	Elm, slippery	Common Persimmon
Basswood, American	Hackberry	Pine, Eastern white

Beech, American	Hawthorn	Poison Ivy
Black gum	Hickory, Bitternut	Poison Oak – vine
Black Maple	Hickory, mockernut	Poplar- Yellow
Boxelder	Hickory, pignut	Redbud, Eastern
Buckeye, Ohio	Hickory, shagbark	Redcedar, Eastern
Burning Bush	Locust, Black	Sassafras
Bush Honeysuckle	Maple, Red	Serviceberry
Butternut	Maple, silver	Sourgum
ButtonBush	Maple, sugar	Spruce, Norway
Catalpa, Northern	Mulberry, red	Sumac, Smooth
Cherry, Black	Mulberry, white	Sumac, staghorn
Chestnut, American	MultiFlora Rose	Sumac,
Chokeberry	Oak, black	Sweetgum
Coffeetree, Kentucky	Oak, bur	Sycamore, American
Common Winterberry Holly	Oak, shumard	Tree-of heaven
Common Witch Hazel	Oak, chinkapin	Tulip Poplar
Walnut, Black	Wanoo, shrub	Virgin Creeper Vine
White cedar, northern	Willow, Black	Willow, Streamco
Willow, Bankers Dwarf		

Rare, Threatened and/or Endangered Species

ODNR, Division of Natural Areas and Preserves maintains the Ohio Heritage Database which records known occurrences of threatened and endangered species with official protection, other species of concern and unique natural or geologic features. In most cases, these records are based on observations from individuals rather than extensive surveys of the area. Based on the records in the Heritage Database, there are 13 occurrences of federally- and

state-listed threatened or endangered species in the watershed. Many of these occurrences are in or very near the Stillwater River. Table 23 lists the state endangered species in the Stillwater River watershed.

Table 23: State Endangered or Threatened Species in the Stillwater River Watershed

COMMON NAME	SCIENTIFIC NAME	STATUS
PLANTS		
Harebell	*Campanula rotundifolia*	State Threatened
Wood's Hellebore	*Veratrum woodii*	State Threatened
Limestone Savory	*Satureja arkansana*	State Threatened
Rock Serviceberry	*Amelanchier sanguinea*	State Endangered
Hazel Dodder	*Cuscuta coryli*	State Endangered
Wheat Sage	*Carex atherodes*	State Endangered
Leafy Blue Flag	*Iris brevicaulis*	State Endangered
Ashy Sunflower	*Helianthus mollis*	State Threatened
Smooth Rose	*Rosa blanda*	State Threatened
Grove Sandwort	*Arenaria lateriflora*	State Threatened
ANIMALS		
Sedge Wren	*Cistothorus plantensis*	State Endangered
Upland Sandpiper	*Bartramia longicauda*	State Threatened
Indiana Bat	*Myotis sodalis*	State and Federal Endangered

Invasive Nonnative Species[4]

Nonnative species are those plants and animals that originated from other places than Ohio. These plants and animals were unknown in the watershed before European settlement in the 1700s. Most nonnative species, such as petunias, the corn plant and the pheasant, do little harm to their new homes because they are not well adapted to our climate, soils, and wildlife. Other nonnative species are invasive, however, and these invasive nonnative species can cause real harm to the native species in an area. These invaders have some adaptive advantage over our native

[4] Information on invasive nonnative species is from the ODNR/DNAP website at http://www.dnr.state.oh.us/dnap/invasive/default.htm

species, and these adaptations can cause them to out-compete our native plants and animals for food, water, or space. As the invasive non-native species begin to crowd out native flora and fauna, the watershed's biological diversity begins to suffer.

Some invasive species arrive by accident, and some are brought into a new area on purpose. One example of purposeful introduction is the invasive nonnative plant Multiflora Rose, which was promoted in Ohio by Soil and Water Conservation Districts as a living fence for soil conservation and wildlife habitat. Unfortunately, due to its extensive underground root network and prolific re-seeding, Multiflora Rose has been known to take over entire fields in Southern Ohio.

Some invasive species, such as Canada thistle, are further classified as *noxious*. Noxious is a legal term that means that for the public good, townships can require destruction of these plants, and a landowner that refuses to comply may be fined or the township will destroy the plants and bill the landowner for the service. Not all invasive plants are classified as noxious, but all noxious plants are invasive.

Invasive Plants in the Stillwater River Watershed

Invasive plants have the ability to form monocultures—areas where there is just one kind of plant, much like a cornfield or a lawn. In wild areas, however, monocultures crowd out native plants, causing the loss of habitat not only for the native plants, but also for our native animals that depend on them. Table 24 lists the invasive non-native species that are found in the Stillwater River watershed, and why these species are dangerous to our native flora.

Table 24: Invasive Non-native Plants of the Stillwater River Watershed[5]

Common Name	Scientific Name	Danger to Native Flora
Amur honeysuckle	Lonicera maackii	These vigorous shrubs out-compete native wildflowers by greening up earlier in the spring than native plants and shading them out. Honeysuckles will re-grow from even small roots left in the soil.
Garlic mustard	Alliaria petiolata	Garlic mustard begins growth earlier in the Spring than native flowers, and shades them out. It also forms extremely dense clusters and a few plants can completely displace native plants within 10 years. Garlic mustard produces large

5 Information on invasive non-native plants was found in the Invasive Plants of Ohio series of fact sheets published in May 2000 by the Ohio Department of Natural Resources, the Nature Conservancy, and Ohio Metroparks, and funded by the Ohio EPA.

		quantities of seed, which remains viable for up to 7 years.
Reed canary grass	Phalaris arundinacea	This grass reproduces vegetatively as well as by seed. It can easily displace native vegetation to form monoculture. The grass has little wildlife value, and the seeds are easily dispersed.
Autumn olive	Elaeagnus umbellate	Autumn olive re-sprouts vigorously after cutting or burning. It grows rapidly, and birds disperse its seeds.
Russian olive	Elaeagnus angustifolia	Russian olive re-sprouts vigorously after cutting or burning. It grows rapidly, and birds disperse its seeds.
Multiflora rose	Rosa multiflora	A dense, thorny plant introduced as "living fence," multiflora rose reproduces from seed and by cane rooting. An average plant produces over a million seeds a year, and these seeds can remain viable for up to 20 years.
Japanese honeysuckle	Lonicera japonica	This aggressive grower damages native populations by limiting sunlight, constricting nutrient flow in stems, and overweighting treetops, contributing to wind damage. A prolific seed producer, it also reproduces by suckers and plants regenerate quickly after cutting.
Narrow-leaved cattail	Typha angustifolia	These plants establish dense monocultures that enable them to shade out other vegetation. They also produce allelopathic compounds, which discourage the growth of other plants. They reproduce by rhizome and seed.
Eurasian water-milfoil	Myriophyllum spicatum	Dense canopies of Eurasian water-milfoil shade out native vegetation, alter the species composition of aquatic invertebrates, and may impair the ability

		of some fish species to spawn. If water-milfoil plants are shredded, each fragment has the capability to become a new plant.
Smooth brome	Bromus inermis	Early emergence helps smooth brome out-compete native plants for sunlight. Sod-forming roots prevent other species from emerging, and 10-year seed viability makes this a difficult plant to eradicate.
Canada thistle	Cirsium arvense	An extensive root system allows Canada thistle to create monocultures covering large areas. Wind-dispersed seeds are viable for 20 years or more.
Common teasel	Dipsacus fullonum (sylvestris)	Teasels produce massive amounts of seed that remain viable for several years and have germination rates higher than 85%. Dying teasels leave behind a "nursery" for young teasels, which allows them to form monoculture and out-compete native plants for water and space.
White sweet-clover	Melilotus alba	The seeds of white sweet clover remain viable for over 30 years. The plant is drought-tolerant and winter-hardy, and their large size causes them to shade out native plants.
Yellow sweet-clover	Melilotus officinalis	The seeds of yellow sweet clover remain viable for over 30 years. The plant is drought-tolerant and winter-hardy, and their large size causes them to shade out native plants.
Tree-of-Heaven	Ailanthus altissima	One mature tree-of-heaven can produce 350,000 seeds a year. They also reproduce by runners and suckers. Sapling growth can reach 4 feet a year. The roots give off a toxin that acts as an herbicide to kill nearby plants. Tree-of-

		heaven is shade tolerant, and can outgrow nearly any native tree. It rapidly takes over wherever there are gaps in the forest canopy.
Lesser naiad	Najas minor	This aggressive aquatic weed grows quickly early in the season and shades out and inhibits native plant growth.
Curly pondweed	Potamogeton crispus	This aggressive aquatic weed grows quickly early in the season and shades out and inhibits native plant growth.

Water Resources

Climate and Precipitation

The average annual precipitation is 38.51 inches. Nearly 60 percent of the rainfall usually falls during the months of April through September. The average seasonal snowfall is about 26 inches. The average annual temperature is 53.3 ^{o}F. In the winter the average temperature is 27 degrees F and the average daily minimum temperature is 18 degrees F. In the summer the average temperature is 70 degrees F, and the average maximum temperature is 82 degrees F. The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the northwest. Average wind speed is highest, 12 miles per hour, in spring. (Darke County Soil Survey 1987)

Surface Water

Wetlands

The regulatory definition for use with the Federal Clean Water Act defines wetlands as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soils. Wetlands include marshes, swamps, bogs, fen, wetland meadows, and wetland prairies. In order to be identified as a wetland, an area must exhibit each of the following:

- Wetland hydrology (flooded sometimes during the growing season)
- Hydric soils (poorly drained, anaerobic, saturated soils)

- Hydrophytic vegetation (vegetation adapted to life in saturated or flooded conditions.)

Of the 372,984 acres (excludes Shelby and Montgomery Counties, Ohio and Randolph County, Indiana) in the Stillwater River watershed, 103,953 acres (28%) are hydric soils. Decades of surface and subsurface drainage, however, has left only an estimated 2,000 acres of actual wetlands, less than two percent of the original. U.S. EPA, Region V, Wetlands and Watersheds Section, sponsored a wetlands inventory conducted by MVRPC in cooperation with numerous agencies in Darke, Miami, and four other contiguous counties. This project classified, evaluated, and ranked the significant wetlands to set the stage for initiating local wetlands preservation efforts. The following are the goals of the Miami Valley Wetlands Inventory Project (MVWI) (MVRPC 1997):

- To identify the remaining significant wetlands of the Miami Valley Region
- To create a wetlands overlay on the MVRPC's Regional GIS data base
- To classify and evaluate wetlands
- To incorporate the wetlands overlay in the Miami Valley Regional Open Space Plan
- To make inventory information available for public and private actions.

The MVWI team used the National Wetlands Inventory maps for reference in locating existing wetlands and wetland remnants. Appendix A, Map 5 illustrates the wetlands in the Stillwater River watershed.

Ditches and Tiles

Darke and Miami Counties are heavily tiled with agricultural field tile to drain wetter soils for higher agricultural production. The water from these fields is channeled into a series of ditches and channelized streams to facilitate fast water removal. County Ditch Maintenance crews clear riparian vegetation and clean ditches to ensure fast water movement. This is highly detrimental to aquatic life. A map of ditches on maintenance can be found in Appendix A, Map 6 (information for Darke County only).

Streams

The Stillwater River has its headwaters in northwest Darke County near the Ohio-Indiana border and flows southeast into Miami County, where it turns south to its confluence with the Great Miami River in Montgomery County just north of downtown Dayton. The total area drained by its 67mile length is 673 square miles (including 34 mi^2 in Indiana). Table 25, prepared by the OEPA, illustrates the stream network for the Stillwater River Watershed for Darke, Miami, and Montgomery Counties, Ohio. This table also shows each stream's aquatic life use designation, its designation attainment status, nonpoint source pollution category, and point sources by subwatershed. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fail to meet the biocriteria. Non-attainment means that none of the applicable indices meet

the biocriteria or one of the organism groups reflects poor or very poor performance (2001).

The Stillwater River and Greenville Creek are both designated as State Resource Waters and State Scenic Rivers. State Resource Waters are *. . . surface waters of the State that lie within National, State, and Metropolitan park systems, wetlands, and wildlife refuges, areas, and preserves, and also include wild, scenic, and recreational rivers, publicly owned lakes and reservoirs and waters of exceptional recreational or ecological significance, (e.g., waters that provide a habitat for identified threatened or endangered species) as determined by the Director of Ohio EPA.*

Table 25: Stream Network for Stillwater River Watershed: Darke, Miami, and Montgomery Counties

STREAM NAME/HUC	MOUTH IN COUNTY	FLOWS INTO	LENGTH (Miles)	DRAINAGE AREA (Square Miles)	AVERAGE FALL (ft/mi)	AQUATIC USE DESIGNATION	ASSESSMENT STATUS	NONPOINT SOURCE POLLUTION CATEGORIES	POINT SOURCES/ NPDES DISCHARGERS
STILLWATER RIVER 05080001	MONTGOMERY	GREAT MIAMI RIVER	67.2 miles	673.2 sq mi (34.2 in Indiana)	4.2 ft/mi	EWH; WWH; MWH[1]	NON-ATTAINING; ATTAINING; IMPAIRED	AGRICULTURE WWTP ; URBAN LAND DISPOSAL HYDROMODIFICATION	ENGLEWOOD WWTP; WEST MILTON WWTP; UNION WWTP; COVINGTON WWTP; PLEASANT HILL WWTP; STILLWATER GOLF ESTATES WWTP; CAL-MAINE FARMS, INC.
PIGEYE CREEK	MONTGOMERY	STILLWATER RIVER	1.9 miles	6.04 sq mi	76.4 ft/mi	WWH	PARTIAL	AGRICULTURE	
MILL CREEK	MIAMI	STILLWATER RIVER	5.7 miles	6.00 sq mi	36.5 ft/mi	WWH	NON-ATTAINING; FULL	AGRICULTURE LAND DISPOSAL	DAYTON-COX INTERNATIONAL AIRPORT

05080001140060									
BRUSH CREEK 05080001140050	MIAMI	STILLWATER RIVER	6.0 miles	17.36 sq mi	30.0 ft/mi	EWH; W1WH	FULL	AGRICULTURE	
JONES RUN	MIAMI	STILLWATER RIVER	0.6 miles	2.58 sq mi	175.2 ft/mi	WWH	PARTIAL	AGRICULTURE	
LUDLOW CREEK A&B 05080001140010 05080001140030	MIAMI	STILLWATER RIVER	13.5 miles	63.50 sq mi	14.7 ft/mi	MWH; WWH	FULL	AGRICULTURE LAND DISPOSAL	
BRUSH CREEK	MIAMI	LUDLOW CK	8.0 miles	23.72 sq mi	15.1 ft/mi	WWH	NON-ATTAINING / FULL	AGRICULTURE LAND DISPOSAL	BARRETT PAVING MATERIALS
SHANK DITCH	MIAMI	BRUSH CK	3.5 miles	1.24 sq mi	11.1 ft/mi	WWH	N/A	AGRICULTURE	
HOG RUN 05080001140020	MIAMI	LUDLOW CK	2.3 miles	9.36 sq mi	11.3 ft/mi	WWH	FULL	AGRICULTURE	LAURA WWTP

1 WWH/MWH – Headwaters to Ansonia / WWH – North Fork of Stillwater to Swamp Creek / EWH – Swamp Creek to Mouth

BAKER DITCH	DARKE	LUDLOW CK	2.5 miles	1.38 sq mi	22.8 ft/mi	LRW	NON-ATTAINING (DRY DITCH)	AGRICULTURE	
FEITSHAMS DITCH	DARKE	LUDLOW CK	0.5 miles	1.56 sq mi	106.0 ft/mi	LRW	FULL	AGRICULTURE	
BROWNS DITCH	DARKE	LUDLOW CK	0.3 miles	1.98 sq mi	126.7 ft/mi	LRW	FULL	AGRICULTURE	
ROCKY RUN	MIAMI	STILLWATER RIVER	2.2 miles	3.12 sq mi	49.6 ft/mi	WWH	FULL	AGRICULTURE	
OPOSSUM RUN	MIAMI	STILLWATER RIVER	2.0 miles	2.60 sq mi	54.0 ft/mi	EWH	FULL	AGRICULTURE	
CANYON RUN	MIAMI	STILLWATER RIVER	1.6 miles	5.04 sq mi	70.7 ft/mi	WWH	IMPACTED	AGRICULTURE	
PAINTER CREEK 05080001130020	MIAMI	STILLWATER RIVER	13.5 miles	48.00 sq mi	11.9 ft/mi	MWH	FULL; NON-ATTAINING; PARTIAL	AGRICULTURE; URBAN HYDROMODIFICATION LAND DISPOSAL	ARCANUM WWTP (SYCAMORE DITCH)
LITTLE PAINTER CREEK 05080001130030	MIAMI	PAINTER CREEK	5.2 miles	11.78 sq mi	8.7 ft/mi	WWH	PARTIAL	AGRICULTURE	

HELLER DITCH	DARKE	LITTLE PAINTER CK	4.1 miles	2.68 sq mi	8.1 ft/mi	MWH	FULL	AGRICULTURE	
GREENVILLE CREEK A, B, C & D 05080001120040 05080001120010 05080001110040 05080001110010	MIAMI	STILLWATER RIVER	40.5 miles (6.4 Indiana)	201.0 sq mi (34.2 Indiana)2	5.9 ft/mi	WWH[2]; EWH	FULL; PARTIAL; NON-ATTAINING	AGRICULTURE; URBAN HYDROMODIFICATION LAND DISPOSAL	GREENVILLE WWTP; GETTYSBURG WTP; CORNING GLASS WORKS; NORCOLD WWTP; ALLIED AFTERMARKET DIVISION; BP OIL COMPANY JAFE DECORATING CO. INC.;
McQUAY DITCH	DARKE	GREENVILLE CREEK	3.2 miles	2.86 sq mi	14.7 ft/mi	WWH	FULL	AGRICULTURE	
POPLAR DITCH	DARKE	GREENVILLE CREEK	2.4 miles	4.82 sq mi	16.3 ft/mi	WWH	FULL	AGRICULTURE	
BOLTON RUN	DARKE	GREENVILLE CREEK	3.5 miles	6.06 sq mi	9.4 ft/mi	WWH	FULL	AGRICULTURE	
		GREENVILLE						AGRICULTURE	

2 WWH – Headwaters to Greenville City Limits (Including the City of Greenville) / EWH – Greenville City Limits to Mouth

DIVIDING BRANCH 05080001120050	DARKE	CREEK	2.5 miles	11.30 sq mi	15.6 ft/mi	WWH	FULL		
BRIDGE CREEK 05080001120030	DARKE	GREENVILLE CREEK	4.6 miles	11.38 sq mi	8.7 ft/mi	WWH	FULL	AGRICULTURE	SHERWOOD FOREST MOBILE HOME PARK; EGI INC.; WITT PLASTICS INC.
MUD CREEK 05080001120020	DARKE	GREENVILLE CREEK	8.0 miles	7.92 sq mi	6.6 ft/mi	WWH	FULL	AGRICULTURE HYDROMODIFICATION	VILLAGE OF WAYNE LAKES
PRAIRIE OUTLET	DARKE	MUD CREEK	2.0 miles	3.72 sq mi	23.0 ft/mi	WWH	PARTIAL	AGRICULTURE LAND DISPOSAL	VILLAGE OF WAYNE LAKES
WEST BRANCH GREENVILLE CK 05080001110050	DARKE	GREENVILLE CREEK	11.4 miles	25.60 sq mi	6.5 ft/mi	WWH	PARTIAL; FULL	AGRICULTURE	
SPRING BRANCH	DARKE	WEST BRANCH	0.5 miles	4.58 sq mi	12.0 ft/mi	WWH	FULL	AGRICULTURE	
KRAUT CREEK	DARKE	GREENVILLE CREEK	7.0 miles	22.82 sq mi	10.0 ft/mi	WWH	FULL	AGRICULTURE	

05080001110030				(1.34 Indiana)					
NORTH FORK KRAUT CK	DARKE	KRAUT CREEK	2.7 miles	7.46 sq mi (0.34 Indiana)	17.8 ft/mi	WWH	FULL	AGRICULTURE	
DISMAL CREEK 05080001110020	DARKE	GREENVILLE CREEK	9.5 miles (4.5 Indiana)	19.20 sq mi (11.40 Indiana	7.2 ft/mi	WWH	NON-ATTAINING; PARTIAL; FULL	AGRICULTURE	MORRIS MOBLIE HOME PARK
ELSON DITCH	RANDOLPH (Indiana)	GREENVILLE CREEK	2.5 miles (all Indiana)	2.52 sq mi (1.84 Indiana)	14.8 ft/mi	WWH	IMPACTED	AGRICULTURE	
HARRIS CREEK 05080001100060	MIAMI	STILLWATER RIVER	9.1 miles	18.08 sq mi	10.8 ft/mi	MWH	PARTIAL; FULL	AGRICULTURE HYDROMODIFICATION	
BALLINGER RUN	MIAMI	HARRIS RUN	1.7 miles	6.12 sq mi	14.1 ft/mi	MWH	NON-ATTAINING; PARTIAL	AGRICULTURE URBAN LAND DISPOSAL	BRADFORD WWTP BRADFORD WTP
TROTTERS CREEK 05080001100050	MIAMI	STILLWATER RIVER	4.8 miles	17.64 sq mi	13.9 ft/mi	WWH	FULL	AGRICULTURE	CHERRYSTONE POULTRY FARMS, INC.

SWAMP CREEK A & B 05080001100030 05080001100010	DARKE	STILLWATER RIVER	13.8 miles	63.9 sq mi	7.0 ft/mi	MWH	FULL; NON-ATTAINING; PARTIAL	AGRICULTURE HYDROMODIFICATION	VERSAILLES WWTP; FOUR STAR DAIRY LIVESTOCK, INC.
INDIAN CREEK 05080001100020	DARKE	SWAMP CREEK	5.2 miles	20.38 sq mi	7.5 ft/mi	MWH	NON-ATTAINING; PARTIAL	AGRICULTURE HYDROMODIFICATION	
BOYD CREEK 05080001090070	DARKE	STILLWATER RIVER	3.3 miles	14.84 sq mi	6.1 ft/mi	MWH	PARTIAL; NON-ATTAINING	AGRICULTURE URBAN	ROLIN ACRES SUBDIVISION WWTP; GREEN VILLA MOBLIE HOME PARK
NORTH FORK STILLWATER RIVER 05080001090060	DARKE	STILLWATER RIVER	7.7 miles	18.30 sq mi	5.4 ft/mi	MWH	NON-ATTAINING	AGRICULTURE URBAN	ANSONIA WWTP
WOODINGTON RUN 05080001090040	DARKE	STILLWATER RIVER	3.4 miles	10.28 sq mi	7.4 ft/mi	WWH	FULL; PARTIAL	AGRICULTURE	
SOUTH FORK STILLWATER RIVER 05080001090020	DARKE	STILLWATER RIVER	3.5 miles	16.72 sq mi	3.7 ft/mi	WWH	PARTIAL; FULL	AGRICULTURE	M @ M POULTRY FARMS

Flood Hazard Areas

Floodplains are the areas of land adjacent to the base flow channel residing below bank full elevation. They are inundated about two years out of three. The boundaries of a flood plain in terms of flood frequencies are defined as 100-year and 500-year. Appendix A, Map 7 illustrates the floodplain areas in the Stillwater River watershed affected by a 100-year flood (a flood having a 1% chance of occurring in any given year).

Ground Water

There are three major types of aquifers in the Stillwater River watershed; buried valley sand and gravel aquifers, carbonate bedrock aquifers, and till aquifers. The buried valley aquifer system consists of ancient bedrock valleys that have been partially or completely filled in with unconsolidated glaciofluvial deposits. The buried valley aquifer system is the most productive aquifer system in terms of groundwater yield. The carbonate bedrock aquifers consist of limestone and dolomite bedrock units that have fractures and solution cavities allowing the bedrock to transmit large quantities of groundwater. Bedrock aquifers in the Stillwater River watershed typically provide enough groundwater for small public water systems and residential use. Till aquifers consist of small sand and gravel lenses in silt and clay-rich till that typically provide just enough groundwater for residential use.

Three-fourths of the watershed's population of 65,101 relies on groundwater resources for their water supply, so protection of groundwater is of concern. Historically, the City of Greenville uses Greenville Creek and the City of West Milton uses the Stillwater River as the major sources of drinking water for their respective residents, serving a total population of 17,939 (28%). However, the City of West Milton began receiving its drinking water supply from the City of Troy in 2004. The City of Troy relies on groundwater for their major source of drinking water. The City of Greenville also receives drinking water from seven groundwater wells. Seven of the villages and several mobile home parks have public water supplies drawn from groundwater and serve a total population of 15,923 (24%). The remaining population of 31,239 (48%) relies on private wells for their water. Potential storage and availability of groundwater varies widely in different portions of the Stillwater River watershed due to the different types of aquifers and their overall characteristics. The storage and yield potentials of bedrock aquifers vary from place to place due to a number of factors, including available recharge, the type and physical configuration of the rocks, and the existence and extent of secondary porosity features (fractures, fissures, solution channels, etc.).

Generally, yields from individual small-diameter wells in the permeable limestone have averages of 5 to 25 gallons per minute (gpm). Larger wells that are properly constructed in the most permeable zones may yield as much as 100 to 250 gpm. Similarly, potential storage and yield in the glacial drift varies according to the extent of the permeable materials, the amount of till present, the availability of recharge, and the physical and hydraulic characteristics of the aquifer materials.

Most of the community groundwater supplies in the watershed are established in stream valley locations where the more extensive permeable sand and gravel deposits are present and where stream recharge is available. About 10% of the watershed is composed of these highly sensitive near-surface sand and gravel deposits that fill, or are adjacent to, buried stream channels associated with the watershed's larger streams. Portions of the Great Miami buried valley sand and gravel aquifer are in the watershed, roughly paralleling the Stillwater River and Greenville Creek. Upon petition by MVRPC, U.S. EPA designated this aquifer system as a Sole Source Aquifer in April 1988, attesting to its importance as a drinking water supply and to its vulnerability to contamination.

The "pollution potential" of the groundwater resources of Darke and Miami Counties has been mapped by ODNR using the DRASTIC mapping system. This system uses existing data (1) to designate mappable units representing various hydrogeologic settings, and (2) to rank the relative pollution potential of each mappable unit based on seven influential physical factors. These factors are (**D**)epth to water, net (**R**)echarge, (**A**)quifer media, (**S**)oil type, (**T**)opography, (**I**)mpact of the vadose (unsaturated) zone media, and (**C**)onductivity of the aquifer. These factors are ranked, weighted, and combined to result in a final pollution potential index score that generally ranges from 45 to 225 in Ohio. Mappable units with higher index scores are more vulnerable to groundwater contamination than units with lower scores.

ODNR assigns a groundwater pollution potential index range of 89 to 179 for Darke County and 75 to 190 for Miami County. Within the watershed, the highest DRASTIC pollution potential index scores are found in Miami County along the Stillwater River between Covington and the southern Miami County line. Areas of somewhat lower vulnerability exist along the remainder of the Stillwater River, along Swamp Creek above Versailles, and along Greenville Creek and its tributaries to the southwest. Appendix A, Map 8 identifies potential groundwater pollution areas.

The rest of the watershed, away from the flood plains of the streams, is only moderately vulnerable to groundwater contamination. Less permeable clay loam soils and higher proportions of till in the vadose zone especially influence these lower scores. DRASTIC scores are intended primarily as a planning tool in comparing one area's pollution potential to another and should be used with some caution. DRASTIC should not be used to evaluate specific sites of less than 100 acres. Locally, hydrogeologic variations may allow the infiltration of potential contaminants through permeable zones in the soil and till down into the limestone bedrock.

Land Use[3]

Farming remains the dominant land use in the Stillwater River watershed, although there has been a decrease in the land area devoted to farms during the past four and one-half decades. In 1945, 96% (579 mi^2) was listed as land in farms, while in

1997 the percentage was 83% (514 mi^2), a loss of 65 square miles (41,600 acres). [4] Much of this loss was conversion to residential land use to hold the 35% population increase occurring since 1940, with most taking place in Greenville and the surrounding township.

While the total area of land in farms dropped by 10% during the 1945-1997 period, the number of farms dropped by more than 61% from about 4,500 farms to 1,700. About 45% of the farms have operators that list their principal occupation as farming, and nearly 80% are individual or family owned.[5] The loss in the number of farms was offset by a concurrent increase in the average size of each farm, which more than doubled from 83 acres in 1945 to 191 acres in 1997. For comparison, the average size of farms for the State was 206 acres.

As illustrated in Figure 5, the trend in the watershed for the past 50 years has been a steady decrease in the number of farms and a steady increase in the average size. The net result has been nearly an 11% decline in the total land in farms, from 370,500 acres to 329,475 acres. Appendix A, Map 9 describes the land cover in the watershed as of 1994.

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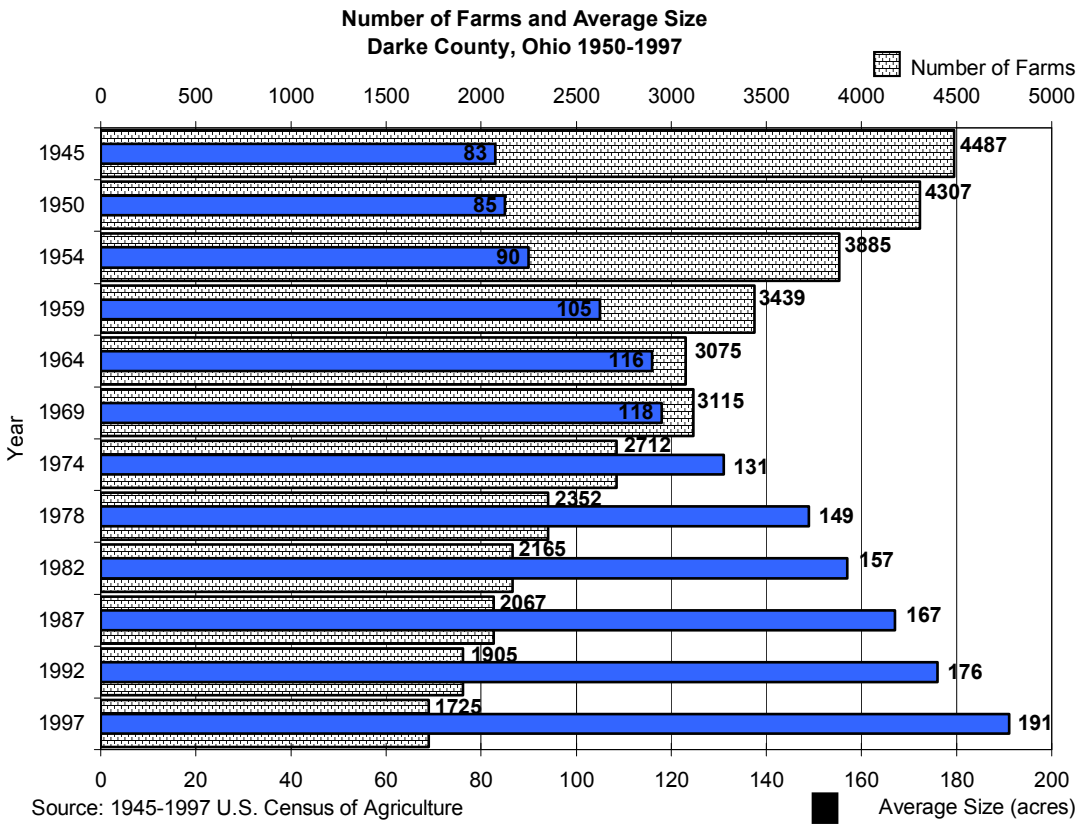
3 The figures cited in this section are from the 1945-1997 U.S. Censuses of Agriculture pertaining to Darke County. The figures and trends for Miami County are comparable. This, plus the fact that the overwhelming majority of the Stillwater River Watershed is located in Darke County, justifies applying these figures to the watershed.

4 1945, 1997 U.S. Census of Agriculture. "Land in farms" is not fully comparable with data for 1969 and earlier censuses due to changes in farm definitions. The indicated trend, however, is valid. The 1997 definition is "any place from which $1,000 or more of agricultural products were produced or sold or normally would have been sold during the census year.

5 Operator spent 50% or more of work time in farming.

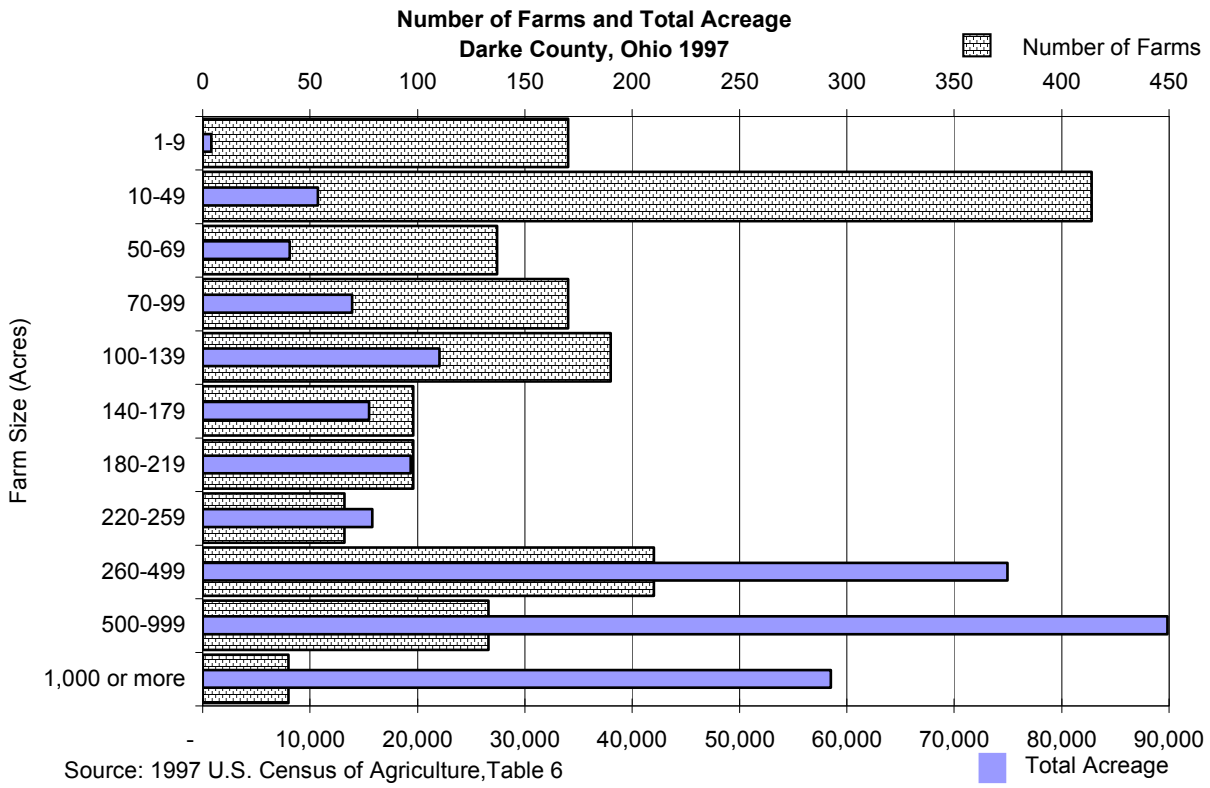
Figure 5 Number of Farms and Average Size, Darke Co., Ohio 1950-1997



The current average farm size is 191 acres, less than 6% of the farms fall within this acreage range, and in total involve only 6% of the farm acreage.[6] More than 35% of all Darke County farms are less than 50 acres and account for only 3.5% of the acreage. Nearly 68% of the county's farm acreage is controlled by the 22% of the farms that are 260 acres or larger. The number of 1997 farms within specified acreage ranges and the total acreage each range represents are shown in Figure 6.

6 Includes land owned, rented, leased, worked on shares, used rent free, etc. regardless of location or use.

Figure 6: Number of Farms and Total Acreage, Darke Co., Ohio 1997



Home Sewage Treatment Systems

The biological assessment for the Stillwater River TMDL suggests that impairment due to causes of nutrient and organic enrichment from on-site sewage systems has occurred in the following populated communities of the drainage basin:

- Wayne Lakes 05080001-110
- Gettysburg (Greenville Creek downstream to mouth) 05080001-120
- Bradford (south of incorporation near Greenville Creek) 05080001-120
- Pitsburg and Philipsburg (as part of the Ludlow Creek) 05080001-140
- Indian Creek at Wolf Road 05080001-100

On-site septic systems are also found on most non-incorporated home sites throughout the watershed. Currently, the best available information on HSTS is an approximate number per township (Table 26). The Darke and Miami County Health

Districts are working on projects to inventory on-site septic systems in Darke and Miami Counties and to educate homeowners on proper septic system design and maintenance. At the completion of these projects in 2007, more data will be available to more specifically map on-site home septic systems.

Table 26: Home Sewage Treatment Systems by Township

Township	Number of HSTS	% Estimated in Watershed
Darke County		
Adams	675	100
Allen	85	37
Brown	286	100
Butler	111	27
Franklin	383	100
Greenville	1533	100
Harrison	70	17
Jackson	369	90
Liberty	253	83
Mississinawa	25	10
Monroe	305	75
Neave	413	100
Patterson	108	36
Richland	274	100
Twin	301	60
Van Buren	499	100
Wabash	16	7

Washington	439	100
Wayne	559	100
York	166	100
Miami County		
Monroe	252	11
Newberry	1085	100
Newton	806	97
Union	1732	99

Impervious Surfaces

Impervious surfaces prevent precipitation from infiltrating the ground and increase runoff and flooding as water that would soak into the ground in natural settings now flows downhill towards the nearest water body. As the water runs across impervious surfaces, particularly in urban areas, it picks up pollutants such as lawn chemicals, soaps, road salt and automotive fluids and carries them to the nearest stream. For this reason, impervious surfaces are considered to be a prime contributor to non-point source pollution. High concentrations of impervious surfaces are found only in the incorporated areas of the watershed. Table 27 illustrates the percentage of impervious surfaces found in each 14-digit HUC. Also refer to Appendix A, Map 9.

Table 27: Acres of Urban Impervious Surfaces by 14-Digit HUC

Watershed 05080001-	Total Watershed Acres	Urban %
Boyd Creek 090 070	838.6	2.2
Bridge Creek 120 030	593	4.5
Brush Creek 140 050	993.9	1.8
Dismal Creek 110 020	500	1.9
Dividing Branch 120 050	647.8	0.5
Greenville Creek A 120 040	2153.7	0.7
Greenville Creek B 120 010	590.3	18.4

Greenville Creek C 110 040	477.3	0.2
Greenville Creek D 110 010	358.7	0.1
Harris Creek 110 060	1065.4	1.7
Hog Run 140 020	571.8	0.5
Indian Creek 110 020	1171.9	0.7
Kraut Creek 110 030	1254.1	0.1
Little Painter Creek 130 030	728.7	0.3
Ludlow Creek A 140 010	1836.6	1.0
Ludlow Creek B 140 030	1364.2	0.8
Mud Creek 120 020	1727	2.4
North Fork Stillwater River 090 060	1115.7	0.4
Painter Creek 130 020	2091.8	1.2
South Fork Stillwater River 090 020	825.2	0.2
Stillwater River A 140 070	1483.9	22.0
Stillwater River B 140 060	1378.4	6.4
Stillwater River C 140 040	996.1	3.7
Stillwater River D 130 040	2068.3	0.9
Stillwater River E 130 010	570.9	5.0
Stillwater River F 100 040	1223.7	0.8
Stillwater River G 090 080	1150.2	0.5
Stillwater River H 090 050	673.9	2.0
Stillwater River I 090 030	654.8	0.5
Stillwater River J 090 010	851.9	0.2
Swamp Creek A 100 030	306.5	5.0
Swamp Creek B 100 010	2251.9	1.3
Trotters Creek 100 050	1116.4	0.5
West Branch Greenville Creek 110 050	1530	0.3

Woodington Run 090 040	676.7	0.2
Totals for entire Stillwater River Watershed:	**37839.3**	**2.4%**

Forest Cover

Healthy forests, particularly riparian forests along a river's edge, are good for water quality. The tree roots hold soil in place and prevent erosion, and the shade trees provide keep water temperatures cool. Table 28 shows the percentage of each 14-digit HUC that is forested. Also refer to Appendix A, Map 9.

Table 28: Percent Forest Cover by 14-Digit HUC

Watershed 05080001-	Total Watershed Acres	Wooded %
Boyd Creek 090 070	838.6	4.5
Bridge Creek 120 030	593	3.1
Brush Creek 140 050	993.9	6.9
Dismal Creek 110 020	500	4.6
Dividing Branch 120 050	647.8	4.5
Greenville Creek A 120 040	2153.7	8.0
Greenville Creek B 120 010	590.3	7.2
Greenville Creek C 110 040	477.3	9.8
Greenville Creek D 110 010	358.7	8.4
Harris Creek 110 060	1065.4	6.7
Hog Run 140 020	571.8	3.1
Indian Creek 110 020	1171.9	3.8
Kraut Creek 110 030	1254.1	7.7
Little Painter Creek 130 030	728.7	1.5
Ludlow Creek A 140 010	1836.6	3.7
Ludlow Creek B 140 030	1364.2	3.8
Mud Creek 120 020	1727	6.0
North Fork Stillwater River 090 060	1115.7	5.3

Painter Creek 130 020	2091.8	2.9
South Fork Stillwater River 090 020	825.2	3.0
Stillwater River A 140 070	1483.9	27.9
Stillwater River B 140 060	1378.4	13.1
Stillwater River C 140 040	996.1	11.4
Stillwater River D 130 040	2068.3	9.6
Stillwater River E 130 010	570.9	4.1
Stillwater River F 100 040	1223.7	13.2
Stillwater River G 090 080	1150.2	8.7
Stillwater River H 090 050	673.9	5.3
Stillwater River I 090 030	654.8	2.5
Stillwater River J 090 010	851.9	2.2
Swamp Creek A 100 030	306.5	8.3
Swamp Creek B 100 010	2251.9	5.7
Trotters Creek 100 050	1116.4	6.0
West Branch Greenville Creek 110 050	1530	6.2
Woodington Run 090 040	676.7	2.7
Totals for entire Stillwater River Watershed:	**37839.3**	**7.1%**

Agriculture

By far the largest percentage of land use in the Stillwater River watershed is devoted to agriculture and open space. Agriculture is the largest industry in the watershed. While a lack of impervious surfaces is good for water quality, manure runoff from CAFOs and land-applied manure, tillage, and agricultural chemical use are by far the largest contributors to sedimentation and nutrient loading in the watershed. Table 29 shows a breakdown of agricultural and open space by 14-digit HUC. Also refer to Appendix A, Map 9.

Table 29: Percentage of Agricultural and Open Space Land Use by 14-digit HUC

Watershed 05080001-	Total Watershed Acres	Ag/Open Areas %

Boyd Creek 090 070	838.6	92.5
Bridge Creek 120 030	593	91.3
Brush Creek 140 050	993.9	90.6
Dismal Creek 110 020	500	91.9
Dividing Branch 120 050	647.8	94.3
Greenville Creek A 120 040	2153.7	90.0
Greenville Creek B 120 010	590.3	72.8
Greenville Creek C 110 040	477.3	89.0
Greenville Creek D 110 010	358.7	90.0
Harris Creek 110 060	1065.4	91.0
Hog Run 140 020	571.8	96.0
Indian Creek 110 020	1171.9	95.1
Kraut Creek 110 030	1254.1	90.7
Little Painter Creek 130 030	728.7	98.0
Ludlow Creek A 140 010	1836.6	94.9
Ludlow Creek B 140 030	1364.2	95.2
Mud Creek 120 020	1727	88.5
North Fork Stillwater River 090 060	1115.7	93.8
Painter Creek 130 020	2091.8	95.5
South Fork Stillwater River 090 020	825.2	96.5
Stillwater River A 140 070	1483.9	45.8
Stillwater River B 140 060	1378.4	76.8
Stillwater River C 140 040	996.1	82.7
Stillwater River D 130 040	2068.3	88.6
Stillwater River E 130 010	570.9	89.5
Stillwater River F 100 040	1223.7	84.5
Stillwater River G 090 080	1150.2	90.3

Stillwater River H 090 050	673.9	92.5
Stillwater River I 090 030	654.8	96.6
Stillwater River J 090 010	851.9	97.5
Swamp Creek A 100 030	306.5	86.0
Swamp Creek B 100 010	2251.9	92.6
Trotters Creek 100 050	1116.4	92.9
West Branch Greenville Creek 110 050	1530	92.5
Woodington Run 090 040	676.7	96.2
Totals for entire Stillwater River Watershed:	**37839.3**	**89.4%**

Crop Types

Of the approximately 329,475 acres listed as farmland in 1997, 301,082 acres (89%) are listed as cropland: 12,121 acres (3.6) as woodland; 15,272 acres (4.5%) as "other[6]" land; and 2570 acres (2.7%) as pastureland. Refer to Appendix A, Map 9. Harvested cropland accounts for about 295,500 acres, with 45% planted in soybeans and 39% planted in corn for seed or grain. Darke County was the State leader in production for both of these crops. Wheat (9%) and hay (5%) account for most of the remaining harvested cropland. In 1997, more than 400 farms diverted a total of 3,400 acres of cropland under annual commodity acreage adjustment programs and another 5,000 acres were placed under the Conservation or Wetlands Reserve Program. **Figures 7 and 8** illustrate 1997 farmland use and harvested cropland use.

6 House lots, barn lots, etc.

Figure 7: Farm Land Use in Acres, Darke Co., 1997

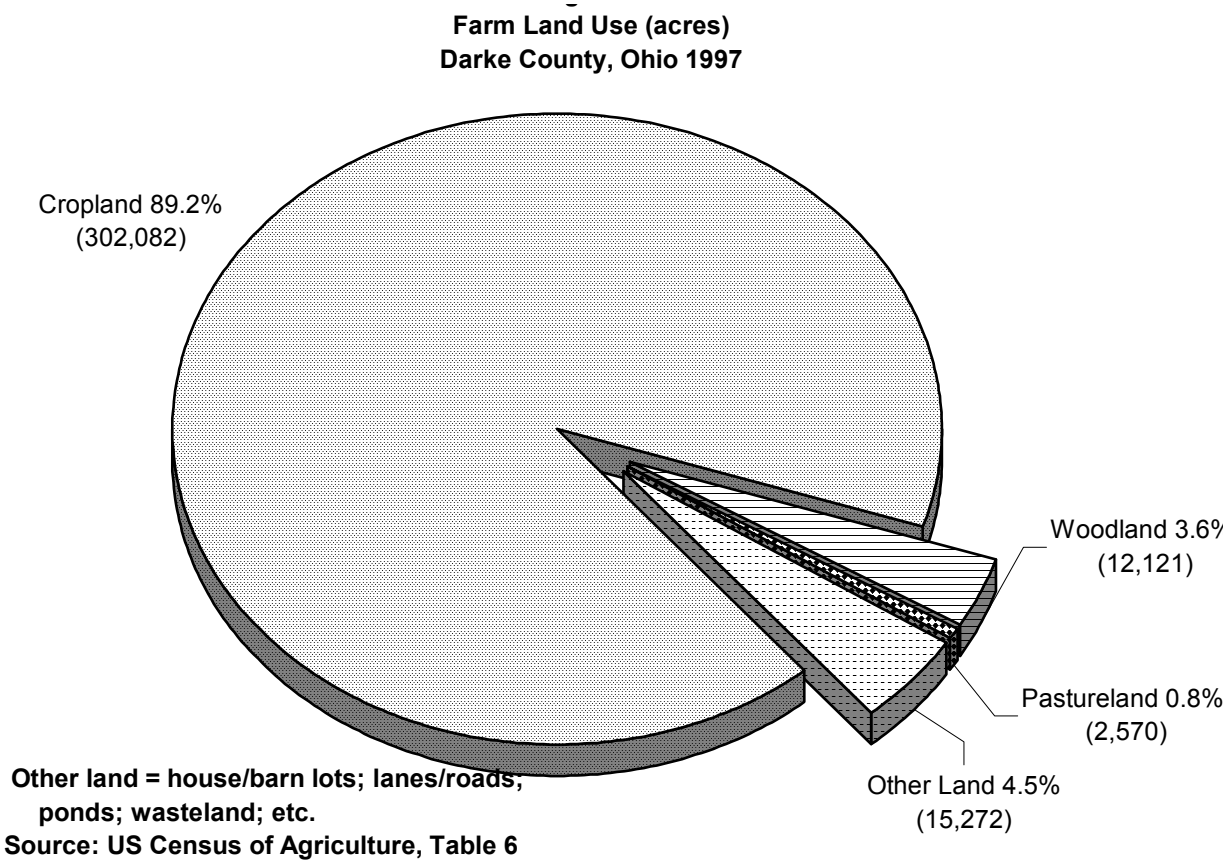
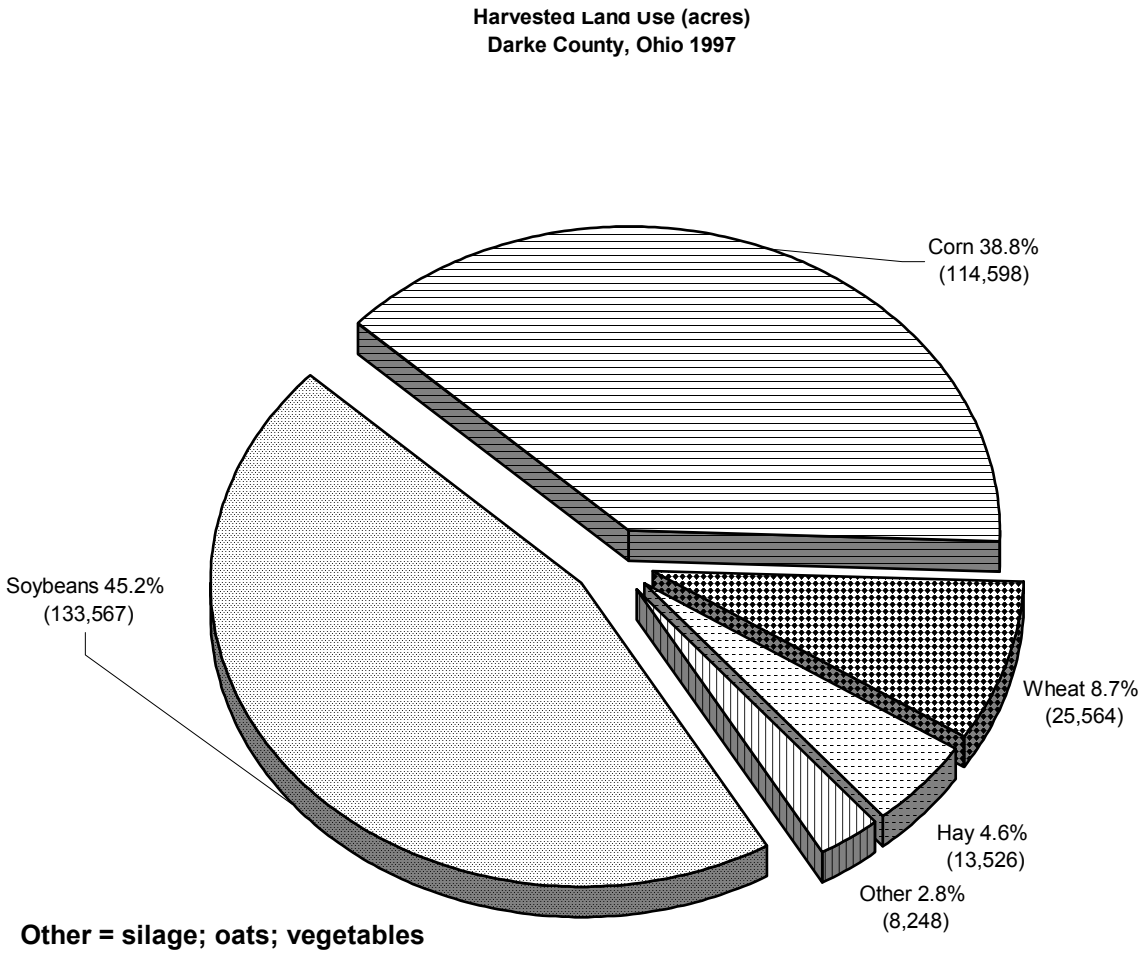


Figure 8: Harvested Land Use in Acres, Darke Co., Ohio, 1997



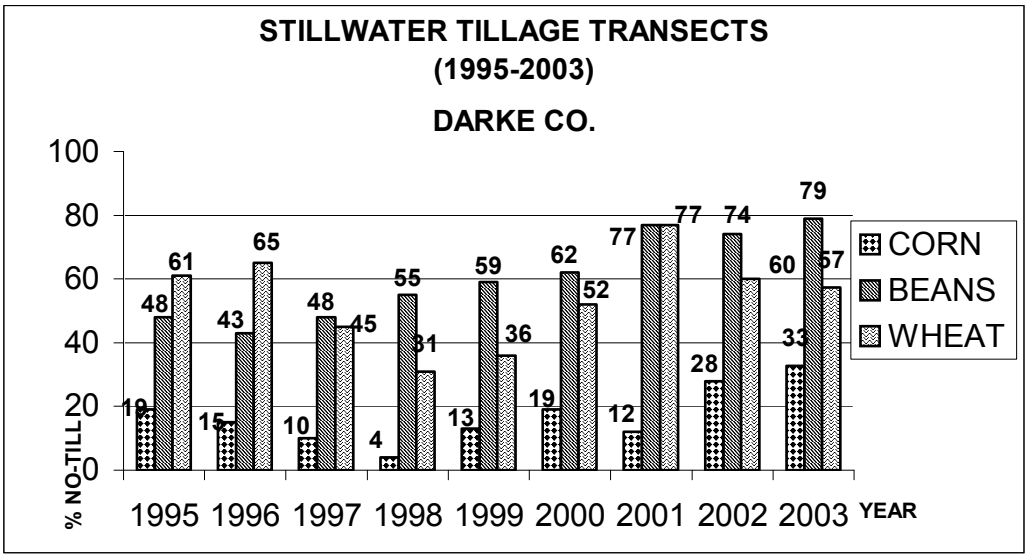
Other = silage; oats; vegetables
Source: 1997 US Census of Agriculture, Table 1

Tillage

The Stillwater Watershed Project, in cooperation with the Darke and Miami SWCDs, have conducted tillage transects since 1995 in the Darke and Miami County portions of the watershed. Every road in the watershed is driven and at every half mile a point is recorded for the tillage practice and crop type. Since 1995, no-till soybeans have increased by 31% and no-till corn has increased by 14%. Figure 9 illustrates the percent no-till for corn, soybeans, and wheat from 1995-2003. This percent is an average of the entire watershed. Appendix D contains the raw data for all the subwatersheds.

The lowest percent of no-till is occurring in the southern portion of the Stillwater River Watershed in the subwatersheds of Ludlow Creek and Painter Creek. This is unsurprising since this area is not highly erodible, and as it contains some of the richest farm ground in the watershed, farmers are loathe to part with even a portion of an acre.

Figure 9: Tillage Transect Data for Corn, Soybeans, and Wheat 1995-2003



Crop Rotations

No current data on crop rotations by 14-digit HUC exists. Anecdotally, however, the most common crop rotation in the watershed is a corn/beans crop rotation. Corn/beans/wheat is also common, and in the northern portions of the watershed many fields are maintained as perennial grasses or legumes for hay for dairy cattle.

Livestock Inventory

A feedlot study was done in the Stillwater River watershed in 2002. Detailed information on the numbers of animal units by 14-digit subwatershed can be found in the individual watershed inventories. Appendix C contains the raw data from the 2002 livestock inventory in table form. A map of the locations of livestock operations can be found in Appendix A, Map 10. By 2010 the livestock inventory will expand to include the number of cattle that have access to streams.

Chemical Use Patterns

No current data currently exists for chemical use patterns in the watershed. Anecdotally, however, the vast majority of farmers in the watershed use agricultural chemicals such as fertilizers, pesticides and herbicides.

Irrigation

The average rainfall in the Stillwater River watershed is approximately 36 inches a year. 60% of this rainfall falls between April and September, which encompasses most crop growing seasons (USDA, 1991). For this reason, little to no irrigation is seen in the Stillwater River watershed.

Water

Table 30 lists the percentage of acreage in each subwatershed that is open water. Also refer to Appendix A, Map 9.

Table 30: Percent of Open Water by 14-digit HUC

Watershed 05080001-	Total Watershed Acres	Open Water %
Boyd Creek 090 070	838.6	0.1
Bridge Creek 120 030	593	0.1
Brush Creek 140 050	993.9	0.1
Dismal Creek 110 020	500	0.7
Dividing Branch 120 050	647.8	0.0
Greenville Creek A 120 040	2153.7	0.1
Greenville Creek B 120 010	590.3	0.1
Greenville Creek C 110 040	477.3	0.0
Greenville Creek D 110 010	358.7	0.2
Harris Creek 110 060	1065.4	0.2
Hog Run 140 020	571.8	0.0
Indian Creek 110 020	1171.9	0.2
Kraut Creek 110 030	1254.1	0.1
Little Painter Creek 130 030	728.7	0.0
Ludlow Creek A 140 010	1836.6	0.0
Ludlow Creek B 140 030	1364.2	0.0
Mud Creek 120 020	1727	0.7
North Fork Stillwater River 090 060	1115.7	0.1
Painter Creek 130 020	2091.8	0.1

South Fork Stillwater River 090 020	825.2	0.1
Stillwater River A 140 070	1483.9	0.6
Stillwater River B 140 060	1378.4	1.4
Stillwater River C 140 040	996.1	1.1
Stillwater River D 130 040	2068.3	0.8
Stillwater River E 130 010	570.9	1.1
Stillwater River F 100 040	1223.7	0.3
Stillwater River G 090 080	1150.2	0.1
Stillwater River H 090 050	673.9	0.1
Stillwater River I 090 030	654.8	0.0
Stillwater River J 090 010	851.9	0.0
Swamp Creek A 100 030	306.5	0.0
Swamp Creek B 100 010	2251.9	0.1
Trotters Creek 100 050	1116.4	0.0
West Branch Greenville Creek 110 050	1530	0.1
Woodington Run 090 040	676.7	0.0
Totals for entire Stillwater River Watershed:	**37839.3**	**0.3%**

Non-Forested Wetland

Table 31 refers to the percentage of acres in each subwatershed that are non-forested wetland. Also refer to Appendix A, Maps 5 and 9.

Table 31: Percentage of Non-Forested Wetland by 14-digit HUC

Watershed 05080001-	Total Watershed Acres	Non-forested Wetlands %
Boyd Creek 090 070	838.6	0.3
Bridge Creek 120 030	593	0.7

Brush Creek 140 050	993.9	0.0
Dismal Creek 110 020	500	0.5
Dividing Branch 120 050	647.8	0.4
Greenville Creek A 120 040	2153.7	0.4
Greenville Creek B 120 010	590.3	0.2
Greenville Creek C 110 040	477.3	0.1
Greenville Creek D 110 010	358.7	1.2
Harris Creek 110 060	1065.4	0.2
Hog Run 140 020	571.8	0.0
Indian Creek 110 020	1171.9	0.1
Kraut Creek 110 030	1254.1	1.1
Little Painter Creek 130 030	728.7	0.0
Ludlow Creek A 140 010	1836.6	0.1
Ludlow Creek B 140 030	1364.2	0.1
Mud Creek 120 020	1727	0.9
North Fork Stillwater River 090 060	1115.7	0.1
Painter Creek 130 020	2091.8	0.0
South Fork Stillwater River 090 020	825.2	0.1
Stillwater River A 140 070	1483.9	0.8
Stillwater River B 140 060	1378.4	0.8
Stillwater River C 140 040	996.1	0.1
Stillwater River D 130 040	2068.3	0.0
Stillwater River E 130 010	570.9	0.1
Stillwater River F 100 040	1223.7	0.4
Stillwater River G 090 080	1150.2	0.1
Stillwater River H 090 050	673.9	0.0
Stillwater River I 090 030	654.8	0.1

Stillwater River J 090 010	851.9	0.0
Swamp Creek A 100 030	306.5	0.3
Swamp Creek B 100 010	2251.9	0.0
Trotters Creek 100 050	1116.4	0.1
West Branch Greenville Creek 110 050	1530	0.5
Woodington Run 090 040	676.7	0.5
Totals for entire Stillwater River Watershed:	**37839.3**	**0.3%**

Barren

Table 32 refers to the percentage of acres in the subwatersheds that are considered barren land. Also refer to Appendix A, Map 9.

Table 32: Percentage of Barren Land by 14-digit HUC

Watershed 05080001-	Total Watershed Acres	Barren %
Boyd Creek 090 070	838.6	0.0
Bridge Creek 120 030	593	0.0
Brush Creek 140 050	993.9	0.0
Dismal Creek 110 020	500	0.0
Dividing Branch 120 050	647.8	0.0
Greenville Creek A 120 040	2153.7	0.2
Greenville Creek B 120 010	590.3	0.0
Greenville Creek C 110 040	477.3	0.0
Greenville Creek D 110 010	358.7	0.0
Harris Creek 110 060	1065.4	0.0
Hog Run 140 020	571.8	0.0
Indian Creek 110 020	1171.9	0.0
Kraut Creek 110 030	1254.1	0.0

Little Painter Creek 130 030	728.7	0.0
Ludlow Creek A 140 010	1836.6	0.0
Ludlow Creek B 140 030	1364.2	0.1
Mud Creek 120 020	1727	0.5
North Fork Stillwater River 090 060	1115.7	0.0
Painter Creek 130 020	2091.8	0.0
South Fork Stillwater River 090 020	825.2	0.0
Stillwater River A 140 070	1483.9	0.1
Stillwater River B 140 060	1378.4	0.2
Stillwater River C 140 040	996.1	0.0
Stillwater River D 130 040	2068.3	0.0
Stillwater River E 130 010	570.9	0.0
Stillwater River F 100 040	1223.7	0.0
Stillwater River G 090 080	1150.2	0.0
Stillwater River H 090 050	673.9	0.0
Stillwater River I 090 030	654.8	0.0
Stillwater River J 090 010	851.9	0.0
Swamp Creek A 100 030	306.5	0.0
Swamp Creek B 100 010	2251.9	0.0
Trotters Creek 100 050	1116.4	0.0
West Branch Greenville Creek 110 050	1530	0.0
Woodington Run 090 040	676.7	0.0
Totals for entire Stillwater River Watershed:	**37839.3**	**0.1%**

Scrub/Shrub Areas

Table 33 lists the subwatersheds and the percentage of their total acreage that is scrub/shrub ground. Also refer to Appendix A, Map 9.

Table 33: Percentage of Scrub/Shrub by 14-digit HUC

Watershed 05080001-	Total Watershed Acres	Scrub/Shrub %
Boyd Creek 090 070	838.6	0.4
Bridge Creek 120 030	593	0.4
Brush Creek 140 050	993.9	0.6
Dismal Creek 110 020	500	0.4
Dividing Branch 120 050	647.8	0.3
Greenville Creek A 120 040	2153.7	0.6
Greenville Creek B 120 010	590.3	1.3
Greenville Creek C 110 040	477.3	0.8
Greenville Creek D 110 010	358.7	0.2
Harris Creek 110 060	1065.4	0.3
Hog Run 140 020	571.8	0.5
Indian Creek 110 020	1171.9	0.2
Kraut Creek 110 030	1254.1	0.3
Little Painter Creek 130 030	728.7	0.2
Ludlow Creek A 140 010	1836.6	0.2
Ludlow Creek B 140 030	1364.2	0.1
Mud Creek 120 020	1727	1.0
North Fork Stillwater River 090 060	1115.7	0.3
Painter Creek 130 020	2091.8	0.2
South Fork Stillwater River 090 020	825.2	0.1
Stillwater River A 140 070	1483.9	2.8
Stillwater River B 140 060	1378.4	1.3
Stillwater River C 140 040	996.1	1.0

Stillwater River D 130 040	2068.3	0.0
Stillwater River E 130 010	570.9	0.3
Stillwater River F 100 040	1223.7	0.7
Stillwater River G 090 080	1150.2	0.4
Stillwater River H 090 050	673.9	0.2
Stillwater River I 090 030	654.8	0.2
Stillwater River J 090 010	851.9	0.2
Swamp Creek A 100 030	306.5	0.4
Swamp Creek B 100 010	2251.9	0.2
Trotters Creek 100 050	1116.4	0.4
West Branch Greenville Creek 110 050	1530	0.4
Woodington Run 090 040	676.7	0.3
Totals for entire Stillwater River Watershed:	**37839.3**	**0.5%**

Protected Lands

The residents and visitors to the Stillwater watershed are fortunate to have a great many parks and preserved areas that safeguard the history and biology of the area. The following information has been taken from various Park and Community websites. Please contact individual park districts for further information.

Parks in Darke County

Darke County Nature Center / Shawnee Prairie Preserve

Shawnee Prairie Preserve was once known as Prophetstown, the village founded by The Prophet (Tecumseh's brother), formed to rally fifteen woodland Indian Nations to gather and demonstrate their living and hunting rights under the 1795 Treaty of Greene Ville.

Not only rich in historical diversity, this 120-acre area is also rich in natural diversity. Shawnee features wetlands, restored prairies, streams, wet woods, swamp forest, a succession area and 2 1/2 miles of trails with benches and observation towers.

Located on St. Rt. 502 west of Greenville, Shawnee Prairie Preserve is also home to the Darke County Nature Center. This center features a nature library, exhibits, science laboratory, classroom, gift shop, large assembly room, and the park's

administration office. Many naturalist-lead programs are available throughout the year for a small fee.

Coppess Nature Sanctuary
Located on Young Road south of St. Rt. 47 between Ansonia and Union City, this 32-acre park is a typical Darke County woodland with a diverse mixture of hickory, oak, beech, and maple featuring a well-marked, half-mile walkway. It is also the park district's spring wildflower site.

Routzong Preserve
Routzong Preserve is located on Routzong Road 5 miles southeast of Greenville off St. Rt. 571.From spectacular spring wildflowers to brilliant fall leaves, the Beech-Maple forest of Routzong Preserve is an area of interest during every season of the year. There are more than 1 1/2 miles of trials to explore on these 55 acres.

The Alice Bish Walkway
Visits to Alice Bish Park, Located on Ohio Street in Greenville, can follow a loop trail that mirrors the course of Greenville Creek. Sightings of wildflowers, waterfowl, songbirds and colorful leaves make time spent here enjoyable.

Prairie Ridge Meadow & Tecumseh Point
Located adjacent to the Greenville City Park, Prairie Ridge Meadow is known throughout the region as an excellent example of a restored prairie. Examples of the blooming plants reintroduced to the hillside include blazing star, evening primrose, tall sunflower, yellow coneflower, purple coneflower, compass plant, obedient flower, butterfly weed, big bluestem and little bluestem grasses.

Running through Prairie Ridge is the abandoned Dayton, Greenville and Union City Railway. The railway trestle that crossed the Greenville Creek was removed and a footbridge built in its place. A trail now runs across the trestle and along the creek and is commonly used for nature walks and leads to Tecumseh Point, the area in which Mud Creek and Greenville Creek meet. This parcel of land was once primitive forest and the home to the Chippewa, Delaware, Kickapoo, Miami, Potawatomi, and Shawnee. One famous Shawnee was Chief Tecumseh, who protested the Treaty of Greene Ville by burning symbolic fires on the Point from 1805 to 1809. Many naturalist-lead programs are available throughout the year for a small fee.

Winterrowd Wetlands
This Park is located on St. Rt. 47, west of Ansonia and includes a 35-acre wetland, 5 acres of upland woods and 20 acres of prairie. The combination of quality habitats makes this area a premier birding location during much of the year. A short trail leads visitors through the prairie area to an observation blind overlooking the wetland.

Anthony Wayne Peace Council House
Located across from Garst Museum on Wilson Drive off North Broadway in Greenville, Darke County Parks' Anthony Wayne Peace Council House is unique among the many honorariums to the Treaty of Green Ville. Located in Prairie Ridge Meadow, adjacent

to the grounds of the Garst Museum, this impressive log structure promotes and represents the peace that was at the heart of the treaty signed here in 1795. 13 American Indian Nations and the United States of America, opening the Ohio country for settlement, signed the much-celebrated treaty.

The Council House, conceived and developed by the Greene Ville Bicentennial Commission and funded by the Ohio Historical Society, was dedicated August 3, 1997. Now part of Darke County Parks, the Council House hosts school groups and public programs that focus on the rich history of the "Treaty City". Open to the public on scheduled weekends throughout the warm weather months, visitors are treated to stories about the settlement of the area presented by volunteer hosts. Constructed to authentically represent the log council houses of woodland Indians, these big houses were used by Native Americans for meetings, councils, feasts, and tribal ceremonies. The Anthony Wayne Peace Council House contains artifacts from representing the 13 Indian Nations that signed the treaty and gifts from Native Americans that visit the structure.

Fort Jefferson Historical Site
Originally General St. Clair's outpost in 1791, this area is now a state park with historic markers located five miles south of Greenville off State Route 121 at 4267 St. Rt. 502 West.

Arcanum Community Park
Arcanum Community Park houses a four-diamond field park with three of the diamonds providing night time lighting. This park also boasts two tennis courts, family picnic area with a covered shelter (electric provided), batting cage, public rest rooms, playground and large open areas for games of all sorts. The park is available for rental. Contact officials at the Arcanum City Building at (937) 692-8500.

Ivester Community Park
Ivester Community Park has two park entrances, one on Ivester Lane and the other on Park Dr. This lovely park, nestled in a wooded area offers three shelters - one enclosed and two open air. All shelters have electricity. This park also has two basketball courts, sand volleyball, and playground area including swings, jungle gyms and seesaws. Also available are grills and restrooms, which make this community, park a great rental for families. Contact officials at the Arcanum City Building at (937) 692-8500 for more information.

Arcanum Veterans Memorial Park
Veterans Memorial Park is located in the center of town on George St. in Arcanum. Community and local business members donated this great memorial. It is a centerpiece commemorating the brave heroes of our town and country. This memorial compliments the historic buildings surrounding it, adding to the hometown charm of Arcanum.

Greenville City Park
With more than 100 acres of park grounds, Greenville's city park offers just about

everything for visitors and locals, alike. Seven fishing lagoons, as well as, a city pool featuring a 150-foot water slide, three ball fields, nine tennis courts, an athletic field complete with a six-lane all-weather track, 18 horseshoe courts, shuffleboard courts, 10 covered shelters, playground equipment, sledding hill, the famous swinging bridge over Greenville Creek, and the Altar of Peace are included in this park. A fishing license is not required to fish in Greenville City Park. Located on Park Drive, this park is accessible from SR 118, North Broadway, East Main Street and Wagner Avenue.

North Park
500 Lease Avenue (30 acres)
North Park is open from 6:00 am until 10:00 pm and is located behind Kroger on Wagner Ave. The following activities are available: a .44 mile walking track, two basketball courts, 2 volleyball courts, athletic fields and new playground equipment. There is one shelter house and bathroom facilities, as well as plenty of paved parking.

South Park
871 Gray Avenue (2 acres)
South Park has a Recreation Center located on the property. The South Park Recreation Center is open Monday through Thursday from 4:00 until 9:00 pm, CLOSED Fridays and open Saturday and Sunday – 12:00 until 5:00 pm. The center is open free of charge to all youth, ages 18 and under. There are various activities such as crafts, pool table, foosball, big screen TV and more. There is a wading pool which is open to children age 10 and under in the summer and various playground equipment. There are two shelter houses with no rental fee.

Emmit B. Smith Park
850 E. 4th Street (3 acres) This Park is open from 6:00 am until 10:00 pm. The park offers benches and a walking and fitness trail.

Ward Park
This park, located at 448 Woodland Drive, Versailles, is a publicly-owned park which contains three shelter houses, a swimming pool, tennis court, ball diamond, concession and restroom facilities and playground equipment. The park shelters are available for reservation beginning in January with reservations being made at the Village Hall, 4 West Main Street. The cost of reservation is $20 per shelter, and is non-refundable. Shelters No. 2 and 3 have a maximum occupancy of 64 persons, while Shelter No. 1 has a maximum occupancy of 32 persons. The swimming pool located within Ward Park is open to the public from the beginning of June through the end of August (opening and closing dates change yearly depending on the school schedule). For more information regarding our publicly owned parks, please contact the Village offices at (937) 526-3294, Monday through Friday, between the hours of 8:00 am and 5:00 pm.

Indian Creek Park

This park, located on Jackson Street (SR 185) in Versailles, is a publicly-owned park containing a shelter house with restroom facilities, basketball court, tennis court, ball diamond, concession stand with restroom facilities and playground equipment. The shelter house at Indian Creek Park is available for rental beginning in January of each calendar year, with reservations taken at the Village Hall, 4 West Main Street. The cost of the shelter house reservation is $20 and is non-refundable. The maximum occupancy of the Indian Creek Shelter House is 64 people. For more information regarding our publicly owned parks, please contact the Village offices at (937) 526-3294, Monday through Friday, between the hours of 8:00 am and 5:00 pm.

Heritage Park

This privately owned park is located off Woodland Drive and Klipstine Road adjacent to the Heritage Estates Subdivision in Versailles. This park contains a gazebo, shelter house, concession stand with restroom facilities, sledding hill, fishing pond, paved walking path, two ball diamonds and playground equipment.

Parks in Miami County

Goode Prairie Preserve

Union-Church Road, Covington

The blending of a wetland prairie and the Stillwater River is highlighted in this 25-acre park located just outside of Covington. Naturalists consider the blend to be a unique form of a slump prairie. Visitors to the preserve can view wildlife and picturesque river scenes while enjoying the solitude of nature in Miami County's own back yard.

Greenville Falls

Range Line Road, Covington

A beautiful cascade and impressive Silurian dolomite and limestone cliffs occur along this valley of Greenville Creek, which is part of the Stillwater State Scenic River system. You'll find rare species of plants, including; rock sandwort, harebell, tufted hairgrass, limestone savory and wand-lily. This 82.4-acre preserve includes a locally significant maple-cottonwood-sycamore floodplain forest.

Stillwater Prairie Reserve

State Route 185, Covington

The western portion of Miami County holds a tranquil beauty centered around the Stillwater River. Registered as a National Scenic River, the Stillwater River's thick, wooded corridors, rolling hills and tame meadows meet the gentle flow of dark waters creating a native landscape for all to view. The best views of this scenery can be found at Stillwater Prairie Reserve. With a unique 1,600 foot recycled plastic boardwalk, nearly two miles of river frontage, a looped trail system, two fishing ponds and picnic areas with grills, a full day can be spent with in the park's 260 acre

borders. Also available at the reserve is a three-acre wetland site with an observation platform for viewing wildlife.

Brukner Nature Center

5995 Horseshoe Bend Road, Troy
Brukner Nature Center is situated on 165 acres and has been educating the community on animal rehabilitation and nature for more than 27 years and contains a complete rehabilitation center, treating more than 1,600 wild animals each year. With a restored 1804 log house, herb gardens, animal and wildlife displays, hiking trails and a bird vista situated three stories above the ground and in the trees, visitors to Brukner have endless options for learning about nature and enjoying its many gifts. Expert naturalists offer special programs at Brukner throughout the year.

Bradford City Park

Located on North Miami Avenue in Bradford. Available are picnic shelters with tables, tennis, basketball and volleyball courts and playground equipment.

Covington Community Park

Located on West U.S. Route 36 in Covington. This park has ball fields, picnic shelters and playground equipment.

Pleasant Hill City Park

Located on South Main Street in Pleasant Hill, and features a gazebo, picnic table and benches.

Housing and Population Trends

According to the MVRPC 2030 Long Range Transportation Planning study (MVRPC 2004), the rural parts of the Miami County portion of the Stillwater watershed should see a relatively large amount of growth by 2030. Although the percentage of growth will be large, most areas of the Miami County portion of the watershed will remain relatively rural—the large percentage of growth reflects the small rural population that currently exists. Urbanized areas of the watershed, however, will experience a great deal of growth as people living in the cities of Dayton, Oakwood, Kettering, and Huber Heights move into surrounding counties. Employment will follow the housing patterns as services are brought to newly expanding communities. This will then bring more people into the area. The town of West Milton is expected to get the vast majority of this growth.

Darke County contracted with the MVRPC to plan agricultural and urban security areas. These areas reflect possible trends in urban development over the next 20 years. The agricultural security areas facilitate farmland preservation by identifying large general areas where active and viable farming operations exist and encroachment by rural residential subdivision is not encouraged Appendix A, Map 11 illustrates these security areas.

Cultural Resources

Watershed History

The Stillwater River watershed was a valuable water resource and way of transportation for the Chippewa, Delaware, Kickapoo, Potawatomi, Shawnee and other Native American nations. The city of Greenville, located in the middle of the Stillwater River watershed, is the site of Fort Greene Ville, one of twelve forts established by General Anthony Wayne. The fort was constructed in 1793 and is one of a series of ten "Indian Wars" forts, extending from Fort Washington at Cincinnati in the south, to Fort Wayne Indiana, in the north. The city of Greenville was named in honor of General Wayne's Revolutionary War co-patriot, General Nathaniel Greene. Fort GreeneVille was a 50-acre tract of ground enclosed by a wooden stockade and blockhouses.

General Anthony Wayne and 12 allied Indian tribes signed the Treaty of Greenville at Fort GreeneVille on August 3, 1795. This treaty brought peace to the area and opened the Northwest Territory for settlement. The major tribes represented at the treaty signing included: Chippewas, Ottawas, Pottawattamies, Shawnees, Deleawares, Miamis, Wayndottes, Eel Rivers, Weas, Piankeshawas, Kickapoos, and Kaskaskias.

Some of the famous Americans to live in the Stillwater River watershed included Phoebe Ann Mosey (also known as Annie Oakley), Lowell Thomas, a well-known world traveler and radio personality, and Zachary Lansdowne, who was an aviator who pioneered the use of helium in dirigibles.

Area Festivals

Several festivals are held throughout the year in the watershed to commemorate the history of its people. Those festivals include: Annie Oakley Days held in Greenville the last week of July, Fort Rowdy Days in Covington, Pumpkin Festival in Bradford, and Poultry Days in Versailles. Other points of interest include:

Alter of Peace – Commemorating the signing of the Treaty of GreeneVille with the Native Americans on August 3, 1795. This monument is located on Memorial Drive in the Greenville City Park

Site of the Signing of the Treaty of GreeneVille- This granite monument is engraved with Howard Christy Chandler's painting of the signing of the Treaty. This monument is located on West Main Street at Elm Street in the City of Greenville. This point marks the approximate place where General "Mad" Anthony Wayne signed the Treaty.

Tecumseh's Point – This site is the location of the Native American encampment during the summer of 1795 during negotiations for the Treaty. The entrance to this site is at the Walnut Street footbridge in the City of Greenville.

Fort Jefferson – This site is the original General St. Clair's outpost in 1791. This State Park is located five miles south of Greenville off of State Route 121.

Birthplace of Lowell Thomas – The original house of Lowell Thomas has been moved from its original location in Woodington to the Garst Museum grounds. The home has been refurbished to the time period of his youth.

Gravesite of Annie Oakley – The site of the graves of Annie Oakley and her husband Frank Butler is located in Brock Cemetery on Greenville-St. Mary's Road, just off of U.S. 127 near Ohio 185 northeast of Greenville.

Garst Museum – This museum contains Darke County Memorabilia dating back to the Native Americans and early settlers. The museum is located at 205 North Broadway Street in the City of Greenville.

Annie Oakley Memorial Park – This Park is located at the intersection of Broadway, Martin Street, and Washington Avenue in the City of Greenville. The Park features a heroic-size statue honoring Annie Oakley.

Bear's Mill – The mill is located on Arcanum-Bears Mill Road, off U.S. 36 east of Greenville, Bear's Mill remains a working grist mill, grinding corn, wheat, and oats into meal and flour. The mill is water-powered by Greenville Creek and is open for tours.

Zachary Lansdowne's Residence – Mr. Lansdowne's residence is located on East Third Street at the corner of Locust Street in Greenville. The residence is on the National Register of Historic Sites.

Low Dam Sites

The Stillwater River is a great place for boating and fishing, but several low dams exist that can cause hazards for recreational users. The Miami Conservancy District is currently in the process of producing a waterproof recreation map that will include the locations of all low dams and river access points. Table 34 shows the locations of low dams currently believed by the ODNR Division of Water to be in the Stillwater River Watershed in Darke and Miami counties. The Miami Conservancy District believes this information to be out of date, and will be doing a physical survey of low dam sites to update this list in 2005. This list will be updated when new information becomes available.

Table 34: Low Dam Locations in the Stillwater River Watershed[7]

ID	County	Waterway	Description	Long.	Lat.	Township	ODOT District	HYUN	Watershed

7 Information on low dam locations in Ohio was found at http://www.dnr.state.oh.us/water/dsafety/lowhead_dams/lowhead_locations_map.htm

301	DARKE	GREENVILLE CREEK	DAM--above Bears Mill Road bridge east of Greenville, portage river left with permission	-84.54	40.11	ADAMS	7	05080001	Upper Great Miami
1225	DARKE	GREENVILLE CREEK		-84.63	40.11	GREENVILLE	7	05080001	Upper Great Miami
258	MIAMI	GREAT MIAMI RIVER	DAM--at Piqua Waterworks behind the roadside park north of Piqua off S.R. 66, portage river right or left	-84.26	40.17	SPRINGCREEK	7	05080001	Upper Great Miami
259	MIAMI	GREAT MIAMI RIVER	DAM--Piqua power dam off Piqua-Troy Road south of Piqua, portage river left	-84.24	40.13	WASHINGTON	7	05080001	Upper Great Miami
263	MIAMI	GREAT MIAMI RIVER	DAM--Troy dam below the Market Street bridge in Troy, portage river left or right	-84.2	40.04	STAUNTON	7	05080001	Upper Great Miami
892	MIAMI	STILLWATER RIVER	DAM--rock dam downstream of the confluence of Greenville Creek and Stillwater River above Bridge Street bridge (S.R. 70) in Covington, portage river left	-84.36	40.12	NEWBERRY	7	05080001	Upper Great Miami
898	MIAMI	STILLWATER RIVER	DAM--low head dam at Water Plant off S.R. 48 north of West Milton, portage river right	-84.32	39.98	UNION	7	05080001	Upper Great Miami
1224	MIAMI	STILLWATER RIVER		-84.35	40.08	NEWTON	7	05080001	Upper Great Miami

Previous and Complementary Water Pollution Control Efforts

Much effort has gone into limiting pollution loading in the Stillwater River over the past 20 years. Some of this effort has been the result of the work of the Stillwater Watershed project, and some has been the result of government and community organizations. Following is a description of just some of the efforts that have been made in the past to limit water pollution in the Stillwater River Watershed.

Nonpoint Source Pollution Potential Ranking

In 1993 the first Stillwater Watershed action plan was completed and was then revised in 1995. For planning purposes the Stillwater River Watershed was divided into 28 individual drainage units. These units are now obsolete and the HUC method

of identifying watersheds is preferred. Appendix A, Map 12 illustrates these obsolete map units. For the most part, these drainage units were the subwatersheds drained by the major tributaries. For the Stillwater River and Greenville Creek, however, their length and the acreage they drain are far too large for comparative planning purposes. Consequently, they were divided into smaller units corresponding to the areas drained between tributaries and these areas have been assigned a letter for identification.

A ranking matrix was developed that assigned a score of 1 (low) to 12 (high) for the following six drainage unit "characteristics": the number of stream miles; the size of the drainage area; the percent of the drainage area that is Highly Erodible Land; the number of Animal Units; the tons of manure per acre per year; and, the number of on-site septic systems in high-density concentrations. Higher scores indicate a greater potential for a problem to exist for that particular characteristic within a drainage unit. Totaling a drainage unit's six "characteristic scores" gives a total score from 6 (low) to 72 (high) with higher scores indicating the potential for multiple problems to exist.

Based on this ranking system, the top five (highest total scores) drainage units are: 1) Swamp Creek; 2) Greenville Creek from Dividing Branch to Bridge Creek (segment #C); 3) Ludlow Creek, Painter Creek, and Greenville Creek from Bridge Creek to Mud Creek (segment #D); 4) North Fork Stillwater River; and, 5) Greenville Creek from Mud Creek to West Branch Greenville Creek (segment #E). Note that more than one drainage unit may have a particular score and therefore more than one drainage unit can hold a particular rank.

The pollution potential ranking matrix was used as a guide to focus conservation practices and programs in the watershed. The results of the total nonpoint source pollution potential ranking indicate that Swamp Creek and Greenville #C subwatersheds have the highest risk for nonpoint sources of pollution. The subwatersheds with the lowest overall risk to nonpoint source pollution include South Fork of the Stillwater, Woodington Run, Boyd Creek, Stillwater #C and Mill Creek. Appendix A, Map 13 illustrates the ranking matrix results.

Analysis of the percent highly erodible cropland revealed that four sub-watersheds have greater than 12% of highly erodible cropland. These watersheds are not isolated in a specific area of the Stillwater River watershed. Instead, the sub-watersheds with highly erodible cropland most susceptible to erosion correspond with sub-watersheds with a variety of land uses. In the lower reaches of the Stillwater River watershed towards Dayton where more housing units and residential development is common, the more than 10% of all cropland is classified as highly erodible. Also, the Greenville #C and sub-watersheds Southwest of Greenville have greater than 10% of highly erodible cropland. These sub-watersheds may have greater developmental pressures than the sub-watersheds in the northern portion of the Stillwater River watershed. In northern Darke County where row crop production

is more prevalent, the sub-watersheds North Fork, Stillwater #D and Trotters Creek have between 12.9 to 19% of all cropland soils are classified as highly erodible.

The highest nonpoint source pollution potential ranking for total number of animal units is located within one specific sub-watershed. The Swamp Creek sub-watershed ranks as the highest nonpoint source pollution potential with 29,829 animal units. Moreover, the highest amount of animal manure produced annually is 5.2 tons manure/ acre/ year and corresponds with the high number of animal units in the Swamp Creek watershed. Swamp Creek, Stillwater #E, Stillwater #F, North Fork, and Stillwater #H sub-watersheds are located in the northern portion of the Stillwater River watershed in Darke County. These five sub-watersheds reflect the high concentration of animal feeding operations in the Stillwater River watershed.

Although non-point source pollution from animal manure waste is problematic in the northern portions of the Stillwater River watershed, the high number of on-site septic systems is more prevalent in the Greenville sub-watersheds south and southeast of the City of Greenville. Ludlow Creek sub-watershed is situated in the southern portion of Stillwater River watershed and has the highest number of on-site septic systems at 687 units. Greenville #D sub-watershed is second with 666 on-site septic systems. Painter Creek and Greenville #C sub-watersheds are a distant third and fourth ranking at 347 and 289, respectively, on-site septic units. These sub-watersheds do, however, lie between Ludlow Creek and Greenville #D sub-watersheds along State Route 49.

The intent of the SWP was to focus incoming funding and conservation efforts in the subwatersheds with the highest pollution potential. GIS data was used to evaluate whether or not the SWP accomplished that goal.

Stillwater GIS Demonstration Project

In 2000, the Stillwater Watershed Project was awarded an ODNR, GIS grant. The grant was used to evaluate the distribution of conservation practices for each cost share program and determined if the Stillwater Watershed Project achieved their goals of targeting conservation efforts throughout the watershed. Malcolm Pirinie, Inc. was contracted out of Columbus to do the GIS analysis. The following information was taken out of the Results Section of the Stillwater GIS Demonstration Project put together by Malcolm Pirinie, Inc. (2000).

Total conservation dollars allocated in the Stillwater River watershed exceed $2,293,000 during the period 1994 – 2000. Ten separate funding resources were used from the Ohio Environmental Protection Agency (OEPA), Ohio Department of Natural Resources (ODNR), and USDA's Natural Resources Conservation Service (NRCS). The most significant amount of dollars made available to watershed landowners was provided from Ohio EPA's Water Pollution Control Loan Fund (WPCLF) program. This program provided low interest loans to watershed landowners to purchase conservation tillage equipment and animal manure waste management facilities. More than $961,000, or 41.9% of all conservation dollars was allocated to

landowners via the WPCLF program. The second highest source of conservation dollars was provided by USDA's Natural Resources Conservation Service (NRCS) Water Quality Improvement Program (WQIP); the precursor to the current Environmental Quality Incentives Program (EQIP). The WQIP was not assessed during the GIS Demonstration Project.

The geographic locations of landowners receiving funding from the five conservation programs were digitized in a GIS and compared with the Nonpoint Source Pollution Potential Ranking derived from the *Stillwater River Watershed Protection Project* report. The Swamp Creek and Greenville #C were ranked number one and two, respectively, pertaining to their high pollution potential ranking from nonpoint source pollution. Refer to Appendix A, Map 13 for analysis results.

Results of this geographic analysis indicate that the Swamp Creek sub-watershed was the focus of much of the agriculturally related conservation practices. More than $838,300 or 36.6% of all conservation dollars were implemented on 85 sites within the watershed. Conversely, although the Greenville #C sub-watershed ranked number two for non-point source pollution potential, only $36,000 or 1.6% of all conservation funding was allocated to two conservation practices in the watershed. Upon further investigation of Greenville #C sub-watershed reveals that the relatively high number of on-site-septic tanks and percent highly erodible cropland indicate that housing developments without centralized sewers might be the source of concern. Appendix A, Map 14 illustrates the distribution of conservation practices by nonpoint source pollution potential ranking.

Great Miami Watershed Network /Stillwater Basin Council

In 2003, the Miami Conservancy District and the Miami Valley Regional Planning Commission agreed to combine the Great Miami River Watershed Network with the four Basin Councils of the Great Miami River Watershed (Stillwater, Upper Great, Twin, and Lower Great). In addition to bringing increased coordination, this merger was designed to give participants a more regional view of watershed-related issues.

The Watershed Network meets quarterly to discuss items of mutual concern, share ideas, review projects and effectively leverage resources. Members of the Network include watershed coordinators, soil and water conservation professionals, OSU Extension personnel, environmental planners, as well as representatives from local governments, businesses, state agencies and universities.

Since forming, the group has finalized a two-year strategic plan, hosted guest speakers from around the state, and participated in two tours of local best management practices -- both agricultural and urban. An online newsletter, planned for 2005, will help people stay connected and have access to resources.

1988 Farm Bill

The 1988 Farm Bill provided funds to determine the amount of Highly Erodible Land (HEL) in the State of Ohio and to help farmers develop conservation plans for how best to manage HEL ground.

House Bill 88

House Bill 88 provided money for pollution abatement in the watershed and beyond.

Natural Resources Conservation Service (Formerly the Soil Conservation Service)8

The Natural Resources Conservation Service (NRCS) is a part of the United States Department of Agriculture (USDA), and NRCS employees work for the federal government. The NRCS is part of a local/Federal partnership with the SWCDs to put conservation on the land. Their offices are usually found in the USDA County Service Centers with the USDA Farm Service Agency and the SWCD.

After the dust bowl years in the late 1920's, erosion became a topic of concern. Convinced that soil erosion was a national menace, in 1933, the Soil Erosion Service, predecessor to the Soil Conservation Service and NRCS, began working with farmers in the Coon Creek watershed of southwestern Wisconsin to teach the application of BMPs such as contouring, strip-cropping, terracing, and wise land use. They believed that the solution to soil loss was in tailoring conservation practices to fit the capability of the land and the desires of landowners.

The Soil Conservation Act in April of 1935 hastened the spread of BMPs across the country. Recognition of the first conservation district, bounded by the Brown Creek watershed in North Carolina, on August 4, 1937, established a method for the Service to assist farmers in the conservation districts with locally elected citizens establishing priorities and plans for the district's work.

Today the NRCS is a vital partner of the SWP, and provides a great deal of technical assistance with TMDLs, BMPs, wetland determinations, and other matters.

Darke Soil and Water Conservation District

Darke Soil and Water Conservation District (SWCD) came to be in April of 1955. In that first year, 64 farmers signed up 8500 acres of land for SWCD programs, and 16 conservation plans were written. Since then, Darke SWCD and its Board of Supervisors has been an active participant in water pollution prevention, including:

- Advocating for no-till in the 1980's and beyond
- Purchase of a no-till drill for rent to Darke County farmers in 1981
- Selling tree seedlings to Darke Countians each year, resulting in hundreds of thousands of new trees being planted in Darke County

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8 All historical information about the NRCS was found at http://www.nrcs.usda.gov/about/history/story.html.

- Doing the technical work that allows farmers to take advantage of U.S. and Ohio cost-share for BMPs
- Providing office space for the Stillwater Watershed Project (SWP)
- Acting as fiscal agent for the SWP
- Providing technical assistance to the SWP

Miami Soil and Water Conservation District

The Miami Soil and Water Conservation District was organized in December of 1943 as the 15th district in Ohio. The first members to serve on the Miami SWCD board were Emmet Brush, Bert Favorite, Dr. Harry Ronicker, William Thompson and Ernest Weaver. The Miami SWCD furnished both the Ohio Federation, and the National Association of Conservation Districts with a president, the late Sam Studebaker, Sr.

The Miami Soil and Water Conservation District assists in the success of the Stillwater Watershed Project (SWP) through general support and involvement. And through the ODNR NatureWorks/Stream Bank Grant, the Miami SWCD has been able to help the SWP establish easements and decrease erosion along the Stillwater. We've also been proud to be a part of the Fetter's Field Days, promoting No-till test plots.

Federal and State programs like HB 88, WQIP and other cost share programs are other positives in our association with the SWP.

The Miami SWCD and its Board of Supervisors has been an active participant in water pollution and soil erosion prevention in many ways, including:

- Encouraging no-till practices since the early 1980's
- Selling many thousand-tree seedlings, over decades, through the annual Miami SWCD tree seedling sale.
- Instituted an Outstanding Cooperator Award in 1957 and have honored each year a deserving land operator who has taken advantage of programs and embraced practices that have helped maintain Miami County's soil and dedication to protecting and maintaining water quality.

Miami County Health District OEPA 319 Grant Septic System Program

In 1999, the Miami County Health District wrote and received a grant to find funding to locate every septic system in the County, determine discharge status, help fund upgrades of HSTS, and educate homeowners on proper septic system care.

Darke County Health District OEPA 319 Septic System Awareness Program

In 2004, the Darke County Health District received a grant from the Ohio EPA to do home site septic system location, renovation, and education in the Stillwater River Watershed. An Advisory Board consisting of licensed scavengers, homeowners, local elected officials and the Stillwater Watershed Coordinator was formed to award grants to homeowners with discharging septic systems. Homeowners with discharging systems make application for a percentage of their project's total cost, with the Advisory Board using a point rating system to determine awards. Additionally, homeowners may also request money for septic system risers with a recent receipt from a licensed scavenger proving that the system has recently been pumped. This project is funded through 2007.

Agriculture For A Clean Environment, (A.C.E).

Agriculture for a Clean Environment, or A.C.E., is a group of farmers, organized as a non-profit organization, for the purpose of promoting environmentally sound practices in the production of a safe, stable and economic food supply for present and future generations. This organization was developed out of the Stillwater Watershed Project in 1994. This organization is influential in promoting best management practices in the watershed. The following are the objectives of this organization:

- Create awareness with the general public and governmental officials regarding modern agricultural practices that are used in maintaining our abundant food supply.
- Develop educational programs, field days and activities that create a greater appreciation of agricultural and environmental issues.
- Provide accurate information to our schools to advance the understanding and appreciation of agriculture's interdependence with the environment.
- Demonstrate land use practices, which protect natural resources and enhance agricultural competitiveness.
- Provide a forum for the exchange of ideas and concerns affecting agriculture in the Stillwater River watershed.
- Provide member representation on environmental issues affecting agriculture.

Active members are individuals who own farmland and/or operate a farm in the Stillwater River watershed (Darke and Miami Counties) with an interest in supporting the mission of the organization. Membership can be individual or family. Each membership has one voting privilege. Associate members include anyone who supports the mission of the association, whether they are individuals, business or

corporations but do not live within the Stillwater River watershed. Associate members have no voting privilege. Currently, A.C.E. has 32 active members. These members are active in promoting best management practices, available cost share programs administered through the SWP, and sponsorship of the biannual canoe floats and southern test plots that compares no-till to conventional tillage funded through the SWP. A.C.E. is governed by a nine member Board of Directors who are elected at the annual A.C.E. banquet.

Ohio Scenic Rivers Program

The Scenic Rivers Program is a branch of the Ohio Department of Natural Resources, Division of Natural Areas and Preserves. The Scenic Rivers Program began with the passage of the Scenic Rivers Act of 1968. The goal of this program is to preserve the natural and historic qualities of Ohio's finer streams so that both present and future generations will be able to experience their natural beauty and values. In 1972, the Scenic Rivers Act of 1968 was amended to include wild and recreational categories. The name of the Act changed to the Ohio Wild, Scenic, and Recreational River Act. This Act requires a 10-member advisory council. This council represents local officials, landowners and conservation organizations appointed to each designated river to oversee the preservation and protection efforts.

In 1975, the Stillwater River was designated recreational from Englewood dam to the confluence with the Great Miami River. A total of 10 miles are designated recreational. A recreational designation is defined as a river that is easily assessed and has development located around it. On October 14, 1980, the Stillwater River and its largest tributary Greenville Creek became Ohio's eighth scenic river. Designated sections include the Stillwater River from Riffle Road bridge in Darke County to the Englewood dam in Montgomery County and Greenville Creek from the Ohio-Indiana state line to the confluence with the Stillwater River. Approximately, 83 miles are designated scenic. A scenic designation is defined as a river with little evidence of humans, although occasional homes, villages, roads and bridges can be seen from the river. Also, the river may run through agricultural areas.

Darke County Farmland Preservation

To explore the land use needs of Darke County, the Darke County Commissioners created a Land Use Committee in 1997. This committee eventually turned into the Darke County Farmland Preservation Task Force in 1999. The task force and MVRPC created *The Darke County Farmland Preservation Plan (1999)*. This plan outlined ways to prevent the encroachment of development into farmland. The mission of the task force is to encourage managed growth in Darke County and to promote the adoption of policies and programs, which will preserve farmland and reduce conflict between agriculture and non-agricultural uses of land. Farmland preservation is a top priority in Darke County due to the abundance of prime farmland, size of the farms, and Darke County's increasing importance to the State of Ohio's farmland production. Listed below are the recommendations made by the task force (MVRPC 2001):

- Promotion of legislation and funding needed to enhance a community's infrastructure, such as water and server service, is essential to protecting Darke County's farmland, especially with Agricultural Security Areas (ASAs).
- ASAs should be designated in Darke County to facilitate farmland preservation by identifying large general areas where active and viable farming operations exist and encroachment by rural residential subdivision is not encouraged. Refer to Appendix A, Map 11 for the ASAs.
- Continual promotion of zoning and subdivision regulations that support the findings of the Darke County Farmland Preservation Plan.
- The creation of an Agricultural Security Advisory Committee is recommended to review requests to modify land usage in an ASA.
- Continue using the CAUV and Agricultural District programs to encourage farmland preservation through tax reduction.
- Provisions and support for land trusts and the donation of conservation easements is needed.
- To maintain an accurate account and inventory of Darke County's farmland issues and programs.
- Initiate an on-going program that tracks the creation of new lots and parcels, zoning changes, and changes in agricultural program participation.

Miami County Farmland Preservation

The Miami Farmland Preservation task force report was completed and submitted to the Miami County Planning and Zoning Department on December 28th 1999. In October of 2002 the Miami County Soil and Water Conservation District office set as one of its priorities to take on the challenge of further implementing farmland preservation plans in Miami County.

The following is a summary of recommendations from the Miami County Farmland Preservation Task Force:

- The Task Force is appreciative of efforts by local elected officials in recognizing the importance of farmland preservation. While there are no easy answers to this issue, it is important that future elected and appointed officials be kept informed in order to continue this dialogue.
- The Task Force believes that the goal of preserving farmland must be balanced with the fundamental right to buy and sell private property. Private property rights are fundamental to our free market economic system and are protected by the fifth and fourteenth amendments to the United States

Constitution. The continued strength of our nation's economy depends on the preservation of the right to freely own, use and transfer real property.

- The foundation for farmland preservation should be the Miami County Comprehensive Plan. Especially relevant are the goals, objectives and policies of this plan. These policies include:
    - Miami County will discourage the conversion of prime agricultural lands to non-agricultural uses. Intensive land development will be guided to those areas, which are designated service areas in the plan.
    - Urban service boundaries should only be extended to those areas where necessary utilities and urban services can be logically provided.
    - Existing agricultural uses will be recognized as viable, and should be protected from conflicting development.
- Efforts should be made to ensure the Comprehensive Plan is updated on a 5 to 10 year basis. There should be continuous efforts to educate the village, cities and townships and citizens about the plan. It would be of benefit to inform the public of the farmland preservation planning effort and to circulate copies of this report.
- All incorporated communities in the County should strive to adopt comprehensive plans and improved land use management tools such as zoning, subdivision regulations and building inspection services.
- The best way to preserve productive agricultural lands may be to promote growth within urban service boundaries. Efforts should be also directed to promote growth in "brown field" areas to avoid unnecessary duplication of services and utilities.
- The Task Force supports changes to state annexation laws to consider the preservation of farmland in the review of annexation petitions. The need to preserve quality agricultural soils and viable farmland should also be included as a major factor in considering whether an annexation will result in the "good of the area".
- The county and townships zoning processes should continue to discourage multi-lot splits and major development in agricultural areas and outside urban service areas.
- Growth should be promoted in a timely and orderly manner. Over-extension of utilities should be discouraged.
    - The County should explore alternative agricultural zoning techniques including fewer permitted land uses in agricultural areas.

- The objective should be to preserve the family farm and productive farmland. The face of agriculture will continue to change. Land use and zoning programs should also continue to evolve.

- The role of the County's agri-businesses in the local economy should be further explored. An agriculture retention and expansion survey should be conducted

- Innovative land use planning techniques to allow higher densities and mixed use developments should be encouraged in areas where appropriate within the urban service areas.

- Infill development (the utilization of bypassed land in urban areas capable of development with services already available) should be encouraged as opposed to piecemeal development outside the urban service areas.

- The Task Force supports efforts to update and revise state subdivision standards and platting laws. The current laws are outdated and do not allow local governments enough authority to direct growth and development. The Task Force is opposed to the further erosion of local control of land use management affairs.

- The Task Force supports efforts to develop improved driveway location and access management standards for both local and state roads.

- The Task Force encourages the use of available tools such as conservation easements, purchase of development rights and other programs made available by the state to preserve agricultural or other significant property.

- The Task Force recommends the creation of a countywide non-profit organization or land trust to be available to hold and manage conservation easements. This would provide landowners an additional local alternative as opposed to a state or regional organization holding the conservation easements. The State of Ohio, Ohio Dept. of Agriculture has developed an agricultural easement donation program that could serve as a model for a local program.

Physical Attributes of the Stillwater River Watershed

Early Settlement Conditions

Based on information gathered from the *Map of Natural Vegetation of Ohio at the Time of the Earliest Land Surveys* prepared by Robert B. Gordon in 1966, when the first settlers arrived in the Stillwater River watershed, the area was almost completely covered with trees. The most common forest type found was Beech forest, and this forest type was the predominant vegetation throughout the watershed. An exception to this rule was the area around Fort Greene Ville, which became the City of Greenville. It was surrounded by a Mixed Oak Forest. This mixed oak forest stretched into HUCs 05080001-120-010, --120-130, --120-020, --120-140, --110-050, --090-080 and –090-070.

In almost every subwatershed, there were pockets of Elm-Ash Swamp Forest. The remains of these swamp forests can be seen today in the watershed's rich cropland and hydric soils. Particularly large swamps were found near the Arcanum and Pitsburg areas in Darke County, in HUCs 05080001-130-120 and –140-010. This land is some of the richest farm ground in the watershed today. The northeast corner of HUC 05080001-100-010 near Versailles was also a large swamp.

A large strip of Oak-Sugar Maple Forest was found in the Miami County portion of the watershed, following the Stillwater River from what today is the town of Pleasant Hill al the way to the confluence with the Great Miami River. Of special interest to biologists is the strip of Prairie Grassland that runs through Greenville Creek #B (HUC 05080001-120-010) and Mud Creek (05080001-120-020) watersheds. Remnants of this prairie can still be found in this area, and it is being maintained and protected by the Darke County Park District.

Channel and Floodplain Conditions

Tables 35-69 illustrate the physical attributes of each stream in the watershed by 14-digit HUC. This information includes channelization, miles of riparian buffer, livestock operations and number of animal units in the watershed, use designation and attainment status.

Stillwater Watershed Inventory HUC 05080001 090

Table 35: Watershed Inventory Stillwater #J HUC 05080001 090 010

Stillwater River Watershed Inventory
Stillwater #J Subwatershed
HUC 05080001 090 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CMNP	CRP		WRP	Bridges/ Culverts
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)		
Stillwater #J												3	4	90	7.2	0	
Mouth of Stillwater J	63-64	5280	5280			0	5280	0	0	3444	7116						1
Stillwater J	64-65	5,280	5280			0	5280	0	932	1064	8564						0
Trib 1	64.96	20600	20600			20600		0	0	0	41200						4
Stillwater J	65-66	5280	5280			0	5280	0	0	0	10560						1
Trib 2	65.3	8980	8980			0	8980	0	0	0	17960						2
Stillwater J	66-67	5280	5280			0	5280	0	857	0	9703						1
Stillwater J	67-67.7	3500	3500			0	3500	0	0	0	7000						1
											0						

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	25	0	1000	2480	1,033,400	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected		
			Feet:	0	Acres:
9,207.00	0	3			

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #J	WWH / MWH proposed	Non-attaining / Partial						
RM 65.8			30	NA	32	30.5		
RM 65.0			18*	NA	20	31		
RM 63.8			40	NA	30	36.5		
RM 63.0			34	5.3*	22	37.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 36: Watershed Inventory South Fork Stillwater River HUC 05080001 090 020

Stillwater River Watershed Inventory

South Fork Stillwater River Subwatershed

HUC 05080001 090 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
South Fork Stillwater River												5	3	47	21.1	0		
South Fork from mouth	0-1	5280	5280			5280	0	0	0	0	10560						1	
Trib 1	0.94	25529	25529			25529	0	0	1273	0	49785						5	
South Fork	1-2	5280	5280			0	5280	0	0	0	10560						2	
South Fork	2-3	5280	5280			0	5280	0	0	0	10560						1	
South Fork	3-4	5280	5280			0	5280	0	0	0	10560						3	
County tile	4.05	8653				0	0	8653	0	0	17306						1	
South Fork	4-5	5280	5280			0	5280	0	0	0	10560						1	
South Fork	5-6	5280	5280			0	5280	0	0	0	10560						1	
South Fork	6-6.8	4422	4422			0	4422	0	0	0	8844						2	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	0	6000	2620	912,000	0	11000	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
8,922.00	0	1	Feet: 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
South Fork	WWH	Partial / Full						
RM 5.5			36ns	NA	16	30		
RM 0.4			38ns	NA	32	44		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 37: Watershed Inventory Stillwater #I HUC 05080001 090 030

Stillwater River Watershed Inventory

Stillwater #I Subwatershed

HUC 05080001 090 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)		
Stillwater #I												0	2	94	12.3	10	
Mouth of Stillwater #I	59.13-60	5280	5280				5280		0	0	10560						1
Trib 1	60.22	19,735	19735			4800			0	0	39470						5
Stillwater #I	60-61	5280	5280				5280		0	0	10560						0
Stillwater #I	61-62	5280	5280				5280		0	0	10560						2
Stillwater #I	62-63	5280	5280				5280		0	0	10560						2
											0						

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	0	0	480	1,000,000	482,544	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
7,090.00	0	1	Feet: 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name		
Stillwater #I	WWH	Partial / Full								0
RM 61.8			25	7	30	34				0
RM 60.2					38					

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 38: Watershed Inventory for Woodington Run HUC 05080001 090 040

Stillwater River Watershed Inventory

Woodingon Run Subwatershed

HUC 05080001 090 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)		
Woodington Run												3	0	0	4.1	25	
Woodington Run from mouth	0-1	5280	5280			0	5280	0	0	500	10060						3
County tile	0.9	8539	0			0	0	8539	0	0	17078						1
Woodington Run	1-2	5280	5280			0	5280	0	0	0	10560						1
Woodington Run	2-3	5280	5280			0	5280	0	0	0	10560						2
Trib 1	2.54	2240	2240			2240	0	0	0	0	4480						0
Woodington Run	3-4	5280	5280			0	5280	0	0	0	10560						2
Woodington Run	4-5	5280	5280			0	2400	0	1700	924	7936						2
Trib 2	4.46	9305	9305			0	9305	0	0	0	18610						4
Woodington Run	5-6	5280	5280			3144	0	0	3309	968	6283						1
											0						

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	15	110	0	0	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
7,331.00	0	0	Feet: 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Woodington Run	WWH	Full ; Partial						
RM 4.9			42	NA	36	51.5		
RM 1.1			44	NA	24	50.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 39: Watershed Inventory Stillwater #H HUC 05080001 090 050

Stillwater River Watershed Inventory

Stillwater #H Subwatershed

HUC 05080001 090 050

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)		
Stillwater #H												2	2	4	23.9	28	
Mouth of Stillwater #H	54.23-55	1214							1214	1214	0						1
Trib 1	55.42	5280	5280						4480	500	5580						1
Stillwater #H	55-56	5280							5280	5280	0						1
Stillwater #H	56-57	5280	5280						2200	2200	6160						3
Stillwater #H	57-58	5280	5280				1260		5280	2770	2510						0
Mouth of North Fork	58										0						
Stillwater #H	58-59.13	5280	5280						0	875	9685						1
											0						

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	110	0	6400	0	80,000	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected

7,331.00	0	1	Feet: 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #H	WWH	Partial / FULL						
RM 58.9			30*	7.8ns	32	42.5		
RM 57.9			38	9	32	47		
RM 57.0			37ns	8.3	34	48		
RM 54.4			43	7.8	28	44		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 40: Watershed Inventory North Fork Stillwater River HUC 05080001 090 060

Stillwater River Watershed Inventory

North Fork Stillwater River Subwatershed

HUC 05080001 090 060

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
North Fork of the Stillwater River												9	2	609	12.8	0		
Mouth of North Fork	0-1	5280	5280			5280			0	2180							2	
North Fork	1-2	5280	5280			5280			0	0	10560						2	
North Fork	2-2.63	3326	3326			3326			0	0	6652						2	
Trib 1	2.63	15840	15840			8860			2700	2700	26280						5	
North Fork	2.63-3	1954	1954			1954			0	0	3908						0	
North Fork	3-4	5280	5280			5280			700	0	9860						2	
North Fork	4-5	5280	5280			5280			1440	1722	7398						1	
North Fork	5-6	5280	5280			5280			0	0	10560						1	
North Fork	6-7	5280	5280			5280			350	350	9860						3	
North Fork	7-8	5280	5280			5280			0	0	10560						2	
Trib 2	8.2	2710	2710					2710	0	0	5420							
North Fork	8-9	5280	5280			5280			1280	415	8865						1	
North Fork	9-10	5280	5280			5280			0	930	9630						0	
											0							

Livestock			Nursery					Starter			

Inventory	Beef	Dairy	Pigs	Swine	Layers	Pullets	Turkeys	Turkeys	Horses	Sheep	Goats
Totals:	381	0	0	1970	880,000	90,000	70,500	5,000	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
12,086.00	0	1	Feet : 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
North Fork	MWH	Non-attaining						0
RM 10.5			12*	NA	2	21.5	Very Poor	0
RM 4.4			20*	5.1	28	24.5		0
RM 0.4			27	7.2	12	36		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 41: Watershed Inventory Boyd Creek HUC 05080001 090 070

Stillwater River Watershed Inventory

Boyd Creek Subwatershed

HUC 05080001 090 070

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)		
Boyd Creek												2	1	8	17.7	0	
Mouth of Boyd Creek	0-1	5280	5280						4348	4348	1864						1
Boyd Creek	1-2	5280	5280						2580	2580	5400						1
Boyd Creek	2-3	5280	5280				4680		0	0	10560						1
Boyd Creek	3-4	5280	5280								10560						2
Boyd Creek	4-5	5280	5280						2225	0	8335						1
Boyd Creek	5-5.6	3168	3168						0	0	6336						3
Trib 1	2.44	19,800	19,800						2280	1710	35610						5
Trib 2	2.66	13,270	13,270			3560	4737		3558	4371	18611						3
											0						

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	121	0	0	1300	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
9,123.00	0	0	Feet:	0	Acres:	0

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Boyd Creek	MWH	Partial; Non-attaining						
RM 3.5			34	NA	16	44.5		
RM 0.8			40	6.1*	30	54.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 42: Watershed Inventory Stillwater #G HUC 05080001 090 080

Stillwater River Watershed Inventory

Stillwater #G Subwatershed

HUC 05080001 090 080

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #G											0	7	8	65.9	0	0		
Mouth of Stillwater #G	45.85-46	690							690	690	0						0	
Stillwater #G	46-47	5280							5280	4125	1155						2	
Stillwater #G	47-48	5280							5280	4580	700						1	
Stillwater #G	48-49	5280							5280	5280	0						0	
Trib 1	49.4	4860							4860	4860	0						1	
Stillwater #G	49-50	5280							5280	5280	0						1	
Stillwater #G	50-51	5280							5280	5280	0						1	
Stillwater #G	51-52	5280							5280	5280	0						1	
Stillwater #G	52-53	5280							5280	5280	0						1	
Stillwater #G	53-54	5280							5280	5280	0						1	
Stillwater #G	54-54.23	1214							1214	1214	0						1	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	291	1236	890	4560	125,000	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
12,533.00	0	0	Feet:	0	Acres:	0

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #G	EWH	FULL						
RM 52.0			46ns	9ns	44	73		
RM 47.8			48ns	9ns	38	73.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Stillwater Watershed Inventory HUC 05080001 100

Table 43: Watershed Inventory Swamp Creek #B HUC 05080001 100 010

Stillwater River Watershed Inventory

Swamp Creek #B Subwatershed

HUC 05080001 100 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Swamp Creek #B												19	15	154	73.3	0		
Swamp Creek	2.45-3	2904	2904						535	535	4738						2	
Swamp Creek	3-3.54	2850	2850						2850	2850	0						0	
Bakerstown Ditch		14545	14545				14545		0	0	29090						3	
Trib 1 of Bakerstown Ditch	0.9	13000	13000				13000		593	593	24814						3	
Swamp Creek	3.54-3.7	850	850						850	175	675						0	
Trib 1	3.7	1520	1520				1520		0	310	2730						0	
Swamp Creek	3.7-4	1664	1664						1664	0	1664						0	
Swamp Creek	4-4.9	4752	4752						1994	1007	6503						1	
Trib 2	4.9	2074	2074			2074			896	1380	1872						0	
Swamp Creek	4.9-5	1030	1030						1030	1030	0						0	
Swamp Creek	5-6.71	9030	9030				1057		2460	1520	14080						0	
Trib 3	6.71	7500	7500						0	0	15000						1	
Swamp Creek	6.71-8.09	7286	7286				7286		0	0	14572						1	
Grassy Fork	8.09	19795	19795				19795		1230	715	37645						4	
Swamp Creek	8.09-9	4805	4805				4805		0	0	9610						1	

Swamp Creek	9-10	5280	5280	5280	640	275	9645	1
Swamp Creek	10-11	5280	5280	5280	1550	3084	5926	1
Swamp Creek	11-12.15	6072	6072	6072	1578	1500	9066	1
Trib 4	12.15	6735	6735	6735	0	0	13470	3
Swamp Creek	12.15-13	4488	4488	4488	700	0	8276	0
Swamp Creek	13-14	5280	5280	5280	0	764	9796	2
Swamp Creek	14-15	5280	5280	5280	0	864	9696	1
Swamp Creek	15-16	5280	5280	5280	0	0	10560	1

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	1360	2095	400	18455	2506929	170000	122000	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
24,435.00	0	8	Feet: 0	Acres: 0

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Swamp Creek #B	MWH	Non-attaining/ Partial						
RM 12.1				28				

RM 8.9		27	NA	28	33
RM 6.5		17	4.8*	30	34.5 VERY POOR
RM 4.4	32*		6.5*	44	42
RM 2.8	27*		7.2*	42	39.5
RM 2.4				26	

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 44: Watershed Inventory Indian Creek HUC 05080001 100 020

Stillwater River Watershed Inventory

Indian Creek

HUC 05080001 100 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Indian Creek												6	9	0	12.9	0		
Mouth of Indian Creek	0-1	5280	5280				5280		0	0	10560						1	
Indian Creek	1-2	5280	5280				5280		925	2020	7615						1	
Indian Creek	2-3	5280	5280				5280		640	1475	8445						0	
Indian Creek	3-3.82	4330	4330				4330		0	620	8040						1	
Trib 1		11430	11430				11430		320	0	22540						4	
Indian Creek	3.82-4.5	2834	2834				2834		0	1948	3720						1	
Trib 2		7370	7370				7370		0	0	14740						1	
Indian Creek	4.5-6	7920	7920				7920		0	0	15840						2	
Indian Creek	6-6.1	415	415				415		0	0	830						1	
Trib 3		9420	9420				9420		1090	0	17750						2	
Indian Creek	6.1-7	4865	4865				4865		0	0	9730						1	
Indian Creek	7-8	5280	5280				5280		0	775	9785						0	
Indian Creek	8-9	5280	5280				5280		0	0	10560						1	
Indian Creek	9-10	5280	5280				5280		0	0	10560						2	
Indian Creek	10-10.3	1524	1524				1524		0	0	3048						0	

Livestock			Nursery Pigs					Starter			

Inventory	Beef	Dairy		Swine	Layers	Pullets	Turkeys	Turkeys	Horses	Sheep	Goats
Totals:	1,675	1078	150	4140	87400	390000	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
			Feet: 0	Acres: 0
12,724.00	1	4		

manure spill - 600,000gallons

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Indian Creek	MWH	Non-attaining						
RM 6.1					10			
RM 5.2			32	NA		37.5		
RM 3.1			20	NA		30	POOR	
RM 2.0					32			
RM 0.5			41	7.8ns	22	47		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

Table 45: Watershed Inventory Swamp Creek #A HUC 05080001 100 030

Stillwater River Watershed Inventory

Swamp Creek #A Subwatershed

HUC 05080001 100 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Unrestricted access to Livestock	Livestock operation needing improved	Livestock operation complying	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)				Whole Field (Acres)	Buffers (CCRP) (Acres)			
Swamp Creek													4	1	9	3.5	0		
Mouth of Swamp Creek	0-1	5280							5280	5280	0							1	
Trib 1	1.0	7890	7890			3841			1050	1050	13680							3	
Swamp Creek	1-2.45	7655	7655						5290	0	10020							1	
											0								

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	330	600	1950	60000	0	11000	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
			Feet: 0	Acres: 0
3,341.00	0	0		

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Swamp Crk #A	WWH	Partial / Full						
RM 2.3			34*	7.1*		34		
RM 2.0			32*	6.4*		43		
RM 1.6					34			
RM 0.3			42	6.7*	42	48.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 46: Watershed Inventory Stillwater River #F HUC 05080001 100 040

Stillwater River Watershed Inventory

Stillwater River #F Subwatershed

HUC 05080001 100 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #F												15	4	14	9.2	0		
Mouth of Stillwater #F	32.38-33	3274	0			0	0	0	3274	3274	0						2	Mouth of Greenville Creek
Trib. 1	32.59	5394	0			0	0	0	5394	2460	2934						1	
Stillwater #F	33.0-34.0	5280	0			0	0	0	5280	5280	0						1	
Harris Creek	33.8										0							
Trotters Creek	34.33										0							
Stillwater #F	34-35	5280	0			0	0	0	5280	5280	0						1	
Stillwater #F	35-36	5280	0			0	0	0	5280	5280	0						1	
Trib. 2	35.8	6150	3217			0	0	0	4044	4044	4212						1	
Stillwater #F	36-37	5280	0			0	0	0	5280	5280	0						1	
Stillwater #F	37-38	5280							5280	5280	0						1	
Trib. 3	37.55	3611	1911			0	0	0	3611	3611	0						0	
Stillwater #F	38-39	5280	0			0	0	0	5280	5280	0						1	
Stillwater #F	39-40	5280	0			0	0	0	5280	5280	0						1	
Stillwater #F	40-41	5280	0			0	0	0	5280	5280	0						0	
Stillwater #F	41-42	5280	0			0	0	0	5280	5280	0						1	
Stillwater #F	42-43	5280	0			0	0	0	5280	5280	0						0	Stillwater Valley golf

										course
Trib. 4	42.19	5882	0	0	0	0	5882	5882	0	1
Stillwater #F	43-44	5280	0	0	0	0	5280	5280	0	1
Trib. 5	43.8	7667	4761	0	0	0	4588	4588	6158	1
Stillwater #F	44-45	5280	0	0	0	0	5280	5280	0	2
Stillwater #F	45-45.85	4488	0	0	0	0	4488	4488	0	0
									0	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	111	210	2000	800	228	386,880	15	0	32	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
			Feet:		Acres:	60.1
13,429.00	0	0				

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #F	EWH	FULL						
RM 44.4			47ns	10.2	42	73		
RM 41.4			50	9.2ns	36	75		
RM 37.7			51	9.3	44	81.5		

RM 33.5 48

a - MIwb is not applicable to headwater streams with
drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (
4 IBI units or 0.5 Miwb units)

Table 47: Watershed Inventory Trotters Creek HUC 05080001 100 050

Stillwater River Watershed Inventory

Trotters Creek Subwatershed

HUC 05080001 100 050

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Unrestricted access to Livestock	Livestock operation needing improved	Livestock operation complying	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)				Whole Field (Acres)	Buffers (CCRP) (Acres)			
Trotters Creek													23	2					
Mouth of Trotters Creek	0-1	5280							5280	5280	0							4	
Trib 1 - Sigmon Ditch	0.3	14,766	14,766						3569	6654	19309							4	
Trotters Creek	1-2	5280	5280						5280	5280	0							1	
Trotters Creek	2-3	5280	5280						314	314	9932							3	
Trotters Creek	3-4	5280	5280						1544	1544	7472							2	
Trib 2	3.15	3889	3889						2849	2849	2080							0	
Trotters Creek	4-5	5280	5280						0	0	10560							1	
Trotters Creek	5-5.44	2349	2349						1083	1702	1913							0	
											0								

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	57	163	0	3000	74	0	49500	0	48	153	1

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected

12,169	0	0	Feet: 0	Acres: 0

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Trotter's Creek	WWH	FULL						
RM 0.3			48	9.4		73.5		
RM 0.9					44			

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 48: Watershed Inventory Harris Creek HUC 05080001 100 060

Stillwater River Watershed Inventory

Harris Creek Subwatershed

HUC 05080001 100 060

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Harris Creek												2	3	31	5.4	0		
Mouth of Harris Creek	0-1	5280							5280	3520	1760							1
Harris Creek	1-2	5280	3646						5280	1570	3710							1
Harris Creek	2-3	5280	5280						4560	0	6000							1
Ballinger Run	2.54	24113	24113			15434			1095	1779	45352							5
Harris Creek	3-4	5280	5280						1300	360	8900							2
Harris Creek	4-5	5280	5280						4948	420	5192							0
Harris Creek	5-6	5280	5280						1325	1325	7910							3
Harris Creek	6-7	5280	5280						0	0	10560							3
Harris Creek	7-8	5280	5280			5280			0	0	10560							3
Harris Creek	8-9	5280	5280			5280			0	0	10560							1
Harris Creek	9-11.3	12239	12239			12239			0	0	24478							2
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	50	514	4000	3000	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
			Feet:	0	Acres:	42.2
11,588.00	1	0				

Ballinger Run - Hog Manure
500,000 gallons

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Harris Creek	MWH	Partial ; Full						
RM 5.2					44			
RM 3.8			35	5.1		31		
RM 1.9			57.5	5.3	36	30		
RM 1.1					38			
RM 0.9			42	6.8*		73		

a - MIwb is not applicable to headwater streams with
drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (
4 IBI units or 0.5 Miwb units)

Stillwater Watershed Inventory HUC 05080001 110

Table 49: Watershed Inventory Greenville Creek #D HUC 05010001 110 010

Stillwater River Watershed Inventory

Greenville Creek #D

HUC 05080001 110 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)				Livestock operation without CNMP	Livestock operation with CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)				Whole Field (Acres)	Buffers (CCRP) (Acres)			
Greenville Creek #D													1	0	0	3.2	0		
Mouth of Greenville Creek #D	30.15-30.75	3170							2084	2084	2172							1	
Trib 1	30.75	7040	3923						3117	2370	8593							1	
Greenville Creek #D	30.75-31	1363	1363						1363	1363	0							0	
Greenville Creek #D	31-32	5280	5280						1640	721	8199							8	Golf Course
Greenville Creek #D	32-33	5280	5280						5280	5280	0							1	
Greenville Creek #D	33-34	5280	5280						5280	5010	270							0	
Trib 2	33.2	5500	5500						2540	2540	5920							1	
Greenville Creek #D	34-34.49	2584	2584						2584	2584	0							2	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	30	0	0	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected

3,912.00	**0**	0	Feet:	0	Acres:	0

Water Quality Assessment								
**All Data from OEPA*								
Stream Name	**Use Designation**	**Attainment Status**	**IBI**	**Miwb**	**ICI**	**QHEI**	**Comment**	**Test Site name**
Greenville Creek #D								
RM 30.2	EWH	Full	48	9.1	42	76		
RM 33			52	8.5		61		
RM 34.3					58			

a - MIwb is not applicable to headwater streams with
drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria
(4 IBI units or 0.5 Miwb units)

Table 50: Watershed Inventory Dismal Creek HUC 05080001 110 020

Stillwater River Watershed Inventory

Dismal Creek

HUC 05080001 110 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Dismal Creek												5	2	98	1.9	0		
Mouth of Dismal Creek	0-0.2	950	950						660	660							1	
Trib 1	.2	4700	4700			4700	0	6700	0	300	9100						2	
Dismal Creek	.2-1	4275	4275						3470	250	4830						1	
Dismal Creek	1-2	5280	5280						420	550	9590						1	
Trib 2	1.35	6850	6850						0	820	12880						2	
Dismal Creek	2-3	5280	5280						1470	1115	7975						2	
Dismal Creek	3-4	5280	5280						4815	530	5215						1	
Dismal Creek	4-4.8	4225	4225						0	0	8450						0	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	54	294	0	204	0	60	11,000	7,000	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
5,437.00	8 spills	0	Feet:	Acres:

4- Heartland Processing - milk

4 - Other - liquid manure, sewage bypass,

wood preservative, oil

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Dismal Creek	WWH	Non-attaining; partial; full	27	N/A				
RM 4.7					42			
RM 1.8					32			
RM 0.1					36			
RM 3.8			27*			44		
RM 2.2			25*			53		
RM 0.1			36ns			48		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 51: Watershed Inventory Kraut Creek HUC 05080001 110 030

Stillwater River Watershed Inventory

Kraut Creek

HUC 05080001 110 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with CNMP	CRP		WRP	Failing septics (%)	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)				
Kraut Creek												3	4	95	37.1	0			
Mouth of Kraut Creek	0-1	5280	5280						2965	1597	5998							1	
Kraut Creek	1-2	5280	5280						0	0	10560							1	
North Fork of Kraut Creek	1.65	29,040	29,040						0	0	58080							8	
North Fork of Kraut Creek	2-3	5280	5280						0	0	10560							1	
North Fork of Kraut Creek	3-4	5280	5280						3319	3319	3922							1	
North Fork of Kraut Creek	4-5	5280	5280						2812	2812	4936							2	
North Fork of Kraut Creek	5-6	5280	5280						2110	655	7795							2	
North Fork of Kraut Creek	6-7	5280	5280						3012	3012	4536							0	
Trib 1	6.3	5578	5578						1150	2358	7648							2	
Trib 2	6.7	9200	9200						1658	700	16042							3	
North Fork of Kraut Creek	7-8	5280	5280						700	2305	7555							2	
North Fork of Kraut Creek	8-9	5280	5280						0	0	10560							1	

North Fork of Kraut Creek	9-9.28	1478	1478					0	0	2956	2	outlets into wetland d
										0		
										0		

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	70	70	0	6740	672,000	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
13,661.00	1	3	Feet: 0	Acres: 0

Diesel Fuel

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Kraut Creek	WWH	Full						
RM 5.9			54	NA	46	61.5		
RM 4.4			50	NA		52		
RM 0.6			42	8.8	42	70		

a - MIwb is not applicable to headwater streams with

drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (
4 IBI units or 0.5 Miwb units)

Table 52: Watershed Inventory Greenville Creek #C HUC 05080001 110 040

Stillwater River Watershed Inventory

Greenville Creek #C

HUC 05080001 110 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Greenville Creek #C												5	2	58	5.8	44.9		
Mouth of Greenville Creek #C	24.28-25	4014	4014						4014	0	4014						1	
Greenville Creek #C	25-26	5280	5280						4263	2348	3949						0	
Trib 1	25.7	1658	1658						384	0	2932						0	
Greenville #C	26-27	5280	5280						5280	5280	0						0	
Trib 2	26.17	5775	5775						3648	4812	3090						2	
Greenville Creek #C	27-28	5280	5280						5280	5280	0						0	
Greenville Creek #C	28-29	5280	5280						5280	5280	0						1	
Greenville Creek #C	29-30	5280	5280						5280	5280	0						0	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	161	290	0	750	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
5,207.00	0	1	Feet:	38.62

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Greenville Creek #C	EWH	Full						
RM 24.7			50	8.5	50	71.5		
RM 26.7			48	7.9	46	56.5		
RM 28.97			45	8.4	50	48.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 53: Watershed Inventory West Branch Greenville Creek HUC 05080001 110 050

Stillwater River Watershed Inventory

West Branch Greenville Creek

HUC 05080001 110 050

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
West Branch Greenville Creek												15	0	125	65.4	0		
Mouth of West Branch Greenville Creek	0-1	5280							3948	3948	2664						1	
West Branch Greenville Creek	1-2	5280	5280						0	0	10560						1	
West Branch Greenville Creek	2-3	5280	5280						0	631	9929						1	
West Branch Greenville Creek	3-4	5280	5280						0	0	10560						1	
West Branch Greenville Creek	4-5	5280	5280						0	0	10560						1	
West Branch Greenville Creek	5-6	5280	5280						0	0	10560						2	
Spring Branch	6.85	16,266	16,266			14,866			0	0	32532						4	
West Branch Greenville Creek	6-7	5280	5280						0	2120	8440						0	
West Branch Greenville Creek	7-8	5280	5280			3180			0	0	10560						2	
West Branch Greenville Creek	8-9	5280	5280			5280			0	0	10560						1	
Trib 1	9.29	8239	8239						1865	1316	13297						1	
West Branch Greenville Creek	9-10	5280	5280			5280			0	0	10560						0	

West Branch Greenville Creek	10-11	5280	5280	5280	0	0	10560	2
West Branch Greenville Creek	11-12	5280	5280	5280	0	0	10560	0
Trib 2	11.1	9925	9925	1620	2210	1792	15848	2
							0	
							0	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	189	1365	0	1700	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
16,645.00	1 spill	0	Feet:	0	Acres:	0
	gas station - petroleum material					

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
West Branch	WWH	Partial; Full						
RM 10.7			42	NA	24	37		
RM 7.4			52	NA	40	42.5		
RM 5.8			56	NA	38	50		
RM 0.3			44	NA	40	78		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI

units or 0.5 Miwb units)

Stillwater Watershed Inventory HUC 05080001 120

Table 54: Watershed Inventory Greenville Creek #B HUC 05080001 120 010

Stillwater River Watershed Inventory

Greenville Creek #B

HUC 05080001 120 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	Number of New Homes	Failing septics (%)	Expected Development	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)							
Greenville Creek #B												1						
Mouth of Greenville Creek #B	17.74-18	1338	1338						1338	1338	0						1	
Greenville Creek #B	18-19	5280	5280						5280	4400	0						2	
Trib 1	18.43	8756	8756						6184	2835	8493						2	
Greenville Creek #B	19-20	5280	5280						5280	5280	0						1	
Greenville Creek #B	20-21	5280	5280						4040	4040	2480						2	
State Rubble Dam	20.8				1.3ft height													
Greenville Creek #B	21-22	5280	5280						5280	5280	0						2	
Trib 2	21.02	1531	1531						1531	1531	0						1	
Greenville Creek #B	22-23	5280	5280						5280	5280	0						0	
Rubble Dam	22.6				2.9ft height													
Greenville Creek #B	23-24	5280	5280						5280	5280	0						1	
Trib 3	23.67	2632	2632						2632	2632	0						0	
Greenville Creek #B	24-24.22	1142	1142						1142	1142	0						0	
											0							
Livestock Inventory			Nursery Pigs					Starter										

	Beef	Dairy		Swine	Layers	Pullets	Turkeys	Turkeys	Horses	Sheep	Goats
Totals:	20	0	0	0	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
6,494.00	5	0	Feet:	Acres: 96.4

Shell Oil - Gasoline, Corning Inc. Hydraulic Fluid, Greenville WWTP - sewage bypass,

GTI - urethane, petroleum material,

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation		Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Greenville Creek	EWH; WWH**		FULL						
RM 23.2				37ns	8.2		48.5		
RM 22.6						14			
RM 22.3						42			
RM 21.7				47	8.5		71.5		
RM 19.6				39*	7.5*	34	45		
RM 19.3				34	7.4	22			
RM 19.2						30			
RM 18.3				36ns	7.2*	26	53		

** Proposed headwaters to Greenville City Limits (including the City of Greenville) is WWH

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 55: Watershed Inventory Mud Creek HUC 05080001 120 020

Stillwater River Watershed Inventory

Mud Creek

HUC 05080001 120 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Mud Creek												9	2	81.1	3.7	131.42		
Mouth of Mud Creek	0-1	5280	5280						925	0	9635						1	
Trib 1	.6	4357	4357						340	0	8374						1	
Mud Creek	1-2	5280	5280						0	0	10560						0	
Mud Creek	2-3	5280	5280						0	0	10560						1	
Mud Creek	3-4	5280	5280						0	0	10560						1	
Mud Creek	4-5	5280	5280						0	0	10560						1	
Lake Branch	5.28	25,872	25,872			21,486			2048	3248	46448						8	
Mud Creek	5-6	5280	5280			3823			0	0	10560						1	Wayne Lake Area
Mud Creek	6-7	5280	5280			5280			0	0	10560						1	
Mud Creek	7-8	5280	5280			5280			0	0	10560						3	
Mud Creek	8-9	5280	5280			745	4535		0	0	10560						1	Gravel pits reroute creek
Mud Creek	9-10	5280	5280				3500		0	0	10560						1	
																	0	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	121	208	11,000	6140	0	0	0	0	0	10	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
18,920.00	0	0	Feet:	0	Acres:	0

Water Quality Assessment									
*All Data from OEPA									
Stream Name	Use Designation		Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Mud Creek	WWH		Full						
RM 7.7						16			
RM 6.1				54	NA		57.5		
RM 5.9						40			
RM 4.7				51	8.1	58	46		
RM 2.1				42	7.3*		35		
RM 0.1						54			

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 56: Watershed Inventory Bridge Creek HUC 05080001 120 030

Stillwater River Watershed Inventory

Bridge Creek

HUC 05080001 120 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/ Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Bridge Creek												3	0	90	0.7	0		
Mouth of Bridge Creek	0-1	5280	5280				2100		1380	760	8420						5	
Trib 1	1	11788	11788						0	0	23576						4	
Bridge Creek	1-2	5280	5280				5280		1385	1685	7490						3	
Bridge Creek	2-3	5280	5280				5280		1100	1100	8360						2	
Bridge Creek	3-4	5280	5280				5280		0	0	10560						1	
Bridge Creek	4-5	5280	5280				5280		0	0	10560						2	
Bridge Creek	5-5.75	3960	3960				3960		0	0	7920						0	
																	0	
																	0	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	253	0	0	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
6,472.00	0	0	Feet:	0	Acres:	0

Water Quality Assessment

*All Data from OEPA

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Bridge Creek	WWH	FULL						
RM 0.2					54			
RM 1.4			38ns	NA		39		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 57: Watershed Inventory Greenville Creek #A HUC 05080001 120 040

Stillwater River Watershed Inventory

Greenville Creek #A

HUC 05080001 120 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock Operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Greenville Creek #A												5	1	60	29.9	0		
Mouth of Greenville #A	0-1	5280	5280														1	
Greenville Creek #A	1-2	5280	5280						5280	5280	0						1	
Greenville Falls					9.9ft height													
Trib 1	2.03	3380	3380						1763	1763	3234						1	
Greenville Creek #A	2-3	5280	5280						5280	5280	0						0	
Trib 2	2.27	564	564						0	0	1128						1	
Greenville Creek #A	3-4	5280	2700						5280	5280	0						2	
Trib 3	3.71	4884	4884						4025	4025	1718						2	
Greenville Creek #A	4-5	5280	2748						5280	5280	0						1	
Trib 4	4.3	3310	3310						701	701	5218						1	
Greenville Creek #A	5-6	5280	5280						5280	5280	0					0	1	Stone Quarry
Greenville Creek #A	6-7	5280	5280						5280	5280	0						1	
Trib 5	6.33	1132	1132						1132	1132	0						0	
Trib 6	6.69	4709	4709						4127	2495	2796						1	
Greenville Creek #A	7-8	5280	5280						5280	5280	0						1	
Trib 7	7.13	3039	3039						0	0	6078						1	

Greenville Creek #A	8-9	5280	5280					5280	5280	0		0
Trib 8	8.93	1230	1230					1230	1230	0		0
Greenville Creek #A	9-10	5280	3320					5280	5280	0		0
Trib 9	9.32	7638	7638			4111		1967	2267	11042		2
Greenville Creek #A	10-11	5280	5280					5280	5280	0		2
Trib 10	10	4150	4150					3943	3884	473		2
Trib11	10.85	1647	1647					852	671	1771		1
Greenville Creek #A	11-12	5280	5280					5280	5280	0		0
McQuay Ditch	11.55	29833	29833			17903		10348	10925	38393		10
Greenville Creek #A	12-13	5280	5280					3623	5280	1657		0
Popular Ditch	12.33	30626	30626					8746	8640	43866		6
Bolton Run	12.79	33935	33935					5649	7379	54842		8
Trib 12	12.88	4313	4313					567	800	7259		2
Greenville Creek #A	13-14	5280	5280					5280	5280	0		1
Trib 13	13.88	5053	5053					1166	1166	7774		1
Greenville Creek #A	14-15	5280	5280					5280	5280	0		0
Bears Mill dam	14			7.3ft height								
Trib 14	14.74	5817	4134		1184			814	814	10006		2
Greenville Creek #A	15-16	5280	5280					3890	5280	1390		0
Trib 15	15.21	160	160		160			160	160	0		0
Greenville Creek #A	16-17	5280	5280					4507	3860	2193		1
Trib 16	16.53	1578	1578					0	0	3156		1
Greenville Creek #A	17-17.76	4004	4004					2836	4004	1168		0
										0		

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	54	0	50	4760	0	0	11000	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
23,537.00	0	0	Feet:		Acres:	87.5

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Greenville Creek #A	EWH	FULL						
RM 16.3			37*	8.6*	54	71		
RM 13.4			46ns	9.6	50	80.5		
RM 10.9			48ns	8.9ns	50	85.5		
RM 6.2			46ns	9.1ns	44	83.5		
RM 3.7			38*	38*		75		
RM 1.4			55	55	46	75.5		
RM 0.1					50			

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 58: Watershed Inventory Dividing Branch HUC 05080001 120 050

Stillwater River Watershed Inventory

Dividing Branch

HUC 05080001 120 050

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Dividing Branch												3	2	0	14.4	0		
Mouth of Dividing Branch	0-1	5280	5280			5280			4093	4093	2374						3	
Dividing Branch	1-2	5280	5280			5280			0	0	10560						2	
Dividing Branch	2-3	5280	5280			5280			0	0	10560						1	
Dividing Branch	3-4	5280	5280			2830	2450		0	0	10560						2	
Dividing Branch	4-5	5280	5280				5280		1135	1135	8290						1	
Dividing Branch	5-6	5280	5280				5280		0	0	10560						0	
Dividing Branch	6-7	5280	5280				5280		0	0	10560						2	
Dividing Branch	7-7.9	4790	4790				4790		0	1100	8480						1	

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	0	222	0	3920	0	0	0	0	0	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
7,032.00	0	0	Feet:	0	Acres:	0

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Dividing Branch	WWH	FULL						
RM 2.4			48	NA	28	40.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Stillwater Watershed Inventory HUC 05080001 130

Table 59: Watershed Inventory Stillwater River #E HUC 05080001 130 010

Stillwater River Watershed Inventory

Stillwater River #E Subwatershed

HUC 05080001 130 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation needing improved	Livestock operation complying	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #E												10	0					
Mouth Stillwater #E	29.52-30	2534	0			0	0	0	2534	2534	0						1	Mouth of Painter Crk
Sugar Grove Dam																		
Stillwater #E	30-31	5280	0		1ft height	0	0	0	5280	5280	0						1	
Stillwater #E	31-32	5280	0			0	0	0	5280	5280	0						0	
Rock Dam					2.6ft height													
Stillwater #E	32-32.38	2006	0			0	0	0	2006	2006	0						1	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	349	0	0	0	6	0	0	0	19	0	85

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
6,264.00	2	0	Feet:	Acres: 0
	Covington WWTP - sewage bypass			

Covington Flea Market - motor oil

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #E	EWH	FULL						
RM 32.1			54	10.1	52	81		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 60: Watershed Inventory Painter Creek HUC 05080001 130 020

Stillwater River Watershed Inventory

Painter Creek Subwatershed

HUC 05080001 130 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Painter Creek												11	1	0	11.3	0		
Mouth of Painter Creek	0-1	5280	5280						5280	5280	0						1	
Painter Creek	1-2	5280	5280						3600	3600	3360						1	
Painter Creek	2-3	5280	5280						3770	3770	3020						0	
Painter Creek	3-4	5280	5280						3939	3725	2896						1	
Painter Creek	4-5	5280	5280						4374	3378	2808						2	
Painter Creek	5-6	5280	5280					900	4016	4016	2528						2	
Painter Creek	6-7	5280	5280					4706	0	3128	7432						1	
Tiling	6.24	5067 tiled									5067	0	0	10134			2	
Painter Creek	7-8	5280	5280					5280	973	1334	8253						2	
Painter Creek	8-9	5280	5280					5280	4610	2923	3027						1	
Painter Creek	9-10	5280	5280					5280	1054	1054	8452						1	
Painter Creek	10-11	5280	5280					5280	2401	0	8159						2	
Trib 1	10.26	10354	10354			10354			641	0	20067						2	
Tiling	Off Trib 1	4546						4546	0	0							1	
Trib 2	10.8	44739	44739						2193	2075	85210						11	
Painter Creek	11-12	5280	5280					5280	0	0	10560						1	

Painter Creek	12-13	5280	5280	5094		0	0	10560		0
Trib 3	12.18	30103	30103			0	0	60206		8
Painter Creek	13-14	5280	5280	5280		0	0	10560		2
Painter Creek	14-15	5280	5280	5280		0	0	10560		2
Painter Creek	15-16	5280	5280	5280		0	0	10560		2
Trib 4	15.4	7475	7475			308	0	14642		1
Painter Creek	16-17	5280	5280	5280		0	0	10560		1
Tiling	16.16	2677			2677					0
Painter Creek	17-18	5280	5280	5280		0	0	10560		2
Painter Creek	18-19	5280	5280	5280		0	0	10560		1
Painter Creek	19-19.93	4907	4907	4907		767	339	8708		1
Tiling	19	5580			5580					1

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	110	475	300	575	0	0	0	0	16	0	8

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
22,675.00	1	0	Feet:	0	Acres:	0

Chicken Manure

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Painter Creek	MWH	Full; non-attaining; Partial						
RM 17.9					30			

RM 16.9	28	NA		27.5	
RM 16.2	16*	NA		32	Very Poor
RM 15.5			10		Very Poor
RM 14.7	12*	NA	4	28	Very Poor
RM 9.7	24	5.6*		40.5	Poor
RM 8.9			26		
RM 4.4			40		
RM 3.4	33*	6.8*		77.5	
RM 1.1			44		Very Good
RM 0.7	33*	6.3*		62.5	

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 61: Watershed Inventory Little Painter Creek HUC 05080001 130 030

Stillwater River Watershed Inventory

Little Painter Creek Subwatershed

HUC 05080001 130 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges/Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Little Painter Creek												5	0	0	8.1	0		
Mouth of Little Painter Creek	0-1	5280							3932	3932	2696						1	
Trib 1	0.73	6137	6137						1641	541	10092						1	
Little Painter Creek	1-2	5280	5280						1700	1323	7537						2	
Little Painter Creek	2-3	5280	5280				5280		0	0	10560						1	
Trib 2	2.8	6,145	6,145			6,145			0	0	12290						2	
Little Painter Creek	3-4	5280	5280				5280		0	0	10560						1	
Little Painter Creek	4-5	5280	5280				5280		0	0	10560						2	
Little Painter Creek	5-6	5280	5280				5280		0	0	10560						2	
Trib 3-Heller Ditch	5.69	18,047	18,047			18,047			0	0	36094						5	
Little Painter Creek	6-7	5280	5280				5280		1000	0	9560						2	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	46	0	0	960	12	0	0	0	4	50	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
7883	0	0	Feet:	0	Acres:	0

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Little Painter Creek	WWH	Partial						
RM 0.4			34*	6.9*		43.5		
RM 1.2					14			

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 62: Watershed Inventory Stillwater River #D, HUC 05080001 130 040

Stillwater River Watershed Inventory

Stillwater River #D Subwatershed

HUC 05080001 130 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #D												48	8					
Mouth of Stillwater #D	21-22	5280	0			0	0	0	5280	5280	0						1	
Stillwater #D	22-23	5280	0			0	0	0	5280	5280	0						0	
Steiners	23.3				3.4ft height													
Stillwater #D	23-24	5280	0			0	0	0	5280	5280	0						2	
Stillwater #D	24-25	5280	0			0	0	0	5280	5280	0						0	
Stillwater #D	25-26	5280	0			0	0	0	5280	5280	0						1	
Stillwater #D	26-27	5280	0			0	0	0	5280	5280	0						0	
Stillwater #D	27-28	5280	0			0	0	0	5280	5280	0						2	
Mill Dam	27.2				0													
Mill Dam	27.6				1.1ft height													
Stillwater #D	28-29	5280	0			0	0	0	5280	5280	0						0	
Stillwater #D	29-29.52	2746	0			0	0	0	2746	2746	0						1	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	308	498	0	1774	2	0	0	0	120	24	15

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected		
22,567.00	2	0	Feet:	Acres:	28

hog manure, Canyon Run - milk byproducts

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #D	EWH	FULL						
RM 27.8			58	9.9	52	80.5		
RM 25.1			59	10.4	46	85.5		
RM 22.8			58	9.7		72.5		
RM 21.2					48			

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Stillwater Watershed Inventory HUC 05080001 140

Table 63: Stillwater River Watershed Inventory Ludlow Creek #A, HUC 05080001 140 010

Stillwater River Watershed Inventory

Ludlow Creek #A Subwatershed

HUC 05080001 140 010

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Unrestricted access to Livestock	Livestock operation needing improved	Livestock operation complying	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)				Whole Field (Acres)	Buffers (CCRP) (Acres)			
Ludlow Creek #A													16	1	4	19.3	0		
Mouth of Ludlow Creek	0-1	5280	0			0	0	0	2470	2470	5620							0	
Ludlow Creek #A	1-2	5280	0			0	0	0	5280	5280	0							1	
Ludlow Creek #A	2-3	5280	5280			0	0	0	5280	4725	555							2	
Ludlow Creek #A	3-4	5280	5280			0	0	0	5280	5280	0							1	
Ludlow Creek #A	4-5	5280	5280			0	0	0	5280	5280	0							3	
Ludlow Creek #A	5-6	5280	0			0	0	0	5280	5280	0							1	
Ludlow Creek #A	6-7	5280	5280			0	0	0	4280	5280	1000							1	
Trib 1- Bakers Ditch	8	2984	2984			0	0	0	2425	2983	560							0	
Ludlow Creek #A	7-8	5280	5280			0	0	0	4320	3840	2400							1	
Trib 2. - Feitshams Ditch	8.5	10,560	10,560			0	10,560	0	1572	1572	17976							3	
Ludlow Creek #A	8-9	5280	5280			0	0	0	2000	2482	6078							0	
Ludlow Creek #A	9-10	5280	5280			0	0	0	590	975	8995							1	
Ludlow Creek #A	10-11	5280	5280			0	0	0	920	0	9640							2	
Ludlow Creek #A	11-11.6	3168	3168			0	0	0	1700	435	4201							1	
Trib. 3 - Brown's Ditch	10.1	14,256	14,256			0	0	0	0	0	28512							6	
Trib 4	11.6	8,190	8,190			8190	0	0	0	0	16380							2	
Trib 5	11.8	19,536	19,536			0	0	0	1151	808	37113							4	

Ludlow Creek #A	11.6-12	2112	2112	0	0	0	0	0	4224	1
Ludlow Creek #A	12-13	5280	5280	0	0	0	0	0	10560	1
Ludlow Creek #A	13-14	5280	5280	3088	0	0	0	0	10560	4
Ludlow Creek #A	14-15	5280	5280	5280	0	0	0	0	10560	2
Ludlow Creek #A	15-16	5,280	5280	5280	0	0	0	0	10560	1
										0

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	80	200	0	900	24	0	0	0	17	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
19,924	1	0	Feet: 0	Acres: 0

Anhydrous Ammonia Spill

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Ludlow #A	MWH ; WWH	Full						
RM 12.6			34	NA	32	50.5	Proposed MWH	
RM 6.4			36ns	7.9ns	44	59.5		
RM 3.5			44	8.1	42	77		
RM 2.9			42	8.1		78		
RM 2.3			40	7.9	40	76		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 64: Stillwater River Watershed Inventory Hog Run HUC 05080001 140 020

Stillwater River Watershed Inventory

Hog Run Subwatershed

HUC 05080001 140 020

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Hog Run												9	3	0	0	0		
Mouth of Hog Run	0-1	5280	5280			0	0	0	2235	2235	6090						2	
Trib 1	0.57	10,560	10,560			0	0	0	3080	3080	14960						3	
Hog Run	1-2	5280	5280			0	0	0	3110	3110	4340						1	
Hog Run	2-3	5280	5280			0	0	0	2300	1500	6760						1	
Hog Run	3-4	5280	5280			0	0	0	280	280	10000						2	
Hog Run	4-5	5280	5280			0	0	0	0	935	9625						2	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	121	138	0	2980	0	0	0	0	29	0	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
6207	0	0	Feet:	0	Acres:	0

Water Quality Assessment
**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Hog Run	WWH	FULL						
RM 0.2			48	7.9	30	70		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 65: Stillwater River Watershed Inventory Ludlow Creek #B, HUC 08080001 140 030

Stillwater River Watershed

Ludlow Creek #B Subwatershed

HUC 05080001 140 030

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Ludlow Creek #B - Brush Creek												8	1	0	0	0		
Mouth of Ludlow Creek # B	0-1	5280							5280	5280	0						3	
Ludlow Creek #B	1-2	5280							4540	4540	1480						2	
Ludlow Creek #B	2-3	5280	5280						3403	1983	5174						3	
Trib 1	2	2500	2500						800	2500	1700						1	
Ludlow Creek #B	3-4	5280	5280						2290	2290	5980						1	
Ludlow Creek #B	4-5	5280	5280						3200	3200	4160						2	
Ludlow Creek #B	5-6	5280	5280						1864	1536	7160						1	
Trib 2	5.9	15235	15235			10,000			0	0	30470						6	
Ludlow Creek #B	6-7	5280	5280						820	0	9740						0	
Ludlow Creek #B	7-8	5280	5280						0	755	9805						4	
Ludlow Creek #B	8-8.5	2640	2640						0	0	5280						2	
Ludlow Creek #B	8.5-9.6	5700	5700						0	0	11400						4	
											0							

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Starter Turkeys	Turkeys	Horses	Sheep	Goats
Totals:	14	0	0	150	30	0	0	0	12	3	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
14,795	3	0	Feet:	0	Acres:	0

solvent, heating oil, diesel fuel

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Ludlow #B - Brush Creek	WWH	Non-attaining / Full						
RM 7.1			38ns	NA		40.5		
RM 0.4			40	8		75.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 66: Stillwater River Watershed Inventory Stillwater River #C, HUC 05080001 140 040

Stillwater River Watershed Inventory

Stillwater River #C Subwatershed

HUC 05080001 140 040

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #C												28	0					
Mouth of Stillwater #C	14.2-15.0	4224	0						4224	4224	0						1	Mouth of Brush Creek
Stillwater #C	15-16	5280	0						5280	5280	0						0	
Stillwater #C	16-17	5280	0						5280	5280	0						0	
Stillwater #C	17-18	5280	0						5280	5280	0						1	
West Milton Dam	18.3			7.4 height														
Stillwater #C	18-19	5280	0						5280	5280	0						0	
Stillwater #C	19-20	5280	0						5280	5280	0						0	
Stillwater #C	20-21	5280	0						5280	5280	0						1	Mouth of Ludlow Creek
											0							

Livestock Inventory	Beef	Ostriches	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	75	30	0	50	10	0	0	0	39	215	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected			
			Feet:	0	Acres:	0
10,942.00	3	0				

oil 2Xs , white ammonia
material

Water Quality Assessment								
*All Data from OEPA								
Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #C	EWH	FULL						
RM 18			57	9.8	48	75		
RM 16			59	10.1	44	80.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 67: Stillwater River Watershed Inventory Brush Creek, HUC 05080001 140 050

Stillwater River Watershed Inventory

Brush Creek Subwatershed

HUC 05080001 140 050

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)	
Brush Creek												27	1			
Mouth of Brush Creek	0-1	5280							5280	5280	0					
Brush Creek	1-2	5280							3205	3205	4150					
Trib 1	1.02	3107							3107	3107	0					
Trib 2	2.31	8976	8976						1812	1812	14328					
Brush Creek	2-3	5280	5280						3964	3964	2632					
Brush Creek	3-4	5280	5280						600	0	9960					
											0					

Livestock Inventory	Beef	Ostriches	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	150	23	0	400	49	0	0	0	116	45	2

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
			Feet:	Acres:
10,861.00	0	0		

Water Quality Assessment
**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name	
Brush Creek	EWH ; WWH	FULL							
RM 0.1			41	NA	36	63			0
									0

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 68: Stillwater River Watershed Inventory Stillwater River #B, HUC 05080001 140 060

Stillwater River Watershed Inventory

Stillwater River #B Subwatershed

HUC 05080001 140 060

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Livestock operation without a CNMP	Livestock operation with a CNMP	CRP		WRP
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)			Whole Field (Acres)	Buffers (CCRP) (Acres)	
Stillwater #B												6	0			
Mouth of Stillwater #B	9-10	5280	0						5280	5280	0					
Englewood Dam	9.0				120ft height											
Impoundment Dam	9.1				8ft height											
Stillwater #B	10-11	5280	0						5280	5280	0					
Stillwater #B	11-12	5280	0						5280	5280	0					
Construction Dam	12.7				1.6 height											
Stillwater #B	12-13	5280	0						5280	5280	0					
Mill Dam	13				0											
Stillwater #B	13-14	5280	0						5280	5280	0					
Trib 1 Pigeye Creek	13.19	12,687	1630		2520				7918	7918	9538					
Stillwater #B	14-14.2	1056	0						1056	1056	0					
Trib 2 Mill Creek	14.1	19,735	19,735						8363	8363	22744					

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	30	0	0	1650	3	0	0	0	114	2	0

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
15,194.00	33	0	Feet:	Acres:

All 33 spills were from the Dayton Airport in the Millcreek Subwatershed

deicing fluid (glycol), urea, ethylene glycol/diesel

jet fuel, proplylene glycol

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #B	EWH	FULL						
RM 11.3			52	9.8	48	76.5		
RM 8.9			28*	7.5		52	Englewood Reservoir	

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range,though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Table 69: Stillwater River Watershed Inventory Stillwater River #A, HUC 05080001 140 070

Stillwater River Watershed Inventory

Stillwater River #A Subwatershed

HUC 05080001 140 070

Stream Segment	River Mile	Length (ft)	Channelized (ft)	Levied (ft)	Dammed (ft)	County Maintained Ditches			Riparian Buffer (>50' in width)			Unrestricted access to Livestock	Livestock operation needing improved	Livestock operation complying	CRP		WRP	Bridges / Culverts	Notes
						Full(ft)	Brush control(ft)	Tile(ft)	Left descending bank (ft)	Right descending bank (ft)	Buffer needed (ft)				Whole Field (Acres)	Buffers (CCRP) (Acres)			
Stillwater #A																			
Mouth of Stillwater #A	0-1	5280							5280	3800	1480							1	Empties into the GMR
Stillwater #A	1-2	5280							5280	5280	0							1	
Stillwater #A	2-3	5280							5280	5280	0							1	
Trib 1	2.3	24,102							13054	13054	22096							13	Urban Stream
Rock Dam	3.3				2 height														
Stillwater #A	3-4	5280							5280	5280	0							0	
Trib 2	3.65	3365							3365	3365	0							3	Urban Stream
Stillwater #A	4-5	5280							5280	5280	0							1	
Trib 3	5.52	4350							4350	4350	0							1	
Stillwater #A	5-6	5280							5280	5280	0							1	
Trib 4	5.8	2620							2620	2620	0							3	
Stillwater #A	6-7	5280							3825	1041	5694							0	
Stillwater #A	7-8	5280							5280	5280	0							2	
Gaging Station weir	8.8				.6ft height														
Stillwater #A	8-9	5280							5280	5280	0							0	Englewood Dam
											0								

Livestock Inventory	Beef	Dairy	Nursery Pigs	Swine	Layers	Pullets	Turkeys	Starter Turkeys	Horses	Sheep	Goats
Totals:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Subwatershed Total Acres	Spills and Discharges	Permitted Facilities	Streambank permanently protected	
16,809.00	9	0	Feet:	Acres:

Englewood WWTP - pesticide discharge

Floor stripping solvent, white milky material

Petroleum material, diesel fuel, floating brown material

Oil, paint wastes, unauthorized discharge (Miller Bros.)

Water Quality Assessment

**All Data from OEPA*

Stream Name	Use Designation	Attainment Status	IBI	Miwb	ICI	QHEI	Comment	Test Site name
Stillwater #A	EWH	Full						
RM 8.86					40			
RM 8.85					48			
RM 8.6			53	10.3		88		
RM 8.3					32			
RM 5.0			59	10.5	46	85.5		
RM 1.6					46			
RM 1.2			55	10.5		85.5		

a - MIwb is not applicable to headwater streams with drainage areas 20 square miles

* - Indicates significant departure from applicable biological criteria (>4IBI uits or >0.5 Miwb units) Underlined scores in the Poor to Very Poor range, though not necessarily a significant departure in the case of Modified Warmwater Habitat.

ns - Non significant departure from applicable biological criteria (4 IBI units or 0.5 Miwb units)

Groundwater Quality

The following summary of groundwater quality data was collected by USGS under the National Water Quality Assessment (NAWQA) Program and Miami Conservancy District (2002). The data provides a brief summary of the groundwater resources in the Stillwater River watershed. The groundwater in the aquifers of the Stillwater River watershed tends to be very hard due to the presence of dissolved calcium, magnesium, and iron. Arsenic was present at detectable concentrations in some of the wells sampled by USGS and Miami Conservancy. The concentrations of arsenic ranged from below instrument detection level to 24ug/L. Iron concentrations were generally high enough (greater than 300 ug/L) to cause staining of plumbing fixtures and laundry in an iron removal system is not in place. Manganese concentrations in some samples were also high enough to cause staining.

USGS NAWQA and Miami Conservancy data suggests that most of the dissolved nitrogen in the aquifers of the Stillwater River Watershed occurs as nitrate or ammonia. Nitrogen concentrations measured as nitrite + nitrate in NAWQA wells ranged from 0.2 to 5.8 mg/L. Miami Conservancy data reported a range of nondetection to 8.47 mg/L for nitrogen as nitrite + nitrate. Analysis of nitrogen as nitrite revealed that nitrite was not the predominant nitrogen species and that most of the nitrogen was in the nitrate form. Dissolved phosphorus concentrations in NAWQA wells ranged from nondetection to 0.126 mg/L. Dissolved orthophosphate concentrations ranged from nondetection to 0.14 mg/L. Miami Conservancy data shows a range of nondetection to 0.07 mg/L for total phosphorus. The following pesticide compounds were detected in one or more samples from USGS NAWQA wells and Miami Conservancy wells in the Stillwater River Watershed: atrazine, cyanazine, metolachlor, simazine, and prometon. All of the concentrations were below the applicable drinking water MCL. Volatile organic compounds (VOCs) detected in Miami Conservancy wells include 1,1,1-trichloroethane, chloroform, and dichloromethane. The detections were all below the applicable drinking water MCL.

In 1999, the Stillwater Watershed Project sponsored a well testing program in selected subwatersheds of the Stillwater River watershed. Twenty-one wells in the subwatershed South Fork of the Stillwater River, twenty-three wells in the subwatershed Stillwater #J, ten wells in the subwatershed Brush Creek, and six wells in the subwatershed Canyon Run (now part of Stillwater #D) were sampled for nitrate, total dissolved solids, and total coliform. Each well was sampled four times over a year. The concentrations of nitrate were all below the MCL on 10 mg/L except at one site in the subwatershed Brush Creek. This sample point was from a spring. There were nine sites (three in Brush Creek, one in Canyon Run, four in South Fork, and one in Stillwater #J) that detected total coliform. Several sampling points had total dissolved solid concentrations over the MCL of 500 mg/L. There were four in South Fork, 16 in Stillwater #J, five in Brush Creek, and one in Canyon Run.

USGS-NAWQA Water Quality Study in the Stillwater River Watershed

In 2000, USGS in conjunction with the Centers for Disease Control conducted a water quality study in the Stillwater River watershed. A snapshot of water quality conditions in the Stillwater River watershed was obtained over a two-day period during a high

stream flow (runoff) event. Water samples from 30 subwatersheds were collected and analyzed for major ions, nutrients, selected pesticides, pesticide degradates, nitrogen isotopes, and antimicrobial compounds. The samples were also tested for resistance to a wide variety of antimicrobial compounds used for humans and animals. The snapshot was taken when hydrologic conditions (large runoff-generating storm) and agricultural activities (spring application of fertilizer) favored elevated concentrations of nutrients, pesticides, and antimicrobial compounds in runoff. Because row-crop and livestock/poultry production are practiced intensively in the Stillwater River watershed, the water-quality data were examined in relation to agricultural factors such as soil types, land use, proximity of sampling sites to confined animal feeding operations (CAFOs), and animal density. The data from this study was then compared to data from index stations in Ohio and data from a national reconnaissance study of antimicrobial compounds in streams.

The median concentration of nitrate and ammonia in runoff samples ranged from 4 to 10 times greater than the median concentrations recorded at three nearby index stations, whereas median concentrations of orthophosphate and potassium were not significantly different from those recorded at the index stations. Median concentrations of selected pesticides in runoff samples were 24 to 3,625 times greater than median concentrations from index stations. Median concentrations of pesticide degradates (deethyl atrazine, acetochlor OA, alachlor OA, metolachlor ESA and OA) detected in every sample during the runoff study were 2 to 122 times greater than those measured at the index stations. In addition, several pesticides that never or infrequently (< 3 percent) were detected in samples from index stations were detected in 10 to 31 percent of the runoff samples (USGS 2003).

A significant, positive correlation between nutrient concentrations in runoff samples and animal-production intensity was found. Nutrient and pesticide concentrations in the runoff were also positively correlated with certain soil associations. However, instantaneous yields of nutrients were not correlated with animal-production intensity (although highest nitrogen yields were associated with subwatersheds that had the greatest animal densities). No relations were observed between the proximity of AFO's to streams that drained to runoff sampling sites and nutrient concentrations and yields (USGS 2003).

The nitrogen isotope data indicate that most nitrate in spring agricultural runoff was derived from inorganic fertilizer and soil-nitrogen sources.

Antimicrobials were detected infrequently and at low concentrations. Of the 21 antimicrobials included in the analyte list, Lincomycin was detected in samples from 7 of the 30 sites and erythromycin-H_2O was detected in one sample. The frequencies with which these two compounds were detected in the runoff study were similar to frequencies of detection in other USGS studies. Lincomycin was not detected in samples from other sites in Ohio and its occurrence appears to be related to the presence of AFOs in the northern part of the Stillwater River watershed.

No *Campylobacter* or *Salmonella sp.* were detected in runoff samples. *E. Coli* was detected in samples from 60 percent of the sites and *Enterococcus sp.* were detected in every sample. Resistance and susceptibility of detected bacteria to

antimicrobials followed expected patterns according to the literature, except for about 10 percent of *Enterococcus sp.* isolates, which were resistant to vancomycin. This compound is used only to treat human illness and the source of resistance observed in these isolates is unknown (USGS 2003).

Based on these results, the significant effects of CAFOs on water quality were difficult to demonstrate with the runoff-sample dataset, at least partly because application of fertilizer to cropland in the Stillwater River watershed overshadows the effects of manure application on runoff water quality except in a few small subwatersheds. Also, findings that suggest high nutrient and antimicrobial concentrations are potentially correlated with high animal-production intensities are worthy of further study. The results of resistance testing provide little or no evidence for the theory that antimicrobial compounds commonly used in AFO's contribute to the increase of antimicrobial resistance in the bacteria (*E. coli, Enterococcus sp.*) isolated from the runoff samples.

Sources of Impairments or Threats

In 1999, the OEPA conducted sampling in the Stillwater Watershed in support of the Stillwater TMDL project. The sampling was done in six 11-digit HUCs, and the TMDLs were then written based on that data and the data from a computer model. The following tables, one for each HUC, were taken directly from the OEPA 2004 Integrated Water Quality Monitoring and Assessment Report. The report indicates the general condition of Ohio's waters and identifies waters that are not meeting water quality goals. More information about this report, explanations of acronyms and abbreviations, and instructions for download can be found online at http://www.epa.state.oh.us/dsw/tmdl/2004IntReport/2004OhioIntegratedReport.html.

Sources of Impairment, headwaters to upstream Swamp Creek HUC 05080001 090

Table 70: Watershed Assessment the Stillwater River (Headwaters to upstream Swamp Creek) HUC 05080001 090

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 115.0
05080001 090	Stillwater River (headwaters to upstream Swamp Creek)	

Integrated Report Assessment Category: 5 **Priority Points: 3**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH,MWH-C Sampling Year(s): 1999

Impairment: Yes

Stream Size Category	Raw Data: Data Available	Raw Data: No. Attaining	% Attainment: Full	% Attainment: Partial	% Attainment: Non	WAU Score: Full	WAU Score: Partial	WAU Score: Non
Small (Spatial)								
< 5 mi^2	14 Sites	5 Sites						
5-20 mi^2	11 Sites	5 Sites	56.1	9.1	34.8			
20-50 mi^2	3 Sites	2 Sites						
						63	14	23
Large (Linear)	6 Sites							
50-500 mi^2	21.8 Miles	15.1 Miles	69.3	18.4	12.3			

High Magnitude Causes	High Magnitude Sources
Nutrients	Nonirrigated Crop Production
Organic Enrichment/DO	Confined Animal Feeding Oper. (NPS)
Other Habitat Alterations	Onsite Wastewater Systems (Septic Tanks)
	Channelization - Agriculture

Recreation Use Assessment

Subcategory of Use: Primary Contact

Impairment: No

		Geometric Mean: 402
No. Ambient Sites: 20	No. Ambient Sampling Records: 42	75th %ile: 750
No. of NPDES MOR Sites: 1	No. of NPDES MOR Records: 19	90th %ile: 1800

Other:

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed: Yes

FCA Issued: Yes

(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")

Impairment Due to FCA: No Pollutant (Waterbody):

Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

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Sources of impairment, upstream Swamp Creek to upstream Greenville Creek HUC 05080001 100

Table 71: Watershed Assessment of the Stillwater River (Upstream Swamp Creek to Upstream Greenville Creek) HUC 05080001 100

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 121.4
05080001 100	Stillwater River (upstream Swamp Creek to upstream Greenville Creek)	

Integrated Report Assessment Category: 5 **Priority Points: 8**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH,MWH-C Sampling Year(s): 1999

Impairment: Yes

Stream Size Category	Raw Data: Data Available	Raw Data: No. Attaining	% Attainment: Full	% Attainment: Partial	% Attainment: Non	WAU Score: Full	WAU Score: Partial	WAU Score: Non
Small (Spatial)								
< 5 mi^2	8 Sites	3 Sites						
5-20 mi^2	13 Sites	5 Sites	19.3	52.5	28.2			
20-50 mi^2	3 Sites	0 Sites						
Large (Linear)	7 Sites					41	40	19
50-500 mi^2	27.3 Miles	17.3 Miles	63.4	27.5	9.1			

High Magnitude Causes	High Magnitude Sources
Other Inorganics	Combined Sewer Overflows
Nutrients	Nonirrigated Crop Productions
Siltation	Confined Animals Feeding Oper. (NPS)
Organic Enrichment/DO	Septage Disposal
Other Habitat Alterations	Channelization - Agriculture
	Spills

Recreation Use Assessment

Subcategory of Use: Primary Contact

Impairment: Yes

Geometric Mean: 761

No. Ambient Sites: 26 No. Ambient Sampling Records: 48 75th %ile: 2150

No. of NPDES MOR Sites: 2 No. of NPDES MOR Records: 46 90th %ile: 7101

Other:

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed: Yes

FCA Issued: Yes

(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")

Impairment Due to FCA: No Pollutant (Waterbody):

Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

Sources of impairment, Greenville Creek headwaters to downstream West Branch HUC 05080001 110

Table 72: Watershed Assessment of Greenville Creek (headwaters to downstream West Branch) HUC 05080001 110

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 70.1
05080001 110	Greenville Creek (headwaters to downstream West Branch)	

Integrated Report Assessment Category: 5 **Priority Points: 6**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH Sampling Year(s): 1999
Impairment: Yes

Stream Size Category	Raw Data: Data Available	Raw Data: No. Attaining	% Attainment: Full	% Attainment: Partial	% Attainment: Non	WAU Score: Full	WAU Score: Partial	WAU Score: Non
Small (Spatial)								
< 5 mi^2	1 Sites	0 Sites						
5-20 mi^2	8 Sites	6 Sites	87.5	6.3	6.2			
20-50 mi^2	2 Sites	2 Sites						
						94	3	3
Large (Linear)	3 Sites							
50-500 mi^2	16.2 Miles	16.2 Miles	100.0	0.0	0.0			

High Magnitude Causes	High Magnitude Sources
Organic Enrichment/DO	Channelization - Agriculture
Other Habitat Alterations	

Recreation Use Assessment

Subcategory of Use: Primary Contact
Impairment: Yes

No. Ambient Sites: 9	No. Ambient Sampling Records: 16	Geometric Mean: 372
No. of NPDES MOR Sites: 1	No. of NPDES MOR Records: 22	75th %ile: 1134
Other:		90th %ile: 1930

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed: Yes
FCA Issued: Yes
(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")
Impairment Due to FCA: No Pollutant (Waterbody):

Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

D.2-264 03/30/04

Sources of impairment, Greenville Creek downstream West Branch to mouth HUC 05080001 120

Table 73: Watershed Assessment of Greenville Creek (downstream West Branch to mouth) HUC 05080001 120

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 97.6
05080001 120	Greenville Creek (downstream West Branch to mouth)	

Integrated Report Assessment Category: 5 **Priority Points: 8**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH Sampling Year(s): 1999
Impairment: Yes

Stream Size Category	Raw Data: Data Available	Raw Data: No. Attaining	% Attainment: Full	% Attainment: Partial	% Attainment: Non	WAU Score: Full	WAU Score: Partial	WAU Score: Non
Small (Spatial)								
< 5 mi^2	8 Sites	5 Sites						
5-20 mi^2	8 Sites	8 Sites	100.0	0.0	0.0			
20-50 mi^2	2 Sites	2 Sites						
						75	18	7
Large (Linear)	11 Sites							
50-500 mi^2	24.3 Miles	12.1 Miles	49.8	35.8	14.4			

High Magnitude Causes	High Magnitude Sources
Organic Enrichment/DO	Major Municipal Point Source Onsite Wastewater System (Septic Tanks) Channelization - Development

Recreation Use Assessment

Subcategory of Use: Primary Contact
Impairment: Yes
Geometric Mean: 632
No. Ambient Sites: 27 No. Ambient Sampling Records: 51 75th %ile: 1200
No. of NPDES MOR Sites: 1 No. of NPDES MOR Records: 67 90th %ile: 2300
Other:

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed: Yes
FCA Issued: Yes
(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")
Impairment Due to FCA: No Pollutant (Waterbody):

Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

D.2-265 03/30/04

Sources of impairment, Stillwater River downstream Greenville Creek to upstream Ludlow Creek HUC 050800010 130

Table 74: Watershed Assessment of Stillwater River (downstream Greenville Creek to upstream Ludlow Creek) HUC 05080001 130

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 92.8
05080001 130	Stillwater River (downstream Greenville Cr. to upstream Ludlow Cr.); excluding Stillwater R mainstem	

Integrated Report Assessment Category: 5 **Priority Points: 5**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH,MWH-C Sampling Year(s): 1999
Impairment: Yes

Stream Size Category	Raw Data: Data Available	Raw Data: No. Attaining	% Attainment: Full	% Attainment: Partial	% Attainment: Non	WAU Score: Full	WAU Score: Partial	WAU Score: Non
Small (Spatial)								
< 5 mi^2	8 Sites	4 Sites						
5-20 mi^2	Sites	Sites	25.0	39.6	35.4			
20-50 mi^2	3 Sites	0 Sites						
						25	40	35
Large (Linear)	4 Sites							
50-500 mi^2	0.0 Miles	0.0 Miles	47.0	0.0	53.0			

High Magnitude Causes	High Magnitude Sources
Organic Enrichment/DO	Minor Municipal Point Source
Other Habitat Alterations	Combined Sewer Overflows
	Animal Holding/Management Areas
	Channelization - Agriculture

Recreation Use Assessment

Subcategory of Use: Primary Contact
Impairment: Yes

No. Ambient Sites: 13 No. Ambient Sampling Records: 21 Geometric Mean: 378
No. of NPDES MOR Sites: 1 No. of NPDES MOR Records: 12 75th %ile: 818
Other: 90th %ile: 5360

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed:
FCA Issued:
(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")
Impairment Due to FCA: Pollutant (Waterbody):

Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

Sources of impairment, upstream Ludlow Creek to mouth HUC 05080001 140

Table 75: Watershed Assessment of upstream Ludlow Creek to mouth HUC 05080001 140

Ohio EPA 2004 Integrated Report Appendix D.2
Watershed Assessment Unit (WAU) Summaries

HUC11	WAU Description	WAU Size (mi^2): 148.0
05080001 140	Stillwater River (upstream Ludlow Creek to mouth); excluding Stillwater R. mainstem	

Integrated Report Assessment Category: 5 **Priority Points: 6**
Next Scheduled Monitoring: 2009

Aquatic Life Use Assessment

Subcategories of ALU: EWH,WWH Sampling Year(s): 1999
Impairment: Yes

Stream Size Category	Raw Data Data Available	Raw Data No. Attaining	% Attainment Full	% Attainment Partial	% Attainment Non	WAU Score Full	WAU Score Partial	WAU Score Non
Small (Spatial)								
< 5 mi^2	4 Sites	1 Sites						
5-20 mi^2	6 Sites	4 Sites	83.3	8.3	8.4			
20-50 mi^2	5 Sites	5 Sites						
						83	8	9
Large (Linear)	10 Sites							
50-500 mi^2	0.0 Miles	0.0 Miles	0.0	0.0	0.0			

High Magnitude Causes	High Magnitude Sources	
Unionized Ammonia	Major Industrial Point Source	Spills
Nutrients	Nonirrigated Crop Production	
Organic Enrichment/DO	Urban Runoff/Storm Sewers (NPS)	
Other Habitat Alterations	Onsite Wastewater Systems (Septic Tanks)	
	Septage Disposal	
	Channelization - Agriculture	
	Channelization - Development	

Recreation Use Assessment

Subcategory of Use: Primary Contact
Impairment: Yes
Geometric Mean: 384
No. Ambient Sites: 19 No. Ambient Sampling Records: 28 75th %ile: 923
No. of NPDES MOR Sites: 0 No. of NPDES MOR Records: 0 90th %ile: 6782
Other:

Fish Consumption Advisory (FCA) Assessment

Waters Within the WAU Sampled and Assessed:
FCA Issued:
(See the 2004 Ohio FCA for more detailed information at "www.epa.state.oh.us/dsw/fishadvisory/index.html")
Impairment Due to FCA: Pollutant (Waterbody):

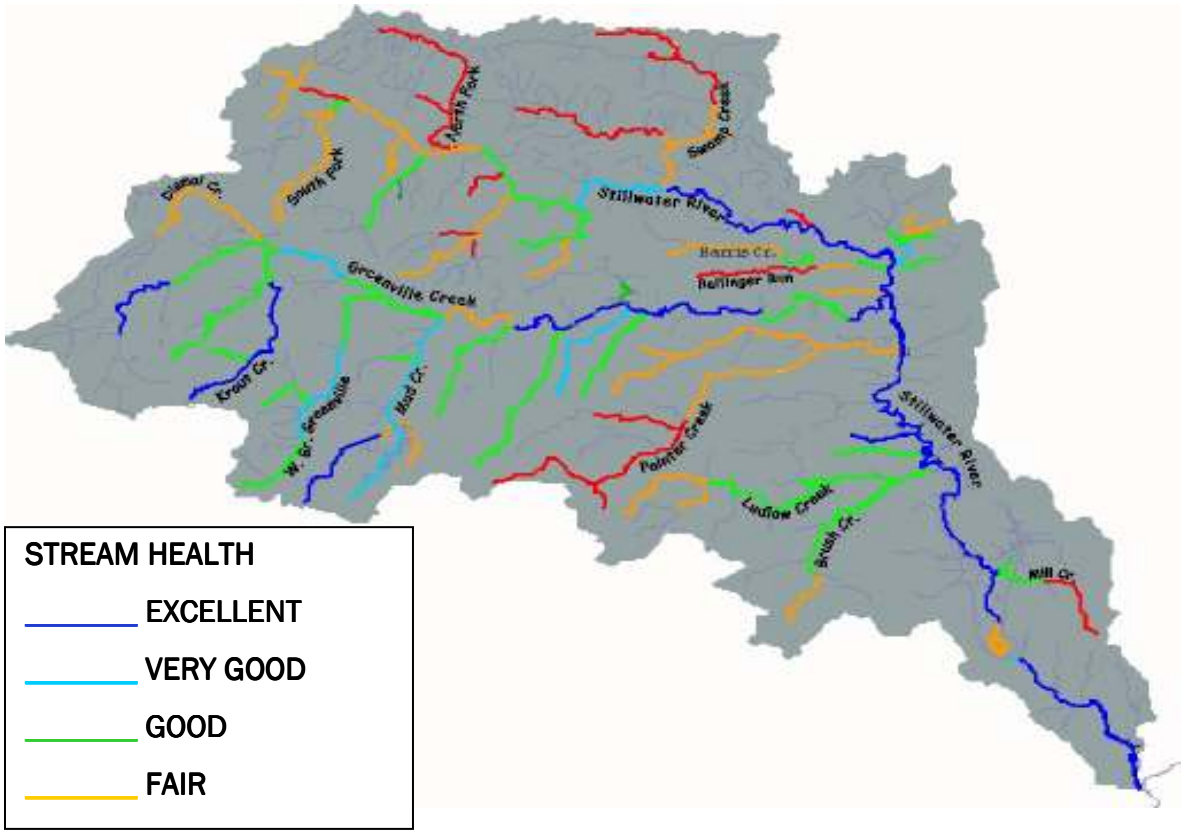
Comments

Development of TMDLs for pollutants impairing beneficial uses is in preparation for the Stillwater River basin. Monitoring in support of the TMDL was conducted in 1999.

Stream Water Resource Quality

The Stillwater Watershed stream segments with the highest biological water quality are the lower Stillwater River mainstem from Covington to the confluence with the Great Miami River, and Greenville Creek and its tributaries originating from the Farmersville Moraine. The most likely reason that the lower Stillwater River is in such good condition is because the riparian forest is intact, development within the adjacent flood plain is largely agricultural, and the agriculture practiced there employs conservation measures (OEPA 2003). Water quality and reasonably intact biological communities are maintained in Greenville Creek and its tributaries by groundwater-augmented base flow (OEPA 2003). Figure 9 illustrates the stream health of the Stillwater River watershed. The stream health index is a value that takes into account the Index of Biotic Integrity (IBI), Modified Index of well being (Miwb), and Invertebrate Community Index (ICI) (OEPA 2002).

Figure 9: Stream Health in the Stillwater River Watershed (OEPA 2001)



The most pervasive problem facing streams in the Stillwater River watershed is habitat destruction (no riparian corridor) through channelization resulting in a whole host of water quality problems such as sedimentation and organic enrichment from livestock and human waste entering the stream unimpeded (Figure 3). The stream segments having the poorest water quality and the most degraded biological communities are, in order of severity, Painter Creek, the North Fork of the Stillwater,

Swamp Creek, Indian Creek, the Stillwater River mainstem upstream from Ansonia, Ballinger Run, and Mill Creek. Painter Creek is degraded by Arcanum's failed sewage collection and treatment system. Swamp Creek, the North Fork of the Stillwater, and the Stillwater mainstem are impacted by habitat destruction and organic enrichment from land-applied manure, Indian Creek from the preceding factors plus failing septic systems, Ballinger Run by organic enrichment from combined sewer overflows (CSOs), and Mill Creek from deicing chemicals used at the Dayton-Cox International Airport.

Figure 10: Threats to Water Resource Quality in the Stillwater River Watershed

On a positive note, there have been many successes in water quality improvements in the Stillwater River watershed. Most of the point source problems along the Stillwater mainstem have been abated and considerable recovery has occurred since 1982 (2003). The existing threat from point sources is now population growth over-running treatment capacity. Also, the implementation of agricultural best management practices (BMPs), such as conversion of previously plowed acreage to no-till, filter strips, and conservation easements, have collectively resulted in improved biological communities for the entire Stillwater mainstem downstream from Ansonia. The Stillwater Watershed Project has been a big promoter of these BMPs. Over $1,061,000 has been raised by the project and in turn went to landowners within the Stillwater River Watershed for BMPs. Through these efforts, resource management plans cover 70,182 acres, which saves 421,089 tons of soil; nutrient

management plans cover 37,855 acres, which reduces commercial fertilizer application by 2,271,300 lbs.

Ohio Water Quality Standards

Ohio EPA employs biological, chemical, and physical monitoring and assessment techniques in bio-surveys in order to meet three major objectives:

- determine the extent to which use designations assigned in the Ohio Water Quality Standards (WQS) are either attained or not attained
- determine if use designations assigned to a given water body are appropriate and attainable
- determine if any changes in key ambient biological, chemical, or physical indicators have taken place over time, particularly before and after the implementation of point source pollution controls or best management practices. The data gathered by a bio-survey is processed, evaluated, and synthesized in a biological and water quality report. Each biological and water quality study contains a summary of major findings and recommendations for revisions to WQS, future monitoring needs, or other actions which may be needed to resolve existing impairment of designated uses. While the principal focus of a bio-survey is on the status of aquatic life uses, the status of other uses such as recreation and water supply, as well as human health concerns are also addressed.

The findings and conclusions of a biological and water quality study may factor into regulatory actions taken by Ohio EPA (e.g., National Permit Discharge Elimination System (NPDES) permits, Water Quality Permit Support Documents (SWPSDs) Director's Orders, the Ohio Water Quality Standards (OAC 3745-1), and are eventually incorporated into Water Quality Permit Support Documents (WQPSDs), State Water Quality Management Plans, the Ohio Non-point Source Assessment, and the Ohio Water Resource Inventory (OEPA 2001).

Hierarchy of Indicators

A carefully conceived ambient monitoring approach, using cost-effective indicators comprised of ecological, chemical, and toxicological measures, can ensure that all relevant pollution sources are judged objectively on the basis of environmental results. Ohio EPA relies on a tiered approach in attempting to link the results of administrative activities with true environmental measures. This integrated approach is outlined in Figure 11 and includes a hierarchical continuum from administrative to true environmental indicators. The six "levels" of indicators include:

- actions taken by regulatory agencies (permitting, enforcement, grants)
- responses by the regulated community (treatment works, pollution prevention)
- changes in discharged quantities (pollutant loadings)
- changes in ambient conditions (water quality, habitat)

- changes in uptake and/or assimilation (tissue contamination, biomarkers, waste load allocation)
- changes in health, ecology, or other effects (ecological condition, pathogens)

Figure 11: Hierarchical continuum from administrative to environmental indicators. (OEPA 2001)

Level 1	Actions by EPA and States	• NPDES Permit Issuance • Compliance/Enforcement • Pretreatment Program • Actual Funding • CSO Requirements • Storm Water Permits
Level 2	Responses By the Regulated Community	• POTW Construction • Local Limits • Storm Water Controls • BMPs for NPS Control
Level 3	Changes in Discharge Quantities	• Point Source Loadings (Effluent & Influent) • Whole Effluent Toxicity (WET) • NPDES Violations • Toxic Release Inventory
Level 4	Changes in Ambient Conditions	• Water Column Chemistry • Sediment Chemistry • Habitat Quality
Level 5	Changes in Uptake and/or Assimilation	• Assimilative Capacity – TMDL/ WLA • Biomarkers
Level 6	Changes in Health and Ecology, or Other Effects	• Biota (Biocriteria) • Bacterial Contamination • Target Assemblages (RT & E, Declining Species)

In this process the results of administrative activities (levels 1 & 2) can be linked to efforts to improve water quality (levels 3,4, and 5), which should translate into the environmental "results:" (level 6). Thus, the aggregate effect of billions of dollars spent on water pollution control since the early 1970s can now be determined with quantifiable measures of environmental condition.

Superimposed on this hierarchy is the concept of stressor, exposure, and response indicators. Stressor indicators generally include activities that have the potential to degrade the aquatic environment such as pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Exposure indicators are those that measure the effects of stressors and can include whole effluent toxicity tests, tissue residues, and biomarkers, each of which provides evidence of biological exposure to a stressor or bio-accumulative agent. Response indicators are generally composite measures of the cumulative effects of stress and exposure and include the more direct measures of community and population response that are represented here by the biological indices which comprise Ohio's biological criteria. Other response indicators could include target assemblages (i.e., rare, threatened, endangered, special status, and declining species or bacterial levels which serve as surrogates for the recreational uses). These indicators represent the essential technical elements for watershed-based management approaches. The key, however, is to use the different indicators within the roles which are most appropriate for each.

Describing the causes and sources associated with observed impairments revealed by the biological criteria and linking this with pollution sources involves an interpretation of multiple lines of evidence including water chemistry data, sediment data, habitat data, effluent data, bio-monitoring results, land use data, and biological response signatures within the biological data itself. Thus the assignment of principal causes and sources of impairment represents the association of impairments (defined by response indicators) with stressor and exposure indicators. The principal reporting venue for this process on a watershed or sub-basin scale is a biological and water quality report. These reports then provide the foundation for aggregated assessments such as the Ohio Water Resource Inventory (305(b) report), the Ohio NPS Assessment, and technical bulletins.

Ohio Water Quality Standards: Designated Aquatic Life Uses

The Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1) consist of designated uses and chemical, physical, and biological criteria designed to represent measurable properties of the environment that are consistent with the narrative goals specified by each use designation. Use designations consist of two broad groups, aquatic life and non-aquatic life uses. In applications of the Ohio WQS to the management of water resource issues in rivers and streams, the aquatic life use criteria frequently control the resulting protection and restoration requirements, hence their emphasis in biological and water quality reports. Also, an emphasis on protecting aquatic life generally results in water quality suitable for all uses. The five different aquatic life uses currently defined in the Ohio WQS with the general intent of each with respect to the role of biological criteria are described as follows (OEPA 2001):

- Warmwater Habitat (WWH) – this designation defines the "typical" warm water assemblage of aquatic organisms for Ohio Rivers and streams; this use represents the principal restoration target for the majority of water resource management efforts in Ohio. Biological criteria are stratified across five ecoregions for the WWH use designation.
- Exceptional Warmwater Habitat (EWH) – this use designation is reserved for waters which support "unusual and exceptional: assemblages of aquatic organisms which are characterized by a high diversity of species, particularly those which are highly intolerant and/or rare, threatened, endangered, or special status (i.e., declining species); this designation represents a protection goal for water resource management efforts dealing with Ohio's best water resources. Biological criteria for EWH apply uniformly across the state.
- Coldwater Habitat (CWH) – this use is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife; this use should not be confused with the Seasonal Salmonid Habitat (SSH) use which applies to the Lake Erie tributaries which support periodic "runs" of salmonids during the spring, summer, and/or fall. No specific biological criteria have been developed for the CWH use although the WWH biocriteria are viewed as attainable for CWH designated streams.
- Modified Warm water Habitat (MWH) – this use applies to streams and rivers which have been subjected to extensive, maintained, and essentially permanent hydro modifications such that the biocriteria for the WWH use are not attainable and where the activities have been sanctioned and permitted by state or federal law; the representative aquatic assemblages are generally composed species which are tolerant to low dissolved oxygen, silt, nutrient, enrichment, and poor quality habitat. Biological criteria for MWH were derived from a separate set of habitat modified reference sites and are stratified across five ecoregions and three major modification types: channelization, run-of-river impoundments, and extensive sedimentation due to non-acidic mine drainage.
- Limited Resource Water (LRW) – this use applies to small steams (usually <3 mi. 2 drainage area) and other water courses which have been irretrievably altered to the extend that no appreciable assemblage of aquatic life can be supported; such waterways generally include small streams in extensively urbanized areas, those which lie in watersheds with extensive drainage modifications, those which completely lack water on a recurring annual basis (i.e., true ephemeral streams), or other irretrievable altered waterways. No formal biological criteria have been established for the LRW use designation.

Chemical, physical, and/or biological criteria are generally assigned to each use designation in accordance with the broad goals defined by each. As such, the system of use designations employed in the Ohio WQS constitutes a "tiered" approach in that, varying and graduated levels, of protection are provided by each. This hierarchy is especially apparent for parameters such as dissolved oxygen, ammonia-nitrogen,

temperature, and the biological criteria. For other parameters such as heavy metals, the technology to construct an equally graduated set of criteria has been lacking, thus the same water quality criteria may apply to two or three different use designations.

Ohio Water Quality Standards: Non-Aquatic Life Uses (OEPA 2001)

In addition to assessing the appropriateness and status of aquatic life uses, each biological and water quality survey also addresses non-aquatic life uses such as recreation, water supply, and human health concerns as appropriate. The recreation used most applicable to rivers and streams are Primary Contact Recreation (PCR) and Secondary Contact Recreation (SCR) uses. The criterion for designating the PCR use is simply having a water depth of at least one meter over an area of at least 100 square feet or where canoeing is a feasible activity. If a water body is too small and shallow to meet either criterion the SCR us applies. The attainment status of PCR and SCR is determined using bacterial indicators (e.g., fecal coliform bacteria, E. coli) and the criteria for each are specified in the Ohio WQS.

Water supply uses include Public Water Supply (RWS), Agricultural Water Supply (AWS), and Industrial Water Supply (IWS). Public Water Supplies are simply defined as segments within 500 yards of a potable water supply or food processing industry intake. The Agricultural Water Supply (AWS) and Industrial Water Supply ((IWS) use designations generally apply to all waters unless it can be clearly shown that they are not applicable. An example of this would be an urban area where livestock watering or pasturing does not take place, thus the AWS use would not apply. Chemical criteria are specified in the Ohio WQS for each use and attainment status is based primarily on chemical-specific indicators. Human health concerns are additionally addressed with fish tissue data, but any consumption advisories are issued by the Ohio Department of Health and are detailed in other documents (Ohio EPA, Boucher 2002)."

Aquatic Habitat (OEPA 2001)

The Ohio EPA must make a determination of the aquatic uses of Ohio's waterways. Several structural indices are used to assess the health of the biological community and measure habitat quality. Biological indicators are features of the aquatic ecosystem that demonstrate the health and vitality of that ecosystem. The indices used by the Ohio EPA are the Index of Biological Integrity (IBI), the Invertebrate Community Index (ICI) and the Qualitative Habitat Evaluation Index (QHEI).

The Index of Biological Integrity (IBI) is a measure of fish species diversity and species populations. This index gives a score which indicates how much a stream habitat is affected by pollutants, and which types of fish are present. Depending on the pollution tolerance of the species, the IBI indicates which species are likely to be found in the stream. The highest score attainable is 60, and higher scores indicate healthier streams (Ohio EPA, 2001). Scores ranging from 44-49 are considered warm water habitat in the Western Alleghany Plateau region of Ohio

The Invertebrate Community Index (ICI) is based on measurements of macro-invertebrate communities living in a stream. Macro-invertebrate studies are

important to assess because many insect taxa are known to be either pollution tolerant or intolerant. The presence of certain species indicates the general water quality of an area. This index gives helpful clues about the amount of pollution stressing the stream environment (Ohio EPA, 2001.

The Qualitative Habitat Evaluation Index (QHEI) is a qualitative evaluation of stream habitat. Physical features that affect fish and invertebrate communities are evaluated. Some of the features evaluated include; type of substrate, amount and type of in-stream cover, channel width, sinuosity, and erosion. QHEI scores of 60 or above are considered conducive to the establishment of warm water fauna.

According to the Total Maximum Daily Load for the Stillwater River Basin Draft Report (2003) and Ohio EPA Biological and Water Quality Study of the Stillwater River Watershed (2001), the biological and water quality conditions vary widely in the Stillwater River basin from the best of the best to the worst or the worst measured with Ohio. A summary of the stream segments in the Stillwater River Watershed listed in the 2004 OEPA Water Quality and Assessment Integrated Report list and associated causes and sources of impairment are given in Tables 70-75.

Point Sources of Pollution

Point sources of pollution are those that are discharged from a specific pipe or outlet. Examples of point source pollution would be that from wastewater treatment plants and factories. This type of pollution differs from nonpoint sources such as sediment and nutrient-laden runoff water in that the amount and types of point source discharges are legislated in the Clean Water Act.

Wastewater Treatment and Disposal

The following data on point source dischargers were compiled by MVRPC in 1990[9] using third quarter 1989 Monthly Operating Reports submitted to Ohio EPA plus information supplied to MVRPC by wastewater treatment plants (WWTPs) through a mail survey. Funds for updating these data have not been available; however, significant changes are unlikely and the data provides baseline information about point source dischargers in the Stillwater River watershed.

Wastewater Treatment Plants (WWTPs)

Nine WWTPs are in the watershed with a total design flow of 7.7 million gallons per day (mgd) and a total average flow of 5.3 mgd. Greenville's WWTP accounts for one-half of the average flow, with Arcanum, West Milton, and Covington contributing 8—10% each towards the total discharge. Three WWTPs discharge into the Stillwater River and there is one discharge to each of: North Fork Stillwater, Greenville Creek, Swamp Creek, Ballinger Run, and Sycamore Ditch. Union City has no stream discharge since the effluent is land applied by irrigation. Ansonia, Arcanum, and Bradford report that 90—98% of their sewer systems are storm/sanitary combined

[9] *An Inventory of Municipal, Industrial, and Other Point Source Dischargers in the Miami Valley Region; Stillwater River Basin, Upper Great Miami River Basin, June 30, 1990.*

and Versailles reported 20% combined. The total number of reported Combined Sewer Overflow outlets is 31, with Arcanum reporting one-half of those. Total sludge production is reported at 136 dry tons per year. Known land application sludge sites are found near Versailles and West Milton. Stream segments totaling 40 miles, 14% of the assessed stream miles, have "sanitary sewers" listed as a category having a known or suspected impact on aquatic life use designation attainment.[10] Refer to Table 76.

Package Treatment Plants

Sixteen package plants are in the watershed, with ten of these clustered around the City of Greenville. Package plants are small-scale prefabricated wastewater treatment plants typically serving mobile home parks, residential developments, schools, restaurants and other entities that are beyond the service boundaries of municipal WWTPs. Package plants generally perform poorly in providing effluent treatment, often because of age and/or neglect. Current records were found to be incomplete, conflicting, and confusing. No meaningful information can be provided regarding flows or receiving streams. Eleven of the package plants are clustered north and south of Greenville and one each is located near Versailles, Gettysburg, and West Milton. One is at Mississinawa Valley High School northeast of Union City and another at the Department of Transportation post near Dawn, east of Ansonia. All are referenced in Table 76.

Home Sewage Treatment Systems (HSTS)

According to the Darke and Miami County Health Districts, a significant number of home sewage treatment systems either discharge off-lot directly (with or without aeration) or discharge via a raised outlet. It is safe to assume there are also several hundred if not several thousand "bootleg" type systems existing as well. The on-site problems in the watershed have been caused by past installations and the continuing growth of on-site systems in the area. The design and installation of better systems for new construction solves only part of the problem. Older, marginal and failing systems continue to cause degradation of the watershed and must be corrected.

Of the Stillwater River's 575 square mile watershed located in Darke and Miami Counties, only 16 square miles (3%), consisting of 17 villages and the City of Greenville, are incorporated. Wastewater treatment plants serve only eight of the 17 villages, plus Greenville. Of the watershed's 65,101 population, 60% rely on HSTS for wastewater treatment and disposal. Because of the pervasiveness of tight, clayey soils with slow percolation rates and saturated soils with a high water table, a large number of the HSTS are failing. Refer to Table 76.

In addition to the unsuitable soils, well over one-half of the HSTSs were installed more than 30 years ago, far beyond the expected functional life. The result of these limitations is surface ponding of the effluent and/or back-up into plumbing fixtures, problems that are commonly "corrected" by disconnecting the leach field (and in

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[10] *Ohio NPS Assessment Status of Stream Segments, Ohio EPA, 1994.*

some cases the septic tank) and hooking into village storm sewer systems, farm-field drainage tiles, or open ditches.

The surface water contamination from these practices is particularly acute when septic systems are found in high-density concentrations such as villages, subdivisions, and mobile home parks. The watershed contains 111 such concentrations totaling 4,258 systems, with 80% found within 2,000 feet of a perennial or intermittent stream. The amount of septic tank effluent produced by these concentrations is about 775,000 gallons per day (283,000,000 gal/yr).[11] Stream segments totaling 68 miles, 24% of the assessed stream miles, have "on-site wastewater treatment systems" listed as a category having a known or suspected impact on aquatic life use designation attainment.[12]

In 1999, the Stillwater Watershed Project conducted a home sewage treatment system survey in the watershed. Seven questions were asked about the home sewage treatment system (HSTS) and the postage was paid to return the postcard back to the project. Also included with the survey was an educational brochure on HSTSs. Over 15,000 surveys were sent out and 602 postcards were returned. Over 50% said their HSTS was over 20 years old. 49% said they had had their HSTS pumped out less than three years ago. 97% of the respondents said they knew where their HSTS was located and 87% said that the educational brochure was helpful in understanding how their HSTS operated. Appendix H contains further analysis of the survey results.

The Darke and Miami County Health Departments received an Ohio EPA 319 Grant to inventory the HSTS in the Stillwater River watershed. The information that they collect will be incorporated into this watershed action plan in late 2005.

Industrial Dischargers

Five industrial dischargers are in the Stillwater River watershed: two in Covington, two in Greenville, and one south of Greenville at Wayne Lakes. The total average (1989) flow is 1.4 mgd, of which 0.8 mgd is from American Aggregate's Wayne Lakes gravel mining operation, an innocuous effluent monitored only for non-filterable solids and pH. Another 0.6 mgd comes from Corning Glass Works and is monitored for oil and grease. The remaining three dischargers average only 1,000 to 12,000 gallons per day and monitor only for pH. Refer to Table 76.

Table 76: Water and Wastewater Treatment sites in the Stillwater River watershed (MVRPC 1997)

Site Names/Location	County	Source Type	NPDES Permit Holder	# of Septic Systems	Groundwater Vulnerability

[11] *2.6 persons/dwelling; 70 gal/person/day.*

On-site Wastewater Treatment and Disposal Systems in Darke County, MVRPC, May 1984.

On-site Wastewater Treatment and Disposal Systems in Miami County, MVRPC, July 1984.

[12] *Ohio NPS Assessment Status of Stream Segments, Ohio EPA, 1994.*

Ansonia	Dk	WWTP	Y	0	high
Versailles	DK	WWTP	Y	0	high
Bradford	Mi	WWTP	Y	0	medium
Greenville	Dk	WWTP	Y	0	high
Covington	Mi	WWTP	Y	0	high
Arcanum	Dk	WWTP	Y	0	medium
Union City	Dk	WWTP	Y	0	high
Gettysburg Village (Adams twp)	Dk	OS	N	141	low
Co.Rd.34 & Co. Rd. 149 (Adams	Dk	OS	N	35	medium
Paul's Lake (Adams Twp.)	DK	OS	N	30	high
Rossburg Village (Allen Twp)	Dk	OS	N	88	medium
New Weston Village (Allen twp)	DK	OS	N	59	medium
Burkettsville (Allen twp)	DK	OS	N	26	
New Madison (Butler twp)	DK	OS	N	84	high
Route 127 (Greenville twp)	DK	OS	N	55	medium
Co. Rd. 505 (Greenville twp)	DK	OS	N	50	high
Coletown Village (Greenville twp)	Dk	OS	N	40	medium
SR 571 & Willis Rd. (Greenville twp) D	DK	OS	N	40	medium
Reck Addition (Greenville twp)	Dk	OS	N	35	medium
SR 127 & Celina Rd. (Greenville twp)	Dk	OS	N	36	medium
White Springs Addition (Gr. Twp)	Dk	OS	N	35	high
Woodington Village (Gr. Twp)	Dk	OS	N	35	medium
Requarth & Jaysville St. Johns Rd. GR twp	Dk	OS	N	33	medium
SR 571 & Wildcat Rd. (Greenville twp)	Dk	OS	N	30	medium
Requarth & Westfall Rds. (Greenville twp)	Dk	OS	N	30	medium
Pikesville Village (Greenville twp)	Dk	OS	N	25	medium
Foreman Addition (Greenville twp)	Dk	OS	N	25	medium
New Madison (Harrison twp)	Dk	OS	N	112	high

SR 571 & Beamsville U.C. Rd. (Jackson twp)	Dk	OS	N	119	medium
Boone Addition (Jackson twp.)	Dk	OS	N	36	medium
Palestine Village (Liberty twp)	Dk	OS	N	79	medium
Lightsville Village (Mississinawa twp)	Dk	OS	N	28	medium
Wayne Lakes Park (Neave twp)	Dk	OS	N	300	high
Fort Jefferson Village (Neave twp)	Dk	OS	N	30	medium
US 127 & Hogpath Rd. (Neave twp)	Dk	OS	N	27	medium
Osgood Village (Patterson twp)	Dk	OS	N	78	medium
Yorkshire Village (Patterson twp)	Dk	OS	N	39	medium
Willowdell Village (Patterson twp)	Dk	OS	N	25	medium
Beamsville Village (Richland twp)	Dk	OS	N	50	medium
Dawn Village (Richland twp)	Dk	OS	N	26	medium
Stelvideo Village (Richland twp)	Dk	OS	N	25	medium
Walls Brothers (Neave twp)	Dk	ID	Y	0	high
Corning Glass Works (Greenville twp)	Dk	ID	Y	0	medium
Beatreme Food Ingredients, Inc. (Covington)	Mi	ID	Y	0	medium
New Tech Plastics, Inc. (Covington)	Mi	ID	Y	0	high
Allied Aftermarket Div. (Honeywell) (Gr twp)	Dk	ID	Y	0	medium
Beckman & Gast Co. (Osgood)	Dk	ID	Y	0	medium
Bish-Boyer Trailer Park (Greenville)	Dk	PP	Y	0	medium
Century Electric Motor Co. (Gettysburg)	Dk	PP	Y	0	medium
Darke Co. Criminal Justice Center (Gr. Twp)	Dk	PP	Y	0	medium
Darke County Home (Greenville twp)	Dk	PP	Y	0	medium
Hurley Migrant Camp (Mississinawa twp)	Dk	PP	Y	0	medium
Colonial MHP (Greenville)	Dk	PP	Y	0	medium
Lakeland Apartments (Greenville)	Dk	PP	Y	0	medium

Sherwood Forest Trailer Park Est. (Neave)	Dk	PP	Y	0	medium
Mississinawa Valley High School (Jackson)	Dk	PP	Y	0	medium
Northgate Development (Greenville)	Dk	PP	Y	0	medium
Robert Olwine MHP (Greenville wp)	Dk	PP	Y	0	medium
Rolin Acres & Anthony Wayne Sch. (Gr. Twp)	Dk	PP	Y	0	medium
Woodland Hghts. Elem. School (Gr. Twp)	DK	PP	Y	0	medium
Darke Co. Garage (ODOT) (Greenville)	DK	PP	Y	0	high
Dawn Outpost (ODOT) (Richland twp)	DK	PP	Y	0	medium
Bradford Water Plant (Newberry twp)	Mi	WTP	Y	0	medium
Gettysburg Water Supply	DK	WTP	Y	0	medium
Hollansburg Arc. & Tillman Rd. (Twin twp)	DK	OS	N	26	medium
SR 49 & 49A Intersection (VanBuren Twp.)	DK	OS	N	75	medium
SR 49 & Shields Rd. (VanBuren twp)	DK	OS	N	49	medium
Webster Village (Wayne twp)	DK	OS	N	40	high
North Star Village (Wabash twp)	DK	OS	N	84	medium
Hillgrove Village (Washington twp)	Dk	OS	N	30	medium

Nonpoint Sources of Pollution

Hydromodification

Dredging, straightening, and the removal of woody riparian vegetation are common practices throughout the watershed. These practices form the basis for the ditch maintenance program (Darke County only) in the watershed and are justified as necessary to maintain open channels for the extensive field-tile drainage systems and are in accordance with Ohio Drainage Law. Virtually all stream channels in the watershed have been modified except for parts of the Stillwater River and Greenville Creek. The result is severe stream bank erosion, increased turbidity, streambed

siltation, elevated stream temperature and algal growth, and the direct introduction of herbicides used to control bank vegetation. Despite these assaults on stream morphology, those few segments that are not under a current maintenance program have shown an ability to eventually recover. Darke County has an active Ditch Maintenance Program. Appendix A, Map 6 illustrates the stream segments under ditch maintenance. There is a total of 180.3 stream miles (61%) in the Stillwater River watershed under the ditch maintenance program.

Soil Erosion/Sedimentation

A 1989 Soil Conservation Service study entitled *Impact of Erosion and Conservation in Ohio* identifies watersheds in the State of Ohio with a need for accelerated technical assistance and increased cost sharing for installation of needed land treatment. Of Ohio's 93 watersheds, the Stillwater River watershed ranks second for cropland acreage eroding faster than the allowable rate ("T")[13] (113,500 acres) and seventh for acreage eroding faster than twice the allowable rate (40,500 acres). The watershed contains 28,340 acres of Highly Erodible Land (HEL), with individual drainage areas ranging from less than 100 acres of HEL to more than 4,000 acres.

The total watershed cropland soil eroding faster than T is 826,300 tons per year (eighth in the State), with 475,500 of those tons coming from cropland eroding at twice the allowable rate. Total tons of soil eroded annually from all sources is 1,234,900. Transporting that many tons of soil would require a freight train with more than 17,600 box cars stretching from the Great Lakes to the Ohio River and with a retail top-soil value of more than $12,000,000.

The economic damage to the soil resource from reduced productivity amounts to $265,100 per year. The study calculates that the total cost of erosion reduction with applied conservation practices in the watershed comes to $940,000 with an economic benefit return of $2,304,700 (all figures are 1989 dollars). The cost for each ton of soil saved in the watershed is $1.88. For comparison, the cheapest is $0.45/ton and the most costly is $5.26/ton.[14]

Several practices have contributed to an increase in the tons of soil eroded in the watershed, including the elimination of fencerow and field-edge trees, shrubs, and brush, and an increase in fall plowing. Also, the amount of harvested cropland has risen 20% since 1969, adding 49,300 acres. A major contributor has been an increase in the amount of cropland devoted to row crops and a concurrent decrease in small grain acreage where the closely planted crops help protect the soil from the impact of raindrops.

In 1949, more than one-half of the harvested cropland was planted in small grains, accounting for 124,000 acres. Small grain acreage has declined steadily since that time, amounting to only 43,000 acres in 1992, just 15% of the combined acreage. Cropland devoted to row crops during the same period has increased by 124,000

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[13] *"T" is the rate at which soil loss can be tolerated without a loss in productivity. "T" values in the watershed range from 3 to 5 tons/acre/year.*

[14] *Cheapest = Lower Scioto River watershed (Pike & Ross Co.); Most costly = Little Muskingum River watershed (Monroe & Washington Co.).*

acres. Stream segments totaling 228 miles, 80% of the assessed stream miles, have "crop production" listed as a category having a known or suspected impact on aquatic life use designation attainment.[15]

Fertilizers and Pesticides

During 1992, farmers in the Darke County part of the watershed spent more than $9 million for commercial fertilizer and $5.5 million for pesticides. Combined, these two categories constituted the third largest farm expense, accounting for 9% of all farm expenses. Commercial fertilizer was used on 75% of the harvested cropland in 1992, compared with 60% in 1969. Additionally, 49,300 acres of harvested cropland were added during the 1969-1992 period, resulting in fertilizer being applied to 73,000 more acres than in 1969.

Herbicide usage increased even more dramatically during the same period, rising from being applied to only 33% of harvested cropland in 1969 to 73% in 1992. When coupled with the increase in harvested acres, this results in herbicide application to an additional 132,000 acres. The percentage of harvested cropland receiving insecticides decreased slightly during this period, but the increase in harvested acreage resulted in 600 more acres being treated.

Animal Feeding Operations

The Stillwater River watershed is largely agricultural. Dairy farms, egg farms, poultry producers, beef cattle and hog producers are all located in the watershed. Darke County has the second highest number of animal units in the state of Ohio. Although Miami County has far fewer animal units, there is a growing problem with the disposal of horse manure in the county.

Livestock Inventory

The purpose of the livestock inventory is to evaluate the distribution of livestock and poultry operations and to determine the amount of waste being produced. The methodology used to collect data was by combining volunteer response with field surveys and face-to-face discussion with livestock producers.

Table 77: Summary of animal units (A.U.) (larger than 50 A.U.) by 11-digit subwatersheds

11- digit Subwatershed	Total Operations	Animal Units
Stillwater Headwaters 05080001 090	55	54,972
Stillwater / Swamp Creek 05080001 100	84	62,382
Greenville Headwaters	28	13,061

[15] *Ohio NPS Assessment Status of Stream Segments, Ohio EPA, 1994.*

05080001 110		
Lower Greenville 05080001 120	27	7,537
Stillwater / Painter 05080001 130	24	4,773
Stillwater / Ludlow 05080001 140	10	3,099
TOTALS	**228**	**145,824**

In 2002, 228 livestock/poultry operations were inventoried in the Stillwater River watershed with a total of 145,824 Animal Units. Each operation had at least 50 animal units. An animal unit is the number of animals of various size and species, which are equivalent to one slaughter or feeder beef with regard to daily waste production: 1.0 slaughter and feeder cattle; 0.7 mature dairy cattle; 2.5 swine weighing over 55 lbs or 25 nursery pigs; 100.0 laying hens or broilers. Table 78 shows the type, total number of animal units and operations by 11-digit subwatersheds. The total number of animal units and type are broken down further by 14-digit subwatersheds and are shown in the 14-digit Subwatershed Section of this document. Also, the number of horses is accounted for in the Subwatershed Section. Appendix A, Map 10 shows the spatial distribution of livestock/poultry in the Stillwater River watershed by 14-digit subwatersheds.

Table 78: Summary of the type of livestock/poultry animal units (larger than 50 A.U.) by 11-digit subwatersheds

11- digit Subbasin	Beef	Dairy	Swine	Chickens	Turkeys	TOTAL
Stillwater Headwaters 05080001 090	718	2010	8186	42,114	1944	**54,972**
Stillwater / Swamp Creek 05080001 100	3092	6182	14,456	35,331	3321	**62,382**
Greenville Headwaters 05080001 110	229	2127	3742	6720	243	**13,061**
Lower Greenville 05080001 120	25	956	6356	0	200	**7537**

Stillwater / Painter 05080001 130	664	1726	2383	0	0	**4773**
Stillwater / Ludlow 05080001 140	107	660	2332	0	0	**3099**
TOTAL	**4835**	**13,661**	**37,455**	**84,165**	**5,708**	**145,824**

The 228 livestock and poultry operations in the watershed produce more than 779,862 tons of solid manure annually. Based on the number of various animal types inventoried in the watershed, this waste produces about 7,441 tons/N/yr, 5,878 tons/P_2O_5/yr, and 4,471 tons/K_2O/yr with a total annual value of $8,894,366. With a P_2O_5 application rate of 50 lbs/acre, nearly 235,000 acres are needed to utilize the yearly phosphorus production16. This is based on a corn grain (160 bu/ac) – soybean (50 bu/acre) – wheat (80 bu/ac) rotation. However, the amount of acres is reduced based on the addition of corn silage and alfalfa to the rotation for dairy cows. Corn silage and alfalfa are an essential diet for the above livestock. The crop rotation with the alfalfa and corn silage utilizes P_2O_5 at a rate of 52 lbs/acre. At this utilization rate, 226,076 acres are needed to utilize the yearly phosphorus production[17.] Also, the method used to calculate the above phosphorus production does not take any feed management programs into consideration. Examples of feed management programs are phased feeding and phytase feed additive. Phased feeding can lower phosphorus production up to 10% and phytase can lower phosphorus production up to 20%.

Although there is enough cropland that exists in the watershed, considerations of time of year, crop type, distance to streams and dwellings, availability of non-owned land for spreading, and especially the hauling distance from the livestock/poultry facility all combine to reduce the actual amount of acreage useable. Table 79 provides additional detail on manure production and nutrient values.

Table 79: Manure and Nutrient Production in the Stillwater River Watershed[18]

Animal Type	Animal Units	Animal Count	Total Tons Manure/Yr	Solids Tons/Yr	Nitrogen Tons/Yr	P2O5 Tons/Yr	K2O Tons/Yr
Dairy	13,661	9,563	186,038	23,627	930	381	735
Beef	4,835	4,835	52,943	6,141	299	222	251

16 Tristate Fertility Guide, Table 12, Extension Bulletin E-2567, August 1996

17 Source: Chore Reduction for Free Stall Dairy Systems, *Hoard's Dairyman,* Fort Atkinson, WI.

18 Adapted From OSU Bulletin 604, Table 1, 1992

Swine	37,455	93,638	167,471	15,407	1,155	904	904
Chickens	84,165	8,416,500	322,562	81,286	4,454	3,840	2,150
Turkeys	5,708	313,940	50,848	12,814	602	530	430
Total	145,824	8,838,476	779,862	139,275	7,441	5,878	4,471
			$ Value Per Year [19]		**$3,720,272**	**$2,938,755**	**$2,235,339**
Total Nutrient Value Per Year =			**$8,894,366**				

In August 2002, the Ohio Department of Agriculture (ODA) finalized rules for the Livestock Environmental Permitting Program. Based on new Ohio legislation passed in 2000, any operation that involves 1,000 Animal Units or more must obtain a Permit to Install and Permit to Operate from Ohio Department of Agriculture. Prior to 2002, Ohio EPA regulated large livestock facilities. In the next 2 years, Ohio EPA permitted facilities will be inspected by ODA and will be required to obtain a Review Compliance Certificate. To qualify, operations will need to have complete Comprehensive Nutrient Management Plans (CNMP), Insect and Rodent Control Plans, and Mortality Management Plans. Any site, large or small, with a controlled direct discharge of wastewater will also need an NPDES discharge permit. The Ohio EPA currently reports that 23 operations in the Stillwater River watershed have a Permit to Install. All of these operations are in Darke County. The remaining livestock and poultry operations (90%) are currently regulated by the largely voluntary Agricultural Pollution Abatement Rules and Standards. The most recent version of the rules has been effective since May 1992 and is administered by the Division of Soil and Water Conservation of ODNR. They are designed to abate water pollution from agricultural production including concentrated animal feeding operations.

19 N @ $0.25 Lb; P @ $0.25Lb; K @ $0.15 Lb

Chapter IV. Watershed Impairments

Stillwater Total Maximum Daily Loads (TMDLs)

A Total Maximum Daily Load (TMDL) is the amount of a given pollutant that can be allowed to enter a water body without causing the water quality standards to be exceeded. TMDLs involve collecting data in water bodies to determine point and nonpoint source pollution loads and using the data to set maximum allowable loads from each of these sources. The Clean Water Act required TMDLs but until recently these calculations have not been enforced. In 2001, representatives from the Ohio EPA and the Stillwater Watershed Project worked together to hold several public informational meetings. The objectives of the meetings were to provide a summary of the Ohio EPA water quality survey that identifies pollution causes and their impact to the river; provide an overview of the Stillwater Watershed Project; to explain the Total Maximum Daily Load (TMDL) process; to accept public comments on the project; and to solicit participation from individuals, organizations, and local governments who can represent the diversity of interests within the watershed and participate in a monthly work group.

Four Sub-Groups were developed out of these public information meetings. These four sub-groups focused on the four major pollution problems in the watershed: (1) drainage/channelization, (2) animal waste, (3) on-site septic systems and (4) urban issues. These four sub-groups were made up of 15-20 individuals who would have a direct impact on the outcomes of the TMDLs. The members of these sub-groups were responsible for coming up with implementation strategies to correct the pollution problems occurring in the Stillwater River watershed. Nutrient loading and flow in the Stillwater River watershed from agricultural management practices and wastewater treatment plants was simulated using the Soil and Water Assessment Tool (SWAT), a computer program used to model conditions within the watershed and impacts upon the water resources. Current implementation strategies incorporate the goals and objectives created by these sub-groups will be taken into account and reflected in this document.

According to the *Total Maximum Daily Loads for the Stillwater River Basin Final Report* (OEPA 2004), agriculture, both livestock production and row crops, dominate the landscape, and are responsible for most of the miles impaired streams in the Stillwater River basin. Much of the stream network has been modified and is maintained in a modified state to facilitate rapid drainage for row crop production; consequently, habitat alterations are a major cause of impairment. Manure from concentrated animal feeding operations (CAFOs) is applied to fields within the watershed. Direct runoff of manure to the streams and leaching of manure through the tile networks results in organic and nutrient enrichment as another major cause of impairment. Because the stream network is maintained for drainage, little or no riparian buffer exists on most headwater streams to filter errant manure. Agriculture is not the only source of water quality impairment, however; various stream segments

in the Stillwater River Watershed are not meeting water quality standards for aquatic life use due to municipal point sources or onsite waste water systems.

As mentioned earlier, the two causes of water quality impairment in the Stillwater River Watershed are organic enrichment and habitat alteration. Other causes listed in Table 80 are, in most cases, secondary consequences of the primary causes. For example, nutrient enrichment often occurs concurrently with organic enrichment as organic matter is often high in nutrient content and those nutrients are remineralized through microbial decomposition. As a result of the various causes listed being interrelated and occurring on a watershed-wide scale, the TMDL for the Stillwater River Watershed is not pollutant specific *per se*; rather it is the watershed scale approach *in toto* to achieve restoration of aquatic life uses. It encompasses broadly prescriptive agricultural BMPs, farm-specific BMPs, county-wide efforts to address failing on-site sewage disposal, suburban stormwater control, adoption of objective criteria for agricultural drainage maintenance, and upgrades to publicly owned sewage collection and treatment systems.

Nutrient loading and flow in the Stillwater River Watershed from agricultural management practices and wastewater treatment plants was simulated using the Soil and Water Assessment Tool (SWAT) (2003). The results of the model suggest that existing nitrogen loads can be assimilated; however, phosphorus loads exceed the assimilative capacity by an order of magnitude. Agricultural fertilizers account for approximately fifty to eight-five percent of the phosphorus load depending on season and need to be reduced by approximately eighty percent during the winter and spring months. Similarly, loads from storm water and on-site sewage systems need to be reduced by seventy percent in the winter and spring. Loads from municipal wastewater need to be reduced by sixty-five percent across all seasons. The SWAT model predicts nutrient loading based on a large number of factors, such as flow rates, manure application practices, growing season, and fertilizer application. Because these vary seasonally, the TMDL numbers are also broken down seasonally. In this document, and also in the *2004 OEPA TMDL Final Report*, ON = October—November, DJF = December—February, MAMJ = March—June, and JAS = July—September. The following recommendations are suggested to affect full recovery of aquatic life uses:

- Comprehensive nutrient management plans for all AFOs,
- Encourage the use of best demonstrated technologies for managing animal waste through cost sharing and other incentive programs,
- Increase the number and width of grass filter strips on maintained ditches through cost sharing and other incentive programs,
- Increase the number of agricultural acres in no-till or conservation tillage through cost sharing and other incentive programs,
- Develop criteria for allowing ditch maintenance
- Establish a Darke County Sewer District, and

- Establish residential on-site sewage inspection programs in Darke and Miami Counties.

The following table lists Stillwater TMDLs and recommendations for bringing the stream into attainment:

Table 80: Stillwater TMDL Recommendations by Water Body ID (WBID)

WBID URM LRM Segment Name	Causes	TMDL Component
OH57 37 45.88 32.4 Stillwater River	Nutrients	NPDES included in WLA; Livestock implementation plan
OH57 38 9.1 0 Harris Creek	Organic enrichment/DO	NPDES included in WLA, Major treatment plan upgrade underway to include CSO control
OH57 39 4.6 0 Ballinger Run	Other habitat alterations Organic enrichment/DO	NPDES included in WLA, Major treatment plan upgrade underway to include CSO control
OH57 41 13.8 0 Swamp Creek	Organic enrichment/DO Other habitat alterations Nutrients	Livestock and drainage and channelization implementation plans
OH57 42 5.2 0 Indian Creek	Nutrients Organic enrichment/DO Other habitat alterations	Livestock drainage and channelization, and septic implementation plans
OH57 43 57.97 45.88 Stillwater River	Nutrients	Livestock and drainage and channelization implementation plans
OH57 44 3.3 0 Boyd Creek	Organic enrichment/DO Other habitat alterations	Livestock and drainage and channelization implementation plans

OH57 45 Stillwater River	67.64	57.97		Other habitat alterations Organic enrichment/DO Nutrients	Livestock and drainage and channelization implementation plans
OH57 4.06	0	UNT to Stillwater		Other habitat alterations	Drainage and channelization implementation plan
OH57 46 North Fork	7.7	0		Organic enrichment/DO Other habitat alterations	Livestock and drainage and channelization implementation plans
OH57 48 South Fork	7	0		Other habitat alterations	Drainage and channelization implementation plan

Stillwater Watershed Project TMDL Planning Meetings

Two planning meetings were held to help with the development of the watershed action plan. Appendix G contains the minutes from these meetings. Anne Baird, OSU Extension Educator in Watershed Management, facilitated both meetings. Table 81 lists the stakeholders involved in developing the plan. These stakeholders were also involved in providing implementation strategies for the Stillwater TMDL. The stakeholders provided implementation strategies and target audiences for the drainage channelization and urban issues subgroups.

Table 81: Stakeholders involved in the development of the Stillwater TMDL recommendations

NAME	AFFILIATION
Tom Menke	Menke Consulting Inc.
Kreig Smail	Miami SWCD
Bob Brill	Landowner / Brukner Nature Center
Rusty Schwepe	Darke Co. Health Dept.
Mike Ekberg	Miami Conservancy District
Wilma Jean Nisonger	Landowner / Darke SWCD Supervisor
George Shade	Landowner
Ralph Burkholder	Landowner / Darke SWCD Supervisor
Brian Cron	Landowner / Miami SWCD Supervisor
Gaynor Millhouse	Landowner / Farmer

Jim Bennett	Darke NRCS
Jim McGarry	Miami Co. Sanitary Engineering
Sarah Hippensteel	Miami Conservancy District
Cyndie Rhoades	Landowner / Darke SWCD
Karen McCalister	Miami NRCS
Hugh Trimble	Ohio EPA, SWDO
Roberta Broerman	Darke Co. Health Department
John Vehre	Darke Co. Health Department
Jeff Thomas	ODNR, Div. Of Soil and Water Conservation
Ed Everman	ODNR, Div. Of Soil and Water Conservation
Harold Beisner	Landowner
Jerry Ballard	ODNR, Div. Of Natural Areas and Preserves
Dan Amspaugh	Stillwater Basin Council
Terry Netzley	Miami Co. Landowner
Ed Francis	Miami Co. Landowner
Steve Foster	Darke Co. OSU Extension
Gerry Tipton	Miami Co. Health Department
Nikki Reese	Stillwater Watershed Project Coordinator
Merlin Baker	Landowner / Farmer
Tim Fine	Miami Co. OSU Extension
Tim Rhoades	Landowner / Farmer
Mike Lucas	MVRPC
Don Lecklider	Landowner / Darke SWCD
Tim Warner	Landowner / Farmer
Linda Raterman	Miami SWCD

Sub-Group TMDL Recommendations

Drainage / Channelization Implementation Strategies:

- Filter Strips

- Conservation / No-till practices
- Coordinate with Ditch Maintenance
- Coordinate with township trustees on problem areas
- Create Owner/Operator relationships, bring both together for education and discussion (rationale: they don't get together very often and decisions and thoughts of one influence the other)
- Provide site visits to BMPs (show landowners what works well)
- Educate ditch maintenance, township trustees, county commissioners, planning & zoning on proper BMPs
- Provide a demo site for a two-stage ditch
- Cost share / involvement of agency professionals ie. Farm Service Agency, NRCS
- Offer guidance to ditch maintenance and planning and zoning to develop specifications for erosion control

Audiences:

- Local Landowners
- Ditch Maintenance
- County Commissioners
- Township Trustees
- Owners / Operators
- Contractors
- Developers
- Realtors
- Planning and Zoning Commissions
- Utilities
- County engineers

Secondary Audiences (people who can influence people who have control over decisions related to ditches)

- Ohio Farm Bureau
- Society for Engineers

Contacts:

- Develop mailing list of landowners owning property along a stream
- Rich Schafer – Darke Co. Ditch Maintenance
- Doug Christian – Miami Co. Engineer
- Local Champions of BMPs within community

- Local planning and zoning commissions
- Word of mouth at seed / fertilizer meetings and coffee shops

Urban Implementation Strategies:

- Please see the audiences listed above.

Implementation Strategies:

- Provide how-to preventive measures regarding the new storm water
- Educate those audiences on BMPs i.e. filter strips for parking lots, retention/detention areas and analysis of effectiveness
- Provide guidelines on subdivision design ordinances, compliance plans (regional wide site plans)
- Educate homeowners on septic systems, pesticide and fertilizer use, household wastes

Audiences:

- Local Landowners
- Ditch Maintenance
- County Commissioners
- Township Trustees
- City and Village Managers / Mayors
- Contractors
- Developers
- Realtors
- Planning and Zoning Commissions
- Utilities
- County engineers
- Public Works Directors

Contacts:

- Provide a meeting or attend their meetings with the above audiences to address the strategies above

Pollutant Loading in the Stillwater River Watershed

This section of the Action Plan will focus on specific nutrient loading issues by watershed. The information has been brought together from several locations: The 2004 Stillwater TMDL Report, the OEPA 305(b) Report, and the Stream Network Report. The Stillwater TMDL Report was written based on six 11-digit HUC basins; therefore, reports of pollutant loading will necessarily be on the 11-digit HUC level. Problem statements are written on the 14-digit level; many problem statements include more than one 14-digit HUC because similar watersheds were grouped.

Load Reductions 1999-2004

In the years between the sampling that was done for the Stillwater TMDL (1999) and the current iteration of this Action Plan, the Stillwater Watershed Project along with its partner organizations and the efforts of local landowners have installed many BMPs, below is a break down on a whole watershed basis. In the future we plan to break this down on a subwatershed basis. Currently, a project is underway to calculate the load reductions accomplished in the years of 1999-2004 in the Stillwater River Watershed. These load reductions are being calculated by establishing a "representative soil" which was then used to calculate nutrient load reductions with the help of ODNR software and RUSLE soil loss equations. Unfortunately, due to budget restrictions and the Darke GIS Specialist being on reduced hours, a timeframe for this project has yet to be established.

HOW WERE THE FUNDS SPENT IN THE STILLWATER RIVER WATERSHED?

(1993 – 2002)

See Map 14

ODNR, NATUREWORKS WATERSHED MANAGEMENT – ($250,000)

* PROVIDES 75% COST SHARE ($219,000 SPENT)

22 WATERWAYS (22.6 ACRES) 8 HOLDING PONDS

2 WETLANDS (2.48 ACRES) 4 COVERED STACKS

9 EROSION CONTROL STRUCTURES 3 ANAEROBIC LAGOONS

2 WASCOBS 1 CONCRETE TANK

1 STREAMBANK REVETMENT 1 COMPOSTER

WATER POLLUTION CONTROL LOAN FUND – ($1.9 MILLION SPENT)

*LOW INTEREST LOAN PROGRAM FOR PURCHASE OF CONSERVATION EQUIPMENT.

44 NO-TILL DRILLS 7 MANURE SPREADERS

18 NO-TILL PLANTERS 2 SUBSOILER

2 FILTER STRIP 6 DISC CHISEL

11 PURCHASE OF MANURE EQUIPMENT (IRRIGATION/PUMPS)

8 SPRAYERS 2 ANAEROBIC LAGOON

3 SKID LOADERS 3 COVERED STACKS

1 STRIP TILL TOOL 2 ANIMAL WASTE HOLDING PONDS

2 WATERWAYS

OEPA 319 NON-POINT SOURCE GRANT/MANURE EQUIPMENT BUYDOWN
($87,000)

2 MANURE PUMPS

2 MANURE SPREADERS

7 INJECTION SYSTEMS

1 MANURE TANK

1 SLUDGE HOSE

OEPA 319 NON-POINT SOURCE GRANT/ FILTER STRIP PROGRAM
($27,000)

30.14 ACRES OF FILTER STRIPS WERE IMPLEMENTED

ODNR, NATUREWORKS STREAMBANKING GRANT
($225,000) ($205,531.95 SPENT)

PURCHASED 123 ACRES OF PERMANENT CONSERVATION EASEMENTS ALONG RIPARIAN CORRIDOR

OEPA 319 NON-POINT SOURCE GRANT, GRID SAMPLING PROGRAM

($64,454.00 SPENT)

12,890.86 ACRES OF SOIL DATA

OEPA 319 NON-POINT SOURCE GRANT, NO-TILL (NT), STRIP TILL EQUIPMENT BUYDOWN/RENTAL ($14,368.00 SPENT)

9 NT DRILLS, 1 NT PLANTER, 6 STRIP TILL RENTALS, 1 NT RENTAL

OEPA 319 NON-POINT SOURCE GRANT MANURE APPLICATION ACCESSORY PROGRAM
($3,483.77 SPENT) - 10 tile plugs, 3 pump-out ports, 3 controllers

OEPA 319 NON-POINT SOURCE GRANT, FIELD BORDER COST SHARE

($36,100.80 SPENT) 45.1 ACRES

HOUSE BILL 88 COST SHARE ($65,000)

NO-TILL ACRES – 9135.5 ACRES / $35,504.88

WASTE UTILIZATION – 4799.9 ACRES / $15,997.80

WELL TESTS – 39 / $1375.00

MANURE TESTS – 35 / $1100.00

COVERED STACK – 1 / $2,000.00

OEPA 319 NON-POINT SOURCE GRANT, WELL TESTING PROGRAM

($8,325.00) 58 LANDOWNERS WERE ASSISTED

OEPA 319 NON-POINT SOURCE GRANT, MANURE STORAGE DEMO SITES

($20,000) ***LIQUID SOILD SEPARATOR***

HI-RISE HOG FACILITY

OEPA 319 NON-POINT SOURCE GRANT, STREAMBANK STABILIZATION PROJECT (ESHEMAN'S)

($15,000) ON 230 FEET OF STREAMBANK, WILLOW POSTINGS, GRADE STABIZATION, & TREE REVETMENTS WERE IMPLEMENTED

4000 FEET OF STREAMBANK WAS PLANTED WITH GREEN ASH, BUR OAK, AND BLACK WALNUT.

OEPA 319 NON-POINT SOURCE GRANT, WETLAND DEMO SITE

($5,000) STILLWATER PRAIRIE RESERVE

WATER QUALITY INCENTIVE PROGRAM (WQIP) - $300,000 SPENT ON 31 DIFFERENT FARMS.

OVER 9700 ACRES OF INTEGRATED CROP MANAGEMENT (ICM) PLANS (SOIL TESTS, MANURE TESTS, WELL TESTS)

USDA, NATURAL RESOURCE CONSERVATION SERVICE CONTRIBUTIONS IN THE STILLWATER RIVER WATERSHED:

RMS CONSERVATION PLANS : 70,181.5 ACRES

NUTRIENT MANAGEMENT PLANS: 37,855 ACRES

APPROX. WATERWAYS: 200 ACRES

WETLANDS RESTORED: 470 ACRES

FILTER STRIPS INSTALLED: 648.3 ACRES

ANIMAL WASTE FACILITIES INSTALLED WITH SOIL & WATER ASSISTENCE: 38

TOTAL FUNDING SPENT: $1,061,241.20

***** THIS FUNDING WENT TO LANDOWNERS IN THE WATERSHED**

(WPCLF Loans are not included in this amount)

Total Landowners Funded: 285

Darke: 206 (72%) **Miami: 79 (28%)**

A total of $1,061,241 has went to landowners living or owning land within the Stillwater River Watershed for best management practices. The remaining funding went towards educational programs, such as, the bi-annual canoe floats, tillage field day, and septic system / lawn care workshop. Also, funding for the newsletter and watershed coordinator was made available. Since 1993, when the SWP received its first funding, a total of 285 landowners were funded. **Also, 70,182 acres of resource management plans resulting in a savings of 421,089 tons of soil was implemented and 37,855 acres of nutrient management plans reducing commercial fertilizer application by 2,271,300 lbs have been implemented.**

Recommended Load Reductions

The following information (Table 82) was calculated based on information from the OEPA 2004 TMDL Final Report. The information is only available on an 11-digit HUC basis for this watershed.

Table 82: Recommended Load Reductions by Drainage Unit

Recommended Load Reductions by Drainage Unit			
Assessment Unit	Pounds/year NO2- + NO3-	Assessment Unit	Pounds/Year Total Phosphorous
05080001-090	4,367	05080001-090	196,028
05080001-100	14,941	05080001-100	18,298
05080001-110	7,882	05080001-110	259,700
05080001-120	0	05080001-120	134,879

05080001-130	312,686	05080001-130	172,681
05080001-140	0	05080001-140	197,027
Total Basin	339,876	Total Basin	978,614

Estimation of Load Reductions

Each of the following Problem Statement and Action Plan (11-digit HUC) sections contains a table of estimated load reductions. All load reduction assumptions were determined in consultation with the Ohio Department of Natural Resources using best professional judgment and the NRCS Field Office Technical Guide, which can be found online at http://www.nrcs.usda.gov/technical/efotg. These assumptions may include:

- Soil Texture
- Practice dimensions
- Slope
- Tillage Practices
- Drainage Area
- Acres per practice (for tillage equipment)

Specific assumptions relating load reductions can be found in Appendix I.

The following tables are taken from the ODNR Ohio Load Reduction Spreadsheet, which can be found on ODNR's website at http://www.ohiodnr.com/soilandwater/downloads.htm under the heading of Estimating Load Reductions For Agricultural and Urban BMPs.

These numbers are based on three years of Plan implementation. Each installed practice has a life expectancy of 10+ years, so practices installed in successive years are additive. For example, the plan provides for the installation of 10,000 feet of grassed waterways per year. In year one of Plan implementation, load reductions will be calculated on 10,000 feet. In the second year of Plan implementation, 10,000 more feet of grassed waterway will be added to the already existing 10,000 feet, so load reductions would be calculated on 20,000 feet for that year. For the third year of Plan implementation, load reductions will be calculated on 30,000 feet of grassed waterways. Therefore, when calculating load reductions over a three-year Plan evaluation cycle, all load reductions will be calculated using (Nx1)+(Nx2)+(Nx3)=load reduction where N = one year's load reduction.

Problem Statements and Action Plan for HUC 05080001 090 Stillwater River (Headwaters to upstream Swamp Creek)

Includes subwatersheds 05080001--090–010, Stillwater River #J; --020, South Fork Stillwater River; --030, Stillwater River #I; --040, Woodington Run; --050, Stillwater River #H; --060, North Fork Stillwater River; --070, Boyd Creek; and –080, Stillwater River #G

Water quality in this basin is among the worst in the Stillwater River watershed, and is classified as very poor. HUC 05080001 090 is the headwaters of the Stillwater River, and this area has been extensively modified for agricultural drainage. These channelized and dipped streams lack habitat to support a diversity of fish and macroinvertebrate species. The channelized nature of these streams also causes water to flow away quickly, so basin flow in this watershed is often very low (OEPA 2001).

Overall Watershed Protection Goals for HUC 05080001 090

1. Reduce phosphorous loads by 25%
2. Bring nitrogen levels into attainment of TMDL recommendations
3. Increase QHEI scores by 5 points
4. Purchase one riparian easement in HUC 05080001 090 020

Estimated Total Load Reductions for HUC 05080001 090

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle (lb/yr)		Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)	
	N	P		
05080001 090 010 + 05080001 090 030	26400	13266		
05080001 090 020	13950	7008		
05080001 090 040	13950	7008		
05080001 090 050 + 05080001 090 080	28716	14448		
05080001 090 060	13950	7008		
05080001 090 070	13950	7008		
			N	P
Total load reductions for 11-digit watershed 05080001 090	110916	55746	2538.9%	28.4%

Stillwater River #J HUC 05080001 090 010

Stillwater River #I HUC 05080001 090 030

Background:

Water quality in HUC 05080001 090 010 and HUC 05080001 090 030 are not meeting it water quality use designations for all river miles. Along the Stillwater River #J, headwaters to the North Fork (stream segment OH57 45) is not meeting its aquatic life use designation of Modified Warmwater Habitat for 2.67 of its 9.67 river miles due to channelization, nutrient loading and organic enrichment. Sedimentation is also likely to be a factor in these watersheds.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year in each of Stillwater River #J and Stillwater River I.
- Maintain the installation of at least 2200 feet of filter strips (approx. 30 feet wide) per year in each of Stillwater #J and Stillwater River #I.
- Increase the amount of riparian vegetation in the watershed by 3% over current levels.
- Increase amount of no-till corn acres by an additional 750 acres in these two watersheds

Action Items:

Table 83: Action Plan for Sediment and Agricultural Chemical Management in the Stillwater #J and #I Watersheds HUCs 05080001 090 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	1512	756	756
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	2244	1188	792
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A

	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	144	72	72
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	750 additional acres of no-till corn per year in these two watersheds	22500	11250	11250
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A

	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	Installation of one wetland in HUC 05080001 090 per 3 year cycle	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen[20] channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on	Watershed coordinator's time to teach	Incorporate a session on stream	One session on stream geomorphology	N/A	N/A	N/A

20 * The purpose of the Rosgen classification type is to provide a general estimate of stream stability. This can be used to estimate areas of poor habitat and increased sediment load.

proper channel design and the advantages of natural channels with floodplains	session, money for supplies	geomorphology into at least one public workshop each year	taught each year			
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A

Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Estimated Load Reductions in These Watersheds (excluding load reductions that are unknowable at this time)				26400	13266	12870

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 84: Action Plan for Manure Nutrient Management in the Stillwater #J and #I Watersheds HUCs 05080001 090 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations

		programs to pay for BMPs		

21

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Darke Co. portion of the Stillwater Watershed
- Decrease the number of discharging systems by 25/year over the entire Darke Co. portion of the Stillwater Watershed

Action Items:

Table 85: Action Plan to Reduce Loads from Sewage Treatment in the Stillwater #J and #I Watersheds HUCs 05080001 090 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost

21 Practices Associated with CMNP include Dry Stack, Tile Plug, Milkhouse Wetland, and more. Based on a 100 cow herd a Dry stack will reduce 1,827 lbs. of nitrogen and 2,242 lbs. of phosphorus per year. A Milkhouse Wetland will reduce approxiametly 451 lbs. of nitrogen and 223 lbs. of phosphorus per year. For other practices associated with a CMNP reduction are not able to be calculated.

Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser

Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed by 15% (a more specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 86: Action Plan to Reduce Agricultural Chemical Contamination in the Stillwater #J and #I Watersheds HUCs 05080001 090 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper	3 new chemical containment facilities built each year in the Stillwater River

		chemical storage	watershed
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans

South Fork Stillwater River HUC 05080001 090 020

Background:

Water quality in HUC 05080001 090 020 is not meeting it water quality use designations for all river miles. The South Fork is only partially meeting its aquatic life use designation of Warmwater Habitat for one of its seven river miles due to channelization and hydromodification. Sedimentation is also likely to be a factor in this watershed.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. This problem is complicated by a partial lack of riparian corridor, as this stream segment is being maintained for agricultural drainage.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year in the South Fork
- Maintain the installation of at least 2200 feet of filter strips (approx. 30 feet wide) per year in the South Fork
- Increase the amount of riparian vegetation in the watershed by 3% over current levels.
- Increase amount of no-till corn acres by an additional 400 acres

Action Items:

Table 87: Action Plan for Sediment and Agricultural Nutrient Control in the South Fork Watershed HUC 05080001 090 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	756	378	378
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1122	594	396
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A

	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	72	36	36
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	A 400 acre increase in conservation tillage per year	12000	6000	6000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A

	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established over a 3 year period in HUC 05080001 090	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A

with floodplains						
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Estimated Load Reductions in These Watersheds (excluding load reductions that are unknowable at this time)				13950	7008	6810

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

1. Reduce manure spills to zero per year

2. Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 88: Action Plan for Manure Nutrient Management in the South Fork Watershed HUC 05080001 090 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations

		transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs		
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large manure brokers to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 89: Action Plan to Reduce Loads from Sewage Treatment in the South Fork Watershed HUC 05080001 090 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser

Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 90: Action Plan to Contamination from Agricultural Chemicals in the South Fork Watershed HUC 05080001 090 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown

Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Woodington Run HUC 05080001 090 040

Background:

Water quality in HUC 05080001 090 040 is not meeting its aquatic life use designation of Warmwater Habitat for all river miles due to channelization, nutrient loading and organic enrichment from agricultural practices. Sedimentation is also likely to be a factor in this watershed.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and nutrient enrichment from agricultural fertilizers is impairing use attainment of part of this stream section. This problem is complicated by a lack of riparian corridor.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year in the South Fork
- Maintain the installation of at least 2200 feet of filter strips (approx. 30 feet wide) per year in the South Fork
- Increase the amount of riparian vegetation in the watershed by 3% over current levels.
- Increase amount of no-till corn acres by an additional 400 acres

Action Items:

Table 91: Action Plan for Sediment and Agricultural Nutrient Control in Woodington Run HUC 05080001 090 040

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	756	378	378
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1122	594	396
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A

Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	72	36	36
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	12000	6000	6000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal	NRCS, SWCD and SWP will discuss WRP with landowners	One wetland constructed in a 3 year period over HUC 05080001	N/A	N/A	N/A

	funding for conservation practices	concerned about flooding and broken tile	090			
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A

	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years			
Total Estimated Load Reductions in These Watersheds (excluding load reductions that are unknowable at this time)				13950	7008	6810

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 92: Action Plan for Manure Nutrient Management in the Woodington Run Watershed HUC 05080001 090 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations

		programs to pay for BMPs		

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 93: Action Plan to Reduce Loading from Sewage Treatment in Woodington Run HUC 05080001 090 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 94: Action Plan for Reducing Contamination from Agricultural Chemicals in Woodington Run HUC 05080001 090 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Stillwater River #H HUC 05080001 090 050

Stillwater River #G HUC 05080001 090 080

Background:

Although water quality in HUC 05080001 090 050 and HUC 05080001 090 080 is fairly good, portions of the stream are not meeting water quality use designations for all river miles. Stillwater River #H and #G, North Fork to Swamp Creek is not meeting its aquatic life use designations of Warmwater Habitat and Exception Warmwater Habitat for four of its 12.09 river miles due to channelization, nutrient loading and organic enrichment. The Village of Ansonia is located in Stillwater River #H, and some non-point source pollution from storm sewers is likely. Sedimentation is also likely to be a factor in these watersheds.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and nutrient enrichment from agricultural chemicals is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year in each these watersheds
- Increase the installation of filter strips (approx. 30 feet wide) to at least 3000 per year in each of these watersheds
- Increase the amount of riparian vegetation in the watersheds by 5% over current levels.
- Increase amount of no-till corn acres by an additional 800 acres across these two watersheds

Action Items:

Table 95: Action Plan for Sediment and Agricultural Nutrient Control in the Stillwater #H and #G Watersheds HUCs 05080001 090 050 and –080

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)

Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	1512	756	756
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	3060	1620	1080
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile	95% of all waterway construction includes tile renovation	144	72	72

	practices	outlets is part of grassed waterway construction where appropriate				
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	24000	12000	12000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	Installation of one wetland in a 3 year period over HUC 05080001 090	N/A	N/A	N/A

Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A

Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Estimated Load Reductions (excluding all unknowable or unknown load reductions)				28716	14448	13908

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Table 96: Action Plan for Manure Nutrient Management in the Stillwater #H and #G Watersheds HUCs 05080001 090 050 and –080

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan

and encourage at least one practice associated with a CMNP	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed

	Coordinator time	facilities	At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 97: Action Plan to Reduce Loading from Sewage Treatment in the Stillwater #H and #G Watersheds HUCs 05080001 090 050 and –080

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from Ansonia's storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 98: Action Plan to Reduce Loading from Urban Non-point Sources in the Stillwater #H and #G Watersheds HUCs 05080001 090 050 and –080

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival

Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 99: Action Plan to Reduce Agricultural Chemical Contamination in the Stillwater #H and #G Watersheds HUCs 05080001 090 050 and –080

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs

Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

North Fork Stillwater River HUC 05080001 090 060

Background:

Water quality in HUC 05080001 090 060 is meeting its water quality use designations of for all river miles. The North Fork is not meeting its aquatic life use designation of Modified Warmwater Habitat for 2.67 of its 9.67 river miles due to channelization, nutrient loading and organic enrichment. A large source of organic enrichment in these watersheds is the WWTP in the town of Ansonia, which lacks capacity. This WWTP also has a CSO, which contributes to the impairment of the watershed. In the years from 1995-2001, 15 violations of the WWTP's NPDES permit occurred, of which 33% were related to fecal coliform contamination (OEPA 2001).

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year
- Maintain the installation at least 2200 feet per year of filter strips (approx. 30 feet wide)
- Increase the amount of riparian vegetation in the watersheds by 3% over current levels.
- Increase amount of no-till corn acres by an additional 400 acres across these two watersheds

Action Items:

Table 100: Action Plan for Sediment and Agricultural Nutrient Control in the North Fork Watershed HUC 05080001 090 060

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	756	378	378
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1122	594	396

	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	72	36	36
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	12000	6000	6000

	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each 3 year cycle in HUC 05080001 090	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A

Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknowable and unknown load reductions)				13950	7008	6810

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 101: Action Plan for Sediment and Agricultural Nutrient Control in the North Fork Watershed HUC 05080001 090 060

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed

Assurance Program (LEAP)				
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County

- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 102: Action Plan for Reducing Loads from Wastewater Treatment in the North Fork Watershed HUC 05080001 090 060

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed

Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 103: Action Plan for Reduction of Urban Non-point Source Pollution in the North Fork Watershed HUC 05080001 090 060

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed

	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 104: Action Plan for Reducing Agricultural Chemical Contamination in the North Fork Watershed HUC 05080001 090 060

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Boyd Creek HUC 05080001 090 070

Background:

Water quality in HUC 05080001 090 070 is not meeting it water quality use designations for all river miles. Boyd Creek is in full attainment of its aquatic life use designation of Modified Warmwater Habitat for three of its four river miles, with one river mile in only partial attainment due to channelization and nutrient loading from agriculture and organic enrichment from onsite septic systems. Rolling Acres WWTP is located in Boyd Creek, and has been the site of numerous discharge complaints. Sedimentation is also likely to be a factor in these watersheds due to lack of riparian corridor. The City of Greenville is also expanding north into the Boyd Creek watershed, and non-point source pollution from homes and parking lots is of increasing concern, as is increased channelization due to development.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation of at least 1800 feet of grassed waterway per year
- Maintain the installation at least 2200 feet per year of filter strips (approx. 30 feet wide)
- Increase the amount of riparian vegetation in the watersheds by 3% over current levels.
- Increase amount of no-till corn acres by an additional 400 acres across these two watersheds

Action Items:

Table 105: Action Plan for Sediment and Agricultural Nutrient Control in the Boyd Creek Watershed HUC 05080001 090 070

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)

Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	756	378	378
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1122	594	396
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile	95% of all waterway construction includes tile renovation	72	36	36

	practices	outlets is part of grassed waterway construction where appropriate				
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	12000	6000	6000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland constructed at least every 3 years in HUC 05080001 090	N/A	N/A	N/A

Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A

Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown and unknowable load reductions)				13950	7008	6810

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 106: Action Plan for Manure Nutrient Management in the Boyd Creek Watershed HUC 05080001 090 070

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan

and encourage at least one practice associated with a CMNP	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed

	Coordinator time	facilities	At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 107: Action Plan to Reduce Nutrient Enrichment from Wastewater Treatment in the Boyd Creek Watershed HUC 05080001 090 070

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 108: Action Plan for Reduction of Urban Non-point Pollution in the Boyd Creek Watershed HUC 05080001 090 070

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival

Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statements and Action Plan for HUC 05080001 100 Upstream Swamp Creek to Upstream Greenville Creek

Includes subwatersheds 05080001--100–010, Swamp Creek #B; --020, Indian Creek; --030, Swamp Creek #A; --040, Stillwater River #F; --050, Trotters Creek and –060, Harris Creek.

Water quality in this basin is among the worst in the Stillwater River watershed, and in Darke County is classified as poor. The Darke County portion of HUC 05080001 100 has been extensively modified for agricultural drainage. These channelized and dipped streams lack habitat to support a diversity of fish and macroinvertebrate species. The channelized nature of these streams also causes water to flow away quickly, so basin flow in this watershed is often very low. Many large animal feeding operations and several point-source dischargers are located the Darke County portion of the watershed; among them are Weaver Brothers Egg Farm, the Versailles WWTP, and Four Star Dairy Livestock, Inc. Water quality in the Miami County portions of the watershed in Trotters Creek, Stillwater River #F, and Harris Creek more fully meets life use designation goals and is ranked from fair to excellent (OEPA 2001). This is probably because Miami County does not have the large population of animal units that are found in Darke County, and the area around the mainstem of the Stillwater River has an almost complete riparian corridor.

Overall Watershed Protection Goals for HUC 05080001 100

1. Reduce nitrogen and phosphorous loads to within TMDL recommended levels
2. Improve QHEI scores to attainment levels

Estimated Total Load Reductions for HUC 05080001 100

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle	Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)

	lbs. N/year	lbs. P/year		
05080001 100 010 + 05080001 100 030	37071	18663		
05080001 100 020	17697	8901		
05080001 100 040	17697	8901		
05080001 100 050	6618	3315		
05080001 100 060	12951	6528		
			N	P
Total load reductions for 11-digit watershed 05080001 090	92034	46308	616.0%	253.0%

Swamp Creek #B HUC 05080001 100 010

Swamp Creek #A HUC 05080001 100 030

Background:

Water quality in HUC 05080001 100 010 and HUC 05080001 100 030, priority watershed protection areas for the SWP, are not meeting it water quality use designations for all river miles. The Swamp Creek subbasin is not meeting its aquatic life use designations of Modified Warmwater Habitat (upstream from RM6.5) and Warmwater Habitat (downstream from RM6.5) for 6.5 of its 12.1 river miles due nutrient loading and organic enrichment. Nutrient loading and enrichment is so high in this watershed that critically low DO and fish kills have been reported. Large CAFOs are located in this area, such as Four Star Dairy Livestock, Inc., which housed over 3000 dairy cattle in 1997. Versailles WWTP is located in this watershed, and has several industrial contributors to the inflow of the sewer system that includes Midmark, Accurite, Whitefords and Weaver Brothers Eggs. Violations of the NPDES permit are not a huge concern after the most recent WWTP expansion, but some nutrient enrichment of Swamp Creek does occur (OEPA 2001).

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterway to at least 6000 feet of per year (total for both watersheds)
- Increase the installation of filter strips (approx. 30 feet wide) to at least 8500 feet per year (total for both watersheds)
- Increase the amount of riparian vegetation in the watersheds by 5% over current levels.
- Increase amount of no-till corn and bean acres by an additional 1000 acres across these two watersheds

Action Items:

Table 109: Action Plan for Sediment and Agricultural Nutrient Control in the Swamp Creek #B and #A Watersheds HUCs 05080001 100 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	2520	1260	1260

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	4335	2295	1530
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	216	108	108

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	30000	15000	15000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	1 wetland constructed in each three year assessment period in these two HUCs	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total target load reductions (excluding unknown or unknowable reductions)				37071	18663	17898

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 110: Action Plan for Manure Nutrient Management in the Swamp Creek #B and #A Watersheds HUCs 05080001 100 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	95% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan

Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 111: Action Plan for Reducing Loads from Wastewater in Swamp Creek #B and #A Watersheds HUCs 05080001 100 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years

Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 112: Action Plan for Reducing Urban Non-point Source Pollution in Swamp Creek #B and #A Watersheds HUCs 05080001 100 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival

Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 113: Action Plan for Reducing Contamination from Agricultural Chemicals in Swamp Creek #B and #A Watersheds HUCs 05080001 100 010 and –030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Indian Creek HUC 05080001 100 020

Background:

Indian Creek, HUC 05080001 100 020, is not meeting its water quality use designations for all river miles. Indian Creek is designated WWH for the lower 1.9 miles of stream, but upstream of Conover Road it is an actively maintained ditch and it has been proposed to change the designation of WWH to MWH upstream of that point. Currently, the stream is in non-attainment of the MWH designation upstream of Conover Road and in partial attainment for the lower 1.9 miles of WWH. It was listed in the 2001 OEPA TSD report as one of the most impaired stream sections in the Stillwater watershed. Along the Stillwater River #J, headwaters to the North Fork is not meeting its aquatic life use designation of Modified Warmwater Habitat for 2.67 of its 9.67 river miles due to channelization, nutrient loading and organic enrichment. Sedimentation is also likely to be a factor in these watersheds.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterway to at least 2000 feet of per year
- Increase the installation of filter strips (approx. 30 feet wide) to at least 3500 feet per year
- Increase the amount of riparian vegetation in the watersheds by 3% over current levels.
- Increase amount of no-till corn and bean acres by an additional 500 acres across

Action Items:

Table 114: Action Plan for Sediment and Agricultural Nutrient Control in the Indian Creek Watershed HUC 05080001 100 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	840	420	420

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1785	945	630
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	72	36	36

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	15000	7500	7500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	1 wetland constructed per three year assessment cycle in HUC 05080001 100	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total target load reductions (excluding unknown or unknowable reductions)				17697	8901	8586

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 115: Action Plan for Manure Nutrient Management in the Indian Creek Watershed HUC 05080001 100 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan

Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 116: Action Plan for Reducing Loads from Wastewater in the Indian Creek Watershed HUC 05080001 100 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years

Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 117: Action Plan for Reducing Urban Non-Point Source Pollution in the Indian Creek Watershed HUC 05080001 100 020

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival

Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 118: Action Plan for Reducing Contamination from Agricultural Chemicals in Indian Creek Watershed HUC 05080001 100 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs

Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Stillwater River #F HUC 05080001 100 040

Background:

Water quality in HUC 05080001 100 040 (Swamp Creek to Greenville Creek) is meeting water quality use designations for all but one river mile. Along the Stillwater River #F, Swamp Creek to Greenville Creek is not meeting its aquatic life use designation of Exceptional Warmwater Habitat for 1 of its 13.5 river miles due to channelization, nutrient loading and organic enrichment. This river segment should be protected from further channelization and nutrient loading in order to maintain the EWH designation.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation at least 2000 feet of grassed waterway per year
- Maintain the installation at least 3500 feet per year of filter strips (approx. 30 feet wide) each year
- Maintain the current amount of riparian vegetation in the watershed
- Increase amount of no-till bean acres by an additional 500 acres across these two watersheds.

Action Items:

Table 119: Action Plan for Sediment and Agricultural Nutrient Control in the Stillwater River #F Watershed HUC 05080001 100 040

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	840	420	420
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1785	945	630

	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	75	36	36
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	15000	7500	7500

	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year cycle in HUC 05080001 100	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A

Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total target load reductions (excluding unknown or unknowable load reductions)				17697	8901	8586

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 120: Action Plan for Manure Nutrient Management in the Stillwater River #F Watershed HUC 05080001 100 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county

Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 121: Action Plan for Reducing Loads from Wastewater Treatment in Stillwater River #F Watershed HUC 05080001 100 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed

design	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Trotters Creek HUC 05080001 100 050

Background:

Trotters Creek, HUC 05080001 100 050 has unconfirmed WWH and EWH designations from the OEPA (OEPA 2004). This stream segment is currently in attainment of aquatic life uses and should be protected so that habitat is not degraded. Although habitat meets expectations for use designation in this area, nutrient loads are expected to be high based on TMDL data. Action Plans for this watershed should focus on maintaining good water quality.

Problem Statement #1:

Sediment loads and organic enrichment have the potential to impair use attainment of this stream section. Riparian areas and buffers must be maintained and increased.

Goals:

- Increase the installation of grassed waterways to at least one 900 foot waterway per year
- Maintain the installation at least 400 feet per year of filter strips (approx. 30 feet wide) each year
- Maintain the current amount of riparian vegetation in the watershed
- Increase the number of no-till acres (corn and beans) by 200 acres

Action Items:

Table 122: Action Plan for Sediment and Agricultural Nutrient Control in the Trotters Creek Watershed HUC 05080001 100 050

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	378	189	189
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	204	108	72

	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	6000	3000	3000

	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland constructed per three year assessment cycle in HUC 05080001 100	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A

Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total target load reductions (excluding unknown or unknowable load reductions)				6618	3315	3279

Problem Statement #2:

Although not a significant problem in this watershed, manure runoff from animal feeding operations would be a possible source of nutrient enrichment.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 123: Action Plan for Manure Nutrient Management in the Trotters Creek Watershed HUC 05080001 100 050

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county

Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Harris Creek HUC 05080001 100 060

Background:

HUC 05080001 100 060, Harris Creek is designated as MWH/WWH. It is in attainment for 6.1 river miles, and in partial attainment for 3 river miles. The main sources of impairment are organic enrichment; poor dissolved oxygen; and siltation due to hydromodification and combined sewer overflows from the town of Bradford.

Problem Statement #1:

Excessive hydromodification of the existing stream for development and agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation at least 1500 feet of grassed waterway per year
- Maintain the installation at least 3500 feet per year of filter strips (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 350 acres

Action Items:

Table 124: Action Plan for Sediment and Agricultural Nutrient Control in the Harris Creek Watershed HUC 05080001 100 060

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	630	315	315

	practices					
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1785	945	630
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	10500	5250	5250
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One watershed will be established per three year cycle in HUC 05080001 100	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total target load reductions (excluding unknown or unknowable load reductions)				12951	6528	6213

Problem Statement #2:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 125: Action Plan for Reducing Urban Non-point Source Pollution in Harris Creek Watershed HUC 05080001 100 060

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school

it	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed

	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statements and Action Plan for HUC 05080001 110 Upper Greenville Creek and Tributaries

Includes subwatersheds 05080001--110–010, Greenville Creek #D; --020, Dismal Creek; --030, Kraut Creek; --040, Greenville Creek #C; and --050, West Branch Greenville Creek.

This portion of Greenville Creek is designated as EWH. Greenville Creek is also designated a State Scenic River. Parts of Greenville Creek meet their aquatic life use designations, and some are in only partial attainment. The pervasive problems in this portion of Greenville Creek include habitat degradation due to channelization and nutrient enrichment from failing HSTS (OEPA 2004). Kraut Creek is designated WWH, and is in full attainment of this life use for all river miles (OEPA 2004). The West Branch is in full attainment for all but half a river mile, which is in partial attainment of this WWH use designation. Dismal Creek suffers from hydromodification from agriculture and land-applied manure. A potion of Dismal Creek is non-attaining of its WWH life use designation.

Overall Watershed Protection Goals for HUC 05080001 110

1. Reduce phosphorous loads by 5%
2. Bring nitrogen loads into attainment with TMDL recommendations
3. Increase QHEI scores by 5 points

Estimated Total Load Reductions for HUC 05080001 110

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle		Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)	
	N (lbs/yr)	P (lbs/yr)		
05080001 110 010 + 05080001 110 040	18600	9390		
05080001 110 030 + 05080001 110 050	18600	9390		
05080001 110 020	7941	3975		
			N	P
Total load reductions for 11-digit watershed 05080001 090	45141	22755	572.7%	8.8%

Greenville Creek #D HUC 05080001 110 010

Greenville Creek #C HUC 05080001 110 040

Background:

HUC 05080001 110 010 Greenville Creek #D and HUC 05080001 110 040 Greenville Creek #C are designated as EWH for all river miles. Greenville Creek #D is in full attainment of the EWH aquatic life use designation, whereas Greenville Creek #C is in

only partial attainment due to hydromodification and channelization for development and agricultural use. Both stream segments would benefit from action plans that emphasized sediment and runoff control, as well as HSTS pollution abatement.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, is impairing use attainment of part of this stream section. Although much of this stream has a healthy riparian corridor, the problem of sedimentation is complicated by a partial lack of riparian corridor in some stream segments.

Goals:

- Maintain the installation at least 1200 feet of grassed waterway per year over these two watersheds
- Maintain the installation at least 6000 linear feet per year of filter strips (approx. 30 feet wide) each year in these two watersheds
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 500 acres per year in these two watersheds.

Action Items:

Table 126: Action Plan for Sediment and Agricultural Nutrient Control in the Greenville Creek #D and Greenville Creek #C Watersheds HUCs 05080001 110 010 and –040

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	504	252	252

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	3060	1620	1080
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Additional 500 acres no-tilled per year	15000	7500	7500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each three-year cycle in HUC 05080001 110	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total target load reductions (excluding unknown and unknowable reductions)				18600	9390	8850

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 127: Action Plan for Manure Nutrient Management in the Greenville Creek #D and Greenville Creek #C Watersheds HUCs 05080001 110 010 and –040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan

Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 128: Action Plan to Reduce Loads from Wastewater Treatment in the Greenville Creek #D and Greenville Creek #C Watersheds HUCs 05080001 110 010 and –040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Kraut Creek HUC 05080001 110 030

West Branch Greenville Creek HUC 05080001 110 050

Background:

These two streams, HUC 05080001 110 030 Kraut Creek and HUC 05080001 110 050 West Branch Greenville Creek, are currently assigned WWH life use designations. Kraut Creek is in full attainment of this life use designation, and the West Branch is in full attainment for all but .5 river miles, which is in partial attainment and impaired by hydromodification. Although both of these creeks are attaining their life use designations, TMDL data indicates that nutrient loading exists and should be addressed in order to keep these streams in attainment.

Problem Statement #1:

Hydromodification of the existing stream for agricultural use could destroy habitat and increase sediment loads and may impair future use attainment of part of this stream section. Erosion from cropland carries with it nutrients from agricultural fertilizers and may also be a future source of impairment.

Goals:

- Maintain the installation at least 1200 feet of grassed waterway per year over these two watersheds
- Maintain the installation at least 6000 feet per year of filter strips (approx. 30 feet wide) each year in these two watersheds
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 500 acres per year in these two watersheds.

Action Items:

Table 129: Action Plan for Sediment and Agricultural Nutrient Control in the Kraut Creek and West Branch Greenville Creek Watersheds HUCs 05080001 110 030 and –050

Action	Resources	How to Accomplish	Measure of	Target Load Reduction

	Needed		Success	N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	504	252	252
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	3060	1620	1080
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal	Watershed coordinator will work with NRCS and SWCD to	95% of all waterway construction includes tile	36	18	18

	funding for conservation practices	ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	renovation			
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	An increase of 500 acres of no-tilled crops each year	15000	7500	7500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland will be established in each three year cycle in HUC 05080001 110	N/A	N/A	N/A

Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A

Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable load reductions)				18600	9390	8850

Problem Statement #2:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 130: Action Plan for Reducing Loads from Sewage Treatment in the Kraut Creek and West Branch Greenville Creek Watersheds HUCs 05080001 110 030 and –050

Action	Resources Needed	How to Accomplish	Measure of	Estimated Cost

			Success	
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser

Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #3:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 131: Action Plan for Reducing Contamination from Agricultural Chemicals in the Kraut Creek and West Branch Greenville Creek Watersheds HUCs 05080001 110 030 and --050

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper	3 new chemical containment facilities built each year in the Stillwater River	Unknown

chemicals		chemical storage	watershed	
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Dismal Creek HUC 05080001 110 020

Background:

Dismal Creek, HUC 05080001 110 020, has an aquatic life use designation of WWH. Of its five river miles, two are in full attainment, two are in partial attainment, and one river mile does not attain the WWH life use designation. Impairments in this watershed include channelization and habitat degradation and organic enrichment from HSTS.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation at least 600 feet of grassed waterway per year
- Maintain the installation at least 3000 feet per year of filter strips (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 250 acres per year

Action Items:

Table 132: Action Plan for Sediment and Agricultural Nutrient Control in the Dismal Creek Watershed HUC 05080001 110 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	252	126	126
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	153	81	54
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A

	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	250 additional acres of no-tilled crops each year	7500	3750	3750
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A

	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One established wetland per each three year cycle in HUC 05080001 110	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A

with floodplains						
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total target load reductions (excluding unknown or unknowable load reductions)				7941	3975	3948

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year

- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 133: Action Plan for Manure Nutrient Management in the Dismal Creek Watershed HUC 05080001 110 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations

		transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs		
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 134: Action Plan for Reducing Loads from Wastewater Treatment in the Dismal Creek Watershed HUC 05080001 110 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction			Estimated Cost
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)	
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	N/A	N/A	N/A	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	N/A	N/A	N/A	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	?	?	N/A	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	?	?	N/A	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	?	?	N/A	Up to $350 per riser

Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole				Up to $2000 per upgraded system

Problem Statement #4:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 135: Action Plan for Reducing Contamination from Agricultural Chemicals in the Dismal Creek Watershed HUC 05080001 110 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper	3 new chemical containment facilities built each year in the Stillwater River	Unknown

		chemical storage	watershed	
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Problem Statements and Action Plan for HUC 05080001 120 Greenville Creek Downstream West Branch to Mouth

Includes subwatersheds 05080001--120–010, Greenville Creek #B; --020, Mud Creek; --030, Bridge Creek; --040, Greenville Creek #A; and --050, Dividing Branch.

Greenville Creek is designated as EWH in Ohio except for the reach flowing through Greenville, which has been channelized and the banks armored and so should be designated WWH. Parts of Greenville Creek meet their aquatic life use designations, and some are in only partial attainment. The pervasive problems in Greenville Creek include habitat degradation due to channelization and nutrient enrichment from failing HSTS (OEPA 2004). Mud Creek, Dividing Branch, and Bridge Creek all suffer from hydromodification from agriculture and land-applied agricultural chemicals. Several point sources, including the Greenville WWTP and BASF, exist in this watershed.

Overall Watershed Protection Goals for HUC 05080001 120

1. Reduce phosphorous loads by 15%
2. Continue to keep nitrogen loads below TMDL levels
3. Increase QHEI scores by 5 points

Estimated Total Load Reductions for HUC 05080001 120

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle		Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)
	N (lbs/yr)	P (lbs/yr)	

05080001 120 010	8901	4525.5		
05080001 120 020 + 05080001 120 030 + 05080001 120 050	27408	13824		
05080001 120 040	9318	4704		
			N	P
Total load reductions for 11-digit watershed 05080001 120	42627	23053.5	Currently, there is no recommended N reduction for this HUC	17.1%

Greenville Creek #B HUC 05080001 120 010

Background:

Greenville Creek #B (West Branch to Dividing Branch) is a channelized portion of the Creek that runs through Greenville, Ohio. Due to hydromodification and bank armament, it has an aquatic life use designation of WWH. Municipal point sources and urban non-point source pollution coupled with channelization caused by development are the major sources of degradation in this watershed. Some row-crop agricultural activity does exist outside of Greenville, and the reduction of nutrient loading from agricultural activities would be beneficial to the watershed.

Problem Statement #1:

Non-point source pollution flowing from storm sewers probably contributes nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 136: Action Plan for Reducing Urban Non-point Source Pollution in the Greenville Creek #B Watershed HUC 065080001 120 010

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed

	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #2:

Row-cropped agricultural land in this watershed is contributing nutrients to this watershed. Fortunately, landowners in this area have historically been proactive conservationists and lead the watershed in installation of filter strips. This momentum should be encouraged.

Goals:

- Maintain the installation at least 750 feet of grassed waterway per year
- Maintain the installation at least 5000 feet per year of filter strips (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 200 acres per year

Action Items:

Table 137: Action Plan for Reducing Nutrient Loads from Agriculture in the Greenville Creek #B Watershed HUC 05080001 120 010

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	315	157.5	157.5

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	2550	1350	900
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	6000	3000	3000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year period over HUC 05080001 120	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total Target Load Reductions (excluding unknown or unknowable load reductions)				8901	4525.5	4075.5

Mud Creek HUC 05080001 120 020

Bridge Creek HUC 05080001 120 030

Dividing Branch HUC 05080001 120 050

Background:

Mud Creek, Bridge Creek, and the Dividing Branch, HUCs 05080001 120 –020, –030 and –050, have all been given the aquatic life use designation of WWH. According to the OEPA 2001 TSD, all of these streams are in full attainment of their aquatic life use designation.

Problem Statement #1:

Although these streams are in full attainment of their WWH life use designation, hydromodification of the existing stream for agricultural use can destroy habitat and increase sediment loads. Row-crop agriculture in this portion of the watershed also increases sediment loads through plowing, and the use of agricultural chemicals may further impair these streams.

Goals:

- Maintain the installation at least 1800 feet of grassed waterway per year across these three watersheds
- Maintain the installation at least 8000 feet per year of filter strips (approx. 30 feet wide) each year across these three watersheds
- Maintain the current amount of riparian vegetation in the watershed
- Increase amount of no-till acres (corn and beans) by an additional 750 acres per year across these three watersheds

Action Items:

Table 138: Action Plan for Sediment and Agricultural Nutrient Control in the Mud Creek, Bridge Creek, and Dividing Branch Watersheds HUCs 05080001 120 020, –030 and –050

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	756	378	378
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	4080	2160	1440
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A

	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	72	36	36
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects; an additional 750 acres no-tilled across these watersheds	22500	11250	11250
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A

	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year period over HUC 05080001 120	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A

with floodplains						
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable load reductions)				27408	13824	13104

Problem Statement #2:

High nutrient loads are occurring in these watersheds due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year

- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 139: Action Plan for Manure Nutrient Management in the Mud Creek, Bridge Creek, and Dividing Branch Watersheds HUCs 05080001 120 020, –030 and –050

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA and encourage at least one practice associated with a CMNP	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan
	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed

Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their facilities	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed
	Coordinator time		At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watersheds, and should be reduced to ensure that these streams continue to meet aquatic life use goals.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed

- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 140: Action Plan for Reducing Loads from Wastewater Treatment in the Mud Creek, Bridge Creek, and Dividing Branch Watersheds HUCs 05080001 120 020, –030 and –050

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed

Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from Greenville storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 141: Action Plan for Reducing Loads from Urban Non-point Source Pollution in the Mud Creek, Bridge Creek, and Dividing Branch Watersheds HUCs 05080001 120 020, –030 and –050

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed

	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 142: Action Plan for Reducing Contamination from Agricultural Chemicals in the Mud Creek, Bridge Creek, and Dividing Branch Watersheds HUCs 05080001 120 020, –030 and –050

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Greenville Creek #A HUC 05080001 120 040

Background:

This segment of Greenville Creek is designated as EWH. It is in full attainment for 9.5 river miles, partial attainment for 2.7 river miles, and non-attaining for 3 river miles. The major sources of impairment in this watershed are from human waste disposal, both from HSTS and the WWTP for the town of Gettysburg. The WWTP and HSTS are contributing significant organic enrichment and decreasing the dissolved oxygen in the stream. The town of Gettysburg's storm sewers also outlet to Greenville Creek #A, contributing lawn chemicals, soaps, and automotive fluids. Although the HSTS and WWTP are the major sources of impairment in this watershed, agricultural practices such as row-crop farming and animal feeding operations also contribute sediment, nutrients, and organic enrichment to this watershed.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads, and organic enrichment from CAFOs is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Maintain the installation at least 600 feet of grassed waterway per year
- Maintain the installation at least 3000 feet per year of filter strips (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 250 acres per year.

Action Items:

Table 143: Action Plan for Sediment and Agricultural Nutrient Control in the Greenville Creek #A Watershed HUC 05080001 120 040

Action	Resources	How to Accomplish	Measure of	Target Load Reduction

	Needed		Success	N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	252	126	126
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	1530	810	810
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal	Watershed coordinator will work with NRCS and SWCD to	95% of all waterway construction includes tile	36	18	18

	funding for conservation practices	ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	renovation			
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	7500	3750	3750
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year cycle in HUC 05080001 120	N/A	N/A	N/A

Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A

Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable load reductions)				9318	4704	4434

Problem Statement #2:

High nutrient loads are occurring in this watershed due to manure runoff from animal feeding operations.

Goals:

- Reduce manure spills to zero per year
- Reduce the number of tons of manure improperly handled to zero per year

Action Items:

Table 144: Action Plan for Manure Nutrient Management in the Greenville Creek #A Watershed HUC 05080001 120 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Develop comprehensive manure nutrient management plans for each livestock operation not permitted by Ohio EPA	NRCS and SWCD staff time	CMNPs are required for farmers participate in government programs	90% of all unpermitted facilities are covered by CMNPs.	$1250/plan

and encourage at least one practice associated with a CMNP	SWCD staff time	Require targets of pollution complaints to have a CMNP to receive assistance from the SWCD	100% of operators that have a pollution complaint lodged against them have a CMNP	$1250/plan
Promote adoption of new technologies, such as tile plugs and pump-out ports	SWCD/NRCS staff time	CMNPs incorporate new technologies	100% of new CMNPs written have pump-out ports, tile plugs, and other new technologies incorporated.	Salary and benefits for one MNM Specialist in this county
Encourage education of farmers through programs such as the Livestock Environmental Assurance Program (LEAP)	OSUE time, Livestock Coalition time	Contact OSUE to hold training in the watershed	One LEAP training held in the Stillwater Watershed per year	$400 training costs x 1 meeting in the entire Stillwater Watershed
Exclude livestock from streams	Coordinator and SWCD staff time, ODNR staff time	Coordinator and SWCD look for unrestricted livestock access during stream survey and tillage transects; landowners where livestock access is occurring are contacted about government programs to pay for BMPs	99% of streams have no livestock access within 7 years	To be determined based on number of necessary installations
Encourage certification of manure applicators	Coordinator time, staff time from NRCS, SWCD and OSUE	Work with large poultry/egg producers such as Weaver Egg to ensure proper application by custom applicators buying manure from their	Hold at least one workshop for manure applicators per year	$965 SWP staff time $200 refreshments = $1165 per year over the entire Stillwater Watershed

	Coordinator time	facilities	At least one meeting with a manure brokering entity per year	$120.00 per year over the entire Stillwater Watershed

Problem Statement #3:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in Darke County
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 145: Action Plan for Reducing Loads from Wastewater Treatment in the Greenville Creek #A Watershed HUC 05080001 120 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #4:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 146: Action Plan for Reducing Loads from Urban Non-point Source Pollution in the Greenville Creek #A Watershed HUC 05080001 120 040

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town

	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #5:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 147: Action Plan for Reducing Contamination from Agricultural Chemicals in the Greenville Creek #A Watershed HUC 05080001 120 040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs

Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Problem Statements and Action Plan for HUC 05080001 130 Stillwater River Downstream Greenville Creek to Upstream Ludlow Creek

Includes subwatersheds 05080001-130–010, Stillwater River #E; --020, Painter Creek; --030, Little Painter Creek; --040, and Stillwater River #D

Although the mainstem portions of this watershed, Stillwater #E and Stillwater #D, are classified as EWH and have some segments in full attainment of that aquatic life use, there is danger to these river segments from development pressures in the towns of Covington and Pleasant Hill. Current Covington development plans through 2030 include more industrialization of the southern portion of the town near the river (MVRPC 2004). Development in this area should be watched carefully and work should be done with Covington city planners so that a balance can be attained between development and environmental needs. Painter Creek is designated as WWH (with EWH proposed) for some river miles and MWH for others, and is not in attainment for most of those miles. Little Painter Creek is in partial attainment of its aquatic life use designation of MWH. The primary sources of impairment in HUC 05080001 130 are combined sewer overflows, municipal point sources, and agriculture.

Overall Watershed Protection Goals for HUC 05080001 130

5. Reduce phosphorous loads by 10%
6. Reduce nitrogen loads by 10%
7. Increase QHEI scores by 5 points

Estimated Total Load Reductions for HUC 05080001 130

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle		Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)
	N (lbs/yr)	P (lbs/yr)	

05080001 130 010 + 05080001 130 040	16269	8161.5		
05080001 130 020	16269	8161.5		
05080001 130 030	9756	4893		
			N	P
Total load reductions for 11-digit watershed 05080001 130	42294	21216	13.5%	12.3%

Stillwater River #E HUC 05080001 130 010

Stillwater River #D HUC 05080001 130 040

Background:

This section of the Stillwater River is designated EWH, but it is not attaining this aquatic life use designation for all river miles. These river segments are in full attainment for 8.6 river miles and partial attainment for 2.8 river miles, leaving 11.4 river miles unassessed. It is important to protect the portions of these watersheds that are already in full attainment while improving the sections that are in only partial attainment. There is significant pressure from development in these watersheds, particularly in Stillwater River #E around the city of Covington, with greater expansion planned. Watershed protection in these watersheds should focus on sustainable development. As with any watershed in the Stillwater basin, nutrient loading from CAFOs and sediment and nutrient loading from farm fields is also a concern and should be addressed.

Problem Statement #1:

Non-point source pollution flowing from storm sewers contributes nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 148: Action Plan for Reducing Urban Non-point Source Pollution in the Stillwater #E and Stillwater #E Watersheds HUCs 05080001 130 010 and –040

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival

Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #2:

Sediment run-off from agricultural land as well as nutrients from agricultural fertilizers are sources of potential impairment in these watersheds. It is also projected that in the next 30 years, runoff from construction sites will become the major source of sedimentation in this watershed.

Goals:

- Increase the adherence to construction site rules concerning sedimentation
- Increase the installation of grassed waterways to at least 750 feet of per year across both watersheds
- Increase the installation of filter strips to at least 1800 feet (approx. 30 feet wide) each year across both watersheds
- Increase the current amount of riparian vegetation in the watershed 3%
- Increase amount of no-till acres (corn and beans) by an additional 500 acres per year across both watersheds.

Action Items:

Table 149: Action Plan for Sediment and Agricultural Nutrient Control in the Stillwater #E and #D Watersheds HUCs 05080001 130 010 and –040

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote use of construction site BMPs	Coordinator time, Miami County Engineer's Office time	Hold one training each year in the Miami County portion of the watershed focusing on construction site BMPs	At least 30 contractors in attendance each year	N/A	N/A	N/A
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	315	157.5	157.5
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	918	486	486

	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	15000	7500	7500

	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year period in HUC 05080001 130	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A

Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable target reductions)				16269	8161.5	7999.5

Problem Statement #3:

Based on information from the Miami County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in the watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 150: Action Items for Reducing Loads from Wastewater Treatment in the Stillwater #E and #D Watersheds HUCs 05080001 130 010 and --040

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Miami General Health District staff time, Coordinator staff time	Work with the Miami General Health District to write countywide HSTS plans	Plan completion within 5 years	Unknown
Locate 100% of home site septic systems and determine discharge status	Miami County General Health District time to do survey	Miami Health District is currently undertaking this task	All Miami County home site septic systems located and mapped via GIS and egregious dischargers contacted	Unknown

Educate homeowners on proper septic maintenance and design	Miami health Districts staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	Unknown
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke and Miami Counties, alternating counties every other year	$1000 per workshop
Encourage upgrade and repair of failing systems	Miami County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Unknown

Painter Creek HUC 05080001 130 020

Background:

Painter Creek, HUC 05080001 130 020, is listed in the OEPA 2001 TSD report as being the most severely impaired stream segment in the Stillwater River watershed. Painter Creek is being impacted by combined sewer overflow from the city of Arcanum. This is adding nutrients and pathogens to the creek, along with toxic substances from the sewage lagoons, which lack capacity and are failing. Unfortunately, dealing with CSOs is beyond the scope of this Plan. This area is also home to some of the richest farm ground in the Stillwater River watershed, and is consequently being impaired by channelization, sediment loading, fertilizer loading and nutrient loading from agricultural fertilizers. Agriculture in this watershed is primarily row-crop based, and there are few AFOs in the watershed so reducing nutrients from manure is not a priority at this time.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterways to at least 750 feet of per year
- Increase the installation of filter strips to at least 1800 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 2%
- Increase amount of no-till acres (corn and beans) by an additional 500 acres per year.

Action Items:

Table 151: Action Plan for Sediment and Agricultural Nutrient Control in the Painter Creek Watershed HUC 05080001 130 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	315	157.5	157.5

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	918	486	324
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	15000	7500	7500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year cycle over HUC 05080001 130	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total Target Load Reductions (excluding unknown or unknowable load reductions)				16269	8161.5	7999.5

Problem Statement #2:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in this watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 152: Action Items for Reducing Loads from Wastewater Treatment in the Painter Creek Watershed HUC 05080001 130 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown

Locate 100% of home site septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County home site septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #3:

Although not the major source of nutrients for this watershed, non-point source pollution flowing from storm sewers probably does contribute nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 153: Action Items for Reducing Loads from Urban Non-point Source Pollution in the Painter Creek Watershed HUC 05080001 130 020

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs
Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town

	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed
	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time

	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Problem Statement #4:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

1. Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
2. Reduce herbicide contamination of the watershed

Action Plan:

Table 154: Action Plan for Reducing Contamination from Agricultural Chemicals in the Painter Creek Watershed HUC 05080001 130 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs

Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Little Painter Creek HUC 05080001 130 030

Background:

Water quality in HUC 05080001 130 030 Little Painter Creek is not meeting its water quality use designations for all river miles. Little Painter Creek is meeting its aquatic life use designation of Modified Warmwater Habitat for 4.2 river miles, but 1 river mile is in only partial attainment due to channelization, nutrient loading and organic enrichment. Sedimentation is also likely to be a factor in this watershed.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterways to at least 500 feet per year
- Increase the installation of filter strips to at least 1000 feet (approx. 30 feet wide) each year

- Increase the current amount of riparian vegetation in the watershed 2%
- Increase amount of no-till acres (corn and beans) by an additional 300 acres per year.

Action Items:

Table 155: Action Plan for Sediment and Agricultural Nutrient Control in the Little Painter Creek Watershed HUC 05080001 130 030

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	210	105	105
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	510	270	180
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A

	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	9000	4500	4500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A

	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each three year period over HUC 05080001 130	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A

with floodplains						
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable load reductions)				9756	4893	4803

Problem Statement #2:

Based on information from the Darke County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in the watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 156: Action Items to Reduce Loads from Wastewater Treatment in the Little Painter Creek Watershed HUC 05080001 130 030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years
Educate homeowners on proper septic maintenance and	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed

design	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #3:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 157: Action Plan to Reduce Contamination by Agricultural Chemicals in the Little Painter Creek Watershed HUC 05080001 130 030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Problem Statements and Action Plan for HUC 05080001 140 Stillwater River Upstream Ludlow Creek to Mouth

Includes subwatersheds 05080001-140–010, Ludlow Creek #A; --020, Hog Run; --030, Ludlow Creek #B; --040, Stillwater River #C; --050, Brush Creek; --060, Stillwater River #B (including Mill Creek); and --070,Stllwater River #A (mouth into the Great Miami River).

Water quality in this basin ranges from reasonably good for Ludlow Creek to quite poor in Mill Creek, which suffers from runoff of de-icing chemicals from Dayton-Cox International Airport. This watershed has the highest development pressure of any in the watershed as people migrate out of the city of Dayton to more rural areas. As this migration occurs, industry will follow the population, which may put further point-source pressure on the watershed. Currently, the watershed is still primarily agricultural, with all the accompanying nutrient loading from agricultural chemicals, manure runoff and failing HSTS.

Overall Watershed Protection Goals for HUC 05080001 140

8. Reduce phosphorous loads by 10%
9. Maintain nitrogen loads below TMDL levels
10. Increase QHEI scores by 5 points

Estimated Total Load Reductions for HUC 05080001 140

The following table represents the expected load reductions from each 14-digit HUC if the Action Plan is implemented in full for one three-year evaluation cycle.

14-digit HUC	Estimated Total Load Reductions for all Action Items over one three-year evaluation cycle		Percentage Reduction from TMDL Recommendations (based on 11-digit HUCs)
	N (lbs/yr)	P (lbs/yr)	
05080001 140 010	10269	5161.5	

05080001 140 020	6628	3325.5		
05080001 140 030	9963	4999.5		
05080001 140 040	9501	4758		
05080001 140 050	9501	4758		
			N	P
Total load reductions for 11-digit watershed 05080001 090	45862	23002.5	Currently no recommended load reduction exists for this HUC	11.7%

Ludlow Creek #A HUC 05080001 140 010

Background:

Ludlow Creek is designated WWH. According to the 2001 TSD Report, however, a designation of MWH would be more appropriate upstream from the Darke County line, as the stream has been channelized and is being maintained for agricultural drainage. Ludlow Creek is currently in partial attainment of the WWH designation, but were the headwaters to reclassified the Ludlow Creek area would be in full attainment. Current impairment to Ludlow Creek comes from channelization, sediment loading, and nutrient loading from agricultural fertilizer application. Significant loading from HSTS and AFOs is also a reasonable assumption.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterways to at least 750 feet per year
- Increase the installation of filter strips to at least 1800 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 2%
- Increase amount of no-till acres (corn and beans) by an additional 300 acres per year.

Action Items:

Table 158: Action Items for Reducing Sediment and Nutrient Loads from Agriculture in the Ludlow Creek #A Watershed HUC 05080001 140 010

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	315	157.5	157.5
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	918	486	324

	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	9000	4500	4500

	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each three year period over HUC 05080001 130	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation practices	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A

Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation initiatives	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for conservation practices and BMPs	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A
Total Target Load Reductions (excluding unknown or unknowable load reductions)				10269	5161.5	4999.5

Problem Statement #2:

Based on information from the Darke and Miami County Health Districts, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in the Stillwater Watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 159: Action Items for Reducing Loads from Wastewater Treatment in the Ludlow Creek #A Watershed HUC 05080001 140 010

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke General Health District staff time, Coordinator staff time	Work with the Darke General Health District to write a countywide HSTS plan	Plan completion within 5 years	Unknown
Locate 100% of homesite septic systems and determine discharge status	Darke County General Health District time to do survey	Darke Health District is currently undertaking this task	All Darke County homesite septic systems located and mapped via GIS and egregious dischargers contacted	$250,000 over the Darke portion of the watershed over 3 years

Educate homeowners on proper septic maintenance and design	Project Coordinator staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke County every other year	$1000 per workshop over the entire Darke portion of the Watershed
Encourage proper septic system maintenance	Darke County General Health District staff time for administration of grant	Grant program to pay for septic system risers	All grant monies available are spent each year.	Up to $350 per riser
Encourage upgrade and repair of failing systems	Darke County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Up to $2000 per upgraded system

Problem Statement #3:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)

- Reduce herbicide contamination of the watershed

Action Plan:

Table 160: Action Items for Reducing Contamination from Agricultural Chemicals in the Ludlow Creek #A Watershed HUC 05080001 140 010

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Ludlow Creek #B HUC 05080001 140 030

Background:

Ludlow Creek is designated WWH. According to the 2001 TSD Report, however, a designation of MWH would be more appropriate upstream from the Darke County line, as the stream has been channelized and is being maintained for agricultural drainage. Ludlow Creek is currently in partial attainment of the WWH designation, but were the headwaters to reclassified the Ludlow Creek area would be in full attainment. Current impairment to Ludlow Creek comes from channelization, sediment loading, and nutrient loading from agricultural fertilizer application. Significant loading from HSTS and AFOs is also a reasonable assumption.

Problem Statement #1:

Excessive hydromodification of the existing stream for agricultural use, which has destroyed habitat and increased sediment loads is impairing use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor.

Goals:

- Increase the installation of grassed waterways to at least 750 feet per year
- Increase the installation of filter strips to at least 1200 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 2%
- Increase amount of no-till acres (corn and beans) by an additional 300 acres per year.

Action Items:

Table 161: Action Items for Reducing Loads from Row-Crop Agriculture in the Ludlow Creek #B Watershed HUC 05080001 140 030

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	315	157.5	157.5

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	612	324	216
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	9000	4500	4500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each three year period over HUC 05080001 130	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total Target Load Reductions (excluding unknown or unknowable load reductions)				9963	4999.5	4891.5

Problem Statement #2:

Based on information from the Miami County Health District, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in the Stillwater Watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 162: Action Items for Reducing Loads from Wastewater Treatment in the Ludlow Creek #B Watershed HUC 05080001 140 030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the watershed to below EPA standards	Darke and Miami General Health District staff time, Coordinator staff time	Work with the Darke and Miami General Health Districts to write countywide HSTS	Plan completion within 5 years	Unknown

		plans		
Locate 100% of homesite septic systems and determine discharge status	Miami County General Health District time to do survey	Miami Health District is currently undertaking this task	All Miami County homesite septic systems located and mapped via GIS and egregious dischargers contacted	Unknown
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time, Darke and Miami health Districts staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke and Miami Counties, alternating counties every other year	$1000 per workshop
Encourage upgrade and repair of failing systems	Miami County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Unknown

Problem Statement #3:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 163: Action Plan for Reducing Contamination from Agricultural Chemicals in the Ludlow Creek #B Watershed HUC 05080001 140 030

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Hog Run HUC 05080001 140 020

Background:

Hog Run is currently in full attainment of its WWH life use designation, and the watershed should be protected to maintain or improve that designation. Further riparian enrichment along with conservation planning for the agriculture industry in the watershed is important. Hog Run also includes the WWTP for the town of Laura, and that point source should be continually evaluated to make sure that capacity keeps up with demand as more and more people move into the area.

Problem Statement #1:

Hydromodification of the existing stream for agricultural use has destroyed habitat and increased sediment loads has the potential to impair use attainment of part of this stream section. Extensive row-crop agriculture and the use of agricultural fertilizers contribute to nutrient loading in the watershed. Steps should be taken to ensure that Hog Run continues to attain its WWH life use designation.

Goals:

- Increase the installation of grassed waterways to at least 500 feet per year
- Increase the installation of filter strips to at least 750 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 2%
- Increase amount of no-till acres (corn and beans) by an additional 200 acres per year.

Action Items:

Table 164: Action Plan for Sediment and Agricultural Nutrient Control in the Hog Run Watershed HUC 05080001 140 020

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote installation of grassed	NRCS, SWCD and Watershed coordinator time,	Work with SWCD, NRCS, and OSUE to promote, design	Linear footage goal met or exceeded	210	105	105

waterways	state and federal funding for conservation practices	and install grassed waterways to NRCS specs.				
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	382.5	202.5	135
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction	95% of all waterway construction includes tile renovation	36	18	18

		where appropriate				
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	6000	3000	3000
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established each three year cycle in HUC 05080001 140	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time,	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater	N/A	N/A	N/A

	state and federal funding for conservation practices		Watershed			
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state	Work with FSA, NRCS and SWCD to offer state and federal funding	75% of acreage on conservation plans developed and implemented	N/A	N/A	N/A

	and federal conservation initiatives	incentives to landowners for conservation practices and BMPs	within 7 years			
Total Target Load Reductions (excluding unknown or unknowable load reductions)				6628.5	3325.5	3258

Problem Statement #2:

Based on information from the Darke and Miami County Health Districts, many onsite septic systems are in poor repair, not being pumped regularly, poorly designed, household wastewater is flowing directly into field tile, or a combination of the above. This discharge is contributing nutrients and organic enrichment to the watershed.

Goals:

- Determine number and type of 100% of septic systems in the Stillwater Watershed
- Increase the number of properly maintained septic systems by 100/year over the entire Stillwater Watershed
- Decrease the number of discharging systems by 20/year over the entire Stillwater Watershed

Action Items:

Table 165: Action Plan for Reducing Loads from Wastewater Treatment in the Hog Run Watershed HUC 05080001 140 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Cost
Reduce the level of fecal coliform bacteria in the	Darke and Miami General Health District staff time,	Work with the Darke and Miami General Health	Plan completion within 5 years	Unknown

watershed to below EPA standards	Coordinator staff time	Districts to write countywide HSTS plans		
Locate 100% of homesite septic systems and determine discharge status	Miami County General Health District time to do survey	Miami Health District is currently undertaking this task	All Miami County homesite septic systems located and mapped via GIS and egregious dischargers contacted	Unknown
Educate homeowners on proper septic maintenance and design	Project Coordinator staff time, Darke and Miami health Districts staff time	Create educational booklet with maintenance and design information	Booklet distributed to all homeowners without sanitary sewer connections	$500 over the entire Darke portion of the Watershed
	Coordinator time to prep and teach workshop; workshop supplies	Septic system workshops for homeowners	Hold a septic system workshop in Darke and Miami Counties, alternating counties every other year	$1000 per workshop
Encourage upgrade and repair of failing systems	Miami County General Health District staff time for administration of grant	Grant program to reimburse homeowners of discharging systems a portion of their costs if they repair their system to non-discharging status	10% decrease in discharging systems in the Stillwater River watershed as a whole	Unknown

Problem Statement #3:

Pesticide and herbicide contamination of this watershed is probably occurring in this watershed due to the large number of grain farms in this area that use pesticides to prevent crop damage. Readers should also be aware that any steps to reduce sedimentation (see Problem Statement #1) will also help to reduce the amount of farm chemicals reaching streams.

Goals:

- Reduce pesticide contamination of the watershed (a specific goal is not included here because there is no current data on pesticide levels in the watershed)
- Reduce herbicide contamination of the watershed

Action Plan:

Table 166: Action Plan for Reducing Contamination from Agricultural Chemicals in the Hog Run Watershed HUC 05080001 140 020

Action	Resources Needed	How to Accomplish	Measure of Success	Estimated Costs
Encourage use of proper storage and containment of farm chemicals	SWCD/NRCS staff time, OSUE staff time, EQIP funding	Farmers are encouraged to take advantage of EQIP funds for proper chemical storage	3 new chemical containment facilities built each year in the Stillwater River watershed	Unknown
Encourage the use of integrated pest management	SWCD/NRCS staff, OSUE staff time	Integrated pest management is discussed with farmers as part of their conservation planning	Integrated pest management discussed as part of 98% of new conservation plans	Unknown

Stillwater River #C HUC 05080001 140 040

Background:

This portion of the Stillwater River is designated EWH, but it is only partially attaining that aquatic life use. A major impairment of this stream segment is the low head dam at the Water Plant off S.R. 48 north of West Milton, which causes low flows downstream and excessive sedimentation upstream. Removal of this dam should cause this river segment to quickly attain its life use designation. Currently there is a lot of agricultural activity in this watershed, with the accompanying nutrient loading from land-applied manure, agricultural chemicals, and sedimentation from farm fields. This watershed is also becoming increasingly urban, with the potential to become completely urbanized by 2030 (MVRPC 2004). Sustainable growth, with an emphasis on pervious surfaces and a WWTP with the capacity to handle the influx of population will be vital in this watershed.

Problem Statement #1:

Tillage for row-crop agriculture has increased sediment loads and is impairing use attainment of part of this river section. The use of agricultural fertilizers contributes to nutrient loading in the watershed. This problem is complicated by a partial lack of riparian corridor, and may be further complicated in the future by channelization caused by development. It will also be difficult to install filter strips in this area, as landowners will be wary of long lease agreements that will prevent them from selling their land to developers in the future. This river segment is further impaired by the lowhead dam at the Water Plant off S.R. 48 north of West Milton, which causes habitat destruction, pooling, sedimentation and low water flow.

Goals:

- Removal of the low head dam at the Water Plant off S.R. 48 north of West Milton
- Work with Miami County engineer's office to educate contractors on construction BMPs
- Increase the installation of grassed waterways to at least 500 feet per year
- Increase the installation of filter strips to at least 500 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 5%
- Increase amount of no-till acres (corn and beans) by an additional 300 acres per year.

Action Items:

Table 167: Action Plan for Sediment and Agricultural Nutrient Control in the Stillwater #C Watershed HUC 05080001 140 040

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Removal of the low head dam at the Water Plant off S.R. 48 north of West Milton	Coordinator time, Board member time	Work with the Army Corps of Engineers to facilitate the public hearing process for dam removal	Low-head dam successfully removed	N/A	N/A	N/A
Promote use of construction site BMPs	Coordinator time, Miami County Engineer's Office time	Hold one training each year in the Miami County portion of the watershed focusing on construction site BMPs	At least 30 contractors in attendance each year	N/A	N/A	N/A
Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	210	105	105

Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	255	135	90
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of grassed waterway construction where appropriate	95% of all waterway construction includes tile renovation	36	18	18

Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	9000	4500	4500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year period in HUC 05080001 140	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time, Park District time, state and federal funding for conservation	Riparian easements will be sought each year	Funding of one riparian project per year over the entire Stillwater Watershed	N/A	N/A	N/A

	practices					
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation planning	NRCS, SWCD, and watershed coordinator time, money from state and federal conservation	Work with FSA, NRCS and SWCD to offer state and federal funding incentives to landowners for	75% of acreage on conservation plans developed and implemented within 7 years	N/A	N/A	N/A

	initiatives	conservation practices and BMPs				
Total target load reductions (excluding unknown or unknowable load reductions)				9501	4758	4713

Problem Statement #2:

Non-point source pollution flowing from storm sewers contributes nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals. This urban non-point source pollution has the potential to be the major source of impairment to this stream segment over the next 30 years.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 168: Action Plan for Reducing Loads from Urban Non-point Source Pollution in the Stillwater River #C Watershed HUC 05080001 140 040

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs

Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed

	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Brush Creek HUC 05080001 140 050

Background:

Brush Creek is designated WWH. It is currently fully in attainment of that aquatic life use designation. It is expected, however, that over the next 30 years it will become highly residential as people move north out of Dayton to work along the I75 corridor (MVRPC 2004). Sustainable growth, with an emphasis on pervious surfaces and a WWTP with the capacity to handle the influx of population will be vital in this watershed.

Currently there is a lot of agricultural activity in this watershed, with the accompanying nutrient loading from land-applied manure, agricultural chemicals, and sedimentation from farm fields.

Problem Statement #1:

Tillage for row-crop agriculture has increased sediment loads and may impair use attainment of part of this river section in the future. The use of agricultural fertilizers contributes to nutrient loading in the watershed. This problem may be further complicated in the future by channelization caused by development. It will also be difficult to install filter strips in this area, as landowners will be wary of long lease agreements that will prevent them from selling their land to developers.

Goals:

- Work with Miami County engineer's office to educate contractors on construction BMPs
- Increase the installation of grassed waterways to at least 500 feet per year
- Increase the installation of filter strips to at least 500 feet (approx. 30 feet wide) each year
- Increase the current amount of riparian vegetation in the watershed 5%
- Increase amount of no-till acres (corn and beans) by an additional 300 acres per year.

Action Items:

Table 169: Action Plan for Sediment and Agricultural Nutrient Control in the Brush Creek Watershed HUC 05080001 140 050

Action	Resources Needed	How to Accomplish	Measure of Success	Target Load Reduction		
				N (lbs/ac/yr)	P (lbs/ac/yr)	Soil (tons/ac/yr)
Promote use of construction site BMPs	Coordinator time, Miami County Engineer's Office time	Hold one training each year in the Miami County portion of the watershed focusing on construction site BMPs	At least 30 contractors in attendance each year	N/A	N/A	N/A

Promote installation of grassed waterways	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed waterways to NRCS specs.	Linear footage goal met or exceeded	210	105	105
Promote installation of grassed filter strips	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Work with SWCD, NRCS, and OSUE to promote, design and install grassed filter strips to NRCS specs.	Linear footage goal met or exceeded	255	135	90
	Coordinator and SWCD time, PF time	Work with PF to publicize additional rental payments to farmers who install warm season grasses	PF will allocate all available monies for warm season grasses each year	N/A	N/A	N/A
	Coordinator time, PF time	Educate landowners about the advantages of warm season grass filter strips for wildlife habitat	Coordinator will ensure that warm season grass filter strips are mentioned at least one landowner meeting each year	N/A	N/A	N/A
Encourage maintenance of tile outlets	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation	Watershed coordinator will work with NRCS and SWCD to ensure that renovation of tile outlets is part of	95% of all waterway construction includes tile renovation	36	18	18

	practices	grassed waterway construction where appropriate				
Promote no-till and low-till farming methods	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	Project Coordinator will work with A.C.E., FSA and SWCD/NRCS to offer low-interest loans for conservation tillage equipment	Yearly increases over current levels as measured by tillage transects	9000	4500	4500
	Watershed Coordinator and SWCD time	Perform tillage transect checks to gather data on tillage practices in the watershed	Tillage transects are completed for the entirety of the Stillwater River Watershed each year	N/A	N/A	N/A
	Watershed Coordinator time, SWCD time, and OSUE time	Maintain no-till test plots and hold field days where farmers can view the plots and see yield data	Test plots are maintained and planted yearly; one field day is held each year	N/A	N/A	N/A
Promote establishment of wetlands	NRCS, SWCD and Watershed coordinator time, state and federal funding for conservation practices	NRCS, SWCD and SWP will discuss WRP with landowners concerned about flooding and broken tile	One wetland established per three year period in HUC 05080001 140	N/A	N/A	N/A
Promote riparian restoration	NRCS, SWCD and Watershed coordinator time,	Riparian easements will be	Funding of one riparian project per year over the	N/A	N/A	N/A

	Park District time, state and federal funding for conservation practices	sought each year	entire Stillwater Watershed			
Survey all streams in the watershed and categorize by Rosgen channel type	Watershed coordinator's time to do stream categorization; help from ODNR with task	Drive watershed, stopping at each stream crossing to determine channel type	All streams are categorized by Rosgen channel type	N/A	N/A	N/A
Educate the public and local officials on proper channel design and the advantages of natural channels with floodplains	Watershed coordinator's time to teach session, money for supplies	Incorporate a session on stream geomorphology into at least one public workshop each year	One session on stream geomorphology taught each year	N/A	N/A	N/A
Promote two-stage ditch design	Coordinator time, OEPA staff time	Work with OEPA to put a two-stage ditch demonstration area into place	One demonstration area in the entire Stillwater River watershed	N/A	N/A	N/A
	Coordinator time; supplies	Hold public information sessions to explain the advantages of two-stage ditch design	One ditch field day is held every other year in this county	N/A	N/A	N/A
Targeted conservation	NRCS, SWCD, and watershed coordinator time,	Work with FSA, NRCS and SWCD to offer state and	75% of acreage on conservation plans developed	N/A	N/A	N/A

planning	money from state and federal conservation initiatives	federal funding incentives to landowners for conservation practices and BMPs	and implemented within 7 years			
Total target load reductions (excluding unknown or unknowable load reductions)				9501	4758	4713

Problem Statement #2:

Non-point source pollution flowing from storm sewers contributes nutrients, pathogens from pet animal feces, and household chemical waste to this stream segment. Also, solid waste in the form of tires, trash, and broken household appliances often makes its way into the stream system, further adding nutrients, pathogens, and chemicals. This urban non-point source pollution has the potential to be the major source of impairment to this stream segment over the next 30 years.

Goals:

- Reduce storm drain related pollution by 10%
- Reduce the amount of solid waste thrown into the stream system by 10%

Action Plan:

Table 170: Action Plan for Reducing Loads from Urban Non-point Source Pollution in the Brush Creek Watershed HUC 05080001 140 050

Action	Resources Needed	How to Accomplish	Measure of Success	Projected Costs

Educate watershed residents on nonpoint source pollution and what can be done to stop it	Coordinator time; supplies	Hold a watershed awareness month in local schools	80% of students score a passing grade on a post-test	$50 for supplies per school $900 coordinator time per school
	Coordinator time; volunteer time; labeling supplies	Work with local schools, churches and civic organizations to label storm drains with the name of the stream they drain to	90% of town storm drains are labeled	$975 coordinator time $400 supplies per town
	Coordinator time; supplies	Hold a watershed festival featuring nonpoint source education and family games	One watershed festival held in each school district	$1500 coordinator time (for all festivals each year); $250 per festival
Educate local residents on watershed issues and build a sense of stewardship for local water resources	Coordinator time; money for supplies, printing, etc.	Produce a fourth grade supplementary science curriculum, based on the Ohio Academic Content Standards, that introduces students to the Stillwater River and promotes a sense of stewardship	One complete curriculum given to every elementary school in the watershed	$3800 coordinator time $1500 printing costs $3000 supplies = $8300 for all schools in the Stillwater Watershed
	Coordinator time; SWCD/NRCS time; borrowed canoes from the DNAP Scenic Rivers Program and Darke and Miami Park Districts; electro-shocking rig from ODNR	Hold two educational canoe floats each year for the residents of the Stillwater River Watershed.	Two floats held each year with attendance of at least 45 per each.	$975 coordinator time $1980 SWCD/NRCS staff time $150 for portable toilets = $3105 for two canoe floats per year over the entire Stillwater Watershed

	Coordinator time; a partnership between DNAP Scenic Rivers, MVRPC, Darke and Miami Park Districts, NRCS/SWCD and others; willing volunteers	Hold one trash clean up in the Stillwater River Watershed each year	One trash clean-up held each year; at least 75 people volunteer	$775 for coordinator time
	Coordinator time; approx. $250 for supplies and materials for teachers; canoes from DNAP Scenic Rivers and Darke and Miami Park Districts; SWCD/NRCS time	Offer at least one competitive field trip grant to a high school science class in the Stillwater River Watershed. Students and teachers will participate in a river clean up, chemical monitoring, macroinvertebrate monitoring, and a canoe float. Teachers receive water testing equipment and teaching supplies.	One canoe float grant awarded each year across the entire Stillwater Watershed with at least 20 students participating	$75 materials for teacher $20 water for students $75 water test kits $775 coordinator time $275 SWCD staff time $75 portable toilet = $1395 per canoe float grant awarded

Stillwater River #B HUC 05080001 140 060

Stillwater River #A HUC 05080001 140 070

Background

These two sections of the Stillwater River are designated EWH. These river segments are in full attainment of that aquatic life use designation except for the stretch between river mile 8.9 and river mile 8.6, where the river is either partially or not attaining the EWH designation due to impoundment, hydromodification, and organic enrichment (OEPA 2001). According to the MVRPC, this area is expected to become completely urbanized before 2030 as people move north out of the Huber Heights and Englewood metro areas. No problem statements or action plans for these HUCs will be offered in this Action Plan, as the scope of the SWP stops at the Montgomery County line.

Chapter V. Implementation

Currently, funding for the Stillwater Watershed Project Coordinator is in serious doubt. Therefore, it must be the overriding priority of the Joint Board to secure funding for this position. Without a full-time SWP Coordinator, further implementation of this Plan will be sporadic at best.

The following chapter is offered in the hope that funding for the SWP will continue, and this Plan will be fully implemented.

Watershed Protection Priorities

The Stillwater River Watershed encompasses a very large area, and not all streams in the system require the same attention. For some areas in the watershed, protection of existing habitat is key, while in others, particularly in the northern portion of the watershed; work must be done to establish minimum habitat conditions.

Discussion with the Joint Board of the Stillwater Watershed Project, the Ohio EPA and Ohio Department of Natural Resources has resulted in the following priority watersheds:

14-digit HUC	Watershed Name	Reason for Priority	Measures of Success
05080001 100 010; 05080001 100 030	Swamp Creek #B; Swamp Creek #A	Of the 12.1 river miles assessed in Swamp Creek, 5.6 miles are in full attainment, 4.2 miles are in partial attainment, and 2.3 miles are non-attaining primarily due to enrichment from land applied manure. It is believed that the 4.2 partially attaining river miles could be brought into attainment within five years	In five years, the 5.6 miles in full attainment maintain their score, the 4.2 partially attaining miles are moved to full attainment, and the 2.3 non-attaining miles are moved to partially attaining status

Watershed Protection Objectives

Please see the action strategies outlined for each 14-digit HUC that are found in Chapter IV. No time-line is given for the completion of these tasks due to uncertainty about future implementation of this Plan.

Education and Marketing Strategy

Education and marketing will be tailored to the subwatersheds being targeted. More urbanized subwatersheds will be targeted via newspaper articles and radio public service announcements. Watersheds with a more rural population will be reached via

informational meetings and face-to-face contact with farm community leaders. It is hoped that the Darke and Miami Farm Bureaus will be instrumental in our reaching the farming community. Further educational and marketing strategy has not yet been planned due to uncertainly about the Stillwater Watershed Project's future funding. Once it becomes clear that the SWP will be funded for the future, the Joint Board, along with the Watershed Coordinator, will formulate a more detailed education and marketing strategy for this Action Plan.

Funding Strategy

A Funding Committee was formed at the February 2005 Stillwater Joint Board Meeting. This committee has been tasked with formulating a funding strategy.

Chapter VI. Evaluation

Tracking of Plan Progress

Water quality changes are often slow and happen over time. It is not expected that even modest load reduction goals will be met before the third year of plan implementation. Currently, further funding for the Stillwater Watershed Project is in serious doubt. Without an additional funding source, funds to pay for a full-time Watershed Coordinator will not exist beyond 2006. Should the SWP be dissolved, it is unlikely that this plan will be implemented locally. Please see Appendix H for the Contingency Diagram.

Should additional funding for staff time and water quality assessment be secured, a priority of the SWP should be to establish water quality monitoring data in the priority subwatershed. Once baseline data is established, the Stillwater Watershed Project Coordinator will monitor the plan progress by putting in place a comprehensive water quality monitoring program. This monitoring program will focus on the priority subwatersheds, and they will be tested both chemically and via macroinvertebrate sampling following OEPA guidelines and quality assurance practices from the *Manual of Ohio EPA Surveillance Methods & Quality Assurance Practices* (available online at http://www.epa.state.oh.us/dsw/documents/Field Manual 10-1-03.pdf) for the first three years of plan implementation. The Watershed Coordinator will also sample macroinvertebrate life using approved OEPA protocols to determine the Cumulative Index Value (CIV) of each testing site. This CIV will indicate the relative biodiversity of the stream macroinvertebrate population and serve as an indicator of progress being made towards attainment of that stream's aquatic life use designation. Stream segments that score at least 20 on the CIV scale will be considered in attainment.

BMP implementation will be tracked via a partnership with the Darke SWCD. The GIS Specialist for the District will assist the Watershed Coordinator by creating GIS layers of all BMPs on a sub-watershed basis. These layers will then be used with tillage transect, animal unit, and soils layers to determine probable soil, nitrogen and phosphorous load reductions. These probable load reductions can then be compared to OEPA SWAT load reduction predictions.

If satisfactory Plan progress is made at any time in those three years (i.e. initial goals set out in the Action Item tables are met or exceeded), the Watershed Action Plan will be updated and the sampling regimen in those watersheds will be cut back to once a year at a time of high flow and resources will be directed at the next-highest priority watersheds.

Chapter VII. Plan Update and Revision

Summary of Watershed Action Plan Revision Strategy

This Watershed Action Plan is a work in progress. It is the hope of the Stillwater Watershed Project that this plan will be as dynamic as the aquatic systems it is meant to protect, changing and adapting to new realities. To that end, the following strategies are proposed:

1. Distribution of the Plan to all appropriate parties (see Appendix G)
2. Advertise the Plan's release via local newspaper, television and radio stations
3. Solicit comments on the Plan from members of both Stillwater boards
4. Solicit comments on the Plan from local elected officials
5. Add an informational session on Plan progress at the annual Stillwater Watershed Project, Inc. meeting and banquet
6. The Coordinator of the Stillwater Watershed Project will conduct water testing with the help of a Stream Team of volunteers to assess changing water conditions. Ohio EPA will also provide input in 2009 when the next assessment cycle of the Stillwater Watershed is scheduled.
7. This Watershed Action Plan shall be revisited and updated at least every three years, or sooner if water conditions or technology change
8. In the event that the SWP is dissolved, all records and references used in the creation of this Action Plan shall be maintained by Darke SWCD

Specific Criteria for Plan Change

Current goals are written on a three-year basis. Every three years, data gathered from priority watersheds should be evaluated to see if it meets the goals set out in the Action Item tables. If these goals are met or exceeded, then the Plan should be updated to reflect new priorities. If these goals are not met, the Plan should be evaluated to determine why the goals are not being met.

Currently, the priority watersheds are HUC 05080001 100 010 Swamp Creek #B and HUC 05080001 100 030, Swamp Creek #A. Specific overreaching goals for these two subwatersheds include:

1. An increase in CIV to at least 20 for all stream segments
2. A 10% reduction in Phosphorous loads
3. Reducing nitrogen to below TMDL levels
4. Increase the installation of grassed waterway to at least 6000 feet of per year (total for both watersheds)

5. Increase the installation of filter strips (approx. 30 feet wide) to at least 8500 feet per year (total for both watersheds)
6. Increase the amount of riparian vegetation in the watersheds by 5% over current levels.
7. Increase amount of no-till corn and bean acres by an additional 1000 acres across these two watersheds

These overreaching goals should be considered three years after Plan implementation to see if they have been met, or if the Plan needs to be revised.

References

Division of Natural Areas and Preserves (DNAP). (2004). Listing of Ohio's Scenic Rivers. Ohio Division of Wildlife: Division of Natural Areas and Preserves website. Available at: http://www.ohiodnr.com/dnap/sr/. Accessed September 30, 2004.

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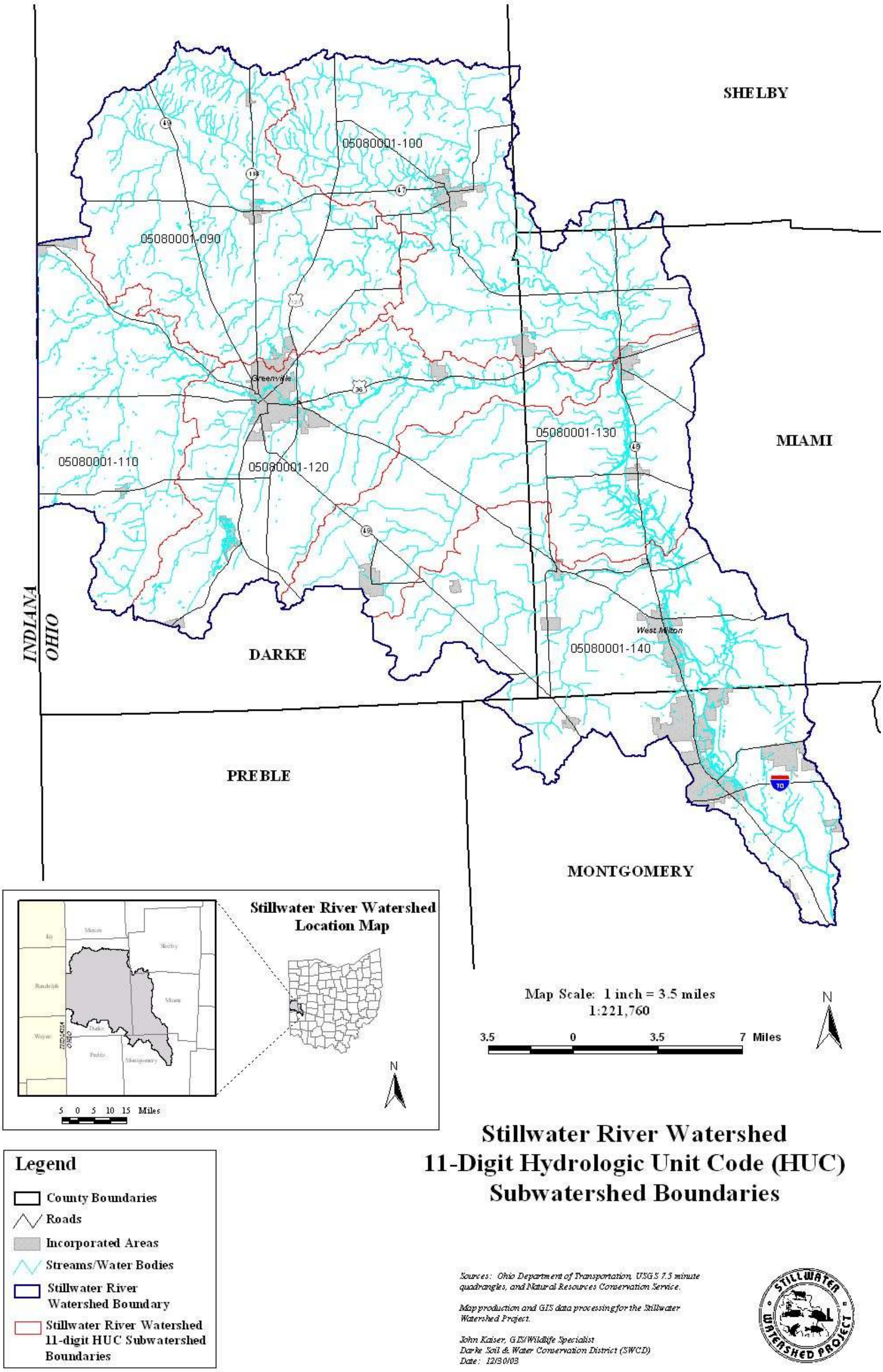
United States Geological Survey (USGS). (2003) *Occurrence and Distribution of Agrichemicals, Antimicrobials, and Bacteria in Runoff in the Stillwater River Watershed, Ohio*.

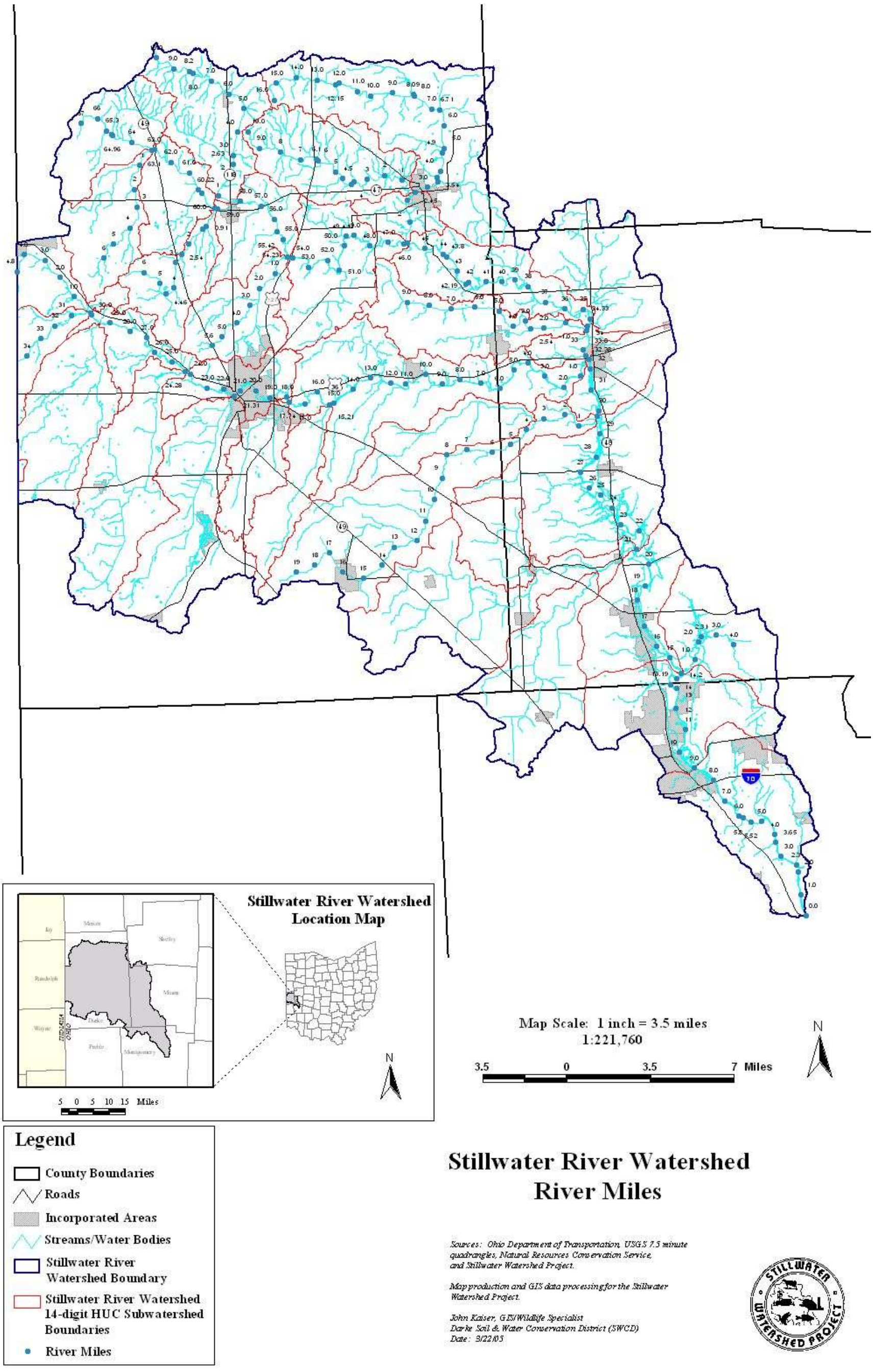
United States Department of Agriculture (USDA). (1991) Soil Survey of Darke County, Ohio; *Available from the Darke Soil and Water office, Greenville, Ohio.*

Appendix A: Maps

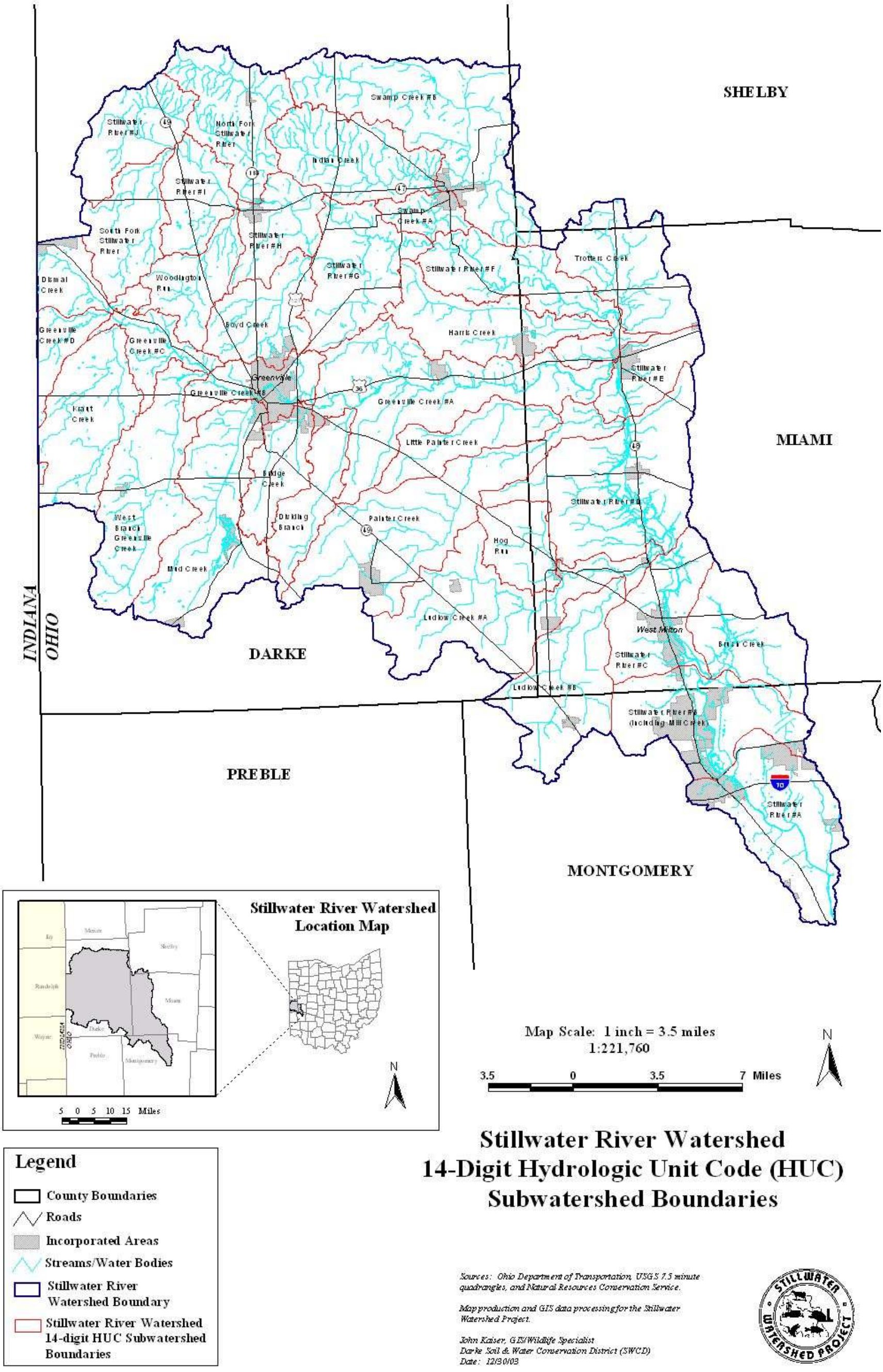
Map 1: Stillwater River 11-digit HUC Boundaries



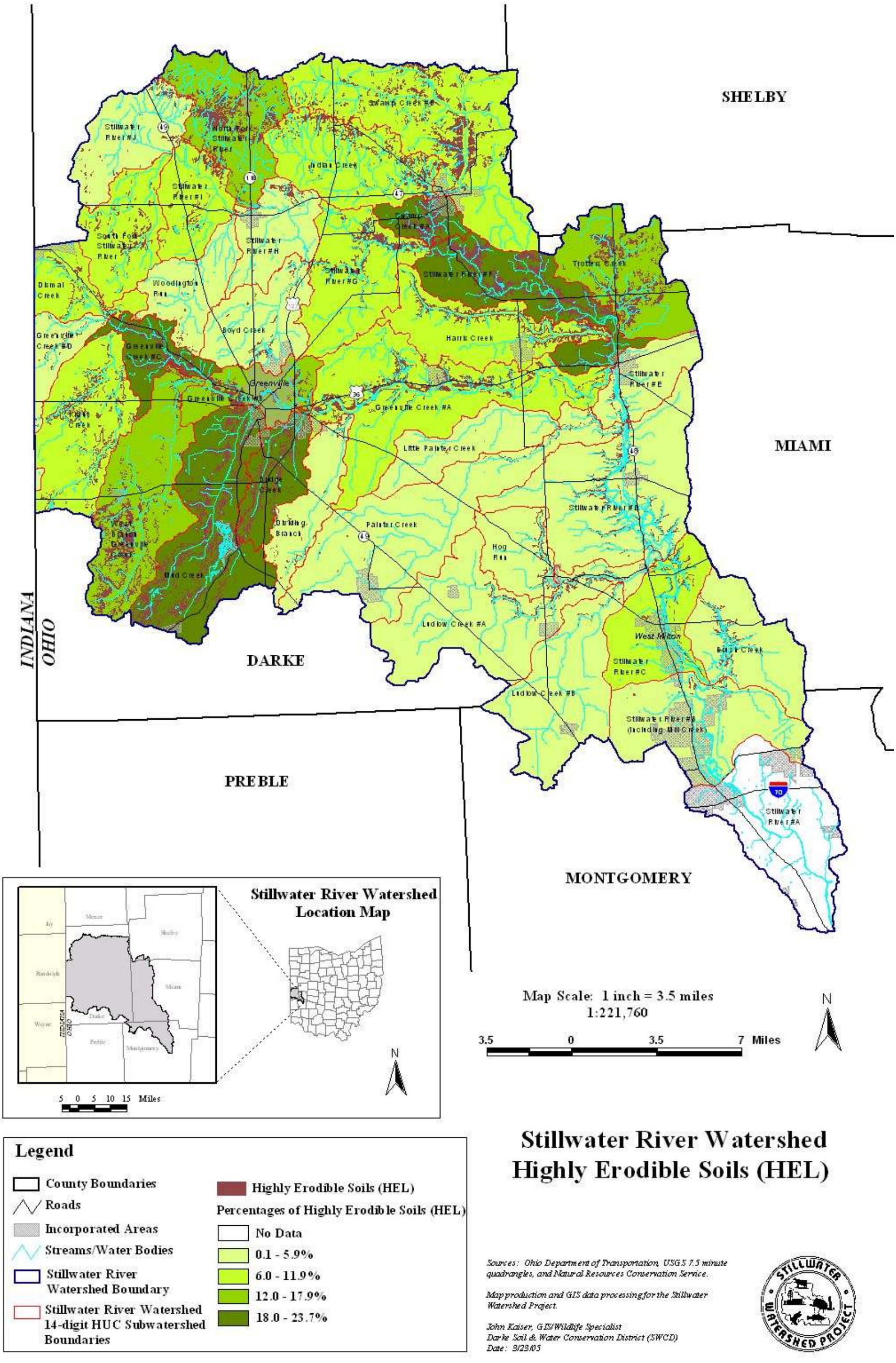
Map 2: Stillwater River Watershed River Miles



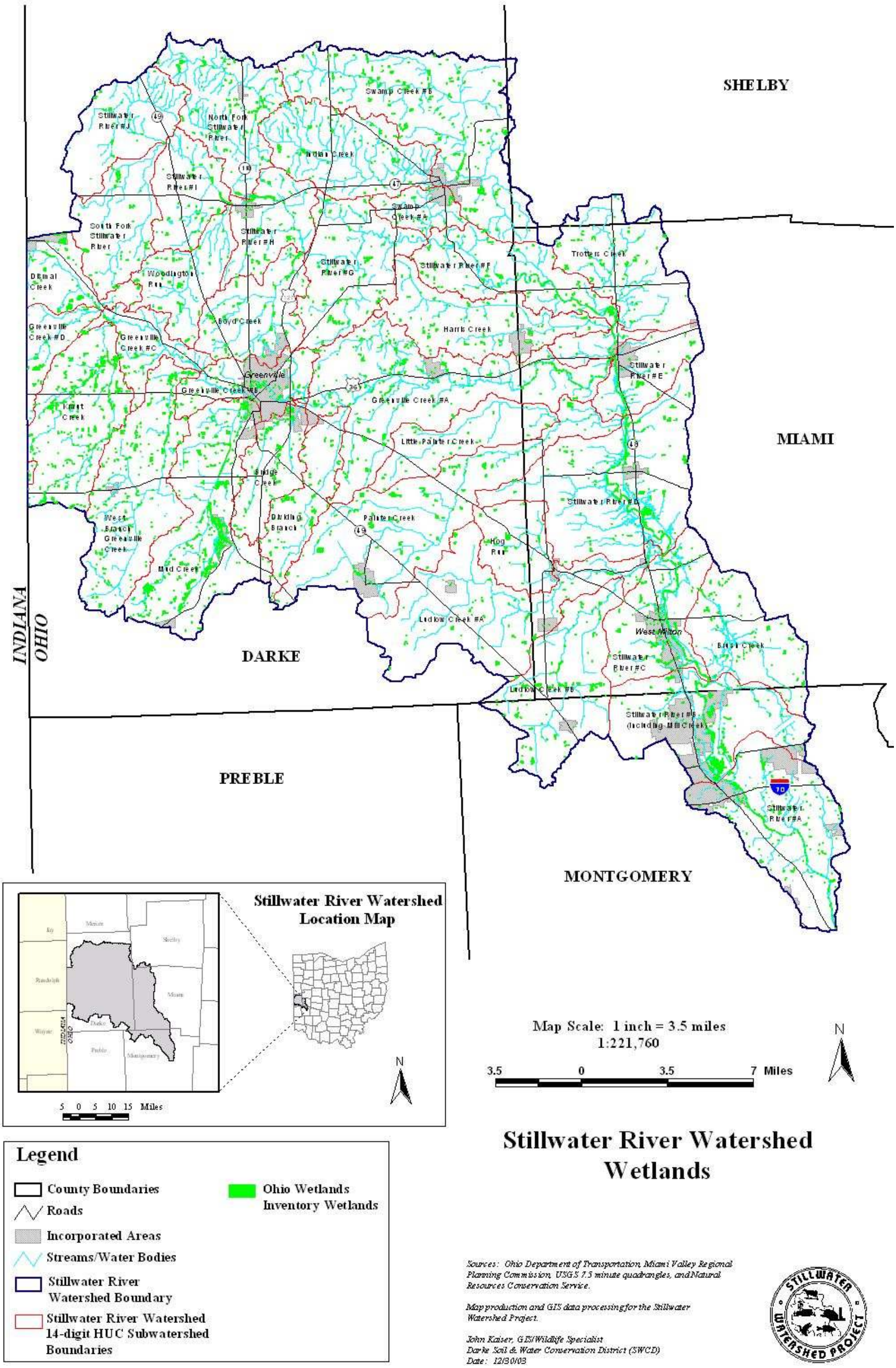
Map 3: Stillwater River 14-digit HUC Boundaries



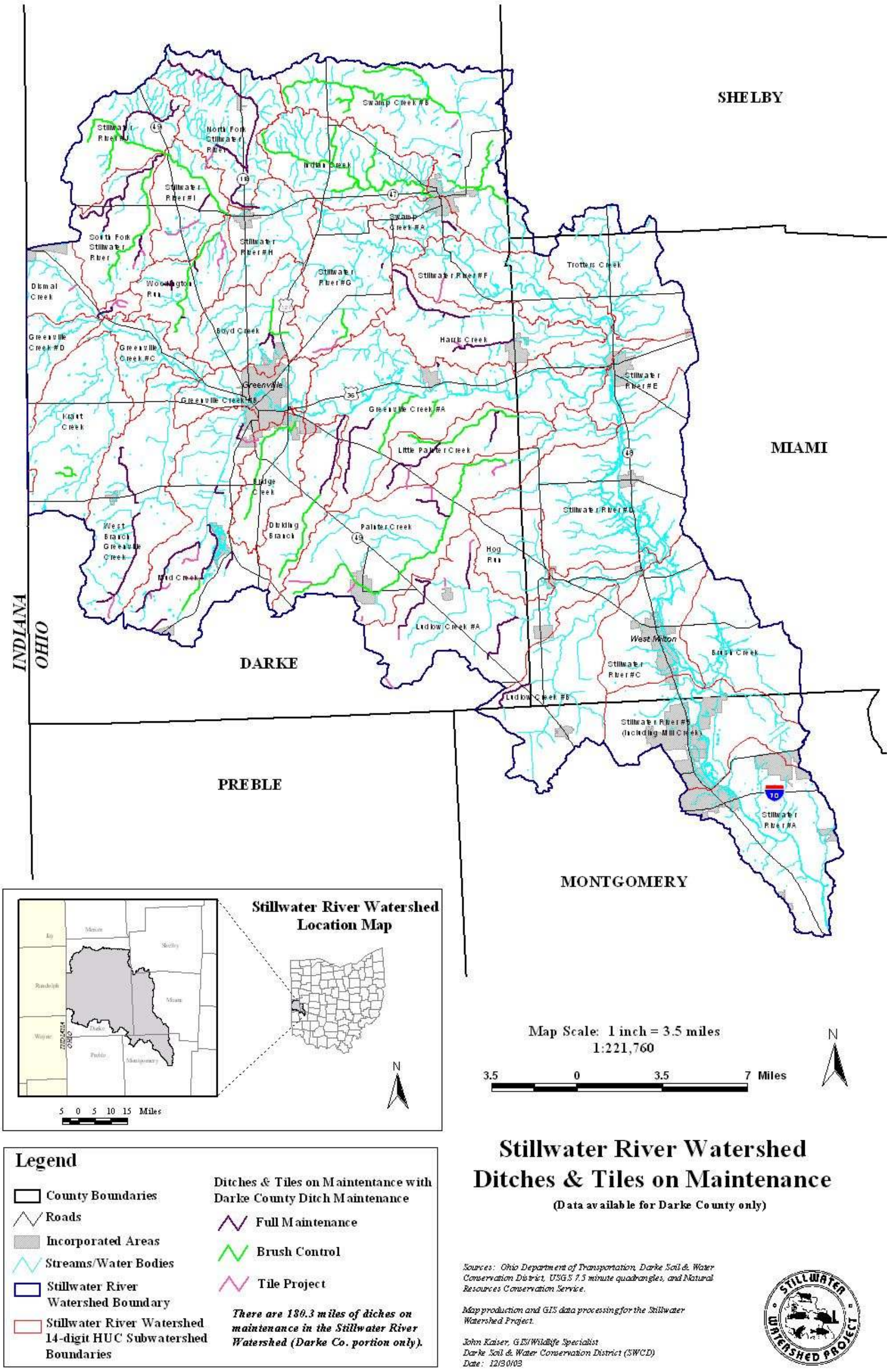
Map 4: Stillwater River Watershed HEL Soils



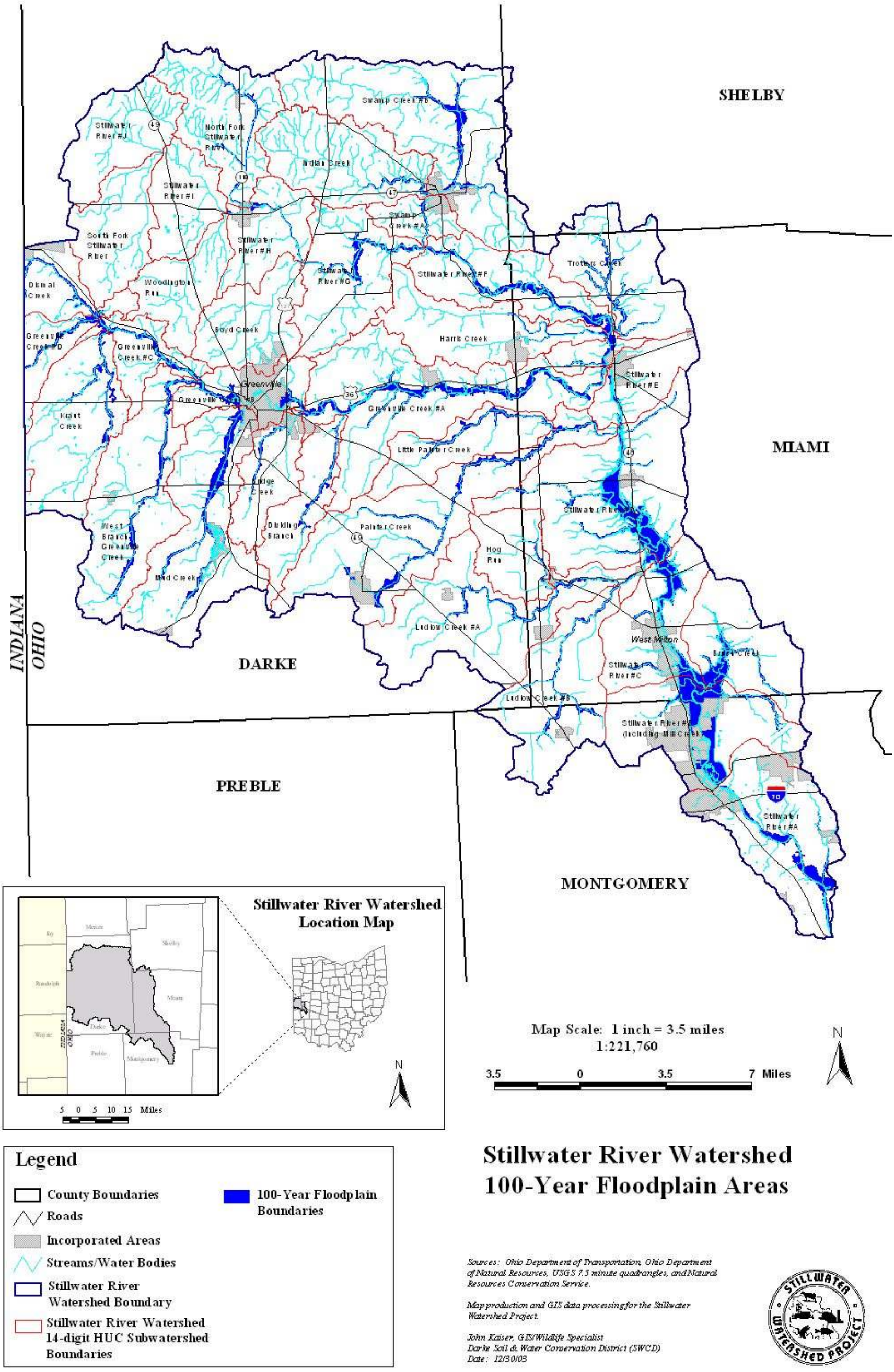
Map 5: Stillwater River Watershed Wetlands Inventory



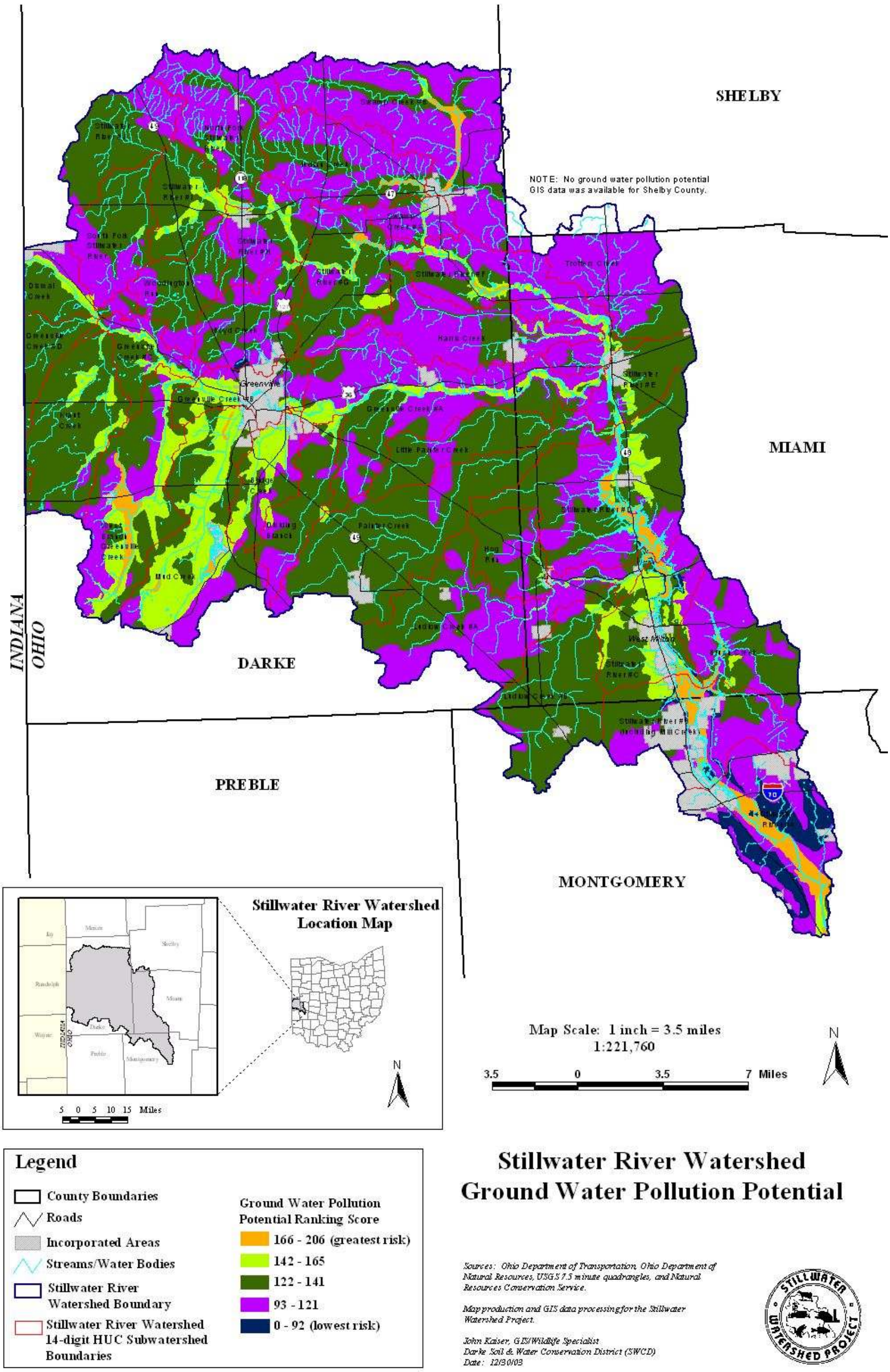
Map 6: Stillwater River Watershed Ditches on Maintenance (Darke County Only)



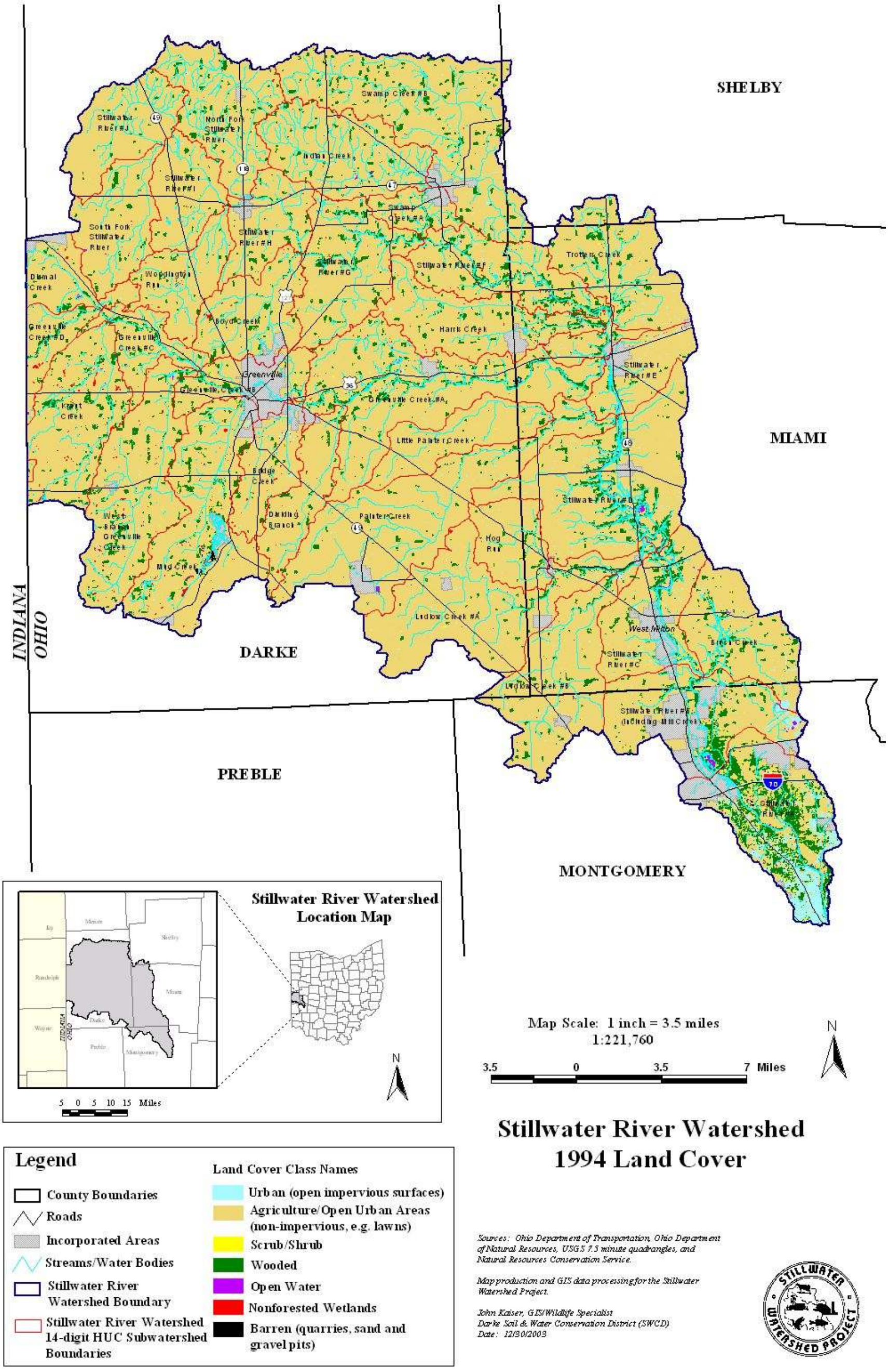
Map 7: Stillwater River Watershed 100-year Floodplain



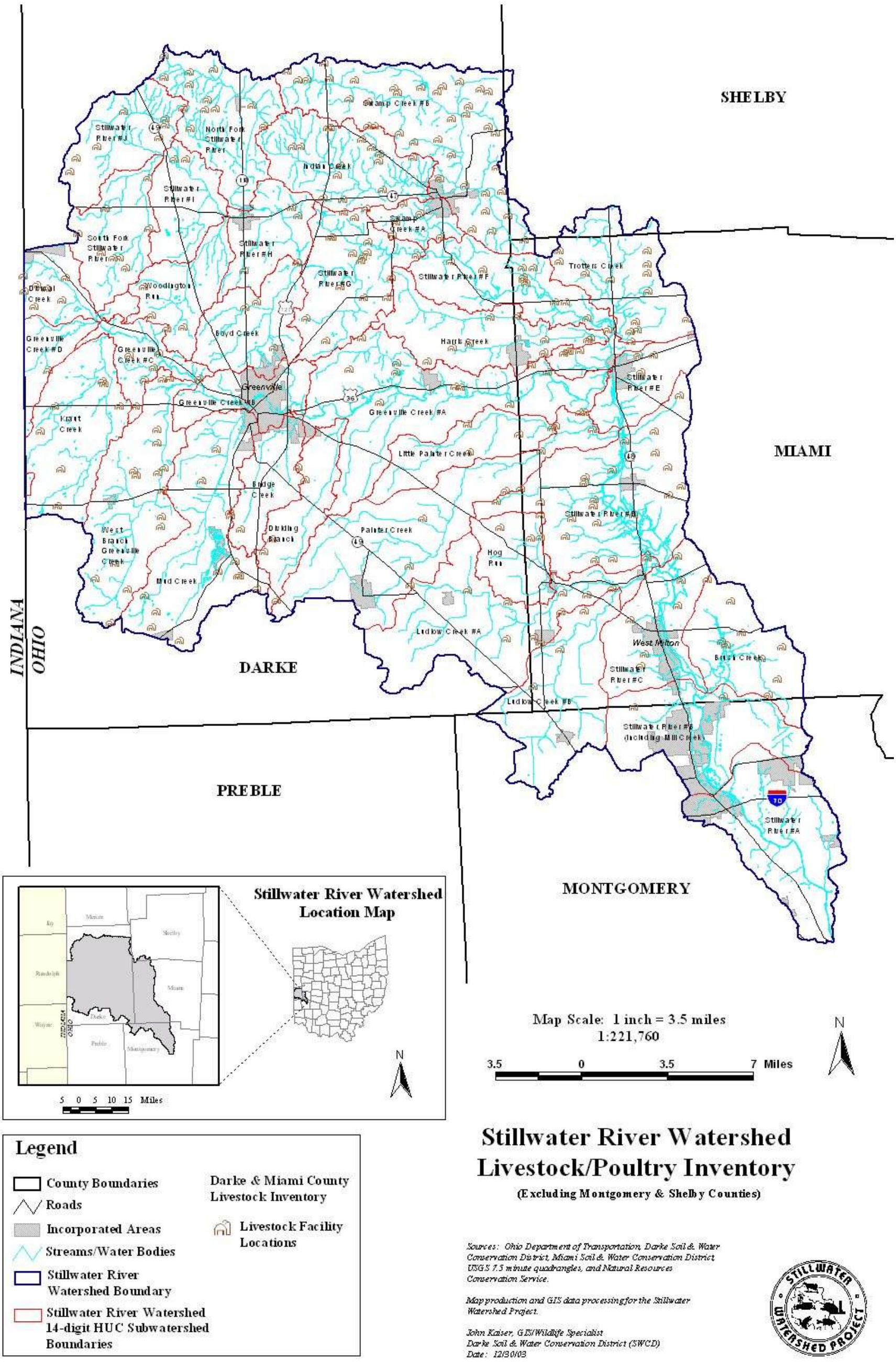
Map 8: Stillwater River Watershed Ground Water Pollution Potential



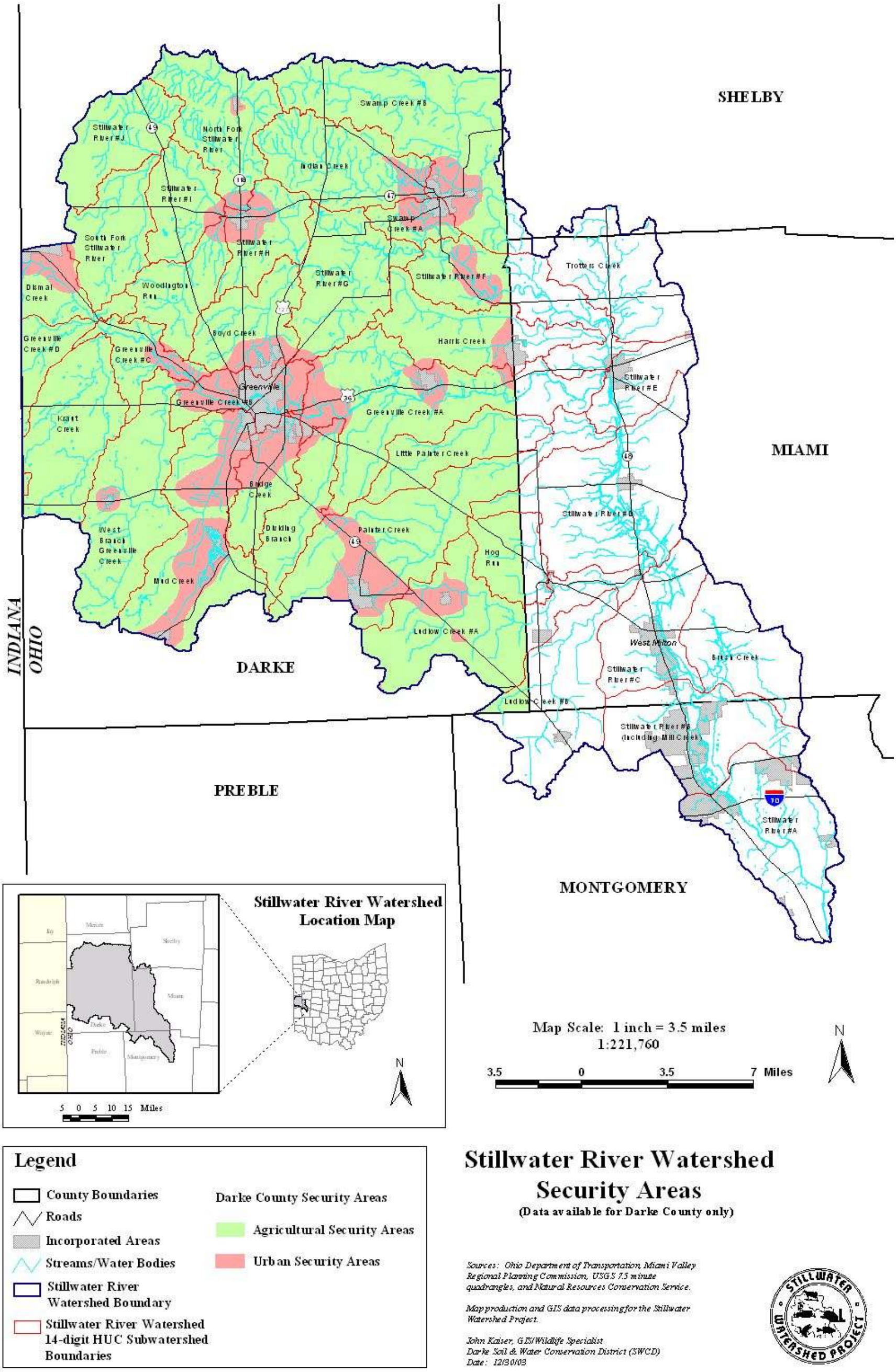
Map 9: Stillwater River Watershed 1994 Land Cover



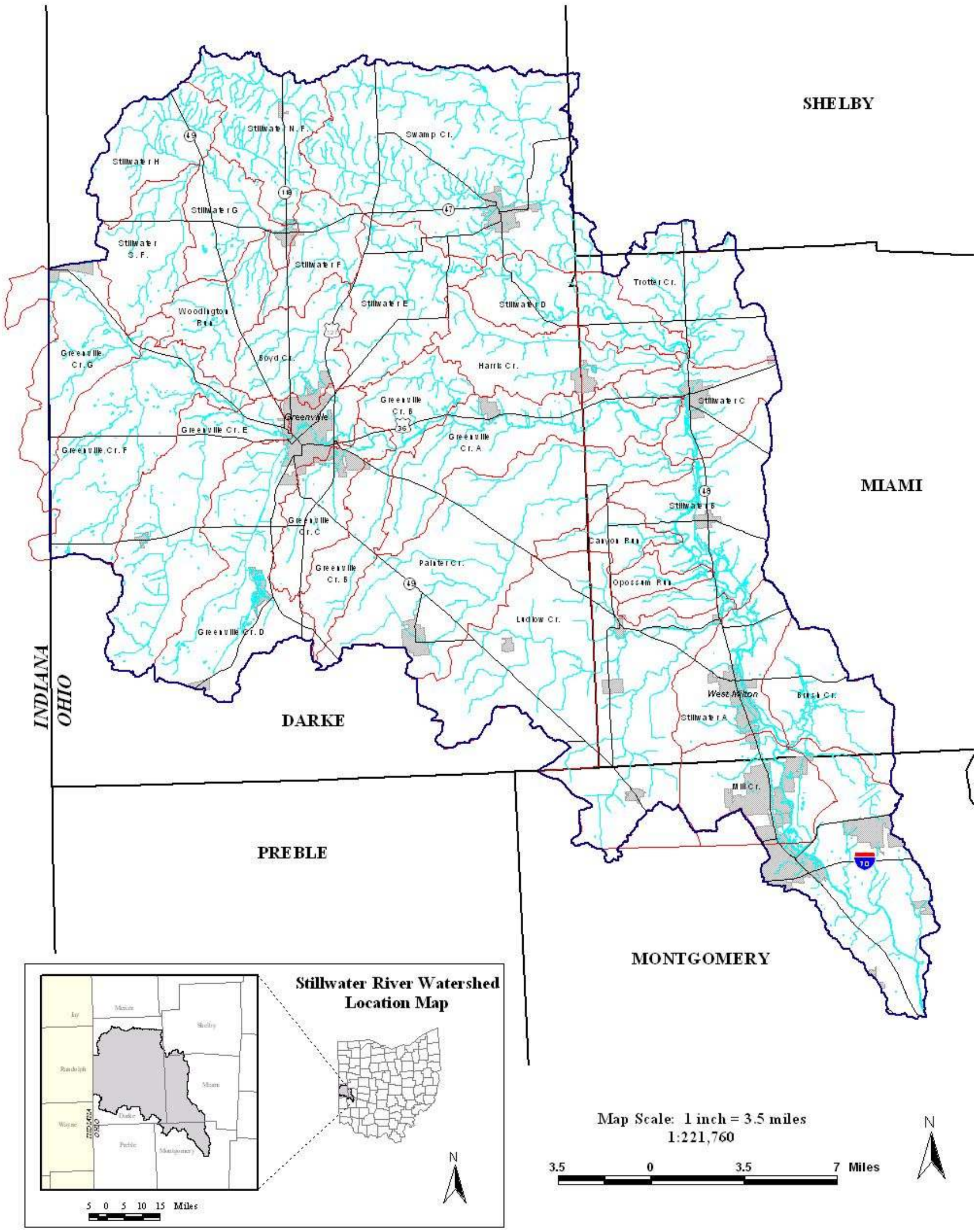
Map 10: Stillwater River Watershed 2002 Livestock/Poultry Inventory



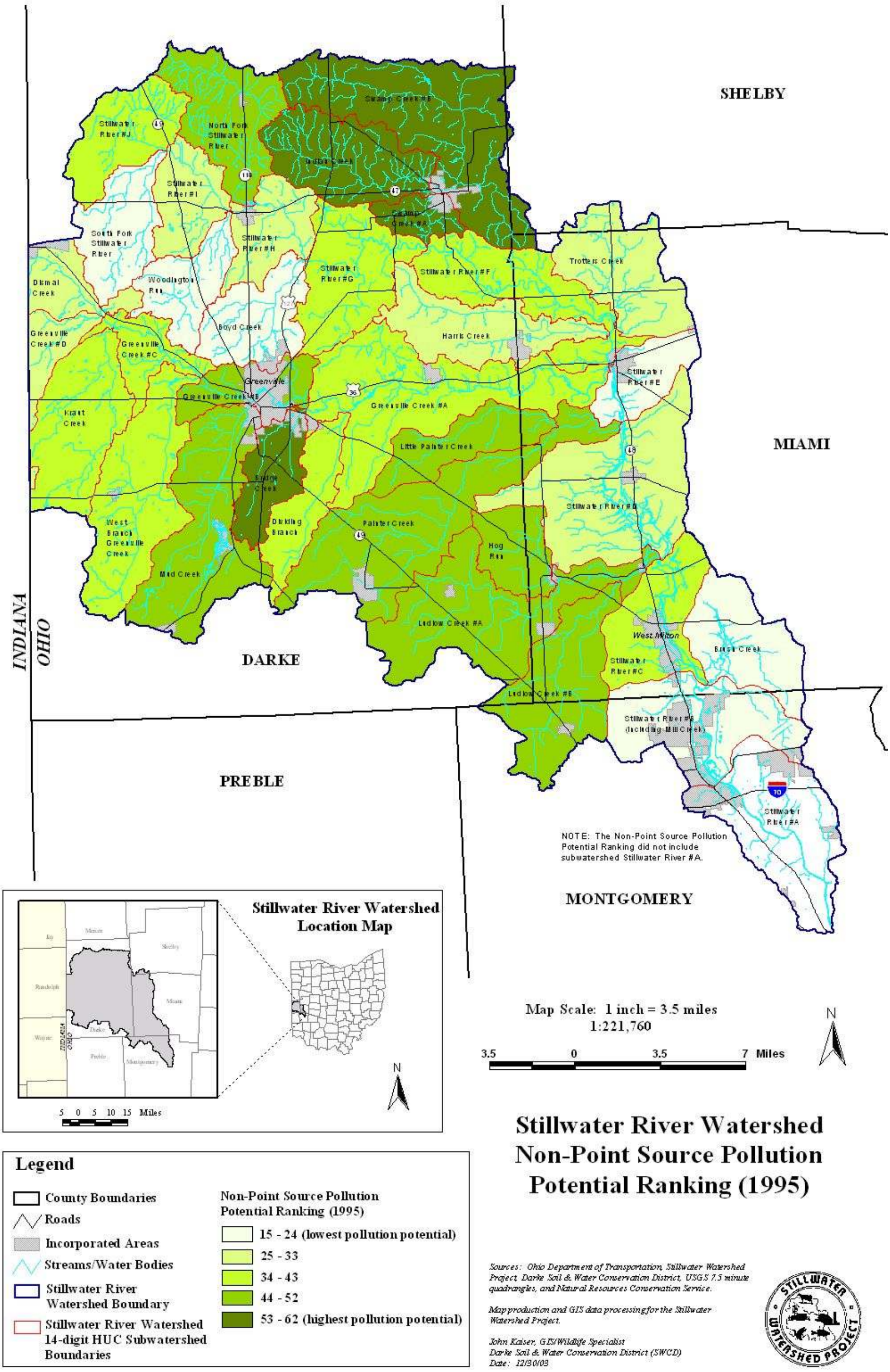
Map 11: Stillwater River Watershed Darke County Security Areas



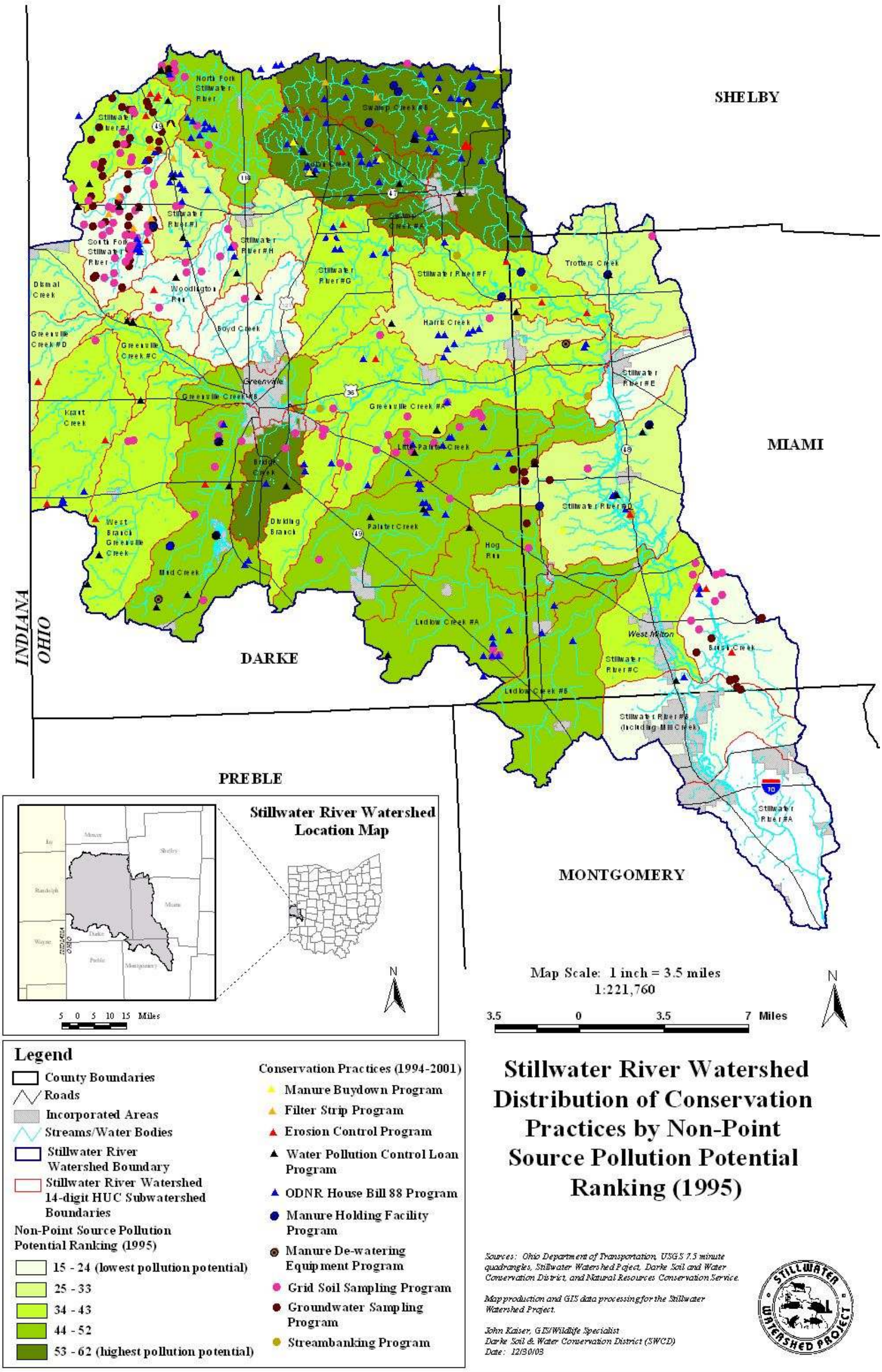
Map 12: Stillwater River Watershed Obsolete Watershed Boundaries



Map 13: Stillwater River Watershed Non-point Source Pollution Potential Ranking



Map 14: Stillwater River Watershed Distribution of Conservation Practices by Non-Point Source Pollution Potential Ranking



Appendix B: The Bylaws of the Stillwater Watershed Project, Inc.

(Amended April 27, 2001)

ARTICLE I – NAME, AREA, AND BOARD OF DIRECTORS

Section I – Organizational Name:

The name of this organization shall be the **"Stillwater Watershed Project, Inc."**

Section II – Program Area:

The focus program area to be served includes the entire Stillwater River Watershed within Darke and Miami counties as delineated by the USDA, Natural Resource Conservation Service.

Section III – Board of Directors

The Stillwater Watershed Project shall be managed and represented by a body referred to as the "Stillwater Watershed Project Board of Directors."

ARTICLE II – MISSION AND OBJECTIVES

Section I – Mission:

This organization is established exclusively for charitable and educational purposes within the meaning of section 501(c)3 of the Internal Revenue Code.

The mission of the Stillwater Watershed Project, defined as a voluntary program, is committed to protecting and enhancing the ground and surface water resource base.

Section II – Objectives:

- Advocate the proper best management practices to reduce nonpoint source pollution from all potential sources that may include agricultural, residential, and commercial.
- Promote the proper manure application and management in the high livestock drainage units.
- Develop and offer public educational opportunities regarding the proper management of septic systems.
- Encourage riparian area and wetland restoration by offering technical and educational opportunities regarding relevant watershed management.
- Sustain cooperation between agriculture, residential, and commercial interests in order to enable a partnership towards the common goal.

To have and exercise all rights and powers which are conferred on nonprofit corporations or which may hereafter be conferred by the laws of the State of Ohio, including the power to contract, rent, lease or sell personal or real property; provided, that this corporation shall not, except to an insubstantial degree, if at all, engage in any activities, or exercise any powers, that are not in furtherance of the primary purposes of this corporation.

Notwithstanding any other provisions of these Regulations, the corporation shall not conduct or carry on any activities not to be conducted or carried on by:

An organization exempt from taxation under Section 501(c)3 of the Internal Revenue Code and the regulations promulgated there under as they now exist or as they may hereafter be amended, or

An organization, contributions to which are deductible pursuant to Section 170 © 2 of the Internal Revenue Code and the Regulations promulgated there under as they now exist or as they may hereafter be amended.

ARTICLE III – MEMBERSHIP

Section I – Active Members

Voting authority on the Board of Directors shall be granted to individuals meeting the following criteria:

- Dues paying member of good standing with the organization;
- Attend at least 6 meetings within fiscal year as a voting or non-voting member or by election of the existing Board of Directors.
- Expressed desire to serve on Board of Directors as a voting member, and
- Approved by simple majority of existing Board of Directors during first board meeting following the Annual Meeting.

Membership is available to individuals with an interest in supporting the mission of the Stillwater Watershed Project, Inc. Membership can be individual, family, or corporate and is available upon receipt of annual dues. Each membership has one voting privilege. The Board of Directors grants ex-Officio membership to individuals, including the Executive Director, who serves in an advisory and supporting capacity to the organization. These individuals are non-voting members of the Board of Directors. The Executive Director shall vote in the event of a tie. An Executive Council also exists that consists of the Executive Director, Immediate Past President, President, President Elect, Secretary/Treasurer of the Board of Directors. Their responsibilities include:

- To develop agendas and action plans for the Board of Directors

- Provide guidance between Board of Directors meetings to the Executive Director
- Represent the organization on public policy issues; and Provide for an annual audit of all financial transactions.

Section II – Ex-Officio Members

The Board of Directors grants ex-Officio membership to individuals, including the Executive Director, who serves in an advisory and supporting capacity to the organization. These individuals are non-voting members of the Board of Directors. The Executive Director shall vote in the event of a tie.

Section III – Dues

Membership in this organization shall be for one year, renewable by the payment of dues. Annual membership shall become delinquent and inactive if not paid by the end of the fiscal year. The Board of Directors, on an annual basis, shall determine the amount of the dues for membership.

Section IV – Transitional Board of Directors

Transitional Board of Directors shall consist of those individuals currently serving as Stillwater Watershed Project Joint Board Officers as described within "Stillwater Watershed Project Joint Board Minutes, 1999." After one full fiscal year of service, Transitional Board of Directors must meet criteria described below.

Section V – Board of Directors

Voting authority on the Board of Directors shall be granted to individuals meeting the following criteria:

- Dues paying member of good standing with the organization;
- Attend at least 6 meetings within fiscal year as a voting or non-voting member or by election of the existing Board of Directors.
- Expressed desire to serve on Board of Directors as a voting member, and
- Approved by simple majority of existing Board of Directors during first board meeting following the Annual Meeting.

ARTICLE IV – MEETING OF MEMBERSHIP

Section I – Annual Meeting

The annual meeting of the Stillwater Watershed Project shall be held at such time and place as designated by the Board of Directors. A notice regarding such meeting shall be made to each member at least 10 days in advance.

Section II – Special Meetings

Special meetings of the organization may be held at the request of the Board of Directors.

ARTICLE V – EXECUTIVE COUNCIL

Section I – Membership

The Executive Council shall consist of the Executive Director, Immediate Past President, President, President Elect, Secretary/Treasurer of the Board of Directors.

Section II – Responsibilities of Executive Council

- To develop agendas and action plans for the Board of Directors;
- Provide guidance between Board of Directors meetings to the Executive Director,
- Represent the organization on public policy issues; and
- Provide for an annual audit of all financial transactions.

ARTICLE VI – BOARD OF DIRECTORS

Section I – Directors Meetings and Quorum

At least nine meetings shall be held annually. The Board of Directors shall determine meeting dates during the first meeting following the Annual Meeting. 50% of the Board of Directors constitute a quorum.

Section II – Powers of the Board of Directors

- To establish the rules, objectives and long range plans for the organization;
- To establish policies to govern the organization;
- To delegate operation of the organization through the appointing of a competent Executive Director,
- To evaluate the performance and progress of the organization in meeting its mission and objectives.
- To authorize any officer or officers to enter in any contract or agreement on behalf of the association; such authority must be in writing;

Only officers designated by the Board of Directors shall sign checks, drafts and other orders for payment of money.

Section III – Officers and Tenure

The Board of Directors shall annually elect the following officers: President-Elect, Secretary/Treasurer.

A Director elected to President-Elect begins a new three-year term on the Board of Directors Executive Council, which consists of one year as President-Elect, one year as President, and one year as Immediate Past President. In the event that this individual's term expires during his or her term in office, that Board of Directors position could be filled through an election at the Annual Meeting.

Section IV – Election

Officers shall be elected and installed at the Board of Directors meeting following the Annual Meeting of the organization.

Section V – Officer Vacancy

The Board of Directors shall make appointments to fill vacancies created by the unfulfilled term(s) of officers.

Section VI – Indemnification

The Board of Directors shall be indemnified by the Stillwater Watershed Project against liabilities imposed upon them and expenses reasonably incurred by them in connection with any claim against them, or any action, suit or proceeding to which they may be a party by reason of their being a director. No director is indemnified (a) with respect to matters for which they shall be adjudged in such action, suit or proceeding to be liable for negligence or misconduct in performance of duty, (b) with respect to any matters which shall be settled by the payment of sums which independent counsel selected by the member(s) shall not deem reasonable payment made primarily with a view to avoiding expense of litigation, or (c) with respect to matters for which such indemnification would be against public policy.

Section VII – Duties of Executive Council

President –preside at all the Board of Director meetings and to see that the authorized business of the organization is carried to completion.

President-Elect –assist the President and preside in the President's absence. If both President and President-Elect are absent, the Past President shall preside over the meeting.

Secretary/Treasurer –keep minutes of all meetings, carry on official correspondence, collect all dues, pay authorized bills, present bills for audit prior to the annual meeting each year and conduct such business as shall be delegated him/her.

Immediate Past President – Serve as a mentor to the President, presides at meetings when the President or President-Elect is not in attendance.

Section VIII – Executive Director

The duties of the Executive Director shall be determined by the Board of directors and may include:

- Supervise and coordinate the business activities of the organization including human and financial resources;
- Develop goals and plan to reach objectives of the organization;
- Execute policies developed by the Board of Directors;
- Manage the day-to-day operations of the organization;
- Provide reports for use by the board and council on performance and progress of the organization.

ARTICLE VII – COMMITTEES AND WORK GROUPS

Section I – Standing Committees

These committees consist of member of the Board of Directors and include committees such as Nominating, Funding, Public Relations, etc. Committee appointments will be made during the first Board of Directors meeting following the Annual Meeting.

Section II – Work Groups

Working Groups shall be determined by the Executive Council as needed to work on specific programs, events, etc. for a specified period of time. Members of the Board of Directors shall chair these Working Groups.

ARTICLE VIII – ORDER OF BUSINESS

Section I – Parliamentary Law

Robert's Rule of Order shall govern all meetings.

Section II – Agenda

The order of business at all meeting shall be as follows:

1. Roll Call / Introductions
2. Report of Minutes of preceding meeting
3. Fiscal Report / Approve Bills

4. Report of Officers and Executive Director
5. Report of Standing Committees
6. Report of Working Groups
7. Old Business
8. New Business
9. Miscellaneous

ARTICLE IX – FINANCIAL PROCEDURES

Section I – Fiscal Year

The fiscal year of the organization for accounting and tax purposes shall be January 1 to December 31.

Section II – Authority to Receive Funds

The Stillwater Watershed Project may accept, receive, and expend funds, grants, and services from the Federal Government or its agencies; from departments, agencies and instruments of state or local government; civic sources; private individuals; groups; and foundations. It may contract with respect thereto and will provide such information and reports as may be necessary to secure such financial aide.

Section III – Deposits

All funds shall be deposited in a bank or banks selected by the Board of Directors for disbursement.

Section IV – Approvals

The Board of Directors must approve all expenditures of disbursements from the Stillwater Watershed Project treasury except for those in the amount to be determined by the Board of Directors, which may be approved solely by the Executive Director.

Section V – Audit

The Executive Council shall provide for an annual audit at the end of each fiscal year to confirm the authorized disbursement of and receipt of funds and shall provide for any other audits by law.

ARTICLE X – BOOKS AND RECORDS

There shall be kept at the office of the organization correct books of accounts of the activities and transactions of the association, including a minute book, which shall contain a copy of the articles of incorporation, these by-laws and all minutes of the board meetings.

ARTICLE XI – AMENDMENT PROCEDURES

The by-laws may be amended annually through the following procedures:

A motion for amendment for the by-laws may be made or seconded at any regular meeting of the Board of Directors. If the motion is approved, the Secretary shall thereafter, but not less than 10 days prior to the next scheduled meeting, forward to each member of the Board a copy of such proposed amendment together with a notice that it will be the subject of action at the next meeting. Such amendment, when presented and considered, shall be deemed adopted upon 2/3 vote of the Board of Directors in attendance at the board meeting.

ARTICLE XII – DISSOLUTION

Under dissolution of the organization, the Board of Directors thereof shall, after paying, or making provision for the payment of all liabilities of the organization, dispose of all the assets of the corporation exclusively for the primary purposes of the organization in such manner, or to such organization of organizations organized and operated exclusively for educational and environmental purposes as shall at that time qualify as an exempt organization or organizations under Section 501 © 3 of the Internal Revenue Code and the Regulations promulgated there under (as they now exist or as they may hereafter be amended), as the Board of Directors shall determine. The Court of Common Pleas of the county in which the principal office of the organization is then located shall dispose of any such assets not so disposed of, exclusively for such purposes, or to such organization or organizations, as said court shall determine, which are organized or operated exclusively for such purposes.

ARTICLE XIII – BONDING

The organization shall purchase a security bond for the officers and Executive Director.

Date of Adoption: June 22, 1999

Date Amended: April 27, 2001

_____ _____

Chairman Secretary

Appendix C: Stillwater Watershed Project, Inc. Annual Membership Form

Yes, I want to support the Stillwater Watershed Project, Inc. Please accept my tax-deductible annual contribution of:

Level	Giving Range
Cottonwood	$10 - 24.00
Stonefly	$25 - 99.00
Smallmouth Bass	$100 - 499.00
Kingfisher	$500 – 999.00
Great Blue Heron	$1000 – or more
Lifetime Membership	$500

_____
Name

_____
Address City State Zip

_____
Phone Number E-mail

Please Circle: Student Landowner Business/Corporation

Please List Projects / Interests you may have in the Stillwater River Watershed:
Examples: canoeing, wildlife habitat, fishing

_____
_____
_____

Your check payable to the Stillwater Watershed Project, Inc. is tax deductible. Your support will help improve water quality, protect wildlife habitat, & protect drinking water in the Stillwater River Watershed. If you have questions please call the Watershed Coordinator at 937-548-1715, ext. 3
Please send check to: Stillwater Watershed Project Inc., 1117 South Towne Ct. Greenville, OH 45331

Appendix D: 2002 Feedlot Study Data

The following table represents the raw data from the 2002 feedlot study. All personal identifiers, including names, farm coordinates and farm addresses have been removed.

Table 171: Raw Data from SWP 2002 Feedlot Study

TOWNSHIP	NMPLAN	NMTEST	MANURE STORAGE	CAPACITY	HANDLING	BEEF	DAIRY	SWINE	NURSERY PIGS	LAYERS	PULLETS	TURKEYS	STARTER TURKEYS	HORSE	SHEEP	GOATS	EPA
Union	N				Spread piles			0.00000				0.00000		3			
Union	N				Spread			0.00000				0.00000		3			
Union								0.00000				0.00000		2			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000		X			
Union	N				Spread	30.00000		0.00000				0.00000		100	2		
Union	N				Spread			0.00000				0.00000		2			
Union						15.00000		0.00000				0.00000					
Union	N				Compost and Spread			0.00000				0.00000		2			
Union								0.00000				0.00000					
Union						15.00000		0.00000				0.00000					
Union								0.00000				0.00000		X			
Union	N				Spread	10.00000		0.00000				0.00000		1			

Union								0.00000				0.00000		X			
Union								0.00000				0.00000		1			
Union								0.00000				0.00000		2			
Union								0.00000				0.00000		1			
Union								0.00000				0.00000		1			
Union	N				Spread			0.00000				0.00000			162		
Union	N				Spread	11.00000		0.00000				0.00000					
Union								0.00000				0.00000		5			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000					
Union	N				Spread/Compost			0.00000				0.00000		3			
Union	N				Spread	3.00000		0.00000				0.00000		1	3		
Union						15.00000		0.00000				0.00000					
Union								0.00000				0.00000					
Union								0.00000				0.00000		X			
Union					Inject			0.00000				0.00000					
Union	N				Compost and Burn			0.00000				0.00000		2			
Union	N				Spread			0.00000				0.00000		3			
Union								0.00000				0.00000					
Union	N				Spread			0.00000				0.00000		2			
Union	N				Spread			0.00000				0.00000		5			
Union	N				Compost			0.00000				0.00000					

Union								0.00000				0.00000		2			
Union	N				Spread	7.00000		0.00000				0.00000					
Union	N				Spread			0.00000				0.00000		4			
Union	N				Free give away			0.00000				0.00000		20			
Union	N				Spread			0.00000				0.00000		2			
Newton	N							0.00000				0.00000		7			
Newton	N					2.00000		0.00000				0.00000		7			
Union	N				Spread	2.00000		0.00000				0.00000					
Newton	N					35.00000		0.00000				0.00000					
Newton	Y				Liquid& Solid	30.00000	100.00000	0.00000				0.00000					
Newton	N							0.00000				0.00000			20		
Newton	N							0.00000				0.00000		3			
Newton	N							0.00000				0.00000		2			
Newton					Haul			0.00000				0.00000		3			
Newton								0.00000				0.00000		1			
Newton								0.00000				0.00000			x		
Newton	N				Solid Spreader	6.00000		0.00000				0.00000					
Newton	N							0.00000				0.00000		2			
Newton								0.00000				0.00000		1			
Newton	N				Solid Spreader	20.00000		0.00000				0.00000					
Newton	N				Spread			0.00000				0.00000		3			

Newton								0.00000				0.00000		X			
Newton	Y				Wagon & Solid			0.00000				0.00000					
Newton								0.00000				0.00000		X			
Newton								0.00000				0.00000		X			
Newton	N					5.00000		0.00000				0.00000					
Newton	N							0.00000				0.00000					
Newton	Y				Inject		138.0 0000	0.00000				0.00000					
Newton	N				Spread	10.0000 0		0.00000				0.00000					
Newton	N				Spread			0.00000				0.00000		1			
Newton	Y				Wagon & Solid			0.00000				0.00000					
Newton	N				Spread			0.00000				0.00000		5			
Newton	N				Garden or give away			0.00000				0.00000			4		
Newton								0.00000				0.00000		4			
Newton	N				Spread	20.0000 0		0.00000				0.00000			50		
Newton	N				Spread	11.0000 0		0.00000				0.00000					
Newton	N				Solid Spreader			0.00000				0.00000					
Newton								0.00000				0.00000					
Newton								0.00000				0.00000		X			
Newton	N				Spread on No-till	11.0000 0		0.00000				0.00000		5			

Newton	N							0.00000				0.00000		10			
Newton	N				Solid Spread	19.00000		0.00000				0.00000					
Newton								0.00000				0.00000		X			
Newton	N				Spread			0.00000				0.00000			8 goats		
Newton								0.00000				0.00000		1			
Newton	Y				Liquid			0.00000				0.00000					
Newton	N				Spread	57.00000		0.00000				0.00000					
Newton								0.00000				0.00000		3			
Newton	Y				Dry Spread	20.00000		0.00000				0.00000		2			
Newton	Y				Spread			0.00000				0.00000					
Newton	N							0.00000				0.00000		1			
Newton								0.00000				0.00000		2			
Newton								0.00000				0.00000					
Newton								0.00000				0.00000		1			
Newton								0.00000				0.00000		1			
Newton								0.00000				0.00000		X			
Newton	N							0.00000				0.00000		2			
Newton	Y					12.00000		0.00000				0.00000					
Newton	N				Spread	15.00000		0.00000				0.00000		37			
Newton								0.00000				0.00000		3			
Newton	N				Spread			0.00000				0.00000		3			

Newton	N				Spread			0.00000				0.00000		2			
Newton								0.00000				0.00000		1			
Newton								0.00000				0.00000					
Newton	N					15.00000		0.00000				0.00000					
Newton	N					40.00000		0.00000				0.00000		5			
Newton	N				Compost and Spread			0.00000				0.00000		4			
Newton								0.00000				0.00000		2			
Newton	N				Spread			0.00000				0.00000		1			
Newton	N				Spread			0.00000				0.00000					
Newton								0.00000				0.00000					
Newton	N				Liquid			0.00000				0.00000					
Newton	N							0.00000				0.00000		2			
Newton	N						58.00000	0.00000				0.00000					
Newton								0.00000				0.00000		X			
Newton	N							0.00000				0.00000		2			
Newton	N				Spread		40.00000	0.00000				0.00000					
Newton	Y				Liquid	100.00000	125.00000	0.00000				0.00000					
Newton	N							0.00000				0.00000		1			
Newton	N				Spread			0.00000				0.00000		4			
Washington	Y				Spread		175.00000	0.00000				0.00000					

Washington	N							0.00000				0.00000		1			
Newberry	N				Pasture			0.00000				0.00000		1			
Washington	N							0.00000				0.00000		4			
Newberry	N				Spread			0.00000				0.00000		1			
Newberry	Y				Spread			0.00000				0.00000					
Newberry	N				Compost	3.00000		0.00000				15.00000					
Newberry	N				Spread			0.00000				0.00000					
Newberry	Y				Spread	10.00000		0.00000				0.00000					
Newberry	N				Spread and no-till	16.00000		0.00000				0.00000					
Newberry	N							0.00000				0.00000					
Newberry	N				Spread and Plow		50.00000	0.00000				0.00000					
Newberry	N				Spread and Till	5.00000		0.00000				0.00000					
Newberry	N				Spread			0.00000				0.00000		9			
Newberry	N				Spread			0.00000				0.00000		5			
Newberry								0.00000				0.00000		X			
Newberry								0.00000				0.00000		8			
Newberry	N				Spread	15.00000		0.00000				0.00000					
Newberry					Spread	6.00000		0.00000				0.00000					
Newberry	N				Spread	8.00000		0.00000				0.00000					
Newberry	N				Surface Spread	330.00000		0.00000				0.00000					

Newberry	N				Spread on Garden	3.00000		0.00000				0.00000			85 Goats		
Newberry	N				Spread thin on No-till	11.00000		0.00000				0.00000					
Newberry	N				Spread	1.00000		0.00000				0.00000		2			
Newberry								0.00000				0.00000		X			
Newberry	N				Spread	6.00000		0.00000				0.00000		2			
Newberry	N					1.00000		0.00000				0.00000			5		
Newberry	N							0.00000				0.00000		2			
Newberry	N				Spread			0.00000				0.00000		5			
Newberry	N							0.00000				0.00000		1			
Newberry	N				Spread	7.00000		0.00000				0.00000		1	39		
Newberry	N							0.00000				0.00000		X			
Newberry	N							0.00000				0.00000		2			
Newberry	N							0.00000				0.00000					
Newberry	N				Spread and Till	5.00000		0.00000				0.00000		4			
Newberry	N				Spread	8.00000		0.00000				0.00000					
Newberry	N				Dry Spread	5.00000		0.00000				0.00000			93 Sheep / 1Goat		
Newberry	N				Spread			0.00000				0.00000		6			
Newberry	N							0.00000				0.00000		X			
Newberry								0.00000				0.00000		3			
Newberry	N				Spread			0.00000				0.00000		3			
Newberry	N					15.0000		0.00000				0.00000					

						0											
Newberry	Y				Surface			0.00000				49500.00000					
Newberry								0.00000				0.00000		7			
Newberry	N				Spread			0.00000				0.00000					
Newberry	N				Spread			0.00000				0.00000		5	16		
Newberry	N				Drag line plowed			0.00000				0.00000					
Newberry	N							0.00000				0.00000		7			
Newberry								0.00000				0.00000		3			
Newberry	Y					10.00000		0.00000				0.00000					
Newberry	Y				Liquid & Dry		160.00000	0.00000				0.00000					
Newberry	N				Spread			0.00000				0.00000		14			
Newberry	N				Semi Solid Spread		70.00000	0.00000				0.00000					
Newberry	N							0.00000				0.00000		30			
Newberry	N							0.00000				0.00000		2			
Newberry	N				Separator		90.00000	0.00000				0.00000					
Newberry	N					2.00000		0.00000				0.00000					
Newberry	N							0.00000				0.00000		8			
Newberry	N				Spread	2.00000		0.00000				0.00000					
Newberry	N							0.00000				0.00000		X			
Newberry	N				Spread	5.00000		0.00000				0.00000					
Newberry	N				Dry Spread			0.00000				0.00000		3			

Newberry	N				Spread	4.00000		0.00000				0.00000					
Newberry	N							0.00000				0.00000					
Newberry	N							0.00000				0.00000					
Newberry	N							0.00000				0.00000			31		
Newberry	N				Spread			0.00000				0.00000		12			
Newberry	N				Spread			0.00000				0.00000		4			
Newberry	N				Spread			0.00000				0.00000		2			
Newberry	N							0.00000				0.00000		2			
Newberry								0.00000				0.00000		X			
Monroe								0.00000				0.00000		8			
Monroe	N				Spread			0.00000				0.00000			6		
Monroe	N				Spread			0.00000				0.00000		9			
Monroe	N				Spread	8.00000		0.00000				0.00000					
Monroe								0.00000				0.00000		3			
Monroe								0.00000				0.00000					
Monroe								0.00000				0.00000		X			
Monroe								0.00000				0.00000					
Monroe	N				Spread	77.00000		0.00000				0.00000			19		
Monroe								0.00000				0.00000		8			
Monroe								0.00000				0.00000					
Monroe						10.00000		0.00000				0.00000					
Monroe								0.00000				0.00000					
Monroe								0.00000				0.00000			X		

Monroe	N				Knife in			0.00000				0.00000			11		
Monroe	N				Dry Spread	9.00000		0.00000				0.00000					
Monroe	N				Spread			0.00000				0.00000					
Monroe								0.00000				0.00000		5			
Union	N							0.00000				0.00000		X			
Union	N				Spread			0.00000				0.00000		6			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000					
Union	N				Spread			0.00000				0.00000		14			
Union	Y				Spread			0.00000				0.00000		6	8		
Union	N				Haul			0.00000				0.00000		9			
Union								0.00000				0.00000		X			
Union	N				Spread			0.00000				0.00000			47		
Union								0.00000				0.00000		x			
Union	N				Spread	15.00000		0.00000				0.00000					
Union	N							0.00000				0.00000		X			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000			6		
Union								0.00000				0.00000		X			
Union	N				Spread			0.00000				0.00000		4			
Union								0.00000				0.00000		X			
Union	N				Spread	5.00000		0.00000				0.00000					
Union	Y				Honey			0.00000				0.00000					

					wagon and Dry												
Union	N							0.00000				0.00000		4			
Union								0.00000				0.00000		X			
Union						1.00000		0.00000				0.00000		4			
Union								0.00000				0.00000					
Union								0.00000				0.00000		X			
Union	N				Spread	4.00000		0.00000				0.00000					
Union	N				Spread			0.00000				0.00000		4			
Newberry	N							0.00000				0.00000		1			
Newberry								0.00000				0.00000		4			
Newberry								0.00000				0.00000		?			
Washington	N				Spread	2.00000	3.00000	0.00000				0.00000					
Twin	N	N	Pit	4 month	inject			275.00000	300								
Monroe								800.00000									
Monroe	Y	N	Solid	120 days	Spread	40.00000											
Monroe	N	N	Solid	1 week	Spread		200.00000										
Mississinawa	Y		Lagoon	1 year	Spread			930.00000									
Allen	Y	Y	Holding Pond	1 year	Dragline inject			840.00000									
Allen											90000						
Allen						150.000											

						00											
Allen	Y	Y	Solid	1 year	Spread					880000							Yes
Allen								75.00000									
Allen	Y	Y	Liquid - Lagoon	1 year	Spread			875.00000	1000								
Allen	N	N	Pit					800.00000									
Allen												22000.00000	5000				
Allen	N	N	Pit	90	Spread			330.00000									
Allen	N	N	Solid	30-60 days	Spread	170.00000						22000.00000					
Allen							30.00000										
Allen												26500.00000					
Allen												22000.00000	5000				
Allen			Solid		Spread	31.00000											
Wabash			Solid		Spread		60.00000										
Wabash	N	N	Solid-Pit / Pad	2 yr / 1 month	Spread	15.00000	145.00000										
Wabash	N	N	Pit-cement / Solid	2 yr / 1 yr	Spread		70.00000				96000						
Patterson	Y	Y	Lagoon	6 months	Irrigate		160.00000										

Patterson	Y	Y	Lagoon	1 year	Irrigate		200.00000										
Patterson	Y	N	Holding Pond	1 year	Inject/irrigate	100.00000		2000.00000									
Patterson			Holding pond	1 year			200.00000										
Patterson								1500.00000									
Patterson	Y	Y	Pit	90-120	Spread/ incorporated/ inject			2000.00000									
Patterson	Y	N	Pit	3 month	Inject			2500.00000									
Patterson							175.00000										
Patterson							200.00000	1000.00000									
Patterson							150.00000										
Patterson	Y	Y	Solid	6 week	Spread	440.00000											
Wayne	Y	Y	Solid	1 year	Spread/ incorporated							100000.00000					Yes
Wayne	Y	N	Solid	60-90	Spread		85.00000										
Wayne								100.00000									
Wayne	Y	N	None		Spread	22.00000											
Wayne										60000							
Wayne												11000.0					

												0000					
Wayne							250.0 0000										
Wayne						14.0000 0											
Wayne	N	N	Pit	1 month	Spread		208.0 0000										
Wayne	Y	N	Pit/Semi Solid	90-120	Spread	600.000 00											
Wayne	Y	N	Lagoon	1 year	Inject		250.0 0000										
Wayne	Y	Y								128480							Yes
Wayne											29000						Yes
Wayne										1280729							Yes
Wayne								2100.00 000									
Wayne	N	N	Solid	2 month	Spread		80.00 000										
Wayne	N	N	Solid	1 month	Spread	300.000 00											
Wayne										757320							Yes
Wayne										340400							Yes
Wayne			Lagoon	1 year	Dragline		400.0 0000										
Wayne	Y	N	Deep Pit	1 year	Spread			2020.00 000									

Wayne						800.00000				500000							
Wayne	Y	N	Lagoon	1 year	Dragline		230.00000										
Wayne	Y	N	Holding Pond	1 year	Dragline Inject			670.00000	400								
Wayne						145.00000											
York										87400							Yes
York											45000						
York								1000.00000									
York								600.00000									
York								300.00000			40000						
York												22000.00000					
York			Solid		Spread	210.00000											
York	N	N	Pit	120	Spread			325.00000									
York	Y	N	Anaerobic Lagoon	1 year	Spread			4040.00000									
York	Y	Y	Lagoon	1 year	Spread		500.00000										
York	N	N	None	120	Spread	75.00000											
York	Y	Y	Holding Pond	1 year	Spread		140.00000	680.00000	150								

York						200.00000											
York	Y	N						500.00000									
Van Buren	Y	N	Slurry	6 months	Inject	80.00000	250.00000										
Van Buren							175.00000	2020.00000									
Franklin							175.00000										
Franklin								600.00000									
Franklin			Holding Pond	1yr	Irrigate			2020.00000									
Franklin			Pasture		Spread		50.00000										
Franklin	Y	N	Pit	1yr	Dragline Inject			1100.00000									
Franklin			Pit					960.00000									
Franklin			Pasture			15.00000											
Adams								250.00000									
Adams								250.00000									
Adams								2000.00000				11000.00000					
Adams	Y	Y	Pit/Solid	1year	Dragline Inject		69.00000	1000.00000									
Adams											386880						

Adams	N	N	Solid		Spread		70.00000										
Adams							150.00000	2000.00000	2000								
Adams								600.00000									
Adams	Y	Y	Lagoon	1 year	Inject		225.00000										
Adams	N	N	Pit	30-60 days	Spread			880.00000									
Adams								30.00000	50								
Adams						50.00000											
Adams						45.00000											
Adams	N	N	Pit/Liquid		Spread	9.00000		750.00000									
Richland	N	N	Lagoon/Solid	1year	Inject	50.00000	265.00000										
Richland	Y	Y	liquid	2/ year	Spread		85.00000										
Richland							110.00000										
Richland	Y	N	None		Spread	130.00000											
Richland							110.00000										
Richland	N	N	Lagoon	1 year	Spread			2000.00000									
Richland	Y	Y	Holding Pond/pit/liq	1 year	Inject			1000.00000			96000						Yes

			uid														
Richland	N	N	Lagoon	1year	Spread		143.0 0000										
Richland	N	N	Anaerobic Lagoon	1 year	Inject/ Irrigate			1500.00 000									
Richland	Y	Y	Solid	1 year	Spread incorporate						80000						
Richland	Y	Y	Lagoon	1 year	Dragline inject		150.0 0000	1120.00 000	290								
Richland	Y	N	Lagoon	1 year	Dragline Inject		140.0 0000	140.000 00	600								
Richland	Y	Y	liquid	2/ year	Spread	65.0000 0	90.00 000										
Richland	Y	N	Lagoon	1 year	Inject		210.0 0000										
Wayne	Y	N	Pit	6 months	Inject			1950.00 000	600								
Richland	N	N	Dry/solid				43.00 000										
Richland	Y	N	Pasture		Spread	25.0000 0											
Richland										125000							
Brown	Y	Y	Lagoon	1 year	Spread				2000								
Brown										120000							Ye s
Brown	Y	Y	Anaerobic Lagoon	1 year	Dragline inject			4400.00 000									Ye s
Brown	Y	Y	Pit	1yr	Spread/inco rporated					1000000	482544						
Brown	Y	Y	Pit/Liquid	120	Spread			480.000 00									

Brown						25.00000		600.00000									Yes
Jackson								2020.00000									
Jackson								600.00000									
Jackson												11000.00000	7000				
Jackson										130000							Yes
Jackson										120000							
Jackson	Y	Y								672000							Yes
Jackson	N	N	Solid		Spread					27000							
Jackson	Y	Y								876400							Yes
Jackson												11000.00000					
Jackson	Y	Y	Anaerobic Lagoon	1yr	Dragline Inject/Inject				4000								
Washington							80.00000	200.00000			60						
Washington							25.00000										
Washington	Y	Y	Slurry	2/year	Inject		54.00000										
Washington	Y	Y					95.00000										
Washington			Solid	1 year	Spread		30.00000										
Washington							40.00										

							000										
Washington							90.00 000										
Washington						15.0000 0											
Washington	Y	Y						1000.00 000									Yes
Washington						30.0000 0											
Washington						30.0000 0		750.000 00									
Washington	N	N	Deep Pit		Spread			1700.00 000									
Washington	Y	Y								672000							Yes
Washington							125.0 0000										
Washington	Y	Y				50.0000 0											Yes
Washington	Y	Y						2000.00 000									Yes
Washington								2000.00 000									
Butler			Pit					2000.00 000									
Butler			Lagoon					1000.00 000									
Butler	N	N	Pit	60-90	Inject	2.00000		1370.00 000									
Butler			Holding Pond		Dragline Inject			1170.00 000									

Butler						40.00000											
Harrison						35.00000									10		
Harrison								1000.00000									
Harrison			Pasture			30.00000											
Harrison	N	N	Pasture			55.00000											
Harrison	N	N	None		Spread	35.00000											
Liberty	Y	N	None	<30	Spread	40.00000	70.00000										
Liberty								200.00000									
Liberty			Pasture			14.00000											
Liberty			Solid		Spread		120.00000										
Liberty							330.00000										
Liberty							140.00000										
Liberty			Solid		Spread		25.00000										
Liberty			Pasture			30.00000		40.00000									
Neave	N	N	Lagoon		Irrigate/Spread		43.00000										
Neave	Y	N	Pit tanks	2 weeks	Spreads			500.00000									

Neave	Y	N	Pit tanks	2 weeks	Spreads			400.00000									
Neave	N	N	Pasture			30.00000											
Neave	N	N	None		Spread	30.00000											
Neave								600.00000									
Neave	Y	Y	Holding Pond	1 year	Inject	14.00000			11000								
Neave	N	N	Solid		Spread		120.00000										
Neave	N	N	Solid		Spread		55.00000										
Neave	N	N	Solid		Spread		78.00000										
Greenville	Y	N	Pit		Inject	7.00000		1800.00000									
Greenville								500.00000									
Greenville								1000.00000									
Greenville	N	N	Pit	120	Spread/incorporated/inject												
Greenville	N	N	Pit	120	Spread/incorporated/inject	25.00000											
Greenville	N	N	Solid		Spread		300.00000										
Greenville	Y	N	Pit/Liquid/Holding Pond	1yr	Spread/Irrigate		165.00000										

Greenville	Y	N	Pit	120	Spread	40.00000											
Greenville	N	N	Holding Pond	1yr	Irrigate		47.00000										
Greenville	Y	N	Solid	120	Spread	21.00000		300.00000									
Greenville	N	N	Solid	2 weeks	Spread		165.00000										
Greenville	N	N	Solid	2 weeks	Spread		20.00000										
Greenville	N	N	Pasture			100.00000											
Greenville	N	N	Pit	1 year	Dragline Inject			1000.00000									
Greenville	N	N	Pasture			11.00000											
Greenville	N	N	Pasture			20.00000											
Wabash						150.00000											
Jackson	N	N	None		Spread	54.00000		4.00000									
Wayne								200.00000									
York											254000						Yes
TOWNSHIP	MNM_PLAN	MNM_TEST	MANURE_STO	CAPACITY	HANDLING	BEEF	DAIRY	SWINE	NURSERY_PI	LAYERS	PULLET	TURKEY	STARTER_T	HORSES	SHEEP	GOATS	EPA

Union	N				Spread piles			0.00000				0.00000		3			
Union	N				Spread			0.00000				0.00000		3			
Union								0.00000				0.00000		2			
Union								0.00000				0.00000		X			
Union								0.00000				0.00000		X			
Union	N				Spread	30.00000		0.00000				0.00000		100	2		

Appendix E: Best Management Practice Evaluations

The following tables represent the efficacy of common best management practices when used for pollutant load reduction. These tables were developed during the TMDL process.

Table 1

AGRICULTURAL BMP EVALUATION TABLE

BMP	Code	Practice Type	Use Area	Purpose	Effectively Controls:	Cost
Conservation Crop Rotation	328	vegetative	cropland	reduce land erosion	nutrient, pesticide, sed., temp.	about 0 (~0)
Constructed Wetlands	657	structural	variable	filter runoff	all	expensive
Contour Farming	330	operational	cropland	reduce land erosion	nutrient, pesticide, sed, path	~0
Cover and Green Manure Crop	340	vegetative	cropland	reduce land erosion	nutrients, pesticides	
Critical Area Planting	342	vegetative	variable	reduce land/bank erosion	metals, sediment	up to $1000/ac.
Diversion	362	structural	all agricultural	control excess runoff	nutrients, pathogen, pest, sed	~ $2.00/ft.
Fencing	382	structural	livestock	reduce land/bank erosion	nutrients, sediment	up to $5.00/ft.
Field Border	386	vegetative	variable	reduce land erosion	nutrient, pathogen, pest, D.O.	
Grade Stabilization Structure	410	structural	variable	control excess runoff	nutrients, sediment	
Grassed Waterway	412	structural	all agricultural	control excess runoff	nutrients, sediment	~$2to3.00/sq.ft.
Integrated Pest Management	685	operational	all agricultural	reduce pesticide runoff	pesticides	variable
Irrigation Water Management (Sprinkler)	442	operational	cropland	reduce land/bank erosion	D.O., nutrients, pest., sed.	
Irrigation Water Management (Surface/Subsurface)	443	operational	cropland	reduce land/bank erosion	sediment	
Irrigation Water Management (Tail water Recovery)	447	operational	cropland	reduce land/bank erosion	nutrients, pesticides, sed.	
Irrigation Water Management (Trickle Irrigation)	449	operational	cropland	reduce land/bank erosion	nutrients, pesticides, sed.	$700to1000/ac.
No Till Conservation Tillage	329	operational	cropland	reduce land erosion	nutrients, pesticides, sed.	$20to25.00/ac.

Nutrient Management	590	operational	cropland	reduce nutrient loads	nutrients, pathogens	variable
Pasture Management-Short Term Grazing System	512	structural	livestock	reduce land erosion	nutrient, pesticide, sed, temp	$1000 to $3000
Pesticide Management	514	operational	all agricultural	reduce pesticide runoff	pesticides	variable
Planned Grazing System	556	operational	livestock	reduce land erosion	nutrients, sediment	
Regulating Water in Drainage Systems	554	structural	variable	control excess runoff	nutrients, pesticides	
Residue Management	344	operational	cropland	reduce land erosion		
Sediment Basin	638	structural	variable	filter runoff	DO, metal, nutrient, pest, sed	expensive
Streambank and Shoreline Protection	580	vegetative	shoreline	reduce band erosion	nutrients, sediment, temp	variable
Stripcropping	586	vegetative	cropland	reduce land erosion	nutrients, pesticides, sed.	~25.00/ac.
Stripcropping, Contour	585	vegetative	cropland	reduce land erosion	nutrient, pathogen, pest, sed	
Subsurface Drain	606	structural	variable	control excess runoff		variable
Terraces	600	structural	variable	control erosion/runoff	nutrient, pathogen, pest, sed	$200.00/ac.
Tree/Shrub Establishment	612	vegetative	variable	reduce land/bank erosion	nutrients, temperature	
Vegetative Filter Strips	393	vegetative	variable	reduce land/bank erosion	metals, nutrients, pest, sed	inexpensive
Waste Management System	312	operational	all agricultural	reduce pollutant loads	DO, nutrient, pathogen, sed	
Windbreak/Shelterbelt Establishment	380	vegetative	variable	reduce land erosion	nutrients, pesticides, sed.	

(Note: "Variable" use area means that the practice may be employed on many types of land, such as stream banks or empty fields, and use is not limited to agricultural areas.)

(Note-2: Practices were listed as "Effectively Controls" if they received a grade of "D" or higher by this report; and some of the parameters were abbreviated to fit in the table, but all correspond to one of the seven parameters evaluated in this paper.)

Table 2a

Dissolved Oxygen

BMP	Code		Grade	Comments
Constructed Wetlands	657		A	only one source reported
Contour Farming	330		E	
Cover and Green Manure Crop	340		F	only one source reported
Critical Area Planting	342		F	only one source reported
Fencing	382		F	only one source reported
Field Border	386		C	only one source reported
Irrigation Water Management (Sprinkler)	442		C	only one source reported
Irrigation Water Management (Surface/Subsurface)	443		F	only one source reported
Irrigation Water Management (Trickle Irrigation)	449		F	only one source reported
No Till Conservation Tillage	329		F	only one source reported
Pasture Management-Short Duration Grazing System	512		E	
Planned Grazing System	556		F	only one source reported
Residue Management	344		F	only one source reported
Sediment Basin	638		C	

Stream bank and Shoreline Protection	580		E	
Strip-cropping, Contour	585		E	
Terraces	600		E	
Tree/Shrub Establishment	612		F	only one source reported
Vegetative Filter Strips	393		E	
Waste Management System	312		C	

Grades: A-B=Medium to High effectiveness

C-D=Medium effectiveness

E-F=Low to Medium effectiveness

Table 2b				
Metals				
BMP	**Code**		**Grade**	**Comments**
Constructed Wetlands	657		A	only one source reported
Cover and Green Manure Crop	340		F	only one source reported
Critical Area Planting	342		C	only one source reported
No Till Conservation Tillage	329		F	only one source reported
Nutrient Management	590		F	only one source reported
Sediment Basin	638		C	only one source reported
Tree/Shrub Establishment	612		F	only one source reported
Vegetative Filter Strips	393		C	
Waste Management System	312		F	only one source reported

"Metals" refers to iron, lead, zinc, copper, and cobalt. (Natural Resources Conservation Service, 1998)

Grades: A-B=Medium to High effectiveness

C-D=Medium effectiveness

E-F=Low to Medium effectiveness

Table 2c

Nutrients-Absorbed

BMP	Code		Grade	Comments
Conservation Crop Rotation	328		B	
Constructed Wetlands	657		B	
Contour Farming***	330		C	
Cover and Green Manure Crop	340		D	
Diversion***	362		D	
Fencing	382		C	
Field Border	386		C	
Grade Stabilization Structure	410		C	only one source reported
Grassed Waterway***	412		C	
Integrated Pest Management	685		F	only one source reported
Irrigation Water Management (Sprinkler)	442		C	only one source reported
Irrigation Water Management (Surface/Subsurface)	443		F	only one source reported
Irrigation Water Management (Tailwater Recovery)	447		A	only one source reported
Irrigation Water Management (Trickle Irrigation)	449		C	sources vary in evaluation

No Till Conservation Tillage***	329		B	
Nutrient Management	590		A	
Pasture Management-Short Term Grazing System***	512		C	
Planned Grazing System	556		D	only one source reported
Regulating Water in Drainage Systems	554		F	only one source reported
Sediment Basin***	638		B	
Stream bank and Shoreline Protection	580		C	
Strip-cropping	586		C	
Strip-cropping, Contour***	585		C	
Terraces***	600		A	
Tree/Shrub Establishment***	612		C	only one source reported
Vegetative Filter Strips***	393		D	
Waste Management System	312		A	
Windbreak/Shelterbelt Establishment	380		C	only one source reported

Table 2d

Nutrients-Soluble

BMP	Code		Grade	Comments
Conservation Crop Rotation	328		B	
Constructed Wetlands	657		C	
Contour Farming***	330		D	
Cover and Green Manure Crop	340		D	
Diversion***	362		E	
Fencing	382		C	
Field Border	386		D	
Grade Stabilization Structure	410		F	only one source reported
Grassed Waterway***	412		D	
Integrated Pest Management	685		F	only one source reported
Irrigation Water Management (Sprinkler)	442		F	only one source reported
Irrigation Water Management (Surface/Subsurface)	443		F	only one source reported
Irrigation Water Management (Tailwater Recovery)	447		A	only one source reported
Irrigation Water Management (Trickle Irrigation)	449		C	sources vary in evaluation
No Till Conservation Tillage***	329		E	

Nutrient Management	590		A	
Pasture Management-Short Term Grazing System***	512		D	
Planned Grazing System	556		D	only one source reported
Regulating Water in Drainage Systems	554		A	only one source reported
Sediment Basin***	638		F	
Stream bank and Shoreline Protection	580		E	
Strip-cropping	586		C	
Strip-cropping, Contour***	585		D	
Terraces***	600		B	
Tree/Shrub Establishment***	612		C	only one source reported
Vegetative Filter Strips***	393		E	
Waste Management System	312		A	
Windbreak/Shelterbelt Establishment	380		F	only one source reported

"Nutrients" refers broadly to all nutrients, but focuses specifically on nitrogen, phosphorous, and organic carbon.

***= Practices marked this way might possibly contribute to groundwater accumulation of nutrients.

Grades: A-B=Medium to High effectiveness

C-D=Medium effectiveness

E-F=Low to Medium effectiveness

Table 2e

Pathogens

BMP	Code		Grade	Comments
Constructed Wetlands	657		B	
Contour Farming	330		C	only one source reported
Diversion	362		C	
Fencing	382		F	only one source reported
Field Border	386		C	only one source reported
Nutrient Management	590		C	only one source reported
Pasture Management-Short Duration Grazing System	512		E	
Strip-cropping, Contour	585		C	only one source reported
Subsurface Drain	606		F	only one source reported
Terraces	600		C	only one source reported
Tree/Shrub Establishment	612		F	only one source reported
Waste Management System	312		B	

"Pathogens" refers to bacteria, viruses, protozoa, fungi, and helminths in solid or dissolved form.

(Natural Resources Conservation Service, 1998)

Grades: A-B=Medium to High effectiveness

C-D=Medium effectiveness

E-F=Low to Medium effectiveness

Appendix F: Tillage Transect Data 1995-2003

SUBWATERSHEDS	% NO-TILL CORN	% NO-TILL BEANS
LUDLOW CREEK	11	47
PAINTER CREEK	11	51
GREENVILLE #A	12	54
CANYON RUN	12	55
STILLWATER #G	14	77
STILLWATER #H	15	86
STILLWATER #F	15	70
BOYD CREEK	16	84
HARRIS CREEK	17	58
GREENVILLE #B	17	59
NORTH FORK	19	68
GREENVILLE #G	20	80
STILLWATER #E	20	64
WOODINGTON RUN	21	71
SOUTH FORK	21	79
GREENVILLE #C	22	72
GREENVILLE #D	23	78
SWAMP CREEK	26	61
GREENVILLE #E	27	83

STILLWATER #D	30	55
GREENVILLE #F	33	81

DARKE COUNTY

STILLWATER TILLAGE TRANSECTS

1995-2003

NO-TILL PERCENTAGES

	1995	1996	1997	1998	1999	2000	2001	2002	2003	AVERAGE
BOYD CREEK										
CORN	28	5	7	3	0	12	17	37	19	14
BEANS	69	61	69	64	76	86	73	81	92	75
WHEAT	33	58	33	43	0	36	100	66	33	45
CANYON RUN										
CORN	0	0	0	0	50	0	0	33	10	10
BEANS	50	33	27	27	61	22	75	60	82	49
WHEAT	0	66	50	50	100	0	100	0	50	46
GREENVILLE #A										
CORN	4	8	8	0	5	21	10	11	26	10
BEANS	29	23	39	40	63	48	72	50	68	48
WHEAT	43	27	14	14	50	43	100	40	30	40
GREENVILLE #B										
CORN	16	10	2	4	16	16	17	32	22	15
BEANS	24	38	51	45	51	53	70	75	65	52

WHEAT	67	20	19	60	25	71	38	60	67	47
GREENVILLE #C										
CORN	13	7	15	8	27	20	13	24	49	20
BEANS	27	56	33	49	69	81	95	90	79	64
WHEAT	100	67	53	0	86	50	100	100	29	65
GREENVILLE #D										
CORN	21	19	11	4	12	8	23	35	47	20
BEANS	47	62	62	55	76	74	82	83	81	69
WHEAT	80	63	43	26	89	69	100	92	33	66
GREENVILLE #E										
CORN	21	22	14	12	8	20	26	41	49	24
BEANS	60	83	63	74	59	65	86	87	90	74
WHEAT	86	63	23	77	6	25	100	88	54	58
GREENVILLE #F										
CORN	20	29	16	17	20	33	28	50	51	29
BEANS	74	68	58	61	51	75	76	87	95	72
WHEAT	73	100	36	75	22	60	100	50	100	68
GREENVILLE #G										
CORN	25	19	18	0	4	4	6	11	69	17
BEANS	57	65	54	74	81	58	89	74	90	71
WHEAT	50	100	50	26	87	33	89	50	100	65
HARRIS CREEK										

CORN	22	15	9	0	16	17	11	22	27	15
BEANS	50	36	24	50	34	56	71	69	73	51
WHEAT	63	50	43	17	50	0	80	100	25	48
LUDLOW CREEK										
CORN	2	10	9	2	14	12	14	9	15	10
BEANS	16	26	31	37	48	35	50	63	67	41
WHEAT	31	83	17	36	33	50	100	50	17	46
NORTH FORK										
CORN	31	18	4	4	0	29	16	15	36	17
BEANS	45	50	45	37	51	88	85	64	81	61
WHEAT	83	79	44	17	0	100	71	33	67	55
PAINTER CREEK										
CORN	7	6	9	3	11	11	7	12	24	10
BEANS	35	19	46	32	53	33	55	59	77	45
WHEAT	29	22	17	54	40	15	100	50	50	42
SOUTH FORK										
CORN	7	15	16	0	14	49	9	28	33	19
BEANS	63	58	58	69	73	73	82	79	76	70
WHEAT	67	76	60	0	100	100	0	25	75	56
STILLWATER #D										
CORN	27	30	20	0	29	33	20	50	33	27
BEANS	23	9	52	53	30	59	64	79	67	48

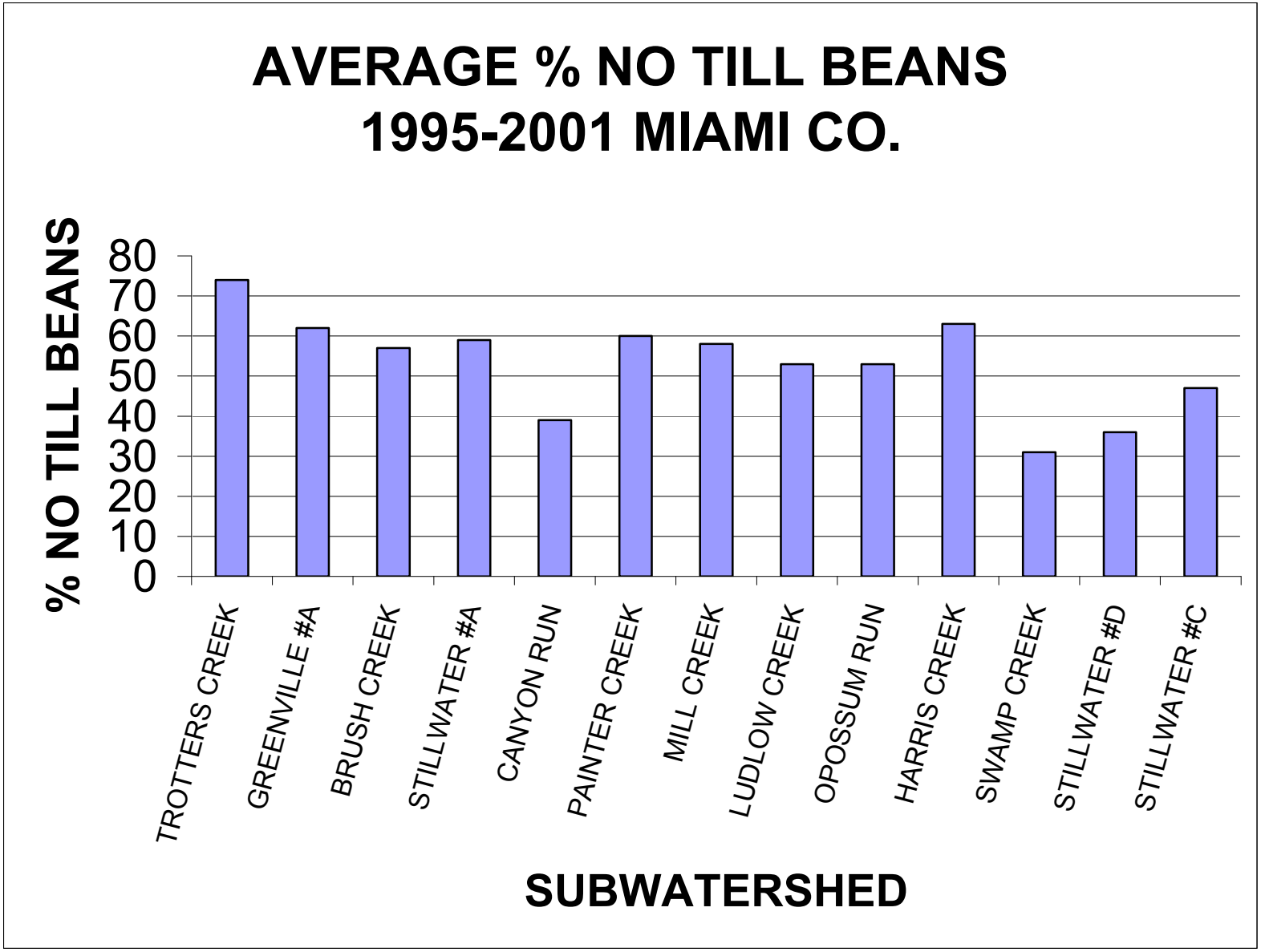
WHEAT	50	20	43	29	0	100	50	80	50	47
STILLWATER #E										
CORN	20	21	15	0	2	24	9	40	28	18
BEANS	42	19	58	55	40	67	75	77	81	57
WHEAT	67	75	52	0	0	57	33	25	50	40
STILLWATER #F										
CORN	25	23	10	0	0	22	4	30	8	14
BEANS	55	31	33	75	78	63	83	71	69	62
WHEAT	50	92	59	25	0	80	100	66	50	58
STILLWATER #G										
CORN	26	3	3	4	13	14	0	8	40	12
BEANS	63	35	57	65	63	68	94	89	81	68
WHEAT	50	77	50	0	0	33	100	50	100	20
STILLWATER #H										
CORN	10	9	5	0	8	27	10	13	38	13
BEANS	58	44	57	79	92	88	88	79	100	76
WHEAT	100	71	100	33	50	75	0	79	80	65
SWAMP CREEK										
CORN	36	38	16	20	15	8	13	35	28	23
BEANS	44	51	54	50	50	45	66	64	63	54
WHEAT	77	91	66	51	27	38	62	50	55	57
WOODINGTON RUN										

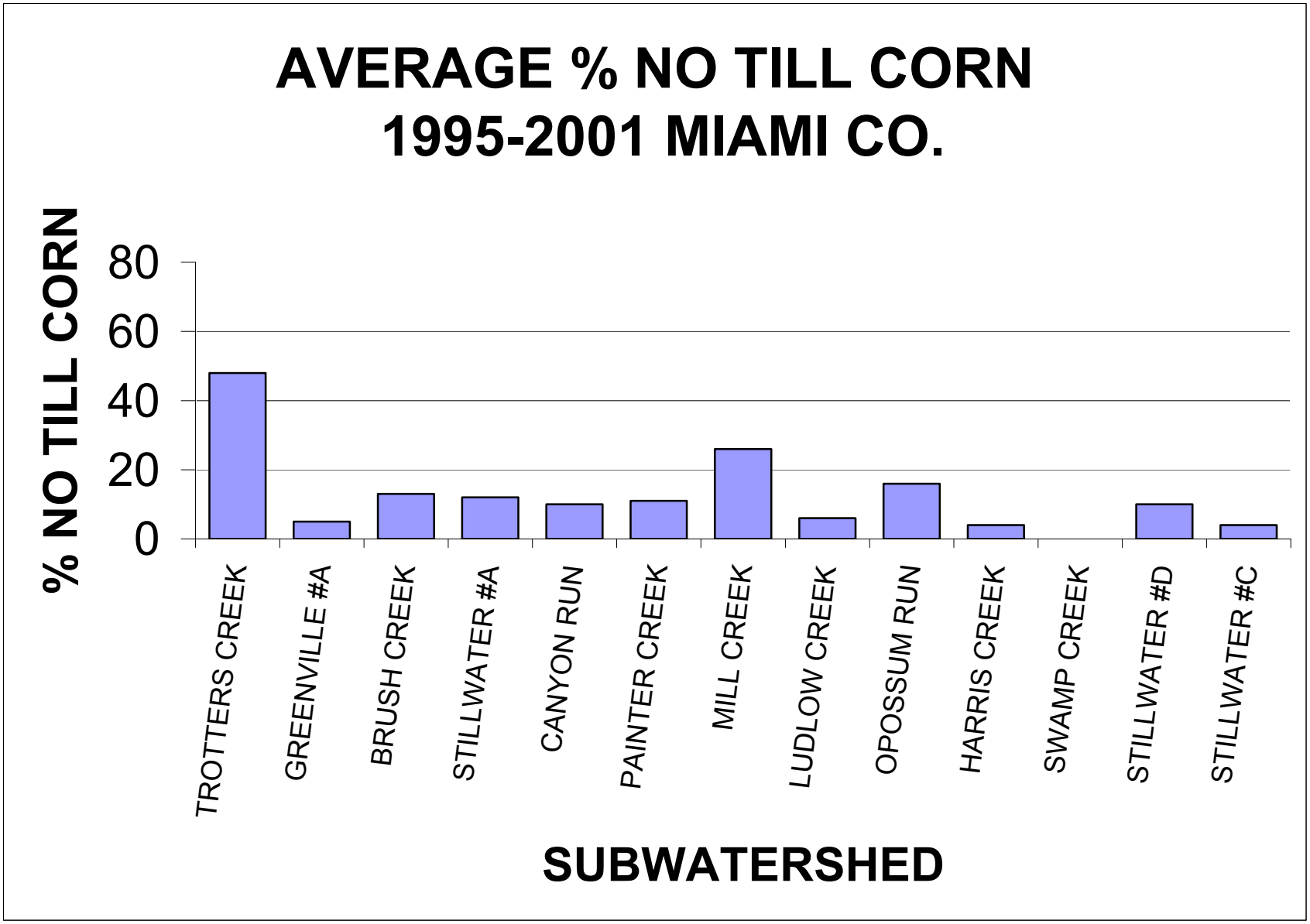
CORN	33	7	0	7	3	25	4	56	36	19
BEANS	72	40	47	58	47	66	83	77	81	63
WHEAT	75	70	67	25	0	50	100	100	89	64

	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**AVERAGE**
CORN	19	15	10	4	13	19	12	28	37	20
BEANS	48	43	48	55	59	62	77	74	77	68
WHEAT	61	65	45	31	36	52	77	60	56	60

Miami County Tillage Transects, 1995-2001

SUBWATERSHED	% NO TILL %NO TILL CORN	% NO TILL BEANS
TROTTERS CREEK	48	74
GREENVILLE #A	5	62
BRUSH CREEK	13	57
STILLWATER #A	12	59
CANYON RUN	10	39
PAINTER CREEK	11	60
MILL CREEK	26	58
LUDLOW CREEK	6	53
OPOSSUM RUN	16	53
HARRIS CREEK	4	63
SWAMP CREEK	0	31
STILLWATER #D	10	36
STILLWATER #C	4	47


AVERAGE % NO TILL BEANS
1995-2001 MIAMI CO.
% NO TILL BEANS
80
70
60
50
40
30
20
10
0
TROTTERS CREEK
GREENVILLE #A
BRUSH CREEK
STILLWATER #A
CANYON RUN
PAINTER CREEK
MILL CREEK
LUDLOW CREEK
OPOSSUM RUN
HARRIS CREEK
SWAMP CREEK
STILLWATER #D
STILLWATER #C
SUBWATERSHED


AVERAGE % NO TILL CORN
1995-2001 MIAMI CO.
% NO TILL CORN
80
60
40
20
0
TROTTERS CREEK
GREENVILLE #A
BRUSH CREEK
STILLWATER #A
CANYON RUN
PAINTER CREEK
MILL CREEK
LUDLOW CREEK
OPOSSUM RUN
HARRIS CREEK
SWAMP CREEK
STILLWATER #D
STILLWATER #C
SUBWATERSHED

Miami County Tillage Transect Data 1995-2001

YEAR	1995	1996	1998	1999	2000	2001	AVERAGE
TROTTER CREEK							
CORN	62	18	60	36	53	59	48
BEANS	62	54	71	79	87	89	74
WHEAT	0	78	0	100	100	100	63
GREENVILLE CR. #A							0
CORN	22	0	8	0	0	0	5
BEANS	25	64	56	50	76	100	62
WHEAT		80	100	100	0	100	63
BRUSH CREEK							0
CORN	15	0	13	6	20	26	13
BEANS	32	44	41	64	71	92	57
WHEAT		17	50	89	75	100	55
STILLWATER #A							0
CORN	14	5	6	10	10	29	12
BEANS	23	32	70	74	74	83	59
WHEAT		30	67	0	100	70	45
CANYON RUN							0
CORN	9	11	20	0	13	6	10
BEANS	58	8	21	75	41	30	39
WHEAT		0	0	86	100	100	48

PAINTER CREEK							0
CORN	7	0	8	15	21	16	11
BEANS	24	41	56	79	83	78	60
WHEAT		100	100	100	100	100	83
MILL CREEK							0
CORN	0	100	40	0	0	18	26
BEANS	0	25	71	83	91	78	58
WHEAT		100	100	67	100	100	78
LUDLOW CREEK							0
CORN	0	6	15	0	11	5	6
BEANS	24	12	47	73	73	91	53
WHEAT		75	66	83	100	100	71
OPOSSUM RUN							0
CORN	0	29	17	29	0	19	16
BEANS	60	38	39	57	45	80	53
WHEAT		100	0	100	100	0	50
HARRIS CREEK							0
CORN	0	0	13	0	10	0	4
BEANS	22	17	90	80	75	91	63
WHEAT		100	100	100	0	100	67
SWAMP CREEK							0
CORN	0	0	0	0	0	0	0

BEANS	50	0	33	100	0	0	31
WHEAT		0	100	0	0	100	33
STILLWATER #D							0
CORN	0	0	8	12	25	15	10
BEANS	16	6	32	38	69	55	36
WHEAT		100	100	100	100	100	83
STILLWATER #C							0
CORN	0	4	9	6	6	0	4
BEANS	43	35	9	63	50	80	47
WHEAT		70	0	88	100	100	60

TOTAL (%)	**1995**	**1996**	**1998**	**1999**	**2000**	**2001**	**AVERAGE**
CORN	1	13	17	9	13	15	11
BEANS	34	30	49	70	64	73	53
WHEAT		65	67	78	90	90	78

*DATA WAS NOT GATHERED FOR WHEAT IN 1995

1997 - TILLAGE TRANSECT WAS NOT COMPLETED

Appendix G: TMDL Meeting Minutes

Stillwater River TMDL Residential Septic Systems Subgroup

April 3, 2001

Prepared by Nikki Reese

Attendance List:

Gerry Tipton – Miami Co. Health Dept. Ron Jackson – Miami Co. Health Dept.

Terry Netzley – Miami Co. Landowner Ed Francis – Miami Co. Landowner

Mike Lucas – MVRPC Nikki Reese – Stillwater Coord.

Don Lecklider – Darke Co. Landowner/Trustee

Dr. Terry Holman – Darke Co. Health Dept.

The meeting opened with introductions. Nikki asked the group if there were any other stakeholders that needed to be included in this group. Gerry suggested semi-public system holders. Nikki suggested septic waste haulers. Discussion followed on who would be possible participants from these sections. Frich from New Madison and Cooper from West Milton were suggested. A letter will be mailed asking them to participant. If they are unable to participant, we will contact them if questions arise concerning their sector.

A group leader was established. It was decided by the group to alternate the group leader. Each group leader will have an alternate. For the next meeting, Ed Francis will be the group leader, and Ron Jackson will be the alternate.

The group went over the timeline for this process again:

June: Identify targets – Key factors

Aug: Develop scenarios to restore

Oct: Prepare the "plan"

Dec: Draft & submit the report

Ground Rules were established:

Voting: Majority ruling. If everyone agrees then state MCU.

Attendance: If you are unable to attend, please call/ e-mail Nikki or OEPA personnel.

Sessions will start and end on time.

Everyone is encouraged to participate.

All participants are considered equal during these sessions. If someone is uncomfortable about something that was said tell Nikki or OEPA personnel.

Everything that is said during these meetings stays here except what we put on paper.

One person talks at a time with a 2-minute minimum.

Before judging the idea, listen to it first as an advocate.

Every idea and comment is valid.

After the meeting, accurately represent the decisions of the group to others.

Discussion was led on a possible timeline specific for this group. Nikki wrote down on the flip chart a possible scenario:

Identify the problem

Inventory current information on septic systems. i.e.: MVRPC data, rules/regulations from Health dept.

Educate the public on what we are doing.

Possible Solutions

Implementation scenarios

Current problems: US EPA, Ohio EPA, and County Health Depts. all have different regulations. The regulations are there but are not enforced. There is a lack of communication between the three organizations. Enforcement is time consuming and lack of sufficient staff and money.

A mission statement was established for the subgroup:

" The Stillwater River TMDL Residential Septic System Subgroup is committed to identifying specific strategies to reduce water impairments caused by septic system discharge."

The next meeting is scheduled for April 23, 2001 at Brukner Nature Center at 1:00 P.M.

Animal Waste Committee

Stillwater TMDL Minutes

May 30, 2001

Darke Co. Nature Center

1:00 P.M. – 3:00 P.M.

In Attendance: Nikki Reese, Jim Rismiller, Harold Beisner, George Shade, Ron Barga, Tom Menke, Rick Wilson, Bill Siefring, Steve Foster and Jim Bennett.

R. Wilson asked about possibility of OEPA biologist to describe their findings or whether it had already been addressed.

Questions and comments on Mission Statement…come to co-census on the following:

"The Stillwater River TMDL Animal Manure Management Subgroup is committed to identifying specific strategies to reduce water quality impacts caused by the release of pollutants from livestock/poultry sources."

Key Problems…See handout from Tom Menke

Nikki Reese wants to expand on those identified: Nutrient enrichment, organic enrichment, bacterial contamination and Sediment/turbidity

1. Direct discharge of manure

- Over-application
- Intentional – milk houses
- Heavy rain after surface
- Tile inlets
- Storage failure
- Open feedlots
- Inadequate storage
- No storage
- Frozen ground
- Tile presence

George Shade discussed effectiveness of our list vs. who will regulate when there is lack of acreage.

Discussed open ditch east of his home where there used to be fish but there is not now.

Discussion of organic affects by Dale White Bacterial same service identified same as nutrient list.

Dale White: Modeling

Modeling can predict an outcome . . . characteristics with observed.

The model that will be used is S.W.A.T.: Soil and Water Assessment Tool. The credibility of this model was discussed.

There are 8 components of the model. Dale White asked for assistance in data inputs from the subgroup for the model. Dale continued to discuss the calibration and verification of the model. He will have handouts on the modeling for the next meeting.

Tom Menke asked if the model will be performed on the entire watershed or a portion of the watershed. The flow measurement will be crucial in the accuracy of the model.

Data needs:

soil properties

tillage types

fertilizer (commercial/organic)

pesticide application

weather (rainfall/temperature)

% of fields tiled

livestock inventories (?)

A discussion of nutrient criteria followed. The N and P will be based on US EPA's criteria. J. Bennett, R. Wilson, and D. White discussed the use of the SWCD's livestock inventories. J. Bennett discussed the privacy rights of the landowners who participated in the livestock inventories.

Discussion of the importance of the timeline presented by Dale White. We should start considering potential implementation items. Dale W. will request data when needed. We should check into implementation plans from LMR and Sugar Creek and see if some of their implementation strategies will relate to our watershed.

J. Bennett mentioned that we have data on available crop type and tillage practice by subwatershed.

Next meeting we will discuss data needs.

Adjourn: 3:00 P.M.

Animal Waste Committee

Stillwater TMDL Minutes

September 5, 2001

Darke Co. Nature Center

1:00 P.M. – 3:00 P.M.

In Attendance: Nikki Reese, Jim Rismiller, Harold Beisner, George Shade, Brian Cron, and Steve Foster.

Steve Foster reviewed the minutes with the group. There were no changes made.

We also reviewed the possible pathways (direct discharge) the group discussed from the last meeting. There were no other suggestions.

George Shade had a question on over application and what factors are involved. We told him that the landowner had to have the right number of acres for the number of Animal Units he/she had and that they had to monitor how many times they apply during the year however this is not monitored unless they are EPA permitted facility.

A discussion followed on the subject of human waste application and if this group is responsible for it or if the Septic System group is.

We reviewed with the group the data needs sent out by Dale White, Ohio EPA. After the review, the group still was unclear as to the information they needed to contribute. Some of the items that the group thought were missing from the data needs included: pesticide lawn care, # of residents / area in regard to septic systems, and input for confined feeding operations. . Nikki will relay the message to Dale.

Nikki passed around potential implementation strategies. Steve and Nikki met earlier and came up with these implementation strategies. They thought this would be helpful for the group to start thinking about implementation strategies. We added two more implementation actions and measures: certification of manure applicators and milk house waste. At the next meeting we will go over the nutrient enrichment sheet and match up the implementation strategies.

The next meeting will be scheduled after harvest season and Dale White has the preliminary modeling data that can be reviewed by the group. The meeting was adjourned at 2:30 P.M.

Appendix H: Results of the Stillwater Watershed Project HSTS Survey

DO YOU KNOW THE LOCATION OF YOUR SEPTIC SYSTEM?	YES	NO	TOTAL
# RESPONDED - 98%	577	15	592

HOW OLD IS YOUR SEPTIC SYSTEM?	0-5 YRS	5-10 YRS	10-15 YRS	20+ YRS	UNKNOWN	TOTAL
# RESPONDED - 100%	105	66	56	293	82	602

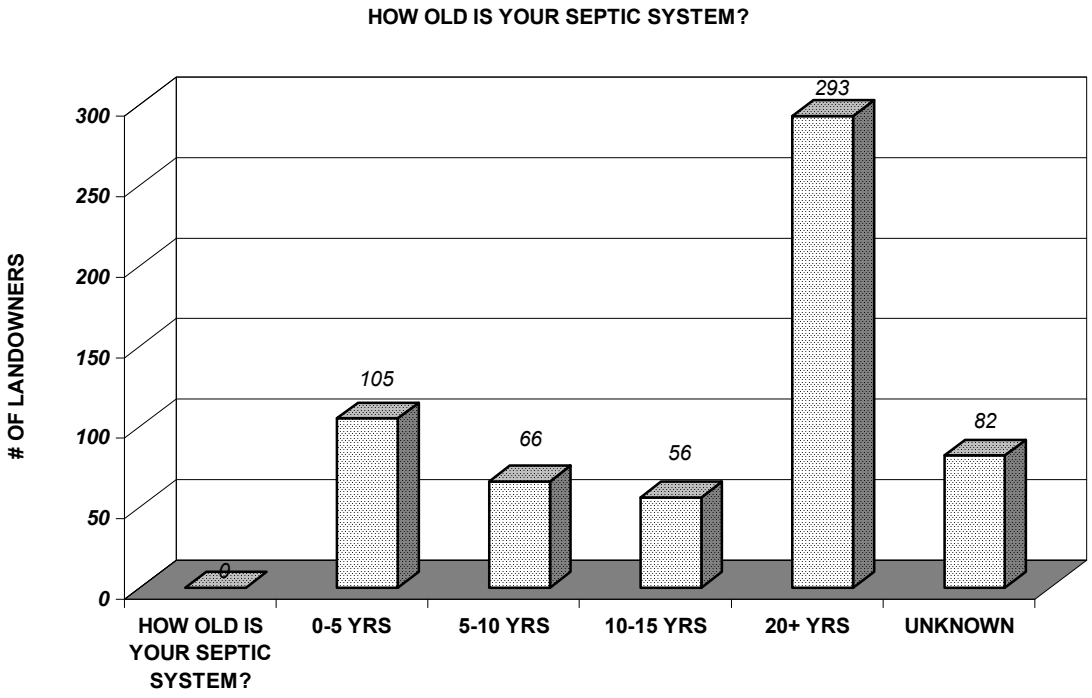
WHEN WAS THE LAST TIME YOU HAD YOUR SEPTIC SYSTEM PUMPED?	LESS THAN 3YRS AGO	4-7YRS AGO	8+YRS AGO	UNKNOWN	NEVER	TOTAL
# RESPONDED - 94%	275	114	61	99	15	564

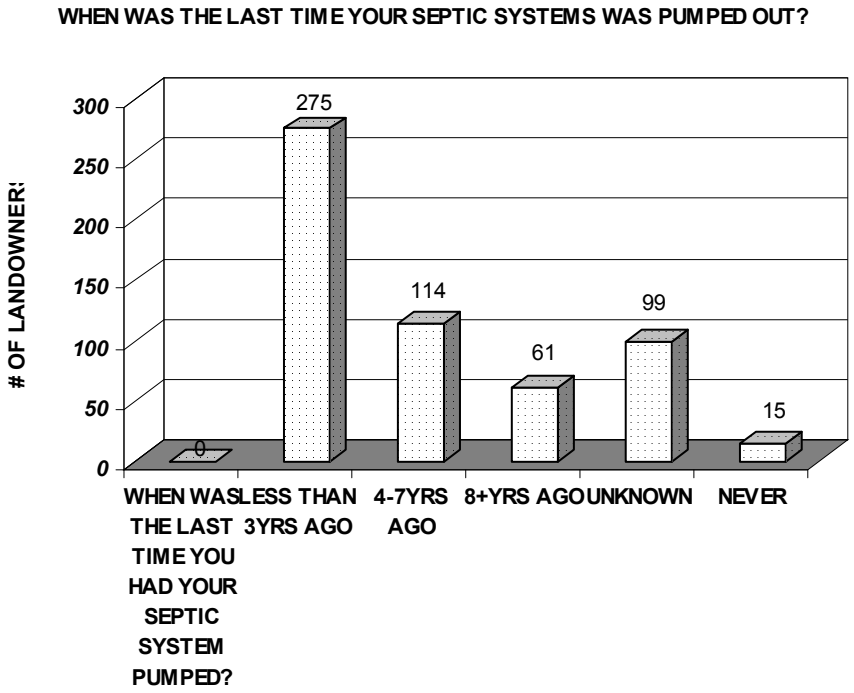
DO YOU HAVE SLOW MOVING DRAINS?	YES	NO	TOTAL
# RESPONDED - 97%	37	557	594

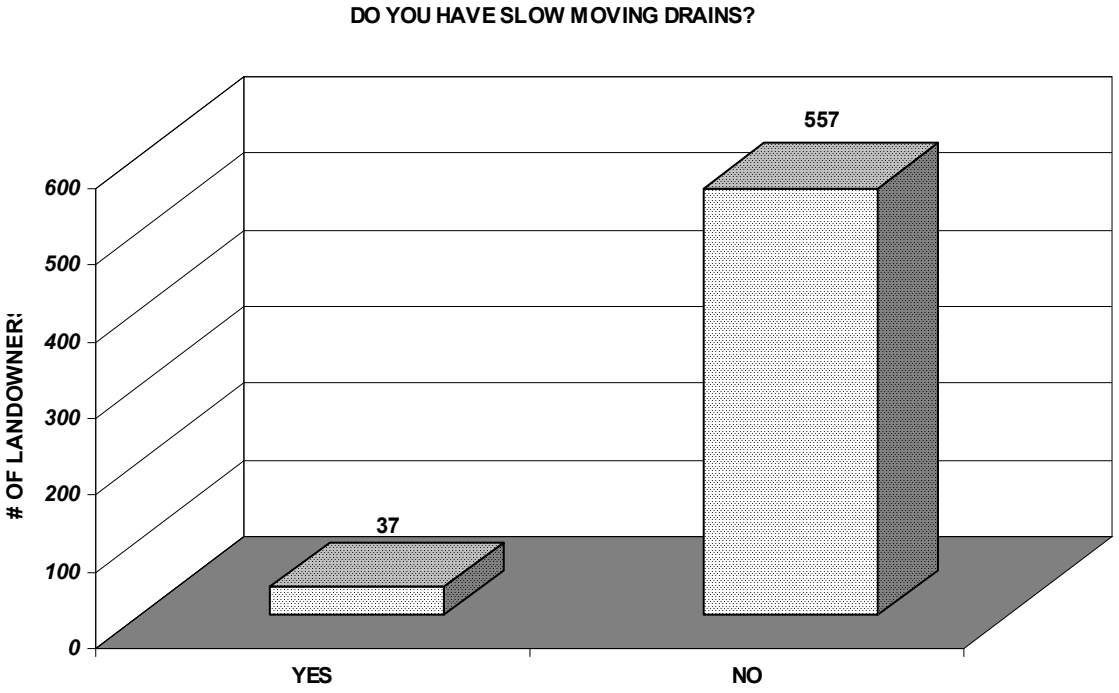
DOES YOUR WATER SOFTENER DISCHARGE INTO YOUR SEPTIC SYSTEM?	YES	NO	UNKNOWN	TOTAL
# RESPONDED - 97%	171	374	36	581

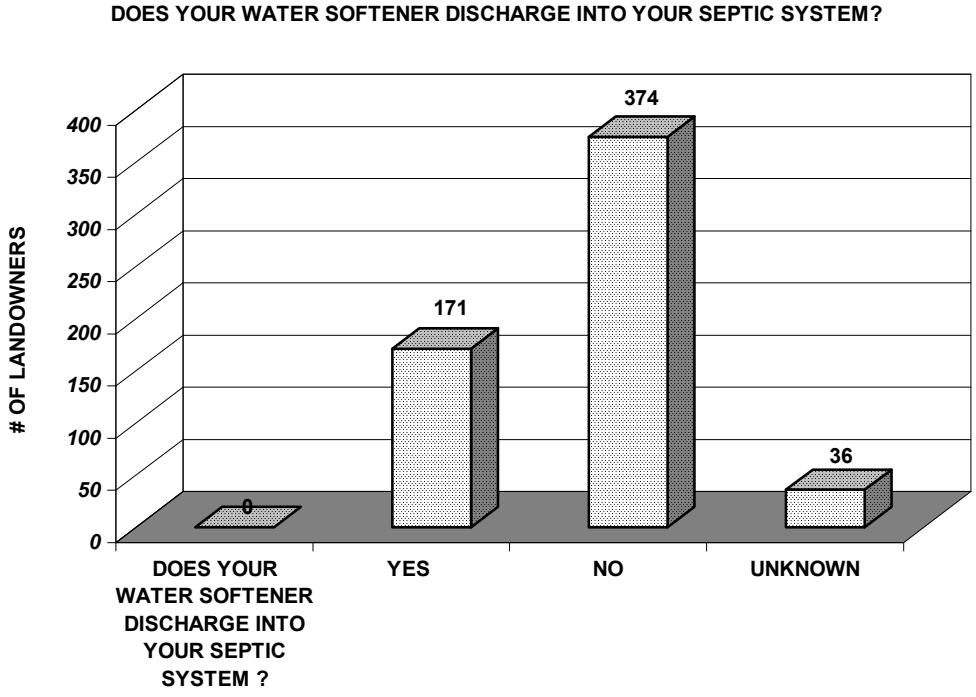
DID THIS BROCHURE HELP YOU UNDERSTAND HOW YOUR SEPTIC SYSTEM WORKS?	YES	NO	TOTAL
# RESPONDED - 98%	511	76	587

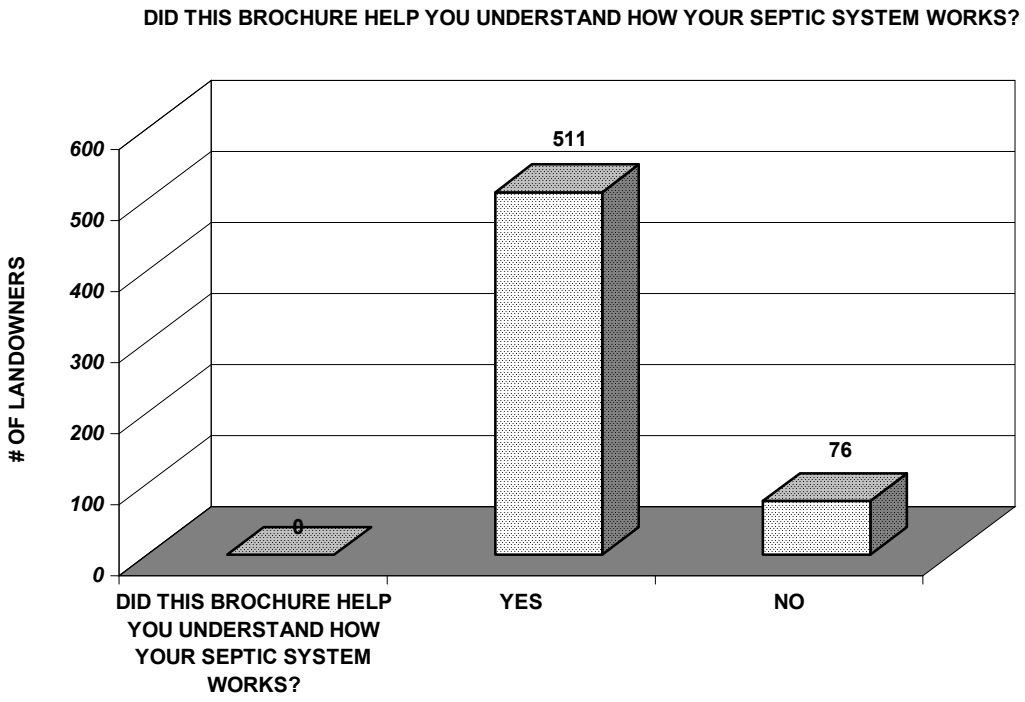
WOULD YOU BE INTERESTED IN MORE INFO?	YES	NO	TOTAL
# RESPONDED - 96%	243	334	577

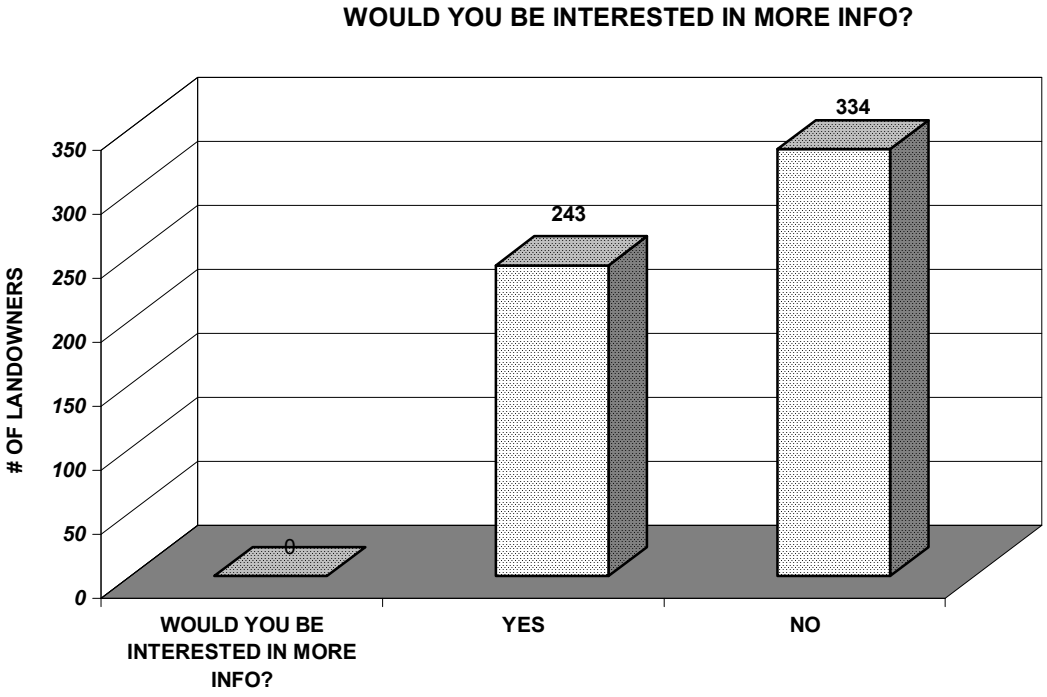

HOW OLD IS YOUR SEPTIC SYSTEM?
OF LANDOWNERS
300
250
200
150
100
50
0
0
105
66
56
293
82
HOW OLD IS YOUR SEPTIC SYSTEM?
0-5 YRS
5-10 YRS
10-15 YRS
20+ YRS
UNKNOWN


WHEN WAS THE LAST TIME YOUR SEPTIC SYSTEMS WAS PUMPED OUT?
OF LANDOWNERS
300
250
200
150
100
50
0
0
275
114
61
99
15
WHEN WAS THE LAST TIME YOU HAD YOUR SEPTIC SYSTEM PUMPED?
LESS THAN 3YRS AGO
4-7YRS AGO
8+YRS AGO
UNKNOWN
NEVER


DO YOU HAVE SLOW MOVING DRAINS?
OF LANDOWNERS
600
500
400
300
200
100
0
37
557
YES
NO


DOES YOUR WATER SOFTENER DISCHARGE INTO YOUR SEPTIC SYSTEM?
OF LANDOWNERS
400
350
300
250
200
150
100
50
0
0
171
374
36
DOES YOUR WATER SOFTENER DISCHARGE INTO YOUR SEPTIC SYSTEM ?
YES
NO
UNKNOWN


DID THIS BROCHURE HELP YOU UNDERSTAND HOW YOUR SEPTIC SYSTEM WORKS?
OF LANDOWNERS
600
500
400
300
200
100
0
0
511
76
DID THIS BROCHURE HELP YOU UNDERSTAND HOW YOUR SEPTIC SYSTEM WORKS?
YES
NO


WOULD YOU BE INTERESTED IN MORE INFO?
OF LANDOWNERS
350
300
250
200
150
100
50
0
0
243
334
WOULD YOU BE INTERESTED IN MORE INFO?
YES
NO

Appendix I: Assumptions Used to Calculate Potential Load Reductions

Problem statement 1.

Waterways Sediment 35 Ton/yr, P 35 lb/yr, N 70 lb/yr (per typical waterway)

Gully dimensions – 3.5' top width, 2.0' bottom width, 1.5' depth, 1000' length, 5 years to form, soil texture is silt loam, Darke County NRCS average cost per foot with one 6" tile $4.55

Estimated 22,500' installed per year in Darke County portion of Stillwater watershed, information for Miami County is unavailable

Filter Strips Sediment 12 T/yr, P18 lb/yr, N 34 lb/yr (per typical filter strip)

For soil loss calculation – R=130, K=0.43, LS = 0.37 (2% slope & 400' length),

C = 0.15, P = 1, soil texture is silt loam, drainage area is 8 acres.

Tile outlet stabilization Sed. 3 Ton/yr, P 3 lb/yr, N 6 lb/yr (per typical project)
Eroding area is 8' top width, 4.0' bottom width, 3' deep, 20' length, formed over 5 years, soil texture silt loam.

Conservation tillage Sed. 4,375 T/yr, P lb/yr, N lb/yr

2.5 tons per acre saved, 350 acres per applicant, 5 applicants per year for conservation tillage equipment

Wetlands Load reductions cannot be estimated, will be determined through monitoring

Riparian restoration Sediment 12 T/yr, P18 lb/yr, N 34 lb/yr (per typical filter strip) For soil loss calculation – R=130, K=0.43, LS = 0.37 (2% slope & 400' length), C = 0.15, P = 1, soil texture is silt loam, drainage area is 8 acres.

Streams survey and classification Load reductions cannot be estimated for this item.

Education Load reductions cannot be estimated for this item.

2 Stage ditch Load reductions cannot be estimated for this item. They may be estimated with post construction monitoring.

Conservation planning Expected to average a soil savings of 2.5 tons/acre.

Problem Statement 2

CNMP's Load reductions cannot be estimated for this item.

Tile plugs / pump out ports Load reductions cannot be estimated for this item.

LEAP training Load reductions cannot be estimated for this item.

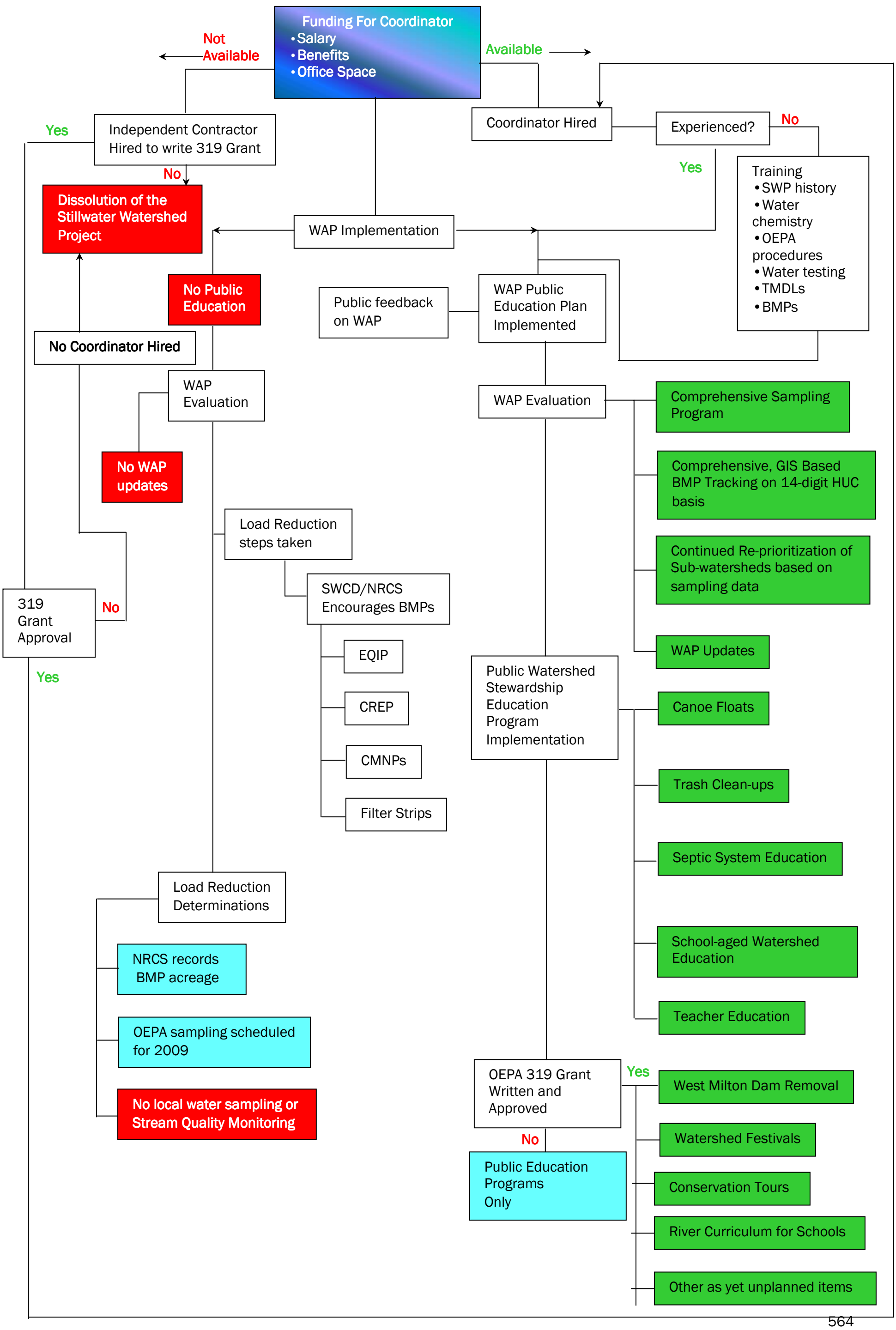
4. Livestock exclusion fencing Load reductions cannot be estimated for this item.

5. Filter strips Sediment 12 T/yr, P18 lb/yr, N 34 lb/yr (per typical filter strip)

For soil loss calculation – R=130, K=0.43, LS = 0.37 (2% slope & 400' length),

C = 0.15, P = 1, soil texture is silt loam, drainage area is 8 acres.

Appendix J: Watershed Action Plan Distribution List

- Darke Soil & Water Conservation District
- Miami Soil & Water Conservation District
- Darke County Commissioners
- Miami County Commissioners
- Stillwater Watershed Project Joint Board Members
- Ohio Department of Natural Resources
- Department of Natural Areas and Preserves—Scenic Rivers
- Ohio Environmental Protection Agency
- Darke Farm Bureau
- Miami Farm Bureau
- Darke County General Health District
- Miami County General Health District
- Miami Valley Regional Planning Commission
- Miami Conservancy District
- The plan will be available online on the Miami SWCD website as technology becomes available
- Copies provided to the general public on request.

Appendix K: Stillwater Contingency Diagram