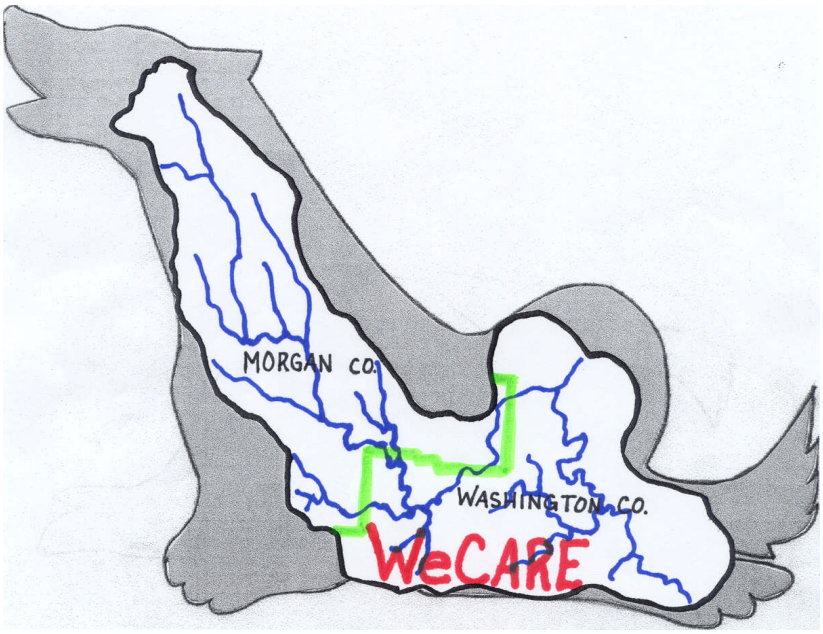
A Comprehensive Watershed Management Plan for the Wolf Creek Watershed



A Collaboration of The Partners of the Wolf Creek Watershed Group and the residents of the Wolf Creek Watershed

Prepared by: Wolf Creek Watershed Partners
Sponsored by: Morgan and Washington Soil & Water Conservation

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Preface

To the Reader:

This document is a comprehensive watershed management plan for the Wolf Creek Watershed as it lies in Southeastern Ohio in Morgan & Washington Counties.

What is a watershed?

A watershed is an area of land which surface water drains into a common outlet, such as a river, lake or wetland. The watershed is named for this common outlet. Depending on its size and location, a watershed can contain one or more of the following features: streams; ditches; ponds; lakes; and /or wetlands. It is as simple as the well-known phrase "water runs downhill".

With a concern for the environment, the Morgan & Washington Soil & Water Conservation Districts have prepared this watershed management plan in conjunction with the Ohio EPA s goal of making all streams in the state of Ohio, fishable and swimmable. It contains documentation of impairments and goals necessary for improvement to the water quality of the streams and is designed to assist organizations within the watershed to seek funds to meet these goals.

*This plan is the result of a project entitled, the **W**olf **C**reek **A**wareness and **R**esource **E**valuation **WeCARE** Project. Funds to support the project were provided by the Ohio EPA 319 Program, the Ohio Department of Natural Resource s Pollution Abatement Funds and Yellow Springs Instruments. In addition, generous support was provided for mapping and statistics by Buckeye Hills/Hocking Valley Resource Development District.*

The vision and mission of the project are as follows:

Mission Statement

The mission statement is: To restore and maintain water quality, and to educate the stakeholders of the Wolf Creek Watershed, resulting in a healthy and abundant watershed.

Vision Statement

The vision of the Wolf Creek Awareness and Resource Evaluation "WeCARE" Project is to create a workable management plan for the watershed through water quality assessments and input from stakeholders concerning the quality of the water within the Wolf Creek Watershed.

Federal, state and county agencies, and over 500 watershed stakeholders provided the cooperation and information necessary to complete the project. This management plan is a result of their efforts.

For more information visit us on the web at: *http://ohiowatersheds.osu.edu*
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Introduction to the Watershed

Location statistics

The Wolf Creek Watershed is located in the Western Allegheny Plateau Region of Southeastern Ohio. It lies primarily in Morgan and Washington Counties with small portions in Athens and Perry Counties. The 234 square mile (149,700 acres) Wolf Creek Watershed "WeCARE" Project Area covers most of the watershed including 68,078 acres of Morgan County as parts of Malta, Union, Homer, Windsor, Deerfield, Marion, and Penn Twps. and 81,622 acres of Washington County as parts of Warren, Waterford, Watertown, Fairfield, Barlow, Wesley Twps. and all of Palmer Twp. (See Map 1)

As part of the Lower Muskingum Watershed, the Wolf Creek Watershed is represented by 2 eleven digit Hydrological Unit Codes (HUC's). They are 05040004 090 as the West Branch of Wolf Creek (includes Wolf Creek to the Muskingum River) and 05040004 100 as the South Branch of Wolf Creek. These two HUC's are divided again into 10 fourteen digit HUC's. An explanation and identification for all are found in the Water Resources Section of the Watershed Inventory of this document. (Map Section, Transparency 1)

Stream Statistics

The two main branches of Wolf Creek are West Branch Wolf Creek beginning in Northwest Morgan County with an average fall of 8.7 feet/mile and South Branch Wolf Creek beginning in Northwest Washington County with and average fall of 13.3 feet/mile. The two branches converge near the village of Waterford before discharging into the Muskingum River just below the Beverly Lock and Dam (See Map 1) Locals refer to the West Branch as "the clear fork" and the South Branch as " the muddy fork".

According to the Gazetteer of Ohio Streams, the Wolf Creek Watershed has 35 named tributaries with over 200 stream miles. In addition to the two main branches, major tributaries include: Little Wolf Creek, Goshen Run, Coal Run, Aldridge Run, Southwest Fork, and South Fork. (See Map 1 & Appendix 1)

Land Use

This rural, mostly agricultural watershed is nestled in the rolling hills of scenic Southeastern Ohio within the foothills of the Appalachian Mountains. The roads meander as much as the streams do with main state routes following the ridge tops and secondary county and township roads "filling in" the areas in between. There are several small villages and one municipality (Chesterhill) within the boundary. In addition to farming, the timber and oil & gas industries also benefit from the abundant natural resources. Currently, only two industries hold NPDES Permits, a wastewater treatment facility in Barlow, and Camp Hervida, a large private recreational facility located near Watertown. Land use/cover for the entire watershed indicates: 57.62% wooded; 40.01% agriculture; 1.73% urban; 0.63% water; < 0.01% non-forested wetlands and 0.01% barren.

Recreational uses include canoeing, fishing, swimming, hunting and sightseeing. Public land within the watershed include Morgan County's, Wolf Creek Wildlife Area, Ohio's Buckeye Trail as it passes through the watershed and Penn Township's Embree Park. The Wayne National Forest's Proclamation Boundary enters into the western Washington County area of

the watershed and is represented by a small portion of, to date, privately owned land. The 62-acre Waterford Boy Scout Reservation is located near the Washington/Morgan border along the West Branch of Wolf Creek. In Washington County, private recreational facilities include Camp Hervida, located on the South Branch of Wolf Creek near Watertown and Goodfellows Park, on Brown's Run, a tributary to South Branch Wolf Creek. The Barlow Mechanical & Agricultural Society, and the Waterford Community Fair Association, each operate fairgrounds hosting many community events in the Washington County portion of the watershed. (See Map 2 for all locations)

History

With Marietta (Ohio's first permanent settlement) nearby, the watershed is part of the first area settled in the state. Historic importance of Wolf Creek to the agricultural and timbering industry is evident as the first sawmills and grist mills in the state were located here. A historic marker at Waterford commemorates the site of the first Grist Mill in the state of Ohio. This reminder, along with several restored covered bridges within the watershed, help to provide a glimpse into the past for area residents as well as tourists. (Map 2)

Demographics

The waterways of Wolf Creek play a vital role in the livelihoods and every day life of those living and working in the area providing drainage, recreation and a resource for water to the 3800+ landowners with a total census of 12,786. The average age of persons living in the watershed study area is approximately 39, with an average median family income well below the state average of $40,956 at $28,868 for Morgan County and $34,275 for Washington County. In unemployment, Morgan ranks first at 18.1% while Washington ranks 66th at 6.1%. Considering persons of 25 years of age or older, the approximate average of 82.55% are High School Graduates, while 12.05% have a bachelors degree or higher. Migration figures show that both counties have shown a slight rise in population over the last year.

The watershed area continues to grow in population, as several farms have been broken for housing developments in the recent past and more expected as public water becomes available. You can almost follow the path of developers behind the waterlines. New homes are evident as older farmhouses are being replaced or families add homes to existing farm acreage. Even with this the streams within the watershed provide drainage for the highest number of farming and livestock operations of any watershed located in either county. (SWCD 2002) (2000 Census)

Districts

The following districts serve the people of the watershed:

- Army Core of Engineers, Huntington District
- Buckeye Hills Hocking Valley Regional Development District
- Morgan and Washington Soil & Water Conservation Districts
- Muskingum Conservancy District
- Ohio Environmental Protection Agency, Southeastern District Office
- Public Sewage Districts:
  Waterford Water & Sewer Association; Washington County Commissioners; White Oak Sewer Association; Stockport Village
- Public Water Districts:
  Tri-County Rural Water & Sewer District; Waterford Water & Sewer Association; Warren Community Water & Sewer District; Little Hocking Water & Sewer Association; Village of Chesterhill; Portersville East Branch Water Co.
- School Districts:
  Fort Frye Local; Morgan Local; Warren Local; Wolf Creek Local; St. Joseph Central
- South East Ohio Joint Solid Waste Management District

Past and Current Water Quality Efforts

The public acceptance of the WeCARE Project has been enhanced by the accomplishments, interest, and publicity generated by the following:

- Morgan SWCD's "Upper Wolf Creek Water Quality Project" (319 Grant, 1995-1998), provided cost-sharing funds for farmers to implement best management practices to reduce non-point source pollution.
- USDA's "Environmental Quality Incentive Program (EQIP)" (1997-present), provides assistance for the implementation of conservation practices related to the management of manure storage/utilization systems and grazing lands. In addition to the statewide program, the Morgan and Washington County SWCDs also applied for and received additional EQIP funds targeted specifically for the Wolf Creek Watershed. (2002 – present)
- Livestock Environmental Assurance Program (LEAP), an educational training for livestock producers on environmental concerns.
- NRCS/SWCD/RC&D's "Tri County Outreach Program Project" (1998 – 2000), an effort to inform non-traditional farmers on the availability of conservation programs.
- USDA's "Emergency Conservation Program (ECP) (2002-2003), an emergency drought program providing cost-sharing assistance to producers.
- USDA's Conservation Reserve Program (CRP), a federal program designed to take land that is actively eroding, out of production. (1985 - present)

Previous & Current Water Quality Efforts

Detail programs have been applied and documents success. What programs are still in use and what agencies deliver them?

The public acceptance and implementation of the proposed Wolf Creek Awareness and Resource Project has been enhanced by the accomplishments, interest, and publicity generated by four recent, highly successful projects: Morgan SWCD's "Upper Wolf Creek Water Quality Project" (319 Grant, 1995 – 1998); USDA's "Environmental Quality Incentive Program" (EQIP) (1997 – present); the Livestock Environmental Assurance Program (LEAP). Additional projects include: the NRCS/SWCD/RC&D Tri-County Outreach Program (1998-2000); USDA's Conservation Reserve Program (CRP) 1985 – Present)**.**

The **Upper Wolf Creek Water Quality Project** targeted 46,379 acres of pastureland, woodland and cropland located in the upper reaches of the watershed in Morgan County. This project was extremely well received by the watershed community. Even though grant funds were dispersed as cost-share funds for the installation of conservation practices, the demand for technical and financial assistance still far exceeded what could be supplied. (Morgan SWCD)

The **USDA s Environmental Quality Incentive Program (EQIP)** provides educational, financial and technical assistance for the implementation of conservation practices related to the management of manure storage/utilization systems and grazing lands. Reflecting a high level of interest, over 105 Wolf Creek watershed landowners applied for assistance under EQIP. Due to limited funding, though, only 60 applications were selected for financial and technical assistance. This includes both a statewide program and a program applied for and received by the Morgan and Washington SWCD's that targets just the Wolf Creek Watershed. (SWCD, NRCS, FSA)

The high degree of environmental concern and interest among Morgan & Washington County livestock producers is again exhibited in the strong rate of their attendance (150 participants) at four locally held **Livestock Environmental Assurance Program (LEAP**) Meetings. These meetings serve to educate producers on the need and benefits of sound environmental practices on their farms. (SWCD, Ohio Livestock Coalition)

An **NRCS/RC&D/SWCD Tri-County Outreach Program** for non-traditional farmers, covered portions of Athens, Morgan and Washington Counties, including the Wolf Creek Watershed. This program targeted farmers with limited resources, minority landowners, female landowners and other individuals who might not be familiar with the conservation programs/assistance available through local, state and federal conservation agencies. Outreach activities to minorities had little to no response from the community. Special meetings and workshops were held with a low attendance.

USDA s Conservation Reserve Program (CRP), a federal program designed to take land, that is actively eroding, out of production. Its provisions help reduce erosion, guard streams and rivers, restore and establish fish and wildlife habitat, and improve air quality. The Washington County portion of the watershed currently has 35 participants. Sign-ups in conjunction with the 2002 Farm Bill are in May 2003. (FSA, NRCS, SWCD)

Demographics

Demographic information is limited to the watershed study area of Morgan and Washington Counties except for calculations where the demographics are used to determine potential effects on water quality. (such as the number of homes and population)

History

It is presumed that prehistoric Native Americans (the mound builders) first discovered present-day Wolf Creek. Evidence yet remains of their occupancy of the region such as mounds, human skeletons and fluted spear points.

During historic Native Americans times in Ohio (about 1700 – 1800), the Delaware, Wyandot, Shawnee, and Iroquois (especially a subgroup known as Mingo), hunted in the Wolf Creek Valley, but had no known villages in the area. During this time, white settlers were discouraged from settling north of the Ohio River, although many attempts to settle in the area resulted in repeated problems with native Americans.

> *Timmeu Sipu , archaic Delaware Indian words, Timmeu meaning wolf and Sipo meaning creek or river, were recorded by the Reverend John Heckewelder, a missionary living among the Ohio Indians on the upper Muskingum River in 1762. Perhaps the Delaware named the creek for the large population of wolves living there. The last recorded siting of a wolf in the area was 1832. (Walker 2000).*

The Northwest Territory, established in 1787, provided a framework for settlement, and a year later the Ohio Company of Associates established a settlement at Marietta. Most of the early settlers were of English, German, or Irish decent.

Various treaties between the settlers and Native Americans proved unsuccessful, and war broke out in 1791. The 1795 Treaty of Greenville lead to peace, with most of the native Americans being confined to certain areas or driven out. Their footpaths became the roadways of current times.

The pioneer settlements in the watershed area, along with the rest of the Ohio Territory, grew and prospered. In 1803, when the adult male population of the territory reached the required number of 5000, Ohio became the 17th state added to the union.

> *Those early settlers were farmers even if they were lawyers or school teachers. Their ambition was to OWN LAND! The more the better. They may have been gentlemen farmers with hired hands to muck out the stables, but they considered themselves farmers and land owners nevertheless*
>
> *.....Louise Zimmer local historian*

Population Growth

According to the 2000 Census Report, the population of the area grew rapidly through 1800's as the area was settled. In Morgan County, figures from 1860 – 1950 indicate a population decline in this agricultural area during the industrial revolution, the onset of the '30's depression, and the '40's post war era as the population moved to more industrialized areas for work. In Washington County, figures indicate that initial growth through the 1800's decreased less in the years to follow, possibly due to the employment opportunities in the

nearby cities of Marietta, Ohio and Parkersburg, WV. Population in the region holds steady through 1970 with an increase to 1980 with better employment opportunities from the nearby coal industry and the booming oil & gas industry. From 1980 to present a steady increase is reflective of the increased land development for housing, as public water becomes available, and as homeowners desire land in a rural setting. The current populations of both counties vary greatly due to the size difference (Morgan – 417.7 sq. miles & Washington – 635.2 sq. miles) and the larger municipalities within Washington County. (2000 Census) (Table 1)

Table 1 Population Growth Chart 1800 - 2000

	1800	1810	1820	1830	1840	1850	1860
Morgan	N/a	n/a	5,297	11,800	20,852	28,585	22,119
Washington	5,427	5,991	10,425	11,731	20,823	29,540	36,268
	1870	**1880**	**1890**	**1900**	**1910**	**1920**	**1930**
Morgan	20,363	20,074	19,143	19,905	16,097	14,555	13,583
Washington	40,609	43,244	42,380	48,245	45,422	43,049	42,437
	1940	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**
Morgan	14,227	12,836	12,747	12,375	14,241	14,194	14,897
Washington	43,537	44,407	51,689	57,160	64,266	62,254	63,251

Current Wolf Creek Watershed Population

The population of the watershed has been determined by using the number of homes within each subwatershed boundary and multiplying by the county average of persons/home depending on the county or counties located within each subwatershed. (Tables 2 & 3) Population of the watershed is also expressed by county. (Table 4) Information was gathered from Perry, Athens, Morgan and Washington Counties. The number of homes was determined by the following: Daag & January, Washington County Engineers 911Census; McInturf, Morgan County Engineer Records; USGS Topographic Maps. The number of persons/home is referenced from the 2000 Census.

Table 2 Avg. Persons/Home by County

County	Persons/Home
Athens	2.40
Morgan	2.50
Perry	2.70
Washington	2.45
State	2.49

Table 3 Watershed Population by Subwatershed

Subwatershed HUC 05040004:	Homes	*Population*
090 010 W Br Wolf Crk above Little Wolf Crk	513	1286
090 020 Little Wolf Crk	242	605
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	288	719
090 040 Aldridge Rn	357	884
090 050 Coal Rn	714	1760
090 060 W Br Wolf Crk between Aldridge Rn & S Br Wolf Crk (ex. Coal Rn)	764	1879
090 070 Wolf Crk between S Br Wolf Crk & Musk. River	342	838
100 010 S Br Wolf Crk above Southwest Frk	1290	3161
100 020 Southwest Frk	367	899
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	308	755
Totals	5185	12786

Table 4 Watershed Population by County

County	Homes	Population
Athens	108	260
Morgan	1654	4135
Perry	15	41
Washington	3408	8350
Totals	5185	12786

Population Age, Income & Education

The average age of the two counties is nearly the same while the average family income differs somewhat. Education opportunities for high school are near or better than the state average, however post high school education is much higher in Washington County possibly due to one 4 year and one 2 year college institution within the county. Additional median family income for Washington County could be attributed to greater employment opportunities within Washington County's larger municipalities. (Table 5)

Table 5 Avg. Age, Income & Education

Area	Avg. Age	Avg median family Income	Education (persons 25 yrs. age or older)	
			% HS degree	% Bach or higher
Morgan	38.9	$28,868	80.6	9.1
Washington	39.1	$34,275	84.5	15.0
State	n/a	$40,956	83.0	21.1

Employment, Poverty Level

As of March 2003 the unemployment for Morgan County is the highest in the state while Washington County ranks 66th. Poverty levels from the 2000 Census indicate a similar trend. Morgan County unemployment has hit an all time high due to recent factory closings, a coal industry suffering from environmental regulations and an overall slump in the state's economy. Washington County figures are more in line with the state average. (Table 6) (Census 2000) (Morgan & Washington County OSU Extension)

Table 6 Unemployment, Poverty Level

Area	% Unemployment	% Below Poverty
Morgan	18.5	18.4
Washington	6.1	11.4
State	6.5	10.6

Agricultural Statistics

Farms in Morgan/Washington County are generally family operated and 147/169 acres in size. (2000 Census) The Wolf Creek Watershed has the greatest number of farms in any watershed in either county or average approximately 150 acres in size. (2000 Census, Morgan/Washington SWCD)

Table 7 Farming

County	Farmland Acres	# of Farms	Acres/Farm
Morgan	110,000	650	147
Washington	147,000	1000	169

Watershed Plan Development

Partnership

Group Responsible

The Supervisors of the Morgan and Washington Soil & Water Conservation Districts (SWCD), as sponsors of the WeCARE Project, are responsible for the completion of the watershed management plan. The supervisors represent their respective SWCD. Each SWCD is a legal subdivision of the State of Ohio, as set forth in *Section 1515 of the Ohio Revised Code*. Every county has an SWCD office that is governed by a board of five supervisors elected by the public from within the county. It was organized for the purpose of developing and carrying out programs for the conservation and development of soil and water resource concerns.
The major function of the SWCD is to assist all landowners, operators or land users within their county, both rural and urban. Projects are developed as a team effort with the landowner, by offering technical advice and many times, assisting with financial support.

Project Inception

In 1995, the Wolf Creek Water Quality Project Team made up of the Morgan SWCD Board & Staff, the local Natural Resource Conservation Service (NRCS) Staff, and the Buckeye Hills Regional Conservation & Development (RC&D) established and met to discuss the water quality issues in the upper portion of the Wolf Creek Watershed. The 46,379-acre Upper Wolf Creek Watershed was targeted because, at that time, the village of Chesterhill used Wolf Creek as a potable water source. The proposal was submitted and approved for 319 grant funding. Although this original project was highly successful, fully implemented, and reached at least 285 landowners, it was still not adequate to meet all of the needs and demands to significantly improve water quality in the ***Upper*** Wolf Creek Watershed Area. Since completing the above project in 1998, the original project team recognized the importance of improving and protecting the water quality in the entire two-county (Morgan & Washington) Wolf Creek Watershed. Later the Morgan SWCD approached the Washington SWCD and proposed that they work together to develop a watershed management plan that addresses the water quality needs and concerns of the Wolf Creek Watershed within the two counties. The Washington SWCD gave enthusiastic approval. Funds to prepare the plan were approved through an Ohio EPA 319 Planning Grant. The Project entitled the Wolf Creek Awareness and Resource Evaluation "WeCARE" Project began July 1, 2001, continuing through June 2003. These funds, along with ODNR's Pollution Abatement Funds, a grant from Yellow Springs Instruments and generous support from the Buckeye Hills Hocking Valley Regional Development District, have provided the means to complete the watershed management plan.

Personnel Responsible

Key personnel responsible for administrative duties, preparing and approving reports and coordination of the project are listed in Table 8.

Table 8 Key WeCARE Project Personnel and Corresponding Responsibilities

NAME	RESPONSIBILITIES
Dan Imhoff, OEPA – DSW	Technical Report Approval, Advise the Project
Dee Wiseman, Morgan SWCD	Technical Reports, Grant revisions, Advise the Watershed Coordinator
Sandy Lahmers, Morgan SWCD	Fiscal Officer, Advise the Watershed Coordinator
Kathy Davis, Morgan SWCD	Coordinating all aspects of the project.
Kevin Williams, Morgan SWCD Brd Chairman	Reps a 5 member board as administrative agents as sponsors of the project.
Larry Schwendemen, Washington SWCD Brd Chairman	Reps a 5 member board as co-sponsors of the project.

The Morgan and Washington SWCD Board of Supervisors, as the group responsible for the plan, combined the talents of the following to prepare the watershed management plan:

- Planning Partners – the staff of the SWCD Districts
- Technical Advisory Committee – The Area Assistance Team
- Stakeholder Advisory Committee – 2 Landowners, 2 Members at Large, 3 Public Officials, 2 SWCD Board Members, County Sanitarian, County Recycling & Litter Prevention Rep.
- Stakeholders – 500+ land owners, land users, public officials
- Professional Assistance & Volunteers - Numerous agencies and individuals sharing their expertise.

These individuals and their talents are outlined in Table 9.

Table 9 Partners Responsible for the Completion of the Plan and Data Collection

GROUPS REPRESENTED	INDIVIDUALS	ROLES RESPONSIBILITES
Morgan SWCD Board	Kevin Williams, Rosalie Pletcher, Donna Chips, Chuck Parmiter, Kathi Spencer (Fall 2002)	Sponsors of the project. Financial and administrative responsibilities.
Washington SWCD Board	Larry Schwendemen, Mark Dailey, Roger Stollar, John Hartline, Jamey Rauch (Fall 2002)	Co-Sponsors of the project.
Planning Partners	Morgan SWCD Staff: Dee Wiseman - District Technician, Sandy Lahmers - Program Coordinator, Kathy Davis - Watershed Coordinator Morgan NRCS Staff: Charles McCluskey Jr. - District Conservationist Washington SWCD Staff: Pam Brooker - District Program Administrator, Mary Campbell - Program Coordinator, Glenna Hoff - Education Specialist, Kevin Wagner - District Technician, Kaabe Shaw - Duck Creek Watershed Coordinator, Rebecca Moore – Wildlife Specialist Former Employees:	Project management decisions based on input from other committees. Worked directly and indirectly on tasks.

	Doug Bensman – Wildlife Specialist, Dave Bauerbach – Urban Technician Washington NRCS: Jon Bourdon - District Conservationist	
Technical Advisory Committee	JP Lieser, OSU Extension Bob First, Buckeye Hills RC&D Mike Greenlee, ODNR – Div of Wildlife Dan Imhoff, OEPA – DSW Bob Mulligan, ODNR – DSWC	Reviewed progress of the project. Advised on technical questions. Worked directly and indirectly on tasks. Provided educational assistance.
Stakeholder Advisory Committee	Land Owners – Merrill Gladden, Robert Tornes Public Officials – David Groah & Jim Theiman (Twp Trustees), Bob Grove (Chesterhill Village Admin.) SWCD Brd Members – Kevin Williams, Roger Stollar, Sanitarian – Ken Robinson Recycling & Litter Control – Dan Richardson Members at large - Jim McKibben (Farm Bureau), Jim Meek (former County Commissioner & Twp Trustee)	Suggestions of working with stakeholders. Advised and assisted with public meetings. Reviewed and monitored the progress of the project.
Stakeholders	500 + land owners, land users & public officials representing the watershed area.	Participated in public meetings & mailing surveys voicing suggestions and concerns for the management plan. (See public involvement of this sec. for details)
Professional Assistance & Volunteers	50 Professionals Provided Assistance & 14 Volunteers Provided Individual Expertise	Assisted in the collection and formulation of data necessary to complete the plan. (See Appendix 2 for a complete list)

Public Involvement

In addition to the public involvement in the selection of SWCD Board Members, the stakeholders of the watershed were invited to participate in the development of the watershed management plan through a survey by mail and public meetings.

Mailing List

An extensive mailing list of landowners was developed utilizing county tax records. This list has been constantly updated through public meetings, public events, direct contacts and referrals. To date (01/31/03) it numbers 3882, including residents, landowners, land users, businesses, public officials, educators, church and civic organizations, and anyone that feels they have a stake in the watershed. This list has been and is used to distribute a semi-annual newsletter, meeting announcements and a mailing survey.

Survey Results

The planning partners compiled a survey based on current land use statistics of the watershed and the information needed to produce a complete watershed management plan. A mailing survey of 3850 stakeholders was conducted with 10.67% responding. (See Appendix 13 for a copy of the survey)(See Table 10 for results))

Table 10 Mailing survey results conducted by the WeCARE Project

TOPIC	SELECTION	% of those responding
Watershed Resident	Yes No	88 12
Land Location	Morgan County Washington County	36 64
Land Uses (Check all that apply)	Residential Agricultural Recreation Idle Commercial (Industrial)	56 52 17 15 <1
Land Use Acres	Woodland Pasture Cropland Residential Commercial Idle	38.3 25.2 29.4 2.8 0.4 3.9
Livestock (Ag Use Landowners)	Yes (# of head 8204) No	69 31
Soil & or manure nutrient level important? (Ag Use Landowners)	Yes No	68 32
Soil & or manure tested in last 3 years? (Ag Use Landowners)	Yes No	26 74

Table 10 (cont.)

Water Source(s) (Check all that apply.)	Public Spring Well Cistern Pond Stream	47 34 31 23 23 15
Water Use(s) (Checked all that apply.)	Home Livestock Recreation Irrigation Industrial	100 46 11 4 1
Problems in Wolf Creek Watershed (Check all that apply)	Litter/Trash Dumping Soil Loss (erosion) Flooding Septic Systems (failing) Drinking Water (lack of) Animal Waste Runoff Fertilizer/Pesticide Runoff Erosion – Timbering Log Jams Oil/Gas Well (brine) Erosion – Farming Industrial Waste Urban Runoff	45 39 31 24 24 21 21 20 17 17 16 11 10
Farmland Preservation (How do you view?)	Positive Negative No Opinion	83 3 14
Urban Growth	Positive	20

(How do you view?)	Negative No Opinion	46 34
Ways to Inform stakeholders about the project. (Check all that apply)	Newsletter Newspaper Personal Contact Field Days Radio	81 16 10 5 4
Do you want eliminated from the mailing list?	Yes No	24 364

This information was used for the following:

- To support a water testing program for the watershed.
- Selection of a stakeholder advisory committee to represent these concerns
- To determine the % of response geographic areas,
- To determine interest in agricultural issues.
- To determine interest in soil and manure sampling for a sampling program offered by the WeCARE Planning Grant.
- To prioritize problems causing nonpoint source pollution based on the survey.
- Land and water usage.

Group Focus

The advisory committee and the planning partners have set priorities to the sub-sheds with non-attained to be addressed first. Then partially attained will be addressed. These sheds have related issues. Educational activities will be focused on the entire watershed by special invites and contacts will be made in the non and partially attained sheds. The activities will address the concerns that need to be addressed to meet attainment keeping everything voluntary and providing financial and technical assistance to the stakeholders to make the improvements needed to meet attainment. Testing and monitoring will continue to be evaluated to meet the requirements of attainment. Efforts will continue to make the areas of improvement.
Through the monitoring, education, technical and finical assistance the non and partially attained streams will reach attainment in the future.

Stakeholders

All sub watershed residents and officials received a special mailing on the public meeting.

Advisory Committee

The stakeholders advisory committees represent the group of stakeholders. They assisted with planning and organizing the public meetings. They reviewed questions and comments for information for public meetings. They have reviewed the draft plan and submitted comments and are waiting on the final approval.
Anyone with interest can be a committee member. New members will be accepted at any time. Due to very few businesses and no industry in the watershed, no representation is on the advisory committee.

Watershed Action Plan

The advisory committee and planning partners will follow the criteria for focusing on the non and partially attained sheds. The watershed as a whole will receive educational information, workshops, and technical assistance. Sometimes a practice installed in a attained area that is working and showing water quality improvement, can sell the practice to an individual in a non or partially attained area. All watershed residents will receive mailings about watershed activities, workshops, and field days on a continuous basis. Cost share assistance will also be published if and when it becomes available to all residents. The priority for funding will be evaluated based on the location of the practice to be installed. First priority for funding will be in the non-attainment, second partially attained, third will be site and water quality issues being addressed. Procedures will be set forth to identify impairments within each sub-watershed before any implementation actions are taken. Once impairments are targeted, appropriate practices will be applied to address each concern. All residents will have the opportunity for funding based on the practices that are available for funding. All applications will go through a ranking process that NRCS has for the EQIP program for example if this is where financial assistance is obtained.

Availability of funding towards the project will continue to monitor and evaluate the sampling sites. Example: financial assistance for installation of practices will be a start. To show improvement at the sites monitoring will be done before and after to show improvement of water quality.

The SWCD office will continue to seek funding for the implementation phase of the project. The stakeholders of the Wolf Creek project will continue to collect, plan, and organize for those non-and partial attainment sites.

Public Meetings

To further involve the public in the decisions of the watershed management plan, two public meetings were held with135 in attendance. Those attending were divided into groups and given the opportunity to voice their opinions as to the values, concerns and solutions concerning the water resources of the watershed. All topics were recorded and ranked. These results are displayed in the following tables (Table 11, 12, & 13)

The public meeting results were used for the following:

- To further support a water testing regimen based on information from the mailing survey, and state and federal agencies.
- To determine publically acceptable solutions to the water quality problems.
- To determine the use and importance of the watershed to stakeholders.
- To identify and prioritize pollution problems

The results of the survey and public meetings will be compared with previous studies, water testing results from the Summer and Fall of 2002 and information from the inventory to determine an appropriate plan of action towards improving the water quality of the Wolf Creek Watershed.

In the fall of 2001, representatives of the Morgan Soil & Water Conservation District conducted soil and manure sampling at selected locations within your farming operation. Below please find the test results and recommendations based on the findings.

The economic value of manure is often overlooked. There is a temptation to view manure as simply a waste to be disposed of. As a result, manure is often applied heavily on fields close to the barn while distant fields receive little or no manure. The purpose of the free sampling is to encourage you to measure the nutrient status of all your fields and to identify fields that should be considered for manure applications.

The intent of this report is to illustrate the value of manure as a nutrient source for crops and to encourage producers to apply manure where it is needed most and to reduce applications on fields that already have high nutrient loads. This is an educational tool and is not meant to serve as a Comprehensive Nutrient Management Plan (CNMP).

Soil Sample Nutrient Levels vs. Recommended Soil Nutrient Levels

Nutrient	**Field # 6**	**Field #11 & 13**	**Field #**
Cation Exchange Capacity (CEC)	8.3	23.6	
Planned Crop	50 % Corn 50 % Oats	Oats, Orchard Timothy, Alfalfa Mix	
Previous Crop	50 % Corn 50 % Grass	Corn	
Actual Soil pH	6.5	7.0	
Recommended Soil pH	6.0-6.5	6.0-7.0	
Actual Phosphorus Level (lbs./ac.)	35	129	
Recommended Phosphorus Level (lbs./ac)	30-80	30-80	
Actual Potassium Level (lbs./ac.)	121	397	
Recommended Potassium Level (lbs./ac.)*	191.5	268	

Green digits indicate acceptable levels of nutrient.
Yellow digits indicate nutrient deficiency.
Red digits indicate nutrients in excess.
*Recommended minimum Potassium level = 150 + (5 x CEC)

Estimated Nutrient Needs of Planned Crops

Field #	Crop Planned	Yield Goal	N Needed	P205 Needed	K20 Needed
6	50 % Oats 50 % Corn (pick)	80 bu/ac 100 bu/ac	75 lb/ac 160 lb/ac	35 lb/ac 60 lb/ac	95 lb/ac 120 lb/ac
11 & 13	Mixed Grass Inter-seeding	4 tons/ac	180 lb/ac	40 lb/ac	180 lb/ac

Source – The Livestock Waste Facilities Handbook. (Midwest Plan Service)

Manure Analysis for M1922 11/15/01

Total Nitrogen	Phosphorus (P205)	Potassium (K20)
13.00 lb/ton	8.59 lb/ton	14.56 lb/ton

Manure needed per acre to supply needed Phosphorus (P205)

Field #	Volume per acre
6	4.1 tons/ac (Oats) 7.0 tons/ac (Corn – Picked)
11 & 13	4.7 tons/ac

The following is an assessment of the soil analysis for the following fields:

Field # 6

Field 6 is in the acceptable range for soil phosphorus and also has reasonable potassium levels. Manure and/or commercial fertilizer should be applied at the crop removal rate (4.1 tons/ac on the oat ground and 7.0 tons/ac on the corn ground). Some additional manure may be applied to increase the soil fertility levels if desired, but there is no agronomic advantage to increasing the soil P & K levels beyond their current levels.

Field # 11 & # 13

Field 11 has soil phosphorus and potassium levels that are well above those recommended. Manure and commercial fertilizer applications are not recommended for these fields until the soil phosphorus and potassium levels are reduced to the recommended levels (see chart above). However, additional nitrogen in the form of commercial fertilizer may be needed to support the planned crop. This will largely depend upon the amount of alfalfa in the seed mixture. If alfalfa is the predominant plant in the stand, adequate nitrogen may be generated naturally. If it is not predominant, some additional nitrogen may be needed.

Note: The minimum setback distances for manure and other organic by-products is **33 feet** from waters of the state, drainage ways, grassed waterways, ponds and lakes. If application is being made to frozen ground the setback distance should be increased to **100 feet.**

Funding for this sampling and analysis was provided through the Wolf Creek Awareness and Resource Evaluation Project. A project designed to create a workable management plan for the watershed through water testing and input from stakeholders concerning the quality of surface water within the Wolf Creek Watershed.

If you have an interest in developing a Comprehensive Nutrient Management Plan for your farming operation or questions regarding the above information, please contact your local SWCD Office. Thank you for your participation.

Table 11 Public Meeting Results ***Percentages represent groups identifying like issues.***

VALUES

(Reasons to protect the watershed)

Recreation
80% - Fishing
53% - Swimming
53% - Canoeing, boating
47% - General
27% - Hunting
7% - Tourism
7% - Camping
7% - Hiking
7% - Trapping

Industry
80% - water for industry
53% - irrigation for crops
40% - agriculture as land use
33% - timbering
7% - mineral resources
7% - oil & gas
7% - coal
7% - fertile soil

Historic
7% - Indian relics, etc.
7% - First Mills
7% - Covered Bridges

Miscellaneous
87% - wildlife
40% - drinking water (domestic)
20% - nice place to live
12% - drainage area
7% - riparian area

Table 12 Public Meeting Results ***Percentages represent groups identifying like issues***.

CONCERNS

(Perceived threats to the watershed)

Trash
100% - litter, debris
7% - log jams

Recreation
7% - too muddy to canoe
7% - decline in fish population
7% - overhanging debris restricts canoeing

Homeowners
100 % - human waste (failing septic)
13 % - chemicals from lawns

Oil & Gas Industry
40% - oil spills
13% - salt brine
7% - gas lines crossing streams

Industry
7 % - power plants (air pollution)
7 % - chemical trails as air pollution
7 % - industry runoff
7 % - electric co. spray
7 % - treatment plants
7 % - oil from dust control
7 % - asphalt dumping
7 % - parking lot runoff

Wildlife
7% - wild animal waste in stream
7% - beavers
7% - dead animals in stream (deer carcass)

Farming Industry
100% - ag. chemicals, fertilizer & pesticides
53% - animal waste

Flooding
40% - general
7% - from timbering

Erosion
53% - farming
27% - natural
20% - logging
13% - 4 wheelers
7% - oil & gas
7% - road ditches

Drinking Water
13% - C8
7% - Ground Water

Miscellaneous
7 % - volume of water runoff from parking lots
7 % - oil film on water
7 % - West Branch Wolf Creek name to Wolfe Creek

Table 13 Public Meeting Results ***Percentages represent groups identifying like issues.***

SOLUTIONS

(Public suggestions to protect the watershed)

Enforcement

13% - current regulations
7% - illegal dumps
7% - protect small farms
7% - health code
7% - ODNR/EPA
7% - over-seeing of ODOT jobs in creek
7% - restrictions on buffer strips
7% - land division regulations
1 neighborhood watch group

Agriculture

40% - manure holding facilities
27% - heavy use feeding pads
27% - fence livestock from stream
20% - alternative water sources for livestock
13% - no till, reduce till farming
7% - fence off woods
7% - crop rotation
7% - *Round-up Ready* crops
7% - encourage farmers to follow Soil & Water Conservation Plans

Trash

13% - dump site clean –up
7% - volunteers clean-up dump sites
7% - litter control
7% - recycle
7% - trash pick-up

Timber

7% - logging regulations
7% - no clear cutting
7% - better regulations, timber best management practices
7% - reclamation after harvest

Oil & Gas

7% - well site reclamation

Erosion

53% - buffer strips
40% - grass waterways
7% - reduce erosion
7% - limit ATV's near stream
7% - plant seedlings near streams
7% - road ditch maintenance
7% - stream bank stabilization
7% - plant trees on highly erodible land
7% - develop water sources tin wet areas to control erosion from cattle

Septic

67% - septic upgrades
7% - septic regulations
7% - public systems

Testing

7% - monitoring any industry with discharge more closely
7% - test in increments to pinpoint areas needing help

Flood Control

7% - flood relief effort
7% - multi-purpose lake

Miscellaneous

7% - use best management practices in all aspects
7% - set a good example
7% - drain swamp areas
7% - preserve & restore wetlands
1—designate areas for industrial sites

Within the Stream

13% - remove hanging branches for canoe access
7% - log jam removal

Education Activities and Programs in the Wolf Creek Watershed

The education specialists in the Morgan and Washington County Soil & Water Conservation District offices work with youth in the schools within the watershed and also with youth that live in the watershed, but may attend a school outside of the watershed boundaries.

Age groups that are worked with include all grade levels from Kindergarten to High School Seniors that attend South Elementary, Morgan Jr. High or Morgan Sr. High schools in Morgan County or Bartlett, Waterford, Warren Elementary, or Warren or Waterford High Schools in Washington County.

Program curriculum varies slightly from year to year but the following are some of the subjects covered during educational visits to the schools or at field days conducted where the students are bused to various sites.

- Trees, leaves & seeds
- General watershed studies
- Point source and Non-point sources of pollution
- Rocks, minerals, weathering
- Topographical maps
- Chemical testing
- Horticulture
- Nitrogen, carbon and oxygen cycles
- Water cycle
- Land lab
- Chemical & physical changes in matter
- Recycling
- Groundwater
- Soils
- Landfills
- Macroinvertebrates
- Skins, skulls, animal tracks
- Earth changes
- Wild School Site
- Stream table
- Fossils

Each year programs are presented during 4-H camp held at Camp Hervida, located in the watershed. Various nature programs are conducted for the Junior and Senior camps as well as for the Cloverbuds and Beginners. These programs also vary from year to year, depending on outdoor conditions.

Livestock Environmental Assurance Programs (LEAP) are held in both counties as part of the educational segment of the SWCD's programming. Level 1 dealing with the most basic issues of livestock and the environment have been very widely spread throughout each county. A joint session for a multi-county area was held for LEAP 2. This program consist of at least 2 or 3 meetings and becomes deeply involved in the testing of both animal waste and soil in fields where manure is spread, map work and intensive record keeping. The newest program out is LEAP Pasture. This program relates the most effective BMP's to those producers dealing with grazing challenges and problems. These types of meetings also go hand in hand with grazing councils and pasture walks that are handled through OSUE and promoted cooperatively through SWCD.

Planned Educational Activities

LEAP 1&2
LEAP Pasture
Grazing Schools/Extend Grazing Season
Conservation Students Field Day
Teacher Workshops
Classroom Visits
Assists to Environmental Study Group
4-H Club & Scout Group assistance

Activities will be held to educate students/adults about the watershed.

In the event that an Implementation grant would be applied for, the educational components of this planning grant would be directly linked to BMP's required in the implementation of conservation practices.

A complete copy of this plan and its detailed information can be obtained at the public libraries serving the Wolf Creek watershed. See reference section for complete list and addresses.

The Watershed Management Plan can be linked from the Ohio Watershed Network at www.ohiowatersheds.osu.edu/

Watershed Inventory

Description of the Watershed

Geology

The bedrock of the Watershed is sedimentary in nature consisting of sandstone, shale, limestone and coal from the Pennsylvanian and the Permian Systems. Beginning in the Northwest portion of the watershed the bedrock layers are in nearly horizontal beds but dip southeast, on average of 30 feet per mile. (USDA Washington/Morgan County Soil Survey)

The Ohio Department of Natural Resources Division of Natural Areas and Preserves has reported the following noteworthy geologic formations:

Pedestal Rock (2 locations)
1) Devil's Tea Table, a 15' x 30' balancing rock. Location: Washington County, Wesley Twp., SW ¼ of Section 21, 0.05 – 0.1 miles west of Twp. Rd 206, 0.55 miles SW of its junction with SR 676. The rock name & section number are located on the Washington County's Engineers Map.
2) 10' X10' balancing rock on a 5' diameter pedestal. Location: Washington County, Wesley Twp., N-Central, N ¼ section of Section 31, 0.45 miles SSW of Liberty Church 0.4 miles NE of the junction of SRs 676 & 555

Natural Bridge or Arch

Lucas Run Natural Bridge. Location: Morgan County, Windsor Twp., 0.8 miles west of the confluence of Lucas Run & West Branch Wolf Creek, 0.3 miles NNW of Benchmark 688 (ref USGS topo map), on the SE side & near the head of and unnamed ravine, north of Lucas Run Rd.

Topography

Wolf Creek Watershed topography consists of very gently to strongly sloping terraces of varying width along a narrow flood plain. The tributaries are narrow and are separated by steep slopes and fairly broad ridge tops. (USDA Morgan, Washington, Athens, and Perry Soil Surveys) The stream gradients are evidence of the steep slopes surrounding the two main branches as West Branch and South Branch Wolf Creek. The average gradient of the West Branch is 8.7 ft./mi., while the headwater streams flowing into the West Branch have an average gradient of 20 –160 ft./mi. The South Branch is 13.3 ft/mi. with headwater streams averaging 22 – 78 ft./mi. (Gazetteer of Ohio Streams) (See Appendix 1)
For greater detail, the Watershed can be located on the following USGS Quadrangle Topography Maps:

• Chesterhill	• Rokeby Lock
• Lowell	• Deavertown
• Stockport	• Amesville
• Watertown	• Fleming
• Beverly	• Ringgold

Soils

The watershed area lies within the Soil Region 12 of the Natural Resource Conservation Service (NRCS) statewide geographic soil database known as STATSGO.
Region 12 is identified by the common soil series of Gilpin-Upshur-Lowell-Guernsey. Soils in this unglaciated area are formed from acidic sedimentary rocks, mainly sandstone, siltstone and shale. Soils with a clayey, red or yellowish brown subsoil are common.

STATSGO further identifies soil series into associations identifying broad areas that have a distinctive pattern, relief and drainage, typically with a unique landscape. Complete descriptions for these Soil series and associations can be found in the corresponding USDA County Soil Survey Manual. They are used to determine suitability, potential use, and management of the soil. For greater detail of soil associations refer to your county *USDA Soil Survey*.

Using slope and individual soil types, soils are classified by the Natural Resource Conservation Service (NRCS) into one of three categories: Highly Erodible Land (HEL), Potential Highly Erodible Land, (PHEL) and Non Highly Erodible Land (NHEL). Utilizing these classifications, the Wolf Creek Watershed it is determined that the watershed is approximately 98% Highly Erodible. (Jon Bourdon, NRCS Washington County District Conservationist, 2002) (Map 3)

Glacial History

The Wolf Creek Watershed is in the unglaciated part of Ohio. Soils have formed in material weathered from sedimentary rocks of Pennsylvanian and Permian age. In some areas, the soils have weathered in place. In a much larger area, material weathered from the rocks has moved down slope by a combination of gravity and local water flow. In a few areas, the material weathered from rock has been transported for a considerable distance by flowing water.

Although glaciers did not cover the watershed, their influence can be seen on current drainage patterns, Prior to glaciation, water from most of the watershed flowed to the south through a stream called Barlow Creek and emptied into the Marietta River, which was roughly where the Ohio River is today. The Marietta River flowed south, then west and joined the Teays River, the major stream of that time.

The South Branch of Wolf Creek flows in the old valley created by the Barlow Creek, but flows in the opposite direction. The West Branch of Wolf Creek flows in the northern part of the valley of this stream. This valley apparently became clogged with debris, diverting the stream to the east. Valley blockages created lakes, in which silty and clayey sediment was deposited. Thus, areas of water laid soils are intermingled with the residual soil in parts of the watershed. (Dr. Charles Redmond 2003) (Stout,1938)

Biological Features

Rare, threatened and endangered species

(fish, mussels, invertebrates, mammals, birds, reptiles & amphibians, and plants)

Federal Species

According to the US Fish and Wildlife Service, before a plant or animal species can receive protection under the Endangered Species Act, it must first be placed on the Federal list of endangered and threatened wildlife and plants. Considering the above, there are currently a total of 26 species represented in the state of Ohio by the US Fish and Wildlife Service that are considered endangered or threatened. (US Fish and Wildlife Service) Searching information compiled by county, for the counties of Washington, Morgan, Athens and Perry, 5 species could be found within the Wolf Creek Watershed. They are classified into one of the following categories:

Endangered - The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range. ***Threatened*** - The classification provided to an animal or plant likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Species listed are as follows:

Bald Eagle *(Haliaeetur leucocephalus*).....	*Threatened*
Indiana Bat *(Myotis sodalis)*.....	*Endangered*
Fanshell Mussel (Cyprogenia stegarie).....	*Endangered*
Pink Mucket Pearly Mussel *(Lampsilis abrupta)*.....	*Endangered*
American Burying Beetle (Nicrophorus americanus).....	*Endangered*

Note: The Timber Rattlesnake has a pre-listed federal status, meaning that a conservation plan exists or is being developed with a strategy to keep this species from being listed. (US Fish and Wildlife Service, March 2003)

State Species

The ODNR Division of Natural Areas and Preserves records known locations of rare, plants and animals, high quality plant communities, and other natural features. Data is obtained through a broad range of sources throughout the state. This data base was started in 1976 and now contains more than 13,000 records.

A search completed within the Wolf Creek Watershed by the ODNR Division of Natural Area and Preserves indicates only plant species have been reported. Plant species found are classified by one of the following designations:

Threatened – If meets one of the following conditions:

- The species is a federal threatened species extant in Ohio but not on the endangered species list.
- The natural populations of the species in Ohio are limited to o less than four or more than 10 occurrences.
- The distribution of the natural populations of the species in Ohio is limited to a geographic area delineated by no less than four or more than seven US Geological 7,5 minute quadrangle maps.

Potentially Threatened - If meets one of the following designations:

- The species is extant in Ohio and does not qualify endangered or threatened species, but is a proposed federal endangered or threatened species or a species listed in the *Federal Register* as under review for such a purposal.

- The natural populations of the species are imperiled to the extent that the species could conceivably become a threatened species in Ohio within the foreseeable future.
- The natural populations of the species, even though they are not threatened in Ohio at the time of designation, are believed to be declining in abundance or vitality at a significant rate throughout all or large portions of the state.

Species found are as follows:

Narrow-leaved Toothwort (Carkamine Dissecta)……*Potentially Threatened*
Downy White Beard Tongue (Penstemon Pallidus)…….. *Threatened*
Golden Knees (Chrysogonum Virginianum) …… *Threatened*

Note: A colony of Great Blue Heron has been reported in Washington County, Warren Twp., Section 25, on the Dobbins Farm. This fact is noteworthy as it represents a breeding animal concentration and if destroyed would remove a significant number from the population. These birds are protected under the Migratory Bird Act.

Plant Communities
Certain plant communities, considered to be high quality examples, are monitored by the ODNR Division of Natural Areas and Preserves. Those found in the watershed are as follows:

Mixed Emergent Marshes
Wide-Leaved Cattails dominant with patches of sweet-flag, willow-herb & jewelweed common & scattered throughout the marsh. Location: Washington Co., Barlow Twp., at the center of the Southwest quarter section of section 22, south of Twp. Rd 39.

Oak-Maple Forest
Second-Growth woodland with sugar maple dominant, shagbark hickory & white oak are co-dominant. Location: Linscott Woods, Morgan County, Malta Twp., at the center of section 21, south & west facing the slope north of Twp. Rd. 128.

Water-Willow Riverine Community
0.5 acres of 95% Water-Willows. Location: Washington County, Waterford Twp., at the Waterford Mill, South bank of the West Branch of Wolf Creek on limestone ledges projecting 30 ft into the stream.

Mixed Mesophytic Forest (2 locations)
1) 7 acre woodlot, beech and black oak with beech dominant, 90% of the canopy is closed. Location: Morgan County, Marion Twp., in the north west ¼ of the south west ¼ of Section 29, facing the slope in the N-S ridge, 0.4 miles north of SR 555.
2) 22 acre woodlot, largest trees are beech & red oak, this area was mature woods in 1898. Location: Proctor Woods, Washington County Barlow Twp., N ½ of the NE ¼ of section 17, sloping south of the section line.

Champion Tree

The ODNR Division of Forestry, Champion Tree Program documents trees in the state that are the largest of there type. Trees reach this status through individual applicants from around the state. A search within the watershed by the ODNR Division of Natural Areas and Preserves reports the following:
Mockernut Hickory, 87" in circumference, 88 feet high and 49 foot spread. Location: Morgan County, Penn Twp., Pennsville, Embree Park.

Invasive Nonnative Species and Potential Impacts

Plants
Autumn Olive and multiflora rose were introduced in the late 60's for use as conservation plantings. For that purpose, they were and still are very effective. They can grow into tight ground cover and do an excellent job stabilizing slopes or other erosion prone areas. The problem is that these plants readily spread beyond the desired area. Both of these plants produce berries attractive to birds for food, and this leads to the seed being spread literally everywhere. Any of these plants can easily "take over" idle fields over the years. They also can become established in active pastures, particularly on steep slopes inaccessible to machinery. Cover established by these species can create a dense canopy prohibiting the growth of desired native species. (Wiseman, Morgan SWCD, 2003)

Aquatic
Carp were introduced to Ohio waters in 1879 by the US Fish Commission. They were originally stocked in ponds to private landowners, but later escaped into streams and now can be found in most low-gradient warm water streams, lakes and reservoirs throughout the state. Carp does especially well in areas of septic discharge, and excessive vegetation. Feeding habits, of digging through sediment, often leads to increased turbidity. Large numbers of carp often indicates poor water quality due to its tolerance of pollutants and low DO level.
(Chad Amos, ODNR-DSWC, 2003)

Water Resources

Climate and Precipitation
This area of Ohio's climate is continental, with a wide range of air temperatures. Higher precipitation occurs in the spring and summer with lower precipitation in the fall and winter. Winter temperature averages 29 – 32 degrees Farenheit and summer temperature averages 70 – 73 degrees Fahrenheit. The average annual air temperature is 52 degrees while the average rainfall is 39 inches. (World Climate.com)

Because no mountain ranges exist between Ohio and the polar regions, no effective barrier prevents the southward spread of Arctic air from northern Canada. Similarly, warm tropical air masses move freely northward in the summer. Storm systems form along the boundary between major cold and warm air masses, and storm paths frequently cross this portion of the state. (OSU Extension Agronomy Guide, Bulletin 472)

Surface Water

Wetlands
Areas that have been classified as non forested wetlands make up < 0.01% of the watershed. (ODNR, Realm 2003) One constructed wetland is located near Watertown at Camp Hervida. (Map 2) A description of this wetland as a *Private Park* is within the Social and Cultural Resources of this section of the document.

Streams
According to the Gazetteer of Ohio Streams there are 35 named tributaries within the 234 square mile drainage area of Wolf Creek with over 200 stream miles. The two main tributaries are the West Branch Wolf Creek and South Branch Wolf Creek. The two converge in Washington County, near Waterford before discharging into the Muskingum River just below the Beverly Dam. Table 14 describes statistics concerning these two main branches.

Table 14 Main Branch Statistics

Stream Name	Drainage (sq mis)	Avg Flow (cfs)	Length (ft)	Avg Grad. (ft/mi)
Wolf Creek (includes West Branch)	234.0	236.3	48.6	8.5
West Branch Wolf Creek	154.4	156.0	45.7	8.7
South Branch Wolf Creek	79.6	80.4	19.9	13.3

For management purposes, watersheds of this size are studied on a subwatershed basis. To achieve this, the WeCARE Project uses ***Hydrological Unit Codes*** **(HUC s).**
(Overlay 1 Map Section)

Hydrological Unit Codes (HUCs)

Hydrological Unit Codes (HUC s) are a classification system using a numerical tiered approach and a brief description for each watershed. Larger watersheds have been assigned 8 digits numbers. Subwatersheds within these larger watersheds are defined by using the same 8 digits with additional digits added in multiples of 3. (USGS,NRCS,ODNR) For example: The Muskingum River Watershed is defined as 05040004 (a total of 8034 square miles). There are several 11 digit watersheds within this watershed. Wolf Creek is made up of two, one for the West Branch Wolf Creek (this includes Wolf Creek) and one for South Branch Wolf Creek. (See Appendix 3) These two 11 digit watersheds are divided further into a total of ten 14 digit watersheds (adding an additional 3 digits). There are seven 14 digit subwatersheds in the West Branch drainage area and three 14 digit subwatersheds in the South Branch drainage area. (See Appendix 3 & clear overlay map) For a more manageable approach to improving water quality, the WeCARE Project uses these 14 digit HUC Subwatersheds.

Subwatershed flow, size
Each of the (10) 14 digit HUC subwatersheds are listed in Appendix 1, along with the following: average yearly flow (USGS); sq. mi. drainage area (NRCS). Ten year low flows and found in the Water Resource Quality – Flows.

Tributary name, length
Streams within each subwatershed are listed in Appendix 1, along with the following: length and gradient of named streams; length of the unnamed streams. Gradients are taken from the *Gazetteer of Ohio Streams*. Lengths include perennial and intermittent streams. Streams are indicated on Map 1. (ODNR-Realm, 2002) (SWCD, 2003)

100 year floodplain area
The 100 year floodplain areas are indicated on Map 4 and viewable by subwatershed using Overlay 1 of the subwatersheds.

Entrenchment Indicators
Entrenchment and Floodplain Connectivity: Entrenchment is a condition in which a stream begins to down-cut and contain water flow within the channel with little or no out of channel flooding. In order for a stream to effectively transport and remove sediment loads from the aquatic system, it is critical that the streams have an adequate floodplain on which to deposit the sediment load. Entrenched streams typically do not have access to a sufficient floodplain to facilitate this process.

Entrenchment is a common condition in watersheds that have experienced increased urbanization or other land use changes that have increased impervious areas such as roofs, parking lots, etc. Such land development can greatly increase the peak storm water runoff within a watershed. Entrenchment is often an early indicator of a stream's response to this intense water discharge.

To date, the Wolf Creek watershed has not experienced large-scale urban or commercial development. As a result, entrenchment does not appear to be a significant problem at this time. Visual observations and comments made by residents of the watershed indicate that flooding occurs annually along many parts of the stream. Farmers along the West Branch have indicated that three flood events per year are not uncommon. This flooding frequency often causes crop producers to delay planting until late spring to reduce the risk of crop loss from spring flooding events.
(Bob Mulligan, ODNR-DSWC)

Sinuosity Indicators
Historically, Wolf Creek has experienced very little channel modification such as stream straightening. This has allowed Wolf Creek to maintain a natural channel with appropriate sinuosity. Channel sinuosity is the ratio stream channel length to down/valley distance. Measurements taken from aerial photographs indicate sinuosity raitos of greater than 1.2 throughout most of Wolf Creek. The sinuosity is similar to that of other streams of similar watershed size in the Western Allegheny Plateau Ecoregion.
(Bob Mulligan, ODNR-DSWC, 2003)

Water Quality Standards
Under the Federal Clean Water Act the State of Ohio EPA is responsible for establishing water quality standards for streams. Ohio's standards contain two elements:1) **beneficial use designations** & 2) **numeric criteria**.
1**) Beneficial use designations** reflect how the stream is used by humans and how well it will support the biological community.
They are assigned to an identified body of water by the Ohio EPA on the basis of scientific monitoring studies about present use, potential for future use and from public input. The four types of uses are *Aquatic Life, Water Supply, Recreational and State Resource Water*. These are briefly described with subcategories in Table 15 :

Table 15 Designated Uses and Subcategories for Surface Water

Aquatic Life

Exceptional Warmwater Habitat – capable of supporting and maintaining exceptional or Unusual warmwater aquatic communities – most biologically productive.

Warmwater Habitat – capable of supporting and maintaining warmwater aquatic communities- Typical for Ohio's rivers and streams.

Modified Warmwater Habitat - incapable of supporting and maintaining aquatic communities Due to irretrievable habitat modifications.

Limited Resource Water Habitat – drainage < 3 sq. miles – lack water or irretrievably altered – Incapable of supporting and maintaining aquatic life communities.

Coldwater Habitat – capable of supporting populations of coldwater aquatic organisms

Water Body

Public – meets drinking water standards with conventional treatment.

Agricultural – suitable for irrigation and livestock watering without treatment

Industrial - suitable for industrial and commercial use with or without treatment

Recreational

Bathing Waters - swimming areas with lifeguard, bathhouse, and regular water testing.

Primary Contact – suitable for full body contact recreation (e.g. swimming or canoeing)

Secondary Contact – suitable for full body contact recreation (e.g. wading)

State Resource Water

Waters within park systems, scenic rivers, wetlands and other ecologically significant areas.

At a minimum, each stream is designated one Aquatic Life Use as described in Table 15. A stream may or may not be a designated use of any of the remaining 3 types of water uses in any or all of the subcategories listed.

2)**Numeric criteria** includes biological indicators and chemical parameters such as pH, coliform bacteria, dissolved oxygen (DO), nitrates, etc. The set of criteria and limitations are set depending on a water bodies designated use.

Expectations for the biological communities are set based on each of the state's five ecoregions and stream types using background data collected on the areas least impacted sites by determining the following:

IBI – Index of Biological Integrity, a measure of the fish species diversity and population, scores range from 0 to 60 with the higher score reflecting a healthier aquatic ecosystem.

ICI – Invertebrate Community Index, based on measurements of the "stream bug community, scores range from 0 to 60 with a higher score reflecting a healthier macroinvertebrate community.

MIwb – Modified Index of Well Being, includes fish mass in the analysis, (e.g.) a high IBI score would show diversity, but if the weight or mass is low, this could indicate problems. Note: Mass is determined on sites with drainage areas of 20 square miles or greater.

These Biological Criteria Indicators and chemical parameters are used to determine if a water body is meeting its designation use.

Wolf Creek s Use Designation

Wolf Creek is part of the Western Allegheny Plateau Ecoregion. Streams in the Wolf Creek Watershed currently carry an Aquatic Use Designation of Exceptional Warm Water Habitat (EWH), Agricultural and Industrial Water Supply, Primary Contact Recreational Use and State Resource Water Designation. However, the Aquatic Life Use Designation and additional use designations were determined in 1978 at the onset of the use designation process, without the use of field assessments.
As a result, the WeCARE Project water resource inventory will be used to determine the most appropriate use designation.

Lakes and Reservoirs (size, uses, watersheds, detention time)

There are many farm ponds of varying sizes within the watershed with one major lake at Goodfellows Park. (See Map 4) The Ohio Department of Natural Resources Division of Dam Safety, as part of their inventory of water impoundments, has compiled data on several structures within the Wolf Creek Watershed boundary. Although there are many impoundments within the watershed, as can be seen on USGS Topographic Maps, the discussion of lakes and reservoirs within the watershed study area is restricted to the ODNR Dam Safety Division Inventory. Information pertaining to the watershed management plan is listed in Appendix 4. (ODNR – Dam Safety Division) Due to the size of the storage of the structures, detention time (the time it takes for water to move through an impoundment) is not determined to be a factor affecting water quality and therefore is not included in this assessment. (Lauren Lambert, OEPA-DSW)

Ground Water

Aquifer:

According to the 1986 National Water Summary of Ground Water in Ohio from the US Geological Survey, The groundwater aquifer in the watershed is shaley sandstone and shale. (U.S. Geological Survey 1986 National Water Summary of Ground Water in Ohio) These aquifers have the smallest yield of the productive aquifers in the state. Even though yields are small, these aquifers are important to Southeastern Ohio many times offering the only practical source of water supply. (U.S. Geological Survey, 1985, p. 342) Note: All public water, whether from treated surface water or well water, comes from outside the watershed**.** (SEDOEPA, 2003)

Flow and Use:

The ground water resources within the watershed area are documented through SWCD field observations and an ODNR study. Springs in the watershed are plentiful. Many have been developed as a source of water for household and, or livestock use. (SWCD, 2002) A groundwater study by Alfred Walter- ODNR, concludes that drilled wells in the watershed area average only 1 – 2 gallons/ minute (gpm) flow at total depths ranging 41 – 171 feet with depth to bedrock ranging 1 – 30 feet. (ODNR, 1984) Wells greater than 5 gpm flow are considered to be good indicators of ground water. (Guide to Ohio Streams, 2001) Low gpm rates of ground water at well locations are not uncommon as impervious layers of soil and bedrock create the many springs that provide a source of fresh water for domestic use and to the streams. (WeCARE Project field observations, 2002)

Source Water Area Protection Plans (SWAP):

In an effort to protect public water sources, public water associations are required to complete a source water area protection plan (SWAP Plan) for an OEPA determined area surrounding the a public water source. To date, the Waterford Water Association protection area for their well, falls within the Wolf Creek Watershed. The area is located in Waterford Twp. just north of the mouth of Wolf Creek.

Sensitivity of Ground Water:

DRASTIC Maps indicate the potential for ground water contamination should a contaminate be introduced. Consulting maps for Morgan and Washington Counties, the areas most sensitive are next to the two main branches of Wolf Creek, West & South Branch. The

sensitivity grows as the drainage moves closer to the confluence at the Muskingum River, where it is the most sensitive. (Reference ODNR, 2003)

Public Water

Locations

Public water is available in several areas of the watershed. (Overlay *WATER*) All sources are generated outside the watershed. Providers are as follows:

Tri-County Rural Water & Sewer District
Waterford Water & Sewer Association
Warren Community Water & Sewer District
Little Hocking Water & Sewer Association; Village of Chesterhill
Portersville East Branch Water Co.

Public Water Facts

All sources are ground water except for Portersville East Branch, which is treated surface water via the Burr Oak Water District.

The Waterford Water & Sewer Association has a water treatment facility within the watershed primarily to treat high manganese and iron levels commonly associated with wells near the Muskingum River. The Source Water Area Protection for its wells, located just north of Waterford in the Muskingum River Basin, enters into the watershed. (Overlay *SEWER*) Discharge from the plant flows into the public sewer line in Waterford and is discharged to the Beverly WWTP, outside the watershed.

The Little Hocking Water & Sewer Association has documented the presence of the chemical C8 in its water supply. This chemical is manufactured by the DuPont Chemical Co. in Washington, West Virginia. Wells for the Little Hocking Water & Sewer Association are located south of the watershed near the Ohio River. The chemical levels are below current OEPA accepted guidelines (study by USEPA pending).(Bob Giffin, Little Hocking Water Association, 2003) Runoff from public water usage is expected in streams, however has been no documentation of C8 in the streams within the watershed by the WeCARE Project. This issue was heavily identified as a potential pollution problem at the WeCARE Project public meetings.

Land Use

Land Use / Land Cover

Statistics provided by ODNR's Real Estate and Land Management (REALM) Division for the entire watershed are listed in Table 16.

Table 16 Wolf Creek Watershed Land Use/Cover

Use/Cover	Percentages
Urban	1.73 %
Agriculture	40.01 %
Wooded	57.62 %
Water	0.63 %
Non forested Wetland	< 0.01 %
Barren	0.01 %
Total	100.00 %

These land use statistics are based on 1994 land use/cover for Washington, Perry and Athens Counties, and 2000 land use/cover for Morgan County. Land use/cover percentages by subwatershed, as described in the Inventory/Water Resource Section of this plan, are found in Appendix 5.

Wooded 57.62 %

Wooded areas include the following: shrub and brush; forest. (Map 5) This land use/cover is the most predominate in the watershed and is well above the state average of 30%. The logging industry utilizes these abundant natural resources. In the last 3 – 5 years local loggers estimate that 60 operations have occurred within the watershed at approximately 40 acres/ operation for an estimated total of 2400 acres logged. The number of operations per year fluctuates with supply and demand. (David Groah, Blaney Hardwoods, Dean Cain Sr, Cain Logging, 2003) In addition, Blaney Hardwoods, a large timber mill operates a facility within the South Branch of Wolf Creek watershed, draining into the tributary of South Fork. (Morgan SWCD, 2003)

Agriculture 40.01 %

Agricultural areas include the following: cropland; pastureland; orchards; concentrated feeding operations; farmsteads. (Map 6) This land use/cover is the second largest in the watershed. Further details by subwatershed are as follows: croptype; tillage; rotations; chemical usage; livestock inventory. Chemical usage considered includes restricted and unrestricted pesticides. Livestock inventories are calculated using animal units. This is a federal designation that varies by animal species. The number of animals is multiplied by a factor (in parentheses) to determine the total number of animals units represented. For example 1000 animal units = 1000 slaughter or feeder cattle (1.0); 700 mature dairy cattle (1.4). Additional factors included the following: Swine weighing more than 55 lbs. = (0.4); Horses = (2.0); Sheep or lambs = (0.1); Others ranged from chickens to goats with a variety of factors. (Appendix 14) (Morgan/Washington SWCD)

Urban 1.73 %

Urban areas include the following: residential; fairgrounds; industrial; transportation; utilities, oil & gas wells. Residential areas are limited to subdivisions, small villages and one municipality, Chesterhill. Details of impervious surfaces and sewage treatment of these areas are as follows:

Impervious Surfaces

The impervious layers within these areas are the result of parking lots, roads, driveways and rooftops. From drive-by estimates by the watershed coordinator, it is estimated that 70% of the urban areas are considered to be impervious. Using the total 1.73% Urban statistics for a total of 1.21% impervious areas throughout the watershed. Percentages of impervious layers by subwatershed are calculated using the same method. Results are found in Table 10. (Map 7) There are no communities subject to the Stormwater Phase II regulations.

Sewage Treatment

Public:

Home sewage treatment systems account for the majority of the sewage treatment in the watershed with public sewage available in the three areas through four systems listed below. Discharge from a wastewater treatment plant occurs only from the White Oak Sewer Assoc. in Barlow with the remaining public systems and discharging to treatment facilities outside the watershed. There are no Combined Sewer Systems (CSS - combination storm runoff and sewage) associated with any of these four systems. Locations are listed below. (Map 7)

Waterford

- Waterford Water & Sewer Association
  Services 285 homes in subwatershed 090 070 (Wolf Creek) (Map 7 & Table 10)
  Discharge to the Beverly Sewer Plant (out of watershed) via Muskingum River bridge.
  (Young, 2003)

Barlow

- White Oak Sewer Association
  Services 30 facilities in subwatershed 100 030 (S Brch Wolf Crk) (Map 7 & Table 10)
  Discharge into South Fork subwatershed 100 030 (Map 7)
  Sewer Overflow at SR 339 & SR 555 into South Fork (Map 7)
  (Yost, 2003)
- Washington County Commissioners
  Services 52 facilities in subwatershed 100 030 (S Brch Wolf Crk) (Map 7 & Table 10)
  Discharge to the Belpre Sewer Plant (out of watershed) via a county gathering system.
  (Lila, **Get last name**) 2003)

Windsor Township, Morgan County

- Stockport Village
  Services 2 facilities in subwatershed 090 040 (Aldridge Run) (Map 2 & Table 10)
  Discharges to the Stockport Sewer Plant (out of watershed)
  (Grove, 2003)

Home Sewage Treatment Systems (HSTS):

The # of homes with home sewage treatment systems are shown by taking the total number of homes/subwatershed (See Demographics Section) and subtracting the number of homes with public sewage in each subwatershed. (Table 17) Homeowners could benefit from 319 implementation funding in assistance with the upgrading of HSTS systems. In areas where public sewage should be provided, documentation of concerns could be used to secure funding to provide public sewage.

Industry

The Oil & Gas Industry is evident throughout the watershed. The energy crises of the seventies created an oil and gas "boom" in the area adding to the number of wells already the area. Information provided by the Ohio Geological Survey indicates that there are 1200+ permitted wells in the watershed area. This land use would normally be documented through urban land use, however due to the disbursement of wells these are, many times, not picked up as a documented land use on a survey. (Morgan SWCD 2003)

Table 17 Urban Use Statistics by Subwatershed

HUC Unit 05040004:	Urban %	Impervious%	Total # Homes	# Homes Public Sewage	# Homes with HSTS
090 010 W Br Wolf Crk above Little Wolf Crk	1.90	1.43	513	-0-	513
090 020 Little Wolf Crk	2.61	1.95	242	-0-	242
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	1.57	1.18	288	-0-	288
090 040 Aldridge Rn	2.18	1.53	357	2	355
090 050 Coal Rn	3.12	2.34	714	-0-	714
090 060 W Br Wolf Crk between Aldridge Rn & W Br Wolf Crk (ex. Coal Rn)	1.02	0.77	764	-0-	764
090 070 Wolf Crk between S Br Wolf Crk & Musk. River	3.25	2.44	342	235	107
100 010 S Br Wolf Crk above Southwest Frk	1.55	1.16	1290	82	1208
100 020 Southwest Frk	0.55	0.41	367	-0-	367
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	1.20	0.90	308	-0-	308
Totals			5185	319	4866

Water 0.63 %
Water area include: streams; lakes; ponds. (Map 4)

Non Forested Wetlands < 0.01 %
(Map 4) This includes one constructed wetland at Camp Hervida. (Resources Section, *Private Parks*) (Map 1)

Barren 0.01 %
Barren areas include: transitional areas; strip mines

Protected Lands

Conservation Easements
There are no known permanent conservation easements currently or expected in the Wolf Creek Watershed. (Morgan & Washington SWCD, 2003)

Wolf Creek Scout Reservation
Located in Windsor Twp., Morgan County (See Map 1), this 62 acre tract of land was donated to the Wolf Creek Scout Troop 222 in 1992 by Clerance Hess. It is used for nature studies and other scouting activities. Permanent restrictions include no hunting or timbering, giving the opportunity for current and future scouts to enjoy this beautiful tract of land in a natural setting. It is located on the West Branch of Wolf Creek in Windsor Twp. of Morgan County. More can be read about this historic place of land in *The Wolf Creek and the Muskingum* by Richard Walker. (Walker, 2000)

Wayne National Forest

A small portion of the Wayne National Forest's Proclamation Boundary is located within the Athens and Washington County portion of the watershed. (See Map 1) This area was established by Congress in 1934 to focus land acquisition and ownership of the National Forest to lands most in need of restoration. The National Forest may purchase land within this boundary from willing sellers as funds are available. At this time the Wayne National Forest has a 28% ownership within this boundary. All the land within the Wolf Creek Watershed, that lies in the forest boundary, is still under private ownership and is part of the Athens Unit of the Forest. This area could potentially carry protection and care of the National Forest Service in the future**.** (USDA Forest Service, 2003)

Status and Trends

(historic, current, projected land use)

Historically, the Wolf Creek watershed has consisted of farmsteads, pastureland and woodlands. Agricultural production has been diverse, with many small dairy herds, beef cow/calf operations, small hog production facilities, etc. Many producers were self-employed on the farm. Due to trends in the agricultural economy, many of the small dairy herds have been liquidated. Many of these farms are now raising beef cattle exclusively. The remaining dairy herds have grown steadily in cattle numbers. As the herds have increased in numbers, many of the dairy cows are raised in confined facilities and have less access to pasture. The increased manure production associated with these facilities coupled with the rugged topography in the watershed has created challenges for many of these expanding operations.

Most of the beef cattle producers have off farm employment. Most beef herds in the watershed range from 10 to 40 cows. There are a few larger beef herds (200 to 300 head) that are managed by full-time producers.

There is very little commercial development or heavy industry in the Wolf Creek Watershed as evidenced by the fact that there have been very few NPDES permits issued in the watershed.

Although the population of the area has not increased greatly over the years, there has been a gradual increase in the number of farms that have been sold in smaller tracts for new home construction. This is occurring primarily in eastern portion of the watershed, particularly Warren Township in Washington County.

More development is expected as public water becomes available. Additional lines that will service the watershed area are being planned by the Tri-County Water Association, Chesterhill Village, the Malta Water Association.
(Bob Mulligan, Resource Specialist, ODNR – DSWC 2003)

Stream & Floodplain Physical Attributes

Early Settlement Conditions

Prior to 1800, the streams in the watershed supported a diverse population of wildlife. Elk, turkey, bear, panther, wolves, bobcat & buffalo inhabited the Wolf Creek Region and the Muskingum Valley. Elk were in rapid decline in the late 1700's according to reports of early settlers and missionarys. Native Americans traveled to the area for its plentiful game, with their camps north of the area near what is now Duncan Falls. The abundance of wolves, for which Wolf Creek was named, was a great annoyance for the early settlers. The last wolf in the area was reported killed in 1832. Early accounts of settlers in the area document fishing along Wolf Creek and the abundance of fish in the Muskingum River. Early settlers were farmers and they utilized Wolf Creek for the first saw and grist mills in the state. (Walker, 2002)

Note: The following categories are quantified by subwatershed in Table 18. Information was collected from the watershed study area only. This includes the counties of Morgan and Washington.

Channelization

Consulting with the Army Core of Engineers, Huntington District, there are no permitted channelization projects on record for the last 5 years. The natural channel miles are not considered to be affected by channelization. Therefore this topic is not included in Table 18.

Riparian Levies

Checking with the county floodplain managers of the Watershed Project Area, there are no permitted levies within the watershed project area. (Morgan County, Jeff McInturf, May 2003) (Washington County, Connie Holbitzol, May 2003) Therefore this topic is not included in Table 18.

Entrenched Miles

The number and severity of entrenchment within the watershed is considered to be non significant. Therefore this topic is not included in Table 18.(WeCARE Plan, 2003 Water Resources - Streams Section)

Channel and Floodplain Condition, Floodplain Connectivity

With no permitted levies in the watershed project area, limited channelization and nonsignificant entrenchment, the channel is considered to have excellent access to its floodplain. (Table 18)

Eroding Banks

(the number and severity of sediment produced)

Eighteen sites throughout the watershed were assessed for erosion as part of a Water Quality Monitoring Program (See the Water Resource Quality Section). Erosion is part of the Quality Habitat Evaluation Index (QHEI) and is rated as little (< 25% eroding), moderate (25 – 50% eroding) or heavy (> 50% eroding). Four additional site are documented as "Heavy Erosion" Sites by the Watershed Coordinator. Locations are documented in Table 18.

Forested Riparian Corridor Assessment

All streams, perennial and intermittent, within each subwatershed were assessed for a 35 foot wooded buffer area tangent to each streambank. Areas considered buffered carry a land use description of wooded as described in the Land Use Section of this document.

Measurements are documented in miles, and as a percentage in comparison to the total number of stream miles within the given subwatershed. (SWCD 2003) (Results: Table 18)

Streams Miles with Unrestricted Livestock Access.
Many streams in the watershed are utilized for watering livestock in one or more of the following situations: limited access crossings; rotational grazing; seasonally; at all times. During the Quality Habitat Assessment Process, 5 of the 18 sites were documented to have unrestricted livestock access. (See Appendices 11&12) The Morgan and Washington SWCD estimated the miles of streams with livestock access utilizing the number of producers with non confined operations in each subwatershed as identified in Appendix 14.

Dams

There are two low head dams located on streams within the watershed. They are as follows:
1) West Branch Wolf Creek: Morgan Co., Marion Twp., SR 377 north 0.5 miles of Chesterhill to West Branch Wolf Creek, 1250 feet upstream, Landowner - Bob Woodyard. This dam was constructed in the late 1970's and is approx. 5ft high and 55 feet wide, impounding 2820 linear feet of stream. It was built to create increased percolation to a nearby manmade well field for public water to supply the municipality of Chesterhill. This water source was abandoned due to heavy silting in the water supply created from high flow events. Note: The current water supply for Chesterhill is a well near Stockport. (Bob Woodyard - Landowner, Bob Grove – Chesterhill Village Administrator) (Table 18) (Map 4)
2) South Branch Wolf Creek: Washington Co., Watertown Twp., SR 339 north 2 miles of Watertown, TR 108 west 0.5 miles to the South Branch of Wolf Creek, 90 feet downstream (north), Landowner – George Harra & Kevin Stollar. This dam was constructed in conjunction with the nearby mill in the late 1800's and is attached to the support to the Harra Covered Bridge. It is approx. 5 feet high and 90 feet wide, impounding 3520 linear feet of stream. There is a slight opening (approx. 2 sq. feet) in center of the dam allowing for flow. (Table 18) (Map 4)

Permanent Protection of Stream Miles

There is one location of permanently protected stream miles. The Boy Scout Reservation located along West Branch Wolf Creek has been protected from logging since its donation to the Boy Scouts in 1995. Approximately 2000 feet of the NW streambank is protected. (Darrell Van Dyne, Scoutmaster, 2003) (Table 18) (Map 2)

Status and Trends

Expected residential/commercial development:
Morgan County: Permits are issued for all buildings. As of June 2003, nine construction sites were permitted this summer within the watershed area of Morgan County. (Jeff McInturf, Morgan County Engineers Office) These are indicated by subwatershed in Table 18.
Washington County: Permits are issued for commercial property only. One construction site is currently operating in the watershed area of Washington County at the Waterford Elementary School. No other permits have been issued as of June 2003. (Connie Holbitzol, Washington County Permit Office) This site is indicated within the corresponding subwatershed in Table 18.
Expected road, highway, bridge construction:
Morgan County: One bridge is scheduled to be replaced by the county highway department on Brandeberry Rd at the West Branch of Wolf Creek in Malta Twp. This is indicated in corresponding subwatershed in Table 18.
Washington County: There are no bridges or road repairs currently scheduled by the county highway department within the watershed area.The Ohio Department of Transporation has scheduled 3 sites for bridge replacement and, or road repair at 3 locations in the watershed study area. (Mike Austin, ODOT District 10) (Table 18)

Table 18 Riparian & Stream Habitat

Subwatershed HUC 05040004:	*Floodplain Connectivity*	Eroding Locations	*Riparian Buffer (35 ft.) # of stream mis. % of total stream mis.*	*Livestock Access # stream mis. % of total stream mis.*	*# Dam & Locations*	*Permanent Protection # & Location*	*Expected # of Road, Building & Bridge Construction*
090 010 W Br Wolf Crk above Little Wolf Crk	***yes***	**M01 Little **M03 Little	47.3 (62%)	34.5 (45%)	***-0-***	***-0-***	****D 6 bldgs.***
090 020 Little Wolf Crk	***yes***	**M02 Mod.	14.9 (67%)	13.1 (58%)	-0-	-0-	1 bldg.
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	***yes***	**M04 Little **M05 Mod. *G Heavy	30.2 (75%)	19.3 (47%)	* A	-0-	***1 bldg.***
090 040 Aldridge Rn	***yes***	**W08 Little * K Heavy	20.2 (77%)	13.4 (50%)	-0-	-0-	-0-
090 050 Coal Rn	***yes***	**M06 Mod. **W07 Little *J Heavy	26.9 (80%)	7.1 (31%)	-0-	-0-	***1 bldg.***
090 060 W Br wolf Crk between Aldridge Rn & S Br Wolf Crk (ex. Coal Rn)	***yes***	**W09 Little **W10 Little	25.5 (56%)	26.3 (57%)	-0-	*C	-0-
090 070 Wolf Cr between S Br Wolf Crk & Muskingum R.	***yes***	**W12 Little	10.8 (67%)	6.6 (41%)	-0-	***-0-***	**** E*** * F
100 010 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	***yes***	**W18 Heavy ** W17 Little **W16 Heavy * L Heavy	40.7 (65%)	37.4 (60%)	-0-	-0-	-0-
100 020 Southwest Frk	***yes***	**W14 Little ** W15 Heavy	23.8 (73%)	19.6 (60%)	-0-	-0-	-0-
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	***yes***	**W13 Little **W11 Little	17.5 (55%)	14.8 (47%)	*.B	-0-	* H * I

n/s - non significant amount

* - indicates a specific location listed by corresponding letter

A: West Branch Wolf Creek Dam Location: Morgan Co., Marion Twp., SR 377 north 0.5 miles of Chesterhill to West Branch Wolf Creek, 1250 feet upstream, Landowner - Bob Woodyard (Map 4)

B: South Branch Wolf Creek Dam Location: Washington Co., Watertown Twp., SR 339 north 2 miles of Watertown, TR 108 west 0.5 miles to the South Branch of Wolf Creek, 90 feet downstream, Landowners George Harra & Kevin Stollar. (Map 4)

C: West Branch Wolf Creek Permanent Protection, Morgan County, Windsor Co., 2000 feet on the NW bank at the Boy Scout Reservation, Landowner – Boy Scout Troop 222 (Map 2)

D: West Branch Wolf Creek Bridge Repair: Morgan Co., Malta Twp. Brandenberry Rd (CR 47) (Morgan Co. Highway Dept.)

E: Wolf Creek Current Commercial Construction Site: Washington Co., Waterford Twp., SR 339 at the Waterford Elementary School in Waterford.

F: Wolf Creek Bridge & Road Repair: Washington Co., Waterford Twp., CR 102 NW of Waterford. Near the mouth of Wolf Creek (ODOT)

G: West Branch Wolf Creek Erosion – Heavy just South of the Williams Covered Bridge

H: Unnamed trib to South Branch Wolf Creek Culvert Replacement: Washginton Co., Watertown Twp., SR 339, 2 mis. N of Watertown (ODOT)

I: South Branch Wolf Creek Bridge Deck Replacement: Washington Co., Watertown Twp., SR 339 at Watertown (ODOT)

J: Coal Run, Washington Co., Wesley Twp., TR 103, heavy erosion & silt at bridge from twp. rd. ditch main.

K: Aldridge Run, Washington Co., Wesley Twp., TR 466 heavy erosion & silt at bridge from twp. rd. ditch Main.

L: South Fork, Washington Co., Barlow Twp., TR 266 heavy erosion & silt at bridge from twp. rd. ditch main.

** - indicates a site location for WeCARE Habitat Assessments

Water Resource Quality

Use Designation and Attainment

OEPA Aquatic Use Designations
Currently the Water Quality Standards show Wolf Creek's aquatic life use designation is Exceptional Warm Water Habitat (EWH). Per a personal communication with Chuck Boucher, OEPA Division of Surface Water Ecological Assessment Section, the original aquatic life use designation was based on a desk top analysis and was therefore subject to verification using field data. Field data collected as part of developing a watershed action plan for Wolf Creek, and, according to Chuck, shows that the actual aquatic life use designation for the entire watershed should be ***Warm Water Habitat (WWH).*** (Boucher, 2003)

OEPA Aquatic Life Use Attainment Status
OEPA 305(b) and 303(d) integrated water quality reports show the results of water quality data and field assessments collected by the Ohio EPA. The reports indicate whether or not the stream is "in attainment" based on its assigned use designation. There are currently ***no 305(b) or 303(d)*** reports for the entire Wolf Creek Watershed. There are OEPA reference sites in the watershed, however, the information is not enough to form a 305(b) report, therefore use attainment utilizing past OEPA data has not been established.

Water Quality Data Summer/Fall 2003 Sampling Season WeCARE Project

Establishing Attainment Status
With water quality data limited, the WeCARE Project designed a water quality monitoring program at selected sites throughout the basin. May – October 2002. Water sampling, habitat assessments, macroinvertebrate surveys and pebble count surveys were completed as part of the program. The Quality Assurance Procedure Plan (QAPP) for this program was approved by the Ohio EPA in April of 2002. The program was designed to address the concerns of the citizens participating in the WeCARE public meetings, the public mailing survey, watershed land use and input from the stakeholders and the technical advisory groups. The results from the water quality monitoring program were used to determine the most appropriate use designation (as stated previously) and to establish the Aquatic Life Use Attainment status as well as attainment based on other numerical parameters.

WeCARE Water Quality Monitoring Program:

Site Selection
Eighteen sites were chosen throughout the basin with regards to the following:

- drainage area
- accessibility for habitat assessments and water sampling
- representation of the land use/cover within the watershed
- Sample ID's are abbreviations of the stream, road, and nearby landowner (Appendix 6)

Locations with bridge sites were necessary to accommodate high flow sampling. (See Map 8 for locations) (Appendix 6 for Site Location Descriptions)

Water Sampling and Analysis

Samples were collected a total of 6 times for the following parameters: **pH; Temperature; Conductivity; Dissolved Oxygen (DO); Total Phosphorus; Nitrate-Nitrites**; **Ammonia; & Total Suspended Solids (TSS)**. Samples were collected under the following conditions: 2 at High Flow twice; 3 at Low Flow; 1at First Flush (as the stream is rising). Sampling was conducted with Ohio EPA personnel. Parameters of pH, temperature, conductivity and dissolved oxygen were conducted on site using a YSI multiparameter probe. The remaining parameters were analyzed at the Ohio EPA laboratory in Columbus, Ohio. Reference the *WeCARE QAPP, April 2002* for sampling and testing methods used. Results are found in Appendices 7 & 8,

Samples were collected a total of 5 times for **Fecal Coliforms** under the following conditions: 2 at High Flow; 2 at Low Flow; & 1 at First Flush. Samples were collected in some cases with Ohio EPA personnel and analyzed at the Zanesville Wastewater Treatment Plant Laboratory or the TCCI Laboratory of New Lexington. For sampling and testing methods employed, refer to the *WeCARE QAPP, April 2002.* Results are found in Appendices 9 & 10.

Habitat Assessments

Habitat assessments of the streams were conducted June – July 2002 at all 18 sites. Conducting the surveys were Jim Grow, Ohio EPA and or Kathy Davis, Watershed Coordinator with assistance from WeCARE Volunteers. The EPA method of establishing a **Qualitative Habitat Evaluation Index (QHEI)** was used. Results are represented by values ranging from 0 – 100 with higher values indicating higher quality habitat at that specific site. Refer to the *WeCARE QAPP, April 2002* for the method. Results are found in Appendices 11 & 12.

Silt Conditions

Eighteen sites throughout the watershed area were assessed for silt as part of a Water Quality Monitoring Program (See the Water Resource Qulaity Section). Silt is part of the Quality Habitat Evaluation Index (QHEI) and is rated as free (no silt), normal (a dusting), moderate (extensive covering but free on some substrate), heavy (nearly all is covered with a deep layer). (Results recorded on individual subwatershed reports within the Implementation section)

Fish Community Assessments

Assessments were conducted June – October 2002 at all wadable sites, with fourteen of the eighteen sites assessed. Identified species were quantified by count and weight (when applicable). Field personal from the Ohio EPA Southeastern District Office and ODNR DSWC conducted the survey according to EPA Standards. The Ohio EPA Ecological Assessment Section (EAS) analyzed the field data and determined values represented by an Index of Biological Integrity (IBI). These values range from 38 to 54 with higher values indicating better water quality. The OEPA EAS further determined use attainment status based on the these values. Attainment is represented as full, partial or non, Reference *WeCARE QAPP, April 2002* for sampling methods. Results are found in Appendices 11 & 12.

Macroinvertebrates Survey

Summer Survey – A summer survey was conducted in July 2002 at all 18 sites. Conducting the survey was Glenna Hoff, Washington SWCD Education Specialist with assistance from Kathy Davis, Watershed Coordinator and WeCARE Volunteers.

Fall Survey – A fall survey was conducted in November at 7 of 18 sites. Conducting the survey was Marietta College Senior and Environmental Major, Josh Holmes with assistance from WeCARE Volunteers.

The *Isaak Walton League Method* was used for both surveys. A site is determined Poor, Fair or Good depending on a numerical value based on the number of tolerant, facultative and intolerant species represented in the sample area. Refer to the *WeCARE, QAPP, April 2002* for the method. Summer drought conditions and early winter conditions made representative assessments difficult. Due to this, results are questionable. Additional studies are warranted under more appropriate conditions. Results can still be compared from site to site with this taken onto account. (Results in Appendices 11 & 12)

Flows

Flows for sampling sites are documented for sampling dates (when data was available) and ten year low flows.

Sampling Flows: Flows at the time of sampling were calculated using data from a USGS gauging station located in a similar watershed in the same basin. (Kevin Kratts, Tetra Tech) (Appendix 7 & 8) Flow data is used to determine pollutant loading to a stream and to determine Best Management Practices (BMP's) – practices that if implemented will result in the reduction of specific pollutant.

Ten Year Low Flows: Ten year low flows were calculated for all sampling sites based on three conditions. They are as follows: 1) Annually, the lowest 7 day consecutive flow, displayed as 7 Q10. 2) Summer, the lowest 30 day consecutive flow, displayed as S 30Q10. 3) Winter, the lowest 30 day consecutive flow, displayed as W 30Q10. (Chris Selbe, OEPA – DSW) (Appendix 6)

Numerical Targets of Water Quality Data

Target values for this study are based on an overall goal of the Ohio EPA 319 program to make all streams fishable and swimmable. Therefore, the primary concern for this plan is to determine target values for Aquatic Use (fishable) and Primary Contact (swimmable).

However, water quality for the agricultural industry as well as additional industries is important as they are indicated by the Ohio EPA as "Water Supply Uses" of the watershed streams. The only current target value (OEPA) for either of these two uses is for nitrogen at 100 mg/l as an agricultural use. In addition to this, the WeCARE Project has set a target for fecal for agricultural use at 5000 mg/l.

These and additional target values and their sources are indicated in Table 19. They are generated from existing OEPA Rules, OEPA studies and the Ohio State University documentation. Target values set from OEPA rules and guidelines are for the Western Allegheny Plateau (WAP) Ecoregion, Warm Water Habitat (WWH) designation, Aquatic Use, Agricultural Use and Primary Contact Recreational Use. All designated uses of the Wolf Creek Watershed. No target values are set for Industrial Use; therefore it is omitted from the table. These values are compared to the WeCARE Water Quality Program Results with values outside the acceptable target limit highlighted in yellow. (See Appendices 7 – 12) Sample sites out of range are indicated on Table 19. Discussions of these results by subwatershed are found in the Impairments Section of this document.

Discussion of Parameters & Targets

pH The measure of the hydrogen ion, indicates acidic or basic conditions, Results range from 0 – 14 with 7 as neutral with < 7 more acidic and > 7 more basic . All sites tested within the acceptable range for aquatic life use (6.5-9.0) Source of target is the OEPA rules. (Table 19)

Temp Temperature readings indicate the ability to hold Dissolved Oxygen, necessary for aquatic life. Results are registered in degrees Celius. Lower temperatures hold more DO, therefore higher temperatures, out of range, can indicate a potential problem. The acceptable range is dependent on the time of year. All sites were within acceptable range for Aquatic Life Use. (Table 19)

DO Dissolved Oxygen is necessary to support Aquatic Life. Results are expressed in mg/l with higher numbers indicated greater amounts of dissolved oxygen. One site tested below the target of 5.0 mg/l. (Table 19)

Phosphorus High levels of phosphorus can be detrimental to aquatic life. It is carried through a system and deposited in low lying areas of slow moving water. The source can be natural, from chemical fertilizers, or from animal or human waste. It typically attaches itself to sediment particles traveling through a watershed and is associated with high levels of sediment deposited in the stream or in the water column as total suspended solids. Until it is assimilated by microrganisims, it can, even at low levels, cause stress to aquatic life. Once agitated by a rain event or additional load to the stream from runoff, it can again become concentrated enough to become stressful to aquatic life.
Phosphorus is expressed in mg/l as a concentration. Higher numbers indicate a greater concentration of phosphorus. Each site has been higher than the target of < 0.10 mg/l. (Table 19)

Nitrates

Sediment
Total Suspended Solids Total Suspended Solids indicates the amount of sediment moving through a watershed system as it is suspended in the water column. Expressed in mg/l, higher numbers indicate greater concentrations. Sediment can carry phosphorus into and through the system. As it is deposited in low lying areas it, can form a covering of silt to various degrees that has adverse effects on aquatic life.
The first sampling of the season (May 14, 2002) was taken at a very high flow after more than 24 hrs. of rain. Samples taken along the main branches of the West and South Branch of Wolf Creek show greater concentrations at sample points closer to the confluence (a common occurrence). Samples from smaller tributaries are flushed out earlier showing lower concentrations.
On the 9/27/02 sampling, during a first flush event, (taken as the stream was rising), tributaries to the two main branches as well as samples from the main branches show higher levels of sediment being deposited to the system.
Habitat, and Riparian and Floodplain evaluations indicate areas of streambank erosion, and land use that could possibly be contributing to sediment.
The measurement of silt assessed during the QHEI evaluation indicates varying levels of silt throughout the basin. From these evaluations it appears that Wolf Creek is transporting its sediment, however areas of silt and could cause difficulty for aquatic life. Also, the sediment load being deposited into the Muskingum River could cause lasting effects to endangered

mussel beds just downstream of the confluence. Therefore the overall goal is to locate the sources and design BMP's to reduce the amount of sediment entering the stream.
A target of 24 mg/l at first flush at any site or at high flow at any tributary is set based on the results during a FF event on sample site M06 on Coal Run. This site carries the highest IBI score, indicating good habitat for the aquatic community.

Fecal Coliform – Fecal Coliform is the measurement of bacteria from human or animal excreta expressed in cpu/100ml (counts per unit/ 100 mililiters). The presence of fecal coliforms can indicate harmful pathogens that can, if ingested, can cause harmful effects to humans or livestock. Higher numbers indicate greater concentrations. Every site monitored was above target levels for Primary Contact (1000 cpu/100ml) and four have been above target levels for agriculture (5000 cpu/100ml). (Table 19)

Ammonia

QHEI – The Quality Habitat Evaluation Index (QHEI) is the score for the results of a habitat assessment. This assessment rates indicators of habitat such as silt, erosion, embeddedness, sinuosity, floodplain quality, substrate material and depth. Results range from 0 – 100 with 60 set as a target. (Table 19)

IBI The Index of Biological Integrity (IBI) is the score for the results of the assessment of the fish community. The score for this parameter is determined by identifying species, quantifying each by count and determining its pollution tolerance. Results are expressed numerically. Higher numbers indicate better water quality. The limits set for the watershed is $\geq$ 44 with a variance of 4. Therefore scores may be as low as 40 and still meet the target. Usually the score along with the ICI (Score based on the macroinvertebrate community) is used to determine whether or not a site is, "in attainment", or otherwise meeting its full potential of water quality based on its use designation. However, without the ICI, attainment for aquatic use is determined based on the IBI alone. Three of fourteen sites do not achieve full attainment status. (Table 19)

Miwb – The Modified Index of Well Being (Miwb) is a numerical calculation using the IBI on sites with a drainage area of 19 sq. mis. or greater. It takes into account the total number *and weight* of each species, taking into account the *quality* of the species represented. Results are expressed numerically. Higher numbers indicate better water quality. The limit set for the watershed is $\geq$ 8.4. All applicable sites meet this limit. (Table 19)

Table 19 WeCARE Project Numerical Targets of Water Quality Data

~ Parameter	Aquatic Use	Ag Use	Primary Contact	Sites Out of Range
pH	* 6.5-9.0	None	None	None
Temp	* 8.3 – 29.4 Deg.Celsius (Date Dependent)	None	None	None
Cond	* < 2400micmhos/cm @ 25 C	None	None	None
DO	* > 5.0 mg/l	None	None	W15
T Phos	** < 0.10 mg/l	None	None	α M01 W08 W16 M02 W09 W17 M03 W10 W18 M04 W11 W05 W12 M06 W14 W07 W15
T Nitrite-Nitrate	** < 1.0 mg/l	* 100 mg/l	None	M01 W15 M05 W16
TSS	** < 60 mg/l	None	None	None
Fecal	None	**** 5,000 cpu/100ml	* 1000 cpu/100ml	Primary Contact: ALL SITES
Ammonia (NH3)	***1.1 13.0 mg/l** (pH & Temp dependent)	None	None	None
QHEI	*** ≥ 60	None	None	M01 W16 M06 W17 W13 W18 W15
Miwb	*** ≥ 8.4	None	None	None
IBI	*** ≥ 44 (variance of 4)	None	None	M02 W13 M03

~ Parameter explanations in previous text.
* ..... target set from the Ohio EPA Rule 3745-1-07 of the Ohio Revised Code
** ..... target set from reference to OEPA Study *(Association between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams, 2003)*
*** target set from reference in an OEPA Study (*The Use of Biocriteria in Asessment of Non-Point Source & Habitat Impacts in Warmwater Streams, Rankin, 1991)*
**** target set from OSU Extension Paper, Dr. Stephen Boyles
α Listed in subshed in appendixes

Locationally-Referenced Use Designations/Use Attainment

As previously stated the WeCARE Project's Aquatic Life Use Attainment Status is based on the Warm Water Habitat designation. The status by site was determined by the OEPA Ecological Assessment Unit based on field data collected by the WeCARE Monitoring Program using the Index of Biological Integrity (IBI). Attainment is represented as full, partial or non. (Appendices 11 & 12) The stream miles in attainment status is calculated by taking the number of miles/stream in Appendix 1 and comparing it to the site(s) monitored or unmonitored.

Table 20 Aquatic Life Use Attainment by Subwatershed

Subwatershed HUC 05040004:	**Designated Streams**			
	Attainment Miles			**Unmonitored Miles**
	Full	***Partial***	***Non***	
090 010 W Br Wolf Crk above Little Wolf Crk	15.4	-0-	6.3	55.0 *
090 020 Little Wolf Crk	-0-	-0-	9.0	13.4 *
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	18.4	-0-	-0-	22.0
090 040 Aldridge Rn	7.4	-0-	-0-	18.9
090 050 Coal Rn	10.5	-0-	-0-	12.4
090 060 W Br Wolf Crk between Aldridge Rn & S Br Wolf Crk (ex. Coal Rn)	-0-	-0-	-0-	45.9
090 070 W Br Wolf Crk between S Br Wolf Crk & Musk. River	-0-	-0-	-0-	16.1
100 010 S Br Wolf Crk above Southwest Frk	22.7	-0-	-0-	40.0
100 020 Southwest Frk	22.4	-0-	-0-	10.3
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	-0-	10.7	-0-	20.9 *

* Please see time lines listed for each practice in each subwatershed in the detailed subwatershed data tables.

Point Source Pollution

Point source pollution enters a water body from one identifiable source through the means of a pipe, ditch or some other type of discharge. They can be a permitted discharge, or from a spill or illicit discharge, or open trash dumps.

NPDES Permits

There are currently 2 National Pollution Discharge Elimination System (NPDES) permits issued to businesses in the watershed. (Map 7) (Table 20) They are as follows:

- Camp Hervida near Watertown
  Lagoon treatment system for human waste servicing the camp. It's the first one licensed for this purpose in the state of Ohio. (See Social & Cultural Resources Section – Recreation)

- White Oak Sewer Association
  Services 30 facilities in subwatershed 100 030 (S Brch Wolf Crk) (Map 7 & Table 10)
  Discharge into South Fork subwatershed 100 030 (Map 7)
  Sewer Overflow at SR 339 & SR 555 into South Fork (Map 7)(Yost, 2003)

Spills and illicit discharges

Spills and illicit discharges in the watershed include: crude oil; livestock waste; human waste. Information of verified complaints was gathered from ODNR Division of Mines and Minerals Management, Oil & Gas Section, ODNR Division of Wildlife Investigator, and the Ohio EPA. Numbers are compiled from statistics representing the year 2000 through May 2003. Two animal waste discharges resulted in fish kills as reported by the ODNR Division of Wildlife. The 7 crude oil spills within the watershed are 7 of 42 crude oil and brine discharges throughout Morgan and Washington Counties for the previously mentioned time frame. Human waste overflow at the sanitary sewer overflow was documented at the White Oak Wastewater Treatment Plant by the Ohio EPA. Southeastern Ohio District. (Table 21)

Open Trash Dumps

The Southeastern Ohio Joint Solid Waste Management District conducts surveys every 5 years that document open dumps. Those included in the survey are not necessarily illegal, however, they are used for documentation for the necessity for solid waste haulers in the areas of concern. Information was provided by the Southeastern Ohio Joint Solid Waste Management District. (Reiter, 2003)

Table 21 Point Source Pollution

Subwatershed HUC 05040004:	NPDES Permits	# of Spills & Illicit Discharges	# Open Trash Dumps
090 010 W Br Wolf Crk above Little Wolf Crk	-0-	1 – crude oil (O&G Well)	3
090 020 Little Wolf Crk	-0-	1 – crude oil (O&G Well)	1
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	-0-	-0-	- 0 -
090 040 Aldridge Rn	-0-	1– animal waste	1
090 050 Coal Rn	-0-	1 – crude oil (O&G Well)	5
090 060 W Br Wolf Crk between Aldridge Rn & S Br Wolf Crk (ex. Coal Rn)	-0-	1 – crude oil (O&G Well)	2
090 070 W Br Wolf Crk between S Br Wolf Crk & Musk. River	-0-	-0-	2
100 010 S Br Wolf Crk above Southwest Frk	White Oak WWTP	3 - crude oil (O&G Wells) 1 – human waste	4
100 020 Southwest Frk	-0-	-0-	2
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	Camp Hervida	1 - animal waste	3

Non-point Sources

Note: The following categories are quantified by subwatershed in Table 21. Information was collected from the watershed study area only. This includes the counties of Morgan and Washington

Failing Home Sewage Treatment Systems
Due to the limited amount of public sewage systems and input from local official, failing septic systems are considered to contribute to non point source pollution from inadequately treated human waste. The number of failing systems was determined by using the total number of Home Sewage Treatment Systems (HSTS) from Table 10 and estimating the percentage of those systems believed to be failing. (Results: Table 21) (Barb Bradley, Morgan County Sanitarian; Ken Robinson, Washington County Sanitarian; Jim Baker, Morgan/Washington Community Action)

Number of construction, bridge and road repairs
The number of construction sites as they relate to past or current non point source pollution sites is considered insignificant as current regulations encourage construction out of the floodplain. Past, current and future road repairs are included in the Stream & Floodplain Physical Attributes Section (Table 18 – "Erosion Locations" at three Twp. road repair locations & in "Status and Trends"). Therefore this is not included in Table 21.

Number and size of confined and non confined livestock operations
The number and size of these operations is considered significant enough to create a non point source pollution problem. Confined livestock operations, depending on there size and proximity to the stream, can contribute to non-point source pollution from runoff containing manure and sediment. The number of stream miles of unrestricted livestock access as documented in Table 18 confirms that non confined livestock in many situations have access to the streams causing bank erosion and manure in the streams. Referencing Appendix 14 (Agricultural Land Use Statisitcs), the total # of operations is estimated with the total # of animal units for confined and non confined operations. (Result: Table 21) (Morgan & Washington SWCD)

Acres of Highly Erodible Land and potential soil loss.
According to Jon Bourdon, Washington County NRCS District Conservationist, using NRCS guidelines, 98 % of the soil within the watershed is considered to be classified as highly erodible. Acres for each subswatershed are determined by using estimated percentages of HEL in each subwatershed and applying it to the total acres/subwatershed. (Bourdon, 2003) ((Map 3) (Appendix 3) (Soil Section of this document.)

Is the stream culverted?
Roadways, both public and private, cross every stream in the watershed utilizing culverts. The culverted streams for this inventory are limited to streams that are culverted a considerable length where the stream is actually redirected as a result.Using this guideline, there are no culverted streams in the watershed. Therefore this topic is not included in Table 21.

Channelization
As indicated in the Stream and Floodplain Physical Attributes Section and Table 18 of this document, there were no permitted channelization locations in the watershed study area within the last 5 years. Therefore this topic is not included in Table 21.

Levied Streams
As indicated in the Stream and Floodplain Physical Attributes Section and Table 18 of this document, there are no permitted levies, therefore this topic is not included in Table 21.

Dammed (Impounded Stream Miles)
The number of stream miles impounded by the 2 dams inventoried in the Stream and Floodplain Physical Attributes Section of this plan is indicated by subwatershed in Table 21. There is no evidence at this time as to the extent, if any, as to the affects from these impoundments to the stream.

Petition Ditches
There are currently no petition ditches within the Wolf Creek Watershed. (Morgan and Washington County Engineers) Therefore this topic it not included in Table 21.

Table 22 Non Point Source Pollution Potential Causes

Subwatershed **HUC 05040004:**	**# Failing HSTS** **% of Total Systems**	**# / size (A.U.)** **Confined** **Livestock operations.**	**# / size (A.U.)** **Non Confined** **Livestock Operations**	*Acres Highly Erodible Soil* **% of Total Acres**	**# of Sreams Miles Dammed**
090 010 W Br Wolf Crk above Little Wolf Crk	256 50%	10 / 961 A.U.	110 / 1424 A.U.	26,623 96%	-0-
090 020 Little Wolf Crk	**169** 70%	3 / 475 A.U.	57 / 841 A.U.	7,012 99%	-0-
090 030 W Br Wolf Crk between Little Wolf Crk & Aldridge Rn	144 50%	11 / 413 A.U.	60 / 1073 A.U.	14,104 96%	0.24
090 040 Aldridge Rn	177 50%	13 / 687 A.U.	94 / 1732 A.U.	7,647 99%	-0-
090 050 Coal Rn	499 70%	11 / 340 A.U.	120 / 2178 A.U.	13,863 99%	-0-
090 060 W Br Wolf Crk between Aldridge Rn & S Br Wolf Crk (ex. Coal Rn)	458 60%	22 / 260 A.U.	58 / 720 A.U.	19,780 98%	-0-
O90 070 Wolf Crk between S Br Wolf Crk & Musk River	53 50%	24 / 290 A.U.	63 / 508 A.U.	6,451 97%	-0-
100 010 S Br Wolf Crk above Southwest Fork	845 70%	178 / 3692 A,.U.	214 / 1920 A.U.	25,497 98%	-0-
100 020 Southwest Fork	193 50%	26 / 1110 A.U.	74 / 919 A.U.	13,734 97%	-0-
100 030 S Br Wolf Crk between Southwest Frk & W Br Wolf Crk	231 75%	28 / 484 A.U.	48 / 322 A.U.	10,314 96%	0.62

HSTS – Home Sewage Treatment Systems
A.U. – Animal Units

Human Impact
Human impact indicators are documented by all catagories in Table 21, fish community assessments, and chemistry testing. The inventory of possible sources indicate human impact from failing septic systems, livestock, road repairs (Table 18), and mismanaged highly erodible soil.

Former Studies

According to the Ohio EPA hydrologic Unit Water Quality Report and the Ohio Non-Point Source Assessment, Wolf Creek and its tributaries are impaired by the following: Organic Enrichment, low dissolved oxygen levels, siltation from overgrazed pastures and woodlands, concentrated feeding operations, and crop production.

According to the NRCS Impact of Erosion and Conservation in Ohio (1989), the Wolf Creek Watershed ranks 2nd in the state of the total acreage of grazed forests; 11th for the highest gross forest erosion attributable to grazing; and 14th for the highest tonnage of eroded soil from all sources. Per the 1993 Unionid survey, the sediment load from Wolf Creek is suspected of negatively impacting the reproduction beds of none federally endangered species of mussels.

West Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 090 010

Basic Statistics

Size:	28,437.8 acres (44.4 Sq. Mis.)
Location:	Morgan County
Avg. Flow:	44.8 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 15.4 Partial 0 Non 6.3
Monitoring Sites:	2 - (M01, M03)

Land Use/Cover

Use/Cover	%
Urban	1.90
Agriculture	36.48
Wooded	61.28
Water	0.33
Wetland	0.01
Barren	0.00

Agricultural Statistics

Ag= 36.48 % (10,374 acs.)

18 % Cropland
55 % Pastureland
16 % Woodland
11 % Idol

Croptype - 60% hay, 25% corn, 2% soy beans, 13% small grains
Tillage 80% conventional till, 20% no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*96*	*1920*	*688*	*1232*
Dairy	*2*	*252*	*168*	*84*
Horses	*13*	*153*	*76*	*77*
Swine	*2*	*20*	*20*	*0*
Sheep	*2*	*13*	*0*	*13*
Other	*5*	*27*	*9*	*18*
Total	***120***	***2360***	***961***	***1424***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
West Branch Wolf Creek ..	* 15.4	n/m	M01
*** Rosseau Creek	6.3	10.7	M03
Buck Run ..	3.6	41.5	n/m
Pleasant Run	1.8	160.5	n/m
Hedgehog Creek .	3.6	37.3	n/m
Kickapoo Creek	3.5	20.4	n/m
Peeper Run ..	1.9	56.6	n/m
20 Unnamed Streams .	40.6	n/a	n/m
Total ..	76.7		

* portion of total length (45.7 ft.)
*** named for WeCARE Project

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
1.90	1.43	513	-0-	513

West Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 090 010
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**M01 Little; **M03 Little
Riparian Buffer (35) # of stream mis. % of total stream mis.	47.3 (62%)
Livestock Access # stream mis. % of total stream mis.	34.5 (45%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	6 bldgs. Bridge repair- W Br Wolf Crk @ Morgan CR 47

** WeCARE Sampling Sites

Non Point Source Pollution

Home Septic Systems # Failing Systems % of total systems	256 50%
Confined Livestock Operations # / size (animal units)	10 / 961 A.U.
Non Confined Livestock Operations # / size (animal units)	110/1424 A.U.
Acres of Highly Erodible Soil (% of Total Acres)	26,623 (96%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	1 crude oil (O&G Well)	3

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.1 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Sample Site # M01 West Branch Wolf Creek (RM 39.20)
Morgan Co., Union Twp., @ CR 16 bridge site,

Site Statistics

RM @ sample pt.	39.20
RM = enters W Br Wolf Crk	39.20
Sq. Mi. Drainage	19.2
Avg. cfs	19.4
Gradient ft./ mi.	6.23

OEPA Commentary on the Fish Community
Habitat at this site was only marginal, and may contribute to a lower IBI score than would be expected, IBI metrics which indicated problems are % individuals of pioneering species,% tolerant fish, and number of sensitive species. Pioneering species those which readily move into disturbed areas once the conditions have become more favorable often indicate dry or intermittent conditions persisting during times of the year, or other high disturbance events. Creek Chubs were very abundant, and in headwater streams they are often the ones which survive in scattered pools or migrate upstream when flows return after droughts. They are also listed as tolerant , which is one reason the tolerant metric score was low. Sensitive species and individuals were also very low, indicating some sort of stress in the environment. Much of this may be related to the severe low flow conditions related to the drought. (Mishne, OEPA 2003)

Aquatic Assessment

Aquatic Use Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	40	n/a	Poor 6	n/m

Habitat Assessment

QHEI	Silt
54.0	Mod.

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**47000**
06/24/02	LF	515
09/27/02	FF	**35000**
10/16/02	HF	**5600**
10/28/02	LF	150

Comments petroleum odor; film on water; trash

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	166.8904 - HF	10:03	7.1	230	10.25	13.02	0.53	0.0700	0.26	< 0.050	35
06/25/02	4.5654 - LF	10:47	7.7	414	8.24	23.02	0.41	* 0.0632	0.32	0.058	8
07/18/02	0.9131 - LF	10:25	7.5	352	7.32	23.24	0.56	* 0.0743	0.35	0.190	< 5
09/27/02	7.3554 - FF	13:48	7.5	535	7.98	18.87	0.94	**0.3510**	**2.12**	0.057	34
10/16/02	n/m - HF	15:15	7.7	397	7.40	12.28	n/m	n/m	n/m	n/m	18
10/28/02	n/m - LF	14:59	7.7	418	9.52	12.25	0.57	* 0.0987	< 0.10	< 0.050	5

West Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 090 010
(cont.)

Sample Site # M03 Rosseau Creek (RM 0.50)
Morgan Co., Union Twp., @ TR 104 bridge site,

Site Statistics

RM @ sample pt.	0.5
RM = enters W Br Wolf Crk	33.33
Sq. Mi. Drainage	8.6
Avg. cfs	8.7
Gradient ft./mi.	7.19

OEPA Commentary on the Fish Community

This sample was collected June 11, 4 days prior to the valid sampling season date. The IBI score of 38 falls short of Warmwater Habitat criteria. Numbers of fish were low, as was species diversity (compared to other streams in the area). No intolerant species were present. Also, no species categorized as headwater species were present. (Mishne, OEPA 2003)

Aquatic Assessment

Aquatic Use Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
NON	38	n/a	Poor 8	n/m

Habitat Assessment

QHEI	Silt
66.5	Norm.

Comments drains Wolf Creek Wildlife Area

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	26000
06/24/02	LF	158
09/27/02	FF	3334
10/16/02	HF	1700
10/28/02	LF	110

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)
05/14/02	74.7530 - HF	10:20	7.6	275	10.48	11.91	0.44	0.0600	< 0.10	< 0.050	27
06/25/02	2.0449 - LF	11:06	7.7	394	7.18	22.98	0.21	* 0.0436	< 0.10	< 0.050	8
07/18/02	0.4090 - LF	10:37	7.7	360	7.69	24.11	0.20	* 0.0453	< 0.10	< 0.050	9
09/27/02	3.2946 - FF	13:34	8.0	331	8.05	17.67	0.39	* 0.1500	< 0.10	0.060	21
10/16/02	n/m - HF	15:00	7.8	329	8.98	12.13	n/m	n/m	n/m	n/m	24
10/28/02	n/m - LF	14:44	8.0	421	8.68	12.58	0.26	* 0.0563	< 0.10	< 0.050	< 5

West Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 090 010
(cont.)

Background Statement: West Branch Wolf Creek in sub-watershed HUC 05040004 090 010, in Morgan County, Union Township, County Rd 16, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, QHEI, aquatic attainment and IBI scores.
Problem Statement: High nutrient loads in the West Branch Wolf Creek are occurring due to unmaintained on-site sewage treatment systems, which account for approximately 50% of all systems in this sub-watershed.
Goal: Over the next 10 years, work with watershed residents and the local Health Departments to upgrade/ repair 128 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 128 systems	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	128 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install 2 Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in the West Branch Wolf Creek are occurring due to 120 livestock operation with possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 60 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 34.5 miles of streambank where access is unlimited.	Streambank fencing 5.18 miles =27,350 ft * $1.40 ft. = $38,290	5.18 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 149 tons in 15 yrs.
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 110 non-confined livestock operations.	4400 ft. of pipeline * $1.40 ft. = $6160 28 troughs set * $619ea. = $17,332 installed on 28 sites	28 sites completed Completed practices reduces nutrient loads & soil loss by 149 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 29.4 miles of streambank where no buffer currently exists.	25 farms will seed cool & warm season grasses on 101 acres * $ 79 acre = $ 7979	23.7 miles buffers installed Completed practices reduces nutrient loads & soil loss by 460 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 20% of confined livestock operations.	Construct 2 animal waste storage facilities on 2 farms * $15,000 ea. = $30,000	2 facilities installed Completed practices reduces nutrient loads by 120 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 20% of confined livestock operations.	Construct 2 settling basin facilities on 2 farms to control the transfer of animal waste to the streams. * $2,000 ea. = $4,000	2 facilities installed Completed practices reduces nutrient loads by 60 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 934 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 467 acres of the cropland	467 acres tillage changed Completed practices reduces nutrient loads & soil loss by 1401 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	234 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	234 acres rotation changed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used 117.0 acres. * $ 10 acre = $1170	117.0 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 351 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 47.3 miles of streambank where no buffer currently exists	25 farms will seed cool & warm season grasses on 101 acres * $ 79 acre = $ 7979	23.7 miles buffers installed Completed practices reduces nutrient loads & soil loss by 460 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $2.20 ft. = $11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Problem Statement: QHEI scores for this portion of the stream only average 54 (generally a value above 60 is needed to achieve warm water biological criteria). Of the QHEI factors (substrata, in-stream cover, morphology, riparian, and floodplain) the lack of in-stream cover seems to explain the low QHEI scores.

Goal: Improve QHEI score from current average score of 54 to an average of 60 or above.

** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Improve QHEI scores	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Encourage the planting of trees in riparian buffers to provide stabilization and cover.	Plant trees in riparian area 5.0 acres * $400= $2,000.	5.0 acre tree buffer installed QHEI scores improved to 70 in 15 yrs.

Little Wolf Creek
HUC 05040004 090 020

Basic Statistics

Size:	7,084.2 acres (11.1 Sq. Mis.)
Location:	Morgan County
Avg. Flow:	11.21 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 0- Partial 0- Non 9.0
Monitoring Sites:	1 - (M02)

Land Use/Cover

Use/Cover	%
Urban	2.61
Agriculture	40.54
Wooded	56.63
Water	0.20
Wetland	< 0.01
Barren	0.02

Agricultural Statistics

Ag= 40.54 % (2,872 acs.)

26 % Cropland
42 % Pastureland
12 % Woodland
20 % Idol

Croptype - 60% hay, 25% corn, 2% soy beans, 13% small grains
Tillage 80% conventional till, 20% no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*51*	*1020*	*275*	*745*
Dairy	*1*	*252*	*200*	*52*
Horses	*5*	*25*	*0*	*25*
Swine	*0*	*0*	*0*	*0*
Sheep	*2*	*16*	*0*	*16*
Other	*1*	*3*	*0*	*3*
Total	***60***	***1316***	***475***	***841***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
Little Wolf Creek	9.0	23.6	M02
Chaineyville Run	1.2	62.9	n/m
8 Unnamed Streams .	12.2	n/a	n/m
Total ..	22.4	n/a	n/a

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
2.61	1.95	242	-0-	242

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

Little Wolf Creek
HUC 05040004 090 020
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**M02 - Mod.
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	14.9 (67%)
Livestock Access **# stream mis.** **% of total stream mis.**	13.1 (58%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	1 bldg.

** WeCARE Sampling Site

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	169 70%
Confined Livestock Operations **# / size (animal units)**	3 / 475 A.U.
Non Confined Livestock Operations **# / size (animal units)**	57 / 841 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	7012 (99%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	1 crude oil (O&G Well)	1

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.2 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Little Wolf Creek
HUC 05040004 090 020
(cont.)

Sample Site # M02 Little Wolf Creek (RM 1.0)
Morgan Co., Penn Twp., CR 13 at bridge site,

Site Statistics

RM @ sample pt.	1.0
RM = enters W Br Wolf Crk	29.90
Sq. Mi. Drainage	10.7
Avg. cfs	10.8
Gradient ft./ mi.	10.7

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Non	38	n/a	Fair 15	n/m

Habitat Assessment

QHEI	Silt
62	Mod.

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**45000**
06/24/02	LF	130
09/27/02	FF	**7500**
10/16/02	HF	**4500**
10/28/02	LF	40

OEPA Commentary

This sample was collected on June 12, three days before the valid sampling season date. The IBI score of 38 falls short of Warmwater Habitat criteria, Bluntnose Minnows and Creek Chubs comprised on half of the fish community. Noe intolerant species were present, and only 4 of the 18 species were moderately sensitive. A high percentage of tolerant fish were present. Additionally, a high percentage of pioneering species were present, indicating an unstable environment.
(Mishne, OEPA 2003)

Comments Livestock Access, just below Pennsville

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	93.0066 - HF	10:34	7.7	375	10.61	11.73	0.70	**0.1000**	0.26	< 0.050	52
06/25/02	2.5443 - LF	11:24	8.0	525	7.89	22.00	0.23	* 0.0698	0.18	< 0.050	9
07/18/02	0.5089 - LF	10:43	7.7	476	5.83	23.58	0.54	* 0.0583	< 0.10	0.067	14
09/27/02	4.0991 - FF	13:22	7.6	424	7.73	17.62	0.59	0.0580	0.19	< 0.050	16
10/16/02	n/m - HF	14:47	7.8	462	8.93	12.43	n/m	n/m	n/m	n/m	28
10/28/02	n/m - LF	14:28	7.7	556	9.06	12.60	.028	* 0.0867	< 0.10	< 0.050	5

Little Wolf Creek
HUC 05040004 090 020
(cont.)

Background Statement: Little Wolf Creek in sub-watershed HUC 05040004 090 020, RM 1.0, in Morgan County, Penn Township, County Rd 13, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, aquatic attainment and IBI scores.
Problem Statement: High nutrient loads in the Little Wolf Creek are occurring due to unmaintained on-site sewage treatment systems, which account for approximately 70% of all systems in this sub-watershed.
Goal: Over the next 10 years, work with watershed residents and the local Health Departments to upgrade/ repair 85 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 85 systems	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	85 Systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install 2 Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in Coal Run are occurring due to 60 livestock operations inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 30 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

** All expected funding sources for implementation act ivies will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 14.9 miles of streambank where access is unlimited.	Streambank fencing 2.2miles = 11,616 ft. * $ 1.40 ft. = $ 16,262	2.2 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 44 tons in 15 yrs.
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 57 non-confined livestock operations.	3000 ft. of pipeline * $1.40 ft. = $4,200 15 troughs set * $ 619 ea. = $9,285 installed on 14 sites	14 sites completed Completed practices reduces nutrient loads & soil loss by 70 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 14.9 miles of streambank where no buffer currently exists.	8 farms will seed cool & warm season grasses on 32 acres * $ 79 acre = $ 2528	7.5 miles buffers installed Completed practices reduces nutrient loads & soil loss by 150 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 25% of confined livestock operations.	Construct 1 animal waste storage facility on 1 farm. * $ 15,000 ea. = $ 15,000	1 facilities installed Completed practices reduces nutrient loads by 60 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 25% of confined livestock operations.	Construct 1 settling basin facility on 1 farm to control the transfer of animal waste to the streams. * $ 2000.00 per site = $ 2000.00	1 facilities installed Completed practices reduces nutrient loads by 30 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 374 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES & FUNDING	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 187 acres of the cropland	187 acres tillage changed Completed practices reduces nutrient loads & soil loss by 561 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	94 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	94 acres rotation changed Completed practices reduces nutrient loads & soil loss by 282 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 94 acres at an approximate * $ 10 acre = $ 940	94 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 282 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 14.9 miles of streambank where no buffer currently exists	8 farms will seed cool & warm season grasses on 32 acres * $ 79 acre = $ 2528	7.5 miles buffers installed Completed practices reduces nutrient loads & soil loss by 150 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	Install 5000 ft of waterways $ 2.20 ft. = $ 11,000 sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

West Branch Wolf Creek
between Little Wolf Creek & Aldridge Run
HUC 05040004 090 030

Basic Statistics

Size:	14,691.9 acres (23.0 Sq. Mis.)
Location:	Morgan County
Avg. Flow:	23.2 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 18.4 Partial 0 Non 0
Monitoring Sites:	Two - (M04, M05)

Land Use/Cover

Use/Cover	%
Urban	1.57
Agriculture	33.38
Wooded	64.43
Water	0.62
Wetland	0.00
Barren	0.00

Agricultural Statistics

Ag= 33.38 % (4,904 acs.)

32 % Cropland
46 % Pastureland
15 % Woodland
7 % Idol

Croptype - 50% hay, 30% corn, 5% soy beans, 15% small grains
Tillage 60% conventional till, 40% no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*49*	*968*	*64*	*904*
Dairy	*5*	*375*	*280*	*95*
Horses	*10*	*50*	*0*	*50*
Swine	*2*	*69*	*69*	*0*
Sheep	*2*	*20*	*0*	*20*
Other	*3*	*4*	*0*	*4*
Total	***71***	***1486***	***413***	***1073***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
West Branch Wolf Creek	*13.4	n/m	M04
McPherson Rn.....	1.8	154.1	n/m
Goshen Rn..... ..	5.0	36.8	M05
Browns Rn.....	1.7	131.0	n/m
11 Unnamed Streams.....	18.5	n/a	n/m
Total ..	40.4	n/a	2

* portion of total length (47.5 ft.)

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
1.57	1.18	288	- 0 -	288

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

West Branch Wolf Creek
between Little Wolf Creek & Aldridge Run
HUC 05040004 090 030
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**M04 - Little; **M05 - Mod; W Br Wolf Crk, 20 meters S of the Williams Covered Bridge - Heavy
Riparian Buffer (35) # of stream mis. % of total stream mis.	30.2 (75%)
Livestock Access # stream mis. % of total stream mis.	19.3 (47%)
# Dams & Locations	W Br Wolf Crk & SR 377, 1250 upstream @ Bob Woodyards.
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	1 bldg.

** WeCARE Sampling Sites

Non Point Source Pollution

Home Septic Systems # Failing Systems % of total systems	144 50%
Confined Livestock Operations # / size (animal units)	11 / 413 A.U.
Non Confined Livestock Operations # / size (animal units)	60 / 1073 A.U.
Acres of Highly Erodible Soil (% of Total Acres)	14,104 (96%)
Stream Miles Dammed	0.24

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	-0-	-0-

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.3 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

West Branch Wolf Creek
between Little Wolf Creek & Aldridge Run
HUC 05040004 090 030
(cont.)

Sample Site # M04 West Branch Wolf Creek (RM 27.20)
Morgan Co., Marion Twp. @ CR 79 bridge site,

Site Statistics

RM @ sample pt.	27.7
RM = enters W Br Wolf Crk	27.7
Sq. Mi. Drainage	59.0
Avg. cfs	59.6
Gradient ft./mi.	4.26

OEPA Commentary
Based on the IBI alone, the site scored within non-significant departure of Exceptional Warmwater Habitat criteria, Species diversity was excellent, which included 7 darter species. Numbers of individuals of each species was fairly evenly distributed, with no species dominating the community, The QHEI score of 72.5 clearly indicates that habitat is available to support an EWH fish community. (Mishne, OEPA, 2003)

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	46	n/a	Good 18	n/m

Habitat Assessment

QHEI	Silt
72.5	Mod.

Comments Livestock Access

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**N/m**
06/24/02	LF	140
09/27/02	FF	**20930**
10/16/02	HF	**1700**
10/28/02	LF	110

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	512.8402 - HF	10:49	7.4	240	10.60	12.50	0.56	0.0900	0.24	< 0.050	96
06/25/02	14.0291 - LF	11:42	8.0	476	8.04	22.99	0.45	*0.0730	0.10	< 0.050	9
07/18/02	2.8058 - LF	11:00	7.9	339	7.83	24.11	0.36	* 0.0353	0.43	< 0.050	10
09/27/02	22.6024 - FF	13:05	8.0	348	9.06	17.36	0.60	**0.1110**	0.33	< 0.050	12
10/16/02	n/m - HF	14:30	7.7	455	7.90	12.02	n/m	n/m	n/m	n/m	18
10/28/02	n/m - LF	14:04	7.7	470	7.43	12.16	0.39	**0.1400**	< 0.10	< 0.050	5

West Branch Wolf Creek
between Little Wolf Creek & Aldridge Run
HUC 05040004 090 030
(cont.)

Sample Site # M05 Goshen Run (RM 0.10)
Morgan Co., Marion Twp., @ CR 52 bridge site,

Site Statistics

RM @ sample pt.	0.10
RM = enters W Br Wolf Crk	25.96
Sq. Mi. Drainage	9.3
Avg. cfs	9.4
Gradient ft./ mi.	4.14

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	48	n/a	Poor 10	n/m

Habitat Assessment

QHEI	Silt
68.0	Norm.

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**50000**
06/24/02	LF	253
09/27/02	FF	**1966667**
10/16/02	HF	**3600**
10/28/02	LF	73

Comments Trash, Algae in riffles

OEPA Commentary
This sampled was collected June 12, three days before the valid sampling season date. The IBI score of 48 is within non-significant departure of Exceptional Warm water Habitat criteria, Six darter species were present as well as one intolerant species and a total of six sensitive species. Numbers of fish

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)
05/14/02	80.8375 - HF	11:03	7.8	304	10.45	11.96	0.34	* 0.0448	0.24	< 0.050	26
06/25/02	2.2114 - LF	11:58	8.1	444	9.47	22.28	< 0.20	* 0.0600	0.15	< 0.050	< 5
07/18/02	0.4423 - LF	11:09	7.9	432	8.04	23.20	< 0.20	* 0.0343	0.13	< 0.050	< 5
09/27/02	3.5627 - FF	12:56	7.5	416	6.59	18.65	3.10	**1.5600**	**3.19**	0.872	266
10/16/02	n/m - HF	14:15	7.8	388	9.68	12.17	n/m	n/m	n/m	n/m	18
10/28/02	n/m - LF	13:51	7.9	474	9.37	12.36	< 0.20	* 0.0760	< 0.10	< 0.050	< 5

West Branch Wolf Creek
between Little Wolf Creek & Aldridge Run
HUC 05040004 090 030
(cont.)

Background Statement: West Branch Wolf Creek in sub-watershed HUC 05040004 090 030, RM 27.2, in Morgan County, MarionTownship, County Rd 79, is not meeting water quality use designations due to excessive nutrient loads, and sedimentation.

Problem Statement: High nutrient loads in the Little Wolf Creek are occurring due to unmaintained on-site sewage treatment systems which account for approximately 70% of all systems in this sub-watershed.

Goal: Over the next 10 years, work with the local Health Departments to attain funding to upgrade/ repair 72 of the failing systems and to educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 72 systems	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	72 -Systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in the West Branch Wolf Creek are occurring due to 71 livestock operations inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 36 livestock operations with the installation of animal waste storage facilities and best management practices to limit access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.
** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 30.2 miles of streambank where access in unlimited.	Streambank fencing 4.5 miles = 23,760 ft. * $ 1.40 = $ 33,264	4.5 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 90 tons in 15 yrs.
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 60 non-confined livestock operations.	3000 ft. of pipeline * $1.40 ft. = $4200 15 troughs set * $ 619 ea. = $9285 installed on 15 sites.	15 sites completed Completed practices reduces nutrient loads & soil loss by 75 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 30.2 miles of streambank where no buffer currently exists.	16 farms will seed cool & warm season grasses on 64 acres * $ 79 = $ 5056	15.1 miles buffers installed Completed practices reduces nutrient loads & soil loss by 302 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 25% of confined livestock operations.	Construct 3 animal waste storage facilities on 2 farms * $ 15,000 ea. = $ 45,000	3 facilities installed Completed practices reduces nutrient loads by 180 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 25% of confined livestock operations.	Construct 3 settling basin facilities on 3 farms to control the transfer of animal waste to the streams. * $ 2,000 ea. = $ 6,000	3 facilities installed Completed practices reduces nutrient loads by 90 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 785 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 393 acres of the cropland.	393 acres tillage changed Completed practices reduces nutrient loads & soil loss by 1179 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	196 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	196 acres rotation changed Completed practices reduces nutrient loads & soil loss by 588 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 98 acres * $ 10 acre = $ 980	98 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 294 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 30.2 miles of streambank where no buffer currently exists	5 farms will seed cool & warm season grasses on 20.4 acres * $ 79 = $ 1612	20.4 miles buffers installed Completed practices reduces nutrient loads & soil loss by 408 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Aldridge Run
HUC 05040004 090 040

Basic Statistics

Size:	7,724.3 acres (12.1 Sq. Mis.)
Location:	Morgan & Washington Cos.
Avg. Flow:	12.2 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 7.4 Partial 0 Non 0
Monitoring Sites:	1 - (W08)

Land Use/Cover

Use/Cover	%
Urban	2.18
Agriculture	33.85
Wooded	63.67
Water	0.30
Wetland	<0.01
Barren	0.00

Agricultural Statistics

Ag= 33.85 % (2,615 acs.)

20 % Cropland
65 % Pastureland
12 % Woodland
3 % Idol

Croptype - 60% hay, 25% corn, 8% soy beans, 7% small grains Tillage
60% conventional till, 40% no till
Rotations 2 yrs. corn, 1 yr beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*100*	*2000*	*288*	*1712*
Dairy	*0*	*0*	*0*	*0*
Horses	*5*	*20*	*0*	*20*
Swine	*2*	*399*	*399*	*0*
Sheep	*0*	*0*	*0*	*0*
Other	*0*	*0*	*0*	*0*
Total	***107***	***2419***	***687***	***1732***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
Aldridge Run..... ..	7.4	28.7	W08
Scott Run.....	3.4	62.9	n/m
Lick Run,,,,,,,,,, ..	1.9	72.0	n/m
11 Unnamed Streams.....	13.6	n/a	n/m
Total ..	26.3	n/a	1

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
2.18	1.53	357	2	355

Aldridge Run
HUC 05040004 090 040
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**W08 - Little; Aldridge Rn, TR 466 at bridge from Twp. ditch main. - Heavy
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	20.2 (77%)
Livestock Access **# stream mis.** **% of total stream mis.**	13.4 (50%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	-0-

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	177 50%
Confined Livestock Operations **# / size (animal units)**	13 / 687 A.U.
Non Confined Livestock Operations **# / size (animal units)**	94 / 1732 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	7,647 (99%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	1 animal waste	1

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.4 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Aldridge Run
HUC 05040004 090 040
(cont.)

Sample Site # W08 Aldridge Run (RM 0.10)
Washington Co., Wesley Twp., TR 466 bridge site,

Site Statistics

RM @ sample pt.	0.10
RM = enters W Br Wolf Crk	16.75
Sq. Mi. Drainage	12.1
Avg. cfs	12.2
Gradient ft./ mi.	14.52

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	42	n/a	Poor 9	Poor 2

Habitat Assessment

QHEI	Silt
61.0	Mod

Comments None

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**45000**
06/24/02	LF	179
09/27/02	FF	**3334**
10/16/02	HF	**2100**
10/28/02	LF	83

OEPA Commentary
The low IBI score appears to be the result of a dominance of the community by Creek Chubs and Bluntnose Minnows. These 2 species comprised over 50% of the community. Tolerant fish were abundant. The pioneering species metric was affected by the high percentage of Creek Chubs. Habitat was good for a headwaters stream.
(Mishne, OEPA 2003)

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	105.1757 - HF	12.02	7.6	294	10.40	12.28	0.41	0.0600	0.24	< 0.050	29
06/25/02	2.8771 - LF	13:01	7.9	464	8.33	23.88	0.24	* 0.0366	< 0.10	< 0.050	5
07/18/02	0.5754 - LF	12:07	7.6	458	8.12	23.99	0.20	* 0.0517	0.10	< 0.050	< 5
09/27/02	4.6354 - FF	11:12	7.5	417	6.73	17.43	0.27	**0.1140**	0.44	< 0.050	59
10/16/02	n/m - HF	13:18	7.8	382	9.07	12.56	n/m	n/m	n/m	n/m	16
10/28/02	n/m - LF	12:58	7.5	586	8.03	13.24	2.27	**0.1260**	0.50	1.880	< 5

Aldridge Run
HUC 05040004 090 040
(cont.)

Background Statement: Little Wolf Creek in sub-watershed HUC 05040004 090 040, RM 0.10, in Washington County, Wesley Township, Twp. Rd 466, is not meeting water quality use designations due to excessive nutrient loads, and sedimentation.

Problem Statement: High nutrient loads in Aldridge Run are occurring due to unmaintained on-site sewage treatment systems, which account for approximately 50% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade / repair 89 of the failing educate citizens of the importance of proper sewage systems. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 89 systems as times permits.	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	89 Systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in Aldridge Run are occurring due to 107 livestock operations inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 54 livestock operations with the installation of animal waste storage facilities and best management practices to limit access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 20.2 miles of streambank where access in unlimited.	Streambank fencing 3.0 miles= 15,840 ft * $1.40 a ft. = $22,176	3.0 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 60 tons in 15 yrs.
Livestock Exclusion (Fencing & Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 94 non-confined livestock operations.	4600 ft. of pipeline * $ 1.40 ft. = $ 6440 24 troughs * $ 619 ea. = $14,856 installed on 24 sites.	24 sites completed Completed practices reduces nutrient loads & soil loss by 120 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 20.2 miles of streambank where no buffer currently exists.	10 farms seed cool & warm season grasses on 42.8 acres * $79 acre = $3381	10.1 miles buffers installed Completed practices reduces nutrient loads & soil loss by 202 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 25% of confined livestock operations.	Construct 3 animal waste storage facilities on 3 farms. * $15,000 ea. = $ 45,000	3 facilities installed Completed practices reduces nutrient loads by 180 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 25% of confined livestock operations.	Construct 3 settling basin Facilities on 3 farms to control the transfer of animal waste to the streams. * $ 2,000 ea. = $ 6,000	3 facilities installed Completed practices reduces nutrient loads by 90 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 523 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation will be EQIP, 319 $, Pollution Abatement., etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 262 acres of the cropland	262 acres tillage changed Completed practices reduces nutrient loads & soil loss by 786 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	131 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	131 acres rotation changed Completed practices reduces nutrient loads & soil loss by 524 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 66 acres at an approximate cost of $10 per acre or $660	66 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 198 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 20.2 miles of streambank where no buffer currently exists	10 farms will seed cool & warm season grasses on 42.8 acres costing *$79 = $3381	10.1 miles buffers installed Completed practices reduces nutrient loads & soil loss by 202 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Coal Run

HUC 05040004 090 050

Basic Statistics

Size:	14,003.4 acres (21.9 Sq. Mis.)
Location:	Morgan, Washington & Athens Co.s
Avg. Flow:	22.1 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 10.5 Partial 0 Non 0
Monitoring Sites:	Two - (M06, W07)

Land Use/Cover

Use/Cover	%
Urban	3.12
Agriculture	29.49
Wooded	66.92
Water	0.43
Wetland	0.00
Barren	0.04

Agricultural Statistics

Ag= 29.49 % (4,130 acs.)

23 % Cropland
55 % Pastureland
18 % Woodland
4 % Idol

Croptype - 60% hay, 25% corn, 2% soy beans, 13% small grains
Tillage 80% conventional till, 20% no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*120*	*2400*	*240*	*2160*
Dairy	*1*	*100*	*100*	*0*
Horses	*6*	*3*	*0*	*3*
Swine	*0*	*0*	*0*	*0*
Sheep	*1*	*13*	*0*	*13*
Other	*3*	*2*	*0*	*2*
Total	***131***	***2649***	***340***	***2178***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
Coal Run..... ..	10.5	20.2	M06,W07
Shrader Run.....	3.2	62.4	n/m
North Branch Coal Run	4.5	42.7	n/m
Buckeye Run.....	2.8	38.8	n/m
Mile Run..... .	1.5	53.4	n/m
7 Unnamed Streams.....	10.6	n/a	n/m
Total ..	33.1	n/a	n/m

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
3.12	2.34	714	-0-	714

HUC 05040004 090 050
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**M06 - Mod; **W07- Little.; Coal Rn, TR 103, TR. road ditch main. Heavy
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	26.9 (80%)
Livestock Access **# stream mis.** **% of total stream mis.**	7.1 (31%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	1 bldg.

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	499 70%
Confined Livestock Operations **# / size (animal units)**	11 / 340 A.U.
Non Confined Livestock Operations **# / size (animal units)**	120 / 2178 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	13,863 (99%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	1 crude oil (O&G Well)	5

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.5 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Coal Run
05040004 090 050
(cont.)

Sample Site # M06 Coal Run (RM 4.9)
Morgan Co., Marion Twp. @ SR 555 bridge site,

Site Statistics

RM @ sample pt.	4.9
RM = enters W Br Wolf Crk	15.11
Sq. Mi. Drainage	16.9
Avg. cfs	17.1
Gradient ft./ mi	6.97

EPA Commentary
The IBI score of 54 clearly indicates that this stream is Exceptional Warmwater Habitat. Excellent species diversity was present, as well as high numbers of individuals. The QHEI score was only moderately good, but with the right features present, the fish community can do very well. (Mishne, OEPA 2003)

Aquatic Assessment

Aquatic Use Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	54	n/a	Good 18	Poor 5

Habitat Assessment

QHEI	Silt
56.0	Mod.

Comments Algae Riffles; Trash; Mussel Shells

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**38000**
06/24/02	LF	63
09/27/02	FF	**7500**
10/16/02	HF	**2600**
10/28/02	LF	80

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	146.8983 - HF	11:48	7.8	230	10.62	12.78	0.41	* 0.0620	< 0.10	< 0.050	18
06/25/02	4.0185 - LF	12:50	8.1	367	9.54	24.40	< 0.20	* 0.0427	< 0.10	< 0.050	< 5
07/18/02	0.8037 - LF	11.56	8.1	382	9.32	25.46	0.24	* 0.0397	< 0.10	< 0.050	< 5
09/27/02	6.4742 - FF	11:48	7.9	648	8.40	17.90	0.58	*** 0.1220**	0.54	< 0.050	24
10/16/02	n/m - HF	13:40	7.8	336	9.85	12.11	n/m	n/m	n/m	n/m	30
10/28/02	n/m - LF	13:35	7.8	490	10.56	12.64	0.24	* 0.0690	< 0.10	< 0.050	< 5

West Branch Wolf Creek above Little Wolf Creek
Coal Run
HUC 05040004 090 050
(cont.)

Sample Site # W07 Coal Run (RM 0.60)
Washington Co., Wesley Twp., @ TR 203 bridge site,

Site Statistics

RM @ sample pt.	0.6
RM = enters W Br Wolf Crk	15.11
Sq. Mi. Drainage	21.8
Avg. cfs	22.0
Gradient ft./ mi.	4.56

OEPA Commentary
There appears to be nothing drastically wrong with this site. Based on the biocriteria index scores, and the QHEI, the site is within non-significant departure of Exceptional Warmwater Habitat. Species diversity was excellent, and total number of fish was high. The habitat was good. (Mishne, OEPA 2003)

Aquatic Assessment

Aquatic Use Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	48	9.4	Good 18	Poor 2

Habitat Assessment

QHEI	Silt
62.5	Norm.

Comments Trash in stream

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**12300**
06/24/02	LF	112
09/27/02	FF	**10000**
10/16/02	HF	**1000**
10/28/02	LF	20

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	189.4901 - HF	12:13	7.7	233	10.44	12.40	0.52	0.0600	0.11	< 0.050	20
06/25/02	5.1836 - LF	13:23	7.9	381	8.69	23.49	< 0.20	* 0.0438	< 0.10	< 0.050	< 5
07/18/02	1.0367 - LF	12.14	7.7	379	7.75	24.00	0.22	* 0.0352	< 0.10	< 0.050	n/t
09/27/02	8.3514 - FF	11:24	7.7	392	8.67	16.91	0.34	*** 0.1330**	0.12	< 0.050	56
10/16/02	n/m - HF	13:26	7.7	374	9.38	11.93	n/m	n/m	n/m	n/m	34
10/28/02	n/m - LF	13.06	7.7	477	8.63	11.99	0.31	* 0.0594	< 0.10	< 0.050	< 5

Coal Run
HUC 05040004 090 050
(cont.)

Background Statement: Coal Run in sub-watershed HUC 05040004 090 050, RM 4.9, in Morgan County, Marion Township, State Rd 555, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, and QHEI scores.

Problem Statement: High nutrient loads in Coal Run are occurring due to unmaintained on-site sewage treatment systems which account for approximately 70% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/upgrade 128 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 128 systems.	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	128 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in Coal Run are occurring due to 131 livestock operations with possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 66 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.
*** All expected funding sources for the implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 26.9 miles of streambank where access in unlimited.	Streambank fencing 4.0 miles = 21,120 ft. * $ 1.40 ft. = $29,568	4.0 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 160 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 120 non-confined livestock operations.	4800 ft. of pipeline *$1.40 ft. = $6720 30 troughs set * $ 619 ea. = $18,570 installed on 30 sites.	30 sites completed Completed practices reduces nutrient loads & soil loss by 190 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 26..9 miles of streambank where no buffer currently exists.	28 farms will seed cool & warm season grasses on 57 acres *$79 acre = $4503	13.5 miles buffers installed Completed practices reduces nutrient loads & soil loss by 270 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 25% of confined livestock operations.	Construct 3 animal waste storage facilities *$15,000 ea. = $45,000	3 facilities installed Completed practices reduces nutrient loads by 180 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 25% of confined livestock operations.	Construct 3 settling basin facility to control the transfer of animal waste to the streams. *$2,000 = $6,000	3 facilities installed Completed practices reduces nutrient loads by 90 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 1033 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 517 acres of the cropland	517 acres tillage changed Completed practices reduces nutrient loads & soil loss by 1551 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	258 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	258 acres rotation changed Completed practices reduces nutrient loads & soil loss by 774 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 129 acres at an approximate cost of $10 per acre or $1290	129 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 387 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 26.9 miles of streambank where no buffer currently exists	28 farms will seed cool & warm season grasses on 114 acres *$79= $9006	13.5 miles buffers installed Completed practices reduces nutrient loads & soil loss by 270 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Problem Statement: QHEI scores for this portion of the stream only average 56 (generally a value above 60 is needed to achieve warm water biological criteria). Of the QHEI factors (substrata, in-stream cover, morphology, riparian, and floodplain) the lack of in-stream cover seems to explain the low QHEI scores.

Goal: Improve QHEI score from current average score of 56 to an average of 60 or above.

*** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Improve QHEI scores	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Encourage the planting of trees in riparian buffers to provide stabilization and cover.	Plant trees in riparian area 5.0 acres * $400= $2,000.	5.0 acre tree buffer installed QHEI scores improved to 70 in 15 yrs.

West Branch Wolf Creek
between Aldridge Run & South Branch Wolf Creek
HUC 05040004 090 060

Basic Statistics

Size:	20,183.3 acres (31.5 Sq. Mis.)
Location:	Morgan & Washington Cos.
Avg. Flow:	31.8 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 0 Partial 0 Non 0
Monitoring Sites:	2 - (W09, W10)

Land Use/Cover

Use/Cover	%
Urban	1.02
Agriculture	33.84
Wooded	63.93
Water	1.21
Wetland	0.00
Barren	0.00

Agricultural Statistics

Ag= 33.84 % (6,830 acs.)

30 % Cropland
60 % Pastureland
8 % Woodland
2 % Idol

Croptype 50% hay, 30% corn, 10% soy beans, 10% small grains
Tillage 60% conventional till, 40% no till
Rotations 2 yrs. corn, 1yr beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*72*	*848*	*160*	*688*
Dairy	*2*	*120*	*100*	*20*
Horses	*3*	*9*	*0*	*9*
Swine	*0*	*0*	*0*	*0*
Sheep	*0*	*0*	*0*	*0*
Other	*3*	*3*	*0*	*3*
Total	***80***	***980***	***260***	***720***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
West Branch Wolf Creek	* 16.9	n/m	W09,W10
Lucas Run.....	4.1	39.4	n/m
Whitewater Creek ..	3.6	47.0	n/m
Laurel Run	4.3	33.8	n/m
11 Unnamed Streams..... .	17.0	n/a	n/m
Total ..	45.9	n/a	2

* portion of total length (45.7 ft.)
*** named for WeCARE Project

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
1.02	0.77	764	-0-	764

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

West Branch Wolf Creek
between Aldridge Run & South Branch Wolf Creek
HUC 05040004 090 060
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	** W09 Little; **W10 Little
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	25.5 (56%)
Livestock Access **# stream mis.** **% of total stream mis.**	26.3 (57%)
# Dams & Locations	-0-
Protected Mis. & Locations	2000 Boy Scout Res. NW Bank (Map 1)
Expected Construction Roads, Bldgs., Bridges	-0-

** WeCARE sampling sites

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	458 60%
Confined Livestock Operations **# / size (animal units)**	22 / 260 A.U.
Non Confined Livestock Operations **# / size (animal units)**	58 / 720 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	19,780 (98%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	1 crude oil (O&G Well)	2

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.6 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

West Branch Wolf Creek
between Aldridge Run & South Branch Wolf Creek
05040004 090 060
(cont.)

Sample Site # W09 West Branch Wolf Creek (RM 13.8)
Washington Co., Wesley Twp. @ CR 206 bridge site

Site Statistics

RM @ sample pt.	13.8
RM = enters W Br Wolf Crk	13.8
Sq. Mi. Drainage	115.0
Avg. cfs	116.2
Gradient ft./ mi.	2.48

Aquatic Assessment

Aquatic Use Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
n/m	n/m	n/m	Fair 16	n/m

Habitat Assessment

QHEI	Silt
74.0	Norm.

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	n/m
06/24/02	LF	116
09/27/02	FF	**3334**
10/16/02	HF	800
10/28/02	LF	200

Comments Excessive Trash

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	999.6037 - HF	12:23	7.5	217	9.59	13.22	0.61	**0.1400**	0.22	< 0.050	184
06/25/02	27.3448- LF	13:40	8.0	444	7.84	24.72	0.25	* 0.0464	< 0.10	< 0.050	11
07/18/02	5.4690 - LF	12.24	7.8	412	6.57	25.18	0.29	* 0.0512	< 0.10	< 0.050	9
09/27/02	44.0555 - FF	11:35	7.5	444	6.93	16.84	0.33	*** 0.1050**	0.15	< 0.050	22
10/16/02	n/m - HF	13:36	7.6	371	8.00	11.94	n/m	n/m	n/m	n/m	14
10/28/02	n/m - LF	13:20	7.5	435	7.82	12.26	0.40	* 0.0950	< 0.10	< 0.050	7

West Branch Wolf Creek
between Aldridge Run & South Branch Wolf Creek
HUC 05040004 090 060
(cont.)

Sample Site # W10 West Branch Wolf Creek (RM 0.30)
Washington Co., Waterford Twp.@ Twp. 103 bridge site

Site Statistics

RM @ sample pt.	0.3
RM = enters W Br Wolf Crk	0.3
Sq. Mi. Drainage	144.0
Avg. cfs	145.4
Gradient ft./ mi.	4.73

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
n/m	n/m	n/a	Good 17	n/m

Comments None

Habitat Assessment

QHEI	Silt
71.0	Mod.

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	n/m
06/24/02	LF	170
09/27/02	FF	**3334**
10/16/02	HF	**1700**
10/28/02	LF	30

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)
05/14/02	1251.6777 - HF	14:57	7.5	197	9.76	14.30	0.69	**0.1500**	0.25	< 0.050	352
06/25/02	34.2404 - LF	15:59	8.3	415	9.14	28.52	0.27	* 0.0929	< 0.10	< 0.050	9
07/18/02	6.8481 - LF	14:23	8.0	399	8.25	27.46	0.31	* 0.0515	< 0.10	< 0.050	6
09/27/02	55.1651 - FF	10:32	7.8	345	8.39	18.33	0.59	*** 0.1340**	< 0.10	< 0.050	71
10/16/02	n/m - HF	12:25	7.1	356	0.24	13.14	n/m	n/m	n/m	n/m	14
10/28/02	n/m - LF	11:44	7.9	372	11.07	12.55	0.41	* 0.0563	< 0.10	< 0.050	< 5

West Branch Wolf Creek
between Aldridge Run & South Branch Wolf Creek
HUC 05040004 090 060
(cont.)

Background Statement: West Branch Creek in sub-watershed HUC 05040004 090 060, RM 13.8, in Washington County, Wesley Township, County Rd 206, is not meeting water quality use designations due to excessive nutrient loads, and sedimentation.

Problem Statement: High nutrient loads in West Branch Creek are occurring due to unmaintained on-site sewage treatment systems, which account for approximately 60% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/repair 115 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 115 systems.	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	115 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in West Branch are occurring due to 80 livestock operations with possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 40 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 26.3 miles of streambank where access is unlimited.	Streambank fencing 4.0 miles = 21,120 ft. * $ 1.40 ft. = $29,568	4.0 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 160 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 58 non-confined livestock operations.	3000 ft. of pipeline * $ 1.40 ft. = $4200 15 troughs set * $ 619 ea. = $ 9285 installed on 15 sites.	15 sites completed Completed practices reduces nutrient loads & soil loss by 95 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 26.3 miles of streambank where no buffer currently exists.	28 farms will seed cool & warm season grasses on 112 acres * $ 79 acre = $ 8848	13.1 miles buffers installed Completed practices reduces nutrient loads & soil loss by 262 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 20% of confined livestock operations.	Construct 4 animal waste storage facilities on 4 farms. *$ 15,000 ea. = $45,000	4 facilities installed Completed practices reduces nutrient loads by 240 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 20% of confined livestock operations.	Construct 4 settling basin facilities to control the transfer of animal waste to the streams. * $ 2,000 ea. = $ 8,000	4 facilities installed Completed practices reduces nutrient loads by 120 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 1025 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319 $, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 513 acres of the cropland	513 acres tillage changed Completed practices reduces nutrient loads & soil loss by 1539 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	257 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	257 acres rotation changed Completed practices reduces nutrient loads & soil loss by 771 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 129 acres. * $ 10 acre = $ 1290	129 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 387 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 26.3 miles of streambank where no buffer currently exists	28 farms will seed cool & warm season grasses on 112 acres * $ 79 acre = $8848	13.1 miles buffers installed Completed practices reduces nutrient loads & soil loss by 262 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Wolf Creek
between South Branch Wolf Creek & the Muskingum River
HUC 05040004 090 070

Basic Statistics

Size:	6,651.0 (10.4 Sq. Mis.)
Location:	Washington County
Avg. Flow:	10.5 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 0- Partial 0- Non 0-
Monitoring Sites:	1 - (W12)

Land Use/Cover

Use/Cover	%
Urban	3.25
Agriculture	40.55
Wooded	46.18
Water	0.92
Wetland	0.00
Barren	0.10

Agricultural Statistics

Ag= 40.55 % (3,296 acs.)

40 % Cropland
50 % Pastureland
10 % Woodland
0 % Idol

Croptype - 65% hay, 20% corn, 10% soy beans, 5% small grains
Tillage 60% conventional till, 40% no till
Rotations 2 yrs. corn, 2 yrs. beans, 1 yr. small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*71*	*624*	*160*	*464*
Dairy	*2*	*130*	*130*	*0*
Horses	*10*	*20*	*0*	*20*
Swine	*0*	*0*	*0*	*0*
Sheep	*2*	*20*	*0*	*20*
Other	*2*	*4*	*0*	*4*
Total	***87***	***798***	***290***	***508***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
Wolf Creek.....	* 2.9	n/m	W12
Hayward Run.....	3.9	47.2	n/m
Duck Creek..... .	2.1	55.5	n/m
Bosman Run..... ..	2.9	77.0	n/m
Flint Run.....	3.3	65.8	n/m
3 Unnamed Streams.....	2.9	n/a	n/m
Total.....	16.1	n/a	n/a

* portion of total length (19.9 mis.)

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years with approximate 2400 acres of forest timbered

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
3.25	2.44	342	235	107

Little Wolf Creek
between South Branch Wolf Creek & the Muskingum River
HUC 05040004 090 070
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**W 12 - Little
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	10.8 (67%)
Livestock Access **# stream mis.** **% of total stream mis.**	6.6 (41%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	Wolf Crk & SR 339, Waterford Elementary School Addition; Wolf Crk & CR 102 bridge & road repair

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	53 50%
Confined Livestock Operations **# / size (animal units)**	24 / 290 A.U.
Non Confined Livestock Operations **# / size (animal units)**	63 / 508 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	6,451 (97%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	-0-	2

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.7 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Wolf Creek
between South Branch Wolf Creek & the Muskingum River
HUC 05040004 090 070
(cont.)

Sample Site # W12 Wolf Creek (RM 1.5)
Washington Co., Waterford Twp., SR 339 bridge site,

Site Statistics

RM @ sample pt.	1.5
RM = enters W Br Wolf Crk	1.5
Sq. Mis. Drainage	227.0
Avg. cfs	229.3
Gradient ft./mi.	3.82

Comments In Waterford; Algae present

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
n/m	n/m	n/a	Poor 10	n/m

Habitat Assessment

QHEI	Silt
62	Mod

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	n/m
06/24/02	LF	116
09/27/02	FF	**3334**
10/16/02	HF	**1000**
10/28/02	LF	**1100**

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	19703.1308 -HF	15:09	7.5	195	10.24	14.46	0.79	**0.1730**	0.43	< 0.050	**299**
06/25/02	53.9762 - LF	16:09	8.2	410	8.44	28.29	0.36	* 0.0402	< 0.10	< 0.050	13
07/18/02	10.7952 - LF	14:28	8.2	384	8.82	28.45	0.36	* 0.0317	< 0.10	< 0.050	11
09/27/02	86.9617 - FF	10:45	7.7	389	6.78	17.94	0.34	* 0.0877	0.27	< 0.050	42
10/16/02	n/m - HF	12:35	7.7	377	7.41	12.83	n/m	n/m	n/m	n/m	54
10/28/02	n/m - LF	11:53	7.5	403	7.12	11.95	0.40	*** 0.1010**	0.37	< 0.050	11

Wolf Creek
between South Branch Wolf Creek & the Muskingum River
HUC 05040004 090 07*0*
(cont.)

Background Statement: Wolf Creek in sub-watershed HUC 05040004 090 070, RM 1.5, in Washington County, Waterford Township, State Rd 339, is not meeting water quality use designations due to excessive nutrient loads, and sedimentation.

Problem Statement: High nutrient loads in the Wolf Creek are occurring due to unmaintained on-site sewage treatment systems, which account for approximately 50% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/repair 27 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 27 systems	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	27 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in Wolf Creek are occurring due 100 livestock operations with possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 60 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 10.8 miles of streambank where access in unlimited.	Streambank fencing 1.6 miles = 8448 ft. *$1.40 ft. =$11,827	1.6 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 45 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 63 non-confined livestock operations.	3000 ft. of pipeline *$ 1.40 ft. = $4200 and 15 troughs set *$619 ea. = $9285 installed on 15 sites.	15 sites completed Completed practices reduces nutrient loads & soil loss by 95 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 10.8 miles of streambank where no buffer currently exists.	6 farms will seed cool & warm season grasses on 22.9 acres *$79 acre = $1809	5.4 miles buffers installed Completed practices reduces nutrient loads & soil loss by 108 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 20% of confined livestock operations.	Construct 5 animal waste storage facilities on 5 farms. *$15,000 ea. = $75,000	5facilities installed Completed practices reduces nutrient loads by 300 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 20% of confined livestock operations.	Construct 5 settling basin facilities to control the transfer of animal waste to the streams. *$2,000 ea. = $10,000	5 facilities installed Completed practices reduces nutrient loads by 150 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 659 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 330 acres of the cropland	330 acres tillage changed Completed practices reduces nutrient loads & soil loss by 990 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	165 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	165 acres rotation changed Completed practices reduces nutrient loads & soil loss by 495 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on 50% of the cropland.	Field strip cropping used on 83 acres * $10 per acre =$830	83 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 249 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 10.8 miles of streambank where no buffer currently exists	6 farms will seed cool & warm season grasses on 22.9 acres *$79 acre = $1809	5.4 miles buffers installed Completed practices reduces nutrient loads & soil loss by 108 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

South Branch Wolf Creek
above South West Fork
HUC 05040004 100 010

Basic Statistics

Size:	26,016.8 (40.7 Sq. Mis.)
Location:	Washington Co.
Avg. Flow:	41.1 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 22.7 Partial 0 Non 0
Monitoring Sites:	Three - (W16,W17,W18)

Land Use/Cover

Use/Cover	%
Urban	1.55
Agriculture	44.49
Wooded	53.52
Water	0.44
Wetland	0.00
Barren	0.00

Agricultural Statistics

Ag= 44.49 % (11,574 acs.)

62 % Cropland
35 % Pastureland
2 % Woodland
1 % Idol

Croptype - 20% hay, 35% corn, 30% soy beans, 15% small grains
Tillage 20% conventional till, 80% no till
Rotations 2 yrs. corn, 2 yrs. beans, 1 yr. small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*231*	*4620*	*2784*	*1836*
Dairy	*3*	*454*	*454*	*0*
Horses	*10*	*55*	*0*	*55*
Swine	*6*	*434*	*434*	*0*
Sheep	*3*	*27*	*0*	*27*
Other	*5*	*2*	*0*	*2*
Total	***258***	***5592***	***3672***	***1920***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
South Branch Wolf Creek..... ..	* 9.2	n/m	W17
South Fork.....	7.5	34.8	W16
Browns Run	6.0	39.8	n/m
Turkey Hen Run ..	4.5	55.7	n/m
Horse Run..... .	4.7	50.2	n/m
Halfway Run.....	6.0	46.6	W18
Chainey Run.. ..	1.3	201.3	n/m
14 Unnamed Streams	23.5	n/m	n/m
Total ..	62.7	n/m	n/m

* portion of total length (19.9 ft.)
*** named for WeCARE Project

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
1.55	1.16	1290	82	1208

South Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 100 010
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**W 18 Heavy; **W 17 Little; **W16 Heavy; South Frk & TR 266, TR ditch main. Heavy
Riparian Buffer (35) **# of stream mis.** **% of total stream mis.**	40.7 (65%)
Livestock Access **# stream mis.** **% of total stream mis.**	37.4 (60%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	-0-

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems **# Failing Systems** **% of total systems**	845 70%
Confined Livestock Operations **# / size (animal units)**	178 / 3692 A.U.
Non Confined Livestock Operations **# / size (animal units)**	214 / 1920 A.U.
Acres of Highly Erodible Soil **(% of Total Acres)**	25,497 (98%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
1 White Oak *WWTP	3 crude oil (O&G Well)	4

* WWTP Waste Water Treatment Plant

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.8 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

South Branch Wolf Creek
above South West Fork
05040004 100 010
(cont.)

Sample Site # W 18 Halfway Run (RM 1.0)
Washington Co., Warren Twp., TR 459 at bridge site,
near JR. Hart

Site Statistics

RM @ sample pt.	1.0
RM = enters S Br Wolf Crk	19.96
Sq. Mi. Drainage	8.4
Avg. cfs	8.5
Gradient ft./ mi.	14.6

EPA Commentary
Based on the IBI score, this site meets Exceptional Warmwater Habitat criteria. Species diversity was excellent. Although Bluntnose Minnows were very numerous, the IBI score was balanced due to the high number of species and high numbers of individuals. The QHEI score of only 39, shich included heavy silt, extensive substrate embeddedness and heavily eroding banks, ranks the habitat as poor. It is a mystery as to why the IBI scored 50.
(Mishne, Ohio EPA, 2003)

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	50	n/a	Poor 3	Poor 6

Comments
Livestock Access

Habitat Assessment

QHEI	Silt
39.0	Heavy

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**9330**
06/24/02	LF	900
09/27/02	FF	**3334**
10/16/02	HF	**8300**
10/28/02	LF	400

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	73.0145 - HF	14:10	7.5	202	10.03	14.58	0.68	* 0.0644	0.34	0.061	17
06/25/02	1.9974 - LF	15:13	7.4	318	7.42	28.86	0.46	* 0.0578	< 0.10	< 0.050	5
07/18/02	0.3995 - LF	13:35	7.4	310	7.89	26.00	0.33	* 0.0620	< 0.10	< 0.050	10
09/27/02	3.2180 - FF	9:56	7.5	363	6.63	17.09	0.60	*** 0.1010**	0.14	0.077	39
10/16/02	n/m - HF	11:42	7.4	269	7.69	12.58	n/m	n/m	n/m	n/m	60
10/28/02	n/m - LF	11:00	7.4	368	8.25	11.14	0.53	*** 0.1020**	0.36	< 0.050	< 5

South Branch Wolf Creek above South West Fork HUC 05040004 100 010 (cont.)

Sample Site #W17 South Branch Wolf Creek (RM 16.2)
Washington Co., Barlow Twp., CR 2 @ bridge site,

Site Statistics

RM @ sample pt.	16.2
RM = enters W Br Wolf Crk	16.2
Sq. Mi. Drainage	35.0
Avg. cfs	35.4
Gradient ft./ mi.	4.83

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	42	9.2	Fair 13	n/m

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**35000**
06/24/02	LF	177
09/27/02	FF	**6667**
10/16/02	HF	**2000**
10/28/02	LF	**1100**

Comments None

Habitat Assessment

QHEI	Silt
50.5	Heavy

EPA Commentary

Similar to the downstream site, there is a high percentage of Bluntnose Minnows in the fish community. With Bluntnose Minnows excluded from the IBI calculation, the score rises to 48, which is within the acceptable limits of Exceptional Warmwater Habitat. Silt appears to be a problem, as well as extremely low flow conditions. The QHEI indicated heavy silt and interstitial flow. It is possible that in a year of normal flow the IBI score might be higher, but silt is still a problem. The

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	304.2272 -HF	13:48	7.4	208	10.32	12.91	0.69	0.0800	0.41	< 0.050	38
06/25/02	8.3223 - LF	14:46	7.8	340	7.95	27.23	0.47	* 0.0493	< 0.10	< 0.050	6
07/18/02	1.6645 - LF	13:18	7.8	268	9.55	26.48	0.28	* 0.0559	0.16	< 0.050	10
09/27/02	13.4082 - FF	9:40	7.5	354	7.23	17.00	0.44	*** 0.1270**	< 0.10	< 0.050	26
10/16/02	n/m - HF	11:25	7.6	328	8.18	12.73	n/m	n/m	n/m	n/m	12
10/28/02	n/m - LF	10:42	7.5	392	7.28	11.50	0.82	* 0.0866	0.80	< 0.050	8

South Branch Wolf Creek
above Little Wolf Creek
HUC 05040004 100 010
(cont.)

Sample Site #W16 South Fork (RM 0.8)
Washington Co., Barlow Twp., TR 266 @ bridge site,
near Carl McAfee s

Site Statistics

RM @ sample pt.	0.8
RM = enters W Br Wolf Crk	13.62
Sq. Mi. Drainage	7.6
Avg. cfs	7.7
Gradient ft./ mi.	10.47

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	42	n/a	Poor 5	Poor 3

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**16000**
06/24/02	LF	**1600**
09/27/02	FF	**2000000**
10/16/02	HF	**5500**
10/28/02	LF	**1400**

Comments
Livestock access

Habitat Assessment

QHEI	Silt
54.0	Heavy

EPA Commentary
Habitat appears to be some of the problem at this site. Heavy silt in the pools, fair/poor channel conditions, and shallow riffles probably contribute to the lower IBI score. Bluntnose Minnows made up a high percentage of the community (26%). There was also a lack of resident headwaters species, which indicates shallow or low-flow conditions may persist for long periods of time. (Mishne, OEPA, 2003)

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	66.0608 - HF	13:35	7.5	233	10.27	14.34	0.77	* 0.0874	0.66	< 0.050	16
06/25/02	1.8071 - LF	14:38	7.7	440	8.62	27.86	0.85	* 0.0449	0.20	0.090	7
07/18/02	0.3614 - LF	13:07	7.7	455	8.39	25.75	3.66	*** 0.1600**	< 0.10	1.180	16
09/27/02	2.9115 - FF	9:27	7.3	690	8.74	18.00	3.86	**1.8200**	**6.92**	0.727	1,720
10/16/02	n/m - HF	11:10	7.5	574	8.95	12.75	n/m	n/m	n/m	n/m	17
10/28/02	n/m - LF	10:29	7.2	592	9.07	11.20	0.60	*** 0.1080**	0.71	< 0.050	8

South Branch Wolf Creek
above South West Fork
HUC 05040004 100 010
(cont.)

Background Statement: South Branch Creek in sub-watershed HUC 05040004 100 010, RM 16.2, in Washington County, Barlow Township, County Rd 2, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, and QHEI scores.

Problem Statement: High nutrient loads in the Little Wolf Creek are occurring due to unmaintained on-site sewage treatment systems which account for approximately 70% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/repairs 126 of the failing systems and educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 126 systems	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	126 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in South Branch are occurring due to 258 livestock operations with the possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 129 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 40.7 miles of streambank where access in unlimited.	Streambank fencing 6.1 miles = 32,208 ft. *$1.40 ft. = 45,091	6.1 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 122 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 20% of the 214 non-confined livestock operations.	8400 ft. of pipeline *$1.40 a ft. = $11,760 and 43 troughs set *$610 ea. = $26,617 installed on 43 sites.	43 sites completed Completed practices reduces nutrient loads & soil loss by 120 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 40.7 miles of streambank where no buffer currently exists.	21 farms will seed cool & warm season grasses on 85.0 acres *$79 acre = $6715	20 miles buffers installed Completed practices reduces nutrient loads & soil loss by 400 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 5% of 178 confined livestock operations.	Construct 9 animal waste storage facilities on 9 farms. *$15,000 ea. = $135,000	9 facilities installed Completed practices reduces nutrient loads by 540 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 5% of confined livestock operations.	Construct 9 settling basin facilities to control the transfer of animal waste to the streams. *$2,000 ea. = $18,000	9 facilities installed Completed practices reduces nutrient loads by 270 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 3587 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation activities will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 1794 acres of the cropland	1794 acres tillage changed Completed practices reduces nutrient loads & soil loss by 5382 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	449 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	449 acres rotation changed Completed practices reduces nutrient loads & soil loss by 1347 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on 25% of the cropland.	Field strip cropping used on 112 acres *$10 acre = $1120	112 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 336 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 40.7 miles of streambank where no buffer currently exists	21 farms will seed cool & warm season grasses on 85.0 acres *$79 acre = $6715	5.4 miles buffers installed Completed practices reduces nutrient loads & soil loss by 108 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Problem Statement: QHEI scores for this portion of the stream only average 47 (generally a value above 60 is needed to achieve warm water biological criteria). Of the QHEI factors (substrata, in-stream cover, morphology, riparian, and floodplain) the lack of in-stream cover seems to explain the low QHEI scores.

Goal: Improve QHEI score from current average score of 47 to an average of 60 or above.

*** All expected funding sources for implementation activities will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Improve QHEI scores	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Encourage the planting of trees in riparian buffers to provide stabilization and cover.	Plant trees in riparian area 5.0 acres * $400= $2,000.	5.0 acre tree buffer installed QHEI scores improved to 70 in 15 yrs.

South West Fork
HUC 05040004 100 020

Basic Statistics

Size:	14,158.8 acres (22.1 Sq. Mis.)
Location:	Washington Co.
Avg. Flow:	22.3 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 22.4 Partial 0 Non 0
Monitoring Sites:	2 - (W14, W15)

Land Use/Cover

Use/Cover	%
Urban	0.55
Agriculture	55.18
Wooded	43.84
Water	0.43
Wetland	0.00
Barren	0.00

Agricultural Statistics

Ag= 55.18 % (7,813 acs.)

60 % Cropland
37 % Pastureland
3 % Woodland
0 % Idol

Croptype - 20% hay, 35% corn, 50% soy beans, 15% small grains
Tillage 20% conventional till, 80% no till
Rotations 2 yrs. corn, 2 yr.soy beans, 1 yr. small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*78*	*1216*	*480*	*736*
Dairy	*5*	*640*	*540*	*100*
Horses	*10*	*65*	*0*	*65*
Swine	*2*	*90*	*90*	*0*
Sheep	*2*	*16*	*0*	*16*
Other	*3*	*2*	*0*	*2*
Total	***100***	***2029***	***1110***	***919***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
South West Fork..... ..	11.5	22.4	W14,W15
9 Unnamed Streams.	21.2	n/a	n/a
Total ..	32.7	n/a	n/a

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years with approximate 2400 acres of forest timbered

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
0.55	0.41	367	-0-	367

South West Fork
HUC 05040004 100 020
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**W14 Little; **W15 Heavy
Riparian Buffer (35) # of stream mis. % of total stream mis.	23.8 (73%)
Livestock Access # stream mis. % of total stream mis.	19.6 (60%)
# Dams & Locations	-0-
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	-0-

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems # Failing Systems % of total systems	193 50%
Confined Livestock Operations # / size (animal units)	26 / 1110 A.U.
Non Confined Livestock Operations # / size (animal units)	74 / 919 A.U.
Acres of Highly Erodible Soil (% of Total Acres)	13,734 (97%)
Stream Miles Dammed	-0-

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
-0-	-0-	2

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.9 13 (pH & temp.dep.)	< 60.0	< 1000	≥ 60	≥ 44 (var. of 4)	≥ 8.4

Sample Site # W14 South West Fork (RM 5.8)
Washington Co., Barlow Twp., @ TR 288 bridge site, near William Tackett

Site Statistics

RM @ sample pt.	5.8
RM = enters W Br Wolf Crk	10.77
Sq. Mi. Drainage	9.4
Avg. cfs	9.5
Gradient ft./mi.	11.05

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	50	n/a	Poor 2	Poor 6

Comments Oil film

Habitat Assessment

QHEI	Silt
68.5	Mod

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	**17000**
06/24/02	LF	431
09/27/02	FF	**10000**
10/16/02	HF	**6700**
10/28/02	LF	150

OEPA Commentary
This site clearly meets EWH criteria. Very good habitat features were present as indicated by the high QHEI score. Excellent species diversity and good numbers of fish all contributed to the high IBI score. Nothing really stands out among the metrics as being a problem. (Mishne, OEPA 2003)

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	81.7067 - HF	12:59	7.7	203	11.59	13.73	0.64	0.0720	0.43	< 0.050	33
06/25/02	2.2351 - LF	14:05	7.7	344	7.77	24.04	0.44	* 0.0307	0.10	< 0.050	6
07/18/02	0.4470 - LF	12:47	7.5	323	6.28	24.24	0.51	* 0.0345	< 0.10	< 0.050	< 5
09/27/02	3.6011 - FF	9:03	7.1	147	6.55	16.56	0.95	**0.1510**	0.89	< 0.050	40
10/16/02	n/m - HF	10:40	7.7	464	9.20	12.93	n/m	n/m	n/m	n/m	21
10/28/02	n/m - LF	10:03	7.5	295	6.45	11.40	0.34	* 0.0887	< 0.10	< 0.050	< 5

(cont.)

Sample Site # W15 South West Fork (RM 1.3)
Washington Co., Watertown Twp., @ SR339 bridge site,
Note: The fish community assessment for this site is
Located @ RM 0.1 Sec 13, landowner:

Site Statistics

RM @ sample pt.	1.3
RM = enters W Br Wolf Crk	10.77
Sq. Mis. Drainage	21.5
Avg. cfs	21.7
Gradient ft./ mi.	3.26

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Full	46	9.5	Poor 9	Poor 8

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	**27300**
06/24/02	LF	70
09/27/02	FF	**3334**
10/16/02	HF	**5100**
10/28/02	LF	100

Comments
Livestock Access; Algae

Habitat Assessment

QHEI	Silt
51.0	Mod.

OEPA Commentary
As is the site scores within non-significant departure of Exceptional Warmwater habitat criteria, one thing stands that stands out is that there were only 2 darter species present, with only 1 individual of each species. According to the QHEI sheet there was a lot of sand, the substrates, were embedded, and the riffles were poor. You mentioned to me that the site at the mouth was deeper than the other site you did for QHEI and bugs. Poor riffles, or lack of riffles, usually mean few darters. Possibly a different site may have yielded more darters. Also of note is that no intolerant species were present. (Mishne, OEPA 2003)

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)
05/14/02	658.0000 -HF	13:27	7.4	210	10.27	13.76	0.78	**0.1240**	**1.50**	0.058	32
06/25/02	18.0000 - LF	14:18	7.1	356	**4.45**	24.86	0.55	* 0.0751	0.27	0.067	10
07/18/02	3.6000 - LF	12:59	7.3	397	5.58	24.75	1.00	* 0.0690	< 0.10	0.140	10
09/27/02	29.0000 - FF	9:16	7.3	484	6.34	16.71	0.77	* 0.0915	0.55	< 0.050	23
10/16/02	n/m - HF	10:55	7.6	538	7.75	13.18	n/m	n/m	n/m	n/m	13
10/28/02	n/m - LF	10:15	7.3	412	**4.50**	10.86	0.65	* 0.0847	0.66	0.075	8

South West Fork
HUC 05040004 100 020
(cont.)

Background Statement: South West Fork Wolf Creek in sub-watershed HUC 05040004 100 020, RM 1.3, in Washington County, Watertown Township, State Rd 339, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, and QHEI scores.

Problem Statement: High nutrient loads in the South West Fork Wolf Creek are occurring due to unmaintained on-site sewage treatment systems which account for approximately 50% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/ upgrade 97 of the failing systems and to educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 97 systems.	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	97 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in South West Fork are occurring due 100 livestock operations with the possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 50 livestock operations with the installation animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 19.6 miles of streambank where access in unlimited.	Streambank fencing 2.9 miles =15,312 ft. *$1.40 ft. = $21,437	2.9 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 58 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 74 non-confined livestock operations.	3600 ft. of pipeline *$1.40 ft. = $5040 and 18 troughs set *$619 ea. = $11,142	18 sites completed Completed practices reduces nutrient loads & soil loss by 54 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 23.8 miles of streambank where no buffer currently exists.	5 farms will seed cool & warm season grasses on 50 acres *$79 acre = $3950	11.9 miles buffers installed Completed practices reduces nutrient loads & soil loss by 238 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 20% of 26 confined livestock operations.	Construct 5 animal waste storage facilities on 5 farms. *$15,000 ea. = $75,000	5 facilities installed Completed practices reduces nutrient loads by 300 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 20% of confined livestock operations.	Construct 5 settling basin facilities to control the transfer of animal waste to the streams. *$2000 ea. = $10,000	5 facilities installed Completed practices reduces nutrient loads by 150 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 2344 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 1172 acres of the cropland	1172 acres tillage changed Completed practices reduces nutrient loads & soil loss by 3516 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	293 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	293 acres rotation changed Completed practices reduces nutrient loads & soil loss by 879 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on of the cropland.	Field strip cropping used on 146 acres at an approximate cost of $10 per acre = $1460	146 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 438 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 23.8 miles of streambank where no buffer currently exists	5 farms will seed cool & warm season grasses on 50 acres *$ 79 acre = $3950	11.9 miles buffers installed Completed practices reduces nutrient loads & soil loss by 238 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

South Branch Wolf Creek
between South West Fork and West Branch Wolf Creek
HUC 05040004 100 030

Basic Statistics

Size:	10,743.5 (16.8 Sq. Mis.)
Location:	Washington Co.
Avg. Flow:	17.0 cfs
Aquatic Life Use:	
Designation	EWH (OEPA) WWH (WeCARE Project)
Attainment Miles	Full 0 Partial 10.7 Non 0
Sample Sites	2 - (W13,W11)

Land Use/Cover

Use/Cover	%
Urban	1.20
Agriculture	51.10
Wooded	46.04
Water	1.66
Wetland	0.00
Barren	0.00

Agricultural Statistics

Ag= 51.10 % (5,490 acs.)

52 % Cropland
48 % Pastureland
2 % Woodland
0 % Idol

Croptype - 65% hay, 20% corn, 10% soy beans, 5% small grains Tillage
20% conventional till, 80% no till
Rotations 2 yrs. corn, 2 yr. soy beans, 1 yr. small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*58*	*480*	*240*	*240*
Dairy	*1*	*116*	*100*	*16*
Horses	*10*	*50*	*0*	*50*
Swine	*3*	*144*	*144*	*0*
Sheep	*2*	*11*	*0*	*11*
Other	*2*	*5*	*0*	*5*
Total	***76***	***806***	***484***	***322***

A.U. Animal Units

Subwatershed Streams

Names	length (mis.)	Av. Grad. (ft./mi)	Sample Sites
South Branch Wolf Crk..... ..	* 10.7	n/m	W13,W11
Painter Run.....	1.5	78.0	n/m
10 Unnamed Streams .	19.4	n/m	n/m
Total ..	31.6	n/a	n/a

* portion of total length (19.9) ***

Industry Statistics

In addition to the agricultural industry, there are 1200+ O&G Wells throughout the entire watershed and there has been an estimated total of 60 timber operations take place in the last 3 5 years for with approximate 2400 acres of forest timbered.

Urban Statistics

Urban %	Impervious %	Total # Homes	# Homes Public Sewage	# Homes with HSTS
1.20	0.90	308	-0-	308

South Branch Wolf Creek
between South West Fork & West Branch Wolf Creek
HUC 05040004 100 030
(cont.)

Stream Riparian & Habitat

Floodplain Activity	Yes
Eroding Locations	**W13 - Little; **W11 - Little
Riparian Buffer (35) # of stream mis. % of total stream mis.	17.5 (55%)
Livestock Access # stream mis. % of total stream mis.	14.8 (47%)
# Dams & Locations	S Brch Wolf Crk @ TR 108, 90 ft. downstream.
Protected Mis. & Locations	-0-
Expected Construction Roads, Bldgs., Bridges	Culvert replacement- Unnamed trib to S Br Wolf Crk @ SR 339, 2 mis. N of Watertown; Bridge deck replacement S Br Wolf Crk @ SR 339 @ Watertown.

** WeCARE sampling site

Non Point Source Pollution

Home Septic Systems # Failing Systems % of total systems	231 75%
Confined Livestock Operations # / size (animal units)	28 / 484 A.U.
Non Confined Livestock Operations # / size (animal units)	48 / 322 A.U.
Acres of Highly Erodible Soil (% of Total Acres)	10,314 (96%)
Stream Miles Dammed	0.62

Point Source Pollution

NPDES Permits	**# of Spills & Illicit Discharges**	**# Open Trash Dumps**
Camp Hervida	1- animal waste	3

Numerical Targets

pH (cu)	**Cond** (uhmo/cm)	**DO** (mg/l)	**Temp** (C)	**T Phos.** (mg/l)	**T Nit** (mg/l)	**NH3** (mg/l)	*TSS* (mg/l)	**Fecal** (cpu/100 ml)	**QHEI**	**IBI**	**Miwb**
6.5 9.0	< 2400 @ 25 C	> 5.0	8.3 24.4 (date dep.)	< 0.10	< 1.0	1.10 13 (pH & temp.dep.)	< 60.0	< 1000	$\geq$ 60	$\geq$ 44 (var. of 4)	$\geq$ 8.4

South Branch Wolf Creek
between South West Fork & West Branch Wolf Creek
HUC 05040004 100 030
(cont.)

Sample Site # W13 South Branch Wolf Creek (RM 10.0)
Washington Co., Barlow Twp., @ SR339 bridge site,

Site Statistics

RM @ sample pt.	10.0
RM = enters W Br Wolf Crk	10.0
Sq. Mi. Drainage	66.0
Avg. cfs	66.7
Gradient ft./ mi.	3.17

EPA Commentary
The one thing that strands out ids the large number of Bluntnose Minnows. These numbers and percentages skew the IBI score to the low end. Metrics which are affected by high numbers of Bluntnose Minnows are % omnivores, % tolerants, and % and % simple lithophils, with Bluntnose Minnows excluded from the IBI calculation, the IBI score rises to a respectable 46. Also, no intolerant species were present at the site, an indicator that something long-term and chronic is present. According to the QHEI sheet, there is heavy silt at the site. This would account for the presence of such large numbers of Bluntnose Minnows because they are very silt-tolerant, and can lay their eggs on the underneath side of cover, which is suspended off the bottom of the silted channel. And, it would account for the lack of intolerant species. (Mishn, OeEPA 2003)

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
Partial	38	9.5	Poor 6	n/m

Comments In Watertown; Oil film; Trash

Habitat Assessment

QHEI	Silt
58.0	Heavy

Fecal

Date	Flow	Fecal (cpu/ 100ml)
06/06/02	HF	n/m
06/24/02	LF	58
09/27/02	FF	3334
10/16/02	HF	14000
10/28/02	LF	290

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/ cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH_3 (mg/l)	TSS (mg/l)
05/14/02	573.6856 - HF	14:35	7.3	194	9.81	13.58	0.85	0.0910	0.85	< 0.050	51
06/25/02	15.6935 - LF	15:31	8.2	330	11.98	27.07	0.46	* 0.0530	< 0.10	< 0.050	9
07/18/02	3.1387 - LF	13:53	7.7	335	8.56	25.80	0.61	* 0.0539	< 0.10	< 0.050	5
09/27/02	25.2840 - FF	10:11	7.6	293	7.74	17.13	0.47	0.0626	0.13	< 0.050	< 5
10/16/02	n/m - HF	11:57	7.4	347	9.43	12.73	n/m	n/m	n/m	n/m	20
10/28/02	n/m - LF	11:20	7.3	385	7.30	12.56	0.69	* 0.0739	0.36	< 0.050	8

between South West Fork & West Branch Wolf Creek

HUC 05040004 100 030

(cont.)

Sample Site # W11 South Branch Wolf Creek (RM 0.7)
Washington Co., Waterford Twp., @ 339 bridge site,

Site Statistics

RM @ sample pt.	0.7
RM = enters W Br Wolf Crk	0.7
Sq. Mi. Drainage	79.4
Avg. cfs	80.2
Gradient ft./ mi.	4.66

Aquatic Assessment

Aquatic Attainment	IBI	Modified IBI	Summer Macro	Fall Macro
n/m	n/m	n/a	Poor 10	n/m

Comments Beautiful site !

Habitat Assessment

QHEI	Silt
78.0	Mod.

Fecal

Date	Flow	Fecal (cpu/100ml)
06/06/02	HF	n/m
06/24/02	LF	63
09/27/02	FF	**3334**
10/16/02	HF	300
10/28/02	LF	10

Chemistry

Date	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)
05/14/02	690.1312 - HF	14:48	7.2	182	10.18	14.40	1.16	**0.1500**	0.94	0.63	89
06/25/02	18.8796 - LF	15:51	8.7	343	10.30	28.94	0.57	* 0.0597	< 0.10	< 0.050	8
07/18/02	3.7760 - LF	14:10	8.3	353	11.07	27.57	0.53	* 0.0997	0.17	< 0.050	7
09/27/02	30.4174 - FF	10:25	7.7	353	8.51	17.44	0.38	*** 0.1090**	< 0.10	< 0.050	12
10/16/02	n/m - HF	12:15	7.6	351	7.45	13.33	n/m	n/m	n/m	n/m	20
10/28/02	n/m - LF	11:35	7.6	386	10.54	12.51	0.56	* 0.0567	0.88	< 0.050	< 5

South Branch Wolf Creek
between
South West Fork & West Branch Wolf Creek
HUC 05040004 100 030
(cont.)

Background Statement: South Branch Wolf Creek in sub-watershed HUC 05040004 100 030, RM 10.0, in Washington County, Barlow Township, State Rd 339, is not meeting water quality use designations due to excessive nutrient loads, sedimentation, aquatic attainment and IBI scores.

Problem Statement: High nutrient loads in the South Branch Wolf Creek are occurring due to unmaintained on-site sewage treatment systems which account for approximately 75% of all systems in this sub-watershed.

Goal: Over the course of the next 10 years, work with the local Health Departments to attain funding to upgrade/repair 116 of the failing systems and to educate citizens of the importance of proper sewage practices. The committee will also continue to seek funding sources.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME
Work with the county Health Department to determine which systems are failing.	Health Department Inspectors time to inspect systems.	Inspect 116 systems.	Failing on-site report with addresses generated.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Writing HSTS plan to provide guidelines to those upgrading or repairing systems.	116 systems upgraded/repaired.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply to DEFA for a low interest on-site loan program for the county.	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015
Replace/Upgrade failing systems.	SWCD assist local Health Dept. in writing the Home Sewage Treatment System Plan.	Apply for a 319 grant to cost share on on-site septic system replacement.	Obtain grant for cost share dollars to assist homeowners for on-site septic repair/upgrade.	2003 thru 2015
Replace/Upgrade failing systems.	Local Health Dept. and Ohio Environmental Protection Agency Officials and Inspectors	Approve and install Demonstration and Alternative Home Sewage Treatment Facilities	DEFA low interest loan program available in county targeting the known failing systems.	2003 thru 2015

Problem Statement: High nutrient loads in south Branch are occurring due 76 livestock operations with possible inadequate storage and improper applications of livestock manure and unlimited access of livestock to the stream and it s tributaries.

Goal: Assist 38 livestock operations with the installation of animal waste storage facilities and best management practices to limit livestock access to the stream. Both are anticipated to reduce nutrients loads significantly in main stream and tributaries.

*** All expected funding sources for implementation will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install livestock exclusion fencing on 15% of 14.8 miles of streambank where access in unlimited.	Streambank fencing 2.2 mi = 11,616 ft. * $ 1.40 ft. = $ 16,262	2.2 mi. fence installed. Completed practices reduces nutrient loads & soil loss by 44 tons in 15 yrs.
Livestock Exclusion (Fencing and Alternative Water Systems)	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install alternative watering systems on 25% of the 48 non-confined livestock operations.	2400 ft. pipeline *$1.40 ft. = $ 3360 12 troughs set * $ 619 ea. = $7428 installed on 12 sites	12 sites completed Completed practices reduces nutrient loads & soil loss by 36 tons in 15 yrs
Riparian buffer strip next to streambank.	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 17.5 miles of streambank where no buffer currently exists.	9 farms will seed cool & warm season grasses on 37.3 acres * $79 acre = $2947	8.8 miles buffers installed Completed practices reduces nutrient loads & soil loss by 176 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install animal waste storage facilities on 20% of 28 confined livestock operations.	Construct 6 animal waste storage facilities on 6 farms. *$15,000 ea. = $90,000	6 facilities installed Completed practices reduces nutrient loads by 360 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install settling basin practices to control animal waste on 20% of confined livestock operations.	Construct 6 settling basin facilities to control the transfer of animal waste to the streams. *$2000 ea. = $12,000	6 facilities installed Completed practices reduces nutrient loads by 180 tons in 15 yrs
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Write approved plans on proper manure application rates and spreading areas to reduce excessive nutrient runoff.	Add a plan writing component to each AWSF and settling basin to complete the steps of a total animal waste handling system at the cost of $500 ea.	Continuous
Animal Waste Storage Facility	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Educate watershed producers of the importance of proper management of resources to promote the improvement of water quality	Hold annual LEAP1, LEAP 2 and/or LEAP Pasture meetings to provide proper manure handling methods	Continuous

Problem Statement: Excessive siltation in the sub-watershed is impairing use attainment. The source of sediment is overland runoff and what it delivers into the stream, directly related and definitely affected are the IBI scores in this sub-watershed.

Goal: Reduce sedimentation and chemical contamination on 1428 acres of cropland by upgrading methods of natural resource use along the stream and it s tributaries.

*** All expected funding sources for implementation will be EQIP, 319$, Pollution Abatement, etc.

OBJECTIVE	RESOURCES	HOW	PERFORMANCE INDICATORS	TIME & ACCOMPLISHMENT
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of conservation tillage methods of cropping throughout the watershed	No-till or minimum-till methods used instead of conventional tillage on 714 acres of the cropland	714 acres tillage changed Completed practices reduces nutrient loads & soil loss by 2142 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the rotation of tillage crops with the hay and grass crops	357 acres of cropland adding an additional 1 or 2 years to the hay portion of the crop rotation.	357 acres rotation changed Completed practices reduces nutrient loads & soil loss by 1071 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the use of field strips to help in the prevention of erosion and the filtration of chemicals on the cropland.	Field strip cropping used on 178 acres * $ 10 acre = $ 900	178 acres Field Strips installed Completed practices reduces nutrient loads & soil loss by 534 tons in 15 yrs.
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Install 35 ft. buffer strips on 50% of the 17.5 miles of streambank where no buffer currently exists	9 farms will seed cool & warm season grasses on 37.3 acres * $ 79 acre = $ 2947	8.8 miles buffers installed Completed practices reduces nutrient loads & soil loss by 176 tons in 15 yrs
Reduce sedimentation & chemical contamination	SWCD, NRCS, ODNR-DSWC and other agency staff & programs	Promote the installation of Grassed Waterways in cropping patterns where tillage is used.	5000 ft of waterways * $ 2.20 ft. = $ 11,000 installed to reduce sedimentation and chemical contamination.	5000 ft. waterway installed Completed practices reduces nutrient loads & soil loss by 467 tons in 15 yrs

Appendix 1

Subwatershed Stream Statistics

Subwatershed	Drainage sq.mis.	**avg. cfs	Subwatershed Stream Names	length (mis.)	Av. Grad. (ft./mi)
05040004 090 010	44.4	44.8	West Branch Wolf Creek ..	* 15.4	n/m
West Branch Wolf Creek above			*** Rosseau Creek	6.3	10.7
Little Wolf Creek			Buck Run ..	3.6	41.5
			Pleasant Run	1.8	160.5
			Hedgehog Creek .	3.6	37.3
			Kickapoo Creek	3.5	20.4
			Peeper Run ..	1.9	56.6
			20 Unnamed Streams .	40.6	n/a
			Total ..	76.7	n/a
05040004 090 020	11.1	11.21	Little Wolf Creek	9.0	23.6
Little Wolf Creek			Chaneyville Run	1.2	62.9
			8 Unnamed Streams .	12.2	n/a
			Total ..	22.4	n/a
05040004 090 030	23.0	23.2	West Branch Wolf Creek	* 13.4	n/m
West Branch Wolf Creek between			McPherson Run	1.8	154.1
Little Wolf Creek & Aldridge Run			Goshen Run .	5.0	36.8
			Browns Run ..	1.7	131.0
			11 Unnamed Streams ..	18.5	n/a
			Total ..	40.4	n/a
05040004 090 040	12.1	12.2	Aldridge Run .	7.4	28.7
Aldridge Run			Scott Run	3.4	62.9
			Lick Run .	1.9	72.0
			11 Unnamed Streams ..	13.6	n/a
			Total ..	26.3	n/a
05040004 090 050	21.9	22.1	Coal Run	10.5	20.2
Coal Run			Shrader Run ..	3.2	62.4
			North Branch .	4.5	42.7
			Buckeye Run .	2.8	38.8
			Mile Run .	1.5	53.4
			7 Unnamed Streams ..	10.6	n/a
			Total ..	22.9	n/a
05040004 090 060	31.5	31.8	West Branch Wolf Creek	* 16.9	n/m

West Branch Wolf Creek between Aldridge Run & South Branch Wolf Creek (excluding Coal Run)			Lucas Run	4.1	39.4
			Whitewater Creek	3.6	47.0
			Laurel Run	4.3	33.8
			11 Unnamed Streams ..	17.0	n/a
			Total ..	45.9	n/a
05040004 090 070 .	10.4	10.5	Wolf Creek ..	* 2.9	n/m
Wolf Creek between South Branch Wolf Creek and the Muskingum River			Hayward Run	3.9	47.2
			Duck Creek	2.1	55.5
			Bosman Run .	2.9	77.0
			Flint Run .	3.3	65.8
			3 Unnamed Streams .	2.9	n/a
			Total ..	16.1	n/a
05040004 100 010	40.7	41.1	South Branch Wolf Creek .	* 9.2	n/m
South Branch Wolf Creek above Southwest Fork			South Fork .	7.5	34.8
			Browns Run .	6.0	39.8
			Turkeyhen Run	4.5	55.7
			Horse Run .	4.7	50.2
			Halfway Run ..	6.0	46.6
			Chainey Run ..	1.3	201.3
			14 Unnamed Streams ..	23.5	n/a
			Total ..	62.7	n/a
05040004 100 020 ...	22.1	22.3	Southwest Fork	11.5	22.4
Southwest Fork			9 Unnamed Streams ..	21.2	n/a
			Total ..	32.7	n/a
05040004 100 030	16.8	17.0	South Branch Wolf Creek .	* 10.7	n/m
South Branch Wolf Creek between Southwest Fork and West Branch Wolf Creek			Painter Run ..	1.5	78.0
			10 Unnamed Streams ..	19.4	n/a
			Total ..	31.6	n/a

* asterisk indicates the length shown is a segment of a stream not entirely in the subwatershed

** mean annual stream flow= 1.01(square miles of drainage)(coefficent of 1.00)
(*USGS Techniques for Estimating Selected Streamflow Characterics of Rural, Unregualted Streams in Ohio)*

*** Rosseau Crk is an unnamed stream on the USGS Topographic Map and identified by the nearby community of Rosseau located "upstream". This identification was deemed necessary as this stream was chosen to sample as part of the *WeCARE* Project.

APPENDIX 2

Professional Assistance and Volunteer List

ORGANIZATION	NAME	TASK
Ohio EPA	Dan Imhoff DSW Logan..... Jim Grow DSW Logan..... Wayne Conrad & Intern..... Randy Spencer..... Sarah Wallace..... Dennis Mishnee OEPA Groveport..... Linda Friedman, Kathy Haas.....	Water Sampling, Electro-shocking Electro shocking Electro shocking Water Sampling Public Water & Sewage Information Interpret fish & stream assessment data Water analysis
ODNR	Dan Kush, DSW..... Chad Amos, DSW..... Bob Mulligan, DSW..... Randy Tornes, ... Wayne Channel, John Sambuco, Bruce Motsch, Realm..... Greg Snieder..... Jim Baker, Div. of Wildlife..... Randy Sanders, Div of Wildlife..... Rodney Tornes, Rick Archer, Dam Saftey..... Mark Irvin, Bill Serbonich.....	Pollution Abatement funding, Sampling expertise Electro shocking, GIS Data, Facilitator Manure & soils info, Facilitator Information on dams and lakes Mapping, Soils, Land Use Flora and Fawns, Endangered Animals Water quality investigator Sycamore article for newsletter Ponds, lakes and dams Silviculture BMP s, Woodland Inventory
SWCD	Dee Wiseman, Morgan Co..... Sandy Lahmers, Morgan Co..... Trista Tredway, Morgan Co..... Pam Brooker, Washington Co..... Mary Campbell, Washington Co..... Kevin Wagner, Washington Co..... Glenna Hoff, Washington Co..... Kaabe Shaw, Washington Co..... Dave Bauerbach, Washington Co..... Doug Bensmen, Washington Co.....	Technicial & Mapping Advice Financial & Education Research, data entry, education. Facilitator, Advertising Mailing list data, Inven-tory, Promotion Assisted water, soil & manure Sampling, Facilitator Macroinvertrebrate sampling, Education, Facilitator Stream assessments, Facilitator, Education Pebble Count, Web Page Pebble Count
NRCS	Charles McCluskey Jr., Morgan Co..... Jon Bourdon, Washington Co..... Pat Feeley, Washington..... Steve Hibinger, ... Sean Browning..... Rick Griffin, MLRA..... Bob First, Nancy Huffman, Buckeye Hills RC&D.....	Computer expertise Soils Information, Facilitator Mapping Facilitator Mapping Soils Mapping Brochure Development & Editing
Water & Sewer Authorities	Ruth Armstrong, Tri County..... Kevin Tornes, Waterford..... Gene Yost, Barlow ..... Ken Richardson, Washington County Sewer ..... Warren Water Assoc..... Bob Grove, Chesterhill ..... Malta Water Assoc.....	Info on public water and sewer lines.
Buckeye Hills Hocking Valley, Regional Resource Development	Brett Alphin.....	GIS Mapping, inventory information
Army Core of Engineers	Desiree Lawson, Kimberly Courts-Brown.....	Channelization, Levied Area

Washington County	Connie Holblitzol.....	Levied areas, Building Permits
American Electric Power Company	Mike Williams, GIS Specialist.....	Mapping
County Engineers	Morgan Co..... Washington Co.....	Maps
Commissioners	Morgan Co. Carl Dodrill, Bruce Dozer, Ron Moore..... Washington Co. Samuel Cook, John Grimes, Sandy Matthews.....	*Support*
Promotion	Keith Spare..... Ron Zonderman..... Morgan County Herald, Marietta Times, Marietta AM, The Reader..... Various restaurants and area businesses in the area.....	Radio (WJAW) interview Radio (WRFD) interview Informative articles, Promotion of public meetings. Placemats & poster promoting the public meeting and project.
Yellow Springs Instruments	Susan Miller.....	Grant for purchasing water sampling equipment
Volunteers	Rosalie Pletcher, Morgan SWCD Brd Member... Donna Chipps, Morgan Brd Member..... Jim McKibben, Farm Bureau Ecological Rep & Retired US Forest Service ..... Josh Long, OU Environmental Graduate..... Ben Strode, Morgan County Ag Student..... Amy Stevens, Zanesville Wastewater Lab Technician..... Jim Parkinson, Retired Lab Tech..... Louise Zimmer, historian..... Winnie Johnson, historian..... Amy Spencer, student..... Sally Spencer, student..... Brooke Copeland, student..... Marla Mummey, Microsoft Specialist..... Tim January, Computer Design..... Josh Holmes, Marietta College Student..... Ronald Holmes, Josh Holmes assistant.....	Facilitator Education, Assisted public meeting Assisted with stream assessments, Public Meeting Facilitator, Assisted with stream assessments. Assisted with stream assessments, single stage sediment samplers Assisted with stream assessments, single stage sediment samplers. Fecal Testing Single Stage Sediment Samplers Local history, Editing Local history Data Entry, Newsletter Processing Data Entry Data Entry Computer Expertise Mapping Macroinvertebrate Assessment Assisted with Macroinbertebrate assessment
TCCI Laboratories	Jeff Roberts.....	Fecal Coliform Analysis, Sampling expertise
County Health Depts.	Morgan Co..... Washington Co.....	HSTS Plan HSTS Plan

Appendix 3

Hydrological Unit Codes with Descriptions

(see map overlay)

HUC *followed by* **Description**		*Acres*	Square Miles
05040004 090	West Branch Wolf Creek (includes Wolf Creek)	**98,774.9**	**154.4**
05040004 090 010	West Branch Wolf Creek above Little Wolf Creek	28,437.8	44.4
05040004 090 020	Little Wolf Creek	7,083.2	11.1
05040004 090 030	West Branch Wolf Creek between Little Wolf Creek & Aldridge Run	14,691.9	23.0
05040004 090 040	Aldridge Run	7,724.3	12.1
05040004 090 050	Coal Run	14,003.4	21.9
05040004 090 060	West Branch Wolf Creek between Aldridge Run & South Branch Wolf Creek (excluding Coal Run)	20,183.3	31.5
05040004 090 070	Wolf Creek between South Branch Wolf Creek & the Muskingum River	6,651.0	10.4
05040004 100	South Branch Wolf Creek	**50,919.1**	**79.6**
05040004 100 010	South Branch Wolf Creek above Southwest Fork	26,016.8	40.7
05040004 100 020	Southwest Fork	14,158.8	22.1
05040004 100 030	South Branch Wolf Creek between Southwest Fork & West Branch Wolf Creek	10,743.5	16.8
	TOTALS	**149,694**	**234.0**

Appendix 4
Wolf Creek Watershed Lakes & Pond Inventory

Map ID #	Pond Name	Stream	Size		Drainage	Use
			surface (ac)	storage (ac/ft)	(acres)	
HUC 05040004 090 010						
W Branch Wolf Crk above Little Wolf Crk						
1	Jones Lake	Peeper Rn	2.0	3.0	591	Private/Recreational
2	Price Pond	Trib. to W Branch Wolf Crk	N/A	N/A	14	Private/Recreational
3	Augustine Pond	Trib to Buck Rn	0.8	N/A	57	Private/Recreational
4	Blocher Pond	Trib to Rosseau Crk	0.5	3.2	22	Private/Recreational
5	Comstock Pond	Tib to Rosseau Crk	9.0	34.9	75	Private/Recreational
6	ODNR Div of Wildlife	Trib to Rosseau Crk	1.2	6.1	18	Public/Recreational
HUC 05040004 090 030						
W Branch Wolf Crk between Little Wolf Crk & Aldridge Rn						
7	Whitacre Pond	Trib to W Branch Wolf Crk	0.8	5.0	4	Private/Recreational
HUC 05040004 090 040						
Aldridge Rn						
8	Earich Pond	Trib to Aldridge Rn	1.5	8.6	34	Private/Recreational
9	Halley Pond	Trib to Aldridge Rn	3.0	7.6	26	Private/Recreational
HUC 05040004 090 050						
Coal Rn						
10	Janes Lake	N Branch Coal Rn	4.5	18.0	70	Private/Water Supply
HUC 05040004 090 060						
W Branch Wolf Crk between Aldridge Rn &S Branch Wolf Crk (excluding Coal Rn)						
11	Pinkerton Lake	Trib to W Branch Wolf Crk	2.8	21.0	18	Private/Recreational
HUC 05040004 100 010						
S Branch Wolf Crk above Southwest Fork						
12	Goodfellows Park Lake	Browns Run	25.6	448.0	411	Private/Recreational
HUC 05040004 100 020						
Southwest Fork						
13	Gribble's Pond	Trib to Southwest Fork	1.8	6.0	43	Private/Recreational
14	Bogard's Pond	Trib to Southwest Fork	2.4	10.7	25	Private/Recreational
15	Wagner's Pond	Trib to Southwest Fork	3.4	24.5	48	Ag Water Supply
16	Woodruff Lake	Trib to Southwest Fork	2.0	8.0	48	Private/Recreational
17	Shaffer Lake #1	Trib to Southwest Fork	4.0	15.9	42.0	Private/Recreational
18	Shaffer Lake	Trib to Southwest Fork	5.0	12.0	312	Private/Recreational

Appendix 5
Land Use/Land Cover for Wolf Creek Subwatersheds

05040004 090 010

W Branch Wolf Crk above Little Wolf Crk

Use/Cover	%
Urban	1.90
Agriculture	36.48
Wooded	61.28
Water	0.33
Wetland	0.01
Barren	0.00

05040004 090 020

Little Wolf Crk

Use/Cover	%
Urban	2.61
Agriculture	40.54
Wooded	56.63
Water	0.20
Wetland	< 0.01
Barren	0.02

05040004 090 030

W Branch Wolf Crk between Little Wolf Crk & Aldridge Rn

Use/Cover	%
Urban	1.57
Agriculture	33.38
Wooded	64.43
Water	0.62
Wetland	0.00
Barren	0.00

05040004 090 040

Aldridge Rn

Use/Cover	%
Urban	2.18
Agriculture	33.85
Wooded	63.67
Water	0.30
Wetland	< 0.01
Barren	0.00

05040004 090 050

Coal Rn

Use/Cover	%
Urban	3.12
Agriculture	29.49
Wooded	66.92
Water	0.43
Wetland	0.00
Barren	0.04

05040004 090 060

**** W Branch Wolf Crk between Aldridge Rn & S Branch Wolf Crk***

Use/Cover	%
Urban	1.02
Agriculture	33.84
Wooded	63.93
Water	1.21
Wetland	0.00
Barren	0.00

05040004 090 070

Wolf Crk between S Branch & the Muskingum River

Use/Cover	%
Urban	3.25
Agriculture	49.55
Wooded	46.18
Water	0.92
Wetland	0.00
Barren	0.10

05040004 100 010

S Branch Wolf Creek above Southwest Fork

Use/Cover	%
Urban	1.55
Agriculture	44.49
Wooded	53.52
Water	0.44
Wetland	0.00
Barren	0.00

05040004 100 020

Southwest Fork

Use/Cover	%
Urban	0.55
Agriculture	55.18
Wooded	43.84
Water	0.43
Wetland	0.00
Barren	0.00

05040004 100 030

S Branch Wolf Crk between Southwest Fork & W Branch Wolf Crk

Use/Cover	%
Urban	1.20
Agriculture	51.10
Wooded	46.04
Water	1.66
Wetland	0.00
Barren	0.00

Note: Wetland Areas are Non Forested

* ***subwatershed area excludes Coal Rn***

Appendix 6

"WeCARE Sampling Site List

Site #	Sample ID	Location	Longitude	Latitude	River	Drainage	Grad.	10 yr. Low Flow (cfs)		
			(+)	(-)	Mile	sq. mis.	ft./mi.	A 7 Q10	S 30 Q10	W 30 Q10
M01	WBWC@CR16JW	**West Branch Wolf Creek** & CR 16	39 36 33.23	81 55 39.13	39.20	19.2	6.23	0.05	0.08	0.55
		Morgan Co., Union Twp., Sec.12								
M02	LWC@CR13PH	**Little Wolf Creek** & CR 13	39 34 33.23	81 52 21.29	1.00	10.7	10.70	0.03	0.04	0.30
		Morgan Co., Penn Twp., Sec. 10								
M03	RC@TR104LW	**Rosseau Creek** & TR 104	39 33 42.55	81 55 47.29	0.50	8.6	7.19	0.02	0.04	0.24
		Morgan Co., Union Twp., Sec. 25								
M04	WBWC@CR79MS	**West Branch Wolf Creek** & CR 79	39 31 55.02	81 51 57.78	27.70	59.0	4.26	0.16	0.25	1.68
		Morgan Co., Marion Twp., Sec. 18								
M05	GR@CR52RJ	**Goshen Run** & CR 52	39 30 45.45	81 51 52.81	0.10	9.3	4.14	0.03	0.04	0.26
		Morgan Co., Marion Twp., Sec.17								
M06	CR@SR555MP	**Coal Run** & SR 555	39 27 35.15	81 49 23.21	4.90	16.9	6.97	0.05	0.07	0.48
		Morgan Co., Marion Twp., Sec. 1								
W07	CR@TR203LA	**Coal Run** & TR 203	39 28 15.35	81 47 27.24	0.60	21.8	4.56	0.06	0.09	0.62
		Washington Co., Wesley Twp., Sec.1								
W08	AR@TR466JS	**Aldridge Run** & TR 466	39 29 00.21	81 47 34.22	0.10	12.1	14.52	0.03	0.05	0.34
		Washington Co., Wesley Twp., Sec. 27								
W09	WBWC@CR206LJ	**West Branch Wolf Creek** & CR 206	39 27 19.42	81 47 00.50	13.80	115.0	2.48	0.32	0.48	3.30
		Washington Co., Wesley Twp., Sec 19								

A 7Q10 = Average Annual Flow of the lowest 7 consecutive days

S 30Q10 = Average Summer Flow of the lowest 30 consecutive days

W 30Q10 = Average Winter Flow of the lowest 30 consecutive days

Appendix 6 (cont.)

WeCARE Sampling Site List

Site #	Sample ID	Location	Longitude	Latitude	River Mile	Drainage sq. mis.	Grad. ft./mi.	10 yr. Low Flow (cfs) A 7Q10	S 30Q10	W 30Q 10
W10	WBWC@TR103FM	**West Branch Wolf Creek** & TR 103	39 31 39.52	81 39 30.59	0.30	144.0	4.73	0.40	0.60	4.10
		Washington Co., Waterford Twp., Lt. 30								
W11	SBWC@SR339RM	**South Branch Wolf Creek** & SR 339	39 31 28.84	81 39 31.07	0.70	79.4	4.66	0.10	0.20	4.91
		Washington Co., Waterford Twp., Lt. 31								
W12	WC@SR339BE	**Wolf Creek** & SR 339	39 32 9.35	81 38 36.25	1.50	227.0	3.82	0.08	0.17	4.08
		Washington Co., Waterford Twp., Lt. 35								
W13	SBWC@SR339RK	**South Branch Wolf Creek** & SR 339	39 27 53.64	81 38 8.34	10.00	66.0	3.17	0.08	0.17	4.08
		Washington Co., Barlow Twp., Sec. 14								
W14	SWF@TR288WT	**South West Fork** & TR 288 (Smith Rd)	39 25 31.87	81 41 15.70	5.80	9.4	11.05	0.01	0.02	0.58
		Washington Co., Barlow Twp., Sec. 29								
*W15	SWF@SR339DH	**South West Fork** & SR 339	39 26 45.46	81 39 3.21	1.30	21.5	3.26	0.03	0.06	1.36
		Washington Co., Watertown Twp., Sec. 13								
		Note: The bio criteria assessment for this site is								
		located @ mile marker 0.1, Sec 13								
W16	SF@TR261CM	**South Fork** & TR 266	39 25 57.27	81 38 49.16	0.80	7.6	10.47	0.01	0.02	0.47
		Washington Co., Barlow Twp., Sec. 18								
W17	SBWC@CR2MD	**South Branch Wolf Creek** & CR 2	39 25 24.42	81 36 45.45	16.20	35.0	4.83	0.04	0.09	2.16
		Washington Co., Barlow Twp., Sec 5								
W18	HR@TR459JH	**Halfway Run** & TR 459	39 25 37.32	81 34 22.23	1.00	8.4	14.60	0.01	0.02	0.52
		Washington Co., Warren Twp., Sec. 30								

A 7Q10 = Average Annual Flow of the lowest 7 consecutive days

S 30Q10 = Average Summer Flow of the lowest 30 consecutive days

W 30Q10 = Average Winter Flow of the lowest 30 consecutive days

"WeCARE" Project Water Chemistry Data for South Branch Wolf Creek

Site	RM sample pt	Stream	RM *enters S Branch*	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)	Date
HUC 05040004 100 010															
S Branch Wolf Crk above Southwest Fork															
W18	1.00	Halfway Run	19.96	73.0145 - HF	14:10	7.5	202	10.03	14.58	0.68	* 0.0644	0.34	0.061	17	05/14/02
	1.00	Halfway Run	19.96	1.9974 - LF	15:13	7.4	318	7.42	28.86	0.46	* 0.0578	< 0.10	< 0.050	5	06/25/02
	1.00	Halfway Run	19.96	0.3995 - LF	13:35	7.4	310	7.89	26.00	0.33	* 0.0620	< 0.10	< 0.050	10	07/18/02
	1.00	Halfway Run	19.96	3.2180 - FF	9:56	7.5	363	6.63	17.09	0.60	*** 0.1010**	0.14	0.077	39	09/27/02
	1.00	Halfway Run	19.96	n/m - HF	11:42	7.4	269	7.69	12.58	n/m	n/m	n/m	n/m	**60**	10/16/02
	1.00	Halfway Run	19.96	n/m - LF	11:00	7.4	368	8.25	11.14	0.53	*** 0.1020**	0.36	< 0.050	< 5	10/28/02
W17	16.20	S Branch Wolf Crk	16.20	304.2272 - HF	13:48	7.4	208	10.32	12.91	0.69	0.0800	0.41	< 0.050	38	05/14/02
	16.20	S Branch Wolf Crk	16.20	8.3223 - LF	14:46	7.8	340	7.95	27.23	0.47	* 0.0493	< 0.10	< 0.050	6	06/25/02
	16.20	S Branch Wolf Crk	16.20	1.6645 - LF	13:18	7.8	268	9.55	26.48	0.28	* 0.0559	0.16	< 0.050	10	07/18/02
	16.20	S Branch Wolf Crk	16.20	13.4082 - FF	9:40	7.5	354	7.23	17.00	0.44	*** 0.1270**	< 0.10	< 0.050	26	09/27/02
	16.20	S Branch Wolf Crk	16.20	n/m - HF	11:25	7.6	328	8.18	12.73	n/m	n/m	n/m	n/m	12	10/16/02
	16.20	S Branch Wolf Crk	16.20	n/m - LF	10:42	7.5	392	7.28	11.50	0.82	* 0.0866	0.80	< 0.050	8	10/28/02
W16	0.80	South Fork	13.62	66.0608 - HF	13:35	7.5	233	10.27	14.34	0.77	* 0.0874	0.66	< 0.050	16	05/14/02
	0.80	South Fork	13.62	1.8071 - LF	14:38	7.7	440	8.62	27.86	0.85	* 0.0449	0.20	0.090	7	06/25/02
	0.80	South Fork	13.62	0.3614 - LF	13:07	7.7	455	8.39	25.75	3.66	**0.1600**	< 0.10	1.180	16	07/18/02
	0.80	South Fork	13.62	2.9115 - FF	9:27	7.3	690	8.74	18.00	3.86	**1.8200**	**6.92**	0.727	**1,720**	09/27/02
	0.80	South Fork	13.62	n/m - HF	11:10	7.5	574	8.95	12.75	n/m	n/m	n/m	n/m	17	10/16/02
	0.80	South Fork	13.62	n/m - LF	10:29	7.2	592	9.07	11.20	0.60	*** 0.1080**	0.71	< 0.050	8	10/28/02
HUC 05040004 100 020															
Southwest Fork															
W14	5.80	South West Fork	10.77	81.7067 - HF	12:59	7.7	203	11.59	13.73	0.64	0.0720	0.43	< 0.050	33	05/14/02
	5.80	South West Fork	10.77	2.2351 - LF	14:05	7.7	344	7.77	24.04	0.44	* 0.0307	0.10	< 0.050	6	06/25/02
	5.80	South West Fork	10.77	0.4470 - LF	12:47	7.5	323	6.28	24.24	0.51	* 0.0345	< 0.10	< 0.050	< 5	07/18/02
	5.80	South West Fork	10.77	3.6011 - FF	9:03	7.1	147	6.55	16.56	0.95	**0.1510**	0.89	< 0.050	40	09/27/02
	5.80	South West Fork	10.77	n/m - HF	10:40	7.7	464	9.20	12.93	n/m	n/m	n/m	n/m	21	10/16/02
	5.80	South West Fork	10.77	n/m - LF	10:03	7.5	395	6.45	11.40	0.34	* 0.0887	< 0.10	< 0.050	< 5	10/28/02
W15	1.30	South West Fork	10.77	658.0000 - HF	13:27	7.4	210	10.27	13.76	0.78	**0.1240**	**1.50**	0.058	32	05/14/02
	1.30	South West Fork	10.77	18.0000 - LF	14:18	7.1	356	**4.45**	24.86	0.55	* 0.0751	0.27	0.067	10	06/25/02
	1.30	South West Fork	10.77	3.6000 - LF	12:59	7.3	397	5.58	25.75	1.00	* 0.0690	< 0.10	0.140	10	07/18/02
	1.30	South West Fork	10.77	29.0000 - FF	9:16	7.3	484	6.34	16.71	0.77	* 0.0915	0.55	< 0.050	23	09/27/02
	1.30	South West Fork	10.77	n/m - HF	10:55	7.6	538	7.75	13.18	n/m	n/m	n/m	n/m	13	10/16/02
	1.30	South West Fork	10.77	n/m - LF	10:15	7.3	412	**4.50**	10.86	0.65	* 0.0847	0.66	0.075	8	10/28/02

HUC 05040004 100 030

S Branch Wolf Crk between Southwest Fork & W Branch Wolf Crk

W13	10.00	S Branch Wolf Crk	10.00	573.6856 - HF	14:35	7.3	194	9.81	13.58	0.85	0.0910	0.85	< 0.050	51	05/14/02
	10.00	S Branch Wolf Crk	10.00	15.6935 - LF	15:31	8.2	330	11.98	27.07	0.46	* 0.0530	< 0.10	< 0.050	9	06/25/02
	10.00	S Branch Wolf Crk	10.00	3.1387 - LF	13:53	7.7	335	8.56	25.80	0.61	* 0.0539	< 0.10	< 0.050	5	07/18/02
	10.00	S Branch Wolf Crk	10.00	25.2840 - FF	10:11	7.6	293	7.74	17.13	0.47	* 0.0626	0.13	< 0.050	< 5	09/27/02
	10.00	S Branch Wolf Crk	10.00	n/m - HF	11:57	7.4	347	9.43	12.73	n/m	n/m	n/m	n/m	20	10/16/02
	10.00	S Branch Wolf Crk	10.00	n/m - LF	11:20	7.3	385	7.30	11.56	0.69	* 0.0739	0.36	< 0.050	8	10/28/02
W11	0.70	S Branch Wolf Crk	0.70	690.1312 - HF	14:48	7.2	182	10.18	14.40	1.16	**0.1500**	0.94	0.063	**89**	05/14/02
	0.70	S Branch Wolf Crk	0.70	18.8796 - LF	15:51	8.7	343	10.30	28.94	0.57	* 0.0597	< 0.10	< 0.050	8	06/25/02
	0.70	S Branch Wolf Crk	0.70	3.7760 - LF	14:10	8.3	353	11.07	27.57	0.53	* 0.0997	0.17	< 0.050	7	07/18/02
	0.70	S Branch Wolf Crk	0.70	30.4174 - FF	10:25	7.7	353	8.51	17.44	0.38	*** 0.1090**	< 0.10	< 0.050	12	09/27/02
	0.70	S Branch Wolf Crk	0.70	n/m - HF	12:15	7.6	351	7.45	13.33	n/m	n/m	n/m	n/m	20	10/16/02
	0.70	S Branch Wolf Crk	0.70	n/m - LF	11:35	7.6	386	10.54	12.51	0.56	* 0.0567	0.88	< 0.050	< 5	10/28/02

"WeCARE" Project Water Chemistry Data for West Branch Wolf Creek

Site #	RM sample pt	Stream	RM *enters W Branch*	Flow (cfs)	Time (military)	pH (cu)	Cond (uhmo/cm)	DO (mg/l)	Temp (C)	TKN (mg/l)	T Phos. (mg/l)	T Nit (mg/l)	NH3 (mg/l)	TSS (mg/l)	Date
HUC 05040004 090 010															
W Branch Wolf Crk above Little Wolf Crk															
M01	39.20	W Branch Wolf Crk	39.20	166.8904 - HF	10:03	7.1	230	10.25	13.02	0.53	0.0700	0.26	< 0.050	35	05/14/02
	39.20	W Branch Wolf Crk	39.20	4.5654 - LF	10:47	7.7	414	8.24	23.02	0.41	* 0.0632	0.32	0.058	8	06/25/02
	39.20	W Branch Wolf Crk	39.20	0.9131 - LF	10:25	7.5	352	7.32	23.24	0.56	* 0.0743	0.35	0.190	< 5	07/18/02
	39.20	W Branch Wolf Crk	39.20	7.3554 - FF	13:48	7.5	535	7.98	18.87	0.94	**0.3510**	**2.12**	0.057	34	09/27/02
	39.20	W Branch Wolf Crk	39.20	n/m - HF	15:15	7.7	397	7.40	12.28	n/m	n/m	n/m	n/m	18	10/16/02
	39.20	W Branch Wolf Crk	39.20	n/m - LF	14:59	7.7	418	9.52	12.25	0.57	* 0.0987	< 0.10	< 0.050	5	10/28/02
M03	0.50	"Rosseau Creek"	33.33	74.7530 - HF	10:20	7.6	275	10.48	11.91	0.44	0.0600	< 0.10	< 0.050	27	05/14/02
	0.50	"Rosseau Creek"	33.33	2.0449 - LF	11:06	7.7	394	7.18	22.98	0.21	* 0.0436	< 0.10	< 0.050	8	06/25/02
	0.50	"Rosseau Creek"	33.33	0.4090 - LF	10:37	7.7	360	7.69	24.11	0.20	* 0.0453	< 0.10	< 0.050	9	07/18/02
	0.50	"Rosseau Creek"	33.33	3.2946 - FF	13:34	8.0	331	8.05	17.67	0.39	*** 0.1500**	< 0.10	0.060	21	09/27/02
	0.50	"Rosseau Creek"	33.33	n/m - HF	15:00	7.8	329	8.98	12.13	n/m	n/m	n/m	n/m	24	10/16/02
	0.50	"Rosseau Creek"	33.33	n/m - LF	14:44	8.0	421	8.68	12.58	0.26	* 0.0563	< 0.10	< 0.050	< 5	10/28/02
HUC 05040004 090 020															
Little Wolf Crk															
M02	1.00	Little Wolf Creek	29.90	93.0066 - HF	10:34	7.7	375	10.61	11.73	0.70	**0.1000**	0.26	< 0.050	52	05/14/02
	1.00	Little Wolf Creek	29.90	2.5443 - LF	11:24	8.0	525	7.89	22.00	0.23	* 0.0698	0.18	< 0.050	9	06/25/02
	1.00	Little Wolf Creek	29.90	0.5089 - LF	10:43	7.7	476	5.83	23.58	0.54	* 0.0583	< 0.10	0.067	14	07/18/02
	1.00	Little Wolf Creek	29.90	4.0991 - FF	13:22	7.6	424	7.73	17.62	0.59	0.0580	0.19	< 0.050	16	09/27/02
	1.00	Little Wolf Creek	29.90	n/m - HF	14:47	7.8	462	8.93	12.43	n/m	n/m	n/m	n/m	28	10/16/02
	1.00	Little Wolf Creek	29.90	n/m - LF	14:28	7.7	556	9.06	12.60	0.28	* 0.0867	< 0.10	< 0.050	5	10/28/02

HUC 05040004 090 030

W Branch Wolf Crk between Little Wolf Crk and Aldridge Rn

M04	27.70	W Branch Wolf Crk	27.70	512.8402 - HF	10:49	7.4	240	10.60	12.50	0.56	0.0900	0.24	< 0.050	**96**	05/14/02
	27.70	W Branch Wolf Crk	27.70	14.0291 - LF	11:42	8.0	476	8.04	22.99	0.45	* 0.0730	0.10	< 0.050	9	06/25/02
	27.70	W Branch Wolf Crk	27.70	2.8058 - LF	11:00	7.9	339	7.83	24.11	0.36	* 0.0353	0.43	< 0.050	10	07/18/02
	27.70	W Branch Wolf Crk	27.70	22.6024 - FF	13:05	8.0	348	9.06	17.36	0.60	**0.1110**	0.33	< 0.050	12	09/27/02
	27.70	W Branch Wolf Crk	27.70	n/m - HF	14:30	7.7	455	7.90	12.02	n/m	n/m	n/m	n/m	18	10/16/02
	27.70	W Branch Wolf Crk	27.70	n/m - LF	14:04	7.7	470	7.43	12.16	0.39	**0.1400**	< 0.10	< 0.050	5	10/28/02
M05	0.10	Goshen Run	25.96	80.8375 - HF	11:03	7.8	304	10.45	11.96	0.34	* 0.0448	0.24	< 0.050	26	05/14/02
	0.10	Goshen Run	25.96	2.2114 - LF	11:58	8.1	444	9.47	22.28	< 0.20	* 0.0600	0.15	< 0.050	< 5	06/25/02
	0.10	Goshen Run	25.96	0.4423 - LF	11:09	7.9	432	8.04	23.20	< 0.20	* 0.0343	0.13	< 0.050	< 5	07/18/02
	0.10	Goshen Run	25.96	3.5627 - FF	12:56	7.5	416	6.59	18.65	3.10	**1.5600**	**3.19**	0.872	**266**	09/27/02
	0.10	Goshen Run	25.96	n/m - HF	14:15	7.8	388	9.68	12.17	n/m	n/m	n/m	n/m	18	10/16/02
	0.10	Goshen Run	25.96	n/m - LF	13:51	7.9	474	9.37	12.36	< 0.20	* 0.0760	< 0.10	< 0.050	< 5	10/28/02

HUC 05040004 090 040

Aldridge Rn

W08	0.10	Aldridge Run	16.75	105.1757 - HF	12:02	7.6	294	10.40	12.28	0.41	0.0600	0.24	< 0.050	29	05/14/02
	0.10	Aldridge Run	16.75	2.8771 - LF	13:01	7.9	464	8.33	23.88	0.24	* 0.0366	< 0.10	< 0.050	5	06/25/02
	0.10	Aldridge Run	16.75	0.5754 - LF	12:07	7.6	458	8.12	23.99	0.20	* 0.0517	0.10	< 0.050	< 5	07/18/02
	0.10	Aldridge Run	16.75	4.6354 - FF	11:12	7.5	417	6.73	17.43	0.27	**0.1140**	0.44	< 0.050	59	09/27/02
	0.10	Aldridge Run	16.75	n/m - HF	13:18	7.8	382	9.07	12.56	n/m	n/m	n/m	n/m	16	10/16/02
	0.10	Aldridge Run	16.75	n/m - LF	12:58	7.5	586	8.03	13.24	2.27	**0.1260**	0.50	1.880	< 5	10/28/02

HUC 05040004 090 050

Coal Rn

M06	4.90	Coal Run	15.11	146.8983 - HF	11:48	7.8	230	10.72	12.78	0.41	* 0.0620	< 0.10	< 0.050	18	05/14/02
	4.90	Coal Run	15.11	4.0185 - LF	12:50	8.1	367	9.54	24.40	< 0.20	* 0.0427	< 0.10	< 0.050	< 5	06/25/02
	4.90	Coal Run	15.11	0.8037 - LF	11:56	8.1	382	9.32	25.46	0.29	* 0.0397	< 0.10	< 0.050	< 5	07/18/02
	4.90	Coal Run	15.11	6.4742 - FF	11:48	7.9	648	8.40	17.90	0.58	*** 0.1220**	0.54	< 0.050	24	09/27/02
	4.90	Coal Run	15.11	n/m - HF	13:40	7.8	336	9.85	12.11	n/m	n/m	n/m	n/m	30	10/16/02
	4.90	Coal Run	15.11	n/m - LF	13:35	7.8	490	10.56	12.64	0.24	* 0.0690	< 0.10	< 0.050	< 5	10/28/02
W07	0.60	Coal Run	15.11	189.4901 - HF	12:13	7.7	233	10.44	12.40	0.52	0.0600	0.11	< 0.050	28	05/14/02
	0.60	Coal Run	15.11	5.1836 - LF	13:23	7.9	381	8.69	23.49	< 0.20	* 0.0438	< 0.10	< 0.050	< 5	06/25/02
	0.60	Coal Run	15.11	1.0367 - LF	12:14	7.7	379	7.75	24.00	0.22	* 0.0352	< 0.10	< 0.050	N/t	07/18/02
	0.60	Coal Run	15.11	8.3514 - FF	11:24	7.7	392	8.67	16.91	0.34	*** 0.1330**	0.12	< 0.050	56	09/27/02
	0.60	Coal Run	15.11	n/m - HF	13:26	7.7	374	9.38	11.93	n/m	n/m	n/m	n/m	34	10/16/02
	0.60	Coal Run	15.11	n/m - LF	13:06	7.7	477	8.63	11.99	0.31	* 0.0594	< 0.10	< 0.050	< 5	10/28/02

HUC 05040004 090 060

W Branch Wolf Crk between Aldridge Rn & S Branch Wolf Crk

W09	13.80	W Branch Wolf Crk	13.80	999.6037 - HF	12:23	7.5	217	9.59	13.22	0.61	**0.1400**	0.22	< 0.050	**184**	05/14/02
	13.80	W Branch Wolf Crk	13.80	27.3448 - LF	13:40	8.0	444	7.84	24.72	0.25	* 0.0464	< 0.10	< 0.050	11	06/25/02
	13.80	W Branch Wolf Crk	13.80	5.4690 - LF	12:24	7.8	412	6.57	25.18	0.29	* 0.0512	< 0.10	< 0.050	9	07/18/02
	13.80	W Branch Wolf Crk	13.80	44.0555 - FF	11:35	7.5	444	6.93	16.84	0.33	*** 0.1050**	0.15	< 0.050	22	09/27/02
	13.80	W Branch Wolf Crk	13.80	n/m - HF	13:36	7.6	371	8.00	11.94	n/m	n/m	n/m	n/m	14	10/16/02
	13.80	W Branch Wolf Crk	13.80	n/m - LF	13:20	7.5	435	7.82	12.26	0.40	* 0.0950	< 0.10	< 0.050	7	10/28/02
W10	0.30	W Branch Wolf Crk	0.30	1251.6777 - HF	14:57	7.5	197	9.76	14.30	0.69	**0.1500**	0.25	< 0.050	**352**	05/14/02
	0.30	W Branch Wolf Crk	0.30	34.2404 - LF	15:59	8.3	415	9.14	28.52	0.27	* 0.0929	< 0.10	< 0.050	9	06/25/02
	0.30	W Branch Wolf Crk	0.30	6.8481 - LF	14:23	8.0	399	8.25	27.46	0.31	* 0.0515	< 0.10	< 0.050	6	07/18/02
	0.30	W Branch Wolf Crk	0.30	55.1651 - FF	10:32	7.8	345	8.39	18.33	0.59	**0.1340**	< 0.10	< 0.050	71	09/27/02
	0.30	W Branch Wolf Crk	0.30	n/m - HF	12:25	7.1	356	9.24	13.14	n/m	n/m	n/m	n/m	14	10/16/02
	0.30	W Branch Wolf Crk	0.30	n/m - LF	11:44	7.9	372	11.07	12.55	0.41	0.0562	< 0.10	< 0.050	< 5	10/28/02

HUC 05040004 090 070

Wolf Crk between S Branch Wolf Crk & the Muskingum River

W12	1.50	Wolf Creek	1.50	1973.1308 - HF	15:09	7.5	195	10.24	14.46	0.79	**0.1730**	0.43	< 0.050	**299**	05/14/02
	1.50	Wolf Creek	1.50	53.9762 - LF	16:09	8.2	410	8.44	28.29	0.36	* 0.0402	< 0.10	< 0.050	13	06/25/02
	1.50	Wolf Creek	1.50	10.7952 - LF	14:28	8.2	384	8.82	28.45	0.36	* 0.0317	< 0.10	< 0.050	11	07/18/02
	1.50	Wolf Creek	1.50	86.9617 - FF	10:45	7.7	389	6.78	17.94	0.34	* 0.0877	0.27	< 0.050	42	09/27/02
	1.50	Wolf Creek	1.50	n/m - HF	12:35	7.7	377	7.41	12.83	n/m	n/m	n/m	n/m	54	10/16/02
	1.50	Wolf Creek	1.50	n/m - LF	11:53	7.5	403	7.12	11.95	0.40	*** 0.1010**	0.37	< 0.050	11	10/28/02

Appendix 9

WeCARE Fecal Coliform Data for South Branch Wolf Creek

Site	RM *sample pt*	Stream	River Mile *enters W Branch*	Flow	Fecal (cpu/100ml)	Date	Time (military)	Temp (C)
HUC 05040004 100 010								
S Branch Wolf Crk above Southwest Fork								
W18	1.0	Halfway Run	19.96	HF	**9330**	06/06/02	9:25	n/m
	1.0	Halfway Run	19.96	LF	900	06/24/02	10:15	n/m
	1.0	Halfway Run	19.96	FF	**3334**	09/27/02	9:56	17.09
	1.0	Halfway Run	19.96	HF	**8300**	10/16/02	11:42	12.58
	1.0	Halfway Run	19.96	LF	400	10/28/02	11:00	11.14
W17	16.2	S Branch Wolf Crk	16.20	HF	**35000**	06/06/02	9:42	n/m
	16.2	S Branch Wolf Crk	16.20	LF	177	06/24/02	10:35	n/m
	16.2	S Branch Wolf Crk	16.20	FF	**6667**	09/27/02	9:40	17.00
	16.2	S Branch Wolf Crk	16.20	HF	**2000**	10/16/02	11:25	12.73
	16.2	S Branch Wolf Crk	16.20	LF	**1100**	10/28/02	10:42	11.50
W16	0.8	South Fork	13.62	HF	**16000**	06/06/02	9:56	n/m
	0.8	South Fork	13.62	LF	**1600**	06/24/02	11:00	n/m
	0.8	South Fork	13.62	FF	**2000000**	09/27/02	9:27	18.00
	0.8	South Fork	13.62	HF	**5500**	10/16/02	11:10	12.75
	0.8	South Fork	13.62	LF	**1400**	10/28/02	10:29	11.20

HUC 05040004 100 020

Southwest Fork

W14	5.8	South West Fork	10.77	HF	**17000**	06/06/02	10:34	n/m
	5.8	South West Fork	10.77	LF	431	06/24/02	11:48	n/m
	5.8	South West Fork	10.77	FF	**10000**	09/27/02	9:03	16.56
	5.8	South West Fork	10.77	HF	**6700**	10/16/02	10:40	12.93
	5.8	South West Fork	10.77	LF	150	10/28/02	10:03	11.40
W15	1.3	South West Fork	10.77	HF	**27300**	06/06/02	10:04	n/m
	1.3	South West Fork	10.77	LF	70	06/24/02	11:18	n/m
	1.3	South West Fork	10.77	FF	**3334**	09/27/02	9:16	16.71
	1.3	South West Fork	10.77	HF	**5100**	10/16/02	10:55	13.18
	1.3	South West Fork	10.77	LF	100	10/28/02	10:15	10.86

HUC 050040004 100 030

S Branch Wolf Crk between Southwest Fork & W Branch Wolf Crk

W13	10.0	S Branch Wolf Crk	10.00	HF	n/m	06/06/02	n/m	n/m
	10.0	S Branch Wolf Crk	10.00	LF	58	06/24/02	9:50	n/m
	10.0	S Branch Wolf Crk	10.00	FF	**3334**	09/27/02	10:11	17.13
	10.0	S Branch Wolf Crk	10.00	HF	**14000**	10/16/02	11:57	12.73
	10.0	S Branch Wolf Crk	10.00	LF	290	10/28/02	11:20	11.56
W11	0.7	S Branch Wolf Crk	0.70	HF	n/m	06/06/02	n/m	n/m
	0.7	S Branch Wolf Crk	0.70	LF	63	06/24/02	9:34	n/m
	0.7	S Branch Wolf Crk	0.70	FF	**3334**	09/27/02	10:25	17.44
	0.7	S Branch Wolf Crk	0.70	HF	300	10/16/02	12:15	13.33
	0.7	S Branch Wolf Crk	0.70	LF	10	10/28/02	11:35	12.51

Appendix 10

WeCARE Fecal Coliform Data for West Branch Wolf Creek

Site	RM *sample pt*	Stream	River Mile *enters W Branch*	Flow	Fecal (cpu/100ml)	Date	Time (military)	Temp (C)
HUC 05040004 090 010								
W Branch Wolf Crk above Little Wolf Crk								
M01	39.2	W Branch Wolf Crk	39.20	HF	**47000**	06/06/02	12:40	n/m
	39.2	W Branch Wolf Crk	39.20	LF	515	06/24/02	12:57	n/m
	39.2	W Branch Wolf Crk	39.20	FF	**35000**	09/27/02	13:48	18.87
	39.2	W Branch Wolf Crk	39.20	HF	**5600**	10/16/02	15:15	12.28
	39.2	W Branch Wolf Crk	39.20	LF	150	10/28/02	14:59	12.25
M03	0.50	"Rosseau Creek"	33.33	HF	**26000**	06/06/02	12:24	n/m
	0.50	"Rosseau Creek"	33.33	LF	158	06/24/02	13:40	n/m
	0.50	"Rosseau Creek"	33.33	FF	**3334**	09/27/02	13:34	17.67
	0.50	"Rosseau Creek"	33.33	HF	**1700**	10/16/02	15:00	12.13
	0.50	"Rosseau Creek"	33.33	LF	110	10/28/02	14:44	12.58
HUC 05040004 090 020								
Little Wolf Crk								
M02	1.0	Little Wolf Creek	29.90	HF	**45000**	06/06/02	12:16	n/m
	1.0	Little Wolf Creek	29.90	LF	130	06/24/02	13:27	n/m
	1.0	Little Wolf Creek	29.90	FF	**7500**	09/27/02	13:22	17.62
	1.0	Little Wolf Creek	29.90	HF	**4500**	10/16/02	14:47	12.43
	1.0	Little Wolf Creek	29.90	LF	40	10/28/02	14:28	12.60

HUC 050040004 090 030

W Branch Wolf Crk between Little Wolf Crk and Aldridge Rn

M04	27.7	W Branch Wolf Crk	27.7	HF	n/m	06/06/02	n/m	n/m
	27.7	W Branch Wolf Crk	27.7	LF	140	06/24/02	13:13	n/m
	27.7	W Branch Wolf Crk	27.7	FF	**20930**	09/27/02	13:05	17.36
	27.7	W Branch Wolf Crk	27.7	HF	**1700**	10/16/02	14:30	12.02
	27.7	W Branch Wolf Crk	27.7	LF	110	10/28/02	14:04	12.16
M05	0.01	Goshen Run	25.96	HF	**50000**	06/06/02	11:59	n/m
	0.01	Goshen Run	25.96	LF	253	06/24/02	13:03	n/m
	0.01	Goshen Run	25.96	FF	**1966667**	09/27/02	12:56	18.65
	0.01	Goshen Run	25.96	HF	**3600**	10/16/02	14:15	12.17
	0.01	Goshen Run	25.96	LF	73	10/28/02	13:51	12.36

HUC 05040004 090 040

Aldridge Rn

W08	0.1	Aldridge Run	16.75	HF	**45000**	06/06/02	11:27	n/m
	0.1	Aldridge Run	16.75	LF	179	06/24/02	12:09	n/m
	0.1	Aldridge Run	16.75	FF	**3334**	09/27/02	11:12	17.43
	0.1	Aldridge Run	16.75	HF	**2100**	10/16/02	13:18	12.56
	0.1	Aldridge Run	16.75	LF	83	10/28/02	12:58	13.24

HUC 05040004 090 050

Coal Rn

M06	4.9	Coal Run	15.11	HF	**38000**	06/06/02	11:37	n/m
	4.9	Coal Run	15.11	LF	63	06/24/02	12:44	n/m
	4.9	Coal Run	15.11	FF	**7500**	09/27/02	11:48	17.90
	4.9	Coal Run	15.11	HF	**2600**	10/16/02	13:40	12.11
	4.9	Coal Run	15.11	LF	80	10/28/02	13:35	12.64
W07	0.6	Coal Run	15.11	HF	**12300**	06/06/02	11:20	n/m
	0.6	Coal Run	15.11	LF	112	06/24/02	12:19	n/m
	0.6	Coal Run	15.11	FF	**10000**	09/27/02	11:24	16.91
	0.6	Coal Run	15.11	HF	**1000**	10/16/02	13:26	11.93
	0.6	Coal Run	15.11	LF	20	10/28/02	13:06	11.99

HUC 05040004 090 060

W Branch Wolf Crk between Aldridge Rn & S Branch Wolf Crk (excluding Coal Rn)

W09	13.8	W Branch Wolf Crk	13.80	HF	n/m	06/06/02	n/m	n/m
	13.8	W Branch Wolf Crk	13.80	LF	116	06/24/02	12:30	n/m
	13.8	W Branch Wolf Crk	13.80	FF	**3334**	09/27/02	11:35	16.84
	13.8	W Branch Wolf Crk	13.80	HF	800	10/16/02	13:36	11.94
	13.8	W Branch Wolf Crk	13.80	LF	200	10/28/02	13:20	12.26
W10	0.3	W Branch Wolf Crk	0.30	HF	n/m	06/06/02	n/m	n/m
	0.3	W Branch Wolf Crk	0.30	LF	170	06/24/02	9:20	n/m
	0.3	W Branch Wolf Crk	0.30	FF	**3334**	09/27/02	10:32	18.33
	0.3	W Branch Wolf Crk	0.30	HF	**1700**	10/16/02	12:25	13.14
	0.3	W Branch Wolf Crk	0.30	LF	30	10/28/02	11:44	12.55

HUC 05040004 090 070

Wolf Crk between S Branch Wolf Crk & the Muskingum River

W12	1.5	Wolf Creek	1.50	HF	n/m	06/06/02	n/m	n/m
	1.5	Wolf Creek	1.50	LF	116	06/24/02	9:07	n/m
	1.5	Wolf Creek	1.50	FF	**3334**	09/27/02	10:45	17.94
	1.5	Wolf Creek	1.50	HF	**1000**	10/16/02	12:35	12.53
	1.5	Wolf Creek	1.50	LF	**1100**	10/28/02	11:53	11.95

Appendix 11

"WeCARE" Project Habitat and Fish Community Assessment
for South Branch Wolf Creek *HUC 05040004 090*

Site #	RM sample pt	Stream	RM enters W Branch	Drainage sq. mis	QHEI	IBI	Summer Macro	Fall Macro	Modified IBI	Attainment Status	Comments
HUC 05040004 100 010											
S Branch Wolf Crk above Southwest Fork											
W18	1.00	Halfway Run	19.96	8.4	**39.0**	50	Poor 3	Poor 6	n/a	Full	livestock access
W17	16.20	South Branch Wolf Crk	16.20	35.0	**50.5**	42	Fair 13	n/m	9.2	Full	none
W16	0.80	South Fork	13.62	7.6	**54.0**	42	Poor 5	Poor 3	n/a	Full	livestock access
HUC 05040004 100 020											
Southwest Fork											
W14	5.80	Southwest Fork	10.77	9.4	68.5	50	Poor 2	Poor 6	n/a	Full	oil film
*W15	1.30	Southwest Fork	10.77	21.5	**51.0**	46	Poor 9	Poor 8	9.5	Full	livestock access, algae
		*IBI, QHEI,MIwb @ RM 0.1									
HUC 05040004 100 030											
S Branch Wolf Crk between Southwest Fork and W Branch Wolf Crk											
W13	10.00	South Branch Wolf Crk	10.00	66.0	**58.0**	**38**	Poor 8	n/m	9.5	**Partial**	in Watertown, oil film, trash
W11	0.70	South Branch Wolf Crk	0.70	79.4	78.0	n/m	Poor 10	n/m	n/m	N/A	beautiful site

Appendix 12

"WeCARE" Project Habitat and Fish Community Assessment
for West Branch Wolf Creek *HUC 05040004 090*

Site #	RM sample pt	Stream	RM enters W Branch	Drainage sq. mis	QHEI	IBI	Summer Macro	Fall Macro	Modified IBI	Attainment Status	Comments
HUC 05040004 090 010											
W Branch Wolf Crk above Little Wolf Crk											
M01	39.20	West Branch Wolf Creek	39.20	19.2	**54.0**	40	Poor 6	n/m	n/a	Full	petroleum odor, film on water, trash
M03	0.50	"Rosseau Creek"	33.33	8.6	66.5	**38**	Poor 8	n/m	n/a	**Non**	drains Wildlife Area
HUC 05040004 090 020											
Little Wolf Crk											
M02	1.00	Little Wolf Creek	29.90	10.7	62.0	**38**	Fair 15	n/m	n/a	**Non**	just below Pennsville, livestock access
HUC 05040004 090 030											
W Branch Wolf Crk between Little Wolf Crk and Aldridge Rn											
M04	27.70	West Branch Wolf Creek	27.70	59.0	72.5	46	Good 18	n/m	n/a	Full	livestock access
M05	0.10	Goshen Run	25.96	9.3	68.0	48	Poor 10	n/m	n/a	Full	trash, algae in riffles
HUC 05040004 090 040											
Aldridge Rn											
W08	0.10	Aldridge Run	16.75	12.1	61.0	42	Poor 9	Poor 2	n/a	Full	none
HUC 05040004 090 050											
Coal Rn											
M06	4.90	Coal Run	15.11	16.9	**56.0**	54	Good 18	Poor 5	n/a	Full	algae in riffles, trash, mussel shells
W07	0.60	Coal Run	15.11	21.8	62.5	48	Good 18	Poor 2	9.4	Full	trash in stream
HUC 05040004 090 060											
W Branch Wolf Crk between Aldridge Rn & S Branch Wolf Crk (excluding Coal Rn)											
W09	13.80	West Branch Wolf Creek	13.80	115.0	74.0	n/m	Fair 16	n/m	n/m	N/A	excess trash in stream
W10	0.30	West Branch Wolf Creek	0.30	144.0	71.0	n/m	Good 17	n/m	n/m	N/A	none
HUC 05040004 090 070											
Wolf Crk between S Branch Wolf Crk & the Muskingum River											
W12	1.50	Wolf Creek	1.50	227.0	63.5	n/m	Poor 10	n/m	n/m	N/A	in Waterford, algae

Appendix 13

WOLF CREEK AWARENESS and RESOURCE EVALUATION PROJECT
Wolf Creek Watershed WeCare Survey

Please complete the following survey. Answers are strictly confidential and will be viewed only by resource personnel to help identify the conservation needs in the Wolf Creek Watershed. Please return it to the Morgan County or Washington County Soil & Water Conservation District Office or return by mail (see reverse side). Stop in the Morgan or Washington SWCD Office. Thank you for your input.

Do you live in the Wolf Creek Watershed?

___Yes ___No

In which township(s) is your land located?

MORGAN	WASHINGTON
___ Deerfield	___ Barlow
___ Homer	___ Fairfield
___ Marion	___ Warren
___ Penn	___ Waterford
___ Union	___ Watertown
___ Windsor	___ Wesley
___ Malta	___ Palmer

Land Use(s):

___ Agriculture	___ Commercial (Industrial)
___ Residential	___ Recreation (Hunting, etc.)
___ Idle	___ Other _____

For the land uses listed above please list the approximate acreage:

Woodland	____	Acres	Residential	____	Acres
Pastureland	____	Acres	Commercial	____	Acres
Cropland	____	Acres	Idle	____	Acres

Do you have livestock on this acreage?

___ Yes ___ No

If yes, please indicate how many of each species:

___ Beef ___ Dairy ___ Sheep
___ Hogs ___ Horses ___ Other_____

Is knowing the fertility level of your soil and/or the nutrient level of your manure important to you?

___ Yes ___ No

Have you tested your soil or your manure in the last 3 years?

___ Yes ___ No

Please check your water source(s):

___ Spring ___ Cistern ___ Stream
___ Well ___ Public ___ Pond

Check your water use(s):

___ Home ___ Recreation

___ Livestock ___ Industrial
___ Irrigation ___ Other_____

Please check the item(s) that you feel are a problem in the Wolf Creek Watershed:

___ Animal Waste Runoff
___ Drinking Water (Lack of/Good)
___ Fertilizers & Pesticides Runoff
___ Flooding
___ Industrial Waste
___ Litter/Trash Dumping
___ Log Jams
___ Oil/Gas Wells (Brine)
___ Septic Systems (Failing)
___ Soil Loss (Erosion)
___ Erosion from farming
___ Erosion from timbering
___ Urban Run-off (Storm Water)
___ Other_____

Do you have any solutions to address these problems? _____
_____
_____
_____
_____

How do you view the following? :

	Positive	Negative	No Opinion
Farmland Preservation	___	___	___
Urban Growth	___	___	___

How would you like to be kept informed about the project?

___ Newsletter ___ Newspaper
___ Radio ___ Field Days
___ Personal Contact ___ Other_____

Would you like your name to be eliminated from the mailing list?

___ Yes ___ No

To be personally contacted or to have your name removed from the mailing list, please write your name and address:

Name _____
Address_____
City _____
Zip _____
Phone _____

Appendix 14

WeCARE by Subwatershed
Agriculture Land Use Statistics

0504000 090 010

W Br Wolf Crk above Little Wolf Crk

Ag= 36.48 % of subwatershed (10,374 acres)

18 % Cropland
55 % Pastureland
16 % Woodland
11 % Idol

Croptype - 60% hay, 25% corn, 3% soy beans, 12% small grains
Tillage - 80% conventional till, 20% no till
Rotations - basic rotation 2 yrs. corn, 1 yr. small grain, 5 yrs. hay
Chemicals Used - *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*96*	*1920*	*688*	*1232*
Dairy	*2*	*252*	*168*	*84*
Horses	*13*	*153*	*76*	*77*
Swine	*2*	*20*	*20*	*0*
Sheep	*2*	*13*	*0*	*13*
Other	*5*	*27*	*9*	*18*
Total	***120***	***2360***	***961***	***1424***

A.U. Animal Units

05040004 090 020

Little Wolf Creek
Ag = 40.54 % of subwatershed (2872 acres)

26 % Cropland
42 % Pastureland
12 % Woodland
20 % Idol

Croptype - 60% hay, 25% corn, 2% soy beans, 13% small grains
Tillage 80% conventional till, 20% no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*51*	*1020*	*275*	*745*
Dairy	*1*	*252*	*200*	*52*
Horses	*5*	*25*	*0*	*25*
Swine	*0*	*0*	*0*	*0*
Sheep	*2*	*16*	*0*	*16*
Other	*1*	*3*	*0*	*3*
Total	***60***	***1316***	***475***	***841***

A.U. Animal Units

Appendix 14

WeCARE by Subwatershed
Agriculture Land Use Statistics

05040004 090 030

W Br Wolf Crk between Little Wolf Crk & Aldridge Rn
Ag = 33.38 % of subwatershed (4904 acres)

32 % Cropland
46 % Pastureland
15 % Woodland
7 % Idol

Croptype 50 % hay, 30 % corn, 5 % soy beans, 15 % small grains
Tillage 60 % conventional, 40 % no till
Rotations 2 yrs. corn/beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*49*	*968*	*64*	*904*
Dairy	*5*	*375*	*280*	*95*
Horses	*10*	*50*	*0*	*50*
Swine	*2*	*69*	*69*	*0*
Sheep	*2*	*20*	*0*	*20*
Other	*3*	*4*	*0*	*4*
Total	***71***	***1486***	***413***	***1073***

A.U. Animal Units

05040004 090 040

Aldridge Run
Ag = 33.85 % of subwatershed (2615 acres)

20 % Cropland
65 % Pastureland
12 % Woodland
3 % Idol

Croptype 60 % hay, 25 % corn, 8 % soy beans, 7 % small grains
Tillage 60 % conventional till, 40 % no till
Rotations 2 yrs. corn, 1 yr. beans, 1 yr. small grains, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*100*	*2000*	*288*	*1712*
Dairy	*0*	*0*	*0*	*0*
Horses	*5*	*20*	*0*	*20*
Swine	*2*	*399*	*399*	*0*
Sheep	*0*	*0*	*0*	*0*
Other	*0*	*0*	*0*	*0*
Total	***107***	***2419***	***687***	***1732***

A.U. Animal Units

Appendix 14

WeCARE by Subwatershed
Agriculture Land Use Statistics

0504000 090 050

Coal Run
Ag= 29.49 % of subwatershed (4130 acres)

23 % Cropland
55 % Pastureland
18 % Woodland
4 % Idol

Croptype 65% hay, 20% corn, 8% beans, 7% small grains
Tillage - 70% conventional till, 30% no till
Rotations - 2 yrs. corn, 1 yr. soy beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used - *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*120*	*2400*	*240*	*2160*
Dairy	*1*	*100*	*100*	*0*
Horses	*6*	*3*	*0*	*3*
Swine	*0*	*0*	*0*	*0*
Sheep	*1*	*13*	*0*	*13*
Other	*3*	*2*	*0*	*2*
Total	***131***	***2649***	***340***	***2178***

A.U. Animal Units

05040004 090 060

W Br Wolf Crk between Aldridge Rn & S Br Wolf Crk
(excluding Coal Rn)
Ag = 33.84 % of subwatershed (6830 acres)

30 % Cropland
60 % Pastureland
8 % Woodland
2 % Idol

Croptype - 50% hay, 30% corn, 10% soybeans, 10% small grains
Tillage 60% conventional till, 40% no till
Rotations 2 yrs. corn, 1 yr. soy beans, 1 yr. small grain, 5 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*72*	*848*	*160*	*688*
Dairy	*2*	*120*	*100*	*20*
Horses	*3*	*9*	*0*	*9*
Swine	*0*	*0*	*0*	*0*
Sheep	*0*	*0*	*0*	*0*
Other	*3*	*3*	*0*	*3*
Total	***80***	***980***	***260***	***720***

A.U. Animal Units

Appendix 14

WeCARE by Subwatershed
Agriculture Land Use Statistics

05040004 090 070

Wolf Crk between S Br Wolf Crk & the Muskingum River
Ag = 49.55 % of subwatershed (3296 acres)

40 % Cropland
50 % Pastureland
10 % Woodland
0 % Idol

Croptype 65% hay, 20% corn, 10% soy beans, 5% small grains
Tillage 40% conventional, 60% no till
Rotations 2 yrs. corn, 2 yrs. soy beans, 1 yr.small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*71*	*624*	*160*	*464*
Dairy	*2*	*130*	*130*	*0*
Horses	*10*	*20*	*0*	*20*
Swine	*0*	*0*	*0*	*0*
Sheep	*2*	*20*	*0*	*20*
Other	*2*	*4*	*0*	*4*
Total	***87***	***798***	***290***	***508***

A.U. Animal Units

05040004 100 010

South Branch Wolf Crk above Southwest Fork
Ag = 44.49 % of subwatershed (11,575 acres)

62 % Cropland
35 % Pastureland
2 % Woodland
1 % Idol

Croptype 20% hay, 35% corn, 30% soy beans, 15% small grains
Tillage 20% conventional till, 80% no till
Rotations 2 yrs. corn, 2 yrs. soy beans, 1 yr. small grains, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*231*	*4620*	*2784*	*1836*
Dairy	*3*	*454*	*454*	*0*
Horses	*10*	*55*	*0*	*55*
Swine	*6*	*434*	*434*	*0*
Sheep	*3*	*27*	*0*	*27*
Other	*5*	*2*	*0*	*2*
Total	***258***	***5592***	***3672***	***1920***

A.U. Animal Units

Appendix 14

WeCARE by Subwatershed
Agriculture Land Use Statistics

0504000 100 020

Southwest Fork

Ag= 55.18 % of subwatershed (7813 acres)

60 % Cropland
37 % Pastureland
3 % Woodland
0 % Idol

Croptype 20% hay, 35% corn, 50% beans, 15% small grains
Tillage - 20% conventional till, 80% no till
Rotations - 2 yrs. corn, 2 yrs. soy beans, 1 yr. small grains, 4 yrs. hay
Chemicals Used - *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*78*	*1216*	*480*	*736*
Dairy	*5*	*640*	*540*	*100*
Horses	*10*	*65*	*0*	*65*
Swine	*2*	*90*	*90*	*0*
Sheep	*2*	*16*	*0*	*16*
Other	*3*	*2*	*0*	*2*
Total	***100***	***2029***	***1110***	***919***

A.U. Animal Units

05040004 100 030

South Br Wolf Crk between Southwest Fork and W Br Wolf Crk
Ag = 51.10 % of subwatershed (5490 acres)

52 % Cropland
48 % Pastureland
2 % Woodland
0 % Idol

Croptype - 65% hay, 20% corn, 10% soybeans, 5% small grains
Tillage 20% conventional till, 80% no till
Rotations 2 yrs. corn, 2 yrs. soy beans, 1 yr. small grain, 4 yrs. hay
Chemicals Used *Round-up Ready, Atrazine Mixture*

Livestock species	*Total # of operations*	*Total # of A.U./species*	*# of A.U. confined*	*# of A.U. non-confined*
Beef	*58*	*480*	*240*	*240*
Dairy	*1*	*116*	*100*	*16*
Horses	*10*	*50*	*0*	*50*
Swine	*3*	*144*	*144*	*0*
Sheep	*2*	*11*	*0*	*11*
Other	*2*	*5*	*0*	*5*
Total	***76***	***806***	***484***	***322***

A.U. Animal Units

Resources

Social & Cultural

Historical

Historic Features Associated with the Streams

The first grist mills and sawmills in Ohio were erected in 1789 1790 on Wolf Creek. (Walker, 2002)
Wolf Creek Mills (Map 2)

- Built 1789**,** Washington Co., Watertown Twp. on the West Branch of Wolf Creek
- Located on Twp. 103 north of SR 676 west of SR 339.
- First Grist Mill in the state of Ohio, a historical marker commemorates the site.
- Currently owned and used by the Waterford Grange
- On the Historical Register

Several covered bridges can still be found in the watershed area. (Covered bridges of Ohio web site) (Map 2)

Barkhurst Mill Covered Bridge

- Built 1872, Morgan Co., Marion Twp.
- Also known as Williams Covered Bridge
- Located 1.7 miles north of Jct. SR 555 at Chesterhill on SR 377, then right 1 mile on CR 52 and right on Williams Rd
- Spans the West Branch of Wolf Creek

Hara Covered Bridge

- Built 1878, Washington Co., Waterford Twp.
- Located on Watertown Rd TR 172, south of SR 339 by about .5 mile. North west of Watertown by about 2 miles
- Spans the South Branch of Wolf Creek

Shinn Covered Bridge

- Built 1886, Washington Co., Palmer Twp.
- Located on Shinn Rd, east of Creek Rd, east of CR 206
- Spans the West Branch of Wolf Creek

The Barlow Fairgrounds Covered Bridge

- Built 1886, Washington Co., Belpre Twp., over Mill Branch
- Originally the Mill Branch Creek Bridge
- Located to the Fairgrounds in Barlow
- Spans the South Fork of the South Branch of Wolf Creek

Bell covered Bridge

- Built 1888, Washington county, Barlow Twp.
- Located on Bell Rd northwest of Barlow by about 2.4 miles
- Spans the South West fork tributary of the South Branch of Wolf Creek

Recreational

Public Areas

Embree Park
Located in Morgan Co., Penn Twp., in the village of Pennsville, this land was donated for a park to the township and is managed by the trustees. This beautiful village park, used primarily for picnics, hosts many family gatherings throughout the season. It is home to Ohio s largest Butternut Tree. (Morgan County.com) (Map 2)

Wolf Creek Wildlife Area
The 3,764 acre wildlife area is located in Morgan County. (Map 2) The scenic rolling hills are dissected by Wolf Creek and several of its tributaries. Brush lands occupy approximately 15% of the area, open land 18%, and woodlands 66%, with wetlands and area ponds occupying less that 1% of the area. Most of the open lands are maintained in agricultural rotations through agreements with local farmers. Brush lands are selectively managed to be in old field condition. Stands of oaks and hickories dominate the drier woodland sites. Maple, beech, elm, and ash are most common on the lower slopes and along streams. The initial land purchase began in 1947 for the construction of a public fishing lake. The newly created dam, impounding a 152-acre lake, was destroyed by a flash flood in 1950. Because restoration of the dam was impractical, the area has been expanded to its current size and managed principally for forest wildlife species. Management work has included the improvement of existing woodlands through timber harvest, selective maintenance of shrubby coverts and permanent grasslands, and management of open land by agricultural cropping. Hunting and fishing are the major recreational uses. Popular secondary uses include berry picking, nature study, photography, and hiking.

The Buckeye Trail
This unique hiking trail passes through the Morgan County portion of the watershed, as it connects the four corners of Ohio in a 1200 mile hiking trail. It is the only long distance trail located entirely within the State of Ohio passing through forests, state and local parks, private lands, small towns and urban areas, highlighting historic and scenic spots. (Buckeye Trail Assoc. 2000) (Map 2)

Private Parks

Goodfellows Park
The park is a 200 acre private recreational facility located in Warren Twp., Washington County, on the southern edge of the watershed. This donated property is owned and operated by the Goodfellows Club of Marietta. Those utilizing the facility are members of the club made up of current and retired employees from Union Carbide, Eramet Marietta, Inc., and Elkem Metals. The grounds include a 26 acre lake utilized for fishing and boating, camp grounds, picnic area, open fields and a clubhouse used for many social events. Currently the Park is working with the ODNR Division of Dam Safety to improve the structure of the dam. To date, the water level has been lowered to meet safety regulations. Future plans are to expand, cover and bench the spillway to improve the slope. Drainage from the dam flows into Browns Run. (Tom Zakowski, Eramet,2003) (ODNR Division of Dam Safety, 2003) (Map 2)

Wolf Creek Scout Reservation
Located in Windsor Twp., Morgan County (See Map 2), this 62 acre tract of land was donated to the Wolf Creek Scout Troop 222 in 1992 by Clerance Hess. It is used for nature studies and other Scouting activities. Restrictions include no hunting or timbering, giving the

opportunity for current and future scouts to enjoy this beautiful tract of land in a natural setting. It is located on the West Branch of Wolf Creek in Windsor Twp. of Morgan County. More can be read about this historic place of land in *The Wolf Creek and the Muskingum* by Richard Walker. (Walker, 2000)

Camp Hervida
Camp Hervida is a locally owned county 4-H campgrounds located near Waterford (See Map 2). Besides 4-H, it is also utilized by schools for outdoor education camps, church camps, reunions, various workshops and other renters hosting over 3500 visitors per year.
In February of 1995 the camp upgraded from vaulted latrines to flush toilets. Wastewater from the kitchen, shower house and restrooms goes through grinder pumps and passes through two lagoons before reaching a constructed wetland. Very little water enters the wetland area but if the water level in the wetland reaches the overflow depth, it passes through a chlorination chamber before it empties into the South Branch of Wolf Creek. It is reported that the same chlorine tablets are still there after 8 years. Transpiration by the cattails and evaporation have been sufficient to remove the water from the wetland area in spite of some heavy rain events. The lagoons are home to many green frogs, spring peepers and bullfrogs as well as turtles and muskrats. Because of the lack of stable water level, the most common wildlife utilizing the wetland are red-winged blackbirds nesting in the cattails. This was the first Ohio EPA approved constructed wetland for human waste. (Marilyn Ortt, 2003)

Fairgrounds

Barlow Fairground
Located within the village of Barlow, the fairground is both beautiful and historic, hosting many community events throughout the year such as: horse shows; tractor pulls; & the annual Barlow Fair. The facility also contains a popular walking track, ball field and the restored Mill Creek Covered Bridge as it spans South Fork. The grounds are owned and operated by the Barlow Agricultural & Mechanical Society and is the oldest independent fair in Ohio. (Mary Campbell, 2003) (Map 2)

Waterford Fairground
Located just south of Waterford, the fairground is owned by the Waterford Township Trustees and operated by the Community Fair Board. In addition to the annual Community Fair, activities include tractor pulls, horse shows and family reunions. Locals enjoy the use of a ball field, and a walking track and shelter provided through a Nature Works Grant. The Washington County 4-H and FFA market hog sale, held during the annual Community Fair, is renowned throughout the state. (Mary Campbell, 2003) (Map 2)

Groups & Organizations

The following groups and organizations within the watershed

Multi-County:

Buckeye Trail Association Inc.
PO Box 254, Worthington, OH 43085, (740) 585-2603; Herb Hull
Farm Bureau
PO Box 220, Zanesville, OH 43702-0220, (800) 964-8184; Debbie Burkhart
Girl Scouts of America,
3230 Bowers Ln, Zanesville, OH 43701, (740) 454-8563; Millie Gessel
National Farmers Org. (Washington / Morgan Cos.)
Rt 2 Box 247, Marietta, Ohio 45750
Southern Ohio Covered Bridge Association
668 N. Main St., Marion, OH 43302; Brian McKee
Wolf Creek Chapter of the Wild Turkey Federation
961 State Rt 78, Malta, OH 43758, (740) 962-2048; Dan Smith

Morgan County:

Boy Scouts of America, Muskingum Valley Council
734 Moorehead, Zanesville, OH 43701, (740) 453-0571
Chesterhill Fire Dept. and Women s Auxiliary
1455 SR 555, Chesterhill, OH 43728, (740) 554-6801; Tim Smedley, Chief 2003
Chesterhill Senior Citizens
PO Box 32, Chesterhill, OH 43728, (740) 554-2860; Marjorie Mayle, President 2003
Chesterhill Lions Club
8687 Boxer Mayle Ln., Chesterhill, OH 43728, (740) 554-2127;Terry Fleming, President 2003
Chesterhill Senior Citizens
PO Box 32, Chesterhill, OH 43728, (740) 554-2860; Marjorie Mayle, President 2003
Deerfield Grange
4736 SR 37, Malta, OH 43758, (740) 962-2985; Linda Wilson, contact
Kate Love Simpson Chesterhill Branch Library
7520 Marion, Chesterhill, OH 43728, (740) 554-7104
Kate Love Simpson Library
358 E Main St, McConnelsville, OH 43756, (740) 962-2533
Girl Scouts of America,
3230 Bowers Ln, Zanesville, OH 43701, (740) 454-8563; Millie Gessel
Morgan County Coonhunters Club
PO Box 144, Malta, OH 43758, (740) 984-8395; Kelly Veyon contact
Malta Grange
CR 16, Malta, OH 43758, (740) 962-4563; Jerry Wilson contact
Pennsville Grange
3746 Westland Rd, Stockport, OH 43787, (740) 557-3656; Davis McInturf, Master 2003
Pennsville Fire Dept & Women s Auxiliary
1370 Washington St., Pennsville, OH 43770 (740) 557-3605; Richard Welsh, Chief 2003
Wolf Creek Wildlife Area
961 SR 78, Malta, OH 43758, (740) 962-2048; Dan Smith

Washington County:

Barlow Agricultural & Mechanical Society
Rt 1 Box 156, Waterford, OH 45786; Roxie Neville, President 2003
Barlow Public Library
Corner of SR 339 & 550, Barlow, OH 45712, (740) 678-0103
Barlow Vincent Fire Dept.
PO Box 121, Barlow, OH 45712, (740) 678-2726
Beverly Public Library
1 McIntosh, Beverly, OH 45715, (740) 984-4060

Beverly-Waterford Chamber of Commerce
PO Box 908, Beverly, OH 45715, (740) 984-2209
Boy Scouts of America, Allohak Council
1340 Juliana St., Parkersburg, WV 26101. (304) 422-4507
Community Fair Inc. at Waterford
PO Box 176, Waterford, OH 45786, (740) 984-4295
Knights of Columbus
SR 676, Waterford, OH 45786, (740) 749-7169
Warren Township Fire Dept.
Rt. 4 Marietta, OH 45750, (740) 373-2424
Waterford Grange
Box 256 Sampson Rd, Waterford, OH 45786, (740) 984-2821; Francis Sampson, contact
Watertown Volunteer Fire Dept.
PO Box 10, Watertown, OH 45787, (740) 749-3124
Wesley Volunteer Fire Dept.
PO Box 92, Bartlett, OH 45713, (740) 551-2028

Districts

- **Army Core of Engineers, Huntington District**
  502 Eighth St., Huntington, WV 25701-2070, (304) 525-4831
- **Buckeye Hills Hocking Valley Regional Development District**
  Rt. 1 PO Box 299 D, Marietta, OH 45850, (740) 374-9436
- **Morgan and Washington Soil & Water Conservation Districts**
  Morgan SWCD, 55 S Kennebec Ave., McConnelsville, OH 43756, (740) 962-4234
  Washington SWCD, 2206 Lancaster St., Ste. E, Marietta, OH 45750, (740) 373-4857
- **Muskingum Conservancy District**
  PO Box 349, New Philadelphia, OH 44663, (330) 343-6647
- **Ohio Environmental Protection Agency, Southeastern District Office**
  OEPA SEDO, 2195 E Front St, Logan, OH 43138 (740) 385-8501

- **Public Sewage Districts:**
  Waterford Water & Sewer Association
  PO Box 276, Waterford, OH 45786 (740) 984-2681; Ron Young
  Washington County Commissioners (for the SR 339 Force Main)
  223 Putnam St., Marietta, OH 45730; (740) 373-6623; John Grimes
  Whiteoak Sewer Association
  PO Box 45, Barlow, OH 45712; (740) 678-8060; Jean Yost
  Village of Stockport
  PO Box 158, Stockport, OH 43787 (740) 559-2411; Bob Grove
- **Public Water Districts:**
  Tri-County Rural Water & Sewer District
  Rt.1 Box 238, Waterford, OH 45786 (740) 350-0073; Ruth Armstrong
  Waterford Water & Sewer Association
  PO Box 276, Waterford, OH 45786 (740) 984-2681; Kevin Tornes
  Warren Community Water & Sewer District
  Rt. 4, Box 120, Marietta, OH 45750 (740) 373-8859; Dennis Rezebek
  Little Hocking Water & Sewer Association
  PO Box 188, Little Hocking, OH 45742, (740) 989-2181; Bob Griffin
  Village of Chesterhill
  PO Box 191, Chesterhill, OH 43728, (740) 554-2100; Bob Grove
  Portersville East Branch Water Co.
  10650 SR 37, Malta, OH 43758, (740) 342-1290; Sharon Withers
- **School Districts:**
  Fort Frye Local, PO Box 1149, Beverly, OH 45715, (740) 984-2497
  Morgan Local, PO Box 509, McConnelsville, OH 43756, (740) 962-2377
  Warren Local, 220 Sweet Apple Rd, Vincent, OH 45784, (740) 678-2366
  Wolf Creek Local, PO Box 67, Main & High St., Waterford, OH 45786, (740) 984-2373
  St. John s Central, 17784 SR 676, Marietta, OH 45750, (740) 896-2697

- **South East Ohio Joint Solid Waste Management District**
  515 Main St., Caldwell, OH 43724, (800) 860-8103

Federal, State. Regional, & County Entities

- **Natural Resource Conservation Service**
  55 S. Kennebec Ave., McConnelsville, OH, 43756, (740) 962-4234 (Morgan Co.)
  Rt. 9 Box 286 E, Marietta, OH 45750, (740) 373-4857 (Washington Co.)
- **Buckeye Hills Resource Conservation & Development**
  2206 Lancaster St. Ste. D, Marietta, OH 45750, (740) 373-7926
- **Ohio Department of Natural Resources, Division of Soil & Water Conservation**
  225 Underwood St., Ste. 400, Zanesville, OH 43701, (740) 455-9178
- **Ohio State University Extension Agency**
  155 East Main St., McConnelsville, OH 43756, (740) 962-4854 (Morgan Co.)
  206 Davis Ave., Marietta, OH 45750, (740) 376-7431 (Washington Co.)
- **Ohio Department of Transportation, District 10**
  338 Muskingum Drive, Marietta, OH 45750, (740) 373-0212
- **County Engineers**
  155 E. Main St., McConnelsville, OH 43756, (740) 962-3171 (Morgan Co.)
  103 Westview Ave., Marietta, OH 45750, (740) 376-7430 (Washington Co.)
- **Washington-Morgan Community Action**
  PO Box 144, Marietta, OH 45750, (740) 373-3745
- **Public Health Department**
  4275 N SR 376 NW, McConnelsville, OH 43756, (740) 962-4572 (Morgan Co.)
  342 Muskingum Dr., Marietta, OH 45750, (740) 374-2782 (Washington Co.)

Political Resources

Federal

US Senator Michael DeWine
140 Russell Senate Office Building, Washington, DC 20510, (800) 205-OHIO
US Senator George Voinovich
B34 Dirksen Senate Office Building, Washington, DC 20510, (614) 469-6697
US Representative Robert Ney 18th District (Morgan Co.)
1605 Longworth House Office Building, Washington DC 20515, (740) 452-8598
US Representative Ted Strickland 6th District (Washington Co.)
336 Cannon Office Bldg., Washington, DC 20515, (888) 706-1833

State

State Senator James Carnes (20th Senate District)
Ohio Senate Bldg., Columbus, OH 43215-4276, (614) 466-8076
State Representative James Stewart (92nd House District)
77 S. High St., 11th Floor, Columbus, OH 43215-6111, (614) 466-2158

County

Morgan County Commissioners:
Ron Moore; Bruce Dozer; Carl Dodrill
155 E. Main St., McConnelsville, OH 43756, (740) 962-3183

Washington County Commissioners:
Sandy Matthews; Sam Cook; John Grimes
205 Putnam St., Marietta, OH 45750, (740) 373-6623

Township

Morgan County Trustees:

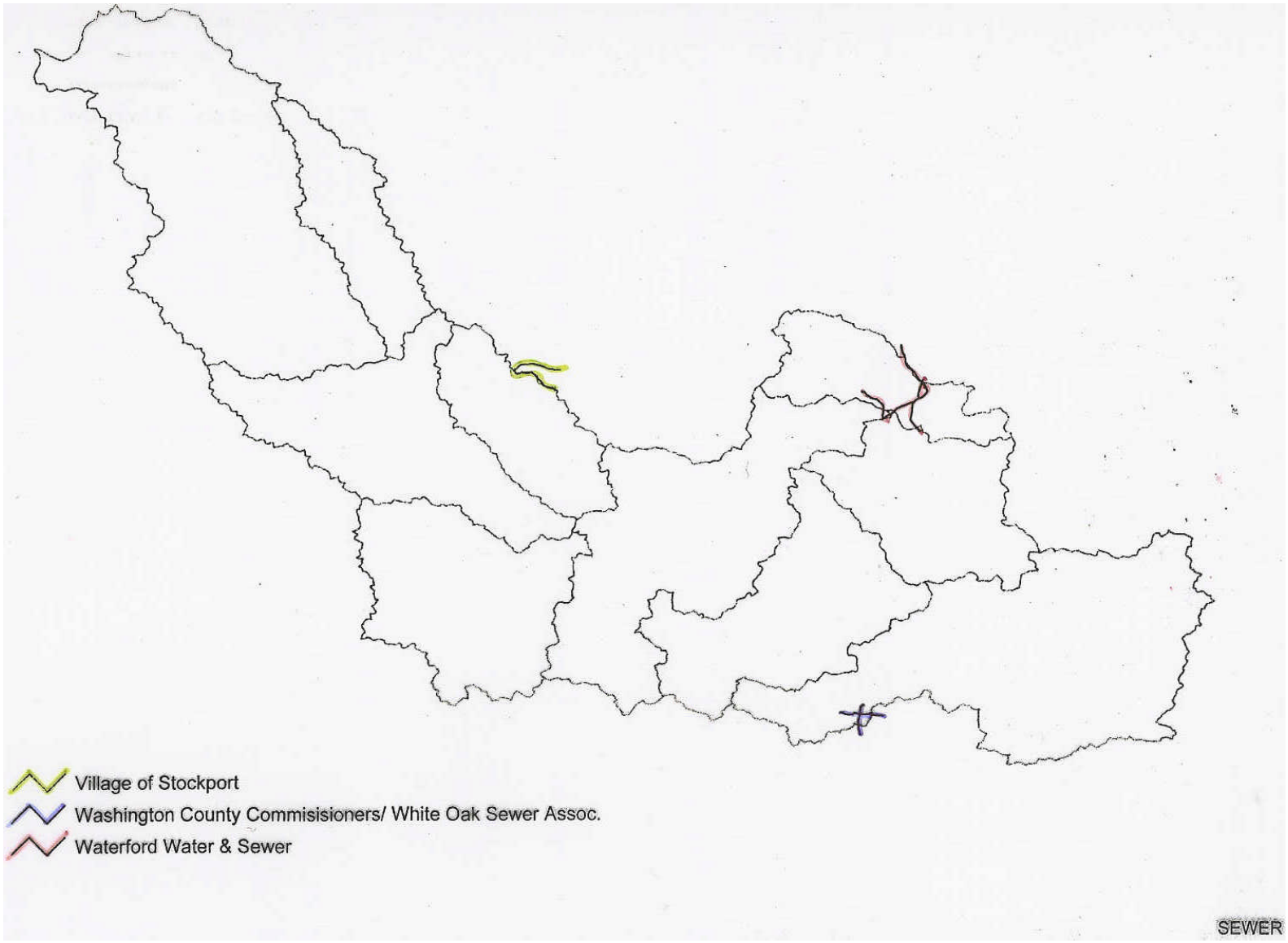
Deerfield Twp - Casey Clemens; Duane McCune; Terry Nelson; Phyllis Reed, Ck
4350 Price Rd, Malta, OH 43758, (740) 962-6429
Homer Twp. - Greg Cable; Virgil Kittle; Paul Southall; Brenda Smith, Ck
9577 Wrightstown Rd, Amesville, OH 45711, (740) 448-7343
Malta Twp. - Terry Spears; Brian Dew; Curt Best; Barbara Greuey, Ck
2817 Conk Palmer Rd., Malta, OH 43758, (740) 9622455
Marion Twp. - John Metcalf; Gary Newton; Charles Simmons; Janice Wogan, Ck
5465 Wogan Rd., Chesterhill, OH 43728, (740) 554-6217
Penn Twp. - Max Williams; Richard Welsh; John Lent; Carole McInturf, Ck
57 E. SR 266 SE, Stockport, OH 43787, (740) 557-3380
Union Twp. - Christopher Nichols; Steve Campbell; Beulah Campbell; Marilyn Horner, Ck
976 SR 78, Malta, OH 43758, (740) 962-6438
Windsor Twp. Phillip Eckert, Columbus Cheadle, Jr., David Groah; Sharon Fitch, Ck
PO Box 65, Stockport, OH 43787, (740) 559-3312

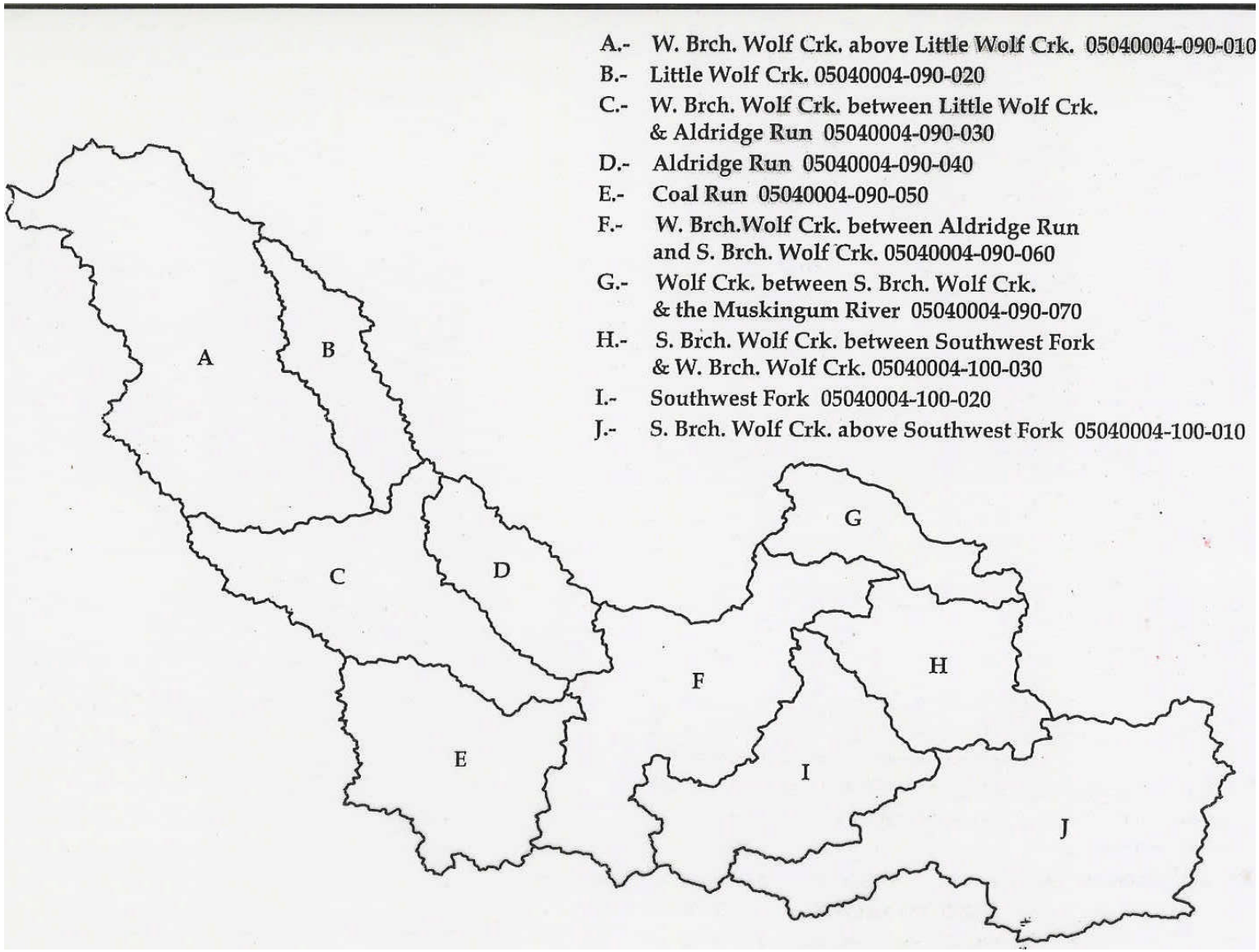
Washington County Trustees:

Barlow Twp. - Darren Roddy; Don Yost; Ralph Ollom; Judith Church, Ck
RR 2 Box 530 AA, Vincent, OH 45874, (740) 678-7308
Fairfield Twp. Bill Griffin; Larry Miskimins, Jr.; Pat Gates; Linda Corbit, Ck
RR 1 Box 115-A, Cutler, OH 45724, (740) 551-2800
Palmer Twp. Greg Nicholson; Thomas Strauss; George Shaffer; Alys Wagner, Ck
Rr 2 Box 185, Waterford, OH 45786, (740) 749-3305
Warren Twp. Nelson Benedict; Robert Lemasters; Robert Coffman; Joan Beardmore, Ck
RR 2 Box 185, Waterford, OH 45786, (740) 749-3305
Waterford Twp. Matthew Cavanaugh, James Harper, Bessie Sparling; Carolyn Offenberger, Ck
PO Box 145, Waterford, OH 45786, (740) 984-8414
Watertown Twp. Donald Rauch; Thomas Neill; James Thieman; Annette Schott, Ck
RR 1 Box 198 A, Waterford, OH 45786, (740) 984-4479
Wesley Twp. Roger Smith; Lewis Venham; Robert Wilcoxen; Beverly Jo Williams, Ck
PO Box 140, Bartlett, OH 45713, (740) 551-2700

City

Chesterhill
Mayor Dave Wetzel; Village Administrator Bob Grove
PO Box 191, Chesterhill, OH 43728, (740) 554-6994


Village of Stockport
Washington County Commisisioners/ White Oak Sewer Assoc.
Waterford Water & Sewer
SEWER


A.- W. Brch. Wolf Crk. above Little Wolf Crk. 05040004-090-010
B.- Little Wolf Crk. 05040004-090-020
C.- W. Brch. Wolf Crk. between Little Wolf Crk. & Aldridge Run 05040004-090-030
D.- Aldridge Run 05040004-090-040
E.- Coal Run 05040004-090-050
F.- W. Brch.Wolf Crk. between Aldridge Run and S. Brch. Wolf Crk. 05040004-090-060
G.- Wolf Crk. between S. Brch. Wolf Crk. & the Muskingum River 05040004-090-070
H.- S. Brch. Wolf Crk. between Southwest Fork & W. Brch. Wolf Crk. 05040004-100-030
I.- Southwest Fork 05040004-100-020
J.- S. Brch. Wolf Crk. above Southwest Fork 05040004-100-010
A
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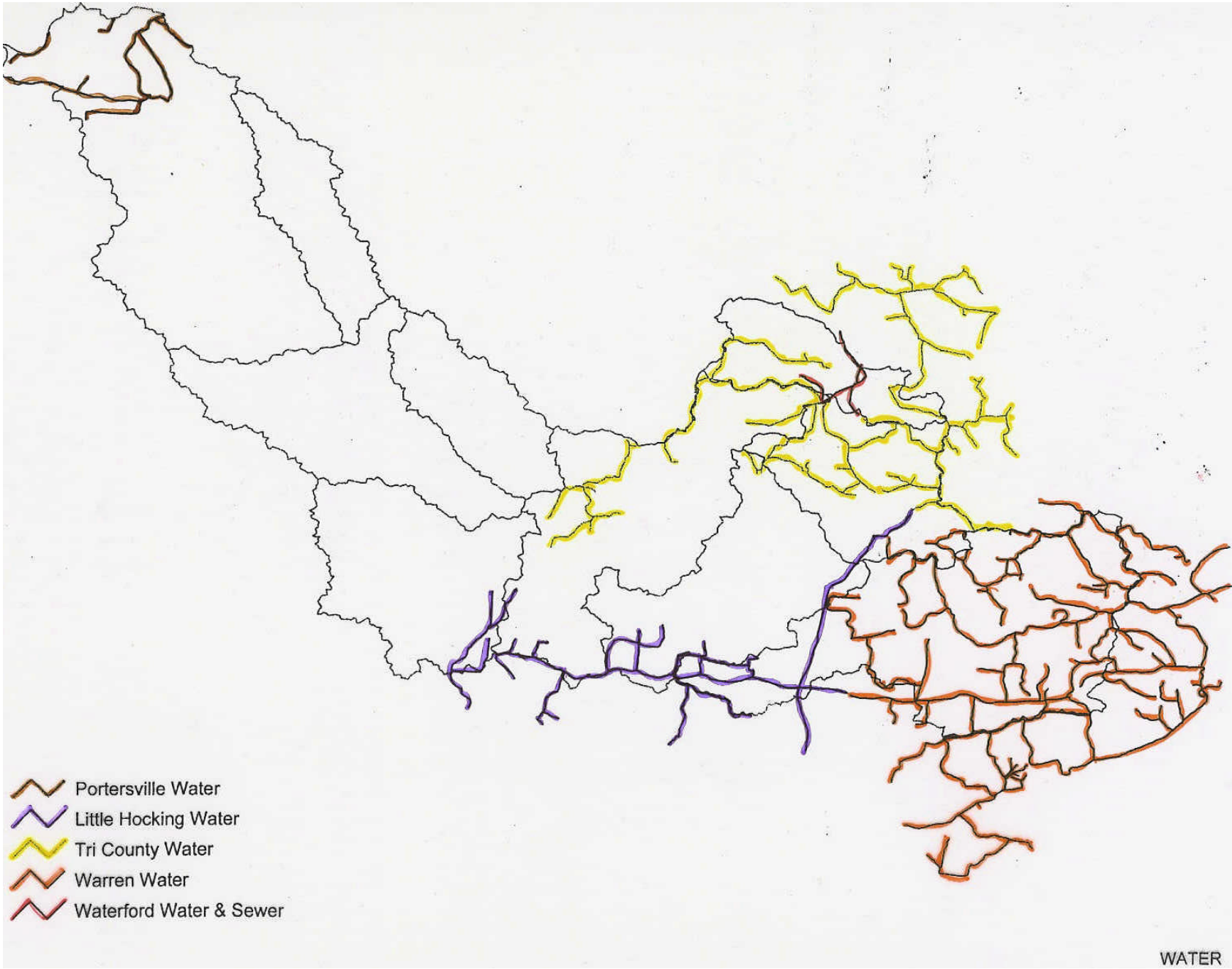

Portersville Water
Little Hocking Water
Tri County Water
Warren Water
Waterford Water & Sewer
WATER

Legend

Wolf Creek Watershed Boundary

Wolf Creek Watershed

Cartography By:
Morgan SWCD
McConnelsville, Ohio

May 2004

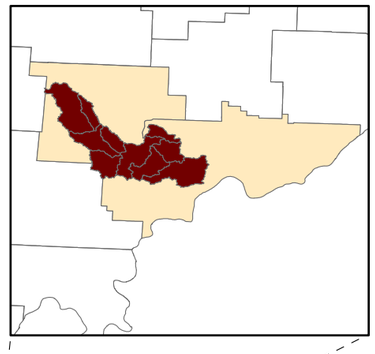
Wolf Creek Watershed

Map 1 - General Features

Map Features

- Town
- State Route
- Stream / Creek
- Wolf Creek
- Township Boundary
- County Area
- Designated Place
- Watershed Boundary

0 0.5 1 2 3 4 Miles



0 5 10 20 30 40 Miles

Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
Bret Allphin- Buckeye Hills-Hocking Valley Regional Development District
June 2003

Buckeye Hills - Hocking Valley Regional Development District

Noble County

Morgan County

Athens County

Washington County

Triadelphia

McConnelsville

Malta

Ringgold

Pennsville

Stockport

Beverly

Waterford

Chesterhill

Bartlett

Barlow

Fleming

Devola

Marietta

Belpre

Lowell

Mack

Pegger Rn.

Kickapoo Crk.

Hedgelog Crk.

Buck Rn.

Little Wolf Crk.

Rose Run Crk.

Goshen Rn.

Brown Rn.

Lick Rn.

Aldridge Rn.

Scott Rn.

Lucas Rn.

Shrader Rn.

Coal Rn.

Walnut Rn.

N. Brch. Coal Rn.

Buckeye Rn.

Whitewater Crk.

Southwest Fork

Hayward Rn.

Flint Rn.

Boseman Run - Duck Crk.

Plumb Rn.

Painters Rn.

Horse Rn.

Halfway Rn.

Chainey Rn.

Turkey Hen Rn.

South Fork

Browns Rn.

37

60

78

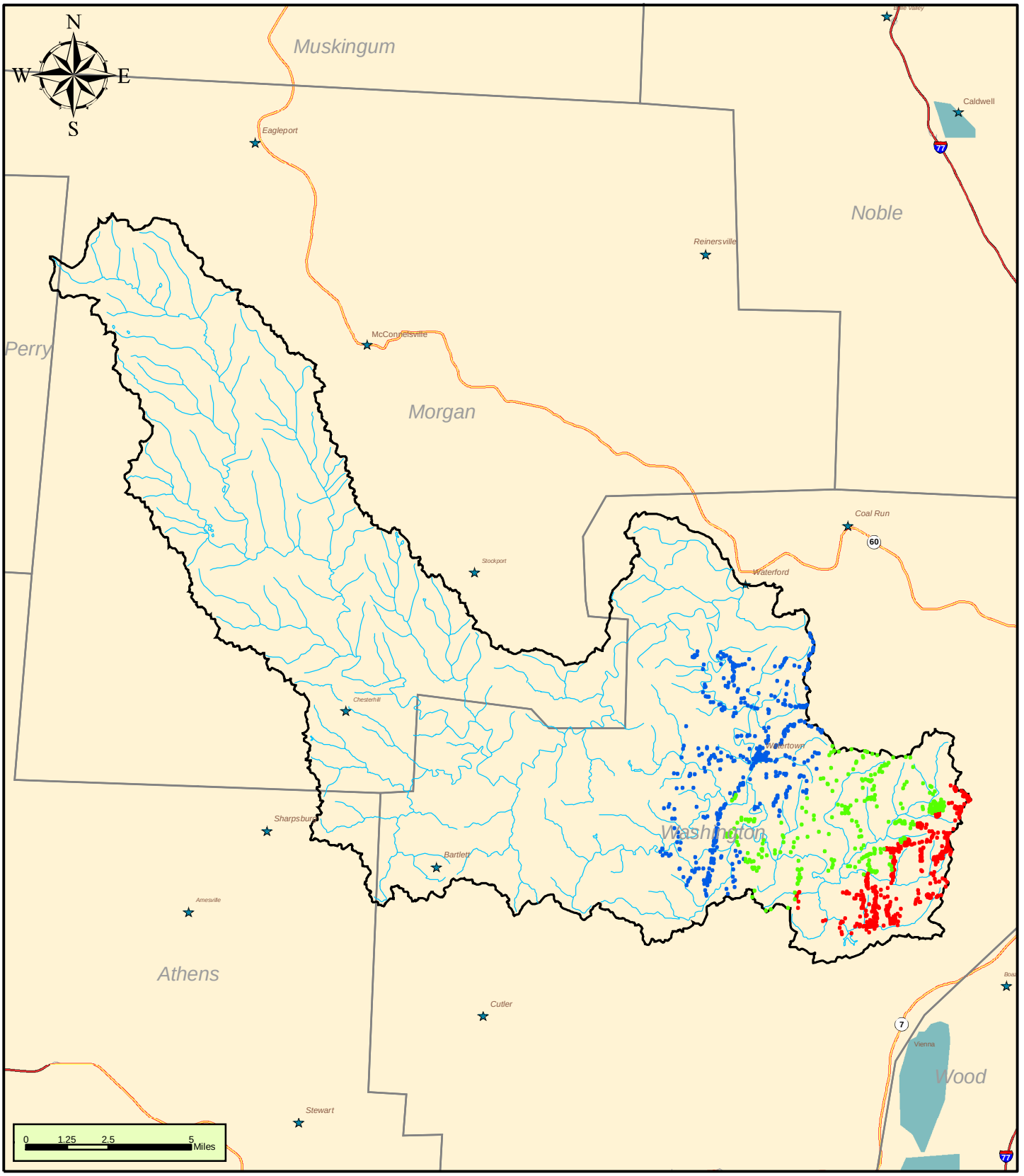
555

377

550

339

676



Legend

- Wolf Creek Watershed Boundary
- Middle Urban Development
- Low Urban Development
- Highest Urban Development

Wolf Creek Watershed
Map 10 - Urban Development

Cartography By:
AEP Land Management Department

November 22, 2004

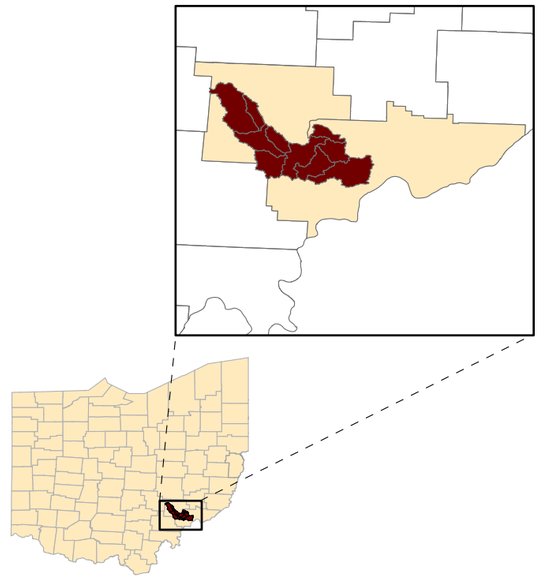
Wolf Creek Watershed

Map 2- General Features and Selected Items

Map Features

- Town
- Stream / Creek
- Wolf Creek
- State Route
- Outdoor Areas
- Covered Bridges
- Other Items of Interest
- Township Boundary
- County Area
- Designated Place
- Watershed Boundary
- Natural Areas

0 0.5 1 2 3 4 Miles



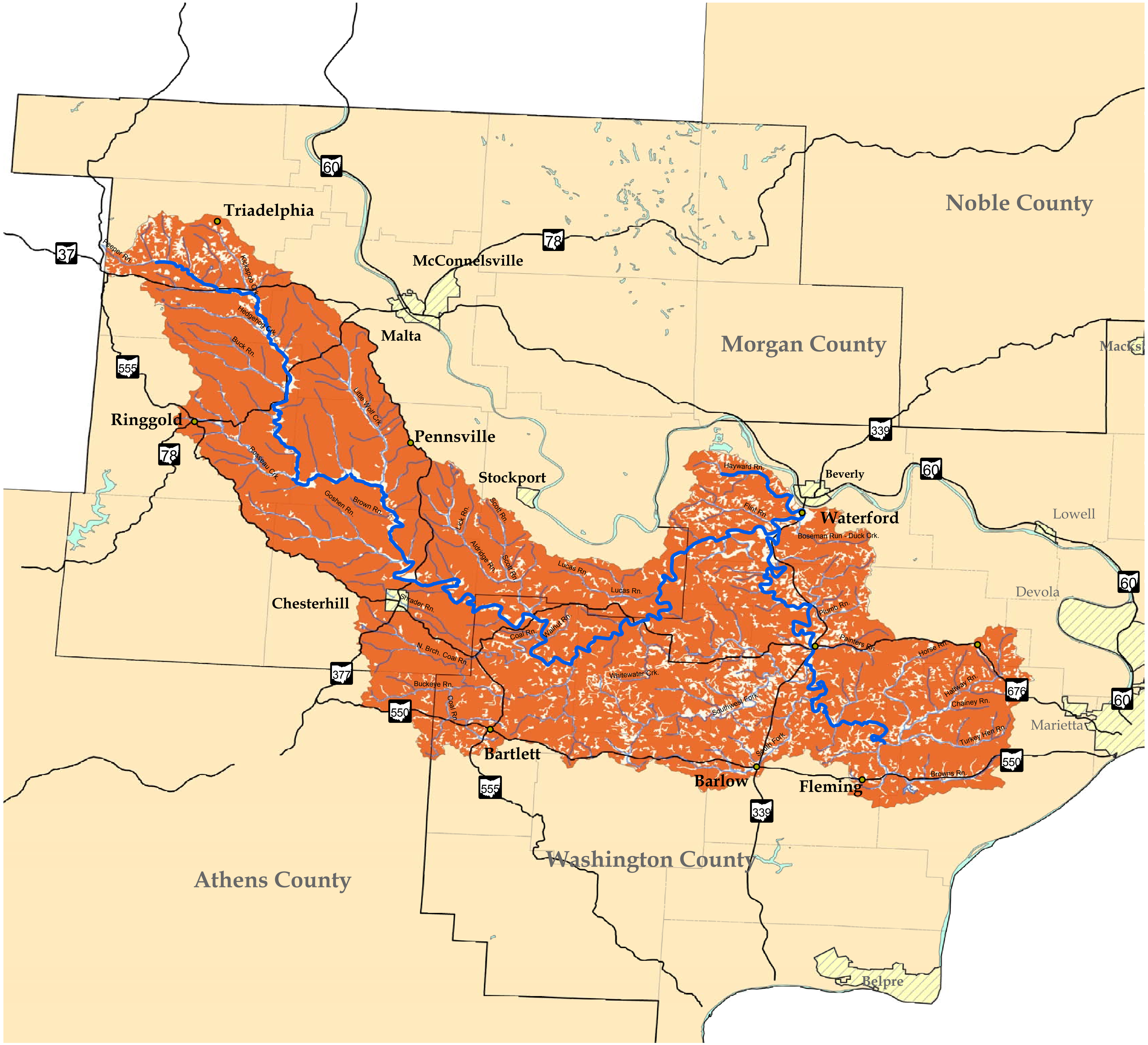
0 5 10 20 30 40 Miles

Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
Bret Allphin- Buckeye Hills-Hocking Valley Regional Development District
June 2003

Buckeye Hills - Hocking Valley
Regional Development District

Wolf Creek Watershed

Map 3- Highly Erodable Soils Inventory

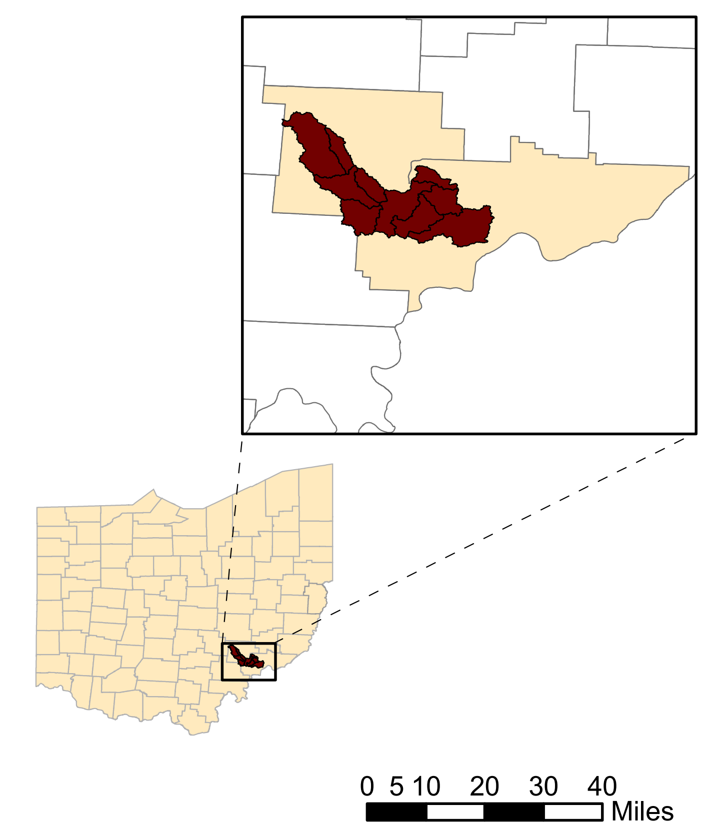


Triadelphia
McConnelsville
Malta
Noble County
Morgan County
Macksburg
Ringgold
Pennsville
Stockport
Beverly
Waterford
Lowell
Devola
Chesterhill
Marietta
Bartlett
Barlow
Fleming
Washington County
Athens County
Belpre
37
60
78
555
377
550
339
676
Peeper Rn.
Hedgehog Crk.
Buck Rn.
Little Wolf Crk.
Goshen Rn.
Brown Rn.
Lick Rn.
Aldridge Rn.
Scott Rn.
Lucas Rn.
Hayward Rn.
Flint Rn.
Boseman Run - Duck Crk.
Purdo Rn.
Painters Rn.
Horse Rn.
Shrader Rn.
Coal Rn.
Walnut Rn.
N. Brch. Coal Rn.
Buckeye Rn.
Whitewater Crk.
Southwest Fork
South Fork
Halfway Rn.
Chainey Rn.
Turkey Hen Rn.
Browns Rn.

Map Features

Town		County Area	
State Route		Watershed Boundary	
Streams / Creeks		Designated Place	
Wolf Creek		Highly Erodable	

0 0.5 1 2 3 4 Miles



Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
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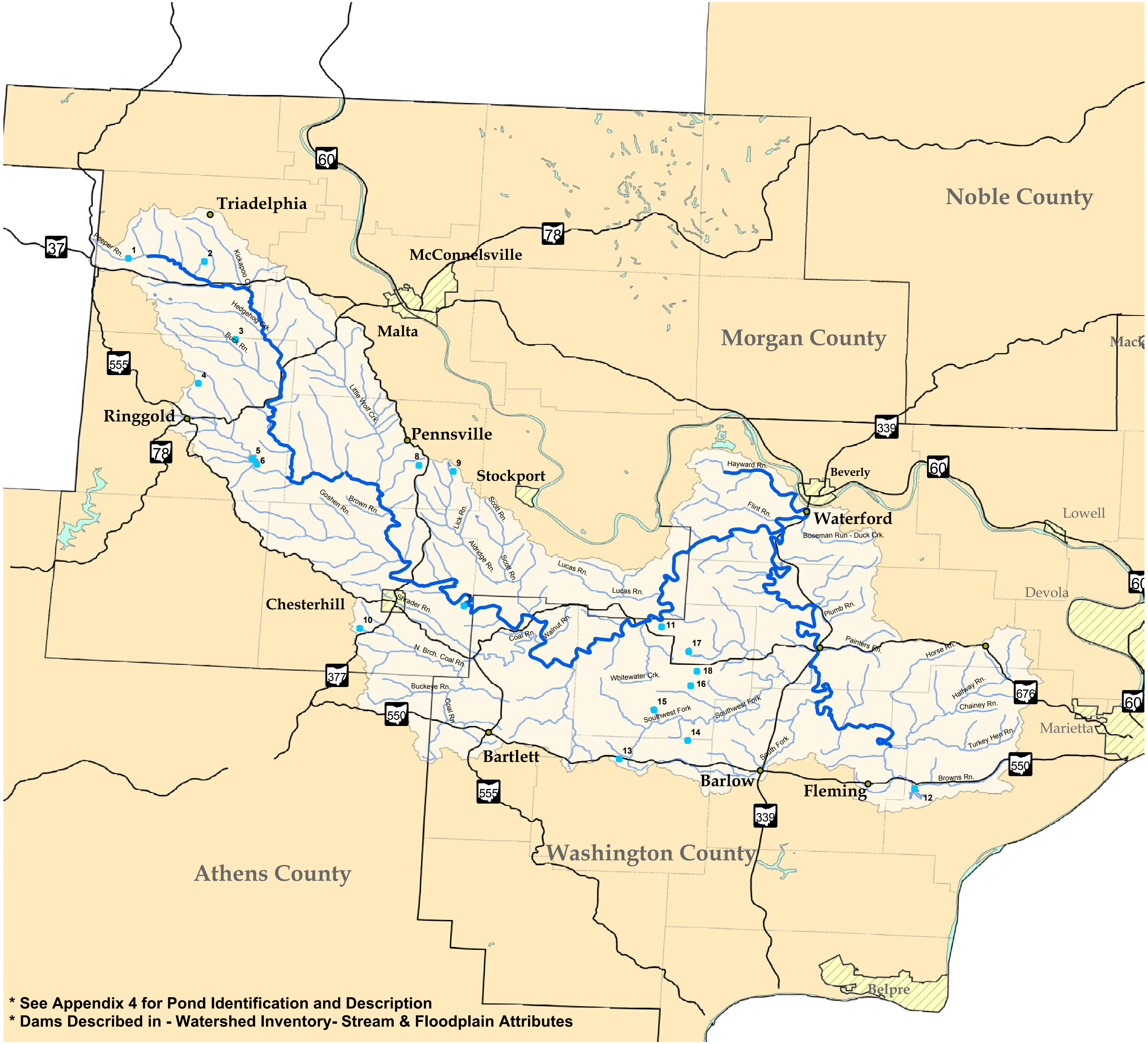
June 2003

Buckeye Hills - Hocking Valley Regional Development District

Wolf Creek Watershed

Map 4- Selected Land Cover and Features

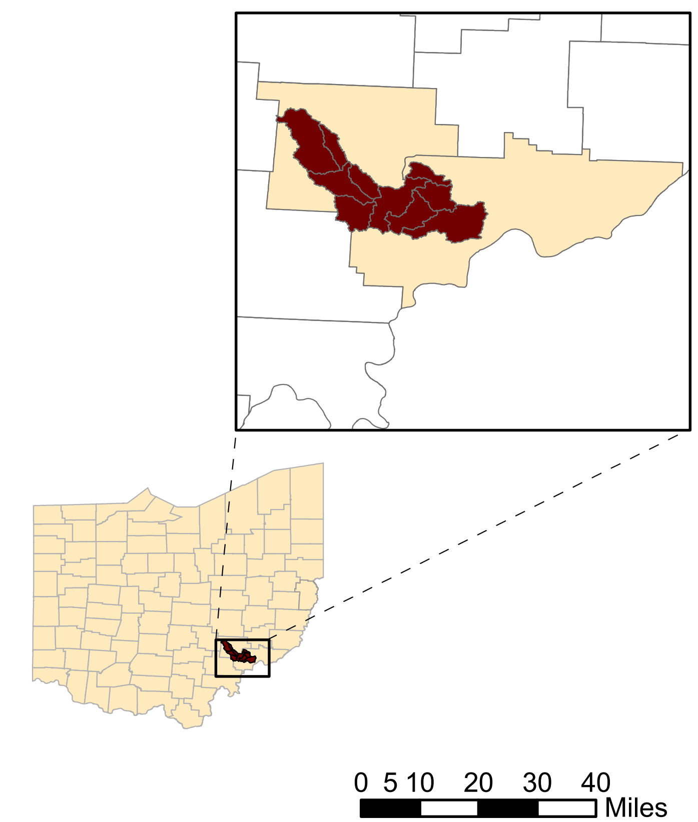


* See Appendix 4 for Pond Identification and Description
* Dams Described in - Watershed Inventory- Stream & Floodplain Attributes

Map Features

- Town
- Ponds
- State Route
- Wolf Creek
- Creeks / Streams
- County Area
- Watershed Boundary
- Designated Place

0 0.5 1 2 3 4 Miles



Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
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June 2003

Buckeye Hills - Hocking Valley
Regional Development District

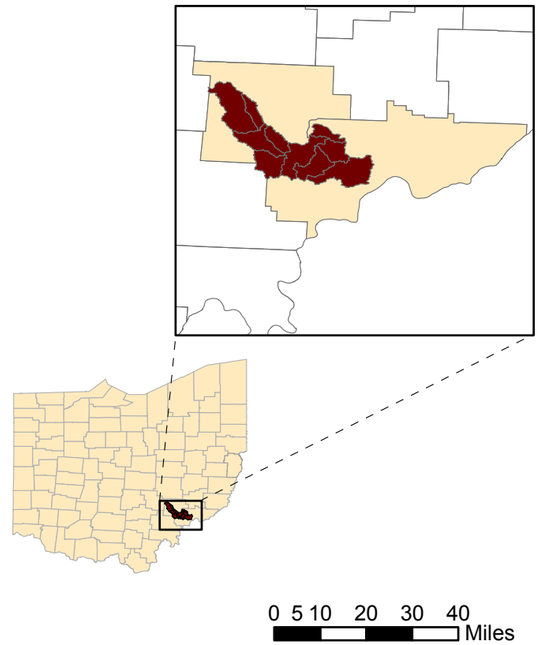
Wolf Creek Watershed

Map 5- Land Use

Map Features

- Town
- State Route
- Wolf Creek
- Streams / Creeks
- Township Boundary
- County Area
- Watershed Boundary
- Designated Place
- Wooded and Scrub

0 0.5 1 2 3 4 Miles



Sources: Ohio Department of Natural Resources, U.S. Census Bureau,-
USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
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June 2003

Buckeye Hills - Hocking Valley
Regional Development District

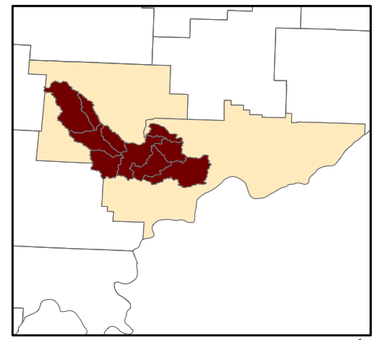
Wolf Creek Watershed

Map 6- Land Use

Map Features

- Town
- State Route
- Wolf Creek
- Streams / Creeks
- Township Boundary
- County Area
- Watershed Boundary
- Designated Place
- Agriculture

0 0.5 1 2 3 4 Miles



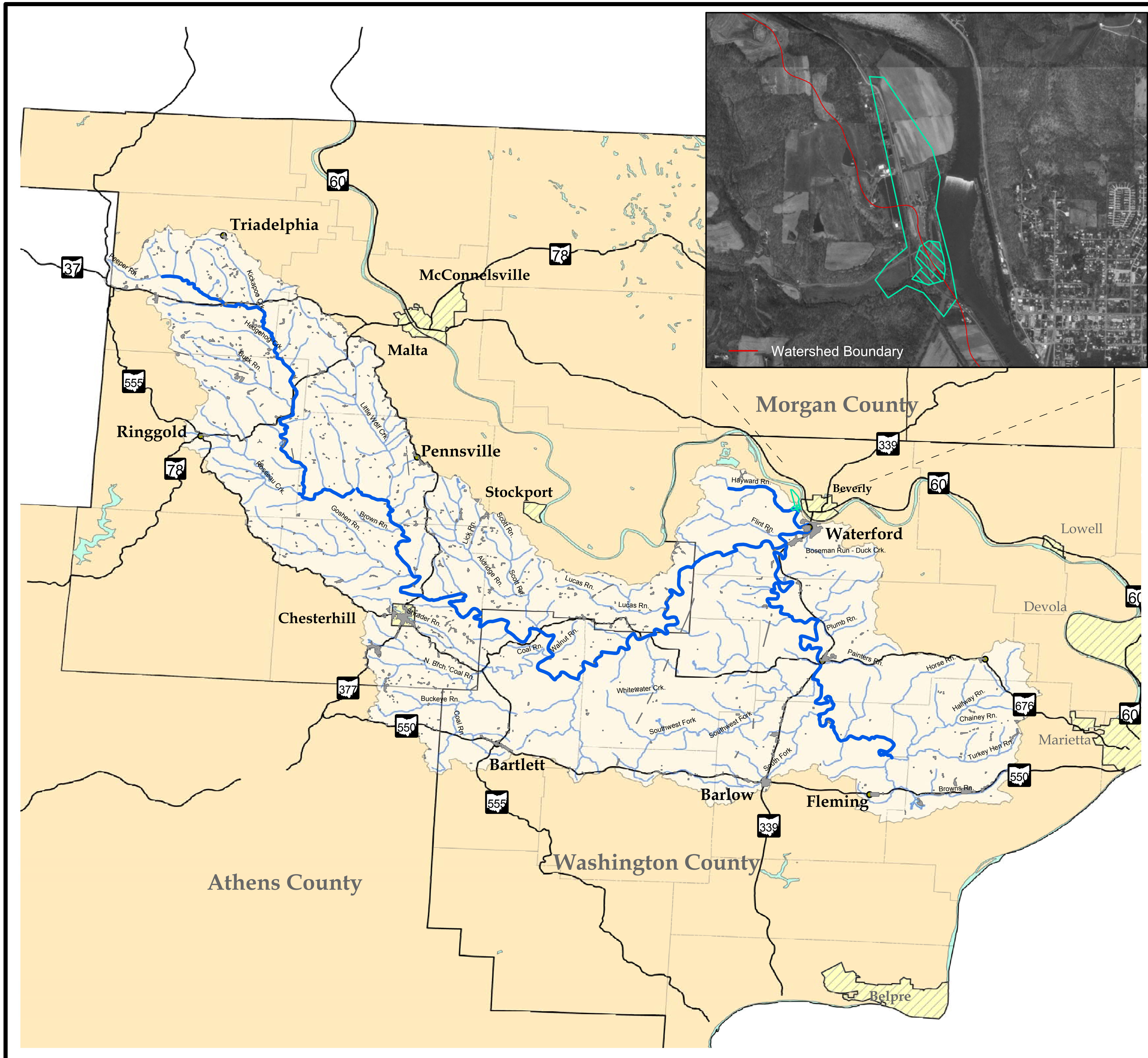
0 5 10 20 30 40 Miles

Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
Bret Allphin- Buckeye Hills-Hocking Valley Regional Development District
June 2003

Buckeye Hills - Hocking Valley
Regional Development District

Wolf Creek Watershed

Map 7- Land Use


Triadelphia
McConnelsville
Malta
Ringgold
Pennsville
Stockport
Chesterhill
Beverly
Waterford
Lowell
Devola
Marietta
Bartlett
Barlow
Fleming
Belpre
Morgan County
Washington County
Athens County
Watershed Boundary
Map Features
Town
State Route
Wolf Creek
Streams / Creeks
Source Water Protection
Inner Protection Area
County Area
Watershed Boundary
Designated Place
Urban Areas
Township Boundary
0 0.5 1 2 3 4 Miles
0 5 10 20 30 40 Miles

Sources: Ohio Department of Natural Resources, U.S. Census Bureau,-
USDA Natural Resources Conservation Service
Map and Data production for Wolf Creek Watershed
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June 2003

Buckeye Hills - Hocking Valley
Regional Development District

Wolf Creek Watershed

Map 8- Testing Site Locations

Noble County
Morgan County
Washington County
Athens County
Triadelphia
McConnelsville
Malta
Pennsville
Stockport
Ringgold
Chesterhill
Beverly
Waterford
Lowell
Devola
Marietta
Bartlett
Barlow
Fleming
Belpre
Mac
M 01
M 02
M 03
M 04
M 05
M 06
W 07
W 08
W 09
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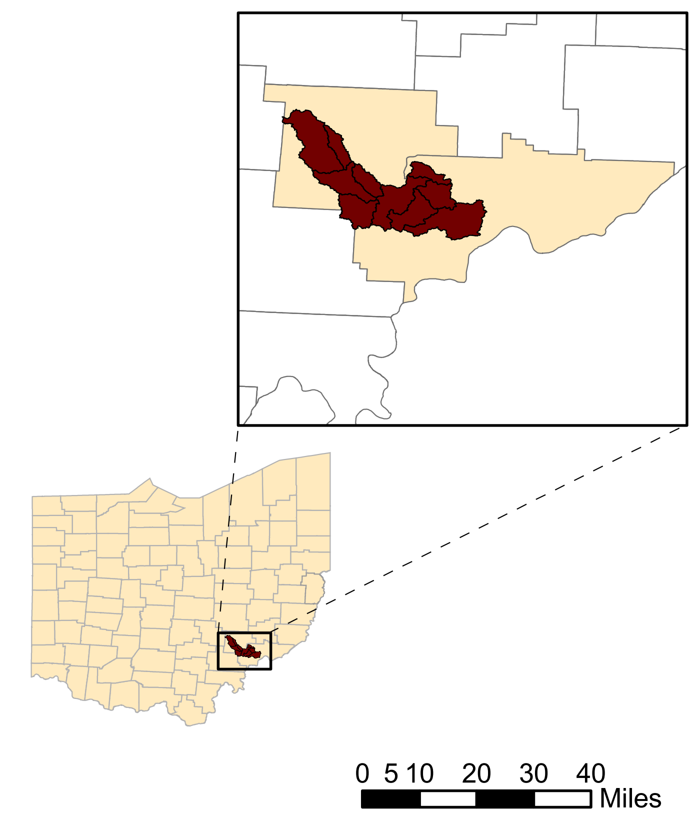
339
676
Hayward Rn.
Flint Rn.
Plumb Rn.
Horse Rn.
Hallway Rn.
Chainey Rn.
Turkey Hen Rn.
Browns Rn.
Whitewater Crk.
Southwest Fork
South Fork
Lucas Rn.
Scott Rn.
Aldridge Rn.
Lick Rn.
Little Wolf Crk.
Hedgehog Crk.
Buck Rn.
Kickapoo Crk.
Peeper Rn.
Goshen Rn.
Brown Rn.
Shrader Rn.
N. Brch. Coal Rn.
Coal Rn.
Buckeye Rn.

Map Features

●	Town		County Area
●	Testing Points		Watershed Boundary
—	State Route		Designated Place
—	Wolf Creek		Township Boundary
—	Stream / Creek		

0 0.5 1 2 3 4 Miles



Sources: Ohio Department of Natural Resources, U.S. Census Bureau,- USDA Natural Resource Conservation Service
Map and Data production for Wolf Creek Watershed
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June 2003

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