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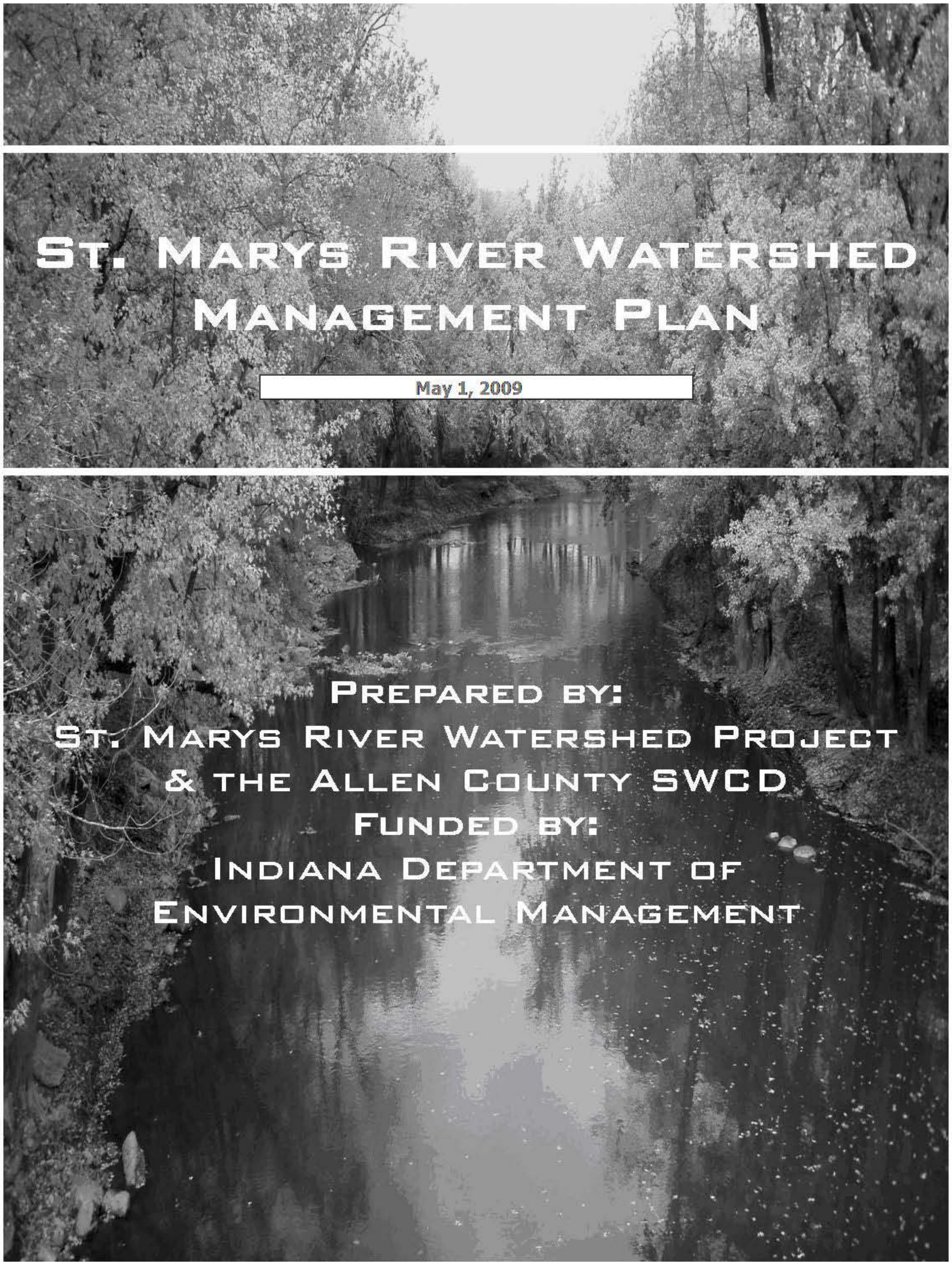
St. Marys River Watershed
Management Plan
May 1, 2009
Prepared by:
St. Marys River Watershed Project
& the Allen County SWCD
Funded by:
Indiana Department of
Environmental Management

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ACRONYMS

BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
C	Celsius
CAFO	Confined Animal Feeding Operation
CBOD	Carbonaceous Biochemical Oxygen Demand
CCA	Certified Crop Advisor
CCC	Criterion Continuous Concentration
CFR	Code Federal Regulation
CFS	Cubic Feet per Second
CFU	Colony Forming Units
COD	Chemical Oxygen Demand
CR	County Road
CSO	Combined Sewer Overflow
DO	Dissolved Oxygen
DSC	Division of Soil Conservation
E	East
E. coli	*Escherichia coli*
FCA	Fish Consumption Advisory
FEMA	Federal Emergency Management Agency
GAP	Gap Analysis Program
GLC	Great Lakes Commission
GPS	Global Positioning System
H+	Hydrogen
HAL	Health Advisory Level
HEL	Highly Erodible Land
HUC	Hydrologic Unit Code
HWY	Highway
IAC	Indiana Administrative Code
IBC	Impaired Biotic Communities
IDEM	Indiana Department of Environmental Management
IN	Indiana
INAFSM	Indiana Association for Floodplain and Stormwater Management
INDOT	Indiana Department of Transportation
ISCO	Indiana State Chemist Office
ISDA	Indiana State Department of Agriculture
ISDH	Indiana State Department of Health
K	Susceptibility to Soil and Water Erosion Factor
LA	Load Allocation
LID	Low Impact Development
LS	Slope Length and Steepness Factor
LTCP	Long Term Control Plan
MCL	Maximum Contaminant Level
MI	Michigan
MOS	Margin of Safety
MRBC	Maumee River Basin Commission
MRBPLG	Maumee River Basin Partnership of Local Governments
MS4	Municipal Separate Storm Sewer System

N	North
NAI	No Adverse Impact
NGO	Non Government Organization
NH3-N	Ammonia Nitrogen
NPDES	National Pollutant Discharge Elimination System
NO_3-NO_2	Nitrate + Nitrite Nitrogen
NRCS	Natural Resources Conservation Service
NTU	Nephelometric Turbidity Unit
NWI	National Wetland Inventory
O_2	Oxygen
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OH	Ohio
ORC	Ohio Revised Code
P	Phosphorus
PCB	Polychlorinated Biphenyl
PPM	Parts Per Million
R	Rainfall and Runoff Factor
RTK	Real Time Kinematic
RUP	Restricted Use Pesticide
RUSLE	Revised Universal Soil Loss Equation
S	South
SMRWP	St. Marys River Watershed Project
SSO	Sanitary Sewer Overflow
SWCD	Soil and Water Conservation District
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation
UWA	Unified Watershed Assessment
W	West
WLA	Waste Load Allocation
WLEB	Western Lake Erie Basin
WMP	Watershed Management Plan
WRAS	Watershed Restoration Action Strategy
WWTP	Waste Water Treatment Plant

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1.0 INTRODUCTION

1.1 Watershed Planning

A watershed, also referred to as a drainage area, catchment, or basin, is defined by the United States Environmental Protection Agency (USEPA), as the area of land where all of the water that is under it or that drains off of it goes into the same place (www.epa.gov/owow/watershed). A basin-like landform, the watershed boundaries are defined geographically by highpoints and ridgelines that descend into lower elevations. After rain falls and snow melts, drop by drop, water is channeled into soils, groundwaters, creeks, and streams, making its way to larger water systems and eventually the sea. The Scientist Geographer, John Wesley Powell, put it best when he said that a watershed is: “that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community." (www.epa.gov/owow/watershed) Watersheds come in all shapes and sizes, from a large scale watershed which encompasses the drainage area of the Great Lakes, to small sub-watersheds, such as Blue Creek located in the St. Marys River Watershed. Watersheds can cross county, state, and national boundaries. The following Figure 1 is an illustration of a generalized watershed. (www.depweb.state.pa.us)

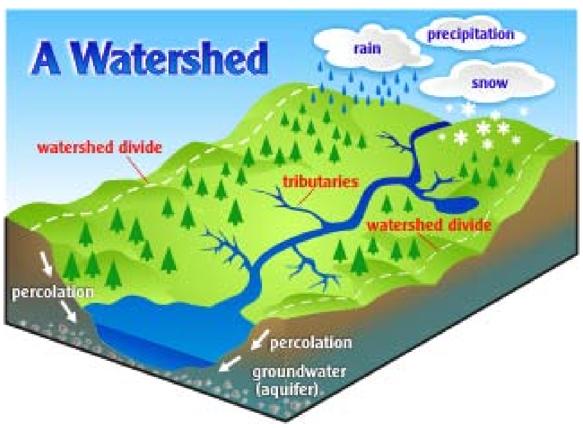

Figure 1. Watershed Illustration.

In the late 1980s, water resource planners began focusing on a watershed approach as a means of watershed planning. This approach crossed political boundaries and was quickly adopted as the standard method for watershed planning and managing water quality. Today, the standard is widely used by organizations, and federal and state agencies. The watershed approach is a flexible framework for managing water resource quality and quantity within specified drain-age areas, or watersheds. This approach includes stakeholder involvement and management actions supported by sound science and appropriate technology. The watershed planning process works within this framework by using a series of cooperative, iterative steps to characterize existing conditions, identify and prioritize problems, define management objectives, develop protection or remediation strategies, and implement and adapt selected actions as necessary. The outcome of this process is documented or referenced in a watershed management plan. A watershed management plan (WMP) outlines a strategy that provides assessment and management information for a geographically defined watershed, including the analyses, actions, participants, and resources related to developing and implementing the plan. The development of a watershed plan requires a certain level of technical expertise and the participation of a variety of people with diverse skills and knowledge.

Using a watershed approach to restore impaired water bodies is beneficial because it addresses water quality and quantity problems in a holistic manner. A watershed approach also involves watershed stakeholders in selecting the management strategies that will be implemented to solve water quality problems. Nonpoint source pollution poses the greatest threat to water quality and is the most significant source of water quality impairment in the St. Marys River watershed, as well as in the nation.

St. Marys River Watershed Management Plan

The St. Marys River Watershed Management Plan (WMP) intends to provide a comprehensive, useful, flexible tool to address resource concerns in the watershed and to protect and enhance natural resources within the boundaries of the Indiana portion of the St. Marys River Watershed. Once completed, the WMP will provide improved living conditions, recreational opportunities, and environmental health benefits to residents who live and work within the watershed. Consequently, it will provide benefits to residents and communities throughout the Western Lake Erie drainage basin. This management plan was developed through a collaborative effort between the Adams, Allen, and Wells County Soil and Water Conservation Districts, with the assistance of local government entities and stakeholders in the watershed. A steering committee of landowners, public officials and local producers was developed following a series of public meetings. Further, the involvement of stakeholders within the Ohio portion of the St. Marys River Watershed was essential for the development of a successful management plan. An array of data, reports, and information was submitted by Ohio stakeholders and incorporated into the WMP. The input obtained from a wide variety of constituencies and citizens was an invaluable resource. The watershed management plan has been developed following the requirements set forth in Indiana Department of Environmental Management's (IDEM) 2003 Watershed Management Plan Checklist.

The need for the development of a WMP for the Indiana portion of the St. Marys River Watershed was brought to light upon the completion of the Total Maximum Daily Load (TMDL) reports completed for the St. Marys River Watershed (HUC 04100000), as well as the Blue Creek/Habegger Ditch and Yellow Creek Watersheds. The TMDL addressed 18.08 river miles in the Blue Creek / Habegger Ditch (HUC 04100004040020, 04100004040030, 04100004040040, and 04100004040050) watershed in Adams County, IN and 32.79 river miles in the Yellow Creek Watershed (HUC 04100004040070) in Adams County. Completed by IDEM in 2005, the reports identified impaired water bodies and the necessary load reductions to meet IDEM water quality standards. TMDL reports were completed for *E. coli* in the St. Marys River Watershed, and for nutrients (nitrogen and phosphorus) and Impaired Biotic Communities (IBC) in the Blue Creek/Habegger Ditch and Yellow Creek Watershed.

To address the impairments addressed in the TMDL reports, as well as concerns identified by St. Marys River Watershed stakeholders and Steering Committee members, the following list of goals has been developed:

Goal: Reduce sediment in all monitored streams to meet a level of 30 mg/l by 2028

Goal: Reduce amount of trash/debris in the watershed by 50% by 2028.

Goal: Reduce Atrazine levels to meet a level of 3.00 µg/l (ppb) in all monitored streams by 2028.

Goal: Reduce levels of *E. coli* to meet IDEM water quality standards (235 cfu/100ml) by 2028.

Goal: Reduce levels of nutrients to meet levels set forth by the TMDL:Nitrogen (10 mg/l), Phosphorus (0.30 mg/l) by 2028. Reduce Ammonia levels so as not to exceed Criterion Continuous Concentration by 2028.

Goal: Significantly reduce stormwater runoff and activity in the Regulatory Flood Hazard Area in order to reduce severity and impacts of flooding by 2028.

Goal: Increase Public Awareness and Participation by 50% by 2028.

The St. Marys WMP identifies management measures, short and long term milestones, approximate cost estimates, and contributing partners necessary to meet these goals. The WMP will also be used as a tool for implementation as well as for securing future funding for implementation projects and management measures in the watershed.

1.2 Partnerships

To develop a successful and comprehensive watershed management plan, a number of partnerships have been developed. These partnerships have played a vital role in identifying resource needs in the watershed.

The following groups and organizations have been essential partners in the development of the St. Marys River Watershed Management Plan.

Adams, Allen, and Wells County Soil and Water Conservation Districts (SWCD)

The three SWCDs teamed together to develop the resources necessary to begin the process of developing the WMP. Additionally, the SWCDs, with their local knowledge of the land have been an essential resource for identifying resource needs in the watershed. Upon completion of the St. Marys River Watershed Management Plan, SWCDs will play a vital role in the implementation phase by working directly with landowners to implement conservation projects.

Adams County Planning Commission

The Adams County Planning Commission has been essential in identifying livestock operations in Adams County. They have an ordinance in place that requires producers to apply for a county livestock permit. Many of the regulations of the ordinance are more stringent than those of the State of Indiana. The ordinance also requires producers to identify locations where waste will be land applied.

Maumee River Basin Commission

Maumee River Basin Commission (MRBC) emerged in 1985 as an alliance between Adams, Allen, DeKalb, Noble, and Steuben Counties, which comprise the Maumee River Basin. The Commission is designed to assist communities in northeast Indiana to curb the threat of flooding. The MRBC is a state agency formed by Indiana Code 13-7-6.1. The MRBC provides regional leadership in planning, promoting, coordinating, and implementing flood control, conservation, and the control and development of resources such as land, water, and man-made improvements (MRBC 1993). The MRBC has authority over several areas of concern that have impacted the watershed. The MRBC has played an essential role in the development of the WMP by helping to identify concerns associated with flooding and erosion in the St. Marys River Watershed.

United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS)

NRCS has provided valuable technical assistance and information to the project. This partnership has been key to identifying the best management practices that are suitable to addressing resource concerns in the watershed. NRCS will also play a vital role in the implementation phase of the project by providing technical assistance and engineering design work, as well as information on current and upcoming farm bill programs.

Western Lake Erie Basin Partnership (WLEB)

The WLEB Charter was agreed to on March 29, 2006, and the signatories agreed to develop a consensus-based Partnership to pursue the following principles:

- The Partnership is committed to collaboration and consensus building - sharing resources and knowledge to link land use to water quality, support ongoing efforts and identify new opportunities to enhance and improve the watershed.
- The Partnership will apply watershed-based solutions to local problems and apply local solutions to watershed problems -inclusively empowering and building the capacity of local watershed groups and supporting ongoing efforts.
- The Partnership is results oriented - it will define the baseline status of the basin, identify and prioritize science based solutions, responsibly support the implementation of innovative and cooperative projects, monitor and evaluate its actions, and support an adaptive management approach.
- The Partnership will speak with one voice, promote transparency, encourage participation, be responsive, create awareness, educate, and inform.
- The Partnership will provide the structure necessary to coordinate public and private resources across political boundaries to accelerate achievement of environmental goals and support for local conservation initiatives.

The Leadership Committee for the WLEB Partnership is comprised of senior members of their respective organizations. Figure 2 outlines the organizational structure of the WLEB partnership.

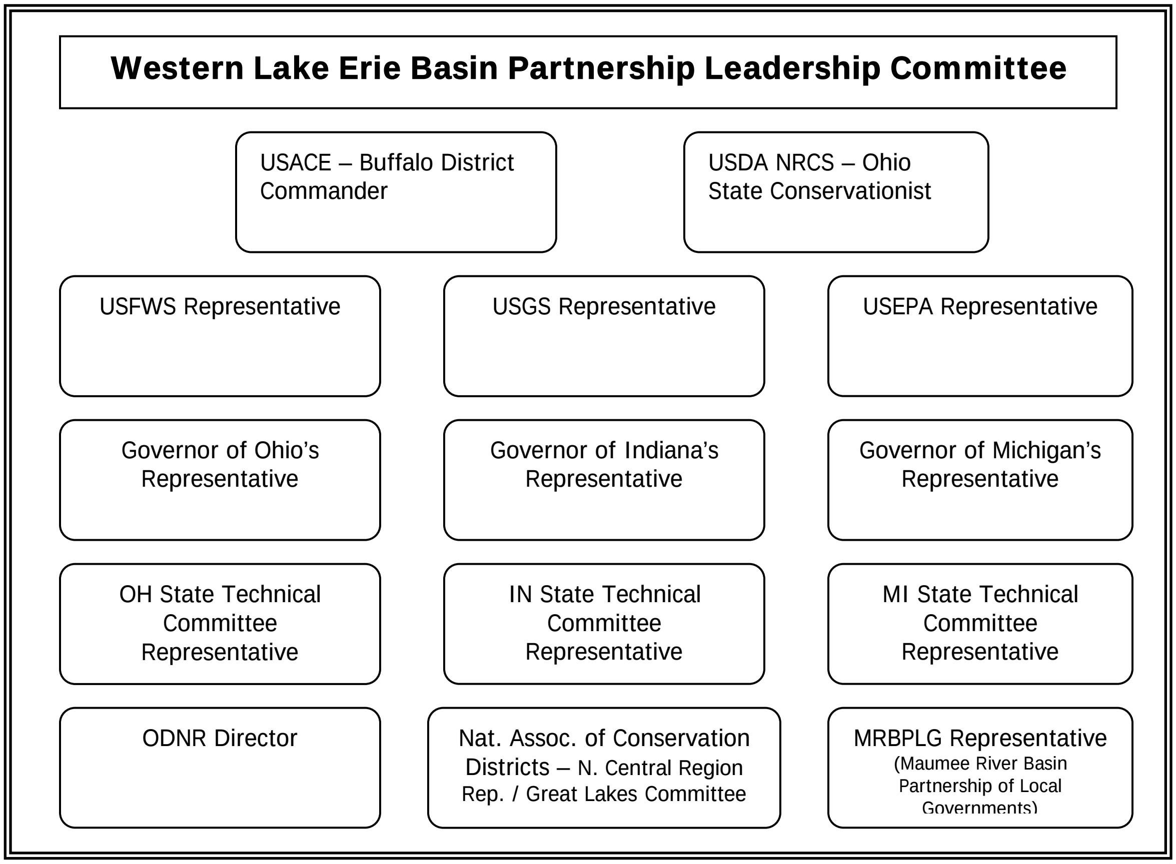

Figure 2. WLEB Partnership Leadership Committee Members.

This group oversees the efforts of an Operational Committee and four Coordination Teams: Project Coordination Team, Outreach/Public Education Coordination Team, Resource Coordination Team, and Research & Data Coordination Team. (www.wleb.org)

The WLEB has provided information about the St. Marys River Watershed. In particular, the WLEB, in association the the US Army Corps of Engineers completed a watershed assessment for the St. Marys River Watershed. The assessment covers both the Ohio and Indiana portion of the watershed, providing background watershed information, flood damage reduction, water quality, natural resource-based recreation, fish and wildlife enhancement, and commercial and recreational navigation. The watershed assessment can be found in Appendix I of this report.

Maumee River Basin Partnership of Local Governments (MRBPLG)

The Maumee River Basin Partnership of Local Governments (MRBPLG) is a consortium of cities, towns, villages, townships, counties, watershed management groups, and the regional community, which was founded in March 2001 by the City of Fort Wayne, Indiana and the City of Toledo, Ohio. This Partnership stretches across the Indiana, Ohio, and Michigan state boundaries and focuses on a watershed-based approach to water quality management in the Maumee River Basin.

The MRBPLG exists to improve and protect water quality on a regional and local watershed basis by acting as an advocate for its members with state and federal agencies, consolidating data, integrating planning and priorities, and encouraging the development of smaller watershed partnerships. (www.mrbplg.org)

The MRBPLG has been an essential partner to the St. Marys River Watershed Project by advising on Combined Sewer Overflow (CSO) and MS4 stormwater issues in the watershed.

Indiana State Department of Agriculture – Division of Soil Conservation (ISDA-DSC)

The Division of Soil Conservation's (DSC) primary focus is soil erosion and its effects on land productivity and water quality. DSC employees work to control off-site sedimentation from agriculture to reduce non-point source pollution in Indiana's lakes, rivers and streams. DSC also provides administrative support and training to Indiana's 92 soil and water conservation districts. (www.in.gov/isda)

ISDA employs District Support Specialists who work cooperatively with soil and water conservation districts (SWCD) and other conservation partners in the design of programs that reach landusers, the general public, government officials, and primary and secondary educational institutions on the husbandry and management of soil and water resources.

Resource specialists are also employed to directly assist land users. The resource specialists work through regional Conservation Implementation Teams to help land users assess specific soil and water resource problems, as well as develop and apply appropriate solutions. Services available to agricultural land users include:

- Provide up-to-date information to create or revise conservation management plans
- Evaluate on-site erosion and nutrient problems
- Help landowners identify specific conservation practices
- Supervise installation and maintenance of selected conservation practices
- Help landowners identify nutrient control cost-share programs and applications.

ISDA also employs two Resource Specialists to promote conservation programs strictly within the greater Maumee River Basin. These WLEB specialists promote conservation programs by speaking with landowners one on one, planning and promoting field days, and providing technical assistance to landowners.

ISDA staff has assisted with the St. Marys WMP by providing information regarding resource concerns in the watershed, especially with soil erosion concerns. ISDA staff in Adams county have also been very helpful by serving as a contact with the Amish community in the area. Upon completion of the WMP, ISDA staff will serve an essential role by working one-on-one with landowners and providing technical assistance on BMP's and conservation programs.

St. Marys River Watershed Steering Committee

The St. Marys Steering Committee is composed of representatives from local city and county governments, Soil and Water Conservation Districts, and private landowners in the watershed. The input obtained from the Steering Committee has proved to be invaluable. Through the local knowledge that these individuals possess, the information contained and presented within the WMP will serve as a valuable planning tool.

The vision of the St. Marys Watershed Project is improved water quality for the inhabitants of the St. Marys River Watershed, with appropriate economic growth and financial security for present and future generations.

The St. Marys River Watershed Project's mission is to continue to improve the health of the St. Marys River through the implementation of best management practices, water quality monitoring, public education, community outreach, and ecosystem restoration activities throughout the St. Marys River Watershed.

2.0 OVERVIEW OF THE ST. MARYS RIVER WATERSHED

2.1 Watershed Location

The St. Marys River watershed is located in the Great Lakes Basin, in the Western Lake Erie Basin, and defined by the 8-digit hydrologic unit code (HUC) 04100004 (Fig. 3, 4). The St. Marys River Watershed is located in northeastern Indiana and northwestern Ohio and covers an area of over 707,000 acres. In Indiana, the watershed spans 240,366 acres across Adams, Allen, and Wells counties. There are approximately 343 miles of perennial streams in Indiana.

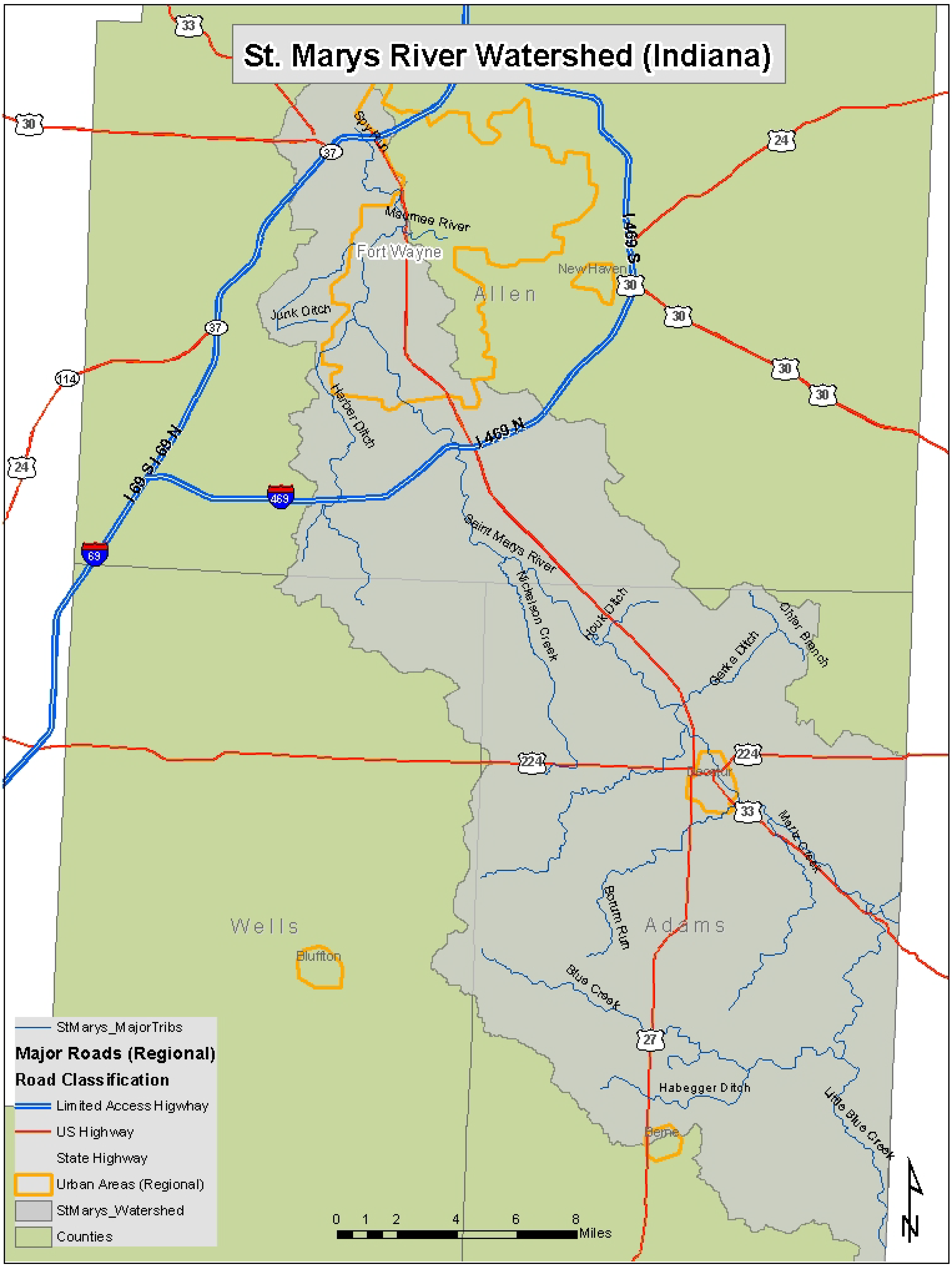

Figure 3. St Marys River Watershed

The St. Marys River originates in New Bremen, Ohio flowing to the Northwest through Auglaize, Mercer, Shelby and Van Wert counties in Ohio. The St. Marys River then flows into Indiana through Adams County southwest of Pleasant Mills, near the Indiana State Line and Highway 33. The St. Marys River continues to the northwest flowing through Wells County into Allen County where it joins the St. Joseph River in Fort Wayne to form the Maumee River, which flows northeast and empties into Lake Erie.

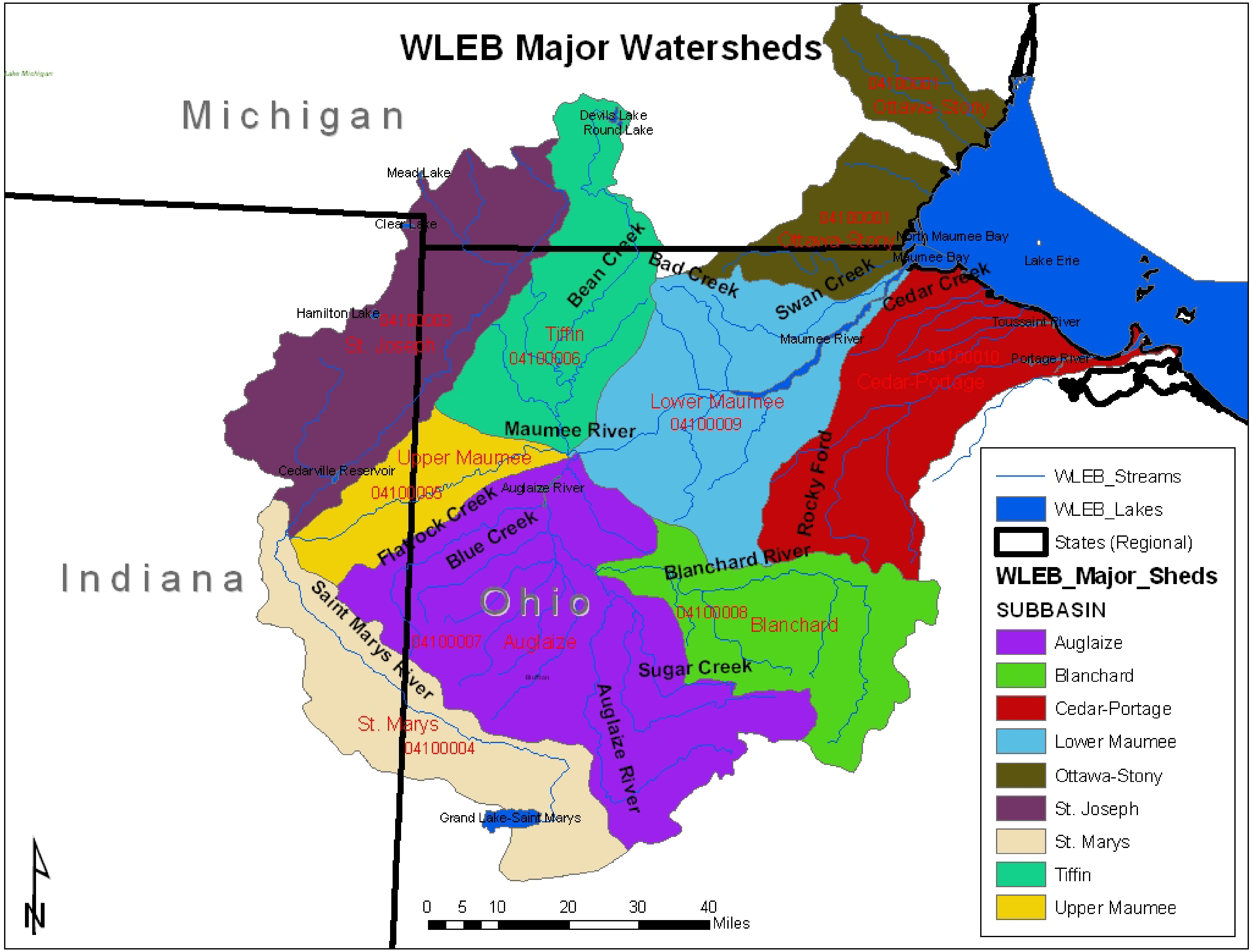

Figure 4. 8-digit watersheds in the Western Lake Erie Basin

The Indiana portion of the St. Marys River watershed can be divided into twenty-two 14-digit sub-watersheds according to the major tributaries of the river (Fig. 5).

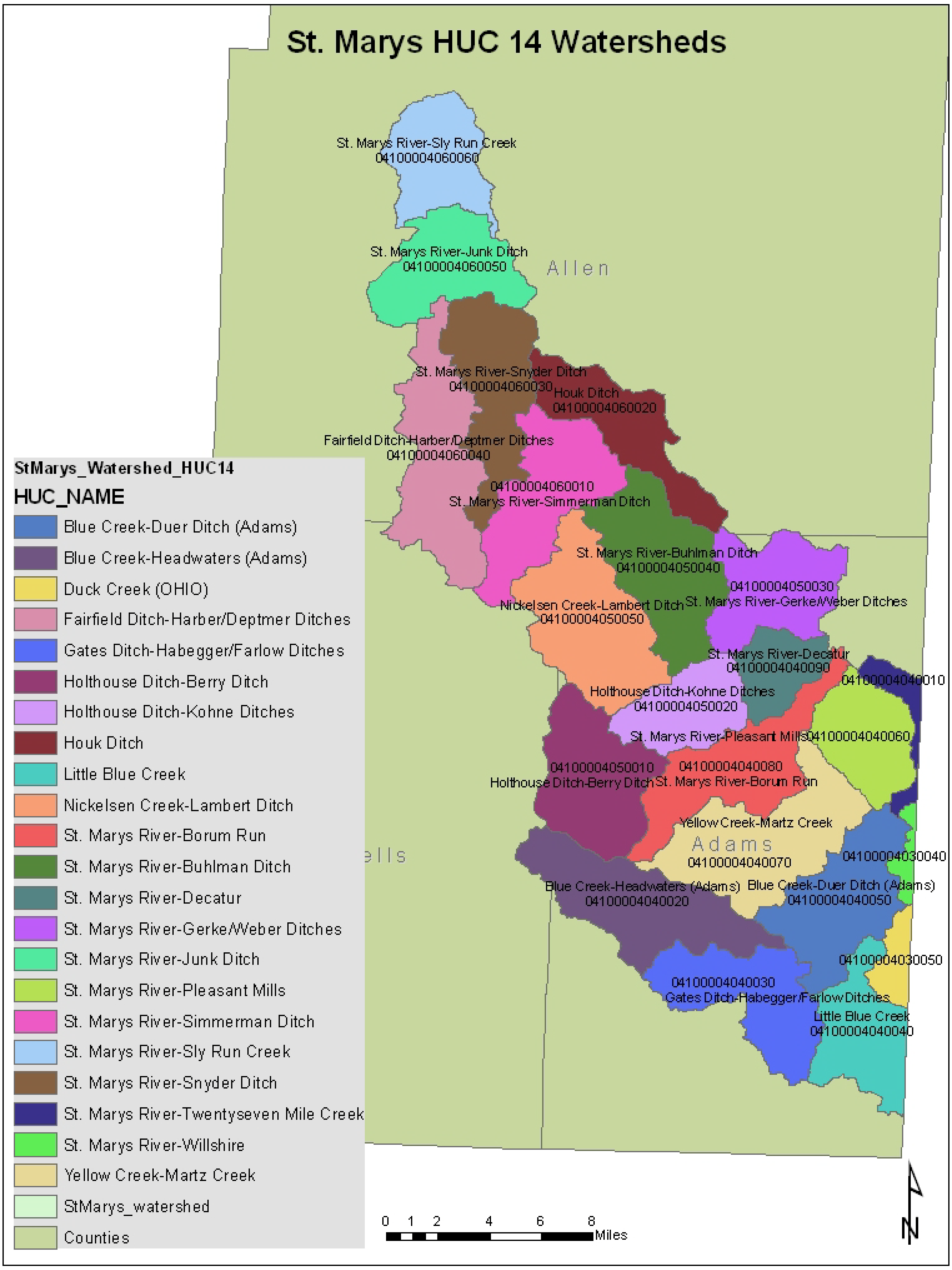

Figure 5. 14-digit sub-watersheds of the St. Marys River Watershed

2.2 Geology / Soils

The St. Marys River Watershed has had extensive glaciation. The area is comprised mainly of a Till Plain, which consists of gently rolling to flat landscapes. The elevations range from 780 to 840 feet above mean sea level. Except where stream valleys dissect the till plain, there is little internal relief.

The entire St. Marys River Watershed is located in the Eastern Corn Belt Plain ecoregion, which is characterized by rolling plains with local end moraines. Glacial deposits of the Wisconsin age are extensive in the region. In comparison to the Central Corn Belt Plains located to the west, it had more natural tree cover and has lighter soils. Prior to settlement, beech/maple hardwood forests were common on Wisconsin soils while beech forests and elm-ash swamp forests dominated the wetter pre-Wisconsin soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity. (www.epa.gov/wed/pages/ecoregions/level_iii.htm) The following Figure 6 shows the geographic location of the St. Marys River Watershed in the Eastern Corn Belt Ecoregion.

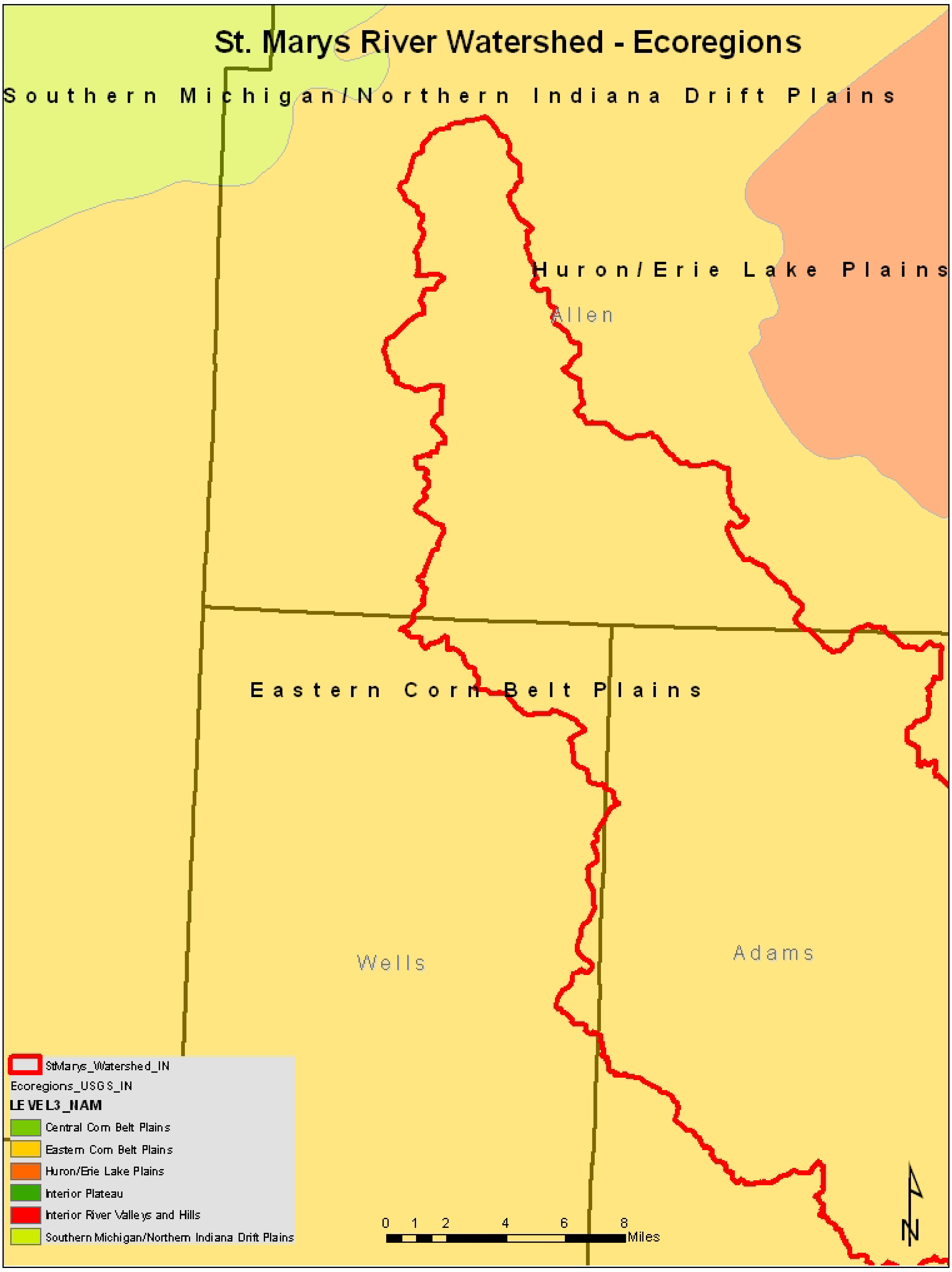

Figure 6. St. Marys River Watershed Ecoregion

The area is very poorly drained and drainage ditches are commonly used to carry runoff and lower the characteristically shallow water table within the slow draining till. The St. Marys River itself is comprised of alluvial and outwash deposits. The alluvium does not extend significantly beyond the channel. The surrounding clayey or silty soils have high runoff coefficients. These factors contribute to surface runoff and ultimately the flooding of the St. Marys River.

Indiana, particularly in the central region, has some of the most productive soils in the United States. The soils, good management, and temperate climate contribute to consistently increasing crop yields. Soil types in the St. Marys River Watershed are derived from two general groups: Saranac-Eel-Tice and the Blount-Pewamo-Glynwood. The clayey Saranac soils occur in depressional areas that are subject to frequent flooding and are poorly drained. Loamy Tice soils, which appear in slightly higher areas than Saranac soils, are somewhat poorly drained. The silty, clayey, and loamy soils of the Blount-Pewamo-Glynwood association, characterized by very gradual swale and swell topography and occasional areas that have frequent changes of slope, occur on till plains and moraines. In depressional areas, the nearly level, very poorly drained Pewamo soils occur. On relatively higher lying broad flats and slight rises, the nearly level somewhat poorly drained Blount soils appear. Glynwood soils, which are gently sloping, moderately well drained soils, are located on yet higher convex side slopes. (Maumee Comm. 1996)

The USDA classifies lands with high potential for erosion as Highly Erodible Lands (HEL). The basis for identifying highly erodible land is the erodibility index of a soil map unit. The erodibility index of soil is determined by dividing the potential erodibility for each soil by the soil loss tolerance (T) value established for the soil. The T value represents the maximum annual rate of soil erosion that could take place without causing a decline in long-term productivity. A soil mapping unit with an erodibility index of 8 or more is a highly erodible soil mapping unit.

Potential erodibility for sheet and rill erosion is estimated by multiplying the following factors of the Universal Soil Loss Equation (USLE):

1. Rainfall and runoff factor (R)
2. Susceptibility of the soil to water erosion (K)
3. Combined effects of slope length and steepness (LS)

The erodibility index for sheet and rill erosion is represented by the formula RKLS/T. A soil map unit is highly erodible if the LS factor for the shortest length and minimum percent of slope is used and the RKLS/T value equals or exceeds 8.

A soil mapping unit is potentially highly erodible if: (1) the RKLS/T value using the minimum LS factor is less than 8 and (2) the RKLS/T value using the maximum LS factor is equal to or greater than 8. Figure 7 below shows areas in the watershed that are subject to erosion.

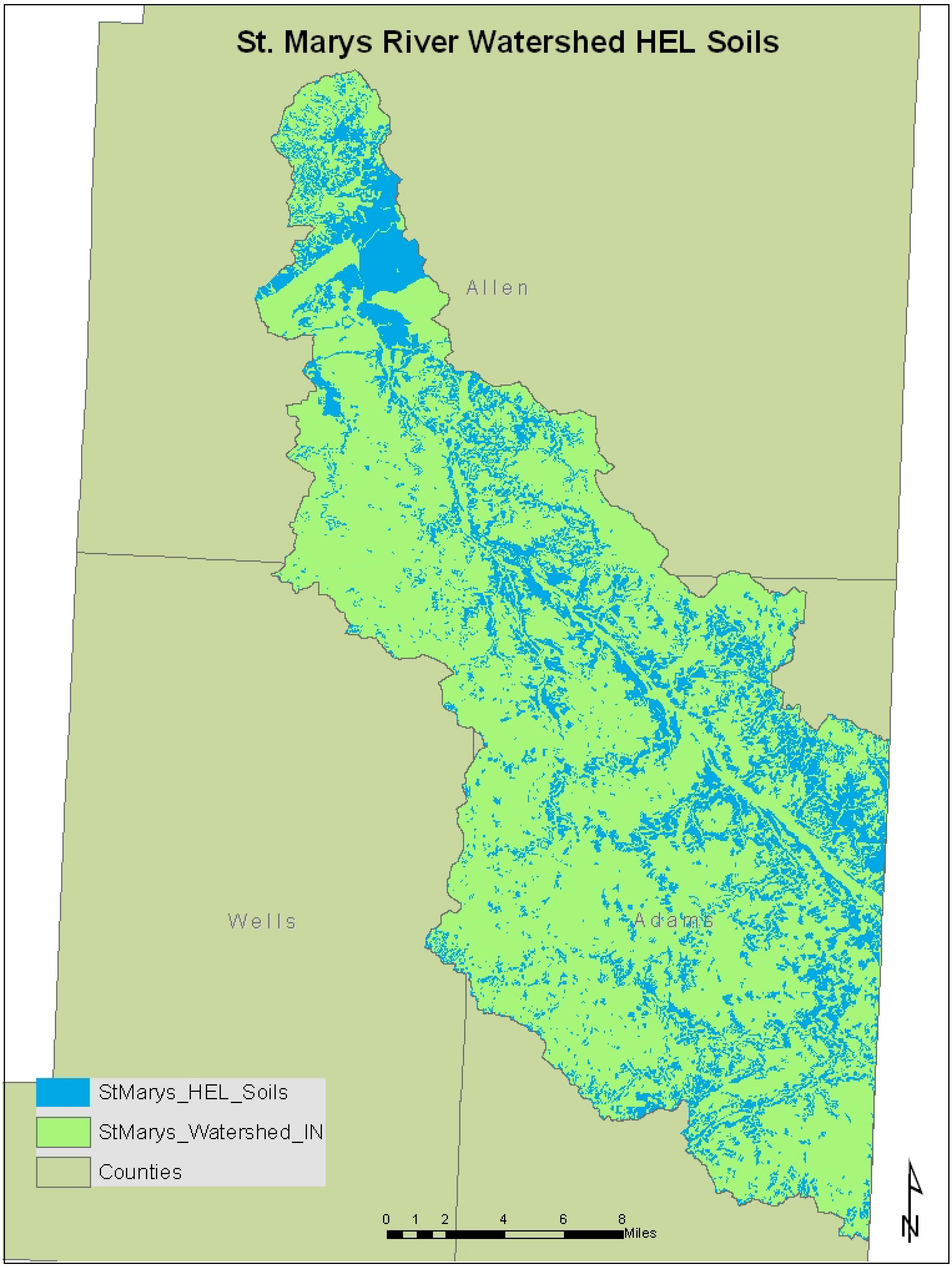

Figure 7. HEL Soil in the St. Marys River Watershed

Septic systems need well-drained soils to function properly. The majority of the soils in the St. Marys River Watershed have severe limitations for the suitability of septic systems due to slow permeability, ponding and seasonal wetness. Figure 8 shows soil limitations for septic systems in the watershed based off of USDA Soil Surveys. Limitations are considered severe if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required (USDA, 1986). However, it should be noted, that after direct conversation with local health departments who conduct investigations for the placement of septic systems, in most cases a suitable area can be found on most land tracts to install a system.

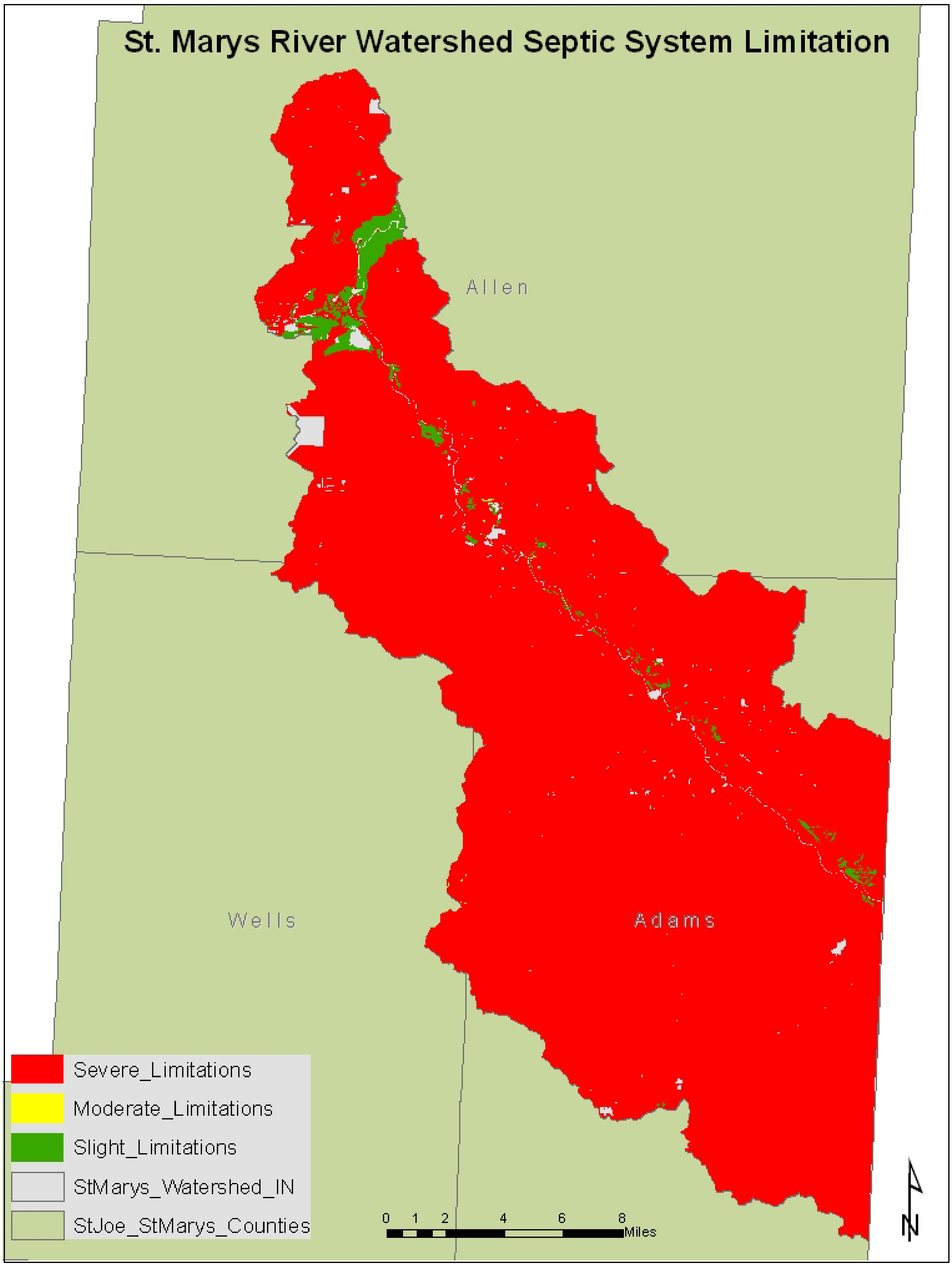

Figure 8. Soil Limitations in the St. Marys River Watershed for septic systems.

2.3 Hydrology

There are approximately 1303.9 miles of waterways in the St. Marys River Watershed. Table 1 provides a break down of stream miles by order and county.

Stream Miles by Order							
Description	Acres of Standing Water (Lakes/Ponds)	Total Miles of Streams	Total Miles of 1st Order Streams	Total Miles of 2nd Order Streams	Total Miles of 3rd Order Streams	Total Miles of 4th Order Streams	Total Miles of 5th Order Streams
St. Marys Watershed	1006.1	1303.9	713.0	285.9	140.5	75.7	88.8
Adams Co., IN portion	360.4	371.1	196.7	90.4	40.1	22.9	21.0
Allen Co., IN portion	294.8	161.7	80.3	35.8	23.3	2.8	19.6
Auglaize Co., OH portion	250.9	304.5	157.0	73.1	32.6	29.2	12.6
Mercer Co., OH portion	51.6	322.7	180.3	60.4	36.7	18.1	27.2
Shelby Co., OH portion	27.6	43.9	31.5	10.0	2.4	N/A	N/A
Van Wert Co., OH portion	20.8	90.2	58.5	15.2	5.4	2.7	8.4

Table 1. Stream Miles by Order (NRCS, 2008).

In Allen County the St. Marys is one of four major rivers, draining the south central portion of the county. The northern part of Adams County is drained by the St. Marys River while the southern portion is drained by the Wabash River. Northern Wells County is drained by Eight-Mile Creek and the Wabash River. A small area in the northeastern part of the county is drained by the St. Marys River. The central and southern parts are drained by the Wabash River, while the southwestern part is drained by the Salamonie River. Approximately 0.32% of the watershed is designated as open water. Prior to clearing and heavy agricultural use, swamps, marshes and wetlands were common in the St. Marys River Watershed. However, once settlements arose, many of these water resources disappeared as subsurface drainage systems were installed to increase agricultural productivity. Furthermore, to increase agricultural productivity in the watershed, many small ditches and streams have been cleared, straightened, and deepened to augment drainage of agricultural fields. Today, legal drains in the watershed are maintained by County Drainage Boards. Many streams in the watershed now lack a riparian corridor or buffer. An inventory of stream buffer widths was completed by the St. Marys River Watershed Project using aerial photos. The following Table 2 shows the results from this inventory.

St. Marys River Watershed Stream Buffers			
	Buffer Width	**# Parcels**	**% Parcels**
	0 – 10 feet	978	41%
	11 – 20 feet	221	9%
	21 – 60 feet	450	19%
	61 – 140 feet	396	17%
	141 - >300 feet	344	14%

Table 2. St. Marys River Watershed Stream Buffers.

Figures 9 and 10 represent approximate stream buffer widths in the St. Marys River Watershed.

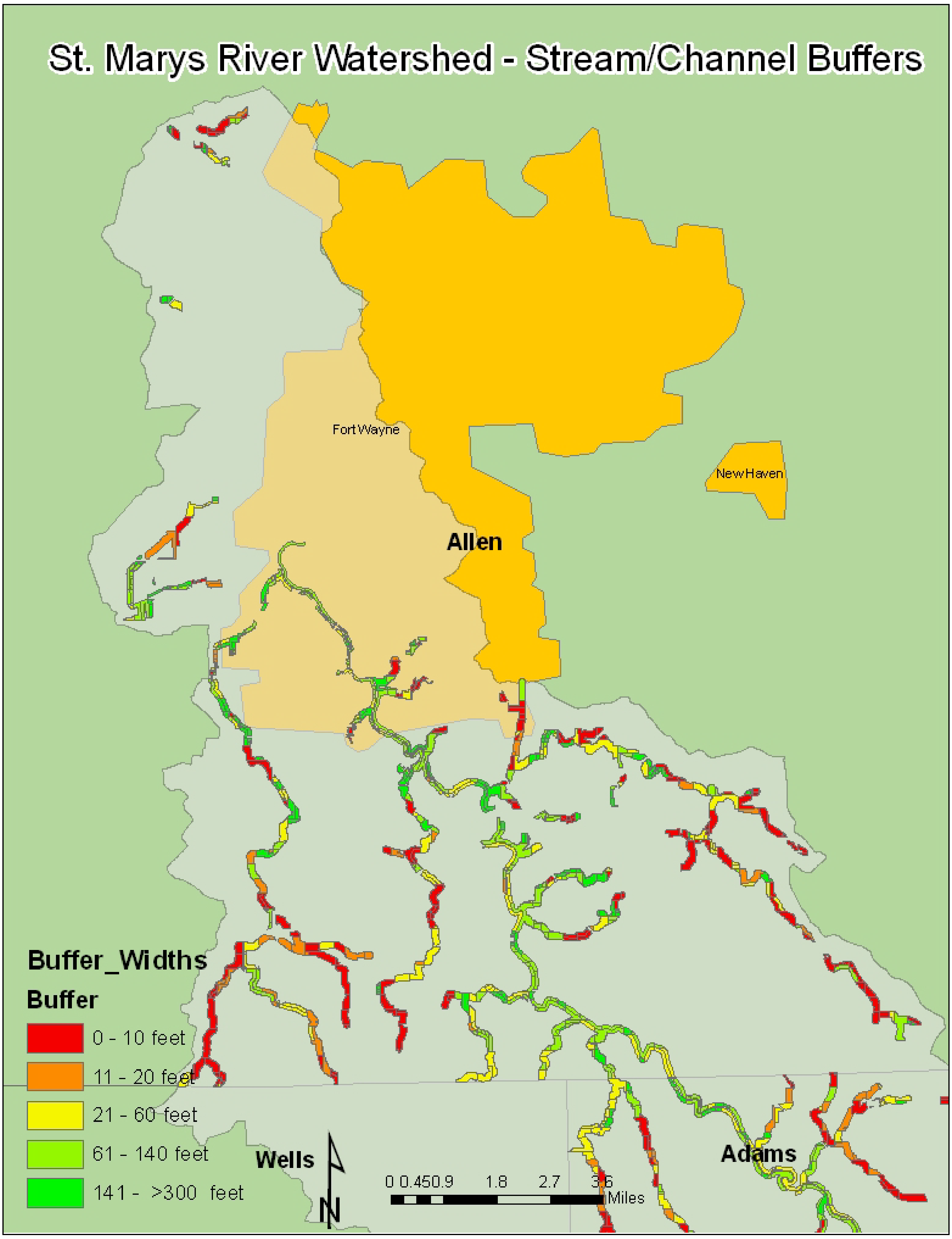

Figure 9. Stream buffer widths in the St. Marys River Watershed – Allen County.

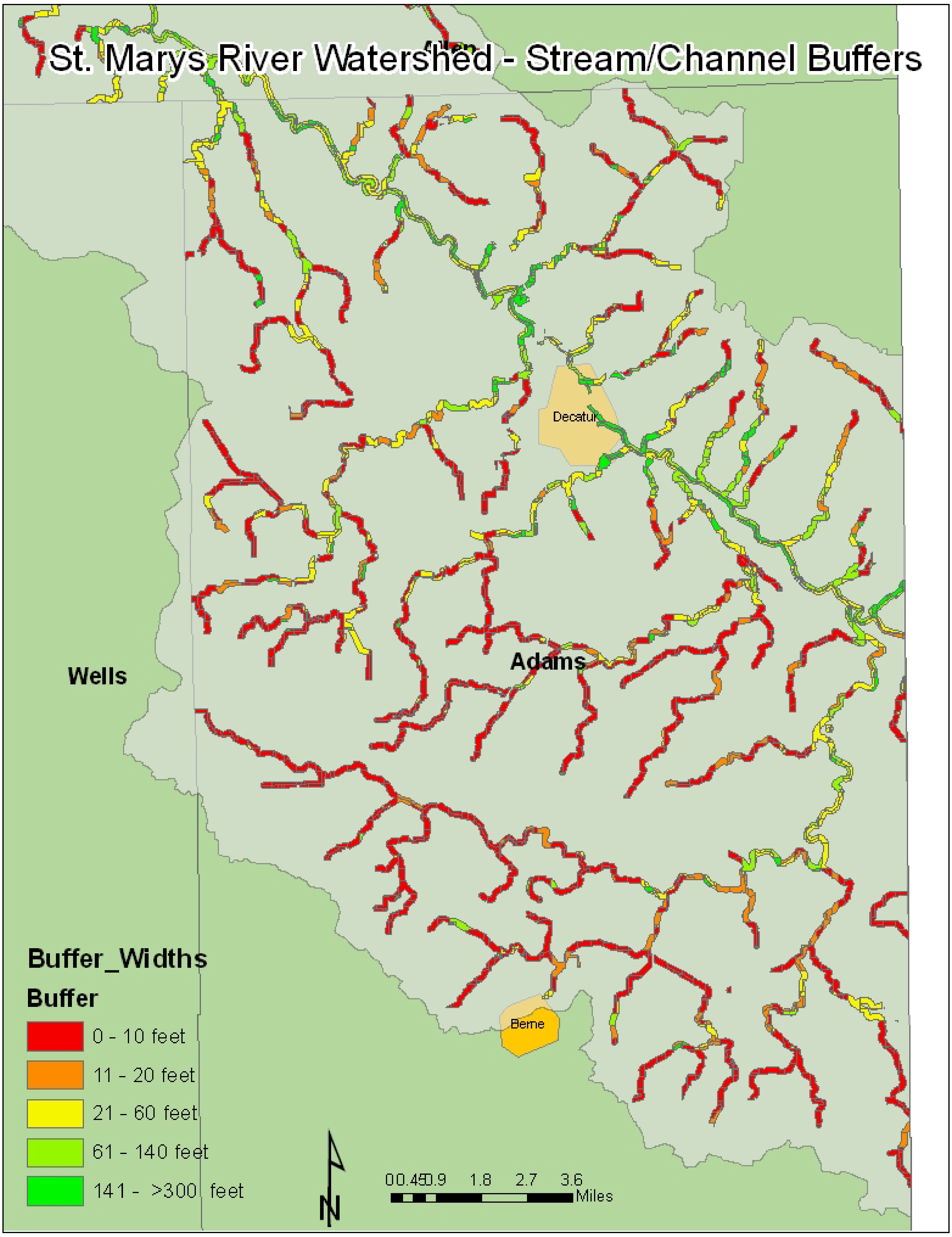

Figure 10. Stream buffer widths in the St. Marys River Watershed – Adams County.

2.4 Climate

The climate of the St. Marys River basin is classified as temperate continental, which describes areas having warm summers, cool winters, and the absence of a pronounced dry season. Precipitation and temperature throughout the basin vary considerably on a daily, seasonal and yearly basis. An average winter temperature of 28ºF and a summer average temperature of 72ºF characterize the climate in the St. Marys River Watershed region. Rainfall averages 36 inches per year with 60% of this falling between April and September during the crop season. Snowfall annually averages 29 inches, which provides a vital source for soil moisture. The average relative humidity is 60% and the predominant wind is from the southwest. (USDA County Soil Surveys, Adams County)

2.5 Landuse

The native vegetation of the St. Marys River Watershed consists of beech-maple hardwood forest. Today this vegetation has been replaced with an intensive agricultural base. The land cover in the watershed is predominantly agriculture, representing approximately 84% of the total land cover. The U.S. Geological Survey - Biological Resources Division and the U.S. Fish and Wildlife Service are overseeing the National GAP Analysis Program. The mission of the Gap Analysis Program (GAP) is to provide regional assessments of the conservation status of native vertebrate species and natural land cover types and to facilitate the application of this information to land management activities (http://gapanalysis.nbii.gov). Figure 11 is a summary of vegetative cover in the watershed determined from the GAP image and Figures 12 and 13, geographically show the land use type within the St. Marys Watershed. Data from the 2006 National Ag Statistics indicates there are approximately 150,921 acres of crop land in the watershed.

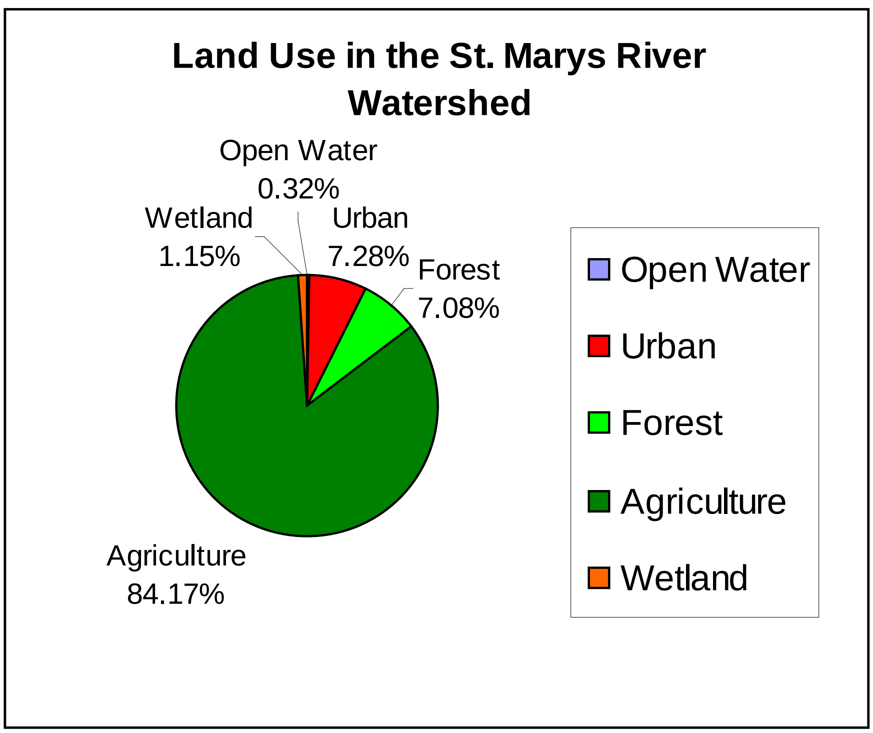

Figure 11. Land Use in the St. Marys River Watershed via Gap Analysis

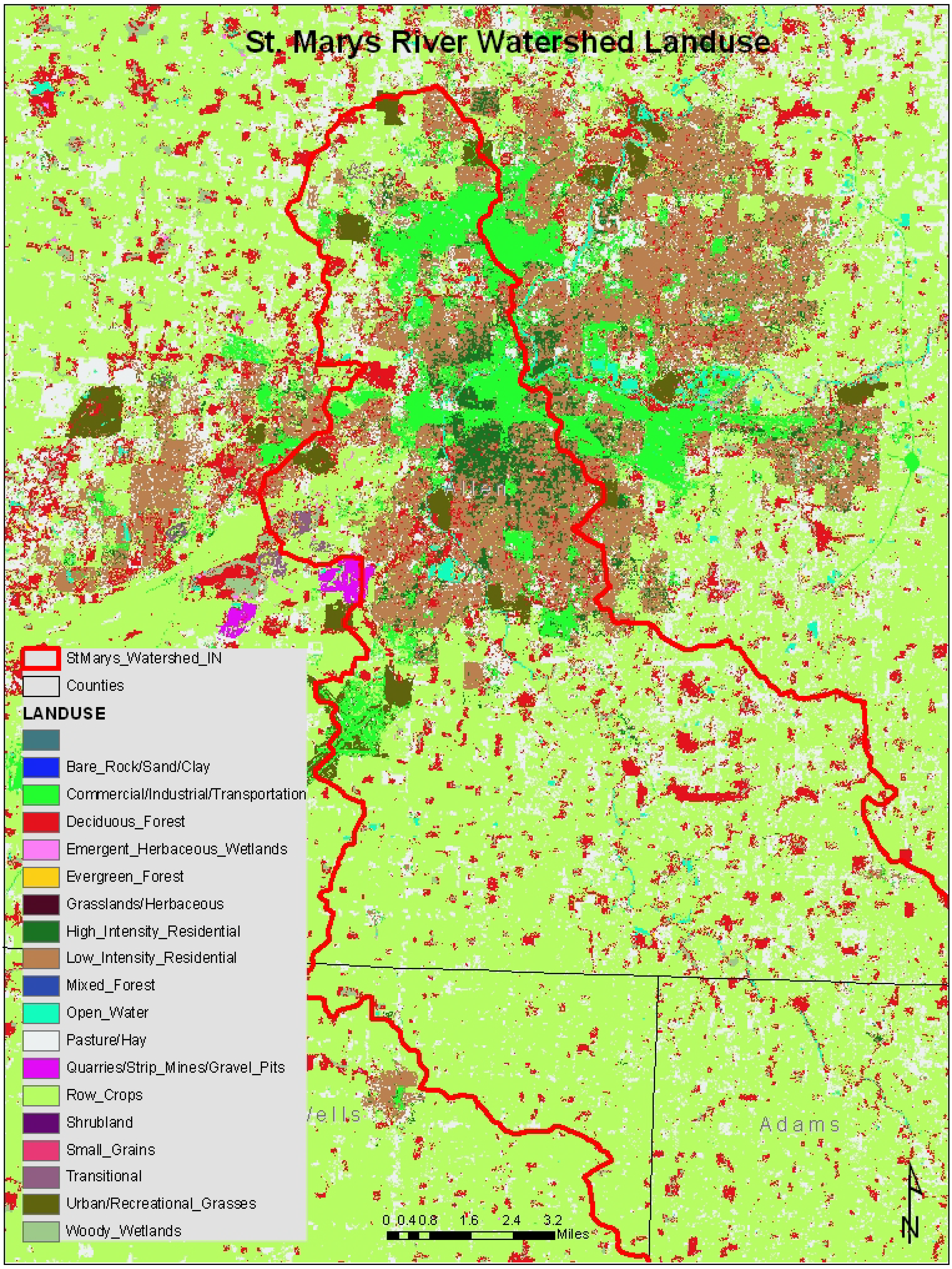

Figure 12. Land use in the St. Marys River Watershed (Allen County)

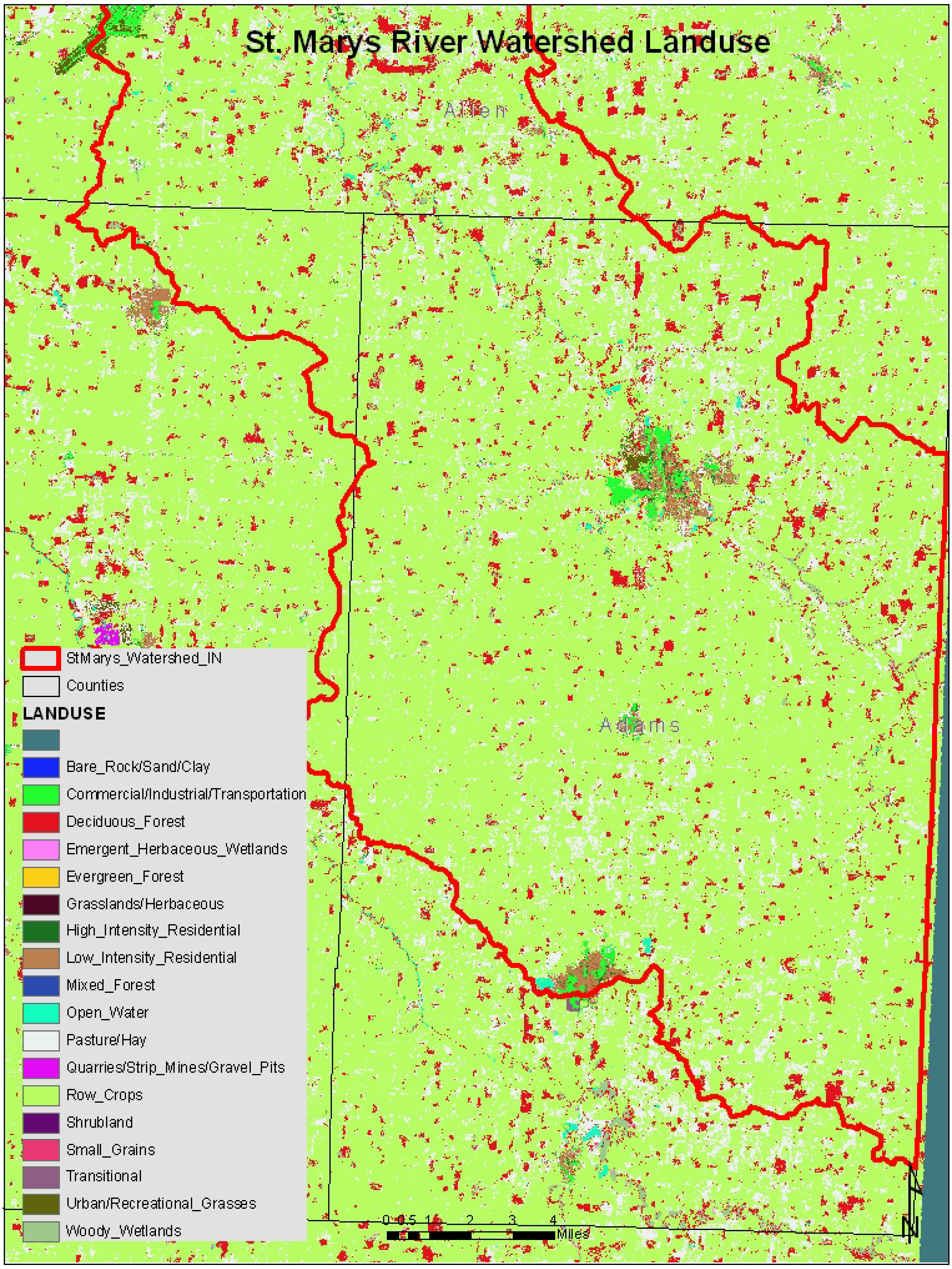

Figure 13. Land use in the St. Marys River Watershed (Adams County)

Corn and soybeans comprise the majority of crops produced in the St. Marys River Watershed. Additional land uses include urban areas, wetlands, and wooded areas. The wetland communities that were present in the watershed include floodplain forest, till plains flat woods, wet prairies, marshes, seeps, and fens. These communities are nearly gone due to the impact of agriculture and urbanization (U.S. Geological Survey, 1994). Decatur, Berne, Monroe and Fort Wayne are the four major urban areas within the watershed. Decatur and Monroe are located wholly within the watershed while Berne and Fort Wayne are located within multiple watersheds. Land use within the city limits of the aforementioned metropolitan areas is by and large urban, consisting mainly of impervious surfaces. These surfaces include roads, parking lots, and rooftops, which direct stormwater into small headwater streams and ditches and ultimately into the main stem of the St. Marys River. In the City of Fort Wayne, sanitary sewers are directed to the waste water treatment plant (WWTP) and discharged to the Maumee River. However, numerous combined sewer overflows (CSO's) and stormwater outlets exist along the St. Marys River. The City of Decatur's sewage treatment plant discharges to the St. Marys River near the north edge of Decatur. Sanitary systems in Berne and Monroe are discharged to the Wabash River. It should be noted that untreated stormwater from these towns also discharges to the St. Marys River Watershed.

Urban sprawl is evident in the outskirts of Fort Wayne and Decatur. In these areas, land once used for agriculture is rapidly being converted to residential housing and commercial businesses. Land use in the majority of the watershed is expected to remain in agricultural production or rural area.

2.6 Land Ownership

The large majority of land in the St. Marys River watershed is privately owned . In the watershed, a total of 518 acres of the 240,366 acres comprising the watershed is designated public lands. The southern portion of the City of Fort Wayne is located in the watershed, with a population of approximately 252,000 people. Decatur, the Adams County seat, is located in the watershed with a population 9,500. Other small towns located within the watershed boundaries include Monroe (population 734) and the northern edge of Berne (population 4150).

2.7 Threatened and Endangered Species

The St. Marys River Watershed is home to numerous threatened and endangered species. Appendix II shows the endangered, threatened and rare species that have been identified in Adams, Allen, and Wells counties. The following Table 3 identifies unique habitat areas in the St. Marys River Watershed.

Unique Habitat Areas				
Ac. Within Range of Known T&E Species	**% of Watershed Within Range of Known T&E Species**	**Natural Communities**	**Permanent Easement (Ac.)**	**% of Watershed in Permanent Easement**
8,431	3.51	122	1,043	0.43
Data Source (Threatened and Endangered Species) = IDNR, Div. of Nature Preserves; Analysis by NRCS, 2007, data source is not public. Habitat ranges indicate the likely life-history range surrounding known locations of T&E species (state & federal listed) that have the potential to be used by the species (ranges for plants = point – 0 miles; amphibians/reptiles/insects/aquatic species = ¼-½ mile; mammals/birds = 1 mile.				
Data Source (Natural Communities) = Areas identified and classified by the IDNR as unique/rare (data include the Natural Community acreage + ¼ mile buffer), unpublished data.				
Data Source (Permanent Easements) = Indiana NRCS (Wetlands Reserve Programs), 2007, unpublished data.				

Table 3. Unique habitat areas in the St. Marys River Watershed.

2.8 Wetlands

Prior to European settlement, 24.1% of Indiana's surface was covered by wetlands (State of Indiana, 2007). Approximately 85% of Indiana's wetlands have been lost, which ranks Indiana fourth in the nation for wetland loss. The following Figure 14, identifies hydric soils in the watershed. Hydric soils have typical characteristics of wetland soils.

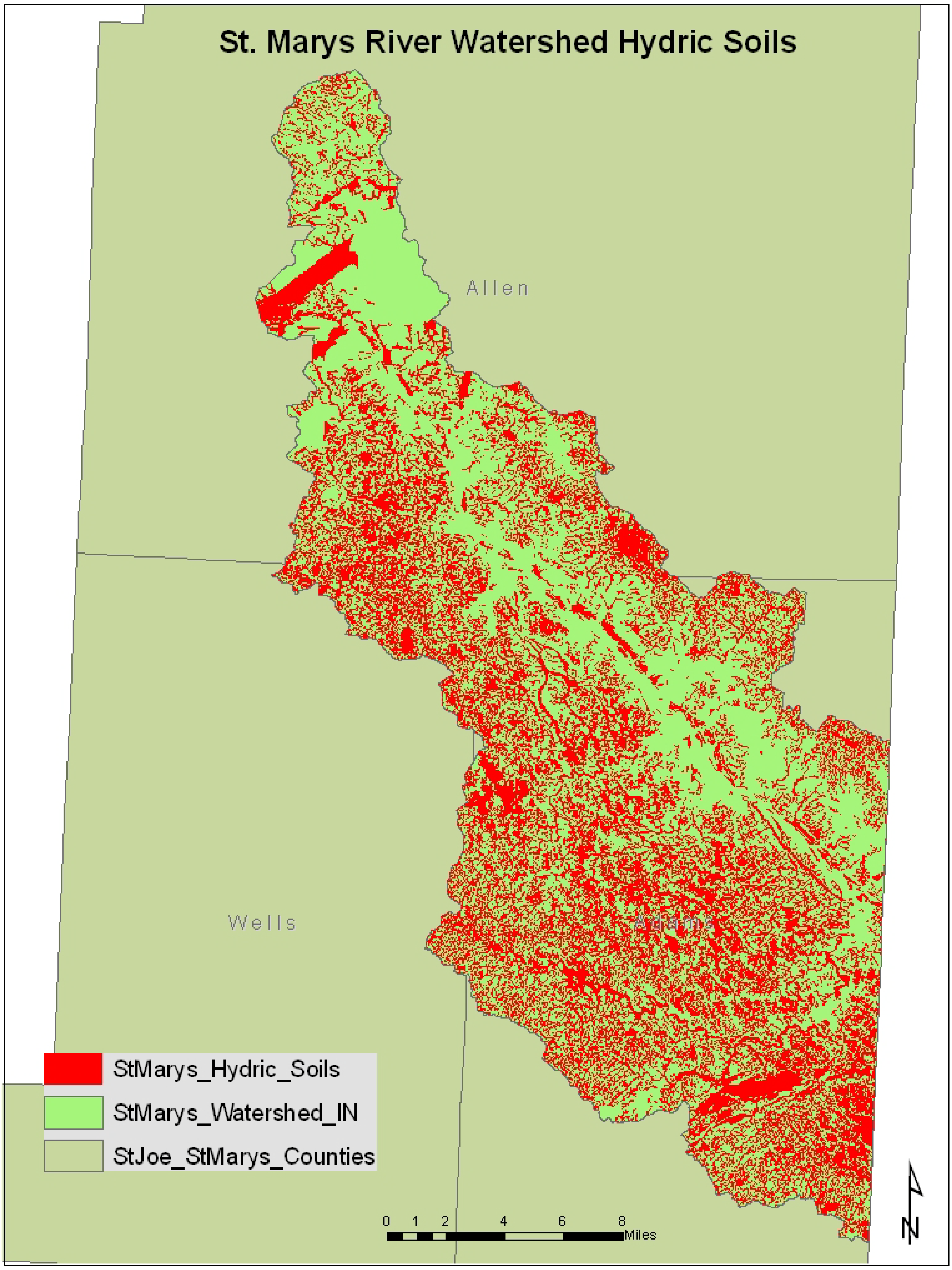

Figure 14. Hydric Soils in the St. Marys River Watershed.

Currently, the St. Marys River Watershed contains approximately 1.15% or 3,322 acres of wetlands. The National Wetland Inventory (NWI) compiled by the United States Geological Society uses aerial photography to catalog wetlands. Figure 15 shows wetlands in the St. Marys River Watershed as compiled by the NWI.

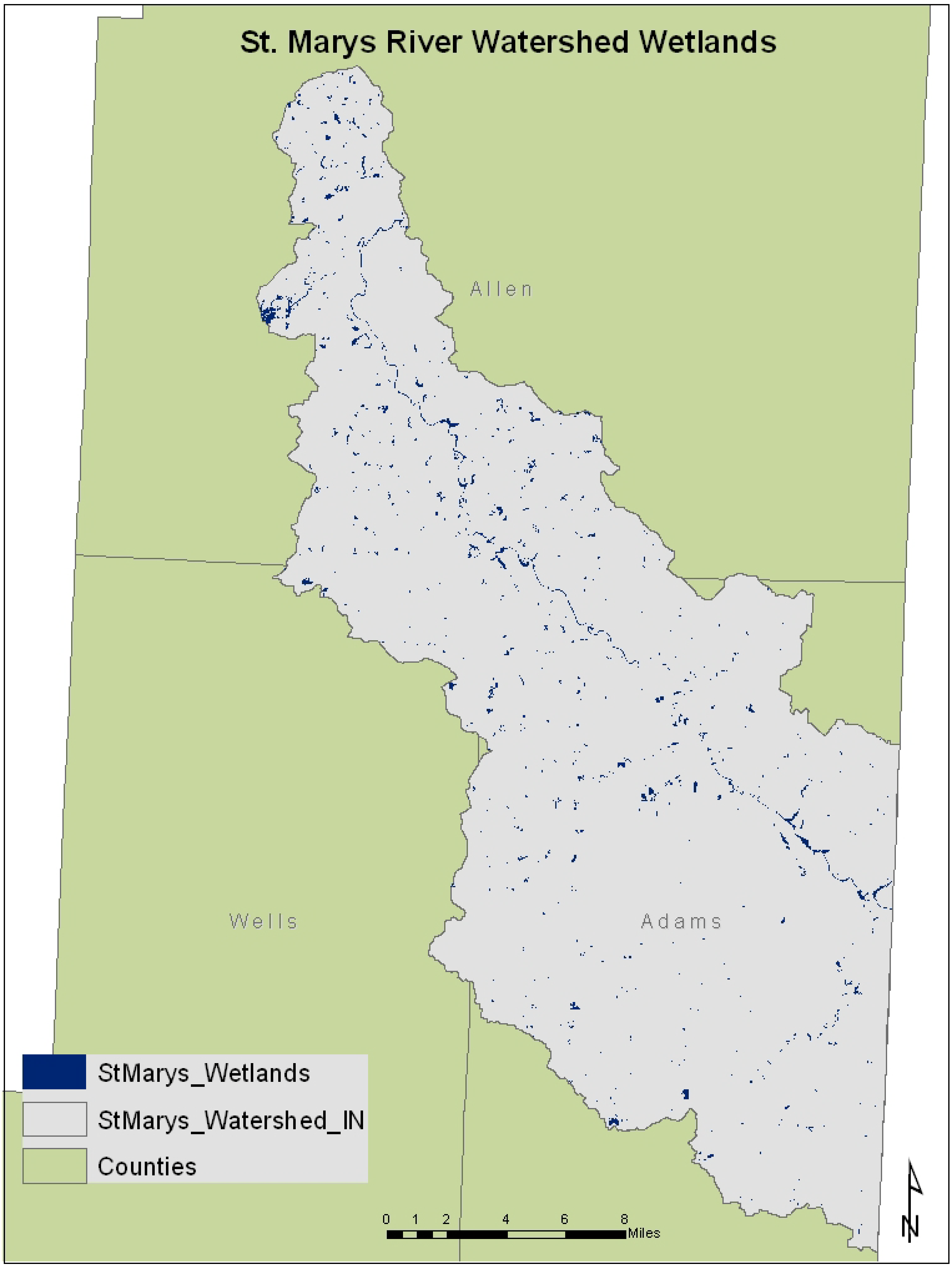

Figure 15. Wetlands in the St. Marys River Watershed.

3.0 WATER QUALITY

A critical step in the watershed planning process is to research and assess the current status of the watershed as well as existing water quality studies that have documented historic conditions in the watershed. IDEM has been the principal party involved in collecting data in the St. Marys River Watershed. IDEM studies have included numerous long term monitoring locations, dating back to 1990; 303(d) list assessments, TMDL studies, a Watershed Restoration Action Strategy survey, as well as biotic community surveys. Furthermore, a number of other agencies and organizations have completed research and collected data in the watershed. The following sections will detail previous and current assessments of the St. Marys River Watershed.

3.1 Indiana 303(d) List

The St. Marys River and its tributaries are designated by IDEM for full body contact recreation and warm water aquatic communities. The USEPA designated the St. Marys for human health and wildlife. The St. Marys River and many of its tributaries do not currently meet IDEM standards for the aforementioned use designations. Section 303(d) of the Clean Water Act requires states to identify waters, through their Section 305(b) water quality assessments, that do not or are not expected to meet applicable water quality standards with federal technology based standards alone. States are also required to develop a priority ranking for these waters, taking into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of impaired waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards.

The 303(d) list commonly recognizes waters in the St. Marys watershed as being impaired. Stream segments in the St. Marys River watershed are listed on the 2002 303(d) List for *E. coli*, impaired biotic communities (IBC), ammonia, nutrients, algae, and total dissolved solids. On the 2004 303(d) List, segments from the St. Marys River watershed are listed for *E. coli*, impaired biotic communities (IBC), ammonia, and nutrients. On the 2006 303(d) List, the St. Marys River watershed is listed for *E. coli*, impaired biotic communities (IBC), nutrients, and fish consumption advisory (FCA) for PCB's and Mercury. The following Table 4 identifies impaired water body segments listed on the 2008 303(d) list as well as the cause of impairment. Figure 16 represents the geographic locations of the 2008 303(d) listed waters.

St. Marys River Watershed (Indiana) 2008 303(d) List of Impaired Waters				
County	**Waterbody Segment ID**	**Waterbody Segment Name**	**Cause of Impairment**	**Category**
ADAMS CO	INA0442_T1001A	FUCH DITCH - UNNAMED TRIBUTARY (CR 17)	IMPAIRED BIOTIC COMMUNTIES	5A
ADAMS CO	INA0442_T1001A	FUCH DITCH - UNNAMED TRIBUTARY (CR 17)	NUTRIENTS	5A
ADAMS CO	INA0443_T1014	GATES DITCH	NUTRIENTS	5A
ADAMS CO	INA0445_00	DUER DITCH (ADAMS) AND OTHER TRIBS	*E. COLI*	5A
ADAMS CO	INA0446_T1015	ST. MARYS RIVER	NUTRIENTS	5A
ADAMS CO	INA0447_T1002	MARTZ CREEK-RUPPERT DITCH AND UNNAMED TRIBUTARY	NUTRIENTS	5A
ADAMS CO	INA0448_00	BORUM RUN AND TRIBS	IMPAIRED BIOTIC COMMUNTIES	5A
ALLEN CO	INA0454_T1005	ST. MARYS RIVER	*E. COLI*	5A
ALLEN CO	INA0454_T1021	ST. MARYS RIVER	IMPAIRED BIOTIC COMMUNTIES	5A
ALLEN CO	INA0454_T1021	ST. MARYS RIVER	NUTRIENTS	5A
ALLEN CO	INA0463_T1003	St. Marys River	NUTRIENTS	5A
ALLEN CO	INA0465_00	JUNK DITCH AND OTHER TRIBS	Mercury in Fish Tissue	5B
ALLEN CO	INA0465_00	JUNK DITCH AND OTHER TRIBS	PCBs in Fish Tissue	5B
ALLEN CO	INA0465_T1002	St. Marys River	NUTRIENTS	5A
ALLEN CO	INA0465_T1002	ST MARYS RIVER	Mercury in Fish Tissue	5B
ALLEN CO	INA0465_T1002	ST MARYS RIVER	PCBs in Fish Tissue	5B
ALLEN CO	INA0466_T1022	St. Marys River	NUTRIENTS	5A
ALLEN CO	INA0466_T1022	ST MARYS RIVER	Mercury in Fish Tissue	5B
ALLEN CO	INA0466_T1022	ST MARYS RIVER	PCBs in Fish Tissue	5B
ADAMS CO	INA0434_00	ST. MARYS RIVER-WILLSHIRE	*E. COLI*	4A
ADAMS CO	INA0441_00	ST. MARYS RIVER	*E. COLI*	4A
ADAMS CO	INA0442_00	BLUE CREEK HEADWATERS (ADAMS)	*E. COLI*	4A
ADAMS CO	INA0442_T1007	BLUE CREEK	*E. COLI*	4A
ADAMS CO	INA0443_T1008	HABEGGER DITCH	*E. COLI*	4A
ADAMS CO	INA0443_T1014	GATES DITCH	*E. COLI*	4A
ADAMS CO	INA0443_T1019	FARLOW DITCH AND TRIBS	*E. COLI*	4A
ADAMS CO	INA0443_T1020	WITTMER NO 1 DITCH	*E. COLI*	4A
ADAMS CO	INA0444_00	LITTLE BLUE CREEK	*E. COLI*	4A
ADAMS CO	INA0445_T1006	BLUE CREEK	*E. COLI*	4A
ADAMS CO	INA0446_00	PLEASANT MILLS AND	*E. COLI*	4A

		TRIBS		
ADAMS CO	INA0446_T1015	ST. MARYS RIVER	*E. COLI*	4A
ADAMS CO	INA0447_00	YELLOW CREEK	*E. COLI*	4A
ADAMS CO	INA0447_T1002	MARTZ CREEK-RUPPERT DITCH AND UNNAMED TRIBUTARY	*E. COLI*	4A
ADAMS CO	INA0448_00	BORUM RUN AND TRIBS	*E. COLI*	4A
ADAMS CO	INA0448_T1016	ST. MARYS RIVER	*E. COLI*	4A
ADAMS CO	INA0449_00	DECATUR TRIBS	*E. COLI*	4A
ADAMS CO	INA0449_T1017	ST. MARYS RIVER	*E. COLI*	4A
ADAMS CO	INA0452_00	HOLTHOUSE DITCH-KOHNE DITCH	*E. COLI*	4A
ADAMS CO	INA0453_00	GERKE/WEBER DITCH AND TRIBS	*E. COLI*	4A
ADAMS CO	INA0453_T1018	ST. MARYS RIVER	*E. COLI*	4A
ALLEN CO	INA0454_T1012	ST. MARYS RIVER TRIB	*E. COLI*	4A
ALLEN CO	INA0454_T1021	ST. MARYS RIVER	*E. COLI*	4A
ALLEN CO	INA0461_T1004	ST. MARYS RIVER	*E. COLI*	4A
ALLEN CO	INA0463_00	SNYDER DITCH AND OTHER TRIBS	*E. COLI*	4A
ALLEN CO	INA0463_T1003	ST. MARYS RIVER	*E. COLI*	4A
ALLEN CO	INA0465_00	JUNK DITCH AND OTHER TRIBS	*E. COLI*	4A
ALLEN CO	INA0465_T1002	ST. MARYS RIVER	*E. COLI*	4A
ALLEN CO	INA0466_T1011	SPY RUN CREEK	*E. COLI*	4A
ALLEN CO	INA0466_T1012	SPY RUN CREEK-UNNAMED TRIBUTARIES	*E. COLI*	4A
ALLEN CO	INA0466_T1022	ST. MARYS RIVER	*E. COLI*	4A
ADAMS CO	INA0443_T1008	HABEGGER DITCH	IMPAIRED BIOTIC COMMUNITIES	4A
ADAMS CO	INA0445_T1006	BLUE CREEK	IMPAIRED BIOTIC COMMUNITIES	4A
ADAMS CO	INA0447_00	YELLOW CREEK	NUTRIENTS	4A
ADAMS CO	INA0447_00	YELLOW CREEK	IMPAIRED BIOTIC COMMUNITIES	4A
ALLEN CO	INA0454_T1012	ST. MARYS RIVER TRIB	IMPAIRED BIOTIC COMMUNITIES	4A

Table 4. 2008 303(d) Listings for St. Marys River watershed

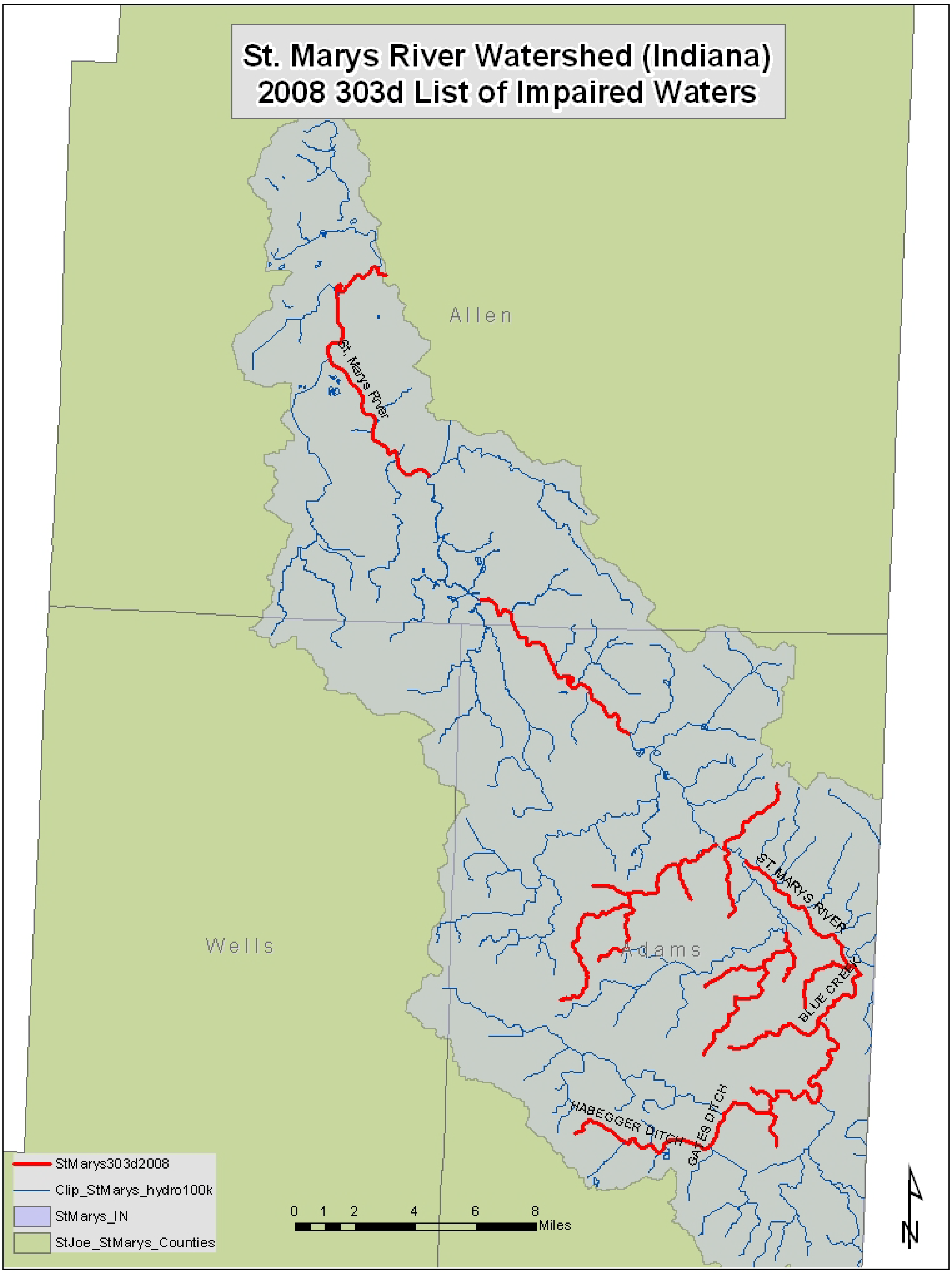

Figure 16. 2008 303(d) list waters.

3.2 St. Marys River TMDL for *E. coli* Impairment / TMDL for Impaired Biotic Communities and Nutrients for the Blue Creek/Habegger Ditch and Yellow Creek Watersheds

In accordance with section 303(d) of the Federal Clean Water Act and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130) it is required that States develop a Total Maximum Daily Load (TMDL) for water bodies that are not meeting State Water Quality Standards (WQS). A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards (www.epa.gov). The TMDL for a given water body and pollutant is the sum of individual waste load allocations (WLA's) for point sources and load allocations (LA's) for nonpoint sources and natural background levels (USEPA, 2001). The sum of the allocations must not result in the exceedence of the water quality standard. In addition, a margin of safety (MOS) must be included in the analysis, either implicitly or explicitly. The MOS accounts for any uncertainty in the relationship between loads and conditions in the receiving water and helps to ensure that the water quality standard is met. These concepts can be expressed conceptually by the equation:

$$TMDL = \sum WLA's + \sum LA's + MOS$$

In 2005, the Indiana Department of Environmental Management (IDEM) completed a TMDL for the St. Marys River Watershed in Allen and Adams Counties to identify the sources of the impairment and determine the allowable levels of *E. coli*, nutrients, and total suspended solids (TSS). The following Table 5 outlines impaired water body segments addressed in the St. Marys River Watershed TMDL.

Waterbody Name	303(d) List ID	Segment ID Number	Length (Miles)	Impairment
St. Marys – Willshire	40	INA0434_00	2.84	*E. coli*
St. Marys River	40	INA0441_00	0.86	*E. coli*
Blue Creek	40	INA0442_T1007	11.94	*E. coli*
Blue Creek	40	INA0445_T1006	12.28	*E. coli*, IBC, Ammonia, Nutrients
Duer Ditch (Adams) and Other Tribs	*to be determined	INA0445_00	9.33	*E. coli*
Blue Creek Headwaters (Adams)	*to be determined	INA0442_00	8.46	*E. coli*
Habegger Ditch	43	INA0443_T1008	5.8	*E. coli*, IBC, Nutrients
Wittmer Ditch, No. 1	*to be determined	INA0443_T1020	2.98	*E. coli*
Farlow Ditch and Tribs	*to be determined	INA0443_T1019	11.01	*E. coli*
Gates Ditch	273	INA0443_T1014	1.17	*E. coli*
Little Blue Creek	272	INA0444_00	22.12	*E. coli*
Borum Run and Tribs	*to be	INA0448_00	21.65	*E. coli*

	determined			
Yellow Creek	274	INA0447_00	32.79	*E. coli*, IBC, Nutrients
Martz Creek – Ruppert Ditch and Unnamed Tributaries	274	INA0447_T1002	9.82	*E. coli*
Holthouse Ditch – Kohne Ditch	275	INA0452_00	10.16	IBC, *E. coli*
St. Marys River	47	INA0448_T1016, INA0449_T1017, INA0453_T1018, INA0454_T1021	21.27	*E. coli*
St. Marys River	47	INA0461_T1004, INA0463_T1003, INA0465_T1002	16.43	*E. coli*, FCA for PCD & Hg
St. Marys River	*to be determined	INA0446_T1015	4.79	*E. coli*
Unnamed Trib. Of St. Marys River	276	INA0454_T1012	2.84	*E. coli*, IBC
Pleasant Mills and Tribs.	*to be determined	INA0446_T1015	4.79	*E. coli*
Decatur Tribs.	*to be determined	INA0449_00	7.12	*E. coli*
Gerke/Weber Ditch and Tribs.	*to be determined	INA0453_00	17.53	*E. coli*
Snyder Ditch and Other Tribs.	*to be determined	INA0463_00	10.61	*E. coli*
Junk Ditch	*to be determined	INA0465_00	6.55	*E. coli*
Spy Run Creek	278	INA0465_T1011	8.75	*E. coli*
Unnamed Tributaries to Spy Run Creek	Evaluated Assessment – will not be listed	INA0466_T1012	5.08	*E. coli*
St. Marys River	47	INA0466_T1022	0.5	*E. coli*

Table 5. Impaired water body segments addressed in the St. Marys River Watershed TMDL.

IDEM has also completed a TMDL for Impaired Biotic Communities and Nutrients for the Blue Creek/Habegger Ditch and Yellow Creek Sub-watersheds located within the larger St. Marys. The following Table 6 outlines impaired water body segments addressed in the Blue Creek/Habegger Ditch and Yellow Creek Watershed TMDL.

Waterbody Name	303(d) List ID	Segment ID Number	Length (Miles)	Impairment
Blue Creek	40	INA0445_T1006	12.28	*E. coli*, IBC, Nutrients
Habegger Ditch	43	INA0443_T1008	5.8	*E. coli*, IBC, Nutrients
Yellow Creek – Martz Ditch	274	INA0447_00	32.79	IBC, Nutrients
Unnamed Trib. Of St. Marys River	276	INA0454_T1012	2.84	*E. coli*, IBC

Table 6. Impaired water body segments addressed in the Blue Creek/Habegger Ditch and Yellow Creek Watershed TMDL.

Ohio also has the St. Marys River listed on their 303(d) List for impaired aquatic life use. Unfortunately, Ohio's portion of the St. Marys River TMDL is not scheduled for completion until 2017. Ohio's TMDL Program has provided support in the completion of Indiana's St. Marys River watershed TMDL. The Indiana TMDLs were developed on the basis that Ohio's water quality standards would be met at the Indiana – Ohio state line. The following Table 7 identifies the target loads set by the St. Marys and Blue Creek/Habegger Ditch and Yellow Creek Watersheds TMDL's.

Indiana TMDL Targets	
TMDL	Target
E. coli	125 cfu/100 ml / 235 cfu/100 ml**
Nitrogen* (nitrate+nitrite)	10 mg/l
Phosphorus*	0.30 mg/l
Total Suspended Solids (TSS)*	30 mg/l
Dissolved Oxygen*	Values ≤4.0 mg/l or ≥12.0 mg/l
pH*	Values <9.0
Algae*	"Excessive" observations by trained staff
* TMDL completed for Blue Creek/Habeggar Ditch and Yellow Creek Watersheds ** Single Sample Maximum Standard = 235 cfu/100 ml; Geometric Mean Standard= 125 cfu/100ml	

Table 7. TMDL target loads.

On average, in the Blue Creek sub watershed, nitrogen data exceeded the IDEM numeric target 14% of the time. Phosphorus criteria was exceeded 44% of the time, and TSS data was exceeded 28% of the time. In the Yellow Creek sub watershed, nitrogen targets were exceeded 5% of the time, phosphorus 39% of the time, and TSS 21% of the time. (Blue Creek/Habegger Ditch & Yellow Creek TMDL) The following table, Table 8, details *E. coli* target exceedances in the St. Marys River watershed.

E. coli Exceedences in the St. Marys River Watershed		
Watershed	**% Violation of IDEM Single Sample Maximum Standard (235 cfu/100ml)**	**% Violation of IDEM Geometric Mean Standard (125 cfu/100ml)**
Blue Creek	86%	100%
Yellow Creek	84%	100%
Martz Ditch	68%	N/A
Borum Run	59%	N/A
Holthouse Ditch	62%	72%
Nickelson Creek	72%	91%
St. Marys River Mainstem	85%	N/A
St. Marys River Mainstem	74%	N/A
St. Marys River Mainstem	71%	100%
St. Marys River Mainstem	60%	100%
St. Marys River Mainstem	75%	N/A
Source: St. Marys TMDL		

Table 8. *E. coli* exceedences in the St. Marys River Watershed

The purpose of the St. Marys River watershed TMDL is to identify pollutant sources and determine the allowable levels of *E. coli* bacteria, ammonia, nutrients, algae, and total dissolved solids from point and nonpoint sources, as well as impaired biotic communities (IBC). For the water bodies listed as impaired, the goal of the TMDL was to identify the pollutants causing the impairment and then set the appropriate allocations or assimilative capacity of the water body based on the pollutants that have been identified. Implementation of the TMDL will help in the attainment of the applicable WQS in the St. Marys River watershed in Adams, Allen and Wells Counties, Indiana. The complete TMDLs are included in Appendix III.

3.3 Water Quality Monitoring by the St. Marys River Watershed Project

The primary objective of the water quality monitoring project was to characterize the water quality in the St. Marys River Watershed. Samples were collected in order to evaluate the current chemical and physical characteristics of surface water, as well supplement previous data collected by IDEM, the Allen County Health Department, and the Adams County Soil and Water Conservation District. Furthermore, nutrient and TSS sampling were conducted throughout the winter months. Collection of these data will allow for levels to be observed during the non-recreational season, complementing data collected by outside sources during the recreational season.

In order to retrieve further baseline water quality conditions, additional water quality data were gathered from approximately twenty (20) sites in the watershed for *E. coli*, ammonia nitrogen, phosphorus, total suspended solids and pesticides. Sampling was conducted weekly in October and November 2007 and April through June 2008. Sampling was completed on a bi-weekly basis December 2007 though March 2008.

Complete sampling results can be found in Appendix IV of this report. The following Figure 17 identifies the water quality monitoring locations used and their associated subwatershed. Table 9 provides descriptions of water quality monitoring locations.

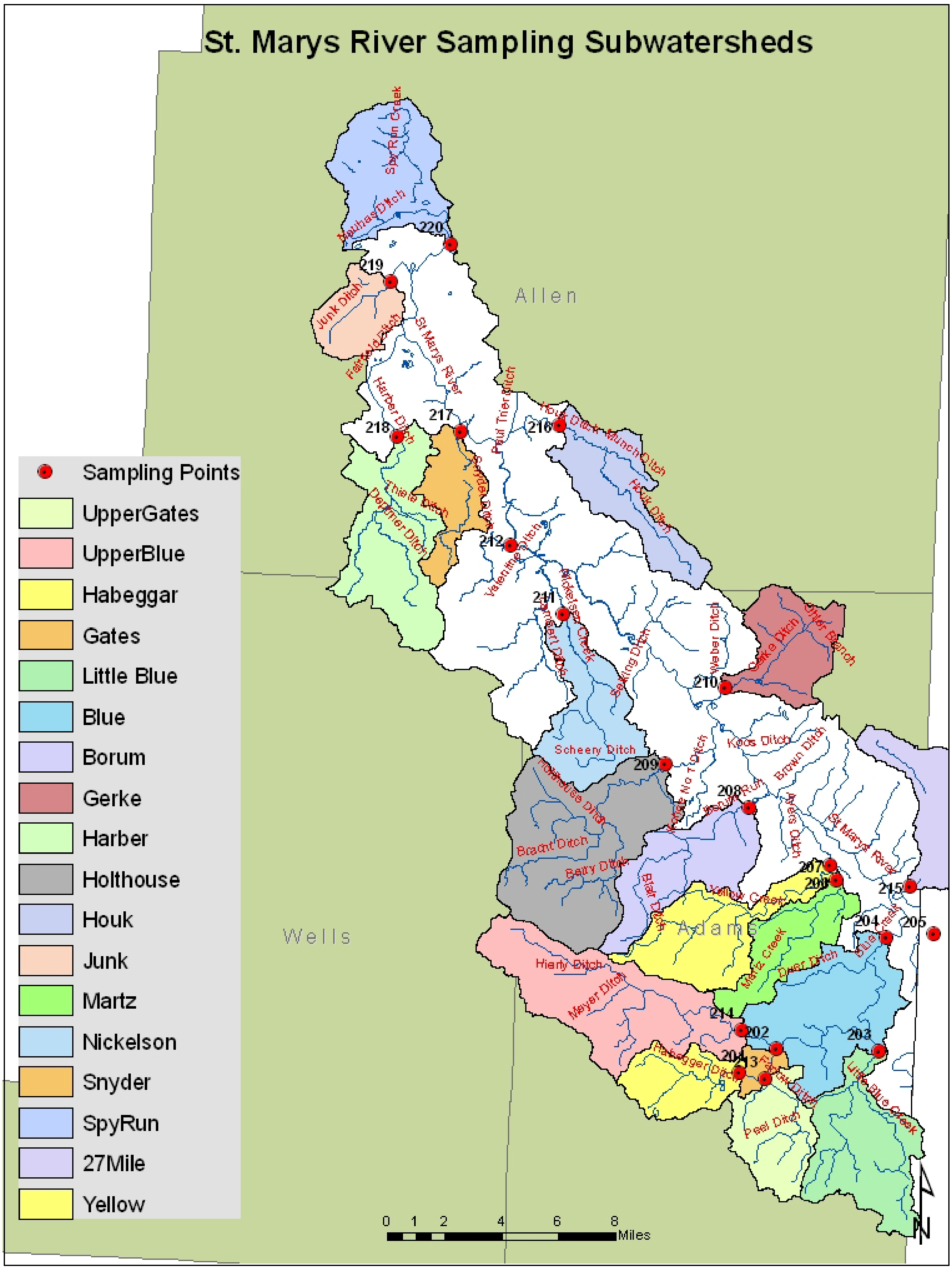

Figure 17. St. Marys River Sampling Subwatersheds.

Sampling Location Descriptions					
Site Number	Stream Name	North (Meters)	East (Meters)	Road Name	IDEM Site Name
201	Habegger Ditch	4510003.66	168902.49	CR S 100 W	LES040-0099
202	Gates Ditch	4511345.77	170976.66	CR E 400 S	LES040-0023
203	Little Blue Ck	4511193.26	176772.14	CR E 400 S	LES040-0010
204	Blue Creek	4517629.29	177183.92	S.R. 124	LES040-0009
205	St. Marys-OH Ln.	4517827.55	179913.89	S.R. 81	UNK000-0007
206	Martz Ditch	4520893.06	174362.44	CR E 200 N	LES040-0040
207	Yellow Creek	4521747.13	174057.41	CR E 250 N	LES040-0038
208	Borum Run	4524949.89	169482.04	High St.	N/A
209	Holthouse Ditch	4527435.84	164754.15	CR N 200 W	LES050-0008
210	Gerke Ditch	4531706.19	168109.42	CR N 000	N/A
211	Nickelsen Creek	4535915.54	158989.18	CR W 1100 W	LES050-0015
212	St. Marys-Poe	4539758.86	156030.43	Hoagland Rd.	LES060-0006
213	Upper Gates Ditch	4509705.65	170355.32	CR S 200 W	N/A
214	Upper Blue Creek	4512448.44	169027.86	CR S 100 W	N/A
215	Twentyseven Mile Creek	4520549.90	178554.40	Piqua Road	N/A
216	Houk Ditch	4546991.91	157158.72	Trentman Road	N/A
217	Snyder Ditch	4546211.05	153166.55	Muldoon Road	N/A
218	Harber Ditch	4545898.70	149555.06	Ferguson Road	N/A
219	Junk Ditch	4554673.66	149242.71	Taylor Road	N/A
220	Spy Run Creek	4556723.43	152629.71	4^{th} Street	N/A

Table 9. Sampling location descriptions.

3.3.1 Water Quality by Parameter

The following section will briefly describe the parameters that were analyzed during sampling activities conducted by the St. Marys River Watershed Project.

Temperature

In addition to having its own toxic effect, temperature affects the solubility and, in turn, the toxicity of many other parameters. Generally the solubility of solids increases with increasing temperature, while gases tend to be more soluble in cold water. Temperature is a factor in determining allowable limits for other parameters such as ammonia (www.kywater.org). The Federal Water Pollution Control Administration (1967) referred to temperature as "a catalyst, a depressant, an activator, a restrictor, a stimulator, a controller, a killer, one of the most important and most influential water quality characteristics to life in water." An important physical relationship exists between the amount of dissolved oxygen in a body of water and its temperature. Simply put, "the warmer the water, the less dissolved oxygen, and vice versa." Figure 18 shows the relationship.

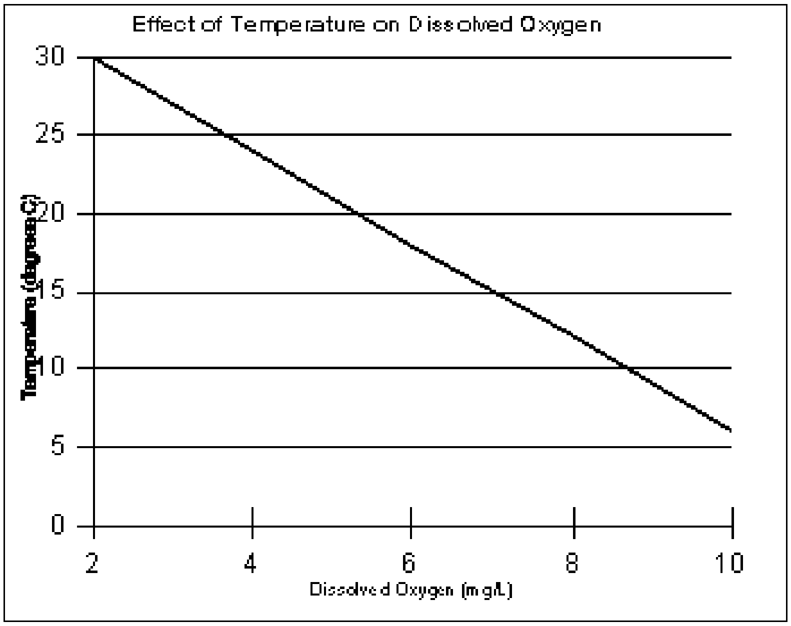

Figure 18. Effects of temperature on dissolved oxygen.

For this reason, heat or "thermal pollution" may be a problem, especially in shallow slow-moving streams, embayments, or pools which can get very warm in mid-summer. Most fish and aquatic organisms simply can't stand warm water and/or low levels of dissolved oxygen. The IAC (327 IAC 2-1.5-8) sets maximum temperatures for Indiana streams in the Great Lakes watershed that are variable by the time of the year, temperatures in May should not exceed 80ºF (26.7ºC) and temperatures from June through September should not surpass 90ºF (32.2ºC).

The following Figure 19 shows maximum temperature levels observed during sampling conducted by the St. Marys River Watershed Project. None of the samples collected exceeded the maximum temperatures set forth by the IAC (327 IAC2-1.5-8).

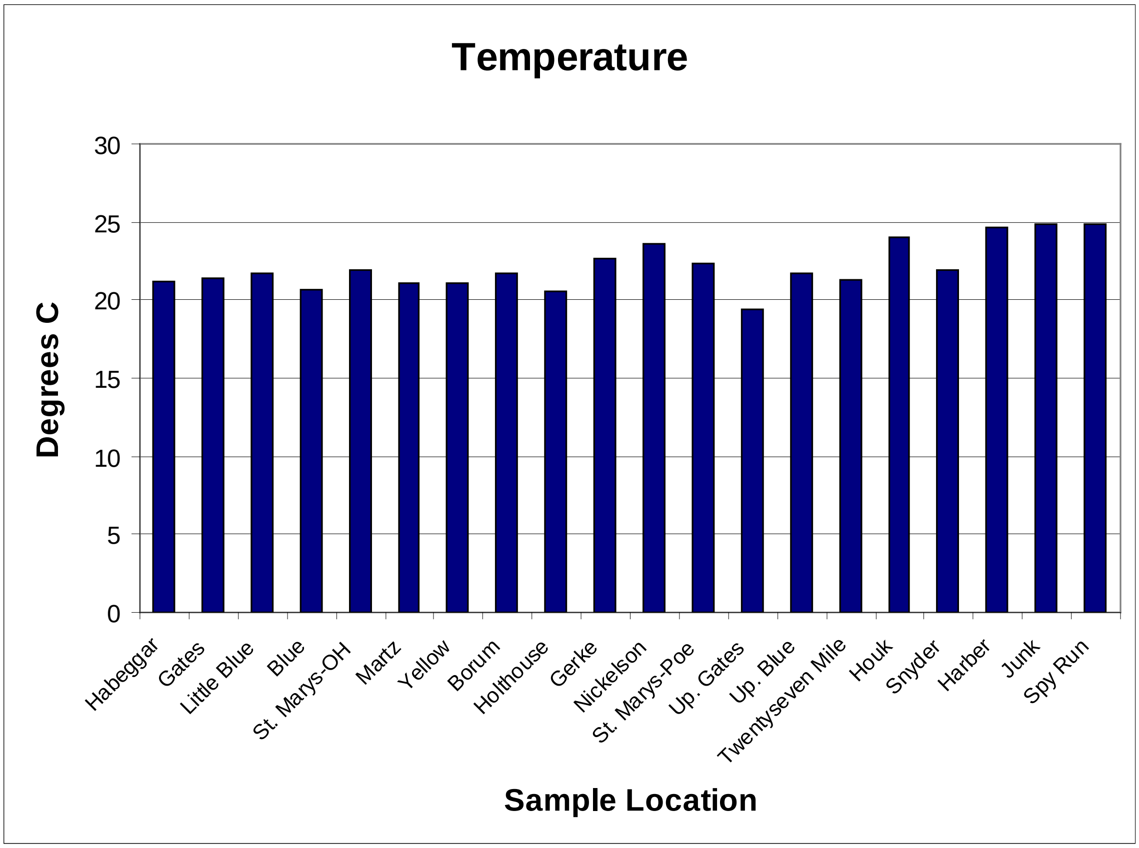

Figure 19. Maximum Temperature levels in the St. Marys River Watershed.

pH

The acidity or basic nature of a solution is expressed as the pH. The concentration of the hydrogen ion [H+] in a solution determines the pH. The more acidic the solution, the lower the pH; the more basic, the higher the pH.

A pH range of 6.0 to 9.0 was established by the IAC (327 IAC 2-1.5-8) and appears to provide protection for the life of freshwater fish and bottom dwelling invertebrates.
The following Table 10 gives some special effects of pH on fish and aquatic life.

Limiting pH Values		
Minimum	**Maximum**	**Effects**
3.8	10.0	Fish eggs could be hatched, but deformed young were often produced
4.0	10.1	Limits for the most resistant fish species
4.1	9.5	Range tolerated by trout
4.3	---	Carp died in five days
4.5	9.0	Trout eggs and larvae develop normally
4.6	9.5	Limits for perch
5.0	---	Limits for stickleback fish
5.0	9.0	Tolerable range for most fish
---	8.7	Upper limit for good fishing waters
5.4	11.4	Fish avoided waters beyond these limits
6.0	7.2	Optimum (best) range for fish eggs
1.0	---	Mosquito larvae were destroyed at this pH value
3.3	4.7	Mosquito larvae lived within this range
7.5	8.4	Best range for the growth of algae

Table 10. Limiting pH values.

One of the most significant environmental impacts of pH is the affect that it has on the solubility and thus the bioavailability of other substances. This process is important in surface waters. Runoff from agricultural, domestic, and industrial areas may contain iron, lead, chromium, ammonia, mercury or other elements. The pH of the water affects the toxicity of these substances. As the pH falls (solution becomes more acidic) many insoluble substances become more soluble and thus available for absorption.

The following Figure 20 shows average pH levels observed during sampling conducted by the St. Marys River Watershed Project. One sample, collected on 10/31/2007/ at the monitoring station located on the St. Marys River at Willshire, OH exceeded the 9.0 maximum value set by the IAC (327 IAC 2-1.5-8) with a value of 9.09. All other values were within the acceptable range.

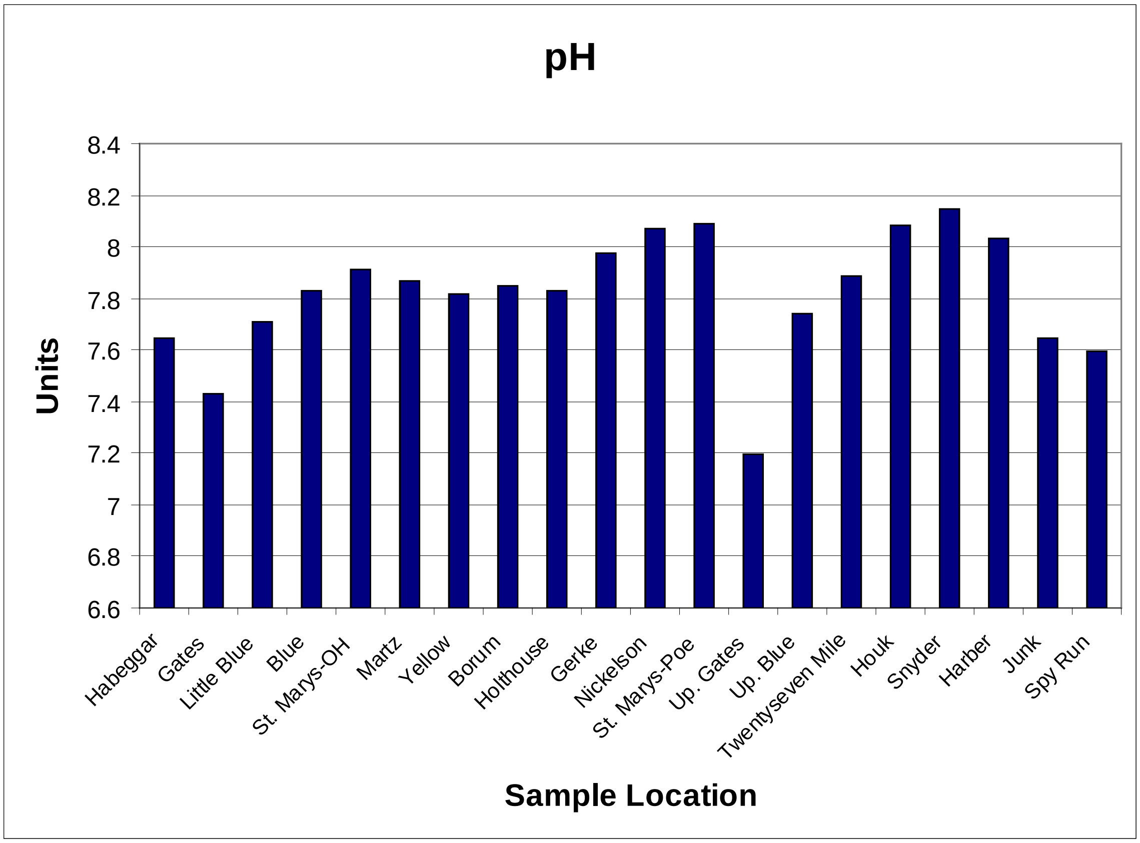

Figure 20. Average pH levels in the St. Marys River Watershed.

Conductivity

Conductivity is a measurement of the ability of an aqueous solution to carry an electrical current. An ion is an atom of an element that has gained or lost an electron(s) which will create a negative or positive state (www.kywater.org). Effects of excess dissolved solids can include the elimination of desirable food plants and habitat-forming plant species. Agricultural uses of water for livestock watering are limited by excessive dissolved solids and high dissolved solids can be a problem in water used for irrigation.

The IAC does not directly set a conductivity standard, it instead sets a standard for dissolved solids (750 mg/L). Multiplying a dissolved solids concentration by a conversion factor of 0.55 to 0.75 µS/cm per mg/L of dissolved solids provides an estimated conversion between dissolved solids concentration and specific conductance (Allan, 1995). This conversion of the IAC standard of 750 mg/L to specific conductance produces a range from 1,000 to 1,360 µS/cm.

Figure 21 displays average conductivity levels observed in the watershed during sampling conducted by the St. Marys River Watershed Project. Average conductivity values across the watershed similar in the range of 500 to 800 µS/cm. The exception to this is at the Harber Ditch monitoring station, this station has an average conductivity level of approximately 1,150 µS/cm.

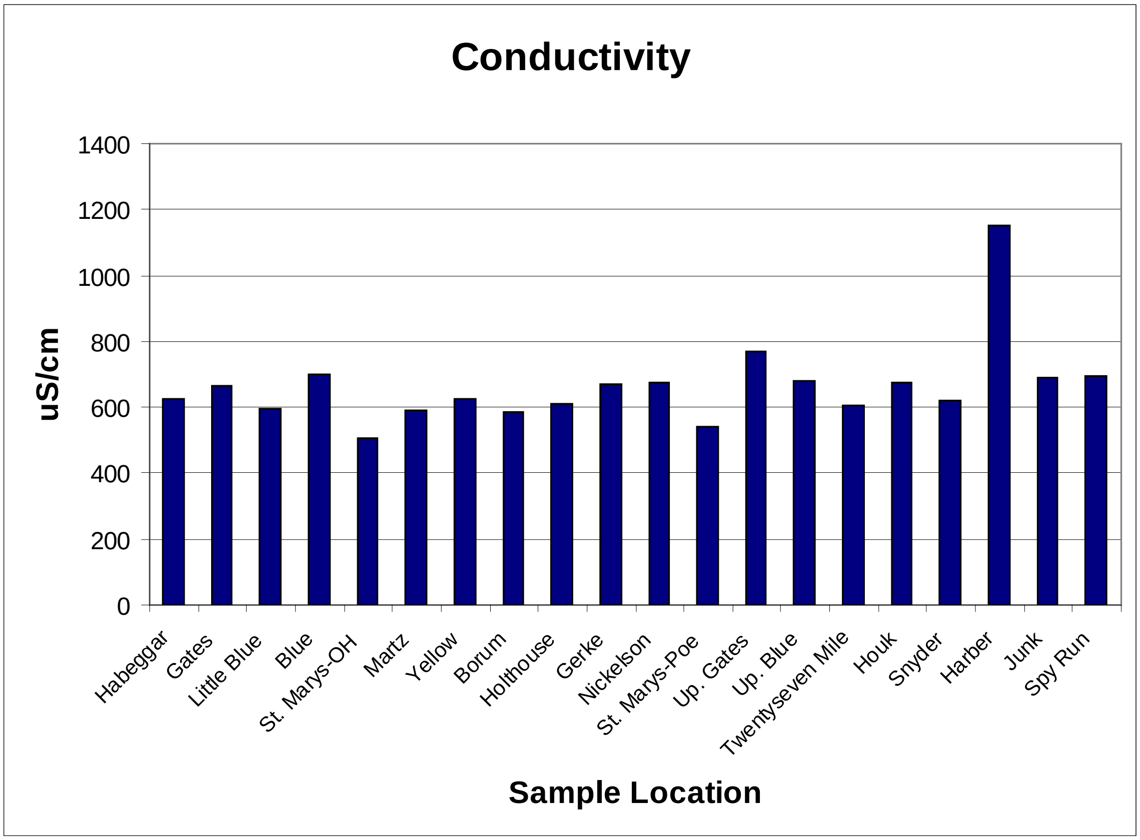

Figure 21. Average Conductivity levels in the St. Marys River Watershed.

Turbidity

Turbidity refers to the clarity of water. The greater the amount of TSS in the water, the murkier it appears and the higher the measured turbidity. Turbidity in the St. Marys River Watershed is most commonly the result of suspended clay and silt that is deposited from erosion. Other factors increasing turbidity include channelization, increased flow rates, and floods (http://waterontheweb.org).

High concentrations of particulate matter can modify light penetration, cause shallow lakes and bays to fill in faster, and smother benthic habitats - impacting both organisms and eggs. As particles of silt, clay, and other organic materials settle to the bottom, they can suffocate newly hatched larvae and fill in spaces between rocks which could have been used by aquatic organisms as habitat. Fine particulate material also can clog or damage sensitive gill structures, decrease their resistance to disease, prevent proper egg and larval development, and potentially interfere with particle feeding activities (http://waterontheweb.org).

Very high levels of turbidity for a short period of time may not be significant and may even be less of a problem than a lower level that persists longer. Figure 22 shows how aquatic organisms are generally affected.

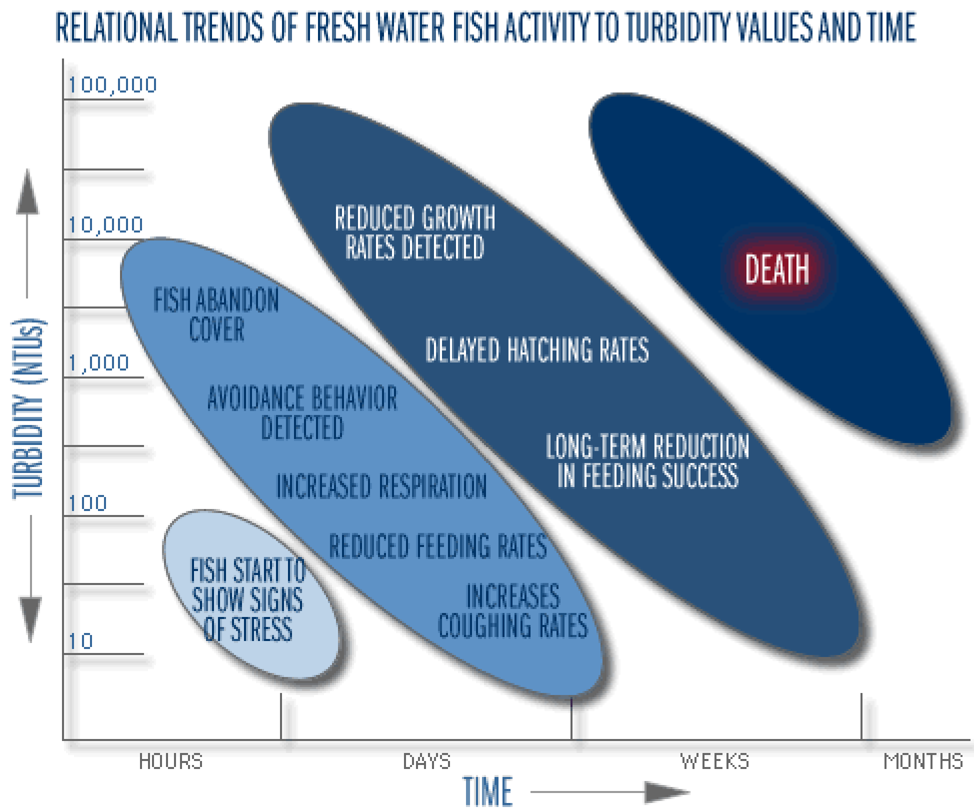

Figure 22. Turbidity effects on fresh water fish. (http://dnr.wi.gov)

Turbidity levels were monitored in the St. Marys River Watershed and averaged. These results are shown in the following Figure 23. Turbidity levels were observed to be the highest in the Blue Creek watershed, which incorporates monitoring stations on Habegger Ditch, Gates Ditch, Little Blue Creek and the Blue Creek. Turbidity levels were especially high at the Gates Ditch stations, with an average of 217 NTU's on the upper reach and 133 NTU's in the lower reach. The Field Manual for Water Quality Monitoring by Mitchell and Stapp indicate levels above 150 NTU's as being "poor" water quality.

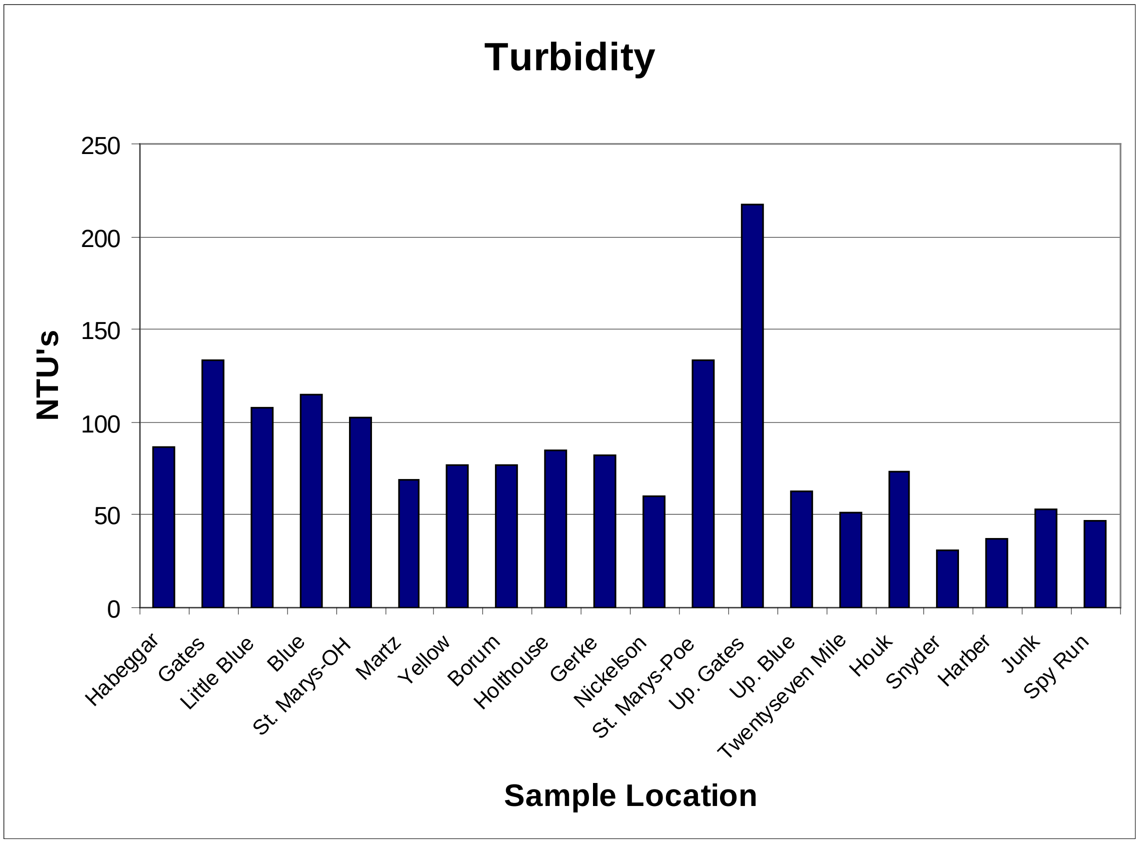

Figure 23. Average Turbidity levels in the St. Marys River Watershed

Dissolved Oxygen

Dissolved oxygen analysis measures the amount of gaseous oxygen (O_2) dissolved in an aqueous solution. Dissolved oxygen is one of the most important parameters in aquatic systems. This gas is an absolute requirement for the metabolism of aerobic organisms and also influences inorganic chemical reactions. Oxygen gets into water by diffusion from the surrounding air, by aeration (rapid movement) and as a waste product of photosynthesis. The amount of dissolved oxygen gas is highly dependent on temperature. The warmer the water, the less dissolved oxygen. This relationship is shown in Figure 18 in the discussion of temperature.

In a nutrient-rich water body the dissolved oxygen is quite high in the surface water due to increased photosynthesis by the large quantities of algae. However, dissolved oxygen tends to be depleted in deeper waters because photosynthesis is reduced due to poor light penetration and due to the fact that dead phytoplankton (algae) falls toward the bottom using up the oxygen as it decomposes. Adequate dissolved oxygen is needed and necessary for good water quality. Oxygen is a necessary element to all forms of life. Adequate oxygen levels are necessary to provide for aerobic life forms which carry on natural stream purification processes. The IAC (327 IAC 2-1.5-8) sets a minimum daily average DO concentration of 5.0 mg/l and a minimum concentration of 4.0 mg/l at any point.

The following Figure 24 shows average dissolved oxygen levels in the St. Marys River Watershed. During sampling, a total of eight sites recorded levels below the minimum concentration of 4.0 mg/l. These sites included: Habegger Ditch (2.34 mg/l), Gates Ditch (1.02 mg/l), St. Marys River at Willshire (1.67 mg/l), Martz Ditch (2.23 (mg/l), Yellow Creek (1.67 mg/l), Borum Run (1.04 mg/l), Holthouse Ditch (0.15 mg/l) and Upper Gates Ditch (2.35 mg/l).

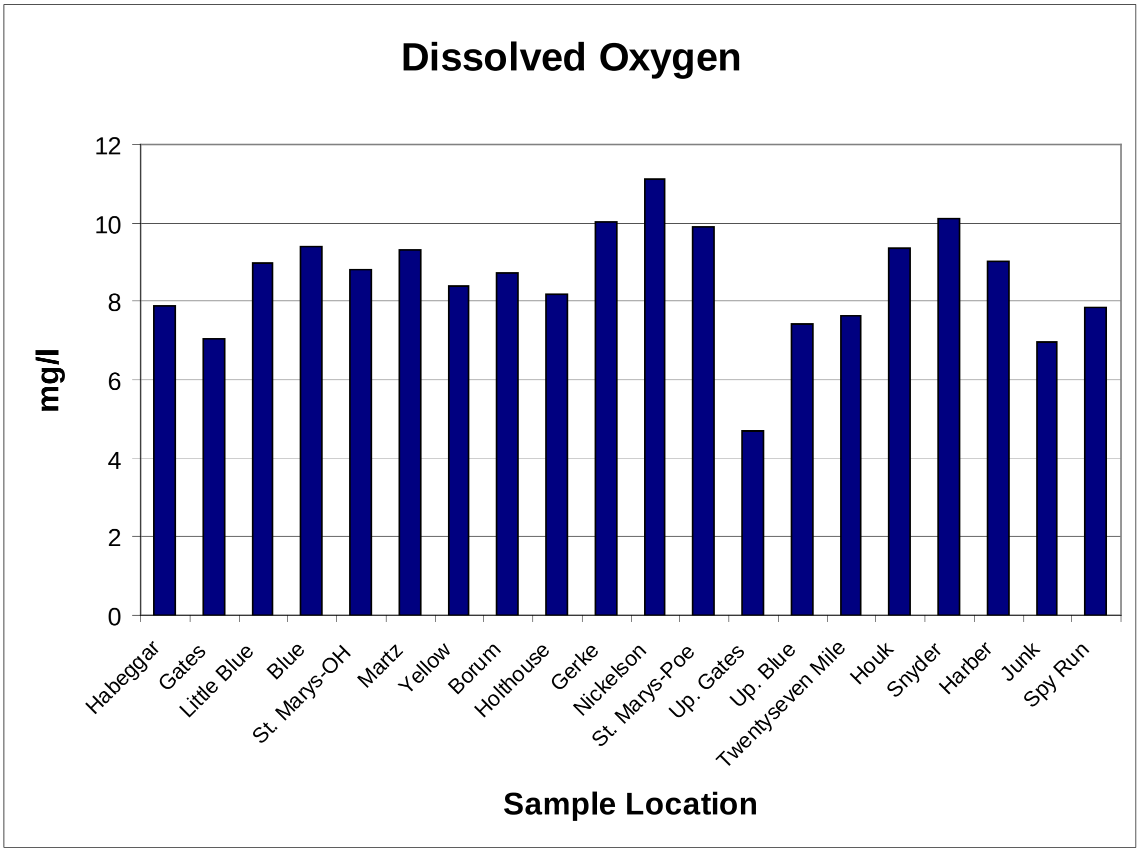

Figure 24. Average Dissolved Oxygen levels in the St. Marys River Watershed

Biological Oxygen Demand

Biological Oxygen Demand (BOD) is a measure of the oxygen used by microorganisms to decompose organic matter. When large quantities of organic wastes are in the water supply, there will also be a lot of bacteria present working to decompose these wastes. In response, the demand for oxygen will be high so the BOD level will also be high. As the waste is consumed or dispersed through the water, BOD levels will begin to decline.

Nutrients can contribute to high BOD levels. Nitrates and phosphates can cause plant life and algae to grow quickly. When plants grow quickly, they also die quickly. This contributes to the organic waste in the water, which is then decomposed by bacteria. This results in a high BOD level. Temperature can also contribute to high BOD levels. For example, warmer water usually will have a higher BOD level than colder water. As water temperature increases, the rate of photosynthesis by algae and other plant life in the water also increases. When this happens, plants grow faster and also die faster. When the plants die, they fall to the bottom where they are decomposed by bacteria. The bacteria require oxygen for this process so the BOD is high at this location. Therefore, increased water temperatures will speed up bacterial decomposition and result in higher BOD levels (www.ciese.org).

When BOD levels are high, dissolved oxygen (DO) levels decrease because the oxygen that is available in the water is being consumed by the bacteria. Since less dissolved oxygen is available in the water, fish and other aquatic organisms may not survive. The following Table 11 provides BOD ranges for water quality.

BOD Level (mg/L)	Water Quality
0.0 – 2.0	Excellent
2.1 – 4.0	Good
4.1 – 10.0	Fair
>10.0	Poor

Table 11. BOD ranges for water quality (Field Manual for Water Quality Monitoring, Mitchell and Stapp)

Figure 25 shows average BOD levels observed during sampling collected by the St. Marys River Watershed Project. Average BOD levels range from 2.34 mg/l at Borum Run to 4.95 mg/l at Upper Gates Ditch with put them into the "good" to "fair" range for water quality. Three monitoring stations had single sample values in the "poor" water quality range; Gates Ditch at 11.73 mg/l, Holthouse Ditch at 11.70 mg/l, and the St. Marys River at Poe, IN at 11.64 mg/l.

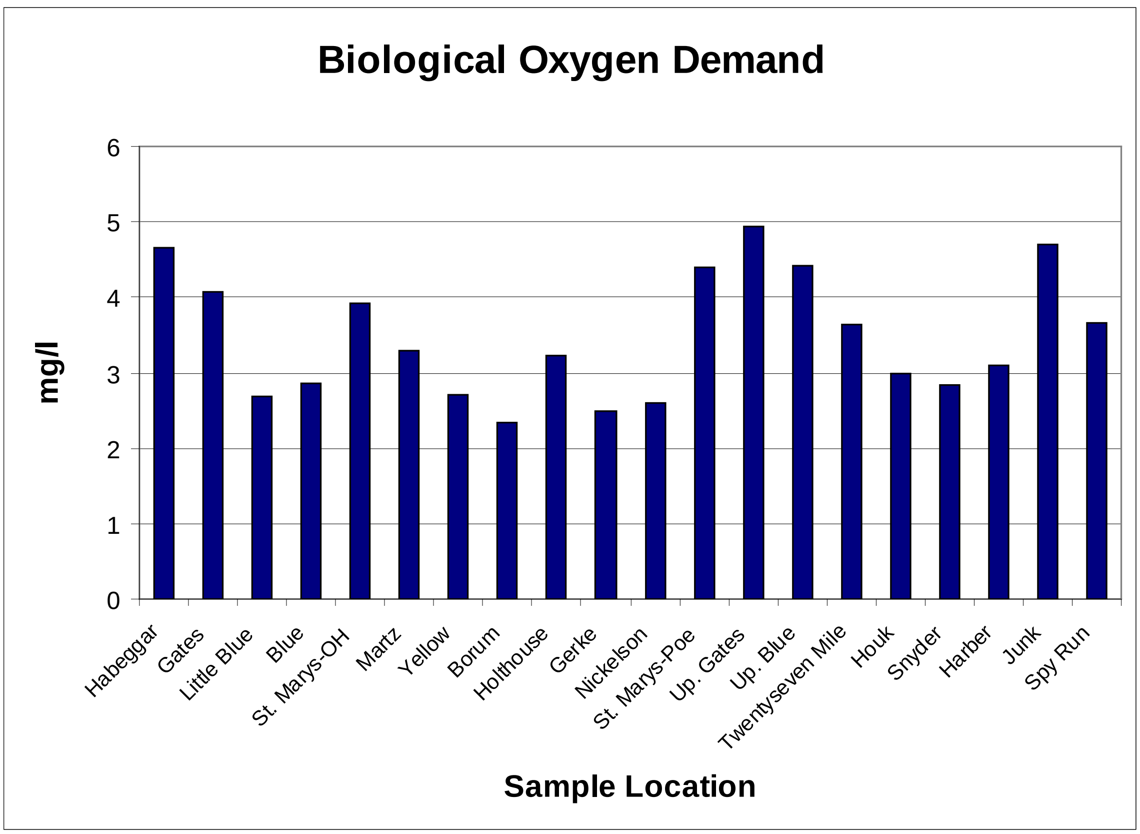

Figure 25. Average BOD levels in the St. Marys River Watershed

Nutrients

The term nutrient refers to two major plant nutrients, phosphorus and nitrogen. Nutrients are measured to predict the amount of algal and plant growth that will occur in a stream, in most cases to predict the potential for nuisance growth. It should be noted that some algal and plant growth is a natural and necessary part of a functioning ecosystem. In fact, nutrients are beneficial to aquatic life in small amounts. However, in over-abundance and under favorable conditions, they can stimulate the occurrence of algal blooms and excessive plant growth in quiet waters or low flow conditions. The algal blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and decomposition of dead algae and other plants. This is accentuated in hot weather and low flow conditions because of the reduced capacity of the water to retain dissolved oxygen. Nutrients are common components of fertilizers, animal and human waste, vegetation, and some industrial processes. Nutrients in surface waters come from both point and nonpoint sources.

The USEPA has established some nutrient standards for drinking water, to date it has not established standards for protecting the biological integrity of a stream. Conversations with IDEM staff indicate that nutrient standards are in the process of being developed for Indiana surface waters. USEPA has issued recommendations for numeric nutrient criteria for streams (USEPA, 2000a). While these are not part of the IAC, they serve as potential target conditions for which watershed managers might aim. The Ohio EPA (OEPA) has also made recommendations for numeric nutrient criteria in streams based on research on Ohio streams (OEPA, 1999). These recommendations also serve as potential target conditions for Indiana surface waters.

Phosphorus

Phosphorus, commonly a result of nonpoint source pollution, can be present as organic matter and dissolved or suspended in the water column. Phosphorus can also be in the form of inorganic compounds originating from soil minerals, fertilizers and household detergents. Phosphorus is the primary target nutrient associated with algae production.

The USEPA recommended targets for nutrient levels in streams are fairly low. The USEPA recommends a target total phosphorus concentration of 0.076 mg/L in streams (USEPA, 2000a). The OEPA recommends a total phosphorus concentration of 0.08 mg/L in Warm water Habitat (WWH) headwater streams to protect the streams' aquatic biotic integrity (OEPA, 1999). WWH refers to a stream that is capable of supporting a healthy, diverse warm water fauna. Streams that cannot support a healthy, diverse community of warm water biota due to irretrievable modifications of the physical habitat are classified as Modified Warmwater Habitat (MWH) streams and have a different criterion (ORC 3745-1-07). Figure 26 shows the State of Ohio's Aquatic Life Use Designations.

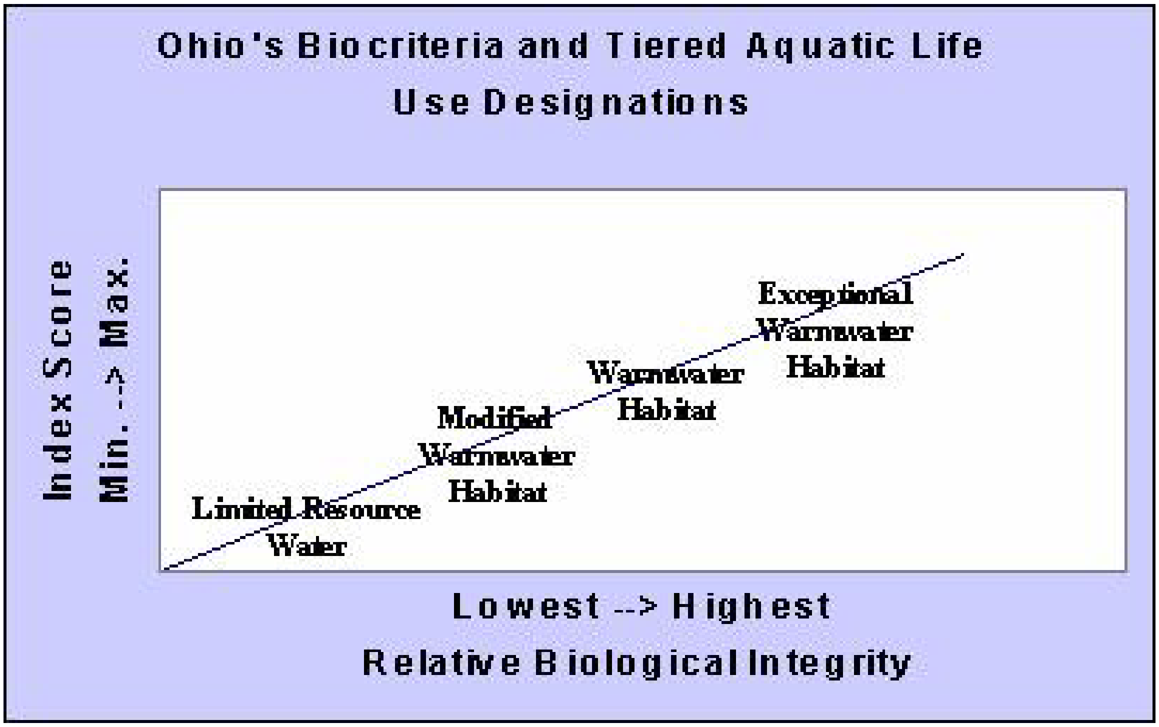

Figure 26. Ohio Aquatic Life Use Designations
(http://www.epa.gov/waterscience/biocriteria/casestudies/aquaticlifeohio.html)

The IDEM TMDL for the Blue Creek/Habegger Ditch and Yellow Creek Watershed set a phosphorus target at 0.30 mg/l in order to meet applicable water quality standards. This standard is also being utilized by the St. Marys River Watershed Project.

Figure 27 shows average Total Phosphorus levels in the St. Marys River Watershed. The data shows that on average, half of the stations were exceeding the 0.30 mg/l phosphorus standard set by the TMDL. All monitoring stations have single sample concentrations that exceed the 0.30 mg/l standard.

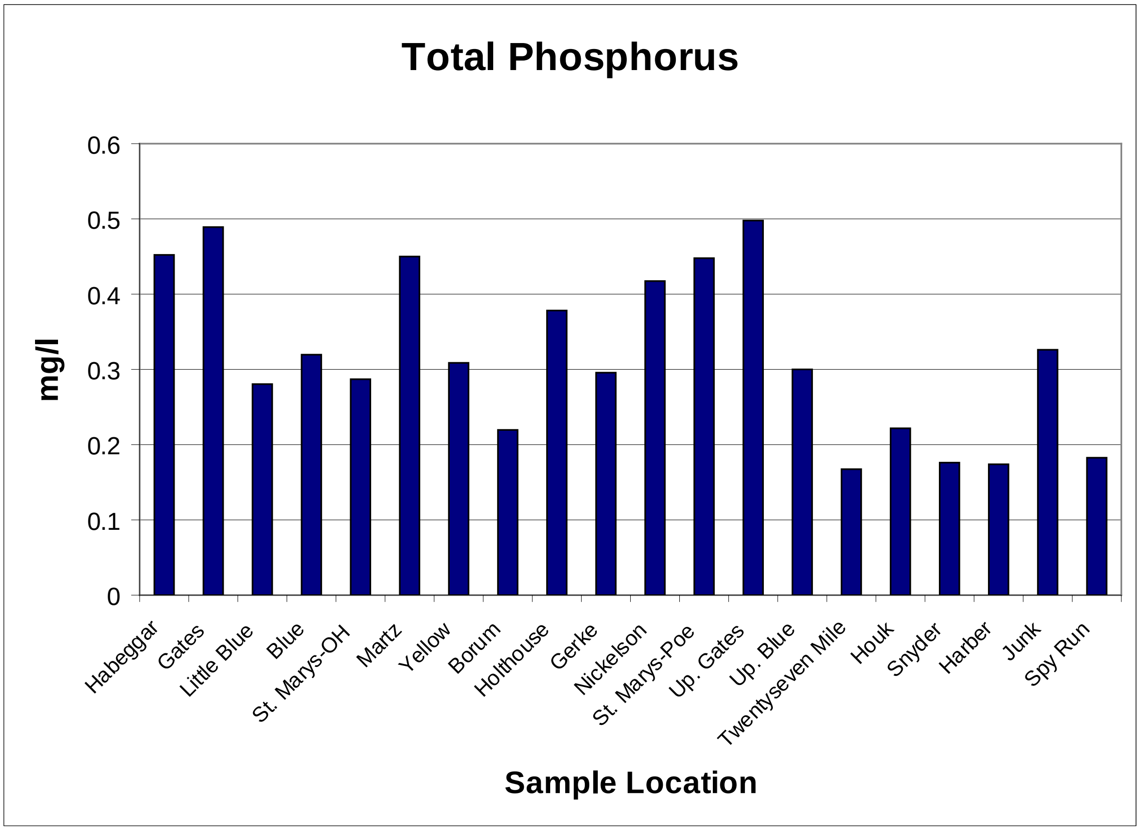

Figure 27. Average Total Phosphorus levels in the St. Marys River Watershed.

Nitrogen – Ammonia

Ammonia is the most reduced form of nitrogen and is introduced into rivers and streams through both urban and rural routes. Urban exposure to ammonia generally comes from the discharge of sewer treatment plants and from industrial processes such as fertilizer manufacture and oil refining. In rural and agricultural areas, ammonia is often present due to fertilizer application and failing septic systems. About three-fourths of the ammonia produced in the United States is used in fertilizers either as the compound itself or as ammonium salts such as sulfate and nitrate. (www.kywater.org)

The USEPA sets aggressive nitrogen criteria recommendations for streams compared to the OEPA. The USEPA's recommended criteria for nitrate-nitrogen concentrations for streams in Aggregate Nutrient Ecoregion VI are 0.633 mg/L (USEPA, 2000a). In contrast, the OEPA suggests using nitrate-nitrogen criteria of 1.0 mg/L in WWH wadeable and headwater streams and MWH headwater streams to protect aquatic life.

It should be made clear that the aforementioned concentrations are not used by the State of Indiana as water quality standards, these are simply listed to use comparatively with nutrient concentrations in the St. Marys River Watershed. The IAC sets only nitrate-nitrogen and ammonia-nitrogen standards for water bodies in Indiana. The IAC requires that drinking waters of the state have a nitrate-nitrogen concentration of less than 10 mg/L. The IAC standard for ammonia-nitrogen depends upon the water's pH and temperature, since both can affect ammonia-nitrogen's toxicity. At a pH >8.0, ammonia is converted to a highly toxic (unionized) form that is fatal to aquatic life at very low levels. At a high pH, ammonia levels as low as 0.02 mg/l can begin to damage fish, and levels of 0.20 mg/l will begin to kill sensitive fish species. As a general rule, streams with an ammonia level of 0.10 mg/l or greater should be considered to be impaired by the pollutant. The IAC requires that ammonia concentrations in fresh waters should range between 0.00 and 0.21 mg/l, depending on water temperature and pH.

The following Figure 28 represents average Ammonia Nitrogen levels observed in the St. Marys River Watershed. Observed values were compared with the maximum ammonia concentrations set by the IAC. Ammonia levels in Habegger Ditch, Gates Ditch, Martz Ditch, and Upper Gates Ditch commonly exceeded IAC concentrations.

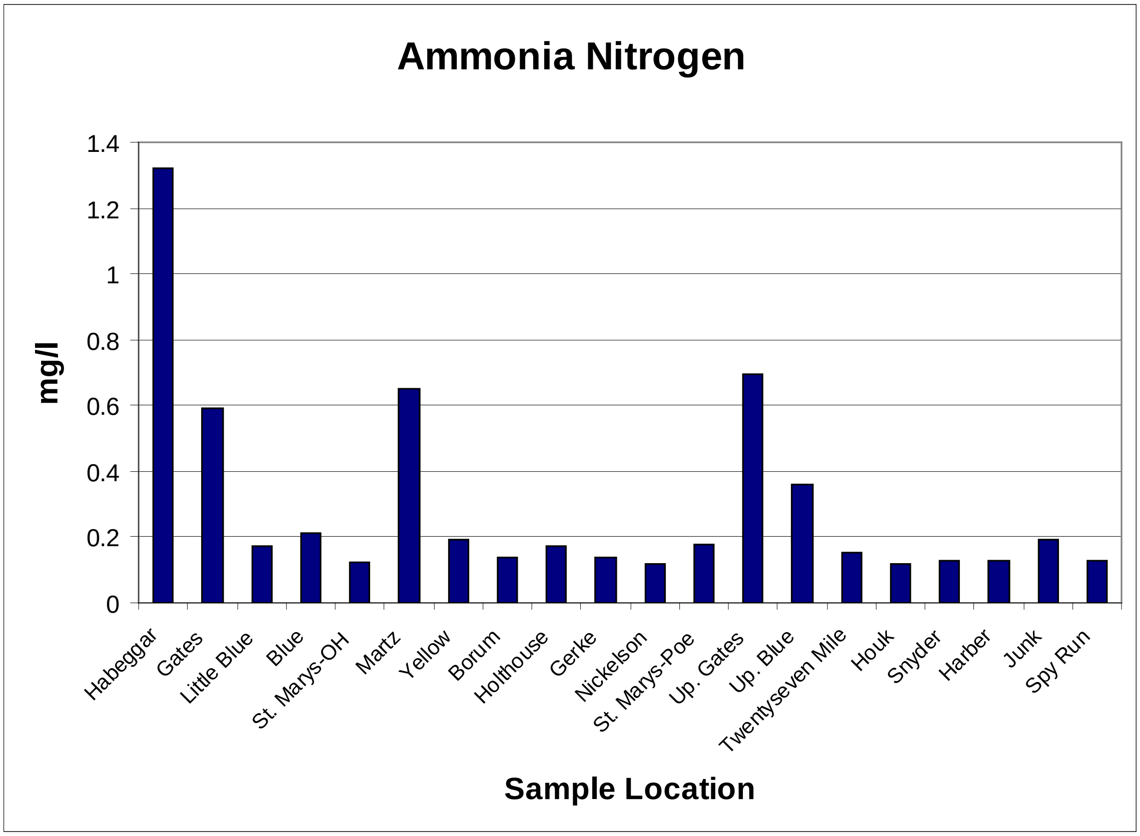

Figure 28. Average Ammonia Nitrogen levels in the St. Marys River Watershed

The Criterion Continuous Concentration (CCC) is a chronic criterion, meaning it is an estimate of the highest concentration of a substance in the water column to which an aquatic community can be exposed to indefinitely without adverse effects. Ammonia is considered a toxic substance for the purposes of determining aquatic life use support. According to IDEM's Consolidated Assessment and Listing Methodology (CALM), a stream is considered impaired if there is more than one exceedance of the CCC in a three year period. Calculation of the CCC on the data collected by the St. Marys River Watershed Project showed CCC exceedences on Habegger Ditch, Gates Ditch, Upper Gates Ditch and Martz Ditch.

E. coli Bacteria

E. coli bacteria are associated with the intestinal tract of warm-blooded animals and are widely used as an indicator of the potential presence of fecal pollution. *E. coli* can enter surface water bodies from nonpoint sources such as runoff from malfunctioning septic systems, straight pipe discharges from septic tanks, livestock, domestic pets, and wildlife. In addition, *E. coli* can come from improperly treated or untreated discharges of domestic wastewater common in urban areas with CSOs. Combined Sewer Overflow locations are shown geographically in Figure 51.

Detection of *E. coli* in water bodies may indicate the presence of other microbes harmful to humans. Certain *E. coli* bacteria themselves also may cause disease in humans and animals.

E. coli is also used as an indicator because it is easier and less costly to monitor and detect than the actual pathogenic organisms such as *Giardia, Cryptosporidium,* and *Shigella*, which require special sampling protocols and sophisticated laboratory techniques in order to evaluate. The presence of waterborne disease-causing organisms can induce outbreaks of typhoid fever, dysentery, cholera, and cryptosporidosis.

E. coli water quality standards have been established in order to ensure safe use of waters for municipal water supplies and recreation. Indiana water quality standards set the maximum *E. coli* levels at 125 cfu/100 ml as a geometric mean based on not less than five samples equally spaced over a 30 day period nor exceed 235 cfu/100ml in any one sample in a 30 day period. These standards are applicable for all surface waters in the state of Indiana.

Figure 29 shows average *E. coli* levels observed during grab sampling conducted by the St. Marys River Watershed Project. Average levels drastically exceed IAC water quality standards at all sites. The monitoring station located on the St. Marys River at Willshire, OH had the lowest average at 687 cfu/100ml. Gates Ditch was on the high end with an average of over 11,000 cfu/100ml.

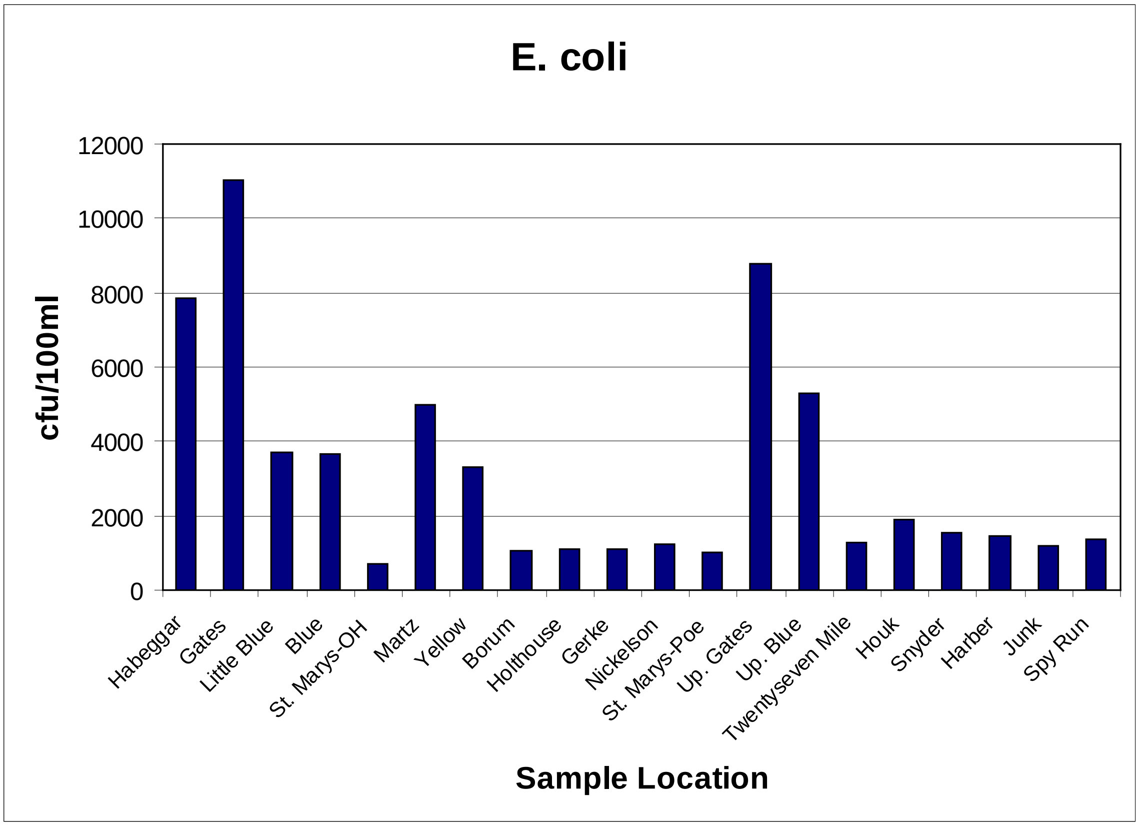

Figure 29. Average *E. coli* levels in the St. Marys River Watershed

Total Suspended Solids

TSS is comprised of organic (algae, zooplankton, bacteria, and detritus) and inorganic (silts, clays, etc.) particles that are transported in the water column. The inorganic portion is usually considerably higher than the organic. Both contribute to turbidity, or cloudiness of the water. Waters with high sediment loads are very obvious because of their "muddy" appearance. This is especially evident in rivers, where the force of moving water keeps the sediment particles suspended. TSS is closely linked to land erosion and erosion of river channels and banks. Moreover, sediment is often linked to the transport of *E. coli*, nutrients (specifically phosphorus), metals, and other chemicals related to agricultural production.

Excessive levels of TSS can smother bottom dwelling (benthic) organisms and eggs, and also impair fish and organismal habitats. Increased levels of TSS can also alter fish populations, causing death in some cases.

Indirectly, suspended solids affect other parameters such as temperature and dissolved oxygen. Because of the greater heat absorbency of the particulate matter, the surface water becomes warmer and this tends to stabilize the stratification (layering) in stream pools, embayments, and reservoirs. This, in turn, interferes with mixing, decreasing the dispersion of oxygen and nutrients to deeper layers.

The 2005 IDEM TMDL set a numeric target of 30 mg/l for TSS in the Blue Creek/Habegger Ditch and Yellow Creek sub watersheds.

Total suspended solids data collected by the St. Marys River Watershed Project was averaged and the results are shown below in Figure 30. Average TSS levels on the Houk, Snyder, Harber, and Junk Ditches, as well as Spy Run Creek are at or under the 30 mg/l TSS target set by the IDEM TMDL. However it should be noted that these locations were not sampled during the winter of 2008, a period when other monitoring stations were reporting very high TSS levels. Of particular concern is Gates Ditch, where the monitoring station on Upper Gates Dates averages over 130 mg/l.

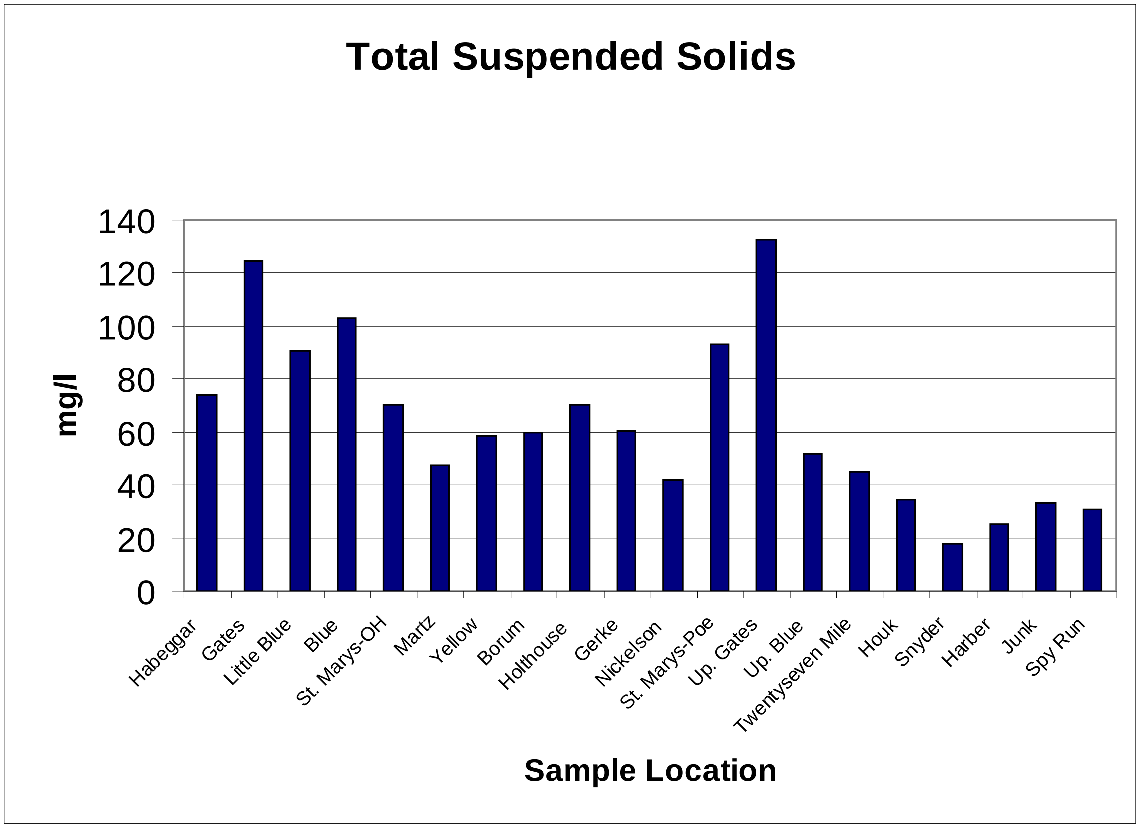

Figure 30. Average Total Suspended Solids levels in the St. Marys River Watershed

Atrazine

Atrazine is an herbicide that is widely used throughout the United States to control weeds in agricultural fields. Atrazine controls a broad spectrum of annual broadleaf weeds and certain annual grasses. Atrazine can be highly mobile in surface runoff and is often carried into nearby water bodies or leaches into ground water. USGS studies have shown that Atrazine commonly uses agricultural drainage tiles as a conduit to nearby surface waters. (Baker, N.T., Stone, W.W., Wilson, J.T., and Meyer, M.T., 2006, Occurrence and Transport of Agricultural Chemicals in Leary Weber Ditch Basin, Hancock County, Indiana, 2003-04: U.S. Geological Survey Scientific Investigations Report 2006-5251, 44p.) USEPA reports indicate that people exposed to atrazine for short periods of time can be subject to the following health effects: congestion of heart, lungs and kidneys; low blood pressure; muscle spasms; weight loss; and damage to adrenal glands. Long term exposure can result in the following health effects: weight loss; cardiovascular damage; retinal and some muscle degeneration; and cancer. USEPA has set a drinking water standard of 3 ppb (3 micrograms/L), which has been adopted in Indiana's drinking water standards (327 IAC 8-2-5).

Atrazine data collected by the St. Marys River Watershed Project was averaged and the results are shown in Figure 31. It should be noted that sampling at sites: Upper Gates Ditch, Upper Blue Creek, Twentyseven Mile Creek, Houk, Snyder, Harber, and Junk Ditches and Spy Run Creek was only completed April – July 2008. (This is a period during which atrazine is being readily applied to agricultural fields.) However, the Blue Creek headwaters and Twentyseven Mile Creek are seeing atrazine levels that exceed the IAC drinking water standard.

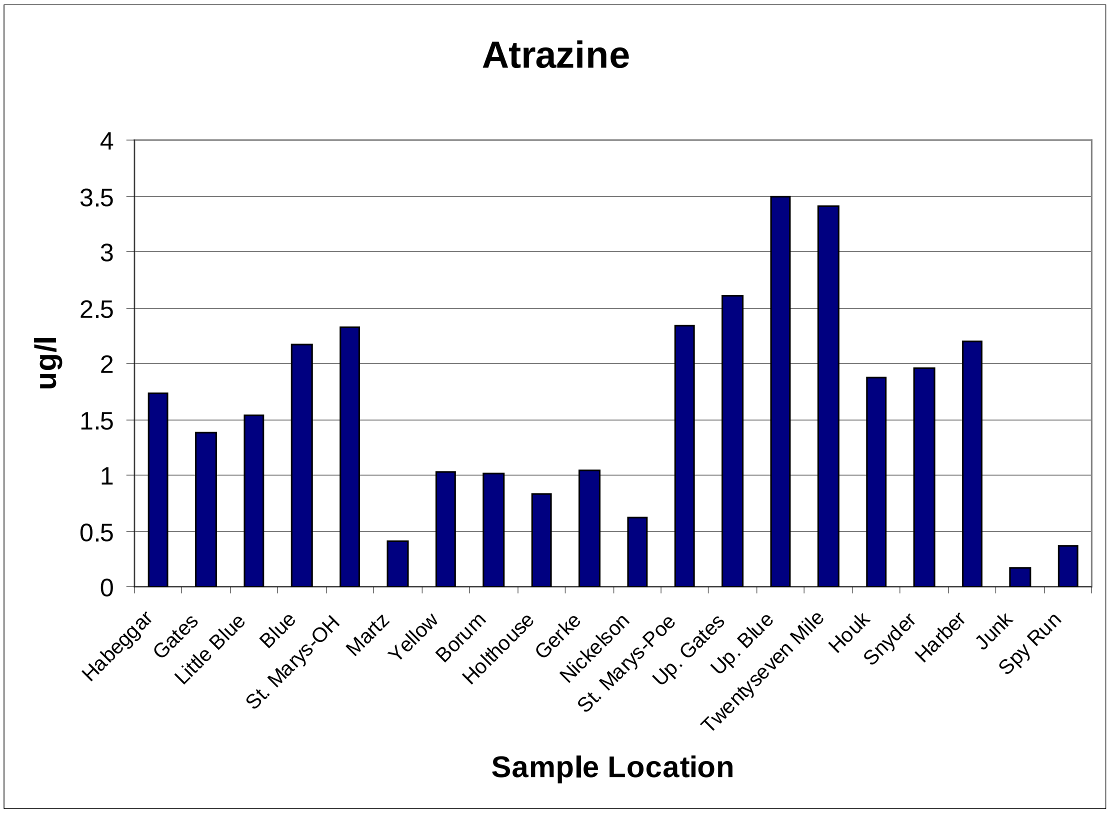

Figure 31. Average Atrazine levels in the St. Marys River Watershed.

Alachlor

Alachlor is an herbicide used to control grasses and broadleaf weeds in corn and soybeans. Alachlor is easily mixed with other chemicals and is often used in conjunction with Atrazine. USEPA has set the maximum contaminant level (MCL) at 2.0 ppb (2 micrograms/l). Exposure at the MCL may result in slight skin and eye irritation. Lifetime exposure above the MCL may result in damage to the liver, kidneys, sleep, lining of the nose and the eyelids; and cancer.

Alachlor data collected by the St. Marys River Watershed Project was averaged and the results are shown in Figure 32. It should be noted that sampling at sites: Upper Gates Ditch, Upper Blue Creek, Twentyseven Mile Creek, Houk, Snyder, Harber, and Junk Ditches and Spy Run Creek was only completed April – July 2008. The alachlor MCL (2 micrograms/l) was exceeded in only one sample, located on the Blue Creek (2.04 micrograms/l).

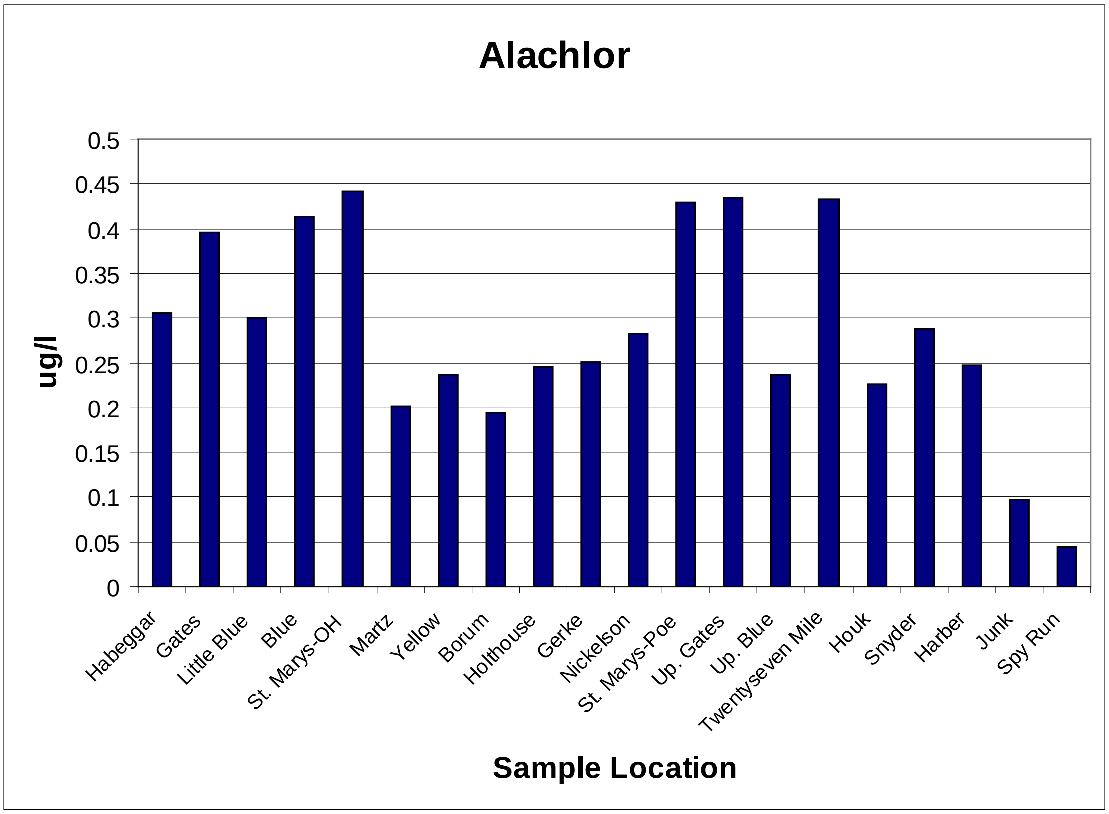

Figure 32. Average Alachlor levels in the St. Marys River Watershed

Cyanazine

Cyanazine is used to control grasses and broadleaf weeds. In the U.S., over 90% of its use in agriculture is to control weeds in corn fields. Its highest use is in corn-growing states of the Midwest. It is used primarily as a pre-emergent herbicide on corn. It is usually applied once during the growing season to control weeds before the corn-seedlings emerge from the soil (www.cornell.edu). Cyanazine may be used in conjunction with other herbicides. Cyanazine is classified by the EPA as a Restricted Use Pesticide (RUP) because of its teratogenicity and because it has been found in groundwater. USEPA has set the maximum contaminant level (MCL) at no more than 1.0 ppb (1 micrograms/L).

Cyanazine data collected by the St. Marys River Watershed was averaged, with results shown in Figure 33. Samples for Upper Gates Ditch, Upper Blue Creek, Twentyseven Mile Creek, Houk, Snyder, Harber, and Junk Ditches and Spy Run Creek were not analyzed for cyanazine due to a shortage of laboratory testing kits. Cyanazine concentrations in the St. Marys River Watershed fall well below USEPA's MCL.

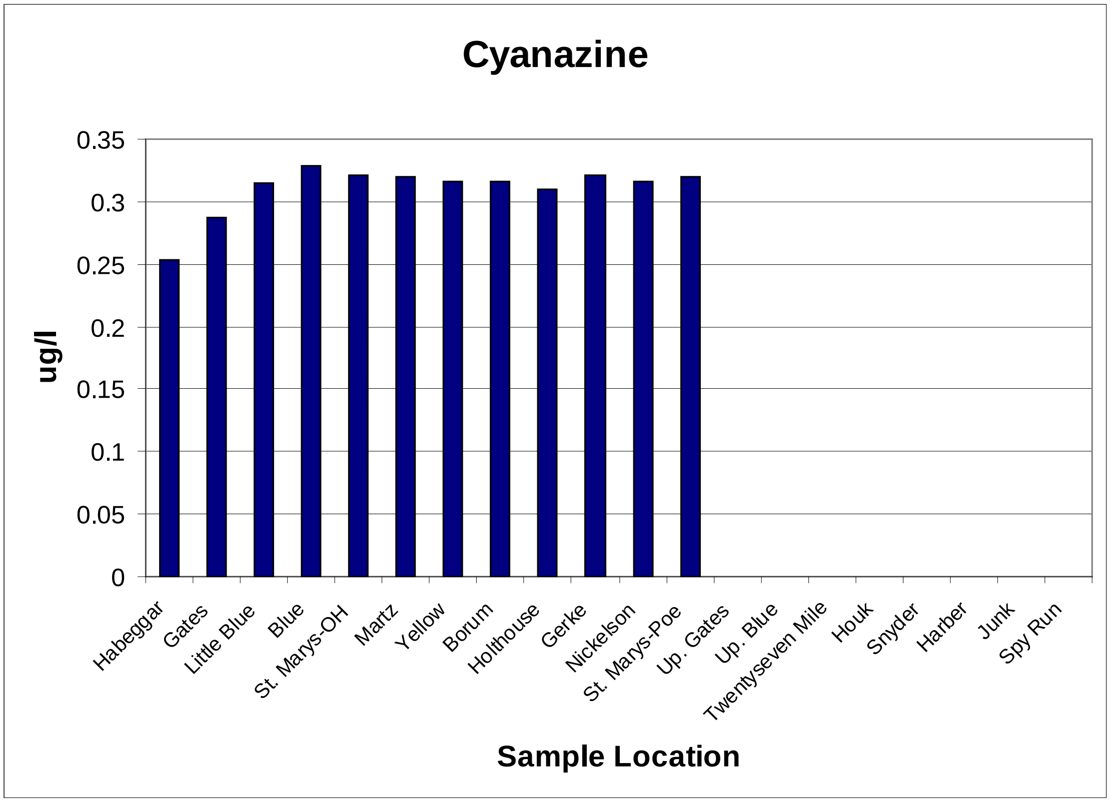

Figure 33. Average Cyanazine levels in the St. Marys River Watershed

Metolachlor

Metolachlor is usually applied to crops before plants emerge from the soil, and is used to control certain broadleaf and annual grassy weeds in field corn, soybeans, peanuts, grain sorghum, potatoes, pod crops, cotton, safflower, stone fruits, nut trees, highway rights-of-way and woody ornamentals (www.cornell.edu). While there is no set MCL for metolachlor that is allowed in drinking water, the USEPA does have a health advisory level (HAL) of 0.525 mg/L for this chemical.

Metolachlor data collected by the St. Marys River Watershed Project was averaged and the results are shown in Figure 34. It should be noted that sampling at sites: Upper Gates Ditch, Upper Blue Creek, Twentyseven Mile Creek, Houk, Snyder, Harber, and Junk Ditches and Spy Run Creek was only completed April – July 2008. All twenty monitoring locations have average concentrations well under USEPA's 0.525 mg/l health advisory level.

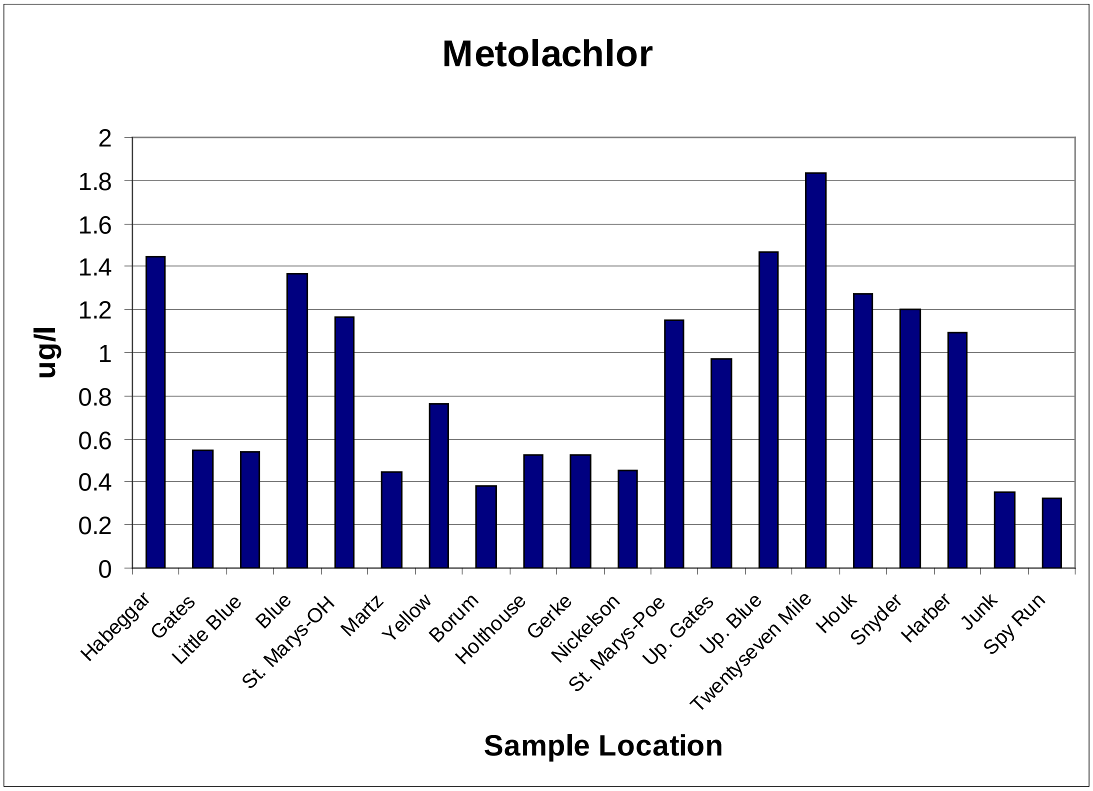

Figure 34. Average Metolachlor levels in the St. Marys River Watershed.

3.4 St. Marys River Watershed Social Indicator Survey

In association with Purdue University, a survey of social indicators was completed in the St. Marys River Watershed. The purpose of this study was to collect social indicators data from both agricultural producers and "urban" residents in the St. Mary's watershed to inform the watershed planning and implementation activities. The results of this survey also provide baseline social indicator information that will be used for comparison with a follow up survey in order to examine changes that occurred in the watershed over time.

The questions in the survey were developed by a regional team of researchers for utilization in nonpoint source pollution (NPS) projects. More information about this regional project can be found at: http://www.uwex.edu/ces/regionalwaterquality/Flagships/Indicators.htm. Social indicators data collected include awareness of water quality issues, sources, and practices for improvement; general water quality attitudes and attitudes toward implementation of practices; and behavior. In Winter, 2008, a five-wave mail survey was utilized to collect the data (Dillman, 2000). An advance notice letter was sent to potential respondents to inform them of the survey's purpose and to notify them that they would be receiving a survey in the next week. The survey was sent the following week, accompanied by a cover letter, similar to the advance notice letter, which informed them of the survey's purpose. A postcard reminder was sent two weeks later, and a replacement survey was sent the following week. After two more weeks, a third replacement survey was sent by priority mail to non-respondents. A 12-page survey was sent to 1000 residents in the watershed; 500 agricultural producers in Allen and Adams counties, and 500 residents of Allen County. After accounting for undeliverable surveys, the overall response rate was 45%. A complete analysis of the results can be found in Appendix V.

3.5 Indiana Fish Consumption Advisory

The Indiana Fish Consumption Advisory (FCA) is an annual report compiled through a collaborative effort between the Indiana Department of Natural Resources (IDNR), the Indiana Department of Environmental Management (IDEM), the Indiana State Department of Health (ISDH) and Purdue University. The FCA reports on the presence of Mercury, heavy metals, and PCBs found in fish tissue. If samples were found to have levels that could be harmful to humans, a fish consumption advisory is issued for that water body.

The 2008 Fish Consumption Advisory lists advisories for a number of species in the Allen County portion of the St. Marys River. The FCA also points out that there is a statewide advisory for carp consumption due to bioaccumulation of PCB's. Appendix VI provides more information regarding specific species and locations.

3.6 St. Marys River Watershed Restoration Action Strategy

The Watershed Restoration Action Strategy (WRAS) was developed by IDEM to be a living document to assist restoration and protection efforts of stakeholders in the St. Marys River Watershed. Released in 2001, the overall goal and purpose of Part I of the Watershed Restoration Action Strategy (WRAS) was to provide a reference point and map to assist with improving water quality. The major water quality concerns and recommended management strategies are addressed in Part II of the WRAS.

This Strategy broadly covers the entire watershed; therefore, it is intended to be an overall strategy and does not dictate management and activities at the stream site or segment level. Water quality management decisions and activities for individual portions of the watershed are most effective and efficient when managed through sub watershed plans. However, these sub watershed plans must also consider the impact on the watershed as a whole.

Finally, this Strategy is intended to be a fluid, living document in order to respond to the temporally dynamic quality of our environment. Therefore, this Strategy will require revision when new or different information becomes available. The WRAS for the St. Marys River Watershed that follows describes the Indiana portion of the watershed. Where available, information for the entire watershed is being included.

Part II of the WRAS identifies priority issues as well as recommended management strategies. Table 12 identifies priority issues as well as recommended management strategies as identified in the WRAS.

WRAS Priority Issues and Recommended Management Strategies	
Issue	Management Strategy
Data / Information & Targeting: A need for more water quality data and information to prioritize and target specific areas.	**Strategy 1:** Volunteer water quality monitoring programs. **Strategy 2:** TMDL development. **Strategy 3:** Coordination between groups completing water quality monitoring activities.
Streambank Erosion & Stabilization: Streambank cutting and erosion increases sediment load and impacts scenic and recreational values. A result of stream energy and velocity, flooding, and land management.	**Strategy:** Structural stabilizqation may be a temporary solution. However, a full understanding of drainage, stream hydraulics, and land management practices is required to solve this problem. Local programs such as those through MRBC may have some influence on reducing sediment, nutrient and pesticide loading.
Failing Septic Systems & Straight Pipe Discharges: Local health departments have identified and verified that this is a problem in the watershed. However, these practices continue at the present.	**Strategy:** The impacts resulting from effluent discharges needs to be illustrated to communities. Elimination will be a cooperative effort between homeowners and government stakeholders.
Water Quality – General: Segments of waterbodies are commonly listed as impaired on the State's 303(d) list.	**Strategy:** Development of St. Marys TMDL as well as a WMP for the St. Marys.
Fish Consumption Advisory: Fish consumption advisories are commonly issued for the St. Marys River Watershed.	**Strategy:** Continued monitoring of PCB's and mercury. Development of TMDL and WMP for the St. Marys River Watershed.
Nonpoint Source Pollution – General: Characterization of water quality impairments resulting from nonpoint source pollution.	**Strategy 1:** Development of TMDL to quantify pollutant loadings. **Strategy 2:** Promotion of Local, State, and Federal programs to reduce nonpoint source pollution. **Strategy 3:** Utilize local SWCD's to work with the Ag community in terms of livestock and waste management and crop production management.
Point Sources – General: Illegal and permitted point source dischargers exist in the watershed.	**Strategy:** Improve compliance of NPDES permit holders. Identify and eliminate illegal dischargers.

Table 12. WRAS Priority Issues and Recommended Strategies.

3.7 Estimating Pollutant Loadings

In order to determine the overall extent of nonpoint source pollution in the watershed, it is important to have an understanding of existing pollutant loads in the watershed.

Flow data for the St. Marys River was available for several United States Geological Survey (USGS) gaging stations in the watershed. Data for the main stem of the St. Marys was available from the USGS gage 04181500 located at Decatur, IN and USGS gage 04182000 located near Fort Wayne, IN. The USGS gage located on Harber Ditch, a tributary to the St. Marys, was retired in 1991. Therefore, to stay consistent with the TMDL, the USGS gage 03324000 on the Little River was used for tributary flow data. Through a regression analysis, the gage on the Little River was found to be a good comparison to the Harber Ditch gage and was used to develop load duration curves for the TMDLs.

Drainage areas were calculated for the twenty (20) sampling locations monitored by the St. Marys River Watershed. From the aforementioned USGS gages and calculated drainage areas, average flows were calculated for each sample date.

The estimated average flows were then multiplied by the sample concentrations for TSS, ammonia, phosphorus, *E. coli*, and atrazine to provide estimated pollutant loads. This process was completed for all twenty (20) sampling locations. Loading results can be found in Appendix IV.

In order to make loading comparisons across subwatersheds, average loading calculations were divided by the subwatershed drainage area, resulting in an average load per square mile. The results are shown in Figures 35-39.

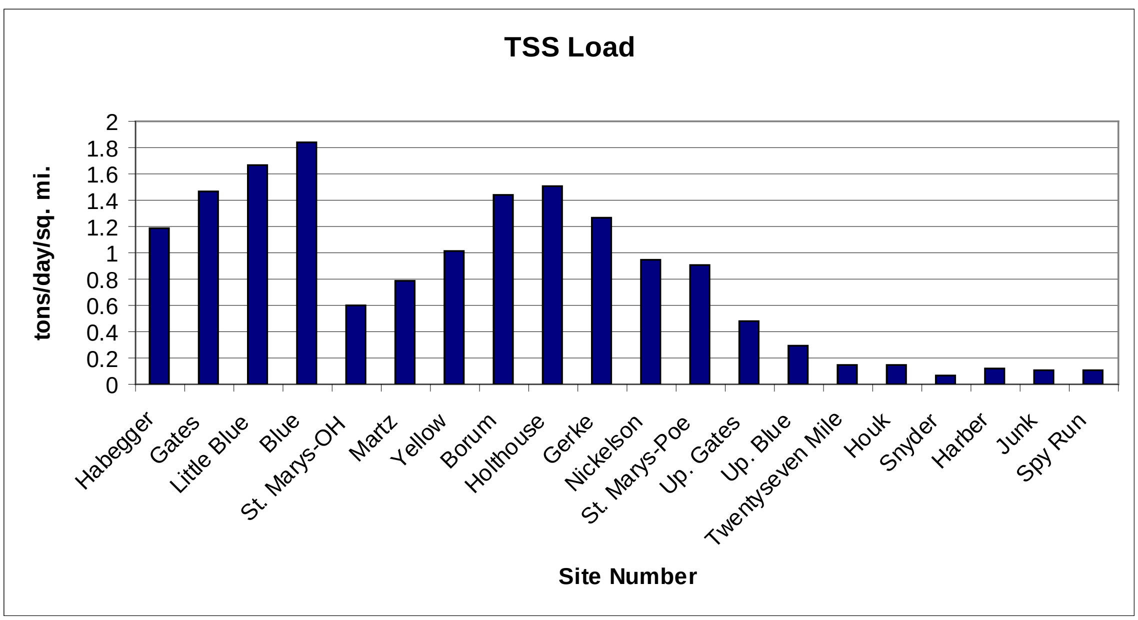

Figure 35. TSS Load: tons/day/sq. mi.

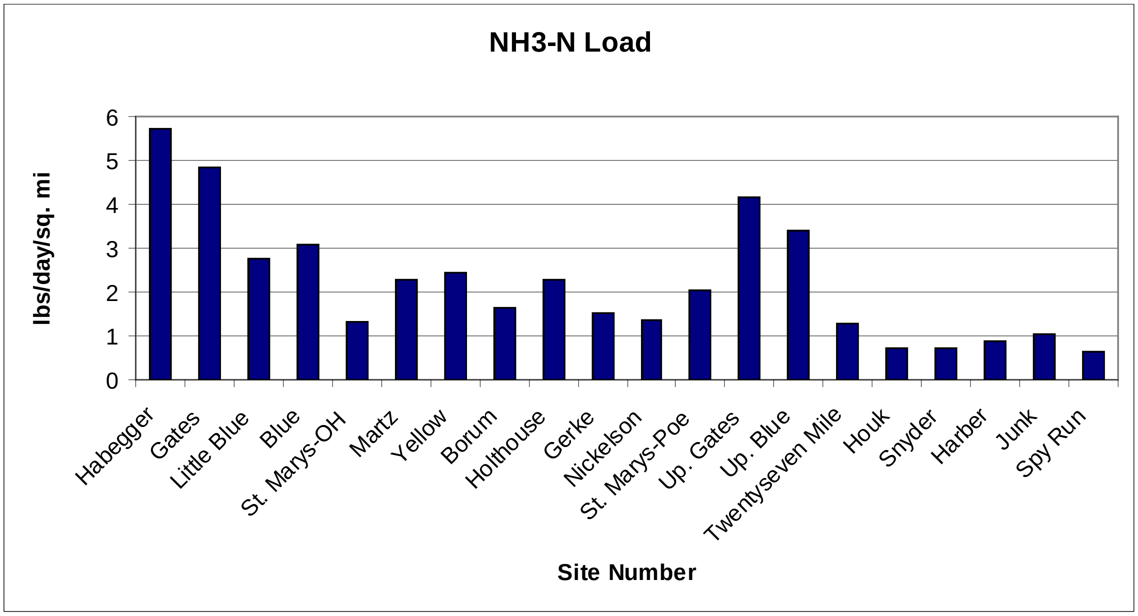

Figure 36. NH3-N Load: lbs./day/sq. mi.

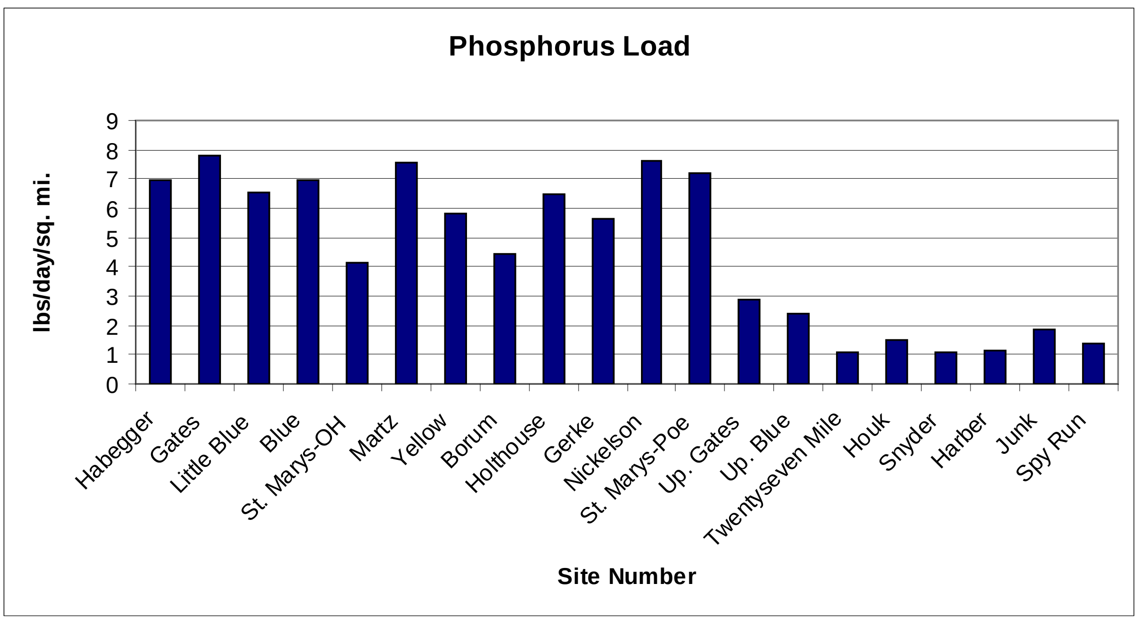

Figure 37. Phosphorus Load: lbs./day/sq. mi.

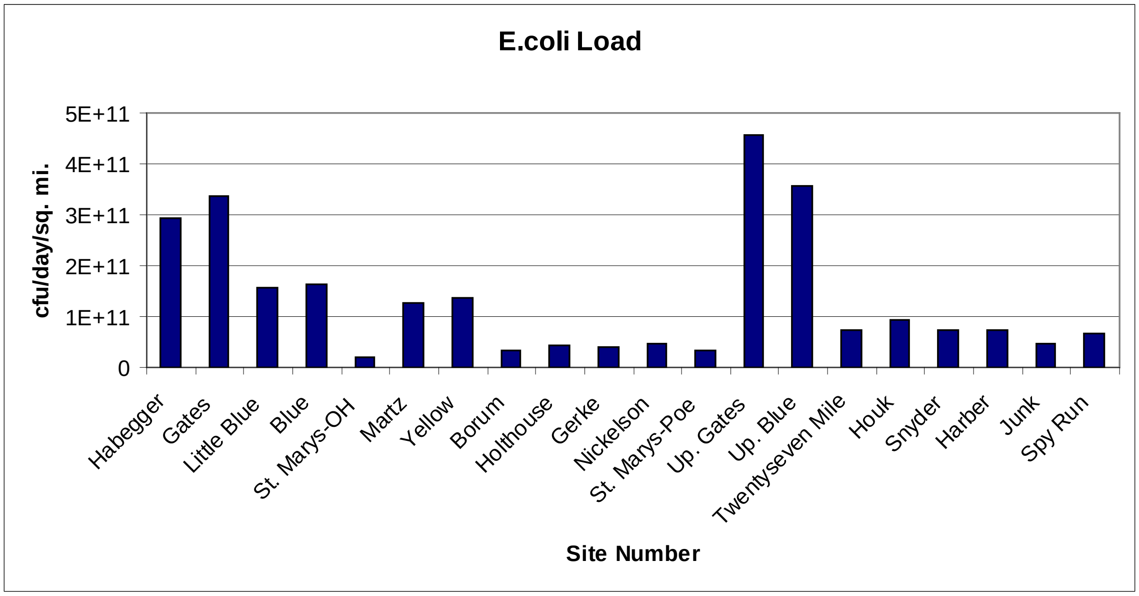

Figure 38. *E. coli* Load: cfu/day/sq. mi.

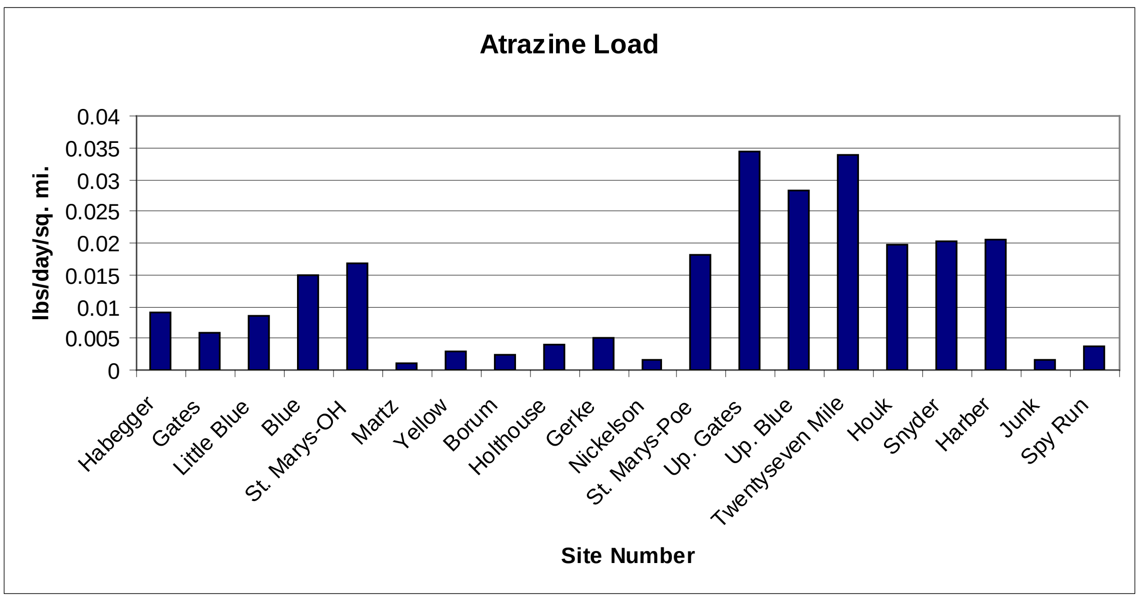

Figure 39. Atrazine Load: lbs./day/sq. mi.

3.8 Indiana's Unified Watershed Assessment (UWA)

The UWA workgroup gathered a wide range of water quality data that could be used to characterize Indiana's water resources. The data were used in layers in order to sort the 8 digit HUC watersheds according to the present condition of the water in lakes, rivers, and streams. The workgroup used only those data that concerned the water column, organisms living in the water, or the suitability of the water supporting aquatic ecosystems. Each layer of information was partitioned by percentiles into scores. The scores ranged between 1 and 5, with a score of 1 being indicative of good water quality or minimum impairment, and a score of 5 indicating heavily impacted or degraded water quality. The scoring derived through the UWA process is derived in the following Table 13.

The data layers listed in Table 13 can be defined as:

- Lake Fishery: Large mouth bass community information for lakes.
- Stream Fishery: Small mouth bass community information for streams.
- Aquatic Life Use Support: The livability of the water column for aquatic life, determined from evaluation of chemical and physical water data, and assessment of aquatic life.
- Fish Consumption Advisories: Site specific advisories based on current data.
- Fish Index of Biotic Integrity: Based on fish community diversity and fish health
- Qualitative Habitat Evaluation Index: Measure of whether the aquatic habitat is suitable for diverse communities, based on visual observations.
- Lake Trophic Scores: Indicator for the rate at which the lake is aging due to inputs of nutrients and other factors.
- Sediment Potential: Indicator of potential sediment input to water bodies in the watershed.

The sources and additional information for these layers include:

- Lake Fishery: From IDNR fish surveys of lakes and reservoirs from 1972 to 1994. Raw scores were averaged for all lakes in the watershed.
- Stream Fishery: From IDNR fish surveys of streams from 1972 to 1994. Raw scores were averaged for all lakes in the watershed.
- Aquatic Life Use Support: IDEM, Office of Water Quality, Assessment Branch
- Fish Consumption Advisories: ISDH and IDEM, Office of Water Quality, Assessment Branch
- Fish Index of Biotic Integrity: IDEM, Office of Water Quality, Assessment Branch
- Qualitative Habitat Evaluation Index: IDEM, Office of Water Quality, Assessment Branch
- Lake Trophic Scores: Indiana Clean Lakes Program through IDEM, Office of Water Quality, Assessment Branch. This score was based on information gathered from sampling conducted in the 1970's and 1980's.
- Sediment Potential: U.S. Geological Survey scored the population rate of change and the 1996 Conservation Tillage Transect data. The scores were then added and normalized to produce a sediment yield indicator for each watershed.

From this scoring, it is evident that stream fishery, aquatic life use support, and qualitative habitat evaluation index are the key concerns. However all categories are of concern based on the ranking for the St. Marys River Watershed.

Results of the Unified Watershed Assessment for the St. Marys River	
Data / Information Layer	**St. Marys River (04100004) Score**
Lake Fishery	*
Stream Fishery	5
Aquatic Life Use Support	5
Fish Consumption Advisories	3
Fish Index of Biotic Integrity	*
Qualitative Habitat Evaluation Index	5
Lake Trophic Scores	*
Sediment Potential	3
Note: The UWA scores range from 1 to 5, with a score of 1 indicating good water quality and a score of 5 indicating severe impairment.	
* No score determined.	

Table 13. Results of the Unified Watershed Assessment for the St. Marys River

During the summer of 1999 the UWA workgroup used additional layers of information to identify the resource concerns and stressors for each of the 361 11-digit watersheds in Indiana. Examination of the human activities that have the potential to impact the ecosystem will help planners focus on those areas where restoration may be most critical. Organizations can identify opportunities to use their programs and resources to address those areas.

This focusing process will illuminate areas where interests of two or more partner agencies may converge. It is intended that this will lead to more effective allocation of resources for restoration and protection activities. At the local level, this information can assist groups to prioritize watershed activities and provide some discussion points for planning.

This amended assessment has the following benefits:

- Provides a logical process for targeting funds, which may be expanded or updated without changing the basic framework.
- Provides information at a finer resolution (11-digit HUC) to agencies and local watershed groups.
- Identifies data gaps.
- Can be used as a compliment to other assessments, such as the 305(b) Report and the 303(d) List.

Table 14 shows the results of the 2000-2001 UWA for the St. Marys River Watershed.

HUC Scores for Each Parameter Used in the Unified Watershed Assessment (2000-2001)																
	11 Digit HUC	Mussel Diversity & Occurrence	Aquatic Life Use Support	Recreational Use Attainment	Stream Fishery	Lake Fishery	Eurasion Milfoil Infestation Status	Lake Trophic Status	Critical Biodiversity Resource	Aquifer Vulnerability	Population Using Surface Water for Drinking Water	Residential Septic System Density	Degree of Urbanization	Density of Livestock	% Cropland	Mineral Extraction Activities
St. Marys	04100004030	nd	nd	nd	nd	nd	nd	nd	1	5	4	1	1	5	5	3
	04100004040	nd	nd	nd	nd	nd	nd	nd	2	5	4	2	2	5	5	3
	04100004050	nd	nd	nd	nd	nd	nd	nd	2	5	4	3	2	5	5	3
	04100004060	nd	nd	nd	5	nd	nd	nd	3	4	4	4	3	4	3	2

Table 14. Scores from the 2000-2001 Unified Watershed Assessment

3.9 St. Marys Watershed Nutrient Management Program

The Adams County SWCD was granted a 319 grant in 2000 to develop a nutrient management program in the St. Marys River Watershed. Phase I of the project involved the hiring of a nutrient management specialist to develop an education and outreach program to assist producers with the development of Nutrient Management Plans, including storage, handling, and application procedures for manure and fertilizer. The specialist was also responsible for collecting bimonthly water quality samples at 12 sites focusing on nitrates and phosphates.

Phase II of the project established a cost share program for livestock producers. The goal of the cost share program was to improve the environmental quality of natural resources in Adams County by establishing a long term nutrient management program. Phase II of the project also continued water quality monitoring across the watershed.

The following Figures 40-42 represent the observed nutrient levels during water quality monitoring during the St. Marys Watershed Nutrient Management Program.

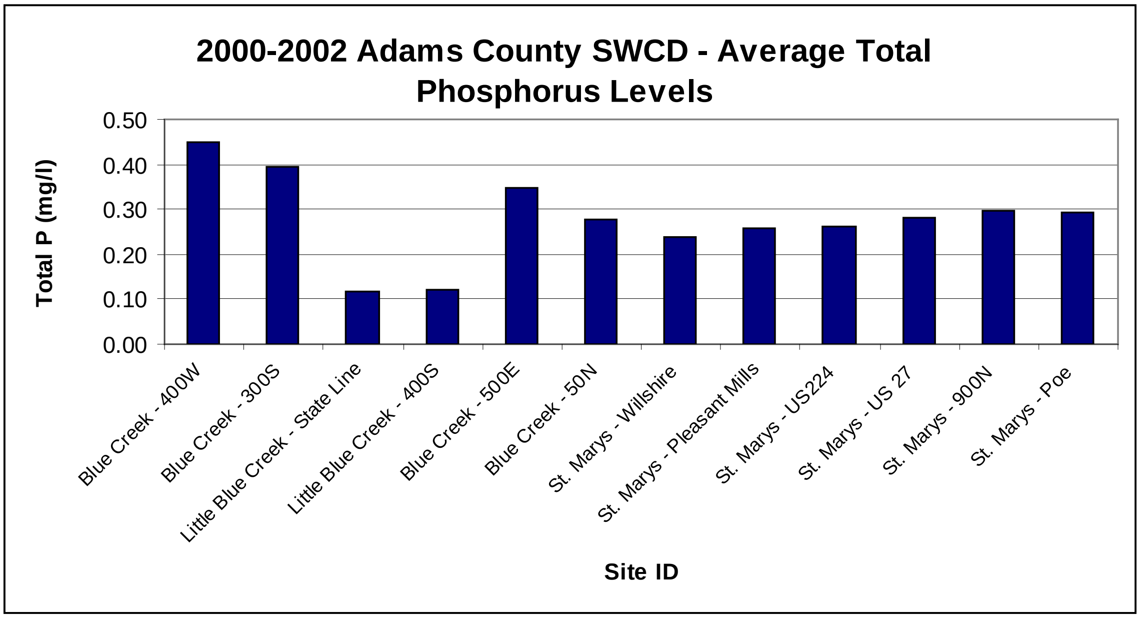

Figure 40. Average Total Phosphorus levels in the St. Marys River Watershed.

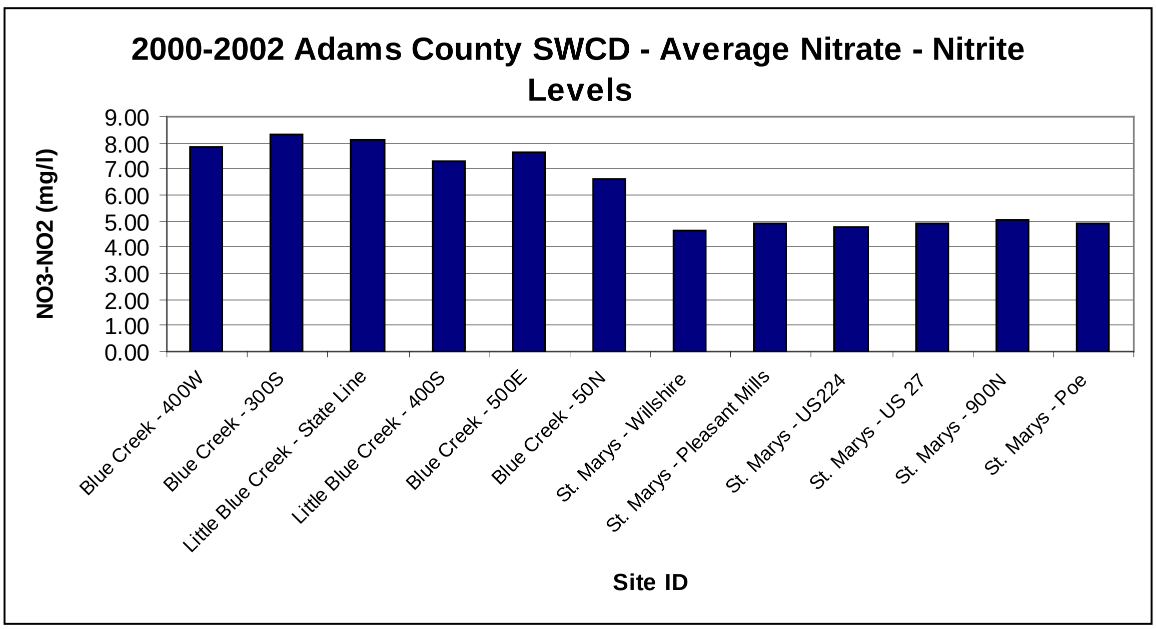

Figure 41. Average Nitrate – Nitrite Levels in the St. Marys River Watershed.

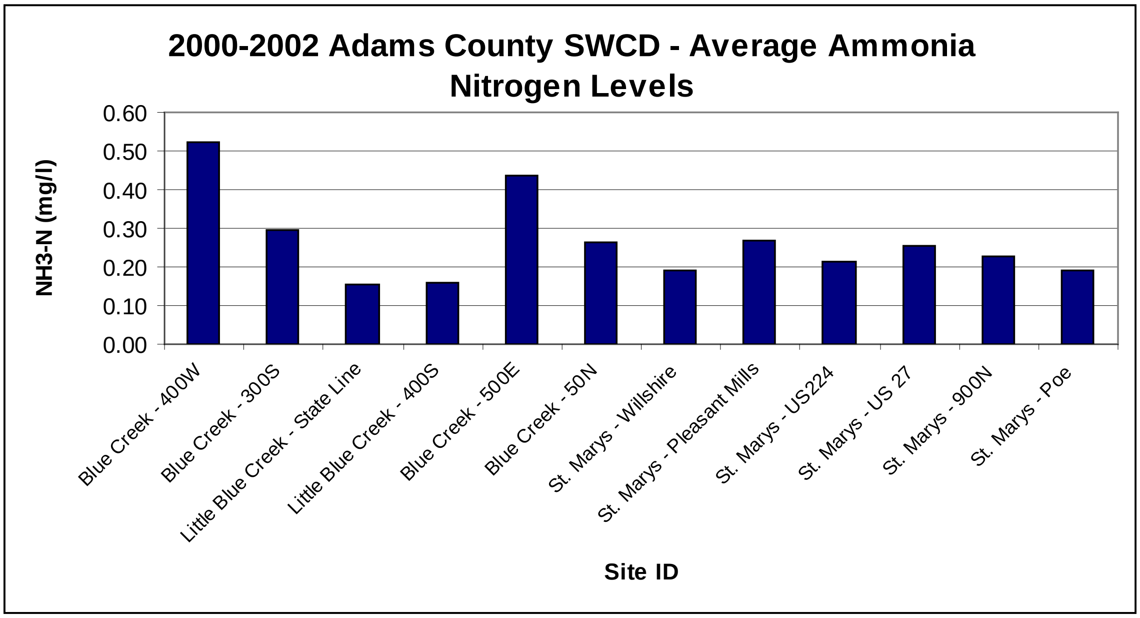

Figure 42. Average Ammonia Nitrogen Levels in the St. Marys River Watershed.

3.10 Water Quality Summary

Habegger Ditch

Habegger Ditch is a tributary to the Gates Creek located in the southern portion of the watershed, with its headwaters located near Berne, IN. Wittmer Ditch and Sprunger Ditch feed into Habegger Ditch. Habegger Ditch was sampled by IDEM in 2004 during the TMDL development as well as the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements were measured in Habegger Ditch by the St. Marys River Watershed Project. Dissolved oxygen measurements violated Indiana water quality standards for a four week period in late September and early October 2007, with a low value of 2.34 mg/l. Temperature, pH and conductivity measurements were within Indiana water quality standards.

Habegger Ditch commonly exceeds the Indiana state standard of 235 cfu/100ml. Loading data shows that a 75% reduction in *E. coli* loads will be necessary to meet IAC *E. coli* standards.

IDEM Nitrate data shows that on average, the IAC drinking water standard (10 mg/l) is met. However, occasional slugs during high flows were observed with levels reaching more than 20 mg/l. Ammonia data collected by the St. Marys River Watershed Project revealed extremely high ammonia levels in the watershed. Concentrations as high as 15.00 mg/l were observed, with an average of 1.32 mg/l. Ammonia concentrations in this range for a prolonged period can be extremely toxic to aquatic organisms. Calculation of the Criterion Continuous Concentration (CCC) resulted in five exceedences of the CCC.

Phosphorus data collected by both IDEM and the St. Marys River Watershed Project exceeded the TMDL and St. Marys Watershed Project standard of 0.30 mg/l with averages of 0.38 mg/l and 0.45 mg/l.

TSS data collected by IDEM was quite different than that collected by the St. Marys River Watershed Project. IDEM data on average met the TMDL goal of 30 mg/l by averaging 23.95 mg/l. However, during high flows, levels as high as 94.50 mg/l were observed. Data collected by the St. Marys River Watershed Project saw an average of almost 74 mg/l with the maximum concentration reaching 696 mg/l. This inconsistency may be due to sampling time, IDEM data was collected March through October. The St. Marys River Watershed Project data was collected during the months of September through July, which included the winter months. It was during the winter months of February and early March that the highest TSS levels were recorded.

Pesticide data was collected by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor. Six Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l. All violations occurred in the months of April-July, a period when Atrazine is being readily applied. Concentrations of Alachlor, Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 15 summarizes water quality data in Habegger Ditch.

Habegger Ditch							
IDEM LES040-0099, CR 150E at CR 500S							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	84.7	17329	3594.5			
E. coli	SMRWP	200	48,392	7846	9.61E+09	2.49E+13	2.31E+12
Nitrogen, NO3+NO2	2004 IDEM	0.06	20.10	4.11			
Phosphorus	2004 IDEM	0.07	1.17	0.38			
Phosphorus	SMRWP	0.03	1.44	0.45	0.2	558.7	55.1
TSS	2004 IDEM	6.7	94.50	23.95			
TSS	SMRWP	9	696	73.99	0.0	151.5	13.0
Temperature	SMRWP	0.04	21.17	11.00			
pH	SMRWP	7.23	8.11	7.64			
DO	SMRWP	2.34	13.15	7.88			
Conductivity	SMRWP	128	1069	624			
Turbidity	SMRWP	11.20	700.90	87.00			
BOD	SMRWP	1.35	9.86	4.66			
NH3-N	SMRWP	0.10	15.00	1.32	0.5	288.7	45.0
Atrazine	SMRWP	0.03	8.17	1.73	0.001	0.527	0.071
Alachlor	SMRWP	0.04	0.71	0.31			
Cyanazine	SMRWP	0.00	0.41	0.25			
Metolachlor	SMRWP	0.06	7.74	1.45			

Table 15. Water quality in Habegger Ditch

Gates Ditch

Gates Ditch, fed by Habegger Ditch, is a tributary to the Blue Creek located in the southern portion of the watershed. Farlow Ditch and Habegger Ditch combine to form Gates Ditch. There are two monitoring stations located on Gates Ditch, one on Lower Gates Ditch near the confluence with Blue Creek, and another in the headwaters, upstream of Habegger Ditch. Lower Gates Ditch was sampled in 2004 by IDEM and again in 2007-2008 by the St. Marys River Watershed Project. Upper Gates Ditch was sampled by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements in Lower Gates Ditch again revealed dissolved oxygen violations during a two week period in mid-October 2007. Measurements of 1.02 mg/l and 2.43 mg/l were recorded during this time. Upper Gates Ditch also experienced low dissolved oxygen levels, 2 of 9 measurements violated the Indiana water quality standard for minimum dissolved oxygen concentration (4.0 mg/l). Temperature, pH and conductivity measurements were within Indiana water quality standards for both monitoring stations on Gates Ditch.

Similar to Habegger Ditch, Lower Gates Ditch *E. coli* data shows extremely high *E. coli* levels, averaging 4,440.4 cfu/100ml in 2004 and 11,041.15 cfu/100ml most recently. Loading data shows that an 86% reduction is necessary to meet Indiana state standards (235 cfu/100ml). The headwaters site also showed elevated bacteria levels, with 100% of the samples exceeding the IAC standard (235 cfu/100ml). Loading results show that an 85% reduction is necessary to meet the standard. On a per square mile analysis, Upper Gates Ditch ranked first for *E. coli* loading.

Nitrogen data collected by IDEM at the lower site exceeded the Nitrate drinking water standard (10 mg/l) in only 2 of 16 samples. Ammonia data for Lower Gates Ditch collected by the St. Marys River Watershed Project ranged from the lab detection level of 0.10 mg/l on several occasions to a maximum of 3.59 mg/l on June 4, 2008. Ammonia levels in the headwaters averaged 0.69 mg/l, with a maximum concentration of 3.70 mg/l. 1 violation of the CCC was reported at the upper reach and 2 exceedences occurred at the lower reach of Gates Ditch.

Phosphorus data collected by IDEM in the lower reach averaged 0.41 mg/l. However, it was interesting that all samples collected in July through October exceeded the 0.30 mg/l TMDL standard. Phosphorus data collected by the St. Marys River Watershed Project averaged 0.49 mg/l with a maximum of 1.51 mg/l. Upper Gates Ditch had the highest Phosphorus concentration with an average of 0.50 mg/l.

In Lower Gates Ditch, only 25% of IDEM TSS samples exceeded the TMDL standard of 30 mg/l, whereas 64% of samples collected by the St. Marys River Watershed Project exceeded the standard. At the upper sampling site TSS levels were in violation of the TMDL standard (30 mg/l) 100% of the time.

Pesticide data was collected in Lower Gates Ditch by the St. Marys River Watershed Project in 2007-2008. Pesticide data in Upper Gates was collected in 2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor. In Lower Gates Ditch, three Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l. A maximum concentration of 10.04 µg/l was reported in June 2008. In the upper reach of Gates Ditch, one sample was in violation of the drinking water standard (9.45 µg/l).All violations occurred in the months of April-July, a period when Atrazine is being readily applied. Concentrations of Alachlor, Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Tables 16 & 17 summarize water quality in Gates Ditch.

Gates Ditch							
IDEM LES040-0023, CR 400S, East of CR 200E							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	204.6	24,200	4,440.4			
E. coli	SMRWP	435	104,620	11,041.15	2.94E+10	6.01E+13	6.36E+12
Nitrogen, NO3+NO2	2004 IDEM	0.28	22.60	4.53			
Phosphorus	2004 IDEM	0.07	1.08	0.41			
Phosphorus	SMRWP	0.11	1.51	0.49	1.4	1925.6	149.0
TSS	2004 IDEM	6.30	157.0	33.51			
TSS	SMRWP	2	1004	124.61	0.1	424.4	38.4
Temperature	SMRWP	0.06	21.36	11.04			
pH	SMRWP	1.02	12.05	7.05			
DO	SMRWP	1.02	12.05	7.05			
Conductivity	SMRWP	128	932	663			
Turbidity	SMRWP	13.40	841	133.83			
BOD	SMRWP	1	11.73	4.07			
NH3-N	SMRWP	0.10	3.59	0.59	0.0	616.5	92.7
Atrazine	SMRWP	0.02	10.04	1.38	0.001	1.565	0.111
Alachlor	SMRWP	0.05	1.47	0.40			
Cyanazine	SMRWP	0.00	0.42	0.29			
Metolachlor	SMRWP	0.00	1.53	0.55			

Table 16. Water quality in Gates Ditch.

Upper Gates Ditch CR 500S, Upstream of confluence with Habegger Ditch							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
Temperature	SMRWP	10.22	19.40	15.12			
pH	SMRWP	6.92	7.47	7.19			
DO	SMRWP	2.35	6.29	4.71			
Conductivity	SMRWP	536	905	770.11			
Turbidity	SMRWP	54.90	1,040	217.11			
BOD	SMRWP	3.34	7.30	4.95			
TSS	SMRWP	46	586	132.50	0.3	22.1	5.1
NH3-N	SMRWP	0.13	3.70	0.69	2.0	278.6	34.3
Phosphorus	SMRWP	0.04	1.66	0.50	0.5	125.3	23.7
E. coli	SMRWP	613	48,392	8,795	2.76E+10	2.81E+13	3.75E+12
Atrazine	SMRWP	0.08	9.45	2.61			
Alachlor	SMRWP	0.21	0.68	0.43			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.12	2.82	0.97			

Table 17. Water quality in Upper Gates Ditch

Little Blue Creek

Little Blue Creek is a tributary to Blue Creek located in the southern portion of the watershed near the Indiana – Ohio state line. The first monitoring station is located on Little Blue Creek upstream of the confluence with Blue Creek. This site was sampled by the Adams County SWCD in 2000 and 2001, by IDEM in 2004, and by the St. Marys River Watershed Project in 2007-2008. The second monitoring station is located in the Little Blue Creek headwaters. This site was sampled by the Adams County SWCD in 2000 and 2001.

Conductivity measurements in Little Blue Creek yielded three violations of the Indiana dissolved solids standard, measurements of 1,067 µS/cm, 1,464 µS/cm, and 1,776 µS/cm were recorded in October 2007. Measurements for pH, temperature, and dissolved oxygen were with Indiana water quality standards.

In the lower reach, *E. coli* levels exceeded IDEM standards 100% of the time when sampled by the Adams County SWCD, 75% of the time when sampled by IDEM, and 90% of the time when sampled by the St. Marys River Watershed Project. A 56% reduction in *E. coli* loading levels will be necessary to meet IDEM water quality standards for *E. coli* (235 cfu/100ml). In the headwaters of Little Blue Creek, all *E. coli* samples collected by the Adams County SWCD surpassed the IDEM standard. The headwaters had an average value of 2,940 cfu/100ml.

Nitrogen data collected for the downstream reach by the Adams County SWCD and IDEM showed averages of 7.28 and 4.26 mg/l, with maximum values of 22.50 and 15.10 mg/l. Ammonia data collected at this site ranged from 0.05 mg/l to 1.02 mg/l when sampled by the Adams County SWCD, and from 0.10 mg/l to 0.44 mg/l when sampled by the St. Marys River Watershed Project. No violations of the CCC were reported on

Little Blue Creek. In the Little Blue Creek headwaters, Nitrogen had a slightly higher average concentration than the downstream site, at 8.09 mg/l. Similar averages were observed between ammonia levels at the upstream and downstream monitoring stations.

Phosphorus data was collected at the downstream monitoring location by all three organizations. In 2000-2001 the Adams County SWCD recorded an average concentration of 0.12 mg/l. In 2004 IDEM saw an average of 0.19 mg/l and in 2007-2008 the St. Marys River Watershed Project observed an average of 0.28 mg/l. In the most recent round of sampling, 70% of samples were under the 0.30 mg/l phosphorus standard set by the TMDL. During the 2000-2001 Adams County SWCD sampling in the Little Blue Creek headwaters, concentrations ranged from the laboratory detection limit up to 0.26 mg/l.

TSS data collected near the confluence showed that in 2004 24% of samples collected by IDEM exceeded the standard of 30 mg/l set by the TMDL. In 2007-2008 sampling conducted by the St. Marys River Watershed project, this number rose to 56% of samples being in exceedence.

Pesticide data was collected by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor. Two Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l. A maximum concentration of 16.4 µg/l was reported. All violations occurred in the months of April-July, a period when Atrazine is being readily applied. Concentrations of Alachlor, Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Tables 18 and 19 summarize water quality in Little Blue Creek.

Little Blue Creek							
IDEM LES040-0010, CR 400S, West of CR 600E							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	70.3	24192	4706			
E. coli	2000-2001 Adams SWCD	400	11,000	2743.8			
E. coli	SMRWP	100	30,760	3,694	4.22E+09	4.18E+13	2.47E+12
Nitrogen, NO3+NO2	2004 IDEM	0.08	15.10	4.26			
Nitrogen, NO3+NO2	2000-2001 Adams SWCD	0.02	22.50	7.28			
Phosphorus	2004 IDEM	ND	1.05	0.19			
Phosphorus	2000-2001 Adams SWCD	0.01	0.42	0.12			
Phosphorus	SMRWP	0.02	1.43	0.28	0.3	1234.3	103.4
TSS	2004 IDEM	8.10	183.0	34.29			
TSS	SMRWP	9.50	920.00	90.61	0.1	452.4	37.4
Temperature	SMRWP	0.04	21.76	11.04			
pH	SMRWP	7.23	8.31	7.71			
DO	SMRWP	4.76	13.54	9.00			
Conductivity	SMRWP	67.30	1776	595.24			
Turbidity	SMRWP	8.80	840.60	107.55			
BOD	SMRWP	1.17	6.00	2.68			
NH3-N	SMRWP	0.10	0.44	0.17	0.9	479.3	43.2
NH3-N	2000-2001 Adams SWCD	0.05	1.02	0.16			
Atrazine	SMRWP	0.01	16.40	1.53	0.001	2.315	0.132
Alachlor	SMRWP	0.03	1.43	0.30			
Cyanazine	SMRWP	0.01	0.46	0.31			
Metolachlor	SMRWP	0.00	2.58	0.54			

Table 18. Water quality in Little Blue Creek

Little Blue Creek Adams SWCD: State Line (700E) N of 900S (Headwaters)							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	400	12,200	2,940			
Phosphorus	2000-2001 Adams SWCD	0.01	0.26	0.12			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.02	21.20	8.09			
NH3-N	2000-2001 Adams SWCD	0.05	0.43	0.16			

Table 19. Water quality in Little Blue Creek (Headwaters)

Blue Creek
Blue Creek is the largest tributary to the St. Marys River. The Blue Creek watershed encompasses the aforementioned tributaries of Habegger Ditch, Gates Ditch and Little Blue Creek. A total of four monitoring stations have been sampled on Blue Creek. The uppermost site was sampled by the Adams County SWCD in 2000 and 2001. Moving downstream, the next monitoring station is located upstream of the Gates Ditch confluence. This site has been sampled by the Adams SWCD in 2000-2001, by IDEM in 2004, and by the St. Marys River Watershed Project in 2007-2008. The next site is located on Blue Creek between the confluences of Gates Ditch and Little Blue Creek. This site was monitored in 2000-2001 by the Adams County SWCD and again in 2004 by IDEM. The final site on Blue Creek is located just upstream of the confluence with the St. Marys River, this site was sampled by all three entities.

Physical parameter measurements were taken by the St. Marys River Watershed Project from 2007-2008 upstream of the confluence with the St. Marys River. Conductivity measurements in Blue Creek saw a period with high conductivity levels leading to violations of the Indiana dissolved solids standard, measurements of 1,281 µS/cm, 1,435 µS/cm, 1,379 µS/cm 1,282 µS/cm and 1,137 µS/cm were recorded in September and October 2007. Measurements for pH, temperature, and dissolved oxygen were with Indiana water quality standards.

In the uppermost reach of Blue Creek, 75% of samples collected by the Adams County SWCD exceeded the 235 cfu/100ml IDEM standard. Concentrations ranged from a low of 100 cfu/100ml to a high of 11,200 cfu/100ml. The next sampling location, also considered as a headwater reach, was sampled by the Adams County SWCD in 2000-2001, by IDEM in 2004, and most recently the St. Marys River Watershed Project in 2007-2008. Average *E. coli* concentrations were recorded as 4,612.5 cfu/100ml in 2000-2001, 2,739.8 cfu/100ml in 2004, and 5,300.5 cfu/100ml in 2007-2008. Loading estimates for this site illustrate that approximately a 50% reduction in *E. coli* loading will be necessary to meet IDEM water quality standards. Moving further downstream, the next monitoring station was sampled in 2000-2001 by the Adams County SWCD and in 2004 by IDEM. Adams County SWCD data shows that 86% of collected samples exceeded the IDEM standard, while 88% of the samples collected by IDEM exceeded the standard. Samples collected by Adams County ranged from 150 cfu/100ml to 58,400 cfu/100ml, whereas those collected by IDEM ranged from 178.8 cfu/100ml to 24,200 cfu/100ml. The furthest downstream site was sampled by all three organizations. Adams County SWCD recorded average *E. coli* levels of 4,693.8 cfu/100ml, IDEM 6,817.9 cfu/100ml, and the St. Marys River Watershed Project 3,644.9 cfu/100ml. Loading calculations for this site estimate that a 52% loading reduction is necessary to meet IDEM water quality standards.

Nitrogen data was collected in the headwater reaches by the Adams County SWCD in 2001, by IDEM in 2004, and by the St. Marys River Watershed Project in 2007-2008. In the uppermost reach, NO3-NO2 data collected by the Adams County SWCD averaged 7.85 mg/l with a maximum level of 27.10 mg/l. Ammonia data collected at this site ranged from a low of the laboratory detection limit to a high of 3.40 mg/l. Downstream of this site, Adams County NO3-NO2 data averaged 8.35 mg/l, while IDEM data averaged 5.49 mg/l. Ammonia concentration collected by the Adams County SWCD and the St. Marys River Watershed Project were similar with averages of 0.30 mg/l and 0.36 mg/l. Maximum ammonia concentrations were recorded at 1.64 mg/l and 2.00 mg/l. No exceedences of the CCC were found in Blue Creek. Downstream of the Gates Ditch confluence, Adams County SWCD NO3-NO2 concentrations ranged from 0.20 mg/l to 29.80 mg/l, IDEM concentrations ranged from 0.53 mg/l to 28.70 mg/l. 21% of the Adams County SWCD samples violated the Indiana drinking water standard of 10 mg/l. 18% of IDEM samples exceeded the standard. Ammonia data collected by Adams County in 2001 at this site ranged from the laboratory detection level of 0.05 mg/l to 3.06 mg/l. The average ammonia concentration at this site was 0.44 mg/l. At the most downstream site on Blue Creek, NO3-NO2 concentrations averaged 6.64 mg/l and 4.80 mg/l. A value of 30.90 mg/l was recorded by the Adams County SWCD in May, 2000. Average ammonia levels of 0.26 mg/l were recorded by the Adams County SWCD in 2000-2001, while an average concentration of 0.21 mg/l was observed in the most recent round of monitoring by the St. Marys River Watershed Project. Tables 20 – 23 summarize water quality in Blue Creek.

Phosphorus data collected by the Adams County SWCD in 2000-2001 had an average concentration of 0.45 mg/l, 48% of these samples exceeded the 0.30 mg/l standard set by the IDEM TMDL. Moving downstream to the next location, phosphorus was sampled by Adams County SWCD in 2000-2001, IDEM in 2004, and by the St. Marys River Watershed Project in 2007-2008. Levels have seen a slight decrease over the period, with an average concentration of 0.39 mg/l in 2000-2001, 0,34 mg/l in 2004, and 0.30 mg/l in 2007-2008. This trend also held true at the monitoring station between Gates Ditch and Little Blue Creek. Adams County SWCD data collected in 2000-2001 averaged 0.35 mg/l, while 2004 IDEM data averaged 0.31 mg/l. At the furthest downstream site, 2000-2001 average values were reported at 0.28 mg/l, 0.25 mg/l in 2004, and 0.32 mg/l in 2007-2008. 35% of samples exceeded the TMDL phosphorus standard (0.30mg/l) in 2000-2001, 25% in 2004, and 39% in 2007-2008.

TSS data were not collected at the most upstream station on Blue Creek. At the monitoring station upstream of Gates Ditch, TSS data were collected by IDEM in 2004 and by the St. Marys River Watershed Project in 2007-2008. IDEM reported TSS levels from below the laboratory detection limit to as high as 139 mg/l. Only 25% of IDEM samples exceeded the TMDL standard of 30 mg/l. In 2007-2008 the St. Marys River Watershed Project recorded TSS levels ranging from 11.4 mg/l to 254 mg/l. 31% of these samples exceeded the TMDL standard. At the monitoring station downstream of Gates Ditch, IDEM reported levels ranging from 10.3 mg/l to 460 mg/l, with an average concentration of 52.61 mg/l. 25% of samples exceeded the TMDL standard.

Pesticide data were collected at two locations on Blue Creek by the St. Marys River Watershed Project in 2007-2008. In the Blue Creek headwaters, two of seven samples exceeded the USEPA drinking water standard of 3.00 µg/l. In Blue Creek near the confluence with the St. Marys River, data revealed a period from June 4, 2008 to July 2, 2008 where high Atrazine levels were reported. Five Atrazine samples exceeded the USEPA drinking water standard. A maximum concentration of 14.42 µg/l was reported on June 4, 2008. On this same day, Alachlor levels in Blue Creek exceeded the MCL level, with a concentration of 2.04 µg/l Concentrations of Cyanazine were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Tables 20-23 summarize water quality in Blue Creek.

Blue Creek 400W just South of 100S							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams County SWCD	100	11,200	3850			
Phosphorus	2000-2001 Adams County SWCD	0.10	2.20	0.45			
Nitrogen, NO3-NO2	2000-2001 Adams County SWCD	0.20	27.10	7.85			
NH3-N	2000-2001 Adams County SWCD	0.05	3.40	0.52			

Table 20. Water Quality in Blue Creek (Headwaters)

Blue Creek IDEM LES040-0066, CR 300S, East of CR 000; SMRWP, CR 100E, Upstream of confluence with Gates Ditch							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	250	27,200	4,612.5			
E. coli	2004 IDEM	34.5	24,200	2738.9			
E. coli	SMRWP	98	43,520	5,300.54	1.17E+10	8.69E+13	8.47E+12
Nitrogen, NO3+NO2	2004 IDEM	0.06	36.40	5.49			
Nitrogen, NO3+NO2	2000-2001 Adams SWCD	0.20	28.90	8.35			
Phosphorus	2004 IDEM	0.09	0.66	0.34			
Phosphorus	2000-2001 Adams SWCD	0.01	1.45	0.39			
Phosphorus	SMRWP	0.04	0.78	0.30	4.3	341.8	57.2
NH3-N	2000-2001 Adams SWCD	0.05	1.64	0.30			
NH3-N	SMRWP	0.10	2.00	0.36	3.0	703.3	81.3
TSS	2004 IDEM	ND	139.00	25.91			
TSS	SMRWP	11.4	254	51.77	0.2	55.8	6.6
Temperature	SMRWP	11.16	21.72	16.95			
pH	SMRWP	7.23	8.10	7.74			
DO	SMRWP	5.13	9.96	7.43			
Conductivity	SMRWP	574	820	680.89			
Turbidity	SMRWP	25.40	166.00	62.65			
BOD	SMRWP	2.32	7.61	4.42			
Atrazine	SMRWP	0.57	6.83	3.49	0.016	2.377	0.674
Alachlor	SMRWP	0.04	0.76	0.24			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.13	4.44	1.47			

Table 21. Water Quality in Blue Creek (Lower headwaters)

Blue Creek							
IDEM LES040-0011, Salem Rd., South of CR 300S; Adams County SWCD, CR 500 E							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	178.8	24,200	2680.1			
E. coli	2000-2001 Adams SWCD	150	58,400	13,421.43			
Nitrogen, NO3+NO2	2004 IDEM	0.53	28.70	5.43			
Nitrogen, NO3+NO2	2000-2001 Adams SWCD	0.20	29.80	7.63			
Phosphorus	2004 IDEM	ND	1.03	0.31			
Phosphorus	2000-2001 Adams SWCD	0.01	1.31	0.35			
NH3-N	2000-2001 Adams SWCD	0.05	3.06	0.44			
TSS	2004 IDEM	10.3	460	52.61			

Table 22. Water quality in Blue Creek (Downstream Gates Ditch)

Blue Creek							
IDEM LES040-0009, SR 124, East of SR 101, Adams County SWCD @ CR 50N							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	75.9	48,400	6817.9			
E. coli	2000-2001 Adams SWCD	150	28,000	4693.8			
Nitrogen, NO3+NO2	2004 IDEM	0.49	17.80	4.80			
Nitrogen, NO3+NO2	2000-2001 Adams SWCD	0.02	30.90	6.64			
Phosphorus	2004 IDEM	0.05	0.72	0.25			
Phosphorus	2000-2001 Adams SWCD	0.01	0.97	0.28			
Phosphorus	SMRWP	0.12	1.23	0.32	1.6	8893.0	529.5
TSS	2004 IDEM	ND	692	71.08			
Temperature	SMRWP	0.00	20.62	12.10			
pH	SMRWP	7.20	8.38	7.83			
DO	SMRWP	5.96	14.31	9.41			
Conductivity	SMRWP	134.00	1435.00	700.10			
Turbidity	SMRWP	0.90	840.00	115.12			
BOD	SMRWP	0.66	8.04	2.86			
TSS	SMRWP	3	792	102.99	0.1	2364.7	197.8
NH3-N	SMRWP	0.10	0.91	0.21	4.2	3800.9	234.3
NH3-N	2000-2001 Adams SWCD	0.05	3.03	0.26			
E. coli	SMRWP	96	30,760	3644.90	2.38E+10	2.02E+14	1.23E+13
Atrazine	SMRWP	0.04	14.42	2.17	0.013	9.858	1.132
Alachlor	SMRWP	0.01	2.04	0.41			
Cyanazine	SMRWP	0.02	0.54	0.34			
Metolachlor	SMRWP	0.00	7.35	1.37			

Table 23. Water quality in Blue Creek (Upstream confluence with St. Marys River)

Twentyseven Mile Creek

Twentyseven Mile Creek is a tributary to the St. Marys River. Twentyseven Mile Creek originates in Ohio, flows southwest across the Indiana-Ohio state line, and joins the St. Marys River north of Willshire, Ohio. Sampling was conducted on Twentyseven Mile Creek upstream of the confluence with the St. Marys River by the St. Marys River Watershed Project during April-July 2008.

Physical parameter measurements in Twentyseven Mile Creek saw no violations of the Indiana water quality standards.

E. coli levels ranged from 219 cfu/100ml to 8,130 cfu/100ml. 92% of samples exceeded the Indiana water quality standard (235 cfu/100ml). Loading calculations show that a 49% reduction in *E. coli* loading is necessary to meet the Indiana standard.

Ammonia data collected during the summer of 2008 reported average ammonia levels of 0.15 mg/l, with a maximum value of 0.71 mg/l.

Phosphorus levels ranged from the laboratory detection level of 0.05 mg/l to 0.42 mg/l. 92% of samples were under the TMDL standard of 0.30 mg/l.

54% of TSS samples violated the TMDL standard for TSS.

Pesticide data was collected by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, and Metolachlor. Two Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l. A maximum concentration of 8.80 µg/l was reported on June 25, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 24 summarizes water quality in Twentyseven Mile Creek.

Twentyseven Mile Creek							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
Temperature	SMRWP	12.39	21.27	12.88			
pH	SMRWP	7.56	8.11	7.88			
DO	SMRWP	5.63	11.61	7.65			
Conductivity	SMRWP	508	647	604.25			
Turbidity	SMRWP	25.10	98.40	51.20			
BOD	SMRWP	1.51	6.04	3.64			
TSS	SMRWP	15.00	146.00	44.93	0.3	26.6	5.5
NH3-N	SMRWP	0.10	0.71	0.15	3.2	300.6	33.7
TP	SMRWP	0.05	0.42	0.17	2.1	123.0	28.2
E. coli	SMRWP	219	8,130	1,290.85	3.25E+10	1.94E+13	1.95E+12
Atrazine	SMRWP	0.26	8.80	3.41	0.014	3.272	0.849
Alachlor	SMRWP	0.03	1.06	0.43			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.57	4.32	1.83			

Table 24. Water quality in Twentyseven Mile Creek.

Martz Creek

Martz Creek is a tributary to Yellow Creek, located in Adams County, south of Decatur, Indiana. Ruppert Ditch is a major tributary to Martz Creek. Martz Creek was sampled by IDEM in 2004 and again by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements were measured in 2007-2008 by the St. Marys River Watershed Project. One of twenty nine dissolved oxygen measurements violated the Indiana dissolved oxygen standard. A reading of 2.23 mg/l was recorded on 10/17/2007. Measurements on Martz Creek also recorded two violations of the Indiana dissolved solids standard. Conductivity reading of 1,037 µS/cm and 1,096 µS/cm were recorded on 9/26/2007 and 10/3/2007. Measurements for pH and temperature were within Indiana standards.

E. coli was first sampled by IDEM in 2004. IDEM recorded levels ranging from a low of 39.7 cfu/100ml to a high of 24,192 cfu/100ml. 67% of IDEM samples exceeded the 235 cfu/100ml Indiana standard. *E. coli* data collected in 2007-2008 by the St. Marys River Watershed Project reported average values over 5,000 cfu/100ml. 100% of the samples collected in Martz Creek exceeded the Indiana *E. coli* standard. An 81% reduction in loading is needed in order to meet Indiana water quality standards.

The St. Marys River Watershed Project reported average ammonia levels of 0.65 m/l. During a 4 week period from 9/26/2007 – 10/17/2007 abnormally high levels of ammonia were observed in Martz Creek. Concentrations of 6.92 mg/l, 5.36 mg/l, 3.74 mg/l and 2.25 mg/l were reported. Concentrations during this period were in violation of the CCC.

Phosphorus levels ranged from 0.03 mg/l to 4.08 mg/l. 42% of samples were in violation of the 0.30 mg/l standard set by the IDEM TMDL.

The St. Marys River Watershed Project recorded average TSS concentrations of 47.73 mg/l in 2007-2008. 28% of samples exceeded the TMDL standard of 30 mg/l.

Pesticide data were collected by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor. Concentrations of Atrazine were under the USEPA drinking water standard; Alachlor and Cyanazine were below MCL levels; and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 25 summarizes water quality in Martz Creek.

Martz Creek							
IDEM LES040-0040, CR 200N, West of US 33							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	37.9	24,192	2935			
Temperature	SMRWP	0.00	21.13	11.53			
pH	SMRWP	7.37	8.25	7.87			
DO	SMRWP	2.23	19.97	9.29			
Conductivity	SMRWP	89	1096	592.79			
Turbidity	SMRWP	11.10	488.20	69.25			
BOD	SMRWP	1.35	9.84	3.30			
TSS	SMRWP	7.5	416	47.73	0.00	122.9	10.5
NH3-N	SMRWP	0.10	6.92	0.65	0.6	229.5	21.5
TP	SMRWP	0.03	4.08	0.45	0.2	753.5	71.7
E. coli	SMRWP	345	48,840	5,000.52	3.50E+10	1.79E+13	1.21E+12
Atrazine	SMRWP	0.03	1.48	0.41	0.001	0.043	.009
Alachlor	SMRWP						
Cyanazine	SMRWP						
Metolachlor	SMRWP						

Table 25. Water quality in Martz Creek.

Yellow Creek

Yellow Creek is a tributary to the St. Marys River, located in central Adams County. Smith Ditch and Johnson Ditch combine to form Yellow Creek. Straight Branch and Hendricks Ditch join Yellow Creek downstream of the Smith Ditch and Johnson Ditch confluence. Martz Creek is a large tributary to Yellow Creek. Yellow Creek was sampled in 2004 by IDEM and the City of Ft. Wayne and again in 2007-2008 by the St. Marys River Watershed Project.

The St. Marys River Watershed Project measured physical parameters in 2007-2008. Dissolved oxygen measurements were found to be in violation of the Indiana dissolved oxygen standard during a four week period from 9/26/2007 – 10/17/2007. A minimum reading of 1.67 mg/l was recorded on 10/10/2007. Measurements on Yellow Creek also recorded two violations of the Indiana dissolved solids standard. Conductivity measurements were in violation for the same four week period. A maximum measurement of 1,120 µS/cm was recorded on 10/17/2007. Measurements for pH and temperature were within Indiana standards.

E. coli data were collected by IDEM and Ft. Wayne in 2004. IDEM data averaged over 2,000 cfu/100ml, while data collected by the City of Ft. Wayne averaged over 13,000 cfu/100ml. Cumulatively, the 2004 data were in violation of the single sample maximum standard 84% of the time. *E. coli* levels were again analyzed in 2007-2008 by the St. Marys River Watershed Project. Concentrations ranged from 96 cfu/100ml to 30,760 cfu/100ml. Loading calculations project that a 52% reduction in loading is necessary to regularly meet the *E. coli* single sample maximum standard.

Nitrogen data were collected by IDEM in 2004. NO3-NO2 data averaged 2.89 mg/l. 94% of collected data was under the Indiana drinking water standard of 10.00 mg/l. Ammonia data was collected by the St. Marys River Watershed Project in 2007-2008. Concentrations averaged 0.10 mg/l to 0.79 mg/l. There were no exceedences of the CCC for Ammonia.

Phosphorus data were collected by IDEM in 2004 and by the St. Marys River Watershed Project in 2007-2008. IDEM saw levels range from under the laboratory detection level to 0.53 mg/l. In 2007-2008 concentrations ranged from a low of 0.03 mg/l to a high of 0.90 mg/l. 24% of IDEM samples exceeded the 0.30mg/l phosphorus standard, while 37% of St. Marys River Watershed Project samples were in violation.

In 2004 24% of IDEM TSS samples were found to be in violation of the standard set forth by the IDEM TMDL. 34% of the TSS samples collected by the St. Marys River Watershed Project were found to be in violation of the 30 mg/l standard.

Pesticide data were collected in Yellow Creek by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, and Metolachlor. Two Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l. A maximum concentration of 10.42 µg/l was reported on July 2, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 26 details water quality in Yellow Creek.

Yellow Creek							
IDEM LES040-0038, CR 250N, East of Salem Road							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	19.9	17,329	2007.4			
E. coli	2004 Fort Wayne	322	48,392	13014.9			
E. coli	SMRWP	96	30,760	3,310.83	6.33E+09	6.27E+13	3.21E+12
Nitrogen, NO3+NO2	2004 IDEM	ND	14.10	2.89			
Phosphorus	2004 IDEM	ND	0.53	0.23			
Phosphorus	SMRWP	0.03	0.90	0.31	0.4	1,522.7	137.3
TSS	2004 IDEM	ND	476.00	54.35			
TSS	SMRWP	5	460	58.49	0.1	404.3	34.1
Temperature	SMRWP	0.00	21.09	11.55			
pH	SMRWP	7.26	8.11	7.82			
DO	SMRWP	1.67	13.78	8.39			
Conductivity	SMRWP	107	1,120	623.83			
Turbidity	SMRWP	1.20	521.90	76.93			
BOD	SMRWP	1.11	5.99	2.70			
NH3-N	SMRWP	0.10	0.79	0.19	1.5	727.7	57.8
Atrazine	SMRWP	0.03	10.42	1.03	0.003	0.675	0.070
Alachlor	SMRWP	0.01	0.66	0.24			
Cyanazine	SMRWP	0.00	0.45	0.32			
Metolachlor	SMRWP	0.00	6.14	0.76			

Table 26. Water quality in Yellow Creek.

Borum Run

Borum Run is located in Adams County, near the southern edge of Decatur, Indiana. The headwater streams of Blair Ditch, Hessler Ditch, Bluhm Ditch, and Hahnert Ditch form Borum Run. Miller Ditch is a tributary to Borum Run. Borum Run was sampled by IDEM in 2004 and by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements in Borum Run were found to be mostly in compliance with Indiana water quality standards. Three dissolved oxygen measurements were found to be in violation, while one conductivity measurement was in violation of the dissolved solids standard.

E. coli data collected by IDEM on Borum Run had an average value of 1,216.7 cfu/100ml, and was in violation of the IDEM single sample maximum standard 63% of the time. 2007-2008 data averaged 1,040.03 cfu/100ml, violating the standard 70% of the time.

Ammonia data collected in 2007-2008 by the St. Marys River Watershed Project reported values ranging from the laboratory detection level to 1.21 mg/l. The average concentration on Borum Run was 0.14 mg/l. There were no violations of the CCC on Borum Run.

Phosphorus data collected in 2007-2008 was in violation of the TMDL standard (0.30 mg/l) 25% of the time. A maximum concentration of 0.84 mg/l was reported in March 2008.

St. Marys River Watershed Project data showed that TSS data exceeded the 30 mg/l standard 19% of the time.

Pesticide data were collected in Borum Run in 2007-2008 by the St. Marys River Watershed Project. Samples were analyzed for Atrazine, Alachlor, and Metolachlor. Two Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l, with measurements of 4.82 µg/l on June 18, 2008 and 8.59 µg/l on July 2, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 27 summarizes water quality in Borum Run.

Borum Run							
IDEM LES040-0097, Mercer Road in Decatur, Then Salem Road at Lift Station							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	11	11,199	1,216.7			
E. coli	SMRWP	1	5,510	1,040.03	4.33E+07	4.13E+12	5.79E+11
Temperature	SMRWP	0.01	21.71	11.58			
pH	SMRWP	7.45	8.12	7.85			
DO	SMRWP	1.04	13.99	8.73			
Conductivity	SMRWP	82.40	1,056	586.26			
Turbidity	SMRWP	0.20	746.50	77.12			
BOD	SMRWP	1.05	4.89	2.34			
TSS	SMRWP	2	752	59.94	0.0	364.8	28.2
NH3-N	SMRWP	0.01	1.21	0.14	0.2	244.8	27.8
TP	SMRWP	0.01	0.84	0.22	0.2	704.3	75.9
Atrazine	SMRWP	0.03	8.59	1.01	0.002	0.214	0.039
Alachlor	SMRWP	0.00	0.50	0.19			
Cyanazine	SMRWP	0.00	0.46	0.32			
Metolachlor	SMRWP	0.00	1.16	0.38			

Table 27. Water quality in Borum Run.

Holthouse Ditch

Holthouse Ditch is located in central Adams County, flowing northeast to the St. Marys River. Bracht Ditch and Berry Ditch join to form Holthouse Ditch. In 2004 Holthouse Ditch was sampled by IDEM and the City of Fort Wayne. In 2007-2008 Holthouse Ditch was sampled by the St. Marys River Watershed Project.

Physical parameter measurements collected by the St. Marys River Watershed Project for temperature, pH and conductivity were found to be in compliance with Indiana standards. The exception was dissolved oxygen, where four measurements were in violation of the Indiana minimum dissolved oxygen concentration standard. Of specific concern were two readings in October, measurements of 0.66 mg/l and 0.15 mg/l.

IDEM and City of Fort Wayne data were found to be in violation the *E. coli* single sample maximum standard 63% of the time. A maximum value of 39,726 cfu/100ml was reported on 7/22/2004 and 8/19/2004. The St. Marys River Watershed Project reported values ranging from 22 cfu/100ml to 8,600 cfu/100ml. 66% of these samples violated the *E. coli* single sample maximum standard.

Ammonia concentrations were recorded by the St. Marys River Watershed Project from 2007-2008. Levels ranged from 0.10 mg/l to 1.65 mg/l. The average ammonia concentration in Holthouse Ditch was 0.17 mg/l. No violations of the CCC were recorded on Holthouse Ditch.

56% of phosphorus samples collected by the St. Marys River Watershed Project were in violation of the TMDL phosphorus target. A maximum value of 1.17 mg/l was reported in March 2008.

TSS concentrations were analyzed by the St. Marys River Watershed Project in 2007-2008. Values ranged from 6 mg/l to 720 mg/l. 31% of these samples were found to be in violation of the TMDL TSS target of 30 mg/l.

Atrazine levels in Holthouse Ditch were in violation of the USEPA drinking water standard (3.00 µg/l) in one of twenty samples. A concentration of 6.63 µg/l was reported on June 4, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 28 summarizes water quality in Holthouse Ditch.

Holthouse Ditch IDEM LES050-0008, CR 200W, South of US 224							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	23.3	6,488	1077.1			
E. coli	Fort Wayne	40	39,726	12,723.5			
E. coli	SMRWP	22	8,600	1,087.90	1.92E+09	2.00E+13	1.20E+12
Temperature	SMRWP	0.00	20.52	11.63			
pH	SMRWP	7.39	8.17	7.83			
DO	SMRWP	0.15	13.59	8.17			
Conductivity	SMRWP	107	1,037	612.21			
Turbidity	SMRWP	0.40	688.30	84.74			
BOD	SMRWP	1.08	11.70	3.22			
TSS	SMRWP	6	720	70.13	0.1	797.7	60.5
NH3-N	SMRWP	0.10	1.65	0.17	1.5	673.8	61.0
Phosphorus	SMRWP	0.01	1.17	0.38	0.6	2,745.8	174.4
Atrazine	SMRWP	0.03	6.63	0.83	0.003	1.598	0.104
Alachlor	SMRWP	0.00	0.61	0.24			
Cyanazine	SMRWP	0.00	0.44	0.31			
Metolachlor	SMRWP	0.01	1.25	0.52			

Table 28. Water quality in Holthouse Ditch.

Gerke Creek

Gerke Ditch originates in northeastern Adams County near the Adams County – Allen County Line. Gerke Ditch flows southwest to its confluence with the St. Marys River. Wagner Ditch, Ohler Branch and Ohler Ditch are tributaries to Gerke Ditch. Gerke Ditch was sampled by the St. Marys River Watershed Project from 2007-2008.

No violations were found for temperature, pH or dissolved oxygen measurements made by the St. Marys River Watershed Project in 2007-2008. Conductivity measurements were found to be in violation of the Indiana dissolved solids standard for a four week period in late September and early October. A maximum reading of 1,459 µS/cm was recorded on 10/17/2007.

The *E. coli* data collected by the St. Marys River Watershed Project exceeded the Indiana single sample maximum standard in 83% of collected samples. A maximum value of 4,710 cfu/100ml was recorded in July 2008.

Ammonia concentrations were recorded by the St. Marys River Watershed Project from 2007-2008. Levels ranged from 0.01 mg/l to 0.68 mg/l. The average ammonia concentration in Holthouse Ditch was 0.14 mg/l. There were no CCC exceedences on Gerke Ditch.

Phosphorus samples collected by the St. Marys River Watershed Project were in violation of the TMDL phosphorus target 29% of the time. A maximum value of 1.06 mg/l was reported in March 2008.

TSS values averaged 60.31 mg/l in Gerke Ditch, with 26% of samples violating the TMDL target for TSS.

Gerke Ditch Atrazine levels were in violation of the USEPA drinking water standard (3.00 µg/l) in one of twenty samples. A concentration of 9.16 µg/l was reported on June 4, 2008. Concentrations of Alachlor and Cyanazine were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 29 summarizes water quality in Gerke Ditch.

Gerke Ditch CR 000, North of CR 850N							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
Temperature	SMRWP	0.04	22.65	12.63			
pH	SMRWP	7.42	8.57	7.97			
DO	SMRWP	4.42	15.38	10.04			
Conductivity	SMRWP	109	1,459	671.43			
Turbidity	SMRWP	0.30	671.40	82.33			
BOD	SMRWP	1.14	6.39	2.48			
TSS	SMRWP	3.90	620	60.31	0.0	242.3	19.8
NH3-N	SMRWP	0.01	0.68	0.14	0.2	148.4	16.2
Phosphorus	SMRWP	0.03	1.06	0.29	0.2	714.9	59.6
E. coli	SMRWP	100	4,710	1,080.90	2.84E+09	4.32E+12	4.06E+11
Atrazine	SMRWP	0.00	9.16	1.05	0.002	0.872	0.054
Alachlor	SMRWP	0.01	0.48	0.25			
Cyanazine	SMRWP	0.00	0.47	0.32			
Metolachlor	SMRWP	0.04	1.35	0.53			

Table 29. Water quality in Gerke Ditch.

Nickelson Creek

Nickelson Creek begins in northwest Adams County, and flows north into Allen County where it joins the St. Marys River. Lambert Ditch is a major tributary to Nickelson Creek. Nickelson Creek was sampled by IDEM and the City of Ft. Wayne in 2004 and again by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements were measured in Nickelson Creek by the St. Marys River Watershed Project. Measurements were found to be in compliance for temperature, pH, and dissolved oxygen. Conductivity measurements were in violation for a four week period. A maximum value of 1,442 µS/cm was reported.

E. coli data collected jointly by IDEM and the City of Ft. Wayne in 2004 exceeded the Indiana *E. coli* single sample maximum approximately 72% of the time. A maximum concentration of 48,400 cfu/100ml was recorded in August 2004. More recently, *E. coli* data collected by the St. Marys River Watershed Project was found to be in violation 72% of the time, with a maximum concentration of 1,217.69 cfu/100ml.

Ammonia data collected by the St. Marys River Watershed Project had an average concentration of 0.12 mg/l. Concentrations ranged from 0.10 mg/l to 0.31 mg/l. No exceedences of the CCC were reported on Nickelson Creek.

Phosphorus data were found to be in violation of the TMDL target approximately 33% of the time. On 3/5/2008 a maximum concentration of 5.41 mg/l was recorded on Nickelson Creek.

TSS data collected in 2007-2008 recorded TSS levels ranging from 0.80 mg/l to 456 mg/l. 22% of collected samples violated the 30 mg/l target set by the TMDL.

Pesticide data were collected by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor Concentrations of Atrazine were under the USEPA drinking water standard, Alachlor and Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 30 summarizes water quality in Nickelson Creek.

Nickelson Creek							
IDEM LES050-0015, CR 1100N, West of CR 550W							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
E. coli	2004 IDEM	18.7	4106	698.7			
E. coli	Fort Wayne	100	48,400	10,864.4			
E. coli	SMRWP	100	7,540	1,217.69	3.41E+09	4.16E+12	6.04E+11
Temperature	SMRWP	0.12	23.61	12.70			
pH	SMRWP	7.36	8.52	8.07			
DO	SMRWP	5.00	18.20	11.11			
Conductivity	SMRWP	105	1,442	676.62			
Turbidity	SMRWP	0.10	529.6	59.75			
BOD	SMRWP	1.21	6.18	2.61			
TSS	SMRWP	0.80	456	41.85	0.0	239.5	18.0
NH3-N	SMRWP	0.10	0.31	0.12	0.7	180.2	17.5
Phosphorus	SMRWP	0.03	5.41	0.42	0.7	180.2	17.5
Atrazine	SMRWP	0.00	2.34	0.63	0.002	0.137	0.021
Alachlor	SMRWP	0.00	1.53	0.28			
Cyanazine	SMRWP	0.01	0.45	0.32			
Metolachlor	SMRWP	0.00	1.23	0.45			

Table 30. Water quality in Nickelson Creek.

Unnamed Tributary (Barkley Road)

The Unnamed Tributary is located in southern Allen County near Barkley Road. The tributary flows southwest before discharging into the St. Marys River. The site was sampled for *E. coli* by IDEM and the City of Fort Wayne in 2004. Samples exceeded the Indiana *E. coli* single sample maximum standard 82% of the time. The City of Ft. Wayne reported a value of 48,400 cfu/100ml in August 2004. The following Table 31 summarizes water quality in the Unnamed Tributary.

Unnamed Tributary							
IDEM LES050-0020, Barkley Road, East of US 27/33							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
E. coli	2004 IDEM	9.6	24,200	2,728.2			
E. coli	2004 Fort Wayne	446	48,400	11,859			

Table 31. Water quality in Unnamed Tributary (Barkley Road)

Natural Drain to St. Marys River

The Natural Drain is located in Allen County, between Hoagland Road and Monroeville Road near US 27. The site was sampled from April 2001 through October 2004 by the Allen County Health Department. *E. coli* data collected at the site violated the Indiana single sample maximum standard 95% of the time. Concentration averaged 55,693.1 cfu/100ml, with a maximum concentration of 590,000 cfu/100ml. Table 32 summarizes data collected from the Natural Drain to the St. Marys River.

Natural Drain to the St. Marys River West side of US 27, South of Monroeville T intersection							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
E. coli	2001-2004 Allen County Health Dept.	10	590,000	55,693.1			

Table 32. Water quality in the Natural Drain to the St. Marys River.

Houk Ditch

Houk Ditch originates near the Allen County – Adams County Line and flows northwest where it discharges into the St. Marys River. Munch Ditch and Paul Trier Ditch are tributaries to Houk Ditch. Houk Ditch was sampled by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements in Houk Ditch were found to be in compliance with Indiana water quality standards. No violations were reported for temperature, pH, dissolved oxygen or conductivity.

E. coli data collected by the St. Marys River Watershed Project on Houk Ditch had an average value of 1,892.08 cfu/100ml, a violation of the IDEM single sample maximum standard 77% of the time.

Ammonia data collected in 2007-2008 by the St. Marys River Watershed Project reported values ranging from 0.10mg/l to 0.25 mg/l. The average concentration on Borum Run was 0.12 mg/l. None of the observed levels were in violation of the CCC.

Phosphorus data collected in 2007-2008 were in violation of the TMDL standard (0.30 mg/l) 15% of the time. A maximum concentration of 0.90 mg/l was reported in May 2008.

St. Marys River Watershed Project data showed that TSS data exceeded the 30 mg/l standard 23% of the time.

Pesticide data was collected in Houk Ditch in 2008 by the St. Marys River Watershed Project. Samples were analyzed for Atrazine, Alachlor, and Metolachlor. Two Atrazine samples were found to be in violation of the USEPA drinking water standard of 3.00 µg/l, with measurements of 3.69 µg/l on June 11, 2008 and 6.40 µg/l on May 14, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 33 summarizes water quality in Houk Ditch.

Houk Ditch							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
Temperature	SMRWP	13.14	23.97	18.59			
pH	SMRWP	7.57	8.37	8.08			
DO	SMRWP	7.06	13.64	9.38			
Conductivity	SMRWP	400	926	674.66			
Turbidity	SMRWP	14.1	228.3	73.58			
BOD	SMRWP	1.75	5.66	2.99			
TSS	SMRWP	7.50	168.00	34.45	0.1	11.0	2.4
NH3-N	SMRWP	0.10	0.25	0.12	1.5	32.6	9.0
Phosphorus	SMRWP	0.03	0.90	0.22	0.4	117.0	19.2
E. coli	SMRWP	75	6,896	1,892.08	7.44E+09	7.42E+12	1.17E+12
Atrazine	SMRWP	0.04	6.40	1.87	0.001	0.835	0.234
Alachlor	SMRWP	0.01	0.53	0.23			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.32	2.73	1.27			

Table 33. Water quality in Houk Ditch.

Snyder Ditch

Snyder Ditch starts near the Allen County – Wells County line before flowing north to the St. Marys River. Snyder Ditch was sampled by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements in Snyder Ditch were found to be in compliance with Indiana water quality standards. No violations were reported for temperature, pH, dissolved oxygen or conductivity.

E. coli levels were analyzed in 2007-2008 by the St. Marys River Watershed Project. Concentrations ranged from 169 cfu/100ml to 7,980 cfu/100ml. Loading calculations project that a 58% reduction in loading is necessary to regularly meet the *E. coli* single sample maximum standard.

Ammonia data were collected by the St. Marys River Watershed Project in 2007-2008. Concentrations ranged from 0.10 mg/l to 0.44 mg/l. All concentrations were in compliance with the CCC.

Phosphorus concentrations ranged from a low of 0.01 mg/l to a high of 0.51 mg/l. One of thirteen samples exceeded the 0.30mg/l phosphorus standard.

In 2007-2008 23% of the TSS samples collected by the St. Marys River Watershed Project were found to be in violation of the 30 mg/l standard set forth by the IDEM TMDL.

Snyder Ditch Atrazine levels were in violation of the USEPA drinking water standard (3.00 µg/l) in two of seven samples. A concentration of 4.29 µg/l was reported on June 11, 2008 and a concentration of 5.38 µg/l was reported on May 14, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 34 details water quality in Snyder Ditch.

Snyder Ditch							
		Concentration			Loading		
Parameter	Data Source	Min.	Max.	Avg.	Min.	Max.	Avg.
Temperature	SMRWP	12.90	21.90	17.70			
pH	SMRWP	7.60	8.57	8.15			
DO	SMRWP	7.24	15.55	10.11			
Conductivity	SMRWP	6.81	685.00	543.42			
Turbidity	SMRWP	17.90	522.00	84.32			
BOD	SMRWP	1.48	41.40	8.38			
TSS	SMRWP	2.60	50.00	17.04	0.0	3.5	0.7
NH3-N	SMRWP	0.10	17.40	1.46	0.8	715.3	56.7
Phosphorus	SMRWP	0.01	0.51	0.17	0.1	37.2	7.9
E. coli	SMRWP	169	7,980	1,395.77	3.16E+07	5.14E+12	5.32E+11
Atrazine	SMRWP	0.08	5.38	1.96	0.001	0.486	0.136
Alachlor	SMRWP	0.01	0.59	0.29			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.45	2.62	1.20			

Table 34. Water quality in Snyder Ditch.

Harber Ditch

Harber Ditch starts in northern Wells County and flows north into Allen County where it meets the St. Marys River. Thiele Ditch, Deptmer Ditch and Hiser Ditch are tributaries to Harber Ditch. Harber Ditch was sampled by the Allen County Health Department from 2000-2004 and again by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements were taken by the St. Marys River Watershed Project in 2008. No violations were reported for temperature, pH, and dissolved oxygen measurements. One conductivity reading was in violation of the Indiana dissolved solids standard, reading 5,500 µS/cm on 6/4/2008.

E. coli data collected by the Allen County Health Department ranged from a minimum concentration of 10 cfu/100ml to a maximum of 200,000 cfu/100ml. 84% of these sampled exceeded the Indiana standard (235 cfu/100ml). More recently, *E. coli* data was collected by the St. Marys River Watershed Project. 85% of samples violated the standard.

Ammonia concentrations were recorded by the St. Marys River Watershed Project from 2007-2008. Levels ranged from 0.10 mg/l to 0.21 mg/l. The average ammonia concentration in Harber Ditch was 0.13 mg/l. No violations of the CCC were reported.

Phosphorus samples collected by the St. Marys River Watershed Project were in violation of the TMDL phosphorus target 15% of the time. A maximum value of 0.56 mg/l was reported in May 2008.

TSS values averaged 25.55 mg/l in Harber Ditch, with 23% of samples violating the TMDL target for TSS.

Atrazine levels in Harber Ditch were in violation of the USEPA drinking water standard (3.00 µg/l) in three of seven samples. A maximum concentration of 5.94 µg/l was observed on May 14, 2008. Concentrations of Alachlor were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 35 summarizes water quality in Harber Ditch.

Harber Ditch / Thiele Drain							
Bluffton Road, North of I-469, Ferguson Road							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2001-2004 Allen County Health Dept.	10	200,000	10,278.4			
E. coli	SMRWP	24	7,890	1,473.31	2.27E+09	1.24E+13	1.38E+12
Temperature	SMRWP	13.69	24.64	18.90			
pH	SMRWP	7.57	8.54	8.03			
DO	SMRWP	6.81	14.12	9.03			
Conductivity	SMRWP	513	5,500	1,150.89			
Turbidity	SMRWP	20.2	68.2	36.89			
BOD	SMRWP	2.06	4.54	3.10			
TSS	SMRWP	6.60	95.00	25.55	0.1	16.5	2.2
NH3-N	SMRWP	0.10	0.21	0.13	2.1	72.5	16.6
Phosphorus	SMRWP	0.06	0.56	0.17	1.4	101.0	21.7
Atrazine	SMRWP	0.09	5.94	2.20	0.003	1.071	0.385
Alachlor	SMRWP	0.07	0.57	0.25			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.4	2.87	1.09			

Table 35. Water quality in Harber Ditch.

Junk Ditch

Junk Ditch is a tributary to the St. Marys River located in Allen County, near Ft. Wayne, Indiana. Junk Ditch was sampled by the St. Marys River Watershed Project from April 2008-July 2008.

Physical parameter measurements in Junk Ditch were found to be in compliance with Indiana water quality standards. No violations were reported for temperature, pH, dissolved oxygen or conductivity.

The *E. coli* data collected by the St. Marys River Watershed Project exceeded the Indiana single sample maximum standard in 85% of collected samples. A maximum value of 4,350 cfu/100ml was recorded in July 2008. Loading data shows that on average a 50% *E. coli* loading reduction is necessary to meet Indiana standards.

Ammonia concentrations were recorded by the St. Marys River Watershed Project from 2007-2008. Levels ranged from 0.01 mg/l to 0.41 mg/l. The average ammonia concentration in Junk Ditch was 0.19 mg/l. All observed levels were in compliance with the CCC.

Phosphorus samples collected by the St. Marys River Watershed Project were in violation of the TMDL phosphorus target 54% of the time. A maximum value of 0.83 mg/l was reported in May 2008.

TSS values averaged 33.34 mg/l in Junk Ditch, with 69% of samples violating the TMDL target for TSS.

Pesticide data were collected in Junk Ditch by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor Concentrations of Atrazine were under the USEPA drinking water standard, Alachlor and Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

Table 36 summarizes water quality in Junk Ditch.

Junk Ditch Taylor Road at Omni Source							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
Temperature	SMRWP	14.83	24.88	19.92			
pH	SMRWP	7.32	8.04	7.65			
DO	SMRWP	4.38	11.23	6.96			
Conductivity	SMRWP	477	910	688			
Turbidity	SMRWP	19.20	91.00	52.86			
BOD	SMRWP	3.05	6.90	4.69			
TSS	SMRWP	6.60	56.00	33.34	0.0	2.2	0.7
NH3-N	SMRWP	0.1	0.41	0.19	0.8	28.2	7.2
Phosphorus	SMRWP	0.17	0.83	0.33	1.4	40.8	13.0
E. coli	SMRWP	194	4,350	1,175.23	6.88E+09	2.58E+12	3.39E+11
Atrazine	SMRWP	0.01	0.30	0.16			
Alachlor	SMRWP	0.00	0.26	0.10			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.12	0.94	0.35			

Table 36. Water quality in Junk Ditch.

Spy Run Creek

Spy Run Creek is a tributary to the St. Marys River, located in Allen County, near Ft. Wayne, Indiana. Neuhaus Ditch is a major tributary to Spy Run Creek. Neuhaus Ditch was sampled by IDEM in 2005. Spy Run Creek was sampled by the St. Marys River Watershed Project in 2007-2008.

Physical parameter measurements were taken by the St. Marys River Watershed Project in 2008. No violations were reported for temperature, pH, and dissolved oxygen measurements. One conductivity reading was in violation of the Indiana dissolved solids standard, reading 1,032 µS/cm on 5/28/2008.

E. coli was first sampled by IDEM in 2005. IDEM recoded levels ranging from a low of 125.9 cfu/100ml to a high of 4,352 cfu/100ml. 80% of IDEM samples exceeded the 235 cfu/100ml Indiana standard. *E. coli* data collected in 2007-2008 by the St. Marys River Watershed Project reported average values over 1,300 cfu/100ml. 77% of the samples collected in Spy Run Creek exceeded the Indiana *E. coli* standard. A 40% reduction in loading is needed in order to meet Indiana water quality standards.

The St. Marys River Watershed Project reported average ammonia levels of 0.13 mg/l. No exceedences of the CCC were reported on Spy Run Creek.

Phosphorus levels ranged from 0.05 mg/l to 0.72 mg/l. However, only one sample violated the 0.30 mg/l standard set by the IDEM TMDL.

The St. Marys River Watershed Project recorded average TSS concentrations of 30.72 mg/l in 2007-2008. 54% of samples exceeded the TMDL standard of 30 mg/l.

Pesticide data was collected in Spy Run Creek by the St. Marys River Watershed Project in 2007-2008. Samples were analyzed for Atrazine, Alachlor, Cyanazine, and Metolachlor Concentrations of Atrazine were under the USEPA drinking water standard, Alachlor and Cyanazine, were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Table 37 and Table 38 summarize water quality in Spy Run Creek and Neuhaus Ditch.

Spy Run Creek 4th Street, Lawton Park							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
Temperature	SMRWP	14.26	24.91	19.46			
pH	SMRWP	6.89	7.82	7.59			
DO	SMRWP	5.72	9.79	7.83			
Conductivity	SMRWP	287	1,032	695			
Turbidity	SMRWP	22.80	87.40	46.81			
BOD	SMRWP	2.04	5.69	3.66			
TSS	SMRWP	9.90	62.00	30.72	0.1	6.8	1.8
NH3-N	SMRWP	0.10	0.28	0.13	1.7	27.8	10.4
Phosphorus	SMRWP	0.05	0.72	0.18	0.9	103.9	24.7
E. coli	SMRWP	76	6,310	1,364.08	1.05E+10	7.96E+12	1.42E+12
Atrazine	SMRWP	0.03	0.73	0.37	0.001	0.162	0.063
Alachlor	SMRWP	0.00	0.14	0.04			
Cyanazine	SMRWP						
Metolachlor	SMRWP	0.08	0.93	0.32			

Table 37. Water quality in Neuhaus Ditch.

Neuhaus Ditch IDEM LES060-0020, Goshen Road							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2005 IDEM	125.9	4,352	1,344.7			

Table 38. Water quality in Spy Run Creek.

St. Marys River

The St. Marys River has been the subject of numerous water quality studies. Between 2000 and 2008, nine locations have been monitored on the St. Marys. The most upstream monitoring station is located near Willshire, Ohio. This site was first monitored by the Adams County SWCD from 2000-2001. IDEM and the City of Ft. Wayne sampled the site again in 2004. Most recently, in 2007-2008 the site was sampled by the St. Marys River Watershed Project. The next site downstream is located near the town of Pleasant Mills. The Pleasant Mills site was sampled by the Adams County SWCD in 2000-

2001 and by IDEM in 2004. The next two sites were sampled by the Adams County SWCD in 2000-2001, the first located at US 224 in Decatur, IN as well as a location at US 33-27 located north of Decatur. Moving north of Decatur, the Adams County SWCD monitored the St. Marys River at CR 900. Moving approximately three miles downstream, the Adams County SWCD sampled at the Adams County – Allen County line. Moving downstream to the Village of Poe, the river was studied by IDEM in 2004 and the St. Marys River Watershed Project in 2007-2008. Further into Allen County, the City of Fort Wayne has collected water quality data at the Ferguson Road Bridge as well as at the Spy Run Bridge.

Physical parameter measurements for temperature, pH, dissolved oxygen, and conductivity were taken at two locations on the St. Marys River by the St. Marys River Watershed Project in 2007-2008. At the Willshire, Ohio monitoring station, physical parameter readings were found to be in compliance for all measurements with the exception of dissolved oxygen and conductivity measurements on 10/10/2007. Dissolved oxygen was recorded as a concentration of 1.67 mg/l while conductivity had a reading on 1,049 µS/cm. At the monitoring station near the Village of Poe, no violations were reported for temperature, pH, or dissolved oxygen. Conductivity readings were in violation for a three week period in October, with measurements of 1,068 µS/cm, 1,089 µS/cm, and 1,224 µS/cm.

E. coli data was collected at all nine monitoring stations on the St. Marys River. At the Willshire, OH site, 75% of collected *E. coli* data exceeded the Indiana single sample maximum standard. In 2004, 64% of IDEM and City of Ft. Wayne samples exceeded the standard, while 52% of samples collected in 2007-2008 by the St. Marys River Watershed Projects exceeded the standard. At the Pleasant Mills site, data collected in 2000-2001 by the Adams County SWCD violated the single sample maximum standard 75% of the time. 2004 IDEM data at this site violated the standard 79% of the time. In Decatur, *E. coli* data collected by the Adams County SWCD in 2000-2001 violated the standard 88% of the time at both the US 224 site and the US 33-27 site. At the CR 900N monitoring station, data reported by the Adams County SWCD also showed an 88% exceedence of the Indiana standard. A 75% exceedence rate was shown at the county line monitoring station. In 2004, data collected by IDEM and City of Ft. Wayne on the St. Marys River near the Village of Poe violated the maximum single sample standard 60% of the time. Data collected by the St. Marys River Watershed Project at this site violated the standard 52% of the time. City of Ft. Wayne data reported from the Ferguson Road site was in violation 53% of the time, while the Spy Run station was in violation 66% of the time.

Nitrogen data were collected at the Willshire, Ohio station by the Adams County SWCD in 2001, and by the St. Marys River Watershed Project in 2007-2008. In the uppermost reach, NO3-NO2 data collected by the Adams County SWCD averaged 4.63 mg/l with a maximum level of 17.50 mg/l. Ammonia data collected at this site ranged from a low of the laboratory detection limit 0.05 mg/l to a high of 0.81 mg/l in 2000-2001 and 0.01 mg/l to 0.26 mg/l in 2007-2008. Ammonia data collected at this site by the St. Marys River Watershed Project was in compliance with the CCC. At the Pleasant Mills monitoring station, Adams County NO3-NO2 data averaged 4.91 mg/l, with a maximum concentration of 19.30 mg/l. Ammonia data collected by the Adams County SWCD reported an average concentration of 0.27 mg/l. The maximum ammonia concentration was recorded at 1.68 mg/l at the Pleasant Mills location. NO3-NO2 data collected by the Adams County SWCD ranged from 0.20 mg/l to 19.00 mg/l. 17% of the Adams County SWCD samples violated the Indiana drinking water standard of 10 mg/l. Ammonia data collected by Adams County in 2001 at this site ranged from the laboratory detection level of 0.05 mg/l to 1.11 mg/l. The average ammonia concentration at this site was 0.21 mg/l. The Adams County SWCD collected NO3-NO2 data at the US 33-27 site. 13% of samples violated the 10 mg/l drinking water standard. Ammonia data collected at this site averaged 0.23 mg/l with a maximum concentration of 1.10 mg/l. North of Decatur at the CR 900 N monitoring station, Adams County SWCD NO3-NO2 data ranged from 0.25 mg/l to 17.90 mg/l. Ammonia data at the CR 900 N site ranged from 0.05 mg/l to 1.10 mg/l. At the Allen County – Adams County line monitoring station, the Adams County SWCD reported a maximum NO3-NO2 concentration of 18.60 mg/l. 17% of NO3-NO2 samples at this site exceeded the Indiana drinking water standard. Ammonia data collected at the County line location ranged from 0.05 mg/l to 1.07 mg/l. In 2007-2008 the St. Marys River Watershed Project collected ammonia data on the St. Marys River near the Village of Poe. Ammonia data ranged from 0.01 mg/l to 0.95 mg/l with an average concentration of 0.18 mg/l. Ammonia concentrations at this site were in compliance with the CCC. At the Ferguson Road site, the City of Ft. Wayne collected ammonia from 2007-2008. Concentrations ranged from 0.10 mg/l to 0.21 mg/l.

Phosphorus data collected by the Adams County SWCD in 2000-2001 at the Willshire, Ohio site had an average concentration of 0.24 mg/l, 25% of these samples exceeded the 0.30 mg/l standard set by the IDEM TMDL. Data collected by the St. Marys River Watershed Project at this site had an average concentration of 0.29 mg/l. 41% of samples violated the 0.30 mg/l phosphorus target set by the TMDL. Moving downstream to the Pleasant Mills location, phosphorus was sampled by Adams County SWCD in 2000-2001, with an average concentration of 0.26 mg/l. At the US 224 site in Decatur Indiana, the Adams County SWCD reported phosphorus results ranging from 0.01 mg/l to 0.78 mg/l. Samples exceeded the TMDL phosphorus standard (0.30 mg/l) 33% of the time. North of Decatur at US 33-27, phosphorus levels were found to be in violation of the standard 21% of the time. At the CR 900 N sampling site, the Adams County SWCD reported phosphorus values ranging from 0.10 mg/l to 0.95 mg/l, while at the Allen County-Adams County line values ranged from 0.01 mg/l to 0.92 mg/l. Samples were in exceedence of the TMDL phosphorus target 46% of the time at the CR 900 N site and 42% of the time at the County line site. At the Poe monitoring station, sampling by the St. Marys River Watershed Project in 2007-2008 reported average phosphorus levels of 0.45 mg/l, with a maximum concentration of 4.47 mg/l. At the Ferguson Road site, the City of Ft. Wayne reported phosphorus levels of 0.10 mg/l to 0.84 mg/l. 33% of samples exceeded the TMDL phosphorus standard.

TSS data were collected at three monitoring stations on the main stem of the St. Marys River. The St. Marys River Watershed Project collected data from 2007-2008 at the Willshire, Ohio monitoring station as well as the monitoring station near the Village of Poe. Average TSS levels were reported at 70.53 mg/l at the Willshire site and 93.32 mg/l at the Poe location. 78% of samples exceeded the TMDL target for phosphorus (30 mg/l) at the Willshire site, while 76% were in violation at the Poe site.

Pesticide data were collected at two locations on the St. Marys River by the St. Marys River Watershed Project in 2007-2008. At the Willshire, Ohio monitoring station, samples exceeded the USEPA drinking water standard of 3.00 µg/l 22% of the time. At the monitoring station near the Village of Poe, data revealed a period from May 7, 2008 to July 2,2008 where high Atrazine levels were reported. Six Atrazine samples exceeded the USEPA drinking water standard. A maximum concentration of 16.40 µg/l was reported on June 4, 2008. Concentrations of Alachlor and Cyanazine were below MCL levels and Metolachlor concentrations were not in excess of health advisory levels.

The following Tables 39-47 summarize water quality in the St. Marys River.

St. Marys River IDEM UNK000-0007, Ohio SR 81, Willshire, OH							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	47.9	5794	739.2			
E. coli	Fort Wayne	144	12,260	3338.3			
E. coli	2000-2001 Adams SWCD	100	3200	993.6			
E. coli	SMRWP	33	9,080	687.48	1.30E+10	1.16E+14	8.02E+12
Temperature	SMRWP	0.10	21.97	12.74			
pH	SMRWP	7.33	9.09	7.91			
DO	SMRWP	1.67	13.18	8.82			
Conductivity	SMRWP	176	1049	504.67			
Turbidity	SMRWP	8.40	338.00	102.46			
BOD	SMRWP	1.35	7.64	3.92			
TSS	SMRWP	10	352	70.53	0.5	4066.9	324.3
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.02	17.50	4.63			
NH3-N	SMRWP	0.01	0.26	0.12	8.0	5984.9	496.7
NH3-N	2000-2001 Adams SWCD	0.05	0.81	0.19			
Phosphorus	SMRWP	0.03	1.24	0.29	4.7	16,641.6	1,565.7
Phosphorus	2000-2001 Adams SWCD	0.01	0.87	0.24			
Atrazine	SMRWP	0.06	14.75	2.32	0.028	65.624	6.245
Alachlor	SMRWP	0.00	1.97	0.44			
Cyanazine	SMRWP	0.00	0.47	0.32			
Metolachlor	SMRWP	0.00	3.68	1.16			

Table 39. Water quality in the St. Marys River (Willshire, OH)

St. Marys River IDEM LES040-0007, SR 101, North of Pleasant Mill							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	148.3	24,200	2,149.4			
E. coli	2000-2001 Adams SWCD	50	13,600	2,856.3			
Phosphorus	2000-2001 Adams SWCD	0.01	0.67	0.26			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.20	19.30	4.91			
NH3-N	2000-2001 Adams SWCD	0.05	1.68	0.27			

Table 40. Water quality in the St. Marys River (Pleasant Mills)

St. Marys River Decatur, US HWY 224							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	100	4,000	1,406.3			
Phosphorus	2000-2001 Adams SWCD	0.01	0.78	0.26			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.20	19.00	4.81			
NH3-N	2000-2001 Adams SWCD	0.05	1.11	0.21			

Table 41. Water quality in the St. Marys River (US HWY 224)

St. Marys River Decatur, US HWY 33-27							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	200	24,000	5,006.3			
Phosphorus	2000-2001 Adams SWCD	0.01	2.01	0.28			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.31	18.70	4.93			
NH3-N	2000-2001 Adams SWCD	0.05	0.95	0.25			

Table 42. Water quality in the St. Marys River (US HWY 33-27)

St. Marys River CR 900N, West of US 27 and US 33							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	500	15,400	3,681.3			
Phosphorus	2000-2001 Adams SWCD	0.10	0.95	0.30			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.25	17.90	5.02			
NH3-N	2000-2001 Adams SWCD	0.05	1.10	0.23			

Table 43. Water quality in the St. Marys River (CR 900 N)

St. Marys River							
CR 1200N, Adams/Allen County Line							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2000-2001 Adams SWCD	100	5,000	1,512.5			
Phosphorus	2000-2001 Adams SWCD	0.01	0.92	0.29			
Nitrogen, NO3-NO2	2000-2001 Adams SWCD	0.20	18.60	4.88			
NH3-N	2000-2001 Adams SWCD	0.05	1.07	0.19			

Table 44. Water quality in the St. Marys River (Adams County-Allen County Line)

St. Marys River							
IDEM LES060-0006, Hoagland Road near Poe							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2004 IDEM	30.5	14,136	1,391.1			
E. coli	Fort Wayne	20	48,400	12,169.4			
E. coli	SMRWP	40	8,570	1,030.97	4.39E+10	2.29E+14	2.48E+13
Temperature	SMRWP	0.23	22.39	13.44			
pH	SMRWP	7.39	8.58	8.09			
DO	SMRWP	5.59	13.71	9.90			
Conductivity	SMRWP	157	1,224	540.8			
Turbidity	SMRWP	7.80	811	133.67			
BOD	SMRWP	1.35	11.64	4.41			
TSS	SMRWP	10	554	93.32	0.9	10,955.0	943.8
NH3-N	SMRWP	0.01	0.948	0.18	6.6	15,788.1	1,496.2
Phosphorus	SMRWP	0.03	4.47	0.45	12.1	92,794.1	5,242.8
Atrazine	SMRWP	0.00	16.40	2.34	0.055	130.18	13.27
Alachlor	SMRWP	0.01	1.70	0.43			
Cyanazine	SMRWP	0.00	0.46	0.32			
Metolachlor	SMRWP	0.02	4.24	1.15			

Table 45. Water quality in the St. Marys River (Village of Poe)

St. Marys River Ferguson Road							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2001-2004 City of Fort Wayne	4	48,400	1,615.5			
E. coli	2007-2008 City of Fort Wayne	27	2,420	468.5			
pH	2007-2008 City of Fort Wayne	6.94	8.56	7.79			
DO	2007-2008 City of Fort Wayne	5.50	13.93	9.35			
Temperature	2007-2008 City of Fort Wayne	0.28	25.4	15.66			
NH3-N	2007-2008 City of Fort Wayne	0.10	0.21	0.11			
Phosphorus	2007-2008 City of Fort Wayne	0.10	0.84	0.31			
TSS	2007-2008 City of Fort Wayne	7.00	408	75.78			

Table 46. Water quality in the St. Marys River (Ferguson Road)

St. Marys River Spy Run Bridge							
		Concentration			Loading		
Parameter	**Data Source**	**Min.**	**Max.**	**Avg.**	**Min.**	**Max.**	**Avg.**
E. coli	2001-2004 City of Fort Wayne	1	48,400	1,656.6			

Table 47. Water quality in the St. Marys River (Spy Run Bridge)

4.0 Potential Water Quality Concerns, Sources, & Causes

A variety of methods were used to identify concerns within the St. Marys River Watershed. A series of public meetings were held that allowed the public to express their individual concerns and contribute to the development of the Watershed Management Plan. The following concerns were identified during two watershed stakeholder meetings. The concerns were then ranked using the nominal ranking method. The scores indicated in Table 48 are the results from the nominal ranking method; those receiving the highest score were assumed to be priority concerns.

Ranking	Issues	Score	Voters
1	Sediment - Runoff	45	17
2	Flooding (Flash & Scouring)	36	9
3	Nutrients - Runoff, Septics & Excess Fertilizer	33	14
4	Bacteria	28	9
5	Stream Bank Stabilization	20	9
6	CAFO - Concentrated Animal Feeding Operation	17	6
7	Reduced Floodplain	15	6
8	Wetlands	11	7
9	Log Jams & snags	7	4
10	Small livestock operations	6	5
11	Trash/Debris	4	1
12	Pesticides - Runoff	4	3
13	Wildlife - Geese	4	2
14	Change in Hydrology	4	2
15	Low Dissolved Oxygen (Impaired Biotic comm)	0	0
16	Municipal Operations	0	0
17	Pet Waste	0	0
18	Silting of the river	0	0
19	Toxic Residue	0	0
20	Public Awareness	0	0
21	Metals	0	0

Table 48. Stakeholder concerns and ranking results

Upon review by the Steering Committee, the list of concerns was consolidated to 7 broad areas of concentration for the St. Marys River Watershed.

1. Sediment
2. Flooding
3. Nutrients
4. Bacteria
5. Trash/Debris
6. Toxic Residues
7. Public Awareness

The following Table 49 details how identified public concerns were categorized into the seven broad categories.

St. Marys River Watershed Areas of Concern						
Sediment	**Flooding**	**Nutrients**	**Bacteria**	**Trash / Debris**	**Toxic Residues**	**Public Awareness**
Sediment-Runoff	Flash Flooding & Scouring	Runoff, Septics, & Excess fertilizer	Bacteria	Trash/ Debris	Pesticides-Runoff	Public Awareness
Streambank Stabilization	Reduced Floodplain	CAFO's	CAFO's		Toxic Residues	
Wetlands	Wetlands	Wetlands	Municipal Operations		Municipal Operations	
Log Jams/Snags	Log Jams/Snags	Small Livestock Operations	Small Livestock Operations		Metals	
Silting of the River	Change in Hydrology	Wildlife/Geese	Wildlife/Geese			
	Silting of the River	Low Dissolved Oxygen (IBC)				
		Pet Waste	Pet Waste			

Table 49. St. Marys River Watershed Areas of Concern

Concerns in the watershed were also identified by driving the watershed, aka a windshield survey. Tillage transects were completed in the months of March and June, any points having ephemeral erosion were documented. Also, a livestock inventory was completed. This inventory documented livestock species and number, as well as the access to streams and potential for waste runoff. Water quality was then used to validate the aforementioned concerns and to help prioritize concerns. The following Tables 50-56 list the potential problems, causes or sources, and the evidence to validate the concern.

Concern: Excessive Sediment Levels	
Potential Source / Cause	**Basis / Evidence**
Erosion and Sedimentation from cropland	High sediment levels could be originating from agricultural practices. Concern of excessive siltation was voiced at numerous public meetings by multiple stakeholders. Excessive sediment was ranked as the number one concern in the watershed by stakeholders. Results from tillage transects show that high amounts of conventional tillage are present throughout the watershed. Soils with a high erosion potential are common throughout the watershed (Figure 7). Evidence of erosion has been seen during windshield surveys. Water quality data has shown excessive TSS levels in the Gates, Little Blue Creek and Blue Creek sub-watersheds.
Channel and streambank erosion and sedimentation. Increased volume and flow due to altered hydrology, i.e subsurface tiling, filled wetlands and impervious surfaces.	High sediment levels could be originating from streambank erosion and destabilization. Concern over streambank erosion was documented as a concern at public meetings. Concerns over log jams resulting from streambank erosion was also voiced as a concern. County surveyors and the MRBC have verified that bank erosion and log jams are continual problems in the watershed.
Erosion from construction and development.	Concern was voiced by stakeholders regarding construction and development sites around the areas South of the City of Fort Wayne, the outlying areas of the City of Decatur, and the areas North of Berne. Development sites without proper stormwater BMP's have been observed during travel across the watershed.
Lack of Public Awareness	The steering committee voiced concern that lack of public awareness could be contributing to high sediment levels, e.g. poor erosion control practices on construction sites as well as poor farming practices. Results from the Social Indicator survey indicated that many ag producers are using conventional farming practices. However, many stated that they would be willing to try no-till or high residue methods.

Table 50. Sediment Concerns, Sources, Evidence.

Problem Statement: Stakeholders expressed great concern in regards to excessive sediment levels at a series of public meetings. Water quality data from current and past monitoring confirm these concerns. Evidence of erosion has been documented through windshield surveys as well as visits to sites with severe streambank erosion. Stakeholders feel that erosion is contributing to silting of the river, impaired biotic communities, nutrient and pesticide loss, poor downstream drinking water, a loss of soil productivity, as well as being a visual impairment.

Concern: Flooding	
Potential Source / Cause	**Basis / Evidence**
Changes in hydrology and hydraulics. Increased volume and flow due to altered hydrology, i.e subsurface tiling, filled wetlands and impervious surfaces.	Flooding was listed as a major concern by watershed stakeholders. With the majority of landuse being agricultural, a high percentage of land has been cleared, tiled, and drained for agricultural practices. Development in the watershed leads to increased impervious surfaces, therefore creating the opportunity for flash flood situations. The National Wetlands Inventory indicates that approximately 85% of Indiana's wetlands have been lost since European settlement.
Developments without proper stormwater detention/retention measures.	The steering committee expressed the concern that developments currently exist and in some cases are being constructed without having the necessary stormwater detention/retention capacity to accommodate the development.
Poor agricultural practices (sediment reducing river carrying capacity)	Concern was expressed by the stakeholders at public meetings. Several lifelong residents of the area feel that the river no longer has the same capacity as it once had, therefore it often widens into the floodplain.
Log Jams/Snags	Log Jams and Snags are common on the St. Marys main stem and on larger tributaries. This was verified by both the Adams and Allen County Surveyors. Log Jams/Snags impede water flow, resulting in upstream flooding and streambank erosion. Voiced as a concern at public meetings.
Floodplain encroachment	The steering committee listed floodplain encroachment as a concern in the St. Marys River Watershed. Urban encroachment into the floodplain could lead to possible upstream flooding.
Natural Causes	It should be noted that flooding is a natural disaster that cannot be avoided. However the impacts that flooding has can be mitigated.

Table 51. Flooding Concerns, Sources, Evidence.

Problem Statement: Stakeholders expressed great concern over the issue of flooding. Historically, flooding has been a problem for the St. Marys, causing structural and agricultural damage for decades. Flooding has been exacerbated by erosion, changes in river hydrology and hydraulics, development without proper stormwater measures, wetland loss, poor agricultural practices, and floodplain encroachment.

Concern: Excessive Nutrient Levels	
Potential Source / Cause	**Basis / Evidence**
Nutrient loading from agricultural sources.	Increased nutrient levels could be coming from agricultural practices. Concern over nutrient runoff was listed as a major concern at stakeholder meetings. With the combination of highly erodible soils and the St. Marys watershed being predominately agricultural land, the potential for nutrient loading is very high. Water quality data has shown that nutrient levels are high in several sub-watersheds, especially following rain events.
Nutrient loading from livestock.	Increased nutrient levels could be resulting from runoff from livestock operations, including CAFO's, CFO's and small animal operations. Results from a livestock inventory have verified that there are very high livestock numbers within the St. Marys River Watershed; over 1000 locations were found to have livestock. 13 locations were identified where livestock had direct access to streams.
Nutrient loading from urban runoff.	Increased nutrient levels could be coming from urban runoff. This concern was voiced by stakeholders at public meetings. Results from the Social Indicator survey show that more than 30% of landowners are unsure of the effect that lawn fertilizers can have on water quality. However 68% viewed urban stormwater as a problem. A mere 16% of respondents are using phosphate free fertilizers.
Nutrient loading from septic systems and improperly operated treatment systems.	Increased nutrient levels could be coming from malfunctioning septic systems and improperly operated treatment plants. Soils throughout the watershed are not suitable for septic systems. In Adams County, the Health Department has verified 10 areas known for malfunctioning septic systems or improperly operated treatment systems. This concern was voiced at public meetings and also was reiterated by the steering committee. All NPDES permitted facilities are regularly in compliance.
Lack of Public Awareness	The steering committee voiced concern that lack of public awareness could be contributing to high nutrient levels, i.e. not following recommendations for agricultural or lawn fertilizer, livestock with stream access, illegal dumping, and placing yard waste into streams or storm sewers. Results from the social indicator survey indicate that there is a lack of environmental awareness in the watershed.

Table 52. Nutrient Concerns, Sources, Evidence.

Problem Statement: Stakeholders expressed concern over nutrient levels during public meetings. Water quality data confirms these concerns. With a large part of the watershed being classified as agricultural, fertilizers and livestock waste are potential sources of nutrients. In populated areas around Fort Wayne, Decatur, and Berne, fertilizers used for residential applications as well as runoff from urban areas could be potential sources of nutrients. Another potential source of nutrients is malfunctioning septic systems and improperly operated treatment systems. The majority of soils in the watershed are not suitable for septic systems.

Concern: Elevated Bacteria Levels	
Potential Source / Cause	**Basis / Evidence**
Wastewater Disposal: Human sources such as individual septic systems, combined sewer overflows & sanitary sewer overflows, and effluent from wastewater treatment plants.	Suspected failing septic systems indicated by high *E. coli* levels indentified in TMDL. CSO's and SSO's are present in the City of Fort Wayne (25/2), Decatur (4), and Berne (2/1). Concern has been voiced at public meetings and through discussions with watershed residents. Soils throughout the watershed are not suitable for septic systems. Water quality data from the St. Marys TMDL has shown that *E. coli* levels are typically above IDEM standards. This was also shown in water quality samples collected by the St. Marys River Watershed Project.
Agriculture: Animal waste runoff from livestock.	Suspected runoff from agricultural sites indicated by high *E. coli* levels indentified in TMDL. Water quality data from the St. Marys TMDL has shown that *E. coli* levels are typically above IDEM standards. This was also shown in water quality samples collected by the St. Marys River Watershed Project. Concern was voiced at stakeholder meetings. Results from a livestock inventory have identified very high numbers of livestock in the St. Marys River Watershed; over 1000 locations were found to have livestock. 13 locations were identified where livestock had direct access to streams.
Natural Sources: Wild animal waste in runoff.	Concern was voiced during public meetings. Wild animal waste could be a source of elevated *E. coli* levels identified by the TMDL. Visual evidence of geese and deer waste can be seen across the watershed.

Urban runoff: Domestic pet waste runoff.	Concern was voiced during public meetings. Pet waste could be a source of elevated *E. coli* levels identified by the TMDL. The Spy Run, Junk Ditch, Harber Ditch, Snyder Ditch, and Houk Ditch subwatersheds are heavily populated and the *E. coli* levels could be a result of domestic pet waste. Visual evidence of domestic pet waste can be seen across the watershed.
Lack of Public Awareness	The steering committee voiced concern that lack of public awareness could be contributing to high *E. coli* levels, e.g. improper septic system maintenance, livestock with stream access.

Table 53. Bacteria Concerns, Sources, Evidence.

Problem Statement: Elevated bacteria levels are seen as a severe issue in the watershed. Stakeholders discussed they were concerned with health risks associated with bacteria in the watershed. All streams sampled in the watershed typically exceeded IDEM *E. coli* water quality standards for full body contact recreation, this result mirrors that found by the TMDL. Suspected sources include failing or malfunctioning septic systems, combined sewer overflows, sanitary sewer overflows, effluent from improperly operated treatment plants, runoff from livestock waste, wild animal waste and pet waste.

Concern:Excessive levels of toxic residues: Pesticides/Herbicides, Industrial Wastes	
Potential Source / Cause	**Basis / Evidence**
Agriculture: Pesticides/Herbicides in runoff	Concern was voiced during public meetings. Water quality data has shown high atrazine levels in the Gates Ditch, Habegger Ditch, Little Blue Creek and Blue Creek sub-watersheds during the 2008 planting season.
Improper Pesticide/Herbicide application	This concern was brought up by the steering committee on the premise that pesticide/herbicide levels could be originating from improper application, i.e. not following setback guidelines and improper volumes being applied in both agricultural and residential settings. 63.9% of survey respondents see excessive pesticide/herbicide application as a problem.
NPDES Permit Holders (IDEM Rule 6)	The steering committee voiced concern that there are IDEM Rule

	6 permit holders who are commonly out of compliance with their permits. Rule 6 requires permit holders to obtain a general NPDES permit to monitor storm water on their site and implement BMP's. This was verified by the City of Decatur Stormwater Coordinator.
Lack of Public Awareness	The steering committee voiced concern that lack of public awareness could be contributing to high levels of toxic residue, e.g. illegal dumping, dumping of household wastes, permit violation, improper pesticide/herbicide application. Social Indicator survey results show that 40% of respondents were unsure of how pesticides/herbicides were affecting water quality.

Table 54. Toxic Residue Concerns, Sources, Evidence.

Problem Statement: Stakeholders expressed concern regarding excessive levels of toxic residues, specifically pesticides and herbicides as well as industrial wastes. IDEM Rule 6 requires analysis of the following parameters:

1. Oil and grease
2. Carbonaceous biochemical oxygen demand (CBOD)
3. Chemical oxygen demand (COD)
4. Total suspended solids (TSS)
5. Total Kjeldahl nitrogen (TKN)
6. Total phosphorous
7. pH
8. Nitrate plus nitrite nitrogen
9. Any pollutant attributable to a facility's industrial activity which is reasonably expected to be present in the discharge
10. Any pollutant that has the potential to be present in a stormwater discharge as requested by IDEM

Concerns were verified with water quality data showing high levels of atrazine. Concern was also voiced with regard to IDEM Rule 6 permit holders who are not meeting the criteria of their general NPDES permits. The steering committee agreed that a large cause of excessive toxic chemicals stems from lack of public awareness.

Concern: Excessive levels of trash/debris	
Potential Source / Cause	**Basis / Evidence**
Illegal dumping and littering	Concern was voiced at public meetings by stakeholders. The Decatur WWTP operator commented on the amount of bottles/cans/debris that are removed at the treatment plant. Visual evidence was observed along streambanks and ditches while completing windshield surveys.
Lack of Public Awareness	The steering committee voiced concern that lack of public awareness could be contributing to excessive levels of trash and debris, i.e. illegal dumping, and littering.

Table 55. Trash/debris Concerns, Sources, Evidence.

Problem Statement: Stakeholders voiced concern over trash and debris along water ways. Trash and debris resulting from illegal dumping and littering are a visual impairment and pose potential health risks.

Concern: Lack of Public Awareness	
Potential Source / Cause	**Basis / Evidence**
Runoff containing fertilizer, pet and livestock waste, and pesticides/herbicides.	Stakeholders identified this as a concern. Water quality data for nutrients, sediment, *E. coli*, and pesticides/herbicides verifies these concerns.
Improper septic system maintenance and operation.	Suspected failing septic systems indicated by high *E. coli* levels indentified in TMDL. Concern has been voiced at public meetings and through discussions with watershed residents. Soils throughout the watershed are not suitable for septic systems. Water quality data from the St. Marys TMDL has shown that *E. coli* levels are typically above IDEM standards. This was also shown in water quality samples collected by the St. Marys River Watershed Project. 55.7% of Social Indicator respondents believe septic systems may be a water quality problem.
Improper chemical disposal.	Concern voiced at public meetings. Social Indicator results show that 62.9% agree that improper chemical disposal is a contributor to poor water quality.
Inadequate stormwater BMP's.	Concern voiced at public meetings. Development sites without proper stormwater BMP's have been observed during travel across the watershed.

Table 56. Public Awareness Concerns, Sources, Evidence.

Problem Statement: Stakeholders identified that water quality issues could be amplified by a lack of individual knowledge of the impacts that people have on water quality. It was verified by Social Indicator survey results, that the majority of residents are unaware of their impacts on water quality.

4.1 Sediment

Erosion occurs when wind or water runoff carries soil particles from one area to another. Sedimentation occurs when these soil particles are deposited into a receiving water body, such as a stream or a lake. These mobilized soil particles may become suspended within the water column, clouding the water and reducing the amount of sunlight reaching aquatic vegetation, and obstructing the gills of aquatic organisms. Particles of silt and sand may eventually precipitate out of the water column, settling on the streambed effectively covering fish spawning areas and macroinverteberate habitat, and smothering food supplies. Land clearing and conventional tillage make soils more susceptible to erosion, which can then cause stream and ditch sedimentation.

Furthermore, pollutants such as phosphorus, pathogens, and heavy metals move through the landscape attached to microscopic soil and organic particles. These same microscopic particles may be easily transported via overland flow and are stored in and carried by streams throughout the watershed.

4.1.1 Agriculture

The land in the St. Marys River Watershed is primarily used for agricultural production. With the necessity of the use of field tiles due to soil conditions in the watershed, sediment from runoff has the potential to leach into field tiles and discharge into nearby streams. The Blue Creek / Habegger Ditch and Yellow Creek Watersheds TMDL indicated that TSS values during mid and high range flow conditions were due to TSS transportation via field tiles.

Agricultural practices inducing erosion is a potential source of sediment pollution in the St. Marys River Watershed. Areas with highly erodible soils, if not managed properly, can erode at an accelerated rate and may lead to excessive soil deposition within streams and ditches. Highly Erodible Land (HEL) determinations are made based on a mathematical equation, the Universal Soil Loss Equation (USLE). This equation, and subsequent versions, consider the average rainfall, erodibility of the soil type, allowable loss for that soil type, and the length and the slope of the area. According to the USDA, an entire farm tract is considered HEL if at least one third of the tract has highly erodible soils present.

HEL erosion has been identified by the NRCS as a water quality problem throughout the watershed. Activities involving land disturbance such as conventional tillage methods, intensive livestock grazing with stream accessibility and removal of wooded areas are likely to increase sediment loadings to the watershed. Figure 7 shows HEL soils in the watershed.

The NRCS has conducted a Rapid Watershed Assessment for the St. Marys River Watershed. Table 57 was developed with data from the NRCS Soil Data Mart and lists Soils Based Resource Concerns for the watershed.

Soils Based Resource Concerns									
County	**Hydric (Ac.)**	**Leaching Index ≥10 (Ac.)**	**Subsurface Drainage = H/VH (Ac.)**	**Soil Erosion (Wind) >500 (Ac.)**	**Potential for Frequent Flooding (Ac.)**	**Surface Runoff Class = H/VH (Ac.)**	**Soil Erosion (Water) >37 (Ac.)**	**Sheet/Rill Erosion Potential b/w 1T & 2T (Ac.)**	**Sheet/Rill Erosion Potential > 2T (Ac.)**
Adams	66,532	3,623	143,206	64,949	6,256	41,814	6,907	0	0
Allen	23,082	954	7,762	1,660	2,440	15,357	1,719	190	20
Wells	7,098	132	6,876	0	11	150	10	0	0
Totals	**96,712**	**4,709**	**157,844**	**66,609**	**8,707**	**57,321**	**8,636**	**190**	**20**

Source: NRCS Soil Data Mart, 2007

Hydric soils = Characterized by, relating to, or requiring an abundance of water, hydric soils are indicators of wetlands, which represent unique management considerations including groundwater impacts, crop production limitations, wildlife considerations, etc.

Leach Index = soils with a relatively high risk of water percolating below the crop root zone; developed using annual precipitation, rainfall distribution data and hydrologic soil groups.

Subsurface Drainage = soils with a relatively high risk of having subsurface drainage; determined from a matrix based on soil drainage class and depth to seasonal high water, and the presence of artificial subsurface drainage and surface tile inlets.

Soil Erosion (Wind) = soils with a relatively high risk of eroding by wind; determined from a location's C (Climate) Factor and a soil's Soil Erodibility Index (I).

Flooding Potential = soils with a relatively frequent risk of being covered by flowing water from any source; determined from the NRCS soil survey.

Surface Runoff Class = soils with a relatively high relative risk of soil solution movement from the surface of a management unit; determined using soil permeability and percent slope.

Soil Erosion (Water) = soils with a relatively high risk of eroding by water; determined from a location's R (Rainfall-Runoff Erosivity) Factor, and a soil's K (Soil Erodibility) and LS (Length-Slope) factors.

Sheet/Rill Erosion Potential = Erosion potential is based on the RUSLE2 calculation for the soil with a "C" Factor equal to that of a typical cropland management system used in Indiana (no-till soybeans, followed by chisel-plowed corn with an injected anhydrous application). Soils under this management system between 1 and 2 times of tolerable limits are eroding above sustainable levels; soils under this management system greater than 2 times of tolerable limits may be ineligible for certain USDA benefits. Management systems that leave more residue on the surface, those with less soil disturbance, crop rotations with higher-residue crops, etc. will decrease soil erosion compared to those under the typical cropland system. Management systems that leave less residue, disturb the soil more, and those with crop rotation with lower-residue crops may increase soil erosion above the typical cropland system.

Leach Index, Wind Erosion, Water Erosion, Flood Potential, and Surface and Subsurface Drainage = Because climatic and other data elements may be county-based, threshold values may differ among adjacent counties and result in abrupt data thresholds.

Table 57. Soil Based Resource Concerns.

Associated with sediment reduction, the Steering Committee feels it is necessary to look at tillage methods in the watershed as a possible source of excess sediment in the St. Marys River Watershed. County tillage data was obtained from the Indiana State Department of Agriculture (ISDA), Division of Soil Conservations and analyzed to show trends of conservation tillage practices in the St. Marys River Watershed (Fig. 43). While this information is provided on a county-wide basis, it is representative of the tillage types and percentages within the boundaries of the St. Marys River watershed. No-till refers to any direct seeding system including strip preparation with minimal soil disturbance.

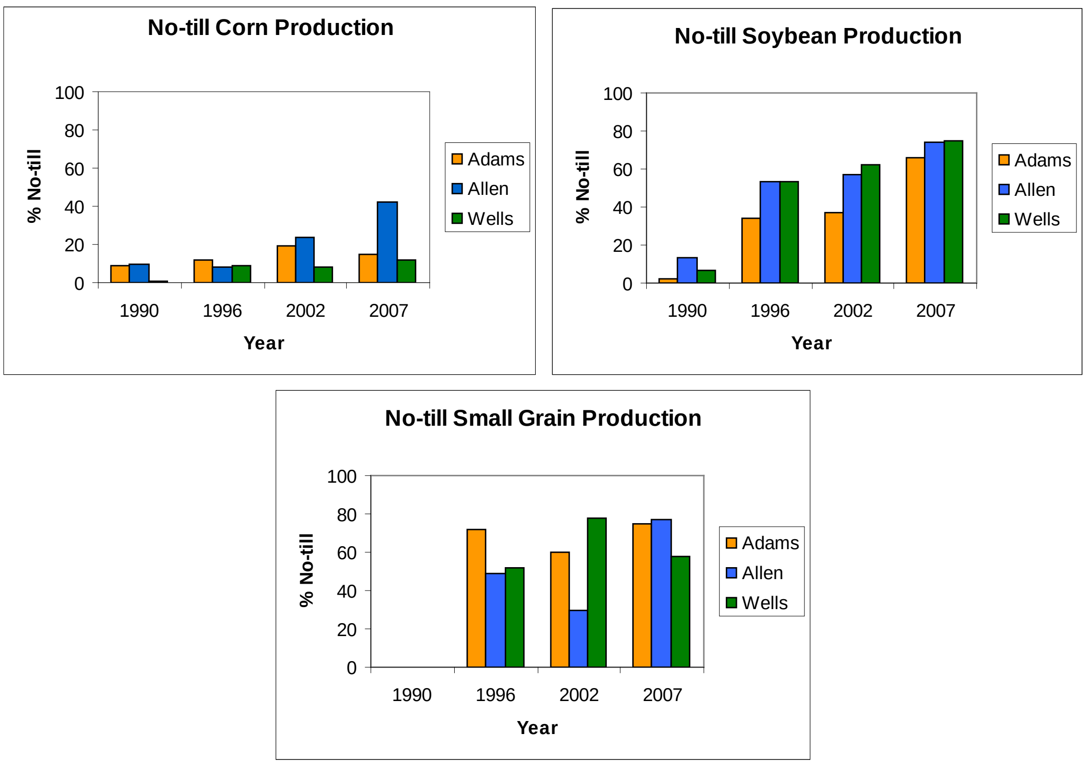

Figure 43. Trends of no-till adoption over a 17-year period, 1990-2007.

It is clear that while no-till soybeans seem to be an accepted practice throughout the tri-county area, no-till corn has not been widely established, especially in Adams and Wells Counties. Resistance to utilize conservation tillage in corn production can be attributed to several rationales including the needed acreage for manure application and associated incorporation methods, increased moisture attributed to the combination of poorly drained soils and excess fodder, the concern of inconsistent plant populations, and possible yield reductions. Alternatively, a continuation of conventional tillage methods may be due to producers continuing to use the "tried and true" methods that were used by generations before them. A change in farming practices may be seen as disrespectful to the elder generations. Small grain production, mainly hay and wheat crops, commonly use no-till practices. Further adoption of conservation tillage methods has the opportunity to open avenues for increased water quality, increased soil health and tilth, and also serves as a means for sediment and nutrient reduction in the St. Marys River Watershed.

Other contributing factors to sediment pollution include cropland being farmed to the stream edges, therefore intensifying erosion and limiting the potential for filtration in the riparian zone. Another source is allowing livestock direct access to streams. This access may destabilize stream banks and also removes vegetation from stream banks. Over grazing by livestock can also induce erosion through exposing the soil and through compaction, which reduces the potential for water infiltration into the soil.

4.1.2 Urban

Construction activities that involve excavation, grading or filling can produce significant sedimentation if not properly controlled. Sedimentation from developing urban areas can be a major source of pollution due to the cumulative number of acres disturbed in a watershed. Construction of single family homes in rural areas can also be a source of sedimentation when homes are placed in or near stream corridors.

As a pollution source, construction activities are typically temporary, but the impacts on water quality can be severe and long lasting. Construction activities tend to be concentrated in the more rapidly developing areas of the watershed, which include the outskirts of Fort Wayne, Decatur and Berne. However, road construction is widespread and often involves stream crossings in remote or undeveloped areas of the basin.

Soil erosion from construction activities contributes to the filling of nearby streams and ditches, affecting water quality, aquatic habitats, drainage, and recreational opportunities. There are a number of Best Management Practices (BMPs) including phased construction, silt fencing, and turf seeding, that when installed and maintained properly, can successfully limit sediment from leaving the site.

Land use planning and development practices are effective methods to control not only where development occurs but also the means by which it occurs, and the overall impact the development will have on water quality. Comprehensive Plans, Zoning Ordinances, MS4 permits and Subdivision Control Ordinances are documents that almost every community uses to guide growth and development within their jurisdictions. Comprehensive Plans were developed for Adams, Allen, and Wells Counties in the early 1990's and include brief descriptions regarding the preservation of natural resources and the environment. These plans should be updated to include land use changes that have occurred within the last 10 years, proposed management measures for protecting the St. Marys River and tributary streams where applicable, MS4 permit requirements and current long range planning measures.

Runoff from urbanized areas, as a rule, is more localized and can often be more severe in magnitude than agricultural runoff. The rate and volume of runoff in urban areas is much greater due both to the high concentration of impervious surface areas and storm drainage systems that rapidly transport stormwater to nearby surface waters. This increase in volume and rate of runoff can result in stream bank erosion and sedimentation in surface waters. Managing nonpoint source pollution in urban environments often includes measures of managing water quantity in addition to water quality. Urban drainage systems, including curb and guttered roadways, also allow urban pollutants to reach surface waters quickly and with little or no filtering.

Replacement of natural vegetation with pavement and removal of buffers reduces the ability of the watershed to filter pollutants before they enter surface waters. The chronic introduction of these pollutants and increased flow and velocity into a stream results in degraded waters.

Stormwater within the Allen County Portion of the St. Marys River Watershed will be managed by the City of Fort Wayne and the Allen County Storm Water Quality Management Plans. These plans will require the following minimum control measures:

- Public Education and Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post Construction Runoff Control
- Municipal Operations Pollution Prevention and Good Housekeeping

The specific BMPs that the City of Fort Wayne and Allen County are attached in Appendix VII.

4.1.3 Channel Sources

Stream bank erosion and channel scouring are potential sources of sediment pollution in the St. Marys River Watershed. Sediment can enter surface waters when unstable stream banks collapse do to sloughing and undercutting. Additional sources include drainage ditch maintenance and concentrated flow from construction sites, agricultural land and urban areas. These areas have the potential to send large quantities of water to small streams and ditches at a high velocity, resulting in stream bank erosion and channel scouring. In addition to high sediment loads, this alters the physical and biological properties of the stream ecosystem. Implementing Low Impact Development (LID) and other BMP's can lessen the impacts resulting from increased flow volumes and velocities.

4.2 Flooding

Flooding and associated flood damage commonly occurs during the spring due to the mix of heavy rains combined with melting snow. However, provided with the right saturation conditions, intense rainfall of short duration during summer rain storms are capable of producing damaging flash flood conditions.

Historical climate and disaster data does indicate a strong prevalence of high water events, carrying with them the ability to result in significant property damages, wash out valuable in-stream habitat, destruct streambanks, increase pollutant loadings to receiving water bodies, and facilitate the associated destruction of aquatic communities. (www.crh.noaa.gov). Debris from infrastructure and buildings damaged by flood events, oils, grease, and toxins from submerged vehicles and septic systems, and common chemicals and solvents that are present in nearly every home, all have the ability to become mobile when flooding occurs. Table 58 illustrates major flooding events on the St. Marys River.

Major Flooding Events on the St. Marys River			
St. Marys River @ Decatur (USGS #04181500)		St. Marys River near Ft. Wayne (USGS #04182000)	
(1) 26.94 ft on 07/09/2003	Major Flood Stage: 24 ft.	(1) 21.20 ft on 07/09/2003	Major Flood Stage: 19 ft.
(2) 26.50 ft on 03/26/1913	Moderate Flood Stage: 20 ft.	(2) 19.66 ft on 03/14/1982	Moderate Flood Stage: 17 ft.
(3) 24.40 ft on 03/14/1982	Flood Stage: 17 ft.	(3) 19.06 ft on 01/14/2005	Flood Stage: 14 ft.
(4) 24.31 ft on 02/25/1985	Action Stage: 13 ft.	(4) 18.33 ft on 02/26/1985	Action Stage: 12 ft.
(5) 24.24 ft on 01/14/2005		(5) 17.92 ft on 01/01/1991	
(6) 24.22 ft on 02/10/1959		(6) 17.67 ft on 02/09/2008	
(7) 24.13 ft on 07/17/1992		(7) 17.07 ft on 07/18/1992	
(8) 23.90 ft on 07/16/1992		(8) 17.03 ft on 01/26/1999	
(9) 23.81 ft on 12/31/1990		(9) 15.81 ft on 05/12/2003	
(10) 23.62 ft on 02/08/2008		(10) 15.48 ft on 06/14/2004	

Table 58. Major Flooding Events on the St. Marys River.

Figure 44. 2003 Flood, Decatur, IN

Adams and Allen County have experienced many flood disasters that resulted in both Presidential Major Disaster and Governor's Disaster Declarations. The greatest known flood occurred in 1913. This event was approximately equivalent to a 500-year event on the St. Mary's and St Joseph Rivers and was equivalent to a 50-year event on the Maumee River. The greatest flood since the 500-year storm event of 1913 occurred in 1982 along the St. Mary's, St. Joseph, and Maumee Rivers on March 15-17, 1982. The National Weather Service reported that the snow accumulation in Northern Indiana at the time of this flood event had a snowmelt water equivalent of 3 to nearly 7 inches of rain. The St. Mary's water monitoring gage near Fort Wayne reached a peak of 19.64 feet and a discharge of 13,000 cubic feet per second (cfs). The St. Joseph River also crested at 13,000 cfs, and the Maumee River gage reached 25.05 feet and a discharge of 26,500 cfs. A record flood event, known as the "Firecracker Flood" was recorded in July 2003 and resulted in the St. Mary's River cresting at 21.20 feet with a discharge of 15,000 cfs. The flood resulted in approximately $66.6 million in personal and property damage combined. Damage in Adams County was $16.5 million. The previous discharge peak of record was February 10, 1959 for the St. Mary's river. Figure 44 shows downtown Decatur, IN following the 2003 flood. (MRBC, 2005) Figures 45 and 46 show flood zones in Allen and Adams Counties.

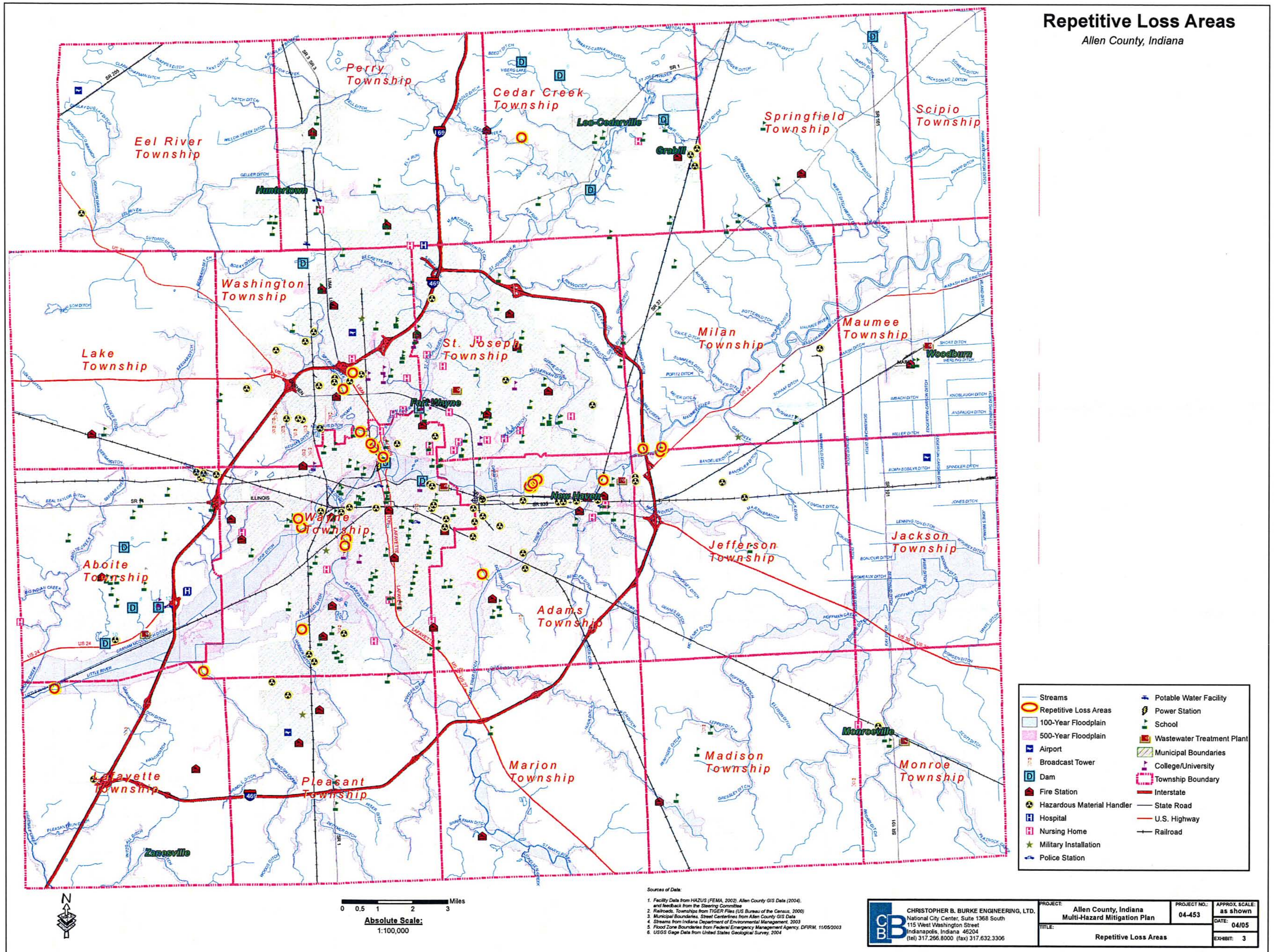

Figure 45. Allen County Flood Zones (MRBC, 2005)

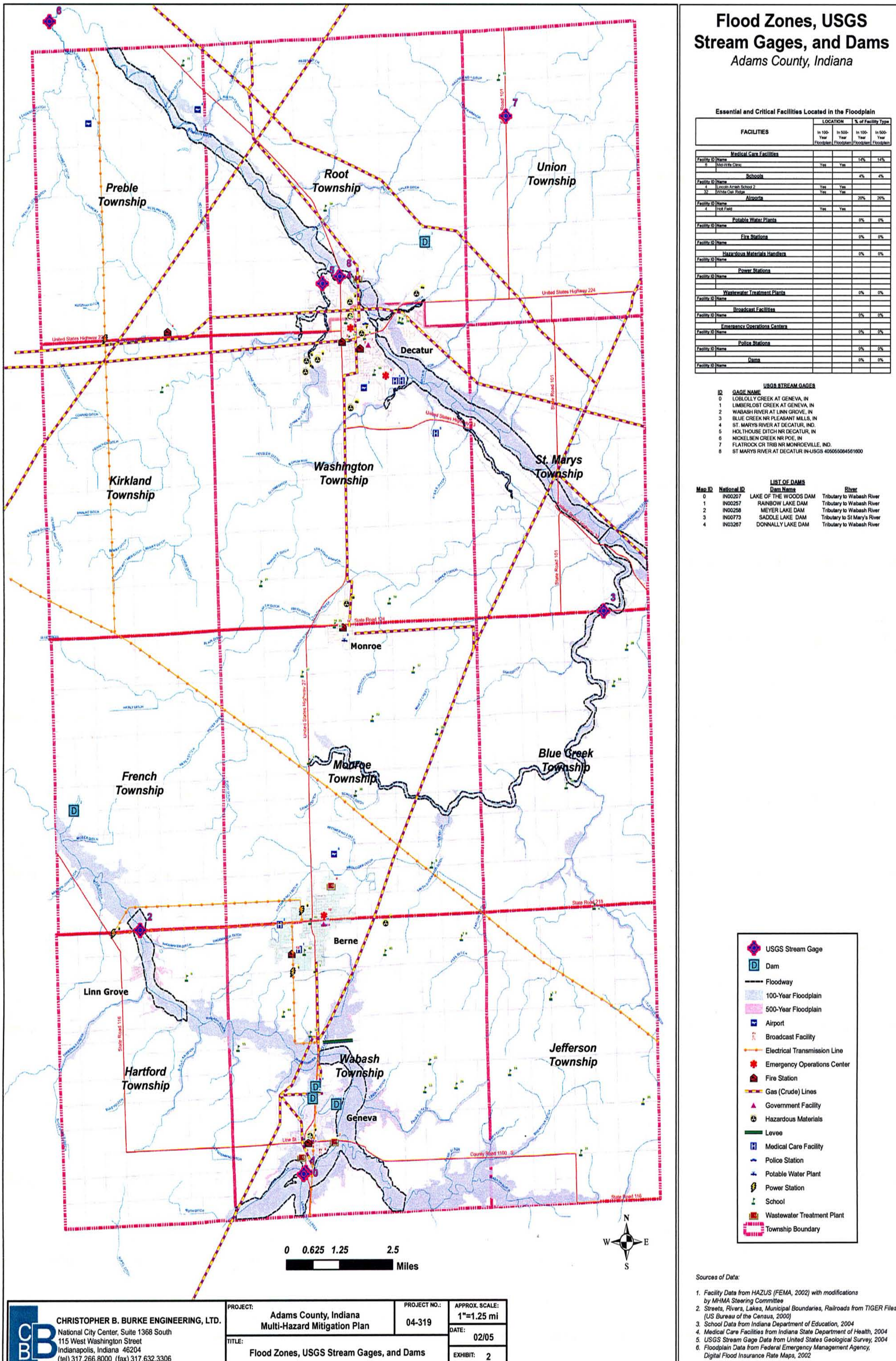

Figure 46. Adams County Flood Zones. (MRBC, 2005)

These events are not only damaging to homes, but also to the agricultural community. Producers may need to replant crops that have been damaged by flooding, or the entire field could become inundated, zeroing out the productivity for that cropping season. Furthermore, livestock facilities that are located in the floodway or the 100-year floodplain are at a higher risk for loss of animals. Table 59 provides a breakdown of the number of buildings in Decatur expected to sustain some level of damage as a result of a 100-year and 500-year flood. Table 59 numbers do not include structures outside of Decatur, IN. Within the rural portions of Adams County, an additional 52 buildings are susceptible to damage resulting from a 100-year flood, and 58 buildings are susceptible during a 500-year flood. MRBC estimates a $16.68 million total economic loss resulting from a 100-year flood, and a loss of $18.06 million resulting from a 500-year flood. (MRBC, 1995).

Number of Buildings Subject to Flood Damage in Decatur						
Stream	100-Year Flood			500-Year Flood[1]		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
St. Marys River	129	21	150	130	23	153
1. Numbers represent the number of structures that, based on the USACE 1992 study, sustain some damage regardless of their first floor elevations						

Table 59. Number of Buildings Subject to Flood Damage in Decatur. (MRBC, 1995)

Tables 60 provides a breakdown of the number of buildings in Fort Wayne and vicinity expected to sustain some level of damage as a result of a 100-year and 500-year flood. In the remaining portion of Allen County, an additional 1,483 buildings are subject to damage in 100-year flood, resulting in a $32 million total economic loss. During a 500-year flood event, 143 buildings are subject to damage, a total economic loss of $37 million.

Number of Buildings Subject to Flood Damage in Fort Wayne and Vicinity						
Stream	100-Year Flood			500-Year Flood[1]		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
St. Marys River	479[2]	65[2]	544[2]	3,207	280	3,487
Spy Run Creek	114[2]	6[2]	120[2]	177	27	204
Junk Ditch	48	42	90	117	52	169
Fairfield Ditch	487	2	489	622	12	634
Trier Ditch	17	10	27	419	23	442
1. Numbers represent the number of structures that, based on the USACE 1993 study, sustain some damage regardless of their first floor elevations						
2. Numbers shown exclude the buildings protected by the USACE Diking Project.						

Table 60. Number of Buildings Subject to Flood Damage in Fort Wayne and Vicinity. (MRBC, 1995)

The 100-year flood is referred to as the "regulatory" or "base" flood and used as a benchmark by the Federal Emergency Management Agency (FEMA). The term 100-year flood is often incorrectly used and can be misleading. It does not mean that only one flood of that size will occur every 100 years. What it actually means is that there is a 1% chance of a flood of that intensity and elevation happening in any given year. In other words, the regulatory flood elevation has a 1% chance of being equaled, or exceeded, in any given year and it could occur more than once in a relatively short period.

As part of the Maumee River Basin, the Indiana portion of the St. Marys Watershed falls under the jurisdiction of the Maumee River Basin Commission (MRBC). The MRBC emerged in 1986 as an alliance between Adams, Allen, DeKalb, Noble, and Steuben Counties, which comprises the Maumee River Basin. Each County is represented by the 3 County Commissioners (or their official designee), the County Surveyor, and a member of the Soil and Water Conservation District Board of Supervisors (SWCD) (or their official designee). These members play a critical role in the formulation of policy and program recommendations and work closely with individual communities by providing assistance and guidance on a number of flood mitigation projects. The Commission is designed to assist communities in northeast Indiana to curb the threat of flooding. The MRBC is a state agency formed by Indiana Code 13-7-6.1. The MRBC provides regional leadership in planning, promoting, coordinating, and implementing flood control, conservation, and the control and development of resources such as land, water, and man-made improvements. This is further stated in the MRBC mission statement: *To provide regional leadership and promotion of flood control, soil and water conservation, and related resource management through a coordinated and comprehensive planning and implementing approach* (MRBC, 1993).

The MRBC is able to provide assistance in the areas of flood control project planning and administration, flood mitigation assistance grant writing, 319 water quality improvement grant writing, erosion and sediment control, flood insurance, floodplain ordinances, inventories of flood prone properties, stormwater and erosion control ordinances, soil and water conservation, and public information programs.

County Commissioners in the St. Marys River Watershed have elected to adopt the Maumee River Basin Commission's (MRBC) more restrictive floodplain ordinance requirements above and beyond the Indiana State requirements. This additional language requires No Adverse Impact (NAI) due to construction within floodplains. When any portion of the Special Flood Hazard Area (SFHA) is filled for the purpose of construction, this needs to be balanced by an equivalent volume of excavation within the same immediate watershed. This results in no net loss of floodplain storage post construction.

As flood events occur in the St. Marys River Watershed, the possibility for pollutants to enter the waterways is increased exponentially. Debris from infrastructure and buildings damaged by flood events, oils, grease, and toxins from submerged vehicles and septic systems, and common chemicals and solvents that are present in nearly every home can all become mobile when flooding occurs. These substances can be severely harmful to aquatic life, other wildlife, and humans that come into contact with the contaminated water, and can pose long term problems for saturated soils in the flood area.

Another common problem associated with flooding is that of streambank erosion. Bank erosion is often the result of increased stream flows associated with heavy rainfall events. When stream flow rates exceed the resistance ability of nearby soils and vegetation, bank erosion occurs. Streambank erosion can have numerous negative impacts ranging from increased turbidity, loss of in-stream habitat, loss of conveyance volume, and damage to public infrastructure such as roads and bridges. Localized streambank problems, primarily in association with in-stream obstructions, have been identified as a water quality issue in the St. Marys River Watershed that needs to be addressed in more detail. To assist in removing obstructions, in 1996 the MRBC developed a Stream Obstruction Removal Assistance Program, providing funding for in-stream obstruction removal. In 1999 MRBC partnered with the Adams County Drainage Board and Surveyor on the first of a 2-phase Stream Obstruction Removal Project. Phase 1 began at the Indiana-Ohio State Line and continued to the CR 900 N Bridge. In Allen County, the City of Fort Wayne Flood Control Manager annually coordinates with the Indiana Department of Transportation (INDOT) to remove debris around bridge piers. In Adams County, the County Engineer and the Mayors Office coordinate with INDOT to remove obstructions.

Areas along the main stem of the St. Marys River and its major tributaries are sensitive to in-stream obstructions following high water events. These obstructions lead to destabilization of stream banks, increased sediment (TSS) loadings to the river, and increased damages and pollutant loadings associated with flooding in sensitive areas.
Sedimentation of river systems depletes the integral pool-riffle-run pattern of stream flow; decreases habitat, spawning, and feeding areas for aquatic organisms; and increases turbidity of the water column. An increased rate of stream bank erosion initiates the cyclical actions of bank destabilization, increased sedimentation in-stream, obstruction development, and increased stream bank erosion, (Figure 47).

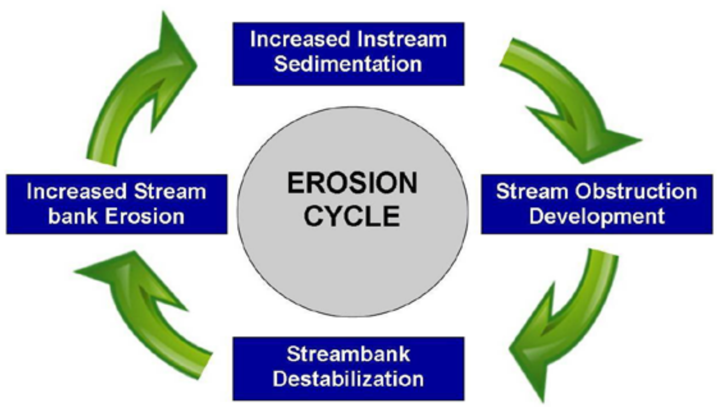

Figure 47. Erosion Cycle

General debris, either from the destruction of buildings or from general washing away of materials on the ground can also have an effect on the severity of the event. When materials are trapped in the stream, water is impeded and can potentially cause an enlarged area to become affected adding to the potential for pollutants to enter the water course and surrounding lands.

4.3 Nutrients

Nutrients, phosphorus (P) and nitrogen (N), are commonly applied in the watershed for agricultural, commercial, and residential practices. In small amounts, N and P are beneficial and necessary to aquatic life. However, in excessive amounts, they can stimulate the occurrence of algal blooms and aquatic plant growth.

Algal blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and the decomposition of dead algae and other aquatic plants. This situation is accelerated by high temperatures and low flow conditions due to the reduced capacity of the water system to retain dissolved oxygen. When the dissolved oxygen levels reach severely low limits, fish kills occur and the aquatic ecosystem is disrupted. The IAC (327 IAC 2-1.5-8) sets a minimum daily average DO concentration of 5.0 mg/l and a minimum concentration of 4.0 mg/l at any point.

Nutrient loading in the surface waters of the St. Marys River Watershed has been identified as a water quality problem and is addressed in this WMP. High nutrient concentrations were observed during water quality monitoring. Nutrient impairments were also reported in the Blue Creek/Habegger Ditch and Yellow Creek Watershed TMDL. Every home, regardless of size or age, has potential pollution sources that can impact ground and surface water and contribute to water quality impairments. Common chemicals applied to flowerbeds and small gardens can have a major impact to local streams and tributaries.

Urban activities may create conditions that result in higher-than-normal concentrations of ammonia and phosphorus in water bodies downstream. While professional lawn and garden chemical applicators receive training and are required to maintain application records, the average homeowner does not. This often results in over-application of lawn and garden chemicals and contributes significant nutrient loads to adjacent water bodies. It is advisable to have residential lawns sampled for available nutrient levels prior to application of additional fertilizers and/or nutrients. These samples will outline the specific needs of the lawn and will reduce the potential for over-application and contaminated runoff entering the local water courses.

Yard waste such as grass clippings, leaves, and dead plants are high in organic matter and if piled or dumped on nearby stream banks can result in the smothering of the vegetation that is naturally stabilizing the bank and preventing soil erosion. Depleted dissolved oxygen levels of nearby waterways as the vegetation decomposes can also be an outcome of improper disposal of lawn and brush clippings.

4.3.1 Agriculture

Nutrients in the form of commercial fertilizers, manure, land-applied sludge, legumes, and crop residue are utilized to enhance crop production. Nutrients can enter streams via surface runoff, nutrients bind with soil particles and are transported along with sediment to rivers and streams. Highly Erodible Land (HEL) in the watershed is shown in Figure 7. Nutrients can also leach into surface drainage tiles, which are common across the watershed, and are carried to surface waters. The Blue Creek / Habegger Ditch and Yellow Creek Watersheds TMDL indicated that nutrient values during mid and high range flow conditions were due to nutrient transportation via field tiles. Livestock manure can also be a contributing factor to nutrient loading in the watershed. Manure can be washed from pastures, washed from crop fields after manure is land applied, or directly placed when livestock are given direct access to streams. The St. Marys River Watershed Project livestock inventory identified 13 locations where livestock have direct access to streams. In reality, this number is likely to be higher due to the fact that pastures away from the road were not visible during the survey. The TMDL also indicated that nutrient levels during and following mid range to high flow conditions are a result of runoff from small animal operations.

4.3.2 Urban

Nutrient applications to residential and commercial lawns, parks, and golf courses can be transported to streams and ditches by storm water. Furthermore, nutrient loading contributions can come from failing septic systems, NPDES dischargers, and Combined Sewer Overflows. These locations are shown geographically in Figures 49-51. The Blue Creek / Habegger Ditch and Yellow Creek Watersheds TMDL indicated that high nutrient values could be contributed during high flow conditions from failing septic systems as well as CSO's and SSO's.

Stormwater within the Allen County Portion of the St. Marys River Watershed will be managed by the City of Fort Wayne and the Allen County Storm Water Quality Management Plans. These plans will require the following minimum control measures:

- Public Education and Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post Construction Runoff Control
- Municipal Operations Pollution Prevention and Good Housekeeping

The specific BMPs that the City of Fort Wayne and Allen County are attached in Appendix VII.

4.4 *E. coli*

The findings of the St. Marys River TMDL reported that there are numerous contributors to elevated *E. coli* levels in the St. Marys River Watershed. *E. coli* is present in the intestinal tracts of warm blooded animals and is used as an indicator to identify pathogenic organisms in surface waters. The presence of pathogenic organisms presents a human health risk to stakeholders in the St. Marys River Watershed. The St. Marys River Watershed Project WMP will address the following sources:

4.4.1 Livestock Manure

In the St. Marys River Watershed, livestock manure is a potential source of *E. coli*. Adams, Allen, and Wells Counties combine to create a significant concentration of livestock production within the state of Indiana. Adams County ranks 4th in the state for hog production with nearly 153,000 head. Adams County is 5th in the state for ducks with approximately 78,814 head. Adams County also ranks 5th in layer production, 10th in pullet production and 7th in Broiler production. Allen County ranks 3rd in horses with 3,249 head and 8th in broiler production. Wells County ranks 10th for laying hens and 16th for pullet production in Indiana. (USDA, 2007) Livestock manure can typically enter surface water through three methods; when livestock is allowed direct access to streams and ditches, through run off from livestock pastures, and through run off following land application of manure. With the necessity of the use of field tiles due to soil conditions in the watershed, applied livestock manure and manure runoff has the potential to leach into field tiles and discharge into nearby streams. The St. Marys TMDL indicated that *E.*

coli values during mid and high range flow conditions were due to *E. coli* transportation via field tiles.

Many landowners in the watershed utilize nearby streams and ditches for watering sources for their livestock. In turn, livestock have the opportunity to deposit fecal matter directly in-stream and on stream banks. As stated earlier, windshield surveys have identified approximately 13 locations in the watershed where livestock have direct access to a stream or ditch. The St. Marys TMDL confirms that since there is a continuous source of *E. coli* during dry conditions, animals with direct access to the stream are considered a source of *E. coli* in addition to other factors.

Manure deposited into upland pastures can also be an *E. coli* source when storm water runoff transports it to nearby streams or ditches. Specifically in the southern portion of the St. Marys River Watershed, grazing livestock in pasture lands or livestock in feedlots have the potential to provide a significant contribution of bacteria. Run off potential from pastures and feedlots can be exacerbated when pastures are overgrazed. Overgrazing reduces the buffering capability of the pasture, allowing surface runoff to drain to nearby streams or ditches unfiltered.

Land application of manure is often beneficial to the health of the soil and crop, and also serves as a useful method of disposal. However it can have the potential to contribute to *E. coli* levels in the St. Marys River Watershed. Guidelines are provided by the NRCS in Standard 633 to assist landowners in reducing the potential for manure-laden water to leave the field where it has been applied (USDA, 2009). Setbacks from streams and open waters, application rates, seasonal timing of the application and various other techniques are outlined in this Standard. While this information cannot be considered a law or regulation, it does encourage landowners to demonstrate their stewardship for the watershed in which they operate. Furthermore, the Adams County Planning Commission has an adopted ordinance, inflicting more stringent regulations for the operator than those set forth in state and federal guidance.

Manure can be land applied by a variety of methods; surface application followed by disking or chiseling to incorporate it into the soil, surface application without incorporation, injection into the soil, and irrigation. In the St. Marys River Watershed, surface application followed by incorporation or direct injection are viewed as the most favorable methods to reduce run off potential.

The number of livestock in the watershed was estimated by a windshield survey conducted during the summer of 2008. During the survey, livestock were recorded with a GPS as every road in the watershed was driven. In addition to major livestock types being observed and recorded, an estimated number of animals, facility age, if the animals were confined or pastured, and if livestock had stream access was also recorded. Table 61 identifies livestock numbers in the watershed.

St. Marys River Watershed Livestock Inventory		
Livestock Type	No. Operations Identified	Estimated No. Animals
Alpaca	1	12
Beef	257	3,033
Buffalo	1	10
Camel	1	2
Chickens	28	475,260
Dairy	21	3,565
Ducks	13	40,406
Goats	17	189
Horses	710	3,105
Pigs	98	94,799
Rabbits	1	200
Rats	1	500
Sheep	17	517

Table 61. Results of the St. Marys River Watershed Livestock Inventory

The following Figure 48 geographically shows locations where livestock were observed in the watershed as well as livestock type.

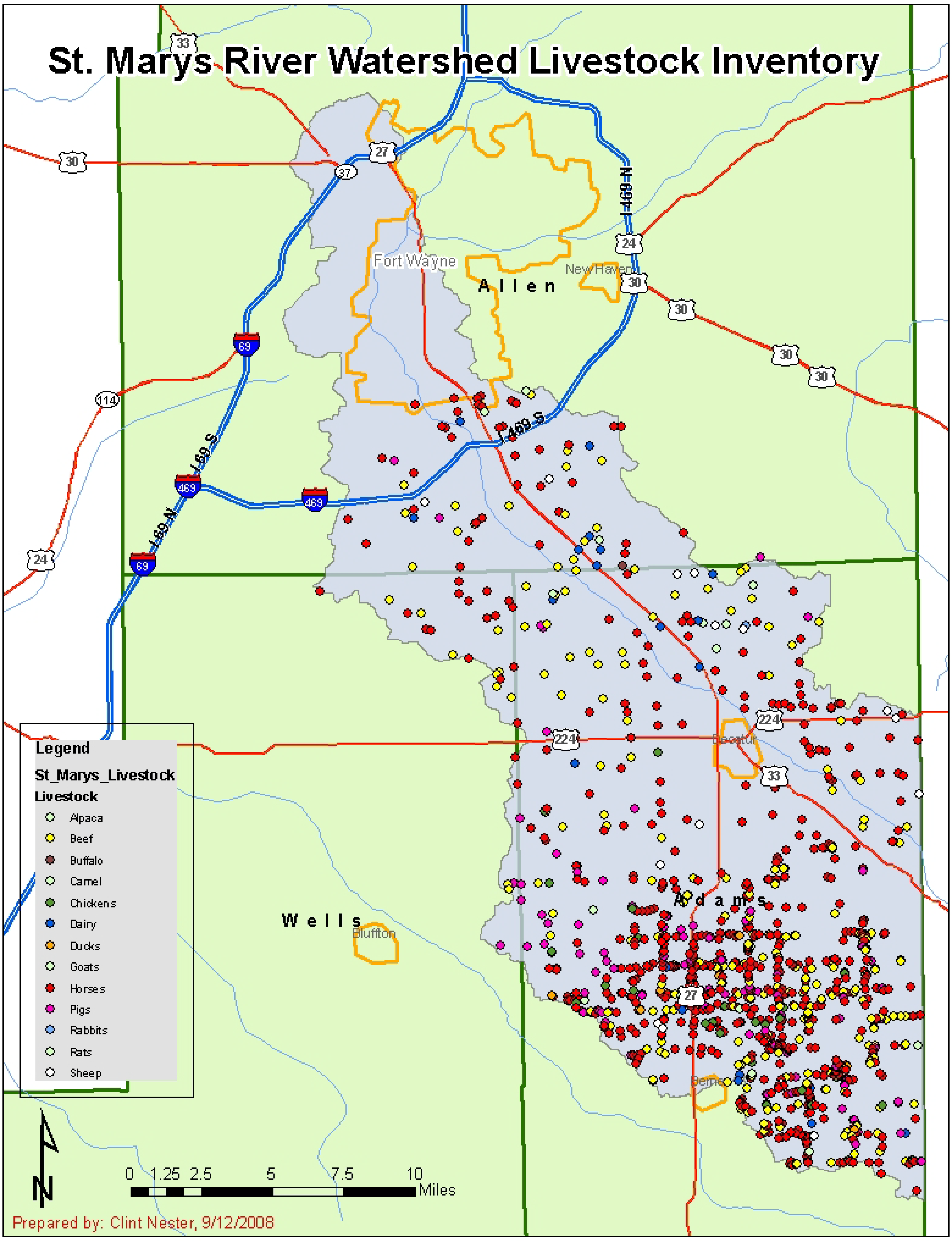

Figure 48. Livestock Operations in the St. Marys River Watershed.

4.4.2 Septic Systems

Septic systems contain all of the wastewater from a household or business that is not connected to a municipal sewer system. A complete septic system consists of a septic tank and an absorption field to receive effluent from the septic tank. The septic tank retains the solid waste, but the soil absorption field provides further absorption and treatment of the liquid waste. Septic systems can be a safe and effective method for treating wastewater if they are sized, sited, and maintained properly. Systems must be properly engineered and installed, located in suitable soils, and receive routine maintenance. If the tank or absorption field malfunctions or are improperly placed, constructed or maintained, nearby wells and surface waters may become contaminated.

Some of the potential problems from malfunctioning septic systems include:

- Polluted groundwater: Pollutants in septic effluent include bacteria, nutrients, toxic substances, and oxygen-consuming wastes. Nearby wells can become contaminated by failing septic systems.
- Polluted surface water: Groundwater often carries the pollutants mentioned above into surface waters, where they can cause serious harm to aquatic ecosystems. Leaking septic tanks can also leak into surface waters through or over the soil. In addition, some septic tanks may directly discharge to surface waters.
- Risks to human health: Septic system malfunctions can endanger human health when they contaminate nearby wells, drinking water supplies, and fishing and swimming areas.

Pollutants associated with onsite wastewater disposal may also be discharged directly to surface waters through direct pipe connections between the septic system and surface waters (straight pipe discharge). It is likely that some straight pipe discharges do occur in rural areas of Adams, Allen, and Wells Counties.

In rural portions of Adams, Allen, and Wells Counties, septic systems are the normal mechanism used for residential wastewater treatment. However, it is important to mention that the majority of soils, especially those in Adams County, are classified as having severe limitations for conventional septic systems. This classification is mainly due to the high clay content of the soils, which inhibits proper percolation of the waste effluent into the soil. This may cause wastewater to remain in the upper levels of the soil profile and in some cases rise to the surface or drain laterally, often to a drainage tile or nearby stream. Figure 8 identifies areas in the watershed with septic limitations due to soil conditions. Figure 49 highlights known septic areas in the watershed. In Allen County, the yellow dots represent areas of known septic systems, installed since 2003, systems installed prior to 2003 are unmapped. This map does not identify locations of older septic systems in Allen County. In Adams County, the color coded dots represent areas of known concentrated septic systems. These areas were identified by the Adams County Health Department as areas with a concentrated amount of systems. Individual septic systems have not been mapped in the county.

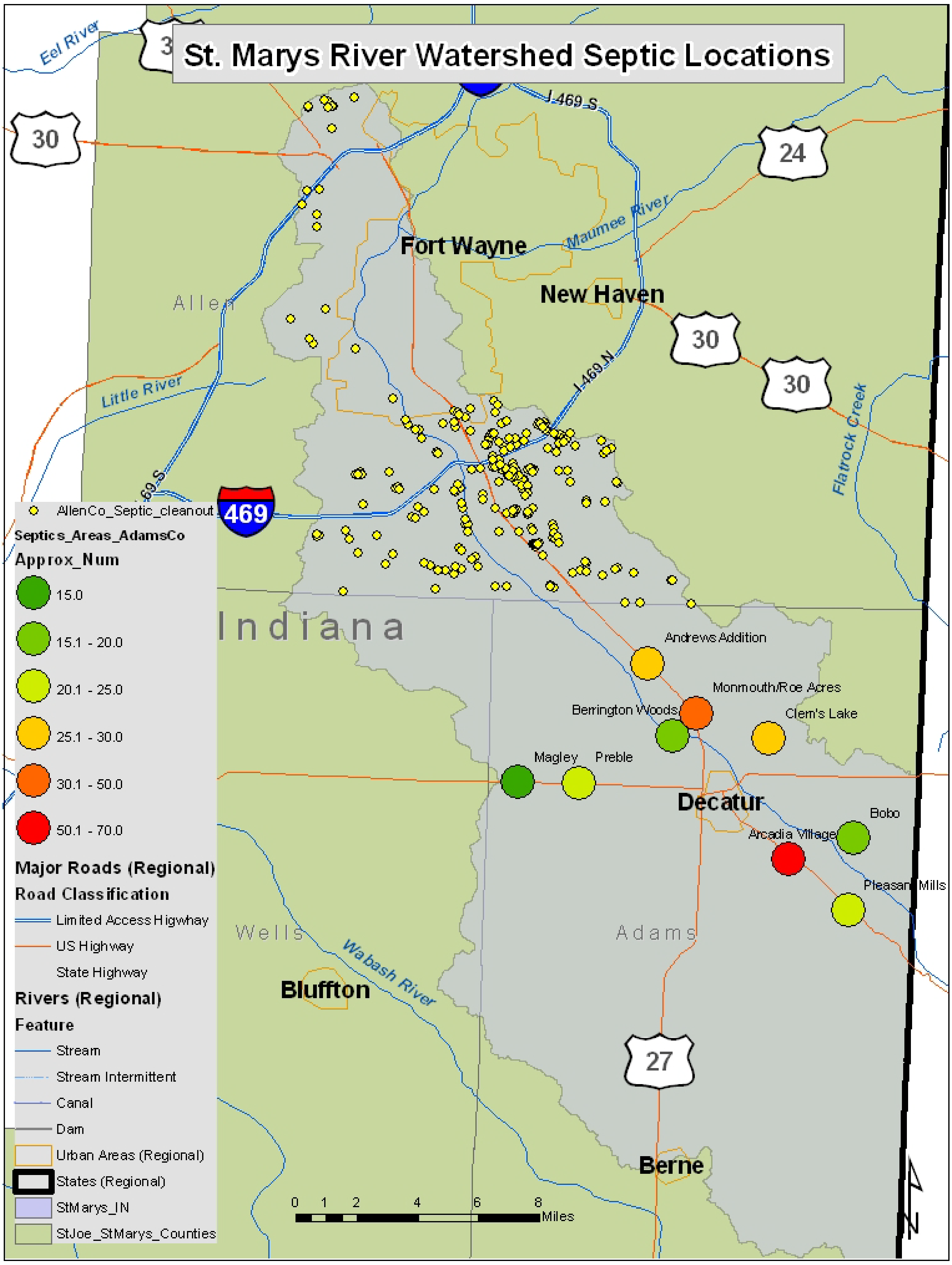

Figure 49. Areas of known septic systems in the St. Marys River Watershed

The St. Marys TMDL sampled near three communities using septic systems in the watershed. In the vicinity of all three communities *E. coli* levels were extremely elevated, consistent with septic system discharge.

In Adams County, Mr. Terry Smith, Sanitarian/Environmental Director with the Adams County Health Department estimates that 30% of the rural homes in Adams County have onsite septic systems that do not pollute the environment and are in compliance with federal, state, and local regulations. However, Mr. Smith acknowledges that the other 70% are not in compliance. He estimates that approximately 1,660 “English” and 830 “Amish” homes discharge about 500,000 gallons of untreated wastewater into the county’s drainage systems every day. (T. Smith, 2007)

In July, 2003, the Allen County Board of Commissioners, with support and guidance from the Fort Wayne - Allen County Department of Health, created the Allen County Onsite Wastewater Management District. This District was created to allow Allen County to utilize legislation permitting surface discharge systems for existing homes with no other options, as well as to enforce regular maintenance on all newly installed systems. Effective September 20, 2004, owners of all newly installed, repaired, or modified septic systems must become members of the District and are charged a membership fee.

The District contracted with the Department of Health to provide many of the services required to be performed by the District. Each system is inspected when the operating permit is due for renewal. The homeowner is then notified of maintenance items which must be addressed prior to the renewal of the operating permit. The whole goal of this program is to prolong the useful life of an onsite sewage system, and to ensure the overall health of the community.

4.4.3 Wildlife & Pet Waste

Wildlife and pet wastes can contribute significantly to the concentrations of bacteria and organic matter in stormwater runoff. The St. Marys TMDL recognizes that agricultural and forested areas in the watershed create ideal wildlife habitat. Therefore, wildlife would contribute during all flow conditions with possible spikes during extreme high flow events due to runoff and flooding. The presence of wildlife has been shown to result in elevated levels of ammonia, organic nitrogen, and *E. coli* bacteria. Recent studies in Maryland and other states have shown that domestic pet waste is among the top five sources of bacteria in contaminated waters and in some areas, more of a fecal coliform contributor than humans. (Maryland Dept. of the Env., www.epa.gov) Pet wastes can be partially controlled through municipal ordinances requiring the collection and removal of the wastes from curbsides, yards, parks, roadways and other areas where the waste can be washed directly into receiving waters and/or storm drains. As the more urban areas within the watershed continue to grow in size and population, the impact of pet waste may become more of an issue and should be investigated further at that time. The St. Marys WMP recognizes that wildlife contributions may be a hard source to control, therefore public education will be conducted in regards to Canadian Geese control and wildlife feeding.

4.5 Trash and Debris

Trash and debris is a potential contributor to water quality impairments in the St. Marys River Watershed. A variety of pollutants such as oils, paints, solvents, and chemicals have the potential to pollute surface waters in the St. Marys River Watershed. These chemicals can reach streams and ditches through illegal dumping activities, inadvertent spills, as well as lack of “good housekeeping” at industries, businesses and residential homes. Visual evidence of illegal dumping activities has been observed during windshield surveys of the watershed. Furthermore, the City of Decatur Stormwater Coordinator has expressed a concern over lack of “good housekeeping” at local businesses and industries.

4.6 Toxic Chemicals

Toxic Chemicals, mainly referring to pesticides in the agricultural sector, include a broad array of chemicals used to control plant growth (herbicides), insects (insecticides), and fungi (fungicides). These chemicals have the potential to enter and contaminate water in the St. Marys River Watershed through direct application, runoff, wind transport, and atmospheric deposition. They can kill fish and wildlife, contaminate food and drinking water sources, and destroy the habitat that animals use for protective cover. Of specific concern are Atrazine levels, which can cause health effects in both humans and wildlife. Atrazine is widely utilized in corn production and is a contaminant of concern for drinking water supplies both locally and nationally. Other herbicides and pesticides used on corn, soybeans, and for pest control on livestock also have the potential to impact surface water.

While some pesticides undergo biological degradation by soil and water bacteria, other pesticides are very resistant to degradation. Such non-biodegradable compounds may become “fixed” or bound to clay particles and organic matter in the soil. However, many pesticides are not permanently fixed by the soil, and instead they collect on plant surfaces and enter the food chain, eventually accumulating in wildlife such as fish and birds. Many pesticides have been found to negatively affect both humans and wildlife by damaging the nervous, endocrine, and reproductive systems or causing cancer (Kormandy, 1996). Excessively high levels of Atrazine were observed throughout the watershed during water quality monitoring during the 2008 growing season.

Mercury and PCB’s are also a concern in the watershed. The 2008 303(d) list identifies Junk Ditch and portions of the St. Marys River as being impaired because of the aforementioned parameters. This concern was also identified in the 2008 Fish Consumption Advisory. The 2008 Fish Consumption Advisory lists advisories for a number of species in the Allen County portion of the St. Marys River. The FCA also points out that there is a statewide advisory for carp consumption due to bioaccumulation of PCB’s. Appendix VI provides more information regarding specific species and locations.

A variety of pollutants such as oils, paints, solvents, and household chemicals also have the potential to pollute surface waters in the St. Marys River Watershed. Results of the Social Indicator survey show that 62.9% of respondents see improper disposal of household waste as a potential water quality problem in the watershed.

4.7 Point Source Pollution Sources

Point source contributors to pollution can be located at a particular point on a map. They are easily identified because pollution is discharged from the end of a pipe. In the state of Indiana, point sources account for about 25% of all pollution (IDNR Hoosier

Riverwatch). Point sources may include discharge sources from factories and industries, municipal sources such as combined sewer overflows (CSO) or wastewater treatment plants (WWTP). The following Figure 50 shows the geographic location of CSO's in the watershed.

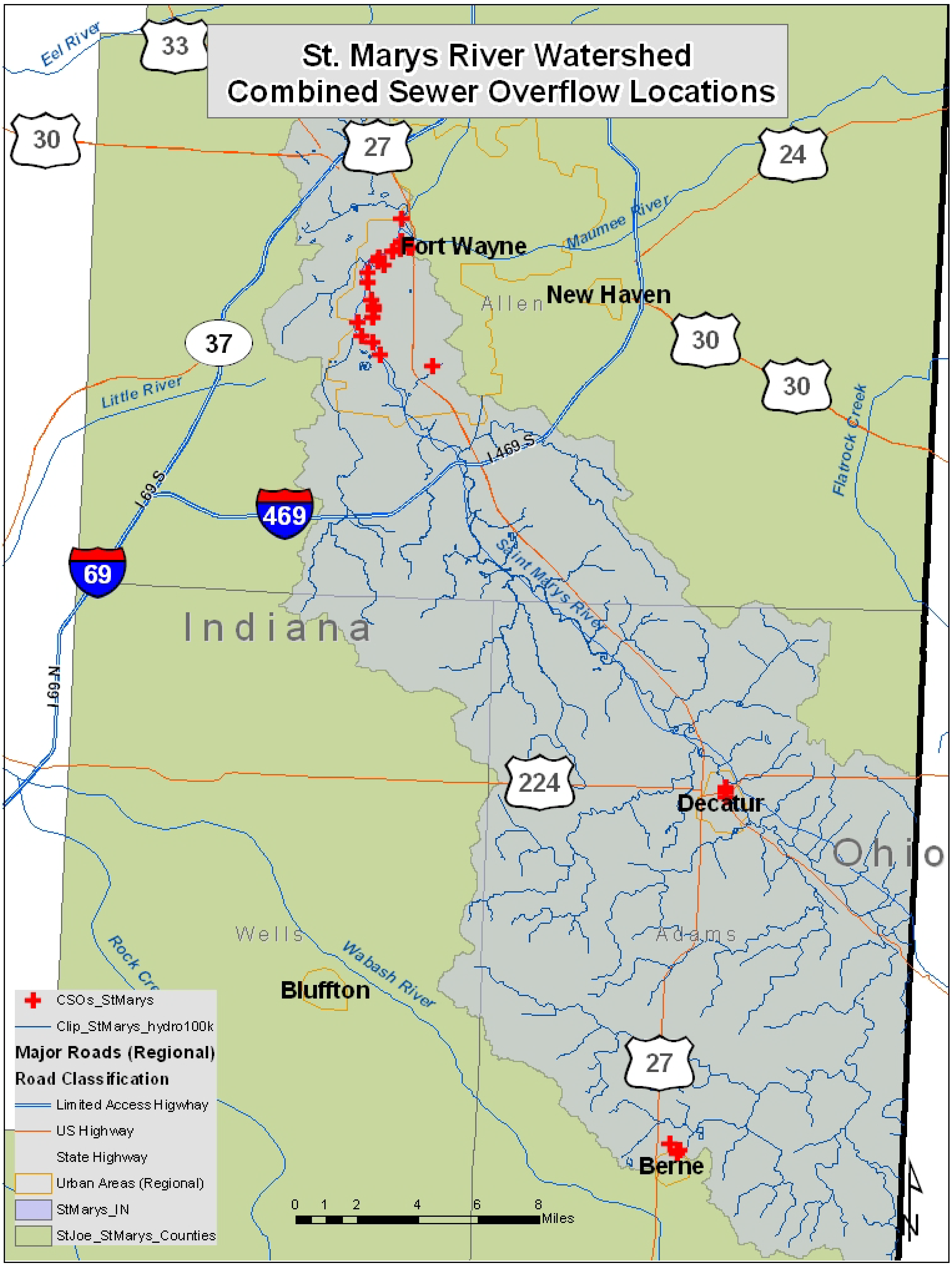

Figure 50: CSO locations in the St. Marys River Watershed.

Point sources may also include leakage or outflow from landfills, petroleum or chemical storage facilities, and any other pollution source that can be pinpointed by a discharge pipe. The primary pollutants associated with point source discharges are oxygen demanding wastes, nutrients, sediments, toxic substances, ammonia and metals. It should be noted that the WMP will not focus on resolving concerns related to point source discharges and pollution. The St. Marys River Watershed Project will acknowledge that point sources are regulated by state and federal government and regulatory measures will be left to the discretion of the appropriate governing body. However, these sources will be identified as possible pollutant sources in order to provide a comprehensive listing of potential sources.

4.7.1 Industrial Facilities

Wastewater point source discharges include municipal (city, town, or county) and industrial wastewater treatment plants and small domestic wastewater treatment systems that may serve schools, commercial offices, residential subdivisions, and individual homes. Stormwater point source discharges include stormwater discharges associated with industrial activities and stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) operated by municipalities and counties.

Point sources are regulated through the National Pollution Discharge Elimination System (NPDES) permitting process. Permits are issued in Indiana by the Indiana Department of Environmental Management (IDEM). There are approximately 20 NPDES permits in the St. Marys watershed. The following Table 62 identifies NPDES facilities in the St. Marys River Watershed.

Facility Information *(Select Name to Read Report)*	**Program ID#**	**Inspections (5 yrs)**	**Qtrs in Non Compliance (3 yrs)**	**Alleged Current Significant Violations**	**Informal Enforcement Actions/NOVs (5 yrs)**	**Formal Enforcement Actions (5 yrs)**
ALLEN COUNTY REGIONAL SEWER DISTRICT FLAT ROCK RD & MINICK RD ARCOLA, IN 46704 FRS ID: 110009974796 0.08399 MGD Houk Ditch	ICP: IN0048119	4	n/a	n/a		ⓘ
B&B CUSTOM PLATING 6214 HOAGLAND RD, RR1 BOX 59 HOAGLAND, IN 46745 FRS ID: 110003082333 0.00100 MGD Unnamed Trib.	ICP: IN0052302	1	n/a	n/a		ⓘ
	RCR: IND064708910			no		ⓘ
BERNE MUNICIPAL WWTP SITE 1 305 S JEFFERSON ST BERNE, IN 46711 FRS ID: 110006766767 0.63800 MGD Habegger Ditch	ICP: IN0021369	4	n/a	n/a	2	1
CENTRAL SOYA INC 1200 N 2ND ST DECATUR, IN 46733 FRS ID: 110000400325 0.64999 MGD St. Marys River	AFS: 1800100005	4	12	no		1
	ICI: 05-2005-4530			no		1
	ICP: IN0000591	3	n/a	n/a		ⓘ
	RCR: IND005129499			no		ⓘ

Facility Information *(Select Name to Read Report)*	**Program ID#**	**Inspections (5 yrs)**	**Qtrs in Non Compliance (3 yrs)**	**Alleged Current Significant Violations**	**Informal Enforcement Actions/NOVs (5 yrs)**	**Formal Enforcement Actions (5 yrs)**
COUNTRY ACRES ASSOCIATION 4205 N 100 W DECATUR, IN 46733 FRS ID: 110009974224 0.01499 MGD Kohne Ditch	ICI: 05-2003-4035			no		1
	ICP: IN0055417	3	n/a	n/a		
DECATUR MUNICIPAL WWTP 1309 MONMOUTH ROAD DECATUR, IN 46733 FRS ID: 110006645513 2.80000 MGD St. Marys River	ICP: IN0039314	6	10	no		
	RCR: INT190014498			no		
DELI DEPOT 1810 COLISEUM BLVD FORT WAYNE, IN 46808 FRS ID: 110006767579 0.02099 MGD Spy Run Creek	ICP: ING080095	1	n/a	n/a		
FORT WAYNE METALS 9609 INDIANAPOLIS RD FT WAYNE, IN 46809 FRS ID: 110003081398 0.03999 MGD Bradbury Ditch	ICP: ING250026	2	n/a	n/a		
	RCR: IND056041122			no		
HESSEN UTILITIES INC 10744 US 27 S FT WAYNE, IN 46816 FRS ID: 110012318189 0.06400 MGD Marion Ditch	ICP: IN0045292	4	n/a	n/a	1	
MESHBERGER BROS STONE CO PLT 2 JCT OF SR 101 & SR 124 PLEASANT MILLS, IN 46780 0.81000 MGD Blue Creek	ICP: IN0044571		n/a	n/a		
MILL ROAD ESTATES 15001 MILL ROAD FT WAYNE, IN 46816 FRS ID: 110009973387 0.01530 MGD St. Marys River	ICP: IN0109835	4	n/a	n/a		1
MONROE PUBLIC WATER SUPPLY 102 S POLK MONROE, IN 46772 FRS ID: 110006680582 0.00200 MGD Yellow Creek	ICP: IN0048151	5	n/a	n/a		
OAKRIDGE ESTATES M H P 2950 W CR 100 N DECATUR, IN 46733 FRS ID: 110012139809 0.03500 MGD Bulham Ditch	ICP: IN0036901	5	n/a	n/a		
RUAN TRANSPORT CORP 910 W WASHINGTON ST DECATUR, IN 46733 FRS ID: 110006767187 0.01799 MGD N/A	ICP: INP000194	2	n/a	n/a		
SAINT JOSEPH SCHOOL 11337 OLD US 27 SOUTH FORT WAYNE, IN 46816 0.00800 MGD	ICP: IN0057207		n/a	n/a		

Facility Information *(Select Name to Read Report)*	**Program ID#**	**Inspections (5 yrs)**	**Qtrs in Non Compliance (3 yrs)**	**Alleged Current Significant Violations**	**Informal Enforcement Actions/NOVs (5 yrs)**	**Formal Enforcement Actions (5 yrs)**
Unnamed Trib.						
SOUTHCREST MOBLE HOME PARK 11410 U.S. 27 SOUTH FORT WAYNE, IN 46816 0.01200 MGD St. Marys River	ICP: IN0029831		n/a	n/a	1	
STONE-STREET QUARRIES, INC. 5536 HOAGLAND RD HOAGLAND, IN 46745 FRS ID: 110009738917 0.03999 MGD Unnamed Trib.	ICP: IN0000612	3	n/a	n/a		
TORQUE TRACTION MFG TECH INC 2100 W STATE ST FT WAYNE, IN 46808 FRS ID: 110000401155 1.36300 MGD Newhaus Ditch	AFS: 1800300003	3		no		
	ICP: IN0000388	2	7	no		
	RCR: IND005470885	1	12	no	1	
UNITED TECHNOLOGIES CORPORATION 917 LIECHTY RD BERNE, IN 46711 FRS ID: 110000400165 0.00000 MGD Habegger Ditch	AFS: 1800100023	4		no		
	ICP: INP000069	3	n/a	n/a		
	ICP: IN0058980	3	n/a	n/a		
	RCR: IND152719878	1		no	1	
WHITE HORSE MOBILE HOME PARK RR 4 DECATUR, IN 46733 FRS ID: 110012139818 0.01200 MGD Borum Run	ICP: IN0044199	3	n/a	n/a		

Table 62. NPDES facilities in the St. Marys River Watershed
www.epa-echo.gov/echo/compliance_report_water.html

Figure 51 shows locations of NPDES permitted locations in the watershed.

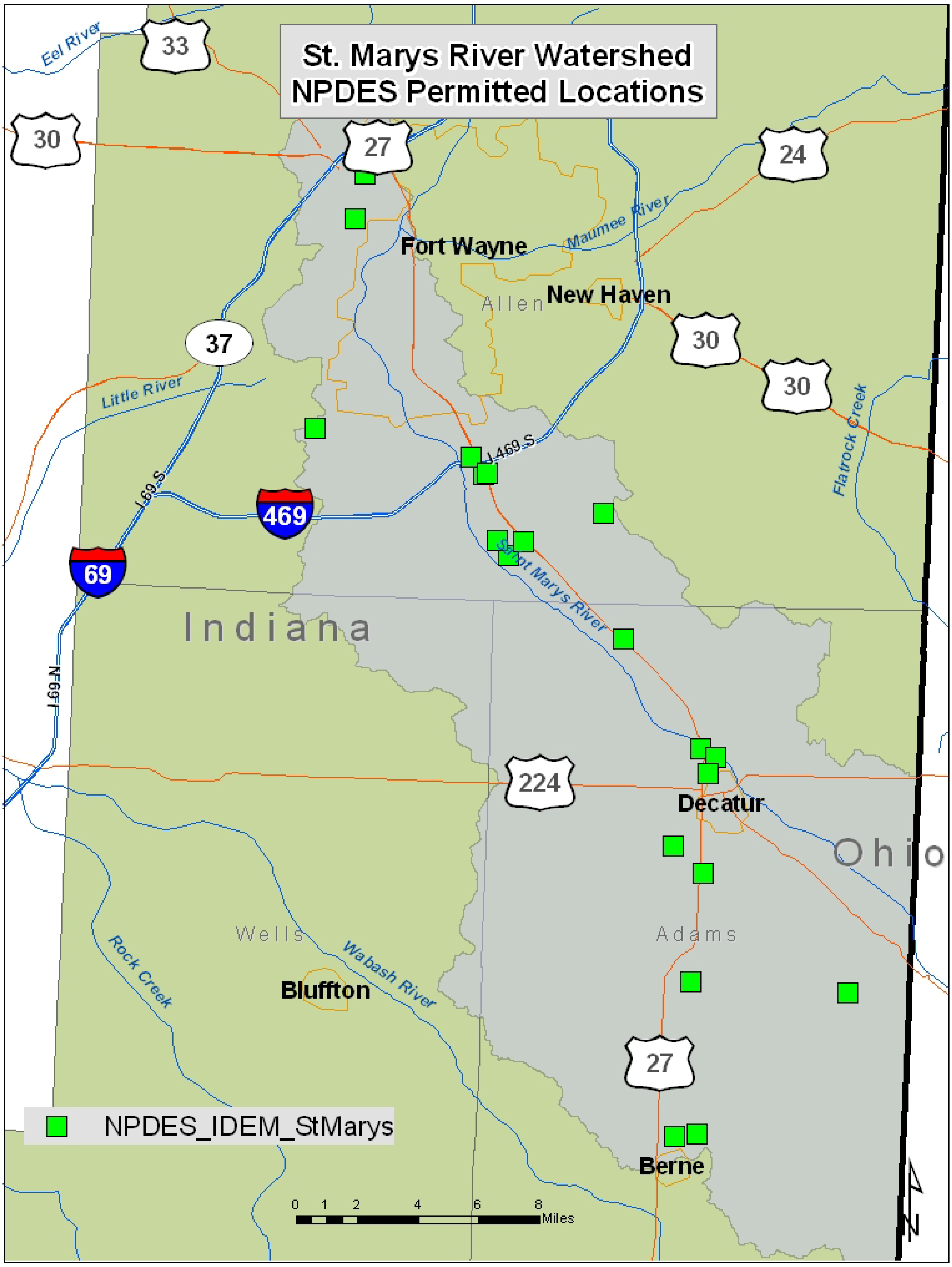

Figure 51. NPDES facilities in the St. Marys River Watershed.

4.7.2 Confined Feeding Operations

Confined Feeding Operations (CFOs) are also considered to be a potential point source discharger and are required by Indiana law to obtain a permit from IDEM's Office of Land Quality for operation. Livestock operations with at least 300 cattle, 600 swine, 600 sheep, or 30,000 fowl for at least 45 days within a 1 year period are designated as a CFO and must complete the permitting process prior to construction of the facilities. Furthermore, any existing operation with fewer animals but wishing to expand to the numbers listed above must apply for and obtain an IDEM permit. Smaller operations with a previous water quality violation may also be designated as a CFO even though they fall under the threshold limit. Larger operations known as Concentrated Animal Feeding Operations (CAFOs) are also required to obtain a permit due to the number of animals present at the operation. Table 63 summarizes CFO and CAFO limits.

CFO and CAFO Limits		
Species	**CFO**	**CAFO**
Cattle	300	
Dairy Cows		700
Veal Calves		1,000
Beef Cattle		1,000
Swine	600	
Swine, 55 lbs. or more		2,500
Swine, 55lbs. or less		10,000
Horses		500
Sheep / Lambs	600	10,000
Poultry	30,000	
Turkeys		55,000
Chickens (liquid manure)		30,000
Laying Hens (not liquid manure)		82,000
Not Laying Hens (not liquid manure)		125,000
Ducks (liquid manure)		5,000
Ducks (not liquid manure)		30,000
Source: USEPA / IDEM		

Table 63. CFO and CAFO Limits.

In order to successfully obtain the NPDES permit, a facility must prove the following: a minimum of 180 days storage for manure, adequate acreage for application of manure, minimum distances from wells and surface waters, a Manure Management Plan has been completed and that there is a sufficient level of record keeping regarding the facility and associated activities.

According to IDEM's records, there are 51 permitted facilities in the St. Marys River Watershed. Table 64 presents livestock operations by county and type. The concern surrounding these operations is the increased amount of manure, *E. coli* and nutrients produced yearly and the potential for leaching or overland runoff of those nutrients into nearby streams and tributaries. Manure contains nutrients such as nitrogen and phosphorus that are beneficial for crop production but in large quantities, are detrimental to water quality. These nutrients, if allowed to enter the water system, will cause increased algal growth leading to increased turbidity and lower levels of dissolved oxygen as the algae and plants decompose. Also present in the manure is E. coli bacteria. E. coli presents a human health risk to both humans and livestock when present in surface waters.

Confined Livestock in the St. Marys River Watershed											
		Dairy		Beef		Swine		Poultry		Sheep	
County	CAFO/CFO	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals
Adams	49	1	1,912	2	558	39	80,144	11	726,292	1	600
Allen	2	0	0	0	0	2	1,342	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0
Totals	51	1	1,912	2	558	41	81,486	11	726,292	1	600
Source: IDEM, Office of Land Quality, 2007											

Table 64. Confined Livestock in the St. Marys River Watershed.

Figure 52 shows the locations of confined feeding operations permitted by IDEM in the St. Marys River Watershed.

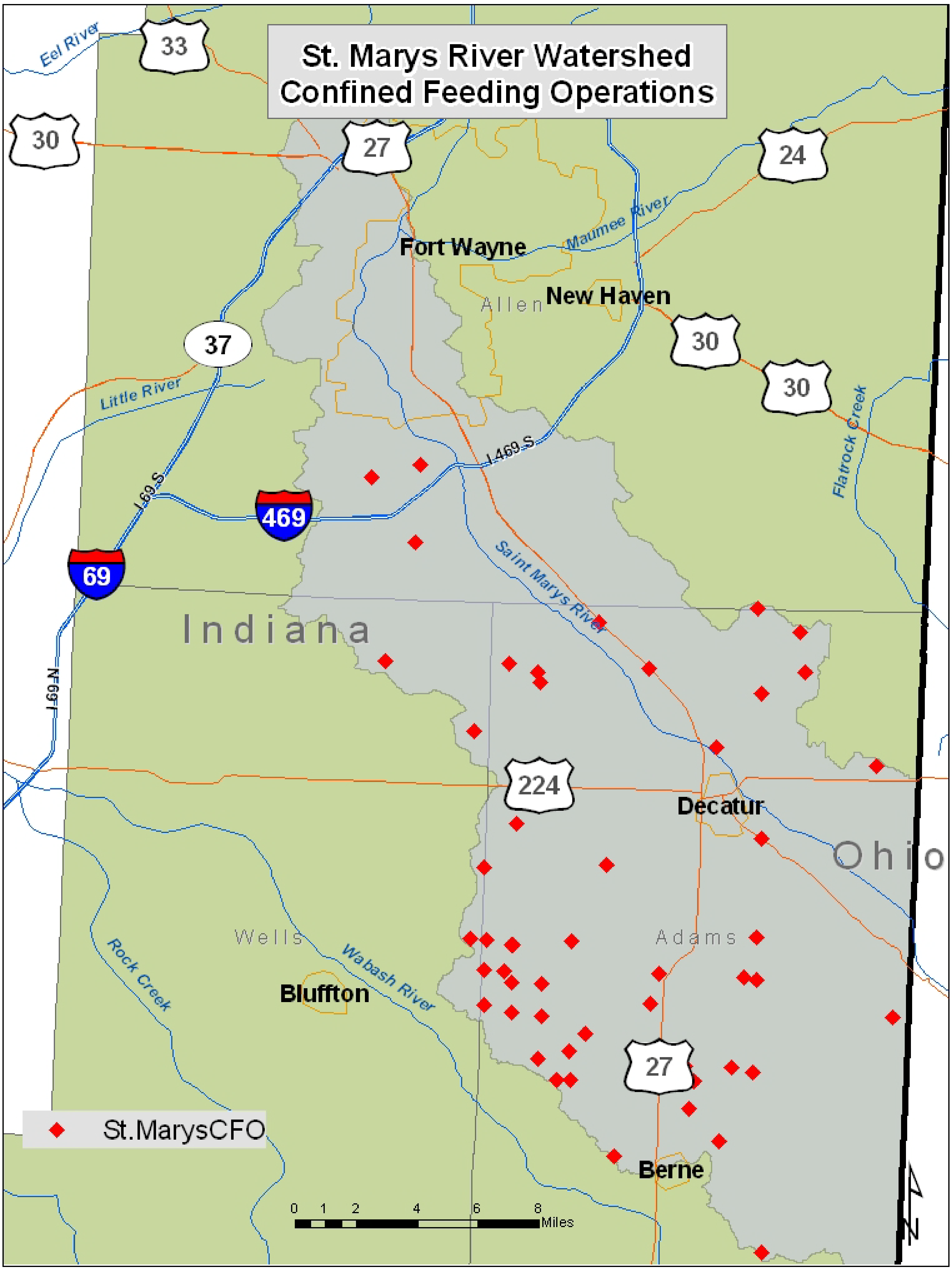

Figure 52. Confined feeding operations permitted by IDEM in the St. Marys River Watershed.

In addition to IDEM livestock permitting, the Adams County Planning Commission developed an intensive livestock operation ordinance in 1976 and modified it in 1997-1998. This ordinance was in response to the high livestock numbers within the county. Sections of this ordinance are more restrictive than corresponding state rules on confined feeding operations. Adams County is more restrictive than the sate in two areas. First, Adams County requires operations to obtain a permit if they have 400 swine, 200 cattle or 20,000 head of poultry. The State of Indiana requires a permit when numbers exceed 600 swine, 300 cattle, or 30,000 poultry. Secondly, Adams County requires operations of any size to be permitted if the landowner does not own the required acreage for manure application.

It should be noted that in addition to the facilities mentioned above, there are a substantial amount of operations with numbers of horses, sheep, hogs, cattle, and/or poultry below the minimum extent of the permitting requirement. This is especially the case in southern Adams County where there is a very large Amish community who rely on such animals for sustenance and transportation. To encompass these small livestock operations, a watershed-wide livestock inventory has been completed. Table 16 details the results of the survey.

5.0 IDENTIFICATION OF CRITICAL AREAS

This section will identify and detail critical areas as designated by the Steering Committee. Taking a “worst-first” approach, the following critical areas have been listed by the committee as those areas being highly impaired, and being important target areas.

Conventionally Tilled Agricultural Fields Adjacent to a Stream or Ditch

Conventional tillage of crop land allows the soil to remain exposed to the elements for extended periods of time. The majority of conventional tillage is completed following the crop harvest in the fall and no crop residue remains on the surface of the field. Thus the topsoil is exposed to the snow and more importantly to the spring snow melts and rain events. As the snow melts and the rain falls, the potential for soil erosion and the resulting sedimentation of receiving waters is greatly increased and nearly guaranteed. Associated with erosion is nutrient and herbicide runoff. Nitrogen compounds are very water soluble and are carried in surface runoff. Phosphorus particles bind to soil particles and are carried into surface waters through erosion. Many common herbicides, including Atrazine are dissolved in water and carried with surface runoff or attach to soil particles and lost by erosion.

Figure 53. Conventional Tillage Adjacent to a Ditch. Photo courtesy of NRCS.

In the St. Marys River Watershed, conventional tillage continues to be the primary means of tillage for row crop production. Figure 54 shows an example of a producer using conventional tillage adjacent to a ditch. Critical areas have been identified for conventionally tilled fields located adjacent to any open ditch or stream. Figure 53 represents all land parcels in the two HUC’s that are adjacent to an open ditch or stream. It should be noted that all parcels identified in Figure 54 are not necessarily currently under conventional tillage. This Figure is only meant to represent an approximate area.

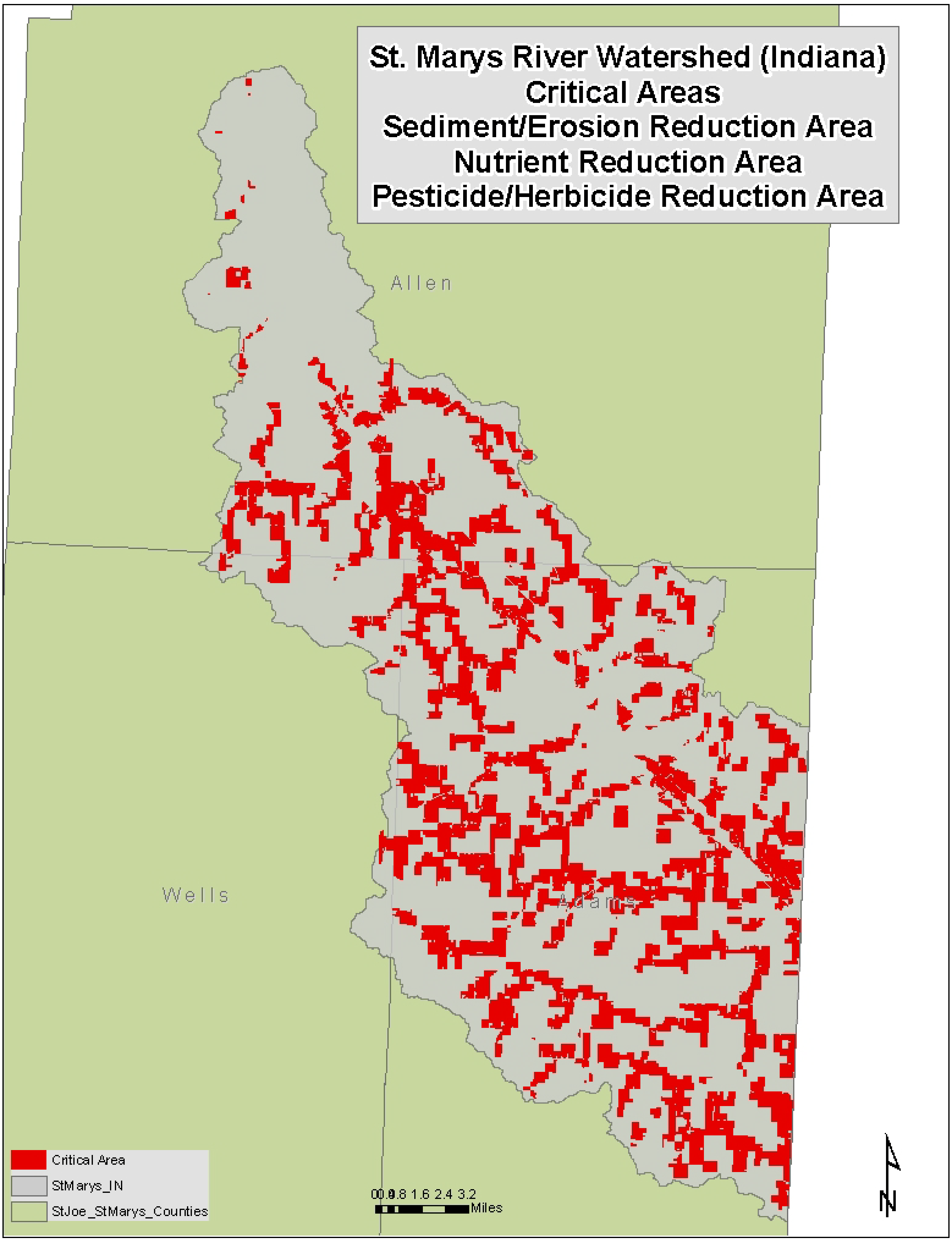

Figure 54. Critical Areas for Conventionally Tilled Agricultural Land.

Areas of Significant Erosion Resulting in Large Gullies

Gully erosion is defined as erosion in channels where runoff water accumulates and removes soils from this channel area. Gullies remove portions of land completely from production, and also contribute to downstream sedimentation problems.

Gullies often develop from intense erosion caused by flow over a steep overfall at the top of the gully. This overfall, called a headcut, moves upstream in a natural drainage way, and it can be initiated off-site and move into field. Gullies can also be enlarged by lateral erosion, sloughing of their sidewalls and cleaning out of debris by flow in the gullies.

Depending on the scale, gullies are divided into two types: ephemeral gully and classical gully. Ephemeral gullies are wider and deeper than rills, but they can be tilled and filled partially or completely. Although the ephemeral gully can be filled in or obliterated by tillage operations, it tends to reappear later at the same location because the depression formed on the landscape will concentrate the runoff. Classical gullies are eroded channels too large to cross and obliterate with tillage equipment. Figure 55 illustrates an example of a classical gully.

Figure 55. Gully Erosion in Adams County, IN. Photo courtesy of Allen Co. SWCD

For the purposes of this WMP, only classical gullies creating significant downstream sedimentation will be considered critical. Gully length, depth, slope, and proximity in the watershed will be evaluated when determining classical gully status.

Unbuffered Stream Reaches

Conservation buffers, or filter strips, are vegetated corridors with or without woody plants established along natural water courses and even constructed drainage ditches. Such buffers are an integral part of the form and function of a healthy water system. Although the appearance of conservation buffers differs between natural streams and drainage ditches, the functions remain the same – to improve water quality by filtering and trapping sediments and pollutants carried by overland runoff, to reduce the velocity of stormwater, and to create important aquatic and terrestrial wildlife habitats.

Field research on buffer width has been conducted in Indiana, Iowa, Maryland and Virginia. All research has shown that filter strips are an effective method for sediment removal, with average reductions ranging from 56-95 percent, depending on soil characteristics, slope, rainfall, runoff conditions, and buffer width. Iowa research demonstrated little improvement in filter effectiveness beyond a 30 foot buffer width. Research demonstrating the effects of buffers on nutrient removal showed mixed results. Total phosphorus removal ranged from 0 to 83%, and nitrogen removal ranged from 27 to 87% (OSU, 2009).

Figure 56. Unbuffered Stream Reach. Photo courtesy of NRCS.

Through visual inspection of digital aerial photography and on the ground inspections, it is clearly evident that there is a lack of vegetated buffers on one or both of the stream banks in the St. Marys River Watershed. Many of these stream miles are centered in row crop land use. With little to no protection and filtering capabilities, these streams have a greater risk potential of being subjected to overland runoff contaminated with excess nutrients, bacteria and soil particles. Figure 56 illustrates an example of an unbuffered stream reach. The St. Marys River Watershed Project has completed an inventory of existing buffers in the watershed. Stream reaches with an existing buffer of 20 feet or less, south of US 224 will be considered a critical area. Figure 57 geographically shows unbuffered stream reaches in the St. Marys River Watershed. The area south of 224 was selected due to the large Amish population in the area. This critical area will focus on the Amish as they are not as typical users of federal cost share programs. It is assumed that English producers in this area and to the north will utilize existing CRP programs to install buffers.

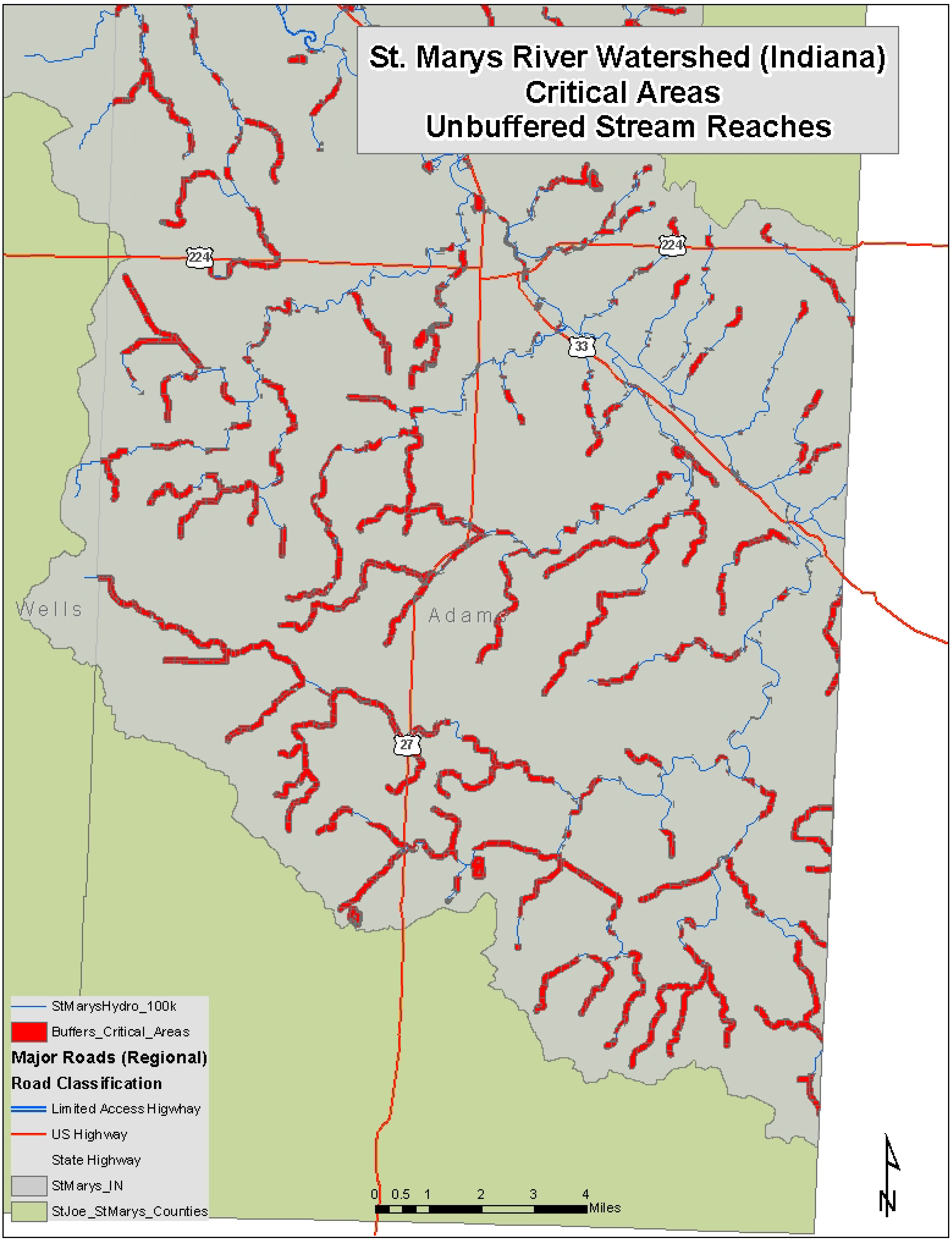

Figure 57. Stream Reaches in the St. Marys River Watershed with a buffer of 20 feet or less.

Critical Livestock Operations

Specifically in the southern portion of the St. Marys River Watershed, grazing livestock in pasture lands or livestock in feedlots have the potential to provide a significant contribution of bacteria. If livestock are allowed unrestricted access to streams and creeks bisecting pasture lands; or if feedlots are located within close proximity to a stream, stormwater runoff or the direct deposit of manure will dramatically increase levels of potentially pathogenic bacteria in the water. Livestock with unrestricted access to streams and creeks have been observed throughout the watershed. Figure 58 illustrates an example of livestock with access to a stream. The St. Marys WMP will designate Animal Feeding Operations (AFO's) and Confined Feeding Operations (CFO's) in the St. Marys River Watershed critical if they meet any of the following circumstances.

Figure 58. Livestock in Stream.
Photo courtesy of NRCS.

- Livestock have direct access to a stream or ditch
- Operation has inadequate on site waste storage
- Operation has inadequate land to apply waste
- Improper land application techniques are being utilized, allowing for direct runoff of waste to a stream or ditch

AFO's are defined by IDEM as (IDEM, 2007):

> *Any agricultural operation where animals are kept and raised in confined situations. It is a lot or facility (other than an aquatic animal production facility) where the following conditions are met:*
> - *Animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and*
> - *Crops, vegetation, forage growth, or post-harvest residies are not sustained in the normal growing season over any portion of the lot or facility.*

CFO's are defined by IDEM as (IDEM, 2007):

> *Any AFO engaged in the confined feeding of at least 300 cattle, or 600 swine or sheep, or 30,000 fowl, such as chickens, turkeys, or other poultry. The IDEM regulates these confined feeding operations, as well as small operations which have violated water pollution rules or laws, under IC 13-18-10.*

For the purposes of the St. Marys WMP, all livestock types will be included. CAFO's are not eligible for funding. Figure 59 shows locations of identified confined livestock operations and locations where livestock have direct stream access in the St. Marys River Watershed. Note: Locations of livestock with direct access and confined livestock may exist that were not identified during the 2008 livestock survey.

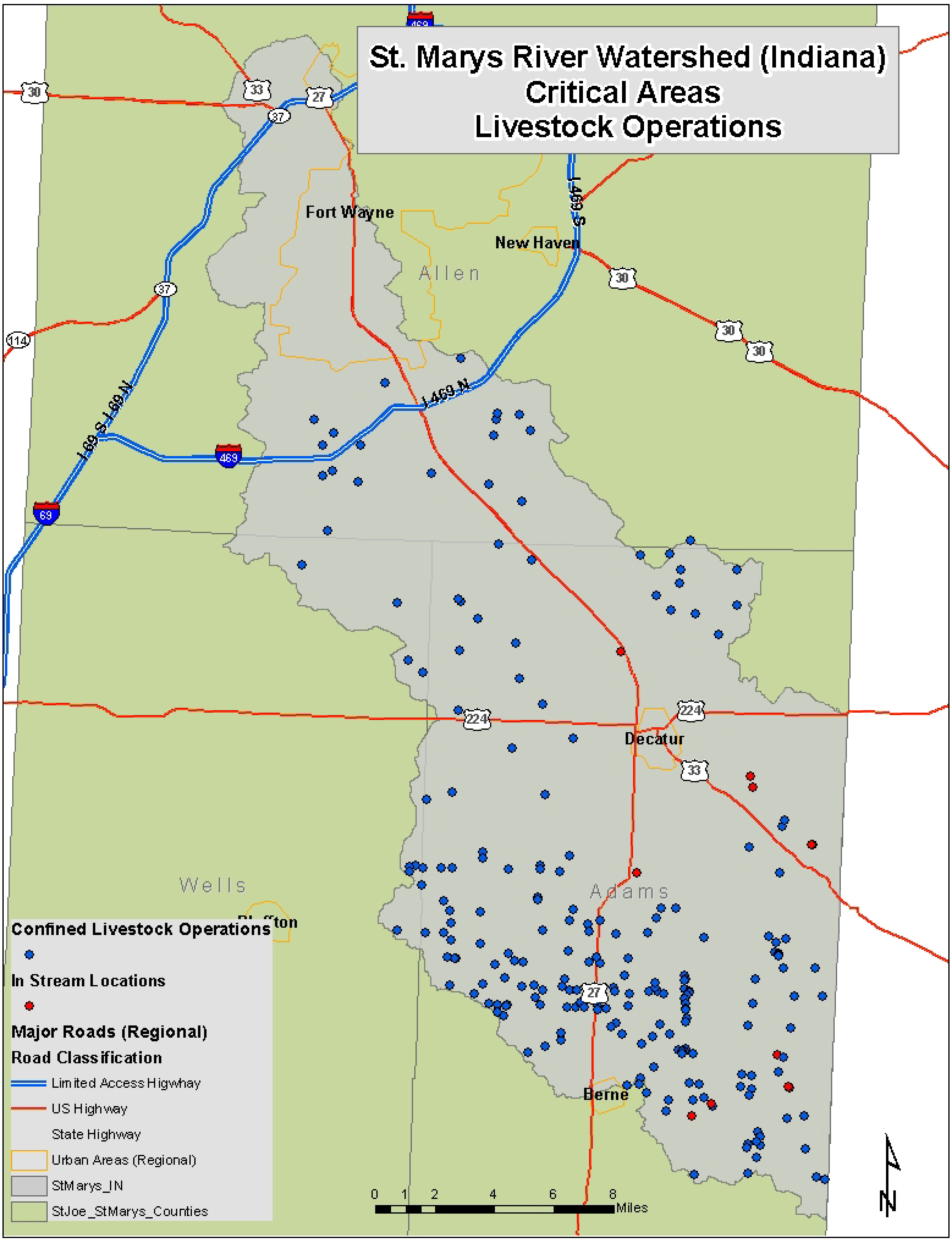

Figure 59. Livestock Operations in the St. Marys River Watershed.

The Regulatory Flood Hazard Area

Due to topography and natural features of the St. Marys River Watershed, flooding is an inevitable disaster. Structural damage and the potential for pollutant sources to enter the waters are also associated with the flooding. Therefore, the critical area will be the Regulatory Flood Hazard Area. The Steering Committee will look to the Maumee River Basin Commission for direction on these critical areas. Figure 60 illustrates a schematic of the regulatory flood hazard area.

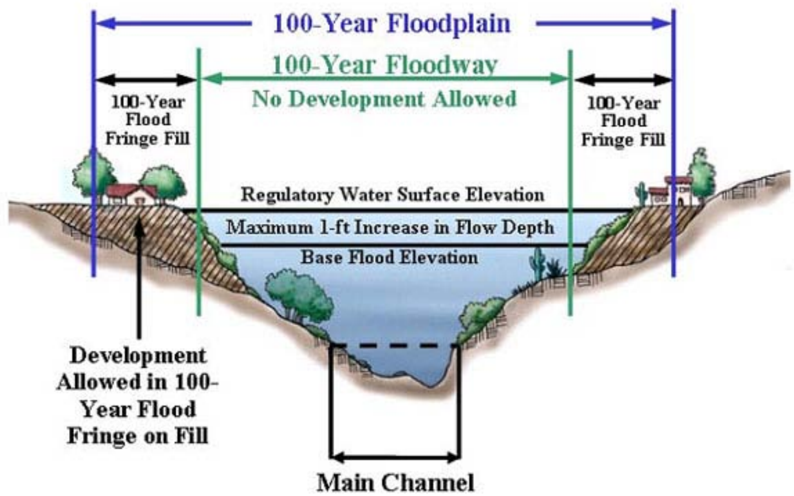

Figure 60. Schematic of the Regulatory Flood Hazard Area
Photo courtesy of Pinal County, AZ

The MRBC has played a vital role in flood protection in the St. Marys River Watershed. MRBC has developed and implemented the "Voluntary Buyout Cost-Share Assistance Program." The voluntary program is designed to acquire property in the flood zone, relocate site occupants, and clear and remove improvements on the site. MRBC also offers assistance to "floodproof" homes in the flood zone.

In Allen County and the City of Fort Wayne, as of July 2008, 9 structures have been retrofitted and 110 structures have been purchased or are in the process of being purchased and demolished. These acquisitions have eliminated flood damage to individual structures as well as to whole neighborhoods. They have eliminated the need for flood fight efforts during a flood and cleanup and damage assessment after the flood. Temporary flood storage in the form of open space has also been restored. This open space can now be used for recreational purposes and natural area restoration.

In addition, the following projects are being pursued or have been completed for the purpose of protecting flood prone structures.

- St Marys River, Park Thompson/Waldron Circle Project (City of Fort Wayne funding): buy row of homes along the river and the Easter Seals ARC building. Construct berm to protect approximately 20 other homes in the neighborhood.
- Fairfield Ditch (potential Corps of Engineers project): conceptual level report has been completed recommending construction of a backwater control structure at Bluffton Road and construction of two levee/wall reaches to protect approximately 70 homes and 3 businesses.
- St Marys River, Woodhurst Levee (City of Fort Wayne funding): construct flood control levee to protect approximately 90 homes, a school, and a church

- St Marys River, Southfair Court & Kenosha Boulevard project (City of Fort Wayne funding): construct sandbag replacement berm to protect about 5 homes instead of sandbagging for frequent flood protection.
- St Marys River, Berry Thieme floodwall (City of Fort Wayne funding): this floodwall project will be dropped in favor of placing "emergency" clay berms during a flood due to stiff opposition to the floodwall, likelihood of seepage under the floodwall, and the difficulty in acquisitions due to the "Historic Designation" of the neighborhood.
- Spy Run, Eastbrook/Westbrook (City of Fort Wayne and federal money): Homes have been bought and demolished along Westbrook and a berm will be constructed to provide protection along Edgehill. Homes along Eastbrook will be bought out and the State Street Bridge raised (reducing expected water surface elevations in the vicinity upstream).
- St Marys River, Winchester Road (City of Fort Wayne funding): acquire and demolish one row of houses then construct sandbag replacement berm at the 1% annual chance flood elevation to protect around 6 homes.
- Lawrence Drain, Times Corner culvert replacement (City of Fort Wayne project): reduced Base Flood Elevations (BFE) in the reach upstream of Jefferson Boulevard. If a Letter of Map Revision (LOMR) is pursued based on this culvert replacement, three apartment buildings, a commercial area, and a retirement home could be removed from the 1% annual chance floodplain.
- Spy Run, channel improvement between Production Drive and Coliseum Boulevard (City of Fort Wayne project): proposed project that could remove approximately 8 businesses from the 1% annual chance floodplain and significantly reduce and/or eliminate the flooding potential for the 10% annual chance flood.
- St Marys River, earthen dike constructed along the east bank of the river near Pauline Street (Reach 3 (E3SM) in the 1995 Master Plan): The berm was constructed almost to the 1% annual chance flood elevation. During a flood situation, the City ties this dike to high ground by building a temporary barrier dike in the middle of a parking lot in the southern portion of the reach.
- St. Marys River, earthen dike ("Vesey Dike") constructed along the west bank of the river generally between Nuttman and Gruber Avenues (Reach W7SM in the 1995 Master Plan) to an elevation below the 1% annual chance flood elevation with the intent to add sand bags if needed per the City of Fort Wayne's plans.

In the process of selecting and designing projects, the City of Fort Wayne has also recognized the need to minimize the impact of the planned projects and has incorporated items such as compensatory storage and rain gardens to better manage stormwater runoff. (MRBC, 2008) Data for MRBC projects in Adams County has not been made available at the current date.

Failing Septic Systems

A source of the elevated pathogen bacteria in the watershed may be associated with improperly functioning, failed, or non-existent (straight pipe) residential septic systems. Many factors can lead to the failure of a residential septic system; the age of the system, lack of regular maintenance to the system, and heavy clay soils. Figure 61 illustrates a classic symptom of a failing system. Within the St. Marys River watershed, the unincorporated areas lack a centralized sewage disposal system, limiting homeowners to on-site septic systems. It is crucial that these homeowners are equipped with the necessary information and knowledge as to the proper maintenance of the system to prevent failure. Although a large portion of the watershed utilizes septic systems, critical areas have been designated as the following 14 digit HUC's:

Figure 61. A Classic Symptom of a Failing Septic System.
Photo courtesy of Shared Waters Alliance.

- St. Marys River-Buhlman Ditch (HUC 04100004050040)
- Nickelson Creek – Lambert Ditch (HUC 04100004050050)
- St. Marys River – Gerke/Weber Ditches (HUC 04100004050030)
- St. Marys River – Decatur (HUC 04100004040090)
- St. Marys River – Pleasant Mills (HUC 04100004040060)
- Yellow Creek – Martz Ditch (HUC 04100004040070)
- Fairfield Ditch – Harber/Deptmer Ditches (HUC 04100004060040)
- St. Marys River – Simmerman Ditch (HUC 04100004060010)

These locations were chosen as critical areas following conversations with the Allen and Adams County Health Department officials. These 14 digit HUC's all encompass communities utilizing septic systems. Critical areas are shown in Figure 62.

Figure 62. Critical Areas in the St. Marys River Watershed Utilizing Septic Systems.

Industrial Facilities

Many facilities in the watershed are subject to the Rule 6 permitting requirements. Facilities are required to obtain a permit if:

- run-off from a precipitation event or from ice or snow melt waters are exposed to (come into contact with) the facility's manufacturing processing activities, raw materials storage areas, or intermediate products storage areas
- that run-off then leaves the facility from one, or several, point source(s) that discharge into a Municipal Separate Storm Sewer System (MS4), or directly into the waters of the state.

Figure 63 illustrates an industrial facility discharging wastewater. Industrial facilities permitted under IDEM Rule 6 and NPDES permits are required to develop and submit a Storm Water Pollution Prevention Plan. Facilities are also required to sample at all facility outfalls. Analyses for the following parameters may be required:

Figure 63. Industrial Facility.
Photo courtesy of USEPA.

1. Oil and grease
2. Carbonaceous biochemical oxygen demand (CBOD)
3. Chemical oxygen demand (COD)
4. Total suspended solids (TSS)
5. Total Kjeldahl nitrogen (TKN)
6. Total phosphorous
7. pH
8. Nitrate plus nitrite nitrogen
9. Any pollutant attributable to a facility's industrial activity which is reasonably expected to be present in the discharge
10. Any pollutant that has the potential to be present in a stormwater discharge as requested by IDEM

Samples must be collected at least annually, with the first sample collected prior to implementation of the Storm Water Pollution Prevention Plan. Storm water outfall sample data collected more frequently than annually must be reported to IDEM. The pH measurement must be taken at the time the grab sample is collected (i.e., due to holding time exceedances, pH can not be analyzed by an off-site laboratory), and can not be estimated using a color comparison (i.e., test strips). Samples must be taken at a point representative of the discharge but prior to entry into surface waters of the state or a storm sewer conveyance. For discharges that flow through on-site detention basins, samples must be taken at a point representative of the discharge from the basin. Run-off events resulting from snow or ice melt should not be sampled and can not be used to meet the annual monitoring requirements of Rule 6. (IDEM Rule 6 Definitions)

Discussions with the City of Decatur Storm Water Manager indicate that many permitted and unpermitted facilities in the watershed lack knowledge that may help them to comply and go above and beyond permit requirements. Therefore, although the focus of the WMP is not on point source dischargers, the Steering Committee felt it was critical to address these facilities in the watershed. All permitted facilities in the watershed will be considered critical areas. The committee feels that education to the general public and to facility representatives can improve permit compliance and improve water quality. Figure 64 geographically shows locations of permitted facilities in the watershed.

Figure 64. Permitted Industrial Facilities in the St. Marys River Watershed.

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6.0 Project Goals, Objectives, and Partners

The following Tables identify project goals, objectives, short and long term milestones, and potential partners. These tables were created with the input from the St. Marys River Watershed Project Steering Committee, watershed stakeholders, potential project partners and conservation planners.

Goal: Reduce sediment in all monitored streams to an average concentration of 30 mg/l by 2028

Objective/Management Measures	Short Term Milestone	Cost	Long Term Milestone	Marketing/ Promotion	Technical/Financial Assistance
Reduce the impact of sediment resulting from surface runoff	Increase % of conservation tillage observed in transect data to 38% by 2013	Greater than $100,000	Increase % of conservation tillage observed in transect data to 53% by 2028	Extension, SWCD's, Private Industry	NRCS, ISDA, IDEM
	Support development of regionally based detention basins to detain surface runoff by 2013.	Greater than $500,000	Continue to support development of regionally based detention basins to detain surface runoff by 2017.	Extension, SWCD's, NGO's	County Government, MRBC
	Increase % of pasture and hayland acreage observed in transect data to 9% by 2013	Greater than $250,000	Increase % of pasture and hayland acreage observed in transect data to 14% by 2028	Extension, SWCD's, Private Industry	NRCS, ISDA
	1/3 of streams have a minimum of 20 ft. buffer by 2013	Less than $300,000	All streams have a minimum of 20 ft. buffer by 2028	Extension, SWCD's, Private Industry, NGO's, MRBC	NRCS, ISDA, IDEM, County Surveyors
	At least 15 producers incorporate the use of cover crops by 2013.	Greater than $300,000	Incorporate cover crops on 20% of agricultural land by 2028.	Extension, SWCD's, Private Industry, NGO's	NRCS, ISDA
	Support at least 2 demonstration sites that showcase LID BMP's that limit amount of runoff from development areas by 2013.	Greater than $25,000	Support at least 10 demonstration sites that showcase LID BMP's that limit amount of runoff from development areas by 2028.	SWCD's, Extension, MRBC, NGO's, Private Industry	IDEM
Increase adoption of BMP's during construction activities.	All construction sites of 1 acre or more meet Rule 5 and/or Rule 13 standards by 2013	Less than $10,000	All construction sites of 1/2 acre or more meet Rule 5 and/or Rule 13 standards by 2028.	SWCD's, Private Industry, NGO's, MRBC	MS4's,
Reduce stream bank erosion and destabilization	Increase public awareness and understanding of public's role in stable streambanks (measured via social indicator survey), implement at least one two stage ditch project by 2013.	Greater than $200,000	Implement an additional 5 two stage ditch projects and continue to increase public awareness and understanding of the public role in stable streambanks (measured via social indicator survey) by 2028.	SWCD's, NGO's, MRBC	County Surveyors, NRCS

	Encourage County Surveyors to install rock check-dams in regulated drains to reduce velocity, allow for sedimentation and increase dissolved oxygen levels by 2013.	Greater than $50,000	Continue to encourage County Surveyors to install rock check-dams in regulated drains to reduce velocity, allow for sedimentation and increase dissolved oxygen levels by 2017.	SWCD's, MRBC	County Surveyors
	Encourage NRCS to install rock check-dams in grassed waterways to reduce velocity, and allow sediment to settle by 2012	Greater than $50,000	Continue to encourage NRCS to install rock check-dams in grassed waterways to reduce velocity, and allow sediment to settle by 2017	SWCD's, MRBC	County Surveyors, NRCS, ISDA
	Implement 3 demonstration sites of livestock fencing, alternate water supply, stream crossing, etc by 2013.	Greater than $25,000	Have 90% of known livestock with stream access fenced from stream by 2028.	Extension, SWCD's, Private Industry	IDEM, ISDA, NRCS

Table 65. Sediment goal and milestones.

The final indicator for the success of the sediment goal will be that all monitored streams obtain average TSS concentrations of 30 mg/l by 2028. To meet this goal, average load reductions between 27.3% and 69.5% will be required. Reductions were calculated by averaging required reductions at each monitoring station. Loads under the TMDL target were not included in the average. Table 66 lists the required reductions to meet the 30 mg/l TMDL target. Other indicators that will be used to track the progress toward reaching the goal will include: the percentage of conservation tillage and pasture and hayland acreage being utilized in the watershed (measured by the annual tillage transect in the watershed), the number of acres of stream buffers installed, the number of producers using cover crops, the number of LID BMP's installed, the number of two stage ditch projects, and increased public awareness measured via the social indicator survey, number of newsletters sent, press releases published, and brochures distributed.

TSS Loading Reductions	
Monitoring Station	**% Reduction to Meet TMDL Target (30 mg/l)**
Habegger Ditch	53.2%
Gates Ditch	54.4%
Little Blue Creek	51.4%
Blue Creek	68.4%
St. Marys River – Wilshire, OH	47.1%
Martz Ditch	59.1%
Yellow Creek	54.5%
Borum Run	68.0%
Holthouse Ditch	57.2%
Gerke Ditch	60.8%
Nickelson Creek	54.8%
St. Marys River – Poe	53.4%
Upper Gates Ditch	63.9%
Upper Blue Creek	69.5%
Twentyseven Mile Creek	35.8%
Houk Ditch	65.0%
Snyder Ditch	31.2%
Harber Ditch	37.0%
Junk Ditch	27.3%
Spy Run Creek	32.1%

Table 66. Required TSS loading reductions.

Goal: Significantly reduce stormwater runoff and activity in the Regulatory Flood Hazard Area in order to reduce severity and impacts of flooding by 2028.

Objective/ Management Measures	Short Term Milestone	Cost	LongTerm Milestone	Marketing/Promotion	Technical/Financial Assitance
Reduce streambank erosion and destabilization	1/3 of streams have a minimum of 20 ft. buffer by 2013	Less than $300,000	All streams have a minimum of 20 ft. buffer by 2028	Extension, SWCD's, Private Industry, NGO's, MRBC	NRCS, ISDA, County Surveyors
	Promote federal programs (WMP, FEP) and MRBC Voluntary Ag. Land Use Conversion Program by 2011.	Less than $10,000	Continue to solicit potential candidates for conservation easement programs by 2012.	SWCD's, ISDA, Extension	NRCS, MRBC
	Increase public awareness and understanding of public's role in stable streambanks (measured via social indicator survey), implement at least one two stage ditch project by 2013.	Greater than $200,000	Implement an additional 5 two stage ditch projects and continue to increase public awareness and understanding of the public role in stable streambanks (measured via social indicator survey) by 2028.	SWCD's, NGO's, MRBC	County Surveyors, NRCS
	Promote existing MRBC Log Jam Removal Program by 2009.	Less than $10,000	Encourage local communities and municipalities to adopt and implement MRBC Log Jam Removal Program by 2013.	SWCD's	MRBC, County Surveyors
Reduce the impact of generalized storm event flooding	Support and lobby for local flood mitigation programs and projects, MRBC buy outs, support INAFSM, flood proofing by 2010.	Less than $10,000	Continue to support and lobby for local flood mitigation programs and projects, MRBC buy outs, support INAFSM, flood proofing by 2013.	SWCD's	MRBC, INAFSM
	Promote implementation of local (MRBC) model floodplain and stormwater ordinances by 2013.	Less than $10,000	Continue to encourage local communities to implement ordinances set by the MRBC Master Plan, specifically in the state of Ohio.	SWCD's, MS4's	MRBC
	Promote at least 2 demonstration sites that showcase LID BMP's that limit amount of runoff from development areas by 2013.	Greater than $25,000	Develop and implement a cost share program for LID BMP's that limit amount of runoff from development areas by 2014.	SWCD's, Extension, MRBC, NGO's, Private Industry	IDEM
	Endorse map modernization process to delineate flood prone areas by 2011.	Less than $10,000	Continue endorsement of complete map modernization process to delineate flood prone areas by 2012.	SWCD's	MRBC
	Implement at least 1 demonstration wetland restoration site that will incorporate additional stormwater holding capacity by 2011.	Greater than $50,000	Develop and implement a cost share program to retain and increase the amount of wetlands located in the watershed by 2012.	Extension, SWCD's, Private Industry, NGO's, MRBC	ISDA, NRCS

	Endorse installation of river gages and flood warning systems by 2011.	Less than $10,000	Continue endorsement of river gages to allow calibration of river models and flood warning systems and collection of discharge data by 2012.	SWCD's	MRBC, City of Fort Wayne, USGS
Improve Ag practices to reduce flooding	Support 2 demonstration sites on the use of alternative Ag BMP's that improve soil water holding capacity and soil quality by 2010.	Less than $100,000	Establish and implement a cost share on the use of alternative Ag BMP's that improve soil water holding capacity and soil quality by 2014.	Extension, SWCD's, Private Industry, NGO's, MRBC	ISDA, NRCS

Table 67. Flooding goal and milestones.

The success of the goal to significantly reduce stormwater runoff and activity in the 100 year floodplain in order to reduce severity and impacts of flooding will be measured in a variety of ways. Indicators will include the number of acres of buffers installed, the number of two stage ditch projects in the watershed, the number of LID BMP's installed, the number of agricultural BMPs to increase soil water holding capacity installed, and the number of structures located in the floodplain. Furthermore, the progress of flood policy initiatives will be measured to gage success of the goal. These policies include implementation of local model floodplain and stormwater ordinances, flood map modernization, and MRBC programs. Public awareness will be measured via the social indicator survey, number of newsletters sent, press releases published, and brochures distributed.

Goal: Reduce levels of nutrients to meet levels set forth by the TMDL: Nitrogen (10 mg/l measured as nitrate-nitrogen), Phosphorus (0.30 mg/l) by 2028. Reduce Ammonia levels so as not to exceed CCC by 2028.

Objective/ Management Measures	Short Term Milestone	Cost	LongTerm Milestone	Marketing/Promotion	Technical/Financial Assitance
Reduce the impact of nutrients from agricultural practices.	50% of producers consult with a Certified Crop Advisor, NRCS, or SWCD for nutrient management (including manure mgt. if applicable) planning by 2013.	Greater than $200,000	80% of producers consult with a CCA, NRCS or SWCD for nutrient management planning (including manure mgt. if applicable) by 2028.	SWCD's, Extension, Private Industry	IDEM, ISDA, NRCS
	Implement at least 1 demonstration wetland restoration site that will remove nutrients from agricultural runoff by 2011.	Greater than $50,000	Develop and implement a cost share program to retain and increase the amount of wetlands located in the watershed by 2012.	Extension, SWCD's, Private Industry, NGO's, MRBC	IDEM, ISDA, NRCS

	Develop cost share program and implement one demonstration site for controlled subsurface drainage by 2013.	Greater than $25,000	Implement cost share program for controlled subsurface drainage by 2018.	Extension, SWCD's, Private Industry	NRCS, ISDA, IDEM
	1/3 of streams have a minimum 20 ft. conservation buffer by 2013	Less than $300,000	All streams have a minimum 20 ft. conservation buffer by 2028	Extension, SWCD's, Private Industry, NGO's, MRBC	NRCS, ISDA, County Surveyors, IDEM
	Increase % of conservation tillage observed in transect data to 38% by 2013	Greater than $100,000	Increase % of conservation tillage observed in transect data to 53% by 2028	Extension, SWCD's, Private Industry	NRCS, ISDA, IDEM
	Increase % of pasture and hayland acreage observed in transect data to 9% by 2013	Greater than $500,000	Increase % of pasture and hayland acreage observed in transect data to 14% by 2013	Extension, SWCD's, Private Industry	NRCS, ISDA, IDEM
	Implement 3 demonstration sites of livestock fencing, alternate water supply, stream crossing, etc by 2013.	Greater than $25,000	Have 90% of known livestock with stream access fenced from stream by 2028.	Extension, SWCD's, Private Industry	IDEM, ISDA, NRCS
	Push for requirement of applicator training and certification by 2010.	Less than $10,000	Require applicators to receive training and certification by 2011.	SWCD's, Extension	ISDA, NRCS, ISCO
	Develop cost share program for alternative waste management systems by 2010.	Greater than $100,000	Implement 3 alternative waste systems by 2013.	SWCD's, Extension	IDEM, ISDA, NRCS
Reduce the impact of excessive nutrients resulting from failing on-site waste disposal systems on water quality	Support the establishment of at least one localized sewer district by 2013.	Less than $10,000	Support the establishment of all localized sewer districts by 2028.	SWCD's, Health Depts.	ISDH, IDEM
	Support State Legislation to address existing failing septic systems by 2011.	Less than $10,000	Continue to support State Legislation to address existing failing septic systems.	SWCD's, Health Depts.	ISDH
	Develop educational material for proper septic system care and maintenance by 2010.	Less than $10,000	Begin distributing educational material for proper septic system care and maintenance by 2011.	SWCD's, Health Depts.	IDEM, ISDH
Reduce the impact of excessive nutrients resulting from CSO's/SSO's	Support local municipalities as they address their Long Term Control Plan's by including updates of progress in quarterly newsletters by 2010.	Less than $10,000	Continue to support local municipalities as they address their Long Term Control Plan's by including updates of progress in quarterly newsletters by 2013.	SWCD's, Health Depts.	IDEM, ISDH

Reduce the impact of excessive nutrients from package WWTP's.	Identify areas of known failing package WWTP's and locate funds to address concerns by 2010.	Less than $10,000	Implement funds to adress failing package WWTP's by 2013.	SWCD's, Health Depts.	ISDH
Reduce the impact of excessive nutrients from pet waste.	Develop, post and distribute printed educational material, including at least 1 billboard by 2010.	Less than $10,000	Develop PSA's geared towards properly managed pet waste by 2018.	SWCD's, Health Depts., Extension	IDEM, MS4's, ISDH
Reduce the impact of excessive nutrients from wildlife waste.	Encourage public to manage open water in a way that will deter wildlife habitation by 2010.	Less than $10,000	Begin holding bi-annual workshops on controlling wildlife populations by 2013.	SWCD's, Health Depts.	IDEM, IDNR
	Encourage DNR control of wildlife by 2010.	Less than $10,000	Encourage DNR to permit hunting in nuisance areas by 2013.	SWCD's, Health Depts.	IDEM, IDNR
Reduce the impact of excessive nutrients from golf courses and lawns.	Develop educational materials for homeowners, golf course managers and lawn care professionals on the impact of over or mis-application of fertilizer by 2010.	Less than $10,000	Distribute educational materials for homeowners and golf course managers and lawn care professionals on the impact of over or mis-application by 2011.	SWCD's, Health Depts., Extension	IDEM
	Hold 1 field day or workshop by 2010 to discuss proper nutrient application.	Less than $10,000	Hold bi-annual field day or workshop by 2011 to discuss proper nutrient application.	SWCD's, Health Depts., Extension	IDEM
	Encourage golf course managers to use buffers along waterways by 2013.	Less than $10,000	Have 60% of all golf courses buffered along waterways by 2020.	SWCD's, Health Depts., Extension	IDEM

Table 68. Nutrient goal and milestones.

The success of this goal will be measured by obtaining nitrogen and phosphorus concentrations of 10.00 mg/l and 0.30 mg/l respectively in all monitored streams in the watershed. These concentrations were identified in the TMDL as target concentrations for unimpaired waters. Average nitrate-nitrogen levels in the watershed are usually under the 10.00 mg/l standard. However, all monitored sites experienced levels that far exceeded the standard during at least one sampling event. The success of the Ammonia goal will be based on the number of exceedences of the CCC. Table 69 shows average nitrate-nitrogen levels and the maximum level observed in each reach. Table 70 shows average reductions needed to meet the CCC.

Nitrate –Nitrogen Levels		
Monitoring Station	**Average Concentration (mg/l)**	**Maximum Concentration (mg/l)**
Habegger Ditch	4.11	20.10
Gates Ditch	4.53	22.60
Little Blue Creek	6.54	22.50
Blue Creek	6.60	36.40
Yellow Creek	2.89	14.10
St. Marys River – Wilshire, OH	4.86	19.30

Table 69. Nitrate-Nitrogen levels in the St. Marys River Watershed.

Ammonia Reductions	
Monitoring Station	**% Reduction to Meet CCC**
Habegger Ditch	43.0% (5*)
Gates Ditch	29.5% (2*)
Little Blue Creek	0.0%
Blue Creek	0.0%
St. Marys River – Wilshire, OH	0.0%
Martz Ditch	52.0% (4*)
Yellow Creek	0.0%
Borum Run	0.0%
Holthouse Ditch	0.0%
Gerke Ditch	0.0%
Nickelson Creek	0.0%
St. Marys River – Poe	0.0%
Upper Gates Ditch	43.5% (1*)
Upper Blue Creek	0.0%
Twentyseven Mile Creek	0.0%
Houk Ditch	0.0%
Snyder Ditch	0.0%
Harber Ditch	0.0%
Junk Ditch	0.0%
Spy Run Creek	0.0%
* Number exceedences of the CCC	

Table 70. Ammonia reductions necessary to meet the CCC.

For phosphorus to meet the 0.30 mg/l target, average loading reductions between 23.4% and 58.3% will be required. Reductions were calculated by averaging required reductions at each monitoring station. Loads under the TMDL target were not included in the average. Table 71 lists the required reductions to meet the 0.30 mg/l TMDL target for phosphorus.

Phosphorus Loading Reductions	
Monitoring Station	**% Reduction to Meet TMDL Target (0.30 mg/l)**
Habegger Ditch	42.8%
Gates Ditch	47.7%
Little Blue Creek	37.4%
Blue Creek	39.9%
St. Marys River – Wilshire, OH	29.6%
Martz Ditch	48.1%
Yellow Creek	38.2%
Borum Run	42.8%
Holthouse Ditch	38.3%
Gerke Ditch	45.5%
Nickelson Creek	45.3%
St. Marys River – Poe	40.8%
Upper Gates Ditch	42.8%
Upper Blue Creek	39.3%
Twentyseven Mile Creek	29.1%
Houk Ditch	39.2%
Snyder Ditch	40.6%
Harber Ditch	23.4%
Junk Ditch	23.4%
Spy Run Creek	58.3%

Table 71. Phosphorus Loading Reductions

Other indicators that will be used to track the progress toward reaching the goal will include: the percentage of conservation tillage and pasture and hayland acreage being utilized in the watershed (measured by the annual tillage transect in the watershed), the number of acres of stream buffers installed, the number of producers using certified crop advisors(CCA's), the number of livestock exclusion projects installed, the number of alternative waste systems installed, the number of controlled drainage structures in place, the number of installed wetlands and increased public awareness measured via the social indicator survey, number of newsletters sent, press releases published, and brochures distributed.

Goal: Reduce levels of *E. coli* to meet IDEM water quality standards (235 cfu/100ml) by 2028.

Objective/ Management Measures	Short Term Milestone	Cost	LongTerm Milestone	Marketing/Promotion	Technical/Financial Assistance
Reduce the impact of livestock on water quality	Increase producers use of manure management planning by 50% by 2013.	Greater than $100,000	Increase producers use of manure management planning by 80% by 2028.	SWCD's, Extension	IDEM, ISDA, NRCS
	Implement 3 demonstration sites of livestock fencing, alternate water supply, stream crossing, etc by 2013.	Greater than $25,000	Have 90% of known livestock with stream access fenced from stream by 2028.	Extension, SWCD's, Private Industry	IDEM, ISDA, NRCS
	Push for requirement of manure applicator training and certification by 2010.	Less than $10,000	Require applicators to receive training and certification by 2011.	SWCD's, Extension	ISDA, NRCS, ISCO
	Develop cost share program for alternative waste management systems by 2010.	Greater than $100,000	Implement 3 alternative waste systems by 2013.	SWCD's, Extension	IDEM, ISDA, NRCS
Reduce the impact of failing on-site waste disposal systems on water quality	Support the establishment of at least one localized sewer district by 2013.	Less than $10,000	Support the establishment of all localized sewer districts by 2028.	SWCD's, Health Depts.	IDEM, ISDH
	Support State Legislation to address existing failing septic systems by 2011.	Less than $10,000	Support State Legislation to address existing failing septic systems.	SWCD's, Health Depts.	ISDH
	Develop educational material for proper septic system care and maintenance by 2010.	Less than $10,000	Begin distributing educational material for proper septic system care and maintenance by 2011.	SWCD's, Health Depts.	IDEM, ISDH
Reduce the impact of CSO's/SSO's on water quality	Support local municipalities as they address their Long Term Control Plan's by including updates of progress in quarterly newsletters.	Less than $10,000	Continue to support local municipalities as they address their Long Term Control Plan's by including updates of progress in quarterly newsletters.	SWCD's, Health Depts.	IDEM, ISDH
Reduce the impact of package	Support the establishment of at least one localized sewer district by 2013.	Less than $10,000	Support the establishment of all localized sewer districts by 2028.	SWCD's, Health Depts.	IDEM, ISDH

WWTP's.	Identify areas of known failing package WWTP's and locate funds to address concerns by 2010.	Less than $10,000	Implement funds to adress failing package WWTP's.	SWCD's, Health Depts.	ISDH
Reduce the impact of pet waste on water quality.	Develop, post and distribute printed educational material, including at least 1 billboard by 2010.	Less than $10,000	Develop PSA's geared towards properly managed pet waste by 2018.	SWCD's, Health Depts.	IDEM, MS4's
Reduce the impact of wildlife waste on water quality.	Encourage DNR control of wildlife by 2010.	Less than $10,000	Encourage DNR to permit hunting in nuisance areas by 2013.	SWCD's, Health Depts.	IDEM, IDNR
	Encourage public to manage open water that will deter wildlife habitation by 2010.	Less than $10,000	Begin holding bi-annual workshops on controlling wildlife populations by 2013.	SWCD's, Health Depts.	IDEM, IDNR

Table 72. Bacteria goal and milestones.

The final indicator for the success of the bacteria goal will be that all monitored streams meet the IDEM *E. coli* single sample maximum concentration of 235 cfu/100ml by 2028. To meet this goal, average loading reductions between 40.5% and 88.4% will be required. Reductions were calculated by averaging required reductions at each monitoring station. Loads under the TMDL target were not included in the average. Table 73 lists the required reductions to meet the 235 cfu/100ml TMDL target. Other indicators that will be used to track the progress toward reaching the goal will include: the number of livestock producers using manure management plans, the number of livestock exclusion BMP’s installed, the number of alternative waste management systems installed, and increased public awareness measured via the social indicator survey, number of newsletters sent, press releases published, and brochures distributed. Furthermore, the progress of environmental policy initiatives will be measured to gage success of the goal. These policies include implementation of Long Term Control Plans, implementing a regional sewer district, as well as state legislation to address failing septic systems.

E. coli Loading Reductions	
Monitoring Station	**% Reduction to IDEM single sample maximum concentration (235 cfu/100ml)**
Habegger Ditch	88.45%
Gates Ditch	86.1%
Little Blue Creek	73.5%
Blue Creek	71.6%
St. Marys River – Wilshire, OH	40.5%
Martz Ditch	81.4%
Yellow Creek	79.2%
Borum Run	63.4%
Holthouse Ditch	72.6%
Gerke Ditch	69.2%
Nickelson Creek	67.7%
St. Marys River – Poe	65.7%
Upper Gates Ditch	85.7%
Upper Blue Creek	74.7%
Twentyseven Mile Creek	53.9%
Houk Ditch	73.6%
Snyder Ditch	61.5%
Harber Ditch	70.8%
Junk Ditch	62.7%
Spy Run Creek	76.6%

Table 73. Required *E. coli* loading reductions.

Goal: Reduce amount of trash/debris in the watershed by 50% by 2028.					
Objective/ Management Measures	**Short Term Milestone**	**Cost**	**LongTerm Milestone**	**Marketing/Promotion**	**Technical/Financial Assitance**
Implement a watershed wide litter control program, "Keep the St. Marys Beautiful".	Conduct 5 (1/year) cleanup projects by 2013.	Less than $10,000	Have a fully implemented program consisting of community education and outreach, and cleanups by 2028.	SWCD's, Extension, MRBC, NGO's	MS4's, IDEM
Remove downed trees and other obstacles that provide catchments for debris	Conduct a survey that identifies existing downed trees and those leaning at 45 degrees or more that should be scheduled for removal by 2010. Develop an annual maintenance schedule to remove downed and/or leaning trees by 2010.	Less than $25,000	Implement an annual maintenace schedule to remove all downed and or/leaning trees by 2012.	SWCD's, MRBC	County Surveyor's, INDOT

Table 74. Trash/Debris goal and milestones.

Public education and outreach will be used to achieve this goal. Success of outreach efforts will be evaluated by the social indicator survey, number of newsletters sent, press releases published, and brochures distributed. Other indicators will include the amount of trash and debris collected during river cleanup projects. Local WWTP's will also be monitored to record how much trash is being removed from incoming effluent. The number of logjams and obstructions removed by Allen and Adams County, and INDOT will also be used to evaluate the success of this goal.

Goal: Reduce Atrazine levels to meet a level of 3.00 μg/l (ppb) in all monitored streams by 2028.					
Objective/ Management Measures	**Short Term Milestone**	**Cost**	**LongTerm Milestone**	**Marketing/Promotion**	**Technical/Financial Assitance**
Increase acreage of conservation buffers to reduce the amount of pesticides entering waterways through agricultural runoff.	1/3 of streams have a minimum of 20 ft. buffer by 2013	Less than $300,000	All streams have a minimum of 20 ft. buffer by 2028	Extension, SWCD's, Private Industry, NGO's, MRBC	NRCS, ISDA, County Surveyors
Utilize Integrated Pest Management (IPM) plans developed by Certified Crop Advisor (CCA)	50% of producers consult with a CCA and have IPM plans by2013.	Greater than $200,000	80% of producers consult with a CCA and have IPM plans by 2028.	SWCD's, Extension	IDEM, ISDA, NRCS

Encourage the use of on-farm chemical and fertilizer storage systems.	Indiana NRCS adopts standardized engineering plans for on-farm storage systems by 2011.	Less than $10,000	All producers meet State Chemist Office minimum secondary containment requirements where necessary. i.e 7500 gallon of liquid fertilizer by 2028.	SWCD's, Extension	IDEM, ISDA, NRCS
Encourage use of precision sprayer controllers, and guidance systems .	20% of all private applicators utilize precision spraying and/or guidance systems by 2010.	Greater than $100,000	50% of all private applicators utilize precision spraying and/or guidance systems by 2028.	SWCD's, Extension	IDEM, ISDA, NRCS
Encourage the use of non-toxic pesticides in both agricultural and non-agricultural applications.	Reduce the amount of toxic pesticides/herbicides used in the watershed by 10% (measured via WQ survey) by 2013.	Less than $25,000	Reduce the amount of toxic pesticides/herbicides used in the watershed by 30% (measured via WQ survey) by 2028.	SWCD's, Extension	IDEM, ISDA, NRCS
Encourage proper disposal of toxic household wastes.	Develop and/or sponsor annual Tox-Away Day by 2010.	Less than $10,000	Continue Tox-Away Day program on annual basis.	Solid Waste Districts	IDEM, ISDA, NRCS
Encourage proper rinsing and disposal of pesticide containers.	Develop and/or sponsor annual Pesticide Container Recycling Day by 2013.	Less than $10,000	Continue to sponsor annual Pesticide Container Recycling Day.	SWCD's, Extension	IDEM, ISDA, NRCS

Table 75. Atrazine goal and milestones.

The indicator for the success of the Atrazine goal will be the evaluation of public education and outreach efforts. Success of outreach efforts will be evaluated by the social indicator survey, number of newsletters sent, press releases published, and brochures distributed. Other indicators will include the numbers of acres of conservation buffers installed, number of producers using CCA's, IPM, and precision spraying systems. The number of residents attending "Tox-Away Day" will also be used as an indicator. The final indicator will be that all monitored streams obtain atrazine concentrations of 3.00 µg/l by 2028. To meet this goal, average loading reductions up to 67.2% will be required. Reductions were calculated by averaging required reductions at each monitoring station. Loads under the TMDL target were not included in the average. Table 75 lists the required reductions to meet the 3.00 µg/l target.

Atrazine Loading Reductions	
Monitoring Station	**% Reduction to Meet Target (3.00 µg/l)**
Habegger Ditch	41.4%
Gates Ditch	52.2%
Little Blue Creek	47.2%
Blue Creek	55.6%
St. Marys River – Wilshire, OH	58.4%
Martz Ditch	0%
Yellow Creek	38.6%
Borum Run	51.4%
Holthouse Ditch	54.8%
Gerke Ditch	67.2%
Nickelson Creek	0%
St. Marys River – Poe	52.5%
Upper Gates Ditch	51.6%
Upper Blue Creek	53.9%
Twentyseven Mile Creek	63.6%
Houk Ditch	35.9%
Snyder Ditch	37.2%
Harber Ditch	29.1%
Junk Ditch	0%
Spy Run Creek	0%

Table 76. Required atrazine loading reductions.

Goal: Increase Public Awareness and Participation by 50% by 2028.					
Objective/ Management Measures	**Short Term Milestone**	**Cost**	**LongTerm Milestone**	**Marketing/ Promotion**	**Technical/Financial Assistance**
Develop and implement an education and outreach program about water quality in the St. Marys River Watershed.	Develop a St. Marys River Watershed Education and Outreach Program geared toward stakeholders in the watershed by 2009.	Less than $25,000	Full implementation of the St. Marys River Watershed Education and Outreach Program by 2012.	Extension, SWCD's, Private Industry, NGO's, MRBC	NRCS, ISDA, County Surveyors
	Increase public awareness and understanding of public's impact on water quality via education and outreach (measured via social indicator survey) by 2013.	Less than $10,000	Increase public awareness and understanding of public's impact on water quality via education and outreach (measured via social indicator survey) by 2028.	SWCD's, Extension, MRBC, NGO's	MS4's, IDEM
	Host at least 2 Hoosier Riverwatch training session by 2010.	Less than $10,000	Host Hoosier Riverwatch training session annually by 2011.	SWCD's, Extension, MRBC, NGO's	IDEM, Hoosier Riverwatch
	Develop an educational curriculum aimed at schools in livestock production areas by 2012.	Less than $10,000	Implement an educational curriculum aimed at schools in livestock production areas by 2013.	SWCD's, Extension, MRBC, NGO's	IDEM, Hoosier Riverwatch
Develop and institute a volunteer action program for the St. Marys River Watershed.	Begin water quality monitoring by 2013 by engaging at least five volunteers to conduct annual water quality assessments via Hoosier Riverwatch.	Less than $10,000	Engage at least 10 volunteers to conduct water quality assessment via Hoosier Riverwatch in the St. Marys River Watershed by 2018.	SWCD's, MRBC	IDEM, Hoosier Riverwatch
	Solicit volunteers to assist in collecting additional water quality data at known problem areas in the watershed by 2010. Research additional funding sources for water quality sampling by 2013.	Greater than $100,000	Conduct weekly water quality monitoring across the watershed by 2013.	SWCD's, MRBC	IDEM,
	Develop Storm Drain Marking Program and obtain volunteers to begin storm drain marking by 2013.	Less than $10,000	Complete Storm Drain Marking for all storm drains by 2028.	SWCD's	MS4's, IDEM

Increase public understanding of methods to decrease toxic waste in surface and ground water. Increase awareness and understanding of general public and Rule 6 permit holders as to their responsibility in reducing off site discharges of hazardous materials. Reduce the impact of excessive pesticides from golf courses and lawns.	Solicit volunteers to assist in staffing and planning summer field days, workshops, presentations, etc. by 2009.	Less than $10,000	Form committees through volunteers to plan annual field days, workshops, presentations, etc. by 2014.	SWCD's, Extension, MRBC, NGO's	Watershed Stakeholders
	Formalize the St. Marys River Watershed Project Board of Directors by 2009.	Less than $10,000	Have a functioning Board of Directors by 2010.	SWCD's	N/A
	Develop a survey and randomly distribute to 1000 landowners to gain an understanding of public knowledge level regarding the effects of toxic residues by 2010. Determine baseline knowledge of pollution prevention/reduction measures.	Less than $25,000	Repeat survey process to determine change of public knowledge regarding pollution prevention/ reduction measures in 2014. Aim for a 25% increase from baseline survey number.	SWCD's, Extension, NGO's, Private Industry	IDEM, ISDA, NRCS
	Hold 2 public meetings, including IDEM Rule 6 permit holders by 2011.	Less than $10,000	Have all IDEM Rule 6 permit holders in compliance with their permit requirements by 2013. Recognize those facilities in compliance.	SWCD's, Extension, MRBC, NGO's	MS4's, IDEM
	Develop educational materials for homeowners and golf course managers on the impact of over- or mis-application by 2010.	Less than $10,000	Distribute educational materials for homeowners and golf course managers on the impact of over or mis-application by 2011.	SWCD's, Extension, Private Industry	IDEM, MS4's

Table 77. Public awareness goal and milestones.

Success of outreach efforts will be evaluated by stakeholder involvement, the social indicator survey, number of newsletters sent, press releases published, and brochures distributed.

7.0 EVALUATING PROGRESS AND EFFECTIVENESS

The St. Marys River Watershed Project will be implementing practices to achieve the aforementioned water quality goals over a twenty year timeline. When these goals are met, the surface water in the watershed should meet Indiana water quality standards. The primary measure of success will be the completion of this St. Marys River Watershed Project WMP. Completion of the WMP, conforming to the requirements set forth by IDEM, has set the stage for improving water quality in the watershed. Now that the WMP is complete, focus can begin on implementing practices identified in the plan to achieve water quality goals. The WMP identifies project milestones, approximate dates for completion, as well as potential project partners. A positive response by watershed stakeholders to implement the recommended practices will be key to achieving the goals identified in the watershed management plan.

Implementation of the WMP will be evaluated by both social and environmental indicators. Social indicators will be gauged by factors such as social indicator surveys, by the number of stakeholders receiving the quarterly newsletter, by volunteer hours, and the number of project partners. Environmental indicators will include the number of acres using conservation tillage, the number of acres of buffer strips, or the linear footage of stream restoration projects, for example. Furthermore, water quality monitoring results will be used to evaluate the success of installed Best Management Practices watershed wide and to make comparative observations with existing benchmark data. The USEPA Region V model will also be used to quantify pollutant loadings.

As the implementation of the WMP progresses, it will be necessary for the steering committee to evaluate the effectiveness of the plan. If necessary, the WMP will be restructured in order to meet the goals of the plan.

8.0 Implementation

The St. Marys River Watershed Project will be the primary party responsible for implementation of the St. Marys River Watershed Management Plan. The project partners will also play a critical role in supporting implementation of the WMP. The St. Marys River Watershed Project, in association with its partners, has begun and will continue to solicit for further funds to implement BMP's in the watershed. Funding sources include, but are not limited to: ISDA Clean Water Indiana grants, USEPA 319 grants, Western Lake Erie Basin Partnership grants, Great Lakes Commission grants and numerous other private foundations and organizations.

St. Marys River Watershed Cost Share Program

The St. Marys River Watershed will continue to seek potential partners and project locations within critical areas of the watershed. The cost share program will be promoted by the St. Marys River Watershed Project and its partners through newsletters, press releases, web pages and outreach opportunities such as summer field days and winter meetings. The cost share program will include items to address concerns in the critical areas. BMPs are listed in Tables 78-84. BMP removal efficiencies were taken from the "BMP List" worksheet located in the STEPL model (STEPL, 2006). BMPs efficiencies from alternative sources are noted.

Critical Area: Conventionally Tilled Agricultural Fields that Intersect a Stream or Ditch			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Equipment modifications to allow producers to effectively implement conservation tillage and/or nutrient and pest management on their farms			
• Planter attachments that allow producers to implement no-till, strip-till or high residue conservation tillage	**55%**	**45%**	**75%**
• GPS systems	**55%**	**45%**	**75%**
• Light bars	**55%**	**45%**	
• Spray controllers			
• Variable rate controllers	**55%**	**45%**	
• Vertical tillage equipment attachments			**75%**
Assistance for pasture/hay planting in critical areas to decrease soil erosion			**93%**[1]
Assistance to producers who utilize cover crops to improve soil quality, reduce erosion and increase soil water holding capacity	**45%**[2]	**15%**[2]	**20%**[2]
Installation of stream buffers/filter strips to reduce sediment and nutrient loading	**70%**	**75%**	**65%**
Installation of grassed waterways to reduce soil erosion			**77%-97%**[3]
Installation of check-dams in grassed waterways to reduce water velocities and allow for sediment deposition			
Assistance for producers to implement nutrient management planning to improve water quality	**20%-30%**[4]	**20%-30%**[4]	**ND**
Assistance for producers to consult with Certified Crop Advisor to assist producers in making conservation wise farm management decisions			
Restoration or construction of wetlands to improve water	**75%-**	**30%-**	**75%-**

quality, hold floodwaters, and increase wildlife habitat Controlled subsurface drainage	**95%[5]**	**50%[5]**	**95%[5]**
Assistance for producers to implement controlled subsurface drainage	**40%-50%[6]**		
Assistance for producers to implement Integrated Pest Management (IPM) to improve water quality			
Permanent seeding of critical areas to reduce soil erosion	**70%**	**75%**	**65%**
Installation of a two stage ditch to demonstrate an alternative ditch design that improves water quality through nutrient and pesticide uptake and sediment deposition	**75%**	**75%**	**75%**
Construction of regionally based runoff detention facilities to hold excess runoff, allowing for sediment and nutrient reduction.	**55%**	**68%**	**86%**
Education and outreach to inform producers on soil erosion and water quality issues	**ND**	**ND**	**ND**
1 = (IDEM/USEPA, 2005); 2 = (Chesapeake Bay, 2004); 3 = (Fiener, 2003); 4 = (DEP, 2009); 5 = (JJR/Tilton, 1998); 6 = (ARS, 2006); ND = No Data			

Table 78. Critical Area: Conventionally Tilled Agricultural Fields that Intersect a Stream or Ditch BMP's and Removal Efficiencies

Critical Area: Areas of Significant Erosion Resulting in Large Gullies			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Equipment modifications to allow producers to effectively implement conservation tillage and/or nutrient and pest management on their farms			
• Planter attachments	**55%**	**45%**	**75%**
• GPS systems	**55%**	**45%**	**75%**
Assistance for pasture/hay planting in critical areas to decrease soil erosion			**93%[1]**
Assistance to producers who utilize cover crops to improve soil quality, reduce erosion and increase soil water holding capacity	**45%[2]**	**15%[2]**	**20%[2]**
Installation of stream buffers/filter strips to reduce sediment and nutrient loading	**70%**	**75%**	**65%**
Installation of grassed waterways to reduce soil erosion			**77%-97%[3]**
Installation of check-dams in grassed waterways to reduce water velocities and allow for sediment deposition			
Construction of regionally based runoff detention facilities to hold excess runoff, allowing for sediment and nutrient reduction	**55%**	**68%**	**86%**
Education and outreach to inform landowners on potential practices to reduce gully erosion	**ND**	**ND**	**ND**
2 = (Chesapeake Bay, 2004); 3 = (Fiener, 2003); ND = No Data			

Table 79. Critical Area: Areas of Significant Erosion Resulting in Large Gullies

Critical Area: Unbuffered Stream Reaches			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Installation of stream buffers/filter strips to reduce sediment and nutrient loading	**70%**	**75%**	**65%**
Assistance for pasture/hay planting in areas adjacent to unbuffered stream reaches to decrease soil erosion and nutrient and bacteria loading			**93%**[1]
Installation of a two stage ditch to demonstrate an alternative ditch design that improves water quality through nutrient and pesticide uptake and sediment deposition	**75%**	**75%**	**75%**
Assistance for riparian corridor protection to improve water quality and improve wildlife habitat	**75%**	**75%**	**75%**
Education and outreach to inform stakeholders on the importance of stream buffers and how they effect water quality	**ND**	**ND**	**ND**
1 = (IDEM/USEPA, 2005); ND = No Data			

Table 80. Critical Area: Unbuffered Stream Reaches

Critical Area: Critical Livestock Operations			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Construction or implementation of livestock fencing from streams, alternative water supply systems, or stream crossings.	**75%**	**75%**	**75%**
Assistance to producers who implement manure/nutrient management planning (Proper waste utilization) to reduce nutrient and *E. coli* loading	**20%-30%**[4]	**20%-30%**[4]	**ND**
Assistance for producers to consult with Certified Crop Advisor to assist producers in making conservation wise farm management decisions	**8%**[2]	**15%**[2]	**25%**[2]
Installation of stream buffers/filter strips to reduce sediment and nutrient loading	**70%**	**75%**	**65%**
Assistance for pasture/hay planting in areas adjacent to unbuffered stream reaches to decrease soil erosion and nutrient and bacteria loading			**93%**[1]
Installation of alternative animal waste system (e.g. anaerobic digester, composting facility) to reduce nutrient and *E.coli* loading.	**80%**[2]	**80%**[2]	**0%**[2]
Education and outreach to inform livestock producers on the role of livestock and its effect on water quality	**ND**	**ND**	**ND**
1 = (IDEM/USEPA, 2005); 2 = (Chesapeake Bay, 2004); 4 = (DEP, 2009); ND = No Data			

Table 81. Critical Area: Critical Livestock Operations

Critical Area: The Regulatory Flood Hazard Area			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Installation of stream buffers/filter strips to reduce sediment and nutrient loading	**70%**	**75%**	**65%**
Assistance for enrollment into landuse conversion programs (Floodplain Easement Program/Wetland Reserve Program) to reduce activity in the regulatory flood hazard area			**96%[1]**
Installation of a two stage ditch to demonstrate an alternative ditch design that improves water quality through nutrient and pesticide uptake and sediment deposition	**75%**	**75%**	**75%**
Restoration or construction of wetlands to improve water quality, hold floodwaters, and increase wildlife habitat Controlled subsurface drainage	**75%-95%[5]**	**30%-50%[5]**	**75%-95%[5]**
Assistance for the implementation of low impact development (LID) BMP's to reduce sediment and nutrient loading	**0%-50%**	**0%-81%**	**0%-90%**
Assistance to producers who utilize cover crops to improve soil quality, reduce erosion and increase soil water holding capacity	**45%[2]**	**15%[2]**	**20%[2]**
Compensation for voluntary home buyouts in flood prone areas	**ND**	**ND**	**ND**
Assistance for homeowners to flood-proof homes in the regulatory flood hazard area to reduce the impacts of flooding	**ND**	**ND**	**ND**
Assistance for riparian corridor protection to improve water quality and improve wildlife habitat	**75%**	**75%**	**75%**
Construction of regionally based runoff detention facilities to hold excess runoff, allowing for sediment and nutrient reduction	**55%**	**68%**	**86%**
Assistance to remove leaning or downed trees to prevent logjams and backups which may accelerate further streambank erosion	**ND**	**ND**	**ND**
Education and outreach to educate watershed stakeholders on the importance of the regulatory flood hazard area and the role it plays in water quality and flood control	**ND**	**ND**	**ND**
1 = (IDEM/USEPA, 2005); 2 = (Chesapeake Bay, 2004); 5 = (JJR/Tilton, 1998); ND = No Data			

Table 82. Critical Area: The Regulatory Flood Hazard Area

Critical Area: Failing Septic Systems			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Assistance to repair/replace failing septic systems in order to reduce nutrient and *E. coli* loading	**ND**	**ND**	**ND**
Assistance to repair/replace failing package WWTP's in order to reduce nutrient and *E. coli* loading	**ND**	**ND**	**ND**
Establishment of a localized sewer district to connect homes with failing systems to a sewer system	**ND**	**ND**	**ND**
Education and outreach to inform homeowners on septic system maintenance	**ND**	**ND**	**ND**
ND = No Data			

Table 83. Critical Area: Failing Septic Systems

Critical Area: Industrial Facility Permit Compliance			
Practice	**N % Removal Efficiency**	**P % Removal Efficiency**	**TSS % Removal Efficiency**
Education and Outreach	**ND**	**ND**	**ND**
ND = No Data			

Table 84. Critical Area: Industrial Facility Permit Compliance

All BMP's will be geo-referenced to identify the locations where they have been installed. Sediment and nutrient loading reductions will be estimated using the USEPA Region V Pollutant Load Reduction Model.

The St. Marys River Watershed Steering Committee recognizes that there is a vast assortment of State and Federal cost share programs aimed at improving water quality, and reducing non-point source pollution. Therefore, for many of the above components of the cost share program, only a small dollar amount will be allotted for them in the St. Marys River Watershed Cost Share Program. For these items we feel that the producer would be making a wiser choice to use the existing programs, and the St. Marys Project will encourage them to do so. However, in rare cases, the St. Marys Steering Committee feels that the allotted dollars can be used to install BMP's on lands not meeting the requirements for other cost share programs or for individuals not interested in participating in other State and Federal programs.

This has allowed the monetary resources of the proposed cost share program to focus on three major areas; erosion, nutrient levels and *E. coli* levels. To address soil erosion, the cost share program will promote strip-till and the use of RTK guidance systems. Due to the heavy soils in the watershed strip-till is a more desirable alternative to straight no-till. In conjunction with strip-till, the use of RTK guidance becomes pertinent in order to plant directly over the tilled strip. To address stream bank erosion, the project proposes to cost share on the construction of two-stage ditch projects. This innovative ditch reconstruction method improves drainage function, reduces nutrients in surface water, allows for sediment deposition during high flows, and creates a very stable stream bank. To address nutrient levels, again strip-till and the use of RTK guidance systems will be promoted. Furthermore, the use of manure and nutrient management planning will be promoted. Finally, to address excessive *E. coli* levels, the proposed project will offer cost share assistance for livestock BMPs (e.g. exclusion fencing, alternative water supply, stream crossings, etc.). Cost share will also be available for alternative animal waste systems (e.g. anaerobic digester, composting facility). Alternative waste systems will not only serve to reduce the occurrence of over application and improper application, but also offers the opportunity to develop an end product of animal waste.

By focusing the cost share program in the aforementioned areas, the St. Marys River Watershed Project Steering Committee feels there is great potential to decrease non-point source pollution in the St. Marys River Watershed.

St. Marys River Watershed Education and Outreach Program

The St. Marys River Watershed Project will continue to engage stakeholders within the watershed to increase the general public's awareness of water quality concerns in the watershed. The St. Marys River Watershed Project will host, sponsor and promote educational and outreach opportunities such as summer field days, winter meetings, and workshops. Other outreach material will include the development and distribution of brochures, posters, signs, newsletters, news releases and reports.

St. Marys River Watershed Water Quality Monitoring Program

The St. Marys River Watershed Project will plan to conduct a future water quality monitoring program in the watershed to evaluate the effectiveness of the installed BMP's. It has been proposed to conduct weekly grab sampling at the 20 sampling locations used previously by the St. Marys River Watershed Project in the year 2012. This data can be viewed alongside existing benchmark data to make comparative observations of water quality in the St. Marys River Watershed. Furthermore, monitoring data can be used to evaluate the WMP and allow the stakeholders to modify the WMP if necessary.

9.0 SUMMARY

The St. Marys River Watershed Management Plan was developed by the St. Marys River Watershed Steering Committee in response to the TMDL's completed for the St. Marys River watershed as well as Blue Creek/Habegger Ditch and Yellow watersheds. With the invaluable input obtained from a multitude of watershed stakeholders, local officials, and conservationists, a WMP was developed identifying water quality problems and associated impairments. The WMP also identifies critical areas in the watershed that will be targeted with specific BMP's tailored to each resource concern. Through a mix of implementation practices and education and outreach activities, the St. Marys River Watershed Management Plan hopes to be a driving force towards achieving the following goals:

Goal: Reduce sediment in all monitored streams to meet a level of 30 mg/l by 2028

Goal: Reduce amount of trash/debris in the watershed by 50% by 2028.

Goal: Reduce Atrazine levels to meet a level of 3.00 µg/l (ppb) in all monitored streams by 2028.

Goal: Reduce levels of *E. coli* to meet IDEM water quality standards (235 cfu/100ml) by 2028.

Goal: Reduce levels of nutrients to meet levels set forth by the TMDL:Nitrogen (10 mg/l), Phosphorus (0.30 mg/l) by 2028. Reduce Ammonia levels so as not to exceed Criterion Continuous Concentration by 2028.

Goal: Significantly reduce stormwater runoff and activity in Regulatory Flood Hazard Area in order to reduce severity and impacts of flooding by 2028.

Goal: Increase Public Awareness and Participation by 50% by 2028.

The overall success of the WMP will be measured by a variety of social and environmental indicators. The St. Marys River Watershed Project Steering Committee views the WMP to be a living document, in need of continuous modification as changes in the watershed occur.

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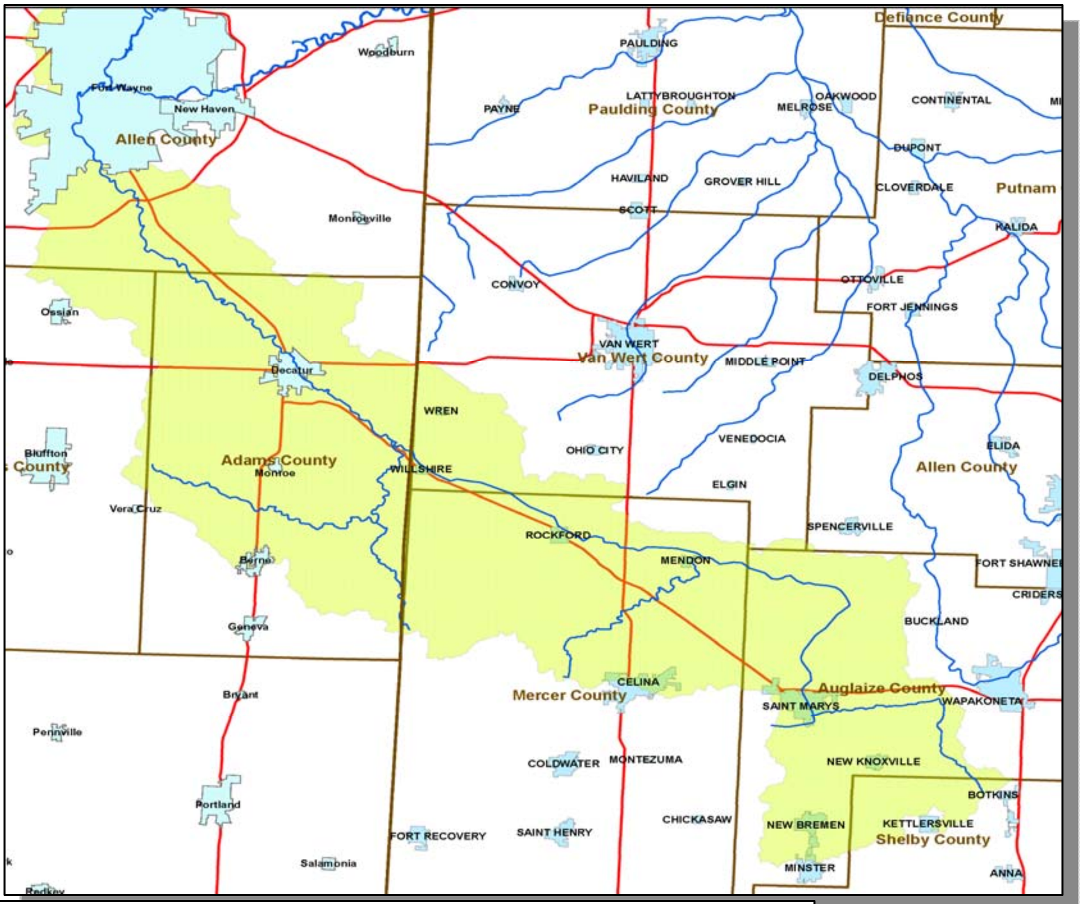
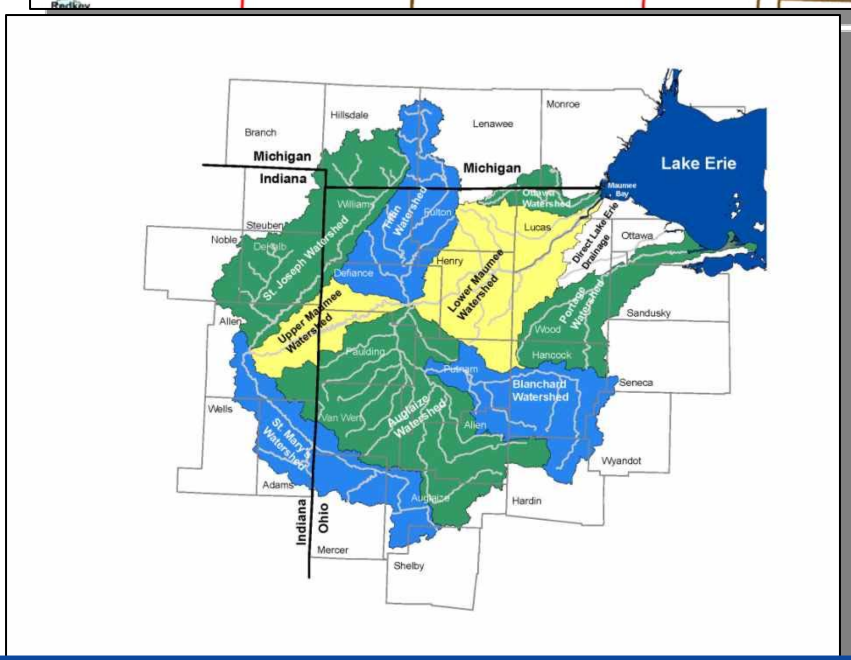
Western Lake Erie Basin Study
St. Marys Watershed Assessment

Final Draft

December 1, 2008





US Army Corps of Engineers®

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EXECUTIVE SUMMARY

Introduction: The St. Marys River watershed is one of eight subwatersheds within the Maumee River Watershed and comprises 13% of that watershed. It is delineated by the United States Geological Survey as 8-digit hydrologic unit number 04100004. The 524, 800-acre (820 square mile) watershed is located in Allan, Adams and Wells counties in northeastern Indiana, and Van Wert, Mercer, Shelby and Auglaize counties in northwestern Ohio. (Figure E-1). The watershed contains approximately 434 miles of tributary perennial streams. The St. Marys River originates near Minster, Ohio flowing to the northwest through St. Marys in Auglaize County, then through, Mercer and Van Wert counties in Ohio. The St. Marys River flows into Indiana southwest of Pleasant Mills, near the Indiana State Line and Highway 33. The river continues to the northwest, flowing through Decatur, Indiana into Allen County. It joins the St. Joseph River in Fort Wayne to form the Maumee River, which flows northeast and empties into Lake Erie.

St Marys River Watershed Profile

HUC:	04100008
Watershed size:	524,800 acres (848 sq. miles)
Land use:	84% agriculture 7% woodland 7% impervious 1% wetlands >1% open water
WQ Attainment:	An assessment of the number of streams in and out of attainment was not available at this writing.
Population:	768,810
Urban Area:	52,480
Peak Flow:	18,000 cfs
Congressional Reps:	Senator George Voinovich, Ohio Senator Sherrod Brown, Ohio Rep. Jim Jordan, 4th District Rep. Robert Latta, 5th District Senator Evan Bayh, Indiana Senator Richard Lugar, Indiana Rep. Mark Souder, 3rd District Rep. Mike Pence, 6th District
Potential Actions $:	To be determined.

Purpose and Authority: This project entails a multi-purpose/multi-objective evaluation of the Western Lake Erie Basin (WLEB) and Watersheds by the U.S Army Corps of Engineers (USACE) to 1) integrate existing projects/plans/studies; 2) assess program progress; and 3) plan future lake and watershed revitalization programs and projects from various federal, state, local and non-governmental organizations. The final product, a comprehensive Western Lake Erie Basin and Watershed Framework, will provide public agencies, watershed groups and other stakeholders with a tool to facilitate the restoration, protection and sustainable use of the water and related natural resources within the study area.

The WLEB study is authorized in Section 441 of the Water Resources Development Act (WRDA) of 1999. This authority directs the Assistant Secretary of the Army for Civil Works to conduct a study to develop measures to improve flood control, navigation, water quality, recreation, and fish and wildlife habitat in a comprehensive manner in the WWLEB

Methodology: The preparation of the assessment consisted of 1) a comprehensive review of existing studies and technical reports to identify problems, opportunities, and project needs; 2) hosting a workshop at a central location in the watershed where elected officials, agencies and citizens were invited to share their comments and identify local problems, needs and project opportunities; 3) distribution of a project needs request form to all county, community, state and local agencies and other nonprofit organizations by letter and also posting the request on the WLEB web site; 4) making direct contact with key agencies to request information on current projects and project needs; 5) distribution of draft materials to WLEB Partnership for review and comment; and 6) completion of both internal and external USACE Independent Technical Reviews (ITR).

Watershed Characteristics:

- ***Physical System and Natural Resources***: The St. Marys River watershed is relatively flat with an average drop of 1.5 to 2 feet per mile. Land use in the watershed is primarily agriculture (68.5%), with 21.1% classified as forest and open space, 9.8% urban, and <.001% (80 ac.) classified as wetlands (NRCS, 2007).
- ***Socio-economic Characteristics*:** The largest incorporated areas within the watershed (in order of size) are the Cities of Fort Wayne and Decatur, Indiana. The remainder of the watershed is primarily rural, with towns including St. Marys and Minster, Ohio. The watershed (in Fort Wayne) is home to several major corporations including the Brotherhood Mutual Insurance Company, Centennial Wireless and North American Van Lines. However, the predominant source of employment in the watershed is the agricultural sector.
- ***Cultural Attributes*:** Limited historic and archaeological resources have been identified in the area and there are no known current Native American interests in the area.
- ***Institutional and Regulatory Setting*:** Most of the land use is managed through rural zoning via county and township governments. Given the dominance of agriculture in the watershed, most of the area is subject to non-point pollution controls.

Resource Analysis: Issues and Opportunities:

- ***Flood Damage Reduction***: Significant flood risks exist due to the relative flatness of the watershed, particularly in the City of Fort Wayne. The confluence of the Upper Maumee and St. Marys in Fort Wayne, coupled with the rapid runoff associated with impervious surfaces in urban areas, contributes to commonplace flooding problems. Investigate of additional flood reduction measures within the watershed is warranted, such as removing structures from the floodplain or creating flood water impoundments upstream of Fort Wayne. The latter also has groundwater recharge benefits.
- ***Water Quality***: Water quality ranges from good to poor in the watershed, with the latter primarily due to runoff from agricultural lands. Opportunities exist to develop riparian buffer strips to enhance side stream habitat while filtering runoff of sediments and nutrients.
- ***Natural Resource- based Recreation***: Fishing and other active natural resource-based recreation opportunities are limited due to the dominance of agricultural land and associated access issues. Public facilities in the watershed do afford residents open space and passive recreation opportunities
- ***Fish and Wildlife Habitat***: Habitat is restricted to fence rows and occasional woodlots along streams and ditches in the area. Most historic wetland resources have been converted to other uses.
- ***Commercial and Recreational Navigation:*** The St. Marys River does not support commercial navigation. Recreational navigation, such as canoeing or shallow draft fishing, is primarily associated with upland reservoirs, ponds or small lakes, and seasonally along 1st and 2nd order streams within the watershed..

Findings and Potential Actions: The St. Marys Watershed, like the WLEB in general, has lost most of the natural ecosystems and features that once reduced flows and sedimentation, and provided natural detention and filtration. Also, flooding is commonplace due to urbanization and encroachment into natural floodplains. This is particularly true within the City of Fort Wayne, which has historically experienced extensive and frequent flood damages. Overall water quality ranges from good in the lower portions of the WLEB to poor in the upper areas where extensive siltation and urban runoff is occurring.

Figure E-1. Location of the St. Marys River Watershed (Ohio DNR)

Potential actions will be established in the course of determining what the specific impairments within the watershed(s) are and whether the impairments are point or non-point source. Potential actions likely will encompass various levels of structural, green engineering, non-structural and educational measures.

Specific priority potential actions are summarized below, and a complete listing is found in Appendix E.

ST. MARYS RIVER WATERSHED

PRIORITY POTENTIAL ACTIONS – A SUMMARY

☞ **Section 3. Flood Damage Reduction (and Water Supply, Sedimentation and Erosion)**
- ❒ Develop watershed management plans to address flooding issues in vulnerable areas of the watershed.
- ❒ Clear log jams/debris.
- ❒ Develop and implement educational programs on improved ditch maintenance.
- ❒ Promote sediment management plans.
- ❒ Construct reservoir upstream of Decatur and Ft. Wayne.
- ❒ Acquire repetitive loss properties.

☞ **Section 4: Water Quality**
- ❒ Undertake log jam studies and GIS mapping initiatives to identify upstream causes of water quality degradation.
- ❒ Continue to eliminate CSOs and SSOs throughout the watershed.
- ❒ Upgrade the Rockford Water treatment plant.
- ❒ Strengthen programs directed at soil erosion and sedimentation problems.
- ❒ Expand technical assistance and demonstration programs for conservation tillage practices.
- ❒ Promote natural stormwater and flood management practices.
- ❒ Develop and maintain a comprehensive watershed management plan to guide current and future efforts.

☞ **Section 5. Natural Resource- based Recreation**
- ❒ Prepare a comprehensive recreation plan to identify gaps, priorities, funding needs and opportunities for multi-objective recreation projects that help solve flooding problems and improve water quality.
- ❒ Expand and protect parks along the St. Marys.

Section 6. Fish and Wildlife Enhancement
- ❒ Restore natural hydrology and flow.
- ❒ Prioritize feasible enhancement and restoration easements
- ❒ Perform a stream corridor survey.
- ❒ Promote wildlife enhancement projects.

☞ **Section 7. Commercial and Recreational Navigation**
- ❒ Investigate the removal of dams that currently impede recreational navigation.
- ❒ Perform hydraulics/hydrology studies to better understand watershed characteristics.
- ❒ Increase the number of access points for canoeing and kayaking.

Plan Implementation: The strategy for implementing identified potential actions will depend upon potential prospective sponsors (i.e., federal, state, regional, local, nonprofit, private). At the federal level and, specifically for those projects which the USACE decides to proceed with or further consider, the implementation strategy will depend upon whether the action falls within existing authorities or whether specific authority will be needed. In addition, funding the project will depend upon Congressional appropriations either for existing authorities or for specifically mandated projects.

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1. INTRODUCTION

1.1 Significance of the Planning Process

The importance of water and related natural resources to the environmental quality and economic well being of the Western Lake Erie Basin (WLEB) and its residents has long been recognized. Federal recognition is found in Section 441 of the Water Resources Development Act (WRDA) of 1999, which called upon the Secretary of the Army to "conduct a study to develop measures to improve flood control, navigation, water quality, recreation, and fish and wildlife habitat in a comprehensive manner in the Western Lake Erie Basin, Ohio, Indiana, and Michigan, including watersheds of the Maumee and adjacent Ottawa and Portage Rivers."

A Section 905(b) analysis (Reconnaissance Study) confirmed the federal interest in this initiative and facilitated an expanded focus leading to a Feasibility Study. That analysis also indicated that Representative Marcy Kaptur supported federal funding "to allow for

Figure 1-1. Location of Western Lake Erie Basin in the Great Lakes.

comprehensive problem and opportunity identification throughout the entire watersheds specified in the original legislation." Figure 1-1 depicts the WLEB in the context of the larger Great Lakes Basin.

The planning process for the Western Lake Erie Basin is significant on several levels, as it:

- *Addresses a number of problems and opportunities critical to the future of the Basin;*

- *Reflects the federal interest in the use, protection and management of the Basin's water and related natural resources;*
- *Embraces a comprehensive, watershed- based approach to planning;*
- *Features a highly collaborative process involving an array of partners;*
- *Consolidates, analyzes and summarizes a wealth of data and information, presenting it in a well documented and referenced "reader friendly" manner;*
- *Reflects a bias toward action, with a focus on practical and pragmatic guidance for future actions by a range of partners;*
- *Makes a critically important contribution to ecosystem restoration planning and management initiatives at the Great Lakes Basin level; and*
- *Provides a template for potential application to other watersheds within (and beyond) the Great Lakes Basin.*

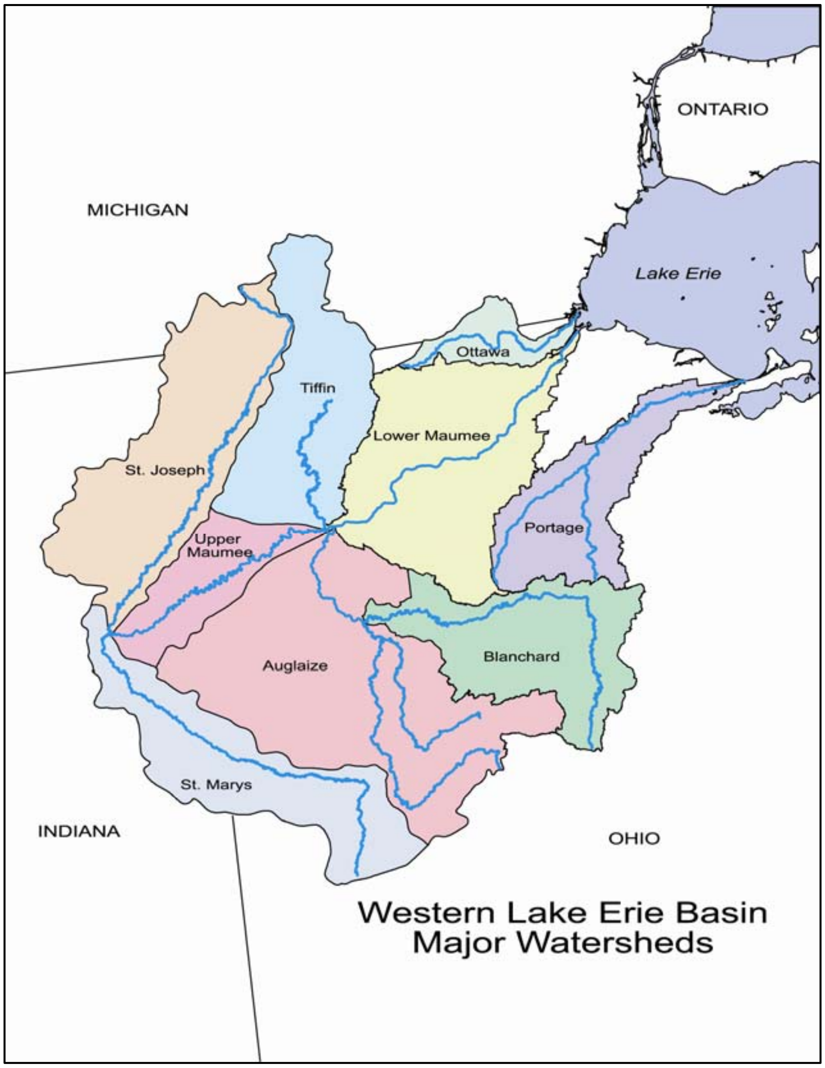


Figure 1-2. Western Lake Erie Basin major watersheds.

1.2 Plan Overview

1.2.1 Purpose: This project entails a multi-purpose/multi-objective evaluation of the Western Lake Erie Basin and Watersheds to (1) integrate existing projects, plans and studies; (2) assess program progress; and (3) incorporate future lake and watershed revitalization programs and projects into a comprehensive Western Lake Erie Basin and Watersheds Management Plan. Toward that end, USACE is completing existing conditions assessments for each of ten areas included in the WLEB project study area (i.e., Blanchard, Ottawa, Lower Maumee, Upper Maumee, Tiffin, St. Joseph, St. Mary's, Auglaize and Portage River watersheds, and the Maumee River Western Basin.) These watersheds are depicted in Figure 1-2. Individual watershed assessments will be rolled up into a comprehensive Western Lake

Erie Basin and Watersheds Management Plan to be submitted to the Congress.

1.2.2 Authority: The WLEB study is authorized under Section 441 of WRDA 1999. This authority directs the Assistant Secretary of the Army for Civil Works to conduct a study to develop measures to improve flood control, navigation, water quality, recreation, and fish and wildlife habitat in a comprehensive manner in the WLEB. The basin consists of the Maumee, Ottawa, and Portage River watersheds in the states of Ohio, Indiana and Michigan. In carrying out the study, the Secretary is directed to cooperate with (and consider the relevant programs of) interested federal, state and local agencies as well as non-governmental organizations.

Figure 1-3. WLEB partnership.

USACE completed a Section 905(b) Reconnaissance Analysis in October 2001. USACE Headquarters subsequently approved)on December 9, 2003) an Expanded Reconnaissance Analysis as a basis for preparation of a Project Management Plan and Feasibility Cost-Sharing Agreement for detailed watershed studies. Based on that analysis, a Feasibility Cost Share Agreement (FCSA) was signed with the city of Toledo in May 2006. Additional agreements will be developed, as needed, for individual projects that may result from plan implementation.

1.2.3 Desired Outcome: The planning effort responds to a directive in Section 441 of WRDA 1999 to "conduct a study to develop measures to improve flood control, navigation, water quality, recreation, and fish and wildlife habitat in a comprehensive manner…." This is to be accomplished through a partnership- based initiative entailing:

- A comprehensive review and analysis of existing studies, plans, reports and associated data and information;
- The identification of problems, opportunities and unmet needs as voiced by policy makers, opinion leaders and other stakeholders; and
- The generation of findings and potential actions that will provide a "blueprint" to guide various public agency and non-governmental partners in the selection, prioritization and implementation of specific actions to address problems and unmet needs.

Collectively, this goal (and its associated planning objectives) will lead to a desired outcome for the Basin and its residents*: the restoration, protection and sustainable use of the water and related natural resources of the Western Lake Erie Basin.*

1.3 Methodology

1.3.1 Planning Team: Roles and Responsibilities: Led by the USACE- Buffalo District, the Planning Team is comprised of the members of the WLEB Partnership, a collaborative multi-governmental (i.e., federal, state, local) initiative "dedicated to enhancing multi-purpose projects that improve land and water resource management in the basin and promote a healthy, productive watershed." The Partnership organizational structure includes a Leadership Committee supported by coordination teams addressing operations, project management, funding, research and data, and public outreach. (See Figure 1.1 and Table 1.1 in Appendix for details.) The Partnership is guided by principles that include collaboration and consensus building; capacity- building at the local level; a results-oriented approach; and a transparent, open process.

WLEB PARTNERS

U.S. Army Corp of Engineers
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geological Survey Ohio Water Science Center
Governor of Indiana
Governor of Michigan
Governor of Ohio
Indiana State Technical Committee
Michigan State Technical Committee
Ohio Department of Natural Resources, Div. of Soil and Water Conservation
National Association of Conservation Districts
Maumee River Basin Partnership of Local Governments

1.3.2 Plan Constituents: WLEB Plan constituents are both participants in- and beneficiaries of- the planning process. The Project Management Plan for the Reconnaissance level study notes that "….the Secretary [of the Army] was directed to cooperate with interested Federal, State, and local agencies and non-governmental organizations and consider all related programs of the agencies." Findings and potential actions generated by the planning process constitute a "capital improvements program" for the Basin that will involve all levels of government (and non-governmental stakeholders) in prioritization and implementation.

The U.S. Congress is a key constituent of the planning process, as indicated by its authorization in WRDA 1999. Constituents also include federal agencies (e.g., U.S. Army Corps of Engineers, Natural Resources Conservation Service, U.S. Environmental Protection Agency); state agencies (e.g., Departments of Natural Resources, Environmental Protection, Transportation); regional agencies and associations (e.g., Toledo Metropolitan Area Council of Governments, Western Lake Erie Basin Partnership); local agencies (e.g., cities and townships); and an array of citizen, business/ industry, and user groups with an interest in the restoration, protection and sustainable use of the resource.

1.3.3 Planning Principles, Assumptions and Constraints: The planning process was guided by a series of principles embraced by the Project Team and reflected in all aspects of its Work Plan. Team members agreed that project design and conduct would feature:

Partnership Mission Statement

The Western Lake Erie Basin Partnership is a tri-state partnership dedicated to enhancing multi-purpose projects that improve land and water resource management in the basin and promote a healthy, productive watershed.

- An **open and inclusive process** actively soliciting stakeholder engagement and substantive contributions to the planning effort;
- A **partnership- oriented process** driven by the collective input of all public and non-governmental entities with a role, responsibility or interest in the future of the Western Lake Erie Basin;
- A **watershed- based approach** favoring the use of hydrologic rather than geo-political boundaries in characterizing the resource and planning for its restoration, protection and sustainable use;
- A **multi-objective and multi-disciplinary process** recognizing the environmental, economic, social and cultural dimensions of resource use and stewardship;
- A **thorough examination and characterization of all relevant existing plans, studies, reports, data bases and other materials** contributing to an understanding of Basin conditions, issues, problems, unmet needs and prospective solutions;
- A **commitment to seek consistency with the range of existing plans and strategies** offering a vision for the Basin and recommendations to achieve it; and
  A **commitment to a concise, practical and pragmatic document** providing the reader with a "blueprint" of potential actions, their rationale, and their impact.

The Project Team designed its approach around a series of assumptions. USACE Principles and Guidelines, as well as applicable regulations and federal laws, have guided the planning process, as has authorizing language in Section 441 of WRDA 1999. Finally, based upon guidance received from Corps project officers, it was assumed that the Project Team would exercise some discretion (subject to final approval) in 1) selecting a preferred format and content for the individual watershed assessments; and 2) identifying "potential actions" relevant to all agencies and organizations within the Basin, including (but not limited to) USACE.

Figure 1-4. Satellite view of sediment plume entering Maumee Bay.

Constraints associated with the project relate primarily to focus, scope, budget, timeframe and implementation authority. The Project Team worked within the parameters of the WRDA language, which limited the primary focus to flood control, water quality, recreation, fish and wildlife habitat, and commercial and recreational navigation. Funding availability and completion deadlines also influenced project methodology and depth of analysis, placing some limitations on data/ information gathering from various sources and, in particular, from stakeholder engagement. Finally, Project Team responsibilities were limited to the generation of "potential actions" and did not include detailed attention to plan implementation.

1.3.4 Communications and Coordination Strategy: The Project Team adopted a policy of "continuous communications" involving USACE, the project contractor (URS Corporation), the WLEB Partnership, and the larger community of stakeholders. Regularly scheduled coordination meetings between USACE and URS (including liaison with the WLEB Partnership) ensured a clear understanding of expectations, responsibilities and timelines. Stakeholder meetings at the onset of the planning process, complemented by interviews and other communications throughout the process, provided interested parties with multiple "access points" to contribute to/ comment on interim products.

1.3.5 Steps in the Planning Process: Watershed assessments are multi-objective initiatives that feature a flexible approach to plan formulation and evaluation. The outcome is a basin/watershed management plan that identifies potential actions (and sponsors) to achieve established objectives. Steps associated with this watershed assessment process include:

- Define the study area based on hydrologic units.
- Establish a watershed group (partnership) to participate in the planning process.
- Establish a framework for federal, state, local, and tribal involvement in the plan process.
- Investigate all problems, needs and opportunities consistent with authorizing language.
- Develop a vision for the watershed and associated goals and objectives
- Develop a scope of work for accomplishing all study tasks.
- Research historic and current conditions and uses of the watershed.
- Identify potential future changes in the watershed and associated future conditions.
- Qualitatively assess cumulative effects of various activities in the watershed.
- Evaluate alternative resource uses and environmental, economic and social impacts.
- Prioritize water and land-related resource problems and opportunities.
- Identify and evaluate conflicting uses and monetary/ non-monetary trade-offs.
- Develop measures to assess progress in implementing recommended future activities.
- Assess project costs, benefits, and environmental impacts of recommended activities.
- Identify and prioritize potential actions in each watershed.
- Document how potential actions will achieve restoration, protection and sustainable use.
- Determine the optimal schedule (and sponsor) for implementing potential actions
- Prepare a comprehensive watershed plan.
- Pursue USACE- identified projects under normal budget procedures.

These steps provided general guidance in the preparation of the St. Marys Watershed Assessment, consistent with the various principles, assumptions and constraints identified above.

1.3.6 Reference Materials: An extensive library was established to support project activities and provide cited references for planning documents. (Section 11 References Cited).

1.3.7 Plan Implementation Strategy: The watershed assessments will provide guidance to an array of public and non-governmental entities with a role and responsibility for the restoration, protection and sustainable use of the water and related natural resources of the WLEB. Specific approaches to plan implementation will be a function of requirements and procedures associated with potential sponsors. As noted, they will likely range from federal agencies and state/ local governments to private sector and other non-governmental entities.

The plan implementation strategy for federal projects will be dictated by the nature of the potential action, and whether that action can be implemented under existing authority or will require authorization by the Congress. Plan implementation for other projects will be accomplished via partnerships among local, state and federal entities and/or by specific sponsors. Funding sources for implementation will vary, but could include a broad range of traditional (e.g., federal, state and local government funding, foundations) and non-traditional sources (e.g., conservancy districts, utilities, assessments, mitigation banks, in-lieu fees).

1.4. Report Overview and Organization

This report is organized into multiple primary chapters that respond to authorizing language in Section 441 of WRDA 1999. An *overview of baseline watershed characteristics* is offered in Chapter Two, and includes the physical system and natural resources; socio-economic characteristics; cultural characteristics; the institutional and regulatory setting; and trends/ issues and their implications for watershed protection and management. Chapter Three focuses principally on *water quantity issues* (i.e., flood damage reduction, water supply, sedimentation, bank erosion) while Chapter Four addresses *water quality*. *Natural resource-based recreation* is the

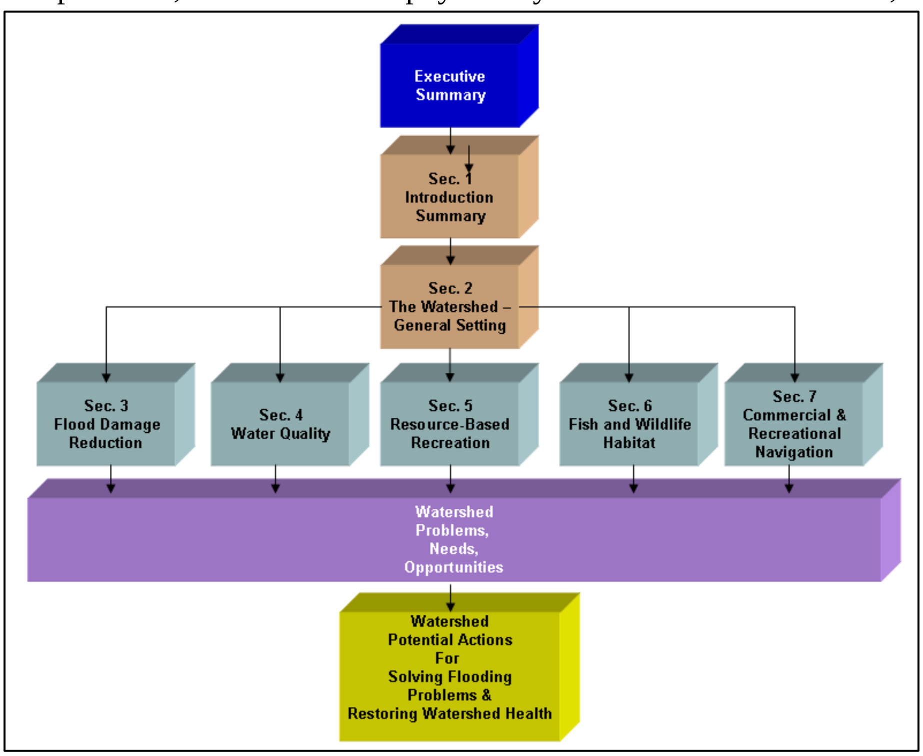


Figure 1-5. Report organization.

focus of Chapter Five, and focuses on parks (local and regional), hunting preserves, and other recreation activities (e.g., hiking, biking, canoeing, boating, fishing, hunting.) Chapter Six focuses on *fish and wildlife enhancement*, documenting problems, needs and opportunities associated with forested, riparian and wetland habitat resources. *Commercial and recreational navigation* is the topic of Chapter Seven, documenting existing facilities, uses and unmet needs that can be addressed by a series of potential actions. Based on the findings and potential actions discussed previously, Chapter Eight presents a preliminary listing of priority potential actions (drawn from plan development research), that are necessary for the restoration, protection and sustainable use of the water and related natural resources of the watershed. *Plan integration* is the focus of Chapter Nine, which discusses the relationship of individual watershed reports to the larger basin-wide integrated report that will be presented to the Congress. Chapter Ten addresses *plan implementation* and how project findings will be implemented and by whom.

2. THE WATERSHED - GENERAL SETTING

2.1 Introduction

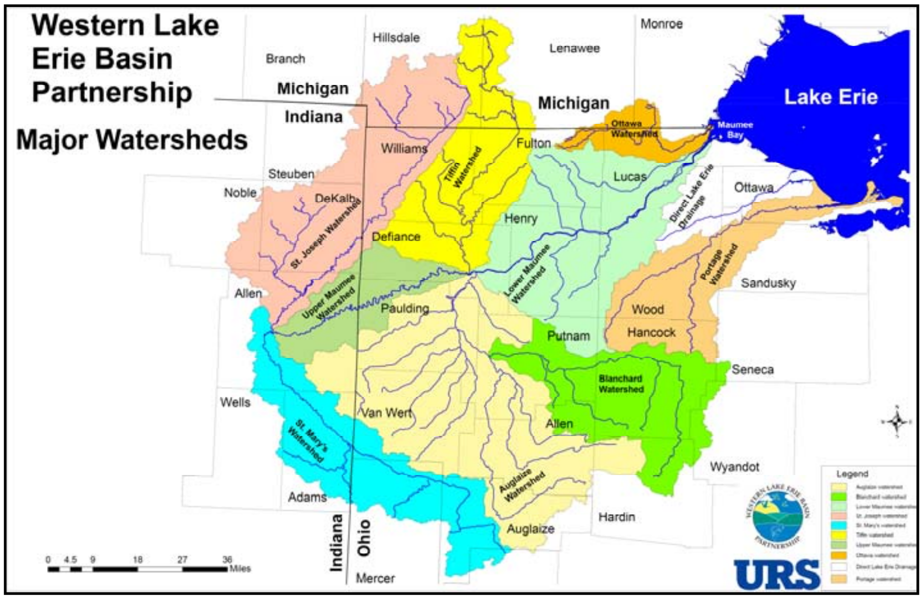


Figure 2-1. Western Lake Erie Basin Project Area.

The St. Marys River Watershed is one of 10 sub-watersheds included in the Western Lake Erie Basin Project Area (Figure 2-1). It is located within several counties of northeast Indiana and northwest Ohio (indicated in light blue in Figure 2-1). The St. Marys River begins in west-central Ohio near Minster, where it flows northward through the city of St. Marys, Ohio. The river continues flowing northward for approximately ten miles before turning west-northwest to flow through Decatur, Indiana. The river continues flowing northwesterly into the City of Fort Wayne, where it hooks around in its last half mile to join the St. Joseph River from the west to form the Maumee River in downtown Fort Wayne. The Maumee River then flows northeast approximately 150 miles from central Fort Wayne to its mouth at Lake Erie.

2.2 Physical System and Natural Resources

2.2.1 Location and Geography: The St. Marys River Watershed is located in northeastern Indiana and northwestern Ohio, covers an area of 814 square miles, and slopes down to the northwest from Shelby, Ohio (Figure 2-2). The watershed contains approximately 434 miles of tributary perennial streams (Figure 2-3).The St. Marys River originates near Minster, Ohio and flows to the northwest through Shelby, Auglaize,

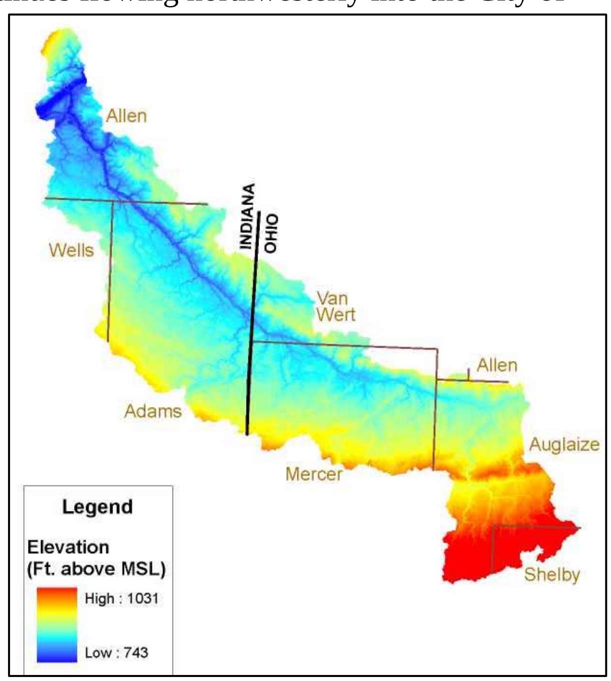


Figure 2-2. Elevation, St. Marys Watershed

Mercer and Van Wert counties in Ohio. The river flows into Indiana through Adams County southwest of Pleasant Mills, near the Indiana State Line and Highway 33. It continues to the northwest, flowing through Wells County and Decatur, Indiana into Allen County (Table 2-1). It joins the St. Joseph River in Fort Wayne to form the Maumee River, which flows northeast and empties into Lake Erie.

Land cover in the watershed is predominantly (68%) agricultural. with corn and soybeans comprising the majority of crops. The entire watershed is located in the Eastern Corn Belt plain ecoregion, characterized by smooth plains, beech/maple hardwood forest, and productive soils. Additional land uses include urban, wetlands and wooded areas. Decatur, Berne and Fort Wayne (all in Indiana) are major urban areas within the watershed. Decatur lies entirely within the watershed, while Berne and Fort Wayne are located within more than one watershed.

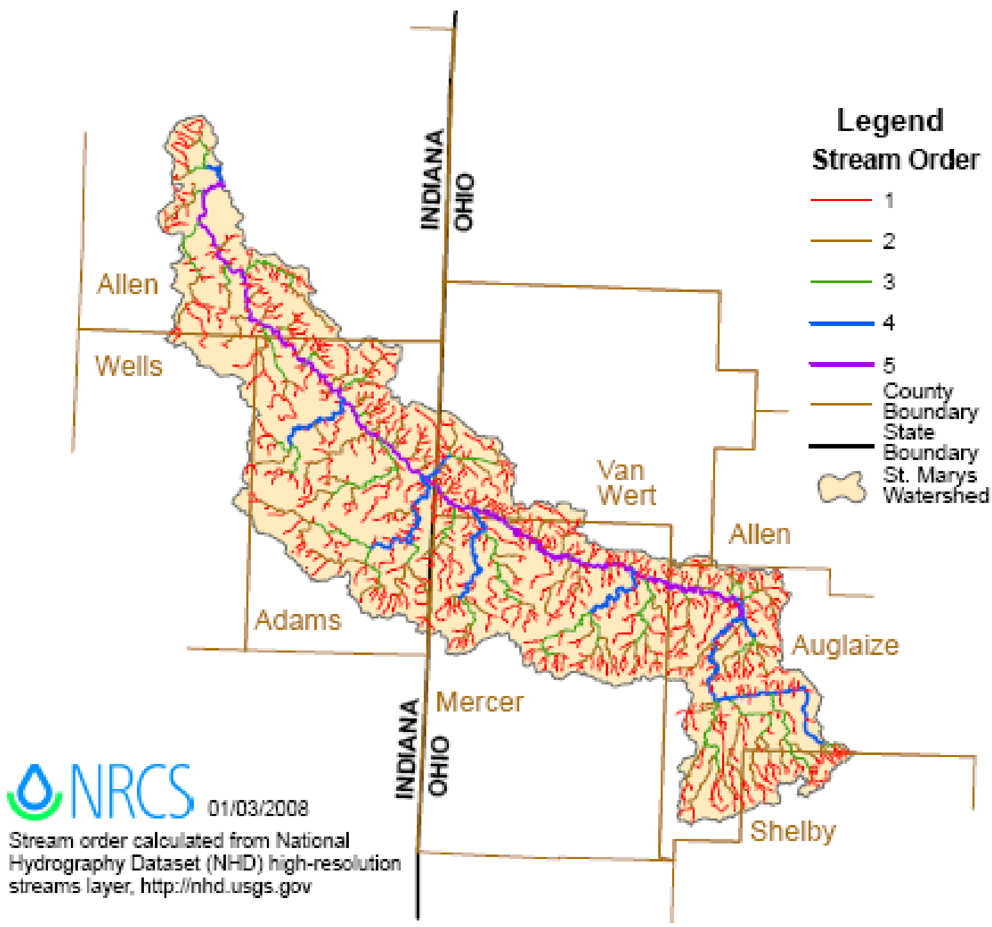


Figure 2-3. St. Marys River and tributaries.

The HUCs for the St. Marys River Watershed are:

HUC11 Water Assessment Unit Description
04100004 - St Marys River Watershed
04100008 010 - Clear Creek & East Fork St. Marys River
04100008 020 - Muddy Creek
04100008 030 - Center Branch of St. Marys River
04100008 040 - St Marys River below Center Branch to above Sixmile Cr.
04100008 050 - Kopp Creek
04100008 060 - Sixmile Creek

Table 2-1 - Counties located in the St. Marys Watershed

County	Total Acres	Acres in Watershed	% of Watershed Area	% of County in Watershed
Adams	217,855	158,828	31.3%	72.9%
Allen	423,033	71,536	14.1%	16.9%
Auglaize	257,604	100,072	19.7%	38.8%
Mercer	304,264	119,016	23.4%	39.1%
Shelby	262,903	15,136	3.0%	5.8%
Van Wert	262,801	29,844	5.9%	11.4%
Wells	236,450	13,676	2.7%	5.8%
Totals		508,214	100.0%	

2.2.2 Climate: Northern Indiana is located in the mid-latitude climate zone, within the Prevailing Westerlies. Summers are typically moderately hot for extended periods, while cold northern air masses dominate the region during winter months. Winter temperatures average 28° F, with summer temperatures averaging 72°. Due to the Prevailing Westerlies, most weather systems move west to east across the region, with the predominant surface wind from the southwest.

Annual precipitation is generally well distributed with somewhat larger amounts in late spring and early summer. Rainfall averages 36 inches per year with 60% falling between the April to September growing season (Figure 2-4). Snowfall averages 29 inches annually, also providing a vital source for soil moisture. The average relative humidity is 60% and, despite considerable cloudiness during the winter months, sunshine days average about 75% over the course of the year.

Temperature differences between daily highs and lows average about 20 degrees F°. The average growing season is 173 days, with the final spring freeze typically in late April and the first autumn freeze typically in mid-October.

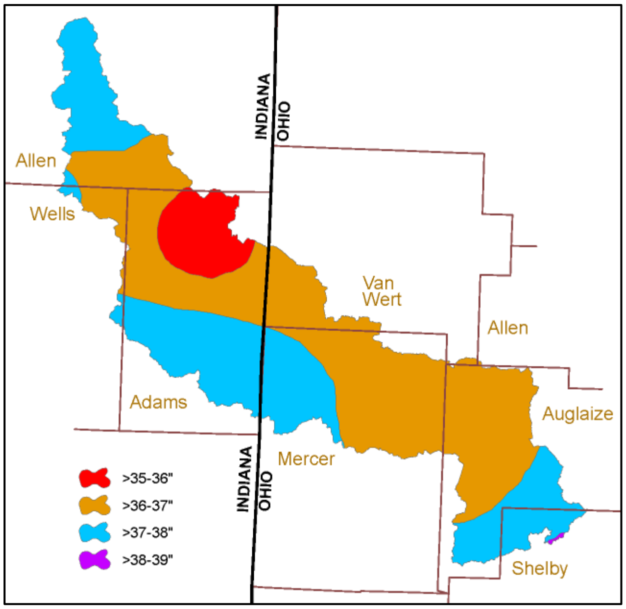


Figure 2-4. Rainfall, St. Marys Watershed

Snowfall in the St. Marys Watershed averages 32.4" per year. Six inch or greater snowfalls usually only occur once per season, and snow depth at any given time rarely exceeds 10".

Typically, the last snow of the season occurs in mid-April, with the first snow occurring around the first of November. The snowiest season on record is 1981-82 with 81.2", contrasting with a record low of 8.3" in 1932-22. Freezing precipitation events are not uncommon but major storms are usually several years apart.

Rains and/or snowmelt occurring in winter and early spring are largely responsible for peak annual flooding along major streams; such events have caused significant damage and loss of property. Floods along the Maumee River are intensified when the St. Joseph and St. Marys Rivers reach peak flow at the same time. Due to the presence of urban development in Fort Wayne, Allen County has historically experienced the most significant flooding problems.

Several studies examining the current/ prospective impact of global warming on the Great Lakes Basin have been undertaken in recent years, with some focusing specifically on Lake Erie and Ohio. (Hall and Stuntz 2007, National Conference of State Legislatures 2008, Sousounis and Bisanz 2000, King et al. 2003, Croley 2003). These studies generally acknowledge a range of climate change impacts associated with increased average temperatures, including higher over-land evapotranspiration and lower runoff, reduced soil moisture, potentially lower groundwater tables and changes in stream base flows, alternation of wetland water balances, and increased summer storm intensity. The impact of these changes may include need for increased irrigation, change in available water resources for industry and citizens, degradation of water quality and increased treatment costs, potential increases in urban flooding due to higher intensity storms, and alternation if aquatic and wildlife resources, including species mix and diversity. Global warming and associated climate change impacts are increasingly important considerations in identifying potential actions needed to sustain and restore watershed health, and reduce the risks associated with watershed scale impacts.

2.2.3 Air Quality: Specific information relating to air quality within the watershed was not made available at the time of this report. Additional information may be added once the Rapid Watershed Assessment has been completed for the watershed. The only pollutants for which there are portions of Ohio and Indiana designated non-attainment are Ozone (eight-hour) and PM 2.5. All of the counties located in the St. Marys River Watershed are in attainment for Ozone and PM 2.5 (OEPA 2008a, IDEM 2008).

2.2.4 Geology: The St. Marys River Watershed has had extensive glaciation. The landscape of the Maumee River Basin is primarily a product of the latest Wisconsin glacial events of the Erie and Saginaw ice lobes, then as the floor of ancestral Lake Erie.

Major landscape elements include: 1) the Tipton Till Plain, a vast region of very low relief that generally corresponds to the southern part of the basin: 2) the Maumee Lacustrine Plain, a flat, nearly featureless paleo-lake bottom that generally corresponds to the central core of the basin, and 3) the Steuben Morainal Lake Area characterized by low-to high-relief and generally corresponding to the northern part of the basin.

The land surface over the greater part of the Maumee River basin is underlain by glacial till or till-like sediments. Such sediments are fine- to medium-grained and poorly-sorted, having minimal reworking by meltwater and mass movement. The surface till in most of the Maumee River Basin is typically clay rich, reflecting the abundance of both lake and shale bedrock in the source area of the Erie Lobe east of the basin. In contrast, tills of the Saginaw Lobe, which underlie Erie Lobe tills in many places in the northern part of the basin, are sandy due to the combination of coarse-grained bedrock and abundant outwash in the source area.

Deposits formed in glacial lakes are also widespread in the Maumee basin, especially in the east central part of the basin known as the Maumee Lacustrine Plain. Sediments range from silt and clay that settled out of the still water in the central portions of the lake, to coarse sand and gravel associated with high-energy shorelines.

Headwaters of the St. Marys River gather along the St. Johns Moraine in the Central Ohio Clayey Till Plain. The St. Marys flows across the Central Ohio Clayey Till Plain at an average gradient of about 2.5 feet per mile and joins the St. Joseph River at the western edge of the Maumee Lake Plain. The St. Marys River itself is comprised of Alluvial and Outwash deposits. The alluvium does not extend significantly beyond the channel. The surrounding clayey or silty soils have high runoff coefficients. These factors contribute to large, surface runoff and, ultimately, to flooding of the St. Marys River.

Watershed surface elevations range from 780 to 840 feet mean sea level. The area is very poorly drained, with ditches commonly used to carry runoff and to lower the characteristically shallow water table within the slow draining till.

2.2.5 Soils: The land surface over the greater part of the Maumee River basin is underlain by glacial till or till-like sediments. Such sediments are fine- to medium-grained and poorly-sorted having minimal reworking by meltwater and mass movement. The surface till in most of the Maumee River basin is typically clay rich, reflecting the abundance of both lake and shale bedrock in the source area of the Erie Lobe east of the basin. In contrast, tills of the Saginaw Lobe, which underlie Erie Lobe tills in many places in the northern part of the basin, are sandy due to the combination of coarse-grained bedrock and abundant outwash in the source area.

Deposits formed in glacial lakes are also widespread in the Maumee basin, especially in the east central part of the basin known as the Maumee Lacustrine Plain. Sediments range from silt and clay deposited in quiet water in the central portions of the lake, to coarse sand and gravel associated with high-energy shorelines.

Elevations range from 780 to 840 feet mean sea level. The area is very poorly drained, with drainage ditches commonly used to carry runoff and lower the characteristically shallow water table within the slow draining till. The St. Marys River itself is comprised of alluvial and outwash deposits. The alluvium does not extend significantly beyond the channel. The surrounding clay/ silty soils have high runoff coefficients. These factors contribute large, surface runoff and ultimately flooding of the St. Marys River.

Indiana, particularly in the central region, has some of the most productive soils in the United States. These soils, coupled with good management and a favorable climate, contribute to consistently high crop yield levels

2.2.6 Water Resources: Water resources within the watershed consist of a combination of surface (man made reservoirs, small lakes, and streams) and groundwater resources. Figure 2.2 depicts the network of streams and their stream order in the watershed, while Table 2.2 summarizes the stream data by county. The surface water resources of the Maumee River Basin include the Maumee, St. Marys, and St. Joseph Rivers; Cedar, Little Cedar, Blue, Fish, and Spy Run Creeks; an extensive network of smaller tributary streams and ditches; two man-made reservoirs; natural lakes; ponds; and scattered remnants of marshes, swamps, and other wetlands.

Table 2-2. Stream miles by order (NRCS, 2008).

Description	Acres of Standing Water (Lakes/ Ponds)	Total Miles of Streams	Total Miles 1st Order Streams	Total Miles 2nd Order Streams	Total Miles 3rd Order Streams	Total Miles 4th Order Streams	Total Miles 5th Order Streams
St. Marys Watershed	1009[1]	1303.9	713.0	285.9	140.5	75.7	88.8
Adams Co., IN Portion	360.4	371.1	196.7	90.4	40.1	22.9	21.0
Allen Co., IN Portion	294.8	161.7	80.3	35.8	23.3	2.8	19.6
Auglaize Co., Portion	250.9	304.5	157.0	73.1	32.6	29.2	12.6
Mercer Co., Portion	51.6	322.7	180.3	60.4	36.7	18.1	27.2
Shelby Co., Portion	27.6	43.9	31.5	10.0	2.4	N/A	N/A
Van Wert Co., Portion	20.8	90.2	58.5	15.2	5.4	2.7	8.4

The present surface-water hydrology of the Maumee River Basin is different from the natural drainage conditions that existed prior to permanent settlement of the area. The most extensive changes are related to clearing of hardwood forests and ditching and tiling of former swamps. The Three Rivers Water Filtration Plant was constructed at the confluence of Fort Wayne's three rivers in 1933. When it was built, it had the capacity to produce 24 million gallons of water per day (MGD). Since the original construction, there have been two major additions: a 24 MGD expansion in 1955 and a 24 MGD addition in 1981. The total capacity of the Plant today is 72 million gallons per day, enough to supply the needs of Fort Wayne for at least the next 10 to 15 years.

While the urbanized Ft. Wayne portion of the watershed relies on city water supplies from the St. Joseph River, rural farms and smaller towns in the basin primarily rely on ground water supplies for drinking water (Figure 2-5).

In general, the groundwater resources of northern Indiana are good to excellent. Exclusive of some areas in northwestern Indiana, well yields from 200 to 2,000 gpm (or 0.3 to 2.8 million mpg can be expected in most areas. Major areas of groundwater availability are found where the productive Silurian-Devonian bedrock aquifer system underlies large areas and where deposits of glacial material up to 500 feet in thickness contain highly productive inter-till sand and gravel aquifers. A number of major outwash plain and "valley train" sand and gravel deposits are associated with the St. Joseph, Elkhart, Pigeon, Fawn, Eel and Tippecanoe River valleys. These sources are capable of large ground-water production. Wells with capacities greater than 400 gpm, or 0.6 mgd, are quite common. (Indiana DNR - http://www.in.gov/dnr/water/files/indiana-wa.pdf).

2.2.7 Aquatic Ecology: As noted in Table 2-3, water quality in the watershed is highly impaired, with five of six hydrologic units having at least half of their sites in non attainment due to factors such as habitat/ flow alternation, siltation, organic enrichment, low oxygen, nutrient enrichment and ammonia.

Table 2-3. Overall water quality assessment (NRCS, 2008).

Unit	Attainment Status			Impairment Causes					
	Watershed Assessment Unit Score	% Sites Full	% Sites Part or Non-Attainment	Habitat/Flow Alteration	Siltation	Organic Enrichment	Low Oxygen	Nutrient Enrichment	Ammonia
Headwaters 10	24	25%	75%	X		X	X	X	X
Outlet/Lye Creek 20	53	50%	50%	X	X	X	X	X	X
Eagle Creek 30	39	27%	73%	X	X	X	X	X	X
Ottawa Creek 40	54	50%	50%	X	X		X	X	
Riley Creek 50	7	7%	93%	X	X	X	X	X	
Cranberry Creek 60	75	56%	44%	X		X	X	X	X
Large River Unit	100	100%	0%	X		X		X	

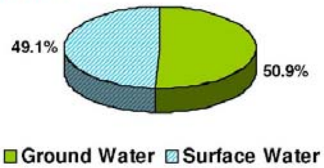
The Indiana Department Environmental Protection completed a 26 site sampling program in the major drainage systems and developed a provisional Index of Biotic Integrity (mIBI). Only one site is classified as non-impaired; 17 are slightly impaired; eight are moderately impaired; and none of the sites sampled are classified as severely impaired.

In 1991, the USEPA and IDEM sampled fish populations in the Maumee River Basin in Indiana. A total of 77 sites were sampled to develop an Index of Biotic Integrity (IBI) for the basin. Overall trends saw increasing biological integrity with increasing drainage area. In general, the St. Joseph River and its tributaries contain the most diverse fish community in the basin, and the St. Marys, the least.

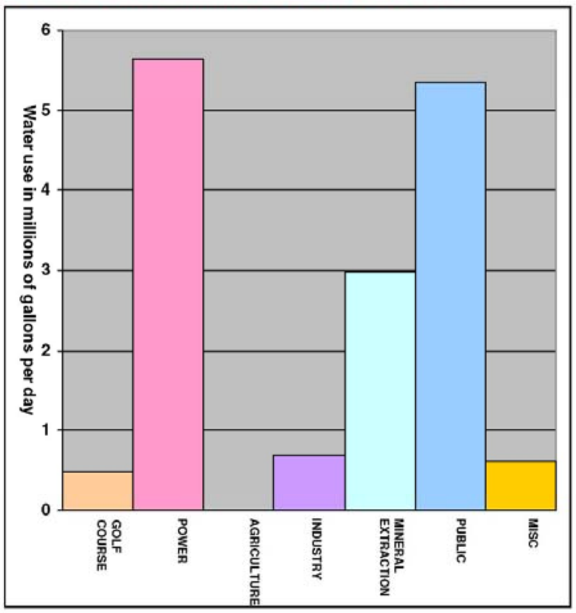
Water Withdrawal in the St. Marys Basin

Total fresh-water withdrawal and source of water in 2005

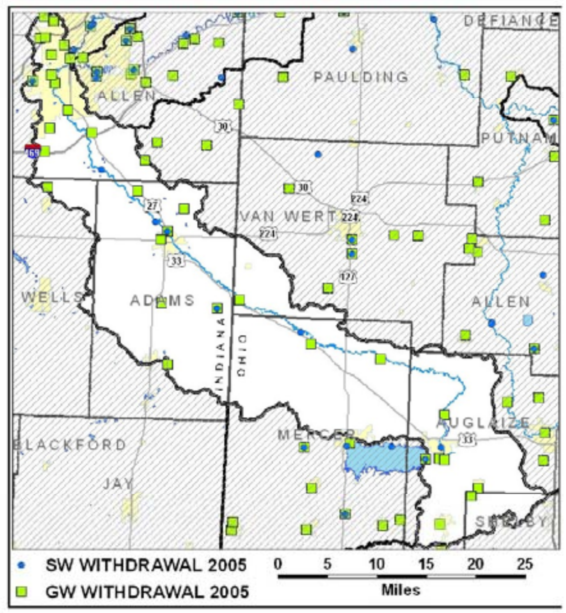
Source	Water use, in million gallons per day	Percent of total use
Surface Water	7.74	49.1%
Ground Water	8.02	50.9%
Total	15.76	100.0%



Total fresh-water withdrawal by category in 2005



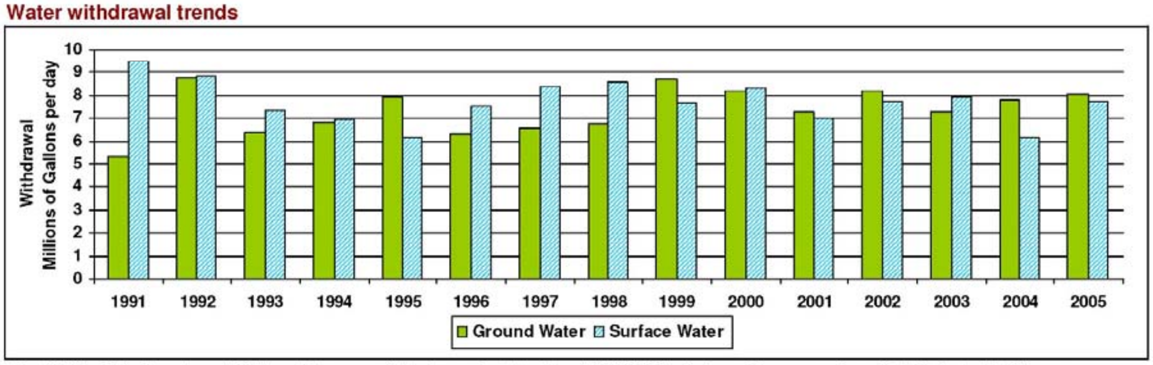
Location of facilities withdrawing water in 2005



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

	Golf Course	Power	Agriculture	Industry	Mineral Extraction	Public	Misc	Total
Surface Water	0.05	5.64	0.00	0.47	1.34	0.00	0.23	7.74
Ground Water	0.44	0.00	0.00	0.22	1.63	5.35	0.38	8.02
Total	0.49	5.64	0.00	0.70	2.97	5.35	0.61	15.76
Percent Total	3.1%	35.8%	0.0%	4.4%	18.9%	34.0%	3.9%	100.0%

Water withdrawal trends



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

Figure 2-5. Water withdrawal from the St. Marys River.

2.2.8 Forests, Wetlands and Floodplains: A comprehensive inventory of Indiana's wetlands was completed by the U.S. Fish and Wildlife Survey as part of its National Wetlands Inventory. The National Wetland Inventory maps for Ohio have not yet been completed, particularly in the NW corner of the state. Current estimates indicate the Maumee River Basin contained 11,428 wetlands covering approximately 51.3 square miles or 32,830 acres. This was roughly four percent of the basins land area in Indiana. Palustrine wetlands constitute 99.5% of the region's wetlands, and nearly 86% of the total wetland area within the Indiana portion of the basin. Riverine and lacustrine wetland coverage accounts for approximately four and 10%, respectively. Fifty-seven percent of the Palustrine Wetlands in the Maumee River Basin are classified as forested, with 27% classified as emergent.

Wetlands in the Maumee River Basin can be further characterized by the duration and timing of surface inundation. Approximately 45% are seasonally flooded, 31% temporarily flooded, 12% semi-permanently flooded or intermittently exposed, and eight percent either saturated or permanently flooded. The remaining four percent are unclassified.

Size classification is important when evaluating different functions and values of a given wetland. With flood prevention, for example, a large wetland will provide increased water storage potential, whereas many species of waterfowl prefer smaller wetland areas for nesting and raising their young. In the Maumee River Basin, nine percent of wetlands are less that one acre in size, 44% are from one to 10 acres, 26% are from 10 to 40 acres, and the remaining 21% are greater that 40 acres.

2.2.9 Fisheries and Wildlife Habitat: The St. Marys River Watershed is located in the Eastern Corn Belt Plain ecoregion, characterized by smooth plains, beech/maple hardwood forests, and productive soils.

The Eastern Corn Belt Plain is a primary rolling till plain with local end moraines; the soil tends to be lighter in color, loamier, better drained and richer than other ecoregions in the area. Glacial deposits of Wisconsinan age are extensive and are not as dissected or as leached as the pre-Wisconsinan till which is restricted to the southern part of Ohio. Forests of American beech were once common on the Wisconsinan soils, while beech forests and elm-ash swamp forest dominated the wetter pre-Wisconsinan soils. Throughout this area today, extensive corn, soybean, wheat and livestock farming is dominant and has replaced the original beech forests and scattered elm-ash swamp forests.

It is estimated that only seven percent of the land use/land cover in the St Marys River watershed is forested, comprised of approximately 35,420 acres of deciduous forest. Wetland acreage is minimal and estimated at approximately 80 acres. Common tree species include oaks (red, white, bur, swamp white, chinquapin), green and white ash, maples (red, sugar, silver, box elder), basswood, elm, black walnut, honey locust, hackberry and other hardwoods. Many of the forested areas are found along major streams, and nearly all are privately owned. The small percentage of publicly owned forests are managed by county park districts; there is no state or federally owned forest land in the watershed.

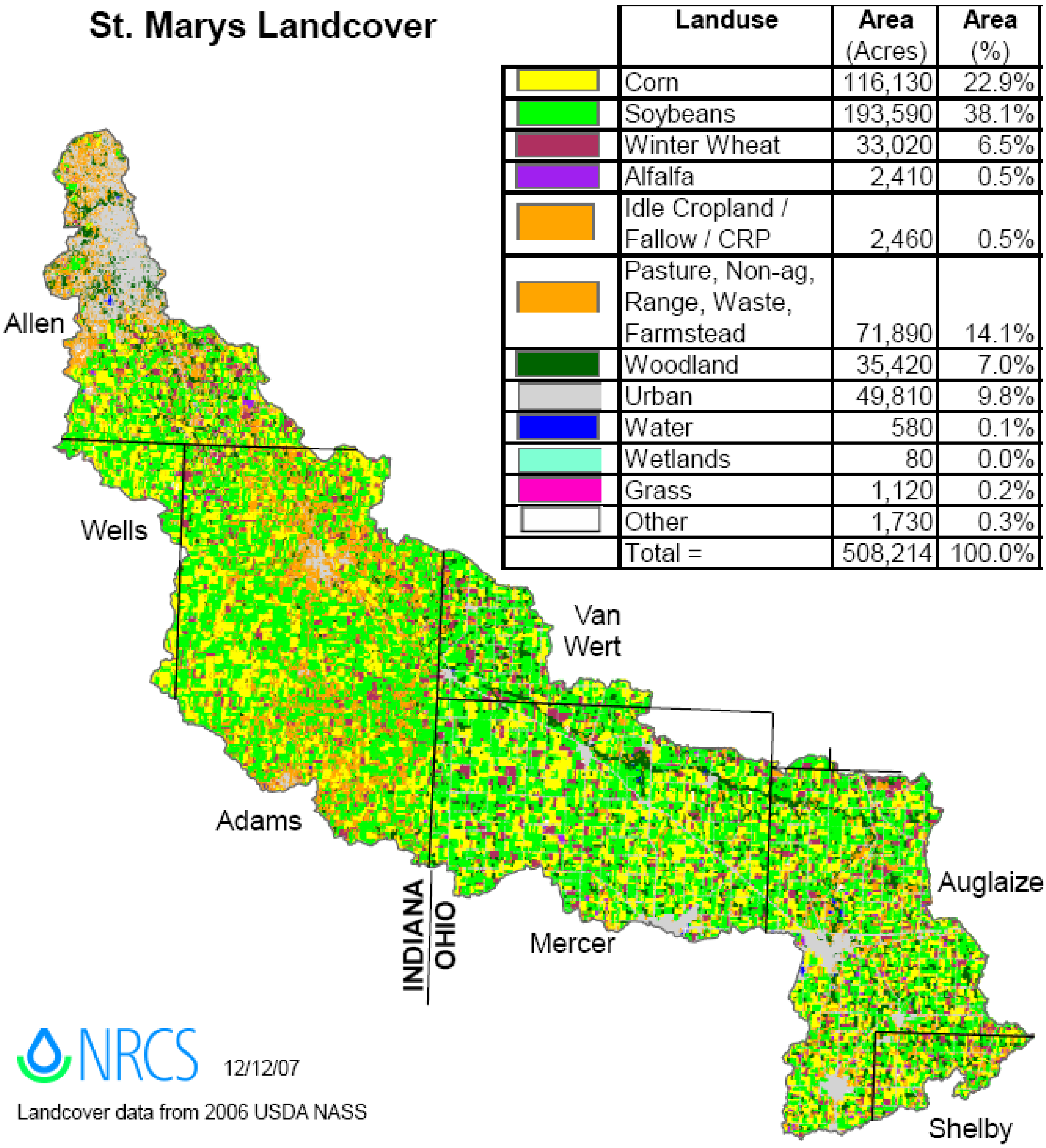
2.3 Socio-economic Characteristics

2.3.1 Demographics: Approximately 61% percent of the watershed's population lives in urban areas, with almost 80% residing in Allen County. The population is growing in the watershed, a trend that is expected to continue. Per capita income in the basin averages about 97 percent of that for Indiana. Recent unemployment trends are slightly higher than the state average, but lower than the national average. Employment and earnings by industry are largely based on manufacturing, the service industry, wholesale and retail trade, and government. These four economic sectors make up approximately 76 percent of the total employment earnings in the watershed. Additional demographic information is provided in Table 2.4.

Table 2-4. Demographic criteria and racial makeup in St. Marys watershed counties.

Demographic Criteria	Allen County, Indiana	Adams County, Indiana	Mercer County, Ohio	Auglaize County, Ohio
2006 Population	347,316	33,719	41,303	47,060
2000 Population	331,849	33,625	40,924	46,611
Median Value Housing Unit (2000)	$ 88,700	$ 85,400	$ 94,000	$ 90,600
Median Household Income (2004)	$ 42,867	$ 43,781	$ 46,210	$ 46,070
Persons living below Poverty Limit (2004)	11.3 %	10.1 %	6.4 %	7.0 %
Racial Makeup (2005)	**Allen County, Indiana**	**Adams County, Indiana**	**Mercer County, Ohio**	**Auglaize County, Ohio**
White Persons	84.3 %	98.7 %	98.4 %	97.9 %
Black Persons	11.79%	0.3 %	0.2 %	0.3 %
American Indian / Alaska Native	0.4 %	0.2 %	0.3 %	0.2 %
Asian Person	1.9 %	0.2 %	0.5 %	0.6 %
Native Hawaiian / Other Pacific Islander	0.1 %	0.0 %	0.0 %	0.0 %
Persons of 2 or more races.	1.6 %	0.6 %	0.6 %	0.9 %

2.3.2 Land Use: The primary land use within the St. Mary's River Watershed (68.5%) is agriculture, with primary field crops including soybeans, corn and wheat. Livestock raised in the watershed include confined livestock (hogs) and some beef cattle. Other land uses include timber and scattered residential. Figure 2-6 displays the land use in the watershed.



Landuse	Area (Acres)	Area (%)
Corn	116,130	22.9%
Soybeans	193,590	38.1%
Winter Wheat	33,020	6.5%
Alfalfa	2,410	0.5%
Idle Cropland / Fallow / CRP	2,460	0.5%
Pasture, Non-ag, Range, Waste, Farmstead	71,890	14.1%
Woodland	35,420	7.0%
Urban	49,810	9.8%
Water	580	0.1%
Wetlands	80	0.0%
Grass	1,120	0.2%
Other	1,730	0.3%
Total =	508,214	100.0%

Figure 2-6. Land use in the St. Marys River Watershed.

2.3.3 Business and Industry: Major employers in the St. Marys River Watershed counties include A& L Laboratories, Almco Steel Products, Eaton Corporation, Purdue University – Ft. Wayne, Indiana Tech, and Marathana Industry.

2.3.4 Labor Force, Employment and Income: Data for the four counties with the most land mass in the St. Marys River Watershed is provided in Table 2-5. Information for counties in Indiana was obtained from Stats Indiana – Allen and Adams County Indiana Profile (http://www.stats.indiana.edu). Information for counties in Ohio was obtained from Ohio County Profiles, Ohio Department of Development, Office of Strategic Research (http://www.odod.state.oh.us).

In 2006, median household income ranged from $42,742 to $46,930 per county in the watershed.

Table 2-5. Labor force, employment, and income in Allen and Adams Counties, Indiana and Mercer and Auglaize Counties, Ohio.

Demographic Criteria	Allen County, Indiana	Adams County, Indiana	Mercer County, Ohio	Auglaize County, Ohio
Labor Force 2006	184,398	21,767	24,100	26,900
Employed Labor Force in 2006	175,277	20,456	23,200	25,800
Unemployed Labor Force in 2006	9,121	1,311	900	1,100
Unemployment Rate (2006)	4.9 %	6.0 %	4.0 %	4.5 %
Median Household Income (2004)	$ 42,867	$ 46,930	$ 42,742	$ 43,367

Unemployment rates were highest in Adams and Allen County at 6.0 and 4.9 percent, respectively. Over 9,000 people were unemployed in the largely urban Allen County in 2006.

Leading employment sectors include manufacturing, wholesale/retail business, health care and social services, federal/state/local government, accommodations and food services, and administrative services. Related growth sectors appear to be retail, finance and insurance, professional and technical services, administrative waste services, accommodation and food services, and local government.

Table 2-6 provides additional business, employment and income data income for counties lying wholly or partially within the St. Marys River Watershed. In 2005, private non-farm establishments with paid employees ranged from 594 to over 9,000 per county. The greatest number of establishments was in Allen County, IN; the lowest was in Van Wert County, OH.

Table 2-6. Business, employment, and income.

Maumee Sub-Basin – St. Marys									
County	Approx Part in Watershed	Population 2006	2000 Persons 18 – 64 Years Old%	2000 Persons 18 – 64 Years Old (Calc)	2005 Private NonFarm Establishments w Paid Employ	2005 Private NonFarm Employment	2000-2005 Priv. NonFarm Employment % Change	2004 Median Household Income	2004 Persons Below Poverty %
Indiana State		6,313,520	62.6%	3,952,263	149,871	2,610,899	-1.5%	$43,217	11.1%
Allen, IN	16.9%	347,316	61.5%	213,599	9,416	169,815	-5.1%	$42,867	11.3%
Adams, IN	72.9%	33,719	56.3%	18,983	786	13,523	-5.7%	$43,781	10.1%
Wells, IN	5.8%	28,199	60.7%	17,117	635	9,902	-13.3%	$45,645	7.6%
Ohio State		11,478,006	69.5%	7,977,214	270,968	4,762,618	-4.8%	$43,371	11.7%
Mercer, OH	39.1%	41,303	58.9%	24,327	1,015	14,297	-14.4%	$46,210	6.4%
Van Wert, OH	11.4%	29,303	60.7%	17,787	594	10,762	-6.1%	$42,351	7.0%
Auglaize, OH	38.8%	47,060	60.5%	28,471	1,031	19,167	7.0%	$46,070	7.0%
Shelby, OH	3.0%	48,884	60.5%	29,574	1,058	26,607	2.3%	$46,686	7.8%

Sources: Census 2000 Gateway, State and County Quick Facts, Census Bureau. Ohio County Profiles, Ohio Department of Development, 2004. 2002 Census of Agriculture – County Data, USDA, National Agricultural Statistics Service.

2.3.5 Property Values and Tax Revenues: Table 2-7 depicts the economic value for farm land and housing in the St. Marys River Watershed. In 2006, the number of housing units ranged from 11,619 (Wells County, IN) to 151,268 (Allen County, IN). Home ownership percentage per county ranged from 71.0% to 80.9%. The median value of owner occupied housing units ranged from $76,000 to $97,000 per county.

Table 2-7. Property statistics.

County	Approx Part in Watershed	2006 Housing Units	2000 Home Ownership Rate %	2000 Median Value of Owner Occupied Housing Units
Indiana		2,756,331	71.4%	$ 94,300
Allen, IN	16.9%	151,268	71.0%	$ 88,700
Adams, IN	72.9%	13,061	77.0%	$ 85,400
Wells, IN	5.8%	11,619	80.9%	$ 87,900
Ohio		5,044,709	69.1%	$103,700
Mercer, OH	39.1%	16,699	80.1%	$ 94,000
Van Wert, OH	11.4%	12,731	81.7%	$ 76,000
Auglaize, OH	38.8%	19,362	77.9%	$90,600
Shelby, OH	3.0%	19,850	74.3%	$97,000

Sources: Census 2000 Gateway, State and County Quick Facts, Census Bureau; Ohio County Profiles, Ohio Department of Development, 2004; and 2002 Census of Agriculture–County Data, USDA, National Agricultural Statistics Service.

Local tax revenues generally include revenue sharing (federal, State, local), sales taxes, and local property and service district taxes.

2.3.6 Natural Resource - based Recreation: Very few natural resource-based recreation opportunities are offered within the Indiana portion of the St. Marys River Watershed, There are no state parks within the watershed, and the river is classified as "non-navigable" by the state's Department of Natural Resources. This contrasts with Ohio, where Grand Lake St. Marys Reservoir, at the headwaters of the St. Marys River system, is part of the state parks system. Originally developed as a feeder for the Miami and Erie Canal, Grand Lake St. Marys was, for many years, considered the largest man-made reservoir in the world. Covering 13,500 acres (55 km^2) in Auglaize and Mercer Counties with an average depth of five to seven feet (1.5 to 2 m), Grand Lake Saint Marys and its associated state park offer swimming, boating (motor and non-motor), camping and fishing.

Hunting along much of the mainstem of the St. Marys River is largely limited to fencerows and along streams and ditches where only limited habitat exists. Recreation on the St. Marys River generally includes fishing, canoeing wading and sight-seeing. Since much of the St. Marys River is relatively narrow and shallow before reaching its confluence with the St. Joseph and Upper Maumee Rivers, only small, shallow-draft watercraft can navigate the river. A more detailed description of recreation resources in the watershed is provided in Chapter 5.

2.3.7 Public Facilities and Services: The watershed is easily accessible via interstate highways 69 and 75, plus several Indiana and Ohio state highways and county roads. US Highway 33 roughly parallels the route of the St. Marys River from St. Marys, Ohio to Fort Wayne, Indiana. Because of the heavy agricultural settlement of the watershed, improved roads allow access to most areas of the St Marys River Watershed, and are generally well maintained.

The cities of Fort Wayne and Decatur, along with other urban areas and smaller communities, offer services that include abundant power supply, law enforcement, fire and emergency services, medical care, recycling centers, libraries, and community/social service centers.

2.3.8 Quality of Life: Health, Safety and Aesthetics: Community aesthetics are tied to the presence of a rural landscape (primarily agricultural), open spaces, numerous small towns and the presence of the Upper Maumee River and associated active and passive recreation opportunities.

The status of outdoor recreation activities, an indicator of quality of life characteristics, is summarized in Table 2-8.

Table 2-8. SCORP Outdoor recreation statistics by county (ODNR, IDNR).

County	Total County Acreage	Rank	Outdoor Recreation Acres	Rank	% of Total Acres for Outdoor Recreation	Rank	2006 Population*	Rank	Outdoor Recreation Acres per 1,000 Residents	Rank
Ohio										
Van Wert	262,805	69	795	69	0.1	87	29,303	75	27	83
Auglaize	257,360	82	3,155	82	0.2	76	47,060	50	67	58
Mercer	303,064	32	14,135	32	1.0	35	41,303	62	342	22
Shelby	262,886	67	3,478	67	0.3	73	48,884	49	71	53
Indiana										
Allen, IN	420,480	1(IN)	4694	N/A	N/A	N/A	344,006	3(IN)	14	N/A
Adams, IN	216,960	18(IN)	859	N/A	N/A	N/A	33,849	48(IN)	26	N/A

2.4 Cultural Characteristics

There are a number of identified Native American, historic properties, and prehistoric archaeological sites along the Upper Maumee. Members of the Shawnee, Miami, and Ottawa Nations were the earliest residents. Tuendawie and Enswoscah tribes of the Wyandott and Miami Nations occupied high ground at the junction of the Auglaize and Maumee Rivers.

2.4.1 Significance: The National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.) defines historic properties as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). The term includes artifacts, records and remains that are located within such properties. The term also includes properties of traditional religious and cultural importance to an Indian tribe that meet NRHP criteria. Under Section 106 of the Act, federal agencies, with direct or indirect jurisdiction over proposed federal or federally assisted undertakings, to take into account effects on historic properties. In consultation with the State Historic Preservation Office (i.e., Ohio Historical Society), Indian tribes and other interested parties, the federal agency makes a determination of significance of potentially affected historic properties. A determination of adverse effect may require further studies, the development of a mitigation plan, and data recovery or architectural recordation.

2.4.2 Historic Properties: The Maumee River Valley is believed to have three Johnny Appleseed Orchards along the river. John Chapman, known as Johnny Appleseed, was born on September 26, 1774 in Leominster, Massachusetts. He began wandering the new frontier planting apple orchards between his late teens and early twenties because he wanted to provide apple trees to settlers.

Johnny Appleseed's first documented presence in Fort Wayne dates from April to May of 1834, when he paid $250 for two parcels of land along the Maumee River east of Fort Wayne. However, local traditions place him in the area much earlier, possibly sometime between 1822-30. In addition to the two plots on the Maumee River, he purchased 74 acres in Wabash Township, Jay County; 42 acres in Eel River Township, Allen County; and another 18 acres on the Maumee River near one of his earlier plots. Of the three tracts along the Maumee, only the 42acres plot was fully developed, and featured a nursery of 15,000 trees by 1845. Upon his death in March of that year, it is believed that Johnny was buried somewhere on the mound in the old Archer Cemetery, now Johnny Appleseed Park.

The Wabash/Erie Canal, the longest ever built in the United States, passes through the Maumee Valley. It was completed in 1853, connecting 468 miles of waterways from Toledo, OH to Evansville, IN. The canal era hit its peak between 1827 and 1850, opening the area to export trade and bringing with it thousands of immigrants. Many canal towns were established along the way: some still exist, although most disappeared as the railroad arrived to take the canal's place.

2.4.3 Archeological Sites: Paleo-Indian studies have been completed by Indiana University-Purdue University at Fort Wayne (Andrew White and Robert G. McCullogh, 2005). The studies documented Native American occupation of the area from ancient times to the present. This region is one of the few places in the lower Great Lakes where Native Americans have maintained an unbroken connection to their ancestral lands.

The great Miami war chief, Little Turtle, was buried with honors by the garrison of Fort Wayne in 1815 and his gravesite is hollowed ground for Miami and non-Miami citizens. Native Americans have occupied the Maumee Valley for about 12,000 years. Indiana artifacts and burial mounds have been discovered at various sites within the watershed.

2.4.4 Native American Interests: Native Americans arrived in the Maumee Valley about 12,000 years ago. From 5,000 B.C. – 1,000 B.C., Native Americans, known as the Archaic People, were nomadic, but would temporarily settle where game was plentiful and crops could be grown. During the Woodland period (about 1,000 B.C. to the arrival of Europeans), Native Americans settled in villages, built mounds, produced crops, and used pottery and tools. By the 1700's, several tribes had settled along the Maumee River; the Miamis at what is now Lakeside Park in Fort Wayne, and the Shawnee and Delaware at the confluence of the Auglaize and Maumee Rivers.

The Home of Miami civil chief Jean Baptiste de Richardville, built in 1827 in Fort Wayne, is recognized as the oldest house of a Native American in the heartland. Richardville built a large trading empire that was instrumental in opening up the western wilderness. Richardville took advantage of the long portage that the Miami controlled, the only dry land connecting the extensive river systems between New Orleans and Montreal.

Table 2.9 lists federally-recognized Native American Nations with an historic presence/ prospective interest in the WLEB.

In northwest Ohio, the area around Grand Lake St Marys in Mercer and Auglaize Counties played an important part in the development of the Northwest Territory. The St. Marys River served as a vital link between the Great Lakes and the Ohio River. Due to heavy water traffic, the renegades Simon and James Girty established a trading post that eventually evolved into the town of St. Marys. General "Mad" Anthony Wayne passed through the area in 1794 during his march to drive out the Shawnee, culminating in the Battle of Fallen Timbers. Some of Wayne's men returned here to make their homes.

In 1837, construction began on a reservoir needed to maintain the Miami-Erie Canal's five-foot depth. At its completion in 1845, 13,500-acre Grand Lake was the largest man-made lake in the world, connected to the canal by a three-mile feeder. The canal prospered until the coming of the railroads in the 1870s. The area experienced another boom in the late 1890s when oil was discovered. For a time, the lake was dotted with oil derricks. Today a pile of rocks near the center of the lake marks the spot of the last producing well.

Table 2-9: Federally recognized American Indian Nations with interest in the Western Lake Erie Basin.

Nation	Tribe Names
Delaware	Delaware Nation, Oklahoma
Miami	Miami Tribe of Oklahoma
Chippewa/Ojibwa	1. Bad River Band of the Lake Superior Tribe of Chippewa Indians of the Bad River Reservation, Wisconsin 3. Bay Mills River Reservation, Wisconsin 4. Keweenaw Bay Indian Community, Michigan 5. Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin 6. Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin 7. Red Lake Band of Chippewa Indians, Minnesota 8. St. Croix Chippewa Indians of Wisconsin 9. Sokaogon Chippewa Community, Wisconsin 10. Turtle Mountain Band of Chippewa Indians of North Dakota
Ottawa	1. Little River Band of Ottawa Indians, Michigan 2. Little Traverse Bay Bands of Odawa Indians, Michigan 3. Ottawa Tribe of Oklahoma
Potawatomi	1. Citizen Potawatomi Nation, Oklahoma 2. Forest County Potawatomi Community, Wisconsin 3. Hannahville Indian Community, Michigan 4. Huron Potawatomi, Inc., Michigan 5. Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan 6. Pokagon Band of Potawatomi Indians, Michigan and Indiana 7. Prairie Band of Potawatomi Nation, Kansas
Seneca	1. Seneca Nation of New York 2. Seneca-Cayuga Tribe of Oklahoma 3. Tonawanda Band of Seneca Indians of New York
Shawnee	1. Absentee-Shawnee Tribe of Indians of Oklahoma 2. Eastern Shawnee Tribe of Oklahoma 3. Shawnee Tribe, Oklahoma
Wyandotte	Wyandotte Tribe of Oklahoma

Tribal names reflect the list of Federally recognized tribes as currently listed by the Bureau of Indian Affairs. These names may vary from the official name attributed by each individual government.

2.5 Institutional and Regulatory Setting

2.5.1 Public Agencies and Programs: Table 2-10 identifies counties and other governmental units (incorporated and unincorporated) located partially or entirely within the St. Marys River Watershed. Incorporated areas have authority to regulate land use, while counties posses the authority to regulate land use in unincorporated areas.

Table 2-10 Local government subdivisions within the St. Marys River Watershed.

County	Other Governmental Unities

	Cities/Villages	Townships
	Indiana	
Adams	Decatur Monroe Berne	Preble, Root, Union, Kirkland, Washington, St. Marys, French, Monroe, Blue Creek, Hartford, Wabash, Jefferson
Allen	Ft. Wayne New Haven	Marion, Pleasant, Madison, Union, Adams, Cedar Creek
Wells	Ossian	Jefferson, Lancaster, Harrison, Nottingham
	Ohio	
Van Wert	Wren	Wilshire Liberty,
Mercer	Rockford Mendon Celina	Black Creek, Liberty, Dublin, Hopewell, Union, Center
Auglaize	St. Marys New Knoxville New Bremen Minster	Salem, Logan, Noble, Moulton, St. Marys, Washington, German, Jackson
Shelby	Keltersville Botkins	Van Buren, Dinsmore

Local/ regional agencies with watershed- related management authorities and interests are listed in Table 2-11. State government agencies with watershed- related missions and services are summarized in Table 2-12. Federal agencies with watershed- related programs are summarized in Table 2-13.

Table 2-11. Local/regional agencies with watershed related management authorities.

Agency	Description/Responsibilities	Watershed Services
Maumee Watershed Conservancy District (Political Subdivision of State of Ohio)	Help provide flood control and improve drainage for the St. Marys River basin.	Provide planning and funding resources.
Allen County Soil and Water Conservation District	Assist local residents, business and agencies in understanding and implementing their role in resource conservation	Ditch improvement and maintenance projects, manure management plan assistance, natural resource education and outreach
Allen County Emergency Management Agency	Planning services associated with natural and man-made disasters	Advocate for greater community efforts to mitigate and prepare for potential emergencies
Van Wert County Engineers	Responsible for the maintenance and improvement of culverts, storm sewers.	Ditch maintenance.
Van Wert County EMA	Serves the citizens of the County through effective planning for natural and man-made	Advocate for greater community efforts to mitigate and prepare for

Table 2-11. Local/regional agencies with watershed related management authorities.

Agency	Description/Responsibilities	Watershed Services
	disasters	potential emergencies.
Van Wert County SWCD	Protect and conserve the natural resources for all residents by providing technical, educational, and financial assistance.	CREP program, water quality studies, Link Deposit program.
Mercer County Engineers	Responsible for the maintenance and improvement of culverts, storm sewers.	Reviews development plans, maintenance for flooding and debris, long range planning and engineering, and drainage design.
Mercer County EMA	Serves the citizens of the County through effective planning for natural and man-made disasters	Advocate for greater community efforts to mitigate and prepare for potential emergencies.
Mercer County SWCD	Protect and improve the soil, water resources, and natural habitats in Mercer County.	Animal waste management, water management (drainage), erosion control, water quality improvement, woodland and wildlife habitat improvement, and public education and information.

Table 2-12. State Agencies having watershed related missions and authorities.

Agency	Description/Responsibilities	Watershed Management Services
Ohio Department of Natural Resources – Fish and Wildlife	Staff biologists research, survey, and watch over abundant species while working to restore those that are not abundant.	
Ohio Department of Natural Resources – Preserves & Scenic Rivers	The division oversees 128 natural areas and preserves and 20 scenic river segments, administers the Natural Areas Program, Scenic Rivers Program, Natural Heritage Database, Endangered Plant Law and Cave Protection Act. It also conducts and promotes research and educational programs designed to further the preservation of significant biological and geological features.	
Ohio Department of Natural Resources - Division of Geological Survey	To provide geologic information and services needed for responsible management of Ohio's natural resources.	Maintain records of all geologic information in the state, as well as geologic samples, and make both available to the public in the form of published maps and reports, open-file reports and records, and digital databases.
Ohio Environmental Protection Agency – Division of Surface Water	The Division of Surface Water is responsible for restoring and maintaining the quality of Ohio's rivers and streams	401 permitting, biological and water quality monitoring, CSO, compliance assistance, environmental mitigation, GIS, Lake Erie Programs, Non-point source program, water quality

Table 2-12. State Agencies having watershed related missions and authorities.

Agency	Description/Responsibilities	Watershed Management Services
		management plans, stormwater, TMDLS, wetland ecology
Ohio Environmental Protection Agency – Division of Drinking and Groundwaters	Protect human health and the environment by characterizing and protecting ground water quality and ensuring that Ohio's public water systems provide adequate supplies of safe drinking water.	Drinking water assistance funds, Drinking water program, groundwater program, environmental education
Ohio Environmental Protection Agency-Division of Environmental and Financial Assistance		Administers the Water Pollution Control Loan Fund, the Drinking Water Assistance Fund, and the Village Capital Improvements Fund.
Ohio NRCS		EQUIP, farm bill, watershed planning, resource conservation and development program, conservation buffer programs
Ohio Department of Transportation	Monitoring and implementing environmental laws, rules and regulations through ODOT's environmental, design, construction and maintenance programs to efficiently and effectively deliver projects that comprise the Department's Transportation Improvement Program	Develop policies, Best management practices, training, NPDES permit compliance, ecological/permits
Ohio Department of Agriculture	Livestock Environmental Permitting Program, Pesticide Regulation Program, Plant Industry Division Plant Pest Control Program, farmland preservation	Agricultural easements, land trust program, dairy farm regulations, pesticide/fertilizer education,
Ohio Department of Development		Clean Ohio Program
Ohio Water Development Authority	provide financial assistance for environmental infrastructure	Drinking water funding, sewer funding, stormwater funding, emergency assistance, Lake Erie costal erosion projects, dam safety and solid waste projects
Ohio Public Works Commission		Provides low-interest loans and grants for infrastructure facilities, Provides grants for local road and bridge projects
Indiana		
Office of Environmental Adjudication	Provide independent, fair and efficient resolution of disputes to decisions made by the Indiana Department of Environmental Management	Resolve enforcement disputes
Department of Environmental Management (IDEM)	provide quality environmental oversight and technical assistance in your community and around the state	Monitoring, enforcement, drinking water permits, wastewater permits, wet weather permits, wetlands and water quality programs,

Table 2-12. State Agencies having watershed related missions and authorities.

Agency	Description/Responsibilities	Watershed Management Services
		environmental clean up, land application oversight, CAFO construction oversight,
Natural Resources Commission	Autonomous board that addresses issues pertaining to the Department of Natural Resources	The commission enacts permanent laws while the Department of Natural resources passes emergency regulations.
Department of Natural Resources	Manager of public lands	Fish and wildlife programs and property management, nature preserves, reservoir property maintenance, outdoor recreation, state forest and state parks, historic preservation & archaeology, lakes floodplains & water management, native and exotic plant programs.
Indiana State Department of Agriculture	Make agriculture a key part of the state's economic revitalization and establish Indiana as a leader in the global agricultural economy	Flood information for farmers, livestock irrigation, livestock producer certification programs, land resources council.

Table 2-13. Federal agencies providing watershed services.

Agency	Mission/Authorities	Watershed Services
Federal Emergency Management Agency	Reduces loss of life and property	Floodplain mapping, disaster mitigation, natural disaster mitigation planning assistance
National Oceanic & Atmospheric Administration	Understands and predicts changes in the earth’s environment and conserve costal and marine resources	Threatened and endangered species, coastal zone management
Natural Resources Conservation Service	Assists landowners and managers with soil, water and natural resource management	Soils maps, technical assistance, agricultural, Bumps cost estimate assistance, EQIP, CRP, WRP, native plants
U.S Environmental Protection Agency	Restores and maintains watersheds and their ecosystems to protect health, support economic development and recreational activity, and provide healthy habitat for fish, plants, and wildlife	Watershed data and information, Best Management Practices, and information/ education
U.S. Army Corps of Engineers	Investigates, develops and maintains the nation’s water and related environmental resources	Water resources planning, shore protection, flood studies, wetland permitting, hydrographic information
U.S. Fish and Wildlife Service		Endangered species by region/state, national wetland inventory, habitat and wildlife, wetlands
U.S. Geological Survey U.S. Geological Survey – Ohio Div. U.S. Geological Survey –	Provides information to minimize loss of life and property from natural disasters, manage water, biology, energy and mineral resources, and	Prepares topographic, floodplain and other maps; gathers stream flow and other water data; and undertakes special studies

Table 2-13. Federal agencies providing watershed services.

Agency	Mission/Authorities	Watershed Services
Michigan Div.	enhance and protect quality of life.	

2.5.2 Non- governmental Organizations and Programs: This category includes non-profit, non-governmental organizations concerned with watershed- related issues. Table 2-14 summarizes identified groups in the St. Marys River Watershed.

Table 2-14. Non-governmental organizations and programs.

Agency	Program Description/Responsibilities	Watershed Services
American Rivers	Works with partners "on the ground" to protect our rivers, clean water, and healthy communities.	Restores rivers, protects natural floodplains, promotes best practices for protection of clean water supply and storage, and assists with policy , education and outreach
Defiance College	Educational programs related to water and ecology.	Provides monitoring support and data
Ducks Unlimited	Conserves, restores and manages wetlands and associated habitats for North America's waterfowl	Wetlands restoration and conservation services, farm bill support, and conservation programs
Environmental Defense Foundation	Works with landowners, businesses, indigenous groups and others to restore ecosystems and protect biodiversity.	Provides habitat and river restoration services; promotes expanded incentives for private lands stewardship; advocates on law and policy issues
Joyce Foundation	Supports efforts to protect the natural environment of the Great Lakes.	Provides grant funding programs for restoring river ecosystems, and advocating investment in Great Lakes restoration
Maumee Watershed Conservancy District (Political Subdivision of State of Ohio)	Administers flood control and drainage improvement programs.	Funds flood reduction projects (primarily in the Auglaize watershed)
MRBPLG	Regional network of local governments and other partners within the Maumee River Basin that evaluates policies and supports and promotes issues and programs, and activities that will benefit water quality within the tri-state region.	Provides advocacy, education and outreach services
Northwest Ohio Flood Mitigation Partnership	Consortium of private and public sector interests dedicated to solving flooding problems in northwest Ohio.	Provides funding, public education and advocacy services
Ohio Environmental Council	Work with individuals, government, local groups and businesses to enhance the quality of life in communities and sustain natural systems	Advocacy, education and outreach, grant funding, environmental watch services
Ohio Farm Bureau Federation	Works on behalf of members at the state and federal level with regulatory agencies, and locally with every county in Ohio	Policy development and advocacy services
Ohio Pheasants	Provides funds for local habitat projects,	Fundraising for habitat restoration

Table 2-14. Non-governmental organizations and programs.

Agency	Program Description/Responsibilities	Watershed Services
Forever	conservation education, and other conservation causes.	
The Nature Conservancy – Ohio Chapter	Protects ecologically important lands and waters	Habitat and species protection, restoration and conservation programs
Tri-Moraine Audubon Society	Promotes the conservation and restoration of ecosystems, including agricultural systems, while focusing on the enjoyment of birds and the natural environment through fellowship, education, and stewardship (Ohio Chapter for Allen, Auglaize, Hancock, Hardin, Logan, Mercer, Shelby, and Van Wert Counties)	Educational and information services focusing on ecological resources
Purdue Extension	Enhance stewardship and innovative monitoring, modeling, and management of natural resources.	Improve the use of plants and animals, educational programs and information about agriculture, natural resources, and the food system, research, outreach and education in the Great Lakes region.
Johnny Appleseed Metropolitan Park District	Comprehensive park system of natural areas and preserves designed to enhance the quality of life of the citizens of Allen County by providing passive outdoor recreational and educational opportunities while conserving and protecting the natural resources.	Outreach and education programs.
Hoosier River Watch	Stewardship of Indiana's waterways through a volunteer stream monitoring and water quality education program.	Increase public awareness of water quality issues and concerns by training volunteers to monitor stream water quality.

2.5.3 Regulatory Framework for Watershed Management: A broad range of regulations and programs exists in Indiana and Ohio at the state and local level for regulating and managing land use, flood risk management, water quality, water supply, and protecting wetlands, threatened and endangered species. Table 2-15 provides an overview.

Table 2-15. Summary of watershed management regulations.

Regulatory Program/Requirement	Description	Implementing Agency

Table 2-15. Summary of watershed management regulations.

Regulatory Program/Requirement	Description	Implementing Agency
Concentrated Animal Feeding Operations	National Pollutant Discharge Elimination System (NPDES) regulations and requirements for concentrated animal feeding operations (CAFOs) to control spills and runoff of nutrients and other pollutants from these operations, also includes NPDES Construction Permits	Ohio Environmental Protection Agency
Drainage/Floodplain Regulations	Mapped floodplains are subject to Ohio and FEMA floodplain management regulations and local government floodplain management regulations	Community or county engineer, building inspector (depends on the designated floodplain administrator), ODNR Division of Water, Floodplain Management Section; County Engineer
General Construction Permit	General permit for statewide regulation for stormwater discharges associated with construction activity	Ohio Environmental Protection Agency
Groundwater Monitoring	Oversees implementation of the Ohio Ground Water Protection and Management Strategy: manages and promotes participation in Ohio's Wellhead Protection Program; manages the State's Underground Injection Control Program (UIC): monitors, through sampling and analysis, the quality of the ground water found in the various geologic regions around Ohio; conducts specialized monitoring studies to identify ground water contamination problems; works with the Ohio Department of Natural Resources and Ohio EPA's Division of Surface Water to identify, quantify, and remediate the adverse impacts on ground water caused by non-point source activities; administers the State Coordinating Committee on Ground Water to enhance coordination among.	Ohio Environmental Protection Agency
Hazard Mitigation Plans – MOEMA & OEMA/FEMA	A plan which details actions before a disaster strikes to prevent permanently the occurrence of the disaster or to reduce the effects of the disaster when it occurs. It is also used effectively after a disaster to reduce the risk of a repeat disaster.	County EMA agency, FEMA, Ohio EMA
Hazard Mitigation Plans (by County)	Identifies natural hazard risks and project needs to reduce hazards.	MOEMA , OEMA, and FEMA
Livestock Environmental Permitting Program	Regulates concentrated animal farm facilities (CAFFs) in Ohio for the purpose of protecting surface and groundwater. ODA manages both PTI and PTO's.	Ohio Department of Agriculture
Long Term Control Plans	The LTCP is a plan with a schedule to control CSO discharges to the area waterways	Municipalities, USEPA, Ohio Environmental Protection Agency
NPDES Industrial	Dischargers with a storm water discharge associated	Ohio Environmental

Table 2-15. Summary of watershed management regulations.

Regulatory Program/Requirement	Description	Implementing Agency
Permit	with industrial activity that is discharged via a point source (including discharges through a municipal separate storm sewer system) to surface waters of the state are required to obtain coverage under this program	Protection Agency
Phase II MS4 Permits	General permit for the statewide regulation of Small Municipal Separate Storm Sewer Systems (MS4) to discharge storm water	Ohio Environmental Protection Agency
TMDL's	A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources	Ohio Environmental Protection Agency
Groundwater Wells	Private water systems are regulated by the Ohio Department of Health and include potable water wells, ponds, springs, cisterns and hauled water storage tanks that provide drinking water to fewer than 25 people, less than sixty days out of the year, and have less than 15 service connections. This includes single water supplies that serve homes, small businesses, small churches, small mobile home parks or communities with fewer than 25 residents.	Ohio Department of Health
	Indiana	
Phase II MS4 Permits	General permit for the statewide regulation of Small Municipal Separate Storm Sewer Systems (MS4) to discharge storm water.	Indiana Department of Environmental Management
General Construction Permit	General permit for the statewide regulation for Storm Water Discharges Associated with Construction Activity	Indiana Department of Environmental Management
NPDES Industrial permit	Dischargers with a storm water discharge associated with industrial activity that is discharged via a point source (including discharges through a municipal separate storm sewer system) to surface waters of the state are required to obtain coverage under this program	Indiana Department of Environmental Management
Long Term Control Plans	The LTCP is a plan with a schedule to control CSO discharges to the area waterways	Municipalities, USEPA, IDEM
Hazard Mitigation Plans – MOEMA & OEMA/FEMA	A plan which details actions before a disaster strikes to prevent permanently the occurrence of the disaster or to reduce the effects of the disaster when it occurs. It is also used effectively after a disaster to reduce the risk of a repeat disaster.	County FEMA agency, FEMA
Groundwater Monitoring		Indiana Department of Environmental Management
TMDLs	A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources	Indiana Department of Environmental Management
404 Permitting, Dredging	Provides wetland protection, and guidance for dredging.	USACE

2.6 Trends, Issues and Implications for Watershed Protection and Management

An analysis of existing conditions in the St. Marys River Watershed, as presented above, elicits the following trends, issues and implications for watershed protection and management.

- Agriculture is the predominant land use in the watershed and, as such, local non-point pollution programs are subject primarily (except for concentrated animal feedlot operations (CAFOs) to non-regulatory based Best Management Practices (BMPs) initiatives at the federal, state and county levels.
- Continued increases in commodity prices (e.g., corn, wheat) will provide compelling incentives for farmers to bring additional land into production, and to alter crop selection. The tension between rural agricultural economy drivers and the importance of maintaining watershed health via agricultural BMPs will create challenges.
- The St. Marys River Watershed has a flat topography, making drainage and associated flooding events a continuing problem.
- Aggressive stormwater and floodplain management programs, coupled with innovative watershed management strategies, will be key to addressing both water quality concerns and historic drainage and flooding problems.

In the following sections, the St. Marys River Watershed assessment focuses on five areas specified in Sec. 441 of the Water Resources Development Act. Potential actions for improving watershed health and addressing a range of problems and opportunities are presented.

- Section Three: Flood Damage Reduction, Water Supply, Sedimentation and Bank Erosion
- Section Four: Water Quality
- Section Five: Resource- based Recreation
- Section Six: Fish and Wildlife Habitat
- Section Seven: Commercial and Recreational Navigation

3. FLOOD DAMAGE REDUCTION, WATER SUPPLY, SEDIMENTATION, AND BANK EROSION

3.1 Introduction

The purpose of this section is to identify and assess existing water resource problems, needs, opportunities and trends in the St. Marys River Watershed and to document findings and identify potential actions. The following subsections deals specifically with flood damage reduction, water supply, sedimentation and stream bank erosion.

3.1.1 General Land Use Characteristics, Impervious Cover: As noted in Chapter 2, the predominant land use in the St. Marys River Watershed is agricultural (68%), with fields and pastureland an additional 14%. Approximately 10% of the watershed is classified as urban, and is located primarily in the northern portion of the watershed.

3.1.2 Drainage Areas by Political Subdivisions: Table 2-1 provides an overview of counties (and associated acreage) located in the watershed. Thirty one percent of Adams County is located within the watershed, followed by Mercer and Auglaize Counties, with 23% and 19%, respectively. Wells and Shelby Counties have the least amount of land in the watershed with 3% or less.

3.1.3 General Flow Conditions: The Maumee River Basin includes streams with some of the lowest mean annual flows in the region, with mean annual runoff of the Maumee River at Waterville at 10.7 inches. Mean annual precipitation is relatively low and fairly evenly distributed across the basin, with runoff in the southern portion lower than those in the northwestern part of the basin.

Base-flow characteristics of streams in the Maumee River Basin are much more variable than mean annual flow characteristics. Mean base-flow indices indicate that ground water may contribute as little as 25% of mean annual flow of streams in the southern till plains area of the basin while streams in the northwestern part may derive as much as 65% of mean annual flow from ground water discharge.

Fifty percent duration flows of streams in the Maumee River Basin vary in similar manner as the base-flow indices. The 90% duration flow of 0.07 cfs per square mile of the Maumee River at Antwerp reflects augmentation at Fort Wayne, as the relative base flow in the St. Marys River is less than in the St. Joseph River.

The 10% duration flows of streams in the Maumee River Basin are relatively low, averaging about 2.2 cfs per square mile. Peak discharges for two year recurrence interval floods are also relatively low, averaging about eight cfs per square mile for the larger streams and proportionately more for smaller streams. Low permeability of soils in much of the basin favors direct surface runoff, but the flat topography tends to attenuate flood peaks. Areas of hummocky terrain in the northwestern parts of the basin contain large amounts of natural storage that attenuates flood peaks. Floods in the Maumee River Basin are characterized by slowly rising flood stages of prolonged duration. Extensive channelization in the basin has resulted in many enlarged channels.

Table 3-1 presents stream gage data for the St. Marys River, and is followed by additional stage and flow data at the Rockford, Decatur and Fort Wayne locations Tables 3-2, 3-3, 3-4). Also provided (Table 3-5) are USGS discharge-frequency relationships.

Table 3-1. St. Marys River stream gage data.

Gage	Gage #	Drainage Area in Square miles	Period of Record	
			Begin Date	End Date
St. Marys River at Rockford, Oh	4180988	340	12/31/2005	12/31/2005
St. Marys River at Decatur, IN	4181500	621	2/12/1932	12/30/2005
St. Marys River near Fort Wayne, IN	4182000	762	4/4/1931	12/31/2005
Harber Ditch at Fort Wayne, IN.	4182590	21.9	2/10/1965	5/31/1991
Spy Run Creek at Fort Wayne, IN	4182810	14	3/14/1982	2002

St. Marys River at Rockford, OH (04180988)

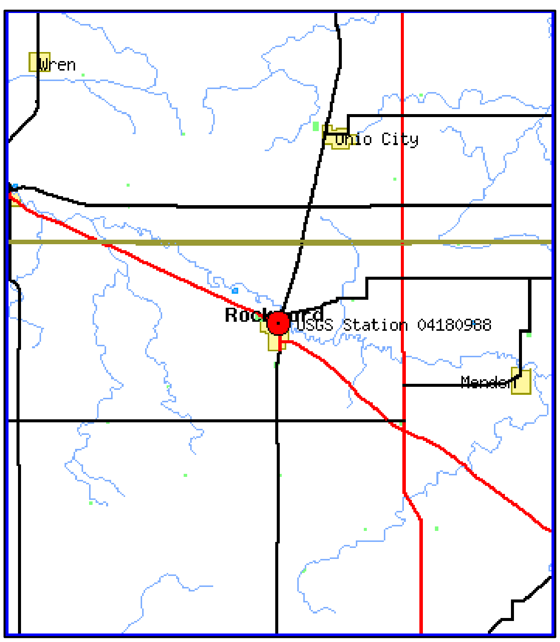


Figure 3-1. Location of the stream gage at Rockford, OH. (04180988)

LOCATION— Lat 40°41'41", long 84°38'48", in NE 1/4 sec. 6, T.1 N., R.3 E., Mercer County, Hydrologic Unit 04100004, on left bank downstream from the SR 118 bridge, on north side of Rockford, 0.1 mi north of intersection of SR 33.

Table 3-2. St. Marys River at Rockford, OH (04180988) stage and flow data.

Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)
2008-10-30	1.30	13.9	2007-05-15	2.84	62.3	2006-02-08	8.49	1107
2008-09-18	1.09	9.68	2007-01-16	11.80	4890	2006-03-15	9.25	1700
2008-08-26	1.32	17.4	2006-12-05	10.35	2330	2006-03-08	2.78	55.6
2008-06-19	2.42	86.0	2006-08-18	1.68	29.6	2005-11-22	6.91	479.0
2008-02-07	14.23	8190	2006-06-29	2.74	59.4	2005-11-18	9.10	1380
2007-11-01	2.15	24.3	2006-06-06	9.65	1630	2005-10-31	5.79	329.0
2007-10-30	2.44	34.4	2006-03-22	4.14	148.0	2005-10-14	1.55	24.0
2007-07-13	1.42	17.4	2006-03-20	5.32	262.0	2005-10-12	1.64	30.4
2007-06-25	1.65	23.9	2006-03-15	9.25	1760	2005-09-14	1.82	38.4

St. Marys River at Decatur, IN (04181500)
LOCATION—Lat 40°50’55”, long 84°56’16”, in SW1/4SW1/4 sec.27, T.28 N., R.14 E., Adams County, Hydrologic Unit 04100004, on right bank 10 ft downstream from bridge on U.S. Highway 27; 0.5 mi upstream from Holthouse Ditch, 1.3 mi north of Decatur, and at mile 29.1.

Figure 3-2. Location of the stream gage at Decatur, IN. (04181500)

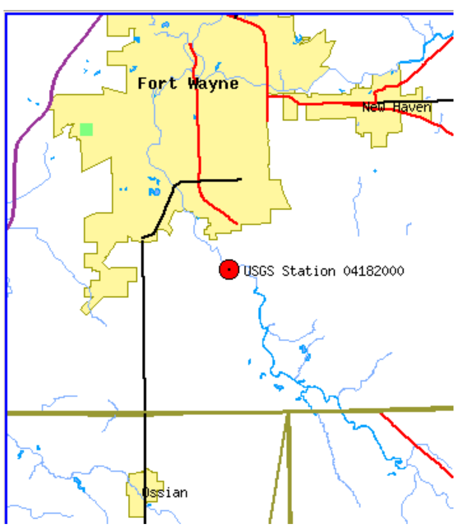
Table 3-3. St. Marys River at Decatur, IN (04181500) stage and flow data.

Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)
2/12/1932	11.9	1750	4/8/1957	21.49	7700	3/14/1982	24.4	10900
5/14/1933	19.5	4860	6/14/1958	20.49	6170	5/2/1983	17.54	3680
3/31/1934	15.9	2840	2/10/1959	24.22	11300	3/21/1984	18.79	4480
5/7/1935	18.1	3940	2/11/1960	18.49	4200	2/25/1985	24.31	10300
2/28/1936		5200	4/26/1961	21.8	8100	3/19/1986	17.73	3770
1/16/1937	22	8580	1/27/1962	20	5510	10/2/1986	12.91	1970
4/10/1938	21.1	6740	3/8/1963	20.58	6310	4/7/1988	15.6	2910
3/14/1939	22.1	8800	4/23/1964	20.66	6450	5/26/1989	20.32	5690

Table 3-3. St. Marys River at Decatur, IN (04181500) stage and flow data.

Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)
4/21/1940	19.3	4710	3/5/1965	17.31	3570	5/17/1990	20.48	5840
6/12/1941	14.2	2330	2/11/1966	12.3	1910	12/31/1990	23.81	9580
4/12/1942	19.5	4860	12/11/1966	21.92	5910	7/17/1992	24.13	10400
5/18/1943	23.4	12000	2/3/1968	21.97	5950	7/5/1993	21.28	6630
4/12/1944	22	8580	1/31/1969	20.46	4790	4/13/1994	20.1	5490
6/21/1945	18.5	4180	2/3/1970	18.45	3600	4/11/1995	18.33	3870
12/31/1945	17.3	3480	2/23/1971	18.43	3580	5/29/1996	21.21	6360
6/2/1947	20.3	5620	4/23/1972	22.42	7470	1997		
3/22/1948	20.43	5740	3/16/1973	19.04	4220	4/10/1998	20.56	6090
2/15/1949	18.29	4060	1/22/1974	22.86	9860	1/25/1999	23.12	9390
2/15/1950	23.6	10800	2/26/1975	20.17	5630	6/15/2000	18.98	4520
12/7/1950	20.61	5990	2/18/1976	22.26	8090	2/10/2001	17.15	3480
3/13/1952	20.4	5740	3/5/1977	16.93	3280	3/31/2002	19.98	5480
3/4/1953	17.6	3460	3/23/1978	23.55	10100	7/9/2003	26.92	15000
8/5/1954	12.32	1690	3/5/1979	22.59	8560	6/14/2004	20.63	6590
3/4/1955	21.57	7740	6/4/1980	22.69	8710	1/14/2005	24.2	10800
11/17/1955	17.69	3700	6/15/1981	21.48	7000	12/30/2005	18.87	4990

St. Marys River near Fort Wayne, IN (04182000)



LOCATION - Lat 40°59′16″, long 85°06′43″, in A. LaFontaine Reserve, T.29 N., R.12 E., Allen County, Hydrologic Unit 04100004, on left bank 130 ft downstream from Anthony Boulevard Extension, 0.8 mi downstream from Houk Ditch, 5 mi south of Fort Wayne, and 10.8 mi upstream from mouth.

Figure 3-3. Location of the stream gage at Fort Wayne, IN. (04182000)

Table 3-4. St. Marys River near Fort Wayne, IN (04182000) stage and flow data.

Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)	Date	Gage Height (ft)	Flow (cfs)
4/4/1931	7.49	2000	4/8/1957	16.57	8990	5/2/1983	11.82	5140
1/17/1932	11.54	4440	6/14/1958	15.06	6980	2/13/1984	13.72	6680
5/14/1933	14.08	6620	2/11/1959	19.42	13600	2/26/1985	18.33	12400
3/31/1934	10.41	3670	2/11/1960	12.63	4940	7/16/1986	12.5	5690
5/8/1935	12	4830	4/28/1961	15.54	8120	2/4/1987	8.55	2850
2/27/1936	16.9	7500	1/28/1962	14	6070	4/7/1988	9.87	3740
1/17/1937	16.83	9430	3/8/1963	15.62	7500	5/27/1989	14.07	7000
4/11/1938	14.92	7400	4/23/1964	14.33	6450	2/23/1990	14.66	7520
3/15/1939	16.07	8110	3/5/1965	11.3	4230	1/1/1991	17.92	10700
4/22/1940	12.29	4960	2/11/1966	7.76	2250	7/18/1992	17.07	9790
6/13/1941	9.5	2970	12/12/1966	15.29	7810	7/6/1993	14.07	7030
4/13/1942	12.74	5070	2/4/1968	15.2	7680	4/13/1994	13.73	6700
5/19/1943	18.79	13400	1/31/1969	14.12	6340	4/11/1995	11.96	5180
4/13/1944	16.38	8930	2/4/1970	12.32	4840	5/30/1996	14.6	7410
4/2/1945	12.79	5150	2/20/1971	11.4	4290	3/1/1997	15.23	7990
1/1/1946	11.92	3500	4/24/1972	15.67	8390	4/11/1998	14.32	7270
6/3/1947	15.03	7150	3/16/1973	12.04	5170	1/25/1999	17.03	9790
3/23/1948	14.35	6560	1/23/1974	16.94	9670	6/15/2000	12.37	5650
5/23/1949	12.85	5150	2/26/1975	13.1	6020	2/10/2001	11.79	5210
2/16/1950	18.34	12300	2/19/1976	15.75	8860	4/1/2002	13.49	6560
12/7/1950	14.87	6770	3/4/1977	11.96	5130	7/9/2003	21.2	16000
3/14/1952	14.69	6570	3/21/1978	18.39	11200	6/14/2004	15.48	8310
3/4/1953	12.01	4470	3/5/1979	16.39	9120	1/14/2005	19.06	12100
4/12/1954	7.37	1950	6/5/1980	15.82	8960	12/31/2005	11.87	5270
3/5/1955	16.18	8350	6/16/1981	14.75	7460			
2/25/1956	13.05	5150	3/14/1982	19.66	12600			

Table 3-5. Discharge-frequency relationships (USGS).

Frequency/ Duration (%)	Return Interval (years)	Peak Flow St Marys River at Decatur cfs	Duration St Marys River at Decatur cfs	Peak Flow St Marys River near Ft. Wayne cfs	Duration St Marys River near Ft. Wayne Cfs
50	2	5,580	130	6,570	147
20	5	8,090	714	9,270	807
10	10	9.900	1,510	10,800	1,770
5	25	11,900	2,430	12,600	3,000
2	50	13,400		13,800	
1.0	100	14,800	4,640	14,900	5,680
0.5	200	16,200		15,900	
0.2	500	18,000		17,200	

3.2 Water Supply

Water usage in the St. Marys River Watershed is 76.2% from surface waters, and 23.8% from ground water. Use includes 27% for domestic, 47% for industrial, 14% for commercial, 5% for mining, and 7% for livestock. (USGS, 1995).

3.2.1 Water supply – Groundwater: Outside of incorporated areas, the majority of residents obtain their drinking water via private wells. Yields from wells range from < 5 gal./min. to upwards of 25 gal./min.

3.2.2 Surface Water Supply and Drinking Water Quality Issues: Water supply is presently adequate and is expected to be so into the foreseeable future. However, all three rivers at Fort Wayne are on the 2004 Indiana Department of Environmental Management 303(d) list of impaired water for CSOs, point source pollution, non-point source pollution, Superfund site, heavy metals, fish consumption advisory, PCBs, mercury, dissolved oxygen, habitat alterations and siltation/erosion.

The Indiana Department of Environmental Management (IDEM) has assessed water quality of 764 miles of stream in the Maumee River Basin (within the State of Indiana) for designated uses of aquatic life support and recreational use. For aquatic life support, 649 miles (85%) are supportive; 31 miles (five percent) are supportive but threatened; nine miles (one percent) are partially supportive; and 75 miles (nine percent) are not supportive. For full-body contact recreational use, 110 miles (14%) are supportive with the balance (654 miles, 86%) not supportive. The majority of river reaches that do not support aquatic life are impaired by low levels of dissolved oxygen (DO) in the water column. Recreational use impairment is primarily related to high levels of coliform bacteria, specifically E. coli.

According to the U.S. Environmental Protection Agency (USEPA), E. coli is the greatest reported impairment (at just over 60%) to the St. Marys River, with PCBs a distant second at 14%. At this location in the Maumee River Watershed, suspended sediments and nutrients are minor contributors to water quality impairments. The primary sources of E-coli are likely farm runoff from livestock operations and urban stormwater runoff/combined sewer overflows.

A December 28, 2007 news release from USEPA announced that "the City of Fort Wayne has agreed to make an estimated $250 million worth of improvements to resolve longstanding problems with overflows from its sewer system. The city's sewer system, which serves approximately 220,000 people, transports the city's sewage for treatment at a wastewater treatment plant prior to discharging it into area rivers and streams. Overflows from the city's collection system discharge raw sewage directly into rivers and streams and can be a major source of water pollution. Fort Wayne's overflows currently number approximately 60 per year."

Urban, rural, and agricultural run-off continue to be problematic in the St. Marys River Watershed., as are community and rural septic systems (08/08/06 Workshop). This problem is further recognized in an article by Da Ouyang, Jon Bartholic and Jim Selegean entitled *Assessing Sediment Loading from Agricultural Croplands in the Great Lakes Basin* (The Journal of American Science, 2005). This article ranks the Maumee River system as the leading contributor of sediment to the entire Great Lakes system. It also states that conventional tillage practices contribute significantly to sediment loading. Conservation tillage practices can reduce the amount of sediment runoff by one half, while no-till techniques result in less than one-quarter the amount of sediment runoff typically associated with conventional tillage.

3.3 Flood Control Infrastructure, Flood Characteristics, Programs and Best Management Practices

3.3.1 Dams and Reservoirs: The relatively flat topography of the Maumee River Basin presents few good sites for development of on-stream reservoirs, and not many large ones have been constructed. Cedarville Reservoir on the St. Joseph River is an important on-stream reservoir that supplies Fort Wayne. At Defiance, there is a relatively large hydroelectric power dam on the Auglaize River. Grand Lake straddles the Lake Erie-Ohio River divide, capturing water from tributaries of the Wabash River and St. Marys River for the Ohio-Erie Canal. There are three large low head dams of canal era vintage on the Maumee River at Independence and Grand Rapids (USFWS).

Off-stream reservoirs are well suited for water supply storage in the Maumee River Basin. These reservoirs are created by enclosing land with earth embankments. Water is pumped from nearby streams during high flow periods to fill the impoundment. Communities in the Maumee River Basin with off-stream storage reservoirs include Lima, Van Wert, Paulding, Findlay, Ottawa, Archbold, Wauseon, Delta, Swanton and Metamora. Many smaller communities obtain adequate source of supply from bedrock aquifers, but development of large quantities of supply from these aquifers is generally restrained by dewatering conflicts and highly mineralized water at greater depths (USFWS). Tables 3-6 and 3-7 list the substantial dams in the watershed.

Table 3- 6. Dams in the St. Marys River Watershed.

Name of Dam	County	Year Completed	ID	Purpose	Stream	Inspected
Mrc Lake Dam	Mercer	Unknown	Oh02099	Recreation, Private	Tributary To St. Mary's River	Yes
Resor Pond Dam	Van Wert	1959	Oh02537	Recreation, Public	Tributary To St. Marys River	Yes
Grand Lake St. Marys - East Embankment	Auglaize	1841	Oh00581	Recreation, Public	Outlet To Miami And Erie Canal Feeder	Yes
Forty Acre Pond Dam	Auglaize	1840	Oh00582	Recreation, Public	Miami & Erie Canal	Yes
Williams Lake	Auglaize	Unknown	Oh01215	Recreation, Private	Offstream	Yes
St. Marys Lime Sludge Lagoons	Auglaize	1988	Oh01212	Waste Retention	Koop	Yes
Unknown	Auglaize	Unknown	Oh01213	Recreation, Private	Tributary To Carter Creek	Yes

Table 3-7. Dam details in the St. Marys River Watershed.

Name of Dam	County	Height (feet)	Length (feet)	Surface area (acres)	Storage (acre-feet)	Drainage Area (sq. mi.)
Mrc Lake Dam	Mercer	12.0	No Data	4.3	No Data	0.15
Resor Pond Dam	Van Wert	16.3	450	3.4	No Data	0.05
Grand Lake St. Marys - East Embankment	Auglaize	17.9	7980	13981.0	No Data	110.30
Forty Acre Pond Dam	Auglaize	15.0	6400	68.0	492.1	1.81
Williams Lake	Auglaize	11.0	No Data	5.0		0.00
St. Marys Lime Sludge Lagoons	Auglaize	13.0	2640	12.0	128.0	0.03
Unknown	Auglaize	15.0	No Data	3.5	No Data	0.30

3.3.2 Extent of Drainage Controls in Place (levees, other features, diversions): Information for this section was not available at the time of this report. A rapid watershed assessment is currently planned for this watershed and additional information may be added once available.

Figure 3-4: Typical drainage ditch in Northeast Ohio with Windrow (Source: ODNR, 2008c).

3.3.3 Extent of Alteration of Drainage System: An extensive rural drainage system exists within the watershed and throughout the WLEB. These systems include the networks of tile and open drainageways (ditches) that receive water from individual farms, home lots, and small rural communities (ODNR, 2008b). An accurate county by county breakdown of "rural drainage systems" within the watershed does not exist. However, a comprehensive understanding of this drainage system will be critical to understanding what additional studies and strategies may be needed to solve problems.

Most of these rural drainage systems have been installed without any BMPs and, consequently, may be contributing to both water quality and flooding problems.

ODNR recently issued a framework document titled, "Rural Drainage Systems – Agencies and Organizations Reach Consensus on Ways Forward" (ODNR 2008b). The document provides a framework for balancing socio-economic drainage needs (e.g., local flooding, row crop production) with environmental stewardship (e.g., water quality, soil erosion and sediment control, and fish and wildlife habitat).

ODNR is also developing an "Ohio Drainage Manual" which will set criteria for evaluating drainage projects and environmental resources and identify BMPs for prospective application. One such BMP being evaluated is the "two-stage ditch" (Figure 3-7). Several demonstration projects have been completed, and early results indicate that this BMP provides enhanced water storage during peak flows while also improving overall ecological health of the area. Further research is needed to fully evaluate system- wide use of this BMP and associated economic and environmental benefits.

Figure 3-5. Two stage ditch in Northwest Ohio (ODNR 2008b).

Many agricultural areas within the watershed have been tiled and/or incised with channels to improve drainage. Drainage alterations and structures are also found where the floodplains are crossed by numerous highways and railroads, as well as urban areas where floodplains have experienced encroachments from development.

3.3.4 Floodplains, Status of Mapping: The status of floodplain mapping status varies widely in the watershed: some communities have updated maps, others do not. Table 3-8 shows the schedule to update the floodplain mapping through FEMA's Map Motorization Program. The maps will be issued on a county basis.

Table 3-8. Status of floodplain mapping.

County	Status
Indiana	
Adams	Preliminary Maps 2007
Allen	Preliminary Maps 2007
Wells	Preliminary Maps 2007
Ohio	
Auglaize	Scoping June 5, 2008
Mercer	Scoping June 5, 2008
Van Wert	Project Deferred
Shelby	In progress

3.3.5 Stream Bank Erosion: Information for this section was not available at the time of this report. A rapid watershed assessment is currently planned for this watershed and additional information may be added once available.

3.3.6 Flooding History and Characteristics Profile: Flooding is common in the Upper portion of the Maumee River Basin and the St Marys River corridor. Because of clay/ silty soils found in the watershed, the basin has high runoff coefficients, indicating that a large percentage of the rainfall and snowmelt in the basin readily translates into surface runoff and frequent flooding.

The City of Fort Wayne has historically been subjected to severe flooding, as the confluence of the St. Joseph, St. Marys and Maumee Rivers is located in the City of Fort Wayne. There are also three feeder creeks (i.e., Spy Run Creek, Fairfield Ditch, Junk Ditch) to the St. Marys River that also experience flooding when the latter is swollen and backwatering occurs.

USACE has worked with the City of Fort Wayne for over half a century in developing over 54,000 feet of flood control projects to reduce the flood threat and damage throughout the city. A combination of levees, flood walls, pumping stations, bypasses, warning systems and relocations have been employed to reduce flood damages. Some features are used in combination for redundancy or as a multi-faceted measure of protection. The central and western portions of the system encompass the St. Marys River in Fort Wayne to its confluence with the Maumee, along with tributaries Junk Ditch and Spy Run Creek.

Despite the longstanding investment in protection measures, flash flooding continues on Spy Run Creek, occurring yearly since 2002. A July 2003 flood on the St. Marys prompted a Section 205 study by USACE, although federal funding was suspended in 2005. Another significant flood event occurred on the St. Marys in January, 2005, prompting the City of Fort Wayne to develop flood projects using local funds. The city identified five areas that have had repetitive flooding and were most vulnerable to significant flood damages: the Woodhurst neighborhood; Park/Thompson/Walderon Circle neighborhood; Tillman Road; Thieme Drive and Berry Street; and the Fairfield Ditch (a secondary feeder for the St. Marys River).

The City of Fort Wayne selected to develop flood damage reduction projects for the Woodhurst, Winchester Road, Park/Thompson/Walderon Circle and Tillman Road locations. The Fairfield Ditch project is located in the St. Marys River Watershed. All these projects are located directly on the St. Marys River except for the Fairfield Ditch project. This site is under investigation for possible flood protection by USACE- Detroit District. The development of a project in this location would be rather complex and will require that a feasibility study be conducted.

3.3.7 Status of Riparian/Floodplains/Wetlands Integrity: Floodplains and their associated stream, wetland and shoreline areas are significant watershed assets, due to multiple benefits related to environmental quality, natural resource management, and recreational opportunities. Floodplains are generally best able to provide these benefits if kept in a natural condition. Alterations of floodplains have resulted in increased flood and stormwater hazards, reduced water quality, loss of habitat and recreational opportunities and poor aesthetics within communities. Wherever possible, the natural characteristics of floodplains and their associated water bodies should be preserved. (MRBC 1993)

The Maumee River Basin Commission (MRBC) has been actively addressing the issue of floodplain integrity. Over the 1993-1995 time period, the MRBC produced a comprehensive, multi-volume report evaluating watershed needs related to floodplain management. The first report volume, titled “Resources and Trends of the Maumee River Basin, Indiana”, provides a thorough review and compilation of available information on a variety of topics relevant to flood control efforts, including history, resources and economy, trends, river description and flooding, and problems and needs. The second report volume, titled “Maumee River Basin Flood Control Master Plan – Damage Inventory Report” provides a detailed account of the nature and severity of the flood damages in the Basin divided into study reaches. The third report volume, titled “Maumee River Basin Flood Control Master Plan Damage Inventory Report (Appendices)”, provides damage details for all structures considered in the study. The fourth report volume, titled “Maumee River Basin Flood Control Master Plan Main Report”, summarizes the major findings of the master pl(n study, documents the identification, development, screening and selection of the alternative solutions, and provides an implementation plan for the recommended Master Plan components. The fifth report (“Maumee River Basin Flood Control Master Plan Appendices 1 through 8 to Main Report”) and sixth report (“Maumee River Basin Flood Control Master Plan Comment Response Document”) provide supporting data and documentation.

A significant contribution of the MRBC work was the development of uniform model flood hazard area ordinances and storm drainage/erosion control ordinances for use by all communities and counties within the Basin. The purpose is to recommend drainage and detention criteria and requirements with the objective to prevent:

- Increases in downstream flooding due to new urbanization;

- Increases in the magnitude and frequency of small flood events which contribute to increased bank erosion;
- Increases in drainage-related damages due to inadequate design of local drainage systems;
- The loss of beneficial stream uses due to degraded stormwater quality; and
- The loss of beneficial stream uses due to adverse hydrologic and hydraulic impacts of urbanization.

This model ordinance presents a regulatory approach to stormwater management that emphasizes conservative approaches to stormwater drainage and detention. It should be augmented by a planning process that examines existing and future watersheds needs.

3.3.8 Natural Hazard Mitigation Planning: Natural Disaster Mitigation Plans are available for most counties. These plans, which present community strategies for mitigating future natural disasters, frequently identify flooding as a natural disaster of predominant concern. Plans were prepared in response to grants received from the Ohio Emergency Management Agency and the Federal Emergency Management Agency (FEMA). Plans are updated every five years and identify steps (project needs) to reduce priority natural disaster risk. Approved plans require that mitigation funding from FEMA be secured.
Figure 3-6 identifies six categories of tools available to solve local flooding problems, as identified by the Ohio Emergency Management Agency. Often, some of these tools can provide important watershed health benefits such as restoring floodplains and riparian areas and encouraging better land use practices in and around floodplains. Table 3-9 presents, for illustrative purposes, selected findings of hazard mitigation reports available in the Upper Maumee River Watershed. Local tools to reduce identified flood risks are identified as well. (Further detail is found in Section 3, Flood Damage Reduction.

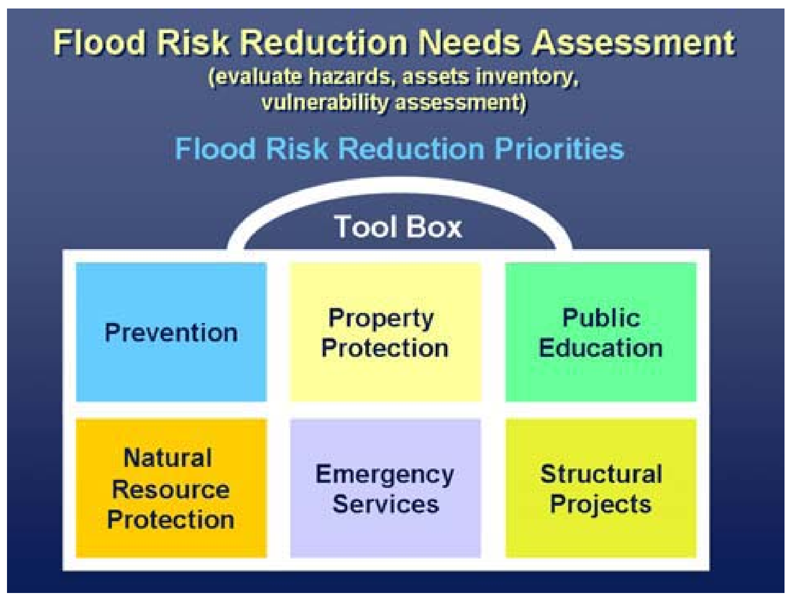


Figure 3-6. Flood risk reduction tools to solve local flooding problems.

Table 3-9. Summary of hazard mitigation plans available for the St. Marys River Watershed.

County	Watershed Flood Risks	Plan for Reducing Flood Risks
Indiana		
DeKalb	Information not available at the time of this report.	Information not available at the time of this report.
Allen	River, flash and urban flooding are the predominant types of flooding in the county. Numerous disasters have been declared, and have caused millions of dollars in damages to homes, businesses, personal property and agriculture. The extent of potential economic loss within the City of Fort Wayne and vicinity has caused flooding to be a major identified risk for the county. There are 158 structures which are expected to sustain some type of damage in a 100-yr storm.	Long-range planning, zoning, and subdivision control ordinances guide or restrict development from hazardous areas. The county's GIS system includes the most recent flood boundaries. Allen County, the City of Fort Wayne, Huntertown, Leo-Cedarville, and the City of New Haven have Stormwater Quality Management Plans and stormwater ordinances in place.
Ohio		
Auglaize	Information not available at the time of this report.	Information not available at the time of this report.
Mercer	Information not available at the time of this report.	Information not available at the time of this report.
Shelby	Information not available at the time of this report.	Information not available at the time of this report.
Van Wert	Information not available at the time of this report.	Information not available at the time of this report.

3.3.9 Status of Runoff Controls/Best Management Practices/Rehabilitation: Information for this section was not available at the time of this report. A rapid watershed assessment is currently planned for this watershed and additional information may be added once available.

3.4 Existing Conditions: Problems and Concerns

3.4.1 Water Supply: At the current time, surface water supplies appear to be adequate in the watershed, although concerns about water quality are well documented. Regional groundwater trends are largely unknown and warrant additional study given reliance on groundwater sources for water supply.

3.4.2 Flood Damage Reduction and Flood Risk Management: Table 3-10 summarizes flood damage reduction and flood control problems, as identified by various public officials and agencies.

Table 3-10. Flood damage reduction and flood control problems and concerns.

WLEB Resource Category	Name	Description	Political Subdivision
Flood Damage Reduction	Comprehensive flood plans	Comprehensive flooding plan is needed for the City of Fort Wayne. Existing projects are localized and do not address the overall problems.	Fort Wayne
Flood Damage Reduction	Flood mitigation plan	Citizens in Fort Wayne feel that the Trier Ditch flood alternative identified by USACE in 1987 would have been more effective in diverting water around the City of Fort Wayne.	Fort Wayne
Flood Damage Reduction	Current and future hydraulic models	No water level gauge at the confluence with the St. Mary's and St Joseph Rivers. Current models may not be accurate.	USGS
Flood Damage Reduction	Impervious surfaces	Impervious surfaces in the city are adding to flooding and runoff.	Fort Wayne
Flood Damage Reduction	Upstream development	Upstream development of Decatur may be contributing to the dangerous flooding in Decatur.	Decatur
Flood Damage Reduction	Comprehensive model floodplain regulations	Many communities have adopted minimum NFIP standards but there needs to be consistency between the regulations. The recommendation is to adopt a basin-wide floodplain ordinance.	Allen, and Adams Counties Fort Wayne,
Flood Damage Reduction	Comprehensive floodplain regulations	Regulations are needed to prevent or eliminate 100-year flooding in the Maumee River Basin and to prevent or eliminate five year repetitive loss flooding in agricultural areas of the basin.	Allen, and Adams Counties Fort Wayne, Auburn, Decatur, Indiana
Flood Damage Reduction	Debris clearing	There is a need for clearing and snagging and for deepening stretches of the rivers. Shallow waters, debris and fallen trees/stumps create access and navigation problems for recreational use of the rivers.	Entire watershed

3.4.3 Sedimentation and Stream Bank Erosion: A multi-objective approach to drainage and stormwater management is needed based on the principles of watershed and stream function. It would be helpful to provide protection of stream reaches that currently have a stable channel form and/or healthy biological conditions from encroachment or modification of the channel, floodplain or riparian area. Channel design and management that incorporates fluvial features will increase stability, improve water quality and support aquatic habitat. Expansion of the riparian corridor is needed, and research is essential to assess performance of individual streams, the drainage network and the watershed for a broad suite of hydrological, ecological, economic and social parameters.

Although comprehensive soil erosion and sedimentation programs have been implemented through NRCS, enhanced efforts are needed. When complete, the NRCS Part 2 Rapid Watershed Assessment will identify needs. Table 3-11 summarizes key problems and concerns.

Table 3-11. Sediment and stream bank erosion problems and concerns.

WLEB Resource Category	Name	Description	Political Subdivision/Agency
Flooding and Water Supply	Sediment loadings	There is a need to reduce sediment load. (Watershed Assessment Workshop)	NRCS, Soil and Water Conservation Districts
Flooding	Comprehensive floodplain regulations	Regulations are needed to prevent or eliminate 100-year flooding in the Maumee River Basin and to prevent or eliminate five year repetitive loss flooding in agricultural areas of the basin.	Allen, and Adams Counties Fort Wayne, Decatur, Indiana
Flooding	Need for repair and stabilization of eroding river banks.	There is a need for buffer zones and bio-engineered solutions and plantings (such as Mesic Prairie Grasses). Erosion control mats called Geo-Jute are coconut mesh mats which completely decompose in 4 years, leaving behind: Indian Grass, Virginia Wild Rice, Wild Barley and other DNR approved riparian vegetation and grasses to reduce sedimentation in the river and erosion along the riverbanks.	NRCS, Soil and Water Conservation Districts

3.5 Anticipated Conditions: Opportunities and Unmet Needs

3.5.1 Water Supply: Water supply issues/ shortages are not anticipated in the foreseeable future. However, the quality of surface water supplies is of concern, and the quantity. Quality of groundwater sources has not been well documented. In addition, the potential impact of climate change on available surface and ground water supplies (e.g., lower groundwater tables, increased irrigation requirements) is a relevant concern throughout the WLEB. Population growth in the region (at least on a localized basis), could result in increased demand for water.

3.5.2 Flood Damage Reduction and Flood Control: Table 3-12 summarizes opportunities and needs.

Table 3-12. Flood damage reduction and flood control opportunities and needs.

WLEB Resource Category	Name	Description	Political Subdivision
Flood Damage Reduction	Comprehensive flood plans	Perform two dimensional hydrodynamic modeling of the rivers that converge in Fort Wayne.	Fort Wayne, USACE
Flood Damage Reduction	Flood mitigation plan	Re-examine USACE 1987 study alternatives for the City of Fort Wayne.	Fort Wayne, USACE
Flood Damage Reduction	Stream gage	New water level gauge needed at the confluence of the St. Marys and St. Joseph Rivers.	Fort Wayne, USGS
Flood Damage Reduction	Green engineering	Use of underground detention and soft engineering to combat increasing impervious surfaces rather than constructing levees.	Multiple jurisdictions
Flood Damage Reduction	Restore wetlands to reduce peak discharges	Increase USDA/NRCS practice of restoring wetlands to reduce peak discharges.	All
Flood Damage Reduction	Stream gages	Install stream gage stations at the mouth of each major tributary to measure flow, water quality and sediment loads.	All
Flood Damage Reduction	Stop logs in drainage ditches to slow down runoff	Increase use of control drainage practices (e.g., using stop logs to slow down runoff from tiled fields at certain times of the year).	All
Flood Damage Reduction	Comprehensive floodplain regulations	Prevent/ eliminate 100-year flooding in the watershed, and prevent/ eliminate five year repetitive loss flooding in agricultural areas.	Allen, and Adams Counties Fort Wayne, Decatur, Indiana
Flood Damage Reduction	Comprehensive model floodplain regulations	Many communities have adopted minimum NFIP standards but there needs to be consistency between the regulations. The recommendation is to adopt a basin-wide floodplain ordinance.	Allen, and Adams Counties Fort Wayne, Decatur, Indiana

3.5.3 Sedimentation and Stream Bank Erosion: Sedimentation and stream bank erosion opportunities and needs are summarized in Table 3-13.

Table 3-13. Sedimentation and stream bank erosion opportunities and needs.

WLEB Resource Category	Name	Description	Political Subdivision
Flood Damage Reduction	Sediment control devices	Add low level outlets at all control structures so sediment deposition upstream of the structures can be periodically flushed downstream.	
Flood Damage Reduction	Erosion screening	Identify and screen sites where stream bank erosion is occurring and where a federal interest may exist.	SWCD, USACE, MRBC, MRBPLG
Flood Damage Reduction	Stream inventory	Develop an inventory of stream bank erosion problem sites.	SWCD, USACE, MRBC, MRBPLG
Flood Damage Reduction	Comprehensive floodplain regulations	Prevent/ eliminate 100-year flooding in the watershed, and prevent/ eliminate five year repetitive loss flooding in agricultural areas.	Steuben, Allen, and Adams Counties Fort Wayne, Decatur, Indiana
Flood Damage Reduction	Comprehensive watershed plan	Preserve, restore and enhance wetlands to improve water quality, provide habitat, store and delay floodwaters, act as a buffer, and provide outdoor recreation.	Allen, and Adams Counties Fort Wayne, Decatur, Indiana

3.6 Past/ Ongoing Studies and Data Gaps

3.6.1 Water Supply: Past/ ongoing studies and data gaps relative to water supply are summarized in Table 3-14.

Table 3-14. Water supply past, ongoing studies and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
ODNR County Water Use Study, various counties	Presents water use profiles for each county; including surface and groundwater usage by category	No recommendations.	N/A
Great Lakes Basin Framework Study (Great Lakes Basin Commission, 1976).	*Appendix 15, Irrigation* Identifies and evaluates the current status and any trends in agricultural irrigation; no specific information on the Upper Maumee, but does provide general	Need to address a projected steady increase in demand for irrigation, with 21,000 acre feet of water needed by 2020	No cost estimate

Table 3-14. Water supply past, ongoing studies and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
	information on the Western Lake Erie Basin		
Great Lakes Basin Framework Study, Appendix 6, Water Supply, Municipal, Industrial, Rural (Great Lakes Commission, 1976).	Municipal, industrial and rural water uses were analyzed separately to determine past use and trends in water supply. Municipal water supply includes communities of all sizes that are served by a central water supply system. Industrial water supply pertains to manufacturing industries and does not include electric generating plants. Rural water supply covers the farm and rural communities where water is not supplied by a central system.	Need to identify key recommendations	No cost estimate
Northwest Ohio Water Plan, 1986 Update	Copy of report not reviewed.	No data.	No data.

3.6.2 Flood Damage Reduction and Flood Control: Several studies have been completed to assess solutions to reduce flood damage and provide flood control. They are summarized in Table 3-15.

Table 3-15. Flood damage reduction past, ongoing studies and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
Maumee River Basin, Indiana and Ohio, Interim Survey Report on Flood Control at Findlay, Ohio, 1962, (USACE – Detroit District)	This study looked at several potential solutions to flooding, including floodplain evacuations, upstream reservoirs, channel improvements, stream diversions, levees, and floodwalls.	Recommended plan of improvement includes a series of floodwalls and levees combined with the diversions of Eagle and Lye Creeks.	Need to gather costs
Maumee River Basin, Indiana and Ohio, Interim Survey Report on Flood Control at Ottawa, Ohio, 1965 (USACE – Detroit District).	Study examined several potential solutions to flooding problems within the city, including upstream reservoirs, evacuation of the floodplain, channel improvements, a high velocity channel, diversions, and levees and floodwalls. Work never completed.	Potential solutions to flooding problems within the city include upstream reservoirs, evacuation of the floodplain, channel improvements, a high velocity channel, diversions, and levees and floodwalls.	

Table 3-15. Flood damage reduction past, ongoing studies and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
Western Lake Erie Basin Water Resources Protection Plan, Ohio, Indiana and Michigan" (2005)	Heavy rains on July 4, 2003 caused extensive flooding in the region.	1. Keep high value development such as homes and businesses out of the floodplain to reduce/prevent flood damages. 2. Where communities have already built in or near the floodplain, remedial actions should include channel modification, relocation, flood proofing and establishment of wetland areas along the stream corridor that serve as natural flood storage areas. 3. Flood reservoirs are not an option due to the primarily flat terrain in the Maumee Basin.	
Maumee River Basin Commission	Comprehensive floodplain regulations Flooding and non-structural mitigation	Adopt a basin-wide floodplain ordinance; many communities have adopted minimum NFIP standards but consistency between regulations is needed.	
Maumee River Basin Commission	Comprehensive master plan	Provide for the long term management of basin water resources.	

3.6.3 Sedimentation and Stream Bank Erosion: A summary of past, ongoing studies and data gaps is presented below (Table 3-16).

Table 3-16. Sedimentation and stream bank erosion past, ongoing and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
Great Lakes Basin Framework Study (Appendix 18–Flood Erosion and Sedimentation), 1976, Great Lakes Basin Commission.	Reports findings from analysis of erosion and sedimentation processes, with an emphasis on predicting future trends in erosion and sedimentation rates.	Solutions to erosion and sedimentation problems are presented, but have limited relevance due to outdated nature of report and more recent advances in soil erosion and sedimentation control technology/ practices.	
Status and Trends in Suspended Discharges, Soil Erosion, and Conservation Tillage in the Maumee River Basin, Ohio, Michigan, and Indiana (USGS 2000)	The relation of suspended-sediment discharges to conservation-tillage practices and soil loss were analyzed for the Maumee River Basin in Ohio, Michigan, and Indiana. Cropland in the basin is the largest contributor to soil erosion and suspended-sediment	Water-quality data in combination with soil-loss estimates were needed to draw these conclusions. These findings provide information to farmers and soil conservation agents about the ability of conservation tillage to reduce soil erosion and suspended sediment discharge from the Maumee River Basin.	No estimate provided

Table 3-16. Sedimentation and stream bank erosion past, ongoing and data gaps.

Study(Sponsor)	Description	Recommendations	Estimated Costs
	discharge to the Maumee River and the river is the largest source of suspended sediments to Lake Erie. Retrospective and recently-collected data from 1970–98 were used to demonstrate that increases in conservation tillage and decreases in soil loss can be related to decreases in suspended sediment discharge from streams.		

3.7 Findings

Summarized in this section are findings drawn from various reports and analyses relating to water supply; flood damage reduction and flood control; and sedimentation and stream bank erosion in the St. Marys River Watershed.

3.7.1 Water Supply: In general, ground water supply capacity is adequate at this time. Surface water resources also appear to be adequate for both public and private consumers. Over the longer term, however, uncertainties exist relative to the potential impact of climate change on available surface and groundwater supplies (e.g., lower groundwater tables, increased irrigation requirements). In addition, population growth in the region (at least on a localized basis), could result in increased demand for water.

3.7.2 Flood Damage Reduction and Flood Control: Information for this section was not available at the time of this report. Additional information may be added once the Rapid Watershed Assessment has been completed.

3.7.3 Sedimentation and Stream Bank Erosion: Stormwater runoff into streams and drainage ways is a leading water quality problem in the St. Marys River Watershed, as well as a major contributor to flooding problems. Given the large number of rural drainage ditches in the watershed, BMPs need to be developed to ensure that drainage improvements and maintenance activities do not increase sediment loadings to the mainstem and tributaries of the St. Marys River Watershed. A comprehensive inventory of the rural drainage system is needed.

3.8 Potential Actions

A number of potential actions for flood damage reduction, flood control, water supply, and sedimentation and stream bank erosion have been identified (Table 3-17). These potential actions should be carefully reviewed and prioritized by the WLEB Partnership.

Table 3-17. Flood damage reduction, flood control, water supply, sedimentation and stream bank erosion potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Construct reservoir upstream of Decatur and Fort Wayne to alleviate flooding.	Maumee River Basin Commission	$50,000,000	2014+
Acquire all residential structures in floodplain	Maumee River Basin Commission	$16,600,000	2010-2014
Water Treatment Plant	Rockford	$2,500,000	2009
Support implementation of additional conservation practices in watershed to reduce sediment loads and erosion by increasing payments to offset gains in price of commodity crops.	NRCS	$2,000,000	2010-2014
Limit additional development and restore flood retention capabilities of floodplains.	Counties	$1,000,000	2010-2014
Continue acquisition of structures along Junk Ditch to maintain overflow path capacity.	Maumee River Basin Commission	$1,000,000	2010-2014
Update floodplain maps and establish base flood elevations.	FEMA	$600,000	2010-2014
Clear log jams, junk, debris from streams and ditches.	Counties	$500,000	2010-2014
Continue Stream Obstruction Removal Program - Special Area of Concern, Section between Adams/Allen County Line and I-469 & Annual Reconnaissance	Maumee River Basin Commission	$325,000	2010-2014
Construct larger on-site detention ponds for future development.	County Engineer	$200,000	2010-2014
Complete Houk Ditch/Trier Ditch overflow evaluation to determine feasibility of designating path as an Impact Area and recommended measures.	Maumee River Basin Commission	$200,000	2010-2011
Continue to identify and provide cost-share match to landowners (agriculture) to compensate them for land conversion programs (floods, riparian areas, etc.)	Maumee River Basin Commission	$150,000	2010-2014
Adopt flood plain, stormwater policies/ordinances/public education.	Ohio Environmental Education Fund	$115,000	2009-2013

Table 3-17. Flood damage reduction, flood control, water supply, sedimentation and stream bank erosion potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Prepare inventory of culverts causing historic flooding and target them for retrofitting.	Counties	$100,000	2010
Enhance data and mapping of flood prone areas outside the floodplain. Development of floodplain maps for local streams not on FIRMs or county maps.	Counties	$100,000	2010-2014
Update/complete Flood Hazard mapping for St. Mary Watershed: IN	Maumee River Basin Commission	$100,000	2010
Yost Levee Removal /Bypass Channel evaluation.	Maumee River Basin Commission	$100,000	2012-2012
Install/operate river gage on Main Street Bridge to calibrate River Hydraulic Model.	Maumee River Basin Commission	$97,500	
Conduct comprehensive inventory and assessment of rural drainage system to better understand this important "drainage infrastructure" and better management maintenance practices to reduce sediment loadings and aquatic habitat.	County Engineer	$75,000	2011
Establish post-flood damage assessment protocol.	Maumee River Basin Commission	$75,000	2011
Incorporate stream restoration and protection into drainage projects.	County Engineer	$50,000	2009-2014
Build collaborative relationships with Ohio communities and the State of Ohio to develop more restrictive standards as they apply to floodplain and stormwater management.	Maumee River Basin Commission	$50,000	2010
Evaluate feasibility of nonstructural tools to reduce or eliminate stream maintenance (woody debris removal)	Maumee River Basin Commission	$50,000	2010-2014
Maintain Junk Ditch/Little River overflow floodplain to assure land use changes do not significantly decrease flow, complete evaluation/Master Plan Update.	Maumee River Basin Commission	$50,000	2010
Identify areas for restoration of natural hydrology and flow characteristics to also benefit flood mitigation.	SWCD	$50,000	2010

Table 3-17. Flood damage reduction, flood control, water supply, sedimentation and stream bank erosion potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Establish cost estimates and schedules for implementing nonstructural flood mitigation recommendations presented in County Natural Disaster Mitigation Plans.	County EMAs	$40,000	2012
Increase freeboard for structures along the St. Marys River corridor	Maumee River Basin Commission	$40,000	2010-2014
Conduct drainage feasibility study on the Fairfield Ditch area.	USACE	$40,000	2010-2012
Implement education programs on improved ditch maintenance program – not striping/spraying.	SWCD	$25,000	2010
Analyze repetitive flood properties and identify feasible mitigation options.	FEMA	$20,000	2012
Develop program to educate building owners in flood hazard areas (including behind levees) to obtain flood insurance to close gap between insured structures and number of structures in the flood hazard area.	Maumee River Basin Commission	$15,000	2010
Promote Wetland Reservoir Subsurface Irrigation Systems as a method of providing seasonal floodplain storage by “temporarily” plugging drainage tiles in late fall after crops have been harvested and then removing said plug several weeks prior to spring planting season. This dual use of property could provide water quality benefits, wildlife habitat, and stormwater runoff detention.	Maumee River Basin Commission	$10,000	2010
Expand distribution of MRBC newsletter to targeted audiences.	Maumee River Basin Commission	$5,000	2010-2014
Purchase homes for demolition along Winchester Road and place levees to compensate for the 100-yr flood elevation.	Fort Wayne	$0	2012
Update Northwest Ohio water Supply Plan.	ODNR	$0	2010-2011

4.0 WATER QUALITY

4.1 Introduction

Presented in this section is an overview of water quality problems, needs and opportunities in the St. Marys River Watershed. Much of the information presented in this section is based upon the Biological and Water Quality Study completed by Ohio EPA (OEPA. 2007).

Figure 4-1. Confluence of the St. Mary's, St. Joseph, and the Upper Maumee Rivers.

4.2 Water Quality Characteristics

Water quality problems in the St. Marys River Watershed reflect the predominantly agricultural use of the land (e.g., sedimentation, fecal coliform contamination, nutrient enrichment).

Numerous reaches of the St. Marys River are currently on the US EPA 303(d) list for impairments associated with mercury, habitat alterations, PCBs, nutrients, pathogens, impaired biotic community, siltation, un-ionized ammonia, toxicity, *E.coli* and flow alteration. There have been no TMDLs conducted for the watershed to date. Table 4-1 lists the water bodies and causes of impairment.

Table 4-1. Streams and pollutants that are 303(d) listed within the St. Marys Watershed. (USEPA 2008)

Waterbody	Siltation	Turbidity	PCBs	Other Habitat Alteration	Flow Alterations	Pathogens	Nutrients	Impaired Biotic Communities	Ammonia	Unknown Toxicity	Organic Enrichment
St. Marys, headwaters to Kopp Creek (IN)				X			X	X			
St. Marys, Kopp Creek to Sixmile Creek (IN)				X			X	X			X
St. Marys, Sixmile Creek to Twelvemile Creek (IN)				X							X
Blue Creek				X		X					x
Maumee River Mainstem (Indiana border to Lake Erie)	X	X	X	X	X		X		X	X	

Table 4-1. Streams and pollutants that are 303(d) listed within the St. Marys Watershed. (USEPA 2008)

Waterbody	Siltation	Turbidity	PCBs	Other Habitat Alteration	Flow Alterations	Pathogens	Nutrients	Impaired Biotic Communities	Ammonia	Unknown Toxicity	Organic Enrichment
Spy Run Basin						X					
St. Marys River						X		X			
St. Marys River Trib						X		X			
St. Marys River-Willshire						X		X			
Wittmer No 1 Ditch						X		X			
Yellow Creek						X		X			
Borum Run And Tribs						X		X			
Decatur Tribs						X		X			
Duer Ditch (Adams) And Other Tribs						X		X			
Farlow Ditch And Tribs						X		X			
Gates Ditch						X		X			
Gerke/Weber Ditch And Tribs						X		X			
Habegger Ditch						X		X			
Holthouse Ditch-Kohne Ditch						X		X			
Junk Ditch And Other Tribs						X		X			
Little Blue Creek						X		X			
Lowther Neuhaus Ditch-Unnamed Tributary						X		X			
Martz Creek-Ruppert Ditch And Unnamed Tributary						X		X			

According to US EPA, primary causes of these impairments include non-irrigated crop rotation, channelization, removal of riparian vegetation and streambank destabilization along agricultural fields, and minor municipal point source pollution. Table 4-2 provides an overview of principal water quality concerns for the watershed.

Table 4-2. Principal water quality concerns in the St. Marys River Watershed. (USEPA 2008)

Causes of Impairment	Sources of Impairment
FCA (Mercury)	Atmospheric deposition
Organic enrichment/ low dissolved oxygen	WWTP, CSO, SSO, urban diffuse runoff, agricultural runoff
Other habitat alterations	Channel modification, drainage modifications
FCA (PCBs)	WWTP, CSO, SSO, urban diffuse runoff,

Table 4-2. Principal water quality concerns in the St. Marys River Watershed. (USEPA 2008)

Causes of Impairment	Sources of Impairment
	agricultural runoff
Nutrients	WWTP, CSO, SSO, urban diffuse runoff, agricultural runoff
Pathogens	WWTP, CSO, SSO, urban diffuse runoff, agricultural runoff
Impaired biotic communities	WWTP, CSO, SSO, urban diffuse runoff, agricultural runoff
Siltation	CSO, SSO, urban diffuse runoff, agricultural runoff
Un-ionized ammonia	WWTP, CSO, SSO
E. coli	CSO, SSO, agricultural runoff
Unknown toxicity	
Flow alteration	Tile drainage, channel straightening

4.3 Water Quality Infrastructure, Programs and Best Management Practices

NRCS Programs

- Conservation Innovation Grants (CIG)
- Conservation Security Program
- Cooperative Conservation Partnership Initiative (CCPI)
- Environmental Quality Incentives Program (EQUIP)
- Farm and Ranch Lands Protection Program (FRPP)
- Grazing Lands Conservation Initiative (GLCI)
- Resource Conservation and Development Program (RC&D)
- Wetlands Reserve Program (WRP)
- Wildlife Habitat Incentives Program (WHIP)
- Ohio Lake Erie Buffer Program
- Urban Conservation

Water quality and assessment programs in place throughout the watershed are effective tools to identify needs, problems and opportunities. Existing water quality data, as well as continued monitoring, provide insight into current conditions and guide program and practice development. In addition, a number of public and nongovernmental agencies and organizations work with landowners to educate and promote land stewardship and provide funding for agricultural BMPs. Information from the numerous studies in the watershed provides a valuable screening tool for assessing and developing actions to improve water quality. Many of these entities have been established with the primary goal of improving and/ or protecting the natural resources of the watershed, such as Soil and Water Conservation Districts. Others have been established to implement or enforce environmental and natural resource rules and regulations, but also may provide significant funding, expertise and training. These include NRCS, ODNR, OEPA, IDEM and IDNR programs that address a wide range of problems through funding, education, priority setting and program/project management.

Urban and agricultural BMPs implemented within the watershed are supported by a variety of federal, state and local agencies, organizations and funding sources. For example:

- Long Term Control Plans have been developed for some communities in the watershed and, when implemented, will eliminate or reduce CSO/SSO discharges.
- Section 319 funds are available for projects that improve water quality within the watershed.
- NRCS Agricultural BMPs (e.g., filter strips, riparian buffers, conservation tillage) are directed at water quality improvements through soil erosion and sediment control.
- Funds and programs are available to facilitate WWTP upgrades, as well as replacement of failing Home Sewage Treatment Systems (HSTS), in the interest of improving water quality.
- Protection of agricultural and natural lands is a priority for land conservancies operating within the watershed.

Principal federal and state agencies working with agricultural producers include NRCS and OEPA, respectively. NRCS funds conservations practices with demonstrated effectiveness in reducing pollutant loads, such as filter strips, conservation tillage practices and riparian buffers.(NRCS 2004). Some of the more important programs dedicated to BMP implementation within the watershed include:

- **Agricultural Programs:** Ohio initiated its first Conservation Reserve Enhancement Program (CREP) in the Lake Erie watershed. CREP is a state, federal and private partnership to enroll 67,000 acres of conservation practices (e.g., buffers strips, riparian buffers, wildlife habitat, wetlands, windbreaks) on environmentally sensitive lands in the watershed. Landowners enrolling cropland and marginal pastureland along streams and ditches will receive annual payments and cost-share from USDA. In addition, landowners may receive state bonus payments to establish, maintain and extend certain conservation practices. Currently 10,721 acres have been added since 1997.

- **Stormwater programs:** Phase II communities are required to develop stormwater management plans that address a series of minimum control measures. Among others, this includes development of BMPs for construction and post-construction stormwater runoff control. In addition, a general permit is required for any construction activity disturbing more then one acre of land within the watershed. NPDES permit requirements are in place for several locations in the Indiana portion of the watershed, including the City of Fort Wayne, Huntertown, LeoCedarville, New Haven and Allen County. Each of these communities has a stormwater management plan in place as well as regulatory ordinances. At present, agricultural activities are exempt from permit regulations.
.
- **Section 319 projects**: Section 319(h) of the federal Clean Water Act provides funding for various types of projects that reduce non-point source water pollution. Funds may be used to conduct assessments, develop and implement TMDLs and watershed management plans, provide technical assistance, demonstrate new technology and/or provide education and outreach. Section 319(h) implementation grant funding is targeted to waters where non-

point source pollution is a significant cause of aquatic life use impairments. Currently, there are no active 319 projects in the watershed.

Unsewered areas are typically found in rural areas or newly developing areas on the urban fringe which is the majority of the watershed. Since housing density is relatively low in these areas, sewer lines have not yet been constructed as it is often cost prohibitive. There are two types of wastewater treatment in the watershed:

Septic systems offer the minimum treatment, or primary treatment of domestic wastewater. In these systems, wastewater is stored in an underground tank where solids settle out and are stored for later removal. The remaining gray water is then filtered through a leachate bed and thereby returned to ground or surface water. Septic systems require somewhat porous soils, which allow the wastewater to percolate through the ground layers. Every few years septic systems need to be pumped out to remove stored sewage solids. With this type of sewage system, discharge will be diffuse. Each home in a residential development may be outfitted with its own septic system, all of which may eventually recharge to a single stream or ground water source. Septic systems in the St. Marys River Watershed are found primarily in rural communities.

Aeration systems are similar to septic systems except the sewage is oxygenated with an aerator, which allows for wastes to break down aerobically. Like the septic systems, aeration systems must also be pumped every few years to remove the stored sewage solids. Unlike septic systems, numerous aeration systems in a single housing development often share a common drainage tile, which usually discharges directly to a stream or river.

4.4 Existing Conditions: Problems and Concerns

Diffuse runoff from urban areas may transport a variety of pollutants, depending on the specific land use and activity in an area. Urban and suburban runoff may include runoff from roads, parking lots, rooftops, industrial areas and other impervious surfaces. Such runoff may or may not be regulated by the Clean Water Act or state environmental protection laws depending upon the population density and size of an urban area, industrial use or commercial use.

The water quality impacts of urban and suburban runoff include changes to local hydrology due to increased impervious surface areas which reduce infiltration and increase runoff. Developed areas typically have greater peak flows, reduced base flows, and shorter concentration times than undeveloped, agricultural and rural areas. This often results in flooding, stream bank erosion, channel incision and others changes detrimental to the health of streams. Stormwater run-off may also carry a variety of pollutants associated with construction activities into water courses, as well as metals, nutrients, sediment and organic material associated with diffuse runoff from developed areas. Pollutants can also include toxics depending upon specific activities in urban areas, as well as bacteria if CSOs/SSOs are a concern.

Table 4-3 summarizes water quality problems and concerns.

Table 4-3. Water quality problems and concerns.

WLEB Resource Category	Name	Description	Political Subdivision
Water Quality	CSO/septic	Evaluation of septic systems within the entire watershed and specifically in Allen County	Allen County
Water Quality	Illicit discharge	Leakage from Anthony Blvd. to New Haven and within the entire watershed	Ft. Wayne
Water Quality	Watershed coordination	Inadequate coordination and liaison with local SWCDs	All
Water Quality	Fertilizers and pesticide runoff	Chemical runoff from lawn fertilizers used in commercial and residential developments	All
Water Quality	Organic enrichment/ D.O., bacteria, nutrients	Failing HSTS	All
Water Quality	Temperature, DO, nutrients, siltation, pesticides	Riparian removal	All
Water Quality	Siltation	Non irrigated cropland	All
Water Quality	Pesticides	Toxics/ fish advisories	All

4.5 Anticipated Conditions: Opportunities and Unmet Needs

Due to the extent of agricultural land use in the St. Marys River Watershed, farming activities are responsible for many of the impairments identified by US EPA (e.g., non-irrigated crop rotation, channelization, removal of riparian vegetation and streambank destabilization along agricultural fields, municipal point source pollution.) Opportunities to address these impairments include agricultural BMPs that limit erosion, nutrients delivery and pesticide delivery; improvements to unsewered areas; agricultural nutrient management plans; and more focused application of volunteer programs. Opportunities and unmet needs, as reported by individuals and within relevant reports, are presented in Table 4-4.

Table 4-4. Water quality opportunities and unmet needs.

WLEB Resource Category	Name	Description	Political Subdivision
Water Quality	Ditch improvement	Enlist Indiana farmers to test an approved design for drainage ditches that reduces sediment and improves water quality and wildlife habitat.	Indiana, The Nature Conservancy
Water Quality	Erosion control	Implement conservation tillage programs.	All

Table 4-4. Water quality opportunities and unmet needs.

WLEB Resource Category	Name	Description	Political Subdivision
Water Quality	Erosion control	Establish riparian buffers/ vegetation.	All
Water Quality	Erosion control	Use constructed or restored wetlands as sediment traps.	All
Water Quality	Erosion control	Erosion control programs are voluntary and participation is not targeted towards land contributing the most sediment.	All
Water Quality	Erosion control	Increase acreage of corn and soybeans grown under conservation tillage in the watershed to 75%.	All
Water Quality	Erosion control	Increase the acreage of filter strips and sod waterways.	All
Water Quality	Nutrients, sediments, pesticides	Increase participation in existing NRCS conservation programs.	All
Water Quality	Nutrients, sediments, pesticides	Prioritize areas for volunteer programs. Provide enhanced monetary incentives for participants from high priority areas (e.g. areas contributing larger amounts of pollutants.)	All
Water Quality	Nutrients, sediments, pesticides	Establish regulations requiring conservation practices.	All

4.6 Past/ Ongoing Studies and Data Gaps

Table 4-5 summarizes past/ongoing studies and data gaps in the watershed. A particularly critical gap is the completion of the TMDLs for the entire watershed, as they will facilitate development of a comprehensive plan to address specific contaminants causing impairments to stream segments.

Table 4-5. Water quality past, ongoing studies and data gaps.

WLEB Resource Category	Name	Description	Recommendations
Water Quality	St. Marys River Watershed TMDL	This report calculates a TMDL for habitat (flow and sedimentation), dissolved oxygen (DO), total phosphorus, ammonia, and bacteria that is expected to assure attainment of the designated aquatic life and/or recreational use. Further, it will suggest how each TMDL may be allocated among the following sources of pollutants	OEPA

Table 4-5. Water quality past, ongoing studies and data gaps.

WLEB Resource Category	Name	Description	Recommendations
		identified as contributing to each particular impairment. There are currently no TMDLs completed for this watershed other than the St. Mary's drainage contribution.	
Water Quality	Ohio EPA Biological and Water Quality Report	A water quality report specific to this watershed needs to be completed.	OEPA
Water Quality	Lake Erie Protection and Restoration Plan	Focuses on specific measurements of water quality and identifies additional initiatives or resources necessary to accomplish Quality Index goals and objectives.	Ohio Lake Erie Commission
Water Quality	Western Lake Erie Basin Partnership Strategic Plan	Establishes goals for each of the strategic objectives developed by the partnership.	WLEB
Water Quality	Maumee River Area of Concern 2004 Stream and Septic Monitoring Study	Incorporates major work plan and monitoring plan elements and both stream and septic system monitoring for the Maumee River AOC Remedial Action Plan.	USACE, TLCHD, TMACOG

4.7 Findings

Water quality and related environmental assessment programs are in place throughout the watershed, and are effective tools in identifying needs, problems and opportunities for improvement. Existing water quality data, along with ongoing monitoring efforts, provide insight into current conditions and guide the selection and application of BMPs.

NRCS supports programs to assess water quality issues related to agricultural lands, and local Soil and Water Conservation Districts work with land owners to implement programs. A limitation to this approach is that all areas of the watershed are given equal priority. Given that some areas of the watershed may contribute greater pollutant loads due to soil type, proximity to water bodies, crop type, and farming practices, a prioritization system that targets land owners contributing greater pollutants should be established.

Multiple public entities at the local, state and federal levels are contributing to water quality improvement efforts within the watershed. Measures to enhance progress include targeting areas contributing greater pollutant loads, providing greater incentives for participation in voluntary programs, and accelerating the rate at which waters are assessed and the sources and causes of impairments are identified.

4.8 Potential Actions

Table 4-6 identifies potential actions needed to restore water quality in the watershed. This list warrants consideration by the WLEB Partnership as potential actions are prioritized.

Table 4-6. Water quality potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Construct reservoir upstream of Decatur and Fort Wayne to alleviate flooding.	Maumee River Basin Commission	$50,000,000	2014+
Acquire all residential structures in floodplain	Maumee River Basin Commission	$16,600,000	2010-2014
Water Treatment Plant	Rockford	$2,500,000	2009
Support implementation of additional conservation practices in watershed to reduce sediment loads and erosion by increasing payments to offset gains in price of commodity crops.	NRCS	$2,000,000	2010-2014
Limit additional development and restore flood retention capabilities of floodplains.	Counties	$1,000,000	2010-2014
Continue acquisition of structures along Junk Ditch to maintain overflow path capacity.	Maumee River Basin Commission	$1,000,000	2010-2014
Update floodplain maps and establish base flood elevations.	FEMA	$600,000	2010-2014
Clear log jams, junk, debris from streams and ditches.	Counties	$500,000	2010-2014
Continue Stream Obstruction Removal Program - Special Area of Concern, Section between Adams/Allen County Line and I-469 & Annual Reconnaissance	Maumee River Basin Commission	$325,000	2010-2014
Construct larger on-site detention ponds for future development.	County Engineer	$200,000	2010-2014
Complete Houk Ditch/Trier Ditch overflow evaluation to determine feasibility of designating path as an Impact Area and recommended measures.	Maumee River Basin Commission	$200,000	2010-2011
Continue to identify and provide cost-share match to landowners (agriculture) to compensate them for land conversion programs (floods, riparian areas, etc.)	Maumee River Basin Commission	$150,000	2010-2014
Adopt flood plain, stormwater policies/ordinances/public education.	Ohio Environmental Education Fund	$115,000	2009-2013

Table 4-6. Water quality potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Prepare inventory of culverts causing historic flooding and target them for retrofitting.	Counties	$100,000	2010
Enhance data and mapping of flood prone areas outside the floodplain. Development of floodplain maps for local streams not on FIRMs or county maps.	Counties	$100,000	2010-2014
Update/complete Flood Hazard mapping for St. Mary Watershed: IN	Maumee River Basin Commission	$100,000	2010
Yost Levee Removal /Bypass Channel evaluation.	Maumee River Basin Commission	$100,000	2012-2012
Install/operate river gage on Main Street Bridge to calibrate River Hydraulic Model.	Maumee River Basin Commission	$97,500	
Conduct comprehensive inventory and assessment of rural drainage system to better understand this important “drainage infrastructure” and better management maintenance practices to reduce sediment loadings and aquatic habitat.	County Engineer	$75,000	2011
Establish post-flood damage assessment protocol.	Maumee River Basin Commission	$75,000	2011
Incorporate stream restoration and protection into drainage projects.	County Engineer	$50,000	2009-2014
Build collaborative relationships with Ohio communities and the State of Ohio to develop more restrictive standards as they apply to floodplain and stormwater management.	Maumee River Basin Commission	$50,000	2010
Evaluate feasibility of nonstructural tools to reduce or eliminate stream maintenance (woody debris removal)	Maumee River Basin Commission	$50,000	2010-2014
Maintain Junk Ditch/Little River overflow floodplain to assure land use changes do not significantly decrease flow, complete evaluation/Master Plan Update.	Maumee River Basin Commission	$50,000	2010
Identify areas for restoration of natural hydrology and flow characteristics to also benefit flood mitigation.	SWCD	$50,000	2010
Establish cost estimates and schedules for implementing nonstructural flood mitigation recommendations presented in County Natural Disaster Mitigation	County EMAs	$40,000	2012

Table 4-6. Water quality potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Plans.			
Increase freeboard for structures along the St. Marys River corridor	Maumee River Basin Commission	$40,000	2010-2014
Conduct drainage feasibility study on the Fairfield Ditch area.	USACE	$40,000	2010-2012
Implement education programs on improved ditch maintenance program – not striping/spraying.	SWCD	$25,000	2010
Analyze repetitive flood properties and identify feasible mitigation options.	FEMA	$20,000	2012
Develop program to educate building owners in flood hazard areas (including behind levees) to obtain flood insurance to close gap between insured structures and number of structures in the flood hazard area.	Maumee River Basin Commission	$15,000	2010
Promote Wetland Reservoir Subsurface Irrigation Systems as a method of providing seasonal floodplain storage by "temporarily" plugging drainage tiles in late fall after crops have been harvested and then removing said plug several weeks prior to spring planting season. This dual use of property could provide water quality benefits, wildlife habitat, and stormwater runoff detention.	Maumee River Basin Commission	$10,000	2010
Expand distribution of MRBC newsletter to targeted audiences.	Maumee River Basin Commission	$5,000	2010-2014
Purchase homes for demolition along Winchester Road and place levees to compensate for the 100-yr flood elevation.	Fort Wayne	$0	2012
Update Northwest Ohio water Supply Plan.	ODNR	$0	2010-2011

5.0 RESOURCE-BASED RECREATION

5.1 Introduction

Resource-based recreation problems, needs and opportunities are discussed in this section and generally address activities such as boating, canoeing, hiking, biking, hunting, fishing and passive outdoor recreation.

Figure 5-1. Impediments to recreation on the St. Marys River.

5.2 Resource- based Recreation, Supply and Demand: Resource-based recreation is critical to the overall environmental and economic health of the watershed, as well as the quality of life of its residents and visitors. Numerous agencies play an active role in maintaining open space and recreation areas within the watershed.

The Maumee River Valley is one of eleven rivers and streams in Ohio that have received Scenic River designation. The 43-mile portion of the Maumee River extending between the Indiana/Ohio state line to the Ohio Route 24 bridge near Defiance is designated as a State Scenic River. In addition to providing habitat, coastal natural areas in the watershed also serve as recreation and tourism attractions for activities that include hunting, bird watching and hiking. This includes wetlands and shoreline habitat areas set aside as preserves and/or for public access.

The Ohio and Indiana SCORP indicate that most people in the Upper Maumee River Watershed have a multitude of quality outdoor recreation opportunities at their disposal. The Ohio SCORP also indicates that most Ohioans are reasonably satisfied with their outdoor recreation experiences and their favorite sites are readily accessible.

ODNR provides substantial information relative to GIS, web sites, and reports, including reference to Ohio Public Fishing Areas, Ohio Public Boating Areas (including facilities), Boating on Ohio's Streams, Boating on Ohio's Waterways Plan, Ohio Water Trails Program, and Canoe and Kayak Registrations, etc.

Numerous county parks exist in the Fort Wayne area. These include Fox Island County Park, Meta County Park, and Cook's Landing County Park.

Table 5-1 provides a descriptive listing of boating areas (and amenities) on the river. Data for sites in Indiana were not readily available. As noted, amenities are limited to roadside parking and parking lot pull off.

Table 5-1. Boating areas on the St. Marys River (ODNR 2004).

Upper Maumee River	Roadside Parking	Parking Lot Pull off	Canoe Rentals	Canoe Ramp Only	Trailer/ Cartop Ramp	Restrooms	Camping	Picnic Area	Water	Food	County
Memorial Park off Chestnut Street in St. Marys, roadside access river right	X										Auglaize
Auglaize Co. Rd. 53 bridge north of St. Marys, between St. Marys River Road and Delphos-St. Marys Road, Roadside access river right	X										Auglaize
Auglaize Co. Rd. 200 bridge (Barber-Werner Road) south of Kassuth, roadside access river right	X										Auglaize
Palmer Road bridge west of Mendon, roadside access river right	X										Mercer
Fort Adams historic marker pull off on S.R. 127 bridge east of Rockford, access river left		X									Mercer
Frysinger Road bridge east of Rockford, roadside access river left	X										Mercer
Town Line Road bridge west of Rockford, roadside access river right	X										Mercer
S.R. 81/49 bridge in Willshire, roadside access river right	X										Van Wert
DAM - rock dam downstream of the S.R. 81/49 bridge in Willshire, portage river left											Van Wert
Roadside access and trail at railroad tracks below S.R. 81/49 bridge in Willshire about 1 mile (off S.R. 49), roadside access river right	X										Van Wert

Parks play a central role in community life for sports, festivals, seasonal events and related activities. Many communities within the Upper Maumee River Watershed maintain parks and recreation programs and facilities that include trails, bike routes, reservoirs and natural areas. In addition, non-governmental groups (e.g. churches, conservation clubs, Salvation Army, YMCA, community recreation associations) provide additional recreational programs and facilities.

5.3 Existing Conditions: Problems and Concerns

With recreational fishing making up a part of watershed recreational activates, fish advisories are a concern within the watershed. The Ohio EPA has issued an advisory recommending a limit of 1 meal per month for Freshwater Drum, Northern Pike and Saugeye caught in the St.

Marys River, in all Counties. Indiana indicates that Black redhorse, Common Carp, Channel Catfish, Largemouth Bass, Silver Redhorse and White Suckers caught in the St. Marys should be consumed no more than once per month.

Table 5-2 summarizes problems and concerns in the Upper Maumee River Watershed, most of which are associated with lack of funding to support existing recreation infrastructure.

Table 5-2. Recreation opportunities and unmet needs.

WLEB Resource Category	Name	Description	Political Subdivision	Sponsoring Entity	Estimated Cost
Recreation	Greenways	Preservation of riparian corridors/greenways for water quality and wildlife habitat.	All		
Recreation	Adaptive reuse of public lands	Existing parklands and reservoirs offer opportunities for adaptive re-use for changing trends and coordination for better utilization.	All		
Recreation	Combining resources with other public entities	Public facilities such as schools, universities/colleges, airports, golf courses, and old industrial sites (brownfields) offer additional opportunities	All		
Recreation	Combining resources with other private entities	Private/non-profit entities (e.g., camps, sport clubs) may be willing to cooperate with public programs	All		
Recreation	Farm parks	Establish “farm parks” in the watershed as an additional recreational amenity, using successes in Ohio (e.g., Lake Farm Park in Lake County, Creek Bend Farm in Sandusky County)	All		
Recreation	Park conservation	Expand and protect parks along the Maumee River (including floodplains) via conservation easement areas, the wetland reserve program or the CREP program.	All		
Recreation	Park conservation	Citizens want more canoeing, however, logs and the need for clearing and snagging block complete access along rivers.	All		

5.4 Anticipated Conditions: Opportunities and Unmet Needs: Anticipated conditions are expected to be similar to existing conditions, although resource constraints (i.e., funding limitations) will be increasingly problematic. Many properties and facilities in the watershed are old and deteriorating, and lack of funding and grant programs for operations and maintenance is a priority concern. Increasing open space as well as improving areas and programs already in existence is critical to sustaining recreation within the watershed. Improvements to both water quality and habitat will also positively impact recreational uses.

Recreation opportunities and unmet needs, based upon workshop outcomes and related project research, are presented in Table 5-3.

Additional identified needs within the watershed involve expansion and connection of an already extensive trail system. Trail alignments to improve existing trails and underdeveloped trail sections are an unmet need within the watershed and would enhance existing recreational areas. An example is the Spencerville-Elgin Rail Trail (Indiana High Rail), an old rail line that crosses the Miami-Erie Canal at Spencerville. This local short line extends from Woodburn, Indiana through Defiance and into Henry County, terminating at Liberty Center, Ohio.

Resource constraints will determine the extent to which recreation opportunities and unmet needs in the St. Marys River Watershed can be addressed. Many properties and facilities in the watershed are old and deteriorating, and requirements for improvements and maintenance compete with plans for facility development and expansion. Non-compatible land uses impose challenges as well, as they can impact both existing and prospective resource-based recreation facilities and opportunities.

Local leadership and volunteerism is recognized as a key component in addressing opportunities and unmet needs associated with resource-based recreation. Collaboration among local governments is essential, given concerns over the challenges and time requirements associated with securing state and federal assistance with desired projects. Such collaboration is needed for planning, funding acquisition, integrating resource-based recreation facilities and opportunities; and achieving efficiencies in terms of operations and maintenance. In addition, multi-objective planning is a key consideration, recognizing that projects with water quality, fish and wildlife and related dimensions (e.g., dam removal, erosion control, flood control) can also yield significant recreational benefits.

The 2003 Ohio SCORP confirmed that there are a number of needs, such as continued operation and maintenance funding for existing facilities and services and preservation and development efforts of applicable resources, facilities, and services to meet changing population demands. Multi-level integrated cooperative efforts were also stressed as important to the region. The needs of high ranking outdoor recreation facilities include those for fishing, picnicking, camping, observation/viewing activities, and a variety of trails (including water access, scenic, historical, hiking/biking, motorized, and equestrian) including their associated services (e.g. parking, scenic/historic views, access, food, rest rooms, picnic camping) (ODNR, 2003).

5.5 Past/ Ongoing Studies and Data Gaps

A series of plans, studies and reports produced in recent years (or presently underway) provide valuable insights into existing and anticipated conditions, problems, needs and opportunities associated with resource- based recreation in the St. Marys River Watershed. Based upon a review of these materials, coupled with workshop outcomes, a number of data gaps and information needs were identified. A summary is provided in Table 5-3 below:

Table 5-3. Recreation past/ongoing studies and data gaps.

WLEB Resource Category	Name	Description	Recommendations
Past Studies			
Recreation	2003 Ohio SCORP Study	Study periodically conducted to assess recreational gaps and needs in the interest of determining priorities for ODNR and local officials.	Needs include operations and maintenance funding for existing facilities and services; continued preservation and development efforts of applicable resources;, facilities, and services to meet changing population demands; multi-level integrated cooperative efforts; outdoor recreation facilities include those for fishing, picnicking, camping, observation/viewing activities; trails (including water access, scenic, historical, hiking/biking, motorized, and equestrian); and associated services (e.g. parking, scenic/historic views, access, food, rest rooms, picnic camping).
Recreation	Boating on Ohio's Waterways Plan (ODNR, 2004)	Examined existing and anticipated conditions, problems, needs and opportunities, along with recommendations pertaining to Ohio's recreational waterways.	Provide additional access points/ facilities for carry-in access to rivers and streams in the watershed.
On Going Studies			
Recreation	Western Lake Erie Basin Study	The study area consists of the western basin of Lake Erie (encompassing portions of the states of Ohio, Indiana and Michigan).	Ongoing
Recreation	SCORP 2008 Study	Serves as a guide in outdoor recreation planning, acquisition, development and management. Also provides a contemporary assessment of outdoor recreation needs and how public and private interests can meet those needs within constraints of the state's resources.	Numerous recommendations identified; applicability to St. Marys River Watershed has not been assessed.
	Discover Ohio	Representatives from National Park	

Table 5-3. Recreation past/ongoing studies and data gaps.

WLEB Resource Category	Name	Description	Recommendations
	Water Trails	Service and Ohio Greenways are actively working to promote the development of car-top/carry-in stream and river access as well as water trail planning through a partnership between local groups and the DOWT group. Future discussions with the Ohio Department of Transportation will be instrumental in the planning of access points at the locations of highway/river crossing intersections	
Recreation	Western Lake Erie Basin Study	The study area consists of the western basin of Lake Eire (encompassing portions of the states of Ohio, Indiana and Michigan (with a focus on the watersheds of the Maumee, Portage and Ottawa Rivers (including the St. Marys River Watershed).	Ongoing
	NW Ohio Greenway Plan	Led by Toledo Metroparks, Ohio Greenways Inc. and the US National Parks Service "Rivers & Greenways" section.	

5.6 Findings

The St. Marys River Watershed offers its residents and visitors a range of resource- based recreation opportunities. Challenges include the need for additional future capacity, funding for maintenance of existing recreation infrastructure, and funding to support new initiatives. A significant opportunity exists with regard to multi-objective projects that can resolve current problems (e.g., flooding, water quality degradation) while, at the same time, enhancing recreational opportunities for both residents and visitors. An opportunity also exists to focus on the historical significance of the St. Marys River Watershed, recognizing that Fort Wayne has been designated a National Heritage Area and other sites are of historical significance (e.g., Johnny Appleseed burial site, Wabash-Eire Canal, site of the Battle of Kekionga, historical downtown Fort Wayne, Indian burial grounds.)

5.7 Potential Actions

Table 5-4 below describes potential actions based upon a review of existing and ongoing studies.

Table 5-4. Recreation potential actions.

Description	Potential Sponsors	Costs Estimates	Time Frame
Expand and connect an already extensive trail system via planning and construction.	Park Districts	$4,000,000	
Expand and protect parks along the St. Marys River, in the interest of protecting floodplains, via measures such as conservation easements, the wetland reserve program and the CREP program.	NRCS	$1,000,000	2010-2014
Establish recreational pathways along filter strips serving as greenways.	Park Districts	$100,000	
Formulate non-structural flood damage and ecosystem restoration projects to provide recreational opportunities.	USACE	$75,000	
Determine the feasibility of clear and snag projects to deepen stretches of the river to increase historical tours via canoe.	Maumee River Basin Commission	$40,000	
Restore historical docks and places along the river.	The Historical Center, Ft. Wayne	$20,000	
Clear and snag logs blocking access/canoeing opportunities	Maumee River Basin Commission	$0	2010

6. FISH AND WILDLIFE HABITAT

6.1 Introduction

This section of the existing conditions assessment provides an overview of fish and wildlife habitat resources in the watershed. Land use in the watershed, like most of the watersheds within the WLEB, is predominantly agricultural and, consequently, fish and wildlife habitat is limited.

6.2 Fish and Wildlife Characteristics

Prior to European settlement, the Maumee River Basin was a vast wilderness of lakes, rivers, wetlands, forests and prairies that harbored a great diversity of fish and wildlife species. The widespread clearing and drainage that followed settlement has dramatically altered the landscape, reducing the region's wetland acres by more than 85%, and virtually eliminating native prairie and savanna. These large-scale conversions of native habitat had significant impacts on fish and wildlife resources, particularly wetland and aquatic species, and grassland dependent birds. Despite rehabilitation efforts, wetlands continue to be lost at a rate that exceeds replacement, and undisturbed grassland habitat is a rarity on the landscape. In addition to direct loss, wildlife habitat, especially wetlands, can be degraded by contamination from agricultural and urban runoff, isolation from other habitats, and increased predation.

A primary focus of the St. Marys River Watershed stakeholders is the recreation or rehabilitation of former wetlands and associated uplands that supported migratory birds. In the northeast pothole region, this takes the form of wetland basins (marshes) surrounded by upland native prairie, which provides breeding and migration habitat for waterfowl such as mallard and blue-winged teal, and marsh birds such as rails, bitterns, and herons. In addition, the federally endangered Indiana bat utilizes riparian (streamside) forests for breeding, foraging, and migration habitat.

Along the floodplains of the larger river systems in northern Indiana, including the St. Marys, forested wetlands are a major focus of rehabilitation activities. These areas provide important breeding and migration habitat for waterfowl, Neotropical migrant songbirds and, as noted above, the federally endangered Indiana bat. Reforestation techniques involve planting mainly 1-2 year old nursery seedlings adapted to floodplain conditions, and controlling competing weed competition for at least three years.

Many species of grassland dependent migratory birds have been declining in recent decades, due in large part to the loss of suitable grassland nesting habitat. Species such as bobolink, grasshopper sparrow, Henslow's sparrow, and upland sandpiper are forced to nest in less secure or isolated patches of habitat, which are subject to high rates of disturbance from owing and nest predation.

Invasive species are one of the major threats to the integrity of native terrestrial and aquatic ecosystems, as their aggressive growth habits crowd out native species and form dense single-species stands. Partnership organizations are actively working in the watershed to help control invasive species on private lands. Control work is often labor intensive, and targeted species include purple loosestrife, common reed, reed canary grass, garlic mustard, bush honeysuckle, buckthorn, and tall fescue.

Implementation of previously completed programs and project types, particularly in concert with watershed BMPs, sedimentation and stream bank erosion, water quality, and recreation will benefit fish and wildlife. On-going authorities, programs and projects of the USFWS and state agencies in the St. Marys River Watershed can also facilitate fish and wildlife habitat objectives. Chapter 2 of this report ("General Setting") provide further detail on opportunities for development of fish and wildlife habitat.

The USACE is also in a position to facilitate fish and wildlife habitat improvement via its associated authorities in jurisdictional areas, as appropriate. Projects or programs that are implemented to address specific problems with fish and wildlife habitat may wholly, or in part, also complement objectives that address problems in sedimentation, stream bank erosion, flood control, water quality and recreation.

Table 6-1 identifies various segments of the St. Marys River and associated conservation priorities as identified by USGS.

Table 6-1. St. Marys River segments identified by the Gap Program as having a high conservation priority (USGS 2008).

14-HU	14-HU Site Name	Highest Criterion Attainment	Discussion
04100004-020-030	St. Marys River below Hussey Creek to above Twelvemile Creek (except Eightmile Creek)	3rd fish (90%) bivalves (95%)	High priority based on fish and bivalve species richness relative to stream size in the Lake Erie Basin
04100004-030-010	St. Marys River below Twelvemile Creek to above Black Creek.	3rd fish/bivalves (95%)	High priority based on fish and bivalve species richness relative to stream size in the Lake Erie Basin
04100004-030-040	St. Marys River below Black Creek to above. Twentysevenmile Creek	3rd fish (90%) bivalves (95%)	High priority based on fish and bivalve species richness relative to stream size in the Lake Erie Basin

Habitat is a critical part of the stream environment. Alteration of natural stream features and modifications to natural hydrology can exacerbate other concerns, such as thermal stress and flow. Structures and activities in the waterway that alter flow may be a source of stressors, such as increased sedimentation or barriers to the upstream migration of aquatic organisms. In addition, instability of channel bottoms and the predominance of fine silty channel materials are a both a symptom and a cause of poorly functioning stream habitat.

Traditional drainage has focused on providing an outlet for subsurface drainage and rapid removal of stormwater resulting in deepened headwater channel construction, over wide and trapezoidal channel bottom design. While solving an immediate problem, each of these comes at the expense of other important stream features. Changes to stream gradient, velocity, conveyance and sediment transport have a direct impact on habitat on all but the most tolerant fish and macroinvertebrate species. Removal of wooded and riparian areas has dramatically altered an ecosystem many plants, birds, and animals require for survival. This removal of streambank vegetation has also resulted in increased water temperature and reduction of shaded protection for aquatic species.

The use of BMPs to correct the effects of stream alteration must consider all impacts. Simply restoring habitat will not restore aquatic life unless sediment and nutrient loadings have also been addressed. Problems and concerns in the watershed are summarized in Table 6-2.

Table 6-2. Fish and wildlife habitat problems and concerns.

WLEB Resource Category	Name	Description	Political Subdivision
Fish and Wildlife Habitat	Stream Alteration	The habitat quality in streams and rivers within the watershed is currently impacted by sedimentation, wetland and riparian loss, and stream modification due to agricultural production in the upper portion of the watershed.	All Counties
Fish and Wildlife Habitat	Removal or vegetation	The removal of forest cover for agricultural purposes has also been extensive throughout the watershed. Scattered woodlots and little riparian corridors account for the only wooded habitat remaining.	All Counties
Fish and Wildlife Habitat	Dams	Several dams located within the St. Marys River Watershed may also contribute to habitat issues.	Counties
Fish and Wildlife Habitat	Stream Impairments	Portions of the St. Marys watershed are on the 303(d) list of impaired streams.	EPA
Fish and Wildlife Habitat	Habitat fragmentation	Urbanization is causing habitat fragmentation.	All Counties
Fish and Wildlife Habitat	Non-point source regulations	Lack of enforcement of existing laws such as NPDES.	US EPA/ ODNR/ IDEM
Fish and Wildlife Habitat	Nutrient loadings	Elevated nutrients such as ammonia, phosphorus, and *E. coli* from agricultural activity is affecting habitat.	All counties
Fish and Wildlife Habitat	Conservation practices	Lack of funding for public and non-profit conservation efforts.	All counties
Fish and Wildlife Habitat	Habitat loss	Loss of riparian habitat.	All counties
Fish and Wildlife	Invasive species	Nuisance species are negatively affecting	All counties

Table 6-2. Fish and wildlife habitat problems and concerns.

WLEB Resource Category	Name	Description	Political Subdivision
Habitat		habitat.	
Fish and Wildlife Habitat	High mosquito populations	Mosquito population is a problem. Also, the St. Marys Watershed is an important bird fly over route.	All counties

6.4 Anticipated Conditions: Opportunities and Unmet Needs

Implementation of previously discussed programs and project types (e.g., watershed BMPs, sedimentation and stream bank erosion, water quality, recreation) will also benefit fish and wildlife habitat enhancement. Ongoing authorities, programs and projects of the USFWS and relevant state agencies can also advance fish and wildlife habitat objectives.

An Ohio update of the National Wetlands Inventory is currently underway and expected to be completed by June 2009; it will serve as the first statewide update since the original inventory in 1974. The new inventory, used in tandem with the Ohio Wetland Restoration and Mitigation Strategy Blueprint, will provide access to precise wetland data and sound strategies for protection, and will serve as an official addendum to the 2008 SCORP (ODNR, 2008).

The USACE may be able to facilitate fish and wildlife habitat improvement via associated authorities in jurisdictional areas, as appropriate. Projects or programs that are implemented to address specific problems with fish and wildlife habitat may wholly, or in part, also complement objectives that address problems in sedimentation, stream bank erosion, flood control, water quality and recreation. Table 6-3 summarizes opportunities and unmet needs.

Table 6-3. Fish and wildlife habitat opportunities and unmet needs.

WLEB Resource Category	Name	Description	Political Subdivision
Fish and Wildlife Habitat	Fish and Wildlife Habitat Restoration Plan	A restoration plan is needed in the St. Marys to identify riparian, wetland and general habitat restoration needs and high priority restoration sites in the watershed. Restoration of wetland and riparian area may provide flood storage and water quality benefits.	Counties, ODNR
Fish and Wildlife Habitat	Fish and Wildlife Habitat Restoration Plan	A restoration plan is needed to identify riparian, wetland, and general habitat restoration needs and high priority restoration sites in the watershed. Restoration of wetland and riparian area may provide flood storage and water quality benefits as well.	Counties, ODNR

Table 6-3. Fish and wildlife habitat opportunities and unmet needs.

WLEB Resource Category	Name	Description	Political Subdivision
Fish and Wildlife Habitat	Funding for conservation practice needs	Funding for habitat enhancement programs and staff to implement new programs and keep current programs moving forward.	NRCS, Federal Partners
Fish and Wildlife Habitat	Land Banking	Consolidate and prioritize conservation lands within the watershed to maximize resources.	Counties, ODNR
Fish and Wildlife Habitat	Education and Outreach	Promote erosion control, conservation, habitat, green space, and no-till.	SWCDs
Fish and Wildlife Habitat	Conservation programs	Enforce/Implement NRCS programs with continued funding.	NRCS, SWCDs

6.5 Past/ Ongoing Studies and Data Gaps

Very few studies have characterized existing conditions and needs for fish and wildlife habitat in the St. Marys River Watershed. Table 6-4 lists ongoing studies and data gaps in the watershed.

Table 6-4. Fish and Wildlife Habitat past/ongoing studies and data gaps.

WLEB Resource Category	Name	Description	Recommendations
Fish and Wildlife Habitat	Ohio Aquatic Gap Analysis – An Assessment of the Biodiversity and Conservation Status of Native Aquatic Animal Species. 2006	Identifies potential high-priority conservation areas, focusing on aquatic habitat. A terrestrial GAP analysis is still in progress.	Analysis is still underway.
Fish and Wildlife Habitat,	Ohio Comprehensive Wildlife Plan 2006	10 year plan to improve fish and wildlife resources in the State. Plan identifies priority areas.	Does not identify the St. Marys River Watershed as a priority focus area for fish and wildlife conservation
Fish and Wildlife Habitat	Western Lake Erie Basin Partnership Strategic Plan	Establishes goals for each of the strategic objectives developed by the partnership.	Road map for Basin-wide improvement

6.6 Findings

The St. Marys River Watershed has excellent wildlife resources in its managed areas, where continued preservation is essential. Beyond those areas and, due largely to the predominance of agriculture, habitat is limited. Several conservation programs are being used (or could be used) to directly or indirectly increase the amount of fish and wildlife habitat in the watershed. Programs include:

- **Conservation Reserve Program (CRP):** A voluntary program available to agricultural producers to help them enhance environmentally-sensitive land. Producers enrolled in CRP plant long-term, resource-conserving covers (e.g., introduced or native grasses or hardwood trees) to improve the quality of water, control soil erosion and enhance wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance for 10 to 15 years. The long-term time frame ensures that investments in environmental benefits accrue over a longer period.
- **Lake Erie Conservation Reserve Enhancement Program**: A local, state, federal and private partnership to **reduce sediment pollution** in Lake Erie and its watersheds by installing 67,000 acres of filter strips, riparian buffers, wetland restoration, hardwood tree plantings, wildlife habitat, and field windbreaks. The CREP is a component of CRP.
- **Environmental Quality Incentive Program (EQIP**): A voluntary, federally funded program providing farmers with incentive payments, as well as technical assistance for conservation activities that help limit soil erosion, improve water and air quality, and protect wildlife habitat. The EQIP Forestry program is targeted at local landowners who want to improve existing woodlots and plant new trees on land that does not qualify for CRP.
- **Wetlands Reserve Program (WRP):** A voluntary conservation program that offers landowners the means and opportunity to protect, restore, and enhance wetlands on their property through perpetual easements, 30 year easements or Land Treatment Contracts. The USDA NRCS manages the program as well as provides technical and financial support to help landowners who participate in WRP.
- **The Wildlife Habitat Incentives Program (WHIP):** A voluntary program for people who want to develop or improve wildlife habitat on private lands. It provides both technical assistance and cost sharing to help establish and improve fish and wildlife habitat. WHIP emphasizes re-establishment of habitat for declining species – wetland and grassland dependent birds, amphibians, reptiles, insects and small mammals. Applications which increase wooded riparian corridors and improve habitat for state and federally listed threatened, rare and endangered aquatic species are encouraged.
- **State Acres for Wildlife Enhancement (SAFE):** Owners and operators of certain cropland in designated geographic areas may enroll eligible land in a new continuous CRP conservation practice titled SAFE, also known as CP38. FSA created SAFE to benefit high-priority state wildlife conservation objectives through the restoration of vital habitat.
- **Ohio Grassland and Wetland Complexes (SAFE):** The goal of the Ohio Grassland and Wetland Complexes SAFE project is to enroll up to 11,600 acres in CRP to benefit high priority species for Ohio, including Karner blue butterflies, frosted elfin butterflies, Henslow's sparrow, dickcissels, wood ducks, northern bobwhite quail and ring-necked pheasants.

A detailed breakdown of the status of these programs in the St. Marys River Watershed is not currently available at the time of this report.

6.7 Potential Actions

The use of best management practices to correct the effects of stream alteration must consider all impacts. Simply restoring habitat will not restore aquatic life unless sediment and nutrient loadings have also been addressed. Table 6-5 lists potential actions for the St. Marys Watershed.

Table 6-5. Fish and wildlife habitat potential actions.

Description:	Potential Sponsors	Costs Estimates	Time Frame
Aggressively promote riparian buffer, conservation and reforestation programs, and purchase land or easements on land adjacent to streams.	SWCD	$1,000,000	2010-2014
Perform a stream corridor survey and inventory of wildlife.	ODNR	$45,000	2010
Emergency streambank and shoreline projection projects.	USACE	$40,000	2010
Feasibility study of restoration projects for impacted habitat study areas.	ODNR	$10,000	2010
Implement additional conservation projects that enhance habitat leveraging both current and new NRCS sponsored programs.	NRCS	$1,000,000	2009-2014

7.0 COMMERCIAL AND RECREATIONAL NAVIGATION

7.1 Introduction

This section identifies in-stream and access issues impacting existing recreational navigation. Designated commercial navigation areas do not exist in the St. Marys River Watershed. Recreational boating activity is largely limited to small, non-motorized boats, and is addressed in detail in Chapter 5 of this report.

7.2 Navigation Characteristics

Recreational boating in the watershed is largely restricted to seasonal use boaters, and is largely limited to small, non motorized watercraft (e.g., canoes, kayaks) due to shallow depth and limited access points. (The latter are presented in Table 5-1.) Enhanced access, reduced navigation impediments (e.g., dams, log jams, shallow depths), and improvements to water quality and fish/ wildlife habitat, would likely increase demand for such activity. There is no commercial navigation activity in the watershed.

7.3 Navigation Infrastructure, Programs and Best Management Practices

Navigation infrastructure is essentially non-existent except where associated with the access sites referenced above. Existing low head dams, log jams, and shallow water depths in the St. Marys River are impediments to recreational boaters.

7.4 Existing Conditions: Issues and Concerns

Section 5.4 of this report presents problems and concerns associated with resource- based recreation, including recreational boating. No other issues or concerns were identified in available published reports.

7.5 Anticipated Conditions: Problems and Unmet Needs

Section 5.5 of this report addresses opportunities and unmet needs with regard to resource-based recreation, including recreational boating. Log jams and low head dams as noted previously are impediments to recreational boater navigation. Removal of these wherever possible will improve recreational navigation opportunities.

7.6 Past/ Ongoing Studies and Data Gaps

Ongoing studies do not exist for navigational concerns in the St. Marys. Potential studies of dam removal and log jam abatement and its impact to recreational navigation in the mainstem would be helpful.

7.7 Findings

No specific recreational navigation needs were identified in the watershed, although continued support of areas currently used for canoeing and kayaking, as well as maintenance of boater access areas, is stressed. Section 5.6 of this report provides additional detail in the broader context of resource- based recreation.

7.8 Potential Actions

Table 7-1. Commercial and recreational navigation potential actions.

Description:	Potential Sponsors	Costs Estimates	Time Frame
Study impact of log jam removal on recreational boating opportunities.	County Engineer	$50,000	2010
Evaluate dam removal opportunities.	ODNR	$40,000	2011
Develop a water trail with additional recreational access.	BMYP	$25,000	2010-2014
Increase the number of access points for canoeing and kayaking.		$25,000	2012-2014
Perform hydraulics/hydrology studies.		$0	

8.0 WATERSHED PRIORITIZATION

Prioritizing potential actions in various categories (i.e., flood damage reduction, water quality, resource- based recreation, fish and wildlife habitat, commercial and recreational navigation) is a critical step as the planning process moves into the implementation phase. Individual actions are typically interdependent, with each one affecting- and being affected by- the others. A strategic approach to their timing, sequence and pairing can have implications for overall plan effectiveness and cost efficiency. It is also necessary in accommodating budgetary realities and other resource constraints that may require actions to be undertaken over an extended period.

By its very nature, the prioritization process must be stakeholder driven, and solicit the support and involvement of local decision makers, opinion leaders and other interested parties. The process must be a flexible and iterative one, recognizing that stakeholder preferences (i.e., priorities) can and do evolve over time as interests, needs and circumstances change.

The Executive Summary of this report offers a consolidated list of potential actions for the St. Marys Watershed, and additional detail is provided in Sections 3-7. This list provides the basis for a prioritization process with the following components:

- *Assemble a local leadership team*, comprised of decision makers and opinion leaders, to assist the Corps of Engineers and WLEB Partnership in soliciting community input on restoration, protection and sustainable use priorities within the watershed.
- *Develop evaluation criteria and a ranking methodology* for the potential actions identified in the report. Such criteria might include significance of the problem, implications for human health and safety, availability of a sponsoring agency/ organization and/ or anticipated benefits.
- *Conduct a public workshop at the local watershed level* to apply the evaluation criteria and rank priority actions.
- *Conduct a public workshop at the Western Lake Erie Basin level* to prioritize potential actions and ensure their consistency with the priorities at the individual watershed levels. The WLEB Partnership is ideally suited for this task.

Finally, the existing conditions, opportunities and unmet needs that have led to the status of each watershed have to be evaluated as a whole to assess how each contributes to the overall water quality status of Maumee Bay and the Western Lake Erie Basin. Data gaps that exit for information from each watershed must in part be filled with an eye to solving the overall problems in the basin. The findings of each report, and the potential actions, should be prioritized in order to reap the maximum benefit of water quality protection for the Western Lake Erie Basin.

Collectively, these actions will provide the basis for a detailed Implementation Plan that provides a “blueprint” to guide the actions of the many partners (See Section 10).

9.0 PLAN INTEGRATION: RELATIONSHIP TO OTHER WATERSHED PLANS

The St. Marys River Watershed is one of 10 areas included in the Western Lake Erie Basin (WLEB) project. Each watershed assessment is unique, as it is based upon the input of local stakeholders and the findings/ recommendations of past and ongoing studies specific to that watershed. At the same time, it is important to recognize that each watershed is inextricably linked to others within the WLEB. The status of water and related natural resources in one watershed (e.g., quality, quantity, usage, management strategies) both affects and is affected by the status of those resources in other watersheds. In some instances, problems, needs and opportunities will be distinctly different from one watershed to the next. In other instances, they may be shared among multiple watersheds or throughout the entire WLEB. Thus, plan integration is essential in providing a meaningful set of priority potential actions at the watershed and Basin-wide levels. It is also critically important to ensure that the selection, sequencing and timing of potential actions is accomplished strategically, and in a manner that ensures timely, efficient and cost- effective implementation.

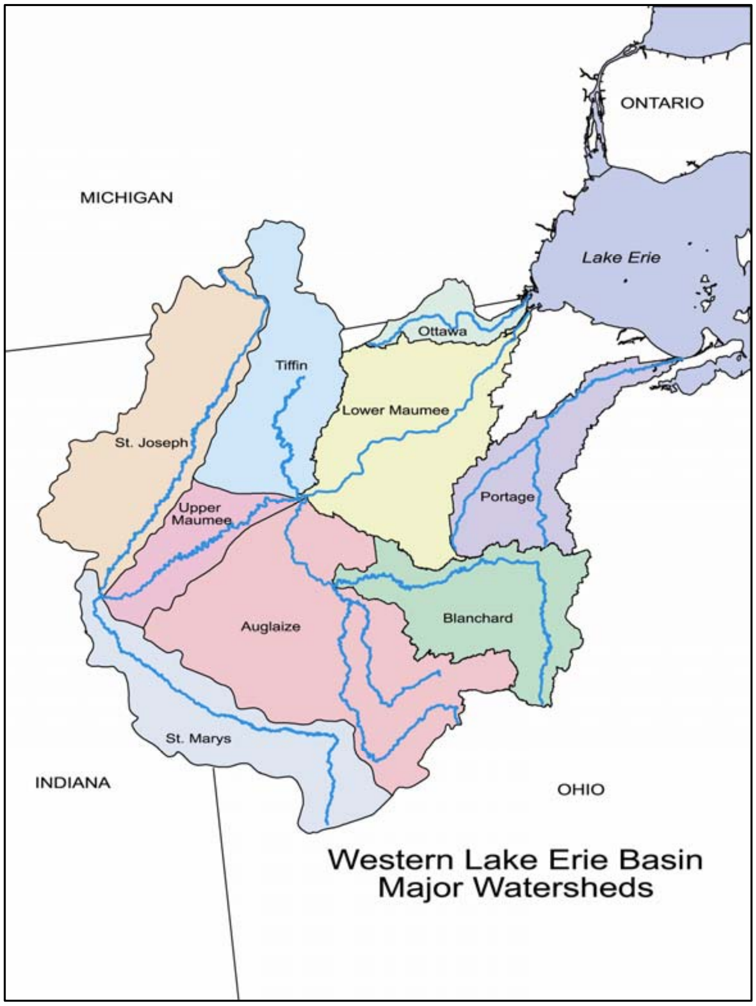


Figure 9-1. Western Lake Erie Basin major watersheds.

Under the leadership of the USACE and NRCS, the WLEB Partnership will be developing a unified and comprehensive Watershed Management Report that "rolls" up the findings of the individual watershed assessments. This will form the basis for a Report to Congress that includes a set of explicit recommendations for measures to address both local and basin-wide problems and unmet needs associated with flood control, water quality, resource- based recreation, fish and wildlife habitat, and recreational and commercial navigation. These measures may include specific programs and projects; additional studies to address data and information gaps; and/ or applied research and demonstration initiatives to evaluate scientific and engineering solutions to identified problems.

10. PLAN IMPLEMENTATION

The 10 watershed assessments associated with this project, as well as the consolidated Report to Congress, will provide guidance to an array of public and non-governmental entities with a role and responsibility for the restoration, protection and sustainable use of the water and related natural resources of the Western Lake Erie Basin. Specific approaches to plan implementation will be a function of 1) the nature of potential actions as prioritized at the individual watershed and Western Lake Erie Basin level; and 2) the requirements and procedures associated with the various prospective sponsors of such actions.

As is evident from this report, the range of potential actions goes well beyond the authority or scope of the Corps of Engineers or any other individual agency/ organization. Leadership (and partnerships) will be required of various federal, state, regional and local governments; academic institutions; foundations; private sector interests; and others with a commitment to the future of the WLEB. Funding sources for implementation will vary as well, and could include a broad range of traditional (e.g., federal, state, and local government funding, foundations) and non-traditional sources (e.g., conservancy districts, utilities, assessments, mitigation banks, in-lieu fees).

At the conclusion of the prioritization process, an Implementation Strategy must be developed (at the Western Lake Erie Basin level) to provide the blueprint needed to harmonize the work of multiple entities, each with distinct project requirements, timeframes and funding sources. A "capital improvements" inventory offering a detailed descriptive listing of recommended projects, costs, sponsors, authorities and related information will be an invaluable component of the Implementation Strategy.

The strategy for securing federal projects will be dictated by the nature of the potential action, and whether that action can be implemented under existing authority or will require authorization by the Congress. Implementation for other projects will be accomplished via partnerships among local, state and federal entities and/or by specific sponsors.

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APPENDICES

(subject to change, additional appendices can be added depending upon the needs of individual watershed assessments, some redundancy here but did not want to change without further discussion with USACE project manager.)

A. **List of Acronyms**
B. Project Scope of Work
C. Task and Activity Timeline
D. Project Team and Contributing Authors
F. Watershed Conceptual Model

Appendix A. List of Acronyms

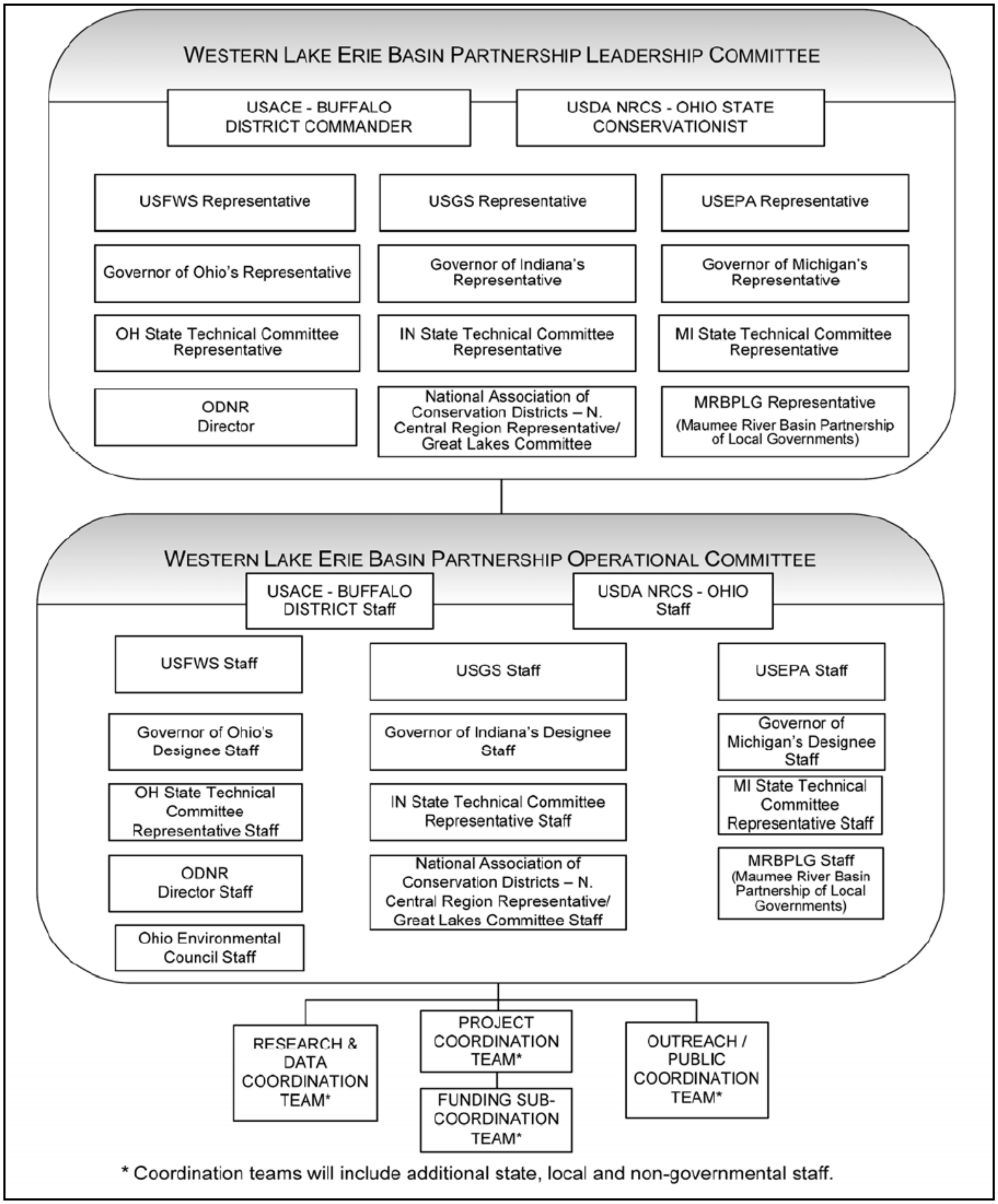
(requires editing)

A/E	*Architect/Engineer*
Am. River	*American Rivers Organization*
AMP	*Ambient Monitoring Program*
AR	*Army Regulation*
ARS USDA	*Agricultural Research Service*
ASLF	*Atlantic States Legal Foundation*
BMP	*Best Management Practice*
CAP	*Conservation Action Project*
CEFMS	*Corps of Engineers Financial Management System*
CELRB	*Corps of Engineers Lakes and Rivers – Buffalo*
CELRBM	*Corps of Engineers Lakes and Rivers – Buffalo Memorandum*
CELRD	*Corps of Engineers Lakes and Rivers Division*
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CFR	*Code of Federal Regulation*
CHRP	*Comprehensive Habitat Restoration Plan*
CSO	*Combined Sewer Overflow*
CW	*Civil Works*
CWE	*Current Working Estimate*
CWP	*Center for Watershed Protection*
CX	*Center of Expertise*
DDE-PM	*Deputy District Engineer for Project Management*
DE	*District Engineer*
DFARS	*Defense Federal Acquisition Regulation Supplement*
DOD	*Department of Defense*
DQLL	*Design Quality Lessons Learned*
DU	*Ducks Unlimited*
EA	*Environmental Assessment*
EFARS	*Engineer Federal Acquisition Regulation Supplement*
EIS	*Environmental Impact Statement*
EPA	*Environmental Protection Agency*
ER	*Engineer Regulation*
Evt. Defense	*Environmental Defense, Center for Conservation Initiatives*
FAR	*Federal Acquisition Regulation*
FEMA	*Federal Emergency Management Agency*
FOIA	*Freedom of Information Act*
FS	*Feasibility Study*
FSA USDA	*Farm Service Agency*
FY	*Fiscal Year*
GIS	*Geographic Information System*
HAB	*Habitat*
HUC	*Hydrologic Unit Code*
HYG	*Hydrogeologic*

IDEM	*Indiana Dept of Environmental Management*
IFG	*Inland Fisher Guide*
IRM	*Interim Remedial Measure*
ISDA	*Indiana State Dept. of Agriculture*
ITR	*Independent Technical Review*
JOYCE	*The Joyce Foundation*
MAWI	*Multi-scale Assessment of Watershed Integrity*
MCP	*Management & Coordination*
MDA	*Michigan Dept. of Agriculture*
MDEQ	*Michigan Dept. of Environmental Quality*
MIPR	*Military Inter-agency Purchase Request*
MOA	*Memorandum of Agreement*
MOU	*Memorandum of Understanding*
MRBPLG	*Maumee River Basin Partnership of Local Governments*
MVRCD	*Maumee Valley Resource Conservation and Development*
NACD	*National Association of Conservation Districts*
NEC	*National Economic Council*
NEPA	*National Environmental Policy Act*
NFPA	*National Fire Protection Association*
NGO	*Non Governmental Organizations*
NPS	*Non-point Source*
NRCS USDA	*Natural Resources Conservation Service*
NRDA	*National Resource Damage Assessment*
NTP	*Notice to Proceed*
O&M	*Operations & Maintenance*
ODA	*Ohio Dept. of Agriculture*
ODH	*Ohio Dept. of Health*
ODNR	*Ohio Department of Natural Resources*
ODOD	*Ohio Dept. of Development.*
ODOT	*Ohio Dept. of Transportation*
OEC	*Ohio Environmental Council*
OEPA	*Ohio Environmental Protection Agency*
OEPA	*Ohio Environmental Protection Agency*
OLEC	*Ohio Lake Erie Commission*
OSHA	*Occupational Safety and Health Administration*
OSU	*The Ohio State University*
PCB	*polychlorinated biphenyl*
PDT	*Project Delivery Team*
PEIS	*Programmatic Environmental Impact Statement*
PGL	*Policy Guidance Letter*
PL	*Public Law*
PLA	*Project Labor Agreement*
PM	*Project Manager*
PMBP	*Project Management Business Process*
PMP	*Project Management Plan*

POC	*Point of Contact*
PORT	*Toledo-Lucas County Port Authority*
PR&C	*Purchase Request & Commitment*
QCP	*Quality Control Plan*
RI	*Remedial Investigation*
RTS	*Regional Technical Specialist*
SBA	*Small Business Administration*
SCORP	*Statewide Comprehensive Outdoor Recreation Plan*
SHPO	*State Historic Preservation Office*
SJWI	*Saint Joe Watershed Initiative*
SOP	*Standard Operating Procedure*
SOW	*Scope of Work*
SVA	*Stream Visual Assessment*
SWCD	*Soil and Water Conservation District(s)*
TMACOG	*Toledo Metropolitan Council of Governments*
TNC	*The Nature Conservancy*
USACE	*U.S. Army Corps of Engineers*
USC	*United States Code*
USDA	*United States Department of Agriculture*
USEPA	*U.S. Environmental Protection Agency*
USFWS	*U.S. Fish and Wildlife Service*
USGS	*U.S. Geological Survey*
UT	*University of Toledo*
VTC	*Video Teleconferencing*
WLEBS	*Western Lake Erie Basin Study*
WRDA	*Water Resources Development Act*

APPENDIX B-1. WLEB PARTNERSHIP



Appendix B-2. Roles and Responsibilities of WLEB Partnership

WLEB Functional Elements	Purpose	Functions
Leadership Committee	➢ Establish and maintain the mission of the Western Lake Erie Basin Partnership. ➢ Set goals, assess performance, and report progress on the watershed improvement effort. ➢ Allocate available resources for Partnership requirements. ➢ Provide ongoing public outreach on the watershed improvement effort. ➢ Provide ongoing senior-level coordination among Partnership member agencies and non-member agencies.	➢ Review progress, address issues requiring senior level coordination, and resolve issues brought forward by the standing Coordination Teams. ➢ Publish on an annual basis a report on the overall watershed improvement progress and status of the Partnership. The USACE and NRCS shall be responsible for preparing the draft report, coordinating the draft report, and issuing the final report. ➢ The report shall publish watershed improvement requirements, funds status, project progress, outreach activities, leadership decisions, and open issues. The standing Coordination Teams shall provide input for the report. ➢ Sponsor and conduct an annual Partnership Meeting for all Partners, Advisors, ➢ Coordinators and Participants. ➢ Review and approve all final actions of the standing Coordination Teams. ➢ Select and approve standing Coordinators who represent interested and involved organizations that sign the member agreement.
Operational Coordination Team	➢ Coordinate the day-to-day activities of the Partnership, prepare for Leadership Committee meetings, and prepare recommendations to the Leadership Committee for evaluation. ➢ At least annually, the Advisors shall evaluate and make recommendations to the Leadership Committee as to whether or not there are additional State, Federal, local agencies, or non-government organizations (NGOs) that can bring additional resources (i.e., funding, people, facilities, material, or equipment) to Partnership activities.	➢
Project Coordination Team	➢ Serve as the Partnership's technical center of expertise on specific projects. ➢ Investigate and provide technical recommendations to the Operational and ➢ Leadership Committees as directed. ➢ Provide input for a comprehensive project database and schedule for the entire ➢ Watershed improvement effort. Monitor	➢ Develop and maintain a comprehensive project database. ➢ Develop and maintain a comprehensive project schedule. ➢ Seek input about potential projects from State, Federal, Local agencies or non-government organizations (NGOs) and identify opportunities for project

WLEB Functional Elements	Purpose	Functions
	projects' program and progress and provide data for status reports showing metrics based progress. ➢ Identify and prioritize projects required for watershed improvement.	➢ coordination. ➢ Provide project definition packages to the Funding Sub-Coordination Team. ➢ Make recommendations to the Leadership Committee. ➢ Develop operating procedures to be approved by the Leadership Committee. ➢ Other duties as assigned by the Leadership Committee.
Funding Sub-Coordination Team	Track existing funding (amount and source) for the Partnership and the watershed improvement effort. - Identify and recommend potential funding sources for watershed improvement projects. - Develop a funding strategy for Partnership projects. - Make recommendations to the Project Coordination Team and Operational Committee.	
Outreach Coordination Team	Enhance public knowledge and understanding of the Partnership and the status of the watershed improvement effort. - Provide a single point of contact for the public to address watershed improvement needs, desires, and issues.	Develop and maintain the Partnership web site and/or other media to provide continuous updates on the watershed improvement effort. - Identify and pursue opportunities for public participation and education in the watershed improvement effort. - Seek, accept, and coordinate public input and responses, as necessary. - Make recommendations to the Leadership Committee. - Develop operating procedures to be approved by the Leadership Committee. - Other duties as assigned by the Leadership Committee.
Research and Data Coordination Team	Synthesize the existing available data into a format useable for watershed analysis across three States: Indiana, Michigan, and Ohio. - Identify gaps in the existing data, prioritize data and research needs, and work within existing authorities and available funding to improve understanding of the Western Lake Erie Basin.	

Appendix B-3. USACE Continuing Authorities Program (CAP).

CAP Authority	Description	Federal Maximum $
Aquatic Ecosystem Restoration (Section 206, Water Resources Development Act of 1996)	This provides for planning, design, and construction of aquatic ecosystem restoration and protection projects, when it is found that the project will improve the quality of the environment, is in the public interest and is cost effective	**$5,000,000**
Beach Erosion Control (Section 103, River and Harbor Act of 1962, as amended)	The Corps of Engineers may construct beach restoration and protection projects not specifically authorized by Congress.	**$2,000,000**
Ecosystem Restoration in Connection with Dredging (Section 204, Water Resources Development Act of 1992)	The Corps of Engineers may carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of an authorized Federal navigation project.	N/A
Emergency Streambank and Shoreline Erosion Protection (Section 14, Flood Control Act of 1946, as amended)	This provides protection from streambank or shoreline erosion to public facilities by the construction or repair of protection works.	**$1,000,000**
Flood Control (Section 205, Flood Control Act of 1948, as amended)	This provides the same complete project and adequate degree of protection as would be provided under specific Congressional authorization	**$5,000,000**
Mitigation of Shore Erosion Damage due to Federal Navigation (Section 111, River and Harbor Act of 1968, as amended)	The Corps of Engineers is authorized to investigate, study and construct projects for the prevention or mitigation of shore damage attributable to Federal navigation works. The study will address structural or nonstructural measures to reduce erosion-type damage by shoreline stabilization	**$2,000,000**
Navigation (Section 107, River and Harbor Act of 1960, as amended)	Small Navigation Projects. This authorizes construction, operation and maintenance of small river and harbor improvement projects.	**$4,000,000**
Project Modifications for Improving the Quality of the Environment (Section 1135(b), Water Resources Development Act of 1986, as amended)	This provides for constructing environmental restoration projects where a USACE project contributed to the degradation of the environment.	**$5,000,000**
Snagging and Clearing for Flood Control (Section 208, Flood Control Act of 1954, as amended)	the Corps of Engineers is authorized under this Act to allot up to $500,000 on any single tributary during any fiscal year for the removal of accumulated snags and other debris, and for the clearing or channel excavation and improvement with limited embankment construction by use of materials from the channel excavation	**$500,000**

Appendix C. Project Team and Contributing Authors

U.S. Army Corps. of Engineers – Buffalo District

Craig Forgette – Project Manager
Tony Friona - Program Technical Manager
Larry Sherman – Flood Damage Reduction

URS Corporation

Tom Denbow – Project Manager
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Lara Kurtz – Watershed Manager
Pete Bick – Watershed Manager
Kari Mackenbach – Watershed Manager
Jim Kooser – Fish and Wildlife
Katherine Holmok – Recreation Planning
Troy Naperala – Water Quality
Steven McKinley – Project Principle

Appendix E. Summary of Upper Maumee River Watershed Potential Actions

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 3. Flood Damage Reduction, Water Supply, Sedimentation, and Bank Erosion			
Construct reservoir upstream of Decatur and Fort Wayne to alleviate flooding.	Maumee River Basin Commission	$50,000,000	2014+
Acquire all residential structures in floodplain	Maumee River Basin Commission	$16,600,000	2010-2014
Water Treatment Plant	Rockford	$2,500,000	2009
Support implementation of additional conservation practices in watershed to reduce sediment loads and erosion by increasing payments to offset gains in price of commodity crops.	NRCS	$2,000,000	2010-2014
Limit additional development and restore flood retention capabilities of floodplains.	Counties	$1,000,000	2010-2014
Continue acquisition of structures along Junk Ditch to maintain overflow path capacity.	Maumee River Basin Commission	$1,000,000	2010-2014
Update floodplain maps and establish base flood elevations.	FEMA	$600,000	2010-2014
Clear log jams, junk, debris from streams and ditches.	Counties	$500,000	2010-2014
Continue Stream Obstruction Removal Program - Special Area of Concern, Section between Adams/Allen County Line and I-469 & Annual Reconnaissance	Maumee River Basin Commission	$325,000	2010-2014
Construct larger on-site detention ponds for future development.	County Engineer	$200,000	2010-2014

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 3. Flood Damage Reduction, Water Supply, Sedimentation, and Bank Erosion			
Complete Houk Ditch/Trier Ditch overflow evaluation to determine feasibility of designating path as an Impact Area and recommended measures.	Maumee River Basin Commission	$200,000	2010-2011
Continue to identify and provide cost-share match to landowners (agriculture) to compensate them for land conversion programs (floods, riparian areas, etc.)	Maumee River Basin Commission	$150,000	2010-2014
Adopt flood plain, stormwater policies/ordinances/public education.	Ohio Environmental Education Fund	$115,000	2009-2013
Prepare inventory of culverts causing historic flooding and target them for retrofitting.	Counties	$100,000	2010
Enhance data and mapping of flood prone areas outside the floodplain. Development of floodplain maps for local streams not on FIRMs or county maps.	Counties	$100,000	2010-2014
Update/complete Flood Hazard mapping for St. Mary Watershed: IN	Maumee River Basin Commission	$100,000	2010
Yost Levee Removal /Bypass Channel evaluation.	Maumee River Basin Commission	$100,000	2012-2012
Install/operate river gage on Main Street Bridge to calibrate River Hydraulic Model.	Maumee River Basin Commission	$97,500	
Conduct comprehensive inventory and assessment of rural drainage system to better understand this important "drainage infrastructure" and better management maintenance practices to reduce sediment loadings and aquatic habitat.	County Engineer	$75,000	2011

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 3. Flood Damage Reduction, Water Supply, Sedimentation, and Bank Erosion			
Establish post-flood damage assessment protocol.	Maumee River Basin Commission	$75,000	2011
Incorporate stream restoration and protection into drainage projects.	County Engineer	$50,000	2009-2014
Build collaborative relationships with Ohio communities and the State of Ohio to develop more restrictive standards as they apply to floodplain and stormwater management.	Maumee River Basin Commission	$50,000	2010
Evaluate feasibility of nonstructural tools to reduce or eliminate stream maintenance (woody debris removal)	Maumee River Basin Commission	$50,000	2010-2014
Maintain Junk Ditch/Little River overflow floodplain to assure land use changes do not significantly decrease flow, complete evaluation/Master Plan Update.	Maumee River Basin Commission	$50,000	2010
Identify areas for restoration of natural hydrology and flow characteristics to also benefit flood mitigation.	SWCD	$50,000	2010
Establish cost estimates and schedules for implementing nonstructural flood mitigation recommendations presented in County Natural Disaster Mitigation Plans.	County EMAs	$40,000	2012
Increase freeboard for structures along the St. Marys River corridor	Maumee River Basin Commission	$40,000	2010-2014
Conduct drainage feasibility study on the Fairfield Ditch area.	USACE	$40,000	2010-2012
Implement education programs on improved ditch maintenance program – not striping/spraying.	SWCD	$25,000	2010

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 3. Flood Damage Reduction, Water Supply, Sedimentation, and Bank Erosion			
Analyze repetitive flood properties and identify feasible mitigation options.	FEMA	$20,000	2012
Develop program to educate building owners in flood hazard areas (including behind levees) to obtain flood insurance to close gap between insured structures and number of structures in the flood hazard area.	Maumee River Basin Commission	$15,000	2010
Promote Wetland Reservoir Subsurface Irrigation Systems as a method of providing seasonal floodplain storage by "temporarily" plugging drainage tiles in late fall after crops have been harvested and then removing said plug several weeks prior to spring planting season. This dual use of property could provide water quality benefits, wildlife habitat, and stormwater runoff detention.	Maumee River Basin Commission	$10,000	2010
Expand distribution of MRBC newsletter to targeted audiences.	Maumee River Basin Commission	$5,000	2010-2014
Purchase homes for demolition along Winchester Road and place levees to compensate for the 100-yr flood elevation.	Fort Wayne	$0	2012
Update Northwest Ohio water Supply Plan.	ODNR	$0	2010-2011
Section 4. Water quality			
Improve hazardous waste cleanup programs by providing resources; establish a cleanup fund for sites which impact public health; establish a grant fund for local communities to clean sites, perform cleanups and attract federal matching funds; take full advantage of the Water Pollution Control loan fund.	OEPA	$5,000,000	2009-2014

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 4. Water quality			
Wastewater Treatment Plant	Rockford	$3,500,000	2009
Provide incentives for agricultural BMPs to reduce surface sediment transport to streams.	NRCS	$3,000,000	2010-2014
Establish and preserve riparian habitat.	SWCD	$2,000,000	2010-2014
Repair areas of streambank erosion.	NRCS	$1,000,000	2010-2014
Increase the percentage of agricultural acreage in the watershed under conservation tillage practices – sponsors.	ODNR	$1,000,000	2010-2014
Develop comprehensive nutrient management plans for all livestock farms regardless of size.	OEPA	$1,000,000	2010-2014
Establish a wetland bank (costs recouped through selling credits).	SWCD	$1,000,000	2010
Expand demonstration projects and research for alternative CSO controls such as rain gardens, bioretention, etc.	OEPA	$600,000	2010-2014
Conduct public outreach on private land management, conservation practices and water quality.	SWCD	$500,000	2010-20143
Develop selective, low impact debris-dam (log jam) removal strategy/program.	County Engineer	$250,000	2010-2014
Provide funding for watershed coordinator.	All	$200,000	2010-2014
Identify all brownfields in the Western Lake Erie Basin. Prioritize Brownfields in the WLEB.	OEPA	$150,000	2009
Implement laws and rules for new permitting requirements and operation of private home septic systems. (i.e., permits to install, operational assessments, funding mechanisms at both state and local levels to cover costs of sewage disposal program activities, public education concerning operation and maintenance).	County Commissioners	$100,000	2009

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 4. Water quality			
Encourage and assist with development of HSTS plans to mitigate bacteria and nutrients from reaching streams.	County Health Department	$100,000	2010
Survey watershed for sources of stream bank erosion, and stabilize these areas in a holistic manner.	Maumee River Basin Commission	$75,000	2010-2014
Conduct inventory of riparian corridors to maximize water quality and quantity benefits.	Maumee River Basin Commission	$75,000	2011
Complete Rapid Watershed Assessment to determine conservation practice needs and cost estimates.	NRCS	$60,000	2009
Develop strategy to implement BMPs on farms with less than 1,000 animals.	NRCS	$50,000	2009
Promote demonstration projects for innovative conservation tillage and cover crop practice.	NRCS	$45,000	2010
Prioritize funding for implementation of soil conservation projects and research into new conservation practices.	NRCS	$45,000	2010
Evaluate need for more detailed water quality data collection and analysis after WLEB study completed.	Maumee River Basin Commission	$35,000	2010
Perform water quality study.	Maumee River Basin Commission	$25,000	2010-2012
Promote in-stream channel measures that increase flow and aeration.	ODNR	$25,000	2010-2014
Increase the number of farms doing soil sampling and precision nutrient (fertilizer) application.	OEPA	$25,000	2010-2014
Precision application of fertilizer/ manure to reduce excess nitrate runoff.	OEPA	$25,000	2010-2014

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 4. Water quality			
Sponsor research to assess performance of individual streams.	OEPA	$25,000	2009-2014
Integrate existing local requirements (e.g., stormwater plans, CSO plans, CAFO management plans) to provide a comprehensive approach to water quality improvements.	OEPA	$25,000	2010-2014
Implement Corridor Protection Ordinances.	NRCS	$10,000	2010
Develop regulations for Agricultural Erosion Control Practices.	NRCS	$10,000	2010
Education.	All	$0	2010-2014
Mandate no floodplain filling or development in the floodplain/buffer area; buy adjacent land or easements on adjacent land.	Maumee River Basin Commission	$0	2010-2014
Implement Conservation Tillage Programs.	NRCS	$0	2010-2015
Require all CSO sources to develop, and subsequently implement, long term control plans or a CSO elimination strategy.	USEPA	$0	Ongoing/ continuous
Section 5. Resource-Based Recreation			
Expand and connect an already extensive trail system via planning and construction.	Park Districts	$4,000,000	
Expand and protect parks along the St. Marys River, in the interest of protecting floodplains, via measures such as conservation easements, the wetland reserve program and the CREP program.	NRCS	$1,000,000	2010-2014
Establish recreational pathways along filter strips serving as greenways.	Park Districts	$100,000	

Description	Potential Sponsors	Cost Estimate	Time Frame
Section 5. Resource-Based Recreation			
Formulate non-structural flood damage and ecosystem restoration projects to provide recreational opportunities.	USACE	$75,000	
Determine the feasibility of clear and snag projects to deepen stretches of the river to increase historical tours via canoe.	Maumee River Basin Commission	$40,000	
Restore historical docks and places along the river.	The Historical Center, Ft. Wayne	$20,000	
Clear and snag logs blocking access/canoeing opportunities	Maumee River Basin Commission	$0	2010
Section 6. Fish and Wildlife Habitat			
Aggressively promote riparian buffer, conservation and reforestation programs, and purchase land or easements on land adjacent to streams.	SWCD	$1,000,000	2010-2014
Perform a stream corridor survey and inventory of wildlife.	ODNR	$45,000	2010
Emergency streambank and shoreline projection projects.	USACE	$40,000	2010
Feasibility study of restoration projects for impacted habitat study areas.	ODNR	$10,000	2010
Implement additional conservation projects that enhance habitat leveraging both current and new NRCS sponsored programs.	NRCS	$1,000,000	2009-2014
Section 7. Commercial and Recreational Navigation			
Study impact of log jam removal on recreational boating opportunities.	County Engineer	$50,000	2010
Evaluate dam removal opportunities.	ODNR	$40,000	2011
Develop a water trail with additional recreational access.	BMYP	$25,000	2010-2014
Increase the number of access points for canoeing and kayaking.		$25,000	2012-2014
Perform hydraulics/hydrology studies.		$0	

Endangered, Threatened, Rare and Extirpated Plants of Indiana

Species Name	Common Name	GRANK	SRANK	FEDERAL	STATE
Acalypha deamii	Mercury	G4?	S2		SR
Aconitum uncinatum	Blue Monkshood	G4	S1		SE
Actaea rubra	Red Baneberry	G5	S2		SR
Adlumia fungosa	Climbing Fumatory	G4	SX		SX
Aesculus octandra	Yellow Buckeye	G5	S3		WL
Agalinis auriculata	Earleaf Foxglove	G3	S1		ST
Agalinis fasciculata	Clustered Foxglove	G5	S3		WL
Agalinis gattingeri	Roundstem Foxglove	G4	S3		WL
Agalinis skinneriana	Pale False Foxglove	G3G4	S1		ST
Agave virginica	Virginia Tube-rose	G5	S3		WL
Alnus rugosa	Speckled Alder	G5T5	S3		WL
Amelanchier humilis	Running Serviceberry	G5	S1		SE
Ammophila breviligulata	Marram Grass	G5	S3		WL
Andromeda glaucophylla	Bog Rosemary	G5	S2		SR
Andropogon ternarius	Silver Bluestem	G5	S3		WL
Androsace occidentalis	Western Rockjasmine	G5	S2		ST
Anemone caroliniana	Carolina Anemone	G5	SX		SX
Antennaria solitaria	Single-head Pussytoes	G5	S3		WL
Arabis drummondii	Drummond Rockcress	G5	S1		SE
Arabis glabra	Tower-mustard	G5	S2		WL
Arabis missouriensis var. deamii	Missouri Rockcress	G4G5QT3?Q	S1		SE
Arabis patens	Spreading Rockcress	G3	S1		SE
Aralia hispida	Bristly Sarsaparilla	G5	S1		SE
Arctostaphylos uva-ursi	Bearberry	G5	S2		SR
Arenaria patula	Pitcher's Stitchwort	G4	S1		SE
Arenaria stricta	Michaux's Stitchwort	G5	S2		SR
Arethusa bulbosa	Swamp-pink	G4	SX		SX
Aristida intermedia	Slim-spike Three-awn Grass	GNR	S2		SR
Aristida tuberculosa	Seabeach Needlegrass	G5	S2		SR
Aristolochia tomentosa	Woolly Dutchman's-pipe	G5	S3		WL
Armoracia aquatica	Lake Cress	G4?	S1		SE
Asclepias meadii	Mead's Milkweed	G2	SX	LT	SRE
Asclepias variegata	White Milkweed	G5	S3		WL
Asclepias viridis	Green Milkweed	G4G5	S1		SE
Asplenium bradleyi	Bradley's Spleenwort	G4	S1		SE

GRANK	G1=critically imperiled globally, G2=imperiled globally,G3=rare or uncommon,G4= widespread but with long term concerns, G5=widespread and secure, T ranks indicate taxonomic subunit rank, ? or Q=questionable rank, NR=not ranked or uncertain rank
SRANK	S1=critically imperiled in state, S2=imperiled in state, SX=extirpated,
STATE:	SX=extirpated, SE=endangered, ST=threatened, SR=rare, SRE = reintroduced, WL = watch list
FEDERAL:	LE=endangered, LT=threatened, C=candidate species

Endangered, Threatened, Rare and Extirpated Plants of Indiana

Species Name	Common Name	GRANK	SRANK	FEDERAL	STATE
Asplenium montanum	Mountain Spleenwort	G5	S1		SE
Asplenium resiliens	Black-stem Spleenwort	G5	S1		SE
Asplenium ruta-muraria	Wallrue Spleenwort	G5	S2		SR
Aster borealis	Rushlike Aster	G5	S2		SR
Aster furcatus	Forked Aster	G3	S2		SR
Aster oblongifolius	Aromatic Aster	G5	S2		SR
Aster schreberi	Schreber Aster	G4	S1		SE
Aster sericeus	Western Silvery Aster	G5	S2		SR
Aster solidagineus	Narrowleaf Aster	G5	S3		WL
Aster undulatus	Waxy-leaved Aster	G5	S3		WL
Astragalus tennesseensis	Tennessee Milk-vetch	G3	SX		SRE
Aureolaria grandiflora var. pulchra	Large-flower False-foxglove	G4G5T4T5	SX		SX
Azolla caroliniana	Carolina Mosquito-fern	G5	S2		ST
Bacopa rotundifolia	Roundleaf Water-hyssop	G5	S1		ST
Baptisia australis	Wild False Indigo	G5	S2		SR
Baptisia leucophaea	Cream Wild-indigo	G4G5	S3		WL
Baptisia tinctoria	Yellow Wild-indigo	G5	S3		WL
Bartonia paniculata	Twining Bartonia	G5	S3		WL
Berberis canadensis	American Barberry	G3	S1		SE
Besseya bullii	Kitten Tails	G3	S1		SE
Betula papyrifera	Paper Birch	G5	S3		WL
Betula populifolia	Gray Birch	G5	S1		SE
Bidens beckii	Beck Water-marigold	G4G5T4	S1		ST
Botrychium biternatum	Sparse-lobe Grape-fern	G5	S3		WL
Botrychium matricariifolium	Chamomile Grape-fern	G5	S2		SR
Botrychium multifidum var. intermedium	Leathery Grape-fern	G5T4?	SX		SX
Botrychium oneidense	Blunt-lobe Grape-fern	G4Q	S3		WL
Botrychium simplex	Least Grape-fern	G5	S1		SE
Buchnera americana	Bluehearts	G5?	S1		SE
Bumelia lycioides	Buckthorn	G5	S1		SE
Cabomba caroliniana	Carolina Fanwort	G3G5	SX		SX
Cakile edentula var. lacustris	American Sea-rocket	G5T3T5	S3		WL
Calamagrostis porteri ssp. insperata	Reed Bent Grass	G4T3	S1		ST
Calla palustris	Wild Calla	G5	S1		SE
Callirhoe triangulata	Clustered Poppy-mallow	G3	SX		SX

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Calycocarpum lyonii	Cup-seed	G5	S2		ST
Camassia angusta	Wild Hyacinth	G5?Q	S1		SE
Cardamine pratensis var. palustris	Cuckoo Flower	G5T5	S3		WL
Carex abscondita	Thicket Sedge	G4G5	S3		WL
Carex alata	Broadwing Sedge	G5	S3		WL
Carex alopecoidea	Foxtail Sedge	G5	S1		SE
Carex arctata	Black Sedge	G5?	S1		SE
Carex atherodes	Awned Sedge	G5	S1		SE
Carex atlantica ssp. atlantica	Atlantic Sedge	G5T4	S2		ST
Carex atlantica ssp. capillacea	Howe Sedge	G5T5?	S1		SE
Carex aurea	Golden-fruited Sedge	G5	S2		SR
Carex aureolensis	Land of Gold Sedge	GNR	S1		SE
Carex bebbii	Bebb's Sedge	G5	S2		ST
Carex brunnescens	Brownish Sedge	G5	S1		SE
Carex bushii	Bush's Sedge	G4	S1		ST
Carex chordorrhiza	Creeping Sedge	G5	S1		SE
Carex conoidea	Prairie Gray Sedge	G5	S1		ST
Carex crawei	Crawe Sedge	G5	S2		ST
Carex cumulata	Clustered Sedge	G4?	S1		SE
Carex debilis var. rudgei	White-edge Sedge	G5T5	S2		SR
Carex decomposita	Cypress-knee Sedge	G3	S2		ST
Carex disperma	Softleaf Sedge	G5	S1		SE
Carex eburnea	Ebony Sedge	G5	S2		SR
Carex echinata	Little Prickly Sedge	G5	S1		SE
Carex flava	Yellow Sedge	G5	S2		ST
Carex folliculata	Long Sedge	G4G5	S2		SR
Carex garberi	Elk Sedge	G5	S2		ST
Carex gigantea	Large Sedge	G4	S1		ST
Carex gravida	Heavy Sedge	G5	S1		SE
Carex leptalea	Bristly-stalk Sedge	G5	S3		WL
Carex leptonervia	Finely-nerved Sedge	G4	S1		SE
Carex limosa	Mud Sedge	G5	S1		SE
Carex livida	Livid Sedge	G5	S1		SE
Carex louisianica	Louisiana Sedge	G5	S3		WL
Carex lupuliformis	False Hop Sedge	G4	S2		SR

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Carex oklahomensis	Oklahoma Sedge	G4	S1		SE
Carex pedunculata	Longstalk Sedge	G5	S2		SR
Carex pseudocyperus	Cyperus-like Sedge	G5	S1		SE
Carex retrorsa	Retrorse Sedge	G5	S1		SE
Carex richardsonii	Richardson Sedge	G4	S1		ST
Carex scabrata	Rough Sedge	G5	S1		SE
Carex seorsa	Weak Stellate Sedge	G4	S2		SR
Carex socialis	Social Sedge	G4	S2		SR
Carex sparganioides var. cephaloidea	Thinleaf Sedge	G5	S2		SE
Carex straminea	Straw Sedge	G5	S2		ST
Carex texensis	A Sedge	G5	S3		WL
Carex timida	Timid Sedge	G2G3	S1		SE
Carex trichocarpa	Hairy-fruit Sedge	G4	S3		WL
Carex trisperma	Three-seed Sedge	G5	S3		WL
Carex woodii	Pretty Sedge	G4	S3		WL
Carya pallida	Sand Hickory	G5	S2		SE
Carya texana	Black Hickory	G4	S1		SE
Cassia fasciculata var. robusta	Partridge Pea	G5T3T5Q	S3		WL
Cassia nictitans	Wild Sensitive Plant	G5	S3		WL
Castanea dentata	American Chestnut	G4	S3		WL
Catalpa speciosa	Northern Catalpa	G4?	S2		SR
Ceanothus herbaceus	Prairie Redroot	G5	S1		SE
Ceratophyllum echinatum	Prickly Hornwort	G4?	S2		SR
Chaerophyllum procumbens var. shortii	Wild Chervil	G5T3T4Q	S1		ST
Chamaelirium luteum	Devil's-bit	G5	S1		SE
Cheilanthes lanosa	Hairy Lipfern	G5	S2		SR
Chelone obliqua var. speciosa	Rose Turtlehead	G4T3	S3		WL
Chimaphila maculata	Spotted Wintergreen	G5	S3		WL
Chimaphila umbellata ssp. cisatlantica	Pipsissewa	G5T5	S2		ST
Chrysopsis villosa	Hairy Golden-aster	G5	S2		ST
Chrysosplenium americanum	American Golden-saxifrage	G5	S2		ST
Cimicifuga racemosa	Black Bugbane	G4	S3		WL
Cimicifuga rubifolia	Appalachian Bugbane	G3	S1		SE
Circaea alpina	Small Enchanter's Nightshade	G5	SX		SX
Cirsium carolinianum	Carolina Thistle	G5	S2		SR

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Cirsium hillii	Hill's Thistle	G3	S1		SE
Cirsium pitcheri	Dune Thistle	G3	S2	LT	ST
Cladrastis lutea	Yellowwood	G4	S2		ST
Clematis pitcheri	Pitcher Leather-flower	G4G5	S2		SR
Clintonia borealis	Clinton Lily	G5	S1		SE
Clitoria mariana	Maryland Butterfly-pea	G5	S3		WL
Cocculus carolinus	Red-berried Moonseed	G5	S3		WL
Coeloglossum viride var. virescens	Long-bract Green Orchis	G5T5	S2		ST
Comptonia peregrina	Sweet Fern	G5	S3		WL
Conioselinum chinense	Hemlock Parsley	G5	S1		SE
Conyza canadensis var. pusilla	Fleabane	G5T5	SX		SX
Coptis trifolia var. groenlandica	Goldthread	G5T5	S3		WL
Corallorhiza trifida var. verna	Early Coralroot	G5TNRQ	SX		SX
Cornus amomum ssp. amomum	Silky Dogwood	G5T5	S1		SE
Cornus canadensis	Bunchberry	G5	S1		SE
Cornus rugosa	Roundleaf Dogwood	G5	S2		SR
Corydalis sempervirens	Pale Corydalis	G4G5	S1		ST
Crataegus arborea	A Hawthorn	G4G5	S1		SE
Crataegus biltmoreana	Biltmore Hawthorn	G5	S1		SE
Crataegus chrysocarpa	Fineberry Hawthorn	G5	S1		SE
Crataegus grandis	Grand Hawthorn	G3G5Q	S1		SE
Crataegus intricata	A Hawthorn	G5	S2		SR
Crataegus kelloggii	Kellogg Hawthorn	G3?	S1		SE
Crataegus pedicellata	Scarlet Hawthorn	G5	S2		ST
Crataegus prona	Illinois Hawthorn	G4G5	S1		SE
Crataegus succulenta	Fleshy Hawthorn	G5	S2		SR
Crataegus viridis	Green Hawthorn	G5	S2		ST
Crotonopsis elliptica	Elliptical Rushfoil	G5	S1		SE
Cuscuta cuspidata	Cusp Dodder	G5	SX		SX
Cuscuta indecora	Pretty Dodder	G5	S1		SE
Cyperus acuminatus	Short-point Flatsedge	G5	S3		WL
Cyperus dentatus	Toothed Sedge	G4	S1		SE
Cyperus houghtonii	Houghton's Nutsedge	G4?	S2		SE
Cyperus pseudovegetus	Green Flatsedge	G5	S2		SR
Cypripedium acaule	Pink Lady's-slipper	G5	S3		WL

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Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper	G5	S2		SR
Cypripedium calceolus var. pubescens	Large Yellow Lady's-slipper	G5T5	S3		WL
Cypripedium candidum	Small White Lady's-slipper	G4	S2		WL
Cypripedium reginae	Showy Lady's-slipper	G4	S3		WL
Dennstaedtia punctilobula	Eastern Hay-scented Fern	G5	S3		WL
Dentaria diphylla	Two-leaf Toothwort	G5	S3		WL
Dentaria multifida	Divided Toothwort	G4?	S1		SE
Deschampsia cespitosa	Tufted Hairgrass	G5	S2		SR
Desmodium laevigatum	Smooth Tick-trefoil	G5	S3		WL
Desmodium viridiflorum	Velvety Tick-trefoil	G5?	S3		WL
Dicliptera brachiata	Wild Mudwort	G5	S1		SE
Didiplis diandra	Water-purslane	G5	S2		SE
Diervilla lonicera	Northern Bush-honeysuckle	G5	S2		SR
Diodia virginiana	Buttonweed	G5	S2		WL
Dodecatheon frenchii	French's Shootingstar	G3	S2		SR
Drosera intermedia	Spoon-leaved Sundew	G5	S2		SR
Drosera rotundifolia	Roundleaf Sundew	G5	S3		WL
Dryopteris celsa	Log Fern	G4	S1		SE
Dryopteris clintoniana	Clinton Woodfern	G5	SX		SX
Echinodorus berteroi	Burhead	G5	SX		SX
Echinodorus cordifolius	Creeping Bur-head	G5	S1		SE
Echinodorus parvulus	Little Bur-head	G3Q	S1		SE
Eleocharis equisetoides	Horse-tail Spikerush	G4	S1		SE
Eleocharis geniculata	Capitate Spike-rush	G5	S2		ST
Eleocharis melanocarpa	Black-fruited Spike-rush	G4	S2		ST
Eleocharis microcarpa	Small-fruited Spike-rush	G5	S1		SE
Eleocharis pauciflora	Fewflower Spikerush	G5	S3		WL
Eleocharis robbinsii	Robbins Spikerush	G4G5	S2		SR
Eleocharis wolfii	Wolf Spikerush	G3G4	S2		SR
Epigaea repens	Trailing Arbutus	G5	S3		WL
Epilobium angustifolium	Fireweed	G5	S1		SE
Epilobium ciliatum	Hairy Willow-herb	G5	SX		SX
Equisetum variegatum	Variegated Horsetail	G5	S1		SE
Erianthus alopecuroides	Woolly Beardgrass	G5	S3		WL
Eriocaulon aquaticum	Pipewort	G5	S1		SE

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Eriophorum angustifolium	Narrow-leaved Cotton-grass	G5	S2		SR
Eriophorum gracile	Slender Cotton-grass	G5	S2		ST
Eriophorum spissum	Dense Cotton-grass	G5T5	SX		SX
Eriophorum viridicarinatum	Green-keeled Cotton-grass	G5	S2		SR
Erysimum capitatum	Prairie-rocket Wallflower	G5	S2	No Status	ST
Eupatorium album	White Thoroughwort	G5	S1		ST
Eupatorium incarnatum	Pink Thoroughwort	G5	S2		ST
Eupatorium rotundifolium	Round-leaved Boneset	G5	S3		WL
Euphorbia obtusata	Bluntleaf Spurge	G5	S1		SE
Euphorbia polygonifolia	Seaside Spurge	G5?	S3		SR
Euphorbia serpens	Matted Broomspurge	G5	S1		SE
Festuca paradoxa	Cluster Fescue	G5	S1		ST
Filipendula rubra	Queen-of-the-prairie	G4G5	S3		WL
Fimbristylis annua	Annual Fimbry	G5	S1		SE
Fimbristylis puberula	Carolina Fimbry	G5	S1		SE
Fragaria vesca var. americana	Woodland Strawberry	G5T5	S1		SE
Fuirena pumila	Dwarf Umbrella-sedge	G4	S2		ST
Galactia volubilis var. mississippiensis	Eastern Milk-pea	G5	S3		WL
Gaura filipes	Slender-stalked Gaura	G5	S2		ST
Gentiana alba	Yellow Gentian	G4	S2		SR
Gentiana puberulenta	Downy Gentian	G4G5	S2		ST
Gentiana villosa	Striped Gentian	G4	S1		SE
Geranium bicknellii	Bicknell Northern Crane's-bill	G5	S1		SE
Geranium robertianum	Herb-robert	G5	S2		ST
Geum rivale	Purple Avens	G5	S1		SE
Gleditsia aquatica	Water-locust	G5	S1		SE
Glyceria acutiflora	Sharp-scaled Manna-grass	G5	S1		SE
Glyceria borealis	Small Floating Manna-grass	G5	S1		SE
Glyceria grandis	American Manna-grass	G5	SH		SX
Gnaphalium macounii	Winged Cudweed	G5	SX		SX
Gonolobus gonocarpos	Angular-fruited Milkvine	G5	S3		WL
Gonolobus obliquus	Angle Pod	G4?	S2		SR
Gymnopogon ambiguus	Broadleaf Beardgrass	G4	SX		SX
Helianthus angustifolius	Swamp Sunflower	G5	S1		SE
Heliotropium tenellum	Slender Heliotrope	G5	S2		ST

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Hemicarpha drummondii	Drummond Hemicarpha	G4G5	SX		SX
Heuchera parviflora var. rugelii	Alumroot	G4TNR	S3		WL
Heuchera villosa	Hairy Alumroot	G5	S3		WL
Hexalectris spicata	Crested Coralroot	G5	S2		SR
Hibiscus moscheutos ssp. lasiocarpos	Hairy-fruited Hibiscus	G5T4	S1		SE
Hieracium venosum	Rattlesnake Hawkweed	G5	S3		WL
Hippuris vulgaris	Common Mare's-tail	G5	SX		SX
Hottonia inflata	Featherfoil	G4	S2		ST
Houstonia nigricans	Narrowleaf Summer Bluets	G5	S2		SR
Hudsonia tomentosa	Sand-heather	G5	S2		ST
Huperzia porophila	Rock Clubmoss	G4	S3		WL
Hydrastis canadensis	Golden Seal	G4	S3		WL
Hydrocotyle americana	American Water-pennywort	G5	S1		SE
Hymenocallis occidentalis	Carolina Spider-lily	G4?	S3		WL
Hymenopappus scabiosaeus	Carolina Woollywhite	G4G5	S1		SE
Hypericum adpressum	Creeping St. John's-wort	G3	S1		SE
Hypericum denticulatum	Coppery St. John's-wort	G5	S2		ST
Hypericum dolabriforme	Straggling St. John's-wort	G4	S2		SR
Hypericum frondosum	Golden St. John's-wort	G4	SX		SX
Hypericum gymnanthum	Clasping-leaved St. John's-wort	G4	S1		SE
Hypericum kalmianum	Kalm St. John's-wort	G4	S3		WL
Hypericum pyramidatum	Great St. John's-wort	G4	S1		ST
Ilex decidua	Deciduous Holly	G5	S3		WL
Iliamna remota	Kankakee Globe-mallow	G1Q	S1		SE
Iresine rhizomatosa	Eastern Bloodleaf	G5	S2		SR
Isoetes engelmannii	Appalachian Quillwort	G4	S1		SE
Isoetes melanopoda	Blackfoot Quillwort	G5	S1		ST
Isotria verticillata	Large Whorled Pogonia	G5	S3		WL
Itea virginica	Virginia Willow	G4	S1		SE
Juglans cinerea	Butternut	G4	S3		WL
Juncus articulatus	Jointed Rush	G5	S1		SE
Juncus balticus var. littoralis	Baltic Rush	G5T5	S2		SR
Juncus militaris	Bayonet Rush	G4	S1		SE
Juncus pelocarpus	Brown-fruited Rush	G5	S2		SE
Juncus scirpoides	Scirpus-like Rush	G5	S2		ST

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Juncus secundus	Secund Rush	G5?	S1		SE
Juniperus communis	Ground Juniper	G5	S2		SR
Kalmia latifolia	Mountain Laurel	G5	S3		WL
Krigia oppositifolia	Dwarf Dandelion	GNR	S2		ST
Lactuca ludoviciana	Western Lettuce	G4G5	SX		SX
Larix laricina	Tamarack	G5	S3		WL
Lathyrus maritimus var. glaber	Beach Peavine	G5T4T5	S1		SE
Lathyrus ochroleucus	Pale Vetchling Peavine	G4G5	S1		SE
Lathyrus venosus	Smooth Veiny Pea	G5	S2		ST
Leavenworthia uniflora	Michaux Leavenworthia	G4	S1		SE
Lechea racemulosa	Illinois Pinweed	G5	S1		SE
Lechea stricta	Upright Pinweed	G4?	SX		SX
Lemna minima	Least Duckweed	GNR	S1		SE
Lemna perpusilla	Minute Duckweed	G5	SX		SX
Lemna valdiviana	Pale Duckweed	G5	S1		SE
Leptochloa panicoides	Amazon Sprangle-top	G5	S1		SE
Lespedeza stuevei	Tall Bush-clover	G4?	SX		SX
Lesquerella globosa	Lesquereux's Mustard	G2	S1	C	SE
Liatris pycnostachya	Cattail Gay-feather	G5	S2		ST
Liatris squarrosa	Scaly Gay-feather	G5	S3		WL
Ligusticum canadense	Nondo Lovage	G4	S1		SE
Lilium canadense	Canada Lily	G5	S2		SR
Lilium superbum	Turk's Cap Lily	G5	S3		WL
Limnobium spongia	American Frog's-bit	G4	S1		SE
Linnaea borealis	Twinflower	G5	SX		SX
Linum intercursum	Sandplain Flax	G4	S1		SE
Linum striatum	Ridged Yellow Flax	G5	S3		WL
Linum sulcatum	Grooved Yellow Flax	G5	S2		SR
Liparis loeselii	Loesel's Twayblade	G5	S3		WL
Lithospermum incisum	Narrow-leaved Puccoon	G5	S1		SE
Lonicera canadensis	American Fly-honeysuckle	G5	SX		SX
Ludwigia decurrens	Primrose Willow	G5	S2		WL
Ludwigia glandulosa	Cylindric-fruited Seedbox	G5	S2		ST
Ludwigia sphaerocarpa	Globe-fruited False-loosestrife	G5	S1		SE
Luzula acuminata	Hairy Woodrush	G5	S1		SE

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Endangered, Threatened, Rare and Extirpated Plants of Indiana

Species Name	Common Name	GRANK	SRANK	FEDERAL	STATE
Lycopodiella inundata	Northern Bog Clubmoss	G5	S1		SE
Lycopodiella subappressa	Northern Appressed Bog Clubmoss	G2	S1		SE
Lycopodium clavatum	Running Pine	G5	S3		WL
Lycopodium dendroideum	Treelike Clubmoss	G5	S1		SE
Lycopodium hickeyi	Hickey's Clubmoss	G5	S2		SR
Lycopodium lucidulum	Shining Clubmoss	G5	S3		WL
Lycopodium obscurum	Tree Clubmoss	G5	S2		SR
Lycopodium tristachyum	Deep-root Clubmoss	G5	S2		SR
Lycopus amplectens	Sessile-leaved Bugleweed	G5	S1		SE
Lygodium palmatum	Climbing Fern	G4	S1		SE
Magnolia acuminata	Cucumber Magnolia	G5	S1		SE
Magnolia tripetala	Umbrella Magnolia	G5	S1		SE
Malaxis unifolia	Green Adder's-mouth	G5	S1		SE
Matteuccia struthiopteris	Ostrich Fern	G5	S2		SR
Mecardonia acuminata		G5	S1		SE
Melampyrum lineare	American Cow-wheat	G5	S2		SR
Melanthium virginicum	Virginia Bunchflower	G5	S1		SE
Melica mutica	Narrow Melic Grass	G5	S3		WL
Melica nitens	Three-flower Melic Grass	G5	S2		ST
Melothria pendula	Creeping Cucumber	G5?	S1		SE
Menyanthes trifoliata	Buckbean	G5	S3		WL
Mikania scandens	Climbing Hempweed	G5	S1		SE
Milium effusum	Tall Millet-grass	G5	S2		SR
Monarda bradburiana	Eastern Bee-balm	G5	S1		SE
Monotropa hypopithys	American Pinesap	G5	S3		WL
Muhlenbergia capillaris	Long-awn Hairgrass	G5	S1		SE
Muhlenbergia cuspidata	Plains Muhlenbergia	G4	S1		SE
Myosotis laxa	Smaller Forget-me-not	G5	S1		ST
Myosotis macrosperma	Large-seeded Forget-me-not	G5	S3		WL
Myriophyllum pinnatum	Cutleaf Water-milfoil	G5	S1		SE
Myriophyllum tenellum	Slender Water-milfoil	G5	S1		SE
Myriophyllum verticillatum	Whorled Water-milfoil	G5	S2		SR
Najas gracillima	Thread-like Naiad	G5?	S1		ST
Najas marina	Holly-leaved Naiad	G5	S3		WL
Napaea dioica	Glade Mallow	G4	S2		SR

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Endangered, Threatened, Rare and Extirpated Plants of Indiana

Species Name	Common Name	GRANK	SRANK	FEDERAL	STATE
Nelumbo lutea	American Lotus	G4	S3		WL
Nemopanthus mucronatus	Mountain Holly	G5	S3		WL
Nothoscordum bivalve	Crow-poison	G4	S2		SR
Oenothera perennis	Small Sundrops	G5	S2		SR
Oenothera triloba	Stemless Evening-primrose	G4	SX		SX
Onosmodium hispidissimum	Shaggy False-gromwell	G4	S1		SE
Ophioglossum engelmannii	Limestone Adder's-tongue	G5	S2		SR
Orobanche fasciculata	Clustered Broomrape	G4	S1		SE
Orobanche ludoviciana	Louisiana Broomrape	G5	S2		SE
Oryzopsis asperifolia	White-grained Mountain-ricegrass	G5	S1		SE
Oryzopsis pungens	Slender Mountain-ricegrass	G5	SX		SX
Oryzopsis racemosa	Black-fruit Mountain-ricegrass	G5	S2		SR
Oxalis illinoensis	Illinois Woodsorrel	G4Q	S2		WL
Oxydendrum arboreum	Sourwood	G5	S2		SR
Pachysandra procumbens	Allegheny Spurge	G4G5	S1		SE
Panax quinquefolius	American Ginseng	G3G4	S3		WL
Panax trifolius	Dwarf Ginseng	G5	S2		WL
Panicum annulum	A Panic-grass	GNR	S1		SE
Panicum bicknellii	A Panic-grass	G4?Q	S1		SE
Panicum boreale	Northern Witchgrass	G5	S2		SR
Panicum columbianum	Hemlock Panic-grass	G5T5	S2		SR
Panicum commonsianum var. addisonii	Commons' Panic-grass	G5TNR	S2		SE
Panicum leibergii	Leiberg's Witchgrass	G5	S2		ST
Panicum longifolium	Long-leaved Panic-grass	G5T5?	SX		SX
Panicum lucidum	Shining Panic-grass	GNR	S1		SE
Panicum mattamuskeetense	A Panic-grass	G4?	SX		SX
Panicum scoparium	Broom Panic-grass	G5	S1		SE
Panicum subvillosum	A Panic-grass	GNRQ	S1		SE
Panicum verrucosum	Warty Panic-grass	G4	S2		ST
Panicum wilcoxianum	Blood Witchgrass	G5	S2		SR
Panicum yadkinense	A Panic-grass	G3G4Q	S2		SE
Passiflora incarnata	Purple Passion-flower	G5	S2		SR
Penstemon canescens	Gray Beardtongue	G4	S2		SE
Penstemon deamii	Deam Beardtongue	G1	S1		SR
Penstemon tubaeflorus	Tube Penstemon	G5	SX		SX

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Perideridia americana	Eastern Eulophus	G4	S1		SE
Phacelia ranunculacea	Blue Scorpion-weed	G4	S1		SE
Phlox amplifolia	Large-leaved Phlox	G3G5	S2		SR
Phlox bifida ssp. stellaria	Cleft Phlox	G5?T3	S1		SE
Phlox ovata	Mountain Phlox	G4	S1		SE
Phoradendron serotinum	American Mistletoe	G5	S3		WL
Pinus banksiana	Jack Pine	G5	S2		SR
Pinus strobus	Eastern White Pine	G5	S2		SR
Pinus virginiana	Virginia Pine	G5	S3		WL
Plantago cordata	Heart-leaved Plantain	G4	S1		SE
Platanthera ciliaris	Yellow-fringe Orchis	G5	S1		SE
Platanthera clavellata	Small Green Woodland Orchis	G5	S3		WL
Platanthera dilatata	Leafy White Orchis	G5	S1		SE
Platanthera flava var. flava	Southern Rein Orchid	G4T4?Q	S1		SE
Platanthera flava var. herbiola	Pale Green Orchis	G4T4Q	S3		WL
Platanthera hookeri	Hooker Orchis	G4	SX		SX
Platanthera hyperborea	Leafy Northern Green Orchis	G5	S2		ST
Platanthera lacera	Green-fringe Orchis	G5	S3		WL
Platanthera leucophaea	Prairie White-fringed Orchid	G3	S1	LT	SE
Platanthera orbiculata	Large Roundleaf Orchid	G5	SX		SX
Platanthera peramoena	Purple Fringeless Orchis	G5	S3		WL
Platanthera psycodes	Small Purple-fringe Orchis	G5	S2		SR
Poa alsodes	Grove Meadow Grass	G4G5	S2		SR
Poa cuspidata	Bluegrass	G5	SX		SX
Poa paludigena	Bog Bluegrass	G3	S3		WL
Poa wolfii	Wolf Bluegrass	G4	S2		SR
Pogonia ophioglossoides	Rose Pogonia	G5	S3		WL
Polygala incarnata	Pink Milkwort	G5	S1		SE
Polygala paucifolia	Gay-wing Milkwort	G5	S1		SE
Polygonella articulata	Eastern Jointweed	G5	S2		SR
Polygonum careyi	Carey's Smartweed	G4	S2		ST
Polygonum cilinode	Fringed Black Bindweed	G5	S1		SE
Polygonum hydropiperoides var. opelousanum	Northeastern Smartweed	G5TNRQ	S2		ST
Polygonum hydropiperoides var. setaceum	Swamp Smartweed	G5	S1		SE

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Endangered, Threatened, Rare and Extirpated Plants of Indiana

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Polypodium polypodioides	Resurrection Fern	G5	S2		SR
Polytaenia nuttallii	Prairie Parsley	G5	S1		SE
Populus balsamifera	Balsam Poplar	G5	SX		SX
Potamogeton bicupulatus	Snail-seed Pondweed	G4	S1		SE
Potamogeton epihydrus	Nuttall Pondweed	G5	S1		SE
Potamogeton friesii	Fries' Pondweed	G4	S1		ST
Potamogeton oakesianus	Oakes Pondweed	G4	S1		SE
Potamogeton praelongus	White-stem Pondweed	G5	S1		ST
Potamogeton pulcher	Spotted Pondweed	G5	S1		SE
Potamogeton pusillus	Slender Pondweed	G5	S2		WL
Potamogeton richardsonii	Redheadgrass	G5	S2		SR
Potamogeton robbinsii	Flatleaf Pondweed	G5	S2		SR
Potamogeton strictifolius	Straight-leaf Pondweed	G5	S1		ST
Potamogeton vaseyi	Vasey's Pondweed	G4	S1		SE
Potentilla anserina	Silverweed	G5	S2		ST
Prenanthes aspera	Rough Rattlesnake-root	G4?	S2		SR
Prenanthes crepidinea	Nodding Rattlesnake-root	G4	S2		WL
Proboscidea louisianica	Louisiana Unicorn-plant	GU	SX		SX
Prunus pensylvanica	Fire Cherry	G5	S2		SR
Psilocarya nitens	Short-beaked Bald-rush	G4?	SX		SX
Psilocarya scirpoides	Long-beaked Baldrush	G4	S2		ST
Psoralea tenuiflora	Few-flowered Scurf-pea	G5	SX		SX
Pteridium aquilinum var. pseudocaudatum	Bracken Fern	G5T5	SX		SX
Pyrola asarifolia	Pink Wintergreen	G5	S1		SE
Pyrola elliptica	Elliptical-leaf Wintergreen	G5	S3		WL
Pyrola rotundifolia var. americana	American Wintergreen	G5	S2		SR
Pyrola secunda	One-sided Wintergreen	G5	SX		SX
Pyrola virens	Greenish-flowered Wintergreen	G5	SX		SX
Quercus falcata var. pagodifolia	Cherry-bark Oak	G5	S3		WL
Quercus lyrata	Overcup Oak	G5	S3		WL
Quercus prinoides	Dwarf Chinquapin Oak	G5	S1		SE
Ranunculus harveyi	Harvey's Buttercup	G4	S1		SE
Ranunculus laxicaulis	Mississippi Buttercup	G5?	S1		SE
Ranunculus pusillus	Pursh Buttercup	G5	S1		SE
Rhamnus alnifolia	Alderleaf Buckthorn	G5	S3		WL

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Rhamnus caroliniana	Carolina Buckthorn	G5	S3		WL
Rhamnus lanceolata	Lance-leaved Buckthorn	G5	S3		WL
Rhexia mariana var. interior	Showy Meadow-beauty	G5T4T5	S3		WL
Rhexia mariana var. mariana	Maryland Meadow Beauty	G5T5	S1		ST
Rhus aromatica var. arenaria	Beach Sumac	G5T3Q	S2		SR
Rhynchospora corniculata var. interior	Short-bristle Horned-rush	G5TNR	S2		ST
Rhynchospora macrostachya	Tall Beaked-rush	G4	S2		SR
Rhynchospora recognita	Globe Beaked-rush	G5?	S1		SE
Ribes hirtellum	Smooth Gooseberry	G5	S3		WL
Rubus alumnus	A Bramble	G5	SX		SX
Rubus centralis	Illinois Blackberry	G2?Q	S1		SE
Rubus deamii	Deam Dewberry	G4?	SX		SX
Rubus depavitus	A Bramble	G5?Q	SX		SX
Rubus enslenii	Southern Dewberry	G4G5Q	S1		SE
Rubus impar	A Bramble	G1G2	SX		SX
Rubus odoratus	Purple Flowering Raspberry	G5	S2		ST
Rubus setosus	Small Bristleberry	G5	S1		SE
Rudbeckia fulgida var. fulgida	Orange Coneflower	G5T4?	S2		WL
Rudbeckia fulgida var. umbrosa	Coneflower	G5T4T5	S1		SE
Sabatia campanulata	Slender Marsh Pink	G5	SX		SX
Sagittaria australis	Longbeak Arrowhead	G5	S2		SR
Salix caroliniana	Carolina Willow	G5	S3		WL
Salix cordata	Heartleaf Willow	G4	S2		ST
Salix serissima	Autumn Willow	G4	S2		ST
Sanguisorba canadensis	Canada Burnet	G5	S1		SE
Sanicula smallii	Small's Snakeroot	G5	S2		SR
Sarracenia purpurea	Northern Pitcher-plant	G5	S3		WL
Satureja glabella var. angustifolia	Calamint	G5	S1		SE
Satureja vulgaris var. neogaea		G5	S3		WL
Saxifraga forbesii	Forbes Saxifrage	G4Q	S1		SE
Saxifraga virginiensis	Virginia Saxifrage	G5	S3		WL
Scheuchzeria palustris ssp. americana	American Scheuchzeria	G5T5	S1		SE
Schizachne purpurascens	Purple Oat	G5	S1		SE
Scirpus expansus	Bulrush	G4	S1		SE
Scirpus hallii	Hall's Bulrush	G3	S1		SE

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Scirpus purshianus	Weakstalk Bulrush	G4G5	S1		SR
Scirpus smithii	Smith's Bulrush	G5?	S1		SE
Scirpus subterminalis	Water Bulrush	G4G5	S2		SR
Scirpus torreyi	Torrey's Bulrush	G5?	S1		SE
Scleria muehlenbergii	Muehlenberg's Nutrush	G5	S1		SE
Scleria oligantha	Little-headed Nutrush	G5	S3		WL
Scleria pauciflora	Fewflower Nutrush	G5	S3		WL
Scleria reticularis	Reticulated Nutrush	G4	S2		ST
Scutellaria parvula var. australis	Southern Skullcap	G4T4?	S2		WL
Scutellaria parvula var. parvula	Small Skullcap	G4T4	SX		SX
Scutellaria saxatilis	Rock Skullcap	G3	S1		SE
Sedum telephioides	Allegheny Stonecrop	G4	S2		SR
Selaginella apoda	Meadow Spike-moss	G5	S1		WL
Selaginella rupestris	Ledge Spike-moss	G5	S2		ST
Senecio anonymus	Small's Ragwort	G5	S3		WL
Senna obtusifolia	Blunt-leaf Senna	G5	S2		SR
Setaria geniculata	Bristly Foxtail	G5	S3		WL
Shepherdia canadensis	Canada Buffalo-berry	G5	SX		SX
Sida hermaphrodita	Virginia Mallow	G3	S1		SE
Silene ovata	Ovate Catchfly	G3	S1		SE
Silene regia	Royal Catchfly	G3	S2		ST
Sisyrinchium montanum	Strict Blue-eyed-grass	G5	S1		SE
Smilax bona-nox	Saw Greenbrier	G5	S3		WL
Solidago buckleyi	Buckley's Goldenrod	G4	S1		SE
Solidago hispida	Hairy Goldenrod	G5	S3		WL
Solidago ptarmicoides	Prairie Goldenrod	G5	S2		SR
Solidago shortii	Short's Goldenrod	G1	S1	LE	SE
Solidago simplex var. gillmanii	Sticky Goldenrod	G5T3?	S2		ST
Solidago squarrosa	Stout-ragged Goldenrod	G4?	S1		SE
Sorbus decora	Northern Mountain-ash	G4G5	SX		SX
Sparganium androcladum	Branching Bur-reed	G4G5	S2		ST
Spigelia marilandica	Woodland Pinkroot	G4	S1		SE
Spiranthes lucida	Shining Ladies'-tresses	G5	S2		SR
Spiranthes magnicamporum	Great Plains Ladies'-tresses	G4	S1		SE
Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	G4	S2		ST

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Spiranthes ovalis	Lesser Ladies'-tresses	G5?	S3		WL
Spiranthes romanzoffiana	Hooded Ladies'-tresses	G5	S1		ST
Spiranthes tuberosa	Little Ladies'-tresses	G5	S3		WL
Spiranthes vernalis	Grassleaf Ladies'-tresses	G5	S2		WL
Stachys clingmanii	Clingman Hedge-nettle	G2Q	S1		SE
Stenanthium gramineum	Eastern Featherbells	G4G5	S1		ST
Stipa avenacea	Blackseed Needlegrass	G5	S2		SR
Stipa comata	Sewing Needlegrass	G5	SX		SX
Strophostyles leiosperma	Slick-seed Wild-bean	G5	S2		ST
Styrax americanus	American Snowbell	G5	S3		WL
Styrax grandifolius	Large-leaf Snowbell	G5	S1		SE
Sullivantia sullivantii	Sullivantia	G4	S2		ST
Synandra hispidula	Gyandotte Beauty	G4	S3		WL
Talinum rugospermum	Prairie Fame-flower	G3G4	S2		ST
Taxodium distichum	Bald Cypress	G5	S2		ST
Taxus canadensis	American Yew	G5	S1		SE
Thalictrum pubescens	Tall Meadowrue	G5	S2		ST
Thuja occidentalis	Northern White Cedar	G5	S1		SE
Tofieldia glutinosa	False Asphodel	G5	S2		SR
Trachelospermum difforme	Climbing Dogbane	G4G5	S2		SR
Tragia cordata	Heart-leaved Noseburn	G4	S2		WL
Trautvetteria caroliniensis	Carolina Tassel-rue	G5	SX		SX
Triadenum tubulosum	Large Marsh St. John's-wort	G4?	S3		WL
Triadenum walteri	Walter's St. John's-wort	G5	S3		WL
Trichomanes boschianum	Filmy Fern	G4	S1		SE
Trichostema dichotomum	Forked Bluecurl	G5	S2		SR
Trifolium reflexum var. glabrum	Buffalo Clover	G5T2T4Q	S1		SE
Trifolium stoloniferum	Running Buffalo Clover	G3	S1	LE	SE
Triglochin palustris	Marsh Arrow-grass	G5	S2		SR
Trillium cernuum var. macranthum	Nodding Trillium	G5T4	S1		SE
Tripsacum dactyloides	Northern Gama-grass	G5	S3		WL
Tsuga canadensis	Eastern Hemlock	G4G5	S3		WL
Utricularia cornuta	Horned Bladderwort	G5	S2		ST
Utricularia geminiscapa	Hidden-fruited Bladderwort	G4G5	S1		SE
Utricularia intermedia	Flatleaf Bladderwort	G5	S3		WL

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Utricularia minor	Lesser Bladderwort	G5	S1		ST
Utricularia purpurea	Purple Bladderwort	G5	S2		SR
Utricularia radiata	Small Swollen Bladderwort	G4	S1		SE
Utricularia resupinata	Northeastern Bladderwort	G4	S1		SE
Utricularia subulata	Zigzag Bladderwort	G5	S2		ST
Uvularia perfoliata	Bellwort	G5	S1		SE
Vaccinium arboreum	Farkleberry	G5	S3		WL
Vaccinium macrocarpon	Large Cranberry	G4	S3		WL
Vaccinium myrtilloides	Velvetleaf Blueberry	G5	S1		SE
Vaccinium oxycoccos	Small Cranberry	G5	S2		ST
Valeriana edulis	Hairy Valerian	G5	S1		SE
Valeriana uliginosa	Marsh Valerian	G4Q	S1		SE
Valerianella chenopodiifolia	Goose-foot Corn-salad	G5	S1		SE
Veratrum woodii	False Hellebore	G5	S3		WL
Verbesina virginica	White Crownbeard	G5?	S1		SE
Veronica americana	American Speedwell	G5	SX		SX
Viburnum cassinoides	Northern Wild-raisin	G5T5	S1		SE
Viburnum molle	Softleaf Arrow-wood	G5	S2		SR
Viburnum opulus var. americanum	Highbush-cranberry	G5T5	S1		SE
Viola blanda	Smooth White Violet	G4G5	S3		WL
Viola egglestonii	Eggleston's Violet	G4	S1		SE
Viola hirsutula	Southern Wood Violet	G4	SX		SX
Viola pedatifida	Prairie Violet	G5	S2		ST
Viola primulifolia	Primrose-leaf Violet	G5	S2		ST
Viola pubescens	Downy Yellow Violet	G5	S3		WL
Vitis palmata	Catbird Grape	G4	S2		SR
Vitis rupestris	Sand Grape	G3	S1		SE
Vittaria appalachiana	Appalachian Vittaria	G4	S2		SR
Waldsteinia fragarioides	Barren Strawberry	G5	S2		SR
Wisteria macrostachya	Kentucky Wisteria	G5	S2		SR
Wolffiella gladiata	Sword Bogmat	G5	S1		SE
Woodwardia areolata	Netted Chainfern	G5	S2		SR
Xyris difformis	Carolina Yellow-eyed Grass	G5	S2		ST
Zannichellia palustris	Horned Pondweed	G5	S2		SR
Zigadenus elegans var. glaucus	White Camas	G5T4T5	S2		SR

GRANK: G1=critically imperiled globally, G2=imperiled globally,G3=rare or uncommon,G4= widespread but with long term concerns, G5=widespread and secure, T ranks indicate taxonomic subunit rank, ? or Q=questionable rank, NR=not ranked or uncertain rank
SRANK: S1=critically imperiled in state, S2=imperiled in state, SX=extirpated,
STATE: SX=extirpated, SE=endangered, ST=threatened, SR=rare, SRE = reintroduced, WL = watch list
FEDERAL: LE=endangered, LT=threatened, C=candidate species

Endangered, Threatened, Rare and Extirpated Plants of Indiana

Species Name	Common Name	GRANK	SRANK	FEDERAL	STATE
Zizia aptera	Golden Alexanders	G5	S2		SR

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11/22/2005

Indiana County Endangered, Threatened and Rare Species List

County: Adams

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Pleurobema clava	Clubshell	LE	SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Toxolasma lividus	Purple Lilliput		SSC	G2	S2
Fish					
Ammocrypta pellucida	Eastern Sand Darter			G3	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Lanius ludovicianus	Loggerhead Shrike	No Status	SE	G4	S3B
Mammal					
Lynx rufus	Bobcat	No Status		G5	S1
Mustela nivalis	Least Weasel		SSC	G5	S2?
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2

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Indiana County Endangered, Threatened and Rare Species List

County: Allen

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Alasmidonta viridis	Slippershell Mussel			G4G5	S2
Epioblasma obliquata perobliqua	White Cat's Paw Pearlymussel	LE	SE	G1T1	S1
Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	S1
Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G4	S2
Ligumia recta	Black Sandshell			G5	S2
Obovaria subrotunda	Round Hickorynut		SSC	G4	S2
Pleurobema clava	Clubshell	LE	SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot		SE	G3T3	S1
Toxolasma lividus	Purple Lilliput		SSC	G2	S2
Toxolasma parvum	Lilliput			G5	S2
Villosa fabalis	Rayed Bean	C	SSC	G1G2	S1
Fish					
Ammocrypta pellucida	Eastern Sand Darter			G3	S2
Moxostoma valenciennesi	Greater Redhorse		SE	G4	S2
Percina evides	Gilt Darter		SE	G4	S1
Amphibian					
Rana pipiens	Northern Leopard Frog		SSC	G5	S2
Reptile					
Clemmys guttata	Spotted Turtle		SE	G5	S2
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Emydoidea blandingii	Blanding's Turtle		SE	G4	S2
Sistrurus catenatus catenatus	Eastern Massasauga	C	SE	G3G4T3T4	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Asio flammeus	Short-eared Owl		SE	G5	S2
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Buteo platypterus	Broad-winged Hawk	No Status	SSC	G5	S3B
Certhia americana	Brown Creeper			G5	S2B
Circus cyaneus	Northern Harrier		SE	G5	S2
Dendroica cerulea	Cerulean Warbler		SSC	G4	S3B
Falco peregrinus	Peregrine Falcon	No Status	SE	G4	S2B
Ixobrychus exilis	Least Bittern		SE	G5	S3B
Lanius ludovicianus	Loggerhead Shrike	No Status	SE	G4	S3B
Nyctanassa violacea	Yellow-crowned Night-heron		SE	G5	S2B
Nycticorax nycticorax	Black-crowned Night-heron		SE	G5	S1B
Phalaropus tricolor	Wilson's Phalarope		SX	G5	SHB
Sturnella neglecta	Western Meadowlark		SSC	G5	S2B
Tyto alba	Barn Owl		SE	G5	S2
Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
Mammal					
Lynx rufus	Bobcat	No Status		G5	S1
Taxidea taxus	American Badger			G5	S2
Vascular Plant					
Andromeda glaucophylla	Bog Rosemary		SR	G5	S2
Armoracia aquatica	Lake Cress		SE	G4?	S1
Chelone obliqua var. speciosa	Rose Turtlehead		WL	G4T3	S3
Circaea alpina	Small Enchanter's Nightshade		SX	G5	SX
Coeloglossum viride var. virescens	Long-bract Green Orchis		ST	G5T5	S2
Crataegus succulenta	Fleshy Hawthorn		SR	G5	S2
Euphorbia obtusata	Bluntleaf Spurge		SE	G5	S1
Phlox ovata	Mountain Phlox		SE	G4	S1
Platanthera psycodes	Small Purple-fringe Orchis		SR	G5	S2

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Indiana County Endangered, Threatened and Rare Species List

County: Allen

Species Name	Common Name	FED	STATE	GRANK	SRANK
Poa alsodes	Grove Meadow Grass		SR	G4G5	S2
Scutellaria parvula var. parvula	Small Skullcap		SX	G4T4	SX
Spiranthes lucida	Shining Ladies'-tresses		SR	G5	S2
Spiranthes magnicamporum	Great Plains Ladies'-tresses		SE	G4	S1
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - floodplain mesic	Mesic Floodplain Forest		SG	G3?	S1
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3
Forest - upland dry	Dry Upland Forest		SG	G4	S4
Forest - upland dry-mesic	Dry-mesic Upland Forest		SG	G4	S4
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3
Lake - pond	Pond		SG	GNR	SNR
Prairie - dry-mesic	Dry-mesic Prairie		SG	G3	S2
Wetland - marsh	Marsh		SG	GU	S4
Wetland - swamp forest	Forested Swamp		SG	G2?	S2
Wetland - swamp shrub	Shrub Swamp		SG	GU	S2

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Indiana County Endangered, Threatened and Rare Species List

County: Wells

Species Name	Common Name	FED	STATE	GRANK	SRANK
Insect: Odonata (Dragonflies & Damselflies)					
Macromia wabashensis	Wabash River Cruiser		SE	G1G3Q	S1
Amphibian					
Rana pipiens	Northern Leopard Frog		SSC	G5	S2
Reptile					
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Nerodia erythrogaster neglecta	Copperbelly Water Snake	PS:LT	SE	G5T2T3	S2
Sistrurus catenatus catenatus	Eastern Massasauga	C	SE	G3G4T3T4	S2
Bird					
Ardea herodias	Great Blue Heron			G5	S4B
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Mammal					
Myotis sodalis	Indiana Bat or Social Myotis	LE	SE	G2	S1
Vascular Plant					
Andromeda glaucophylla	Bog Rosemary		SR	G5	S2
Arethusa bulbosa	Swamp-pink		SX	G4	SX
Armoracia aquatica	Lake Cress		SE	G4?	S1
Carex arctata	Black Sedge		SE	G5?	S1
Carex echinata	Little Prickly Sedge		SE	G5	S1
Carex limosa	Mud Sedge		SE	G5	S1
Crataegus kelloggii	Kellogg Hawthorn		SE	G3?	S1
Eriophorum gracile	Slender Cotton-grass		ST	G5	S2
Euphorbia obtusata	Bluntleaf Spurge		SE	G5	S1
Fragaria vesca var. americana	Woodland Strawberry		SE	G5T5	S1
Plantago cordata	Heart-leaved Plantain		SE	G4	S1
Platanthera orbiculata	Large Roundleaf Orchid		SX	G5	SX
Poa alsodes	Grove Meadow Grass		SR	G4G5	S2
Viburnum opulus var. americanum	Highbush-cranberry		SE	G5T5	S1
Xyris difformis	Carolina Yellow-eyed Grass		ST	G5	S2
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3

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Office of Water Quality
Total Maximum Daily Load Program

Total Maximum Daily Load
For *E. coli* Impairment in the St. Marys River Watershed
and Maumee River
Adams and Allen Counties

and

Total Maximum Daily Load
For Impaired Biotic Community Impairment in the
St. Marys River Watershed
Adams and Allen Counties

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June 9, 2006

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I. Introduction

In accordance with section 303(d) of the Federal Clean Water Act and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130) it is required that States develop a Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting Water Quality Standards (WQS). TMDLs provide States a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the quality of their water resources. The purposes of this TMDL are to identify the sources of the impairment and determine the allowable levels of *E. coli* bacteria for the St. Marys River watershed in Adams and Allen Counties and *E. coli* bacteria for the Maumee River in Allen County in Indiana. In addition, this TMDL will address the Impaired Biotic Community (IBC) and nutrient impairments by determining the sources and allowable levels of nutrients and total suspended solids (TSS) for the Blue Creek/Habegger Ditch, Yellow Creek, and the Unnamed Tributary to St. Marys River watersheds, Adams and Allen Counties, Indiana. Based on information gathered as a part of this TMDL, nutrients and TSS have been determined as the primary pollutants contributing to the IBC impairment for the aforementioned watersheds.

The Indiana Department of Environmental Management (IDEM) was awarded a 104(b)(3) grant by USEPA Region 5 to complete TMDLs for the St. Marys River watershed and Maumee River in 2004. America's Clean Water Foundation received a grant to fund Bruce Cleland, of USEPA Region 10, for technical support to assist IDEM in developing these watershed and river TMDLs. After IDEM and Mr. Cleland reviewed the initial data used to determine that this watershed and river were impaired, a more comprehensive study was initiated in the spring of 2004 to gain a thorough understanding of the St. Marys River watershed. IDEM sampled the St. Marys River watershed biweekly from March of 2004 through October of 2004. IDEM partnered with the City of Fort Wayne to sample several sites in Adams and Allen County on the weeks opposite the IDEM sampling, from July of 2004 through October of 2004. This sampling examined basic water quality throughout the St. Marys watershed, which included several key tributaries. IDEM did not collect additional water quality data in the Maumee River during the 2004 sampling event.

These TMDLs are separated into sections by impairment. When appropriate, each section is separated further into the St. Marys River watershed and Maumee River. Each section will contain detailed information regarding the waterbodies that are impaired for that parameter, a description of the impairment, sources of the impairment, the appropriate load allocations, waste load allocations, margin of safety, and implementation suggestions for that impairment. A general description of the St. Marys River watershed and Maumee River are located below.

St. Marys River Watershed

The St. Marys River watershed is located in Adams and Allen Counties in Indiana. The St. Marys River watershed is located in the Great Lakes Basin, hydrologic unit code 41000040. The St. Marys River watershed TMDL includes the St. Marys River, Habegger Ditch, Gates Ditch, Blue Creek, Yellow Creek, Martz Ditch, Borum Run, Holthouse Ditch, Kohne Ditch, Gerke Ditch, and Nickelsen Creek. The St. Marys River starts in Ohio and flows across the Ohio-Indiana State line into the southern part of Adams County. The St. Marys River continues north through Adams and Allen County before joining the St. Joseph River to create the Maumee River in the City of Fort Wayne and flows back into Ohio (Figure 1). Ohio also has the St. Marys River listed on their 303(d) List. Unfortunately, Ohio has their portion of the St. Marys River TMDL scheduled for completion in 2012. However, Ohio's TMDL Program has provided support in the completion of Indiana's St. Marys River watershed TMDL.

The St. Marys River watershed is listed on the 2002 303(d) List for *E. coli*, impaired biotic communities (IBC), ammonia, nutrients, algae, and total dissolved solids. On the 2004 303(d) List, the St. Marys River watershed is listed for *E. coli*, impaired biotic communities (IBC), ammonia, and nutrients. Based on the data collected in 2004 by IDEM and the City of Fort Wayne, a reassessment was completed on the St. Marys River watershed. This reassessment was completed to define the extent of the impairments listed on the 2004 303(d) List and in turn confirmed the listings of the St. Marys River watershed that were on the 2002 303(d) List. The reassessment for the *E. coli* impairment resulted in the addition of the following segments in the St. Marys River watershed to the 2006 303(d) List: INA0443_T1019, INA0443_T1020, INA0442_00, INA0445_00, INA0446_00, INA0446_T1015, INA0448_00, INA0449_00, INA0453_00, INA0454_T1005, INA0454_T1012, INA0463_00, INA0463_T1003, INA0446_T1022, INA0465_00, and INA0465_T1002.

The reassessment also determined that segment INA0446_T1013 will be split. In this segment, the headwaters will be changed to "being evaluated for *E. coli*" and will not appear on the 2006 303(d) List. However, the main stem of this segment up to the first tributary will be assessed as impaired for *E. coli* and will be listed on the 2006 303(d) Lists (Figure 1, Table 1).

Table 1: 2004 303(d) Listings for St. Marys River watershed

Waterbody Name	**Segment ID Number**	**Length (Mi)**	**Impairment**
St. Marys-Willshire	INA0434_00	2.84	*E. coli*
St. Marys River	INA0441_00	0.86	*E. coli*
Blue Creek	INA0442_T1007	11.94	*E. coli*
Blue Creek	INA0445_T1006	12.28	*E. coli*, IBC, ammonia, nutrients
Duer Ditch (Adams) and Other Tribs	INA0445_00	9.33	*E. coli*
Blue Creek Headwaters (Adams)	INA0442_00	8.46	*E. coli*
Habegger Ditch	INA0443_T1008	5.8	*E. coli*, IBC, nutrients
Wittmer Ditch, No. 1	INA0443_T1020	2.98	*E. coli*
Farlow Ditch and Tribs	INA0443-T1019	11.01	*E. coli*
Gates Ditch	INA0443_T1014	1.17	*E. coli*
Little Blue Creek	INA0444_00	22.12	*E. coli*
Borum Run and Tribs	INA0448_00	21.65	*E. coli*
Yellow Creek	INA0447_00	32.79	*E. coli*, IBC, nutrients
Martz Creek-Ruppert Ditch and Unnamed Tributaries	INA0447_T1002	9.82	*E. coli*
Holthouse Ditch-Kohne Ditch	INA0452_00	10.16	IBC, *E. coli*
St. Marys River	INA0461_T1004 INA0463_T1003 INA0465_T1002 INA0448_T1016 INA0449_T1017 INA0453_T1018 INA0454_T1021	37.7	*E. coli*
St. Marys River	INA0446_T1015	4.79	*E. coli*
Unnamed Trib of St. Marys River	INA0454_T1012	2.84	*E. coli*, IBC

Pleasant Mills and Tribs	INA0446_00	15.3	*E. coli*
Decatur Tribs	INA0449_00	7.12	*E. coli*
Gerke/Weber Ditch and Tribs	INA0453_00	17.53	*E. coli*
Snyder Ditch and Other Tribs	INA0463_00	10.61	*E. coli*
Junk Ditch	INA0465_00	6.55	*E. coli*
Spy Run Creek	INA0465_T1011	8.75	*E. coli*
Unnamed Tributaries to Spy Run Creek	INA0466_T1012	5.08	*E. coli*
Lowther Neuhaus Ditch	INA0466_T1013	3.03	*E. coli*
Unnamed Tributary to Lowther Neuhaus Ditch	INA0466_T1014	3.00	*E. coli*
St. Marys River	INA0466_T1022	0.5	*E. coli*

** The total miles of the stream, may be adjusted on the 2006 303(d) List.*

Maumee River

The Maumee River is located in Allen County, Indiana. The Maumee River flows from the confluence of the St. Marys River and St. Joseph River in the City of Fort Wayne. The Maumee River then flows east through Allen County and across the Indiana-Ohio State line into Ohio. The major tributaries in the Maumee River include Trier Ditch, Bullerman Ditch, Gar Creek, Botern Ditch, Black Creek, Ham Interceptor Ditch, and other tributaries (Figure 2).

The Maumee River is listed on the 2002 and 2004 303(d) Lists for *E. coli*. *E. coli* samples collected at sites on the Maumee River and two of its major tributaries by the Allen County Health Department and the City of Fort Wayne confirm the *E. coli* impairment as listed on the 2004 303(d) List. Stream segment INA0516_M1005 of the Maumee River is not listed for *E. coli*. A reassessment was completed on this segment and it will be listed for *E. coli* on the 2006 303(d) List. The tributaries of Bullerman Ditch and Botern Ditch are listed on the 2004 303(d) List for impaired biotic communities (IBC). The tributary of Black Creek is listed on the 2004 303(d) List for nutrients and algae. The tributary of Ham Interceptor Ditch is listed on the 2004 303(d) List for impaired biotic communities and nutrients (Table 2). The Maumee River portion of this TMDL will only address the *E. coli* impairment on the Maumee River. The additional streams that have been impaired in the Maumee River Basin will be addressed in future TMDLs. The Maumee River is listed on the Ohio 2004 303(d) List for aquatic life impairment but not for recreational uses. Similar to the St. Marys TMDL, the Ohio portion of the Maumee River will be completed at a future time.

Table 2: 2004 303(d) Listings for Maumee River

Waterbody Name	Segment ID Num.	Length (Miles)	Impairment
Maumee River	INA0511_M1007 INA0514_M1006 INA051A_M1003	15.58	*E. coli*
Maumee River	INA0516_M1005	4.34	**E. coli*, FCA Hg & PCBs

Maumee River	INA0518_M1004 INA051C_M1002 INA051D_M1003	9.57	*E. coli*, FCA Hg & PCBs
Bullerman Ditch & other Tribs	INA0514_00	7.76	IBC
Botern Ditch & Tribs	INA0519_T1008	9.69	IBC
Black Creek (Allen County)	INA051B_00	34.37	nutrients algae
Ham Interceptor Ditch	INA051E_00	38.36	IBC, nutrients

**will be added in the 2006 303(d) List*

The purpose of the Maumee River TMDL is to identify the sources and determine the allowable levels of *E. coli* bacteria that will result in the attainment of the applicable WQS in the Maumee River in Allen County, Indiana.

II. *E. coli* TMDL for St. Marys River Watershed

The St. Marys River watershed can be divided into multiple sub-watersheds according to the major tributaries. Each of these major tributaries is impaired for *E. coli* separate from the St. Marys River *E. coli* impairment. These sub-watersheds are Blue Creek, Yellow Creek, Borum Run, Holthouse Ditch, and Nickelsen Creek. This section will address the TMDL required for the *E. coli* impairment in the St. Marys River watershed. Each of the sub-watersheds, in addition to the St. Marys River, will have a separate source assessment, while the numeric target, waste load allocation (WLA), load allocation (LA), and implementation activities will be applied to the entire St. Marys River watershed.

Section 1 - Background for St. Marys River watershed

The St. Marys River watershed was listed for an *E. coli* impairment on Indiana's 2002 and 2004 303(d) Lists. On the 2002 303(d) List, Blue Creek, Gates Ditch, and Little Blue Creek were also listed for an *E. coli* impairment. On the 2004 303(d) List, Habegger Ditch was added for an *E. coli* impairment (Figure 1, Table 3).

Due to additional data collection by IDEM's Assessment Branch in 2004, the 303(d) listing was reassessed for the *E. coli* impairment. Based on the reassessment, for the 2006 303(d) List, the St. Marys River, the Unnamed Tributaries of Blue Creek, Fuch Ditch, Schugg Ditch, Swartz Ditch, Wittmer Ditch No.1, Wittmer Ditch No.2, Farlow Ditch, Peel Ditch, Smith Shoemaker Ditch, Borum Run, Brown Ditch, Miller Ditch, Hanhet Ditch, Bluhm Ditch, Hessler Ditch, Blair Ditch, Holthouse Ditch-Kohne Ditch, St. Marys River Tributary, Gerke Ditch and other tributaries, and Weber Ditch will be added (Figure 1).

The state of Ohio has the St. Marys River listed as impaired for *E. coli* on their 303(d) List. The TMDL for the St. Marys River in Ohio is not scheduled to be developed until 2012. However, Ohio EPA has provided information on the St. Marys River in Ohio in support of the IDEM TMDL Program's development of the St. Marys River watershed TMDL.

This TMDL addresses approximately 290.66 miles of the St. Marys River watershed in Adams and Allen Counties, Indiana, where designated uses are impaired by elevated levels of *E. coli* during the recreational season. Adams and Allen Counties are located in northeast Indiana (Figure 1). All of the thirty-four (34) segments of the listed streams for this TMDL are located in the Great Lakes Basin in hydrologic unit codes 05120201 and 05120202. The description of the study area, its topography, and other particulars are as follows:

Table 3: Impaired Segments addressed by the St. Marys River Watershed E. coli TMDL

Waterbody Name	Segment ID Number(s)	Length (mi)	Impairment
Blue Creek	INA0442_T1007, INA0445_T1006	24.22	*E. coli*
Duer Ditch (Adams) and Other Tribs	INA0445_00	9.33	*E. coli*
Blue Creek Headwaters (Adams)	INA0442_00	8.46	*E. coli*
Habegger Ditch	INA0443_T1008	5.8	*E. coli*
Wittmer Ditch, No. 1	INA0443_T1020	2.98	*E. coli*
Farlow Ditch and Tribs	INA0443_T1019	11.01	*E. coli*
Gates Ditch	INA0443_T1014	1.17	*E. coli*
Little Blue Creek	INA0444_00	22.12	*E. coli*
Borum Run and Tribs	INA0448_00	21.65	*E. coli*
Holthouse Ditch-Kohne Ditch	INA0452_00	10.16	*E. coli*
St. Marys River	INA0449_T1017, INA0453_T1018, INA0454_T1005, INA0454_T1021, INA0461_T1004, INA0463_T1003, INA0465_T1002, INA0448_T1016	37.7	*E. coli*
Junk Ditch	INA0465_00	6.55	*E. coli*
St. Marys River	INA0446_T1015	4.79	*E. coli*
Yellow Creek	INA0447_00	32.79	*E. coli*, IBC, nutrients
Martz Creek-Ruppert Ditch and Unnamed Tributaries	INA0447_T1002	9.82	*E. coli*
St. Marys River Trib	INA0454_T1012	2.84	*E. coli*
Gerke/Weber Ditch and Tribs	INA0453_00	17.53	*E. coli*
Snyder Ditch and Other Tribs	INA0463_00	10.61	*E. coli*
Junk Ditch and Other Tribs	INA0465_00	6.55	*E. coli*
Spy Run Creek	INA0466_T1011	8.75	*E. coli*
Pleasant Mills and Tribs	INA0446_00,	15.3	*E. coli*
Decatur Tribs	INA0449_00	7.12	*E. coli*
Unnamed Tributaries to Spy Run Creek	INA0466_T1012	5.08	*E. coli*
Lowther Neuhaus Ditch	INA0466_T1013	3.03	*E. coli*
Unnamed Tributary to Lowther Neuhaus Ditch	INA0466_T1014	3.00	*E. coli*
St. Marys River	INA0466_T1022	0.5	*E. coli*
St. Marys River –Wilshire	INA0434_00	2.84	*E. coli*
St. Marys River	INA0441_00	0.86	*E. coli*

Historical data collected by IDEM's Assessment Branch documented elevated levels of *E. coli* in the St. Marys River watershed from 1991 to 2004. IDEM's Assessment Branch completed a survey of the watershed for the St. Marys River in 2000. In this survey, IDEM's Assessment Branch sampled four sites, five times, with the samples evenly spaced over a 30-day period from June 12, 2000, to July 10, 2000 (Figure 3). Each of the four sites violated the single sample maximum standard and geometric mean standard. This data was the basis for listing the St. Marys River watershed on the 2002 303(d) List.

IDEM's Assessment Branch completed an intensive survey in 2004. IDEM's Assessment Branch sampled fourteen sites, once every other week from March 2004 to October 2004 (Figure 3). The City of Fort Wayne sampled seven of the same sites as IDEM on opposite weeks from July of 2004 through October of 2004. This enables IDEM to calculate a geometric mean value for these seven sites sampled from July 2004 to October 2004. Each of these sites violated the single sample maximum standard nine to twelve times in the survey. The geometric mean was violated 92% of the time (Attachment A).

The City of Fort Wayne sampled the St. Marys River at two sites weekly during the recreational season from 2001 through 2004. These sites had many violations of the single maximum and geometric mean standards over this time (Figure 3, Attachment A).

The Allen County Health Department conducting a study to determine the impact septic systems have on a waterbody. The Health Department chose sampling sites throughout Allen County that had a cluster of homes on septics with an adjacent stream. Three of Allen County Health Department sampling sites were in the St. Marys River watershed. These sites were sampled weekly during the recreational season from 2001 through 2004. All three of these sites violated the single sample maximum and geometric mean standard multiple times over this time. Some of the single sample maximum standard violations were substantially higher than the water quality standards (Figure 3, Attachment A).

As part of a Clean Water Act Section 319 grant, the Adams County Soil and Water Conservation District sampled twelve sites in the St. Marys River watershed approximately monthly from May of 2000 through May of 2001. The sampling locations focused on the St. Marys River, Blue Creek, and Little Blue Creek. The single sample maximum standard was violated 83% of the time (Figure 3, Attachment A).

Section 2 - Numeric Targets

The impaired designated use for the waterbodies in the St. Marys River watershed is for total body contact recreational use during the recreational season, April 1st through October 31st.

Indiana Administrative Code 327 IAC 2-1.5-8(e)(2), establishes the full body contact recreational use *E. coli* WQS[1] for all waters in the Great Lakes system as follows:

> (2) *E. coli* bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period.

[1] *E. coli* WQS = 125 cfu/100ml or 235 cfu/100ml; 1 cfu (colony forming units)= 1 mpn (most probable number)

The sanitary wastewater *E. coli* effluent limits from point sources in the Great Lakes system during the recreational season, April 1st through October 31st, are also covered under 327 IAC 2-1.5-8(e)(2).

For the St. Marys River watershed during the recreational season (April 1st through October 31st), the target level is set at the *E. coli* WQS of 125 per one hundred milliliters as a 30-day geometric mean based on not less than five samples equally spaced over a thirty day period.

Section 3 - Source Assessment

3.1 - Blue Creek Sub-Watershed

Watershed Characterization

The Blue Creek sub-watershed is located entirely in Adams County. Blue Creek starts in the southwest portion of the county near the Adams-Wells County Line. Blue Creek then flows southeast until it is joined by Habegger Ditch. Blue Creek then turns and starts to flow northeast before discharging into the St. Marys River. Little Blue Creek is the last major tributary to discharge into Blue Creek before it joins the St. Marys River (Figure 4).

A reassessment using the data gathered by IDEM in 2004 was completed on the Blue Creek sub-watershed during the development of the St. Marys River watershed TMDL. In addition to portions of Blue Creek, all of Gates Ditch, and Habegger Ditch being listed as impaired for *E. coli*, the reassessment concluded that the headwaters of Blue Creek, Farlow Ditch and Tributaries, Wittmer No. 1 Ditch and Duer Ditch and other tributaries will be listed on the 2006 303(d) List as impaired for *E. coli*. The 2004 reassessment resulted in the entire Blue Creek sub-watershed scheduled for listing as impaired for *E. coli* on the 2006 303(d) List. The St. Marys River watershed TMDL will address the *E. coli* impairment, as it will appear on the 2006 303(d) List. The data collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

E. coli Data

Twelve of the thirty sampling sites for the St. Marys River watershed are located in the Blue Creek sub-watershed. At one of the twelve sampling sites, Site 3, *E. coli* data was not collected leaving eleven sampling sites in the Blue Creek sub-watershed sampled for *E. coli*. The Adams County Soil and Water Conservation District, from May of 2000 to October of 2000, sampled monthly five of the eleven sampling sites, for *E .coli* (Figure 4). IDEM's Assessment Branch, from March of 2004 to October of 2004, sampled biweekly four of the eleven sampling sites for *E. coli* (Figure 4). The Adams County Soil and Water Conservation District and IDEM both sampled one of the sampling sites, Site 7. The Adams County Soil and Water Conservation District sampled this site from May of 2000 through October of 2000 and April of 2001 through May of 2001 monthly. IDEM's Assessment Branch sampled this site biweekly from March of 2004 through October of 2004. The remaining sampling site, Site 11, (Figure 4) was sampled by the City of Fort Wayne and IDEM's Assessment Branch from March of 2004 to October of 2004. IDEM's Assessment Branch sampled this site biweekly from March of 2004 to October of 2004. The City of Fort Wayne sampled this site on the opposite weeks IDEM's Assessment Branch sampled this site from July of 2004 to October of 2004. This allowed IDEM's TMDL Program to obtain a geometric mean value from the data collected from July of 2004 to October of 2004 (Attachment A).

The data collected by the Adams County Soil and Water Conservation District in 2000 had an *E. coli* single sample maximum standard average violation 89% of the time. The data collected by IDEM and the

City of Fort Wayne in 2004 had an average *E. coli* single sample maximum standard violation 86% of the time and a geometric mean standard violation 100% of the time. The highest single sample maximum standard *E. coli* value was >48,000 cfu/100mL at Site 11 in 2004. Combining all data, the *E. coli* values ranged from just over the single sample maximum standard to >48,000 cfu/100mL. The highest geometric mean value was >22,719 cfu/100mL at Site 11 in 2004.

Seven of the eleven sampling sites represent *E. coli* values for Blue Creek. The remaining five sample sites represent the major tributaries to Blue Creek. All eleven sampling locations were sampled at the mouth of the major tributaries, and had elevated levels of *E. coli*. The sampling sites on Blue Creek also had an elevated level of *E. coli*. The major tributaries in the Blue Creek sub-watershed are listed separately as being impaired for *E. coli*, but it can be concluded that these tributaries are contributing to the *E. coli* impairment in Blue Creek.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 94% of the landuse in the Blue Creek sub-watershed was agriculture. The remaining landuse for the Blue Creek sub-watershed consisted of approximately 5% forested, 0.4% wetlands, 0.7% urban (Figure 5). A comparison of 1992 landuse with aerial photos taken in 2003 shows no substantial changes to the Blue Creek sub-watershed have occurred.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Blue Creek sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. However, many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001. (Smith, T., 2005)

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There are three NPDES permitted facilities located in the Blue Creek sub-watershed (Figure 4, Appendix 1). Pleasant Mill #2/Meshberger Bros. Stone Plant #2 (ING490084) discharges to Blue Creek and does not contain a sanitary component. Bing-Lear Manufacturing Group, Berne (IN0058980) discharges to Habegger Ditch and does not contain a sanitary component. Berne STP (IN0021369) discharges to the Wabash River, which is not located in the St. Marys River watershed. However, the Berne STP effluent outfall did, until several years ago, discharge to Habegger Ditch. Pleasant Mill #2, Meshberger Bros. Stone Plant #2 and the Bing-Lear Manufacturing Group, Berne STP are not sources of *E. coli* to the Blue Creek sub-watershed since there is no sanitary component in their discharge. Even though the Berne STP effluent outfall has a sanitary component to its discharge, its outfall is no longer located on Habegger Ditch, so the Berne STP effluent outfall is also not a source of *E. coli* to the Blue Creek sub-watershed.

Combined Sewer Overflows (CSO)

The City of Berne is the only CSO community in the Blue Creek sub-watershed (Figure 6, Appendix 2). The City of Berne has three CSO discharge points. These three CSO discharge points discharge to Sprunger Ditch, which is a tributary of Habegger Ditch. The City of Berne submitted their CSO Long Term Control Plan (LTCP) in August of 2002. The City of Berne and IDEM's office of Enforcement are currently working on an agreed order to address CSO discharge points in the collection system. CSO discharge points are a source of *E. coli* to the Blue Creek sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are twenty CFOs in the Blue Creek sub-watershed (Figure 4). Three of the CFOs are designated as CAFOs (Figure 4, Appendix 3). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The active animal operations in Blue Creek sub-watershed have no open enforcement actions at this time. However, these operations are still a potential source of *E. coli* for the Blue Creek sub-watershed TMDL.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Blue Creek sub-watershed. However, it is believed that these small livestock operations may be a source of *E. coli* impairment.

<u>3.2 - Yellow Creek Sub-Watershed</u>

Watershed Characterization

The Yellow Creek sub-watershed is located entirely in Adams County. Smith Ditch and Johnson Ditch combine to form Yellow Creek. Straight Branch and Hendricks Ditch flow into Yellow Creek downstream of the Smith Ditch and Johnson Ditch confluence. Yellow Creek flows northeast until it is joined by Martz Ditch. Ruppert Ditch is the major tributary of Martz Ditch. After Martz Ditch joins Yellow Creek, Yellow Creek then flows northwest to the St. Marys River (Figure 7).

A reassessment using the data gathered by IDEM in 2004 was completed on the Yellow Creek sub-watershed during the development of the St. Marys River watershed TMDL. It was determined that the headwater streams are not impaired for *E. coli* and will be delisted on the 2006 303(d) List. This includes the tributaries of Straight Branch, Smith Ditch, Johnson Ditch, and Hendricks Ditch. Yellow Creek, Martz Ditch, and Ruppert Ditch will remain on the 2006 303(d) List as impaired for *E. coli*. The St. Marys River watershed TMDL will address the *E. coli* impairment, as it will appear on the 2006 303(d) List. The data that was collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

E. coli Data

Two of the thirty sampling sites for the St. Marys River watershed are located in the Yellow Creek sub-watershed. One of the two sampling sites is located on Martz Ditch before its confluence with Yellow Creek. IDEM's Assessment Branch from March 2004 to October 2004 sampled this site biweekly. The remaining sampling site was located on Yellow Creek after the confluence of Martz Ditch. This site was sampled by the City of Fort Wayne and IDEM's Assessment Branch from March of 2004 to October of 2004. IDEM's Assessment Branch sampled this site biweekly from March of 2004 to October of 2004. The City of Fort Wayne sampled this site on the opposite weeks IDEM's Assessment Branch sampled this site, from July of 2004 to October of 2004. This allowed IDEM's TMDL Program to obtain a geometric mean value from the data collected from July of 2004 to October of 2004 (Figure 7, Attachment A).

The *E. coli* data collected on Martz Ditch in 2004 have an average *E. coli* single sample maximum standard violation rate 68% of the time. The *E. coli* data collected on Yellow Creek by IDEM and the City of Fort Wayne in 2004 had an average *E. coli* single sample maximum standard violation 84% of the time and a geometric mean standard average violation 100% of the time. The highest single sample maximum standard *E. coli* value was >48,392 cfu/100mL on Yellow Creek in 2004. Combining all data collected in the Yellow Creek sub-watershed, the *E. coli* values ranged from above 300 cfu/100mL to >48,000 cfu/100mL with an average single sample maximum standard violation 76% of the time. The highest geometric mean value was 39,720 cfu/100mL at Site 16 on Yellow Creek in 2004 (Figure 7).

The sampling site on Martz Ditch is at the mouth. The sample taken at the Yellow Creek sampling location downstream of the confluence with Martz Ditch had elevated levels of *E. coli*. Martz Ditch and its tributary are listed separately as being impaired for *E. coli*, but it can be concluded that these tributaries are contributing to the *E. coli* impairment in Yellow Creek.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 95% of the landuse in the Yellow Creek sub-watershed was agriculture. The remaining landuse for the Yellow Creek sub-watershed consisted of approximately 4% forested, 0.4% wetlands, 1% urban (Figure 8). A comparison of 1992 landuse with aerial photos taken in 2003 shows no substantial changes to the Yellow Creek sub-watershed have occurred.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of

E. coli. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Yellow Creek sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. The Arcadia Subdivision is located in the Yellow Creek sub-watershed. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001. (Smith, T., 2005)

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There is one NPDES permitted facility located in the Yellow Creek sub-watershed (Figure 7, Appendix 1). Monroe Water Department (IN0048151) discharges to Yellow Creek and does not contain a sanitary component. Since Monroe Water Department does not have a sanitary component, it is not a source of *E. coli* to the Yellow Creek sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are five CFOs in the Yellow Creek sub-watershed, none of which are considered CAFOs (Figure 7, Appendix 3). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations “not cause or contribute to an impairment of surface waters of the state.” The active animal operations in Yellow Creek sub-watershed have no open enforcement actions at this time. However, these operations are still a potential source of *E. coli* for the Yellow Creek sub-watershed.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Yellow Creek sub-watershed. However, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

3.3 - Borum Run Sub-Watershed

Watershed Characterization

The Borum Run sub-watershed is located entirely in Adams County. The headwater streams of Blair Ditch, Bluhm Ditch, Hahnert Ditch, and Hessler Ditch combine to form Borum Run. Borum Run flows northeast and discharges into the St. Marys River. Miller Ditch is the only major tributary to Borum Run (Figure 9).

A reassessment using the data gathered by IDEM in 2004 was completed on the Borum Run sub-watershed during the development of the St. Marys River watershed TMDL. The Borum Run sub-watershed was not listed as being impaired on any 303(d) List. Based on the data gathered by IDEM's Assessment Branch in 2004, the reassessment concluded that the entire Borum Run sub-watershed is impaired for *E. coli* and Borum Run will be listed as impaired for *E. coli* on the 2006 303(d) List. The 2006 303(d) listing will include the following waterbodies: Borum Run, Miller Ditch, Hessler Ditch, Hahnert Ditch, Bluhm Ditch, and Blair Ditch. The St. Marys River watershed TMDL will address the *E. coli* impairment as it will appear on the 2006 303(d) List.

E. coli Data

One of the thirty sampling sites for the St. Marys River watershed is located in the Borum Run sub-watershed. This sampling site is located near the mouth of Borum Run. This site was sampled biweekly by IDEM's Assessment Branch from March 2004 to October 2004 (Figure 9, Attachment A).

The *E. coli* data collected on Borum Run in 2004 had an average *E. coli* single sample maximum standard violation 59% of the time. The highest single sample maximum standard *E. coli* value was 11,199 cfu/100mL on Borum Run in 2004.

The location of the sampling site on Borum Run is representative of the Borum Run sub-watershed. Since the landuses in the Borum Run sub-watershed are homogenous, it can be concluded that the tributaries are contributing to the *E. coli* impairment in Borum Run.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 93% of the landuse in the Borum Run sub-watershed was agriculture. The remaining landuse for the Borum Run sub-watershed consisted of approximately 6% forested, 0.07% wetlands, 0.7% urban (Figure 10). A comparison of 1992 landuse with the aerial photos taken in 2003 shows no substantial changes to the Borum Run sub-watershed have occurred.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Borum Run sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001 (Smith, T., 2005).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There is one NPDES permitted facility located in the Borum Run sub-watershed (Figure 9, Appendix 1). The White Horse Mobile Home Park (IN0044199) has a total residual chlorine limit, which is an indication of a sanitary component to its discharge. The facility did have significant water quality violations, including total residual chlorine, in 2001. These violations did result in an enforcement action and an agreed order. Since the completion of these enforcement activities, which resulted in changes at the treatment facility, the White Horse Mobile Home Park has been in compliance with the water quality standards.

Previously, facilities with design flows less than 1 MGD (typically minor municipals and semipublics) were not required to have *E. coli* effluent limits or conduct monitoring for *E. coli* bacteria, provided they maintained specific total residual chlorine levels in the chlorine contact tank. The assumption was that as long as chlorine levels were adequate in the chlorine contact tank, the *E. coli* bacteria would be deactivated and compliance with the *E. coli* WQS would be met by default. The original basis for allowing chlorine contact tank requirements to replace bacteria limits was based on fecal coliform, not *E. coli*. No direct correlation between the total residual chlorine levels and *E. coli* bacteria can be conclusively drawn. Further, it has been shown that exceedances of *E. coli* bacteria limits may still occur when the chlorine contact tank requirements are met. Due to the complications of comparing total residual chlorine to *E. coli*, it is difficult to determine to what extent, if any, this discharger could be contributing to the *E. coli* impairment in the Borum Run sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are no CFOs or CAFOs in the Borum Run sub-watershed

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Borum Run sub-watershed. However, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

<u>3.4 - Holthouse Ditch Sub-Watershed</u>

Watershed Characterization

The Holthouse Ditch sub-watershed is located entirely in Adams County. Bracht Ditch and Berry Ditch combine to form Holthouse Ditch. Holthouse Ditch flows northeast to its confluence with the St. Marys River (Figure 11).

A reassessment using the data gathered by IDEM in 2004 was completed on the Holthouse Ditch sub-watershed during the development of the St. Marys River watershed TMDL. It was determined that the headwater streams are not impaired for *E. coli* and will be delisted on the 2006 303(d) List. This includes the tributaries of Bracht Ditch and Berry Ditch. Holthouse Ditch and Kohne Ditch will remain on the 2006 303(d) List as impaired for *E. coli*. The St. Marys River watershed TMDL will address the *E. coli* impairment as it will appear on the 2006 303(d) List. The data that was collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

E. coli Data

One of the thirty sampling sites for the St. Marys River watershed is located in the Holthouse Ditch sub-watershed. This sampling site is located on Holthouse Ditch downstream of Kohne Ditch. The City of Fort Wayne and IDEM's Assessment Branch from March of 2004 to October of 2004 sampled the site. IDEM's Assessment Branch sampled this site biweekly from March of 2004 to October of 2004. The City of Fort Wayne sampled this site from July of 2004 to October of 2004 on the opposite weeks that IDEM's Assessment Branch sampled the site. This allowed IDEM's TMDL Program to obtain a geometric mean value from the data collected from July of 2004 to October of 2004 (Figure 11, Attachment A).

The *E. coli* data collected on Holthouse Ditch by IDEM and the City of Fort Wayne in 2004 had an average *E. coli* single sample maximum standard violation of 62% of the time and a geometric mean standard violation of 72% of the time. The highest single sample maximum standard *E. coli* value was 39,720 cfu/100mL on Holthouse Ditch. The highest geometric mean value was 32,081 cfu/100mL at this site.

The sampling site on Holthouse Ditch was taken downstream of Kohne Ditch and had an elevated level of *E. coli*. Kohne Ditch is listed along with Holthouse Ditch on the 303(d) List. It can be concluded that based on the location of the sampling site during the sampling event completed in 2004 that Kohne Ditch is contributing to the *E. coli* impairment in Holthouse Ditch.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 93% of the landuse in the Holthouse Ditch sub-watershed was agriculture. The remaining landuse for the

Holthouse Ditch sub-watershed consisted of approximately 3% forested, 1% wetlands, 2% urban, and 1% water (Figure 12). A comparison of 1992 landuse with the aerial photos taken in 2003 shows no substantial changes to the Holthouse Ditch sub-watershed have occurred.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Holthouse Ditch sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001 (Smith, T., 2005).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There is one NPDES permitted facility located in the Holthouse Ditch sub-watershed (Figure 11, Appendix 1). The Country Acres Association (IN0055417) has a total residual chlorine limit, which is an indication of a sanitary component to its discharge. This facility has had significant violations of their total residual chlorine limits, among other violations, over the past four years. IDEM's TMDL Program has brought this to the attention of IDEM's Inspector, IDEM's Compliance Section, IDEM's Enforcement Section, and IDEM's Data Management Section. These sections are reviewing the violations more closely to understand the nature of the violations.

Previously, facilities with design flows less than 1 MGD (typically minor municipals and semipublics) were not required to have *E. coli* effluent limits or conduct monitoring for *E. coli* bacteria, provided they maintained specific total residual chlorine levels in the chlorine contact tank. The assumption was that as long as chlorine levels were adequate in the chlorine contact tank, the *E. coli* bacteria would be deactivated and compliance with the *E. coli* WQS would be met by default. The original basis for allowing chlorine contact tank requirements to replace bacteria limits was based on fecal coliform, not *E. coli*. No direct correlation between the total residual chlorine levels and *E. coli* bacteria can be conclusively drawn. Further, it has been shown that exceedances of *E. coli* bacteria limits may still occur when the chlorine contact tank requirements are met. Due to the complications of comparing total residual chlorine to *E. coli*, it is difficult to determine to what extent, if any, this discharger could be a source of *E. coli* in the Holthouse Ditch sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are eleven CFOs in the Holthouse Ditch sub-watershed, none of which are considered CAFOs (Figure 11, Appendix 3). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The active animal operations in Holthouse Ditch sub-watershed have no open enforcement actions at this time. However, these operations are still a potential source of *E. coli* for the Holthouse Ditch sub-watershed.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Holthouse Ditch sub-watershed; however, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

<u>3.5 - Nickelsen Creek Sub-Watershed</u>

Watershed Characterization

The Nickelsen Creek sub-watershed is located in Adams and Allen Counties. Nickelsen Creek starts in the northwest corner of Adams County and flows north into Allen County where it discharges to the St. Marys River. Lambert Ditch is the major tributary to Nickelsen Creek and discharges to Nickelsen Creek at the Adams-Allen County Line (Figure 13).

A reassessment using the data gathered by IDEM in 2004 was completed on the Nickelsen Creek sub-watershed during the development of the St. Marys River watershed TMDL. Nickelsen Creek was not listed on the 2004 303(d) List but will be listed on the 2006 303(d) List for *E. coli*. It was determined that Lambert Ditch should not be listed as impaired for *E. coli*. This conclusion was based on the sampling location on Nickelsen Creek in comparison to the location of the confluence of Lambert Ditch to Nickelsen Creek. The St. Marys River watershed TMDL will address the *E. coli* impairment as it will appear on the 2006 303(d) List. The data that was collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

E. coli Data

One of the thirty sampling sites for the St. Marys River watershed is located in the Nickelsen Creek sub-watershed (Figure 13, Attachment A). This sampling site is located on Nickelsen Creek upstream of the confluence of Lambert Ditch. This site was sampled by the City of Fort Wayne and IDEM's Assessment Branch from March of 2004 to October of 2004. IDEM's Assessment Branch sampled this site biweekly from March of 2004 to October of 2004. The City of Fort Wayne sampled this site from July of 2004 to October of 2004 on the opposite weeks IDEM's Assessment Branch sampled this site. This allowed

IDEM's TMDL Program to obtain a geometric mean value from the data collected from July of 2004 to October of 2004.

The *E. coli* data collected on Nickelsen Creek by IDEM's Assessment Branch and the City of Fort Wayne in 2004 had an average *E. coli* single sample maximum standard violation 72% of the time and a geometric mean standard violation 91% of the time. The highest single sample maximum standard *E. coli* value was >48,400 cfu/100mL. The highest geometric mean value was 16,082 cfu/100mL.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 93% of the landuse in the Yellow Creek sub-watershed was agriculture. The remaining landuse for the Yellow Creek sub-watershed consisted of approximately 5% forested, 1% wetlands, 0.3% urban (Figure 14). A comparison of 1992 landuse with the aerial photos taken in 2003 shows no substantial changes to the Yellow Creek sub-watershed have occurred.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Nickelsen Creek sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001(Smith, T., 2005).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There are no NPDES permitted facilities located in the Nickelsen Creek sub-watershed.

Storm Water General Permit Rule 13

There is one municipal separate storm sewer system (MS4) community, Allen County, in the Nickelsen Creek sub-watershed. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). It can be determined that the MS4 community of Allen County is a potential source of *E. coli* to the Nickelsen Creek sub-watershed. However, it is difficult to determine, prior to the completion of the permit requirements, if this MS4 community is a significant source of *E. coli* in the Nickelsen Creek sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are two CFOs in the Nickelsen Creek sub-watershed, none of which are considered CAFOs (Figure 13, Appendix 3). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The active animal operations in Nickelsen Creek sub-watershed have no open enforcement actions at this time. However, these operations are still a potential source of *E. coli* for the Nickelsen Creek sub-watershed.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Nickelsen Creek sub-watershed. However, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

3.6 - St. Marys River

Watershed Characterization

The St. Marys River in Adams County is located in a predominantly agricultural watershed. The St. Marys River flows from Ohio into the middle of Adams County. Upon entering Indiana, the St. Marys River flows northwest through the City of Decatur in Adams County into Allen County. The St. Marys River flows through the City of Fort Wayne in Allen County before it joins the St. Joseph River to create the Maumee River. Four of the sub-watersheds mentioned in Section 3 are located entirely in the Adams County portion of the St. Marys River. These sub-watersheds are Blue Creek, Yellow Creek, Borum Run, and Holthouse Ditch. The Nickelsen Creek sub-watershed starts in Adams County, but flows into Allen County before joining the St. Marys River. In addition to these five sub-watersheds, numerous tributaries that are impaired for *E. coli* enter the St. Marys River. These tributaries include Pleasant Mills and Tributaries, Decatur Tributaries, Gerke/Weber Ditch and Tributaries, St. Marys River Tributary, Snyder Ditch and other tributaries, and Junk Ditch and other tributaries (Figure 15).

A reassessment using the data gathered by IDEM's Assessment Branch in 2004 was completed on the St. Marys River during the development of the St. Marys River watershed TMDL. On the 2004 303(d) List, segment INA0454_T1012 of the St. Marys River was not listed as being impaired for *E. coli*. The reassessment concluded that on the 2006 303(d) List that segment INA0454_T1012 of the St. Marys River will be listed as impaired for *E. coli*. In addition, the reassessment concluded that a number of the tributaries were contributing to the *E. coli* impairment on the St. Marys River and should be listed as impaired on the 2006 303(d) List. These tributaries include Pleasant Mills and tributaries, Decatur Tributaries, Gerke/Weber Ditch and tributaries, Snyder Ditch and other tributaries, and Junk Ditch and other tributaries. The St. Marys River watershed TMDL will address the *E. coli* impairment as it will appear on the 2006 303(d) List.

E. coli Data

Ten of the thirty sampling sites for the St. Marys River watershed are located on the St. Marys River (Attachment A). Four of the ten sampling sites (Figure 16) were sampled by the Adams County Soil and Water Conservation District from May of 2000 through October of 2000 and April of 2001 through May of 2001, monthly. Combining the *E. coli* data at these four sampling sites, these four sites violated the single sample maximum standard approximately 85% of the time. The highest single sample maximum standard was 24,000 cfu/100mL at Site 19.

Two of the ten sampling sites (Figure 16) on the St. Marys River were sampled by the City of Fort Wayne in 2001 through 2004 weekly from April to October. Combining the data at these two sites per year, in 2001 the single sample maximum daily standard was violated approximately 80% of the time and violated the geometric mean 100% of the time. The highest single sample maximum *E. coli* value in 2001 was 6,000 cfu/100mL. In 2002, the single sample maximum daily standard violated approximately 65% of the time and the geometric mean standard violated approximately 98% of the time. The highest single sample maximum *E. coli* value in 2002 was 5,400 cfu/100mL. In 2003, the single sample maximum daily standard violated 30% of the time and the geometric mean standard violated 38% of the time. The highest single sample maximum *E. coli* value in 2003 was 5400 cfu/100mL. In 2004, the single sample maximum daily standard violated approximately 74% of the time. The highest single sample maximum *E. coli* value in 2004 was >48,400 cfu/100mL.

Two of the ten sampling sites were sampled by IDEM's Assessment Branch biweekly from March of 2004 to October of 2004. The City of Fort Wayne sampled this site from July of 2004 to October of 2004 on the opposite weeks IDEM's Assessment Branch sampled this site. This allowed IDEM's TMDL Program to obtain a geometric mean value from the data collected from July of 2004 to October of 2004. The single sample maximum standard was violated approximately 71% of the time and the geometric mean standard violated 100% of the time. The highest *E. coli* value was >48,400 cfu/100mL.

IDEM's Assessment Branch, the City of Fort Wayne, and the Adams County Soil and Water Conservation District all sampled one of the ten sampling sites. IDEM's Assessment Branch sampled the site biweekly from March 2004 through October 2004. The City of Fort Wayne sampled this site from July 2004 through October 2004 on opposite weeks IDEM's Assessment Branch sampled this site. The Adams County Soil and Water Conservation District sampled this site from May of 2000 through October of 2000 and April of 2001 through May of 2001, monthly. The data collected in 2004 had a single sample maximum standard violation 60% of the time and a geometric mean violation 100% of the time. The highest *E. coli* value in 2004 was 12,260 cfu/100mL. The data collected in 2000 and 2001 had a single sample maximum standard violation 75% of the time. The highest *E. coli* value in 2002 to 2001 was 3,200 cfu/100mL.

Adams County Soil and Water Conservation District and IDEM's Assessment Branch (Figure 16) both sampled the last site, Site 14. The Adams County Soil and Water Conservation District sampled this site from May of 2000 through October of 2000 and April of 2001 through May of 2001, monthly. IDEM's Assessment Branch sampled this site from March 2004 through October of 2004, biweekly. The single sample maximum standard in 2000 to 2001 was violated 75% of the time. The highest *E. coli* value was

13,600 cfu/100mL. In 2004, the single sample maximum standard was violated 75% of the time. The highest *E. coli* value was >24,200 cfu/100mL.

Tributaries

Each of the sub-watersheds described in Section 3.0 has a sampling point located close to the mouth of the major waterbody in the sub-watershed. This site was chosen to represent the amount of *E. coli* coming into the St. Marys River from that particular sub-watershed. Each of these sub-watersheds is impaired for *E. coli*. Along with these sub-watersheds, many tributaries along the St. Marys River in Adams County are also impaired for *E. coli*. Based on the *E. coli* data collected on the St. Marys River and its major tributaries, it can be concluded that these tributaries are contributing to the *E. coli* impairment in St. Marys River (Figure 16).

St. Marys River in Ohio

The St. Marys River is impaired in Ohio for *E. coli*. Site 12 was taken on the St. Marys River in the town of Wilshire, Ohio. This site was sampled to represent the load of *E. coli* coming into Indiana from Ohio. This site confirmed that the St. Marys River, before it enters Indiana, is impaired for *E. coli* and is contributing to the *E. coli* impairment on the St. Marys River in Indiana.

Landuse

IDEM assessed landuse using the 1992 Gap Analysis Program (GAP). In 1992, approximately 78% of the landuse along the St. Marys River was agriculture. The remaining landuse the area along the St. Marys River consisted of approximately 12% urban, 1% wetlands, 8% urban (Figure 17). A comparison of landuse information from 1992 with aerial photos taken in 2003 shows there is no substantial change to the area along the St. Marys River.

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the St. Marys watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of *E. coli* impairment in waterbodies. In 2001, the Adams County Health Department completed a study to identify homes that have only septic tanks and no additional treatment systems throughout the county. Many of these systems then discharge directly to a stream or to a field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, approximately 10,000 residents, in rural Adams County have only a septic tank and no additional treatment for their wastewater. This study also identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to connecting to a municipal system. Six of the seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, the Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001 (Smith, T., 2005).

As was mentioned earlier, the Allen County Health Department conducted a study to see the potential effect a community of homes with septic systems has on a stream. Communities of homes were chosen throughout Allen County. Three of these communities are located along the St. Marys River. Site 26 is representative of a community in Poe (Figure 16). This community is connected to a pipe that runs over the bank into the St. Marys River. The Allen County Health Department took the sample from the pipe as the discharge came down the bank of the St. Marys River. This site represents approximately seventy homes, several businesses, and several churches. Most of these homes do not have a permit for a septic system by the Allen County Health Department and have around a 90% failure rate (Chapple, G. 2005). The sampling data collected by the Allen County Health Department, weekly during the recreational season from 2001 through 2004 show *E. coli* values no lower than 250 cfu/100mL and as high as >2,000,000 cfu/100mL.

Site 27 is the second Allen County Health Department sampling site located along the St. Marys River. Site 27 represents a natural drain located on the Westside of US 27, south of Monroeville Road (Figure 16). This sampling site represents two communities. The community on the east side has approximately fifty homes and a church with a school. The community on the west side is a mobile home park with approximately forty trailers. These two communities were connected to municipal sewers in February of 2003. The Allen County Health Department data collected weekly during the recreational season from 2001 to 2004 does show a reduction in the *E. coli* level between the 2003 and 2004 sampling events. This site went from violating 100% of the time in 2003 to violating 79% in 2004. The *E. coli* values in 2003 ranged from 1200 cfu/100mL to 340,000 cfu/100mL to values in 2004 ranging from 300 cfu/100mL to 56,000 cfu/100mL.

Site 28 is the third Allen County Health Department sampling site located along the St. Marys River. Site 28 represents an older subdivision located at the intersection of Bluffton Road and Hamilton Road. This older subdivision drains to Thiele Drain/Harber Ditch. This community was sampled at Bluffton Road, north of I-469, which is north of the community. This older subdivision has approximately twenty homes. On aerial photos, the sampling site is surrounded by an elementary school on the east side and a warehouse on the west side. Both of these buildings are connected to municipal sewer systems. Some of the homes in this community are newer and have absorption fields. The Allen County Health Department *E. coli* data was also collected weekly during the recreational season from 2001 to 2004. This site has an average single sample violation of 77%, which is lower than the two previous sites. This lower average can be attributed to the sampling location. The high *E. coli* values range in the 100,000's cfu/100mL.

Overall, the data collected at these three sites show significant septic systems failure in Allen County. Septic systems are a significant source of *E. coli* to the St. Marys River in Allen, as well as, in Adams County.

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

Ten permitted NPDES facilities discharge into the St. Marys River or its tributaries that are not represented in the five sub-watersheds (Figure 18, Appendix 1). Three of the ten permitted facilities have *E. coli* limits. These are Decatur STP (IN0039314), Hessen Utilities/Country Court Estates MHP (IN0045292), and Hoagland STP- Allen County Regional Sewer District (IN0048119).

The Decatur STP discharges to the St. Marys River. This facility has violations of their *E. coli* limits in 2003. However, according to IDEM's inspector, this was due to the heavy rain events and flooding of the St. Marys River. Since, the Decatur STP is not violating, except during extreme weather conditions, this facility is not a significant source of *E. coli* to the St. Marys River.

Hessen Utilities/Country Court Estates MHP discharges to Marion Ditch, which is a tributary to the St. Marys River. This facility has had *E. coli* limits since July of 2004. Prior to the initiation of *E. coli* limits, Hessen Utilities/Country Court Estates MHP had total residual chlorine limits. IDEM's TMDL Program has found a significant record of violations of their total residual chlorine limit since 2002. Out of the four *E. coli* values from the facility in 2004, three of them violated the *E. coli* water quality standard. Currently, there is no open enforcement case for this facility. Due to the significant violations at Hessen Utilities/Country Court Estates MHP, this facility is a significant source of *E. coli* to the St. Marys River.

The Hoagland WWTP/Allen County Regional Sewer District discharges to Houk Ditch, which is a tributary to the St. Marys River. This facility has not reported violations of their *E. coli* water quality standard. Therefore, the Hoagland WWTP/Allen County Regional Sewer District is not a significant source of *E. coli* to the St. Marys River.

Two of ten NPDES facilities have total residual chlorine limits. These facilities are Oak Ridge Estates MHP (IN0036901) and Mill Road Estates (IN0109835). Previously, facilities with design flows less than 1 MGD (typically minor municipals and semipublics) were not required to have *E. coli* effluent limits or conduct monitoring for *E. coli* bacteria, provided they maintained specific total residual chlorine levels in the chlorine contact tank. The assumption was that as long as chlorine levels were adequate in the chlorine contact tank, the *E. coli* bacteria would be deactivated and compliance with the *E. coli* WQS would be met by default. The original basis for allowing chlorine contact tank requirements to replace bacteria limits was based on fecal coliform, not *E. coli*. No direct correlation between the total residual chlorine levels and *E. coli* bacteria can be conclusively drawn. Further, it has been shown that exceedances of *E. coli* bacteria limits may still occur when the chlorine contact tank requirements are met.

Oak Ridge Estates MHP has had significant violations of its total residual chlorine limit from 2000 to 2004 that could have affected the sampling completed in 2001 and 2004. IDEM's inspector sent the facility an Inspection Summary/Violation letter in April of 2004. In response to this letter, the facility hired a contractor to address the Summary/Violation letter. The data that the facility has submitted to IDEM in 2005 has not shown total residual chlorine limit violations. Due to the complications of comparing total residual chlorine to *E. coli*, it is difficult to determine to what extent this discharger is a source of *E. coli* to the St. Marys River.

Mill Road Estates has had significant violations of its total residual chlorine limit that could have affected the sampling completed in 2001 and 2004. The violations have resulted in an enforcement action and an agreed order. To date, according to IDEM's Enforcement Section the requirements in the agreed order have not been met by the facility. Due to the complications of comparing total residual chlorine to *E. coli*, it is difficult to determine to what extent this discharger is a source of *E. coli* to the St. Marys River.

The remaining five NPDES permitted facilities that discharge to the St. Marys River do not have a sanitary component to their discharge or are a pretreatment permit. These facilities include Ruan Transport Corporation (INP00194), Bunge North American LLC/Central Soya (IN0000591), BandB Custom Plating (IN0052302), Stone-Street Quarry (IN0000612), and Cintas Mechanical Laundry Division (ING250055). Since these five facilities do not contain a sanitary component to their discharge, or do not discharge to a stream, they are not a source of *E. coli* to the St. Marys River.

Combined Sewer Overflows (CSO) & Sanitary Sewer Overflows (SSO)

There are two CSO communities along the St. Marys River (Figure 19, Appendix 2). The City of Decatur has four CSO discharge points. All of the City of Decatur's CSO discharge points discharge to the St. Marys River. The City of Decatur submitted their CSO Long Term Control Plan to IDEM in July of 2002. The City of Fort Wayne has twenty-six CSO discharge points and one SSO discharge point. Of the twenty-six CSO discharge points, twenty-four of them discharge directly to the St. Marys River. The remaining two CSO discharge points and the one SSO discharge to tributaries that then go to the St. Marys River. The City of Fort Wayne submitted their CSO Long Term Control Plan to IDEM in December of 2004. SSOs are not a permitted activity and are an illegal discharge. CSO discharge points and SSO outfalls are a significant source of *E. coli* to the St. Marys River.

Storm Water General Permit Rule 13

There are three municipal separate storm sewer system (MS4) communities; the City of Decatur, the City of Fort Wayne, and Allen County in the St. Marys River. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). It can be determined that the MS4 communities of Allen County and the City of Fort Wayne and the City of Decatur are a potential source of *E. coli* to the St. Marys River. However, prior to the completion of the permit requirements, it is difficult to determine the magnitude of *E. coli* impact these MS4 communities have on St. Marys River.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are nine CFOs near the St. Marys River, none of which are considered CAFOs (Figure 20, Appendix 3). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The active animal operations near the St. Marys River have no open enforcement actions at this time. However, these operations are still a potential source of *E. coli* for the St. Marys River.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the St. Marys River. However, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

Section 4 - Linkage Analysis

The linkage between the *E. coli* concentrations in the St. Marys River watershed and the potential sources of *E. coli* provides the basis for the development of this TMDL. Analysis of this relationship allows for estimating the total assimilative capacity of the stream and any needed load reductions. Water quality duration curves were created for the sites in the St. Marys River watershed that were sampled by IDEM and the City of Fort Wayne in 2004. A flow duration interval is described as a percentage. Zero (0) percent corresponds to the highest stream discharge (flood condition) and 100 percent corresponds to the lowest discharge (drought condition). These sampling sites are representative of the hydrodynamics of the St. Marys River watershed (Attachment B). This section will discuss the water quality duration curves and the linkage of Section 3.0 for each sub-section of the St. Marys River watershed and the St. Marys River.

4.1 - Blue Creek Sub-Watershed

4.1.1 Water Quality Duration Curves

Water quality duration curves were created for six of the ten sampling sites in the Blue Creek sub-watershed (Attachment C). Site LES040-0099 is located at the mouth of Habegger Ditch. This site had an average geometric mean of 1007 cfu/100mL. Site LES040-0023 is located at Gates Ditch, which also represents sources coming from Farlow Ditch. This site had an average geometric mean of 1748 cfu/100mL. According to the water quality duration curves, *E. coli* violations occurred more consistently at Site LES040-0023, than at Site LES040-0099. This indicates a more constant source of *E. coli* at Site LES040-0023, than at site LES040-0099.

Site LES040-0011 is located on Blue Creek below the confluence of Gates Ditch to Blue Creek. The geometric mean value for Site LES040-0011 is 1074 cfu/100mL. According to the water quality duration curves, the *E. coli* values are similar to Sites LES040-0099 and LES040-0023. This indicates there are additional constant sources of *E. coli*.

Site LES040-0010 is located at the mouth of Little Blue Creek. The average geometric mean value at this site is 815 cfu/100mL. This is the lowest average geometric mean value of the six sites in the Blue Creek sub-watershed. The *E. coli* violations are highest during mid-range to moist flow conditions, which is different than seen at the previous three sites. Sources of *E. coli* that spike during mid-range to moist flow conditions are caused by precipitation events and runoff.

Site LES040-0066 is located on Blue Creek below the confluence of Little Blue Creek into Blue Creek. The average geometric mean at this site is 856 cfu/100mL. This is a decrease from the *E. coli* values at the upstream site, Site LES040-0011, and a increase in *E. coli* values at LES040-0010 located at the mouth of Little Blue Creek. This decrease in *E. coli* values indicates that Little Blue Creek is diluting Blue Creek. According to the water quality duration curves, from Site LES040-0011 to Site LES040-0066, there is a leveling of the *E. coli* values over the flow conditions. This indicates that while runoff does play an important part in the water quality impairment, there are still many constant sources of *E. coli* in the watershed.

Site LES040-0009 is located near the mouth of Blue Creek after the confluence of the Unnamed Tributary (Duer Ditch). The average geometric mean at this site is 1243 cfu/100mL. In comparison to the upstream sites in the Blue Creek sub-watershed, the water quality duration curve for this site indicates the *E. coli* levels are increasing in conjunction with the stream flow levels.

4.1.2 Source Linkage

The landuse in this sub-watershed is predominately agricultural. Row crops comprise 88% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure, runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* value during mid-range to high flow conditions indicates the presence of *E. coli* transportation by field tiles.

Pasture is 11% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals located in these smaller animal operations are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes in *E. coli* levels during extreme high flow conditions due to runoff or flooding which carries large quantities of *E. coli* at one time.

This area has Amish communities. Amish communities are not required to follow state guidelines for waste removal. Therefore, the specific extent of the Amish community impact on the *E. coli* impairment for these streams is unknown; however, Amish communities are considered a source of E. coli in this watershed.

There is a lack of *E. coli* sampling for Farlow Ditch, and Duer Ditch and other tributaries. The location of the sampling sites in this sub-watershed indicates that these tributaries are contributing to the *E. coli* impairment. It is unclear as to the magnitude that these tributaries contribute to the *E. coli* impairment.

None of the NPDES permitted facilities in this sub-watershed contain a sanitary component in their discharge; therefore, these facilities are not sources of *E. coli*.

Permitted CFOs and CAFOs are clustered in the headwaters of Blue Creek. CFOs and CAFOs could be sources of *E. coli* during high flow conditions on the water quality duration curve. These facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility. However, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department (Adams County Health Department personal communication). The septic systems described by this information would provide a constant source of *E. coli* particularly during low to mid-range flow conditions. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe that discharges to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

There are three CSO discharge points from the town of Berne in this sub-watershed. Site LES040-0099 and Site LES040-0023 are located downstream of these CSO discharge points. CSO discharge points are shown on water quality duration curves during high flow events. Sites LES040-0099 and LES040-0023 show higher *E. coli* values during high flows, than any of the other six sampling sites in this sub-watershed. It can be concluded that CSO discharge points are a source of *E. coli* in this sub-watershed.

4.1.3 Conclusions

The *E. coli* data has an average single sample maximum violation 85% of the time and a geometric mean violation 100% of the time. There are no known NPDES permits, CFO, or CAFO violations. CSO discharge points from the town of Berne are a significant source of *E. coli*. Based on the water quality duration curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources, which include small animal operations, Amish communities, wildlife, and leaking and failing septic systems.

4.2 - Yellow Creek Sub-Watershed

4.2.1 Water Quality Duration Curves

Water quality duration curves were created for the two sampling sites in the Yellow Creek sub-watershed (Attachment C). In 2004, IDEM sampled both sites and the City of Fort Wayne sampled one of the sites. Site LES040-0040 is located at the mouth of Martz Ditch. The geometric mean value at this site was 531 cfu/100mL. According to the water quality duration curves, there are no violations during dry flow conditions. Most of the violations for *E. coli* occur during the mid-range to moist conditions. This could be due to the small drainage area, 9.8 square miles, of Martz Ditch at this site. Due to the small drainage area, precipitation quickly affects this stream. During dry conditions, base flow in the stream is minimal, so there are fewer continuous sources of *E. coli*. During higher flow conditions, sources of *E. coli* enter the stream during the "first flush" and then the water moves quickly through the stream. High flow conditions occur after the "first flush" has moved through the stream, causing the peaks of *E. coli* to be less in smaller drainage area streams. The water quality duration curves illustrate this point.

Site LES040-0038 is located on Yellow Creek after the confluence of Martz Ditch to Yellow Creek. The average geometric mean value at this site is 1150 cfu/100mL. Unlike Site LES040-0040, this site has continuous sources of *E. coli* as indicated by the *E. coli* values during dry conditions on the water quality duration curves. In addition, the high flow *E. coli* values are higher than at Site LES040-0038, which is consistent with larger drainage area streams that have a less flashy response to precipitation.

4.2.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 87% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles themselves are not sources of *E. coli*, but they can carry *E. coli* from land-applied manure, runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* values during mid-range to high flow conditions indicate the presence of *E. coli* transportation by field tiles.

Pasture comprises 8% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

Amish communities will more likely be found in the headwaters of this sub-watershed. Amish communities are not required to follow state guidelines for waste removal. Therefore, the significance of the Amish community impact on the *E. coli* impairment for these streams is unknown.

Due to a lack of sampling in the headwater streams in this sub-watershed, the headwater streams are not listed as impaired. Since there are known sources of *E. coli* in the headwater streams, the assumption can be made that these headwater streams are contributing to the *E. coli* impairment in the downstream sections of this sub-watershed. However, it is unclear as to the magnitude that these tributaries play a part in the impairment.

None of the NPDES permitted facilities in this sub-watershed contain a sanitary component in their discharge and are not sources of *E. coli*.

Permitted CFOs are found in the impaired and non-impaired sections of Yellow Creek sub-watershed. CFOs and CAFOs could be shown on the water quality duration during high flow conditions. Though these facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. One of the six communities, Arcadia Village Subdivision, is located in this sub-watershed. According to the water quality duration curve for Site 16, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also be failing during higher flow conditions by leaching to a field tile or other type of pipe to the stream. For Site LES040-0040, in particular, violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

4.2.3 Conclusions

The *E. coli* data has an average single sample maximum violation 76% of the time and a geometric mean violation 100% of the time. There are no known NPDES permits, CFO, and CAFO violations. Based on the water quality durations curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources which include small animal operations, Amish communities, wildlife, and leaking and failing septic systems.

<u>4.3 - Borum Run Sub-Watershed</u>

4.3.1 Water Quality Duration Curves

A water quality duration curve was created for the sampling site in the Borum Run sub-watershed (Attachment C). Site LES040-0097 is located at the mouth of Borum Run. The geometric mean value at this site is 259 cfu/100mL. According to the water quality duration curves, there are no violations during dry flow conditions. Most of the violations for *E. coli* occur during the mid-range to moist conditions. This could be due to the small drainage area, 14.4 square miles, of Borum Run at this site. Due to the small drainage area, precipitation more quickly affects this stream. During dry conditions, base flow is minimal in the stream, so there are fewer continuous sources of *E. coli*. During higher flow conditions, sources of *E. coli* to enter the stream during the “first flush” and then the water moves quickly through the stream. High flow conditions occur after the “first flush” has moved through the stream, causing the peaks of *E. coli* to be less in smaller drainage area streams.

4.2.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 90% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields.

These field tiles then drain to the nearest stream. Field tiles themselves are not sources of *E. coli*, but they can carry *E. coli* from land-applied manure and runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* values during mid-range to high flow conditions indicate the presence of *E. coli* transportation by field tiles.

Pasture comprises 3% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

There is a lack of *E. coli* sampling throughout this sub-watershed. The sampling site located at the mouth of Borum Run violates the *E. coli* water quality standard, indicating that the entire sub-watershed is impaired for *E. coli*. It is unclear the magnitude the headwater streams play a part in the impairment.

The one NPDES permitted facility with a sanitary component in this sub-watershed, White Horse Mobile Home Park, is now considered to be in compliance. This facility had violations of the WQS during the 2001 sampling of the St. Marys River Watershed. Since the completion of the enforcement activities and the resulting changes in treatment of the facility, the White Horse MHP is in compliance with WQS. The water quality duration curves do not indicate that this facility is a significant source of *E. coli* to the sub-watershed. White Horse MHP is not a significant source adding to the *E. coli* impairment.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

4.2.3 Conclusions

The *E. coli* data has an average single sample maximum violation 59% of the time. There are no known current NPDES permit violations. The downstream portion of this sub-watershed is located on the edge of the City of Decatur. This is the first sub-watershed to be in an urban area. Based on the water quality durations curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources which include small animal operations, Amish communities, wildlife, leaking and failing septic systems.

<u>4.4 - Holthouse Ditch Sub-Watershed</u>

4.4.1 Water Quality Duration Curves

A water quality duration curve was created for the sampling site in the Holthouse Ditch sub-watershed (Attachment C). Site LES050-0008 is located on Holthouse Ditch after the confluence of

Kohne Ditch to Holthouse Ditch. This geometric mean value at this site is 706 cfu/100mL. The water quality duration curve for this site shows higher *E. coli* values during moist to high flows conditions.

4.4.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 90% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure and runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* value during mid-range to high flow conditions indicates the presence of *E. coli* transportation by field tiles.

Pasture comprises 4% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this sub-watershed during dry conditions, this would indicate that animals have direct access to the stream.

Urban comprises 2% of the landuse. The downstream portion of this sub-watershed flows through the Southern edge of the City of Decatur. Urban areas create more impervious surfaces that cause an increase of runoff from precipitation to the nearby streams. With an increase in runoff, there are higher levels of *E. coli* in the higher flow conditions. The urbanized area also creates an environment where constant sources, agriculture, septic systems, and smaller WWTP, are less commonly a source of *E. coli*.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

The headwater streams are not listed as impaired. This is due to a lack of *E. coli* sampling in the headwater streams in this sub-watershed. Since there are known sources of *E. coli* in the headwater streams, the assumption can be made that these headwater streams are contributing to the *E. coli* impairment in the downstream sections of this sub-watershed. However, it is unclear as to the magnitude that these tributaries play a part in the impairment.

The one NPDES permitted facility with a sanitary component in this sub-watershed, Country Acres Estates, is possibly contributing to the *E. coli* impairment. This facility has had multiple years of noncompliance, which would have influenced the sampling for this sub-watershed. Currently this facility has been referred to IDEM's Enforcement Section for noncompliance.

Permitted CFOs and CAFOs are clustered in the headwaters of Holthouse Ditch. CFOs and CAFOs would be shown on the water quality duration during high flow conditions. Though these facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. One of the six communities, Peterson Community, is located in this sub-watershed. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

4.4.3 Conclusions

The *E. coli* data has an average single sample maximum violation of 62% and a geometric mean violation 72% of the time. One NPDES permit is potentially a significant source of *E. coli* to this sub-watershed. The CFOs and CAFOs have no known violations and are considered to be in compliance. Based on the water quality durations curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources which include small animal operations, wildlife, runoff from urban areas, clustering of smaller communities outside of the City of Decatur, and leaking and failing septic systems.

4.5 - Nickelsen Creek Sub-Watershed

4.5.1 Water Quality Duration Curves

A water quality duration curve was created for the sampling site in the Nickelsen Creek sub-watershed (Attachment C). Site LES050-0015 is located on Nickelsen Creek before the confluence of Lambert West Ditch to Nickelsen Creek. This geometric mean value at this site is 630 cfu/100mL. The water quality duration curve for this site shows higher *E. coli* values during moist to high flows conditions.

4.5.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 88% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure, runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* value during mid-range to high flow conditions indicates the presence of *E. coli* transportation by field tiles.

Pasture comprises 5% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions, this would indicate that animals have direct access to the stream.

Forests comprise 5% of the landuse. The forested areas are located along the stream bank, which creates a buffer strip. Buffer strips assist in slowing the time of transport of the contaminant, in this case *E. coli*, to the stream. Due to the choice of sampling location, this is only slightly reflected in the results. This is especially evident in the dry to moist conditions with an increase in compliance of the *E. coli* water quality standards.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

Due to the sampling location on Nickelsen Creek being before the confluence of Lambert West Ditch, this stream is not impaired. However, based on the landuse of this sub-watershed, it can be determined that Lambert West Ditch is a source of *E. coli* to Nickelsen Creek. It is unclear as to the magnitude that this tributary plays a part in the impairment.

Allen County is considered an MS4 community. Only a small portion of the downstream segment is included in Allen County. This downstream segment contains a small number of homes; therefore, this is not a significant source of *E. coli* to this sub-watershed.

There are two permitted CFOs in this sub-watershed. CFOs would be shown on the water quality duration curve during high flow conditions. Though these facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

4.5.3 Conclusions

The *E. coli* data have an average single sample maximum violation 72% of the time and an average geometric mean violation 91% of the time. There are no known NPDES permits in this watershed. There are no CFO violations and the CFOs are considered to be in compliance. The Allen County MS4 community is considered a source of *E. coli*, but not a significant source. Based on the water quality durations curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources which include small animal operations, wildlife, leaking and failing septic systems.

4.6 - St. Marys River

4.6.1 Water Quality Duration Curves

Water quality duration curves were created for five of the nine sampling sites along the St. Marys River (Attachment C). Site UNK000-0007 is located on the St. Marys River in Willshire, Ohio. This represents the sources of *E. coli* in the St. Marys River from Ohio. The geometric mean value at this site is 380 cfu/100mL. The water quality duration curve for this site shows higher *E. coli* values during dry flow conditions, which would indicate more of a continuous source of *E. coli*.

Site LES040-0007 is located on the St. Marys River at SR 101, north of Pleasant Mills. This is the first site on the St. Marys River after it enters from Ohio just after the confluence of the Blue Creek sub-watershed. The geometric mean for this site is 436 cfu/100mL. The water quality duration curve for this site using the 2004 IDEM sampling data shows higher *E. coli* values during moist conditions. Using IDEM's data from 1988 to 2004, this site still has higher *E. coli* values in moist conditions, but shows constant *E. coli* violations during dry conditions. The constant violations during dry conditions indicate continuous sources of *E. coli*. One of the major constant sources of *E. coli* is the Blue Creek sub-watershed.

Site LES060-0006 is located on the St. Marys River, near the Town of Poe. The geometric mean for this site is 493 cfu/100mL. The Allen County Health Department recognizes that the Town of Poe is a known area for septic failure. This is confirmed by the water quality duration curves showing higher *E. coli* levels during moist conditions and a few high *E. coli* values during dry conditions. This sampling site was taken downstream of the discharge from the Town of Poe. In addition, the Allen County Health Department has taken samples at the Town of Poe's discharge before it enters the St. Marys River. These *E. coli* values are extremely high during all flow conditions.

Site 29 is located on the St. Marys River at Ferguson Road. This sampling site is on the south edge of the City of Fort Wayne. The geometric mean for this site was 189 cfu/100mL. According to the water quality duration curves, there is less of a continuous source of *E. coli* and more of a storm driven source of *E. coli*. These results would be expected in more urbanized areas.

Site 30 is located at Spy Run Bridge on the St. Marys River. This sampling site is located in the middle of the City of Fort Wayne before the St. Marys River joins with the St. Joseph River to form the Maumee River. The geometric mean for this site is 318 cfu/100mL. According to the water quality duration curves, there is a consistent *E. coli* violation during all flow conditions. This means that there are many different sources of *E. coli* at this sampling site.

4.6.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 71% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure and runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* values in the downstream sites during mid-range to high flow conditions indicate the presence of *E. coli* transportation by field tiles.

Pasture comprises 7% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions in the downstream sites, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

Four NPDES permitted facilities discharge into the St. Marys River. Two of these facilities, Decatur STP and Oak Ridge Estates, have a sanitary component to their discharge. Neither of these facilities had significant violations of their permit limits and are both considered to be in compliance. The remaining NPDES permitted facilities discharge into the sub-watersheds of the St. Marys River. These facilities have been discussed earlier in this section as the facility is relevant to the appropriate sub-watershed.

There are three MS4 communities, the City of Decatur, the City of Fort Wayne, and Allen County, in the St. Marys River watershed. Permits have been issued for these MS4 communities. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11).

Many tributaries to the St. Marys River do not fall within a sub-watershed. Based on the landuse and sampling locations on the mainstem of the impaired sections of the St. Marys River, these tributaries are considered to be impaired and a source of *E. coli* to the mainstem of the St. Marys River.

Permitted CFOs and CAFOs are located in the sub-watersheds of the St. Marys River. These CFOs and CAFOs are addressed in the above sections for each sub-watershed. CFOs and CAFOs would be shown on the water quality duration during high flow conditions. Though these facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* for this sub-watershed based on information provided to IDEM by the Adams County Health Department and the Allen County Health Department. The Adams County Health Department's septic information is prevalent mainly in the sub-watersheds. The Allen County Health Department sampled three communities, Sites 26, 27, and 28, in the St. Marys River watershed. Site 27 and 28 are communities located along two unimpaired tributaries to the St. Marys River. Site 26 is the sampling site from the discharge of the Town of Poe before the discharges flows into the St. Marys River (Attachment A). *E. coli* levels at all these sites show extremely elevated levels of *E. coli*. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also be failing during higher flow conditions by leaching to a field tile or other type of pipe to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently.

There are twenty-four CSO discharge points from the City of Fort Wayne that flow into the St. Marys River. In addition, two CSO discharge points and one SSO discharge into to a natural drain that flows to Highland Drain. These CSO discharge points and SSOs are located between Sites 29 and 30. There are four CSO discharge points from the City of Decatur that discharge into the St. Marys River. These are located north of Site 18 and Site 19. None of the water quality duration curves captured the influence of the Decatur CSO discharge points on the St. Marys River. CSO discharge points and SSOs are shown on water quality duration curves during high flow events. Site 4 and Site 5 show higher *E. coli* values during high flows, than any of the other six sampling sites. It can be concluded that CSO discharge points and SSO are a source of *E. coli* in this sub-watershed. CSO discharge points are a known source of *E. coli*. It is difficult to determine to what extent these discharges have on the *E. coli* impairment in the St. Marys River watershed. The Long Term Control Plans (LTCP) that are under review at IDEM will provide the necessary guidelines to insure that the CSO discharge points do not cause or contribute to the impairment of the St. Marys River watershed.

The City of Fort Wayne has one SSO identified in their NPDES permits. SSOs are prohibited from discharging at any time and any discharge may be addressed through an enforcement action.

4.6.3 Conclusions

The *E. coli* data has an average single sample maximum violation 70% of the time and an average geometric mean violation 86% of the time. The known NPDES permits that have a sanitary component are in compliance. There are no CFO violations and CFO facilities are considered to be in compliance. The Allen County, Decatur, and Fort Wayne MS4 communities are considered sources of *E. coli*, but not significant sources. CSO discharge points from the City of Decatur and CSO discharge points and SSO from the City of Fort Wayne are sources of *E. coli* to the St. Marys River. The sub-watershed and other tributaries are major sources of *E. coli* to the mainstem of the St. Marys River. The load of *E. coli* in the St. Marys River in Ohio is above Indiana's *E. coli* water quality standards. The St. Marys River is impaired for *E. coli* in Ohio and their sources of *E. coli* will be addressed at a later date through an Ohio-based TMDL. Based on the water quality duration curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources which include small animal operations, wildlife, leaking and failing septic systems. In addition, the CSO discharge points and SSO are a major source of *E. coli* for the mainstem of the St. Marys River.

Section 5 - TMDL Development

The TMDL represents the maximum loading that can be assimilated by the waterbody while still achieving the Waters Quality Standard (WQS). As indicated in the Numeric Targets section of this document, the target for this *E. coli* TMDL is 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1 through October 31. Concurrent with the selection of a numeric concentration endpoint, TMDL development also defines the critical conditions that will be used when defining allowable levels. Many TMDLs are designed as the set of environmental conditions that, when addressed by appropriate controls, will ensure attainment of WQS for the pollutant. For example, the critical conditions for the control of point sources in Indiana are given in 327 IAC 5-2-11.1(b). In general, the 7-day average low flow in 10 years (Q7, 10) for a stream is used as the design condition for point source dischargers. However, *E. coli* sources to St. Marys River watershed arise from a mixture of dry and wet weather-driven conditions, and there is no single critical condition that would achieve the *E. coli* WQS. For the St. Marys River watershed and the contributing sources, there are a number of different allowable loads that will ensure compliance, as long as they are distributed properly throughout the watershed.

For most pollutants, TMDLs are expressed on a mass loading basis (e.g. pounds per day). For *E. coli* indicators, however, mass is not an appropriate measure because *E. coli* is expressed in terms of organism counts (or resulting concentration) (USEPA, 2001). Meeting the Water Quality Standards (WQS) of 125 colony forming unit (cfu) per 100 mL as a geometric mean and 235 cfu/100 mL is the overall goal of the TMDL. The geometric mean *E. coli* WQS allows for the best characterization of the watershed. The geometric mean provides a more reliable measure of E. coli concentration because it is less subject to random variation (USEPA, 2004). However, by setting the target to meet the 125 cfu/100 mL geometric mean standard, this TMDL also will meet the 235 cfu/100 mL single day standard. Therefore, this *E. coli* TMDL is concentration-based consistent with 327 IAC 5-2-11.1(b) and 40 CFR, Section 130.2 (i) and the TMDL is equal to the geometric mean *E. coli* WQS for each month of the recreational season (April 1 through October 31). The Wasteload Allocation and Load Allocations in the TMDL are set at 125 cfu/mL, which, as stated above, also will meet the 235 cfu/100 mL single day standard.

Section 6 - Allocations

TMDLs are comprised of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include a Margin of Safety (MOS), either implicitly or explicitly, that accounts for uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this definition is denoted by the equation:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The term TMDL represents the maximum loading that can be assimilated by the receiving water while still achieving WQS. The overall loading capacity, of 125 cfu per 100mL, is subsequently allocated into the TMDL components of WLAs for point sources, LAs for nonpoint sources, and the MOS. This *E. coli* TMDL is concentration-based consistent with USEPA regulations at 40 CFR, Section 130.2(i).

To investigate further the potential sources mentioned above, an *E. coli* load duration curve analysis, as outlined in an unpublished paper by Cleland (2002), was developed for each sampling site in the watershed. The load duration curve analysis is a relatively new method utilized in TMDL development. The method considers how stream flow conditions relate to a variety of pollutant loadings and their sources (point and nonpoint).

In order to develop a load duration curve, continuous flow data is required. The USGS gage for the Harber Ditch, which was retired in 1991, was used for the tributary watersheds. The Little River gage was then used to determine the flow on the sampling day for the load duration curve analysis. A regression analysis between the Little River (03324000) and the Harber Ditch gage data (Figure 21) was done to confirm the use of the Little River data to supplement the information at the retired Harber Ditch gage. The Little River is located in an adjacent watershed of the St. Marys River watershed. This comparison uses a coefficient of determination value, R^2, to indicate the "fit" of the data. The comparison found the coefficient of determination, R^2, to be 0.74. Values near 1.0 for R^2 indicate a good fit of the data, whereas values near 0.0 indicate a poor fit of the data. Therefore, flow data from USGS gage (03354000) in Little River was used to supplement the Harber Ditch data. Although Harber Ditch is not a listed segment, it is a tributary that flows into the St. Marys from the west. Watershed characteristics are quite similar to the listed tributaries (e.g. dominated by row crop agriculture). Thus, the duration curve derived from flow information collected at Harber Ditch is used for the other tributaries. St. Marys River gage (04182590) was used for the development of the *E. coli* load duration curve analysis for the St. Marys River watershed TMDL.

The flow data is used to create flow duration curves, which display the cumulative frequency of distribution of the daily flow for the period of record. The flow duration curve relates flow values measured at the monitoring station to the percent of time that those values are met or exceeded. Flows are ranked from extremely low flows, which are exceeded nearly 100% of the time, to extremely high flows, which are rarely exceeded. Flow duration curves are then transformed into load duration curves by multiplying the flow values along the curve by applicable water quality criteria values for *E. coli* and appropriate conversion factors. The load duration curves are conceptually similar to the flow duration curves in that the x-axis represents the flow recurrence interval and the y-axis represents the allowable load of the water quality parameter. The curve representing the allowable load of *E. coli* was calculated using the single sample maximum and geometric mean standards of 235 *E. coli* per 100 ml and 125 *E. coli* per 100 ml, respectively. The final step in the development of a load duration curve is to add the water quality pollutant data to the curves. Pollutant loads are estimated from the data as the product of the pollutant concentrations, instantaneous flows measured at the time of sample collection, and appropriate conversion factors. In order to identify the plotting position of each calculated load, the recurrence interval of each instantaneous flow measurement was defined. Water quality pollutant monitoring data are plotted on the same graph as the load duration curve that provides a graphical display of the water quality conditions in the waterbody. The pollutant monitoring data points that are above the target line exceed the water quality standards (WQS); those that fall below the target line meet the WQS (Mississippi DEQ, 2002).

6.1 - Wasteload Allocations

There are sixteen permitted dischargers in the St. Marys River watershed. Seven of the sixteen permitted dischargers have a sanitary component to their discharge. Four of these sixteen permitted dischargers already have *E. coli* limits in their permits. Three of these sixteen permitted dischargers have total residual chlorine limits in their permits. Eight of these sixteen do not have a sanitary component in their discharge or are a pretreatment permit that is connected to another WWTP for additional treatment. One of these permitted dischargers' effluent does not discharge to the St. Marys River watershed but has CSO discharge points that discharge to this watershed.

There are three MS4 communities the City of Decatur, the City of Fort Wayne, and Allen County, in the Maumee River. To date, these permits have not been issued for any of these MS4 communities. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11).

The WLA for permitted activities is set at the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1st through October 31st.

The WLA for CSO discharge points and MS4 permit activities will be set in the LTCP and MS4 permits to be issued to these facilities. These permits do not allow these activities to cause or contribute to a violation of WQS, which is set in Indiana Administrative Code 327 IAC 2-1.5-8(e)(2).

The WLA for prohibited discharges from SSOs and septic systems with straight pipe discharges directly to streams are set at zero (0.0).

6.2 - Load Allocations

The LA for nonpoint sources is equal to the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1st through October 31st. The LA will use the geometric mean of each sampling location to determine the reduction necessary to comply with WQS at each site (Appendix 4). The reductions have additionally been broken down into a flow regime that will help identify critical flows and areas for the implementation of this TMDL (Appendix 4).

Load allocations may be affected by subsequent work in the watershed. There are currently no watershed projects or plans in the St. Marys watershed. However, there have been several watershed projects completed in the surrounding areas. IDEM plans to work with the watershed coordinators in the surrounding areas along with local government agencies to encourage interest in watershed projects. It is anticipated that watershed projects will be useful in continuing to define and address the nonpoint sources of the *E. coli* in the St. Marys River watershed.

6.3 - Margin of Safety

A Margin of Safety (MOS) was incorporated into this TMDL analysis. The MOS accounts for any uncertainty or lack of knowledge concerning the relationship between pollutant loading and water quality. The MOS can be either implicit (i.e., incorporated into TMDL analysis thorough conservative assumptions) or explicit (i.e., expressed in the TMDL as a portion of the loadings). This TMDL uses an implicit MOS by applying a couple of conservative assumptions. First, no rate of decay for *E. coli* was applied. *E. coli* bacteria have a limited capability of surviving outside of their hosts. Therefore, a rate of decay is normally applied. However, applying a rate of decay could result in a discharge limit that would be greater than the *E. coli* WQS, thus no rate of decay was applied. IDEM determined that applying the *E. coli* WQS of 125 per one hundred milliliters to all flow conditions and with no rate of decay for *E. coli* is a more conservative approach that provides for greater protection of the water quality. Therefore, the *E. coli* WQS was applied to all flow conditions thus creating a more conservative MOS for this TMDL.

Section 7 - Seasonality

Seasonality in the TMDL is addressed by expressing the TMDL in terms of the *E. coli* WQS for total body contact during the recreational season (April 1st through October 31st) as defined by 327 IAC 2-1-6(d). There is no applicable total body contact *E. coli* WQS during the remainder of the year in Indiana. Because this is a concentration-based TMDL, *E. coli* WQS will be met regardless of flow conditions in the applicable season.

Section 8 - Monitoring

Future *E. coli* monitoring of the St. Marys River watershed will take place during IDEM's five-year rotating basin schedule and/or once TMDL implementation methods are in place. In addition, IDEM will also work with the City of Fort Wayne, the Allen County Health Department, and the Adams County SWCD to collect additional data from any sampling they may have completed. Monitoring will be adjusted as needed to assist in continued source identification and elimination. When these results indicate that the waterbody is meeting the *E. coli* WQS, IDEM will monitor at an appropriate frequency to determine if Indiana's 30-day geometric mean value of 125 *E. coli* per one hundred milliliters is being met.

Section 9 - Reasonable Assurance Activities

Reasonable assurance activities are programs that are in place or will be in place to assist in meeting the St. Marys River watershed TMDL allocations and the *E. coli* Water Quality Standard (WQS). Following is a list of reasonable assurance activities that pertain to the St. Marys River watershed.

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

For the permitted dischargers that have only total residual chlorine limits in their current permits, IDEM's TMDL program proposes that *E. coli* limits and monitoring be added when the next permit renewals are issued.

Three CSO communities discharge to the St. Marys River watershed. These facilities are currently in the NPDES Long Term Control Plan permitting process. This process will address any concern about CSO discharges causing or contributing to the violation of the *E. coli* WQS.

One SSO community discharges to the St. Marys River watershed. This activity is prohibited. Continual monitoring and work with these facilities is needed to eliminate these types of discharges. This will assure that they no longer cause or contribute to violations of the *E. coli* WQS.

Storm Water General Permit Rule 13

MS4 permits are being issued in the state of Indiana. The three MS4 communities in the St. Marys River watershed are the City of Decatur, City of Fort Wayne, and Allen County. Once these permits have been issued and implemented, they will improve the water quality in the St. Marys River watershed. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). These permits will be used to address storm water impacts in the St. Marys River watershed.

Confined Feeding Operations and Confined Animal Feeding Operations

CFOs and CAFOs are required to manage manure, litter, and process wastewater pollutants in a manner that does not cause or contribute to the impairment of *E. coli* WQS.

Watershed Projects

Two 319 grants were awarded to the Adams County Soil and Water Conservation District in 1999 and 2000. These grants were to address nutrient management. The information gathered for these grants will be useful to build upon for work in this watershed.

IDEM has recently hired a Watershed Specialist for this area of the state. The Watershed Specialist will be available to assist stakeholders with starting a watershed group, facilitating planning activities, and serving as a liaison between watershed planning and TMDL activities in the St. Marys River watershed.

Potential Future Activities

Nonpoint source pollution, which is the primary cause of *E. coli* impairment in this watershed, can be reduced by the implementation of "best management practices" (BMPs). BMPs are practices used in agriculture, forestry, urban land development, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Livestock owners, farmers, and urban planners, can implement BMPs outside of a watershed management plan, but the success of BMPs would be enhanced if coordinated as part of a watershed management plan. Following are examples of BMPs that may be used to reduce *E. coli* runoff:

1. **Watershed Groups -** Adams and Allen County along with the City of Fort Wayne have shown and interested in forming a group to address the impairments in the St. Marys River watershed.

2. **Riparian Area Management -** Management of riparian areas protects stream banks and riverbanks with a buffer zone of vegetation, either grasses, legumes, or trees.

3. **Manure Collection and Storage -** Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run-off into surface waters or leach down into groundwater.

4. **Contour Row Crops -** Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.

5. Manure Nutrient Testing - If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid over application and runoff.

6. Drift Fences - Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keeps animals out and prevents direct input of *E. coli* to the stream.

7. Pet Clean-up / Education - Education programs for pet owners can improve water quality of runoff from urban areas.

8. Septic Management/Public Education - Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some anthropogenic sources of *E. coli*.

Section 10 - Conclusion

The sources of *E. coli* to the St. Marys River include both point and nonpoint sources. In order for the St. Marys River watershed to achieve Indiana's *E. coli* WQS, the wasteload and load allocations for the St. Marys River watershed in Indiana have been set to the *E. coli* WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty day period from April 1st through October 31st. Achieving the wasteload and load allocations for the St. Marys River watershed depends on:

1) *E. coli* limits being added to dischargers who monitor for total residual chlorine.
2) Continued monitoring of facilities that do not use disinfection to assure compliance with the *E. coli* WQS.
3) Assure compliance with CFO and CAFO permits so that they do not cause or contribute to violations of the *E. coli* WQS.
4) Nonpoint sources of *E. coli* being controlled by implementing best management practices in the watershed.
5) The issuance of the MS4 permits for the City of Decatur, City of Fort Wayne, and Allen County.
6) The issuance of a LTCP for the City of Decatur and the City of Fort Wayne.

The next phase of this TMDL is to identify and support the implementation of activities that will bring the St. Marys River watershed in compliance with the *E. coli* WQS. IDEM will continue to work with its existing programs on implementation. In the event that designated uses and associated water quality criteria applicable to the St. Marys River watershed are revised in accordance with applicable requirements of state and federal law, the TMDL implementation activities may be revised to be consistent with such revisions. Additionally, IDEM will work with local stakeholder groups to pursue best management practices that will result in improvement of the water quality in the St. Marys River watershed.

Section 11 - References

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Mississippi Department of Environmental Quality. 2002. Fecal Coliform TMDL for the Big Sunflower River, Yazoo River Basin.

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III. *E. coli* TMDL for Maumee River

Section 1 - Background for Maumee River

The Maumee River was listed for an *E. coli* impairment on Indiana's 2002 and 2004 303(d) Lists (Table 2). On the 2002 303(d) List, Bullerman Ditch, Bottern Ditch, and Black Creek (Allen) were listed for impaired biotic communities and nutrients (Figure 22).

Upon further investigation into the Maumee River listing on the 2004 303(d) List, it was discovered that a segment in the middle of the river was not listed. A reassessment was completed on the Maumee River and segment INA0516_M1005 will be listed as impaired for *E. coli* on the 2006 303(d) List.

This TMDL addresses approximately 29.49 miles of the Maumee River in Allen County, Indiana, where recreational uses are impaired by elevated levels of *E. coli* during the recreational season. Allen County is located in northeast Indiana (Figure 22). All of the seven (7) segments for the listed streams of this TMDL are located in the Great Lakes Basin in hydrologic unit code 014100005010. The description of the study area, its topography, and other particulars are as follows:

Table 4: Impaired Segments addressed by the Maumee River E. coli TMDL

Waterbody Name	303(d) List ID	Segment ID Number	Length (Miles)	Impairment
Maumee River	45	INA0511_M1007 INA0514_M1006 INA051A_M1003	15.58	*E. coli*
Maumee River	45	INA0516_M1005	4.34	**E. coli*, FCA Hg & PCBs
Maumee River	45	INA0518_M1004 INA051C_M1002 INA051D_M1003	9.57	*E. coli*, FCA Hg & PCBs

**The total miles of the stream, may be adjusted on the 2006 303(d) List.*

Historical data collected by IDEM documented elevated levels of *E. coli* in the Maumee River at two fixed station sampling locations from 1991 to 2000. IDEM completed sampling at two sites on the Maumee River in 2000. For this sampling event, IDEM sampled two sites, five times, with the samples evenly spaced over a 30-day period from June 12, 2000, to July 11, 2000 (Figure 22). These two sites violated the single sample maximum standard and the geometric mean standard. This data was the basis for the listing of the Maumee River on the 2002 303(d) List.

The City of Fort Wayne sampled the Maumee River at two sites weekly during the recreational season from 2001 through 2003 (Figure 22, Attachment D).

The Allen County Health Department conducted a study to see the impact septic systems have on a waterbody. The Health Department chose sampling sites throughout Allen County that had a cluster of homes on septics with an adjacent stream. Six of the Allen County Health Department sampling sites were in the Maumee River. These sites were sampled weekly during the recreational season from 2001 through 2004. All six of these sites violated the single sample maximum and the geometric mean standard multiple times over this time period. Some of the single maximum standard violations were substantially higher than the water quality standards (Figure 22, Attachment D).

Section 2 - Numeric Targets

The impaired designated use for the waterbodies in the Maumee River is for total body contact recreational use during the recreational season, April 1st through October 31st.

The Indiana Administrative Code, 327 IAC 2-1.5-8(e)(2), establishes the full body contact recreational use *E. coli* WQS[2] for all waters in the Great Lakes system as follows:

> (2) *E. coli* bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period.

The sanitary wastewater *E. coli* effluent limits from point sources in the Great Lakes system during the recreational season, April 1st through October 31st, are also covered under 327 IAC 2-1.5-8(e)(2).

For the Maumee River during the recreational season (April 1st through October 31st), the target level is set at the *E. coli* WQS of 125 per one hundred milliliters as a 30-day geometric mean based on not less than five samples equally spaced over a thirty day period.

Section 3 - Source Assessment

Watershed Characterization

The confluence of the St. Joseph River and St. Marys River in Allen County form the Maumee River. The Maumee River then flows east into Ohio. Many tributaries enter the Maumee River. None of the major tributaries are listed on the 303(d) List as being impaired. These tributaries include Bullerman Ditch, Trier Ditch, Gar Creek, Botern Ditch, Black Creek, Ham Interceptor Ditch, and other tributaries (Figure 22).

E. coli Data

E. coli data has been collected on four sites in the Maumee River (Figure 22, Attachment D). IDEM's Assessment Branch sampled two sites (Site 1 and Site 9) on the Maumee River five times weekly from June of 2000 to July of 2000. This enabled IDEM's TMDL Program to calculate a geometric mean value. These sites violated the single sample maximum standard and geometric mean standard 100% of the time.

IDEM's Assessment Branch and the City of Fort Wayne have *E. coli* data for the same site, Site 6, on the Maumee River (Figure 22, Attachment D). IDEM sampled this site monthly during the recreational season from 1991 to 1997. Additionally, IDEM's Assessment Branch sampled this site once monthly in April of 2000 and August of 2000 and then again in April of 2003. For IDEM's Assessment Branch sampling, this site violated the single sample maximum standard 54% of the time. The sample collected in April of 2003 did not violate the single sample maximum standard. The City of Fort Wayne sampled this site weekly during the recreational season from 2001 to 2003. For the City of Fort Wayne data, this site violated the single sample maximum standard an average of 61% of the time. The highest single sample was 8000 cfu/100mL. The geometric mean standard was violated an average of 73% of the time.

[2] *E. coli* WQS = 125 cfu/100ml or 235 cfu/100ml; 1 cfu (colony forming units)= 1 mpn (most probable number)

The City of Fort Wayne sampled one site, Site 2, on the Maumee River weekly during the recreational season from 2001 to 2003 (Figure 22, Attachment D). This site violated the single sample maximum standard an average of 57% of the time. The highest *E. coli* value was 20,000 cfu/100mL. This site violated the geometric mean value an average of 73% of the time.

Tributaries

The major tributaries of Bullerman Ditch, Botern Ditch, Black Creek, Gar Creek, Trier Ditch, and Ham Interceptor Ditch are not impaired for *E. coli* on the 303(d) List (Figure 22). There has not been enough data collected on these tributaries to determine if they are impaired or to what extent they are contributing to the *E. coli* impairment in the Maumee River.

Landuse

Landuse information was also assembled in 1992 using the Gap Analysis Program (GAP). In 1992, approximately 82% of the landuse in the Maumee River was agriculture. The remaining landuse for the Maumee River consisted of approximately 9% developed, 2% wetlands, 7% forested (Figure 23).

Wildlife

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Homes within the Maumee River are almost entirely on septics. Failing septic tanks are known sources of *E. coli* impairment in waterbodies. As was mentioned earlier, the Allen County Health Department conducted a study to see the potential effect a community of homes with septic systems has on a stream. Communities of homes were chosen throughout Allen County. Six of these communities are located along the Maumee River.

Site 3 is located on Trier Ditch south of Meyer Road, south of Hovel/Mckinnie (Figure 22). The Allen County Health Department believes this site is representative of an Industrial Area and possibly a community of homes south of the sampling site (G. Chapple, 2005). Aerial photos confirm a community of homes located south of the sampling location. The *E. coli* data was collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 67% of the time and an average geometric mean standard violation 86% of the time. The highest *E. coli* value was 18,000 cfu/100mL (Attachment D).

Site 4 is the second Allen County Health Department sampling site located in the Maumee River. Site 4 was sampled on Bender #2 at Paulding Road, east of Hartzell (Figure 22). This sampling site represents a community of approximately twenty homes south of the sampling location. These twenty homes were being considered for connection to nearby the Regional Sewer District, but this community was too great a distance from the existing Regional Sewer District (G. Chapple, 2005). The *E. coli* data was collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 85% of the time and an average geometric mean standard violation 96% of the time. The highest *E. coli* value was 133,000 cfu/100mL (Figure 22, Attachment D).

Site 5 is the third Allen County Health Department sampling site located in the Maumee River. Site 5 represents a community located near Trier Drain, south of the sampling location at Rose and Broadway by the railroad tracks. The Allen County Health Department *E. coli* data was also collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 83% of the time and an average geometric mean standard violation 83% of the time. The highest *E. coli* value was 18,000 cfu/100mL (Figure 22, Attachment D).

Site 7 is the fourth Allen County Health Department sampling site located in the Maumee River. Site 7 represents a strip development of homes located near Rushart Drain, south of the sampling location at Berthaud Road, south of Slusher. This strip development of homes contains approximately twenty homes with some newer homes that have absorption fields. The Allen County Health Department *E. coli* data was also collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 92% of the time and a geometric mean standard violation 100% of the time. The highest *E. coli* value was >200,000 cfu/100mL (Figure 22, Attachment D).

Site 8 is the fifth Allen County Health Department sampling site located in the Maumee River. Site 8 represents a community located near Wilbur Drain, south of the sampling location at Ehle Road. This community contains approximately fifteen homes. The Allen County Health Department *E. coli* data was also collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 87% of the time and a geometric mean standard violation 100% of the time. The highest *E. coli* value was 120,000 cfu/100mL (Figure 22, Attachment D).

Site 10 is the sixth Allen County Health Department sampling site located in the Maumee River. Site 10 represents a community located near Litzenberg Drain, south of the sampling location at State Line Road, north of Dawkins Road. The Allen County Health Department *E. coli* data was also collected weekly during the recreational season from 2001 to 2004. This sampling site had an average single sample violation 64% of the time and a geometric mean standard violation 89% of the time. The highest *E. coli* value was 400,000 cfu/100mL (Figure 22, Attachment D)

Overall, the data collected at these six sites show that septic systems are failing in Allen County. Septic systems are a significant source of *E. coli* to the Maumee River.

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

There are six NPDES permitted facilities in the Maumee River (Figure 22, Appendix 5). One of the six permitted discharges, Fort Wayne Municipal STP (IN0032191), only has *E. coli* limits and total residual chlorine (TRC) in their permit. Fort Wayne Municipal STP has not had violations of either their *E. coli* or TRC limits in the past 4 years. Therefore, this permitted discharger is considered to be in compliance and is not a significant source of the *E. coli* impairment in the Maumee River.

One of the six NPDES permitted facilities, Woodburn Municipal STP (IN0021407), does not have *E. coli* or TRC limits, but does contain a sanitary component. Woodburn Municipal STP is a lagoon system, so its permit does not include *E. coli* limits. It was believed that an extended retention time of sanitary wastewater was sufficient to provide a natural attrition of *E. coli* that would be in compliance with Indiana's *E. coli* Water Quality Standards. However, recent studies completed by Ron Turco from Purdue University have indicated that *E. coli* may live longer in this environment than originally believed. Therefore, it is unclear at this time to determine how significant a source of *E. coli* the Woodburn Municipal STP is to the Maumee River. In order to determine if the Woodburn Municipal STP is contributing to the *E. coli* impairment on the Maumee River, IDEM's TMDL Program will recommend *E. coli* reporting requirements be added to this permit during its next permit renewal.

The remaining four of the six dischargers do not have *E. coli* or total residual chlorine limits in their permits. None of these four dischargers has a sanitary component to their discharge. Therefore, *E. coli* limits do not apply to their permits. These permitted dischargers are not contributing to the sources of *E. coli* in the Maumee River.

Storm Water General Permit Rule 13

There are two municipal separate storm sewer systems (MS4) communities, the City of Fort Wayne, the City of New Haven in the Maumee River. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). It is difficult to determine to what extent, if any, these MS4 communities could be a source of *E. coli* in the Maumee River.

Combined Sewer Overflows (CSO)

There are two CSO communities in the Maumee River. The City of Fort Wayne has eleven CSO discharge points, eight of which discharge directly to the Maumee River and three of which discharge to tributaries of the Maumee. The City of New Haven has four CSO discharge points that discharge in the Maumee River (Figure 22, Appendix 6). The City of Fort Wayne's CSO Long Term Control Plan (LTCP) has recently submitted their CSO LTCP to IDEM. The City of New Haven submitted their CSO LTCP in July of 2002. CSO discharge points are a source of *E. coli* to the Maumee River.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are nineteen CFOs in the Maumee River (Figure 22). Two of the CFOs are considered CAFOs (Appendix 7). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." There are currently no open enforcement actions on any of the operational CFOs and CAFOs in Maumee River. Therefore, these operations are not considered a significant source of *E. coli* for the Maumee River TMDL.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and *E. coli* impairment. No specific information on these small livestock operations is currently available for the remaining portion of the Maumee River. However, it is believed that these small livestock operations may be a source of *E. coli*.

Section 4 - Linkage Analysis

The linkage between the *E. coli* concentrations in the Maumee River and the potential sources of *E. coli* provides the basis for the development of this TMDL. Analysis of this relationship allows for estimating the total assimilative capacity of the stream and any needed load reductions. Water quality duration curves were created for three samplings sites in the Maumee River watershed that were sampled by IDEM and the City of Fort Wayne from 1991 to 2003. A flow duration interval is described as a percentage. Zero (0) percent corresponds to the highest stream discharge (flood condition) and 100 percent corresponds to the lowest discharge (drought condition). These sampling sites are representative of the hydrodynamics of the Maumee River (Attachment E). This section will discuss the water quality duration curves and the linkage of the Maumee River.

Water Quality Duration Curves

Water quality duration curves were created for three sampling sites along the Maumee River (Attachment F). Site MAU-ANT is located on the Maumee in Fort Wayne, Indiana within the mixing zone of the St. Marys and St. Joseph Rivers. This represents the sources of *E. coli* in the Maumee River from both of these river systems. This geometric mean value at this site is 244 cfu/100mL. The water quality duration curve for this site shows higher *E. coli* values throughout the curve with clusters during mid-range and high flow conditions. This indicates continuous source of *E. coli* with inputs during larger rain events.

Site MAU-LAN is located on the Maumee River at Landin Road. This is the first site on the Maumee River after the St. Marys and St. Joseph River mixing zone. The geometric mean for this site is 255 cfu/100mL. The water quality duration for this site is a similar curve to the MAU-ANT. This indicates load added between the two sampling sites.

Site M-114 is located on the Maumee River, near the town of Woodburn. The geometric mean for this site is 430 cfu/100mL. The water quality duration for this site shows consistent violations of WQS with little change during different flow conditions. This indicates constant sources of *E. coli*.

Source Linkage

Landuse information was assessed using the 1992 the Gap Analysis Program (GAP). In 1992, approximately 82% of the landuse in the Maumee River watershed was agriculture. The remaining landuse for the Maumee River watershed consisted of approximately 9% developed, 2% wetlands, 7% forested (Figure 23). Comparison of the landuse noted in 1992 with aerial photos taken in 2003 photos shows no significant changes.

Row crops comprise 71% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure and runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* values in the downstream sites during mid-range to high flow conditions indicate the presence of *E. coli* transportation by field tiles.

Pasture comprises 7% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions in the downstream sites, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes during extreme high flow conditions due to runoff or flooding.

Six NPDES permitted facilities discharge into the Maumee River. Two of these facilities, Fort Wayne STP and Woodburn Municipal STP, have a sanitary component to their discharge. Neither of these facilities has significant violations of their permit limits and are considered to be in compliance. The remaining four NPDES permitted facilities do not have a sanitary component to their discharge.

There are two MS4 communities, the City of Ft Wayne and the City of New Haven, on the Maumee River. To date, permits have not been issued for any of these MS4 communities. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11).

The major tributaries to the Maumee River are Bullerman Ditch, Botern Ditch, Black Creek, Gar Creek, Trier Ditch, and Ham Interceptor Ditch. These tributaries are not impaired for *E. coli* (Figure 22). Data has not been collected on these tributaries. Due to the continuous impairment of the Maumee River, it is assumed that the tributaries contribute to the *E. coli* impairment. However, the lack of data makes it impossible to determine to what extent these tributaries are contributing to the *E. coli* impairment in the Maumee River.

Permitted CFOs and CAFOs are located in the Maumee River. CFOs and CAFOs would be shown on the water quality duration during high flow conditions. Though these facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of *E. coli* the Maumee River based on information provided to IDEM by the Allen County Health Department. The Allen County Health Department sampled several communities, sites 3, 4, 5, 7, 8, and 10, in the Maumee River. *E. coli* levels at all these sites show extremely elevated levels of *E. coli*. The septic systems as described in this information would provide a consistent source of *E. coli* particularly during low to mid-range flows. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe to the stream. Violations of the *E. coli* water quality standard are shown on the water quality duration curves during high flow, but not consistently (G. Chapple, 2005).

There are two CSO communities in the Maumee River watershed. The City of Fort Wayne has eleven CSO discharge points to the Maumee River watershed. The City of New Haven has four CSO discharge points that discharge in the Maumee River watershed (Figure 22, Appendix 6). The City of Fort Wayne CSO Long Tern Control Plan (LTCP) has recently submitted their CSO LTCP to IDEM. The City of New Haven submitted their CSO LTCP in July of 2002. CSO discharge points are a source of *E. coli* to the Maumee River.

There are eight CSO discharge points from the City of Fort Wayne that flow into the Maumee River. These CSO discharge points are located between Sites 1 and 3. The remaining three CSO discharge points discharge to tributaries of the Maumee. There are four CSO discharge points from the City of New Haven that discharge into tributaries of the Maumee River. These are located south of Site 3. CSO discharge points are shown on water quality duration curves during high flow events. All of these sites show higher *E. coli* values during high flows. It can be concluded that CSO discharge points are a source of *E. coli* the Maumee River. CSO discharge points are a known source of *E. coli*. It is difficult to determine to what extent these discharges have on the *E. coli* impairment in the Maumee River watershed. The Long Term Control Plan (LTCP) that is under review at IDEM will provide the necessary guidelines to insure that the CSO discharge points do not cause or contribute to the impairment of the Maumee River.

<u>Conclusions</u>

The *E. coli* data has an average single sample maximum violation 70% of the time and an average geometric mean violation 86% of the time. The known NPDES permits that have a sanitary component are in compliance. There are no CFO violations and the CFOs are considered to be in compliance. The

New Haven and Fort Wayne MS4 communities are considered sources of *E. coli*, but not significant sources. CSO discharge points from the City of Fort Wayne and the City of New Haven are sources of *E. coli* to the Maumee River. Tributaries are sources of *E. coli*, at an unknown magnitude, to the Maumee River. Based on the water quality durations curves, it can be concluded that the majority of sources of *E. coli* in this waterbody are nonpoint sources which include small animal operations, wildlife, and leaking and failing septic systems. In addition, the CSO discharge points are a major source of *E. coli* for the Maumee River.

Section 5 - TMDL Development

The TMDL represents the maximum loading that can be assimilated by the waterbody while still achieving the Water Quality Standard (WQS). As indicated in the Numeric Targets section of this document, the target for this *E. coli* TMDL is 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1 through October 31. Concurrent with the selection of a numeric concentration endpoint, TMDL development also defines the critical conditions that will be used when defining allowable levels. Many TMDLs are designed as the set of environmental conditions that, when addressed by appropriate controls, will ensure attainment of WQS for the pollutant. For example, the critical conditions for the control of point sources in Indiana are given in 327 IAC 5-2-11.1(b). In general, the 7-day average low flow in 10 years (Q7, 10) for a stream is used as the design condition for point source dischargers. However, *E. coli* sources to Maumee River arise from a mixture of dry and wet weather-driven conditions, and there is no single critical condition that would achieve the *E. coli* WQS. For the Maumee River and the contributing sources, there are a number of different allowable loads that will ensure compliance, as long as they are distributed properly throughout the watershed.

For most pollutants, TMDLs are expressed on a mass loading basis (e.g. pounds per day). For *E. coli* indicators, however, mass is not an appropriate measure because *E. coli* is expressed in terms of organism counts (or resulting concentration) (USEPA, 2001). Meeting the Water Quality Standards (WQS) of 125 colony forming unit (cfu) per 100 mL as a geometric mean and 235 cfu/100 mL is the overall goal of the TMDL. The geometric mean *E. coli* WQS allows for the best characterization of the watershed. The geometric mean provides a more reliable measure of E. coli concentration because it is less subject to random variation (USEPA, 2004). However, by setting the target to meet the 125 cfu/100 mL geometric mean standard, this TMDL also will meet the 235 cfu/100 mL single day standard. Therefore, this *E. coli* TMDL is concentration-based consistent with 327 IAC 5-2-11.1(b) and 40 CFR, Section 130.2 (i) and the TMDL is equal to the geometric mean *E. coli* WQS for each month of the recreational season (April 1 through October 31). The Wasteload Allocation and Load Allocations in the TMDL are set at 125 cfu/mL, which, as stated above, also will meet the 235 cfu/100 mL single day standard.

Section 6 - Allocations

TMDLs are comprised of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include a Margin of Safety (MOS), either implicitly or explicitly, that accounts for uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this definition is denoted by the equation:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The term TMDL represents the maximum loading that can be assimilated by the receiving water while still achieving WQS. The overall loading capacity, of 125 cfu/100mL, is subsequently allocated into the TMDL components of WLAs for point sources, LAs for nonpoint sources, and the MOS. This *E. coli* TMDL is concentration-based consistent with USEPA regulations at 40 CFR, Section 130.2(i).

To investigate further the potential sources mentioned above, an *E. coli* load duration curve analysis, as outlined in an unpublished paper by Cleland (2002), was developed for each sampling site in the watershed. The load duration curve analysis is a relatively new method utilized in TMDL development. The method considers how stream flow conditions relate to a variety of pollutant loadings and their sources (point and nonpoint).

In order to develop a load duration curve, continuous flow data is required. The USGS gage for the Maumee River (04183000) located near New Haven, Indiana was used for development of the *E. coli* load duration curve analysis for the Maumee River TMDL. USGS gage (04183000) is located on the Maumee River in Allen County

The flow data is used to create flow duration curves, which display the cumulative frequency of distribution of the daily flow for the period of record. The flow duration curve relates flow values measured at the monitoring station to the percent of time that those values are met or exceeded. Flows are ranked from extremely low flows, which are exceeded nearly 100% of the time, to extremely high flows, which are rarely exceeded. Flow duration curves are then transformed into load duration curves by multiplying the flow values along the curve by applicable water quality criteria values for *E. coli* and appropriate conversion factors. The load duration curves are conceptually similar to the flow duration curves in that the x-axis represents the flow recurrence interval and the y-axis represents the allowable load of the water quality parameter. The curve representing the allowable load of *E. coli* was calculated using the daily and geometric mean standards of 235 *E. coli* per 100 ml and 125 *E. coli* per 100 ml, respectively. The final step in the development of a load duration curve is to add the water quality pollutant data to the curves. Pollutant loads are estimated from the data as the product of the pollutant concentrations, instantaneous flows measured at the time of sample collection, and appropriate conversion factors. In order to identify the plotting position of each calculated load, the recurrence interval of each instantaneous flow measurement was defined. Water quality pollutant monitoring data are plotted on the same graph as the load duration curve that provides a graphical display of the water quality conditions in the waterbody. The pollutant monitoring data points that are above the target line exceed the water quality standards (WQS); those that fall below the target line meet the WQS (Mississippi DEQ, 2002).

6.1 - Wasteload Allocations

As previously mentioned, there are six permitted dischargers in the Maumee River. Two of the six permitted dischargers have a sanitary component to their discharge. One of these six permitted dischargers already has *E. coli* limits in their permits. One of these six does not have a disinfection requirement and the TMDL group is recommending monitoring to insure compliance with the WQS. The remaining four of these six permitted dischargers do not have a sanitary component to their discharge.

There are two MS4 communities, the City of Fort Wayne, and the City of New Haven, in the Maumee River. To date, these permits have not been issued for any of these MS4 communities. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11).

The WLA is set at the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1st through October 31st.

The WLA for CSO discharge points and MS4 permit activities will be set in the LTCP and MS4 permits to be issued to these facilities. These permits do not allow these activities to cause or contribute to a violation of WQS, which is set in Indiana Administrative Code 327 IAC 2-1.5-8(e)(2).

The WLA for prohibited discharges such as septic systems with straight pipe discharges directly to streams is set at zero (0).

6.2 - Load Allocations

The LA for nonpoint sources is equal to the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1st through October 31st. The LA will use the geometric mean of each sampling location to determine the reduction necessary to comply with WQS at each site (Appendix 8). The reductions have additionally been broken down into a flow regime, which will help identify critical flows and areas for the implementation of this TMDL (Table 4).

Load allocations may be affected by subsequent work in the watershed. There are currently no watershed projects or plans on the Maumee River. However, there have been watershed projects completed in the surrounding areas. IDEM plans to work with the watershed coordinators in the surrounding areas along with local government agencies to encourage interest in watershed projects. It is anticipated that watershed projects will be useful in continuing to define and address the nonpoint sources of the *E. coli* in the Maumee River.

6.3 - Margin of Safety

A Margin of Safety (MOS) was incorporated into this TMDL analysis. The MOS accounts for any uncertainty or lack of knowledge concerning the relationship between pollutant loading and water quality. The MOS can be either implicit (i.e., incorporated into TMDL analysis thorough conservative assumptions) or explicit (i.e., expressed in the TMDL as a portion of the loadings). This TMDL uses an implicit MOS by applying a couple of conservative assumptions. First, no rate of decay for *E. coli* was applied. *E. coli* bacteria have a limited capability of surviving outside of their hosts; therefore, a rate of decay normally would be applied. However, applying a rate of decay could result in a discharge limit that would be greater than the *E. coli* WQS, thus no rate of decay was applied. Second, the *E. coli* WQS was applied to all flow conditions. This adds to the MOS for this TMDL. IDEM determined that applying the *E. coli* WQS of 125 per one hundred milliliters to all flow conditions and with no rate of decay for *E. coli* is a more conservative approach that provides for greater protection of the water quality.

Section 7 - Seasonality

Seasonality in the TMDL is addressed by expressing the TMDL in terms of the *E. coli* WQS for total body contact during the recreational season (April 1st through October 31st) as defined by 327 IAC 2-1.5-8(e)(2). There is no applicable total body contact *E. coli* WQS during the remainder of the year in Indiana. Because this is a concentration-based TMDL, *E. coli* WQS will be met regardless of flow conditions in the applicable season.

Section 8 - Monitoring

Future *E. coli* monitoring of the Maumee River will take place during IDEM's five-year rotating basin schedule and/or once TMDL implementation methods are in place. In addition, IDEM will also work with the City of Fort Wayne and the Allen County Health Department to collect additional sampling they might have completed. Monitoring will be adjusted as needed to assist in continued source identification and elimination. When these results indicate that the waterbody is meeting the *E. coli* WQS, IDEM will monitor at an appropriate frequency to determine if Indiana's 30-day geometric mean value of 125 *E. coli* per one hundred milliliters is being met.

Section 9 - Reasonable Assurance Activities

Reasonable assurance activities are programs that are in place or will be in place to assist in meeting the Maumee River TMDL allocations and the *E. coli* Water Quality Standard (WQS). Following is a list of reasonable assurance activities that pertain to the St. Marys River watershed.

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

For the permitted discharger that has a sanitary component and does not have a disinfection requirement, IDEM's TMDL program proposes that *E. coli* monitoring be added when the next permit renewals are issued.

<u>Storm Water General Permit Rule 13</u>

MS4 permits are being issued in the state of Indiana. The two MS4 communities in the Maumee River are the City of Fort Wayne and the City of New Haven. Once these permits have been issued and implemented, they will improve the water quality in the Maumee River. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). These permits will be used to address storm water impacts in the Maumee River.

<u>Confined Feeding Operations and Confined Animal Feeding Operations</u>

CFO and CAFO are required to manage manure, litter, and process wastewater pollutants in a manner that does not cause or contribute to the impairment of *E. coli* WQS.

<u>Watershed Projects</u>

The Maumee River Basin Commission is an active group whose mission is to provide regional leadership and promote flood control, soil and water conservation, and related resource management through a coordinated and comprehensive planning and implementing approach.

IDEM has recently hired a Watershed Specialist for this area of the state. The Watershed Specialist will be available to assist stakeholders with starting a watershed group, facilitating planning activities, and serving as a liaison between watershed planning and TMDL activities in the Maumee River. The interest from the City of Fort Wayne and both Adams and Allen county health departments should provide the catalyst needed to promote implementation in the Maumee River.

Potential Future Activities

Nonpoint source pollution, which is the primary cause of *E. coli* impairment in this watershed, can be reduced by the implementation of "best management practices" (BMPs). BMPs are practices used in agriculture, forestry, urban land development, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Livestock owners, farmers, and urban planners, can implement BMPs outside of a watershed management plan, but the success of BMPs would be enhanced if coordinated as part of a watershed management plan. Following are examples of BMPs that may be used to reduce *E. coli* runoff:

1. **Riparian Area Management -** Management of riparian areas protects stream banks and riverbanks with a buffer zone of vegetation, either grasses, legumes, or trees.

2. **Manure Collection and Storage -** Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run-off into surface waters or leach down into ground water.

3. **Contour Row Crops -** Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.

4. **Manure Nutrient Testing -** If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid over-application and runoff.

5. **Drift Fences -** Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keep animals out and prevents direct input of *E. coli* to the stream.

6. **Pet Clean-up / Education -** Education programs for pet owners can improve water quality of runoff from urban areas.

7. **Septic Management/Public Education -** Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some anthropogenic sources of *E. coli*.

Section 10 - Conclusion

The sources of *E. coli* to the Maumee River include both point and nonpoint sources. In order for the Maumee River to achieve Indiana's *E. coli* WQS, the wasteload and load allocations for the Maumee River in Indiana have been set to the *E. coli* WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty day from April 1st through October 31st. Achieving the wasteload and load allocations for the Maumee River depends on:

1) *E. coli* monitoring being added to insure lagoon dischargers meet WQS.
2) CFOs and CAFOs not violating their permits.
3) Nonpoint sources of *E. coli* being controlled by implementing best management practices on the waterbody.

4) The issuance of the MS4 permits for the City of Fort Wayne and the City of New Haven.
5) The issuance of the LTCP for the City of Fort Wayne and the City of New Haven.
6) Inadequate and failing septic systems need to be replaced.

The next phase of this TMDL is to identify and support the implementation of activities that will bring the Maumee River in compliance with the *E. coli* WQS. IDEM will continue to work with its existing programs on implementation. In the event that designated uses and associated water quality criteria applicable to the Maumee River are revised in accordance with applicable requirements of state and federal law, the TMDL implementation activities may be revised to be consistent with such revisions. Additionally, IDEM will work with local stakeholder groups to pursue best management practices that will result in improvement of the water quality in the Maumee River.

Section 11 - References

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IV. IMPAIRED BIOTIC COMMUNITIES TMDL FOR BLUE CREEK/HABEGGER DITCH, YELLOW CREEK, AND THE UNNAMED TRIBUTARY TO ST. MARYS RIVER WATERSHEDS

TMDL Overview

The Blue Creek/Habegger Ditch and Yellow Creek Watersheds are impaired for IBC and nutrients. The Unnamed Tributary to the St. Marys River is impaired for Impaired Biotic Communities (IBCs). The purpose of the TMDL for the Blue Creek/Habegger Ditch, Yellow Creek, and Unnamed Tributary to St. Marys River watersheds is to identify the sources and determine the allowable levels for nutrients. For the waterbodies listed as having an Impaired Biotic Community (IBC), the goal of the TMDL will be to identify the pollutants causing the impairment and then set the appropriate allocations or watershed practices based on the pollutants that have been identified. These activities will result in the attainment of the applicable WQS in the Blue Creek/Habegger Ditch, Yellow Creek, and Unnamed Tributary to the St. Marys River watersheds in Adams and Allen Counties in Indiana. This section will address the TMDL requirements for the IBC and nutrient impairments in these watersheds. Each of these watersheds will have separate source assessments, while the numeric target, waste load allocation (WLA), load allocation (LA), and implementation activities will be combined.

Section 1 - Background for Blue Creek/Habegger Ditch, Yellow Creek and the Unnamed Tributary to the St. Marys River Watersheds

Blue Creek/Habegger Ditch watershed was listed for *E. coli*, IBC, and nutrients (nitrogen and phosphorus) impairments on Indiana's 2002 and 2004 303(d) Lists. Yellow Creek watershed was listed for IBC and nutrient (nitrogen and phosphorus) impairments on Indiana's 2002 and 2004 303(d) Lists. The Unnamed Tributary of the St. Marys River was listed for *E. coli* and IBC impairments on Indiana's 2004 303(d) List (Figure 24).

This TMDL address approximately 18.08 river miles of the Blue Creek/Habegger Ditch watershed in Adams County, Indiana, where designated uses are impaired by elevated levels of nutrients and low IBC scores. This TMDL also addresses approximately 32.79 river miles of the Yellow Creek watershed in Adams County. Finally this TMDL addresses approximately 2.84 river miles of the Unnamed Tributary to the St. Marys River watershed in Allen County. These watersheds are located in northeast Indiana (Figure 24). All four (4) segments of the listed streams for this TMDL are located in the Great Lakes Basin in hydrologic unit codes (HUCs) 05120201 and 05120202 (Table 5).

Table 5: Impaired Segments addressed by the Blue Creek/Habegger Ditch and Yellow Creek Watersheds Impaired Biotic Communities TMDL

Waterbody Name	Segment ID Number	Length (Miles)	Impairment
Blue Creek	INA0445_T1006	12.28	*E. coli*, IBC, nutrients
Habegger Ditch	INA0443_T1008	5.8	*E. coli*, IBC, nutrients
Yellow Creek-Martz Ditch	INA0447_00	32.79	IBC, nutrients, *E. coli*
Unnamed Trib of St. Marys River	INA0454_T1012	2.84	*E. coli*, IBC

Historical data collected by IDEM's Assessment Branch documented elevated levels of nutrients in the Blue Creek/Habegger Ditch and Yellow Creek watersheds in Adams County, Indiana.
the from 1996 to 2004. IDEM's Assessment Branch completed a source ID survey of the watershed Blue Creek/Habegger Ditch and Yellow Creek watershed 2001. In 2002 the Unnamed Tributary to the St. Marys River was added to the 303(d) List for and IBC impairment.

IDEM's Assessment Branch completed an intensive survey for all impaired parameters in 2004. IDEM's Assessment Branch sampled fourteen sites, once every other week from March 2004 to October 2004 (Figure 25). The City of Fort Wayne sampled seven of the same sites as IDEM on opposite weeks from July of 2004 through October of 2004 (Attachment G).

As part of a 319 grant, the Adams County Soil and Water Conservation District sampled twelve sites for nutrients in the St. Marys River watershed approximately monthly from May of 2000 through May of 2001. This study focused on the St. Marys River, Blue Creek, and Little Blue Creek. (Figure 25, Attachment G).

Section 2 - Numeric Targets

Nutrient conditions were evaluated on a site-by-site basis using the benchmarks described below. In most cases, it requires two or more of these conditions to be met in order to classify a waterbody as impaired:

Total Phosphorus
- One or more values >0.3 mg/L

Nitrogen (measured as NO_3 + NO_2)
- One or more values >10.0 mg/L

Dissolved Oxygen (DO)
- Values below the water quality standard of 4.0 mg/L or values consistently at or close to the standard, in the range of 4.0 - 5.0 mg/L
- Values ≥12.0 mg/L

pH measurements
- Values above the water quality standard of 9.0 or values consistently at or close to the standard, in the range of 8.7 to 9

Algal Condition
- Algae are described as "excessive" based on field observations by trained staff

Total Suspended Solids
- Values >30 mg/L

Blue Creek/Habegger Ditch, Yellow Creek and Unnamed Tributary to the St. Marys River watersheds have been identified as impaired by a low IBI score, in additional to having elevated nutrient levels. Nutrients rarely approach concentrations in the ambient environment that are toxic to aquatic life, however, nutrients are essential in minute amounts for the proper functioning of healthy aquatic ecosystems. Nevertheless, nutrient concentrations in excess of these minute needs can exert negative effects on the aquatic ecosystem by increasing algal and aquatic plant life production (Sharpely et al., 1994). Increased plant production increases turbidity, decreases average dissolved oxygen concentrations, and increases fluctuations in diurnal dissolved oxygen and pH levels. Such changes shift species composition away from functional assemblages comprised of intolerant species, benthic insectivores, and top carnivores that are typical of high quality streams towards less desirable assemblages of tolerant species, generalists, omnivores, and detrivores that are typical of degraded streams (Ohio EPA, 1999). Such a shift in community structure lowers the diversity of the system; the IBI scores can reflect this shift.

Total suspended solids (TSS) are particles in the water that can be trapped by a filter. High concentrations of TSS can reduce the amount of sunlight available to aquatic organisms and decrease water clarity. This leads to a number of effects including reduction of aquatic plants available for consumption by higher-level organisms, lower dissolved oxygen, and the impaired ability of fish to see and catch food. TSS particles can also hold heat resulting in increased stream temperature. Further, TSS can clog fish gills, retard growth rates, decrease resistance to disease, and prevent egg and larval development. When TSS settles on the bottom of a waterbody, eggs of fish and invertebrates are smothered, larvae can suffocate, and habitat quality is degraded (Ohio EPA 2006). Based on this information, the nutrient targets coupled with Total Suspended Solids (TSS) target will be used to set reductions necessary for achieving the reductions necessary for the IBC impairment.

Section 3 - Source Assessment

3.1 - Unnamed Tributary to St. Marys

Watershed Characterization

The Unnamed Tributary to the St. Marys sub-watershed is located entirely in Allen County. The Unnamed Tributary to the St. Marys River is less than 3 miles in length and is in the northern portion of Allen County near the Allen-Adams County Line. The Unnamed Tributary to the St. Marys River flows southeast until it is joined by the St. Marys River (Figure 26).

A reassessment using the data gathered by IDEM in 2004 was completed on the Unnamed Tributary to the St. Marys River sub-watershed during the development of the St. Marys River watershed TMDL. The reassessment concluded that Unnamed Tributary to the St. Marys River will be listed on the 2006 303(d) List as impaired for IBC and *E.coli*. The St. Marys River watershed TMDL will address the IBC impairment using the nutrient and TSS criteria. The data that was collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

Nitrogen, Phosphorus, and TSS Data

One site in the Unnamed Tributary to the St. Marys River sub-watershed was sampled for nitrogen, phosphorus, and TSS. IDEM's Assessment Branch collected samples biweekly from March 2004 to October 2004 (Attachment G).

Phosphorus data collected by IDEM exceeded the numeric target 14% of the time. The highest phosphorus concentration was 0.83 mg/L at site LES050-0020. TSS collected by IDEM exceeded the numeric target 23% of the time. The highest TSS concentration was 584 mg/L at site LES050-0020.

Landuse

Landuse information was assessed using data from the 1992 Gap Analysis Program (GAP). Approximately 90% of the landuse in the Unnamed tributary to the St. Marys River sub-watershed was agriculture. The remaining landuse for the Unnamed Tributary to the St. Marys River sub-watershed consisted of approximately 8% forested, and 1.5% wetland (Figure 27). A comparison of 1992 landuse with the aerial photos taken in 2003 shows no substantial changes to the Unnamed Tributary sub-watershed have occurred.

Wildlife

Wildlife is a known source of nutrient and TSS impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of nutrients and TSS. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Homes within the Unnamed Tributary to the St. Marys River sub-watershed are almost entirely on septics. Failing septic tanks are known sources of nutrients and TSS in waterbodies. The Allen County Health Department has conducted studies to see the potential effect a community of homes with septic systems has on a stream. Communities of homes were chosen throughout Allen County. None of these communities are located along the Unnamed Tributary to the St. Marys River sub-watershed, but this information will be useful for implementation of this TMDL. Failing septic tanks are known sources of nutrients and TSS impairment in waterbodies (Allen County Health Department communication 2004).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There are no NPDES permitted facilities located in the Unnamed Tributary to the St. Marys River sub-watershed

Combined Sewer Overflows (CSO) & Sanitary Sewer Overflows (SSO)

There are no NPDES permitted facilities located in the Unnamed Tributary to the St. Marys River sub-watershed

Confined Feeding Operations and Concentrated Animal Feeding Operations

There are no CFOs/CAFOs located in the Unnamed Tributary to the St. Marys River sub-watershed

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. The possibility still exists that these operations may still have an adverse impact on the water quality within the watershed. No specific information on these small livestock operations is currently available for the remaining portion of the Unnamed Tributary to the St. Marys River sub-watershed. It is believed that these small livestock operations may be a potential source of the nutrient and TSS impairments.

3.2 - Blue Creek Sub-Watershed

Watershed Characterization

The Blue Creek sub-watershed is located entirely in Adams County. Blue Creek starts in the southwest portion of the county near the Adams-Wells County Line. Blue Creek then flows southeast until it is joined by Habegger Ditch. Blue Creek then turns northeast before discharging into the St. Marys River. Little Blue Creek is the last major tributary to discharge into Blue Creek before it joins the St. Marys River (Figure 28).

A reassessment using the data gathered by IDEM in 2004 was completed on the Blue Creek sub-watershed during the development of the St. Marys River watershed TMDL. The reassessment concluded that Blue Creek and Habegger Ditch will be listed on the 2006 303(d) List as impaired for nutrients (nitrogen and phosphorus) and TSS. The reassessment resulted in the entire Blue Creek sub-watershed being scheduled to be listed as impaired for nutrients and TSS on the 2006 303(d) List. The St. Marys River watershed TMDL will address the nutrient and TSS impairments, as they will appear on the 2006 303(d) List. The data that was collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 supported the conclusions of the reassessment.

Nitrogen, Phosphorus, and TSS Data

Three sites in the Blue Creek sub-watershed were sampled for nitrogen, phosphorus, and TSS. IDEM's Assessment Branch collected samples biweekly from March 2004 to October 2004 (Attachment G).

Nitrogen data collected by IDEM exceeded the numeric target 14% of the time. The highest nitrogen concentration was 36.4 mg/L at site LES040-0066. Phosphorus data collected by IDEM exceeded the numeric target 44% of the time. The highest phosphorus concentration was 1.03 mg/L at site FES040-0011. TSS collected by IDEM exceeded the numeric target 28% of the time. The highest TSS concentration was 692 mg/L at site LES040-0009.

Landuse

Landuse information was assessed using data from the 1992 Gap Analysis Program (GAP). Approximately 94% of the landuse in the Blue Creek sub-watershed was agriculture. The remaining landuse for the Blue Creek sub-watershed consisted of approximately 5% forested, 0.4% wetlands, and 0.7% urban (Figure 29). A comparison of 1992 landuse with the aerial photos taken in 2003 shows no substantial changes to the Blue Creek sub-watershed have occurred.

Wildlife

Wildlife is a known source of nutrient and TSS impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of nutrients and TSS. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Blue Creek sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of nutrient and TSS impairments in waterbodies. In 2001, the Adams County Health Department completed a study throughout the county identifying homes that rely solely on septic tank systems. Many of these systems discharge directly to a stream or field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, or approximately 10,000 residents, in rural Adams County rely solely on septic tanks. This study further identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to a municipal system. Six of these seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001 (Smith, T., 2005).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There are three NPDES permitted facilities located in the Blue Creek sub-watershed (Figure 28, Appendix 9). Pleasant Mill #2/Meshberger Bros. Stone Plant #2 (ING490084) discharges to Blue Creek and does not contain a sanitary component. Bing-Lear Manufacturing Group, Berne (IN0058980) discharges to Habegger Ditch and does not contain a sanitary component. Berne STP (IN0021369) discharges to the Wabash River, which is not located in the St. Marys River watershed. However, until several years ago the Berne STP effluent outfall did discharge to Habegger Ditch. Pleasant Mill #2, Meshberger Bros. Stone Plant #2 and the Bing-Lear Manufacturing Group, Berne STP are not sources of nutrients or TSS to the Blue Creek sub-watershed since there is no sanitary component in their discharge. Even though the Berne STP effluent outfall has a sanitary component to its discharge, its outfall is no longer located on Habegger Ditch. The Berne STP effluent outfall is also not considered a source of nutrients or TSS to the Blue Creek sub-watershed.

Combined Sewer Overflows (CSO) & Sanitary Sewer Overflows (SSO)

The City of Berne is the only CSO community in the Blue Creek sub-watershed (Figure 30, Appendix 10). The City of Berne has three CSO outfalls. These three CSO outfalls discharge to Sprunger Ditch, which is a tributary of Habegger Ditch. The City of Berne submitted their CSO Long Term Control Plan (LTCP) in August of 2002. The City of Berne and the IDEM Office of Enforcement is currently working on an agreed order to address CSOs and SSOs in the collection system. SSOs are not a permitted activity and are not a legal discharge. CSO and SSO outfalls are a source of nutrients and TSS to the Blue Creek sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for Confined Feeding Operations (CFOs) and Concentrated Animal Feeding Operations (CAFOs). There are twenty CFOs in the Blue Creek sub-watershed (Figure 28) and three of them, are CAFOs (Figure 28, Appendix 11). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations “not cause or contribute to an impairment of surface waters of the state.” The active animal operations in Blue Creek sub-watershed have no open enforcement actions at this time. However, these operations are still considered a potential source of nutrients and TSS for the Blue Creek sub-watershed TMDL.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. The possibility still exists that these operations may still have an adverse impact on the water quality within the watershed. No specific information on these small livestock operations is currently available for the remaining portion of the Blue Creek sub-watershed. It is believed that these small livestock operations may be a potential source of the nutrient and TSS impairments.

3.3 - Yellow Creek Sub-Watershed

Watershed Characterization

The Yellow Creek sub-watershed is located entirely in Adams County. Smith Ditch and Johnson Ditch combine to form Yellow Creek. Straight Branch and Hendricks Ditch flow into Yellow Creek downstream of the Smith Ditch and Johnson Ditch confluence. Yellow Creek flows northeast until it is joined by Martz Ditch. Ruppert Ditch is the major tributary of Martz Ditch. After Martz Ditch joins Yellow Creek, Yellow Creek then flows northwest to the St. Marys River (Figure 31).

A reassessment using the data gathered by IDEM in 2004 was completed on the Yellow Creek sub-watershed during the development of the St. Marys River watershed TMDL. The St. Marys River watershed TMDL will address the nutrient (nitrogen and phosphorus) and TSS impairments as they will appear on the 2006 303(d) List. The data that were collected by the City of Fort Wayne in conjunction with IDEM data collected in 2004 support the conclusions of the reassessment.

Nitrogen, Phosphorus, and TSS Data

Two sites were sampled for nitrogen, phosphorus, and TSS in the Yellow Creek sub-watershed. Nitrogen, phosphorus, and TSS samples were collected from sites LES040-0099 and LES040-0038. Samples were collected biweekly by IDEM’s Assessment Branch and biweekly by the City of Fort Wayne on opposing weeks from March 2004 to October 2004 (Attachment G).

Nitrogen collected by IDEM exceeded the numeric target 5% of the time. The highest nitrogen concentration was 17.8 mg/L at site LES040-0099. Phosphorus collected by IDEM and the City of Fort Wayne exceeded the numeric target 39% of the time. The highest phosphorus concentration was 1.17 mg/L at site LES040-0099. TSS collected by IDEM and the City of Fort Wayne exceeded the numeric target 21% of the time. The highest TSS concentration was 206 mg/L at site LES040-0038.

Landuse

Landuse information was assessed using data from the 1992 Gap Analysis Program (GAP). Approximately 95% of the landuse in the Yellow Creek sub-watershed was agriculture. The remaining landuse for the Yellow Creek sub-watershed consisted of approximately 4% forested, 0.4% wetlands, and 1% urban (Figure 32). A comparison of 1992 landuse with the aerial photos taken in 2003 show no substantial changes to the Yellow Creek sub-watershed have occurred.

Wildlife

Wildlife is a known source of nutrient and TSS impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of nutrients and TSS. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Septic Systems

Many homes within the Yellow Creek sub-watershed treat wastewater with on-site septic systems. Failing septic systems are known sources of nutrient and TSS impairments in waterbodies. In 2001, the Adams County Health Department completed a study throughout the county identifying homes that rely solely on septic tank systems. Many of these systems discharge directly to a stream or field tile that will carry the wastewater to streams. This study found an estimated 35% of the homes, or approximately 10,000 residents, in rural Adams County rely solely on septic tanks. This study further identified seven unsewered communities. These seven unsewered communities represent 10% of the approximate 10,000 residents who are neither connected to a municipal treatment plant or using a complete on-site septic system. The remaining 90% live in rural communities that are not as accessible to a municipal system. Six of these seven unsewered communities are located in the St. Marys River watershed. These six communities are Pleasant Mills, Arcadia Village Subdivision and surrounding area, Monmouth, Preble-Magley, Peterson, and Sunnybrook (or Andrews) Subdivision. In 1986, Adams County Health Department began requiring new homes in the rural, unsewered areas to install on-site septic systems according to the Indiana State Department of Health rules and regulations. Many of the homes in these communities were built prior to 1986 and are not covered under this new regulation. As of February 2005, approximately 750 to 800 on-site septic systems exist in Adams County, which is an increase from approximately 600 onsite systems in 2001 (Smith, T., 2005).

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There is one NPDES permitted facility located in the Yellow Creek sub-watershed (Appendix 9, Figure 31). Monroe Water Department (IN0048151) discharges to Yellow Creek and does not contain a sanitary component. Since Monroe Water Department does not have any component of its discharge that could be considered a source of nutrients or TSS to the Yellow Creek sub-watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for Confined Feeding Operations (CFOs) and Concentrated Animal Feeding Operations (CAFOs). There are five CFOs in the Yellow Creek sub-watershed (Figure 31, Appendix 11), none of which are CAFOs. The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The active animal operations in Yellow Creek sub-watershed have no open enforcement actions at this time. However, these operations are still considered a potential source of nutrients and TSS for the Yellow Creek sub-watershed.

Small Animal Operations

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. The possibility still exists that these operations may still have an adverse impact on the water quality within the watershed. No specific information on these small livestock operations is currently available for the remaining portion of the Yellow Creek sub-watershed. It is believed that these small livestock operations may be a potential source of the nutrient and TSS impairments.

Section 4 - Linkage Analysis

The linkage between the nutrient and TSS concentrations in the Blue Creek/Habegger Ditch and Yellow Creek watersheds and the potential sources of nutrients provides the basis for the development of this TMDL. Analysis of this relationship allows for estimating the total assimilative capacity of the stream and any needed load reductions. Water quality duration curves were created for the sampling sites in the Blue Creek/Habegger Ditch and Yellow Creek watersheds that were sampled by IDEM and the City of Fort Wayne in 2004. A flow duration interval is described as a percentage. Zero (0) percent corresponds to the highest stream discharge (flood condition) and 100 percent corresponds to the lowest discharge (drought condition). These sampling sites are representative of the hydrodynamics of Blue Creek, Habegger Ditch, and Yellow Creek watersheds (Attachment H). This section will discuss the water quality durations and the linkage of Section 3.0 for each sub-section of the Blue Creek/Habegger Ditch and Yellow Creek watersheds.

The linkage between nutrients and TSS concentrations in the Unnamed Tributary to the St. Marys River watershed and potential sources of nutrients provides part of the basis for the development for this TMDL. Unlike the two previous watersheds, the flow measurements taken do not align with the load duration curves created for this watershed. The load duration curves will therefore not be used for this watershed. IDEM has completed additional testing on this tributary, which is less than 3 miles in length, and the flow information collected support that naturally occurring conditions inhibit the formation of the ideal biotic community characteristic of higher ordered streams. This tributary is a 1-order stream that naturally dries up in the summer. According to Stehr and Branson (1938), "the reduction of the stream to a series of pools during the summer period of small rainfall and high evaporation prevents many species from returning to the stream during this season and effectively limits the variety and size of the fauna at this time." Stehr and Branson (1938) continue, "...very few of these [fish] ever reach the middle and upper sections of the stream for the water on many of the riffles is too shallow for their passage." Further research on headwater streams (Schlosser, 1982; Harrel, et. al., 1967; Lotrich, 1973; Whiteside and McNatt, 1972; and Matthews, 1981) indicates that headwater streams, including zero-order and first-order streams do not possess the same diversity as higher order streams, and thus may never be able to obtain a fully diverse warm-water aquatic habitat. The flow data collected from March 9, 2004, through October 4, 2004, shows 53% of the samples taken were during no flow conditions (Figure 33). This lack of flow for extended periods, as stated above, will adversely effect the fish populations.

4.1- Unnamed Tributary to St. Marys sub-watershed

4.1.1 Water Quality and Stream Flow

Site LES050-0020 is located near the center of the stream length. This site had violations of the phosphorus (0.44 mg/L) and TSS (53 mg/L) numeric targets. After review of these water quality duration curves it has been determined that flow from the surrogate flow gage does not represent the flow in the Unnamed tributary to St. Marys River (Figure 33). Therefore, these water quality duration curves will not be used for the Unnamed Tributary to St. Marys River.

4.1.2 Source Linkage

The landuse in this sub-watershed is predominately agricultural. Row crops comprise 82% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of nutrients and TSS, but they can carry nutrients and TSS from land applied manure, runoff from the fields and pastures, failing septics, and other sources of nutrients not adjacent to the streams. The high phosphorus and TSS values during mid-range to high flow conditions indicates the presence of phosphorus and TSS transported by field tiles.

Pasture accounts for approximately 9% of the total landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals present in these smaller animal operations are not as likely to enter a stream during high flow conditions. The high nutrient and TSS values during mid-range to high flow conditions indicates run-off during or shortly after precipitation events.

Wildlife is a known source of nutrients and TSS. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes in phosphorus and TSS levels during extreme high flow conditions due to runoff or flooding which carries large quantities of phosphorus and TSS at one time.

There are no National Pollutant Discharge Elimination System (NPDES) permitted facilities in this sub-watershed. Therefore, these facilities are not a contributing source to the nutrient and TSS impairments.

There are no CFOs and CAFOs in this sub-watershed. Therefore, these facilities are not a contributing source to the nutrient and TSS impairments.

Septic systems are a known source of nutrients and TSS for this sub-watershed based on information provided to IDEM by the Allen (Allen County Health Department personal communication). The septic systems described by this information would provide a constant source of nutrients and TSS, particularly during low flow conditions. According to the water quality duration curve, there are no consistent violations of the nutrient or TSS targets during these flow conditions. However, septic systems will contribute to the violations founds during higher flow conditions. During higher flow conditions, septic systems can fail by leaching into a field tile or other type of pipe that discharges to the stream.

There are no CSOs or SSO in this sub-watershed. Therefore, these types of discharges are not a contributing source to the nutrient and TSS impairments.

4.1.3 Conclusion

There are no known NPDES permits, CFOs, CAFOs, CSOs, or SSOs in this sub-watershed. Based on the lack of point sources, it can be concluded that the sources of phosphorus and TSS in this watershed are nonpoint sources, which include small animal operations, Amish communities, wildlife, and leaking and failing septic systems. Additionally the lack of flow during will inhibit a healthy biotic community.

4.2 - Blue Creek/Habegger sub-watershed

4.2.1 Water Quality Duration Curves

Water quality duration curves were created for four sites in the Blue Creek/Habegger Ditch sub-watershed (Attachment H). Site LES040-0099 is located at the mouth of Habegger Ditch. This site had violations of the nitrogen (20.1 mg/L), phosphorus (0.44 mg/L), and TSS (53 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

Site LES040-0011 is located on Blue Creek after the confluence of Gates Ditch. This site had violations of the nitrogen (14.7 mg/L), phosphorus (0.39 mg/L), and TSS (41.8 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

Site LES040-0066 is located on Blue Creek after the confluence of Little Blue Creek. This site had violations of the nitrogen (11.5 mg/L), phosphorus (0.42 mg/L), and TSS (58 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

Site LES040-0009 is located near the mouth Blue Creek after the confluence of the Unnamed Tributary (Duer Ditch). This site had violations of the nitrogen (13.8 mg/L), phosphorus (0.4 mg/L), and TSS (49.53 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

4.2.2 Source Linkage

The landuse in this sub-watershed is predominately agricultural. Row crops comprise 88% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of nutrients and TSS, but they can carry nutrients and TSS from land applied manure, runoff from the fields and pastures, failed septics, and other sources of nutrients not adjacent to the streams. The high nutrients and TSS values during mid-range to high flow conditions indicates the presence of nutrients and TSS transported by field tiles.

Pastures accounts for approximately 11% of the total landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals present in these smaller animal operations are not as likely to enter a stream during high flow conditions. The high nutrient and TSS values during mid-range to high flow conditions indicates run-off during or shortly after precipitation events.

Wildlife is a known source of nutrients and TSS. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes in nutrient and TSS levels during extreme high flow conditions due to runoff or flooding which carries large quantities of nutrients and TSS at one time.

This area has Amish communities. Amish communities are not required to follow state guidelines for waste removal; therefore, the significance of the Amish community impact on the nutrient and TSS levels for these streams is unknown.

There is a lack of nutrient and TSS sampling for Farlow Ditch, and Duer Ditch and other tributaries. The location of the sampling sites in this sub-watershed indicates that these tributaries are contributing to the nutrient and TSS impairments. It is unclear the magnitude these tributaries contribute to the nutrient and TSS impairments.

None of the National Pollutant Discharge Elimination System (NPDES) permitted facilities in this sub-watershed are violating their NPDES permits; therefore, these facilities are not considered as a contributing source to the nutrient and TSS impairments.

Permitted CFOs and CAFOs are clustered in the headwaters of Blue Creek. CFOs and CAFOs could be sources of nutrients and TSS during high flow conditions. These facilities have the potential to cause or contribute to the exceedance of the nutrient and TSS targets through land application or a malfunction at the facility. However, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of nutrients and TSS for this sub-watershed based on information provided to IDEM by the Adams County Health Department (Adams County Health Department personal communication). The septic systems described by this information would provide a constant source of nutrients and TSS, particularly during low flow conditions. According to the water quality duration curve, there are no consistent violations of the nutrient or TSS targets during these flow conditions. However, failing septic systems will contribute to the violations founds during higher flow conditions. During higher flow conditions, septic systems can fail by leaching into a field tile or other type of pipe that discharges to the stream.

There are two CSOs and one SSO from the Town of Berne in this sub-watershed. Site LES040-0099 is located downstream of these CSOs and SSO. CSOs and SSOs typically show on water quality duration curves during high flow events. Site LES040-0099 showed high nutrient values during higher flows.

4.2.3 Conclusions

There are no known NPDES permit, CFO, or CAFO violations. CSOs and SSOs from the Town of Berne are a source of nutrients and TSS. Based on the water quality duration curves, it can be concluded that the majority of sources of nutrients and TSS in this watershed are nonpoint sources, which include small animal operations, Amish communities, wildlife, and leaking and failing septic systems.

<u>4.3 - Yellow Creek sub-watershed</u>

4.3.1 Water Quality Duration Curves

Water quality duration curves were created for the two sampling sites in the Yellow Creek sub-watershed (Attachment H). Both of these sites were sampled by IDEM and one site was also sampled by the City of Fort Wayne in 2004. Site LES040-0040 is located at the mouth of Martz Ditch. This site had violations at the 10th percentile for nitrogen (11.4 mg/L), phosphorus (0.35 mg/L) and TSS (54 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

Site LES040-0038 is located on Yellow Creek below the confluence of Martz Ditch to Yellow Creek. This site had violations at the 10th percentile for nitrogen (14.1 mg/L), phosphorus (0.4 mg/L) and TSS (36.3 mg/L) numeric targets. According to the water quality duration curves, nutrient violations occurred during or shortly after precipitation events. This indicates sources due to run-off events.

4.3.2 Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 87% of the landuse. The soils in this sub-watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles themselves are not sources of nutrients and TSS, but they can carry nutrients and TSS from land-applied manure, runoff from the fields and pastures, failed septics, and other sources of nutrients and TSS not adjacent to the streams. The high nutrient and TSS values during mid-range to high flow conditions indicates the presence of nutrients and TSS transported by field tiles.

Pasture comprises 8% of the landuse. This indicates the presence of non-regulated smaller animal operations in this sub-watershed. Animals located in these smaller animal operations are not as likely to enter a stream during high flow conditions. The high nutrient and TSS values during mid-range to high flow conditions indicates run-off during or shortly after precipitation events.

Wildlife is a known source of nutrients and TSS. The predominant agricultural and forested landuse in this sub-watershed creates ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes in nutrient and TSS levels during extreme high flow conditions due to runoff or flooding which carries large quantities of nutrients and TSS at one time.

This area has Amish communities. Amish communities are not required to follow state guidelines for waste removal; therefore, the significance of the Amish community impact on the nutrient and TSS levels for these streams is unknown.

Due to a lack of sampling in the headwater streams in this sub-watershed, the headwater streams are not listed as impaired. Since there are known sources of nutrients and TSS in the headwater streams, the assumption can be made that these headwater streams are contributing to the nutrient and TSS impairments in the downstream sections of this sub-watershed. However, it is unclear as to the magnitude that these tributaries play a part in the impairment.

None of the National Pollutant Discharge Elimination System (NPDES) permitted facilities in this sub-watershed are violating their NPDES permits, and are not considered a contributing source to the impairments of nutrients and TSS.

Permitted CFOs and CAFOs are clustered in the headwaters of Yellow Creek. CFOs and CAFOs could be sources of nutrients and TSS during high flow conditions on the water quality duration curve. These facilities have the potential to cause or contribute to the exceedance of the nutrient and TSS targets through land application or a malfunction at the facility. However, all of these facilities are operating in compliance with their permit.

Septic systems are a known source of nutrients and TSS for this sub-watershed based on information provided to IDEM by the Adams County Health Department (Adams County Health Department personal communication). The septic systems described by this information would provide a constant source of nutrients and TSS, particularly during low flow conditions. According to the water quality duration curve, there are no consistent violations of the nutrient or TSS targets during these flow conditions. However, septic systems will contribute to the violations founds during higher flow conditions. During higher flow conditions, septic systems can fail by leaching into a field tile or other type of pipe that discharges to the stream.

4.3.3 Conclusions

There are no known NPDES permit, CFO, or CAFO violations. Based on the water quality durations curves, it can be concluded that the majority of sources of nutrients and TSS in this watershed are nonpoint sources which include small animal operations, Amish communities, wildlife, and leaking and failing septic systems.

Section 5 - TMDL Development

The TMDL represents the maximum loading that can be assimilated by the waterbody while still achieving the targets for nutrient and TSS levels, as indicated in the Numeric Targets section of this document. Concurrent with the selection of a numeric concentration endpoint, TMDL development also defines the critical conditions that will be used when defining allowable levels. These numeric targets meet the requirements of a daily load because they are instantaneous standards that must be met at all times within the waterbody. Many TMDLs are designed as the set of environmental conditions that, when addressed by appropriate controls, will ensure attainment of target levels for the pollutant. For example, the critical conditions for the control of point sources in Indiana are given in 327 IAC 5-2-11.1(b). In general, the 7-day average low flow in 10 years (Q7, 10) for a stream is used as the design condition for point source dischargers. However, nutrient and TSS sources to Blue Creek/Habegger Ditch and Yellow Creek watersheds arise from wet weather-driven conditions. For the Blue Creek/Habegger Ditch and Yellow Creek River watersheds and the contributing sources, the allowable loads during wet weather conditions are outlined in the WLA and LA sections that will ensure compliance, as long as they are distributed properly throughout the watersheds. The Unnamed Tributary to the St. Marys River has violations of the phosphorus and TSS targets only. These violations are not dependent on wet weather events. In the Unnamed Tributary to St. Marys River the violations are predominantly during dry weather conditions. This is due to the concentration of these parameters during the no flow period in stream. The act of collecting the sample during these low flow periods makes re-suspension of the sediment likely. For the Unnamed Tributary to the St. Marys River watershed and the contributing sources, the allowable loads during dry weather conditions are outlined in the WLA and LA sections that will ensure compliance with WQS.

<u>Unnamed Tributary to St. Marys River</u>

The Unnamed Tributary to St. Marys River has been listed due to IBC impairment. IDEM has completed additional testing on this tributary, which is less than 3 miles in length, and the flow information collected support that naturally occurring conditions inhibit the formation of the ideal biotic community characteristic of higher ordered streams. This tributary is a first order stream that naturally dries up in the summer. According to Stehr and Branson (1938), "the reduction of the stream to a series of pools during the summer period of small rainfall and high evaporation prevents many species from returning to the stream during this season and effectively limits the variety and size of the fauna at this time.” Stehr and Branson (1938) continue, "...very few of these [fish] ever reach the middle and upper sections of the stream for the water on many of the riffles are too shallow for their passage." Further research on headwater streams (Schlosser, 1982; Harrel, et. al., 1967; Lotrich, 1973; Whiteside and. McNatt, 1972; and Matthews, 1981) indicates that headwater streams, including zero-order and first-order streams do not possess the same diversity as higher order streams, and thus may never be able to obtain a fully diverse warm-water aquatic habitat. The flow data collected from March 9, 2004-October 4, 2004 shows 53% of the samples taken are during no flow conditions (Figure 33). This lack of flow for extended periods as stated above will adversely effect the fish populations. Along with this lack of flow elevated levels of phosphorus and TSS have been documented, which will require reductions (Appendix 12).

Section 6 - Allocations

TMDLs are comprised of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include a Margin of Safety (MOS), either implicitly or explicitly, that accounts for uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this definition is denoted by the equation:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The term TMDL represents the maximum loading that can be assimilated by the receiving water while still achieving WQS. The overall loading capacity is subsequently allocated into the TMDL components of WLAs for point sources, LAs for nonpoint sources, and the MOS. This nutrient and TSS TMDL is concentration-based consistent with USEPA regulations at 40 CFR, Section 130.2(i).

To investigate further the potential sources mentioned above, nutrient and TSS load duration curve analyses, as outlined in an unpublished paper by Cleland (2002), was developed for each sampling site in the watershed (Attachment I). The load duration curve analysis is a relatively new method utilized in TMDL development. The method considers how stream flow conditions relate to a variety of pollutant loadings and their sources (point and nonpoint).

In order to develop a load duration curve, continuous flow data is required. The USGS gage for the Harber Ditch, which was retired in 1991, was used for the tributary watersheds. The Little River gage was then used to determine the flow on the sampling day for the load duration curve analysis. A regression analysis between the Little River (03324000) and Harber Ditch (Figure 34) was created to confirm the use of the Little River data to supplement the information at the retired Harber Ditch gage. The Little River is located in a watershed adjacent to the St. Marys River watershed. This comparison uses a coefficient of determination value, R^2, to indicate the "fit" of the data. The comparison found the coefficient of determination, R^2, to be 0.74 values near one (1) for R^2 indicate a good fit of the data, whereas values near zero (0) indicate a poor fit of the data. Therefore, flow data from USGS gage (03354000) in Little River was used to supplement the Harber Ditch data. Harber Ditch, which is not a listed segment, is a tributary to the St. Marys that flows into the river from the west. Watershed characteristics of Harber Ditch are quite similar to the listed tributaries (e.g. dominated by row crop agriculture and forest). Thus, the duration curve derived from flow information collected at Harber Ditch is used for the other tributaries. The St. Marys River gage (04182590) was used for the development of the nitrogen, phosphorus, and TSS load duration curve analyses for the Blue Creek/Habegger Ditch and Yellow Creek watershed TMDLs.

The flow data is used to create flow duration curves, which display the cumulative frequency of distribution of the daily flow for the period of record. The flow duration curve relates flow values measured at the monitoring station to the percent of time that those values are met or exceeded. Flows are ranked from extremely low flows, which are exceeded nearly 100% of the time, to extremely high flows, which are rarely exceeded. Flow duration curves are then transformed into load duration curves by multiplying the flow values along the curve by applicable water quality values for nitrogen, phosphorus and TSS and appropriate conversion factors. The load duration curves are conceptually similar to the flow duration curves in that the x-axis represents the flow recurrence interval and the y-axis represents the allowable load of the water quality parameter. The curve representing the targeted loads of nitrogen, phosphorus and TSS were calculated using the nutrient listing targets. The final step in the development of a load duration curve is to add the water quality pollutant data to the curves. Pollutant loads are estimated from the data as the product of the pollutant concentrations, instantaneous flows measured at the time of sample collection, and appropriate conversion factors. In order to identify the plotting position of each calculated load, the recurrence interval of each instantaneous flow measurement was defined. Water quality pollutant monitoring data are plotted on the same graph as the load duration curve that provides a graphical display of the water quality conditions in the waterbody. The pollutant monitoring data points that are above the target line exceed the nutrient or TSS target level; those that fall below the target line meet the nutrient or TSS target level (Mississippi DEQ, 2002).

6.1 - Wasteload Allocations

There are three permitted dischargers in Blue Creek/Habegger Ditch and Yellow Creek watersheds. None of the NPDES permitted facilities in this sub-watershed are violating their NPDES permits and are not considered a contributing source to the impairments of nutrient and TSS. One of these permitted discharger's effluent does not discharge to the Blue Creek/Habegger Ditch watershed but has CSOs and SSOs that discharge to this watershed.

The WLA for permitted activities is set at the nutrient and TSS target levels of total phosphorus less than 0.3 mg/L, nitrogen less than 10.0 mg/L, and total suspended solids (TSS) less than 30 mg/L

The WLA for waste stabilization lagoon systems, which must discharge at a 10:1 dilution ratio, is 75 mg/L for TSS.

The WLA for prohibited discharges from SSOs and septic systems with straight pipe discharges directly to streams is set at 0.0 mg/L.

There are no permitted dischargers (CSO, SSO, CAFO, or CFO's) in the Unnamed Tributary to the St. Marys River, therefore, no WLA is necessary for this watershed.

6.2 - Load Allocations

The LA for nonpoint source activities is set at the nutrient and TSS target levels of total phosphorus less than 0.3 mg/L, nitrogen less than 10.0 mg/L, and total suspended solids (TSS) less than 30 mg/L. The reductions have additionally been broken down into flow regime, which will help identify critical flow and areas for the implementation of this TMDL (Appendix 12).

Load allocations may be affected by subsequent work in the watershed. There are currently no watershed projects or plans in the Blue Creek/Habegger Ditch, Yellow Creek, or the Unnamed Tributary to the St. Marys River watersheds. However, there have been several watershed projects completed in the surrounding areas. IDEM plans to work with the watershed coordinators in the surrounding areas along with local government agencies to encourage interest in watershed projects. It is anticipated that watershed projects will be useful in continuing to define and address the nonpoint sources of the nutrients and TSS in the Blue Creek/Habegger Ditch, Yellow Creek and Unnamed Tributary to the St. Marys River watersheds.

6.3 - Margin of Safety

The numbers calculated for the reductions necessary to achieve the target standards are considered conservative because only the samples violating the target standards were used when calculating the needed reductions. In addition to using violations only to calculate the needed reductions, an additional 5% reduction will be added to the target reduction to insure compliance with the target standards.

Section 7 - Seasonality

Seasonality in the TMDL is addressed by expressing the TMDL in terms of the *E. coli* WQS for total body contact during the recreational season (April 1 through October 31) as defined by 327 IAC 2-1-6(d). There is no applicable total body contact *E. coli* WQS during the remainder of the year in Indiana. Because this is a concentration-based TMDL, *E. coli* WQS will be met regardless of flow conditions in the applicable season.

Section 8 - Monitoring

Future monitoring of the Blue Creek/Habegger Ditch, Yellow Creek, and Unnamed Tributary to the St. Marys River watersheds will take place during IDEM's five-year rotating basin schedule and/or once TMDL implementation methods are in place. During the five-year rotating basin schedule, IDEM will monitor the Blue Creek/Habegger Ditch, Yellow Creek, and the Unnamed Tributary to the St. Marys River watersheds for nutrients and TSS. In addition, IDEM will also work with the City of Fort Wayne, the Allen County Health Department, and the Adams County SWCD to collect additional sampling data that may be required. Monitoring will be adjusted as needed to assist in continued source identification and elimination. When these results indicate that the waterbody is meeting the nutrient and TSS targets, additional sampling may no longer be required and IDEM's five year rotating basin schedule will be sufficient future monitoring.

Section 9 - Reasonable Assurance Activities

Reasonable assurance activities are programs that are in place or will be in place to assist in meeting the Blue Creek/Habegger Ditch and Yellow watersheds TMDL allocations and the targets.

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

For the permitted dischargers, no changes are requested; although, future monitoring for phosphorus may be requested if additional monitoring shows impacts on the watersheds.

There is one CSO community that discharges to the Habegger Ditch. This facility is currently in the NPDES Long Term Control Plan permitting process. This process will address any concern regarding CSO discharges causing or contributing to the violation of the nutrient or TSS targets.

There is one SSO community that discharges to the Habegger Ditch. This activity is prohibited. Continued monitoring and work with these facilities is needed to eliminate these types of discharges. This will assure that SSOs no longer cause or contribute to violations of nutrient and TSS targets.

<u>Storm Water General Permit Rule 13</u>

MS4 permits are being issued in the state of Indiana. There are no MS4 communities in the Blue Creek/Habegger Ditch and Yellow Creek watersheds.

Confined Feeding Operations and Confined Animal Feeding Operations

CFOs and CAFOs are required to manage manure, litter, and process wastewater pollutants in a manner that does not cause or contribute to the impairment of nutrient and TSS targets. The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state."

Watershed Projects

Two 319 grants were awarded to the Adams County Soil and Water Conservation District in 1999 and 2000. These grants were to address nutrient management. The information gathered for these grants will be useful to build upon for work in this watershed.

IDEM has recently hired a Watershed Specialist for this area of the state. The Watershed Specialist will be available to assist stakeholders with starting a watershed group, facilitating planning activities, and serving as a liaison between watershed planning and TMDL activities in the Blue Creek/Habegger Ditch and Yellow Creek watersheds. Adams and Allen County along with the City of Fort Wayne have shown an interest in forming a group to address the impairments in the St. Marys River, possibly including Blue and Yellow Creek watersheds.

Potential Future Activities

Nonpoint source pollution, which is the primary cause of the nutrient and TSS impairments in this watershed, can be reduced by the implementation of "best management practices" (BMPs). BMPs are practices used in agriculture, forestry, urban land development, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Livestock owners, farmers, and urban planners, can implement BMPs outside of a watershed management plan, but the success of BMPs would be enhanced if coordinated as part of a watershed management plan. Following are examples of BMPs that may be used to reduce nutrient and TSS runoff:

1. **Riparian Area Management -** Management of riparian areas protects stream banks and riverbanks with a buffer zone of vegetation, either grasses, legumes, or trees.

2. **Manure Collection and Storage -** Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run-off into surface waters or leach down into ground water.

3. **Contour Row Crops -** Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.

4. **Manure Nutrient Testing -** If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid over-application and runoff.

5. **Drift Fences -** Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keeps animals out and prevents direct input of nutrients and TSS to the stream.

6. Pet Clean-up / Education - Education programs for pet owners can improve water quality of runoff from urban areas.

7. Septic Management/Public Education - Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some sources of nutrients and TSS.

Section 10 - Conclusion

The sources of nutrients and TSS to the Blue Creek/Habegger Ditch and Yellow Creek watersheds include both point and nonpoint sources. In order for the Blue Creek/Habegger Ditch and Yellow Creek watersheds to achieve Indiana's nutrient and TSS targets, the wasteload and load allocations for the Blue Creek/Habegger Ditch and Yellow Creek watersheds in Indiana have been set to nitrogen 10 mg/L, phosphorus 0.30 mg/L and TSS 30 mg/L. Achieving the wasteload and load allocations for the Blue Creek/Habegger Ditch and Yellow Creek watersheds depends on:

1) Assure compliance with CFO and CAFO permits so that they do not cause or contribute to violations of the nutrient and TSS targets.
2) Nonpoint sources of nutrients and TSS being controlled by implementing best management practices in the watershed.
3) The issuance of the MS4 permits for the City of Decatur, City of Fort Wayne, and Allen County.
4) The issuance of LTCPs for the City of Decatur and the City of Fort Wayne.

The next phase of this TMDL is to identify and support the implementation of activities that will bring the Blue Creek/Habegger Ditch, Yellow Creek and Unnamed Tributary to the St. Marys River watersheds in compliance with the nutrient and TSS targets. IDEM will continue to work with its existing programs on implementation. In the event that designated uses and associated water quality criteria applicable to Blue Creek/Habegger Ditch, Yellow Creek and Unnamed Tributary to the St. Marys River watersheds are revised in accordance with applicable requirements of state and federal law, the TMDL implementation activities may be revised to be consistent with such revisions. Additionally, IDEM will work with local stakeholder groups to pursue best management practices that will result in improvement of the water quality in the Blue Creek/Habegger Ditch, Yellow Creek and Unnamed Tributary to the St. Marys River watersheds.

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Appendix 1: NPDES Permits in the St. Marys River Watershed

Facilities with *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0039314	Decatur Municipal STP	St. Marys River	
IN0044199	White Horse Mobile Home Park	Borum Run via Miller	
IN0045292	Hessen Utilities	Marion Ditch	
IN0048119	Hoagland WWTP/ Allen Co Regional Sewer District	Houk Ditch	
IN0021369	Berne STP	Wabash River	Blue Creek

Facilities with Total Residual Chlorine Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0036901	Oak Ridge Estates	St. Marys River via Bulham Ditch	
IN0055417	Country Acres Association WWTP	Kohne Ditch	
IN0109835	Mill Road Estates	St. Marys River	

Facilities with no Total Residual Chlorine or *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0048151	Monroe Water Department	Yellow Creek	
IN0052302	BandB Custom Plating	St. Marys River via Tributary	
IN0058980	Bing-Lear Manufacturing Group, Berne	Habegger Ditch	Blue Creek
ING250026	Fort Wayne Metals	Bradbury Ditch	
ING490084	Meshberger Bros Stone Plt #2	Blue Creek	Blue Creek
INP000069	Bing-Lear Manufacturing Group, Berne	Berne STP	Blue Creek
INP000194	Ruan Transport Corporation	Decatur STP	
INP000197	Driggs Farms of Indiana, Inc	Decatur STP	

Appendix 2: Combined Sewer Overflows in St. Marys River Watershed

City of Fort Wayne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
004	J02-90, 210’ South of bridge at W. Jefferson and St. Marys River	St. Marys River
005	J11-164, 210’ Southeast of Manito Blvd and Indiana Village Blvd	St. Marys River
007	K03-92, 250’ Southeast of Electic Ave. and Brown Street	St. Marys River
011	K06-233, 230’ Southeast of Main St. and Camp Allen Dr.	St. Marys River
012	K06-234, 230’ Southeast of Main St. and Camp Allen Dr.	St. Marys River
013	K06-298, 80’ North of Thieme Dr. and Berry St.	St. Marys River
014	K07-106, 60’ West of Dinnen Ave. and Packard Ave.	St. Marys River
016	K07-109, 280’ Southwest of Broadway and Kinsmoor Ave.	St. Marys River
017	K07-176, 130’ Southwest of St. Marys Pkwy	St. Marys River
018	K11-165, 150’ West of Broadway and Rudisill Blvd	St. Marys River
019	K11-178, 150’ West of Broadway and Rudisill Blvd	St. Marys River
020	K15-116, 1300’ West of Hartman Rd and Westover Rd	St. Marys River
021	K19-044, 850’ West of Old Mill Rd. and Fairfax Ave.	St. Marys River
023	L06-103, 90’ Northwest of JacksonSt. and Superior St	St. Marys River
024	L06-420, 220’ North of Superior St. and Fairfield Ave.	St. Marys River
025	L06-421, 220’ North of SuperiorSt. and Fairfield Ave.	St. Marys River
026	M10-151, 310’ East of Third St. and Calhoun St.	St. Marys River
027	M10-202, 200’ Southeast of Third St. and Calhoun St.	St. Marys River
028	M10-238, 150’ East of St. Marys River Bridge and Spy Run Ave.	St. Marys River
029	M10-265, 230’ East of Duck St. and Barr St.	St. Marys River
032	M10-306, 120’ North of Clair St. and Harrison St.	St. Marys River
033	M10-313, 200’ Southeast of Third St. and Calhoun St.	St. Marys River
054	O23-080, 240’ East of Mercer Ave. and Hollis Ln.	Natural Drain #4
056	J03-313, Brown Street Pump Station	St. Marys River
067	K19-077, 310’ Southeast of Hartman Rd and Foster Park Dr.	St. Marys River

SSO

Outfall #	Location	Receiving Waters
070	N23-121, 230’ east of the intersection at John and Warfield	Highland Drain
071	N23-122, 290’ east of the intersection at John and Warfield	Highland Drain

City of Decatur

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
005	Swirl Concentrator	St. Marys River
008	Marshall Street	St. Marys River
009	Monroe Street	St. Marys River
011	Jefferson Street	St. Marys River

City of Berne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
003	Welty Street and Compromise	Sprunger Ditch to Habegger Ditch
004	Main and Ruesser	Sprunger Ditch to Habegger Ditch

SSO

Outfall #	Location	Receiving Waters
006	North End of East Water Street	Sprunger Ditch to Habegger Ditch

Appendix 3: CFO & CAFO in St. Marys River Watershed

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
8	Gary Steffen	Holthouse Ditch						60							
65	Grace Farms	Blue Creek								60,000					
91	Carl Lotter	Yellow Creek		4,200											
123	Jim Fiechter	Blue Creek			920										
469	Jerry Lee Graber	Blue Creek		320	920							6,000			
590	Ted Liechty	Blue Creek	ING800590							119,000					
635	Charles W Hill	Blue Creek			1,400										
638	Troyer Swine	Blue Creek			1,000										
684	Lynn Myers	St. Marys River			1,920										
902	David Hill	Blue Creek			625										
933	SDD Hogs, Inc	Blue Creek	ING800933		3,600										
944	ISCF Brothers Pork	Blue Creek			2,000										
948	Philip R Moser	Holthouse Ditch		1,185	500										
971	Emanuel Schmidt	Blue Creek		500	300										
1065	Pigs in a Blanket	Nickelsen Creek		2,880											
1197	Earl Gerber Farms, Inc	Holthouse Ditch									96,000				
1306	Triple G Ranch	Blue Creek		500	800	166									
1607	Triple T Farms, Inc	Holthouse Ditch		900	450		350					63,000			

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
1882	Gerald and Charles Miller	St. Marys River		250	1,945	110									
1886	Alvin Schwartz	Yellow Creek			1,950										
2206	Cottonwood Corporation	Holthouse Ditch		2,400	2,400										
2369	Allen Buuck	Nickelsen Creek			410										
2435	ADM Alliance Nutrition, Inc	St. Marys River		1,000	702	351	376	82	56	2,800		1,452	1,440		
2548	Daniels J Michaels	Yellow Creek		510	255					8,200					
3005	Joel Houk	Holthouse Ditch		200	500	96									
3281	Gene Witte	St. Marys River		360	200	80									
3292	South 40 Farm			600		415									
3615	KMV Family Farms	St. Marys River						375							
3668	David H LaFontaine	Yellow Creek								81,000					
3737	Stan Von Gunten	Blue Creek									33,600				
3944	Moser Bros-Pine Hill Acres	Holthouse Ditch		160		576									
3985	Double G Farms	Blue Creek		200	580	99									
4037	Kirkland Farms	Holthouse Ditch			1,500										
4038	County Line Swine	Blue Creek		900	600	415									

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
4067	Fuelling Farms	St. Marys River													600
4181	Victor Steiner	Yellow Creek		240	506	172									
4307	Stoller Poultry, Inc	Blue Creek			1,920					100,410					
4421	Kaehr Ag Inc	Blue Creek		460	600	204									
4637	Rigger Pork, Inc (Masterpork)	Blue Creek		800	120	619									
4964	Paul Rumple	Holthouse Ditch			6,000										
4997	Bruce Dick	Borum Run		240	540	146									
5007	Progress Pork	Blue Creek			2,000										
6000	Irish Acres Dairy	Blue Creek	ING806000					1,552	360						
6020	SandG Poultry	Blue Creek	ING806020							132,000					
6049	Tri Oak Farms, Inc	Blue Creek		320	500	134									
6159	Stan Biberstein	Holthouse Ditch								63,000					
6175	Jerry Lambright	Blue Creek												3,000	
6201	Ron Aschliman	Holthouse Ditch			3,040										
6239	James and Ron Collins	Holthouse Ditch			700										
6330	Steve Henry	Blue Creek									50,000				
4039	Thomas Wyss	St. Marys River			154										

4683	Duane E Franz	St. Marys River		400	530	100									
4942	Robert J Schuhler	St. Marys River		500	364	324									

Appendix 4: St. Marys River Watershed Reductions

Blue Watershed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
2940.1	1428.1	892.9	366.2		1082.4	88.4	51.8	Blue Creek -- Salem Rd.
3205.2	1797.2	622.8	158.4		868.2	85.6	71	Blue Creek -- CR 300 S
7549.8	3316.3	474.8	346.9		1425.1	91.2	79.6	Blue Creek -- SR 124
5298.9	1571.5	779.8	218.1		1091	88.5	8.4	Habegger Ditch -- CR 150 E
6208	3951.6	909.7	1311.8		2326.1	94.6	20.1	Gates Ditch -- CR400 S
1162.5	1105.9	824.1	295.5		748	83.3	16.3	Little Blue Creek -- CR 400 S

Yellow Watershed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
1492.5	775.3	1052.9	65.3		531.1	76.5	9.8	Martz Creek -- CR 200 N
5508.4	980.2	673.3	480.8		1149.8	89.1	24.5	Yellow Creek -- CR 250 N

Holthouse / Borum / Nickelson / Unnamed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
698.1	465.4	286	48.9		259.7	51.9	14.4	Borum Run -- Mercer Rd
6059.2	687.7	306.2	194.8		706.1	82.3	27.3	Holthouse Ditch -- CR 200 W
3849.9	766.9	327.8	163		630.2	80.1	12.2	Nickelsen Creek -- CR 1100 N
5711.1	2133	346.9	372.4		1120.1	88.8	2.3	Unnamed Tributary -- Barkley Rd

St. Mary's River

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
150	960.3	248.3	586.1		380.5	67.1	354	St. Marys - Ohio SR 81
261.3	1019.5	499.2	271.3		435.8	71.3	467.8	St. Marys - SR 101 Bridge
505.1	774.4	476.9	628.1	243.6	491	74.5	467.8	St. Marys - Pleasant Mills
1119.9	1411.2	139.3	269.1		493.4	74.6	643.2	St. Marys - Hoagland Rd
1967.7	905.8	414.8	284	374.2	601.3	79.2	672	St. Marys - Ferguson Road
304.3	357.2	159.3	202.3	69.5	189.3	33.9	672	St. Marys - Ferguson Road
1933.6	1009.4	736.8	537	243.7	716	82.5	820	St. Marys - Spy Run
391.9	431.6	226.2	323	263.2	318	60.7	820	St. Marys - Spy Run Bridge

Appendix 5: NPDES Permits in the Maumee River Watershed

Facilities with *E. coli* Limits and Total Residual Chorine

Permit No.	Facility Name	Receiving Waters
IN0032191	Fort Wayne Municipal STP	Maumee River

Facilities with no Total Residual Chlorine or *E. coli* Limits with Sanitary Component

Permit No.	Facility Name	Receiving Waters
IN0021407	Woodburn Municipal STP	Maumee River

Facilities with no Total Residual Chlorine or *E. coli* Limits with No Sanitary Component

Permit No.	Facility Name	Receiving Waters
IN0000485	Norfolk and Western Railway Co	Trier Ditch
IN0000507	BF Goodrich Tire Manufacturing	Maumee River
ING490049	Hanson Aggregates, Midwest W.	Carson Drain
INM020346	New Haven CSS	N/A

Appendix 6: Combined Sewer Overflows in Maumee River Watershed

City of Fort Wayne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
039	N06-022, 120' North of Hanna St. and Berry St.	Maumee River
048	O10-252, 350' West of Edgewater and Garfield	Maumee River
050	O10-277, 100' North of Coombs St. and Herbert St.	Maumee River
055	P06-192, 430' North of N. Anthony Blvd. and Wayne St.	Maumee River
057	P10-121, Stormwater Liftstation Wet Well	Maumee River
058	O06-34, 390' Northwest of Edsall Ave. and Dwenger Ave.	Maumee River
060	R06-31, 670' Northeast of Greenwalt Ave. and Maumee River	Unnamed Ditch to Maumee River
061	R14-137, 200' West of Lavern Ave. and State Blvd.	Baldwin Ditch
062	R14-138, 200' West of Lavern Ave. and State Blvd	Baldwin Ditch
064	S02-35. 610' Southeast of Coliseum Blvd. S.	Unnamed Ditch to Maumee River

City of New Haven

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
001	Near the Town's Abandoned Wastewater Treatment Facility	Martin Drain
002	East side of Bench Mark 761 and the NandW Railroad Crossing	Martin Drain
003	N.E. of the intersection of West Street and South Street	Trier Ditch
004	Just North of the Crossing of Brookwood Drive and Trier Ditch	Trier Ditch

Appendix 7: Confined Feeding Operations and Concentrated Animal Feeding Operations in the Maumee River Watershed

Log #	Name	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Ducks
23	Bruce Brenneke						370	60	
470	Harmony Farms			385					
571	Ned S. Byer		500	740	156				
573	Richard and David Hartmann			200					
575	Schlatter Stock Farms			500		400			
708	Mark S. Rekeweg			1,600					
952	Steve R. Schneider		620	300	152				
1200	Victor Eicher			500					
1222	Lake Farms			270					
2219	Flat Rock LLC		1,200	160	477				
2485	Richard and David Hartmann		1,000	1,490					
2991	Richard Rodenbeck		300	300	30				
3967	Michael J. May		200	225	86				
4001	Schlatter Stock Farm		125	1,550					
4820	Brinkman and Son Farm		100	500	82				
4840	Jim Kline		140	600	120				
6098	Jurgielewicz Duck Farm	ING806098							5,000
6195	Schlatter Stock Farms-Ward Rd			4,000					
6287	Mark and Brenda Rekeweg	ING806287	1,100	4,600					

Appendix 8: *E. coli* Reductions for the Maumee River Watershed

Maumee River									
	High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	
MAU-ANT	364.3	277.8	133.4	350.7	182.8	244	48.8	1,900	Maumee River -- Anthony Boulevard
MAU-LAN	297.5	263.4	166.6	393.2	211.1	255.3	51	1,967	Maumee River -- Landin Road
M-129	2600	993	159.4	387.5	252.3	525.9	76.2	1,967	Maumee River -- Fixed Station @ Landin Road
M-114	1567.4	911.6	369.9	253	110.4	430.3	70.9	2,050	Maumee River -- Fixed Station near Woodburn

Appendix 9: NPDES Permits in the St. Marys River Watershed

Facilities with *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	Sub-Watershed
IN0021369	Berne STP	Wabash River	Blue Creek
IN0048151	Monroe Water Department	Yellow Creek	Yellow Creek
IN0058980	Bing-Lear Manufacturing Group, Berne	Habegger Ditch	Blue Creek
ING490084	Meshberger Bros Stone Plt #2	Blue Creek	Blue Creek
INP000069	Bing-Lear Manufacturing Group, Berne	Berne STP	Blue Creek

Appendix 10: Combined Sewer Overflows in St. Marys River Watershed

City of Berne

CSO Outfall #	Location	Receiving Waters
003	Welty Street and Compromise	Sprunger Ditch to Habegger Ditch
004	Main and Ruesser	Sprunger Ditch to Habegger Ditch

SSO Outfall #	Location	Receiving Waters
006	North End of East Water Street	Sprunger Ditch to Habegger Ditch

Appendix 11: Confined Feeding Operations and Concentrated Animal Feeding Operations in the Blue Creek/Habegger Ditch and Yellow Creek Watersheds

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Layers	Pullets	Broilers
65	Grace Farms	Blue Creek					60,000		
91	Carl Lotter	Yellow Creek		4,200					
123	Jim Fiechter	Blue Creek			920				
469	Jerry Lee Graber	Blue Creek		320	920				6,000
590	Ted Liechty	Blue Creek	ING800590				119,000		
635	Charles W Hill	Blue Creek			1,400				
638	Troyer Swine	Blue Creek			1,000				
902	David Hill	Blue Creek			625				
933	SDD Hogs, Inc	Blue Creek	ING800933		3,600				
944	ISCF Brothers Pork	Blue Creek			2,000				
971	Emanuel Schmidt	Blue Creek		500	300				
1306	Triple G Ranch	Blue Creek		500	800	166			
1886	Alvin Schwartz	Yellow Creek			1,950				
2548	Daniels J Michaels	Yellow Creek		510	255		8,200		
3668	David H LaFontaine	Yellow Creek					81,000		
3737	Stan Von Gunten	Blue Creek						33,600	
3985	Double G Farms	Blue Creek		200	580	99			
4038	County Line Swine	Blue Creek		900	600	415			

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Dairy	Dairy Calves	Layers	Ducks
4181	Victor Steiner	Yellow Creek		240	506	172				
4307	Stoller Poultry, Inc	Blue Creek			1,920				100,410	
4421	Kaehr Ag Inc	Blue Creek		460	600	204				
4637	Rigger Pork Inc Masterpork	Blue Creek		800	120	619				
5007	Progress Pork	Blue Creek			2,000					
6000	Irish Acres Dairy	Blue Creek	ING806000				1,552	360		
6020	SandG Poultry	Blue Creek	ING806020						132,000	
6049	Tri Oak Farms, Inc	Blue Creek		320	500	134				
6175	Jerry Lambright	Blue Creek								3,000

Appendix 12: Load Reductions for the Blue Creek/Habegger Ditch and Yellow Creek Watersheds

Stream Name	Drainage Area	Site #	NO2+NO3 mg/L	% Reduction Needed	Phosphorus mg/L	% Reduction Needed	TSS mg/L	% Reduction Needed
Habegger Ditch	8.4 sq mi	LES040-0099	20.10	55.25%	0.436	36.19%	53.01	48.41%
Martz Creek	9.8 sq mi	LES040-0040	10.92	13.42%	0.320	11.25%	35.00	19.29%
Yellow Creek	24.5 sq mi	LES040-0038	10.92	13.42%	0.320	11.25%	35.00	19.29%
All Blue Creek Values	79.6 sq mi	-0009,-0011,-0066	11.70	19.53%	0.391	28.27%	44.48	37.55%
Unnamed Trib	2.8 sq mi	LES050-0020	no exceedances		0.441	36.97%	55.74	51.18%
St. Marys Watershed	1900 sq mi		10.92	13.42%	0.320	11.25%	35.00	19.29%

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Figure 1: St. Marys River Watershed

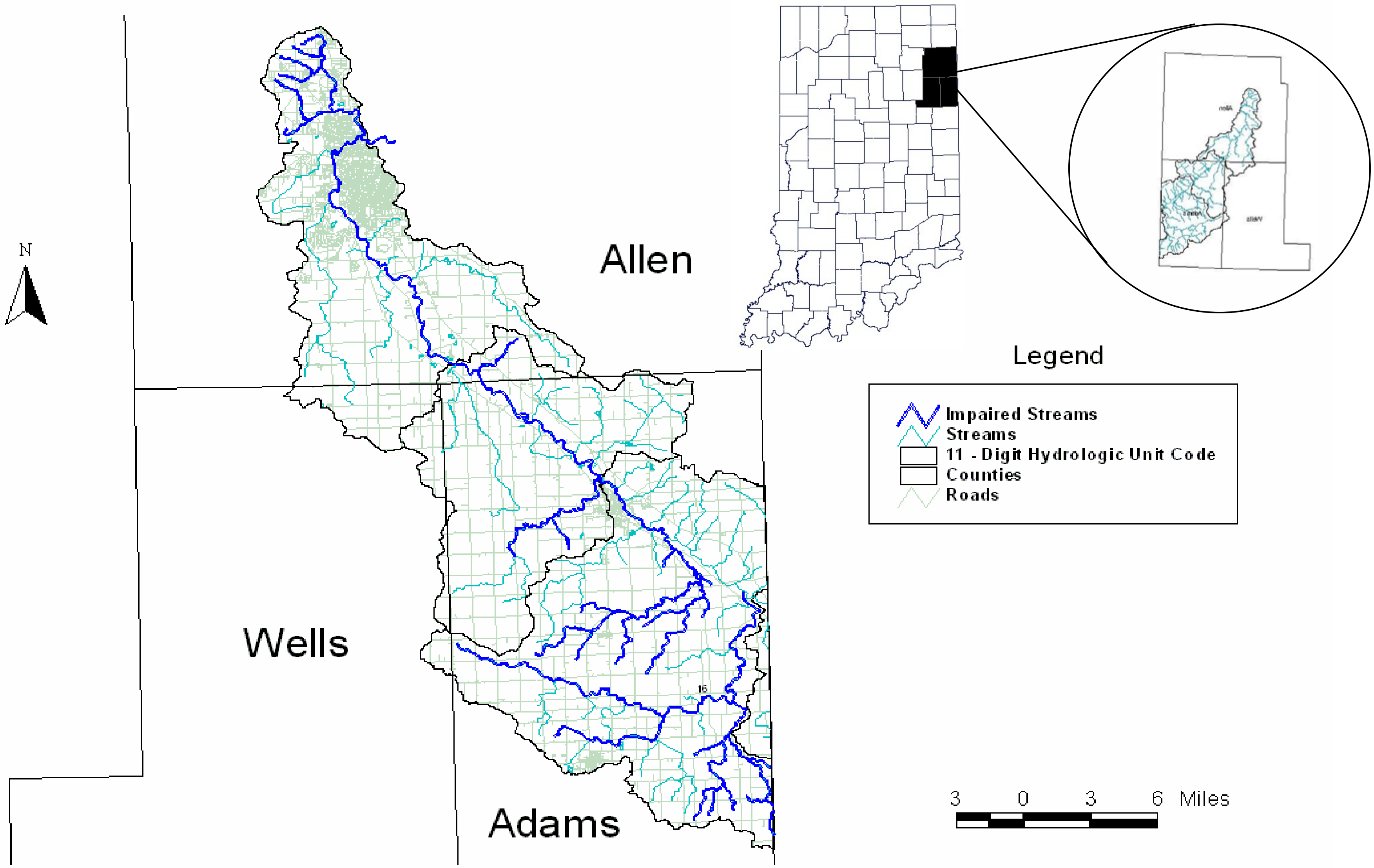


Figure 2: Maumee River Watershed

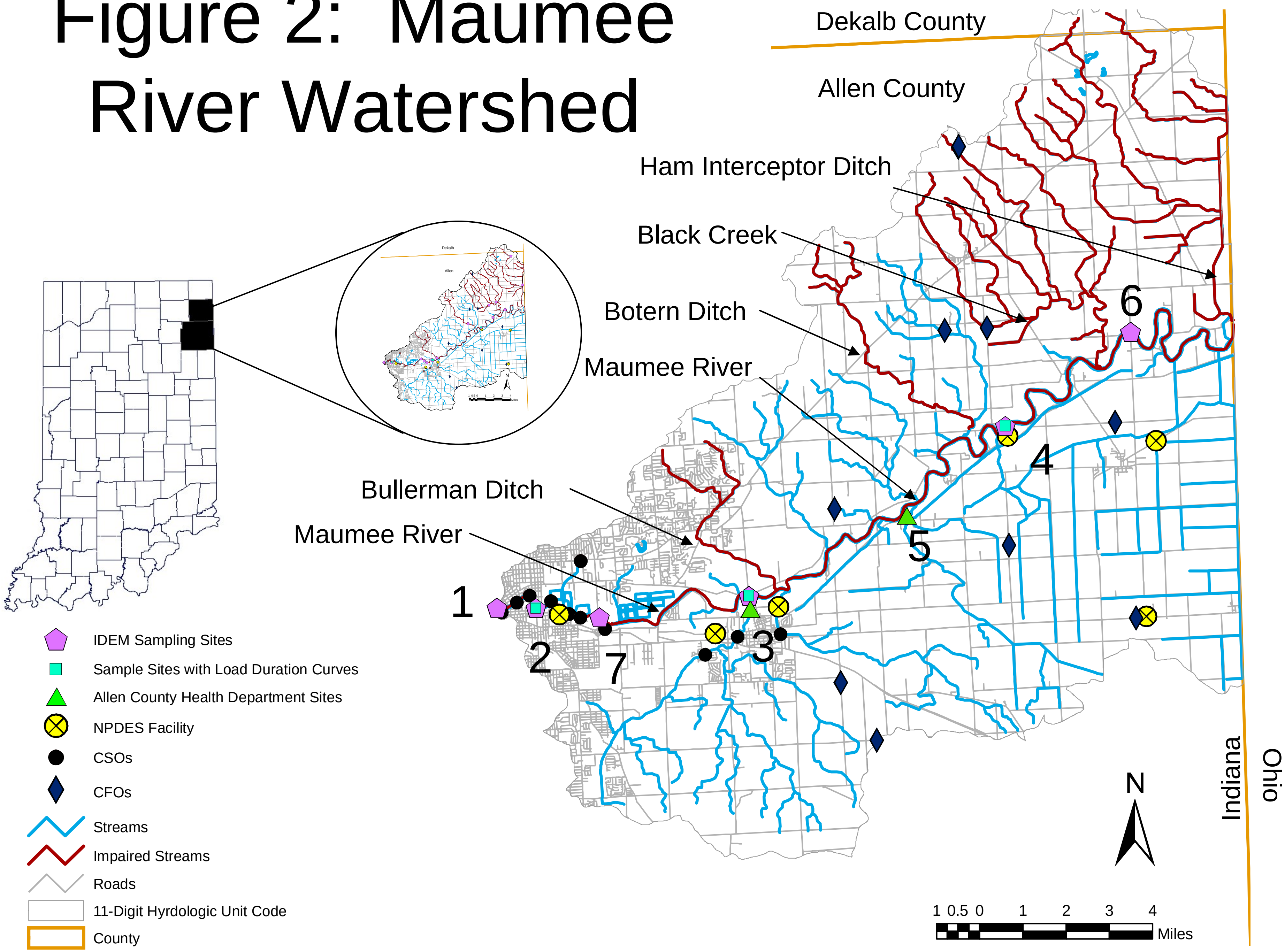


Figure 3: Sample Sites in the St. Marys River Watershed

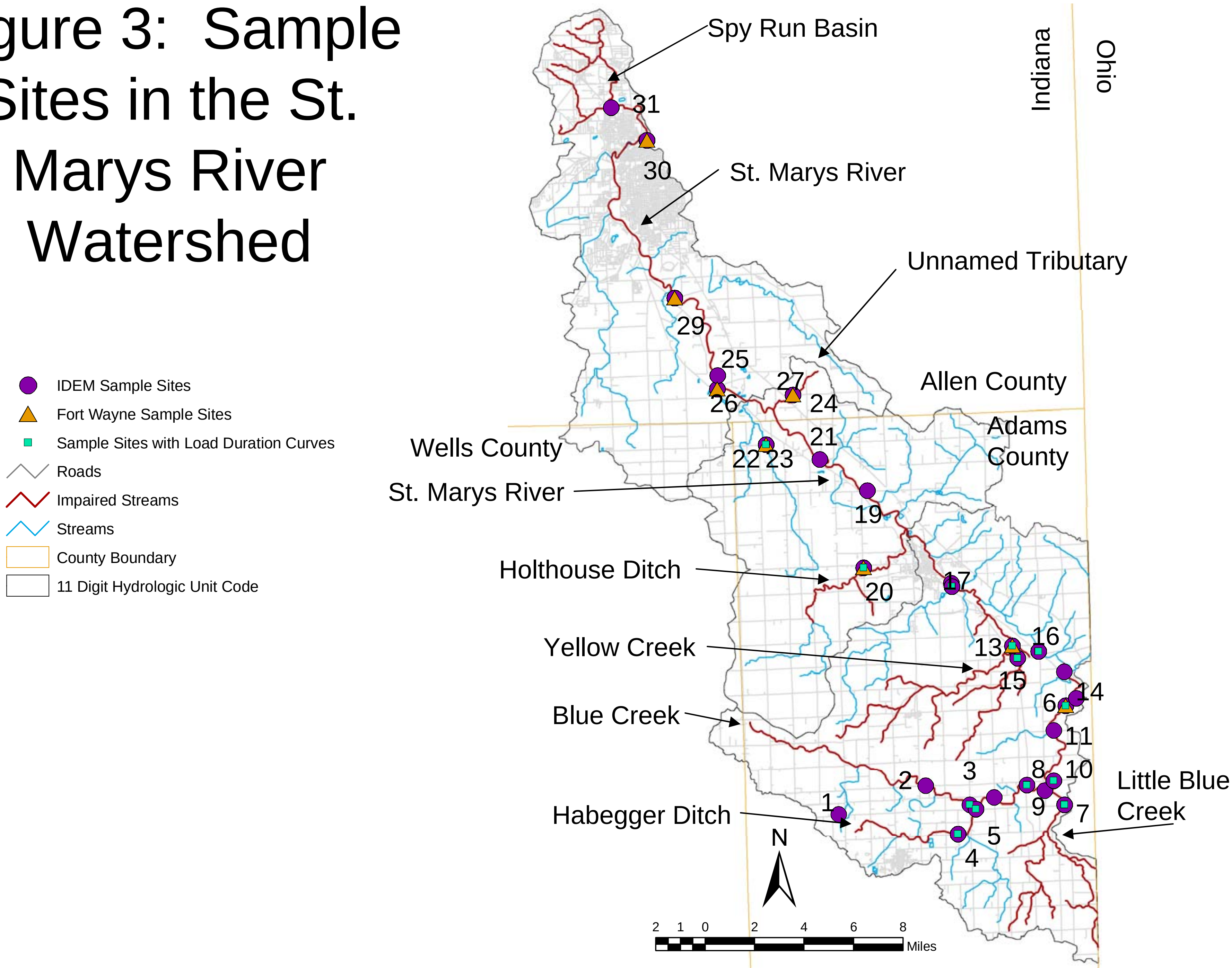


Figure 4: Blue Creek Watershed

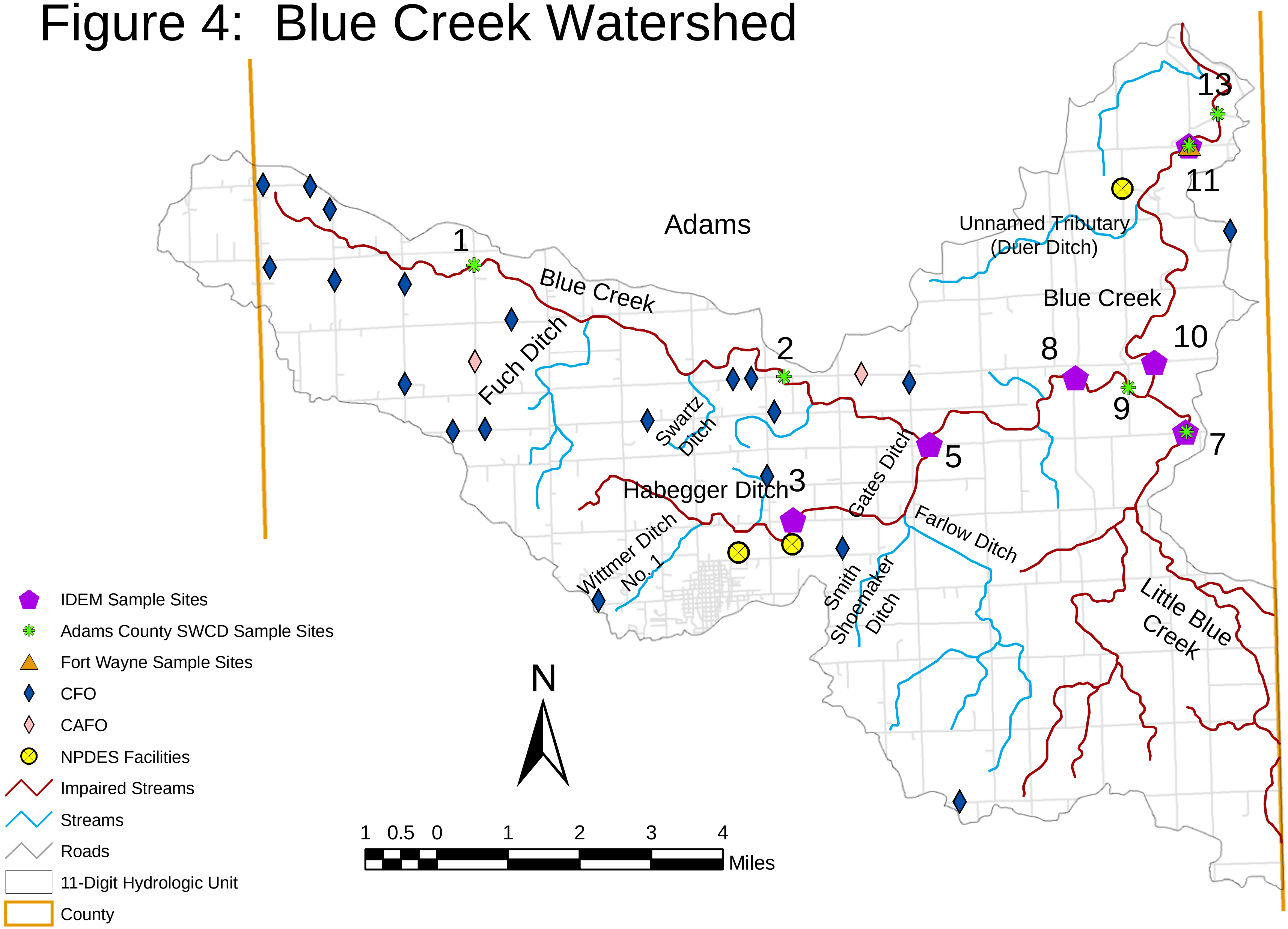


Figure 5: Blue Creek Landuse

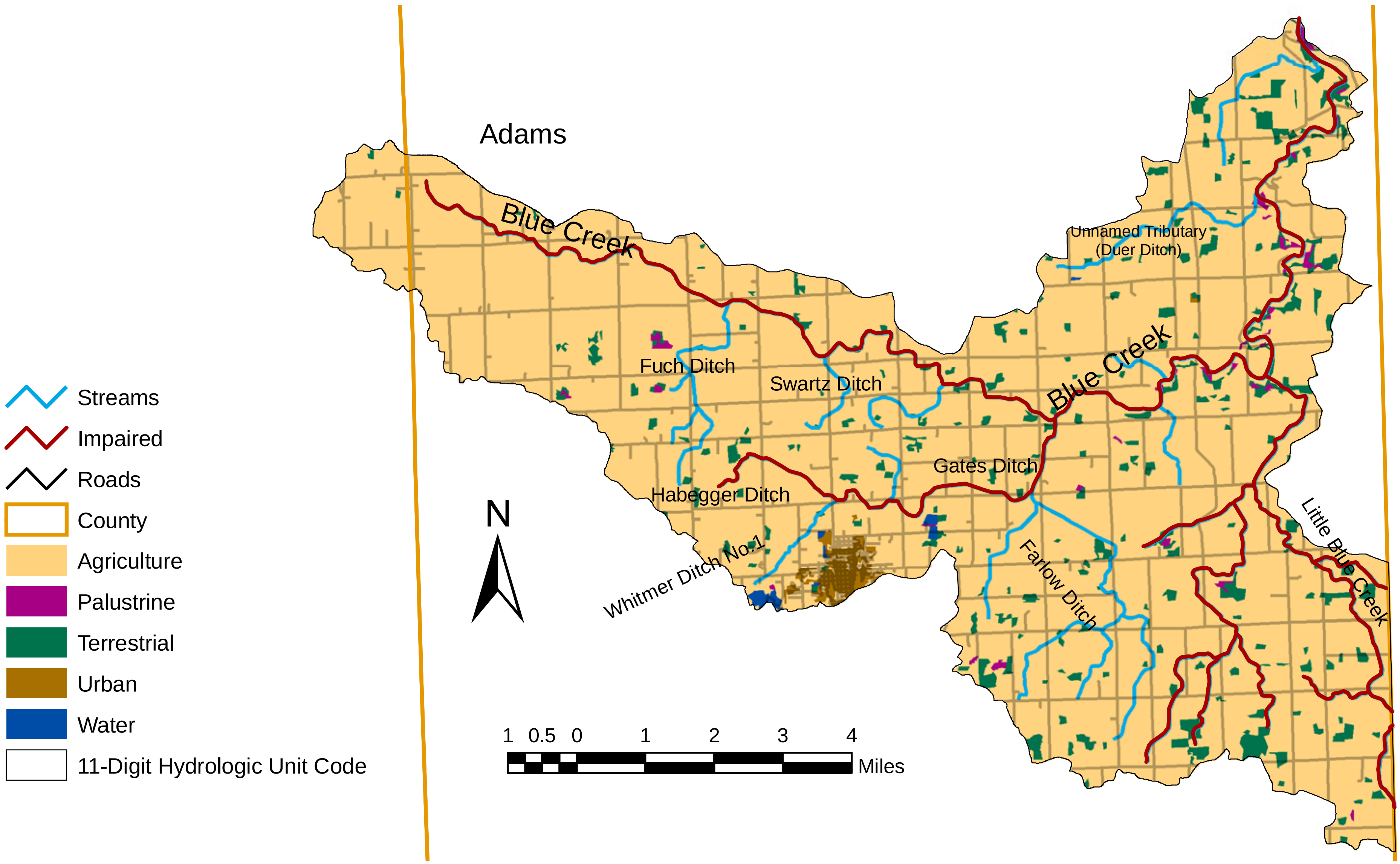


Figure 6: Blue Creek CSOs

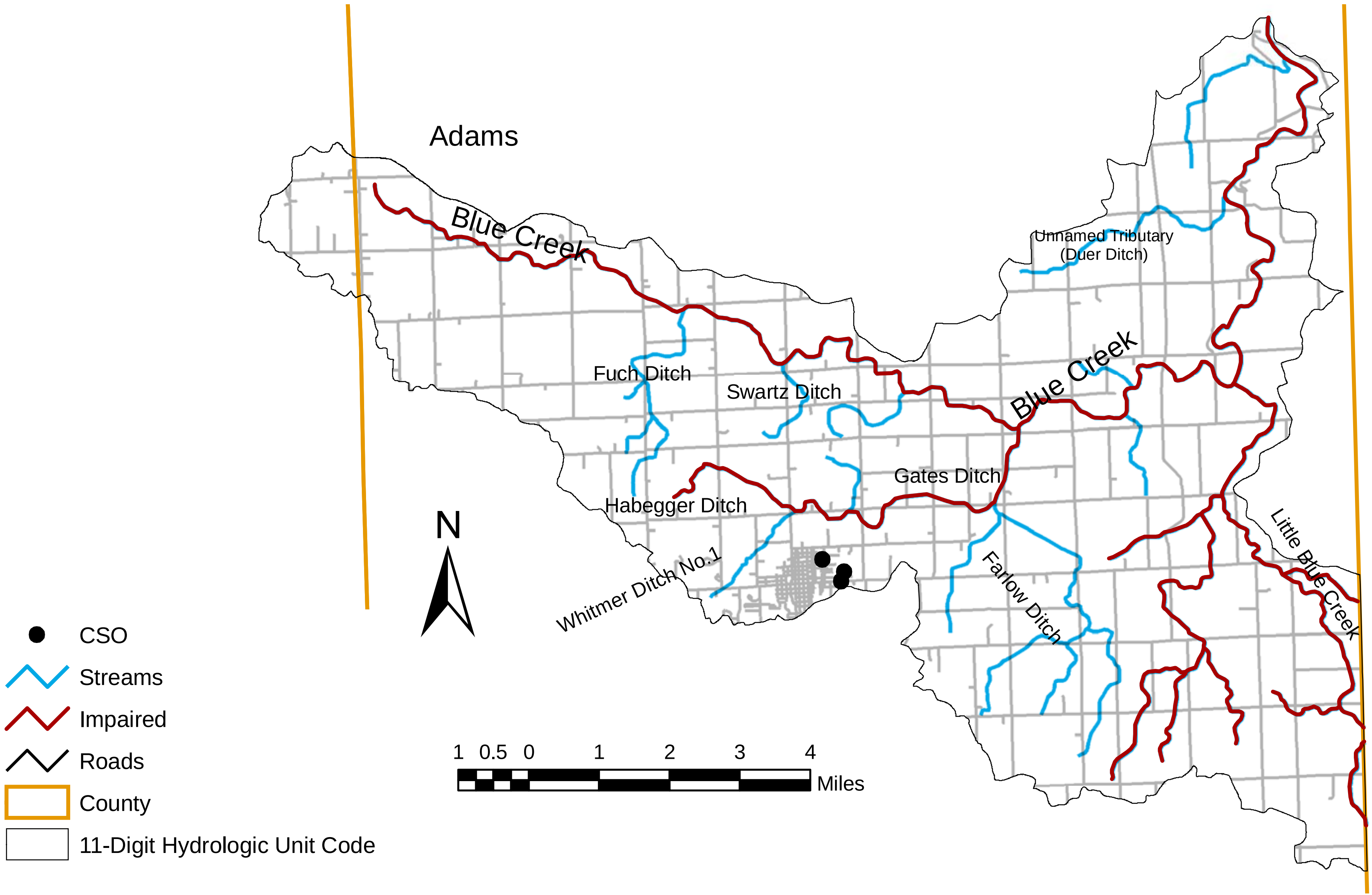


Figure 7: Yellow Creek Watershed

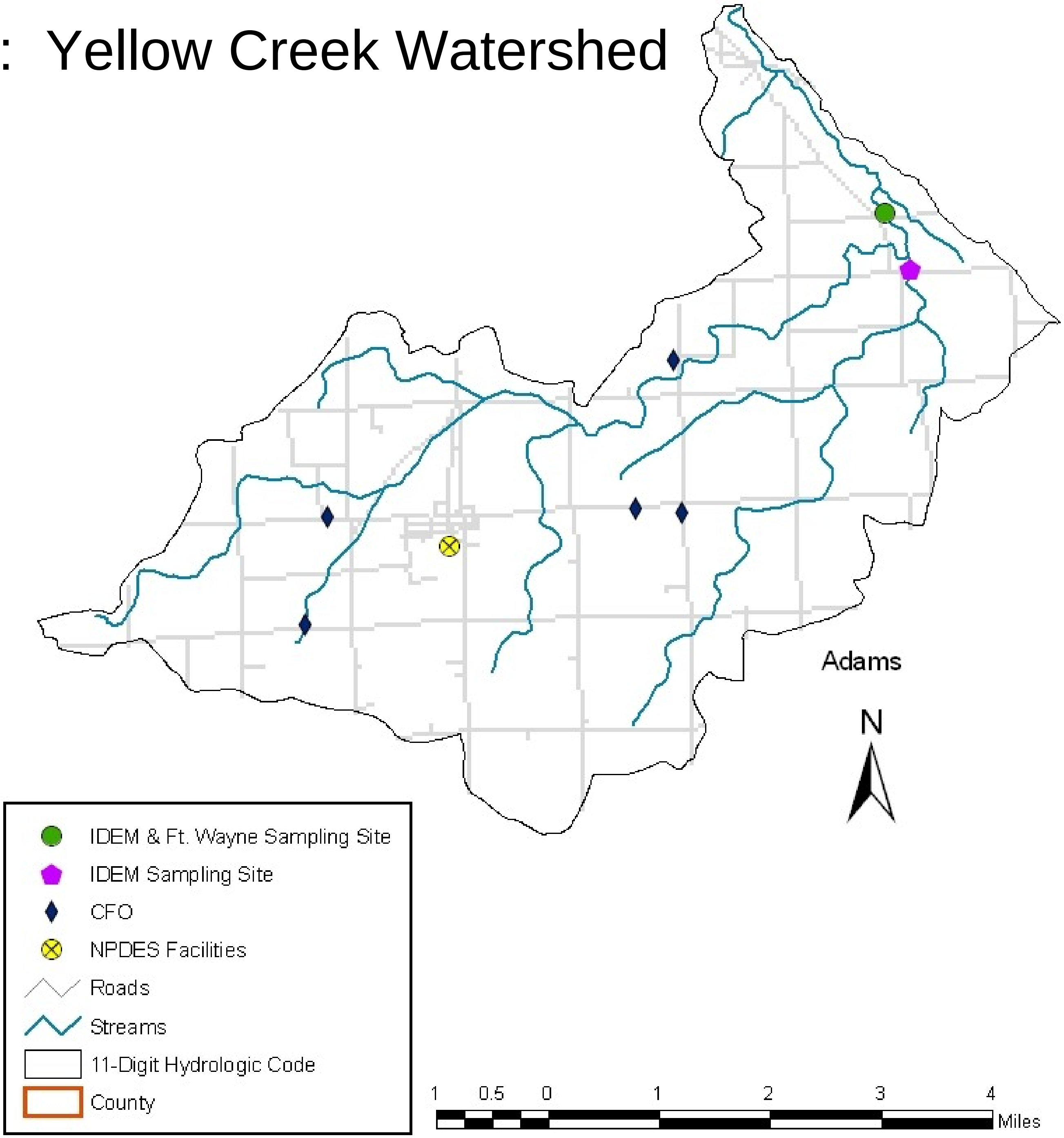


Figure 8: Yellow Creek Watershed Landuse

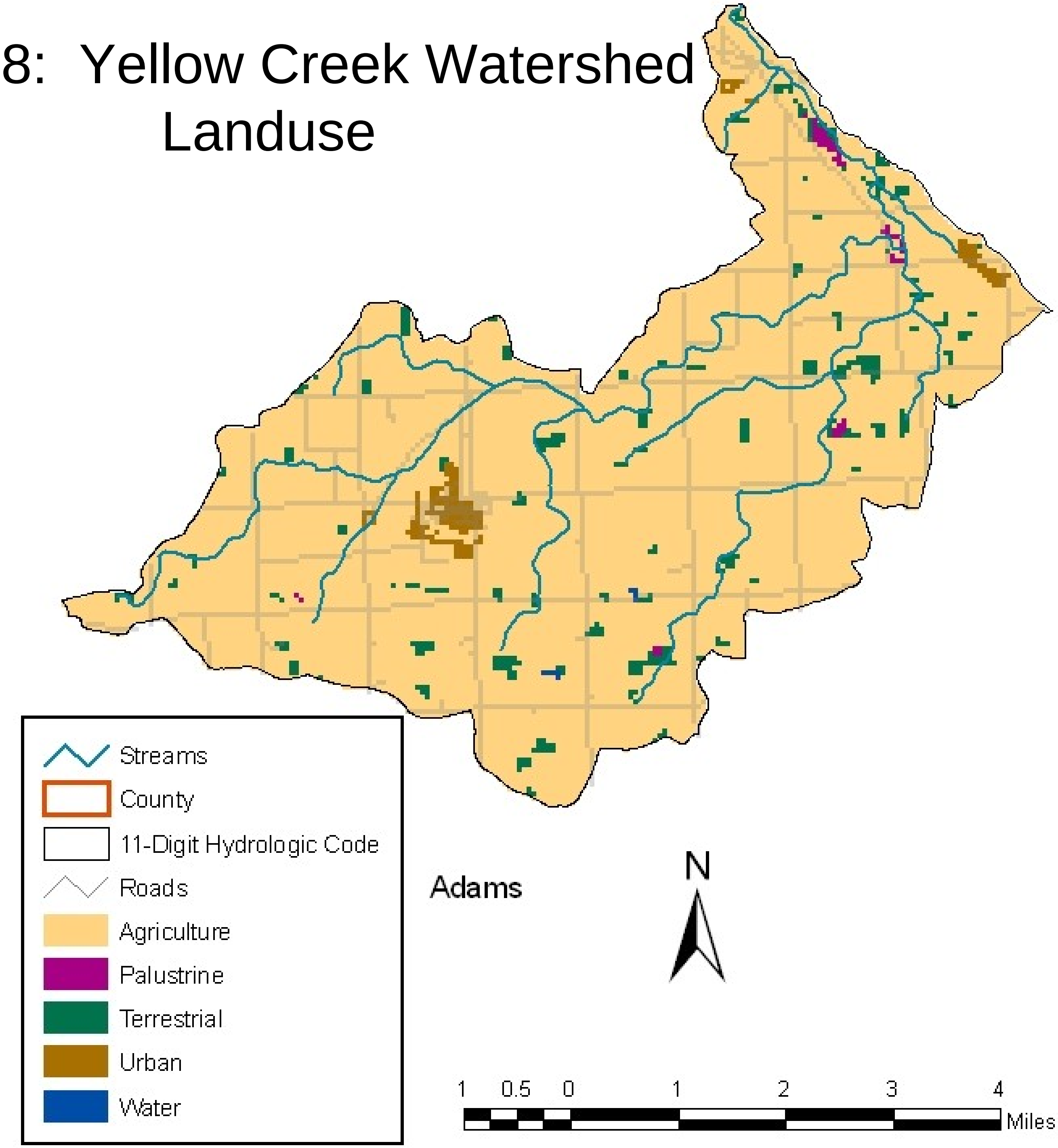


Figure 9: Borum Run Watershed

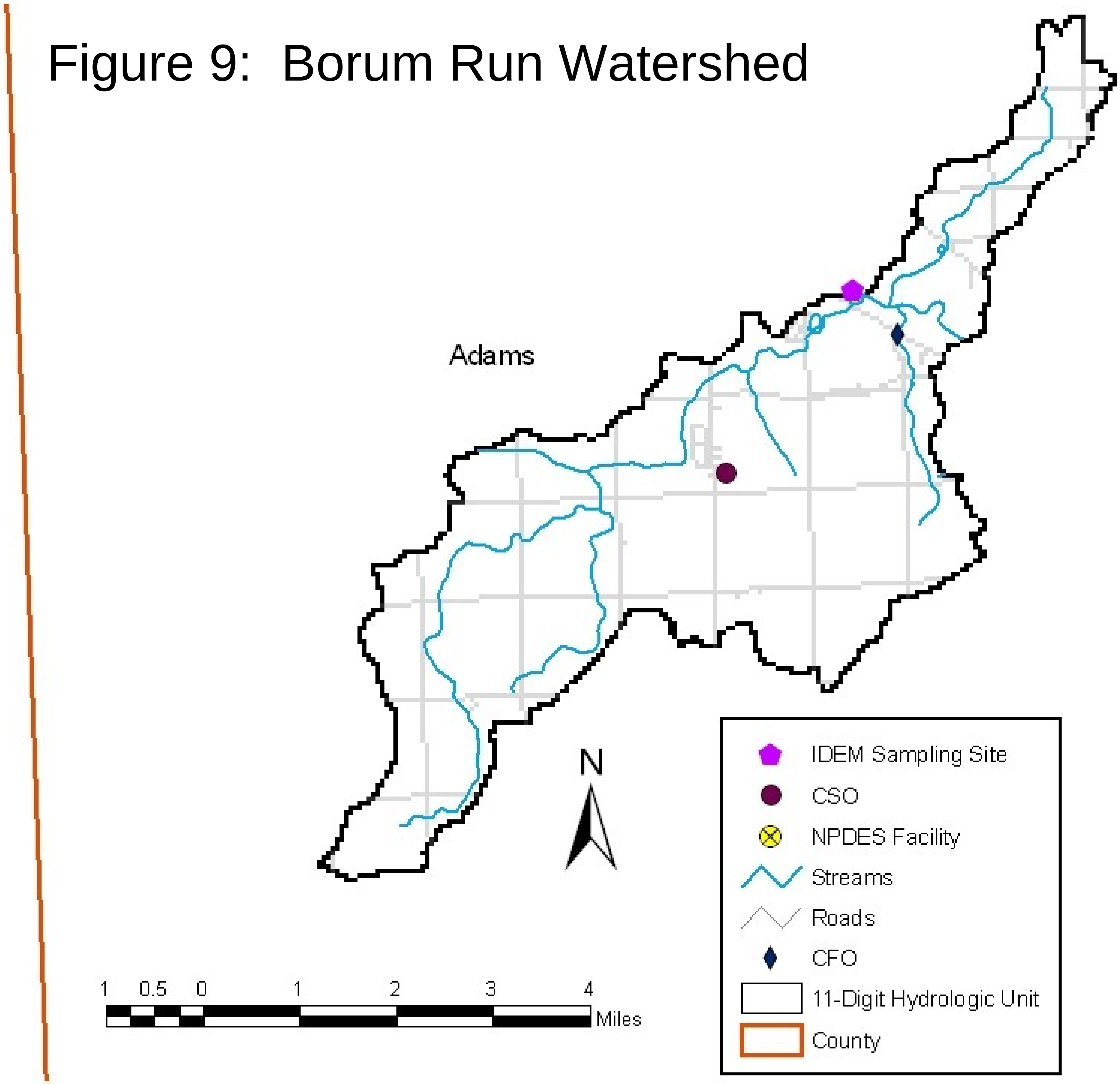


Figure 10: Borum Run Landuse

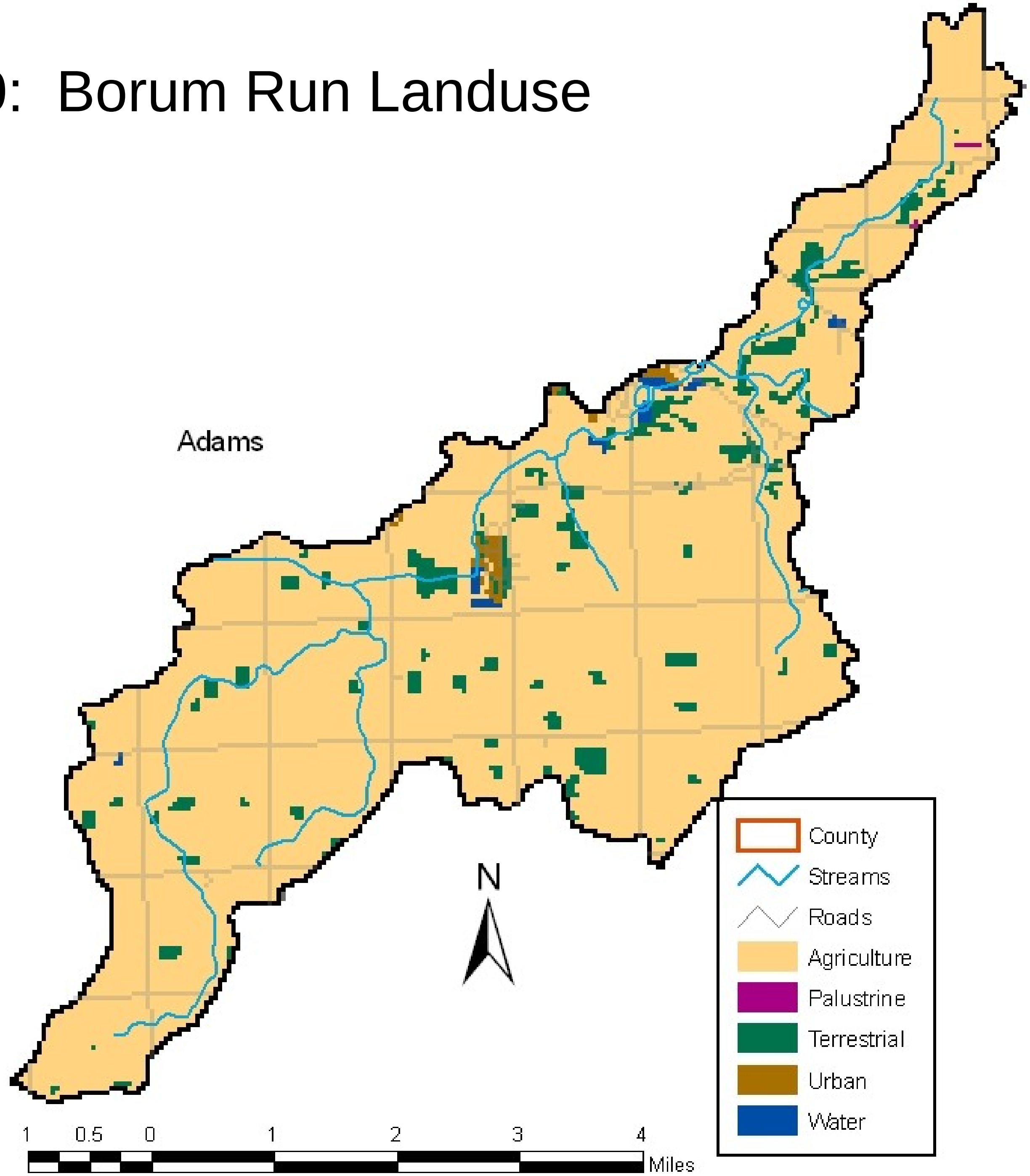


Figure 11: Hotlhouse Ditch Watershed

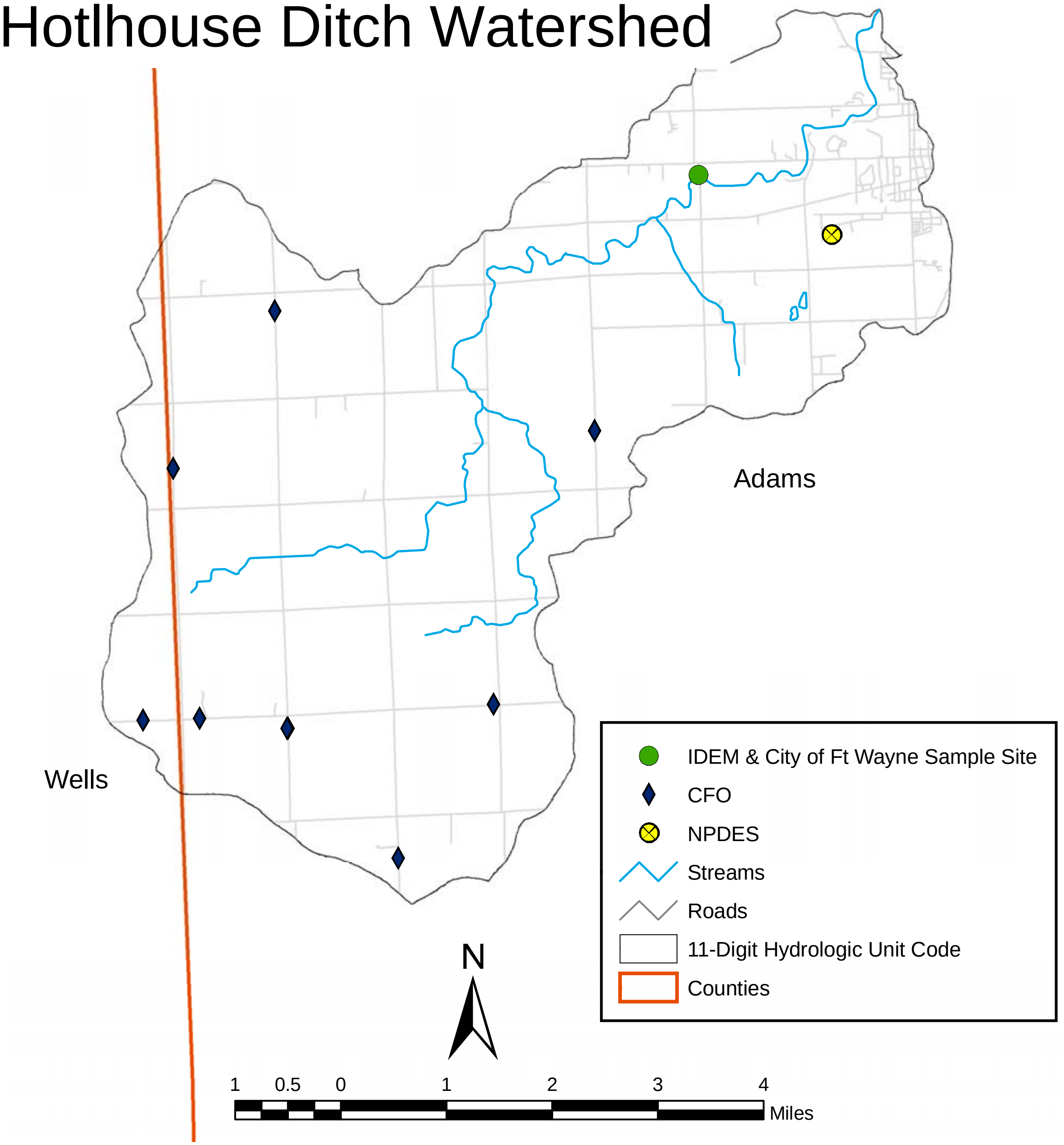


Figure 12: Holthouse Ditch Landuse

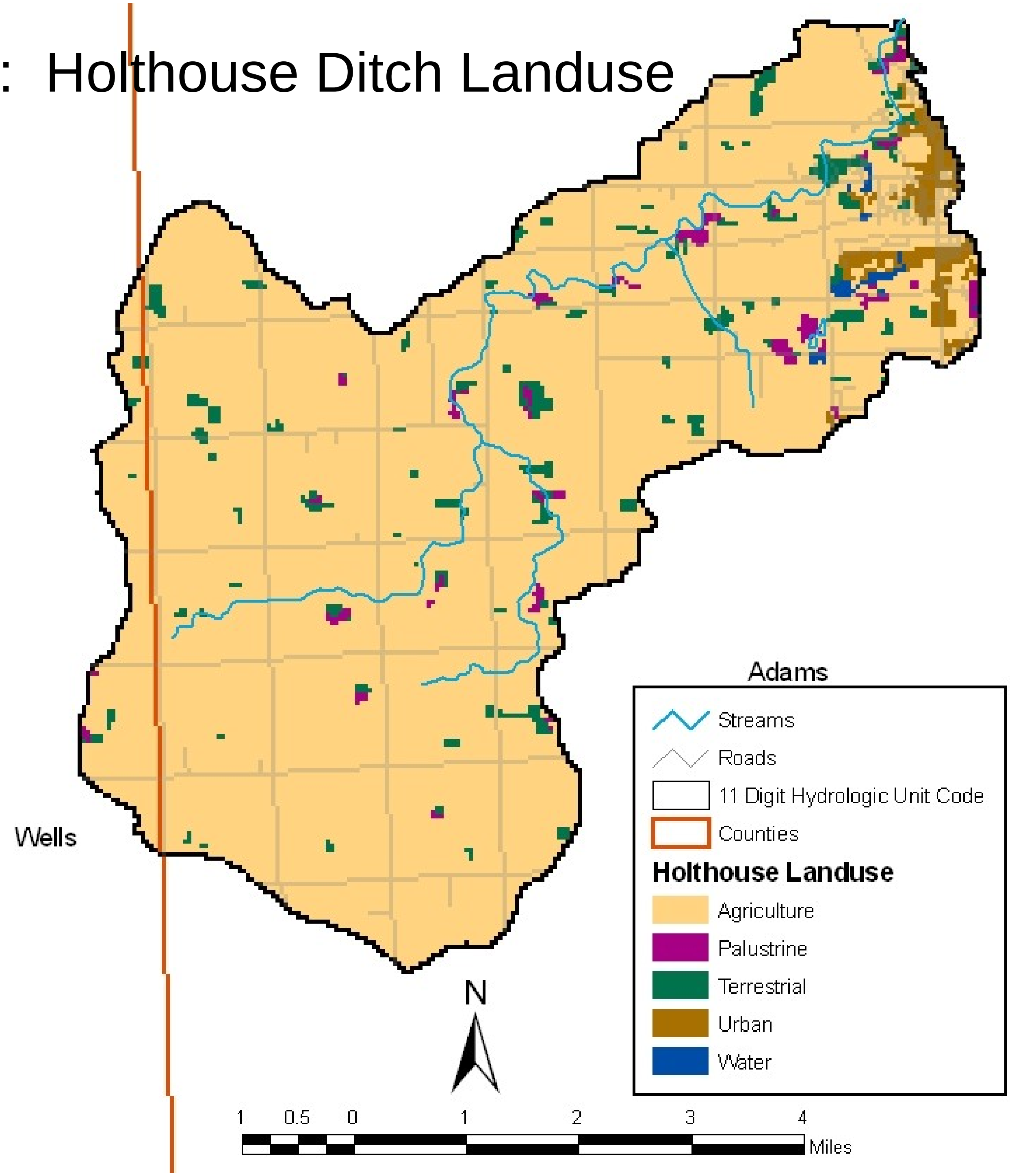


Figure 13: Nickelsen Creek Watershed

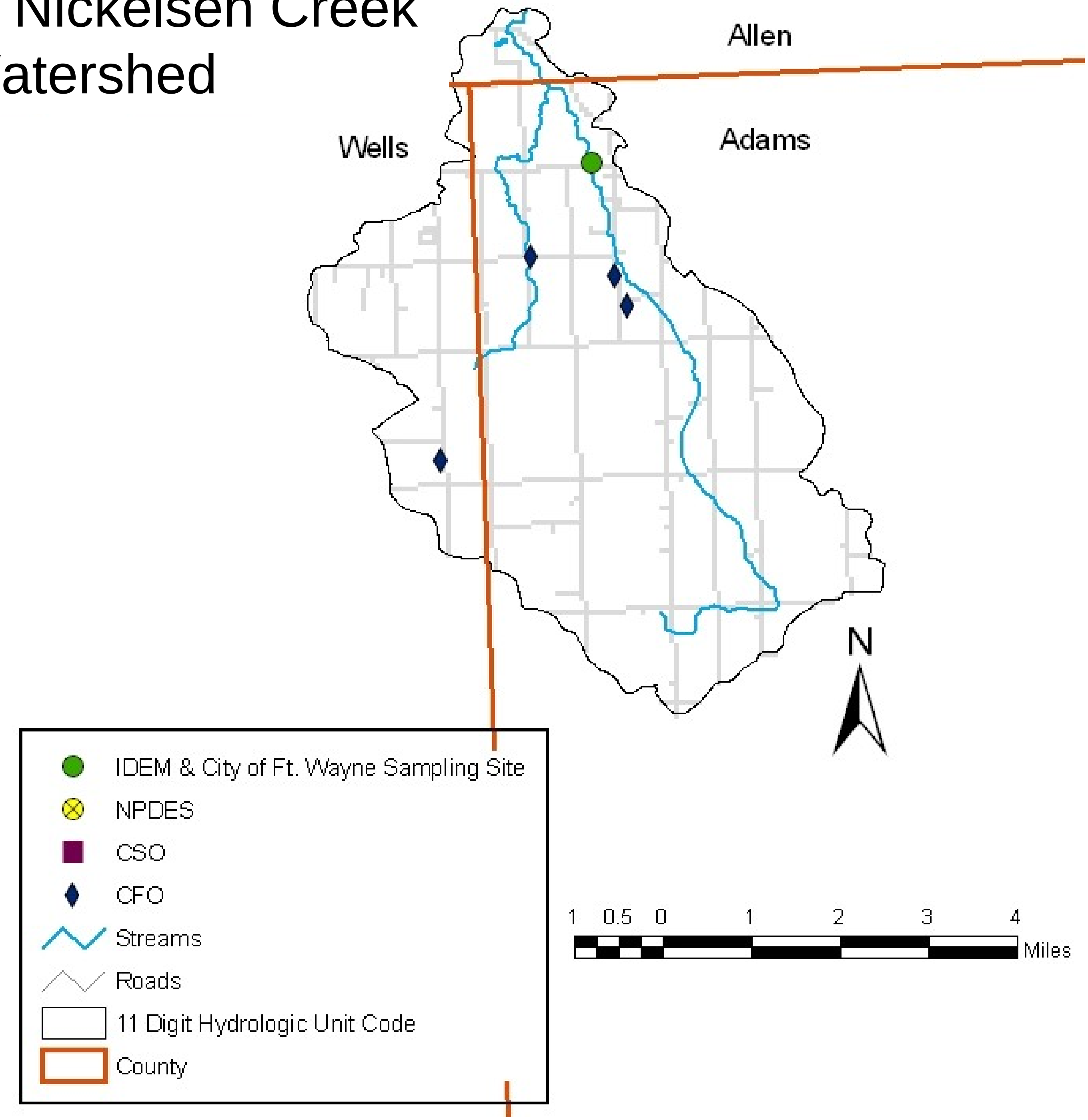


Figure 14: Nickelsen Creek Landuse

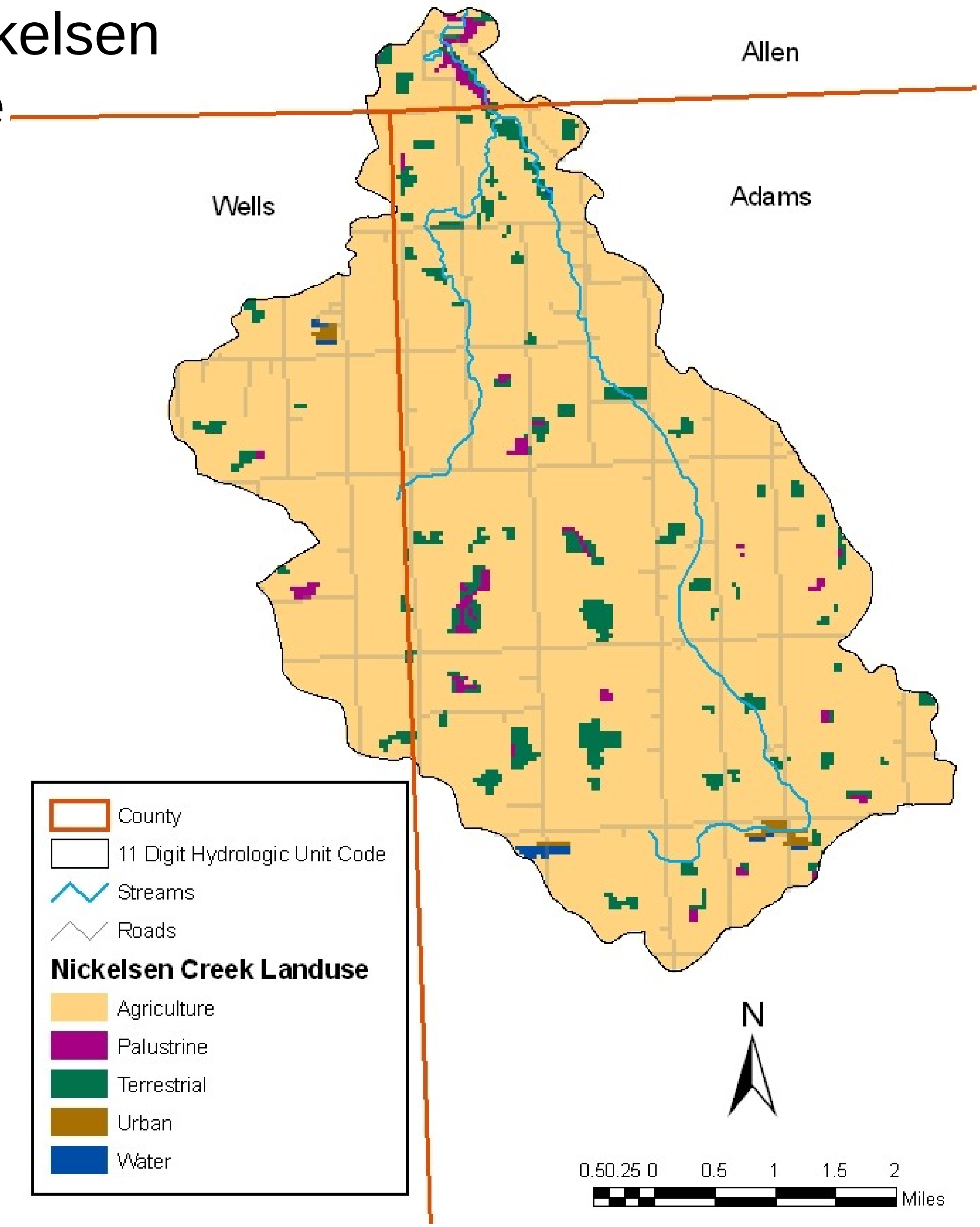


Figure 15: St. Marys River Watershed

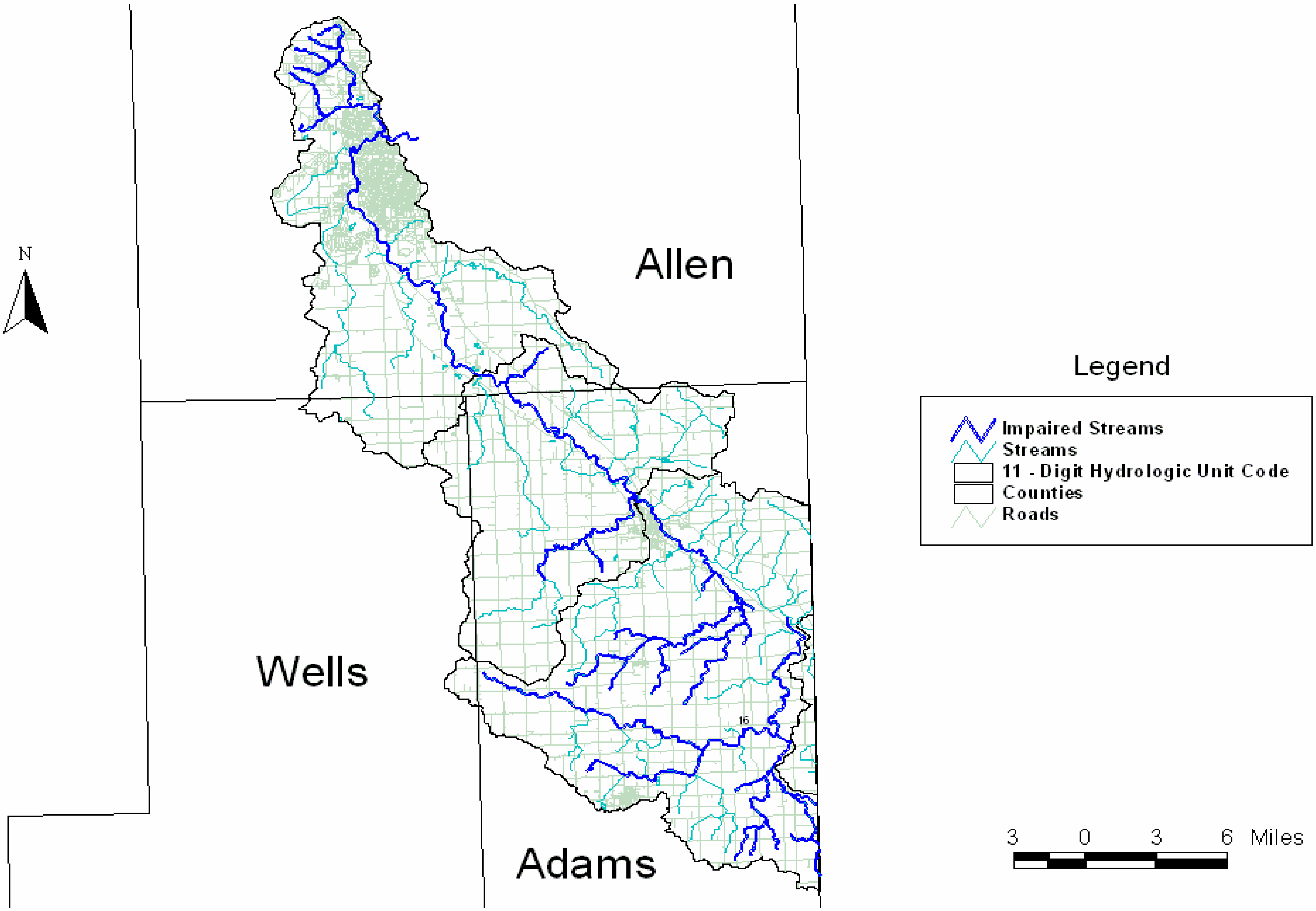


Figure 16: Sample Sites in the St. Marys River Watershed

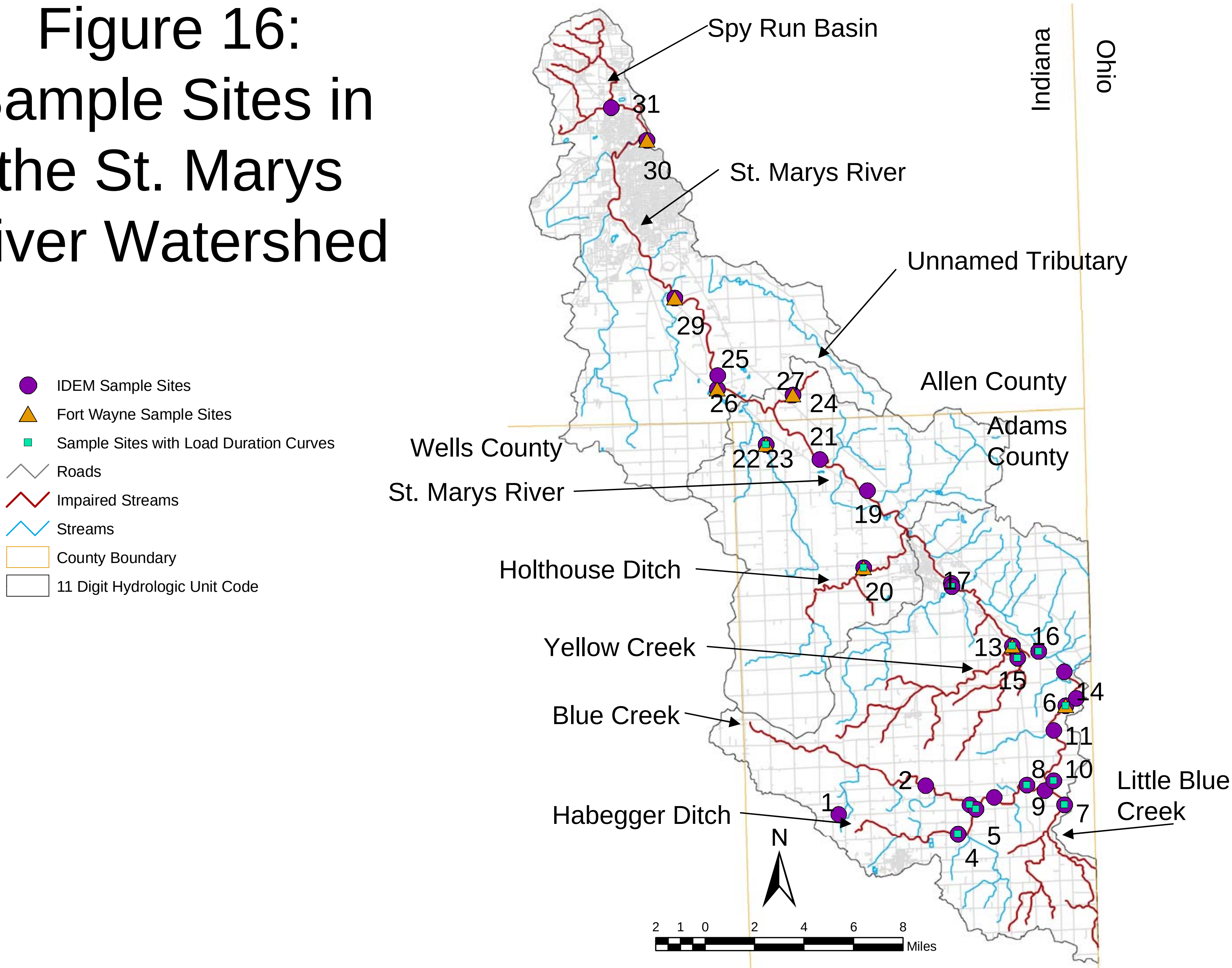


Figure 17: St. Marys River Watershed Landuse

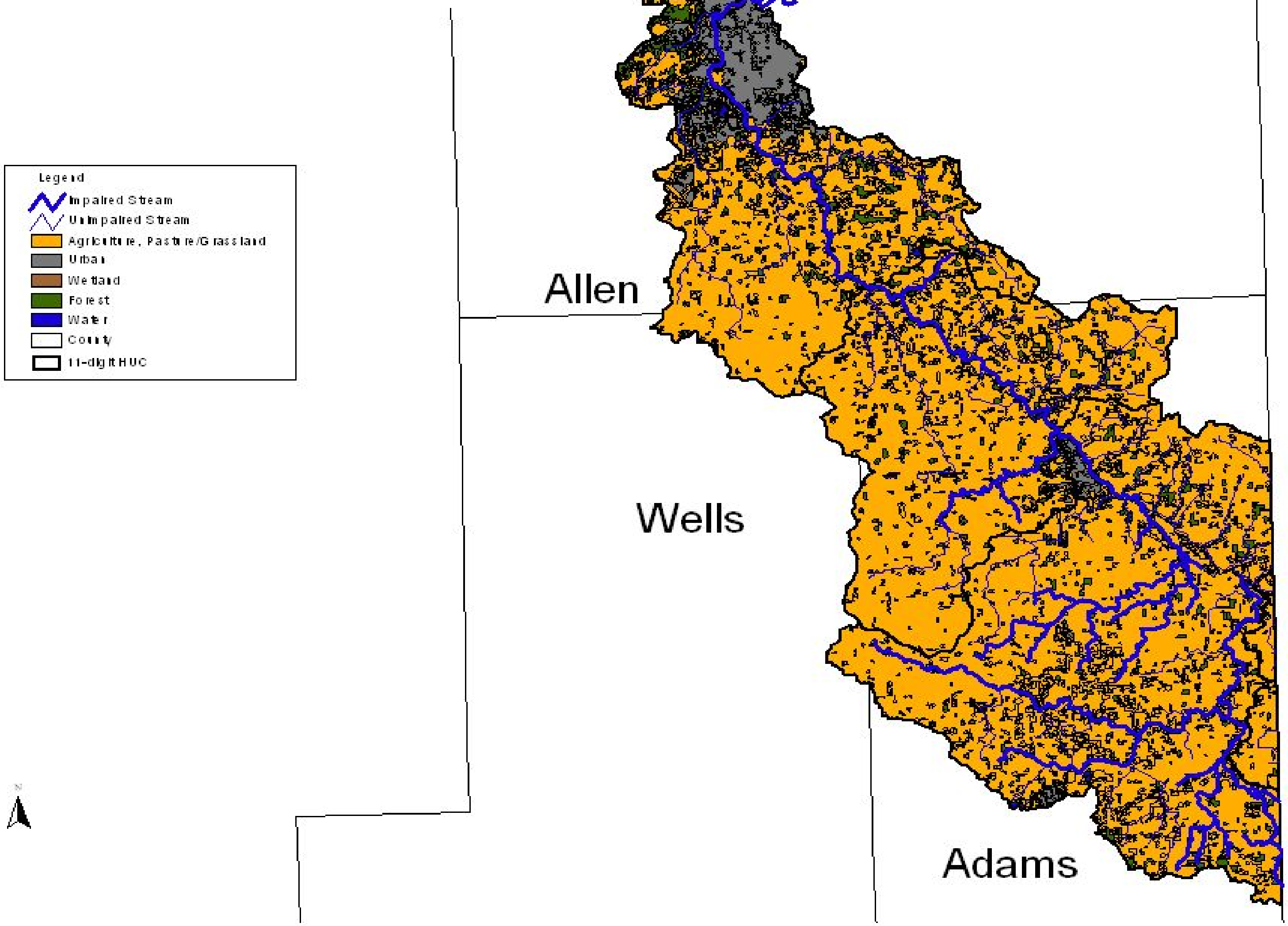


Figure 18: NPDES Facilities in the St. Marys River Watershed

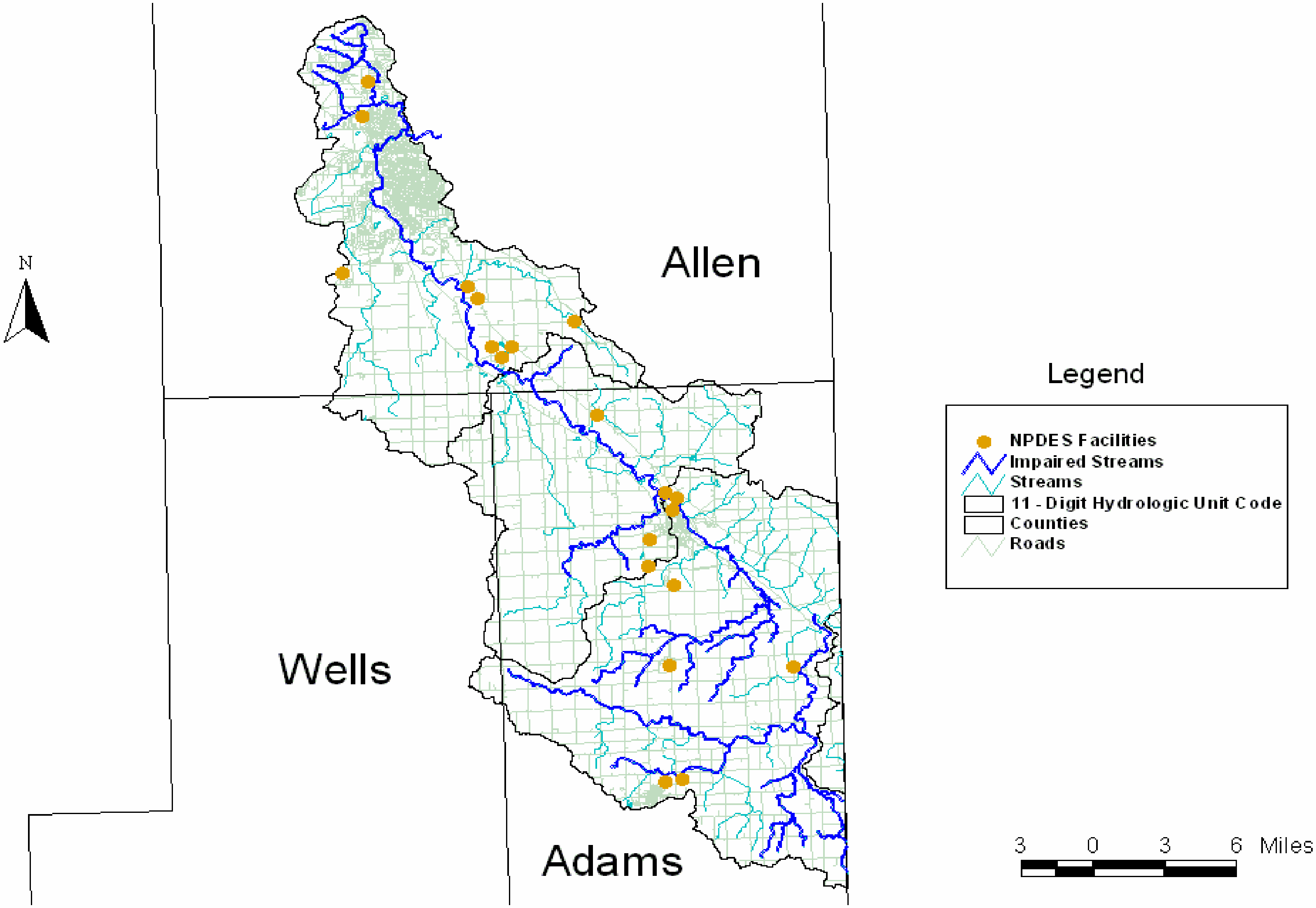


Figure 19: St. Marys CSOs Discharge Points

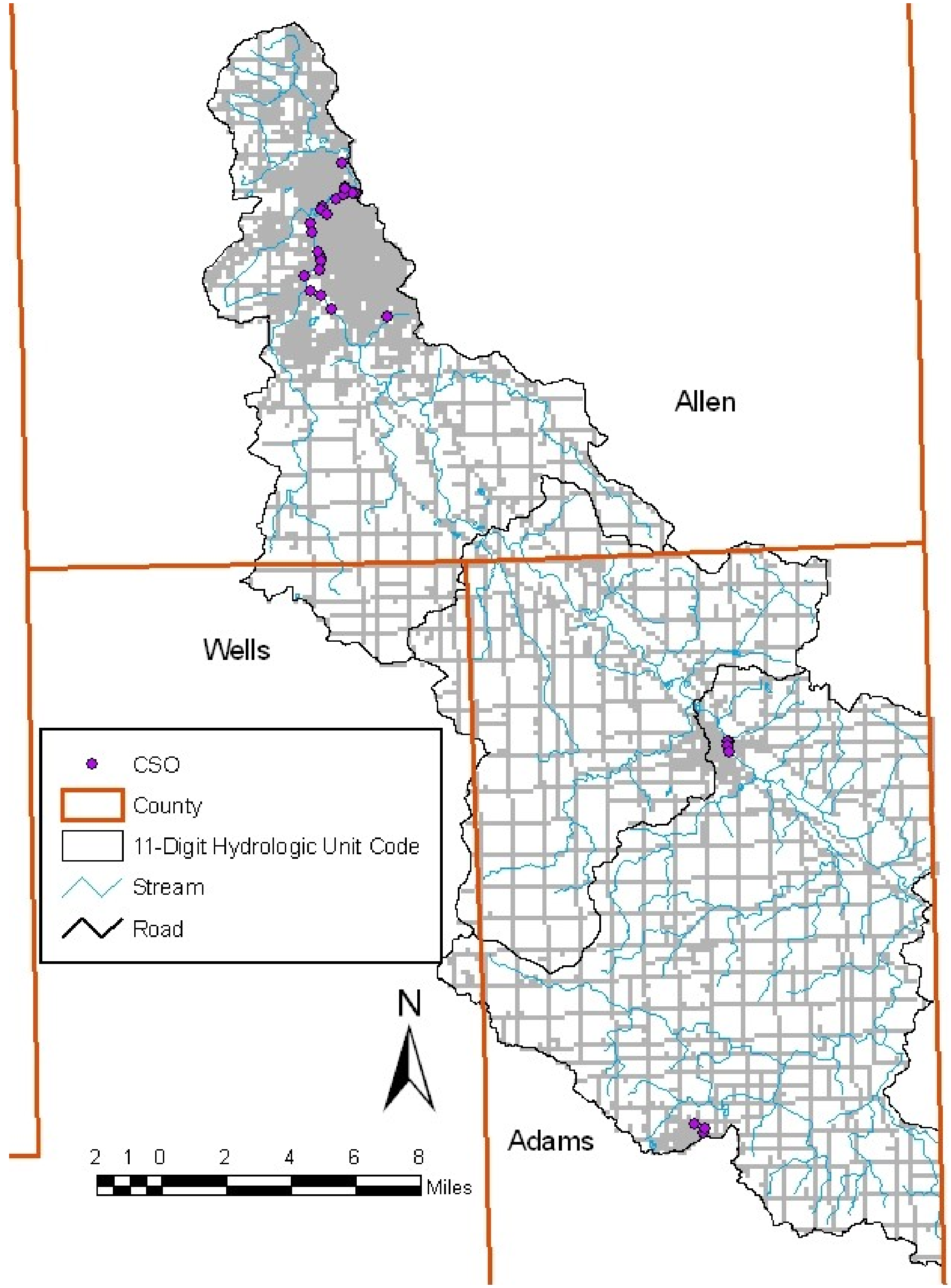


Figure 20: Confined Feeding Operations in the St. Marys River Watershed

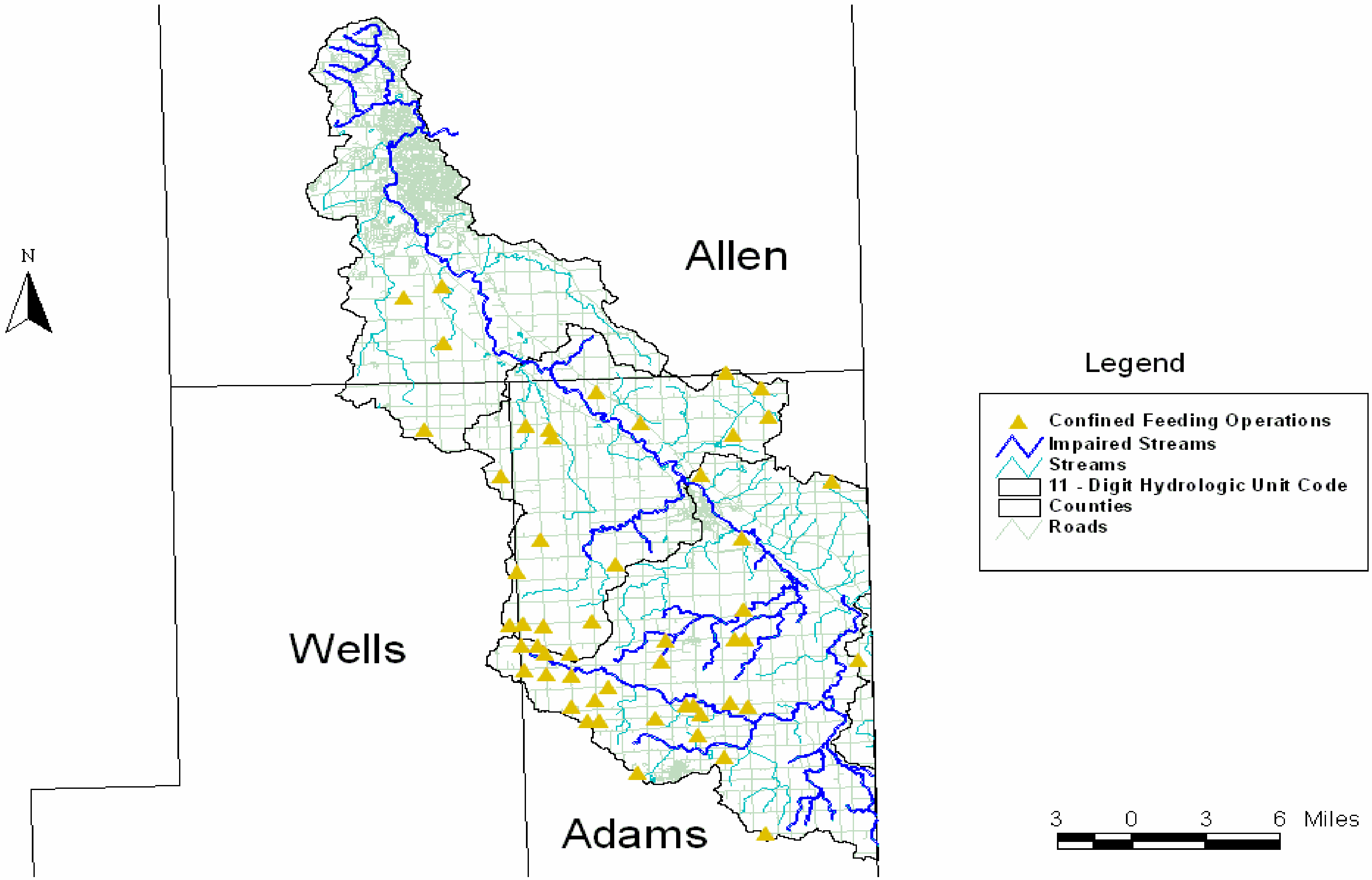


Figure 21: Regression Analysis

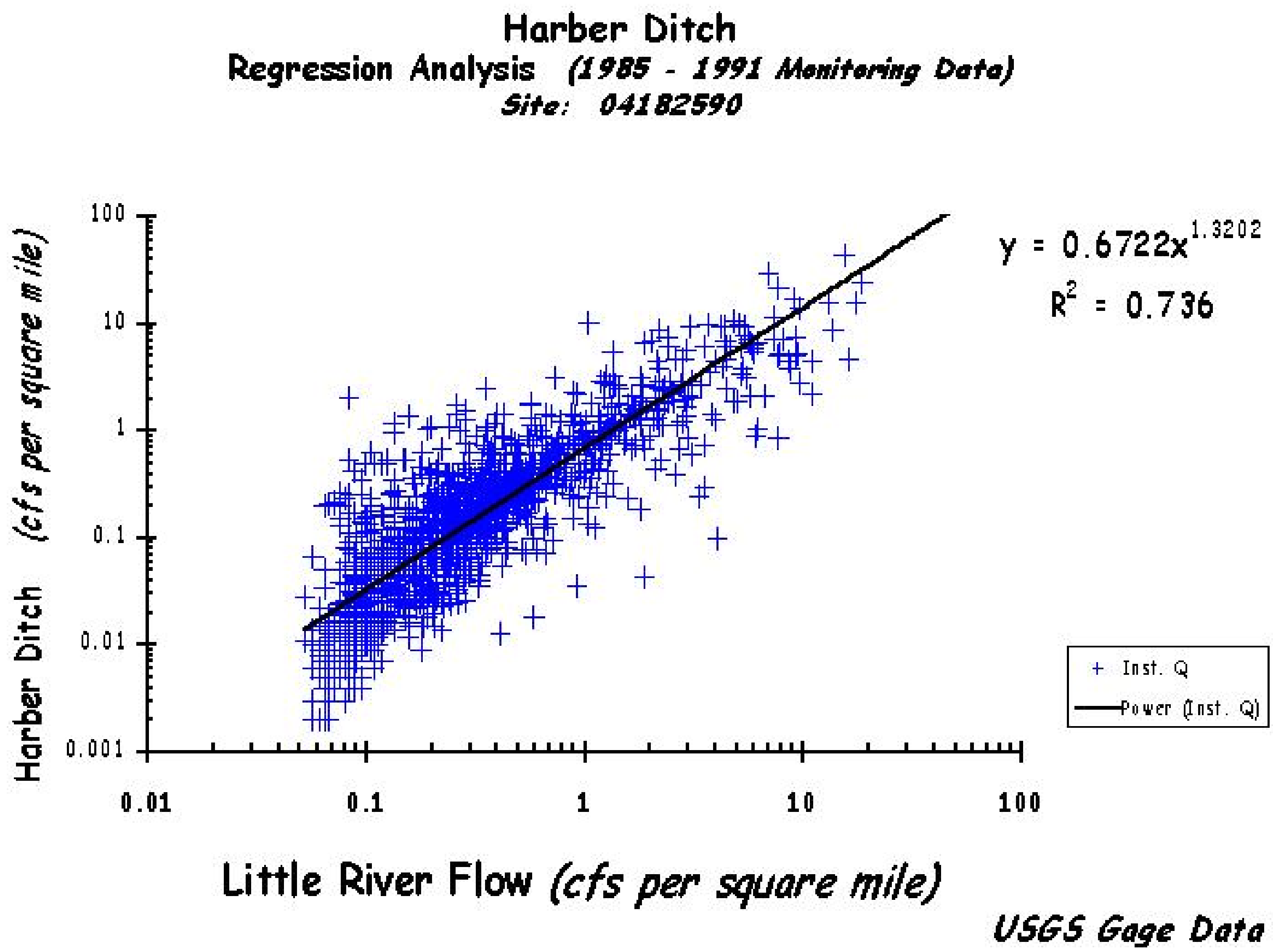


Figure 22: Maumee River Watershed

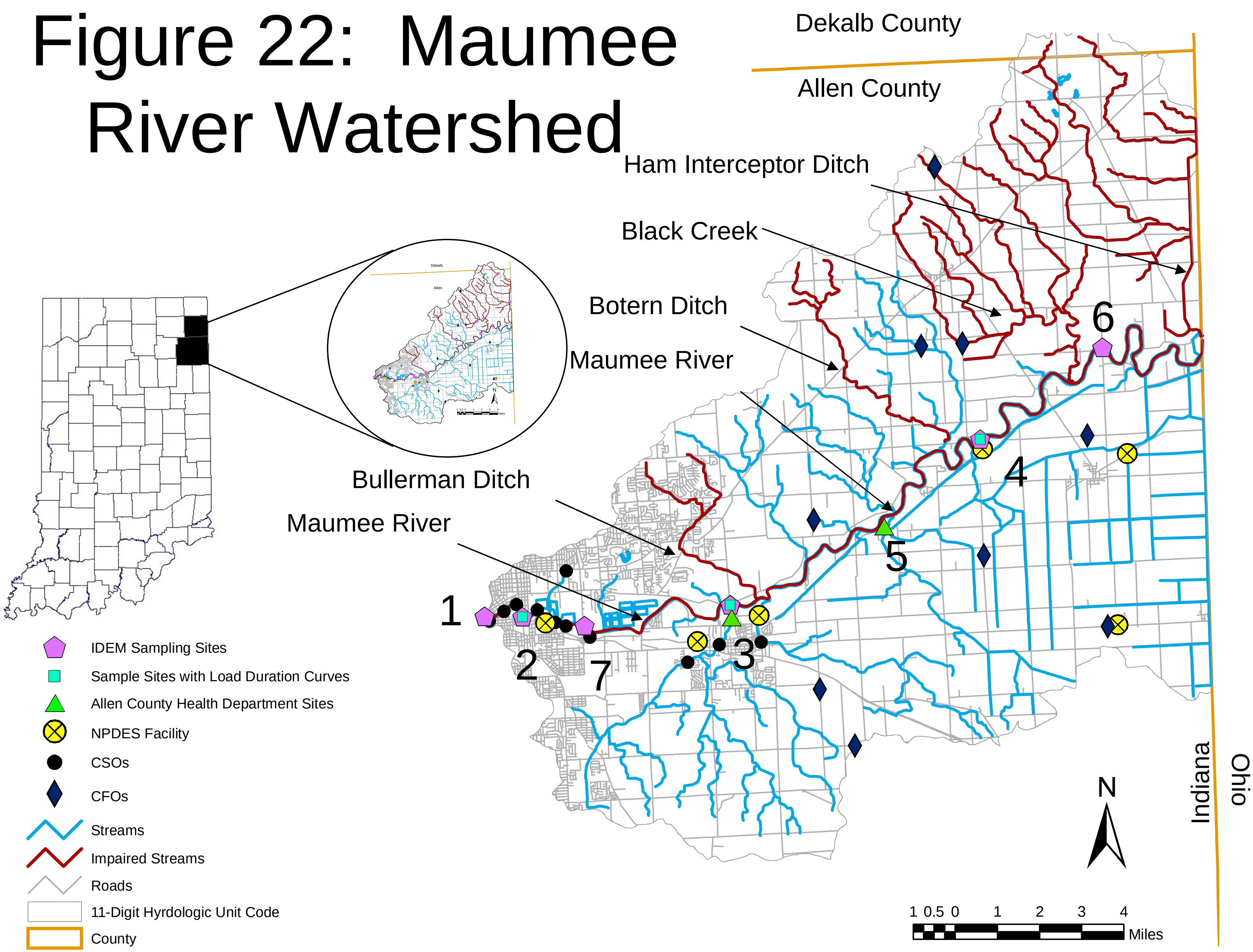


Figure 23: Maumee River Landuse

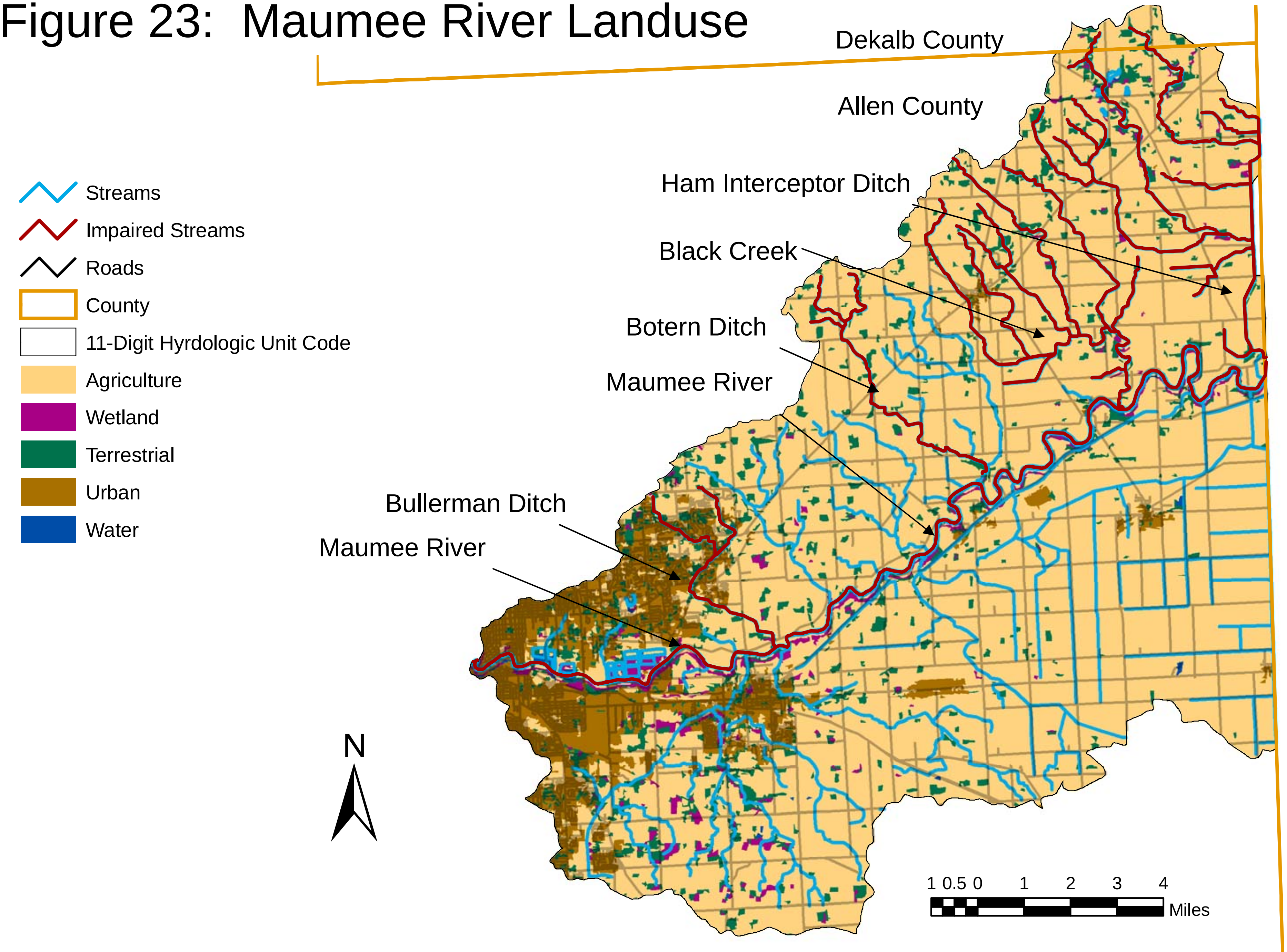


Figure 24: St. Marys River Watershed

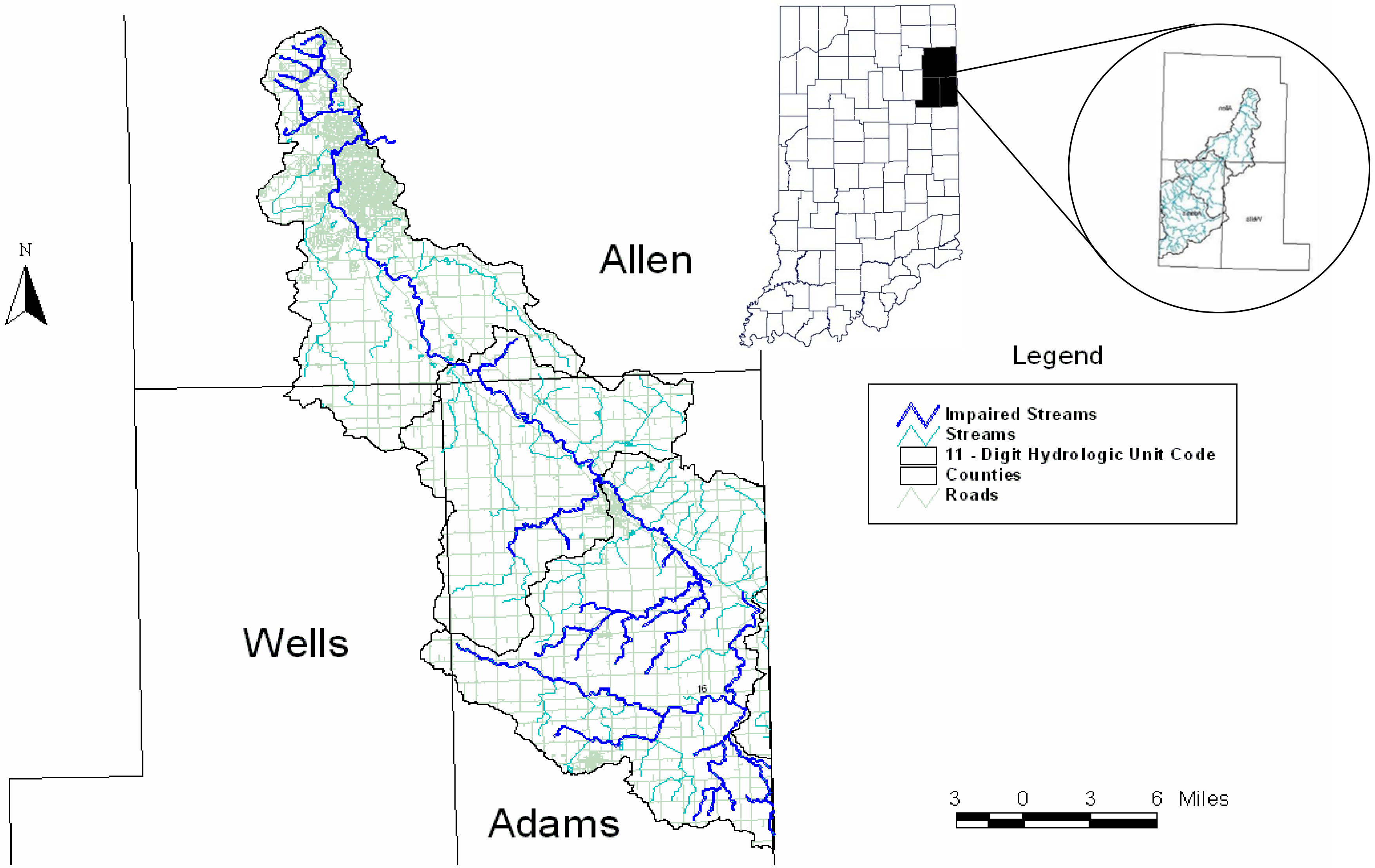


Figure 25: Sample Sites in the St. Marys River Watershed

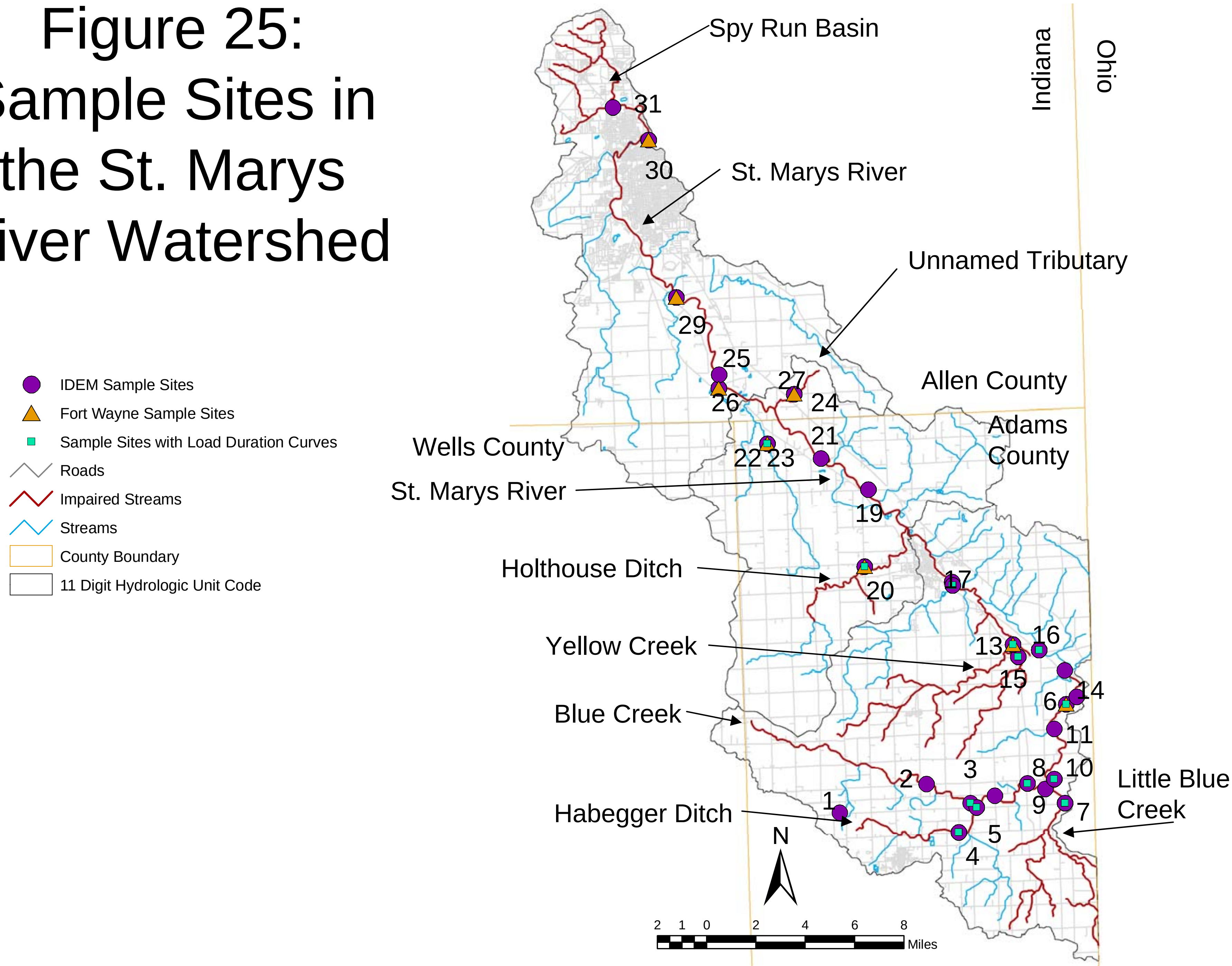


Figure 26:
Unnamed Tributary

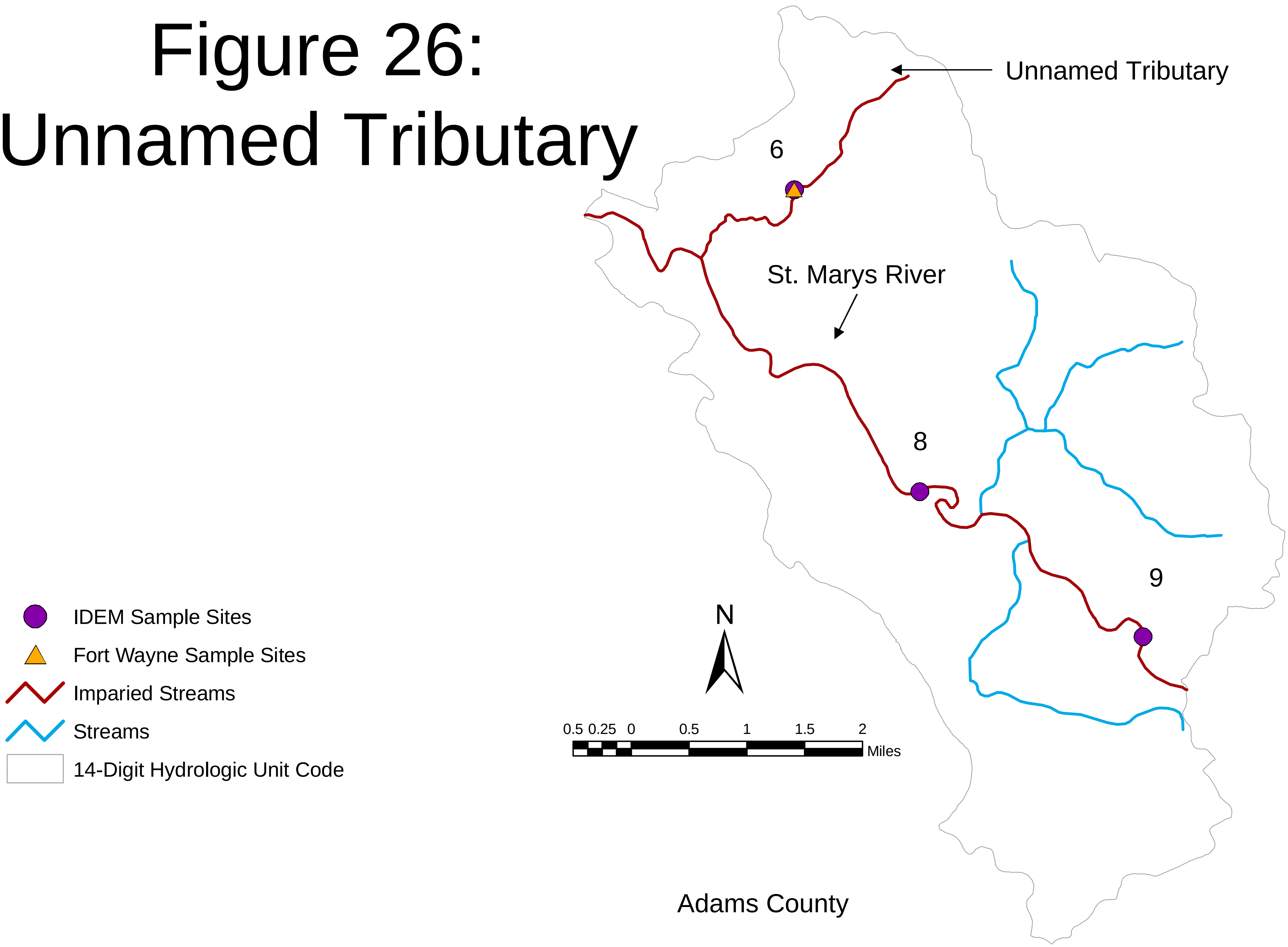


Figure 27: Unnamed Tributary Landuse

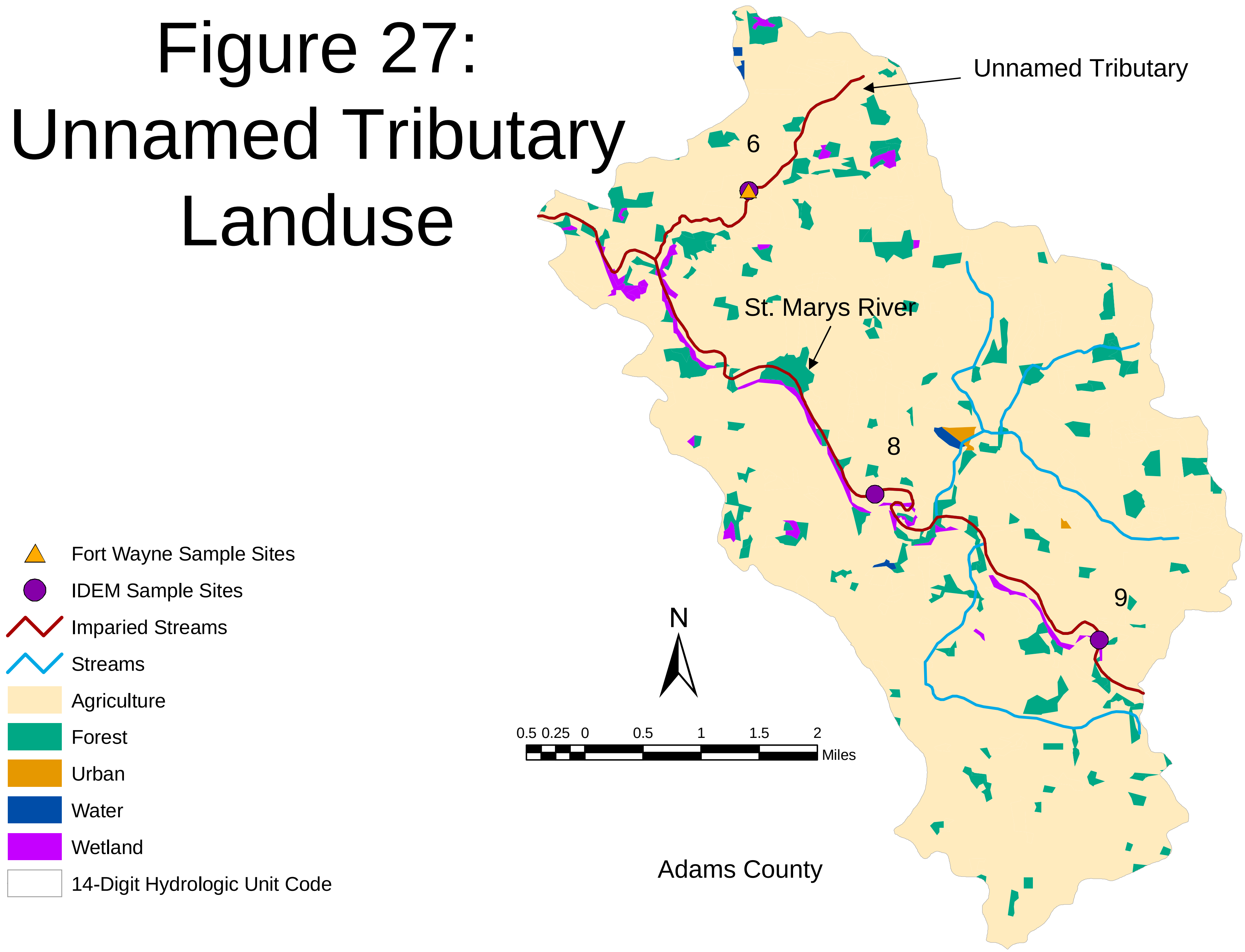


Figure 28: Blue Creek Watershed

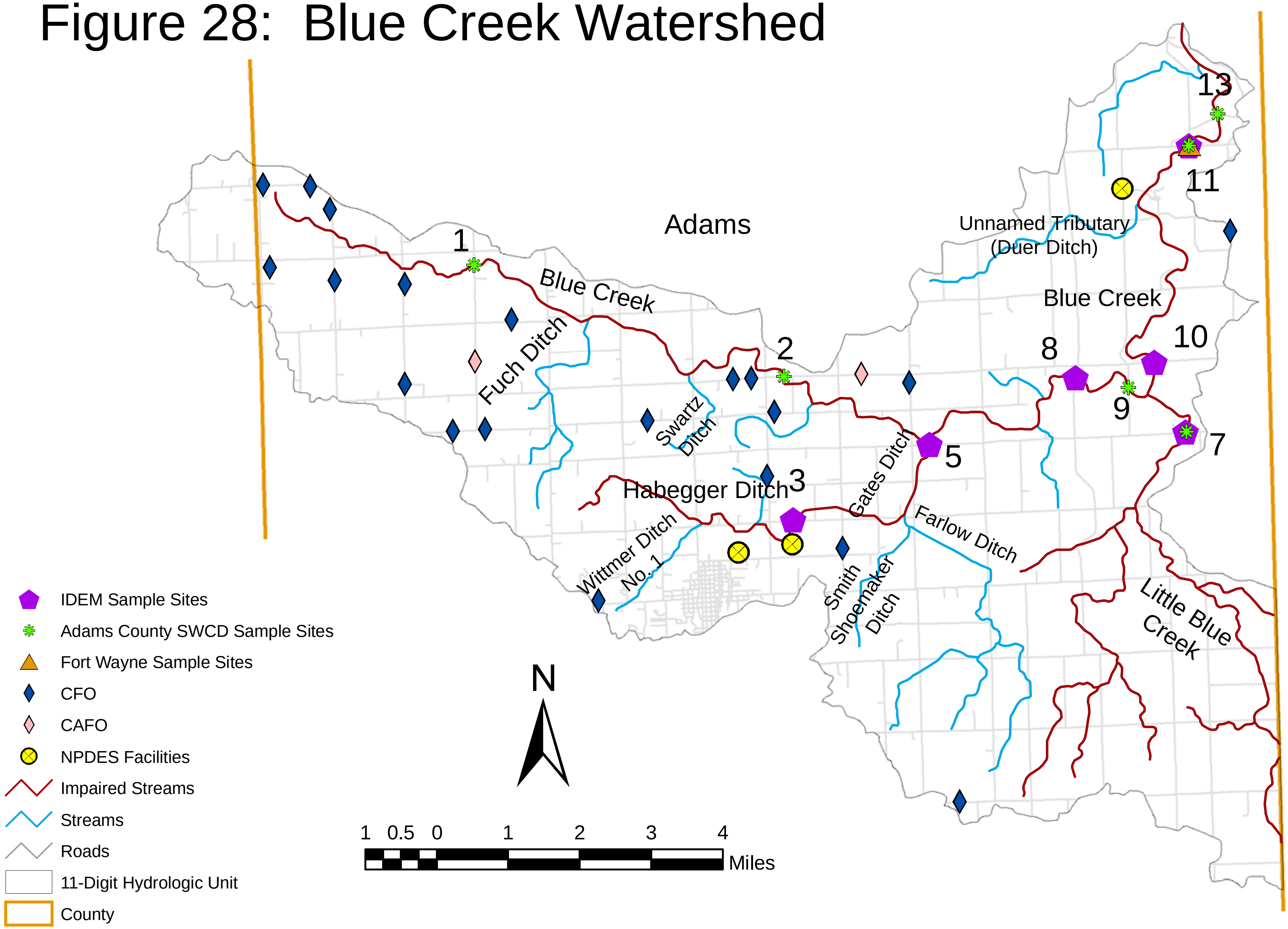


Figure 29: Blue Creek Landuse

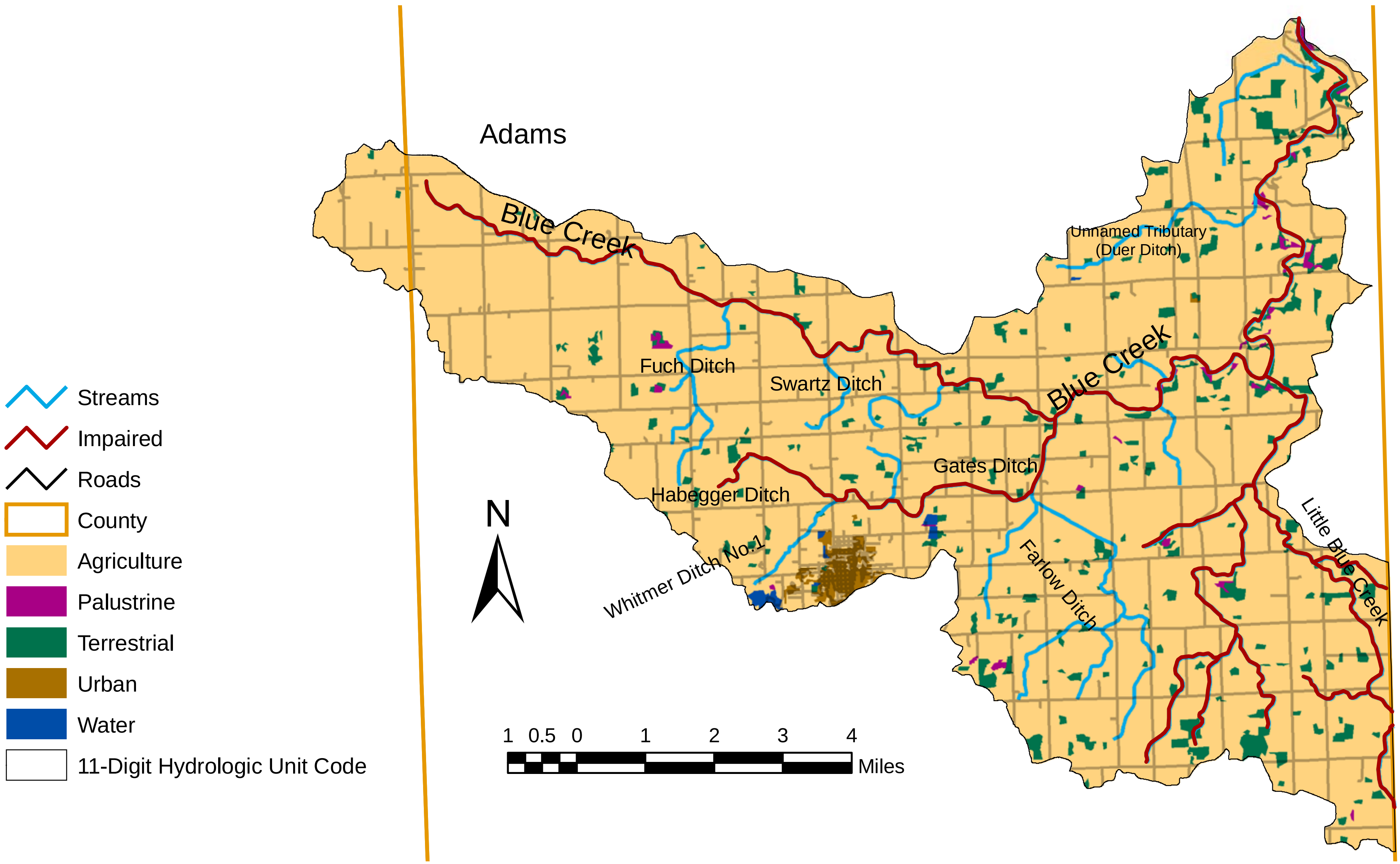


Figure 30: Blue Creek CSOs

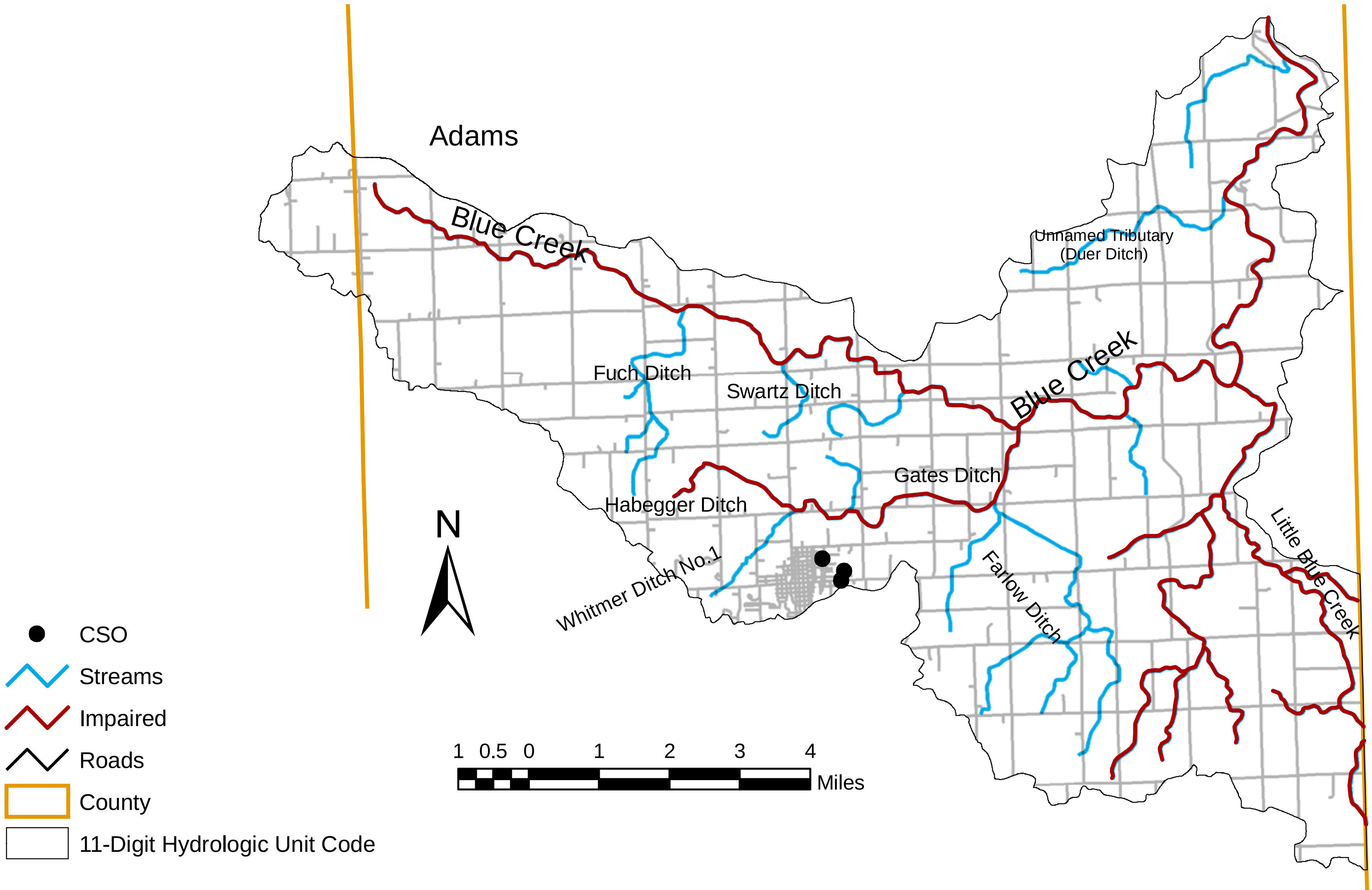


Figure 31: Yellow Creek Watershed

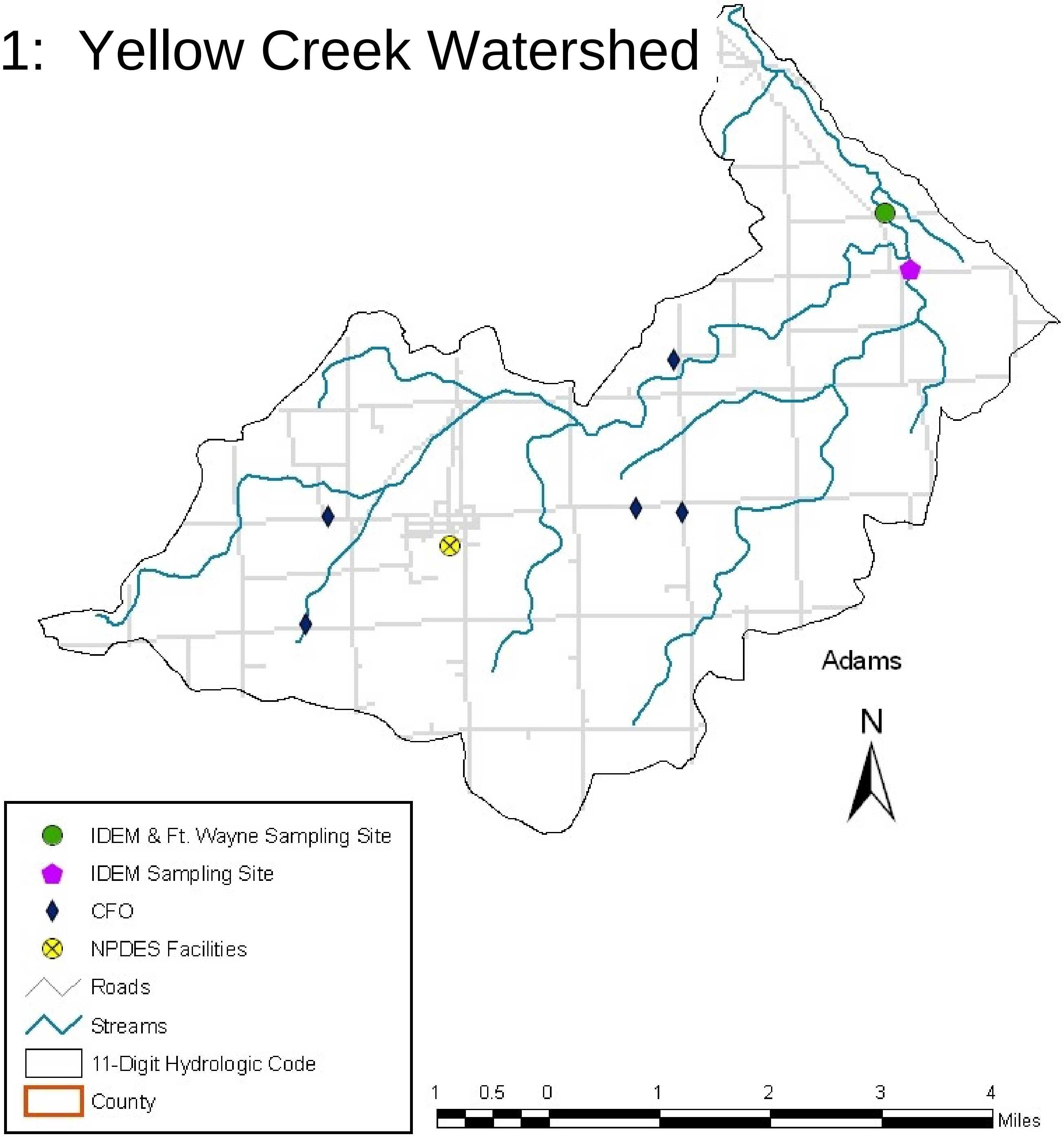


Figure 32: Yellow Creek Watershed Landuse

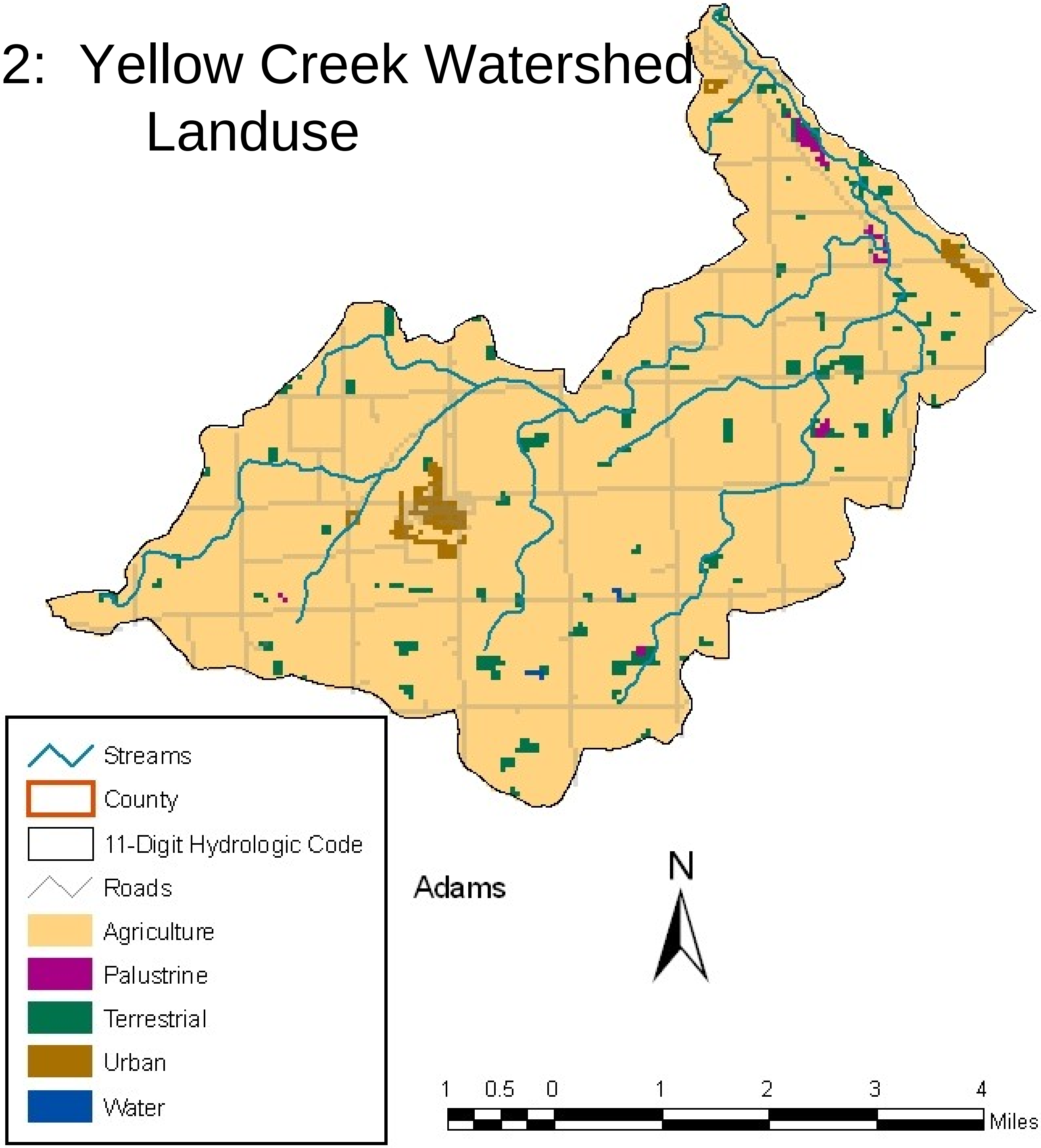
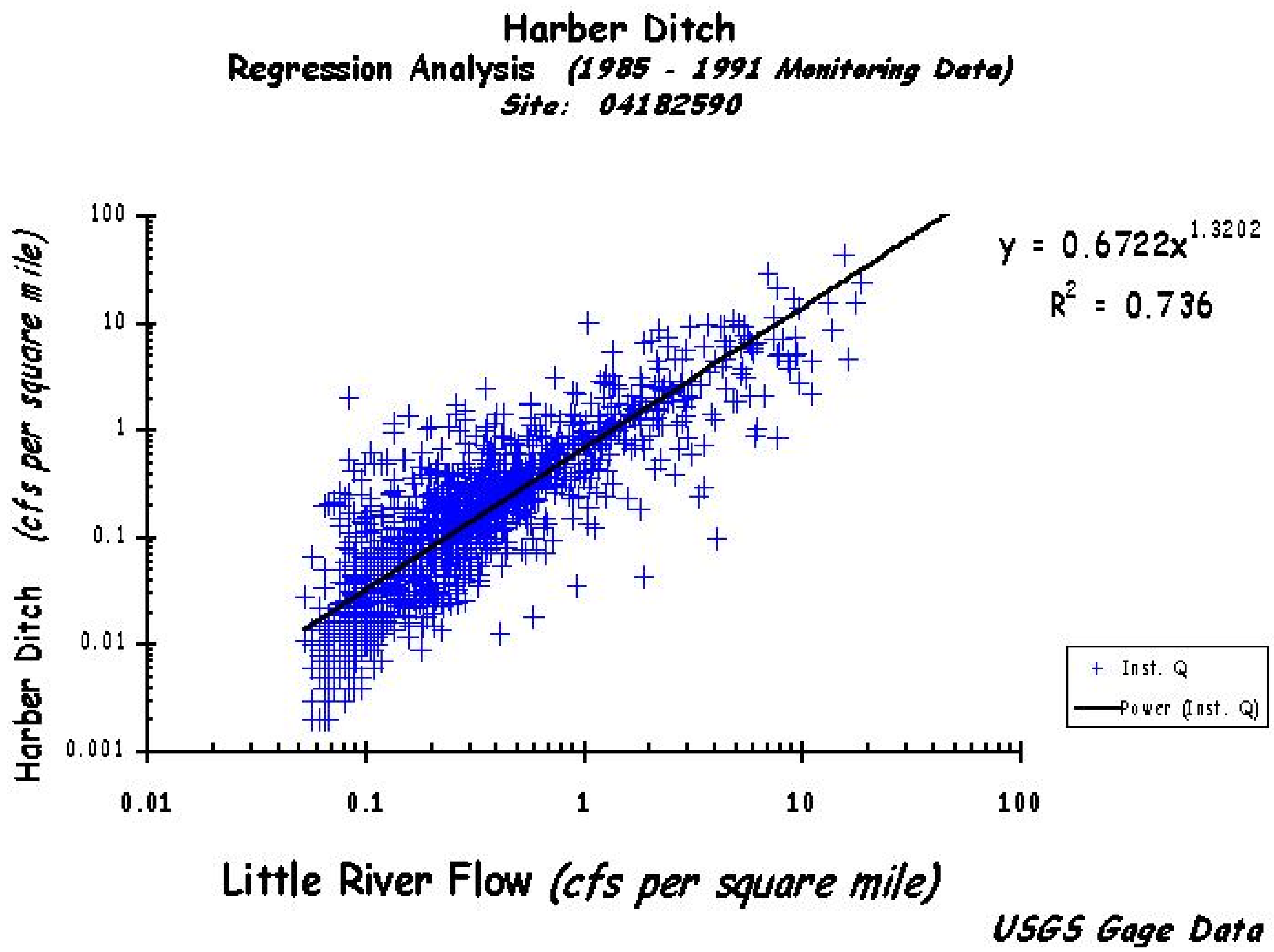


Figure 33: Sampling Flow Chart for Unnamed Tributary to St. Marys

Unnamed Tributary to St. Marys Site Number 24 (LES050-0020)		
Date	**Flow**	**Notes**
3/9/2004	Yes	
3/22/2004	Yes	
4/5/2004	Yes	
4/19/2004	No	No Flow - Stagnant
5/5/2004	No	Pool - No flow
5/18/2004	No	No Flow - Stagnant
6/1/2004	Yes	
6/15/2004	Yes	
6/28/2004	No	No Flow - Stagnant
7/12/2004	No	No Flow - Stagnant
7/26/2004	No	No Flow - Stagnant
8/9/2004	No	No Flow - Stagnant
8/24/2004	No	No Flow - Stagnant
9/7/2004	Yes	
10/4/2004	No	No Flow - Stagnant

Figure 34: Regression Analysis



Appendix 1: NPDES Permits in the St. Marys River Watershed

Facilities with *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0039314	Decatur Municipal STP	St. Marys River	
IN0044199	White Horse Mobile Home Park	Borum Run via Miller	
IN0045292	Hessen Utilities	Marion Ditch	
IN0048119	Hoagland WWTP/ Allen Co Regional Sewer District	Houk Ditch	
IN0021369	Berne STP	Wabash River	Blue Creek

Facilities with Total Residual Chlorine Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0036901	Oak Ridge Estates	St. Marys River via Bulham Ditch	
IN0055417	Country Acres Association WWTP	Kohne Ditch	
IN0109835	Mill Road Estates	St. Marys River	

Facilities with no Total Residual Chlorine or *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	St. Marys River Watershed
IN0048151	Monroe Water Department	Yellow Creek	
IN0052302	BandB Custom Plating	St. Marys River via Tributary	
IN0058980	Bing-Lear Manufacturing Group, Berne	Habegger Ditch	Blue Creek
ING250026	Fort Wayne Metals	Bradbury Ditch	
ING490084	Meshberger Bros Stone Plt #2	Blue Creek	Blue Creek
INP000069	Bing-Lear Manufacturing Group, Berne	Berne STP	Blue Creek
INP000194	Ruan Transport Corporation	Decatur STP	
INP000197	Driggs Farms of Indiana, Inc	Decatur STP	

Appendix 2: Combined Sewer Overflows in St. Marys River Watershed

City of Fort Wayne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
004	J02-90, 210' South of bridge at W. Jefferson and St. Marys River	St. Marys River
005	J11-164, 210' Southeast of Manito Blvd and Indiana Village Blvd	St. Marys River
007	K03-92, 250' Southeast of Electic Ave. and Brown Street	St. Marys River
011	K06-233, 230' Southeast of Main St. and Camp Allen Dr.	St. Marys River
012	K06-234, 230' Southeast of Main St. and Camp Allen Dr.	St. Marys River
013	K06-298, 80' North of Thieme Dr. and Berry St.	St. Marys River
014	K07-106, 60' West of Dinnen Ave. and Packard Ave.	St. Marys River
016	K07-109, 280' Southwest of Broadway and Kinsmoor Ave.	St. Marys River
017	K07-176, 130' Southwest of St. Marys Pkwy	St. Marys River
018	K11-165, 150' West of Broadway and Rudisill Blvd	St. Marys River
019	K11-178, 150' West of Broadway and Rudisill Blvd	St. Marys River
020	K15-116, 1300' West of Hartman Rd and Westover Rd	St. Marys River
021	K19-044, 850' West of Old Mill Rd. and Fairfax Ave.	St. Marys River
023	L06-103, 90' Northwest of Jackson St and Superior St	St. Marys River
024	L06-420, 220' North of Superior St. and Fairfield Ave.	St. Marys River
025	L06-421, 220' North of Superior St and Fairfield Ave.	St. Marys River
026	M10-151, 310' East of Third St. and Calhoun St.	St. Marys River
027	M10-202, 200' Southeast of Third St. and Calhoun St.	St. Marys River
028	M10-238, 150' East of St. Marys River Bridge and Spy Run Ave.	St. Marys River
029	M10-265, 230' East of Duck St. and Barr St.	St. Marys River
032	M10-306, 120' North of Clair St. and Harrison St.	St. Marys River
033	M10-313, 200' Southeast of Third St. and Calhoun St.	St. Marys River
054	O23-080, 240' East of Mercer Ave. and Hollis Ln.	Natural Drain #4
056	J03-313, Brown Street Pump Station	St. Marys River
067	K19-077, 310' Southeast of Hartman Rd and Foster Park Dr.	St. Marys River

SSO

Outfall #	Location	Receiving Waters
070	N23-121, 230' east of the intersection at John and Warfield	Highland Drain
071	N23-122, 290' east of the intersection at John and Warfield	Highland Drain

City of Decatur

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
005	Swirl Concentrator	St. Marys River
008	Marshall Street	St. Marys River
009	Monroe Street	St. Marys River
011	Jefferson Street	St. Marys River

City of Berne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
003	Welty Street and Compromise	Sprunger Ditch to Habegger Ditch
004	Main and Ruesser	Sprunger Ditch to Habegger Ditch

SSO

Outfall #	Location	Receiving Waters
006	North End of East Water Street	Sprunger Ditch to Habegger Ditch

Appendix 3: CFO & CAFO in St. Marys River Watershed

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
8	Gary Steffen	Holthouse Ditch						60							
65	Grace Farms	Blue Creek								60,000					
91	Carl Lotter	Yellow Creek		4,200											
123	Jim Fiechter	Blue Creek			920										
469	Jerry Lee Graber	Blue Creek		320	920							6,000			
590	Ted Liechty	Blue Creek	ING800590							119,000					
635	Charles W Hill	Blue Creek			1,400										
638	Troyer Swine	Blue Creek			1,000										
684	Lynn Myers	St. Marys River			1,920										
902	David Hill	Blue Creek			625										
933	SDD Hogs, Inc	Blue Creek	ING800933		3,600										
944	ISCF Brothers Pork	Blue Creek			2,000										
948	Philip R Moser	Holthouse Ditch		1,185	500										
971	Emanuel Schmidt	Blue Creek		500	300										
1065	Pigs in a Blanket	Nickelsen Creek		2,880											
1197	Earl Gerber Farms, Inc	Holthouse Ditch									96,000				
1306	Triple G Ranch	Blue Creek		500	800	166									
1607	Triple T Farms, Inc	Holthouse Ditch		900	450		350					63,000			
1882	Gerald and Charles Miller	St. Marys River		250	1,945	110									

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
1886	Alvin Schwartz	Yellow Creek			1,950										
2206	Cottonwood Corporation	Holthouse Ditch		2,400	2,400										
2369	Allen Buuck	Nickelsen Creek			410										
2435	ADM Alliance Nutrition, Inc	St. Marys River		1,000	702	351	376	82	56	2,800		1,452	1,440		
2548	Daniels J Michaels	Yellow Creek		510	255					8,200					
3005	Joel Houk	Holthouse Ditch		200	500	96									
3281	Gene Witte	St. Marys River		360	200	80									
3292	South 40 Farm			600		415									
3615	KMV Family Farms	St. Marys River						375							
3668	David H LaFontaine	Yellow Creek								81,000					
3737	Stan Von Gunten	Blue Creek									33,600				
3944	Moser Bros-Pine Hill Acres	Holthouse Ditch		160		576									
3985	Double G Farms	Blue Creek		200	580	99									
4037	Kirkland Farms	Holthouse Ditch			1,500										
4038	County Line Swine	Blue Creek		900	600	415									
4067	Fuelling Farms	St. Marys River													600

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Layers	Pullets	Broilers	Turkeys	Ducks	Sheep
4181	Victor Steiner	Yellow Creek		240	506	172									
4307	Stoller Poultry, Inc	Blue Creek			1,920					100,410					
4421	Kaehr Ag Inc	Blue Creek		460	600	204									
4637	Rigger Pork, Inc (Masterpork)	Blue Creek		800	120	619									
4964	Paul Rumple	Holthouse Ditch			6,000										
4997	Bruce Dick	Borum Run		240	540	146									
5007	Progress Pork	Blue Creek			2,000										
6000	Irish Acres Dairy	Blue Creek	ING806000					1,552	360						
6020	SandG Poultry	Blue Creek	ING806020							132,000					
6049	Tri Oak Farms, Inc	Blue Creek		320	500	134									
6159	Stan Biberstein	Holthouse Ditch								63,000					
6175	Jerry Lambright	Blue Creek												3,000	
6201	Ron Aschliman	Holthouse Ditch			3,040										
6239	James and Ron Collins	Holthouse Ditch			700										
6330	Steve Henry	Blue Creek									50,000				
4039	Thomas Wyss	St. Marys River			154										
4683	Duane E Franz	St. Marys River		400	530	100									
4942	Robert J Schuhler	St. Marys River		500	364	324									

Appendix 4: St. Marys River Watershed Reductions

Blue Watershed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
2940.1	1428.1	892.9	366.2		1082.4	88.4	51.8	Blue Creek -- Salem Rd.
3205.2	1797.2	622.8	158.4		868.2	85.6	71	Blue Creek -- CR 300 S
7549.8	3316.3	474.8	346.9		1425.1	91.2	79.6	Blue Creek -- SR 124
5298.9	1571.5	779.8	218.1		1091	88.5	8.4	Habegger Ditch -- CR 150 E
6208	3951.6	909.7	1311.8		2326.1	94.6	20.1	Gates Ditch -- CR400 S
1162.5	1105.9	824.1	295.5		748	83.3	16.3	Little Blue Creek -- CR 400 S

Yellow Watershed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
1492.5	775.3	1052.9	65.3		531.1	76.5	9.8	Martz Creek -- CR 200 N
5508.4	980.2	673.3	480.8		1149.8	89.1	24.5	Yellow Creek -- CR 250 N

Holthouse / Borum / Nickelson / Unnamed

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
698.1	465.4	286	48.9		259.7	51.9	14.4	Borum Run -- Mercer Rd
6059.2	687.7	306.2	194.8		706.1	82.3	27.3	Holthouse Ditch -- CR 200 W
3849.9	766.9	327.8	163		630.2	80.1	12.2	Nickelsen Creek -- CR 1100 N
5711.1	2133	346.9	372.4		1120.1	88.8	2.3	Unnamed Tributary -- Barkley Rd

St. Mary's River

High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	Site Name
150	960.3	248.3	586.1		380.5	67.1	354	St. Marys - Ohio SR 81
261.3	1019.5	499.2	271.3		435.8	71.3	467.8	St. Marys - SR 101 Bridge
505.1	774.4	476.9	628.1	243.6	491	74.5	467.8	St. Marys - Pleasant Mills
1119.9	1411.2	139.3	269.1		493.4	74.6	643.2	St. Marys - Hoagland Rd
1967.7	905.8	414.8	284	374.2	601.3	79.2	672	St. Marys - Ferguson Road
304.3	357.2	159.3	202.3	69.5	189.3	33.9	672	St. Marys - Ferguson Road
1933.6	1009.4	736.8	537	243.7	716	82.5	820	St. Marys - Spy Run
391.9	431.6	226.2	323	263.2	318	60.7	820	St. Marys - Spy Run Bridge

Appendix 5: NPDES Permits in the Maumee River Watershed

Facilities with *E. coli* Limits and Total Residual Chorine

Permit No.	Facility Name	Receiving Waters
IN0032191	Fort Wayne Municipal STP	Maumee River

Facilities with no Total Residual Chlorine or *E. coli* Limits with Sanitary Component

Permit No.	Facility Name	Receiving Waters
IN0021407	Woodburn Municipal STP	Maumee River

Facilities with no Total Residual Chlorine or *E. coli* Limits with No Sanitary Component

Permit No.	Facility Name	Receiving Waters
IN0000485	Norfolk and Western Railway Co	Trier Ditch
IN0000507	BF Goodrich Tire Manufacturing	Maumee River
ING490049	Hanson Aggregates, Midwest W.	Carson Drain
INM020346	New Haven CSS	N/A

Appendix 6: Combined Sewer Overflows in Maumee River Watershed

City of Fort Wayne

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
039	N06-022, 120’ North of Hanna St. and Berry St.	Maumee River
048	O10-252, 350’ West of Edgewater and Garfield	Maumee River
050	O10-277, 100’ North of Coombs St. and Herbert St.	Maumee River
055	P06-192, 430’ North of N. Anthony Blvd. and Wayne St.	Maumee River
057	P10-121, Stormwater Liftstation Wet Well	Maumee River
058	O06-34, 390’ Northwest of Edsall Ave. and Dwenger Ave.	Maumee River
060	R06-31, 670’ Northeast of Greenwalt Ave. and Maumee River	Unnamed Ditch to Maumee River
061	R14-137, 200’ West of Lavern Ave. and State Blvd.	Baldwin Ditch
062	R14-138, 200’ West of Lavern Ave. and State Blvd	Baldwin Ditch
064	S02-35. 610’ Southeast of Coliseum Blvd. S.	Unnamed Ditch to Maumee River

City of New Haven

CSO DISCHARGE POINT

Outfall #	Location	Receiving Waters
001	Near the Town’s Abandoned Wastewater Treatment Facility	Martin Drain
002	East side of Bench Mark 761 and the NandW Railroad Crossing	Martin Drain
003	N.E. of the intersection of West Street and South Street	Trier Ditch
004	Just North of the Crossing of Brookwood Drive and Trier Ditch	Trier Ditch

Appendix 7: Confined Feeding Operations and Concentrated Animal Feeding Operations in the Maumee River Watershed

Log #	Name	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Beef	Dairy	Dairy Calves	Ducks
23	Bruce Brenneke						370	60	
470	Harmony Farms			385					
571	Ned S. Byer		500	740	156				
573	Richard and David Hartmann			200					
575	Schlatter Stock Farms			500		400			
708	Mark S. Rekeweg			1,600					
952	Steve R. Schneider		620	300	152				
1200	Victor Eicher			500					
1222	Lake Farms			270					
2219	Flat Rock LLC		1,200	160	477				
2485	Richard and David Hartmann		1,000	1,490					
2991	Richard Rodenbeck		300	300	30				
3967	Michael J. May		200	225	86				
4001	Schlatter Stock Farm		125	1,550					
4820	Brinkman and Son Farm		100	500	82				
4840	Jim Kline		140	600	120				
6098	Jurgielewicz Duck Farm	ING806098							5,000
6195	Schlatter Stock Farms-Ward Rd			4,000					
6287	Mark and Brenda Rekeweg	ING806287	1,100	4,600					

Appendix 8: *E. coli* Reductions for the Maumee River Watershed

Maumee River									
	High	Moist	Mid-Range	Dry	Low	Site Geometric Mean	Overall Site Reductions	Area	
MAU-ANT	364.3	277.8	133.4	350.7	182.8	244	48.8	1,900	Maumee River -- Anthony Boulevard
MAU-LAN	297.5	263.4	166.6	393.2	211.1	255.3	51	1,967	Maumee River -- Landin Road
M-129	2600	993	159.4	387.5	252.3	525.9	76.2	1,967	Maumee River -- Fixed Station @ Landin Road
M-114	1567.4	911.6	369.9	253	110.4	430.3	70.9	2,050	Maumee River -- Fixed Station near Woodburn

Appendix 9: NPDES Permits in the St. Marys River Watershed

Facilities with *E. coli* Limits

Permit No.	Facility Name	Receiving Waters	Sub-Watershed
IN0021369	Berne STP	Wabash River	Blue Creek
IN0048151	Monroe Water Department	Yellow Creek	Yellow Creek
IN0058980	Bing-Lear Manufacturing Group, Berne	Habegger Ditch	Blue Creek
ING490084	Meshberger Bros Stone Plt #2	Blue Creek	Blue Creek
INP000069	Bing-Lear Manufacturing Group, Berne	Berne STP	Blue Creek

Appendix 10: Combined Sewer Overflows in St. Marys River Watershed

City of Berne

CSO Outfall #	Location	Receiving Waters
003	Welty Street and Compromise	Sprunger Ditch to Habegger Ditch
004	Main and Ruesser	Sprunger Ditch to Habegger Ditch

SSO Outfall #	Location	Receiving Waters
006	North End of East Water Street	Sprunger Ditch to Habegger Ditch

Appendix 11: Confined Feeding Operations and Concentrated Animal Feeding Operations in the Blue Creek/Habegger Ditch and Yellow Creek Watersheds

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Layers	Pullets	Broilers
65	Grace Farms	Blue Creek					60,000		
91	Carl Lotter	Yellow Creek		4,200					
123	Jim Fiechter	Blue Creek			920				
469	Jerry Lee Graber	Blue Creek		320	920				6,000
590	Ted Liechty	Blue Creek	ING800590				119,000		
635	Charles W Hill	Blue Creek			1,400				
638	Troyer Swine	Blue Creek			1,000				
902	David Hill	Blue Creek			625				
933	SDD Hogs, Inc	Blue Creek	ING800933		3,600				
944	ISCF Brothers Pork	Blue Creek			2,000				
971	Emanuel Schmidt	Blue Creek		500	300				
1306	Triple G Ranch	Blue Creek		500	800	166			
1886	Alvin Schwartz	Yellow Creek			1,950				
2548	Daniels J Michaels	Yellow Creek		510	255		8,200		
3668	David H LaFontaine	Yellow Creek					81,000		
3737	Stan Von Gunten	Blue Creek						33,600	
3985	Double G Farms	Blue Creek		200	580	99			
4038	County Line Swine	Blue Creek		900	600	415			

Log #	Name	St. Marys River Watershed	NPDES #	Nursery Pigs	Growers/ Finishers	Sows/ Boars	Dairy	Dairy Calves	Layers	Ducks
4181	Victor Steiner	Yellow Creek		240	506	172				
4307	Stoller Poultry, Inc	Blue Creek			1,920				100,410	
4421	Kaehr Ag Inc	Blue Creek		460	600	204				
4637	Rigger Pork Inc Masterpork	Blue Creek		800	120	619				
5007	Progress Pork	Blue Creek			2,000					
6000	Irish Acres Dairy	Blue Creek	ING806000				1,552	360		
6020	SandG Poultry	Blue Creek	ING806020						132,000	
6049	Tri Oak Farms, Inc	Blue Creek		320	500	134				
6175	Jerry Lambright	Blue Creek								3,000

Appendix 12: Load Reductions for the Blue Creek/Habegger Ditch and Yellow Creek Watersheds

Stream Name	Drainage Area	Site #	NO2+NO3 mg/L	% Reduction Needed	Phosphorus mg/L	% Reduction Needed	TSS mg/L	% Reduction Needed
Habegger Ditch	8.4 sq mi	LES040-0099	20.10	55.25%	0.436	36.19%	53.01	48.41%
Martz Creek	9.8 sq mi	LES040-0040	10.92	13.42%	0.320	11.25%	35.00	19.29%
Yellow Creek	24.5 sq mi	LES040-0038	10.92	13.42%	0.320	11.25%	35.00	19.29%
All Blue Creek Values	79.6 sq mi	-0009,-0011,-0066	11.70	19.53%	0.391	28.27%	44.48	37.55%
Unnamed Trib	2.8 sq mi	LES050-0020	no exceedances		0.441	36.97%	55.74	51.18%
St. Marys Watershed	1900 sq mi		10.92	13.42%	0.320	11.25%	35.00	19.29%

Attachment A

E. coli Data for St. Marys River Watershed TMDL

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Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	5/31/2000		E.coli	100		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	6/19/2000		E.coli	800		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	7/20/2000		E.coli	11200		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	8/18/2000		E.coli	9600		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	9/21/2000		E.coli	1400		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	10/31/2000		E.coli	100		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	4/19/2001		E.coli	500		Adams		
1	Adams County SWCD	319 grant	Blue Creek		on 400W just south of 100 S	#1	5/17/2001		E.coli	1000		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	5/31/2000		E.coli	900		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	6/19/2000		E.coli	1000		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	7/20/2000		E.coli	800		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	8/18/2000		E.coli	27200		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	9/21/2000		E.coli	5750		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	10/31/2000		E.coli	250		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	4/19/2001		E.coli	500		Adams		
2	Adams County SWCD	319 grant	Blue Creek		on 300 S, just E. 000	#2	5/17/2001		E.coli	500		Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22010	3/9/2004	Duplicate	E. Coli	105	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22026	3/23/2004	Normal	E. Coli	410.6	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22043	4/20/2004	Normal	E. Coli	1732.9	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22061	5/6/2004	Normal	E. Coli	126.7	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22077	5/19/2004	Normal	E. Coli	17329	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22094	6/2/2004	Normal	E. Coli	14136	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22112	6/16/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22128	6/29/2004	Normal	E. Coli	84.7	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22145	7/13/2004	Normal	E. Coli	>2420	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22163	7/27/2004	Normal	E. Coli	>2420	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21890	4/6/2004	Normal	E. Coli	261.3	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22179	8/10/2004	Normal	E. Coli	>2420	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22197	8/25/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22214	9/8/2004	Normal	E. Coli	8164	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22230	9/21/2004	Normal	E. Coli	248.1	MPN/100mL	Adams		
4	IDEM	2004 St Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA22248	10/5/2004	Normal	E. Coli	191.8	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22008	3/9/2004	Normal	E. Coli	980.4 (Q)	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22024	3/23/2004	Normal	E. Coli	727	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21887	4/6/2004	Normal	E. Coli	579.4	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22041	4/20/2004	Normal	E. Coli	727	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22059	5/6/2004	Normal	E. Coli	686.7 (Q)	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22075	5/19/2004	Normal	E. Coli	> 24200		Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22092	6/2/2004	Normal	E. Coli	17329	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22110	6/16/2004	Normal	E. Coli	2224	MPN/100mL	Adams		

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22126	6/29/2004	Normal	E. Coli	547.5	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22143	7/13/2004	Normal	E. Coli	> 2420		Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22161	7/27/2004	Normal	E. Coli	> 2420		Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22177	8/10/2004	Normal	E. Coli	1553.1 (fB)	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22181	8/10/2004	Duplicate	E. Coli	1046.2 (fBJ)	MPN/100mL	Adams	Estimated	
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22195	8/25/2004	Normal	E. Coli	325.5	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22212	9/8/2004	Normal	E. Coli	14136	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22228	9/21/2004	Normal	E. Coli	204.6	MPN/100mL	Adams		
5	IDEM	2004 St Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA22246	10/5/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	5/31/2000		E.coli	400		Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	6/19/2000		E.coli	600		Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	8/18/2000		E.coli	12200		Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	10/31/2000		E.coli	1000		Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	4/19/2001		E.coli	0		Adams		
6	Adams County SWCD	319 grant	Little Blue Creek		State Line (700E) N of 900S	#3	5/17/2001		E.coli	500		Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22007	3/9/2004	Normal	E. Coli	686.7 (Q)	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22023	3/23/2004	Normal	E. Coli	116.9	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA21886	4/6/2004	Normal	E. Coli	70.3	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22040	4/20/2004	Normal	E. Coli	146.7	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22058	5/6/2004	Normal	E. Coli	307.6 (Q)	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22074	5/19/2004	Normal	E. Coli	24192	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22091	6/2/2004	Normal	E. Coli	5172	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22109	6/16/2004	Normal	E. Coli	261.3	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22125	6/29/2004	Normal	E. Coli	613.1	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22142	7/13/2004	Normal	E. Coli	> 2420		Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	Straight Pipe CR 400 S	AA23339	7/13/2004	Normal	E. Coli	17329	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22160	7/27/2004	Normal	E. Coli	24192	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22176	8/10/2004	Normal	E. Coli	1553.1 (fB)	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22194	8/25/2004	Normal	E. Coli	1203.3	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22211	9/8/2004	Normal	E. Coli	770.1	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22227	9/21/2004	Normal	E. Coli	866.4	MPN/100mL	Adams		
7	IDEM	2004 St Marys Watershed	Little Blue Cr	LES040-0010	CR 400 S (17 S Rd), West of CR 600 E	AA22245	10/5/2004	Normal	E. Coli	100.8	MPN/100mL	Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	5/31/2000		E.coli	1300		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	6/19/2000		E.coli	1000		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	7/20/2000		E.coli	2800		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	8/18/2000		E.coli	11000		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	9/21/2000		E.coli	3950		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	10/31/2000		E.coli	400		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	4/19/2001		E.coli	500		Adams		
7	Adams County SWCD	319 grant	Little Blue Creek	LES040-0010	on 400 S just west of 600 E	#4	5/17/2001		E.coli	1000		Adams		

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Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22004	3/9/2004	Normal	E. Coli	920.8	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22022	3/23/2004	Normal	E. Coli	238.2	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22039	4/20/2004	Normal	E. Coli	178.5	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22057	5/5/2004	Normal	E. Coli	648.8	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22073	5/19/2004	Normal	E. Coli	>24200	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22079	5/19/2004	Duplicate	E. Coli	>24200	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22090	6/2/2004	Normal	E. Coli	3654	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22096	6/2/2004	Duplicate	E. Coli	4352	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22108	6/16/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22124	6/29/2004	Normal	E. Coli	648.8	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22141	7/13/2004	Normal	E. Coli	1553.1	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22159	7/27/2004	Normal	E. Coli	>2420	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA21885	4/6/2004	Normal	E. Coli	410.6	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22175	8/10/2004	Normal	E. Coli	>2420	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22193	8/25/2004	Normal	E. Coli	1046.2	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22210	9/8/2004	Normal	E. Coli	1725	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22226	9/21/2004	Normal	E. Coli	613.1	MPN/100mL	Adams		
8	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0011	Salem Rd, S of CR 300 S	AA22244	10/5/2004	Normal	E. Coli	218.7	MPN/100mL	Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	5/31/2000		E.coli	1200		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	6/19/2000		E.coli	800		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	7/20/2000		E.coli	1200		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	8/18/2000		E.coli	58400		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	9/21/2000		E.coli	23200		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	10/31/2000		E.coli	150		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	4/19/2001		E.coli	0		Adams		
9	Adams County SWCD	319 grant	Blue Creek		on 500E just S. of 300S	#5	5/17/2001		E.coli	9000		Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22009	3/9/2004	Normal	E. Coli	325.5 (Q)	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22025	3/23/2004	Normal	E. Coli	547.5	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA21888	4/6/2004	Normal	E. Coli	1553.1	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22042	4/20/2004	Normal	E. Coli	325.5	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22060	5/6/2004	Normal	E. Coli	461.1 (Q)	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22076	5/19/2004	Normal	E. Coli	> 24200		Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22093	6/2/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22111	6/16/2004	Normal	E. Coli	5172	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22127	6/29/2004	Normal	E. Coli	547.5	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22144	7/13/2004	Normal	E. Coli	70.8	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22162	7/27/2004	Normal	E. Coli	> 2420		Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22178	8/10/2004	Normal	E. Coli	1732.9 (fB)	MPN/100mL	Adams		
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22196	8/25/2004	Normal	E. Coli	1299.7	MPN/100mL	Adams		

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Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22213	9/8/2004	Normal	E. Coli	2419.2	MPN/100mL	Adams			
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22229	9/21/2004	Normal	E. Coli	727	MPN/100mL	Adams			
10	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0066	CR 300 S, E of CR 000	AA22247	10/5/2004	Normal	E. Coli	34.5	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22005	3/9/2004	Normal	E. Coli	435.2 (Q)	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22021	3/23/2004	Normal	E. Coli	547.5	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA21884	4/6/2004	Normal	E. Coli	75.9	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22038	4/20/2004	Normal	E. Coli	166.4	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22055	5/6/2004	Normal	E. Coli	410.6 (Q)	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22072	5/19/2004	Normal	E. Coli	> 24200		Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22089	6/2/2004	Normal	E. Coli	2602	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22107	6/16/2004	Normal	E. Coli	2419.2	MPN/100mL	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22123	6/29/2004	Normal	E. Coli	613.1	MPN/100mL	Adams			
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		7/8/2004	Normal	E. Coli	630	Colonies/100ml	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22140	7/13/2004	Normal	E. Coli	1203.3	MPN/100mL	Adams			
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		7/22/2004	Normal	E. Coli	39776	Colonies/100ml	Adams			
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22158	7/27/2004	Normal	E. Coli	> 2420		Adams		2486	June 29-July 27
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		8/5/2004	Normal	E. Coli	12976	Colonies/100ml	Adams		6877	July 8-August 5
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22174	8/10/2004	Normal	E. Coli	1119.9 (fBJ)	MPN/100mL	Adams	Estimated	22719	July 13- August 10
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Adams		22719	July 22- August 19
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22192	8/25/2004	Normal	E. Coli	866.4	MPN/100mL	Adams		12976	July 27- August 25
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		9/2/2004	Normal	E. Coli	14545	Colonies/100ml	Adams		13738	August 5 - Sept. 2
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22208	9/8/2004	Normal	E. Coli	1354	MPN/100mL	Adams		14545	Aug 10 - Sept 8
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		9/16/2004	Normal	E. Coli	322	Colonies/100ml	Adams		2164	Aug 19 - Sept 16
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22225	9/21/2004	Duplicate	E. Coli	290.9	MPN/100mL	Adams		1109	Aug 25 - Sept 21
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		9/30/2004	Normal	E. Coli	320	Colonies/100ml	Adams		813	Sept 2 - Sept 30
11	IDEM	2004 St Marys Watershed	Blue Cr	LES040-0009	SR 124, East of SR 101	AA22243	10/5/2004	Duplicate	E. Coli	178.5	MPN/100mL	Adams		270	Sept 8 - October 5
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		10/14/2004	Normal	E. Coli	264	Colonies/100ml	Adams		269	Sept 16 - Oct 14
11	Ft. Wayne		Blue Cr	LES040-0009	SR 124, East of SR 101		10/28/2004	Normal	E. Coli	1146	Colonies/100ml	Adams			
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22003	3/9/2004	Normal	E. Coli	75.4 (Q)	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22020	3/23/2004	Normal	E. Coli	260.2	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA21883	4/6/2004	Normal	E. Coli	47.9	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22037	4/20/2004	Normal	E. Coli	55.4	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22054	5/6/2004	Normal	E. Coli	461.1 (Q)	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22071	5/19/2004	Normal	E. Coli	5794	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22088	6/2/2004	Normal	E. Coli	980.4	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22106	6/16/2004	Normal	E. Coli	150	MPN/100mL				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22122	6/29/2004	Normal	E. Coli	231	MPN/100mL				
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		7/8/2004	Normal	E. Coli	1100	Colonies/100ml				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22139	7/13/2004	Normal	E. Coli	344.8	MPN/100mL				
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		7/22/2004	Normal	E. Coli	5226	Colonies/100ml				

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Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22156	7/27/2004	Normal	E. Coli	1119.9	MPN/100mL			1099	June 29 - July 27
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		8/5/2004	Normal	E. Coli	6152	Colonies/100ml			3282	July 8 - Aug 5
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22173	8/9/2004	Normal	E. Coli	365.4 (Q)	MPN/100mL				
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		8/19/2004	Normal	E. Coli	12260	Colonies/100ml				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22191	8/24/2004	Normal	E. Coli	648.8	MPN/100mL				
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		9/2/2004	Normal	E. Coli	595	Colonies/100ml				
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22207	9/7/2004	Normal	E. Coli	1046.2	MPN/100mL			2701	Aug 8 - Sept 7
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		9/16/2004	Normal	E. Coli	144	Colonies/100ml			1017	Aug 19 - Sept 16
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22224	9/21/2004	Normal	E. Coli	148.3	MPN/100mL			233	Aug 24 - Aug 21
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		9/30/2004	Normal	E. Coli	3978	Colonies/100ml			474	Sept 2 - Sept 30
12	IDEM	2004 St Marys Watershed	St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH	AA22241	10/5/2004	Normal	E. Coli	98.8	MPN/100mL			303	Sept 7 - Oct 5
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		10/14/2004	Normal	E. Coli	394	Colonies/100ml			319	Sept 16 - Oct 14
12	Ft. Wayne		St. Mary's River (in Ohio)	UNK000-0007	Ohio SR 81, Willshire, OH		10/28/2004	Normal	E. Coli	196	Colonies/100ml				
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	5/31/2000		E.coli	400		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	6/19/2000		E.coli	400		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	7/20/2000		E.coli	3200		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	8/18/2000		E.coli	199		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	9/21/2000		E.coli	650		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	10/31/2000		E.coli	100		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	4/19/2001		E.coli	500		Adams			
12	Adams County SWCD	319 grant	St. Marys River	UNK000-0007	Hwy 81, Willshire OH	#7	5/17/2001		E.coli	2500		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	5/31/2000		E.coli	1000		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	6/19/2000		E.coli	1800		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	7/20/2000		E.coli	2400		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	8/18/2000		E.coli	28000		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	9/21/2000		E.coli	1700		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	10/31/2000		E.coli	150		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	4/19/2001		E.coli	1000		Adams			
13	Adams County SWCD	319 grant	Blue Creek		on 50N just E. of 600 E	#6	5/17/2001		E.coli	1500		Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22002	3/9/2004	Normal	E. Coli	151.5 (Q)	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22019	3/23/2004	Normal	E. Coli	148.3	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA21882	4/6/2004	Normal	E. Coli	298.7	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22036	4/20/2004	Normal	E. Coli	153.9	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22053	5/6/2004	Normal	E. Coli	727 (Q)	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22070	5/19/2004	Normal	E. Coli	> 24200	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22087	6/2/2004	Normal	E. Coli	1299.7	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22105	6/16/2004	Normal	E. Coli	261.3	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22121	6/29/2004	Normal	E. Coli	547.5	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22138	7/13/2004	Normal	E. Coli	579.4	MPN/100mL	Adams			
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22155	7/27/2004	Normal	E. Coli	1299.7	MPN/100mL	Adams			

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22172	8/9/2004	Normal	E. Coli	816.4 (Q)	MPN/100mL	Adams		
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22190	8/24/2004	Normal	E. Coli	920.8	MPN/100mL	Adams		
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22206	9/7/2004	Normal	E. Coli	2419.2	MPN/100mL	Adams		
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22223	9/21/2004	Normal	E. Coli	201.4	MPN/100mL	Adams		
14	IDEM	2004 St Marys Watershed	St. Mary's River	LES040-0007	SR 101 Bridge, North of Pleasant Mills	AA22240	10/5/2004	Normal	E. Coli	365.4	MPN/100mL	Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	5/31/2000		E.coli	100		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	6/19/2000		E.coli	1400		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	7/20/2000		E.coli	1200		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	8/18/2000		E.coli	13600		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	9/21/2000		E.coli	1500		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	10/31/2000		E.coli	50		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	4/19/2001		E.coli	500		Adams		
14	Adams County SWCD	319 grant	St. Marys River	LES040-0007	Pleasant Mills St/Hwy 101	#8	5/17/2001		E.coli	4500		Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22011	3/9/2004	Duplicate	E. Coli	>2419.2	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22028	3/22/2004	Normal	E. Coli	37.9	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA21891	4/5/2004	Normal	E. Coli	142.1	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22044	4/19/2004	Normal	E. Coli	547.5	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22062	5/5/2004	Normal	E. Coli	193.5	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22078	5/18/2004	Normal	E. Coli	24192	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22095	6/1/2004	Normal	E. Coli	2419.2	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22113	6/15/2004	Normal	E. Coli	920.8	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22129	6/28/2004	Normal	E. Coli	1732.9	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22146	7/12/2004	Normal	E. Coli	648.8	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22164	7/26/2004	Normal	E. Coli	6131	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22180	8/9/2004	Normal	E. Coli	461.1	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22198	8/24/2004	Normal	E. Coli	325.5	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22215	9/7/2004	Normal	E. Coli	6131	MPN/100mL	Adams		
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22231	9/20/2004	Normal	E. Coli	98.1 (QJ)	MPN/100mL	Adams	Estimated	
15	IDEM	2004 St Marys Watershed	Martz Creek	LES040-0040	CR 200 N, W of US 33	AA22249	10/4/2004	Normal	E. Coli	43.5	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22001	3/9/2004	Normal	E. Coli	866.4 (Q)	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22018	3/22/2004	Normal	E. Coli	19.9	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA21881	4/5/2004	Normal	E. Coli	49.6	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22035	4/19/2004	Normal	E. Coli	648.8	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22052	5/5/2004	Normal	E. Coli	116 (Q)	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22069	5/18/2004	Normal	E. Coli	5172	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22086	6/1/2004	Normal	E. Coli	866.4	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22104	6/15/2004	Normal	E. Coli	980.4	MPN/100mL	Adams		
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22120	6/28/2004	Normal	E. Coli	866.4	MPN/100mL	Adams		
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		7/8/2004	Normal	E. Coli	1100	Colonies/100ml	Adams		

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22137	7/12/2004	Normal	E. Coli	648.8	MPN/100mL	Adams			
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		7/22/2004	Normal	E. Coli	22398	Colonies/100ml	Adams			
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22154	7/26/2004	Normal	E. Coli	1413.6	MPN/100mL	Adams		2774	June 28-July 26
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		8/5/2004	Normal	E. Coli	>48392	Colonies/100ml	Adams		4964	July 8-August 5
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22171	8/9/2004	Normal	E. Coli	920.8 (Q)	MPN/100mL	Adams		22398	July 12- Aug 9
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		8/19/2004	Normal	E. Coli	39720	Colonies/100ml	Adams		29827	July 22- August 19
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22189	8/24/2004	Normal	E. Coli	980.4	MPN/100mL	Adams		39720	July 26 - Aug 24
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		9/2/2004	Normal	E. Coli	398	Colonies/100ml	Adams		3976	Aug 5 - Sept 2
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22205	9/7/2004	Normal	E. Coli	17329	MPN/100mL	Adams		3976	Aug 9 - Sept 7
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		9/16/2004	Normal	E. Coli	728	Colonies/100ml	Adams		2258	Aug 19 - Sept 16
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22222	9/20/2004	Normal	E. Coli	36.7 (QJ)	MPN/100mL	Adams	Estimated	538	Aug 24 - Sept 20
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		9/30/2004	Normal	E. Coli	322	Colonies/100ml	Adams		454	Sept 2 - Sept 30
16	IDEM	2004 St Marys Watershed	Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd	AA22239	10/4/2004	Normal	E. Coli	1203.3	MPN/100mL	Adams		656	Sept 7 - Oct 4
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		10/14/2004	Normal	E. Coli	3570	Colonies/100ml	Adams		1002	Sept 16 - Oct 14
16	Ft. Wayne		Yellow Cr.	LES040-0038	CR 250 N, East of Salem Rd		10/28/2004	Normal	E. Coli	506	Colonies/100ml	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22000	3/9/2004	Normal	E. Coli	435.2 (Q)	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22017	3/22/2004	Normal	E. Coli	36.4	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA21880	4/5/2004	Normal	E. Coli	11	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22034	4/19/2004	Normal	E. Coli	93.3	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22045	4/19/2004	Duplicate	E. Coli	118.7	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22051	5/5/2004	Normal	E. Coli	214.3 (Q)	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22068	5/18/2004	Normal	E. Coli	> 2420		Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22085	6/1/2004	Normal	E. Coli	1119.9	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22103	6/15/2004	Normal	E. Coli	435.2	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22119	6/28/2004	Normal	E. Coli	1553.1	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22136	7/12/2004	Normal	E. Coli	461.1	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22153	7/26/2004	Normal	E. Coli	579.4	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22170	8/9/2004	Normal	E. Coli	307.6 (Q)	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22188	8/24/2004	Normal	E. Coli	461.1	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22204	9/7/2004	Normal	E. Coli	11199	MPN/100mL	Adams			
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22221	9/20/2004	Normal	E. Coli	120.3 (QJ)	MPN/100mL	Adams	Estimated		
17	IDEM	2004 St Marys Watershed	Borum Run	LES040-0097	Mercer Rd in Decatur,then Salem Rd. At lift station	AA22238	10/4/2004	Normal	E. Coli	19.9	MPN/100mL	Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	5/31/2000		E.coli	600		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	6/19/2000		E.coli	1800		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	7/20/2000		E.coli	800		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	8/18/2000		E.coli	1000		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	9/21/2000		E.coli	1450		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	10/31/2000		E.coli	100		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	4/19/2001		E.coli	1500		Adams			
18	Adams County SWCD	319 grant	St. Marys River		Decatur, US HWY 224E	#9	5/17/2001		E.coli	4000		Adams			

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Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	5/31/2000		E.coli	200		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	6/19/2000		E.coli	4400		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	7/20/2000		E.coli	2000		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	8/18/2000		E.coli	2800		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	9/21/2000		E.coli	4000		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	10/31/2000		E.coli	1650		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	4/19/2001		E.coli	1000		Adams			
19	Adams County SWCD	319 grant	St. Marys River		Decatur, US Hwy 33-27	#10	5/17/2001		E.coli	24000		Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA21999	3/9/2004	Normal	E. Coli	166.9 (Q)	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22016	3/22/2004	Normal	E. Coli	23.3	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA21879	4/5/2004	Normal	E. Coli	58.3	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22033	4/19/2004	Normal	E. Coli	127.4	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22050	5/5/2004	Normal	E. Coli	222.4 (Q)	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22067	5/18/2004	Normal	E. Coli	> 2420		Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22084	6/1/2004	Normal	E. Coli	1986.3	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22102	6/15/2004	Normal	E. Coli	816.4	MPN/100mL	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22118	6/28/2004	Normal	E. Coli	980.4	MPN/100mL	Adams			
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		7/8/2004	Normal	E. Coli	630	Colonies/100ml	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22135	7/12/2004	Normal	E. Coli	365.4	MPN/100mL	Adams			
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		7/22/2004	Normal	E. Coli	39726	Colonies/100ml	Adams			
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22152	7/26/2004	Normal	E. Coli	1732.9	MPN/100mL	Adams		2906	June 28-July 26
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		8/5/2004	Normal	E. Coli	20924	Colonies/100ml	Adams		8060	July 8-August 5
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22169	8/9/2004	Normal	E. Coli	980.4 (Q)	MPN/100mL	Adams		28831	July 12- Aug 9
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		8/19/2004	Normal	E. Coli	39720	Colonies/100ml	Adams		32081	July 22- August 19
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22186	8/24/2004	Normal	E. Coli	686.7	MPN/100mL	Adams		28829	July 26 - Aug 24
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		9/2/2004	Normal	E. Coli	244	Colonies/100ml	Adams		5875	Aug 5 - Sept 2
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22203	9/7/2004	Normal	E. Coli	6488	MPN/100mL	Adams		3113	Aug 9 - Sept 7
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		9/16/2004	Normal	E. Coli	40	Colonies/100ml	Adams		729	Aug 19 - Sept 16
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22220	9/20/2004	Normal	E. Coli	155.1 (QJ)	MPN/100mL	Adams	Estimated	99	Aug 24 - Sept 20
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		9/30/2004	Normal	E. Coli	126	Colonies/100ml	Adams		107	Sept 2 - Sept 30
20	IDEM	2004 St Marys Watershed	Holthouse Ditch	LES050-0008	CR 200 W, South of US 224	AA22237	10/4/2004	Normal	E. Coli	24.3	MPN/100mL	Adams		50	Sept 7 - Oct 4
20	Ft. Wayne		Holthouse Ditch	LES050-0008	CR 200 W, South of US 224		10/28/2004	Normal	E. Coli	378	Colonies/100ml	Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	5/31/2000		E.coli	500		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	6/19/2000		E.coli	3000		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	7/20/2000		E.coli	1600		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	8/18/2000		E.coli	4800		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	9/21/2000		E.coli	15400		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	10/31/2000		E.coli	150		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	4/19/2001		E.coli	500		Adams			
21	Adams County SWCD	319 grant	St. Marys River		CR 900N, West of 27 & 33	#11	5/17/2001		E.coli	3500		Adams			

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA21998	3/9/2004	Normal	E. Coli	435.2 (Q)	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22015	3/22/2004	Normal	E. Coli	34.1	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA21878	4/5/2004	Normal	E. Coli	29.4	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22032	4/19/2004	Normal	E. Coli	133.4	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22049	5/6/2004	Normal	E. Coli	816.4 (Q)	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22066	5/18/2004	Normal	E. Coli	235.9	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22083	6/1/2004	Normal	E. Coli	866.4	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22100	6/15/2004	Normal	E. Coli	1203.3	MPN/100mL	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22117	6/28/2004	Duplicate	E. Coli	2419.2	MPN/100mL	Adams			
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		7/8/2004	Normal	E. Coli	1610	Colonies/100ml	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22134	7/12/2004	Normal	E. Coli	1119.9	MPN/100mL	Adams			
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		7/22/2004	Normal	E. Coli	39726	Colonies/100ml	Adams			
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22151	7/26/2004	Normal	E. Coli	866.4	MPN/100mL	Adams		5369	June 28-July 26
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		8/5/2004	Normal	E. Coli	6510	Colonies/100ml	Adams		7467	July 8-August 5
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22168	8/9/2004	Normal	E. Coli	172.3 (Q)	MPN/100mL	Adams		16082	July 12- Aug 9
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Adams		16082	July 22- August 19
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22185	8/24/2004	Normal	E. Coli	290.9	MPN/100mL	Adams		6510	July 26 - Aug 24
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		9/2/2004	Normal	E. Coli	100	Colonies/100ml	Adams		807	Aug 5 - Sept 2
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22202	9/7/2004	Normal	E. Coli	4106	MPN/100mL	Adams		100	Aug 9 - Sept 7
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		9/16/2004	Normal	E. Coli	378	Colonies/100ml	Adams		194	Aug 19 - Sept 16
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22219	9/20/2004	Normal	E. Coli	18.7 (QJ)	MPN/100mL	Adams	Estimated	194	Aug 24 - Sept 20
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		9/30/2004	Normal	E. Coli	244	Colonies/100ml	Adams		210	Sept 2 - Sept 30
22	IDEM	2004 St Marys Watershed	Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W	AA22236	10/4/2004	Normal	E. Coli	152.9	MPN/100mL	Adams		242	Sept 7 - Oct 4
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		10/14/2004	Normal	E. Coli	406	Colonies/100ml	Adams		275	Sept 16 - Oct 14
22	Ft. Wayne		Nickelsen Cr	LES050-0015	CR 1100 N, West of CR 550 W		10/28/2004	Normal	E. Coli	406	Colonies/100ml	Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	5/31/2000		E.coli	100		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	6/19/2000		E.coli	2600		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	7/20/2000		E.coli	600		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	8/18/2000		E.coli	200		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	9/21/2000		E.coli	1350		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	10/31/2000		E.coli	750		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	4/19/2001		E.coli	1500		Adams			
23	Adams County SWCD	319 grant	St. Marys River		CR 1200 N, Adams/Allen Co Line	#12	5/17/2001		E.coli	5000		Adams			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA21997	3/9/2004	Normal	E. Coli	2419.2 (Q)	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22014	3/22/2004	Normal	E. Coli	33.2	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA21877	4/5/2004	Normal	E. Coli	9.6	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22031	4/19/2004	Normal	E. Coli	35	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22048	5/5/2004	Normal	E. Coli	648.8 (Q)	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22065	5/18/2004	Normal	E. Coli	> 2420		Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22082	6/1/2004	Normal	E. Coli	3448	MPN/100mL	Allen			

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22099	6/15/2004	Normal	E. Coli	3448	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22116	6/28/2004	Normal	E. Coli	1553.1	MPN/100mL	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22133	7/12/2004	Normal	E. Coli	360.9	MPN/100mL	Allen			
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		7/22/2004	Normal	E. Coli	12976	Colonies/100ml	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22150	7/26/2004	Normal	E. Coli	> 2420		Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22184	8/2/2004	Normal	E. Coli	1553.1	MPN/100mL	Allen			
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		8/5/2004	Normal	E. Coli	6896	Colonies/100ml	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22167	8/9/2004	Normal	E. Coli	275.5 (Q)	MPN/100mL	Allen			
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Allen			
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		9/2/2004	Normal	E. Coli	1360	Colonies/100ml	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22201	9/7/2004	Normal	E. Coli	> 24200	MPN/100mL	Allen			
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		9/16/2004	Normal	E. Coli	1076	Colonies/100ml	Allen			
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22218	9/20/2004	Normal	E. Coli	648.8 (QJ)	MPN/100mL	Allen	Estimated		
24	Ft. Wayne		Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33		9/30/2004	Normal	E. Coli	446	Colonies/100ml	Allen		867	Sept 2 - Sept 30
24	IDEM	2004 St Marys Watershed	Unnamed tributary St Marys R	LES050-0020	Barkley Rd, E of US 27/33	AA22235	10/4/2004	Normal	E. Coli	178.5	MPN/100mL	Allen		441	Sept 7 - Oct 4
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA21995	3/9/2004	Normal	E. Coli	343.6 (Q)	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22012	3/22/2004	Normal	E. Coli	1046.2	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA21875	4/5/2004	Normal	E. Coli	62.4	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22029	4/19/2004	Normal	E. Coli	30.5	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22046	5/5/2004	Normal	E. Coli	344.8 (Q)	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22063	5/18/2004	Normal	E. Coli	1119.9	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22080	6/1/2004	Normal	E. Coli	14136	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22097	6/15/2004	Normal	E. Coli	1119.9	MPN/100mL	Allen			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22114	6/28/2004	Normal	E. Coli	238.2	MPN/100mL	Allen			
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		7/8/2004	Normal	E. Coli	100	Colonies/100ml	Adams			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22131	7/12/2004	Normal	E. Coli	98.5	MPN/100mL	Allen			
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		7/22/2004	Normal	E. Coli	>48392	Colonies/100ml	Adams			
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22148	7/26/2004	Normal	E. Coli	1299.7	MPN/100mL	Allen		154	June 28-July 26
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		8/5/2004	Normal	E. Coli	11588	Colonies/100ml	Adams		1076	July 8-August 5
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22165	8/9/2004	Normal	E. Coli	980.4 (Q)	MPN/100mL	Allen		11588	July 12- Aug 9
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Adams		11588	July 22- August 19
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22182	8/24/2004	Normal	E. Coli	866.4	MPN/100mL	Allen		11588	July 26 - Aug 24
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		9/2/2004	Normal	E. Coli	485	Colonies/100ml	Adams		2371	Aug 5 - Sept 2
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22199	9/7/2004	Normal	E. Coli	1664	MPN/100mL	Allen		485	Aug 9 - Sept 7
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		9/16/2004	Normal	E. Coli	220	Colonies/100ml	Adams		327	Aug 19 - Sept 16
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22216	9/20/2004	Normal	E. Coli	59.2 (QJ)	MPN/100mL	Allen	Estimated	327	Aug 24 - Sept 20
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		9/30/2004	Normal	E. Coli	216	Colonies/100ml	Adams		285	Sept 2 - Sept 30
25	IDEM	2004 St Marys Watershed	St. Mary's River	LES060-0006	Hoagland Rd. near Poe	AA22233	10/4/2004	Normal	E. Coli	139.6	MPN/100mL	Allen		188	Sept 7 - Oct 4
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		10/14/2004	Normal	E. Coli	<20	Colonies/100ml	Adams		188	Sept 16 - Oct 14

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
25	Ft. Wayne		St. Mary's River	LES060-0006	Hoagland Rd. near Poe		10/28/2004	Normal	E. Coli	104	Colonies/100ml	Adams			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/2/2001		E. coli	50		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/9/2001		E. coli	7400		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/16/2001		E. coli	550		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/23/2001		E. coli	90		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/30/2001		E. coli	18000		Allen		801	April 2 to April 30
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/7/2001		E. coli	250		Allen		1105	April 9 to May 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/14/2001		E. coli	51000		Allen		1626	April 16 to May 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/21/2001		E. coli	1200		Allen		1900	April 23 to May 21
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/28/2001		E. coli	700		Allen		2864	April 30 to May 28
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/4/2001		E. coli	3800		Allen		2099	May 7 to June 4
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/11/2001		E. coli	40000		Allen		5791	May 14 to June 11
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/18/2001		E. coli	3000		Allen		3286	May 21 to June 18
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/25/2001		E. coli	310		Allen		2507	May 28 to June 25
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/2/2001		E. coli	250000		Allen		8122	June 4 to July 2
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/9/2001		E. coli	800		Allen		5947	June 11 to July 9
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/16/2001		E. coli	90000		Allen		6994	June 18 to July 16
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/23/2001		E. coli	200000		Allen		16201	June 25 to July 23
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/30/2001		E. coli	300000		Allen		64074	July 2 to July 30
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/6/2001		E. coli	90000		Allen		52233	July 9 to Aug 6
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/13/2001		E. coli	110000		Allen		139832	July 16 to Aug 13
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/20/2001		E. coli	140000		Allen		152751	July 23 to Aug 20
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/27/2001		E. coli	100000		Allen		132977	July 30 to Aug 27
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/3/2001		E. coli	17000		Allen		74893	Aug 6 to Sept 3
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/10/2001		E. coli	34000		Allen		61644	Aug 13 to Sept 10
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/17/2001		E. coli	4900		Allen		33086	Aug 20 to Sept 17
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/24/2001		E. coli	86000		Allen		30014	Aug 27 to Sept 24
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/1/2001		E. coli	490000		Allen		41244	Sept 3 to Oct 1
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/8/2001		E. coli	76000		Allen		55646	Sept 10 to Oct 8
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/15/2001		E. coli	42000		Allen		58048	Sept 17 to Oct 15
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/22/2001		E. coli	200000		Allen		121887	Sept 24 to Oct 22
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/3/2002		E. coli	700		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/10/2002		E. coli	13,000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/17/2002		E. coli	8000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/24/2002		E. coli	113000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/1/2002		E. coli	20000		Allen		11047	April 3 to May 1
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/8/2002		E. coli	280000		Allen		36615	April 10 to May 8
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/15/2002		E. coli	7000		Allen		32351	April 17 to May 15
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/22/2002		E. coli	800000		Allen		81263	April 24 to May 22
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/29/2002		E. coli	36000		Allen		64645	May 1 to May 29

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/5/2002		E. coli	4400		Allen		47755	May 8 to June 5
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/12/2002		E. coli	23000		Allen		28969	May 15 to June 12
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/19/2002		E. coli	160000		Allen		54167	May 22 to June 19
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/26/2002		E. coli	14000		Allen		24118	May 29 to June 26
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/1/2002		E. coli	120000		Allen		30685	June 5 to July 1
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/10/2002		E. coli	560000		Allen		80885	June 12 to July 10
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/17/2002		E. coli	150000		Allen		117691	June 19 to July 17
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/24/2002		E. coli	79000		Allen		102198	June 26 to July 24
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/31/2002		E. coli	42000		Allen		127311	July 1 to July 31
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/7/2002		E. coli	380000		Allen		160320	July 10 to Aug 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/14/2002		E. coli	660000		Allen		165676	July 17 to Aug 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/21/2002		E. coli	480000		Allen		209069	July 24 to Aug 21
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/28/2002		E. coli	210000		Allen		254219	July 31 to Aug 28
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/4/2002		E. coli	410000		Allen		400972	Aug 7 to Sept 4
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/2/2003		E. coli	17000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/8/2003		E. coli	6000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/15/2003		E. coli	>200000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/24/2003		E. coli	720000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/1/2003		E. coli	29000		Allen		38202	April 2 to May 1
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/6/2003		E. coli	2900		Allen		24551	April 8 to May 6
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/13/2003		E. coli	1300		Allen		16750	April 15 to May 13
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/20/2003		E. coli	7000		Allen		14068	April 24 to May 20
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/27/2003		E. coli	380000		Allen		12380	May 1 to May 27
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/3/2003		E. coli	13000		Allen		10545	May 6 to June 3
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/10/2003		E. coli	620000		Allen		30834	May 13 to June 10
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/17/2003		E. coli	460000		Allen		99723	May 20 to June 17
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/26/2003		E. coli	4200000		Allen		358447	May 27 to June 26
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/30/2003		E. coli	4000		Allen		144172	June 3 to June 30
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/7/2003		E. coli	1400		Allen		92325	June 10 to July 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/14/2003		E. coli	10000		Allen		40443	June 17 to July 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/21/2003		E. coli	11000		Allen		19168	June 26 to July 21
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/28/2003		E. coli	20000		Allen		6578	June 30 to July 28
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/4/2003		E. coli	4400		Allen		6705	July 7 to Aug 4
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/11/2003		E. coli	750000		Allen		23561	July 14 to Aug 11
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/18/2003		E. coli	>2000000		Allen		29190	July 21 to Aug 18
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/25/2003		E. coli	>200000		Allen		40412	July 28 to Aug 25
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/2/2003		E. coli	39000		Allen		50489	Aug 4 to Sept 2
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/8/2003		E. coli	440000		Allen		234347	Aug 11 to Sept 8
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/15/2003		E. coli	840000		Allen		243369	Aug 18 to Sept 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/29/2003		E. coli	4000		Allen		87139	Aug 25 to Sept 29

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/7/2003		E. coli	>200000		Allen		87139	Sept 8 to Oct 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/14/2003		E. coli	380000		Allen		153955	Sept 15 to Oct 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/20/2003		E. coli	500000		Allen		158955	Sept 29 to Oct 20
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/27/2003		E. coli	90000		Allen		90942	Oct 7 to Oct 27
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/5/2004		E. coli	194000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/12/2004		E. coli	670000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/19/2004		E. coli	780000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	4/26/2004		E. coli	720000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/4/2004		E. coli	570000		Allen		529463	April 5 to May 4
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/10/2004		E. coli	830000		Allen		708094	April 12 to May 10
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/17/2004		E. coli	350000		Allen		621856	April 19 to May 17
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	5/24/2004		E. coli	150000		Allen		447187	April 26 to May 24
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/1/2004		E. coli	26000		Allen		230153	May 4 to June 1
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/7/2004		E. coli	270000		Allen		198205	May 10 to June 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/14/2004		E. coli	5000		Allen		71301	May 17 to June 14
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/21/2004		E. coli	10300		Allen		35225	May 24 to June 21
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	6/28/2004		E. coli	4400		Allen		17391	June 1 to June 28
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/6/2004		E. coli	3000		Allen		11291	June 7 to July 6
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/12/2004		E. coli	41000		Allen		7745	June 14 to July 12
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/19/2004		E. coli	16000		Allen		9774	June 21 to July 19
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	7/26/2004		E. coli	80		Allen		3699	June 28 to July 26
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/2/2004		E. coli	1400		Allen		2942	July 6 to Aug 2
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/9/2004		E. coli	<100		Allen		2928	July 12 to Aug 9
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/16/2004		E. coli	<100		Allen		1215	July 19 to Aug 16
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/23/2004		E. coli	1500		Allen		552	July 26 to Aug 23
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	8/30/2004		E. coli	130000		Allen		6487	Aug 2 to Aug 30
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/7/2004		E. coli	170000		Allen		32124	Aug 9 to Sept 7
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	9/13/2004		E. coli	>2000000		Allen		32124	Aug 16 to Sept 13
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/4/2004		E. coli	>2000000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/11/2004		E. coli	>2000000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/18/2004		E. coli	140000		Allen			
26	Allen County Health Dept		Tile Drain on bank of river (St. Marys Basin)		South of Hoagland Rd. one of the community tiles from Poe	29-13-29-81Y	10/25/2004		E. coli	>2000000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	4/2/2001		E. coli	970		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	4/9/2001		E. coli	31000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	4/16/2001		E. coli	3000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	4/23/2001		E. coli	200		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	4/30/2001		E. coli	2100		Allen		2069	April 2 - April 30
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	5/7/2001		E. coli	2000		Allen		2391	April 9 - May 7
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		West side of US 27 south of Monroeville Rd. T	29-13-17-61Y	5/14/2001		E. coli	3800		Allen		1571	April 16 - May 14

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/21/2001		E. coli	79000		Allen		3022	April 23 - May 21
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/28/2001		E. coli	15000		Allen		7167	April 30 - May 28
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/4/2001		E. coli	3000		Allen		7697	May 7 - June 4
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/11/2001		E. coli	30000		Allen		13230	May 14 - June 11
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/18/2001		E. coli	15000		Allen		17410	May 21 - June 18
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/25/2001		E. coli	200000		Allen		20965	May 28 - June 25
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/2/2001		E. coli	45000		Allen		26117	June 4 - July 2
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/9/2001		E. coli	200000		Allen		60492	June 11 - July 9
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/16/2001		E. coli	200000		Allen		88405	June 18 - July 16
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/23/2001		E. coli	5000		Allen		70967	June 25 - July 23
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/30/2001		E. coli	4700		Allen		33517	July 2 - July 30
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/6/2001		E. coli	1000		Allen		15654	July 9 - Aug 6
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/13/2001		E. coli	54000		Allen		12048	July 16 - Aug 13
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/20/2001		E. coli	520000		Allen		14585	July 23 - Aug 20
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/27/2001		E. coli	60000		Allen		23973	July 30 - Aug 27
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/3/2001		E. coli	31000		Allen		34961	Aug 6 - Sept 3
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/10/2001		E. coli	590000		Allen		125243	Aug 13 - Sept 10
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/17/2001		E. coli	35000		Allen		114838	Aug 20 - Sept 17
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/24/2001		E. coli	71000		Allen		77115	Aug 27 - Sept 24
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/1/2001		E. coli	174000		Allen		95415	Sept 3 - Oct 1
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/8/2001		E. coli	66000		Allen		110982	Setp 10 - Oct 8
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/15/2001		E. coli	19000		Allen		55826	Sept 17 - Oct 15
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/22/2001		E. coli	34000		Allen		55503	Sept 24 - Oct 22
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/4/2002		E. coli	20,000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/11/2002		E. coli	150,000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/17/2002		E. coli	90,000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/25/2002		E. coli	70,000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/2/2002		E. coli	14000		Allen		48364	April 4 - May 2
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/9/2002		E. coli	36000		Allen		54397	April 11 - May 9
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/23/2002		E. coli	32000		Allen		39938	April 17 to May 23
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/30/2002		E. coli	600		Allen		14661	April 25 to May 30
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/5/2002		E. coli	7000		Allen		9251	May 2 to June 5
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/13/2002		E. coli	80000		Allen		13109	May 9 to June 13
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/20/2002		E. coli	36000		Allen		13109	May 23 - June 20
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/2/2002		E. coli	64000		Allen		15058	May 30 - July 2
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/9/2002		E. coli	34000		Allen		33762	June 5 - July 9
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/11/2002		E. coli	25000		Allen		43551	June 13 - July 11
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/18/2002		E. coli	150000		Allen		49385	June 20 - July 18
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/25/2002		E. coli	26000		Allen		46274	July 2 - July 25
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/1/2002		E. coli	42000		Allen		42535	July 9 - Aug 1

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/8/2002		E. coli	280000		Allen		64846	July 11 - Aug 8
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/15/2002		E. coli	44000		Allen		72608	July 18 - Aug 15
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/22/2002		E. coli	67000		Allen		61799	July 25 - Aug 22
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/29/2002		E. coli	50000		Allen		70434	Aug 1 - Aug 29
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/5/2002		E. coli	260000		Allen		101421	Aug 8 - Sept 5
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/5/2002		E. coli	240000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/12/2002		E. coli	19000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/19/2002		E. coli	190000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/1/2002		E. coli	180000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/8/2002		E. coli	42000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/15/2002		E. coli	100000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/22/2002		E. coli	110000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/24/2002		E. coli	20000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/31/2002		E. coli	120000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/3/2003		E. coli	11000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/8/2003		E. coli	6000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/17/2003		E. coli	18000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/24/2003		E. coli	340000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/1/2003		E. coli	100000		Allen		33209	April 3 to May 1
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/6/2003		E. coli	5000		Allen		28364	April 8 to May 6
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/13/2003		E. coli	19000		Allen		35719	April 17 to May 13
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/20/2003		E. coli	54000		Allen		44496	April 24 to May 20
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/27/2003		E. coli	220000		Allen		40786	May 1 to May 27
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/3/2003		E. coli	13000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/26/2003		E. coli	21000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/30/2003		E. coli	80000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/7/2003		E. coli	4500		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/14/2003		E. coli	4000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/21/2003		E. coli	31000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/28/2003		E. coli	6000		Allen		12178	June 30 to July 28
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/4/2003		E. coli	11000		Allen		8189	July 7 to Aug 4
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/11/2003		E. coli	1200		Allen		6287	July 14 to Aug 11
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/18/2003		E. coli	21000		Allen		8759	July 21 to Aug 18
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/25/2003		E. coli	60000		Allen		9996	July 28 to Aug 25
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/2/2003		E. coli	7000		Allen		10309	Aug 4 to Sept 2
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/8/2003		E. coli	19000		Allen		11500	Aug 11 to Sept 8
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/15/2003		E. coli	18000		Allen		19765	Aug 18 to Sept 15
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/29/2003		E. coli	10000		Allen		17039	Aug 25 to Sept 29
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/7/2003		E. coli	38000		Allen		15552	Sept 2 to Oct 7
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/14/2003		E. coli	15000		Allen		18113	Sept 8 to Oct 14

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/20/2003		E. coli	19000		Allen		18113	Sept 15 to Oct 20
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/27/2003		E. coli	5300		Allen		14183	Sept 29 to Oct 27
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/5/2004		E. coli	700		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/12/2004		E. coli	2300		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/19/2004		E. coli	17000		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	4/26/2004		E. coli	100		Allen			
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/4/2004		E. coli	22000		Allen		2270	April 5 to May 4
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/10/2004		E. coli	19000		Allen		4392	April 12 to May 10
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/17/2004		E. coli	37000		Allen		7655	April 19 to May 17
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	5/24/2004		E. coli	13000		Allen		7255	April 26 to May 24
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/1/2004		E. coli	39000		Allen		23926	May 4 to June 1
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/14/2004		E. coli	31000		Allen		25625	May 10 to June 14
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/21/2004		E. coli	1300		Allen		14987	May 17 to June 21
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	6/28/2004		E. coli	3900		Allen		9556	May 24 to June 28
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/6/2004		E. coli	18000		Allen		10199	June 1 to July 6
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/12/2004		E. coli	7000		Allen		7233	June 14 to July 12
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/19/2004		E. coli	8000		Allen		5517	June 21 to July 19
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	7/26/2004		E. coli	1500		Allen		5677	June 28 to July 26
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/2/2004		E. coli	10		Allen		1722	July 6 to Aug 2
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/9/2004		E. coli	10		Allen		384	July 12 to Aug 9
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/16/2004		E. coli	10		Allen		104	July 19 to Aug 16
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/23/2004		E. coli	23000		Allen		128	July 26 to Aug 23
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	8/30/2004		E. coli	1300		Allen		124	Aug 2 to Aug 30
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/7/2004		E. coli	3000		Allen		390	Aug 9 to Sept 7
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/13/2004		E. coli	300		Allen		769	Aug 16 to Sept 13
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/20/2004		E. coli	10		Allen		769	Aug 23 to Sept 20
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	9/27/2004		E. coli	70		Allen		241	Aug 30 to Sept 27
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/4/2004		E. coli	4500		Allen		309	Sept 7 to Oct 4
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/11/2004		E. coli	3400		Allen		317	Sept 13 to Oct 11
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/18/2004		E. coli	56000		Allen		903	Sept 20 to Oct 18
27	Allen County Health Dept		Natural Drain (St. Marys Basin)		west side of US 27 south of Monroeville Rd T	29-13-17-61Y	10/25/2004		E. coli	9000		Allen		3519	Sept 27 to Oct 25
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/2/2001		E. coli	20		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/9/2001		E. coli	260		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/16/2001		E. coli	100		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/23/2001		E. coli	40		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/30/2001		E. coli	50		Allen		64	April 2 - April 30
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/7/2001		E. coli	80		Allen		84	April 9 - May 7
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/14/2001		E. coli	180		Allen		78	April 16 - May 14
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/21/2001		E. coli	160		Allen		86	April 23 - May 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/28/2001		E. coli	200		Allen		118	April 30 - May 28

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/4/2001		E. coli	1800		Allen		242	May 7 - June 4
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/11/2001		E. coli	2400		Allen		478	May 14 - June 11
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/18/2001		E. coli	100		Allen		425	May 21 - June 18
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/25/2001		E. coli	230		Allen		457	May 28 - June 25
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/2/2001		E. coli	1200		Allen		654	June 4 - July 2
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/9/2001		E. coli	2300		Allen		686	June 11 - July 9
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/16/2001		E. coli	200000		Allen		1662	June 18 - July 16
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/23/2001		E. coli	5000		Allen		3635	June 25 - July 23
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/30/2001		E. coli	2100		Allen		5658	July 2 - July 30
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/6/2001		E. coli	1900		Allen		6202	July 9 - Aug 6
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/13/2001		E. coli	320		Allen		4180	July 16 - Aug 13
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/20/2001		E. coli	89000		Allen		3555	July 23 - Aug 20
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/27/2001		E. coli	1400		Allen		2756	July 30 - Aug 27
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/3/2001		E. coli	240		Allen		1786	Aug 6 - Sept 3
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/10/2001		E. coli	800		Allen		1502	Aug 13 - Sept 10
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/17/2001		E. coli	10000		Allen		2991	Aug 20 - Sept 17
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/24/2001		E. coli	1200		Allen		1264	Aug 27 - Sept 24
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/1/2001		E. coli	230		Allen		881	Sept 3 - Oct 1
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/8/2001		E. coli	860		Allen		1137	Sept 10 - Oct 8
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/15/2001		E. coli	4400		Allen		1599	Sept 17 - Oct 15
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/22/2001		E. coli	500		Allen		878	Sept 24 - Oct 22
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/3/2002		E. coli	800		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/10/2002		E. coli	400		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/17/2002		E. coli	1000		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/24/2002		E. coli	310		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/1/2002		E. coli	360		Allen		514	April 3 - May 1
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/8/2002		E. coli	5300		Allen		750	April 10 - May 8
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/15/2002		E. coli	620		Allen		818	April 17 - May 15
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/22/2002		E. coli	370		Allen		671	April 24 - May 22
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/29/2002		E. coli	29000		Allen		1662	May 1 - May 29
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/5/2002		E. coli	2300		Allen		2409	May 8 - June 5
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/12/2002		E. coli	900		Allen		1690	May 15 - June 12
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/19/2002		E. coli	470		Allen		1599	May 22 - June 19
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/26/2002		E. coli	800		Allen		1865	May 29 - June 26
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/1/2002		E. coli	1000		Allen		951	June 5 - July 1
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/10/2002		E. coli	15000		Allen		1384	June 12 - July 10
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/17/2002		E. coli	230		Allen		1053	June 19 - July 17
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/24/2002		E. coli	270		Allen		943	June 26 - July 24
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/31/2002		E. coli	18000		Allen		1757	July 1 - July 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/7/2002		E. coli	690		Allen		1632	July 10 - Aug 7

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/14/2002		E. coli	500		Allen		826	July 17 - Aug 14
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/21/2002		E. coli	11000		Allen		1791	July 24 - Aug 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/28/2002		E. coli	1000		Allen		2328	July 31 - Aug 28
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/4/2002		E. coli	800		Allen		1249	Aug 7 - Sept 4
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/11/2002		E. coli	360		Allen		1096	Aug 14 - Sept 11
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/18/2002		E. coli	2300		Allen		1488	Aug 21 - Sept 18
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/25/2002		E. coli	1200		Allen		955	Aug 28 - Sept 25
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/2/2002		E. coli	7000		Allen		1410	Sept 4 - Oct 2
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/9/2002		E. coli	74000		Allen		3486	Sept 11 - Oct 9
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/16/2002		E. coli	1100		Allen		4358	Sept 18 - Oct 16
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/23/2002		E. coli	22000		Allen		6846	Sept 25 - Oct 23
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/30/2002		E. coli	1900		Allen		7506	Oct 2 - Oct 30
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	3/31/2003		E. coli	1200		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/7/2003		E. coli	2200		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/14/2003		E. coli	90		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/21/2003		E. coli	670		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/29/2003		E. coli	6900		Allen		1019	Mar 31 - April 29
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/7/2003		E. coli	2000		Allen		1129	April 7 - May 7
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/14/2003		E. coli	400		Allen		803	April 14 - May 14
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/21/2003		E. coli	600		Allen		1173	April 21 - May 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/28/2003		E. coli	710		Allen		1187	April 29 - May 28
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/5/2003		E. coli	1200		Allen		836	May 7 - June 5
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/11/2003		E. coli	3700		Allen		946	May 14 - June 11
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/18/2003		E. coli	2500		Allen		1364	May 21 - June 18
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/26/2003		E. coli	25000		Allen		2877	May 28 - June 26
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/30/2003		E. coli	8600		Allen		4738	June 5 - June 30
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/7/2003		E. coli	3200		Allen		5764	June 11 - July 7
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/14/2003		E. coli	1000		Allen		4437	June 18 - July 14
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/21/2003		E. coli	2300		Allen		4364	June 26 - July 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/28/2003		E. coli	1900		Allen		2606	June 30 - July 28
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/4/2003		E. coli	2800		Allen		2082	July 7 - Aug 4
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/11/2003		E. coli	50000		Allen		3608	July 14 - Aug 11
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/18/2003		E. coli	500		Allen		3141	July 21 - Aug 18
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/25/2003		E. coli	2100		Allen		3085	July 28 - Aug 25
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/2/2003		E. coli	200000		Allen		7828	Aug 4 - Sept 2
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/8/2003		E. coli	2400		Allen		7591	Aug 11 - Sept 8
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/15/2003		E. coli	3000		Allen		4324	Aug 18 - Sept 15
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/29/2003		E. coli	500		Allen		4324	Aug 25 - Sept 29
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/7/2003		E. coli	520		Allen		3271	Sept 2 - Oct 7
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/14/2003		E. coli	10000		Allen		1797	Sept 8 - Oct 14

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/20/2003		E. coli	380		Allen		1243	Sept 15 - Oct 20
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/27/2003		E. coli	430		Allen		843	Sept 29 - Oct 27
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/5/2004		E. coli	10		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/12/2004		E. coli	140		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/19/2004		E. coli	250		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	4/26/2004		E. coli	50		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/4/2004		E. coli	460		Allen		96	April 5 - May 4
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/10/2004		E. coli	230		Allen		179	April 12 - May 10
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/17/2004		E. coli	280		Allen		206	April 19 - May 17
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	5/24/2004		E. coli	27000		Allen		525	April 26 - May 24
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/1/2004		E. coli	88000		Allen		2342	May 4 - June 1
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/7/2004		E. coli	1200		Allen		2836	May 10 - June 7
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/14/2004		E. coli	67000		Allen		8824	May 17 - June 14
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/21/2004		E. coli	930		Allen		11218	May 24 - June 21
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	6/28/2004		E. coli	5700		Allen		8219	June 1 - June 28
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/6/2004		E. coli	5000		Allen		4631	June 7 - July 6
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/12/2004		E. coli	3500		Allen		5737	June 14 - July 12
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/19/2004		E. coli	200		Allen		1793	June 21- July 19
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	7/26/2004		E. coli	2100		Allen		2111	June 28 - July 26
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/2/2004		E. coli	2900		Allen		1844	July 6 - Aug 2
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/9/2004		E. coli	LA		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/16/2004		E. coli	10		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/23/2004		E. coli	1500		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	8/30/2004		E. coli	1500		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/7/2004		E. coli	100000		Allen			
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/13/2004		E. coli	610		Allen		1065	Aug 16 to Sept 13
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/20/2004		E. coli	500		Allen		2330	Aug 23 to Sept 20
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	9/27/2004		E. coli	240		Allen		1615	Aug 30 to Sept 27
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/4/2004		E. coli	550		Allen		1321	Sept 7 to Oct 4
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/11/2004		E. coli	210		Allen		385	Sept 13 to Oct 11
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/18/2004		E. coli	58000		Allen		957	Sept 20 to Oct 18
28	Allen County Health Dept		Thiele Drain/Harber Ditch (St. Marys basin)		Bluffton Rd north of 469	29-12-16-71Y	10/25/2004		E. coli	490		Allen		953	Sept 27 to Oct 25
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/3/2001	Normal	E. coli	440	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/9/2001	Normal	E. coli	80	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/16/2001	Normal	E. coli	1800	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/23/2001	Normal	E. coli	460	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/30/2001	Normal	E. coli	30	Colonies/100ml	Allen		245	April 3 - April 30
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/7/2001	Normal	E. coli	92	Colonies/100ml	Allen		179	April 9 - May 7
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/14/2001	Normal	E. coli	100	Colonies/100ml	Allen		187	April 16 - May 14
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/21/2001	Normal	E. coli	512	Colonies/100ml	Allen		145	April 23 - May 21

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/29/2001	Normal	E. coli	460	Colonies/100ml	Allen		145	April 30 - May 29
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/4/2001	Normal	E. coli	920	Colonies/100ml	Allen		288	May 7 - June 4
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/11/2001	Normal	E. coli	260	Colonies/100ml	Allen		355	May 14 - June 11
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/18/2001	Normal	E. coli	110	Colonies/100ml	Allen		362	May 21 - June 18
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/26/2001	Normal	E. coli	80	Colonies/100ml	Allen		250	May 29 - June 26
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/2/2001	Normal	E. coli	76	Colonies/100ml	Allen		174	June 4 - July 2
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/9/2001	Normal	E. coli	1200	Colonies/100ml	Allen		184	June 11 - July 9
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/16/2001	Normal	E. coli	220	Colonies/100ml	Allen		178	June 18 - July 16
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/23/2001	Normal	E. coli	1800	Colonies/100ml	Allen		311	June 26 - July 23
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/30/2001	Normal	E. coli	320	Colonies/100ml	Allen		410	July 2 - July 30
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/6/2001	Normal	E. coli	410	Colonies/100ml	Allen		574	July 9 - Aug 6
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/14/2001	Normal	E. coli	150	Colonies/100ml	Allen		379	July 16 - Aug 14
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/20/2001	Normal	E. coli	210	Colonies/100ml	Allen		375	July 23 - Aug 20
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/27/2001	Normal	E. coli	370	Colonies/100ml	Allen		273	July 30 - Aug 27
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/4/2001	Normal	E. coli	400	Colonies/100ml	Allen		286	Aug 6 - Sept 4
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/10/2001	Normal	E. coli	2000	Colonies/100ml	Allen		393	Aug 14 - Sept 10
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/17/2001	Normal	E. coli	180	Colonies/100ml	Allen		407	Aug 20 - Sept 17
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/24/2001	Normal	E. coli	610	Colonies/100ml	Allen		504	Aug 27 -Sept 24
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/1/2001	Normal	E. coli	180	Colonies/100ml	Allen		436	Sept 4 - Oct 1
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/9/2001	Normal	E. coli	390	Colonies/100ml	Allen		434	Sept 10 - Oct 9
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/15/2001	Normal	E. coli	2800	Colonies/100ml	Allen		464	Sept 17 - Oct 15
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/22/2001	Normal	E. coli	420	Colonies/100ml	Allen		550	Sept 24 - Oct 22
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/29/2001	Normal	E. coli	360	Colonies/100ml	Allen		495	Oct 1 - Oct 29
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/1/2002	Normal	E. coli	396	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/8/2002	Normal	E. coli	800	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/15/2002	Normal	E. coli	640	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/22/2002	Normal	E. coli	460	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/29/2002	Normal	E. coli	5660	Colonies/100ml	Allen		880	April 1 - April 29
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/6/2002	Normal	E. coli	200	Colonies/100ml	Allen		768	April 8 - May 6
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/13/2002	Normal	E. coli	7500	Colonies/100ml	Allen		1201	April 15 - May 13
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/20/2002	Normal	E. coli	100	Colonies/100ml	Allen		829	April 22 - May 20
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/29/2002	Normal	E. coli	1450	Colonies/100ml	Allen		1042	April 29 - May 29
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/3/2002	Normal	E. coli	420	Colonies/100ml	Allen		620	May 6 - June 3
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/10/2002	Normal	E. coli	700	Colonies/100ml	Allen		796	May 13 - June 10
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/17/2002	Normal	E. coli	350	Colonies/100ml	Allen		431	May 20 - June 17
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/24/2002	Normal	E. coli	2880	Colonies/100ml	Allen		845	May 29 - June 24
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/1/2002	Normal	E. coli	170	Colonies/100ml	Allen		550	June 3 - July 1
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/8/2002	Normal	E. coli	760	Colonies/100ml	Allen		619	June 10 - July 8
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/15/2002	Normal	E. coli	60	Colonies/100ml	Allen		379	June 17 - July 15
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/22/2002	Normal	E. coli	750	Colonies/100ml	Allen		441	June 24 - July 22

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/29/2002	Normal	E. coli	90	Colonies/100ml	Allen		221	July 1 - July 29
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/5/2002	Normal	E. coli	180	Colonies/100ml	Allen		223	July 8 - Aug 5
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/12/2002	Normal	E. coli	130	Colonies/100ml	Allen		157	July 15 - Aug 12
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/19/2002	Normal	E. coli	130	Colonies/100ml	Allen		183	July 22 - Aug 19
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/26/2002	Normal	E. coli	400	Colonies/100ml	Allen		161	July 29 - Aug 26
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/3/2002	Normal	E. coli	200	Colonies/100ml	Allen		189	Aug 5 - Sept 3
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/9/2002	Normal	E. coli	240	Colonies/100ml	Allen		201	Aug 12 - Sept 9
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/16/2002	Normal	E. coli	100	Colonies/100ml	Allen		190	Aug 19 - Sept 16
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/24/2002	Normal	E. coli	385	Colonies/100ml	Allen		236	Aug 26 - Sept 24
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/30/2002	Normal	E. coli	350	Colonies/100ml	Allen		230	Sept 3 - Sept 30
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/7/2002	Normal	E. coli	230	Colonies/100ml	Allen		237	Sept 9 - Oct 7
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/14/2002	Normal	E. coli	280	Colonies/100ml	Allen		244	Sept 16 - Oct 14
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/21/2002	Normal	E. coli	15	Colonies/100ml	Allen		167	Sept 24 - Ot 21
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/28/2002	Normal	E. coli	80	Colonies/100ml	Allen		122	Sept 30 - Oct 28
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/7/2003	Normal	E. coli	6	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/14/2003	Normal	E. coli	18	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/21/2003	Normal	E. coli	6	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		4/28/2003	Normal	E. coli	7	Colonies/100ml	Allen			
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/5/2003	Normal	E. coli	8	Colonies/100ml	Allen		8	April 7 - May 5
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/12/2003	Normal	E. coli	1200	Colonies/100ml	Allen		24	April 14 - May 12
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/19/2003	Normal	E. coli	76	Colonies/100ml	Allen		31	April 21 - May 19
29	Ft. Wayne		St. Marys River		Ferguson Rd		5/27/2003	Normal	E. coli	52	Colonies/100ml	Allen		48	April 28 - May 27
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/2/2003	Normal	E. coli	28	Colonies/100ml	Allen		64	May 5 - June 2
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/9/2003	Normal	E. coli	224	Colonies/100ml	Allen		124	May 12 - June 9
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/16/2003	Normal	E. coli	720	Colonies/100ml	Allen		112	May 19 - June 16
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/23/2003	Normal	E. coli	540	Colonies/100ml	Allen		166	May 27- June 23
29	Ft. Wayne		St. Marys River		Ferguson Rd		6/30/2003	Normal	E. coli	240	Colonies/100ml	Allen		226	June 2 - June 30
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/7/2003	Normal	E. coli	370	Colonies/100ml	Allen		378	June 9 - July 7
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/15/2003	Normal	E. coli	200	Colonies/100ml	Allen		370	June 16 - July 15
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/21/2003	Normal	E. coli	320	Colonies/100ml	Allen		314	June 23 - July 21
29	Ft. Wayne		St. Marys River		Ferguson Rd		7/28/2003	Normal	E. coli	30	Colonies/100ml	Allen		176	June 30 - July 28
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/4/2003	Normal	E. coli	416	Colonies/100ml	Allen		197	July 7 - Aug 4
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/11/2003	Normal	E. coli	290	Colonies/100ml	Allen		187	July 15 -Aug 11
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/18/2003	Normal	E. coli	288	Colonies/100ml	Allen		202	July 21 - Aug 18
29	Ft. Wayne		St. Marys River		Ferguson Rd		8/25/2003	Normal	E. coli	65	Colonies/100ml	Allen		147	July 28-Aug 25
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/2/2003	Normal	E. coli	4	Colonies/100ml	Allen		98	Aug 4-Sept 2
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/8/2003	Normal	E. coli	38	Colonies/100ml	Allen		61	Aug 11 - Sept 8
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/15/2003	Normal	E. coli	120	Colonies/100ml	Allen		51	Aug 18 - Sept 15
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/22/2003	Normal	E. coli	116	Colonies/100ml	Allen		42	Aug 25 - Sept 22
29	Ft. Wayne		St. Marys River		Ferguson Rd		9/29/2003	Normal	E. coli	80	Colonies/100ml	Allen		44	Sept 2 - Sept 29

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/6/2003	Normal	E. coli	30	Colonies/100ml	Allen		66	Sept 8 - Oct 6
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/13/2003	Normal	E. coli	70	Colonies/100ml	Allen		75	Sept 15 - Oct 13
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/20/2003	Normal	E. coli		Colonies/100ml	Allen		66	Sept 22 - Oct 20
29	Ft. Wayne		St. Marys River		Ferguson Rd		10/27/2003	Normal	E. coli	15	Colonies/100ml	Allen		40	Sept 29 - Oct 27
29	Ft. Wayne		St. Mary's River		Ferguson Rd		7/8/2004	Normal	E. Coli	300	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		7/22/2004	Normal	E. Coli	>48400	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		8/5/2004	Normal	E. Coli	12076	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		9/2/2004	Normal	E. Coli	1065	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		9/16/2004	Normal	E. Coli	270	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		9/30/2004	Normal	E. Coli	244	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		10/14/2004	Normal	E. Coli	<10	Colonies/100ml	Allen			
29	Ft. Wayne		St. Mary's River		Ferguson Rd		10/28/2004	Normal	E. Coli	60	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/3/2001	Normal	E. coli	1600	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/9/2001	Normal	E. coli	600	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/16/2001	Normal	E. coli	1200	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/23/2001	Normal	E. coli	900	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/30/2001	Normal	E. coli	70	Colonies/100ml	Allen		592	April 3 - April 30
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/7/2001	Normal	E. coli	32	Colonies/100ml	Allen		271	April 9 - May 7
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/14/2001	Normal	E. coli	90	Colonies/100ml	Allen		185	April 16 - May 14
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/21/2001	Normal	E. coli	520	Colonies/100ml	Allen		157	April 23 - May 21
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/29/2001	Normal	E. coli	600	Colonies/100ml	Allen		144	April 30 - May 29
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/4/2001	Normal	E. coli	1480	Colonies/100ml	Allen		266	May 7 - June 4
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/11/2001	Normal	E. coli	2920	Colonies/100ml	Allen		656	May 14 - June 11
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/18/2001	Normal	E. coli	1000	Colonies/100ml	Allen		1062	May 21 - June 18
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/26/2001	Normal	E. coli	848	Colonies/100ml	Allen		1171	May 29 - June 26
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/2/2001	Normal	E. coli	450	Colonies/100ml	Allen		1105	June 4 - July 2
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/9/2001	Normal	E. coli	3000	Colonies/100ml	Allen		1273	June 11 - July 9
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/16/2001	Normal	E. coli	260	Colonies/100ml	Allen		785	June 18 - July 16
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/23/2001	Normal	E. coli	3000	Colonies/100ml	Allen		978	June 26 - July 23
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/30/2001	Normal	E. coli	1450	Colonies/100ml	Allen		1088	July 2 - July 30
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/6/2001	Normal	E. coli	500	Colonies/100ml	Allen		1112	July 9 - Aug 6
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/14/2001	Normal	E. coli	360	Colonies/100ml	Allen		727	July 16 - Aug 14
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/20/2001	Normal	E. coli	4600	Colonies/100ml	Allen		1292	July 23 - Aug 20
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/27/2001	Normal	E. coli	4000	Colonies/100ml	Allen		1369	July 30 - Aug 27
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/4/2001	Normal	E. coli	700	Colonies/100ml	Allen		1183	Aug 6 - Sept 4
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/10/2001	Normal	E. coli	4250	Colonies/100ml	Allen		1815	Aug 14 - Sept 10
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/17/2001	Normal	E. coli	1160	Colonies/100ml	Allen		2294	Aug 20 - Sept 17
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/24/2001	Normal	E. coli	6000	Colonies/100ml	Allen		2419	Aug 27 - Sept 24
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/1/2001	Normal	E. coli	600	Colonies/100ml	Allen		1655	Sept 4 - Oct 1

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/9/2001	Normal	E. coli	620	Colonies/100ml	Allen		1616	Sept 10 - Oct 10
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/15/2001	Normal	E. coli	3000	Colonies/100ml	Allen		1507	Sept 17 - Oct 15
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/22/2001	Normal	E. coli	1800	Colonies/100ml	Allen		1645	Sept 24 - Oct 22
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/29/2001	Normal	E. coli	380	Colonies/100ml	Allen		947	Oct 1 - Oct 29
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/1/2002	Normal	E. coli	884	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/8/2002	Normal	E. coli	740	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/15/2002	Normal	E. coli	660	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/22/2002	Normal	E. coli	680	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/29/2002	Normal	E. coli	3740	Colonies/100ml	Allen		1019	April 1 to April 49
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/6/2002	Normal	E. coli	1000	Colonies/100ml	Allen		1044	April 8 to May 6
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/13/2002	Normal	E. coli	5400	Colonies/100ml	Allen		1554	April 15 to May 13
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/20/2002	Normal	E. coli	500	Colonies/100ml	Allen		1470	April 22 to May 20
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/29/2002	Normal	E. coli	2700	Colonies/100ml	Allen		1937	April 29 to May 29
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/3/2002	Normal	E. coli	560	Colonies/100ml	Allen		1325	May 6 to June 3
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/10/2002	Normal	E. coli	1400	Colonies/100ml	Allen		1417	May 13 to June 10
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/17/2002	Normal	E. coli	420	Colonies/100ml	Allen		850	May 20 to June 17
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/24/2002	Normal	E. coli	360	Colonies/100ml	Allen		796	May 29 to June 24
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/1/2002	Normal	E. coli	220	Colonies/100ml	Allen		482	June 3 to July 1
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/8/2002	Normal	E. coli	300	Colonies/100ml	Allen		426	June 10 to July 8
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/15/2002	Normal	E. coli	380	Colonies/100ml	Allen		328	June 17 to July 15
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/22/2002	Normal	E. coli	170	Colonies/100ml	Allen		274	June 24 to July 22
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/29/2002	Normal	E. coli	270	Colonies/100ml	Allen		258	July 1 to July 29
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/5/2002	Normal	E. coli	740	Colonies/100ml	Allen		329	July 8 to Aug 5
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/12/2002	Normal	E. coli	55	Colonies/100ml	Allen		235	July 15 to Aug 12
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/19/2002	Normal	E. coli	130	Colonies/100ml	Allen		189	July 22 to Aug 19
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/26/2002	Normal	E. coli	Test Failed	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/3/2002	Normal	E. coli	1600	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/9/2002	Normal	E. coli	60	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/16/2002	Normal	E. coli	240	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/24/2002	Normal	E. coli	220	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/30/2002	Normal	E. coli	250	Colonies/100ml	Allen		263	Sept 3 to Sept 30
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/7/2002	Normal	E. coli	260	Colonies/100ml	Allen		183	Sept 9 to Oct 7
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/14/2002	Normal	E. coli	600	Colonies/100ml	Allen		290	Sept 16 to Oct 14
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/21/2002	Normal	E. coli	190	Colonies/100ml	Allen		277	Sept 24 to Oct 21
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/28/2002	Normal	E. coli	160	Colonies/100ml	Allen		260	Sept 30 to Oct 28
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/7/2003	Normal	E. coli	32	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/14/2003	Normal	E. coli	8	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/21/2003	Normal	E. coli	20	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		4/28/2003	Normal	E. coli	8	Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/5/2003	Normal	E. coli	8	Colonies/100ml	Allen		13	April 7 - May 5

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/12/2003	Normal	E. coli	2000	Colonies/100ml	Allen		29	April 14 - May 12
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/19/2003	Normal	E. coli	249	Colonies/100ml	Allen		58	April 21 - May 19
30	Ft. Wayne		St. Marys River		Spy Run Bridge		5/27/2003	Normal	E. coli	88	Colonies/100ml	Allen		78	April 28 - May 27
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/2/2003	Normal	E. coli	36	Colonies/100ml	Allen		105	May 5 - June 2
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/9/2003	Normal	E. coli	20	Colonies/100ml	Allen		126	May 12 - June 9
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/16/2003	Normal	E. coli	300	Colonies/100ml	Allen		86	May 19 - June 16
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/23/2003	Normal	E. coli	260	Colonies/100ml	Allen		87	May 27 - June 23
30	Ft. Wayne		St. Marys River		Spy Run Bridge		6/30/2003	Normal	E. coli	620	Colonies/100ml	Allen		128	June 2 - June 30
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/7/2003	Normal	E. coli	250	Colonies/100ml	Allen		189	June 9 - July 7
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/15/2003	Normal	E. coli	500	Colonies/100ml	Allen		360	June 16 - July 15
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/21/2003	Normal	E. coli	200	Colonies/100ml	Allen		332	June 23 - July 21
30	Ft. Wayne		St. Marys River		Spy Run Bridge		7/28/2003	Normal	E. coli	20	Colonies/100ml	Allen		199	June 30 - July 28
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/4/2003	Normal	E. coli	800	Colonies/100ml	Allen		209	July 7 - Aug 4
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/11/2003	Normal	E. coli	340	Colonies/100ml	Allen		222	July 15 - Aug 11
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/18/2003	Normal	E. coli	29	Colonies/100ml	Allen		126	July 21 - Aug 18
30	Ft. Wayne		St. Marys River		Spy Run Bridge		8/25/2003	Normal	E. coli	67	Colonies/100ml	Allen		101	July 28 - Aug 25
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/2/2003	Normal	E. coli	24	Colonies/100ml	Allen		105	Aug 4 - Sept 2
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/8/2003	Normal	E. coli	34	Colonies/100ml	Allen		56	Aug 11 - Sept 8
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/15/2003	Normal	E. coli	3	Colonies/100ml	Allen		22	Aug 18 - Sept 15
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/22/2003	Normal	E. coli	5	Colonies/100ml	Allen		15	Aug 25 - Sept 22
30	Ft. Wayne		St. Marys River		Spy Run Bridge		9/29/2003	Normal	E. coli	64	Colonies/100ml	Allen		15	Sept 2 - Sept 29
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/6/2003	Normal	E. coli	18	Colonies/100ml	Allen		14	Sept 8 - Oct 6
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/13/2003	Normal	E. coli	56	Colonies/100ml	Allen		16	Sept 15 - Oct 13
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/20/2003	Normal	E. coli		Colonies/100ml	Allen			
30	Ft. Wayne		St. Marys River		Spy Run Bridge		10/27/2003	Normal	E. coli	1	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		7/8/2004	Normal	E. Coli	1100	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		7/22/2004	Normal	E. Coli	20924	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		8/5/2004	Normal	E. Coli	3300	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		8/19/2004	Normal	E. Coli	>48400	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		9/2/2004	Normal	E. Coli	1085	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		9/16/2004	Normal	E. Coli	346	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		9/30/2004	Normal	E. Coli	9768	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		10/14/2004	Normal	E. Coli	>20	Colonies/100ml	Allen			
30	Ft. Wayne		St. Mary's River		Spy Run Bridge		10/28/2004	Normal	E. Coli	126	Colonies/100ml	Allen			
31	IDEM	2005 Corvallis E. coli	Lowther Neuhaus Ditch	LES060-0020	Goshen Road		9/12/2005		E. Coli	435.2	MPN/100 mL	Allen			
31	IDEM	2005 Corvallis E. coli	Lowther Neuhaus Ditch	LES060-0020	Goshen Road		9/19/2005		E. Coli	1553	MPN/100 mL	Allen			
31	IDEM	2005 Corvallis E. coli	Lowther Neuhaus Ditch	LES060-0020	Goshen Road		9/26/2005		E. Coli	4352	MPN/100 mL	Allen			
31	IDEM	2005 Corvallis E. coli	Lowther Neuhaus Ditch	LES060-0020	Goshen Road		10/3/2005		E. Coli	257.5	MPN/100 mL	Allen			
31	IDEM	2005 Corvallis E. coli	Lowther Neuhaus Ditch	LES060-0020	Goshen Road		10/11/2005		E. Coli	125.9	MPN/100 mL	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/3/2001	Normal	E. coli	140	Colonies/100ml	Allen			

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
	Ft. Wayne		St. Joseph River		Mayhew Road		4/9/2001	Normal	E. coli	280	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/16/2001	Normal	E. coli	260	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/23/2001	Normal	E. coli	80	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/30/2001	Normal	E. coli	20	Colonies/100ml	Allen		110	April 3 - April 30
	Ft. Wayne		St. Joseph River		Mayhew Road		5/7/2001	Normal	E. coli	80	Colonies/100ml	Allen		99	April 9 - May 7
	Ft. Wayne		St. Joseph River		Mayhew Road		5/14/2001	Normal	E. coli	70	Colonies/100ml	Allen		75	April 16 - May 14
	Ft. Wayne		St. Joseph River		Mayhew Road		5/21/2001	Normal	E. coli	276	Colonies/100ml	Allen		76	April 23 - May 21
	Ft. Wayne		St. Joseph River		Mayhew Road		5/29/2001	Normal	E. coli	400	Colonies/100ml	Allen		104	April 30 -May 29
	Ft. Wayne		St. Joseph River		Mayhew Road		6/4/2001	Normal	E. coli	540	Colonies/100ml	Allen		202	May 7 - June 4
	Ft. Wayne		St. Joseph River		Mayhew Road		6/11/2001	Normal	E. coli	200	Colonies/100ml	Allen		242	May 14 - June 11
	Ft. Wayne		St. Joseph River		Mayhew Road		6/18/2001	Normal	E. coli	150	Colonies/100ml	Allen		282	May 21 - June 18
	Ft. Wayne		St. Joseph River		Mayhew Road		6/26/2001	Normal	E. coli	84	Colonies/100ml	Allen		222	May 29 - June 26
	Ft. Wayne		St. Joseph River		Mayhew Road		7/2/2001	Normal	E. coli	104	Colonies/100ml	Allen		170	June 4 - June 2
	Ft. Wayne		St. Joseph River		Mayhew Road		7/9/2001	Normal	E. coli	130	Colonies/100ml	Allen		128	June 11 - July 9
	Ft. Wayne		St. Joseph River		Mayhew Road		7/16/2001	Normal	E. coli	130	Colonies/100ml	Allen		117	June 18 - July 16
	Ft. Wayne		St. Joseph River		Mayhew Road		7/23/2001	Normal	E. coli	80	Colonies/100ml	Allen		103	June 26 - July 23
	Ft. Wayne		St. Joseph River		Mayhew Road		7/30/2001	Normal	E. coli	60	Colonies/100ml	Allen		97	July 2 - July 30
	Ft. Wayne		St. Joseph River		Mayhew Road		8/6/2001	Normal	E. coli	30	Colonies/100ml	Allen		75	July 9 - Aug 6
	Ft. Wayne		St. Joseph River		Mayhew Road		8/14/2001	Normal	E. coli	100	Colonies/100ml	Allen		72	July 16 - Aug 14
	Ft. Wayne		St. Joseph River		Mayhew Road		8/20/2001	Normal	E. coli	98	Colonies/100ml	Allen		68	July 23 - Aug 20
	Ft. Wayne		St. Joseph River		Mayhew Road		8/27/2001	Normal	E. coli	300	Colonies/100ml	Allen		88	July 30 - Aug 27
	Ft. Wayne		St. Joseph River		Mayhew Road		9/4/2001	Normal	E. coli	100	Colonies/100ml	Allen		98	Aug 6 - Sept 4
	Ft. Wayne		St. Joseph River		Mayhew Road		9/10/2001	Normal	E. coli	480	Colonies/100ml	Allen		170	Aug 14 - Sept 10
	Ft. Wayne		St. Joseph River		Mayhew Road		9/17/2001	Normal	E. coli	80	Colonies/100ml	Allen		162	Aug 20 - Sept 17
	Ft. Wayne		St. Joseph River		Mayhew Road		9/24/2001	Normal	E. coli	470	Colonies/100ml	Allen		222	Aug 27 - Sept 24
	Ft. Wayne		St. Joseph River		Mayhew Road		10/1/2001	Normal	E. coli	180	Colonies/100ml	Allen		201	Sept 4 - Oct 1
	Ft. Wayne		St. Joseph River		Mayhew Road		10/9/2001	Normal	E. coli	210	Colonies/100ml	Allen		233	Sept 10 - Oct 9
	Ft. Wayne		St. Joseph River		Mayhew Road		10/15/2001	Normal	E. coli	2000	Colonies/100ml	Allen		310	Sept 17 - Oct 15
	Ft. Wayne		St. Joseph River		Mayhew Road		10/22/2001	Normal	E. coli	170	Colonies/100ml	Allen		360	Sept 24 - Oct 22
	Ft. Wayne		St. Joseph River		Mayhew Road		10/29/2001	Normal	E. coli	160	Colonies/100ml	Allen		290	Oct 1 - Oct 29
	Ft. Wayne		St. Joseph River		Mayhew Road		4/1/2002	Normal	E. coli	548	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/8/2002	Normal	E. coli	1280	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/15/2002	Normal	E. coli	200	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/22/2002	Normal	E. coli	620	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/29/2002	Normal	E. coli	500	Colonies/100ml	Allen		534	April 1-April 29
	Ft. Wayne		St. Joseph River		Mayhew Road		5/6/2002	Normal	E. coli	100	Colonies/100ml	Allen		380	April 8 - May 6
	Ft. Wayne		St. Joseph River		Mayhew Road		5/13/2002	Normal	E. coli	3300	Colonies/100ml	Allen		459	April 15 - May 13
	Ft. Wayne		St. Joseph River		Mayhew Road		5/20/2002	Normal	E. coli	100	Colonies/100ml	Allen		400	April 22 - May 20
	Ft. Wayne		St. Joseph River		Mayhew Road		5/29/2002	Normal	E. coli	350	Colonies/100ml	Allen		357	April 29 - May 29
	Ft. Wayne		St. Joseph River		Mayhew Road		6/3/2002	Normal	E. coli	180	Colonies/100ml	Allen		291	May 6 - June 6

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
	Ft. Wayne		St. Joseph River		Mayhew Road		6/10/2002	Normal	E. coli	380	Colonies/100ml	Allen		380	May 13 - June 10
	Ft. Wayne		St. Joseph River		Mayhew Road		6/17/2002	Normal	E. coli	120	Colonies/100ml	Allen		196	May 20 - June 17
	Ft. Wayne		St. Joseph River		Mayhew Road		6/24/2002	Normal	E. coli	510	Colonies/100ml	Allen		271	May 29 - June 24
	Ft. Wayne		St. Joseph River		Mayhew Road		7/1/2002	Normal	E. coli	740	Colonies/100ml	Allen		315	June 3 - July 1
	Ft. Wayne		St. Joseph River		Mayhew Road		7/8/2002	Normal	E. coli	240	Colonies/100ml	Allen		334	June 10 - July 8
	Ft. Wayne		St. Joseph River		Mayhew Road		7/15/2002	Normal	E. coli	240	Colonies/100ml	Allen		304	June 17 - July 15
	Ft. Wayne		St. Joseph River		Mayhew Road		7/22/2002	Normal	E. coli	80	Colonies/100ml	Allen		281	June 24 - July 22
	Ft. Wayne		St. Joseph River		Mayhew Road		7/29/2002	Normal	E. coli	240	Colonies/100ml	Allen		241	July 1 - July 22
	Ft. Wayne		St. Joseph River		Mayhew Road		8/5/2002	Normal	E. coli	20	Colonies/100ml	Allen		117	July 8 - Aug 5
	Ft. Wayne		St. Joseph River		Mayhew Road		8/12/2002	Normal	E. coli	265	Colonies/100ml	Allen		120	July 15 - Aug 12
	Ft. Wayne		St. Joseph River		Mayhew Road		8/19/2002	Normal	E. coli	360	Colonies/100ml	Allen		130	July 22 - Aug 19
	Ft. Wayne		St. Joseph River		Mayhew Road		8/26/2002	Normal	E. coli	100	Colonies/100ml	Allen		136	July 19 - Aug 26
	Ft. Wayne		St. Joseph River		Mayhew Road		9/3/2002	Normal	E. coli	90	Colonies/100ml	Allen		111	Aug 5 - Aug 26
	Ft. Wayne		St. Joseph River		Mayhew Road		9/9/2002	Normal	E. coli	90	Colonies/100ml	Allen		151	Aug 12 - Sept 9
	Ft. Wayne		St. Joseph River		Mayhew Road		9/16/2002	Normal	E. coli	70	Colonies/100ml	Allen		115	Aug 19 - Sept 16
	Ft. Wayne		St. Joseph River		Mayhew Road		9/24/2002	Normal	E. coli	195	Colonies/100ml	Allen		102	Aug 26 - Sept 24
	Ft. Wayne		St. Joseph River		Mayhew Road		9/30/2002	Normal	E. coli	200	Colonies/100ml	Allen		117	Sept 3 - Sept 30
	Ft. Wayne		St. Joseph River		Mayhew Road		10/7/2002	Normal	E. coli	270	Colonies/100ml	Allen		146	Sept 9 - Oct 7
	Ft. Wayne		St. Joseph River		Mayhew Road		10/14/2002	Normal	E. coli	110	Colonies/100ml	Allen		152	Sept 16 - Oct 14
	Ft. Wayne		St. Joseph River		Mayhew Road		10/21/2002	Normal	E. coli	80	Colonies/100ml	Allen		156	Sept 24 - Oct 21
	Ft. Wayne		St. Joseph River		Mayhew Road		10/28/2002	Normal	E. coli	35	Colonies/100ml	Allen		111	Sept 30 - Oct 28
	Ft. Wayne		St. Joseph River		Mayhew Road		4/7/2003	Normal	E. coli	Test Failed	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/14/2003	Normal	E. coli	16	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/21/2003	Normal	E. coli	9	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		4/28/2003	Normal	E. coli	4	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		5/5/2003	Normal	E. coli	8	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Mayhew Road		5/12/2003	Normal	E. coli	1300	Colonies/100ml	Allen		23	April 14 - May 12
	Ft. Wayne		St. Joseph River		Mayhew Road		5/19/2003	Normal	E. coli	62	Colonies/100ml	Allen		30	April 21 - May 19
	Ft. Wayne		St. Joseph River		Mayhew Road		5/27/2003	Normal	E. coli	94	Colonies/100ml	Allen		48	April 28 - May 27
	Ft. Wayne		St. Joseph River		Mayhew Road		6/2/2003	Normal	E. coli	30	Colonies/100ml	Allen		71	May 5 - June 2
	Ft. Wayne		St. Joseph River		Mayhew Road		6/9/2003	Normal	E. coli	54	Colonies/100ml	Allen		104	May 12 - June 9
	Ft. Wayne		St. Joseph River		Mayhew Road		6/16/2003	Normal	E. coli	150	Colonies/100ml	Allen		68	May 19 - June 16
	Ft. Wayne		St. Joseph River		Mayhew Road		6/23/2003	Normal	E. coli	60	Colonies/100ml	Allen		67	May 27 - June 23
	Ft. Wayne		St. Joseph River		Mayhew Road		6/30/2003	Normal	E. coli	100	Colonies/100ml	Allen		68	June 2 - June 30
	Ft. Wayne		St. Joseph River		Mayhew Road		7/7/2003	Normal	E. coli	1040	Colonies/100ml	Allen		138	June 9 - July 7
	Ft. Wayne		St. Joseph River		Mayhew Road		7/15/2003	Normal	E. coli	100	Colonies/100ml	Allen		156	June 16 - July 15
	Ft. Wayne		St. Joseph River		Mayhew Road		7/21/2003	Normal	E. coli	340	Colonies/100ml	Allen		184	June 23 - July 21
	Ft. Wayne		St. Joseph River		Mayhew Road		7/28/2003	Normal	E. coli	10	Colonies/100ml	Allen		129	June 30 - July 28
	Ft. Wayne		St. Joseph River		Mayhew Road		8/4/2003	Normal	E. coli	780	Colonies/100ml	Allen		194	July 7 - Aug 4
	Ft. Wayne		St. Joseph River		Mayhew Road		8/11/2003	Normal	E. coli	190	Colonies/100ml	Allen		138	July 15 - Aug 11

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
	Ft. Wayne		St. Joseph River		Mayhew Road		8/18/2003	Normal	E. coli	52	Colonies/100ml	Allen		121	July 21 - Aug 18
	Ft. Wayne		St. Joseph River		Mayhew Road		8/25/2003	Normal	E. coli	35	Colonies/100ml	Allen		77	July 28 - Aug 25
	Ft. Wayne		St. Joseph River		Mayhew Road		9/2/2003	Normal	E. coli	2	Colonies/100ml	Allen		56	Aug 4 - Sept 2
	Ft. Wayne		St. Joseph River		Mayhew Road		9/8/2003	Normal	E. coli	48	Colonies/100ml	Allen		32	Aug 11 - Sept 8
	Ft. Wayne		St. Joseph River		Mayhew Road		9/15/2003	Normal	E. coli	168	Colonies/100ml	Allen		31	Aug 18 - Sept 15
	Ft. Wayne		St. Joseph River		Mayhew Road		9/22/2003	Normal	E. coli	132	Colonies/100ml	Allen		38	Aug 25 - Sept 22
	Ft. Wayne		St. Joseph River		Mayhew Road		9/29/2003	Normal	E. coli	176	Colonies/100ml	Allen		52	Sept 2 - Sept 29
	Ft. Wayne		St. Joseph River		Mayhew Road		10/6/2003	Normal	E. coli	76	Colonies/100ml	Allen		107	Sept 8 - Oct 6
	Ft. Wayne		St. Joseph River		Mayhew Road		10/13/2003	Normal	E. coli	106	Colonies/100ml	Allen		126	Sept 15 - Oct 13
	Ft. Wayne		St. Joseph River		Mayhew Road		10/20/2003	Normal	E. coli		Colonies/100ml	Allen		117	Sept 22 - Oct 20
	Ft. Wayne		St. Joseph River		Mayhew Road		10/27/2003	Normal	E. coli	18	Colonies/100ml	Allen		71	Sept 29 - Oct 27
	Ft. Wayne		St. Joseph River		Tennessee St		4/3/2001	Normal	E. coli	220	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/9/2001	Normal	E. coli	260	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/16/2001	Normal	E. coli	110	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/23/2001	Normal	E. coli	140	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/30/2001	Normal	E. coli	20	Colonies/100ml	Allen		112	April 3 - April 20
	Ft. Wayne		St. Joseph River		Tennessee St		5/7/2001	Normal	E. coli	48	Colonies/100ml	Allen		83	April 9 - May 7
	Ft. Wayne		St. Joseph River		Tennessee St		5/14/2001	Normal	E. coli	32	Colonies/100ml	Allen		54	April 16 - May 14
	Ft. Wayne		St. Joseph River		Tennessee St		5/21/2001	Normal	E. coli	500	Colonies/100ml	Allen		74	April 23 - May 21
	Ft. Wayne		St. Joseph River		Tennessee St		5/29/2001	Normal	E. coli	540	Colonies/100ml	Allen		96	April 30 - May 29
	Ft. Wayne		St. Joseph River		Tennessee St		6/4/2001	Normal	E. coli	370	Colonies/100ml	Allen		173	May 7 - June 4
	Ft. Wayne		St. Joseph River		Tennessee St		6/11/2001	Normal	E. coli	100	Colonies/100ml	Allen		200	May 14 - June 11
	Ft. Wayne		St. Joseph River		Tennessee St		6/18/2001	Normal	E. coli	100	Colonies/100ml	Allen		251	May 21 - June 18
	Ft. Wayne		St. Joseph River		Tennessee St		6/26/2001	Normal	E. coli	200	Colonies/100ml	Allen		209	May 29 - June 26
	Ft. Wayne		St. Joseph River		Tennessee St		7/2/2001	Normal	E. coli	144	Colonies/100ml	Allen		161	June 4 - July 2
	Ft. Wayne		St. Joseph River		Tennessee St		7/9/2001	Normal	E. coli	100	Colonies/100ml	Allen		124	June 11 - July 9
	Ft. Wayne		St. Joseph River		Tennessee St		7/16/2001	Normal	E. coli	20	Colonies/100ml	Allen		90	June 18 - July 16
	Ft. Wayne		St. Joseph River		Tennessee St		7/23/2001	Normal	E. coli	80	Colonies/100ml	Allen		86	June 26 - July 23
	Ft. Wayne		St. Joseph River		Tennessee St		7/30/2001	Normal	E. coli	44	Colonies/100ml	Allen		63	July 2 - July 30
	Ft. Wayne		St. Joseph River		Tennessee St		8/6/2001	Normal	E. coli	102	Colonies/100ml	Allen		59	July 9 - Aug 6
	Ft. Wayne		St. Joseph River		Tennessee St		8/14/2001	Normal	E. coli	102	Colonies/100ml	Allen		59	July 16 - Aug 14
	Ft. Wayne		St. Joseph River		Tennessee St		8/20/2001	Normal	E. coli	480	Colonies/100ml	Allen		112	July 23 - Aug 20
	Ft. Wayne		St. Joseph River		Tennessee St		8/27/2001	Normal	E. coli	450	Colonies/100ml	Allen		158	July 30 - Aug 27
	Ft. Wayne		St. Joseph River		Tennessee St		9/4/2001	Normal	E. coli	210	Colonies/100ml	Allen		216	Aug 6 - Sept 4
	Ft. Wayne		St. Joseph River		Tennessee St		9/10/2001	Normal	E. coli	1120	Colonies/100ml	Allen		349	Aug 14 - Sept 10
	Ft. Wayne		St. Joseph River		Tennessee St		9/17/2001	Normal	E. coli	160	Colonies/100ml	Allen		382	Aug 20 - Sept 17
	Ft. Wayne		St. Joseph River		Tennessee St		9/24/2001	Normal	E. coli	360	Colonies/100ml	Allen		361	Aug 27 - Sept 24
	Ft. Wayne		St. Joseph River		Tennessee St		10/1/2001	Normal	E. coli	180	Colonies/100ml	Allen		300	Sept 4 - Oct 1
	Ft. Wayne		St. Joseph River		Tennessee St		10/9/2001	Normal	E. coli	550	Colonies/100ml	Allen		364	Sept 10 - Oct 9
	Ft. Wayne		St. Joseph River		Tennessee St		10/15/2001	Normal	E. coli	3200	Colonies/100ml	Allen		449	Sept 17 - Oct 15

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
	Ft. Wayne		St. Joseph River		Tennessee St		10/22/2001	Normal	E. coli	270	Colonies/100ml	Allen		499	Sept 24 - Oct 22
	Ft. Wayne		St. Joseph River		Tennessee St		10/29/2001	Normal	E. coli	180	Colonies/100ml	Allen		434	Oct 1 - Oct 29
	Ft. Wayne		St. Joseph River		Tennessee St		4/1/2002	Normal	E. coli	544	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/8/2002	Normal	E. coli	320	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/15/2002	Normal	E. coli	220	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/22/2002	Normal	E. coli	200	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/29/2002	Normal	E. coli	360	Colonies/100ml	Allen		268	April 1 - April 29
	Ft. Wayne		St. Joseph River		Tennessee St		5/6/2002	Normal	E. coli	100	Colonies/100ml	Allen		308	April 8 - May 6
	Ft. Wayne		St. Joseph River		Tennessee St		5/13/2002	Normal	E. coli	5600	Colonies/100ml	Allen		219	April 15 - May 13
	Ft. Wayne		St. Joseph River		Tennessee St		5/20/2002	Normal	E. coli	100	Colonies/100ml	Allen		389	April 22 - May 20
	Ft. Wayne		St. Joseph River		Tennessee St		5/29/2002	Normal	E. coli	100	Colonies/100ml	Allen		332	April 29 - May 29
	Ft. Wayne		St. Joseph River		Tennessee St		6/3/2002	Normal	E. coli	140	Colonies/100ml	Allen		289	May 6 - June 3
	Ft. Wayne		St. Joseph River		Tennessee St		6/10/2002	Normal	E. coli	290	Colonies/100ml	Allen		239	May 13 - June 10
	Ft. Wayne		St. Joseph River		Tennessee St		6/17/2002	Normal	E. coli	140	Colonies/100ml	Allen		296	May 20 - June 17
	Ft. Wayne		St. Joseph River		Tennessee St		6/24/2002	Normal	E. coli	240	Colonies/100ml	Allen		142	May 29 - June 24
	Ft. Wayne		St. Joseph River		Tennessee St		7/1/2002	Normal	E. coli	240	Colonies/100ml	Allen		169	June 3 - July 1
	Ft. Wayne		St. Joseph River		Tennessee St		7/8/2002	Normal	E. coli	210	Colonies/100ml	Allen		201	June 10 - July 8
	Ft. Wayne		St. Joseph River		Tennessee St		7/15/2002	Normal	E. coli	220	Colonies/100ml	Allen		218	June 17 - July 15
	Ft. Wayne		St. Joseph River		Tennessee St		7/22/2002	Normal	E. coli	150	Colonies/100ml	Allen		206	June 24 - July 22
	Ft. Wayne		St. Joseph River		Tennessee St		7/29/2002	Normal	E. coli	80	Colonies/100ml	Allen		209	July 1 - July 29
	Ft. Wayne		St. Joseph River		Tennessee St		8/5/2002	Normal	E. coli	50	Colonies/100ml	Allen		168	July 8 - Aug 5
	Ft. Wayne		St. Joseph River		Tennessee St		8/12/2002	Normal	E. coli	245	Colonies/100ml	Allen		123	July 15 - Aug 12
	Ft. Wayne		St. Joseph River		Tennessee St		8/19/2002	Normal	E. coli	980	Colonies/100ml	Allen		126	July 22 - Aug 19
	Ft. Wayne		St. Joseph River		Tennessee St		8/26/2002	Normal	E. coli	210	Colonies/100ml	Allen		170	July 29 - Aug 26
	Ft. Wayne		St. Joseph River		Tennessee St		9/3/2002	Normal	E. coli	70	Colonies/100ml	Allen		182	Aug 5 - Sept 3
	Ft. Wayne		St. Joseph River		Tennessee St		9/9/2002	Normal	E. coli	50	Colonies/100ml	Allen		178	Aug 12 - Sept 9
	Ft. Wayne		St. Joseph River		Tennessee St		9/16/2002	Normal	E. coli	30	Colonies/100ml	Allen		178	Aug 19 - Aug 16
	Ft. Wayne		St. Joseph River		Tennessee St		9/24/2002	Normal	E. coli	415	Colonies/100ml	Allen		117	Aug 26 - Sept 24
	Ft. Wayne		St. Joseph River		Tennessee St		9/30/2002	Normal	E. coli	320	Colonies/100ml	Allen		98	Sept 3 - Sept 30
	Ft. Wayne		St. Joseph River		Tennessee St		10/7/2002	Normal	E. coli	100	Colonies/100ml	Allen		107	Sept 9 - Oct 7
	Ft. Wayne		St. Joseph River		Tennessee St		10/14/2002	Normal	E. coli	10	Colonies/100ml	Allen		115	Sept 16 - Oct 14
	Ft. Wayne		St. Joseph River		Tennessee St		10/21/2002	Normal	E. coli	75	Colonies/100ml	Allen		83	Sept 24 - Oct 21
	Ft. Wayne		St. Joseph River		Tennessee St		10/28/2002	Normal	E. coli	150	Colonies/100ml	Allen			Sept 30 - Oct 28
	Ft. Wayne		St. Joseph River		Tennessee St		4/7/2003	Normal	E. coli	8	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/14/2003	Normal	E. coli	34	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/21/2003	Normal	E. coli	5	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		4/28/2003	Normal	E. coli	3	Colonies/100ml	Allen			
	Ft. Wayne		St. Joseph River		Tennessee St		5/5/2003	Normal	E. coli	12	Colonies/100ml	Allen		9	April 7 - May 5
	Ft. Wayne		St. Joseph River		Tennessee St		5/12/2003	Normal	E. coli	700	Colonies/100ml	Allen		21	April 14 - May 12
	Ft. Wayne		St. Joseph River		Tennessee St		5/19/2003	Normal	E. coli	78	Colonies/100ml	Allen		25	April 21 - May 19

Attachment A: E. coli Data for the St Marys River Watershed

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	Geo Mean	
	Ft. Wayne		St. Joseph River		Tennessee St		5/27/2003	Normal	E. coli	76	Colonies/100ml	Allen		43	April 28 - May 27
	Ft. Wayne		St. Joseph River		Tennessee St		6/2/2003	Normal	E. coli	38	Colonies/100ml	Allen		72	May 5 - June 2
	Ft. Wayne		St. Joseph River		Tennessee St		6/9/2003	Normal	E. coli	80	Colonies/100ml	Allen		105	May 12 - June 9
	Ft. Wayne		St. Joseph River		Tennessee St		6/16/2003	Normal	E. coli	130	Colonies/100ml	Allen		75	May 19 - June 16
	Ft. Wayne		St. Joseph River		Tennessee St		6/23/2003	Normal	E. coli	40	Colonies/100ml	Allen		65	May 27 - June 23
	Ft. Wayne		St. Joseph River		Tennessee St		6/30/2003	Normal	E. coli	190	Colonies/100ml	Allen		79	June 2 - June 30
	Ft. Wayne		St. Joseph River		Tennessee St		7/7/2003	Normal	E. coli	360	Colonies/100ml	Allen		123	June 9 - July 7
	Ft. Wayne		St. Joseph River		Tennessee St		7/15/2003	Normal	E. coli	500	Colonies/100ml	Allen		178	June 16 - July 15
	Ft. Wayne		St. Joseph River		Tennessee St		7/21/2003	Normal	E. coli	440	Colonies/100ml	Allen		227	June 23 - July 21
	Ft. Wayne		St. Joseph River		Tennessee St		7/28/2003	Normal	E. coli	60	Colonies/100ml	Allen		246	June 30 - July 28
	Ft. Wayne		St. Joseph River		Tennessee St		8/4/2003	Normal	E. coli	640	Colonies/100ml	Allen		314	July 7 - Aug 4
	Ft. Wayne		St. Joseph River		Tennessee St		8/11/2003	Normal	E. coli	120	Colonies/100ml	Allen		252	July 15 - Aug 11
	Ft. Wayne		St. Joseph River		Tennessee St		8/18/2003	Normal	E. coli	54	Colonies/100ml	Allen		161	July 21 - Aug 18
	Ft. Wayne		St. Joseph River		Tennessee St		8/25/2003	Normal	E. coli	20	Colonies/100ml	Allen		87	July 28 - Aug 25
	Ft. Wayne		St. Joseph River		Tennessee St		9/2/2003	Normal	E. coli	8	Colonies/100ml	Allen		58	Aug 4 - Sept 2
	Ft. Wayne		St. Joseph River		Tennessee St		9/8/2003	Normal	E. coli	96	Colonies/100ml	Allen		40	Aug 11 - Sept 8
	Ft. Wayne		St. Joseph River		Tennessee St		9/15/2003	Normal	E. coli	92	Colonies/100ml	Allen		38	Aug 18 - Sept 15
	Ft. Wayne		St. Joseph River		Tennessee St		9/22/2003	Normal	E. coli	92	Colonies/100ml	Allen		42	Aug 25 - Sept 22
	Ft. Wayne		St. Joseph River		Tennessee St		9/29/2003	Normal	E. coli	184	Colonies/100ml	Allen		65	Sept 2 - Sept 29
	Ft. Wayne		St. Joseph River		Tennessee St		10/6/2003	Normal	E. coli	104	Colonies/100ml	Allen		109	Sept 15 - Oct 6
	Ft. Wayne		St. Joseph River		Tennessee St		10/13/2003	Normal	E. coli	20	Colonies/100ml	Allen		80	Sept 22 - Oct 13
	Ft. Wayne		St. Joseph River		Tennessee St		10/20/2003	Normal	E. coli		Colonies/100ml	Allen		77	Sept 29 - Oct 20
	Ft. Wayne		St. Joseph River		Tennessee St		10/27/2003	Normal	E. coli	23	Colonies/100ml	Allen		54	Oct 6 - Oct 27

Attachment B

Water Quality Duration Curves for St. Marys River Watershed TMDL

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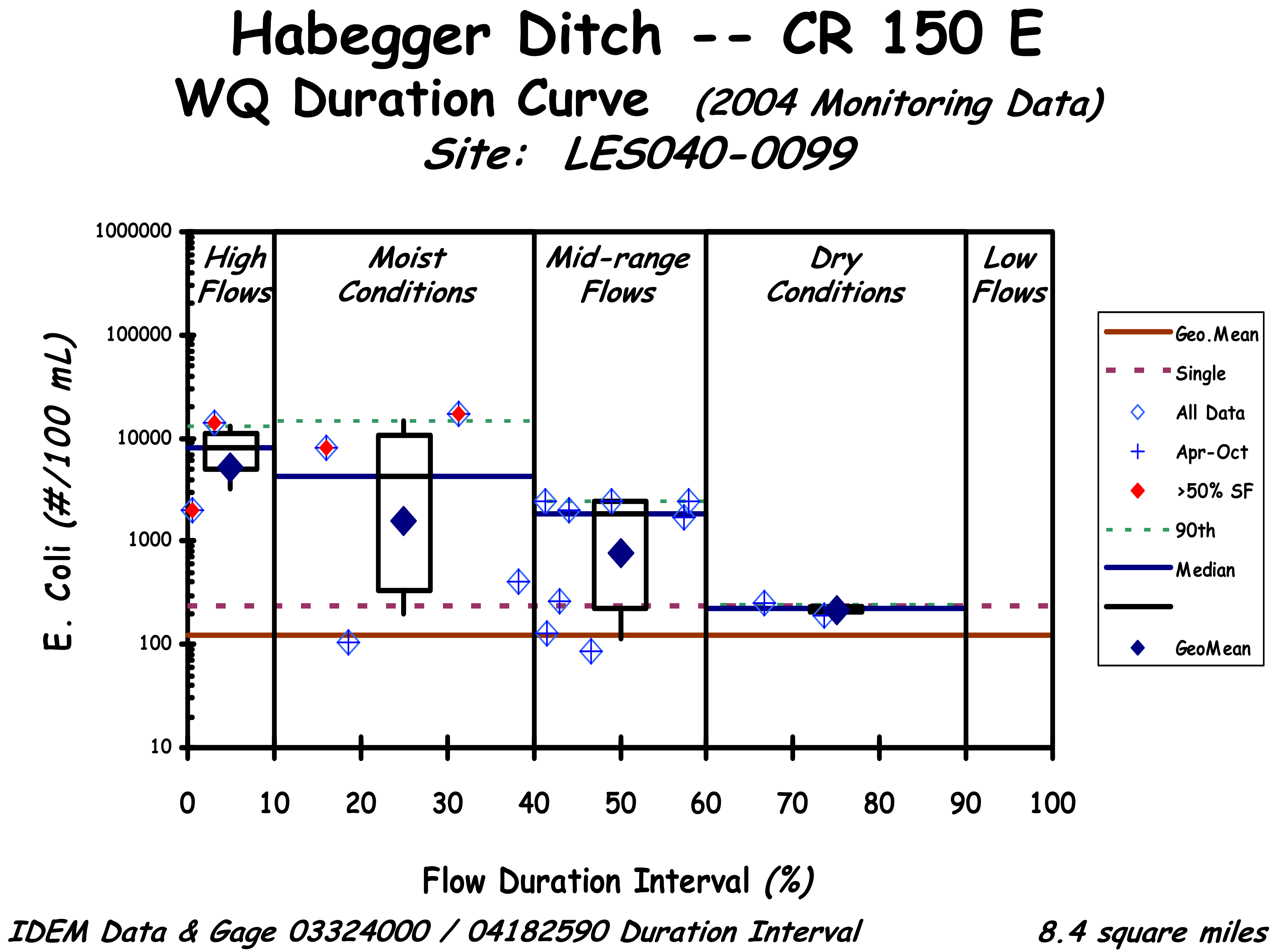
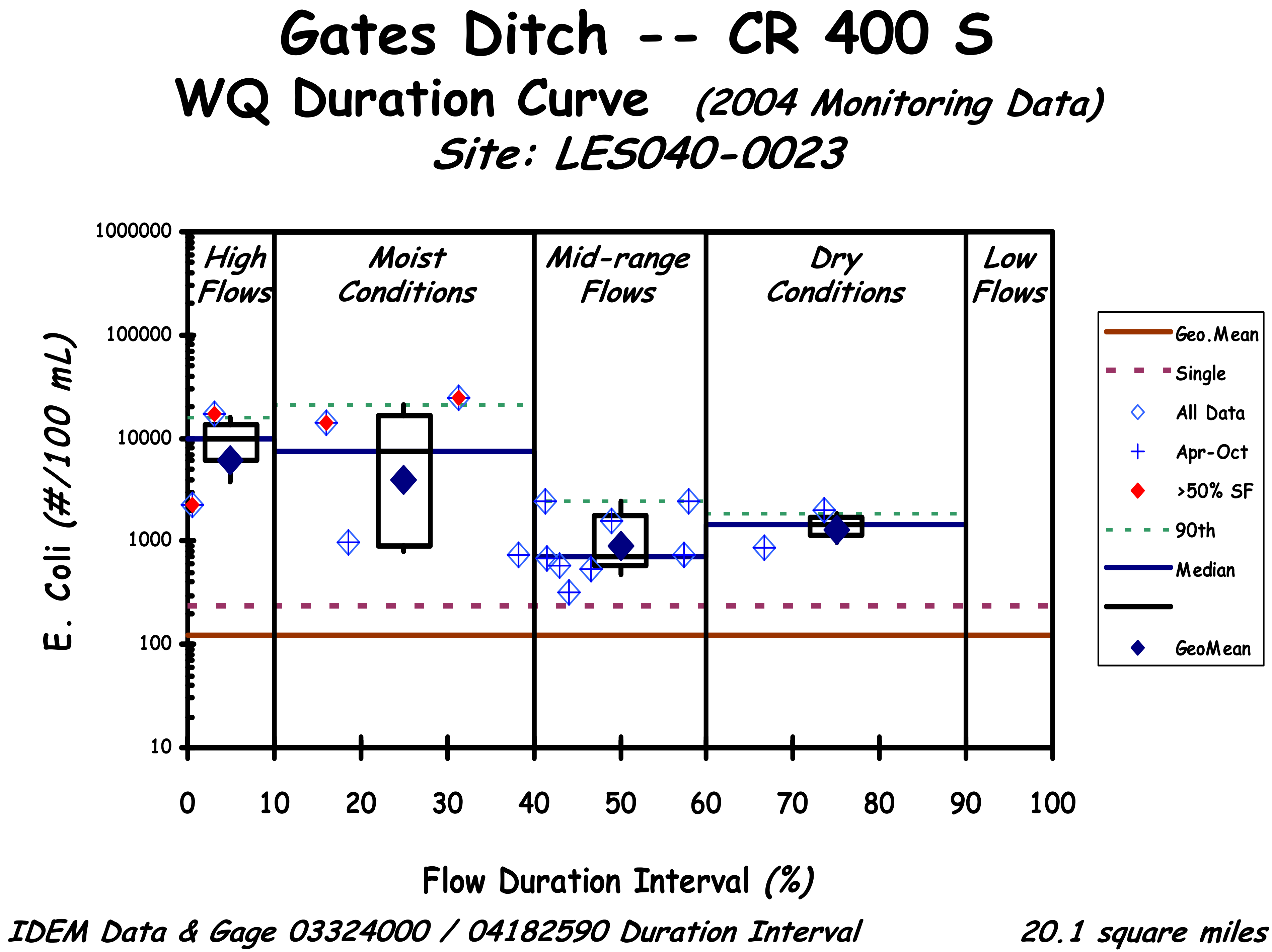

Habegger Ditch -- CR 150 E
WQ Duration Curve (2004 Monitoring Data)
Site: LES040-0099
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
1000000
100000
10000
1000
100
10
E. Coli (#/100 mL)
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
Geo.Mean
Single
All Data
Apr-Oct
>50% SF
90th
Median
GeoMean
IDEM Data & Gage 03324000 / 04182590 Duration Interval
8.4 square miles

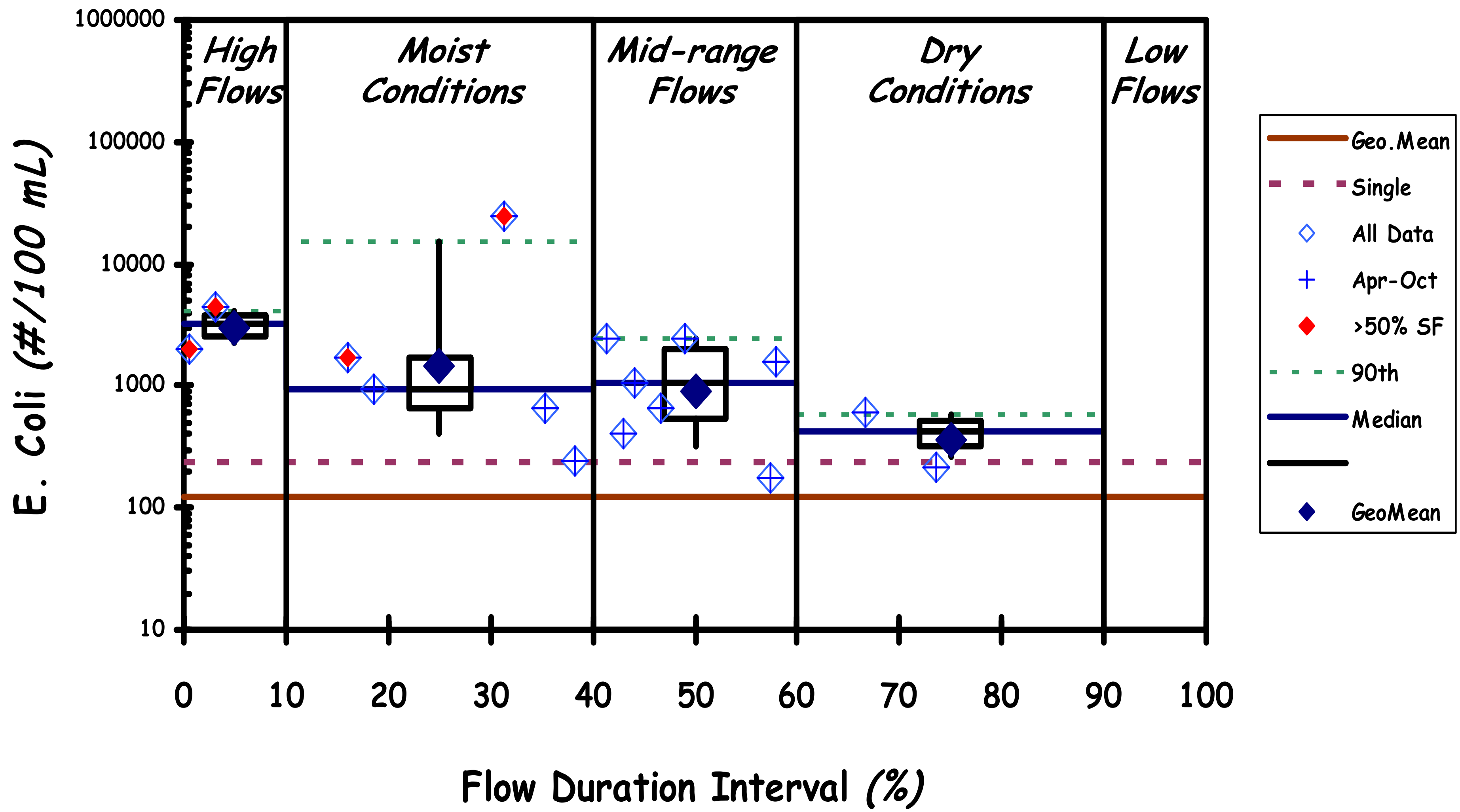


Gates Ditch -- CR 400 S
WQ Duration Curve (2004 Monitoring Data)
Site: LES040-0023
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
E. Coli (#/100 mL)
1000000
100000
10000
1000
100
10
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
Geo.Mean
Single
All Data
Apr-Oct
>50% SF
90th
Median
GeoMean
IDEM Data & Gage 03324000 / 04182590 Duration Interval
20.1 square miles

Blue Creek -- Salem Road

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0011

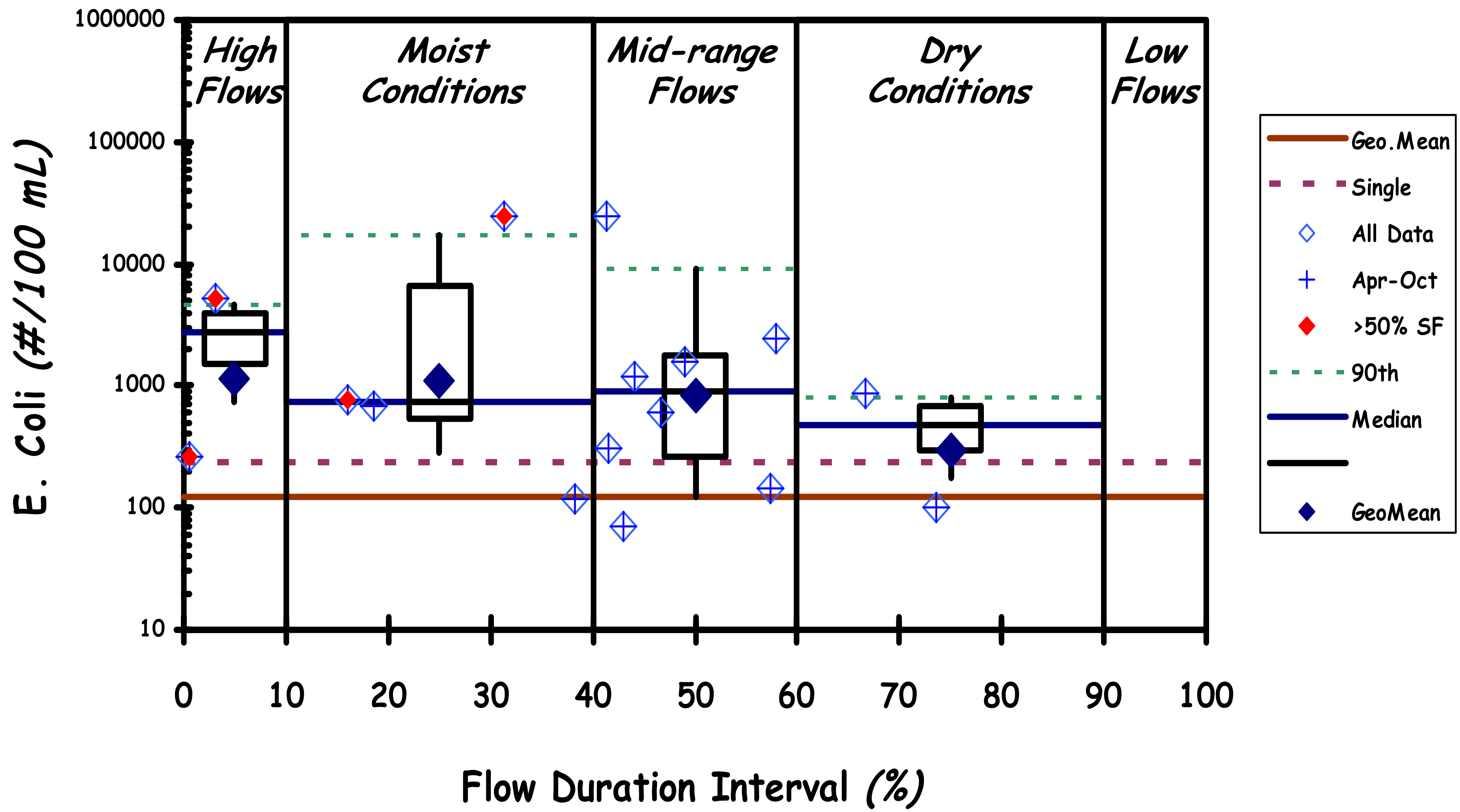


IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0010

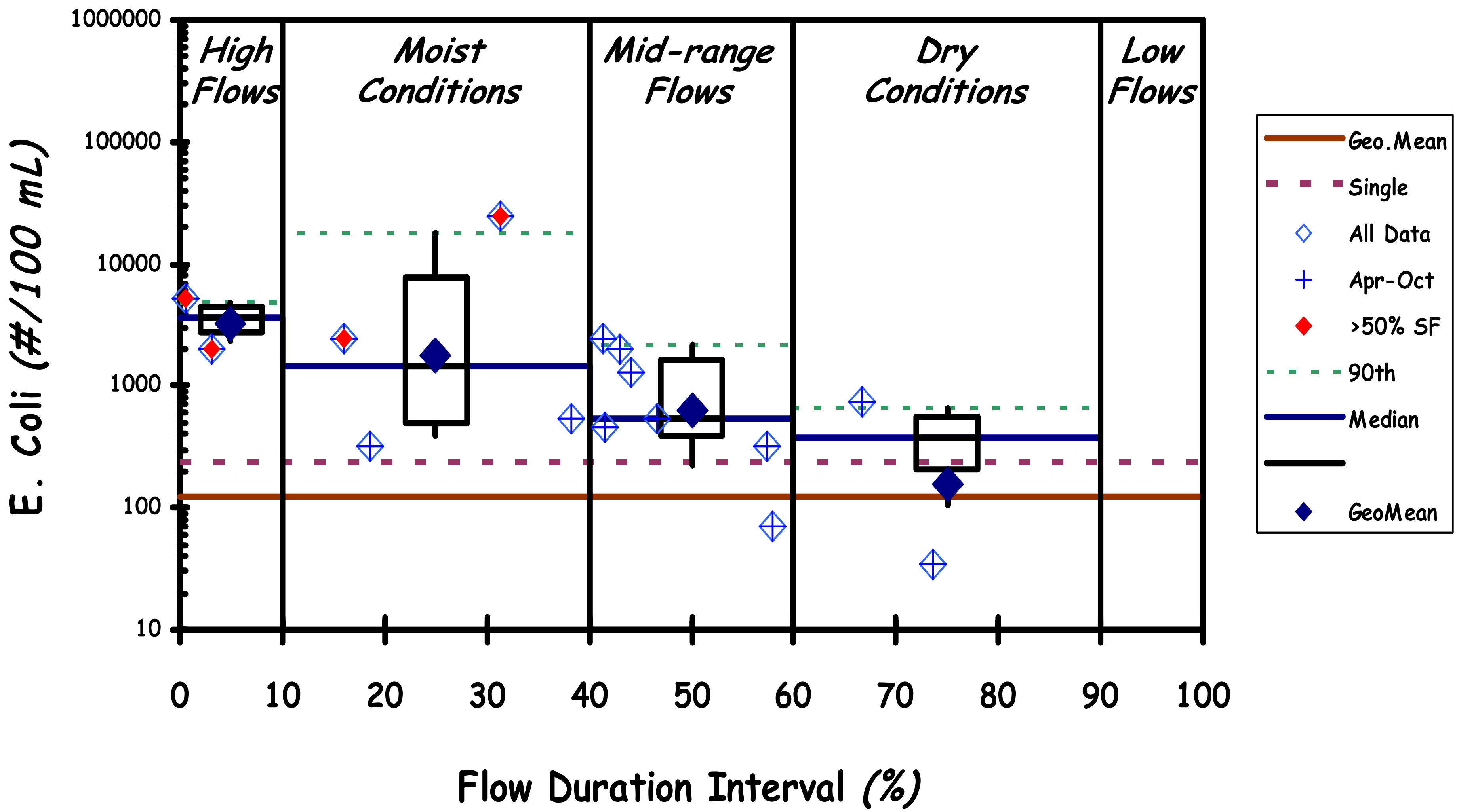


IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

Blue Creek -- CR 300 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0066

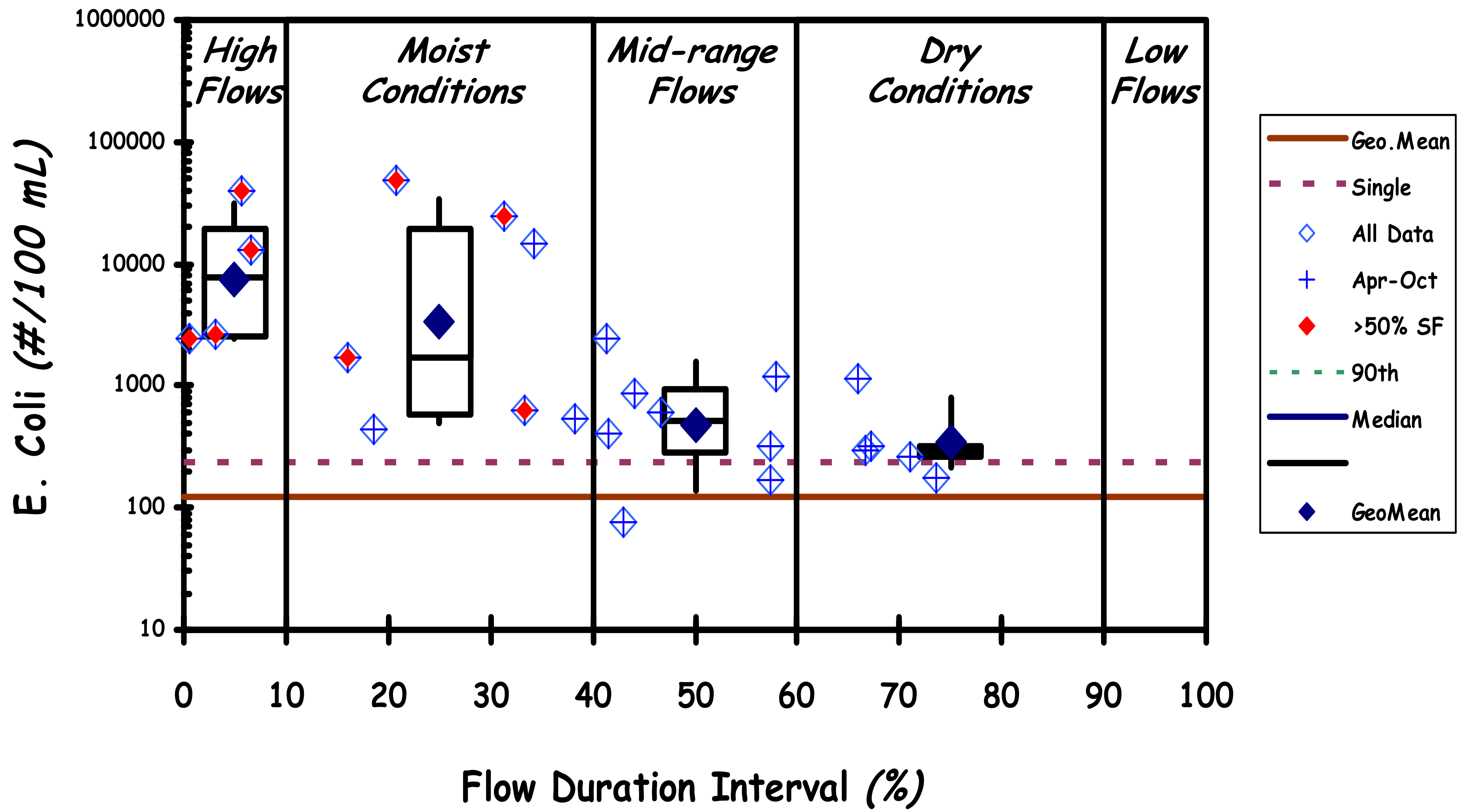


IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*

Blue Creek -- SR 124

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

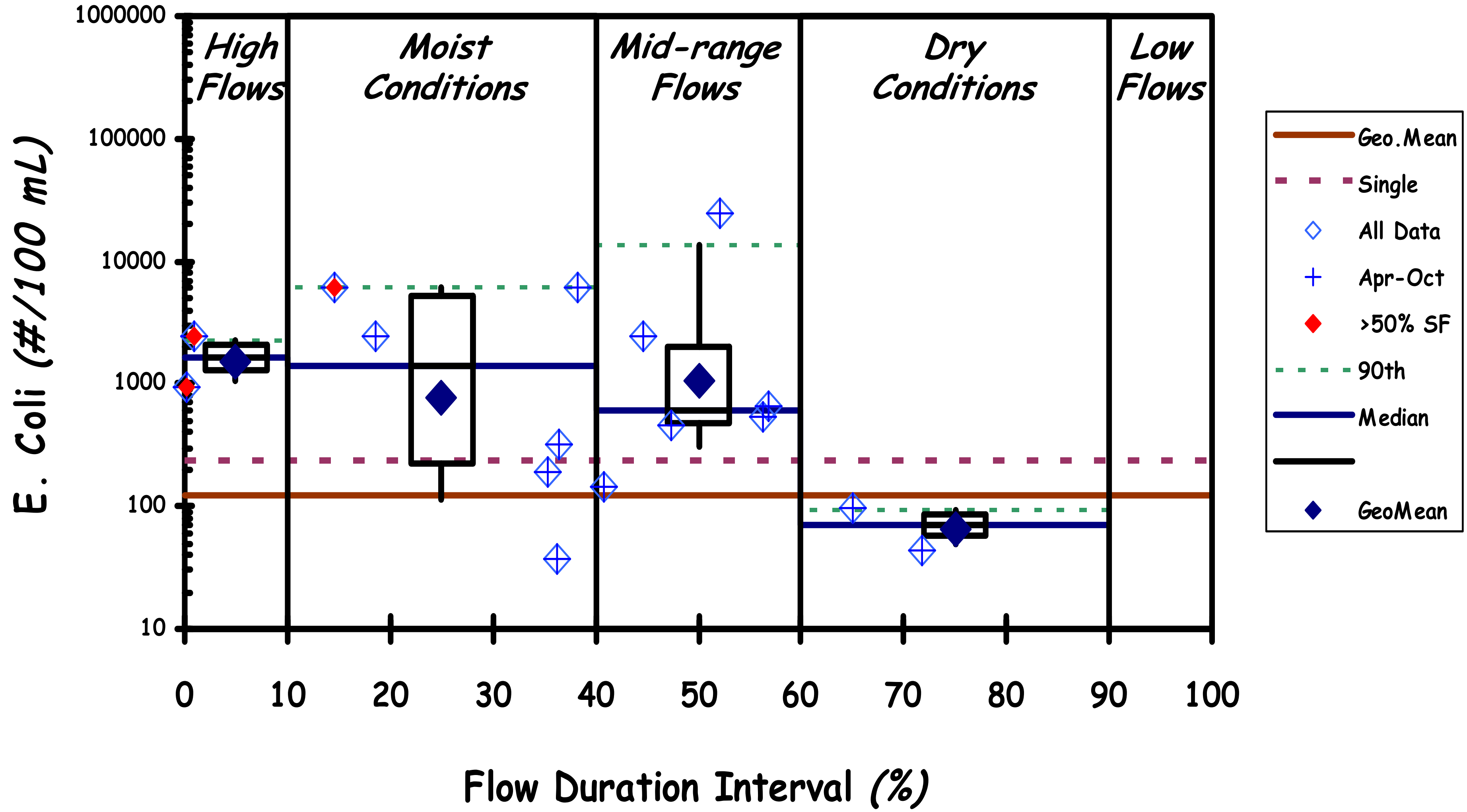


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Martz Creek -- CR 200 N

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0040

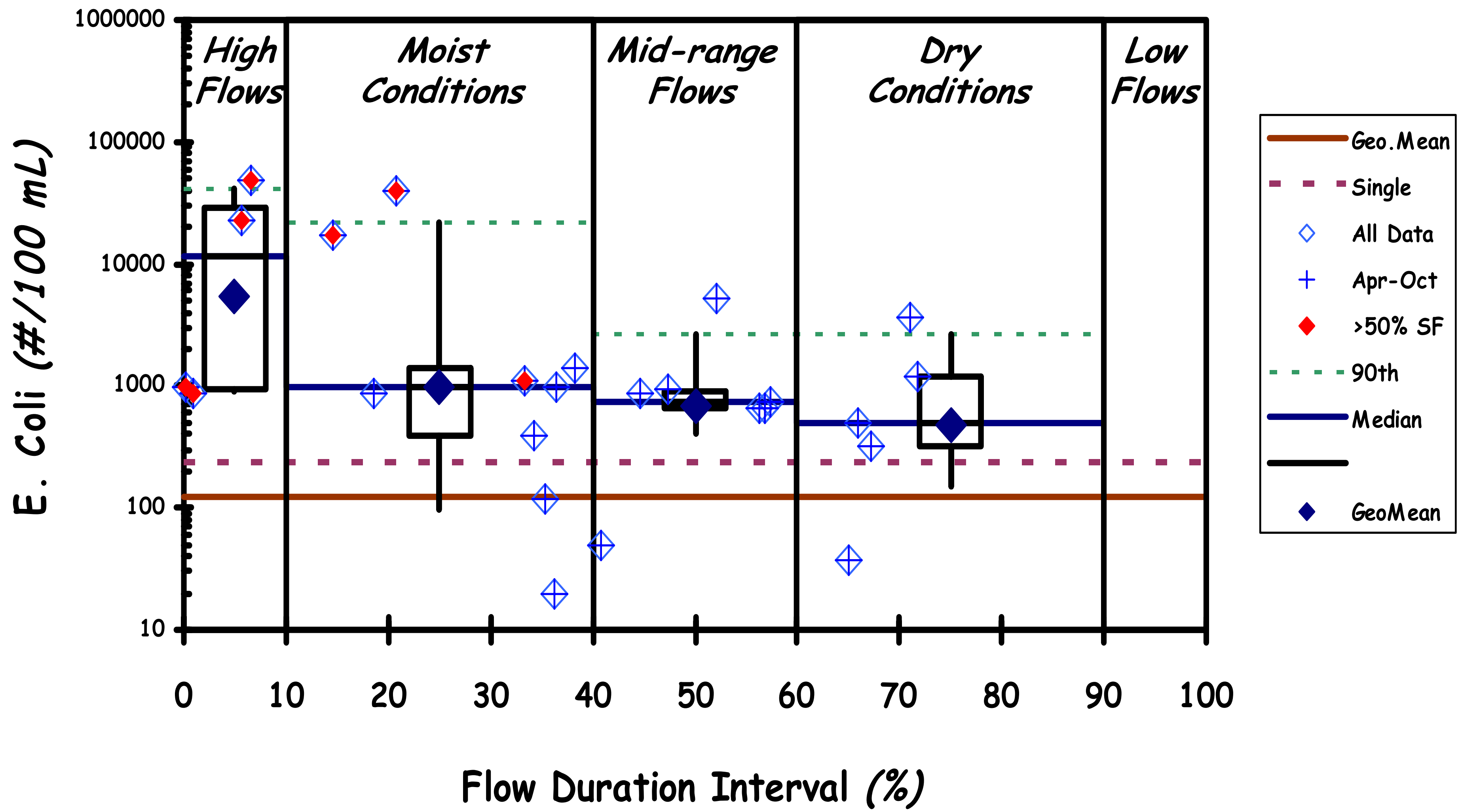


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



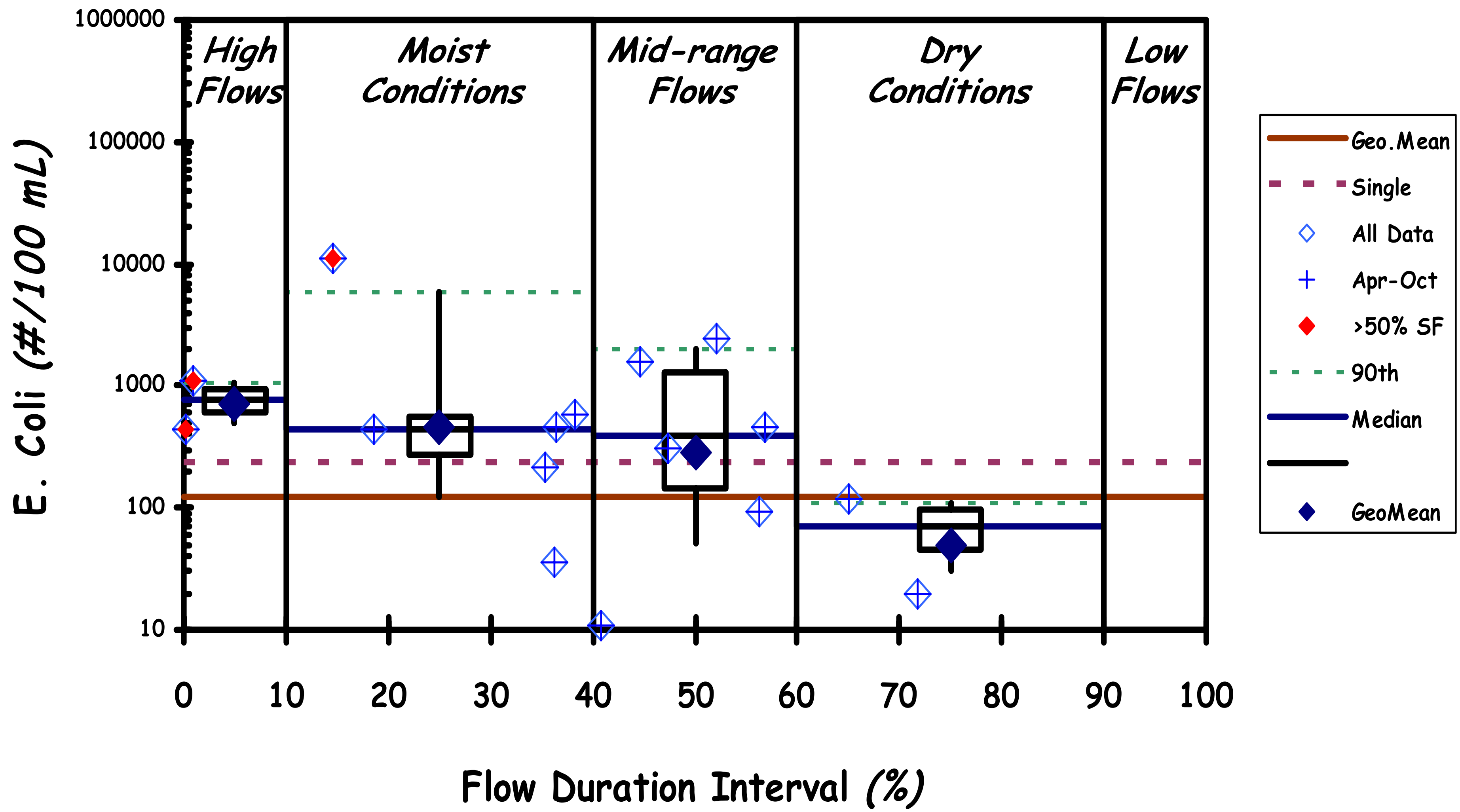
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval

24.5 square miles

Borum Run -- Mercer Road

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0097

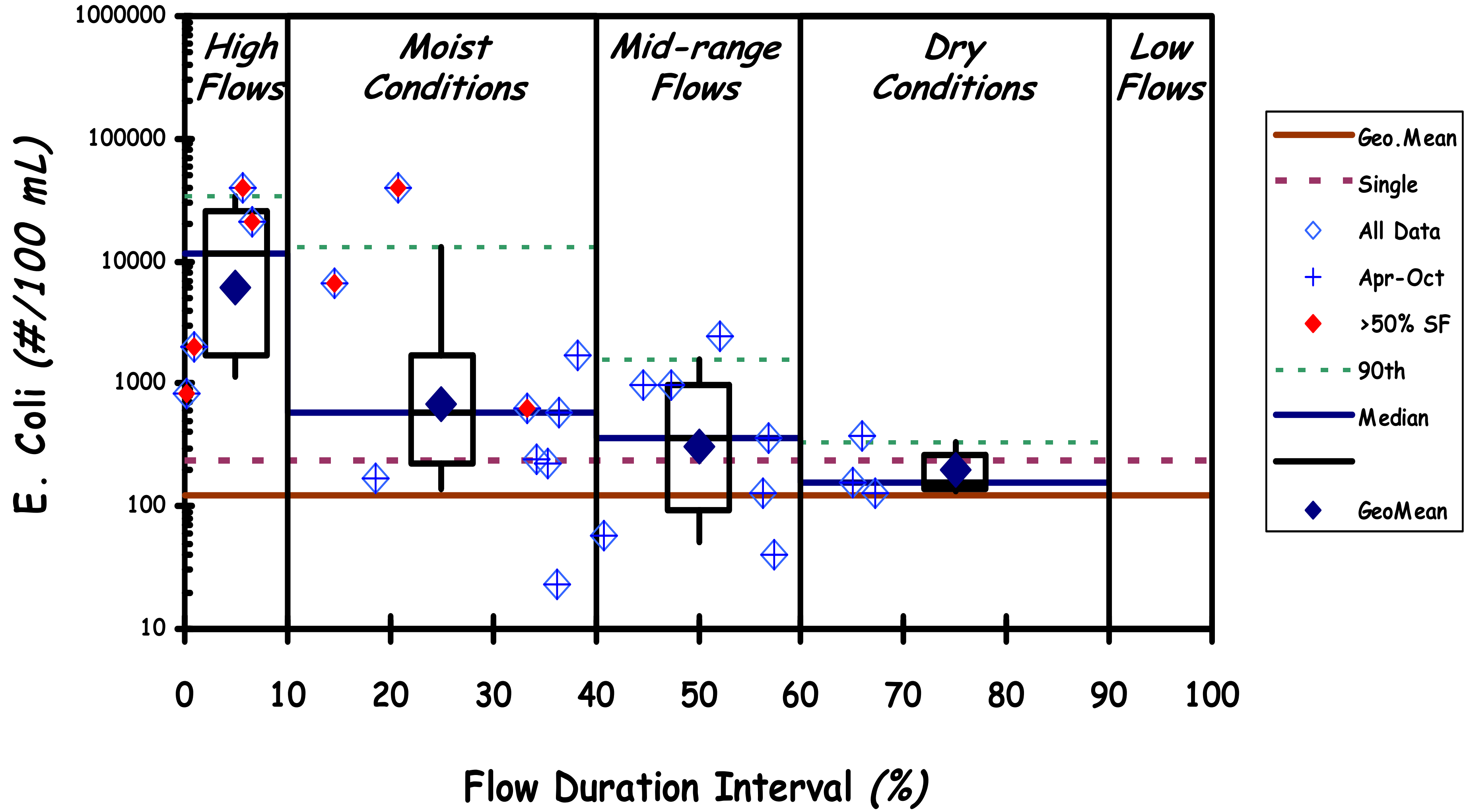


IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES050-0008

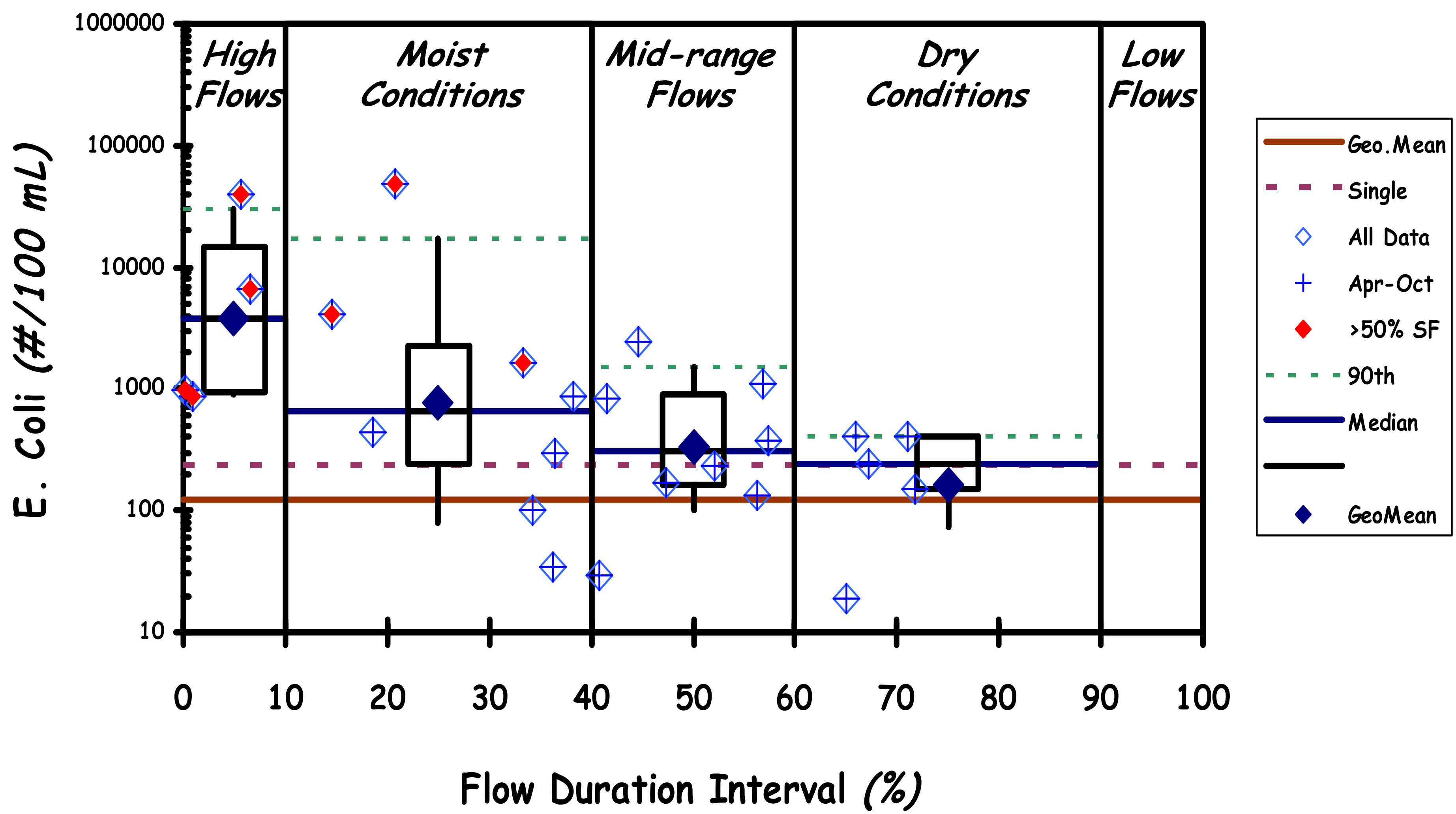


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*

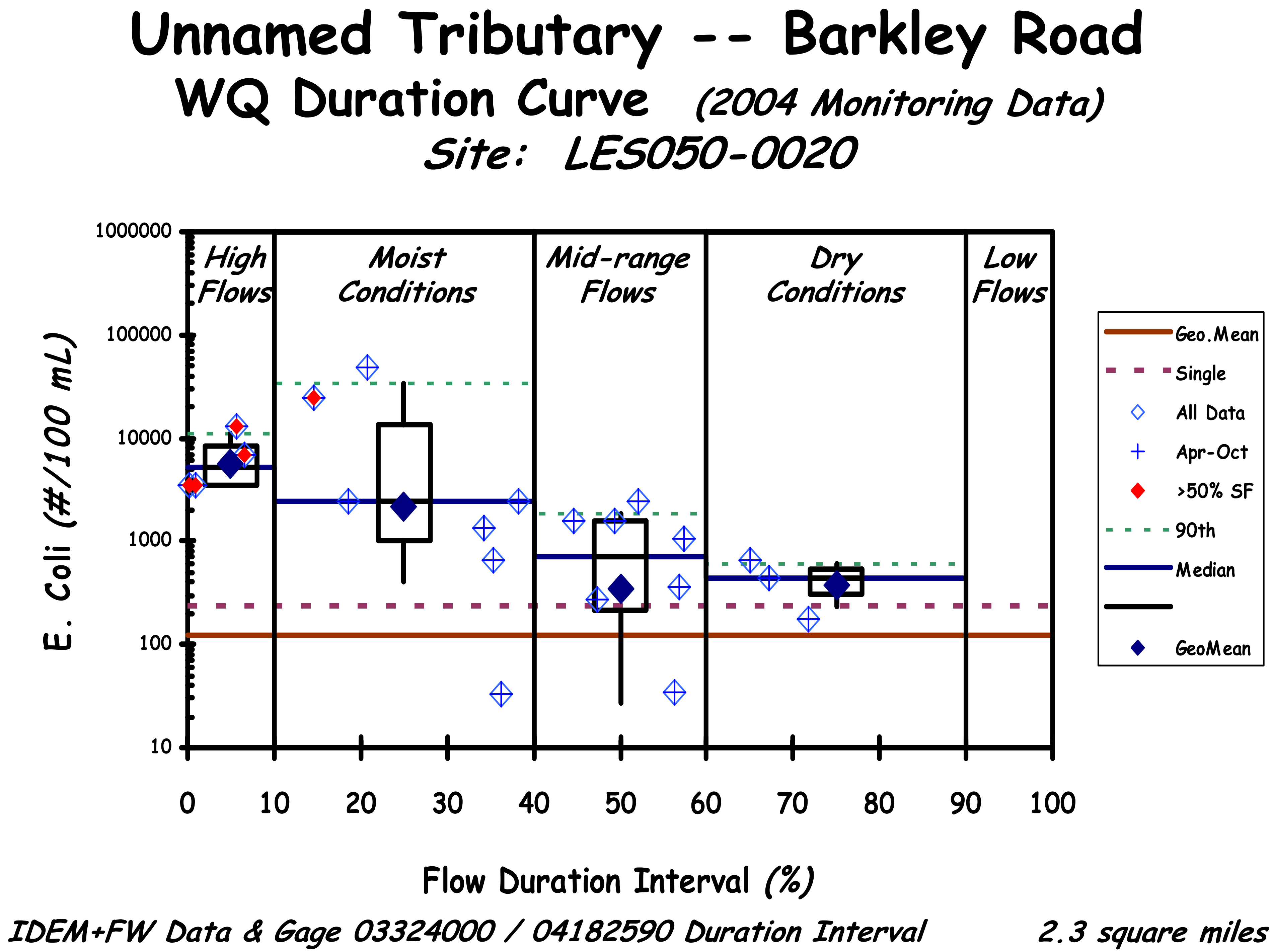
Nickelsen Creek - CR 1100 N

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES050-0015



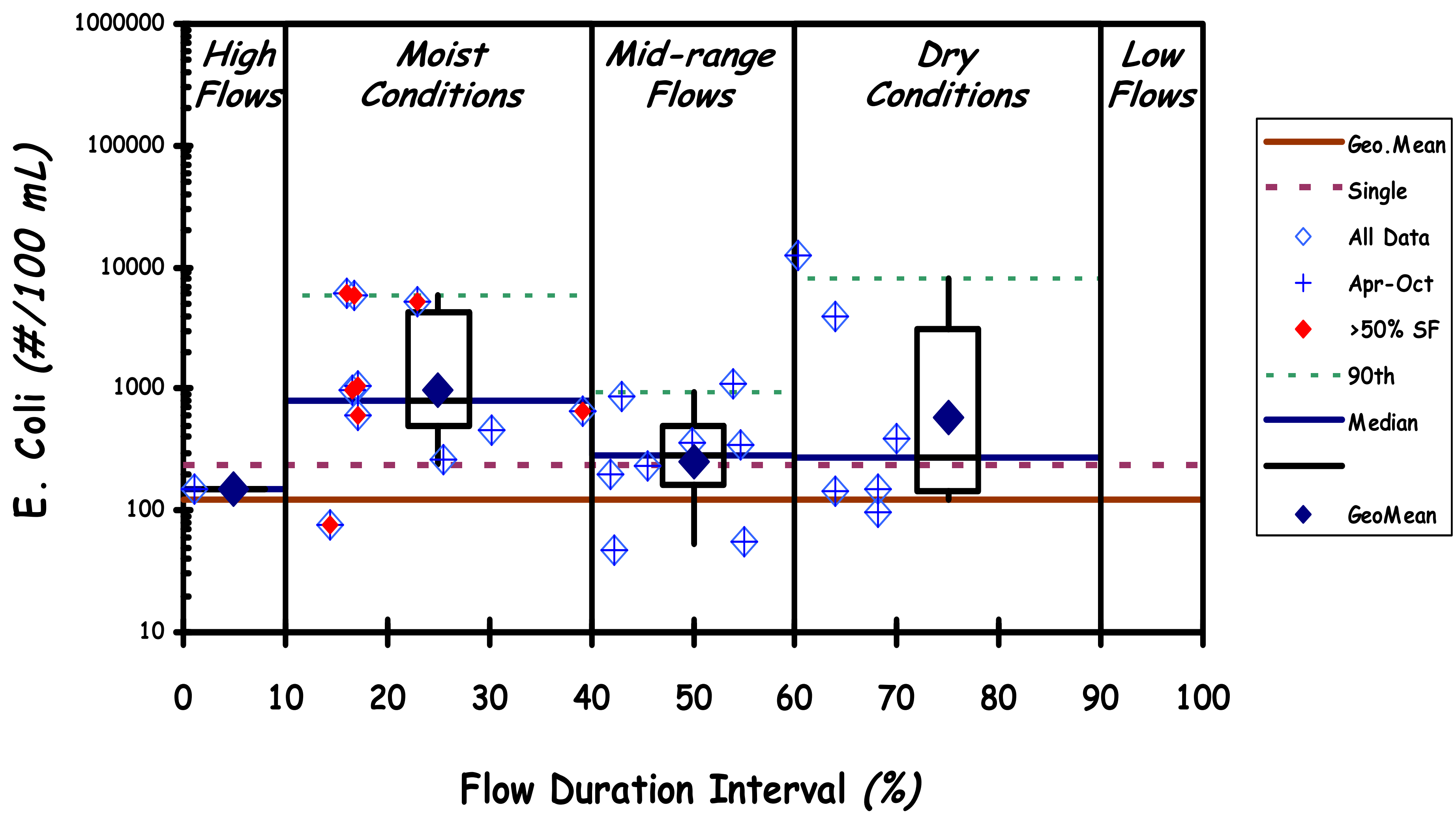
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *12.2 square miles*


Unnamed Tributary -- Barkley Road
WQ Duration Curve (2004 Monitoring Data)
Site: LES050-0020
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
1000000
100000
10000
1000
100
10
E. Coli (#/100 mL)
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
Geo.Mean
Single
All Data
Apr-Oct
>50% SF
90th
Median
GeoMean
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval
2.3 square miles

St. Mary's River at Wilshire, OH

WQ Duration Curve *(2004 Monitoring Data)*

Site: UNK000-0007

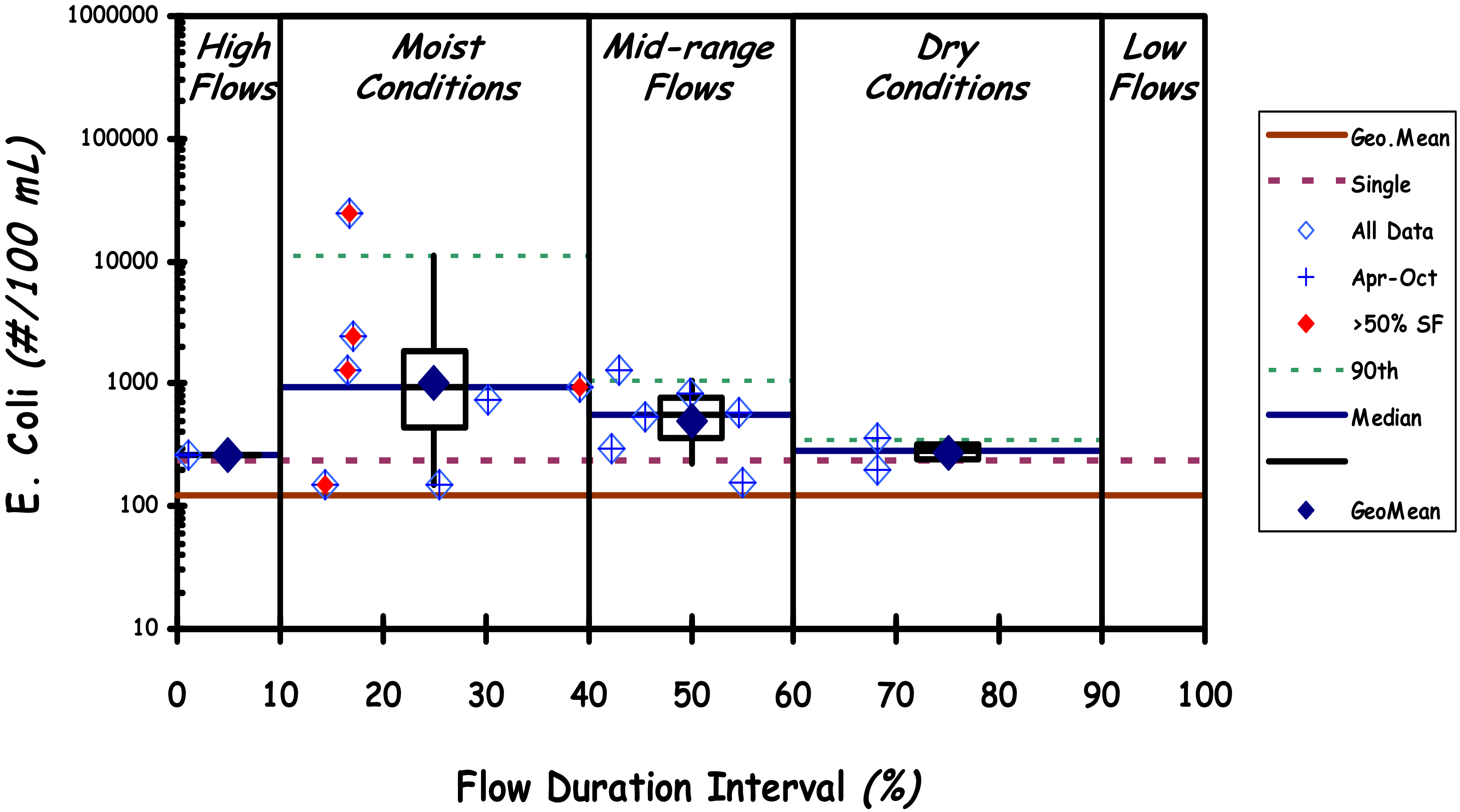


IDEM+FW Data & Gage 04181500 Duration Interval *354 square miles*

St. Mary's River at Pleasant Mills

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0007



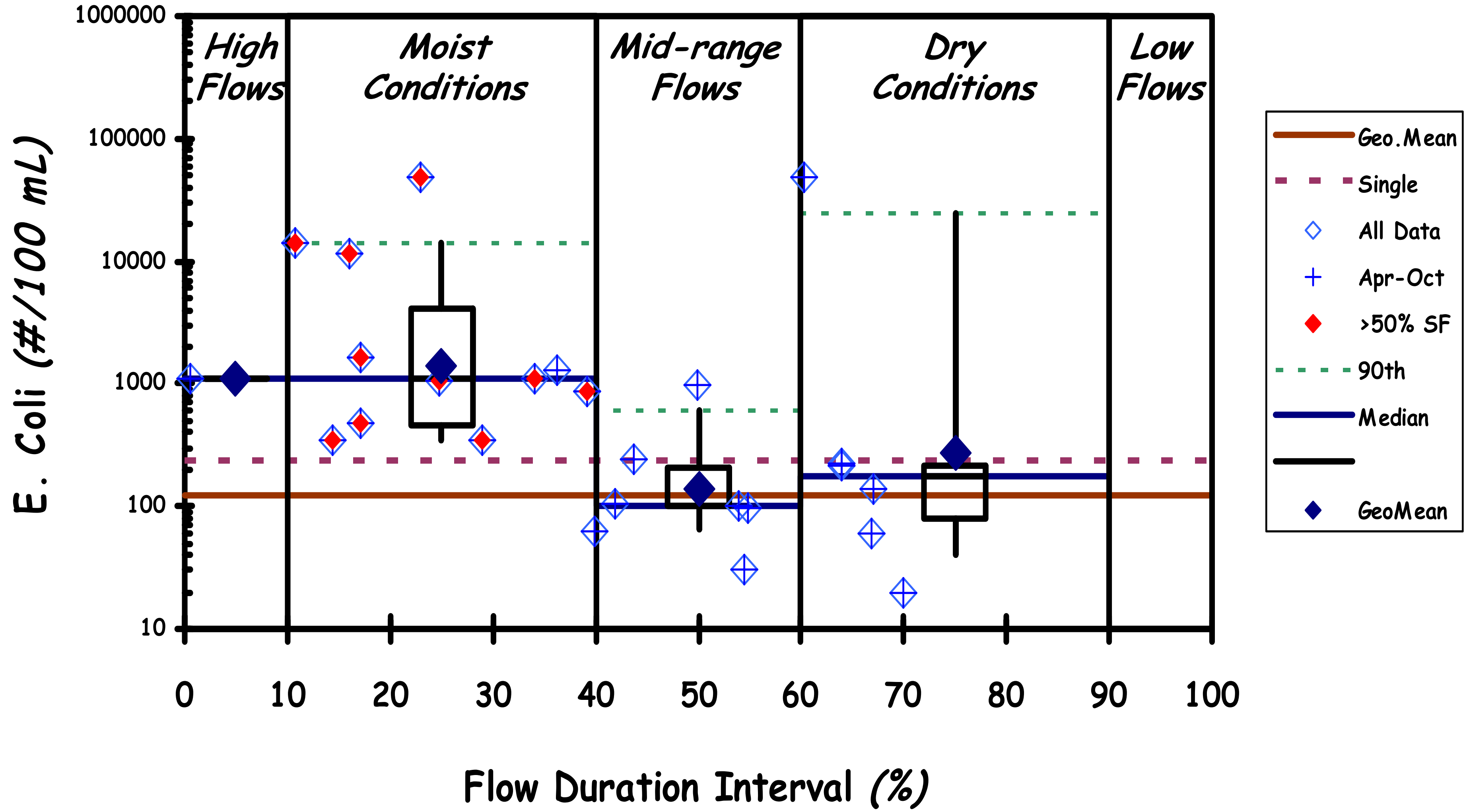
IDEM Data & Gage 04181500 Duration Interval

468 square miles

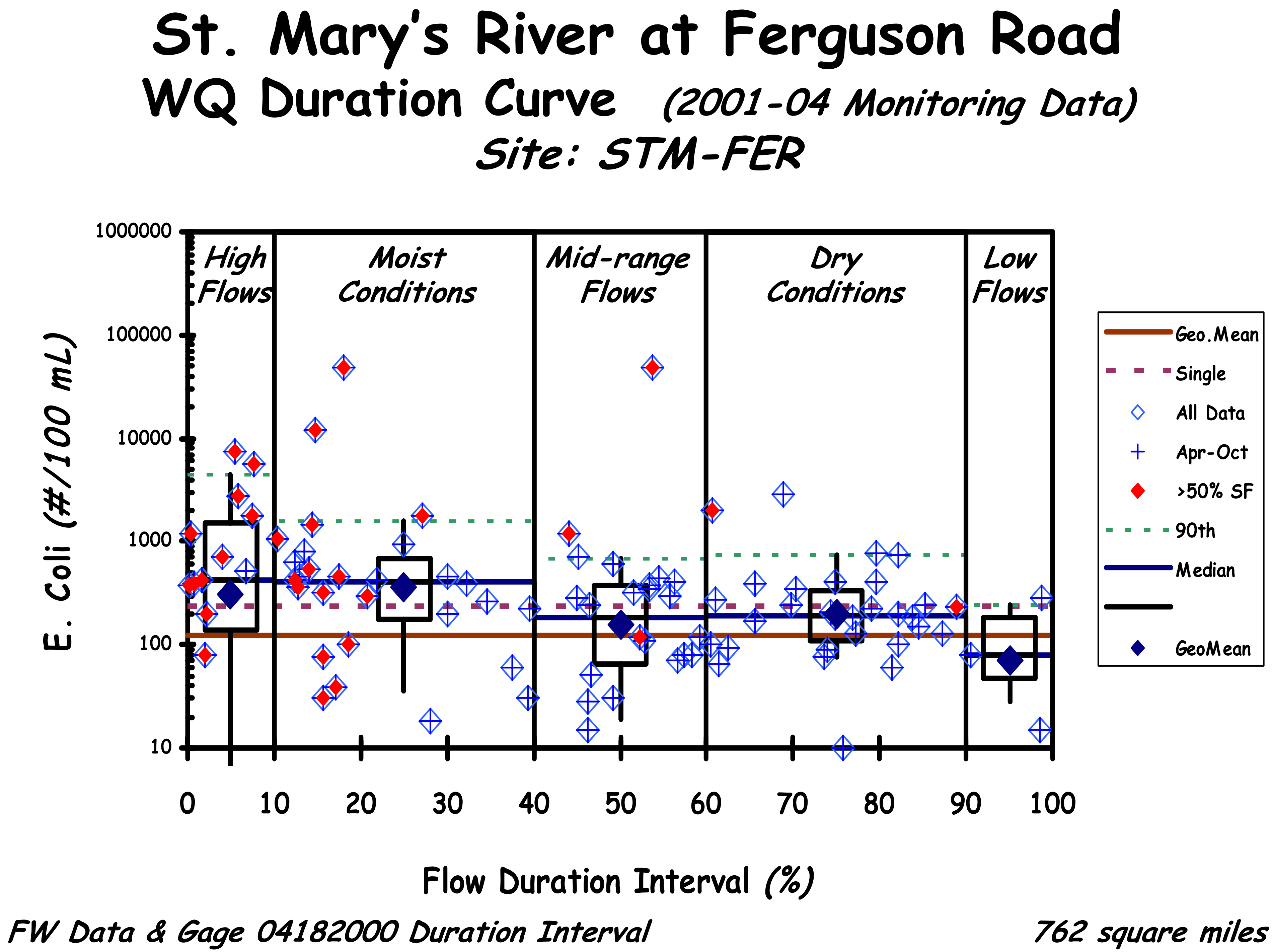
St.Mary's River near Poe

WQ Duration Curve (2004 Monitoring Data)

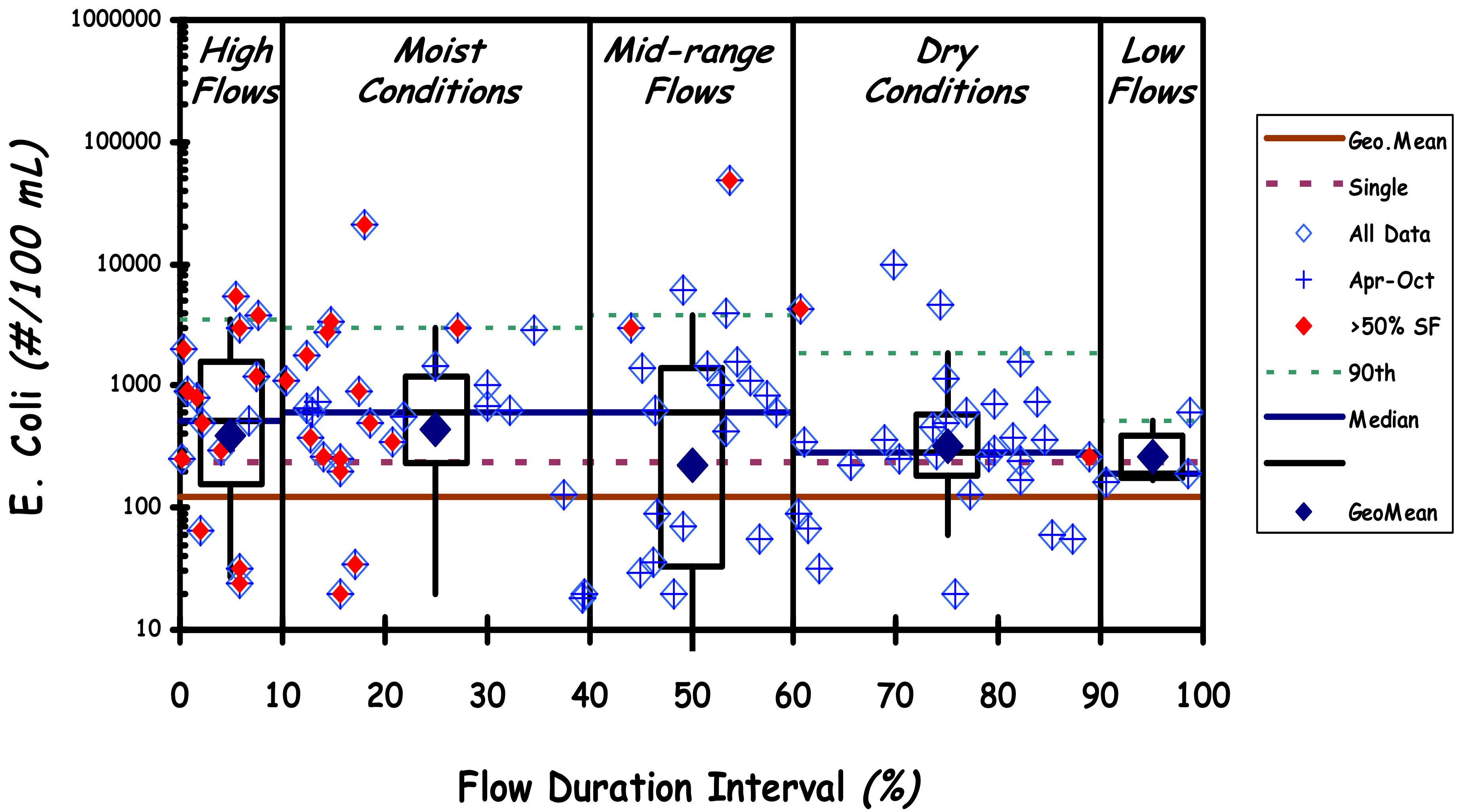
Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval *643 square miles*

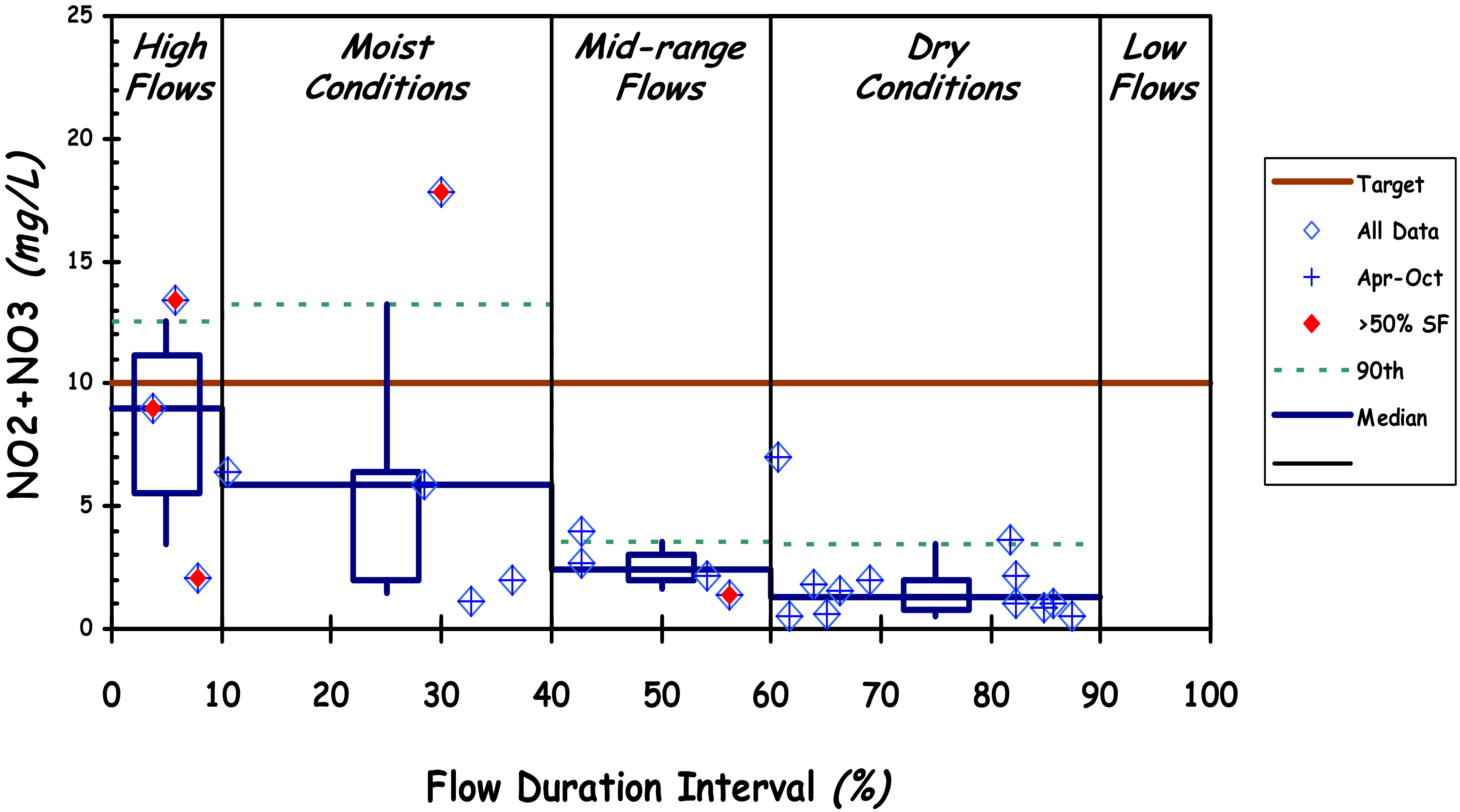

St. Mary's River at Ferguson Road
WQ Duration Curve (2001-04 Monitoring Data)
Site: STM-FER
E. Coli (#/100 mL)
1000000
100000
10000
1000
100
10
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
Geo.Mean
Single
All Data
Apr-Oct
>50% SF
90th
Median
GeoMean
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
FW Data & Gage 04182000 Duration Interval
762 square miles

St. Mary's River at Spy Run Bridge
WQ Duration Curve *(2001-04 Monitoring Data)*
Site: STM-SPY



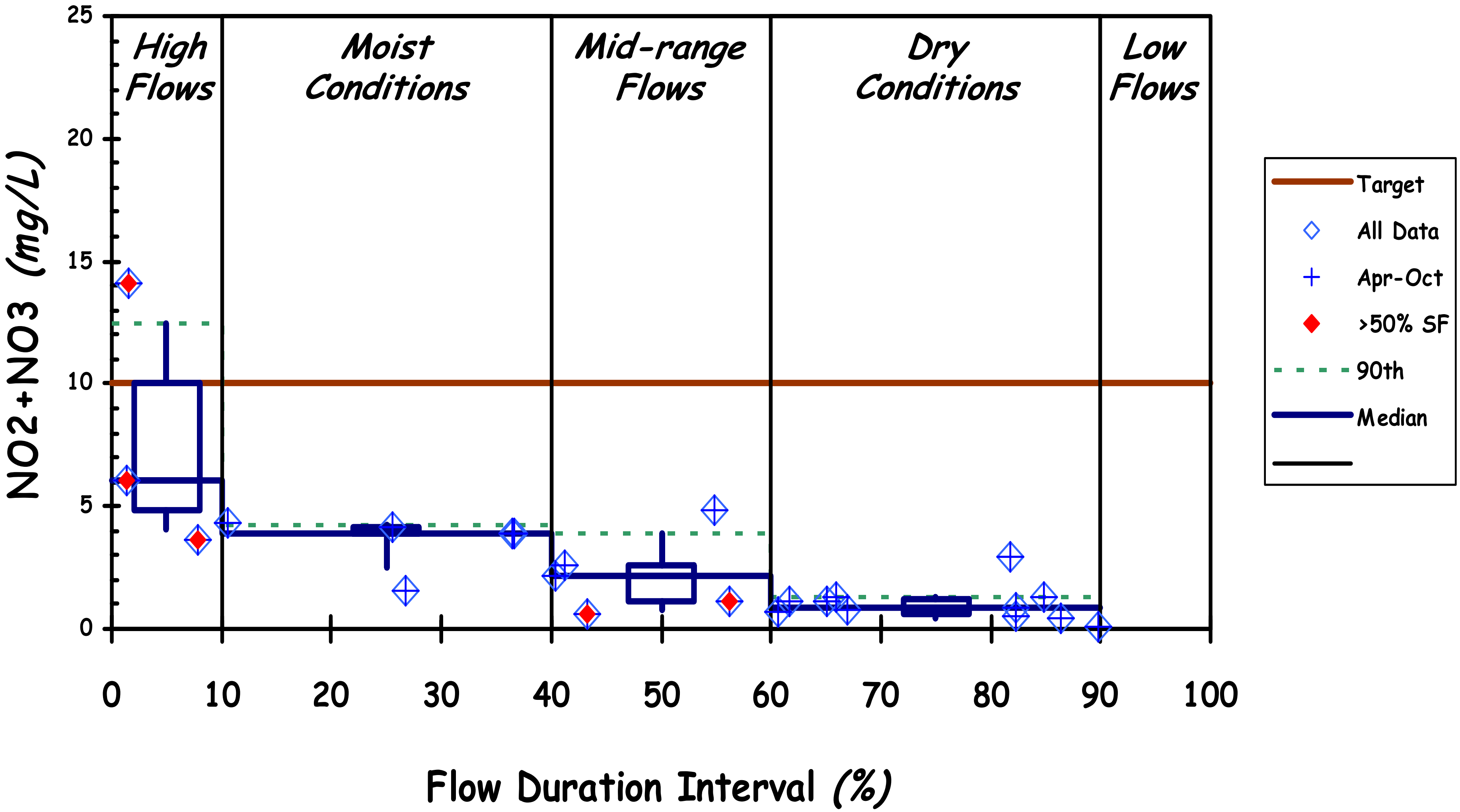
FW Data & Gage 04182000 Duration Interval *820 square miles*

Blue Creek -- SR 124
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0009



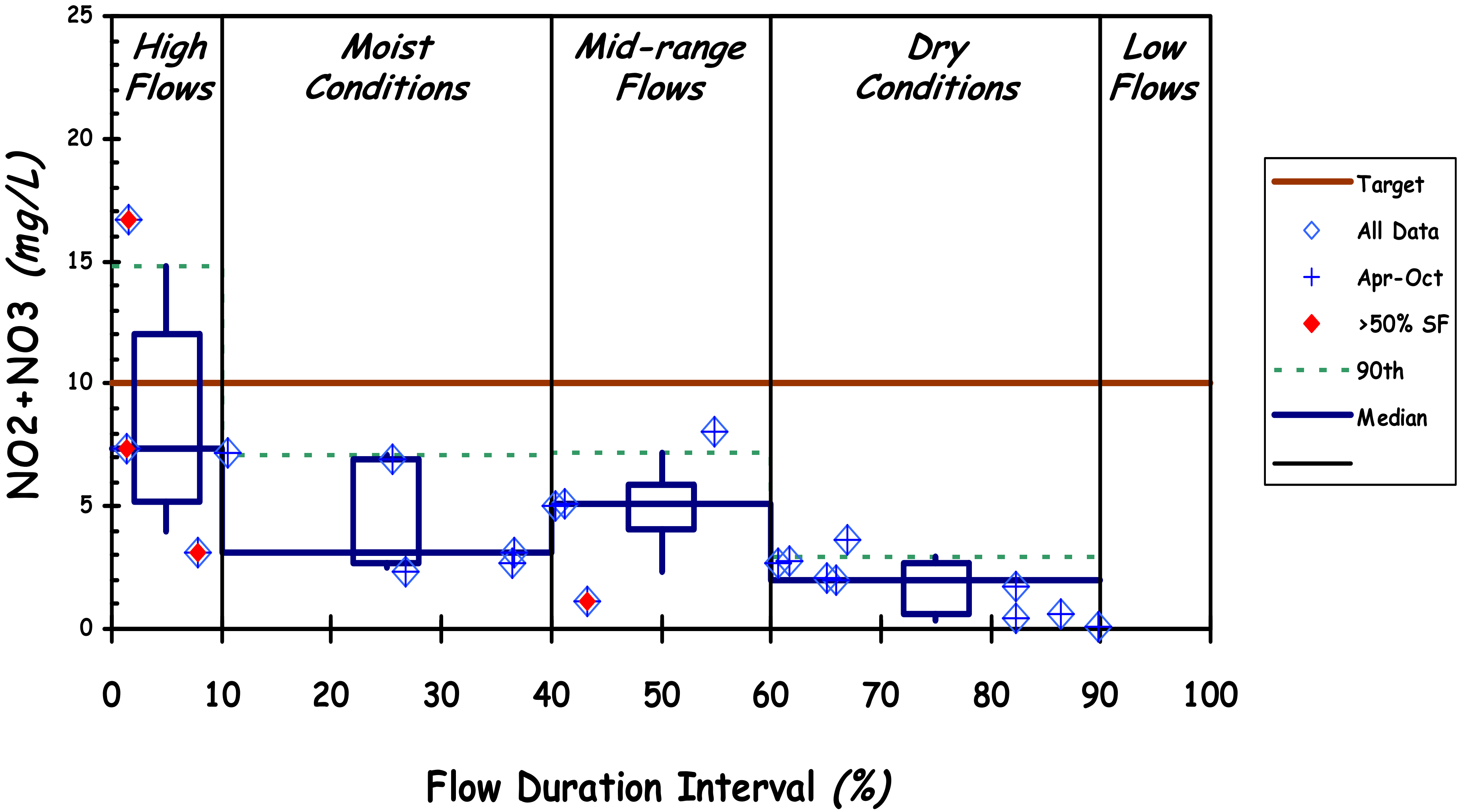
*IDEM+FW Data & Gage 04180000** Duration Interval* *79.6 square miles*

Yellow Creek -- CR 250 S
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0038



*IDEM+FW Data & Gage 04180000** Duration Interval* *24.5 square miles*

Holthouse Ditch -- CR 200 W
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0008

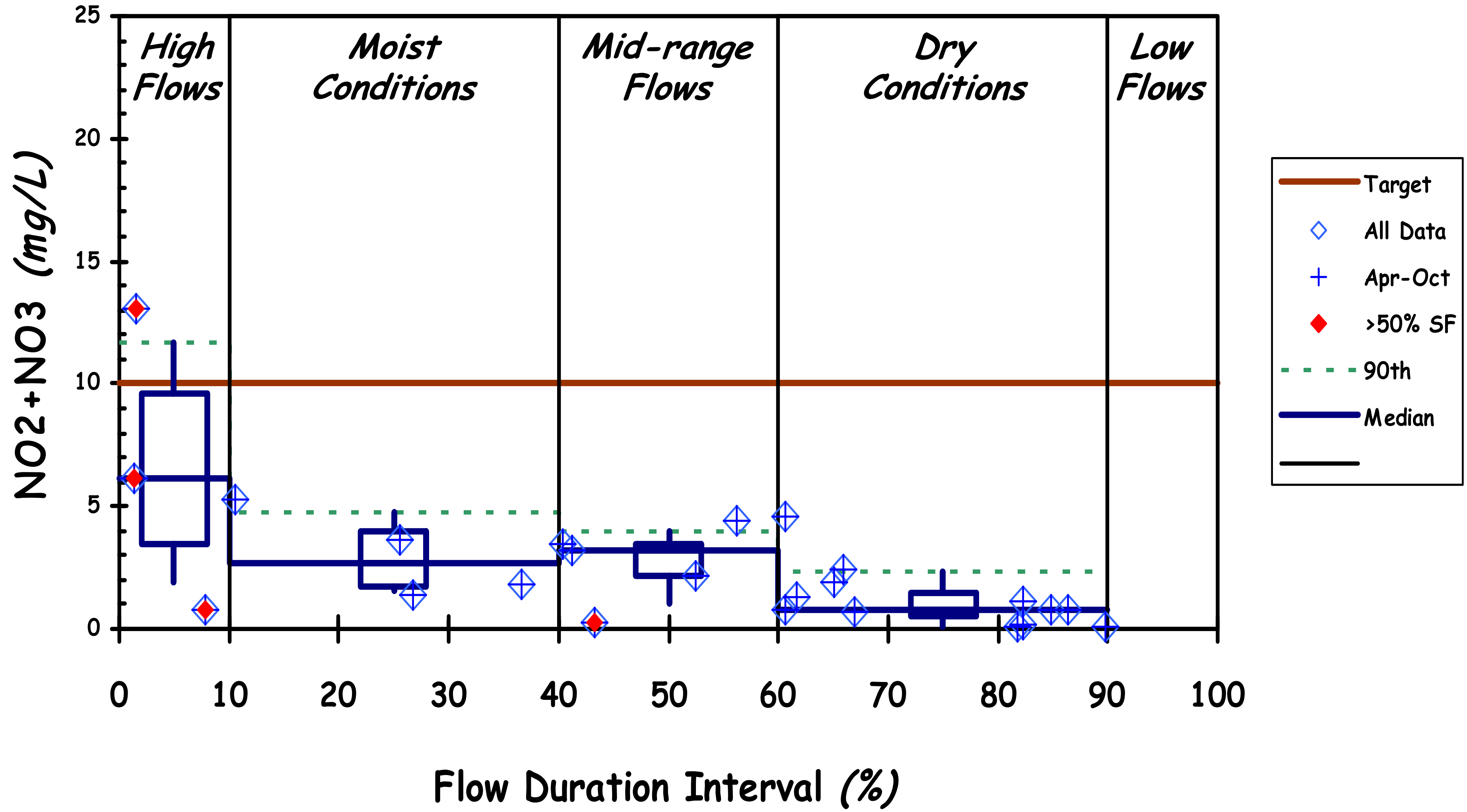


*IDEM+FW Data & Gage 04180000** Duration Interval* *27.3 square miles*

Nickelsen Creek - CR 1100 N

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES050-0015

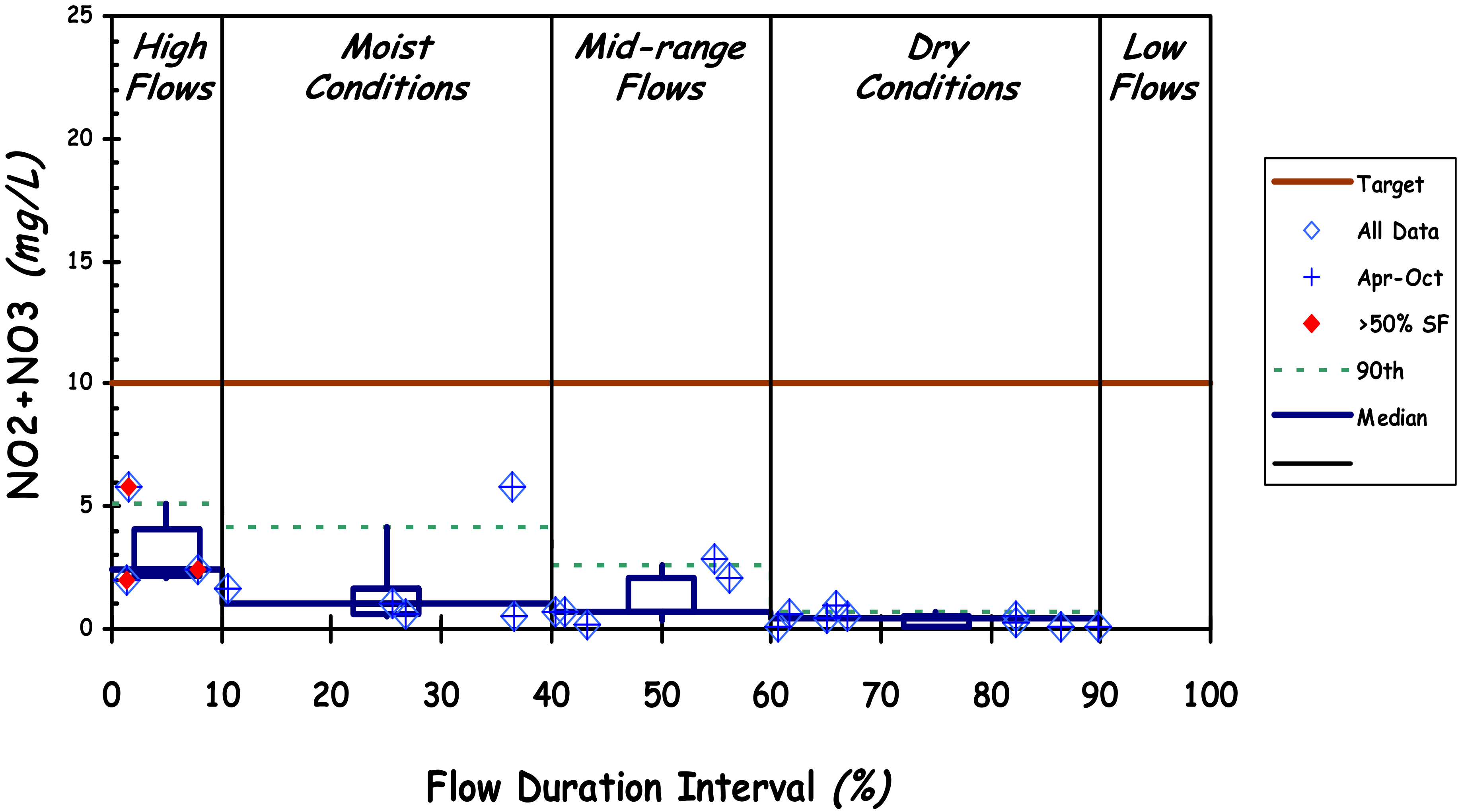


*IDEM+FW Data & Gage 04180000** Duration Interval* *12.2 square miles*

Unnamed Tributary -- Barkley Road

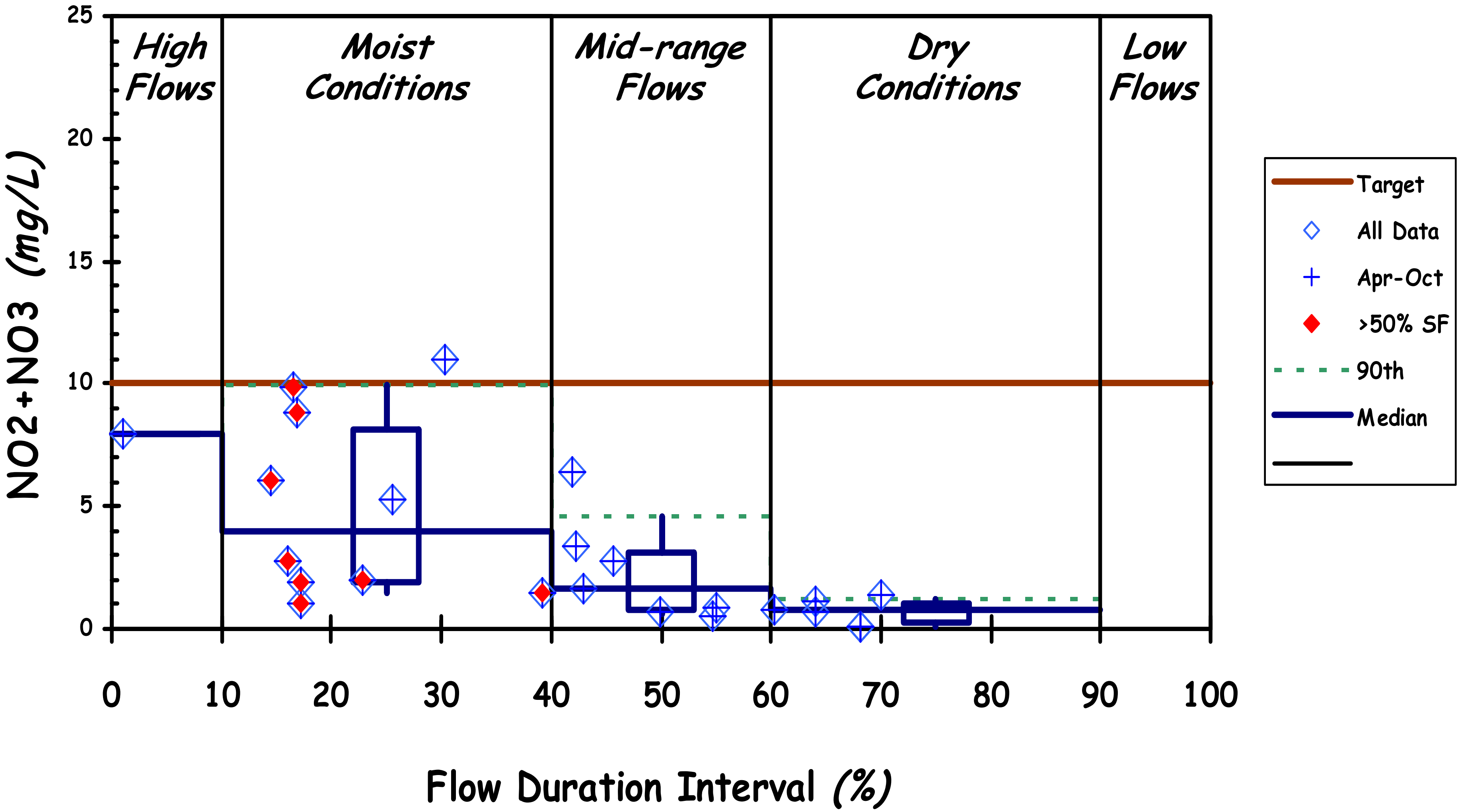
WQ Duration Curve *(2004 Monitoring Data)*

Site: LES050-0020



*IDEM+FW Data & Gage 04180000** Duration Interval* *2.3 square miles*

St. Mary's River at Wilshire, OH
WQ Duration Curve *(2004 Monitoring Data)*
Site: UNK000-0007



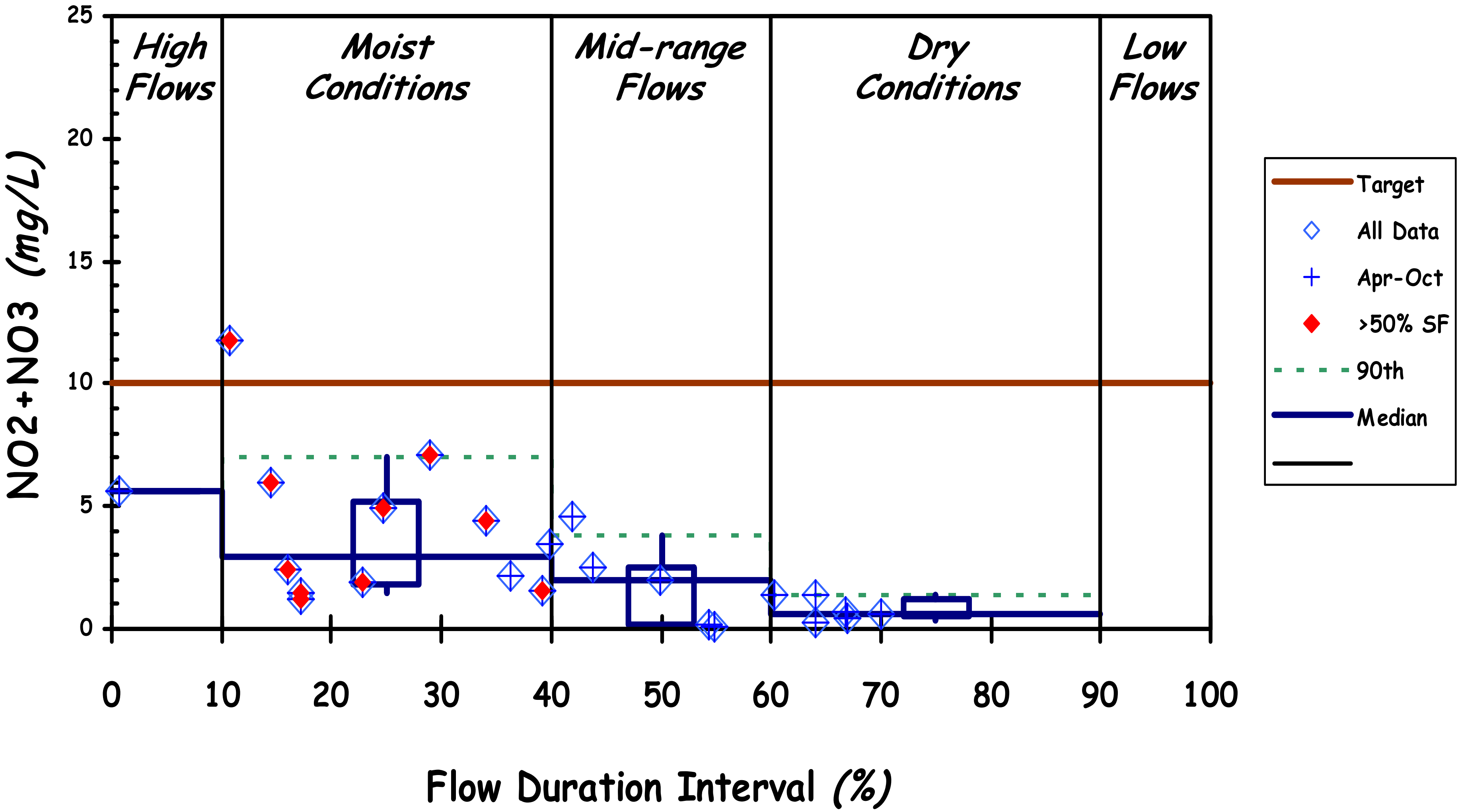
IDEM+FW Data & Gage 04181500 Duration Interval

354 square miles

St. Mary's River near Poe

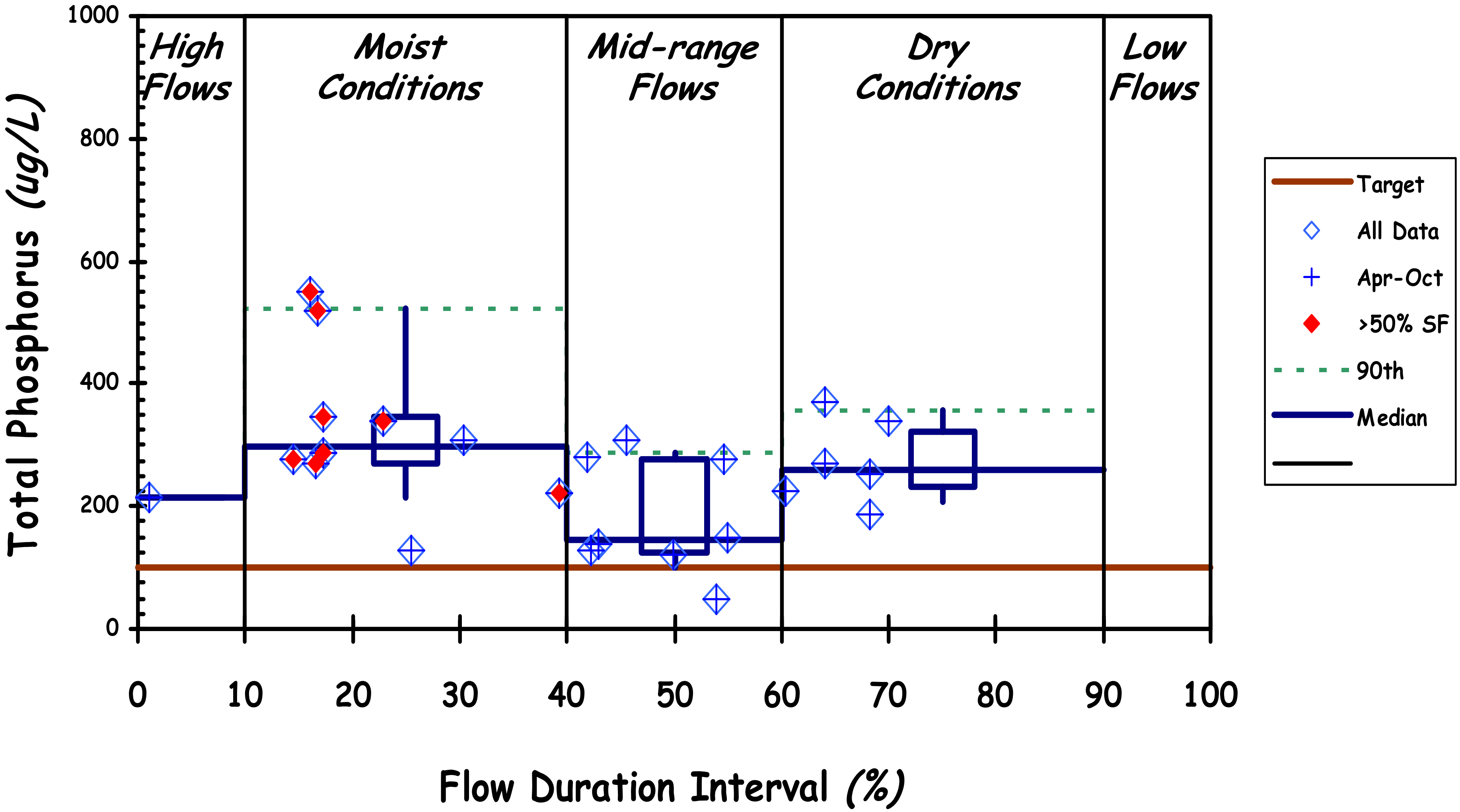
WQ Duration Curve (2004 Monitoring Data)

Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval *643 square miles*

St. Mary's River at Wilshire, OH
WQ Duration Curve *(2004 Monitoring Data)*
Site: UNK000-0007

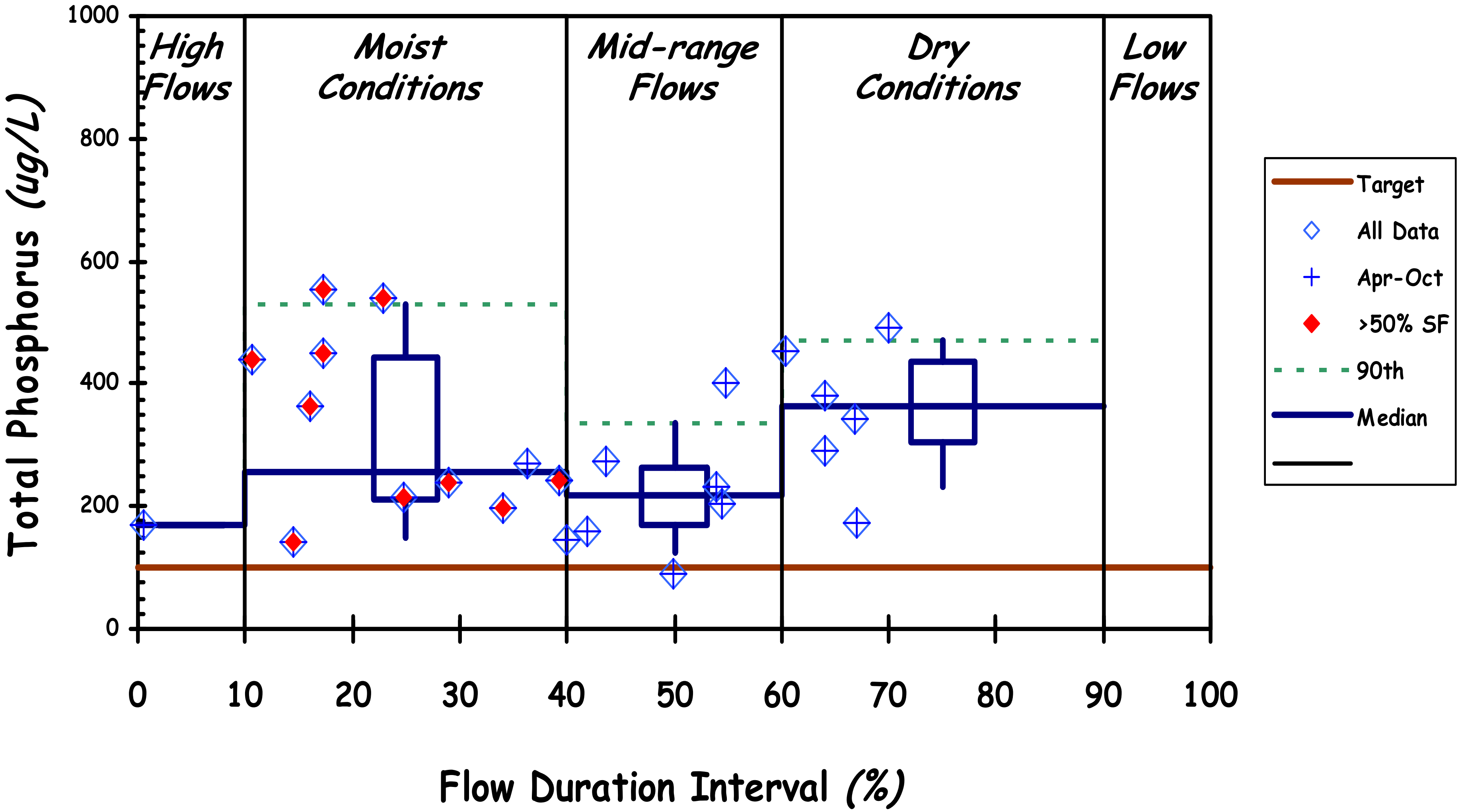


IDEM+FW Data & Gage 04181500 Duration Interval *354 square miles*

St. Mary's River near Poe

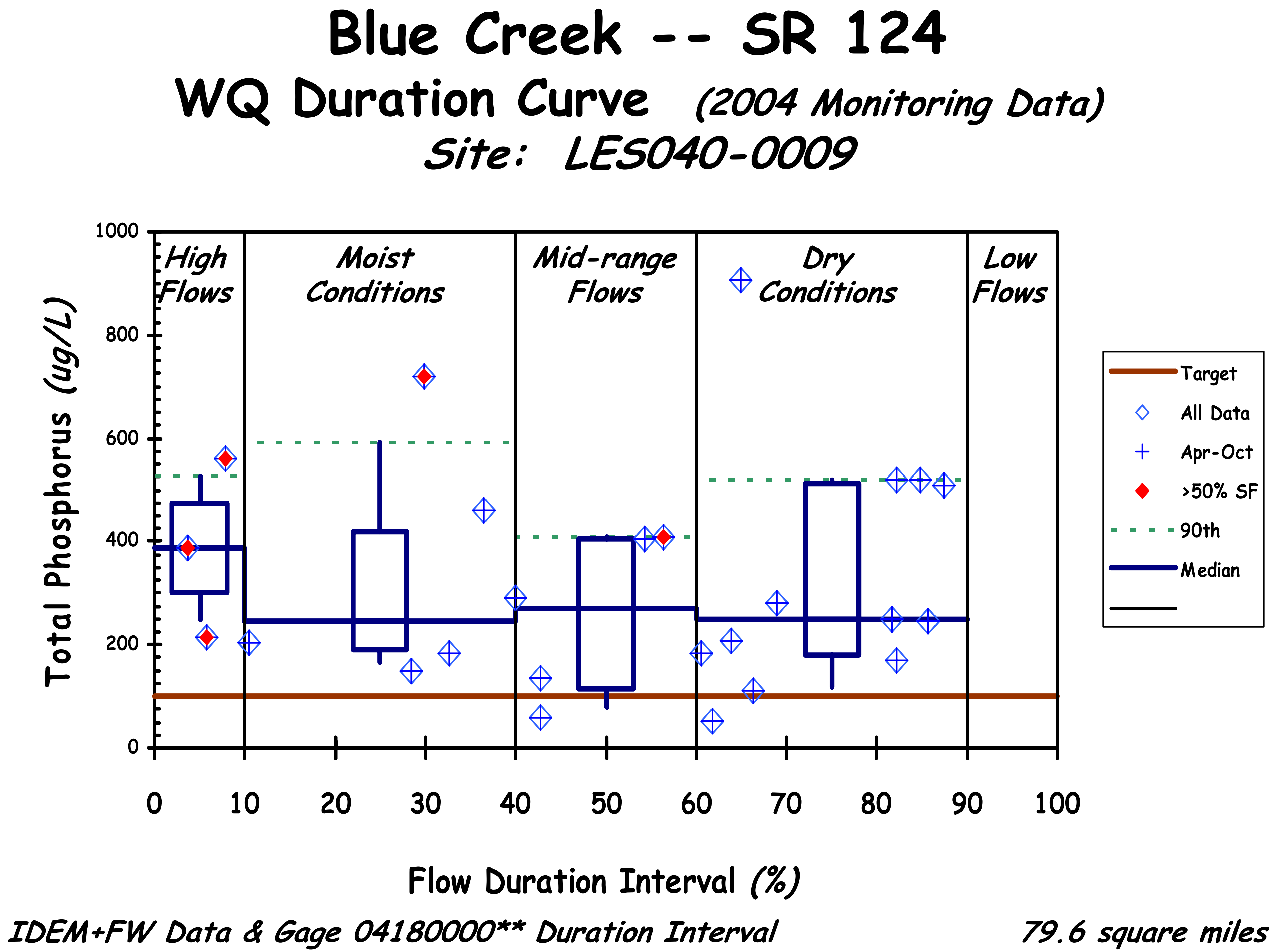
WQ Duration Curve *(2004 Monitoring Data)*

Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval

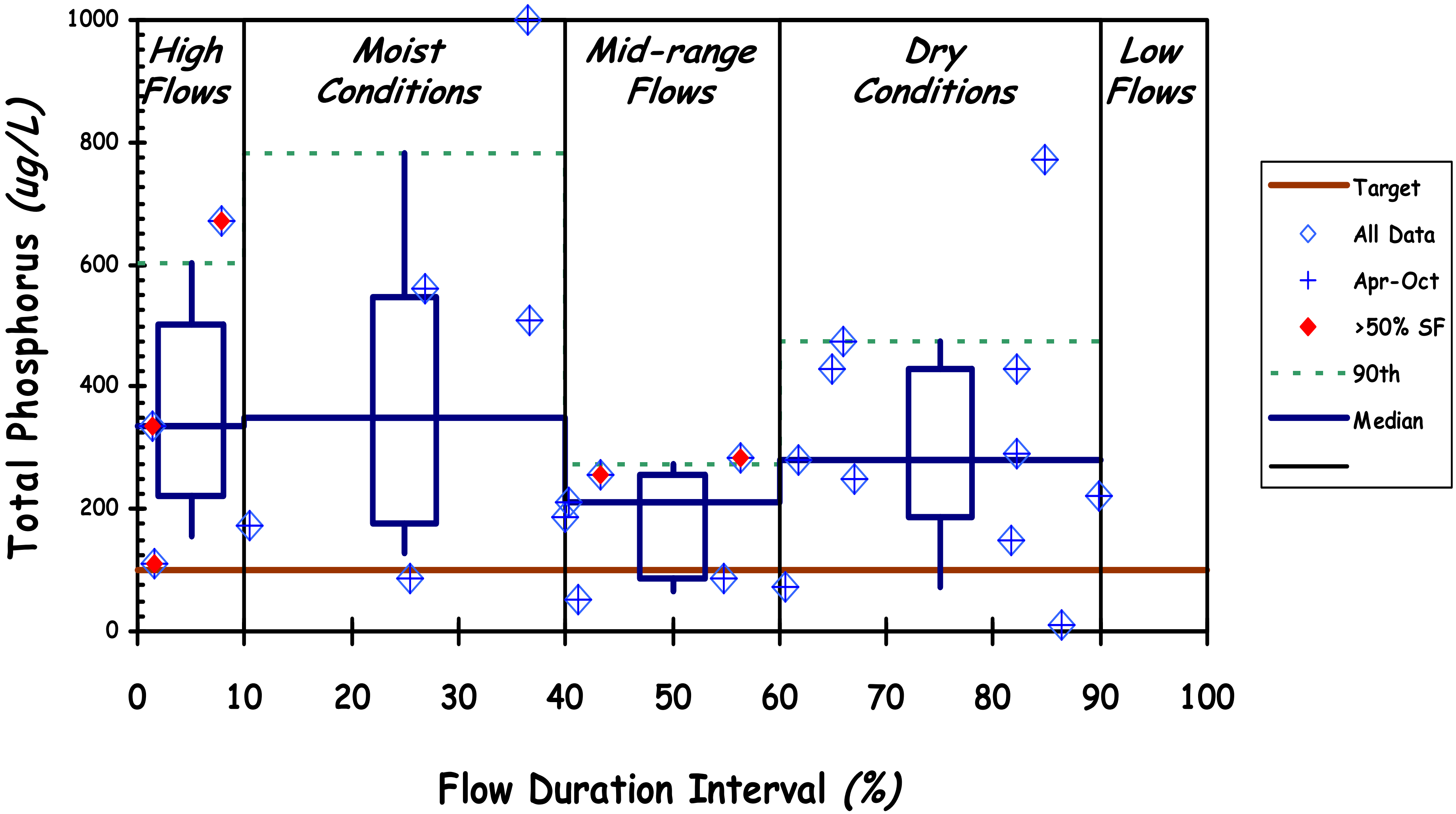
643 square miles


Blue Creek -- SR 124
WQ Duration Curve (2004 Monitoring Data)
Site: LES040-0009
Total Phosphorus (ug/L)
1000
800
600
400
200
0
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
0
10
20
30
40
50
60
70
80
90
100
Target
All Data
Apr-Oct
>50% SF
90th
Median
Flow Duration Interval (%)
IDEM+FW Data & Gage 04180000** Duration Interval
79.6 square miles

Yellow Creek -- CR 250 S

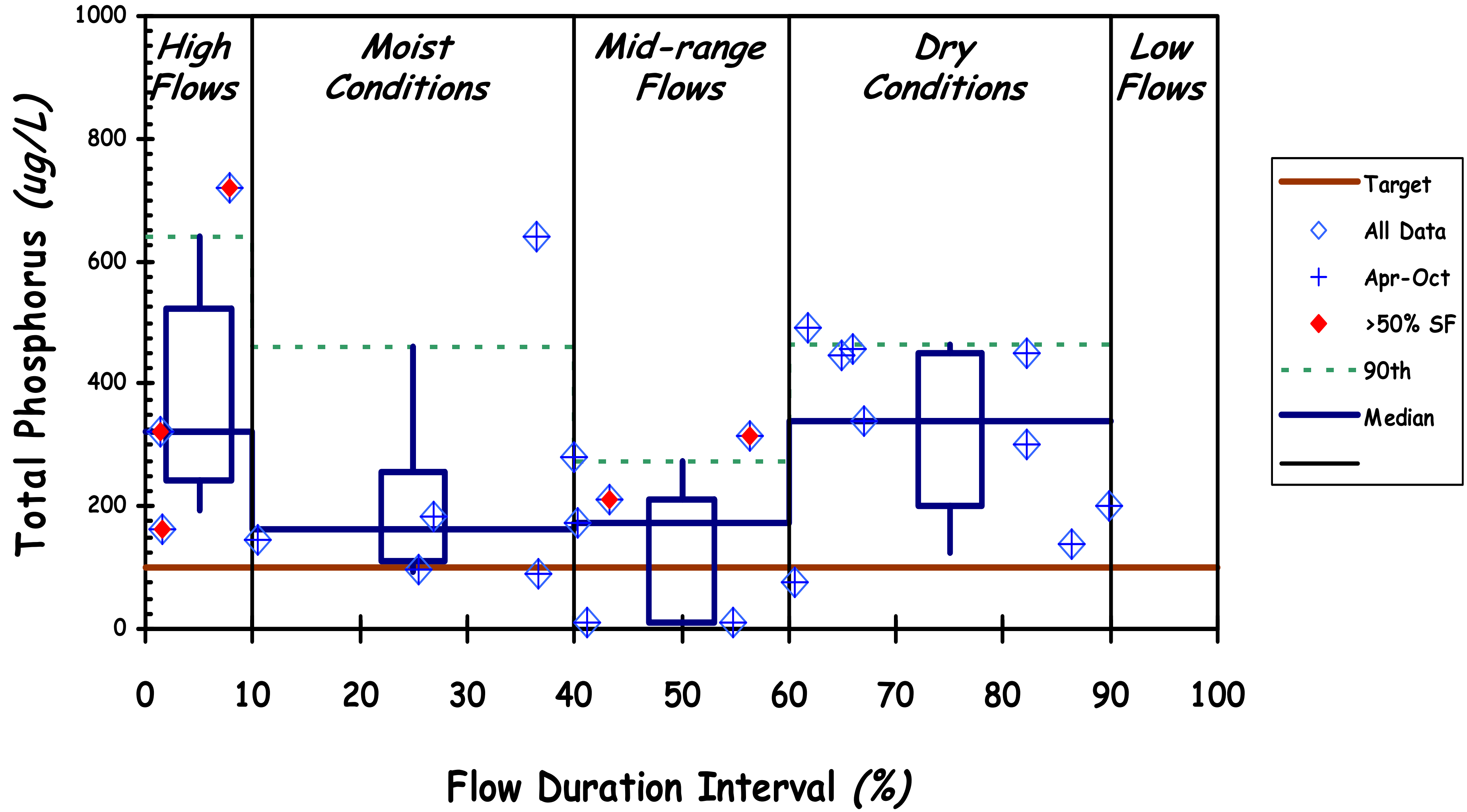
WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



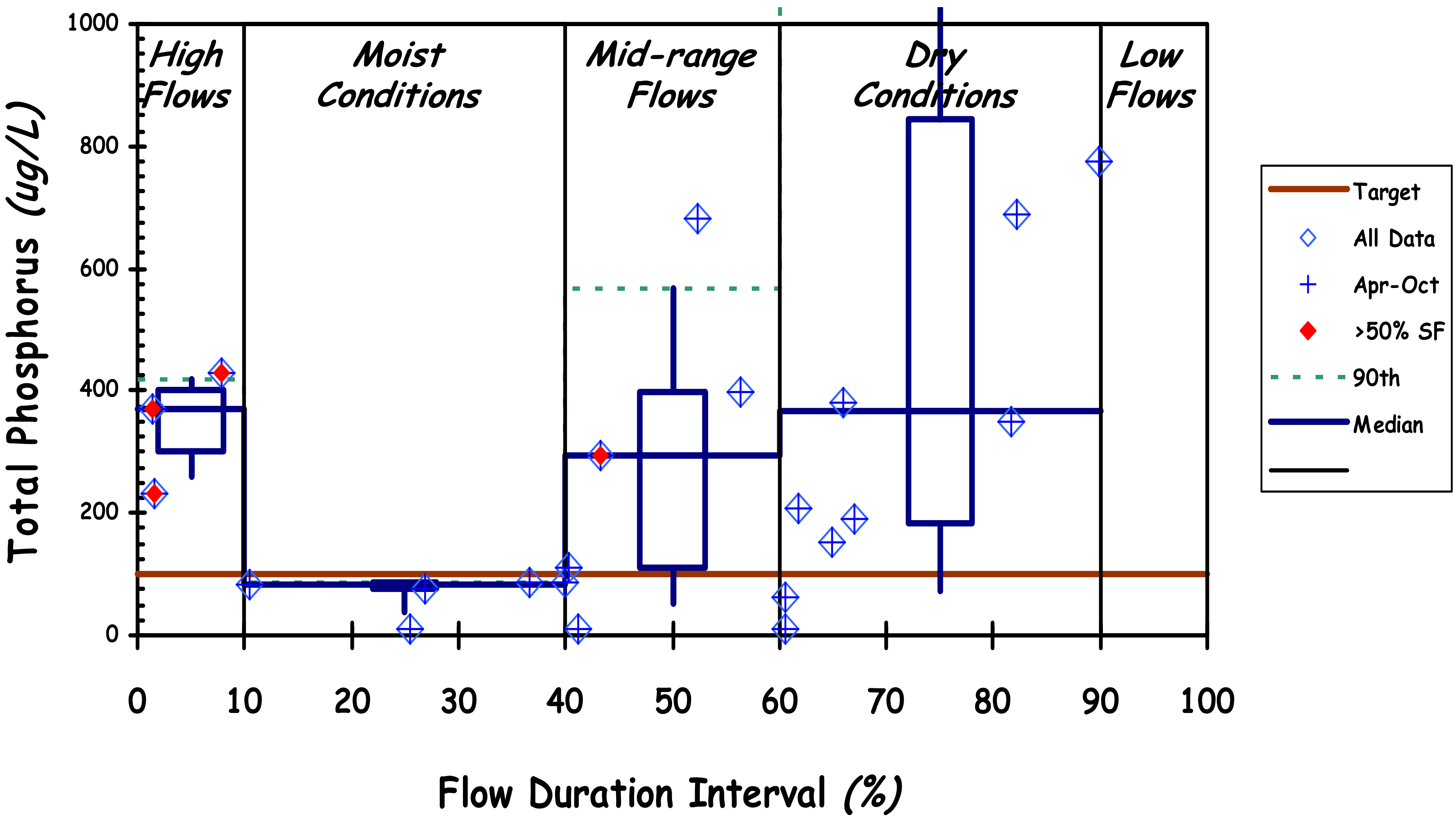
*IDEM+FW Data & Gage 04180000** Duration Interval* *24.5 square miles*

Holthouse Ditch -- CR 200 W
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0008



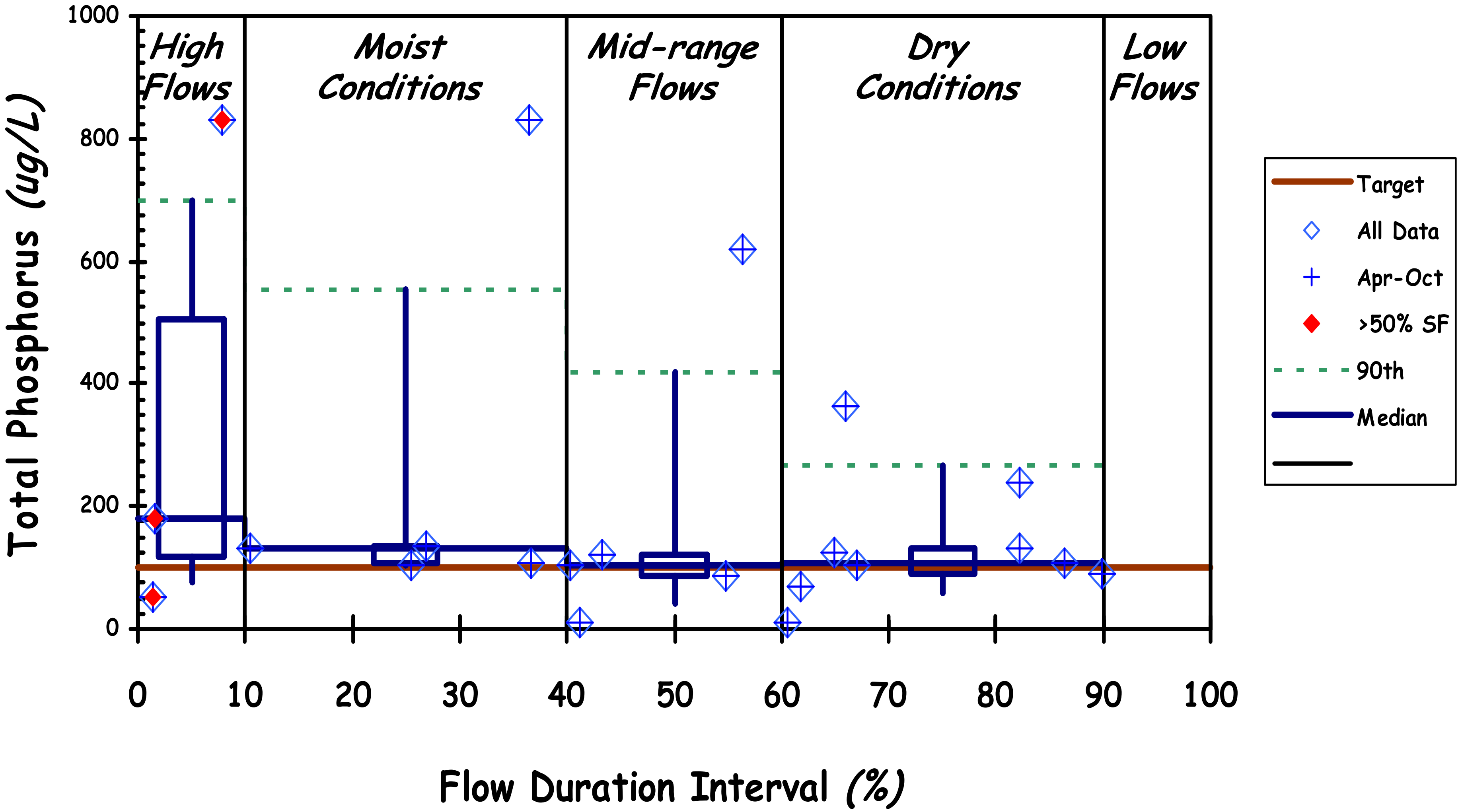
*IDEM+FW Data & Gage 04180000** Duration Interval* *27.3 square miles*

Nickelsen Creek – CR 1100 N
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0015



*IDEM+FW Data & Gage 04180000** Duration Interval* *12.2 square miles*

Unnamed Tributary -- Barkley Road
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0020



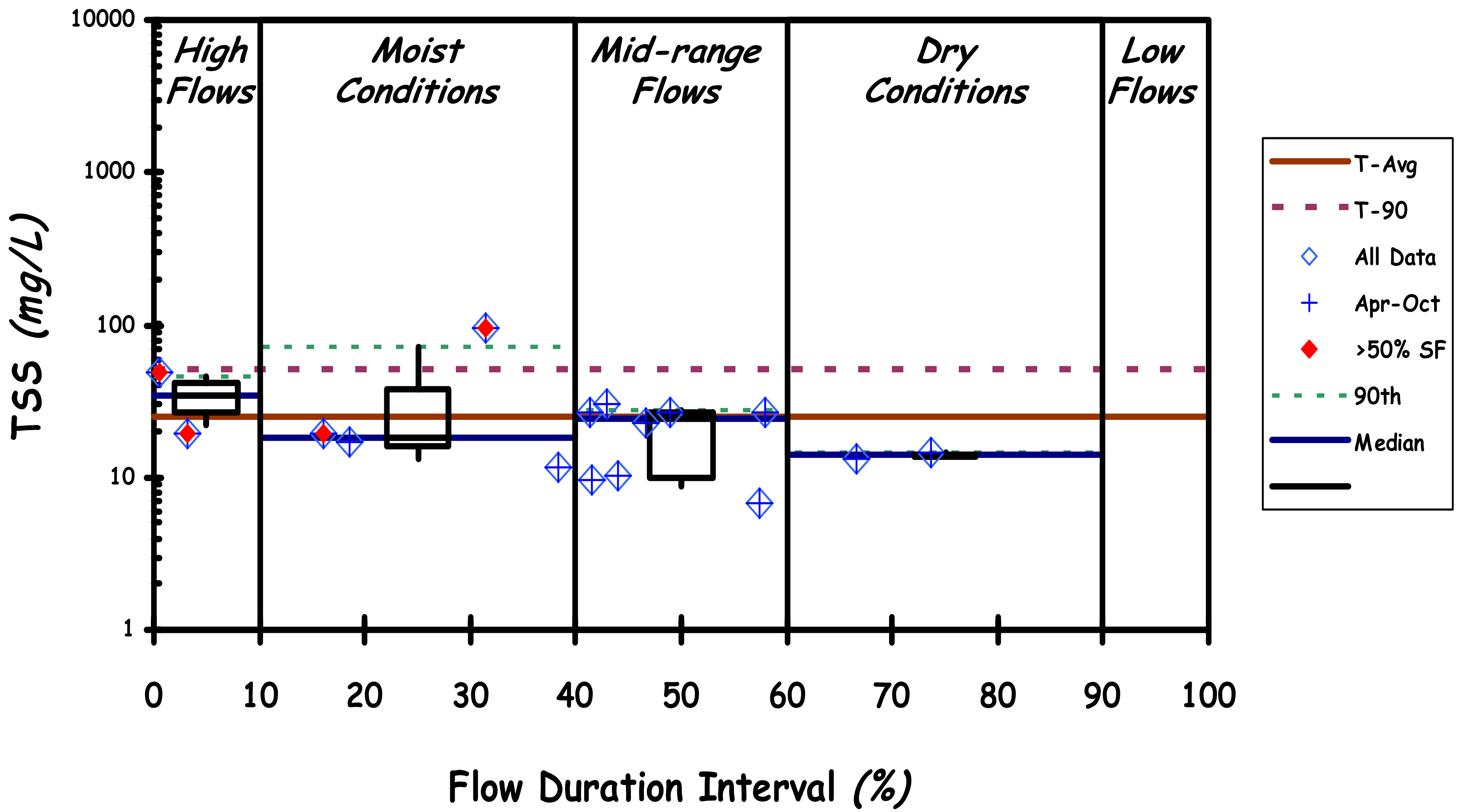
*IDEM+FW Data & Gage 04180000** Duration Interval*

2.3 square miles

Habegger Ditch -- CR 150 E

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0099

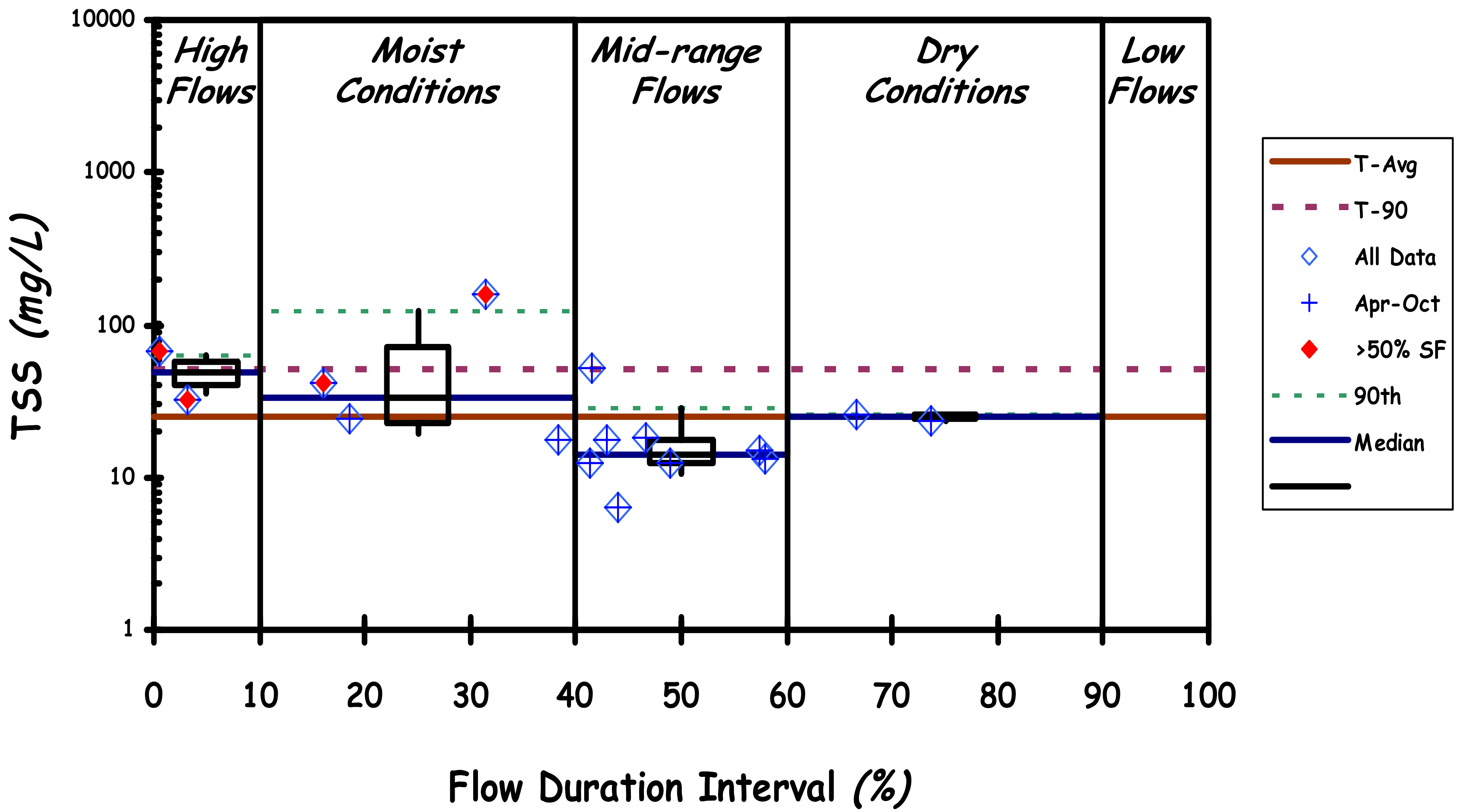


IDEM Data & Gage 03324000 / 04182590 Duration Interval *8.4 square miles*

Gates Ditch -- CR 400 S

WQ Duration Curve (2004 Monitoring Data)

Site: LES040-0023

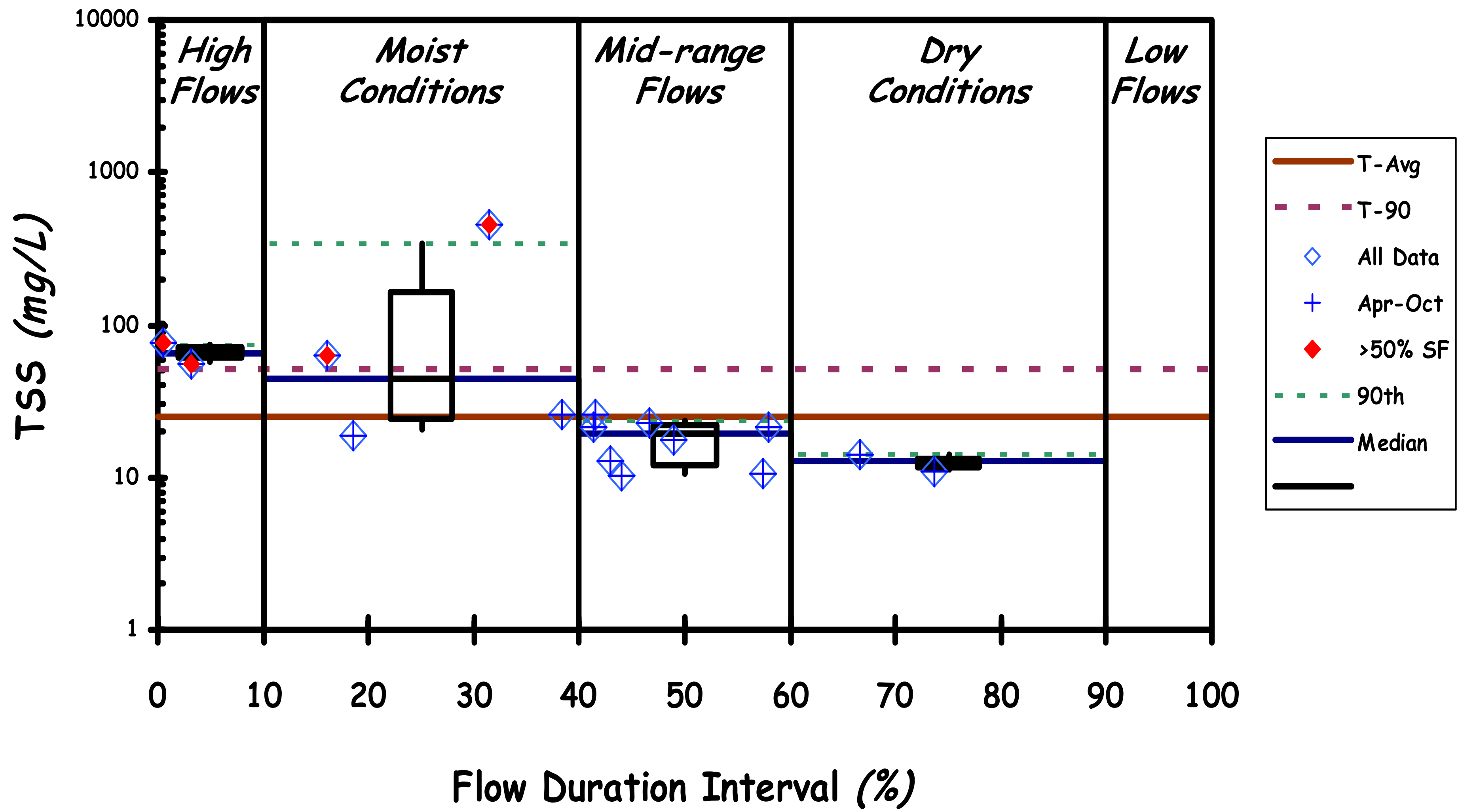


IDEM Data & Gage 03324000 / 04182590 Duration Interval *20.1 square miles*

Blue Creek -- Salem Road

WQ Duration Curve (2004 Monitoring Data)

Site: LES040-0011

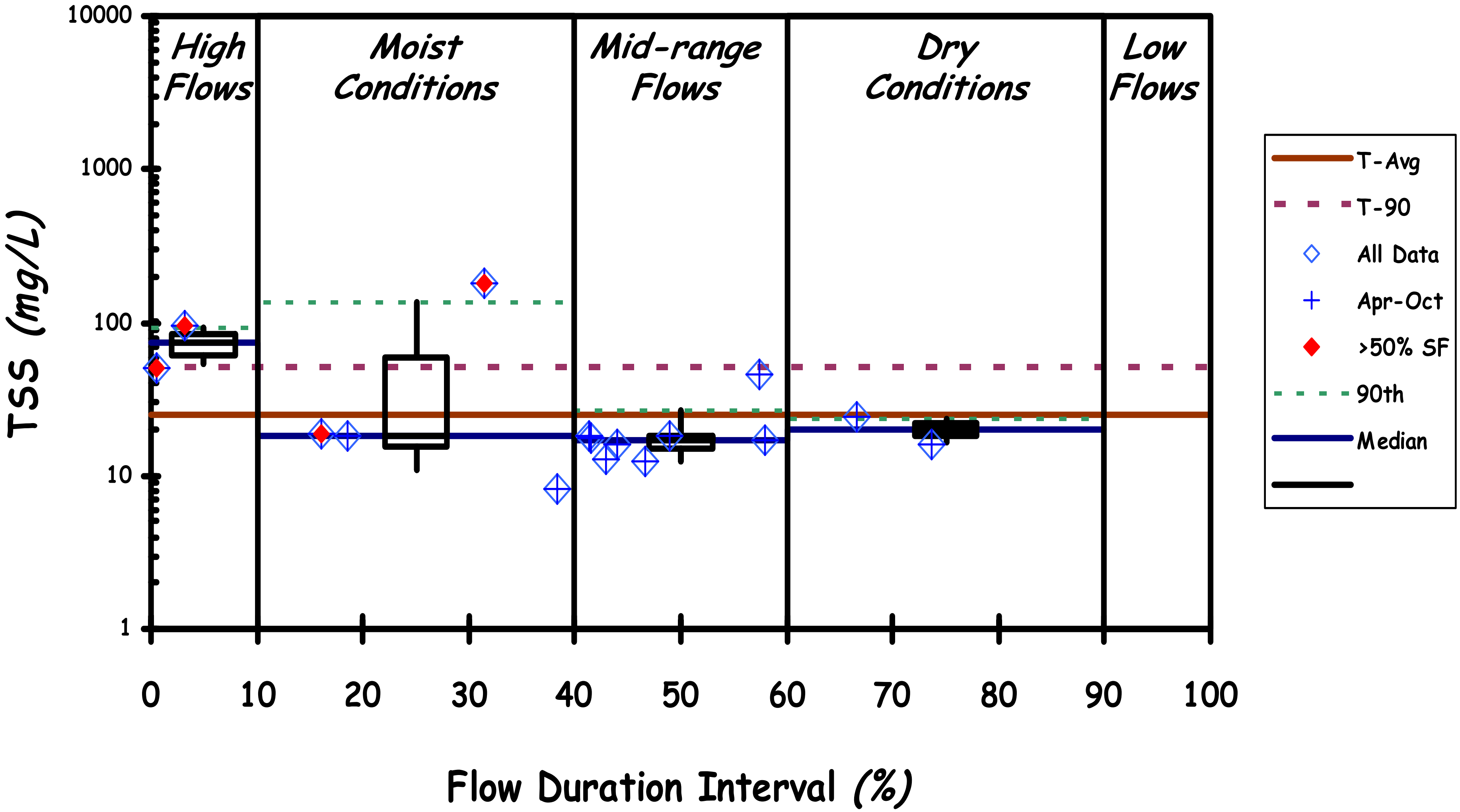


IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0010

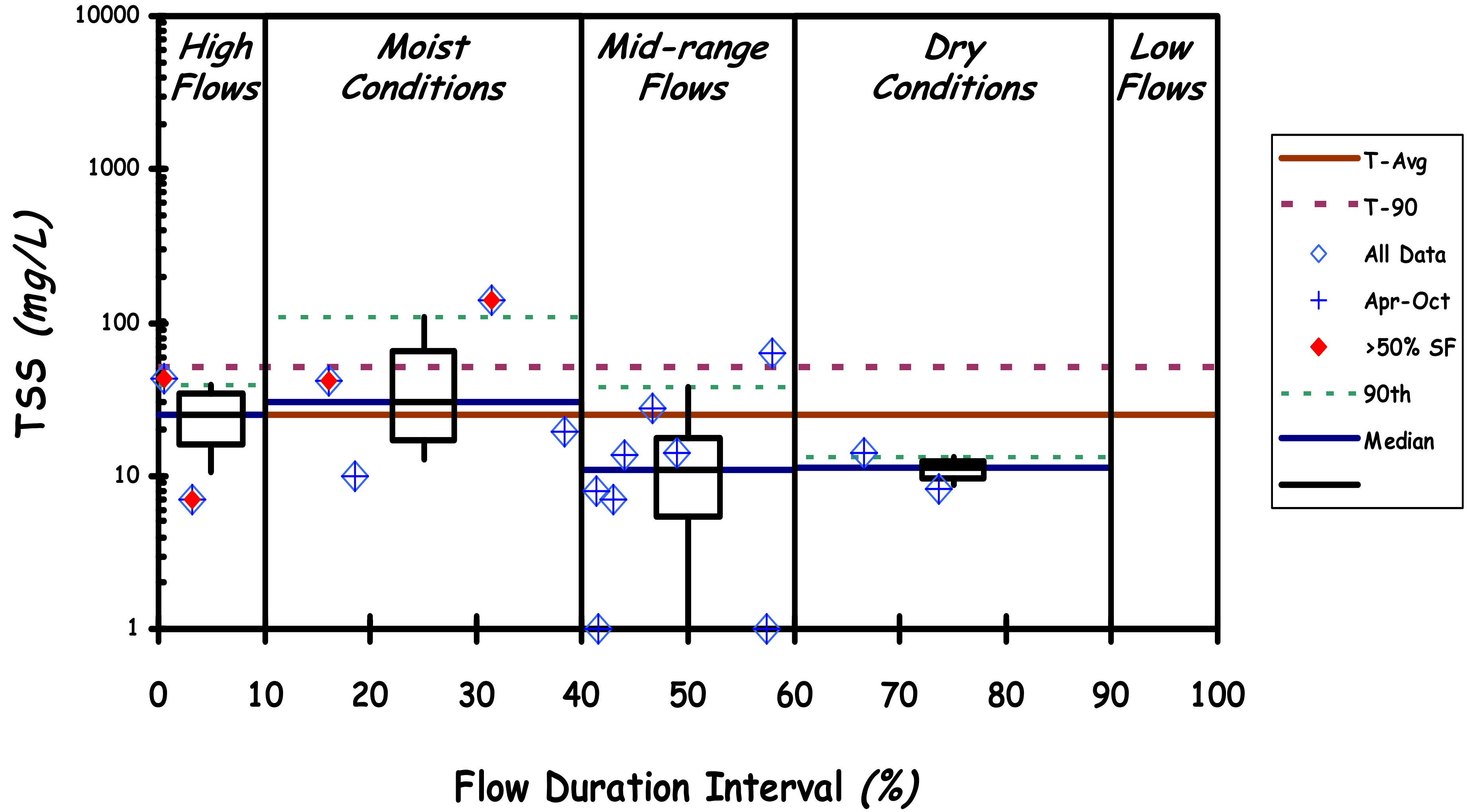


IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

Blue Creek -- CR 300 S

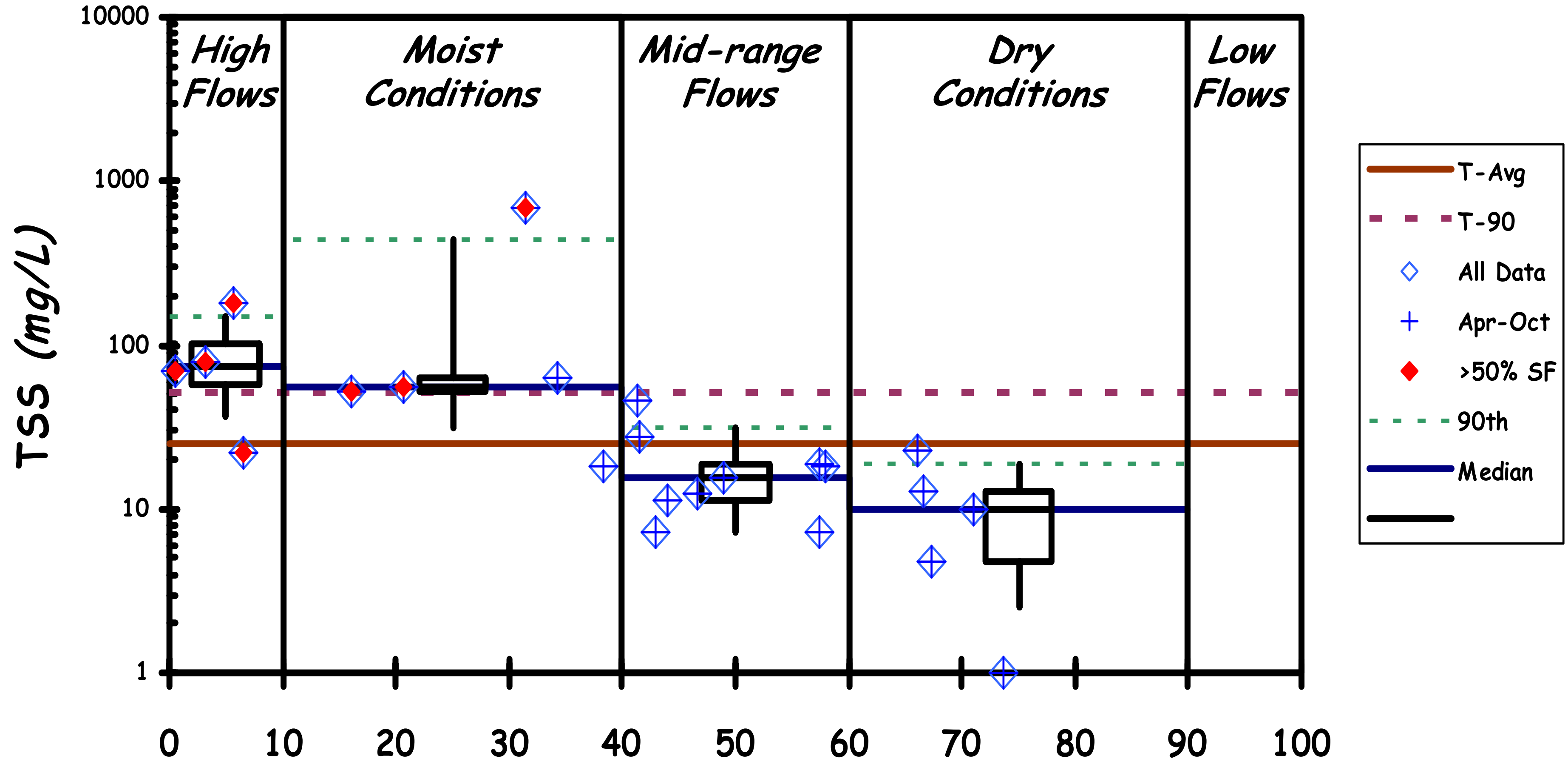
WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0066



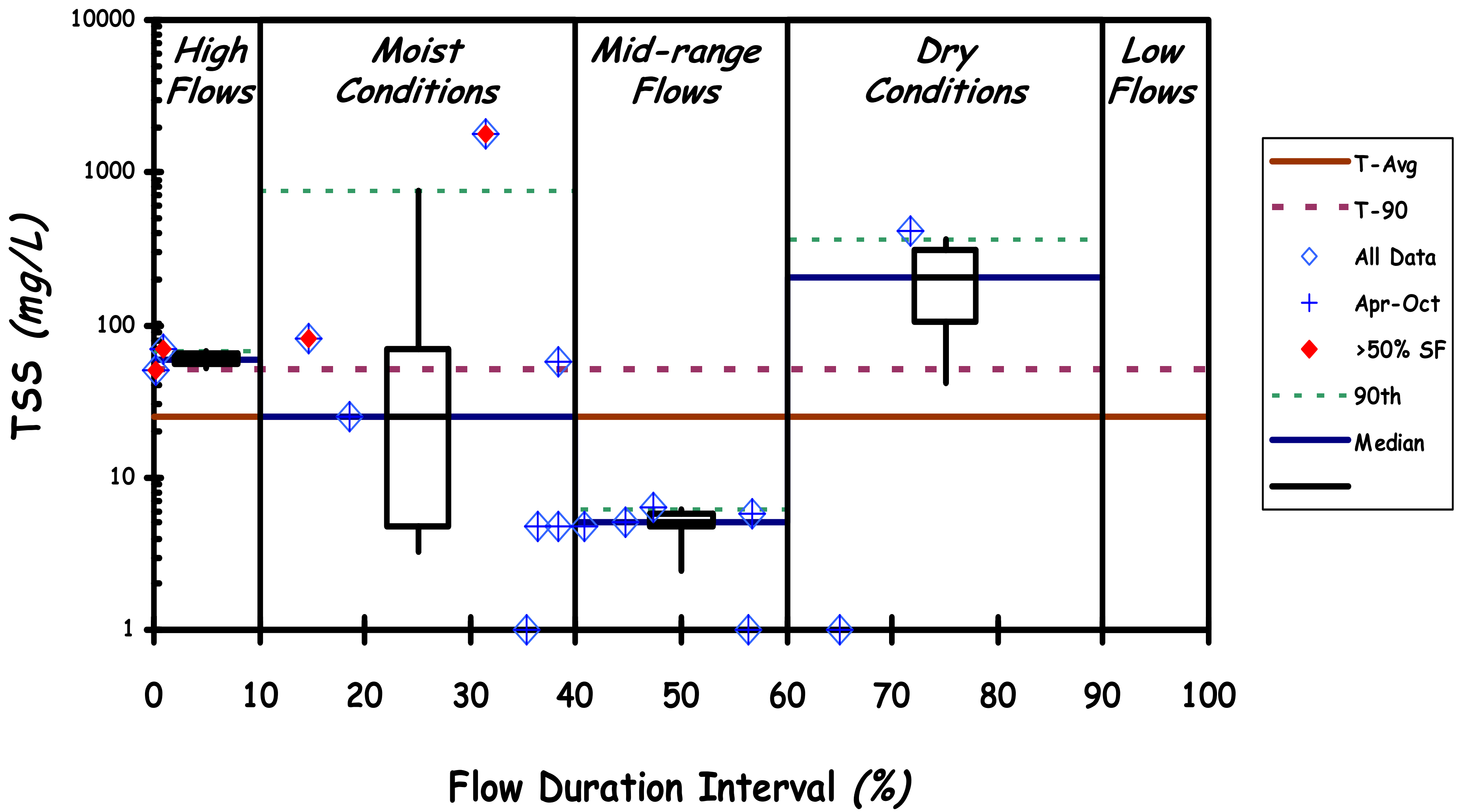
IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*

Blue Creek -- SR 124
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0009



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Martz Creek -- CR 200 N
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0040

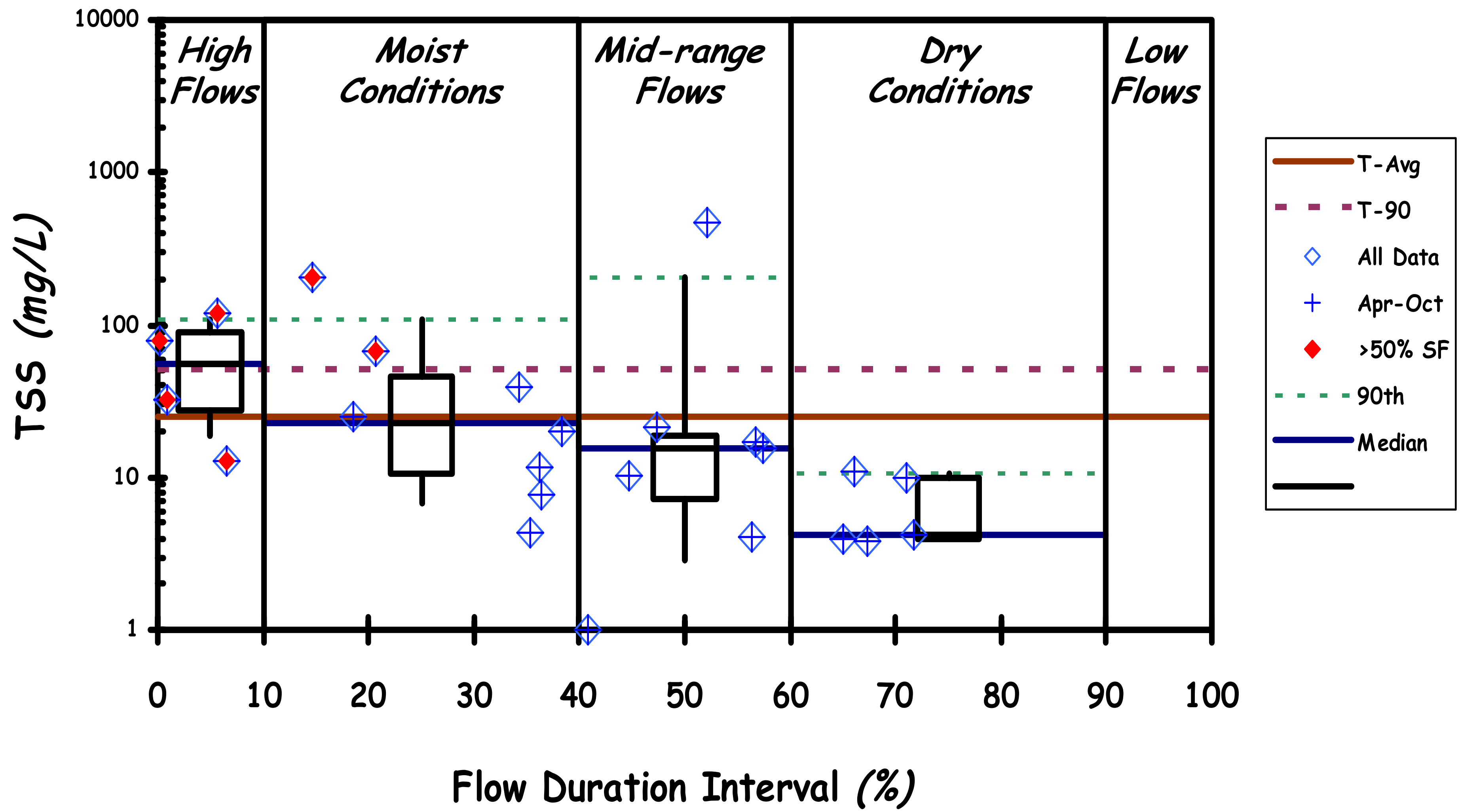


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038

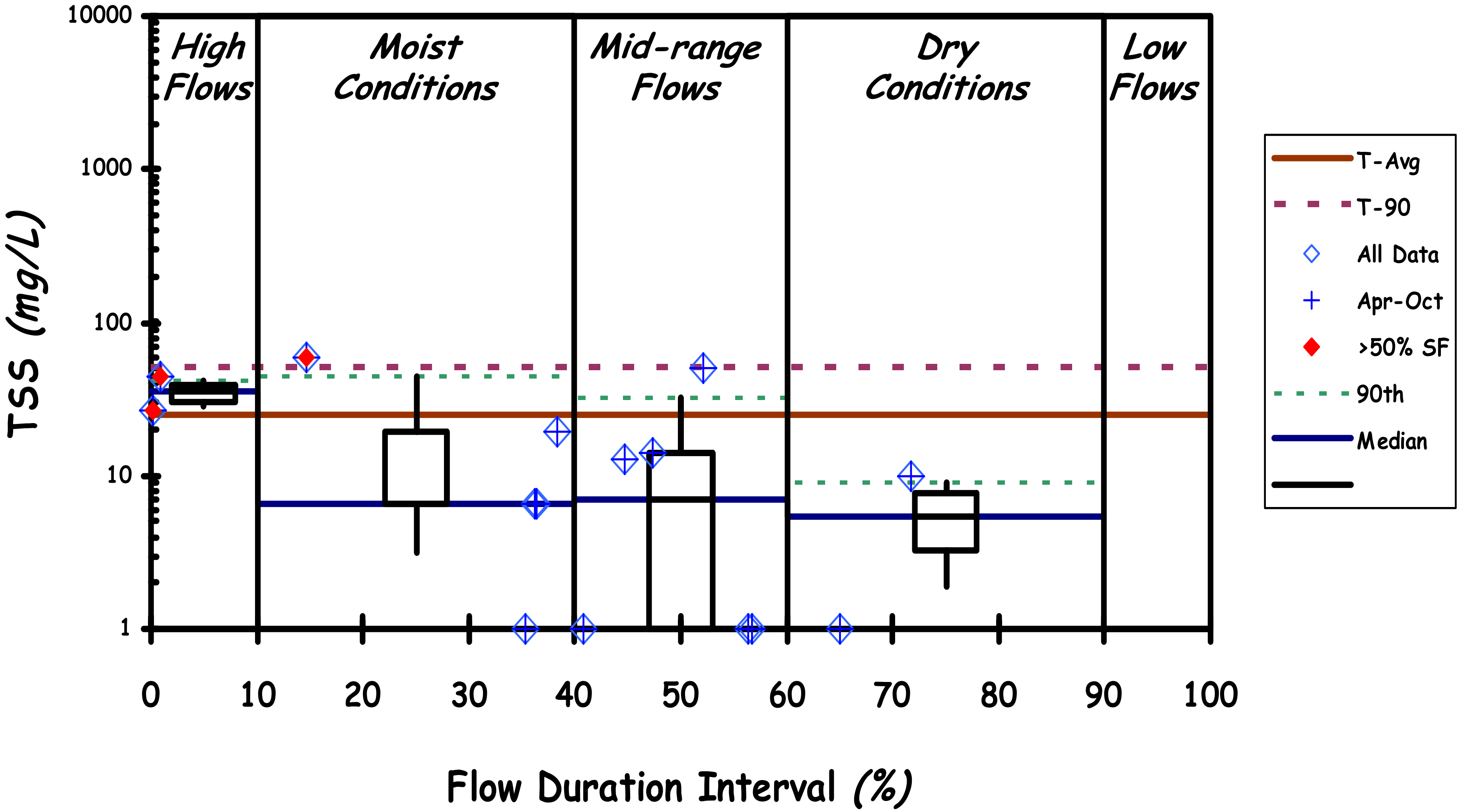


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

Borum Run -- Mercer Road

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0097

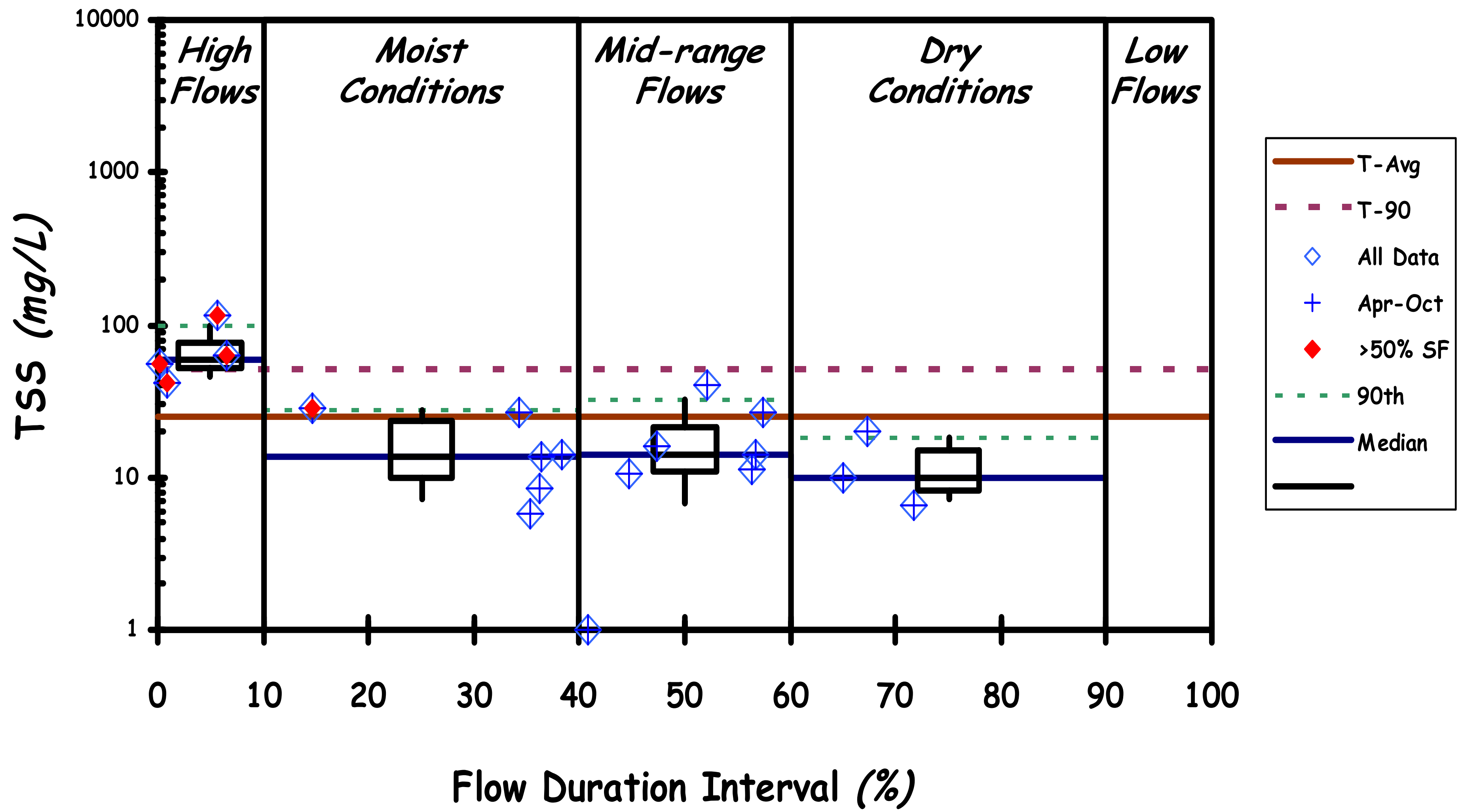


IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W

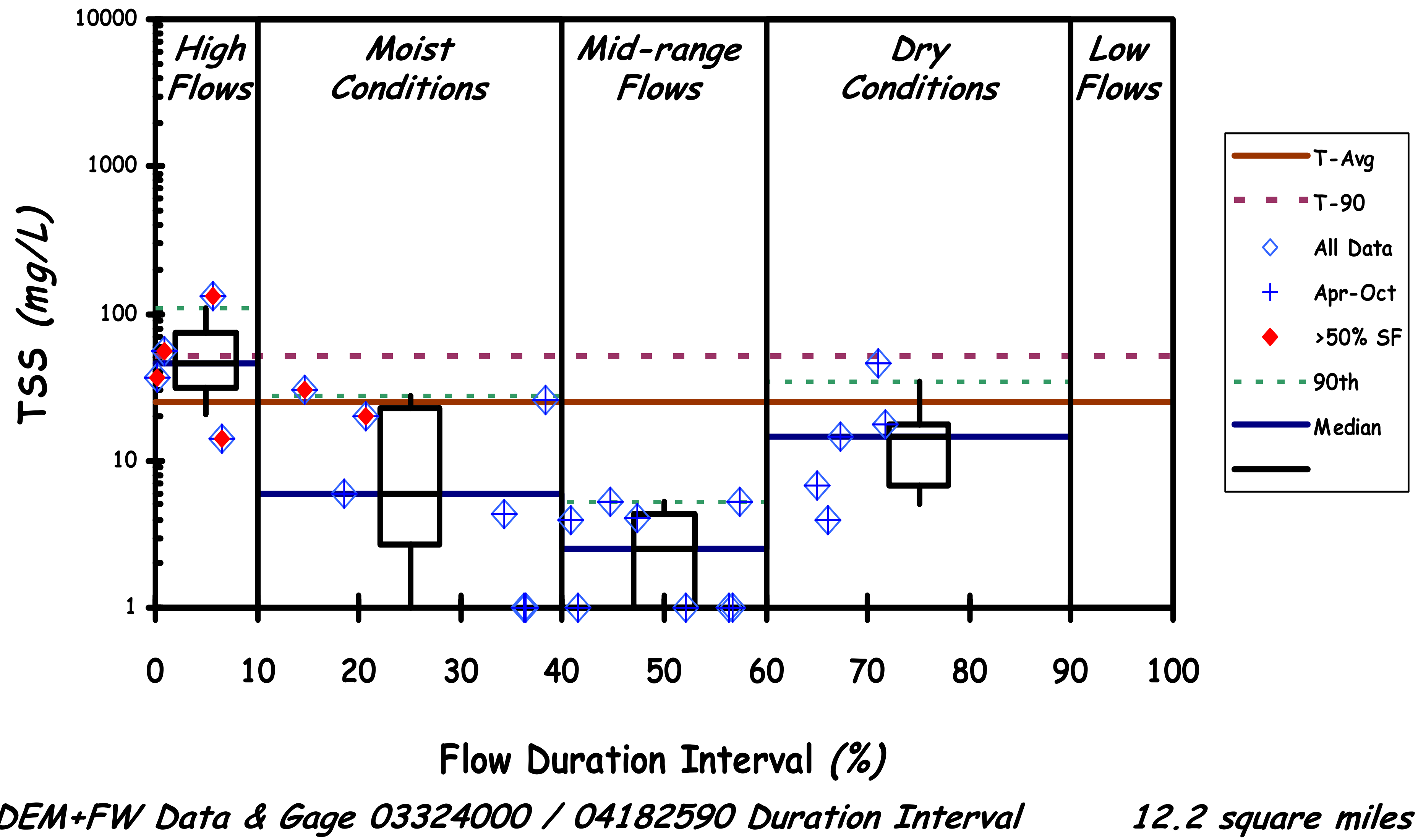
WQ Duration Curve *(2004 Monitoring Data)*

Site: LES050-0008

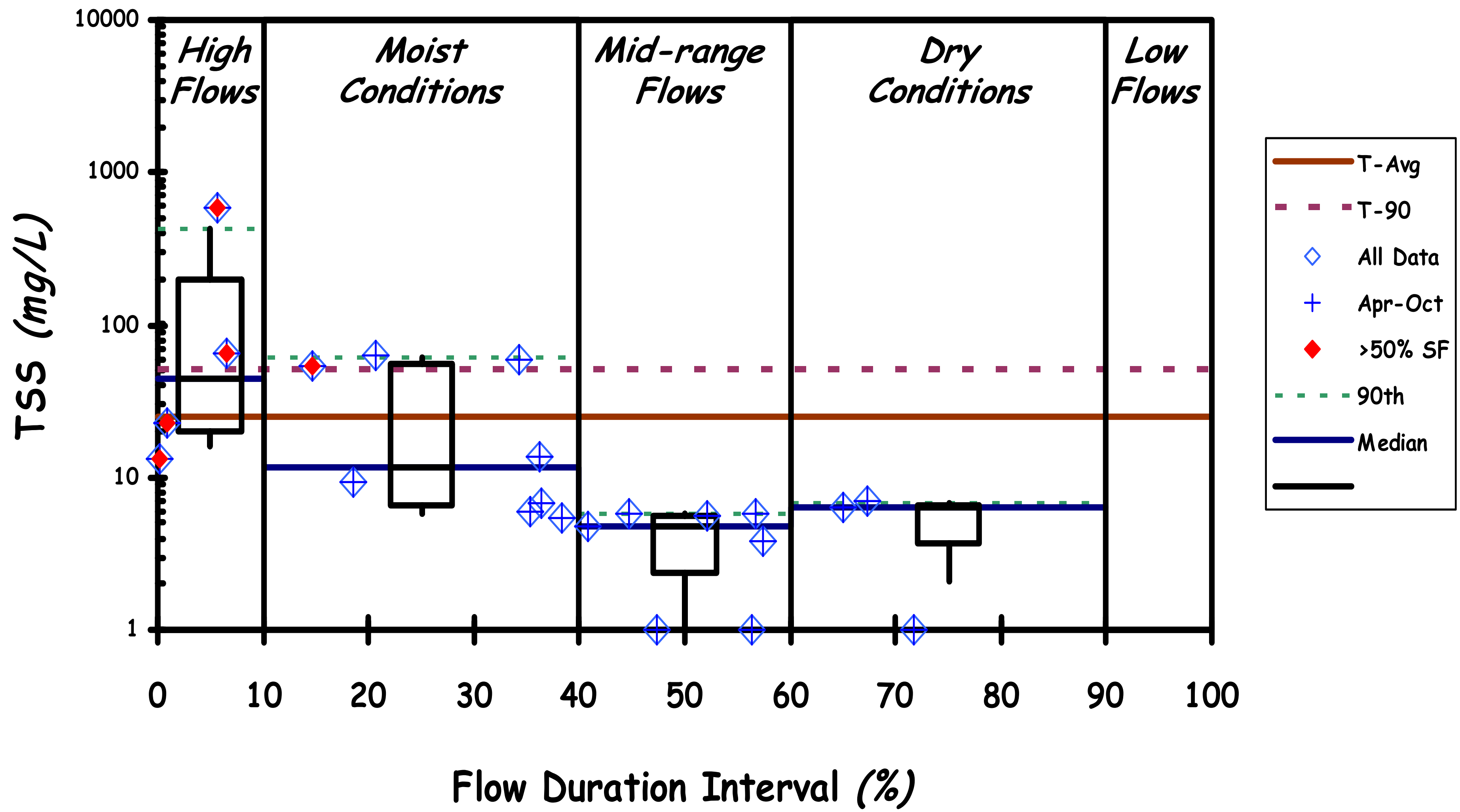


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*

Nickelsen Creek - CR 1100 N
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0015

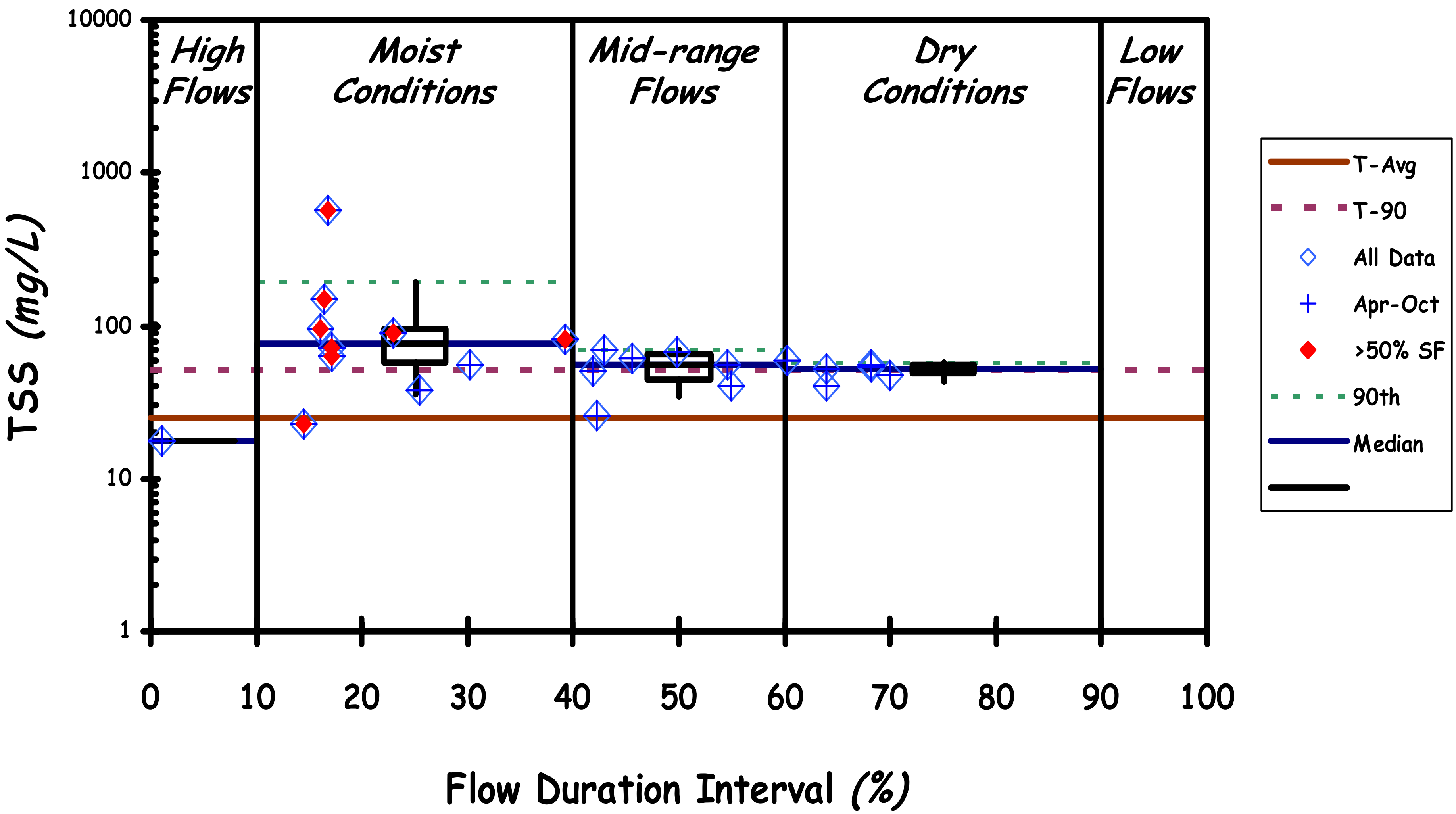


Unnamed Tributary -- Barkley Road
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES050-0020



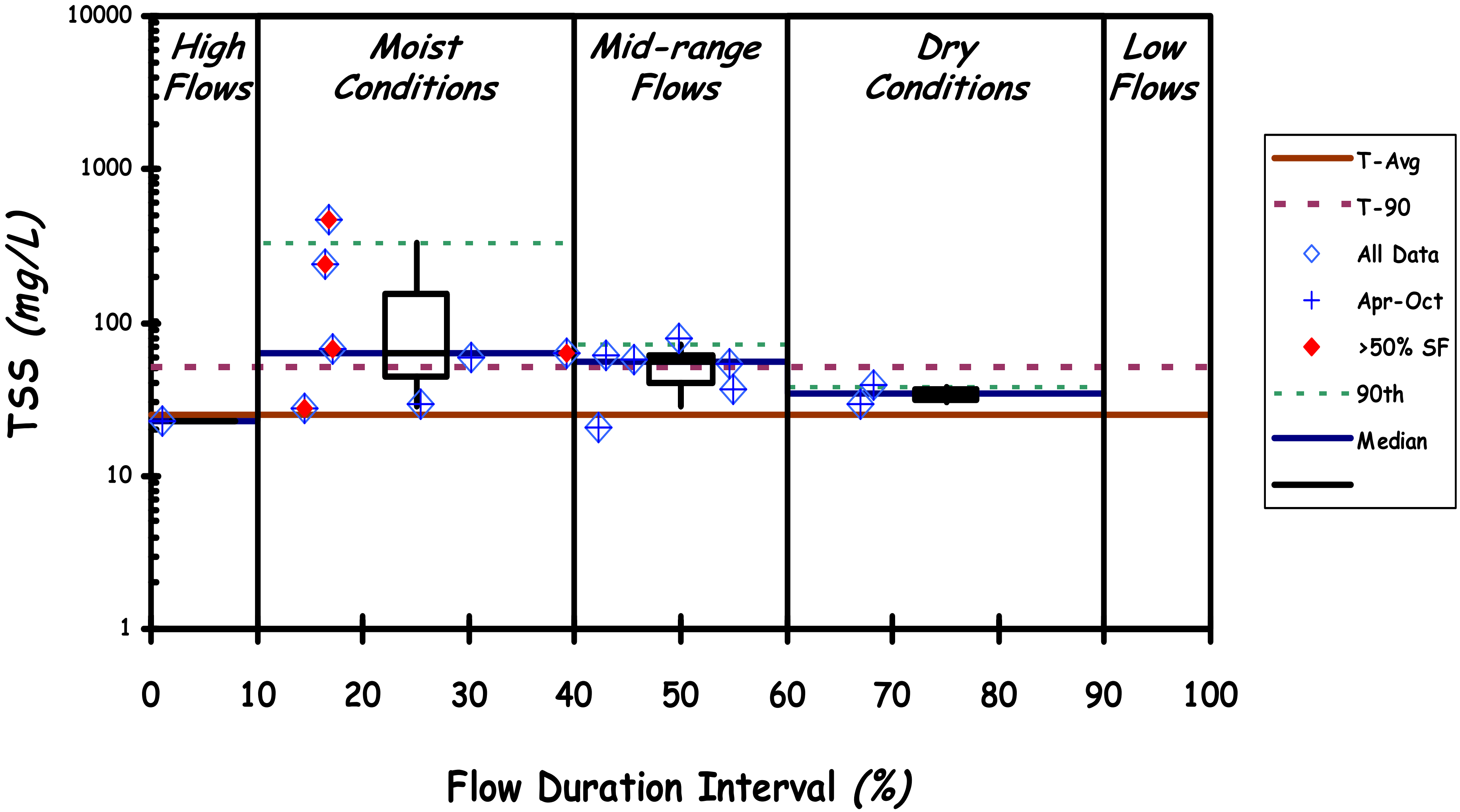
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *2.3 square miles*

St. Mary's River at Wilshire, OH
WQ Duration Curve *(2004 Monitoring Data)*
Site: UNK000-0007



IDEM+FW Data & Gage 04181500 Duration Interval *354 square miles*

St. Mary's River at Pleasant Mills
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0007

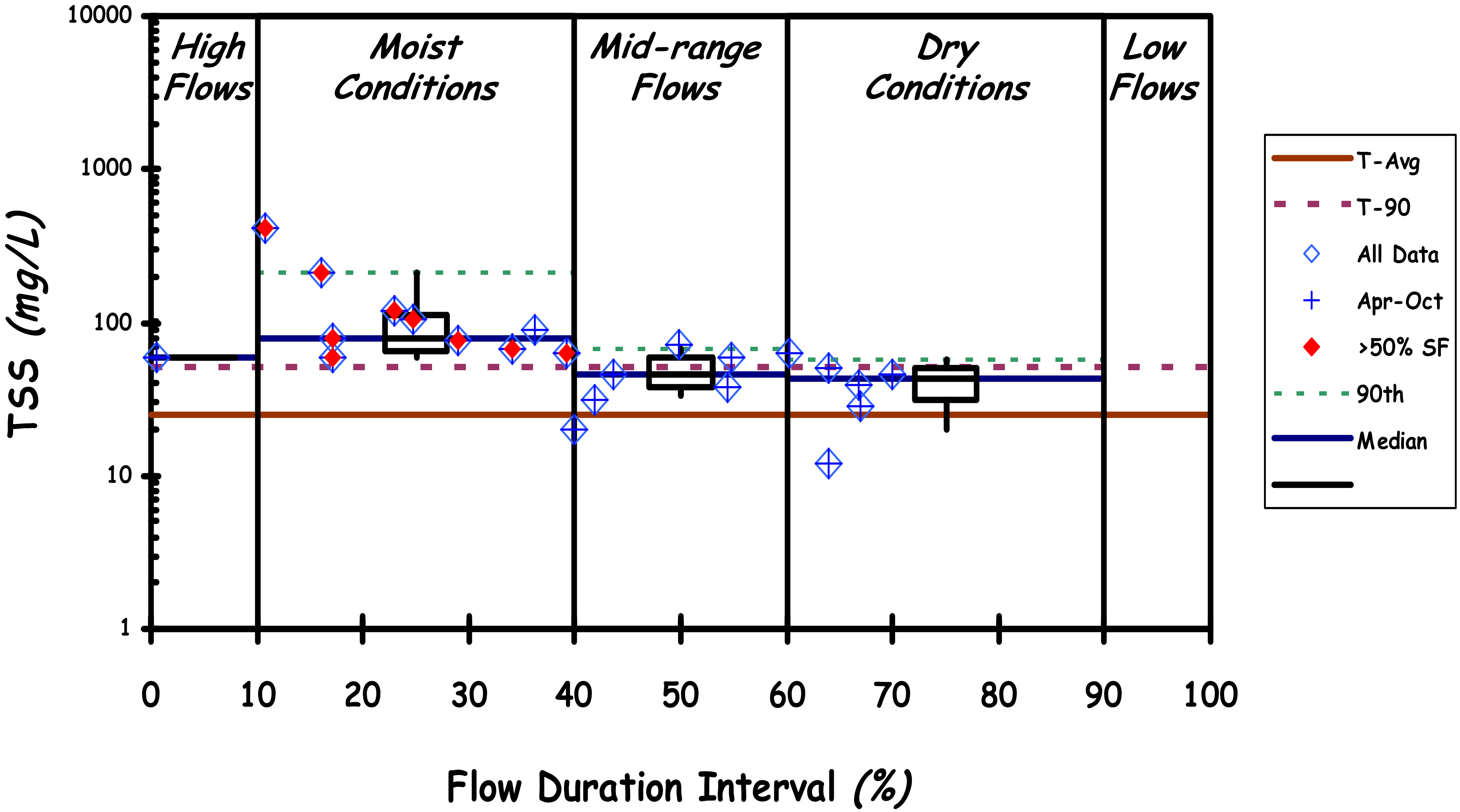


IDEM Data & Gage 04181500 Duration Interval *468 square miles*

St. Mary's River near Poe

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval

643 square miles

Attachment C

Load Duration Curves for St. Marys River Watershed TMDL

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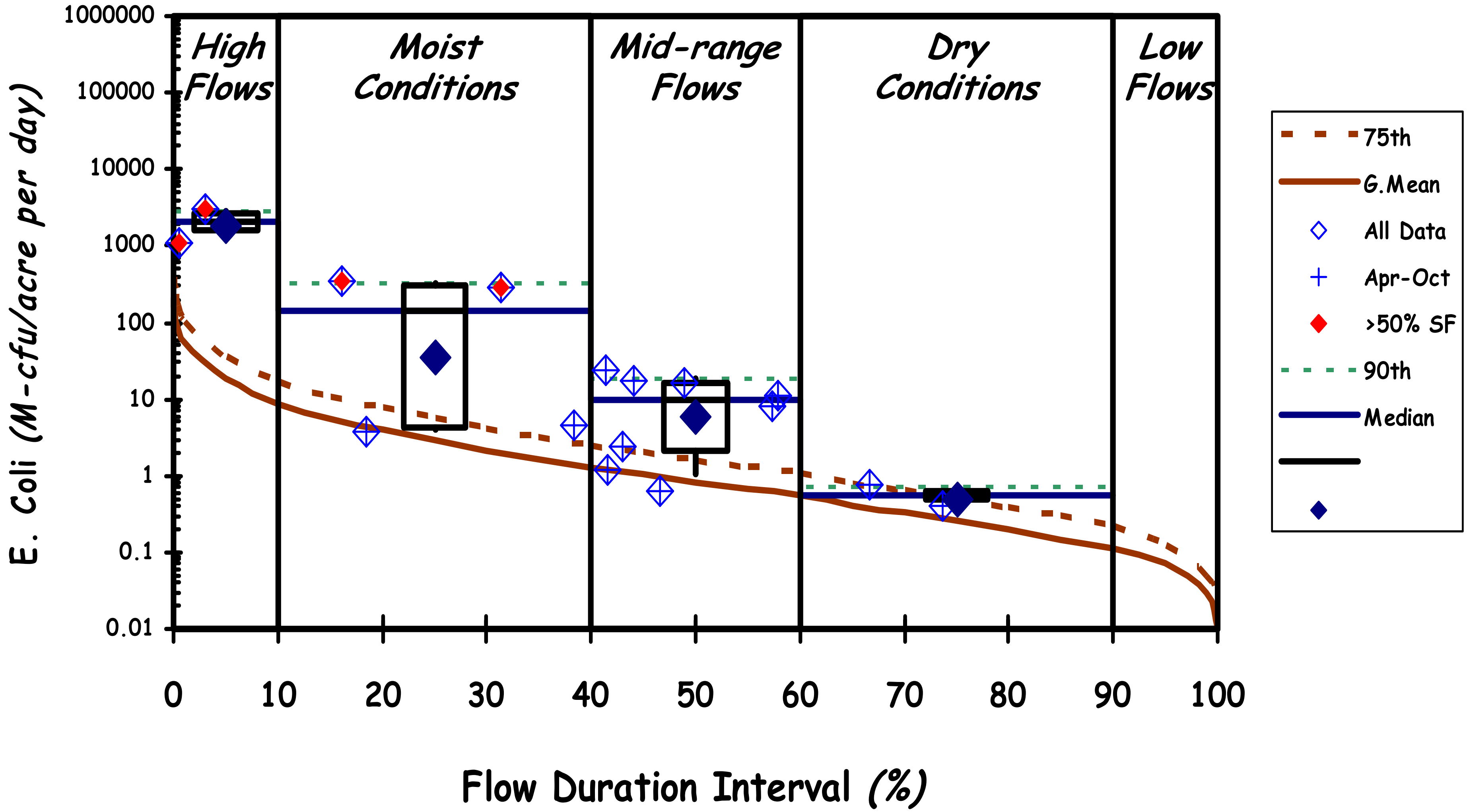
Habegger Ditch -- CR 150 E

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0099

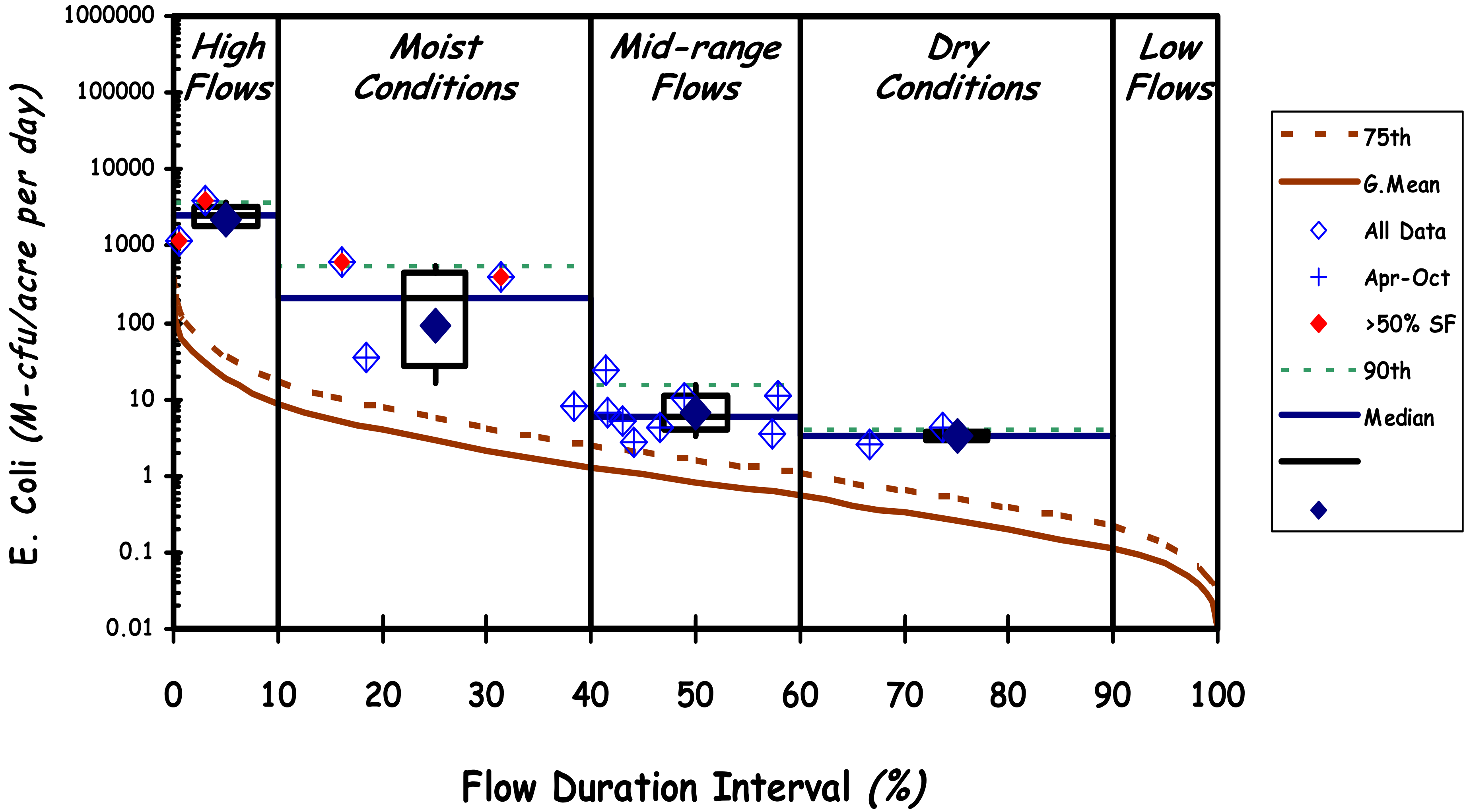


IDEM Data & Gage 03324000 / 04182590 Duration Interval *8.4 square miles*

Gates Ditch -- CR 400 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0023

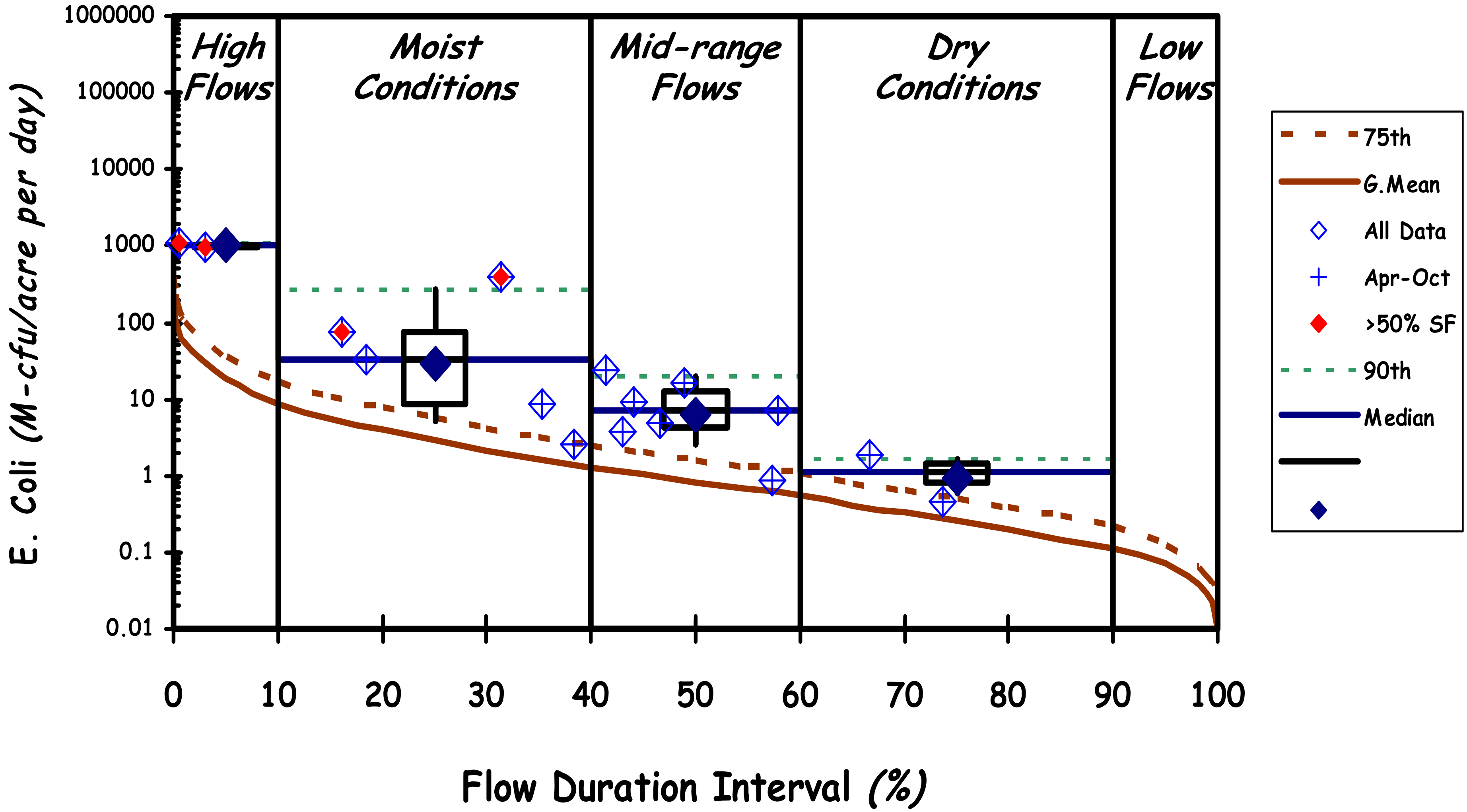


IDEM Data & Gage 03324000 / 04182590 Duration Interval *20.1 square miles*

Blue Creek -- Salem Road

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0011

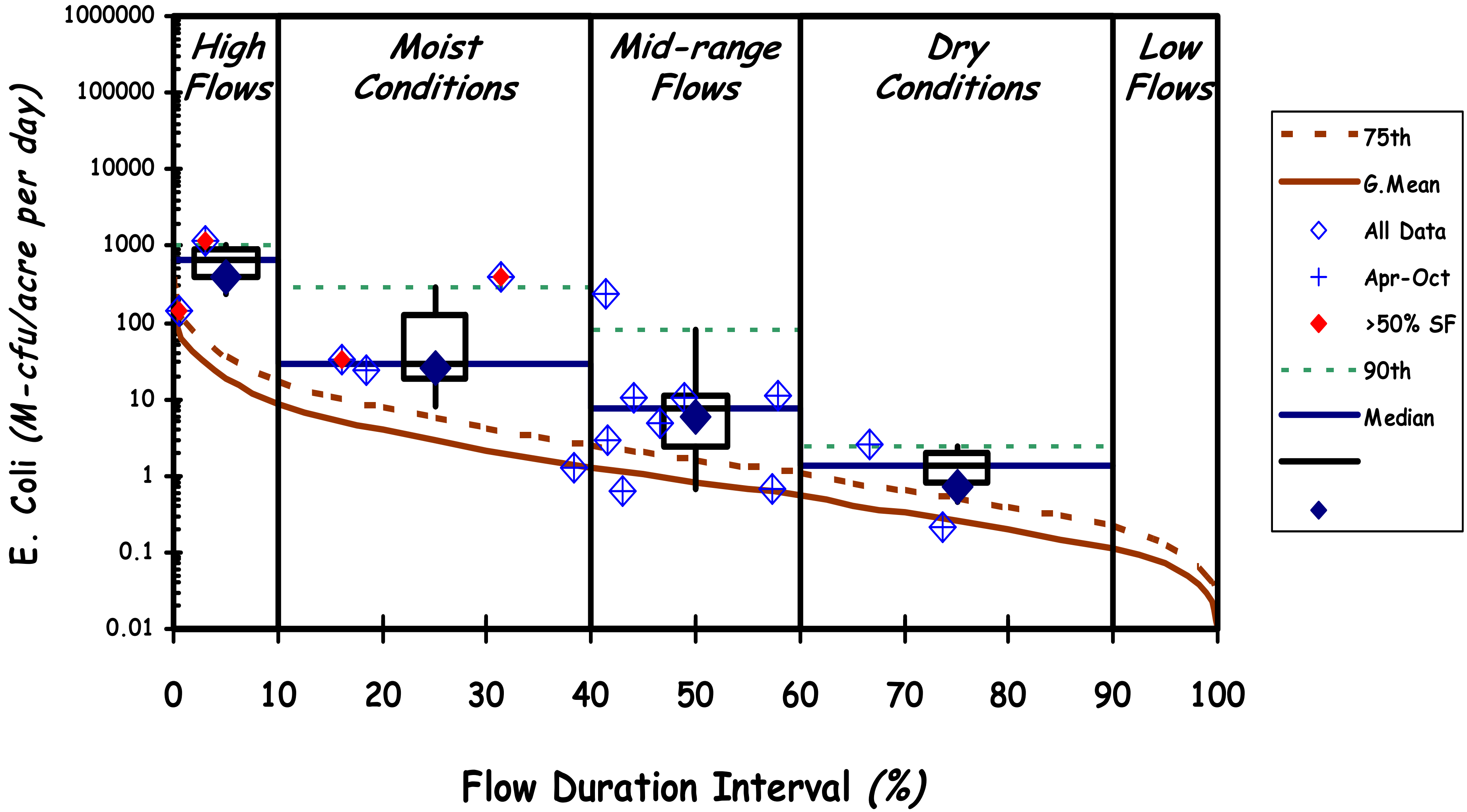


IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S

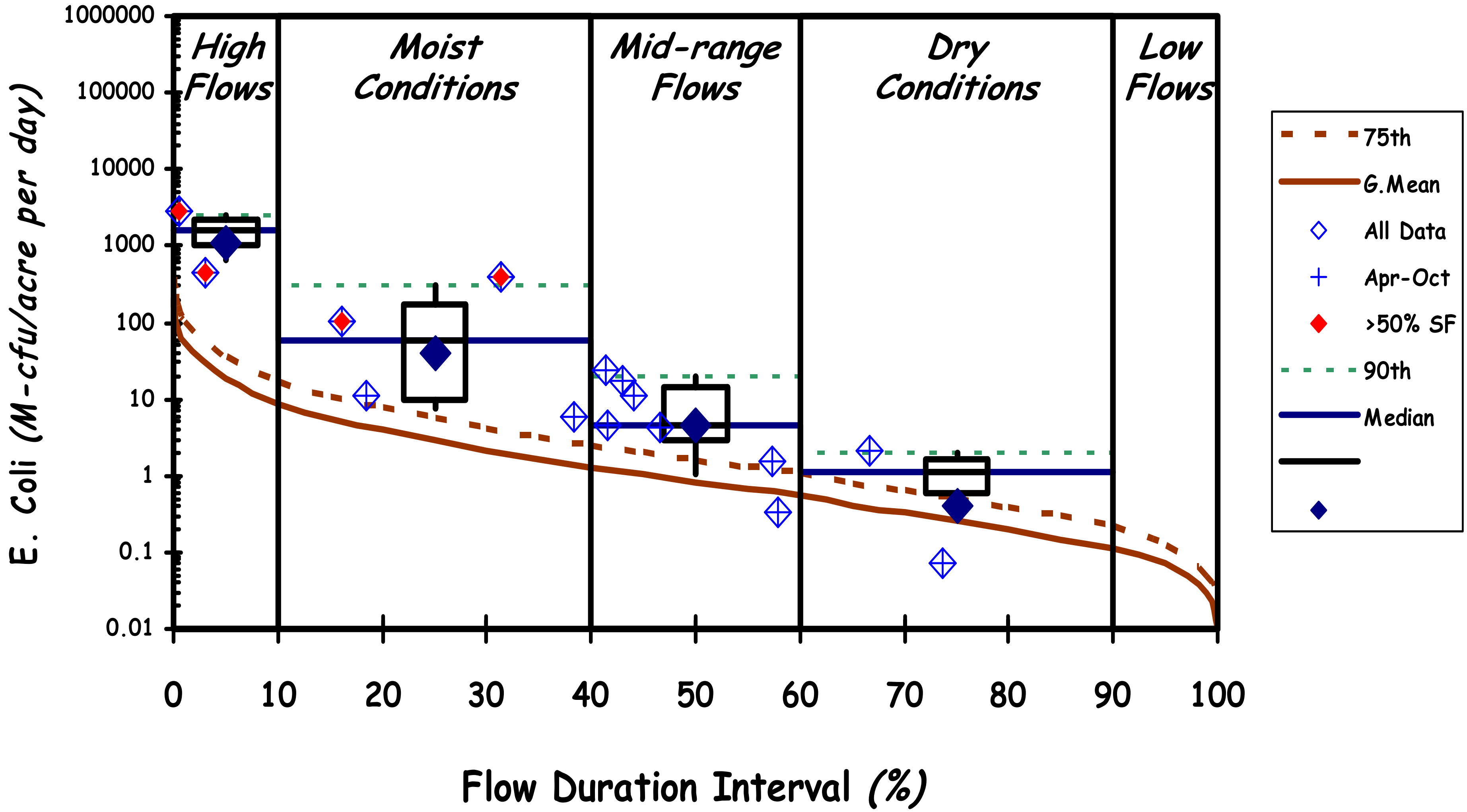
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0010



IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

Blue Creek -- CR 300 S
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0066

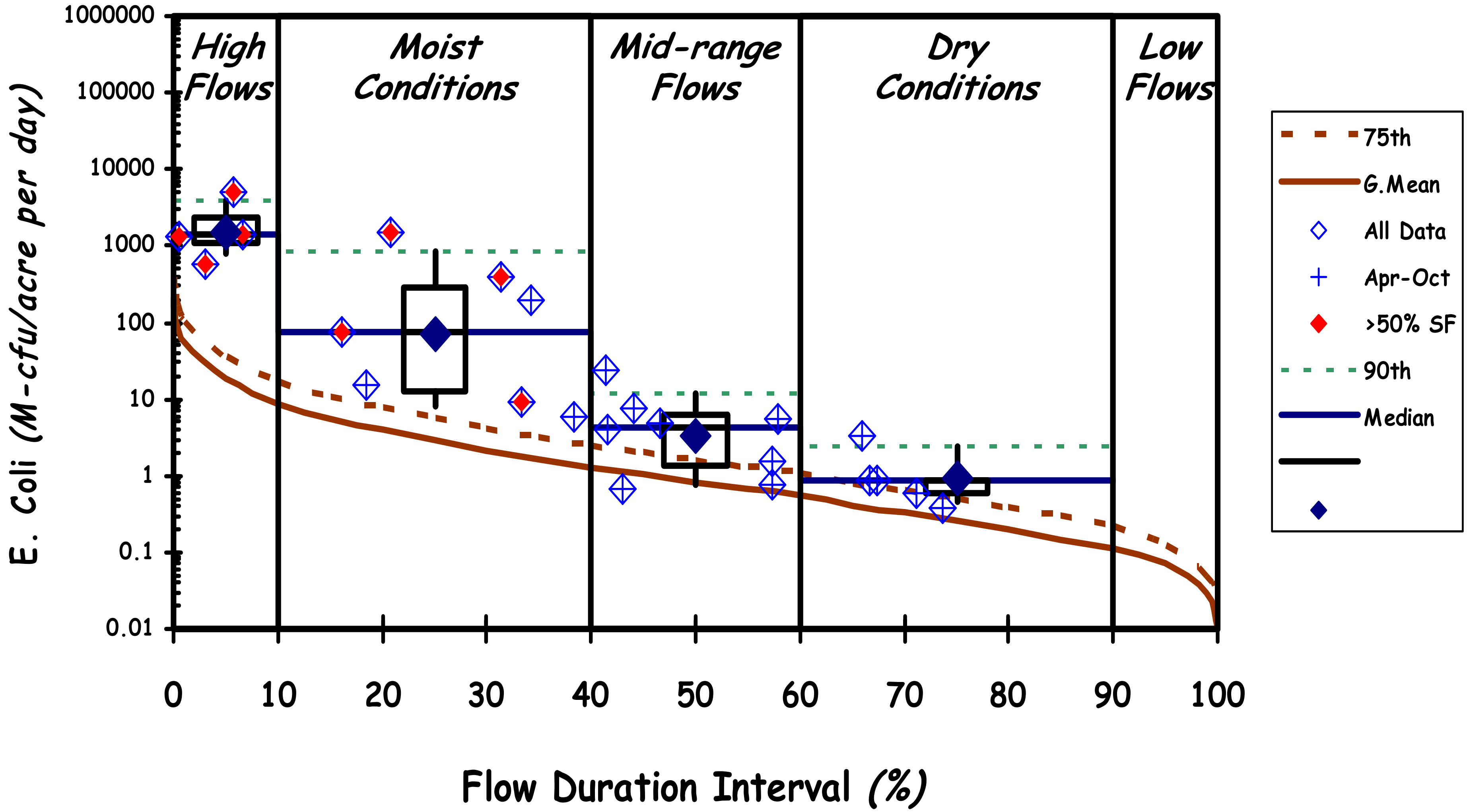


IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*

Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

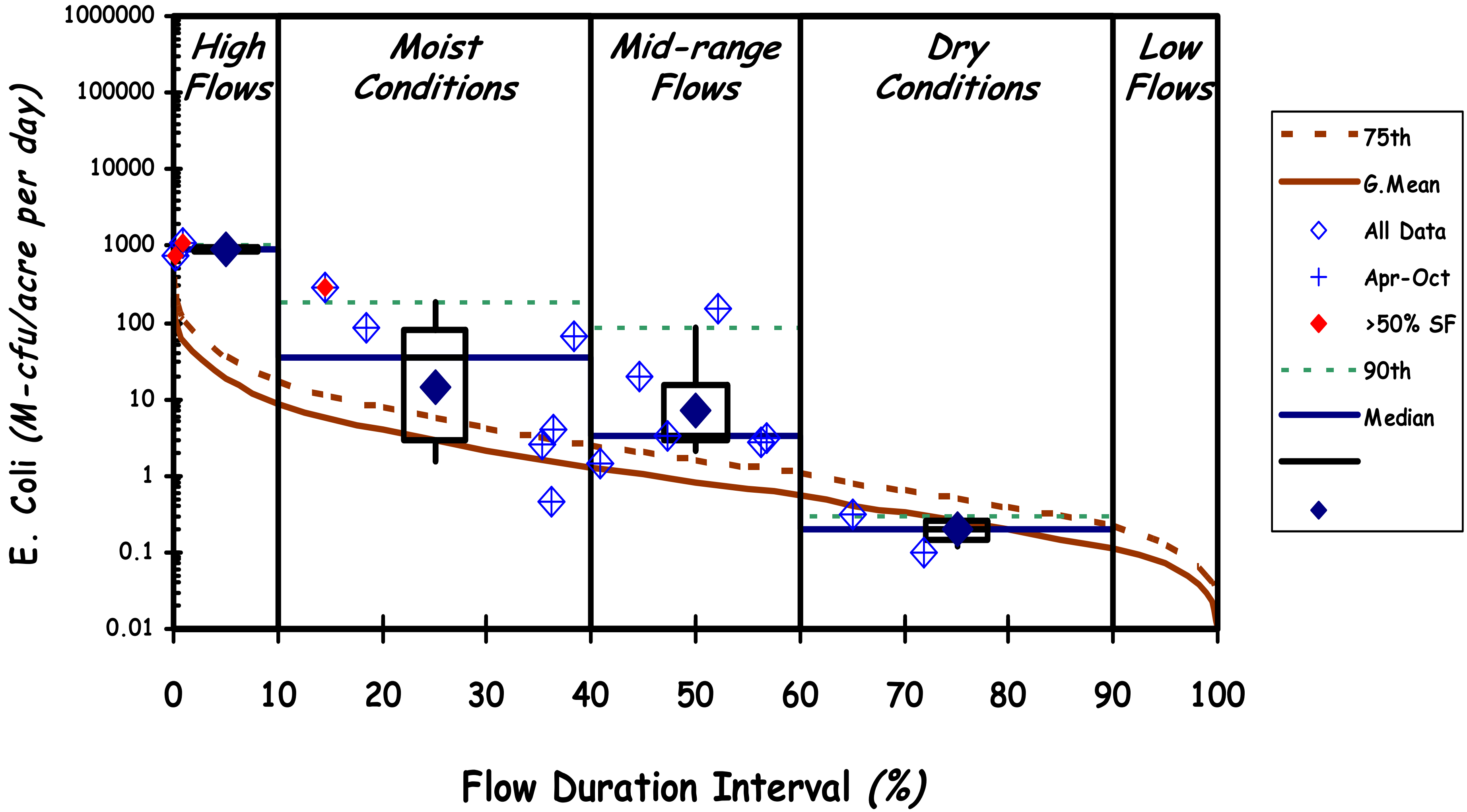


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Martz Creek -- CR 200 N

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0040

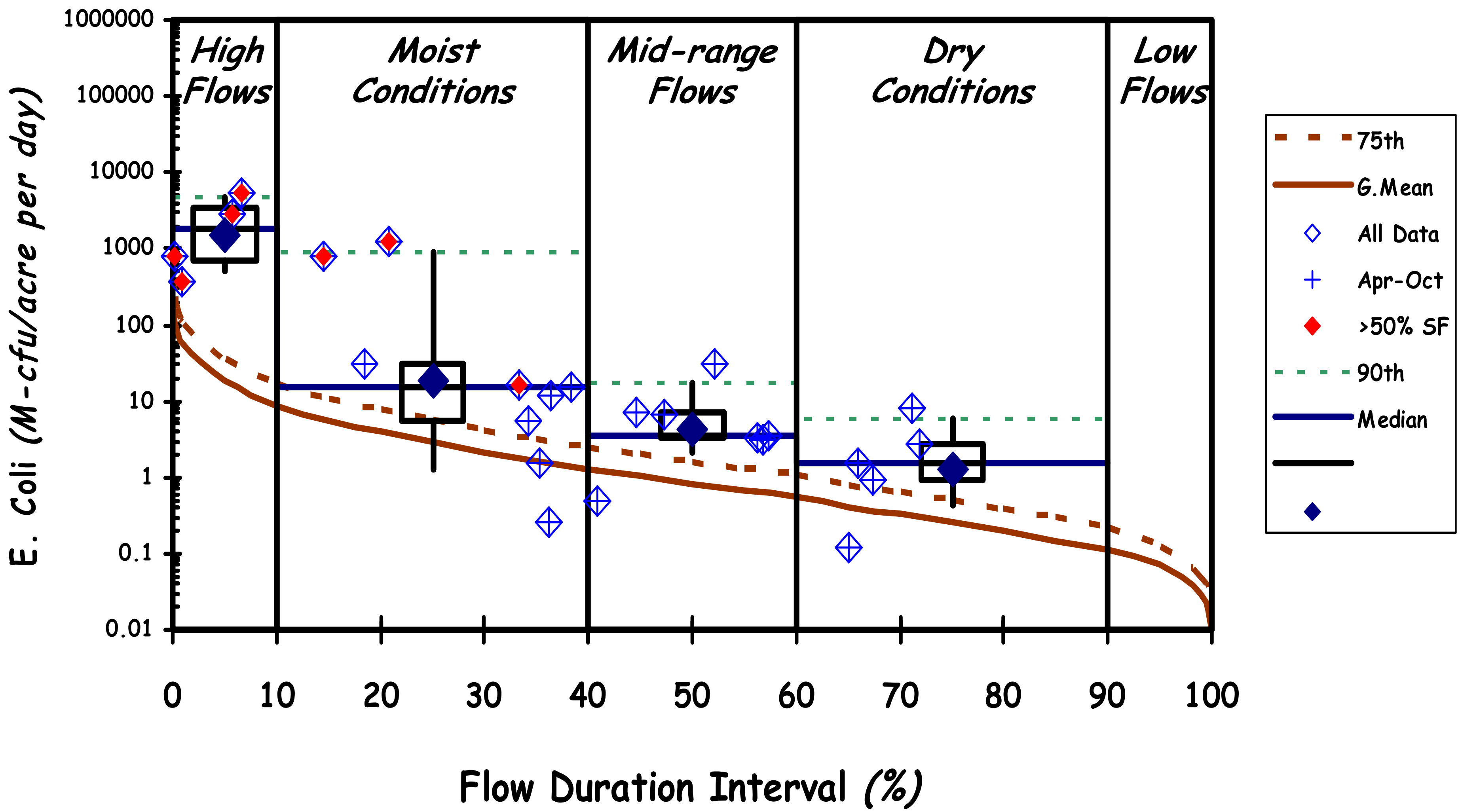


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

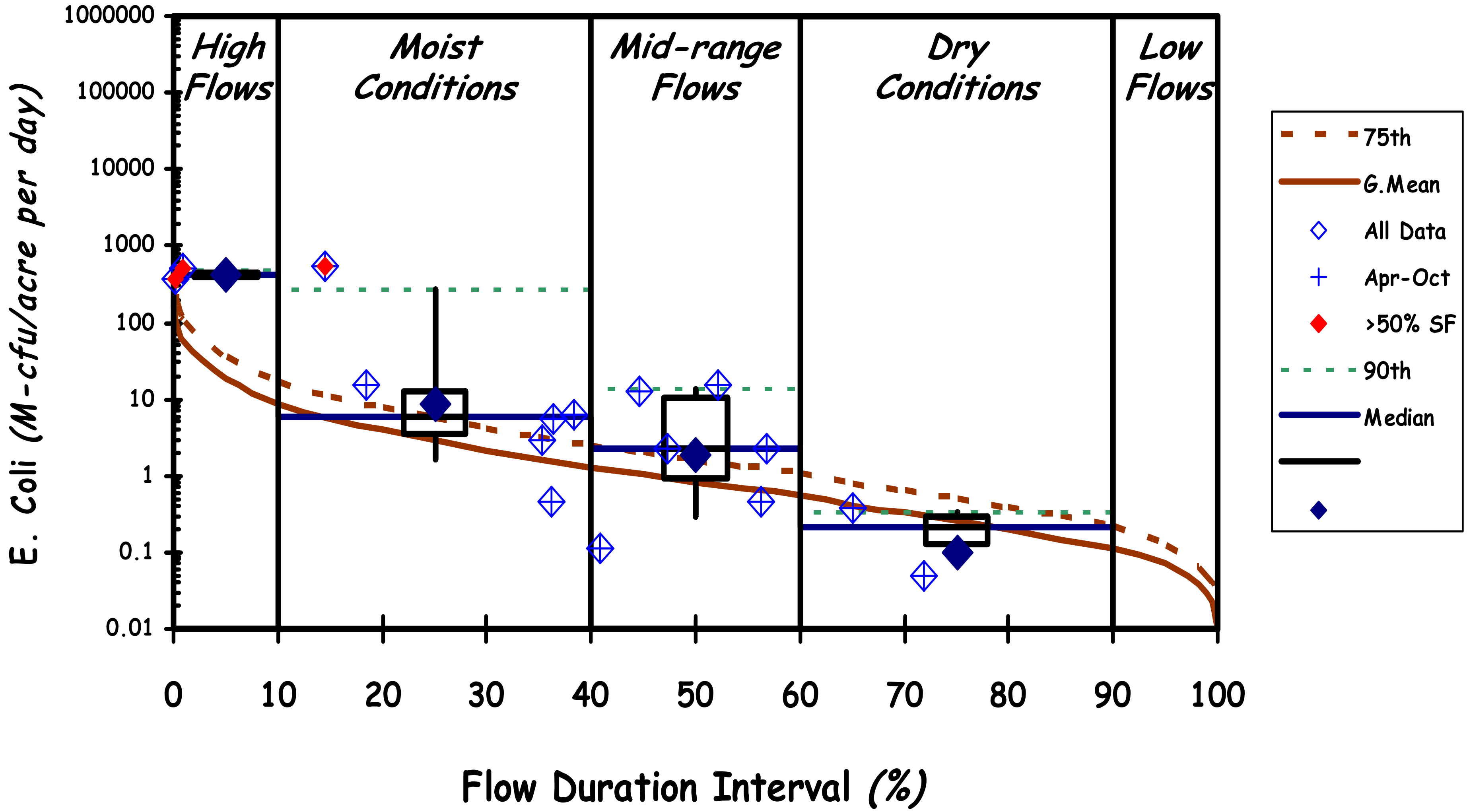
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

Borum Run -- Mercer Road
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0097

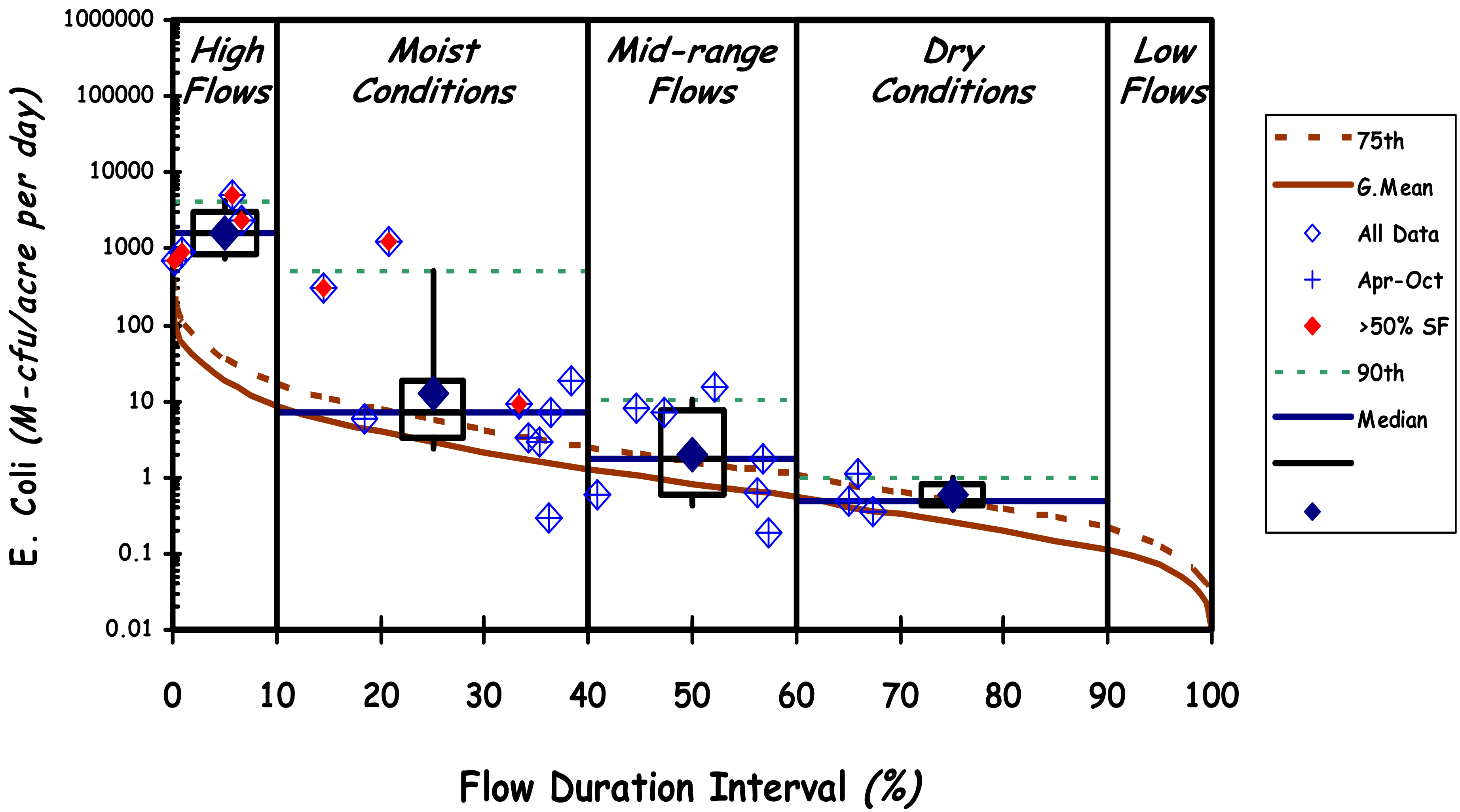


IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W

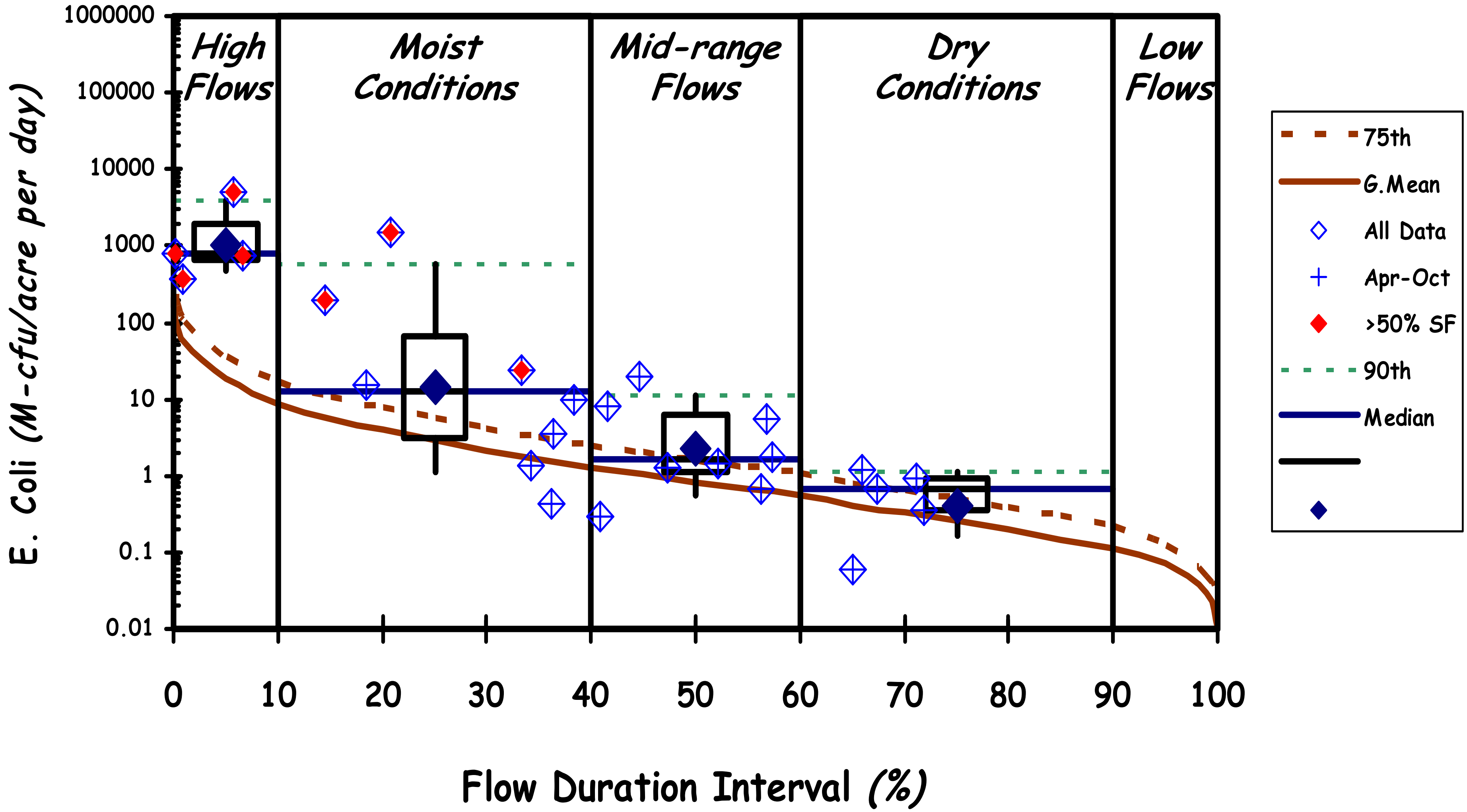
Load Duration Curve *(2004 Monitoring Data)*

Site: LES050-0008



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*

Nickelsen Creek – CR 1100 N
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0015

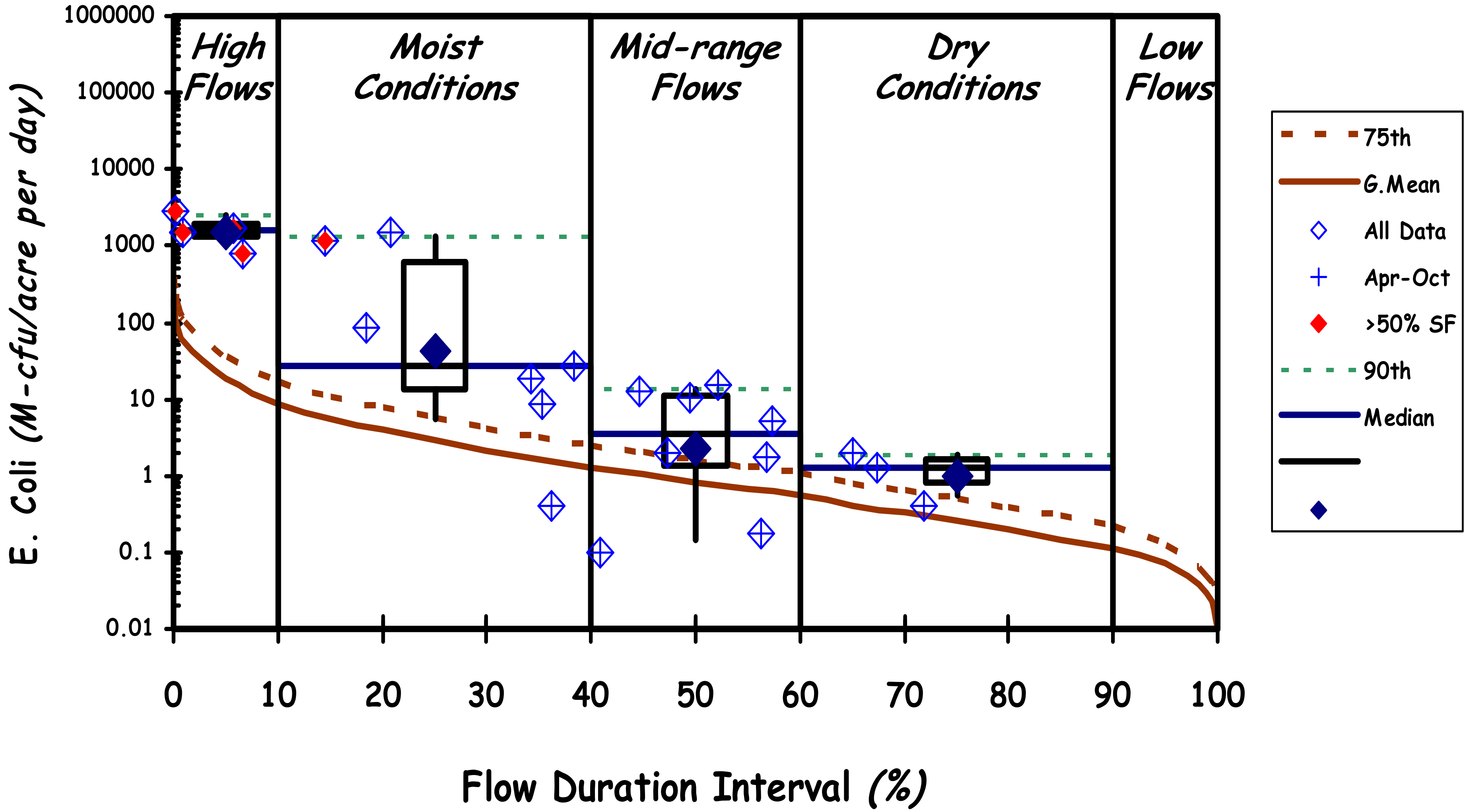


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *12.2 square miles*

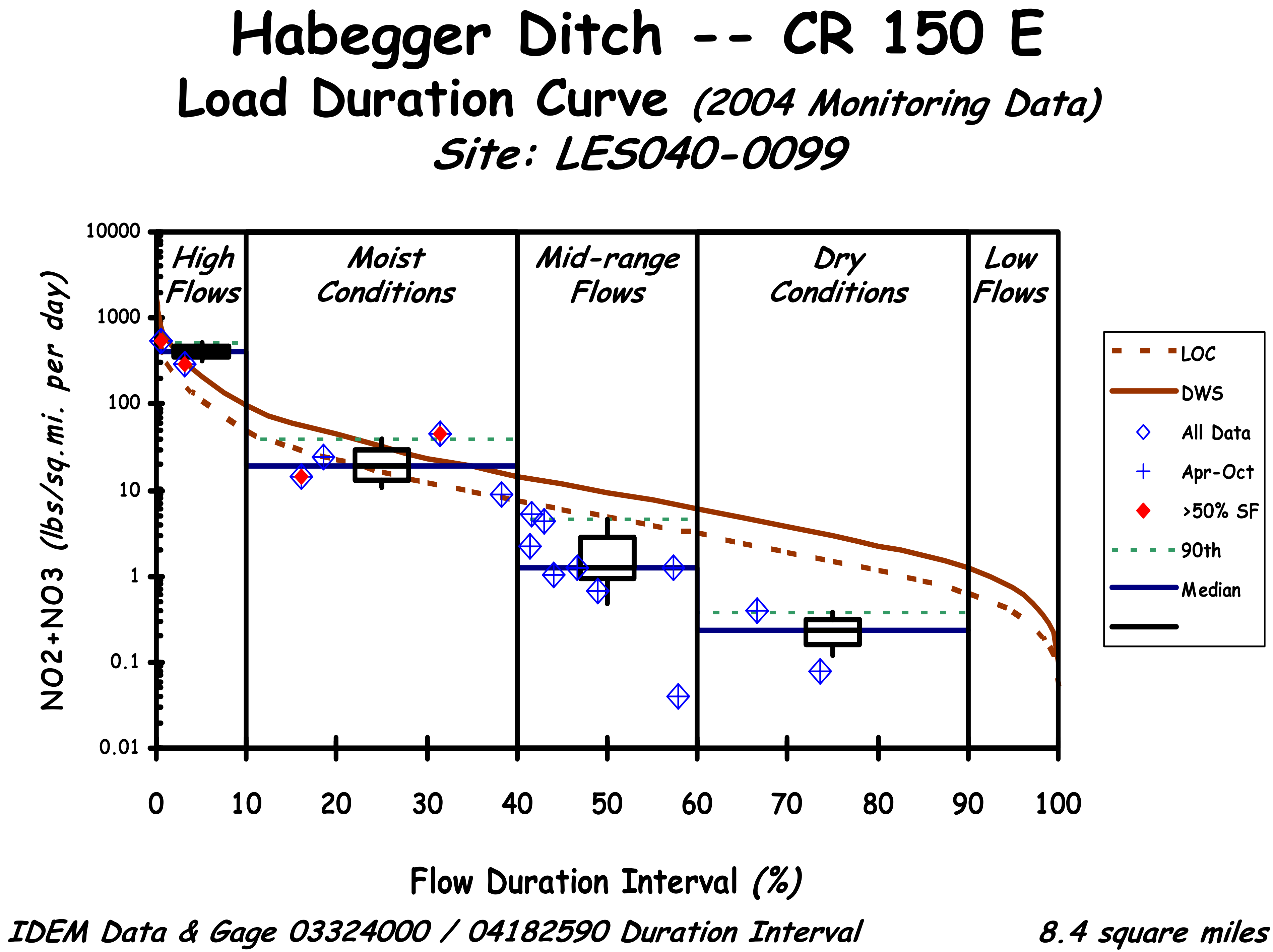
Unnamed Tributary -- Barkley Road

Load Duration Curve *(2004 Monitoring Data)*

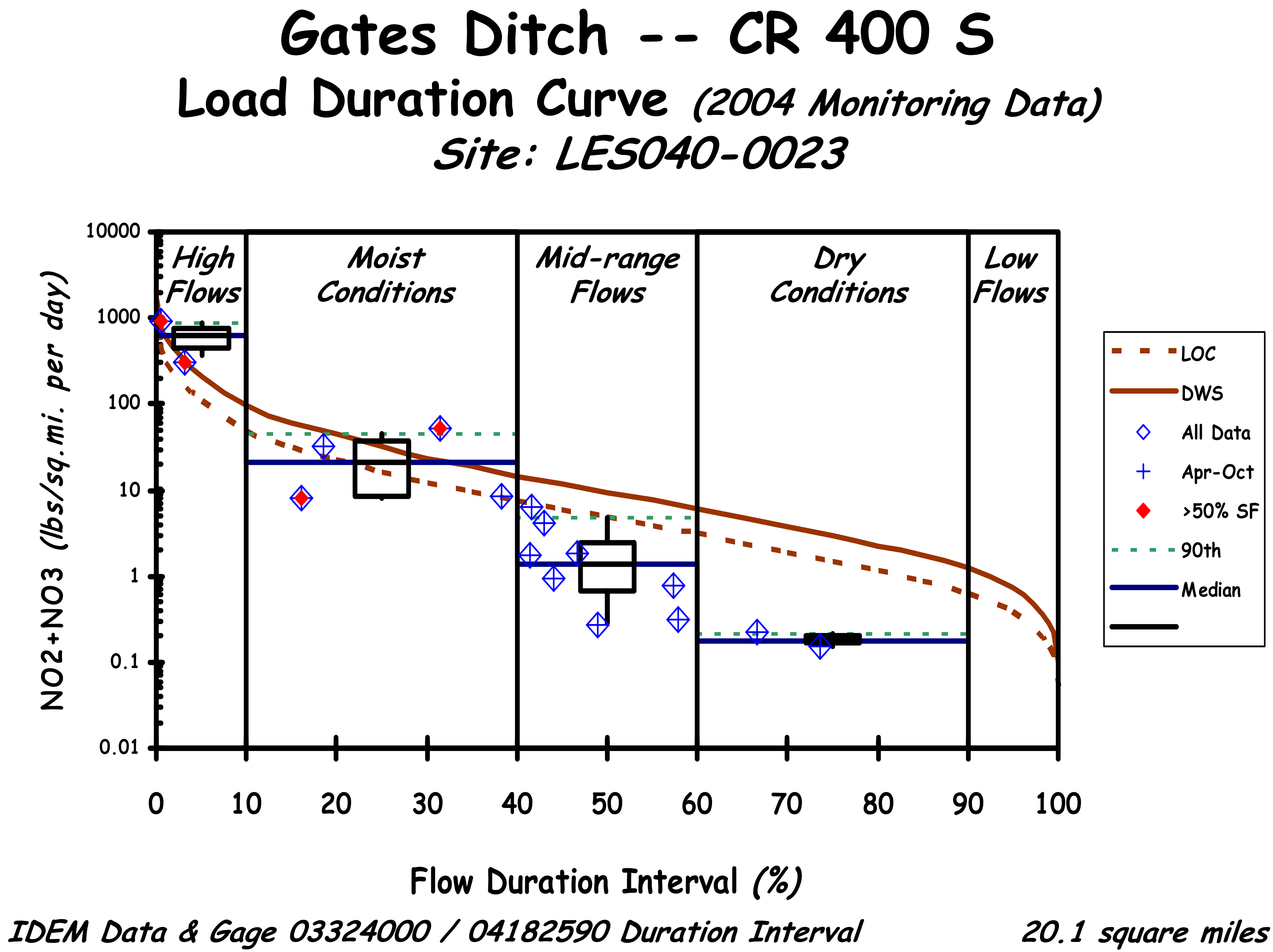
Site: LES050-0020



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *2.3 square miles*

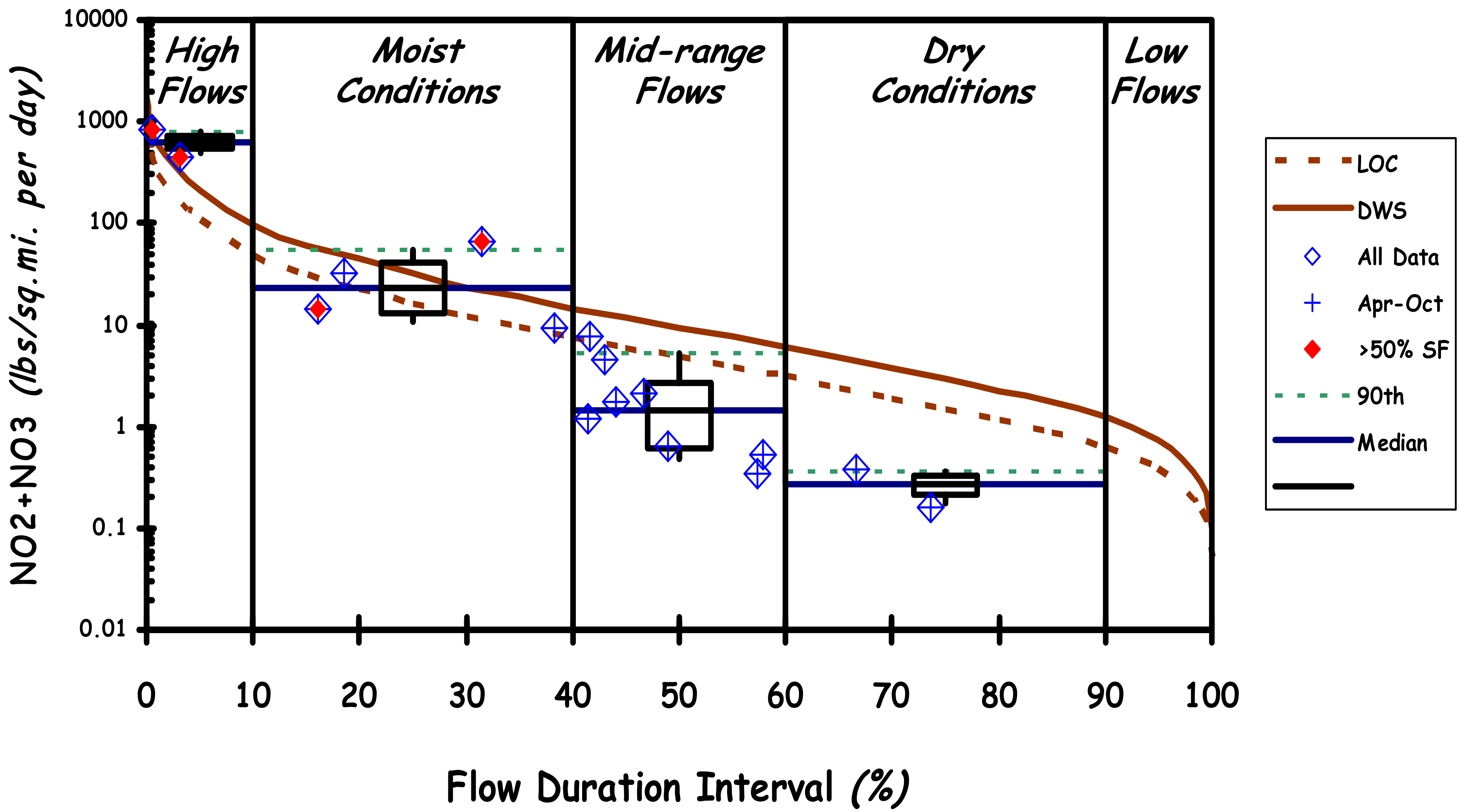


Habegger Ditch -- CR 150 E
Load Duration Curve (2004 Monitoring Data)
Site: LES040-0099
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
NO2+NO3 (lbs/sq.mi. per day)
10000
1000
100
10
1
0.1
0.01
0
10
20
30
40
50
60
70
80
90
100
LOC
DWS
All Data
Apr-Oct
>50% SF
90th
Median
Flow Duration Interval (%)
IDEM Data & Gage 03324000 / 04182590 Duration Interval
8.4 square miles



Gates Ditch -- CR 400 S
Load Duration Curve (2004 Monitoring Data)
Site: LES040-0023
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
NO2+NO3 (lbs/sq.mi. per day)
10000
1000
100
10
1
0.1
0.01
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
LOC
DWS
All Data
Apr-Oct
>50% SF
90th
Median
IDEM Data & Gage 03324000 / 04182590 Duration Interval
20.1 square miles

Blue Creek -- Salem Road
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0011

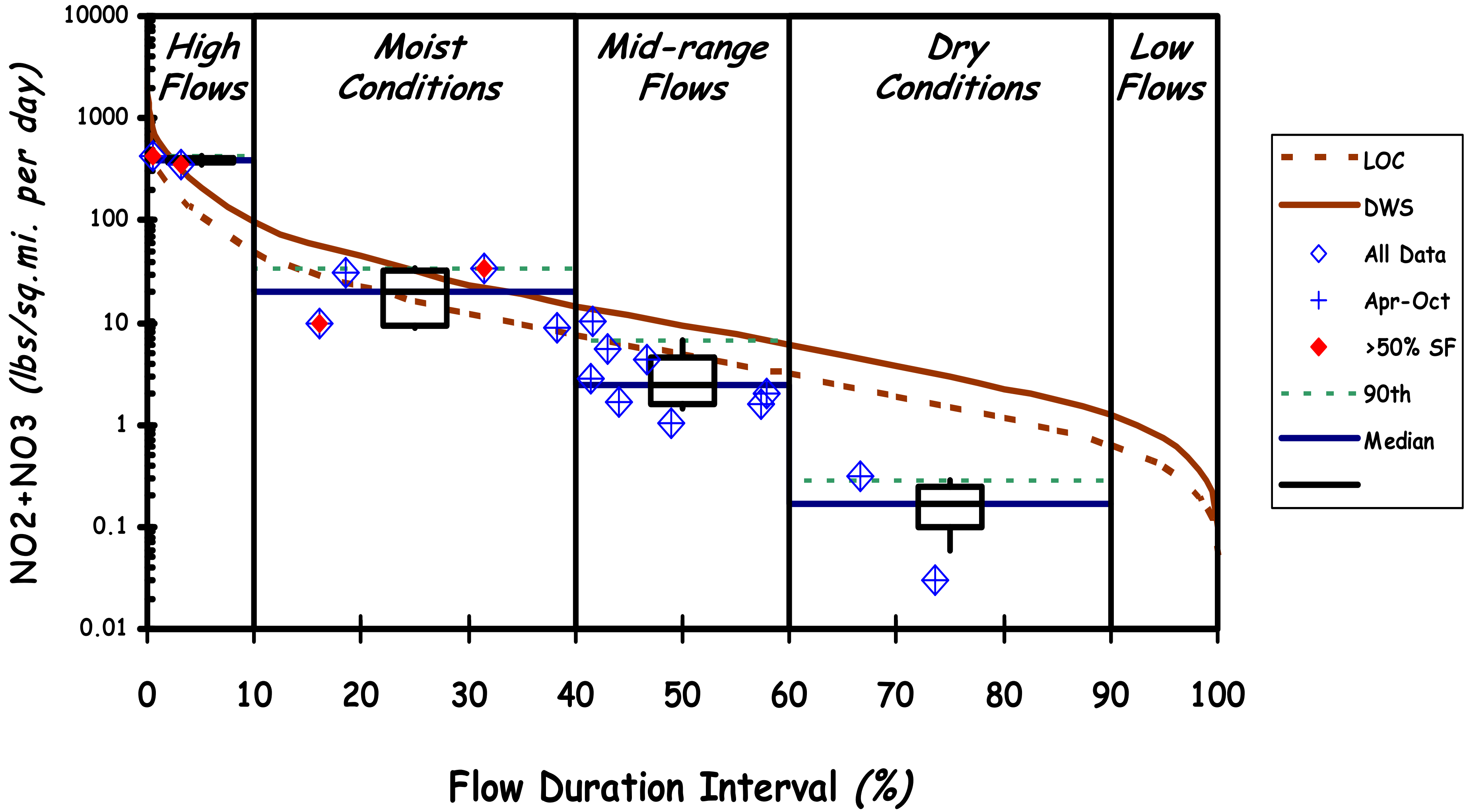


IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0010

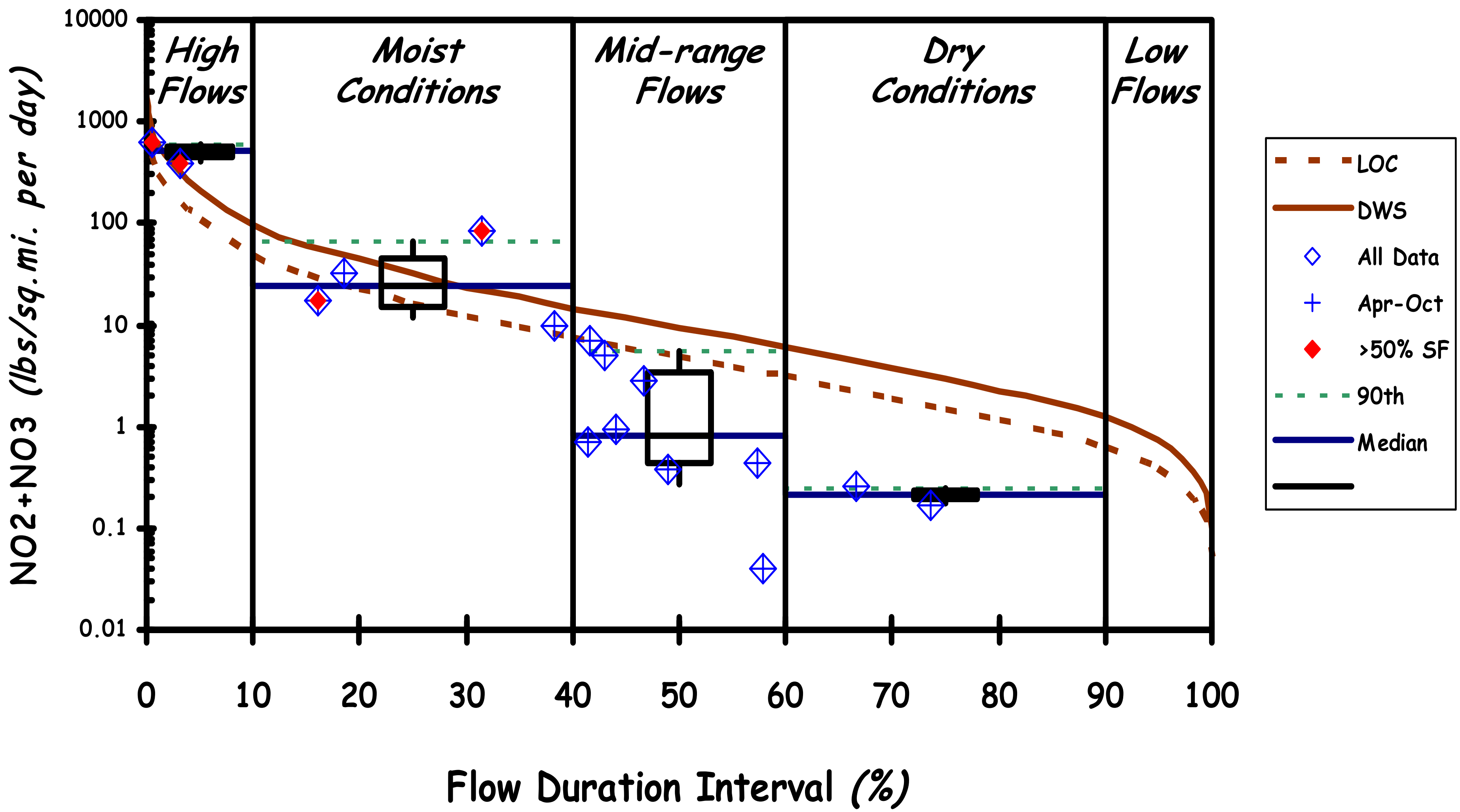


IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

Blue Creek -- CR 300 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0066

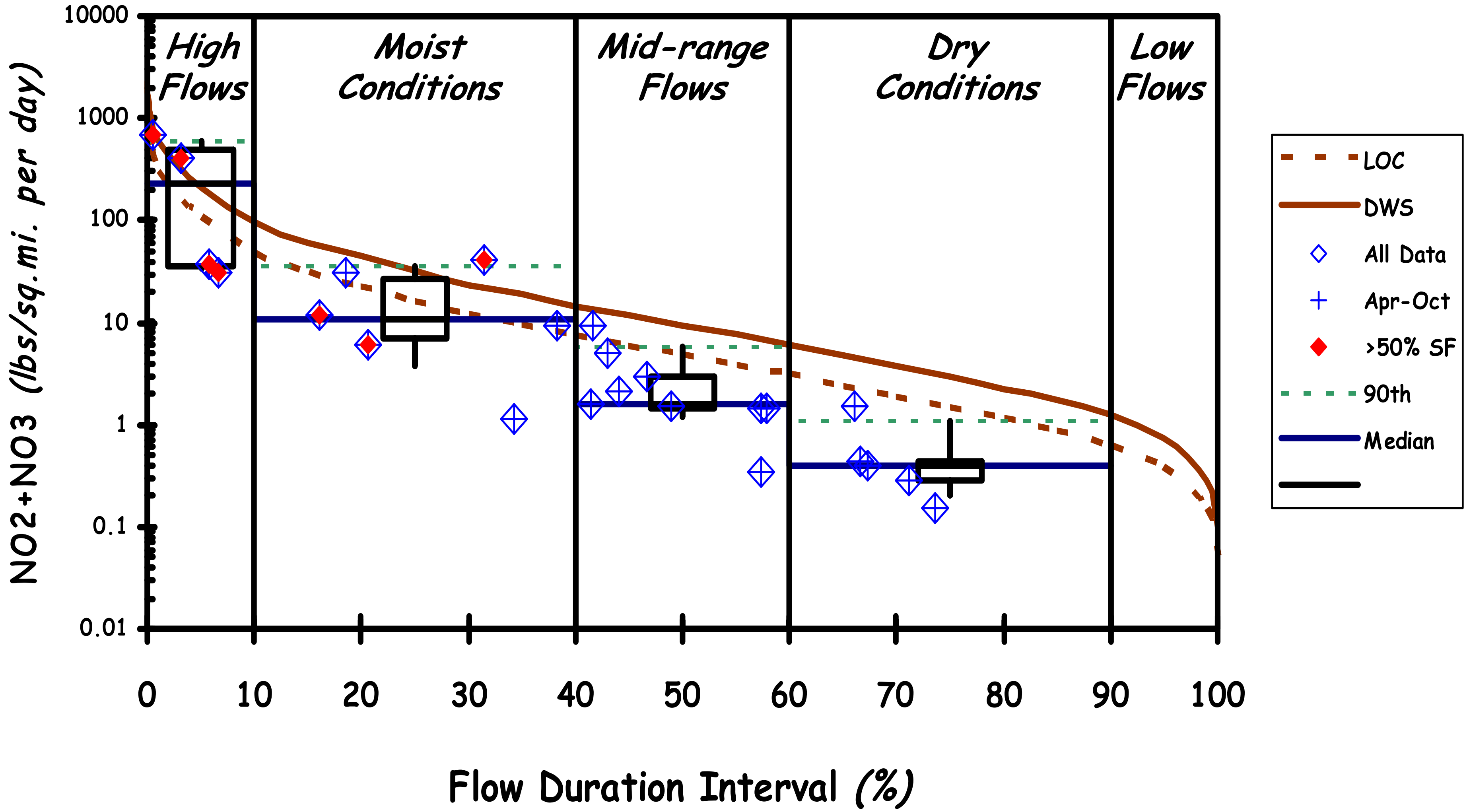


IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*

Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

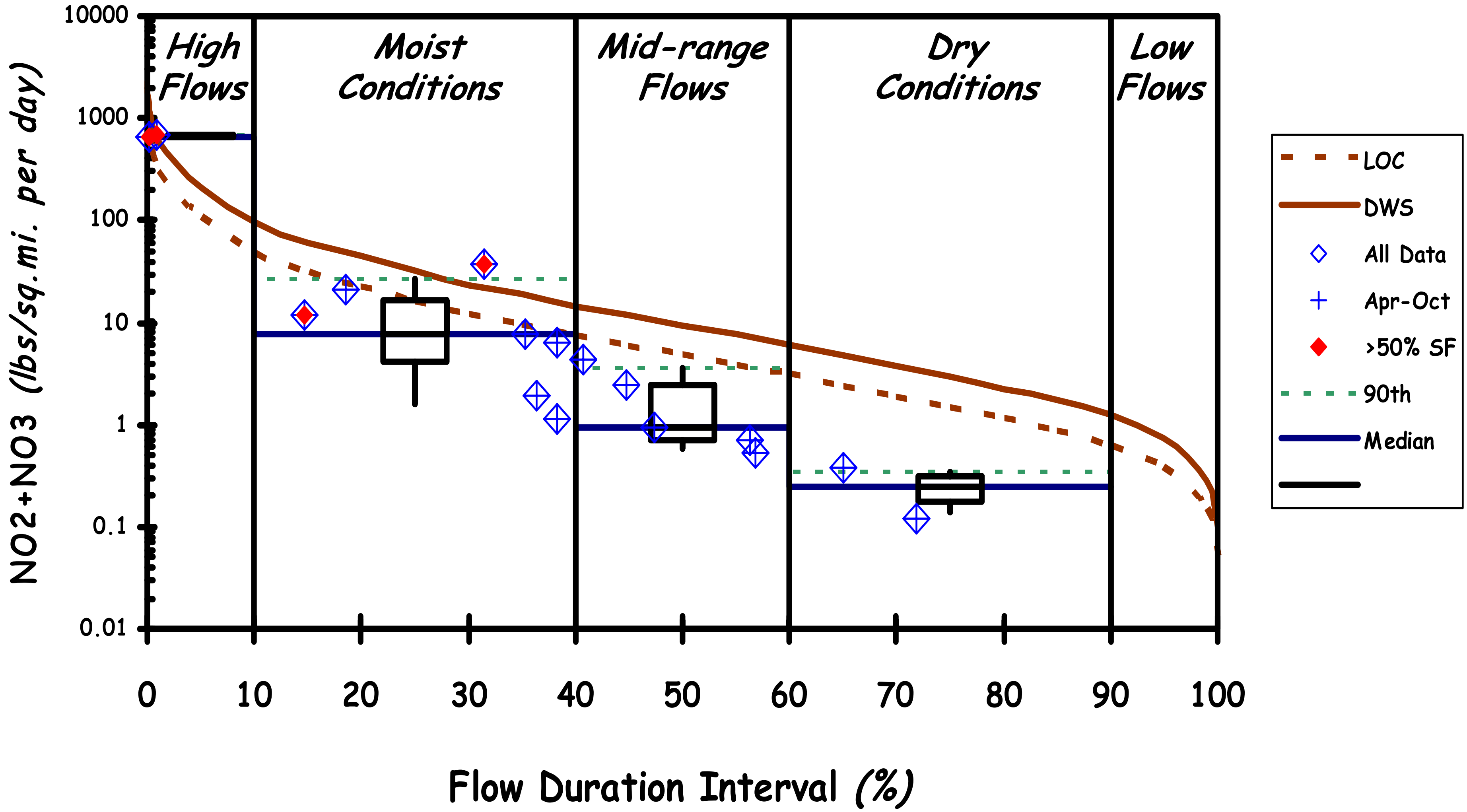


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Martz Creek -- CR 200 N

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0040

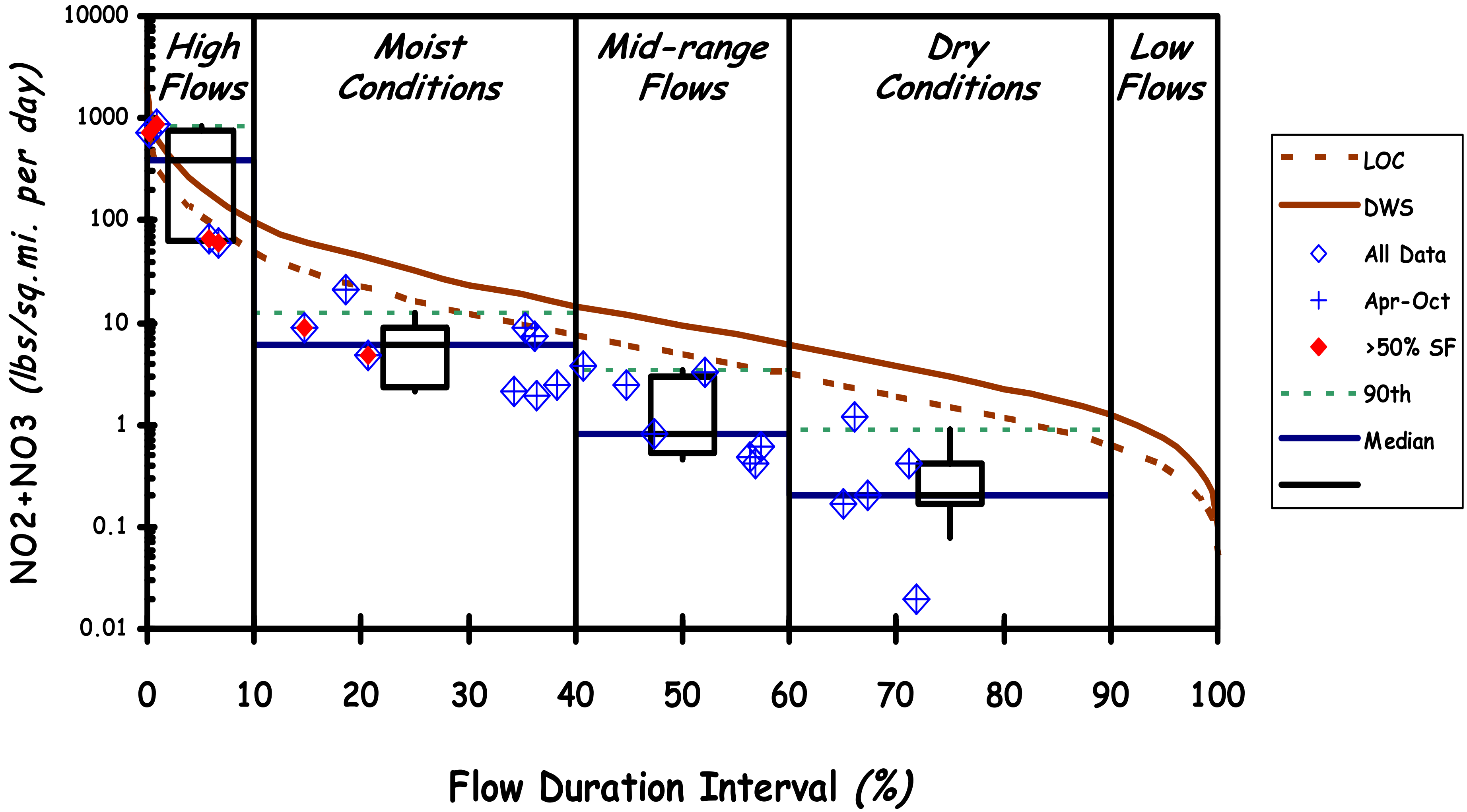


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038

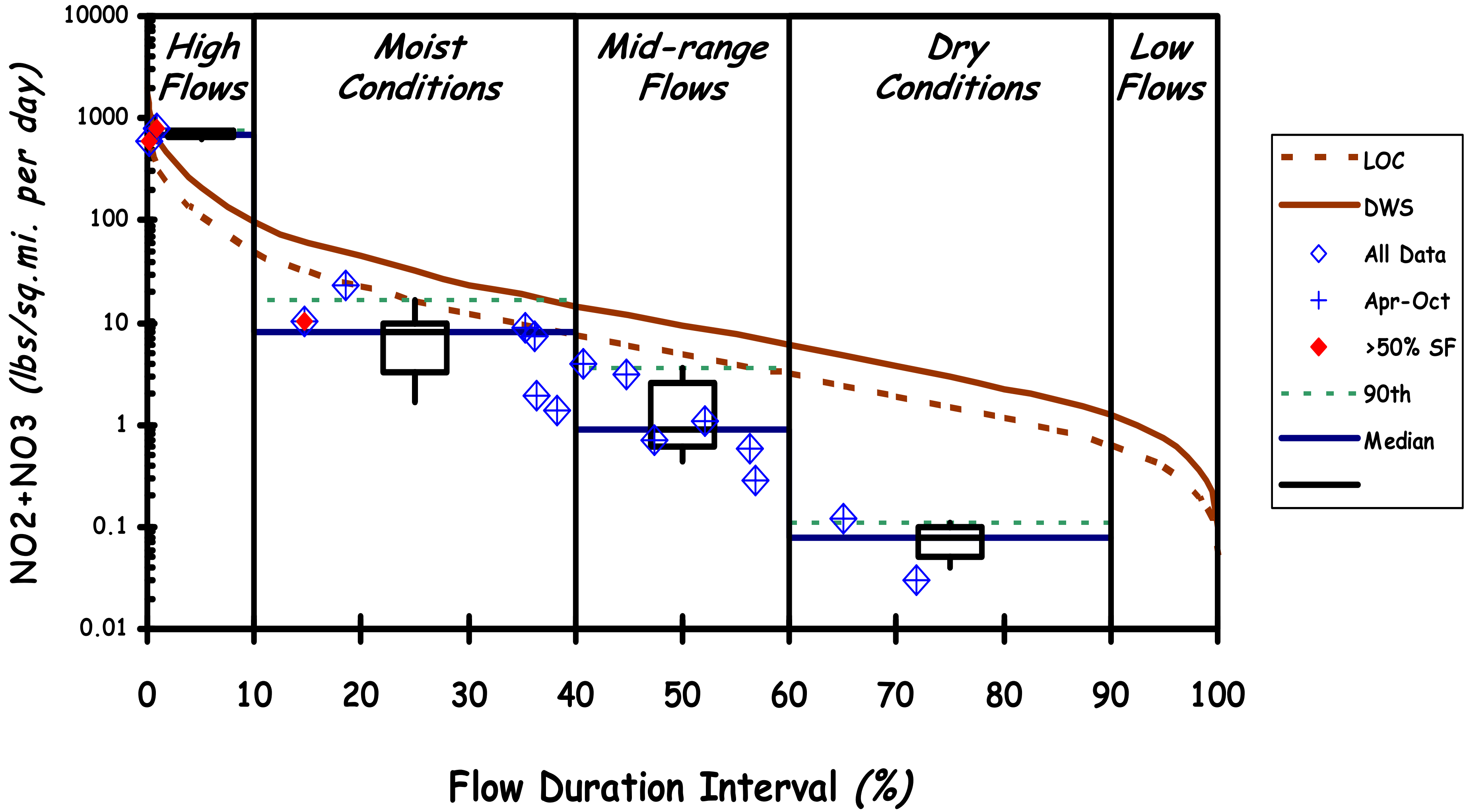


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

Borum Run -- Mercer Road

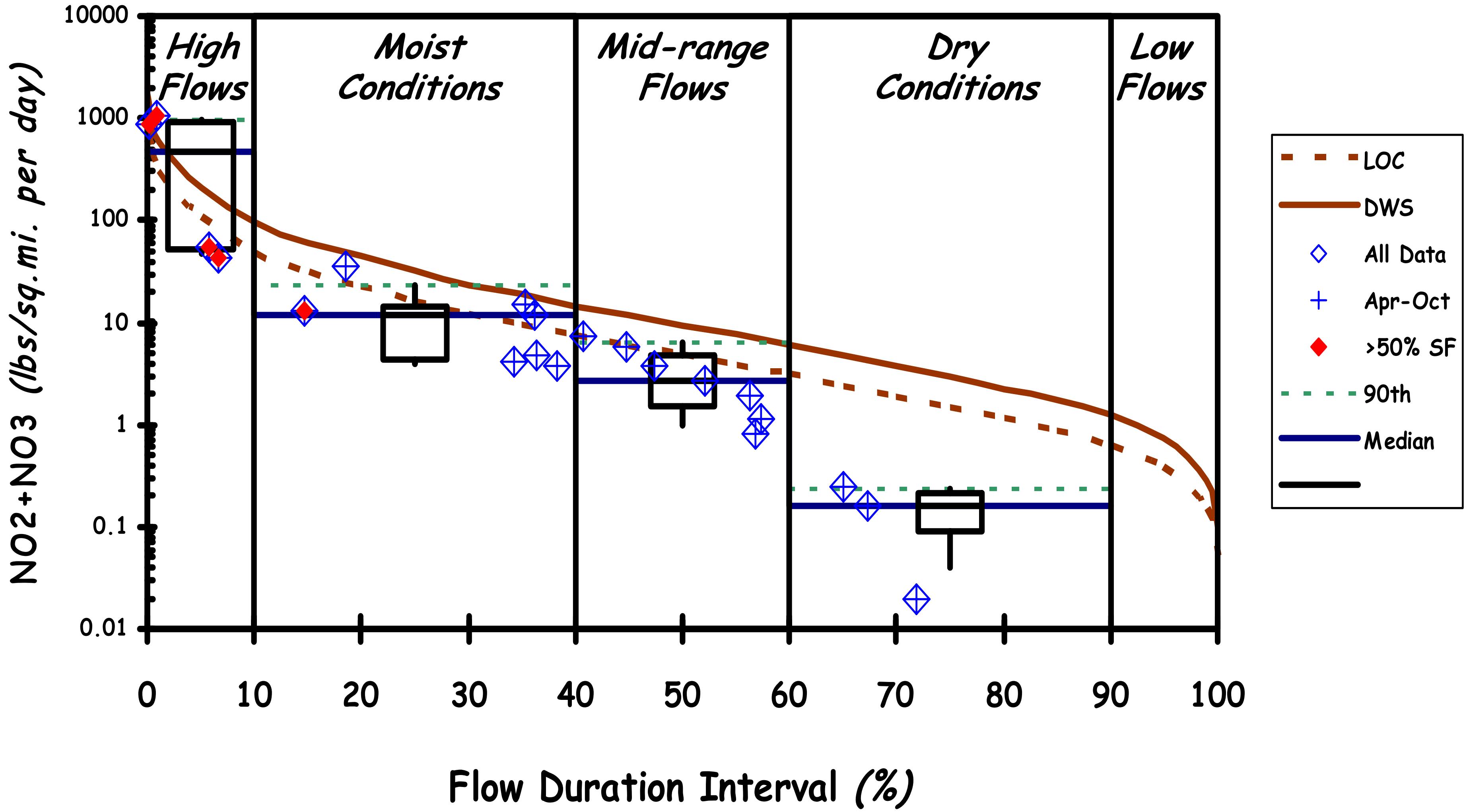
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0097



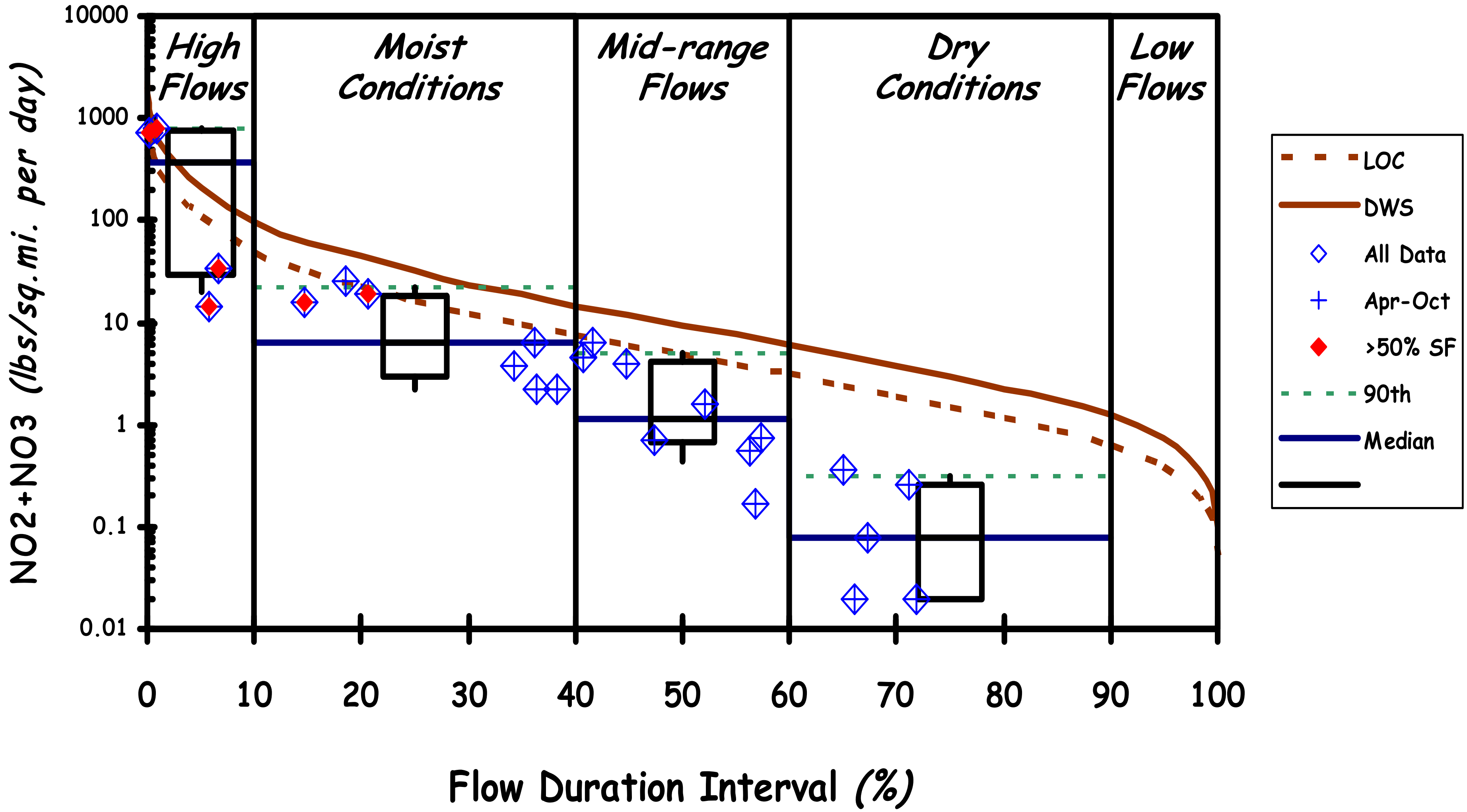
IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0008



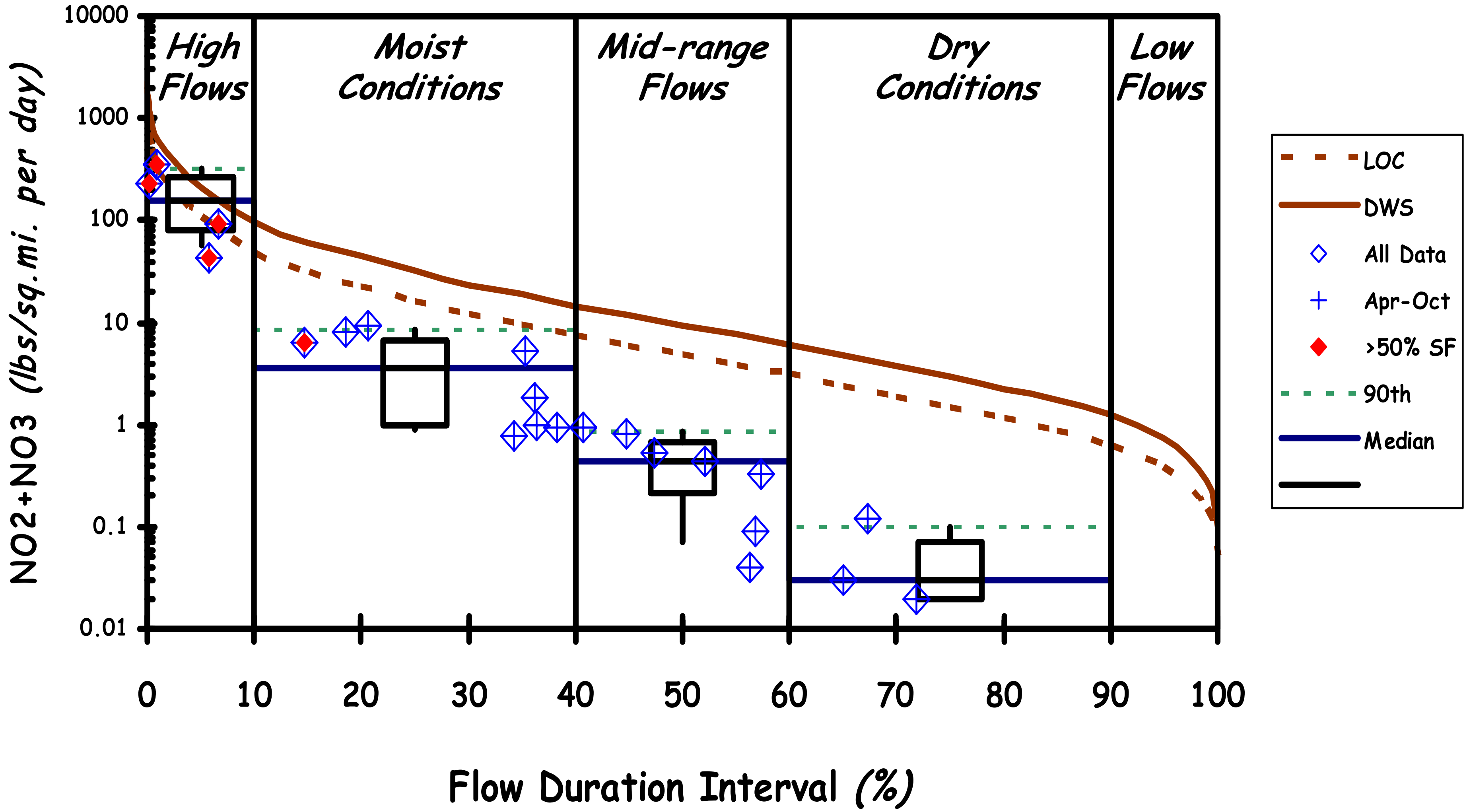
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*

Nickelsen Creek – CR 1100 N
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0015

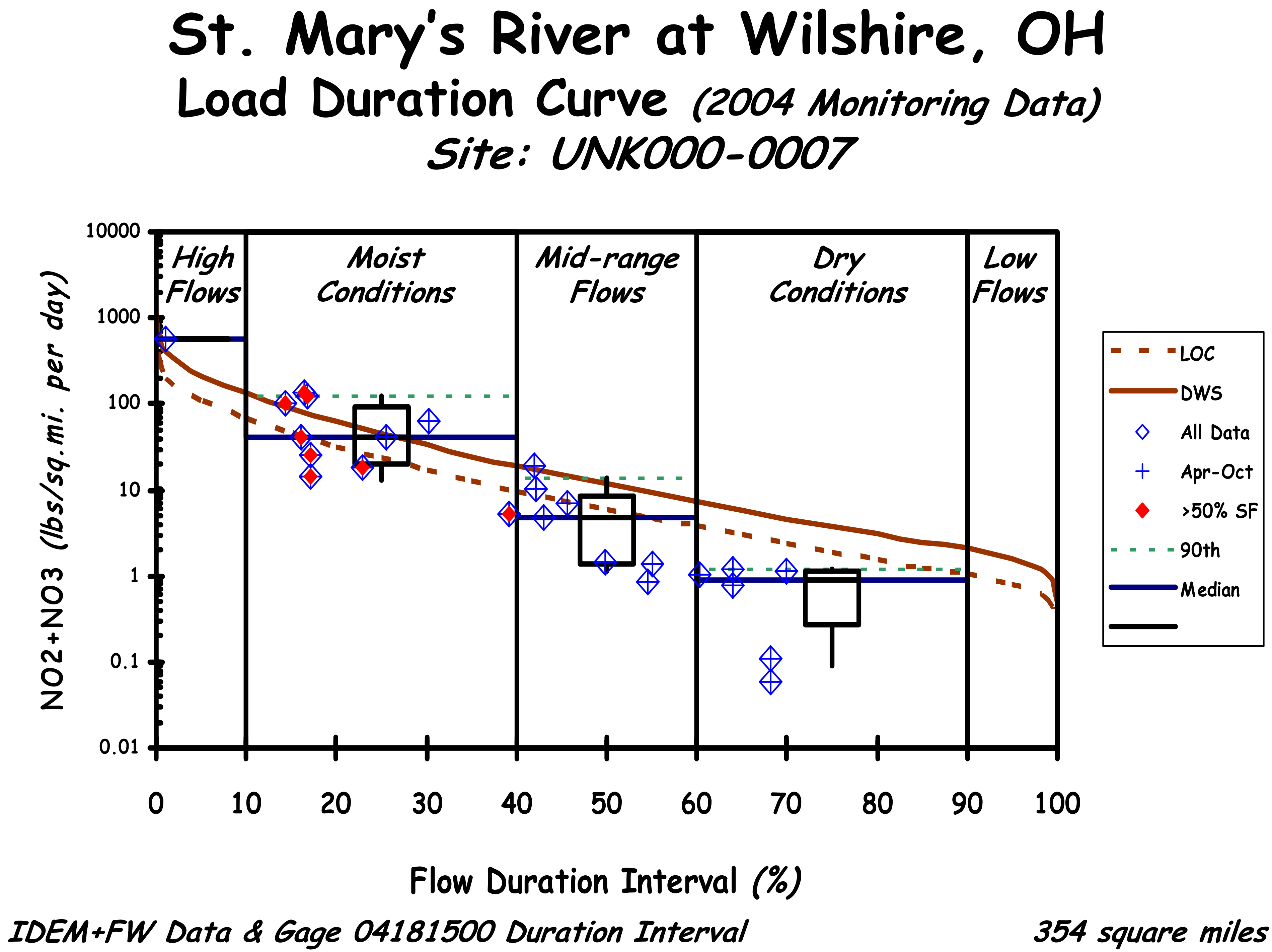


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *12.2 square miles*

Unnamed Tributary -- Barkley Road
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0020



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *2.3 square miles*

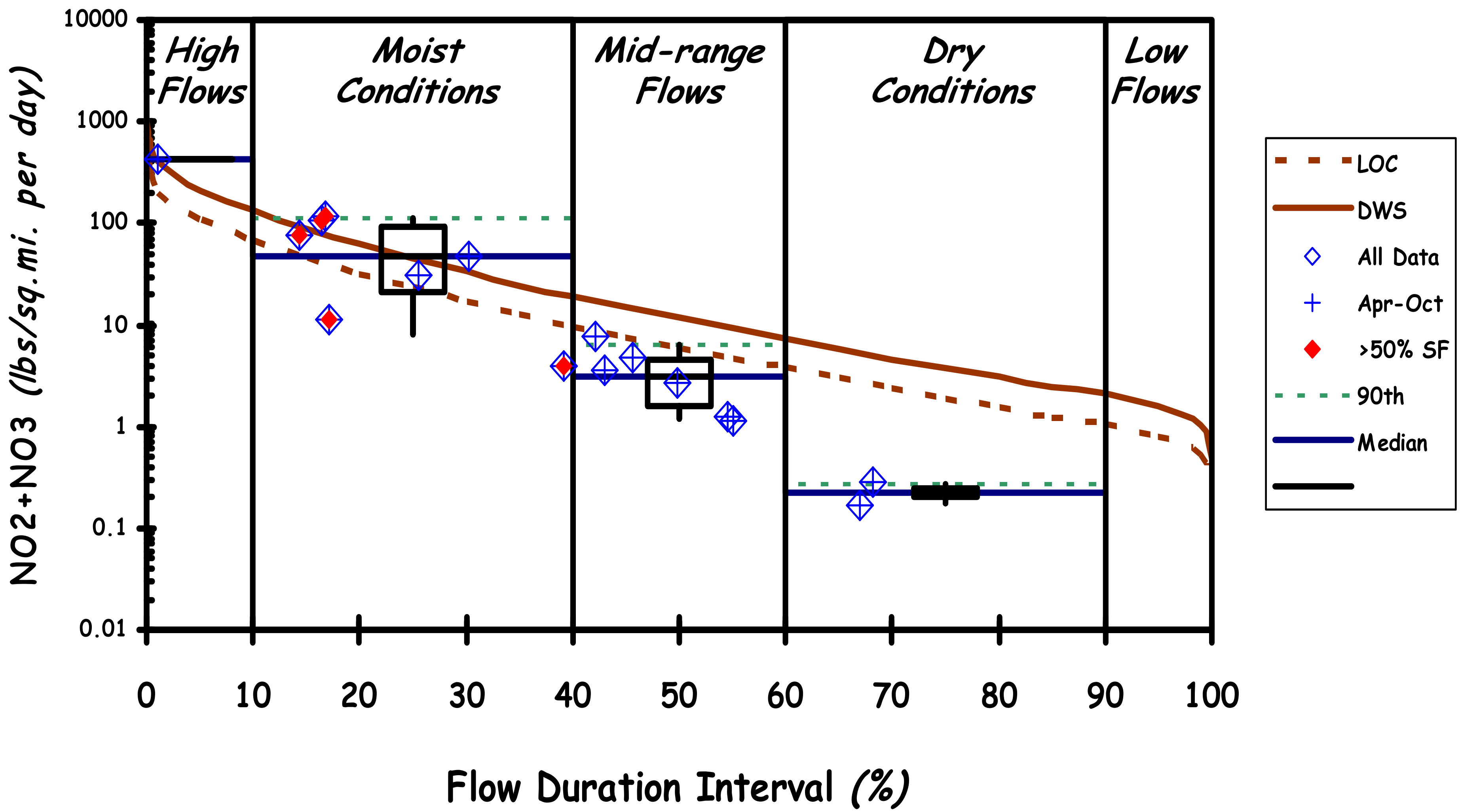


St. Mary's River at Wilshire, OH
Load Duration Curve (2004 Monitoring Data)
Site: UNK000-0007
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
LOC
DWS
All Data
Apr-Oct
>50% SF
90th
Median
NO2+NO3 (lbs/sq.mi. per day)
10000
1000
100
10
1
0.1
0.01
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
IDEM+FW Data & Gage 04181500 Duration Interval
354 square miles

St. Mary's River at Pleasant Mills

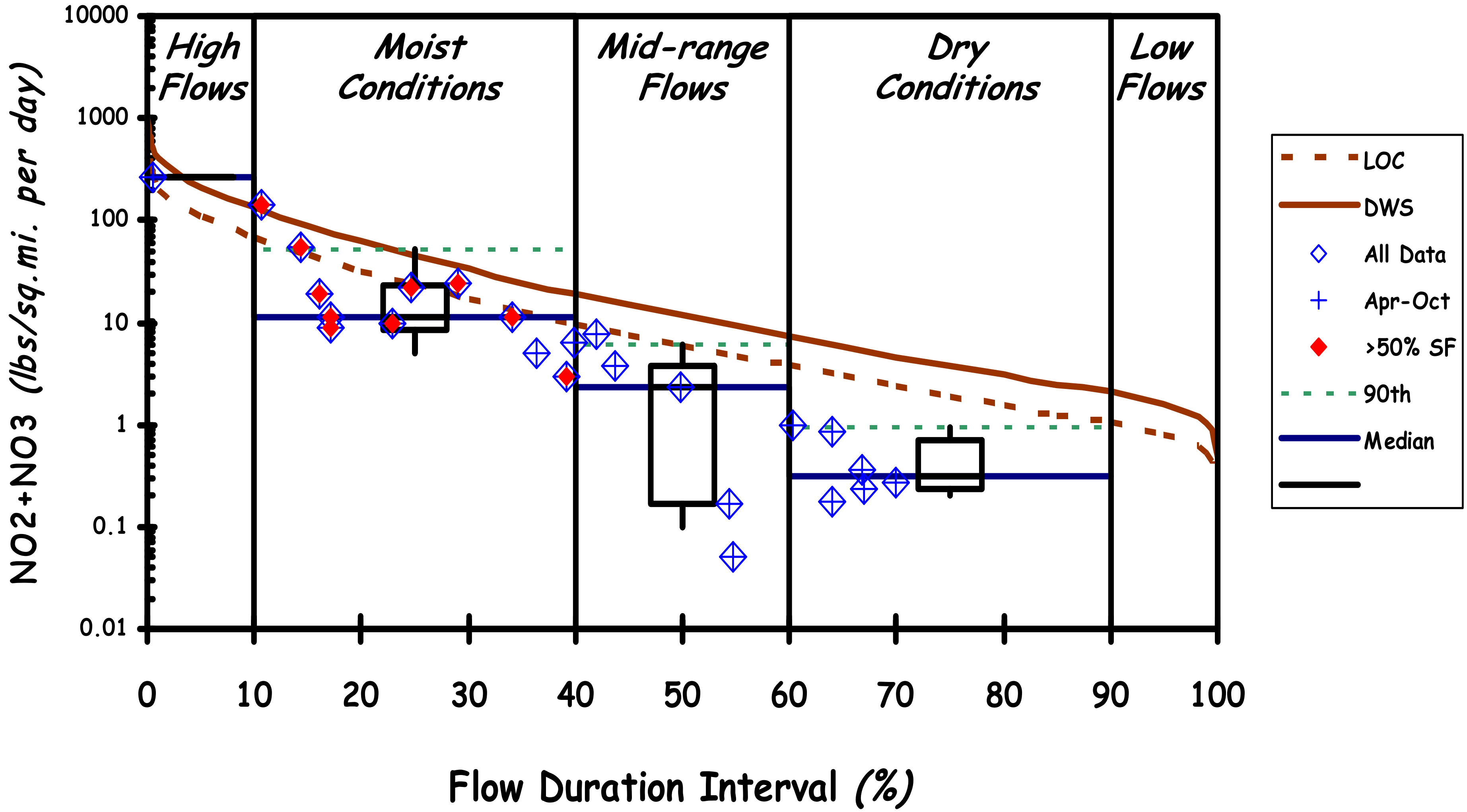
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0007

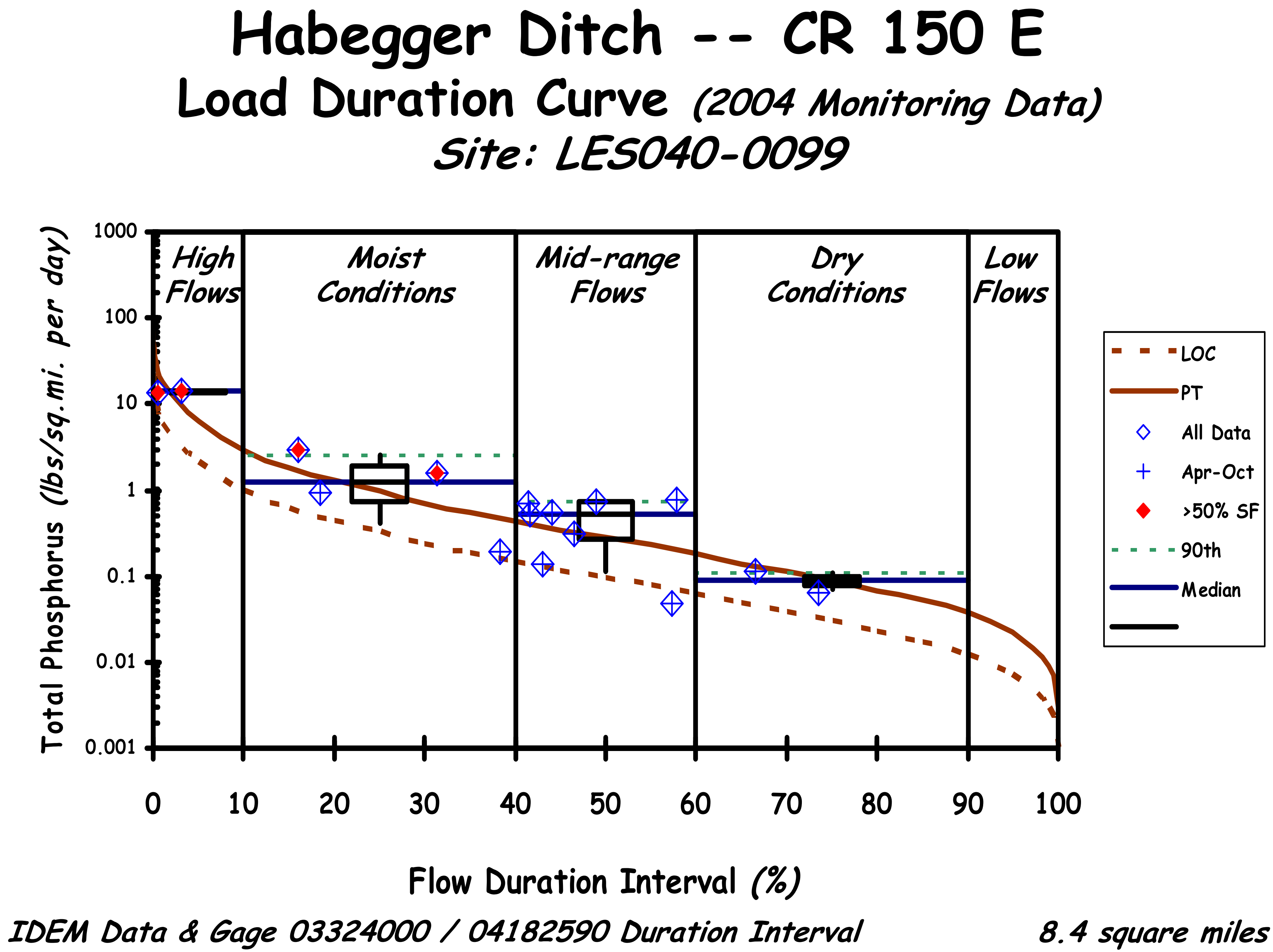


IDEM Data & Gage 04181500 Duration Interval *468 square miles*

St. Mary's River near Poe
Load Duration Curve *(2004 Monitoring Data)*
Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval *643 square miles*

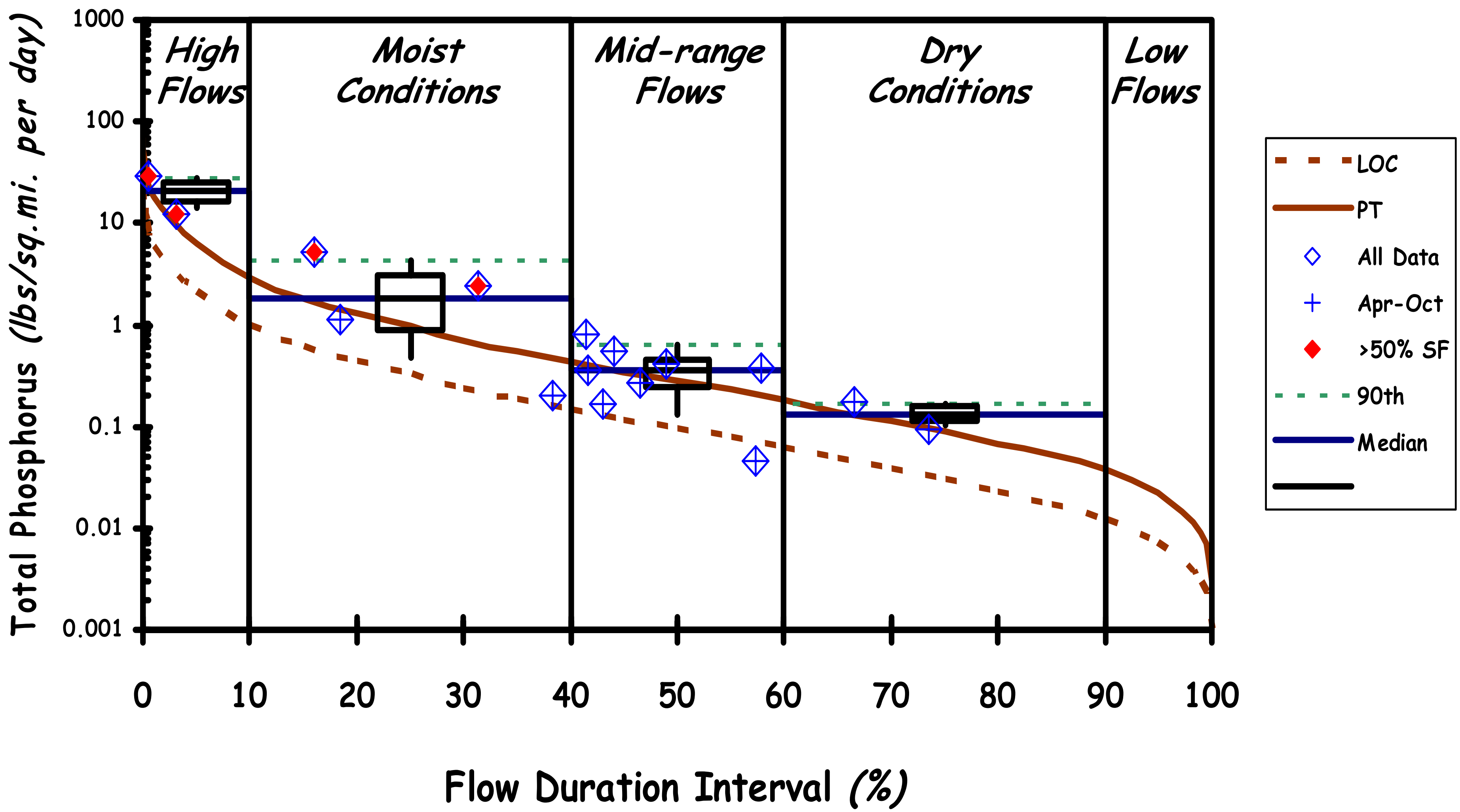


Habegger Ditch -- CR 150 E
Load Duration Curve (2004 Monitoring Data)
Site: LES040-0099
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
Total Phosphorus (lbs/sq.mi. per day)
1000
100
10
1
0.1
0.01
0.001
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
LOC
PT
All Data
Apr-Oct
>50% SF
90th
Median
IDEM Data & Gage 03324000 / 04182590 Duration Interval
8.4 square miles

Gates Ditch -- CR 400 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0023

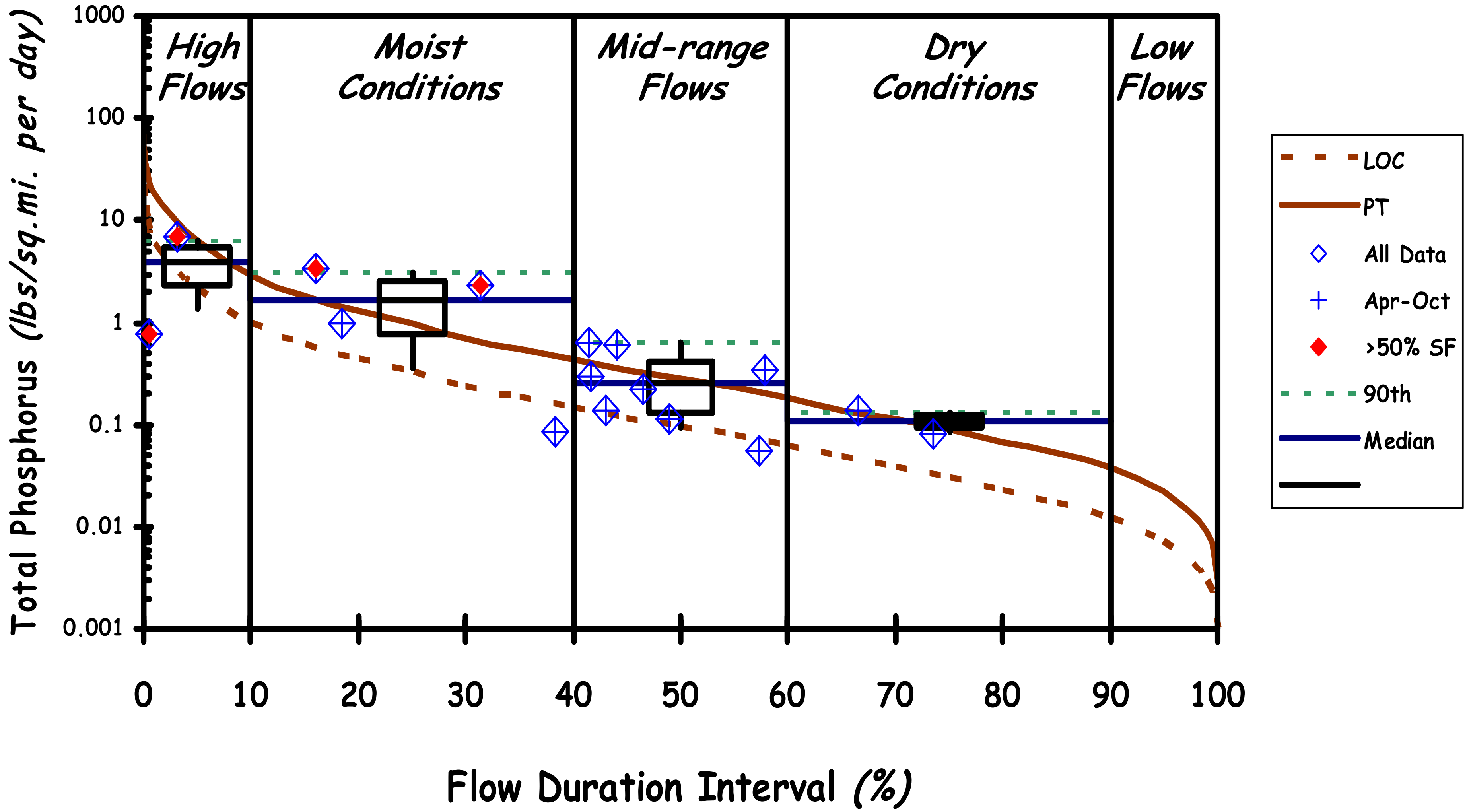


IDEM Data & Gage 03324000 / 04182590 Duration Interval *20.1 square miles*

Blue Creek -- Salem Road

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0011

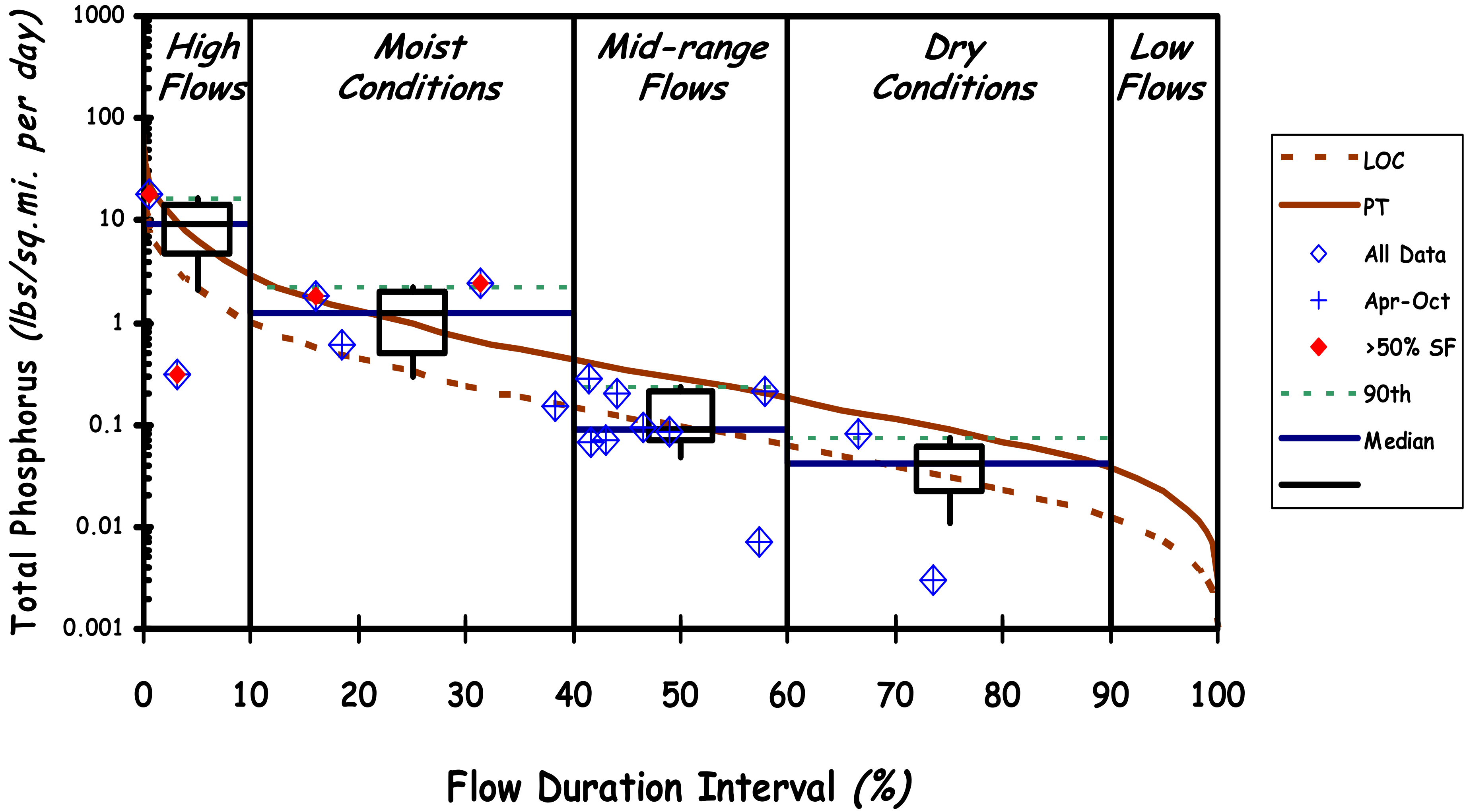


IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0010

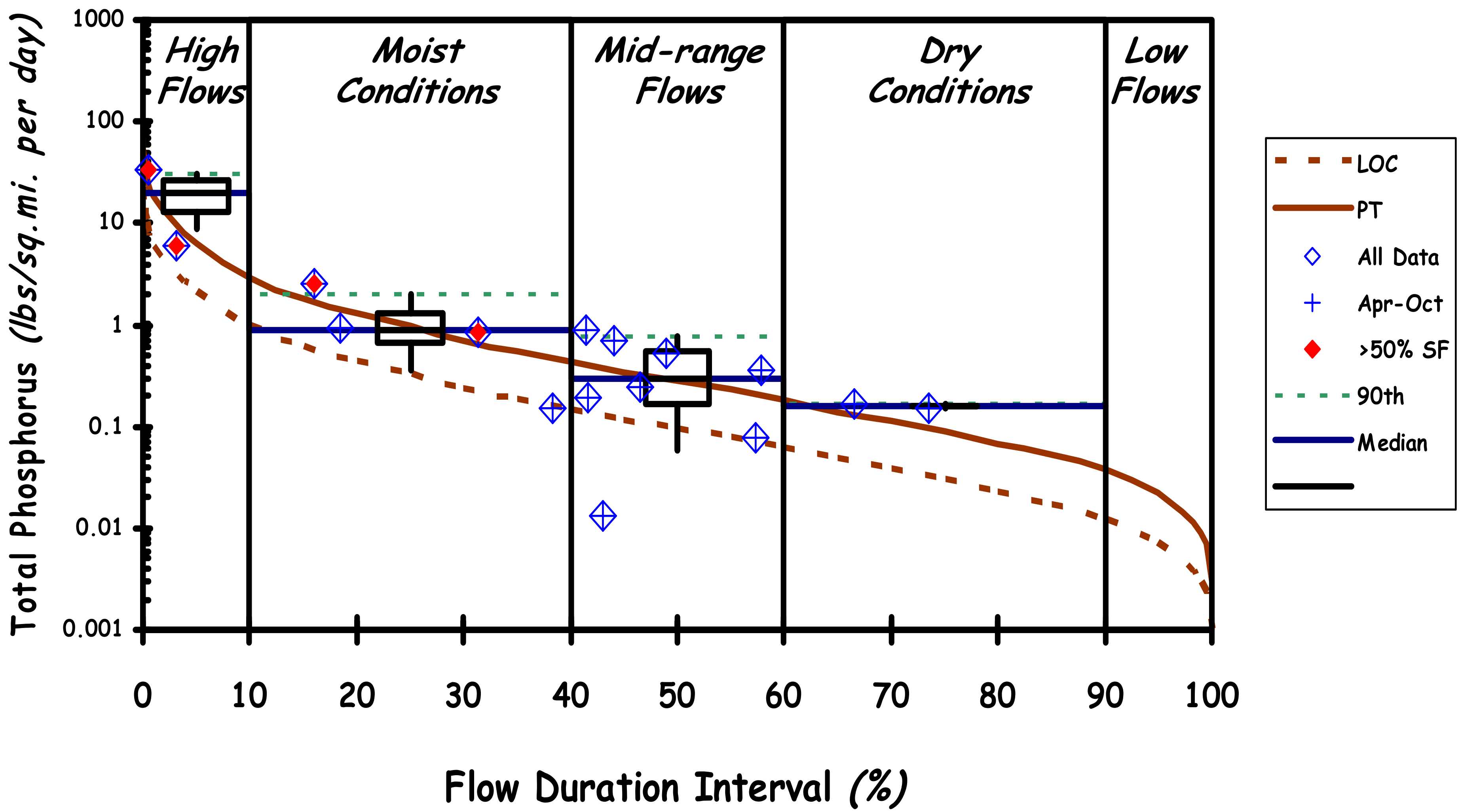


IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

Blue Creek -- CR 300 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0066

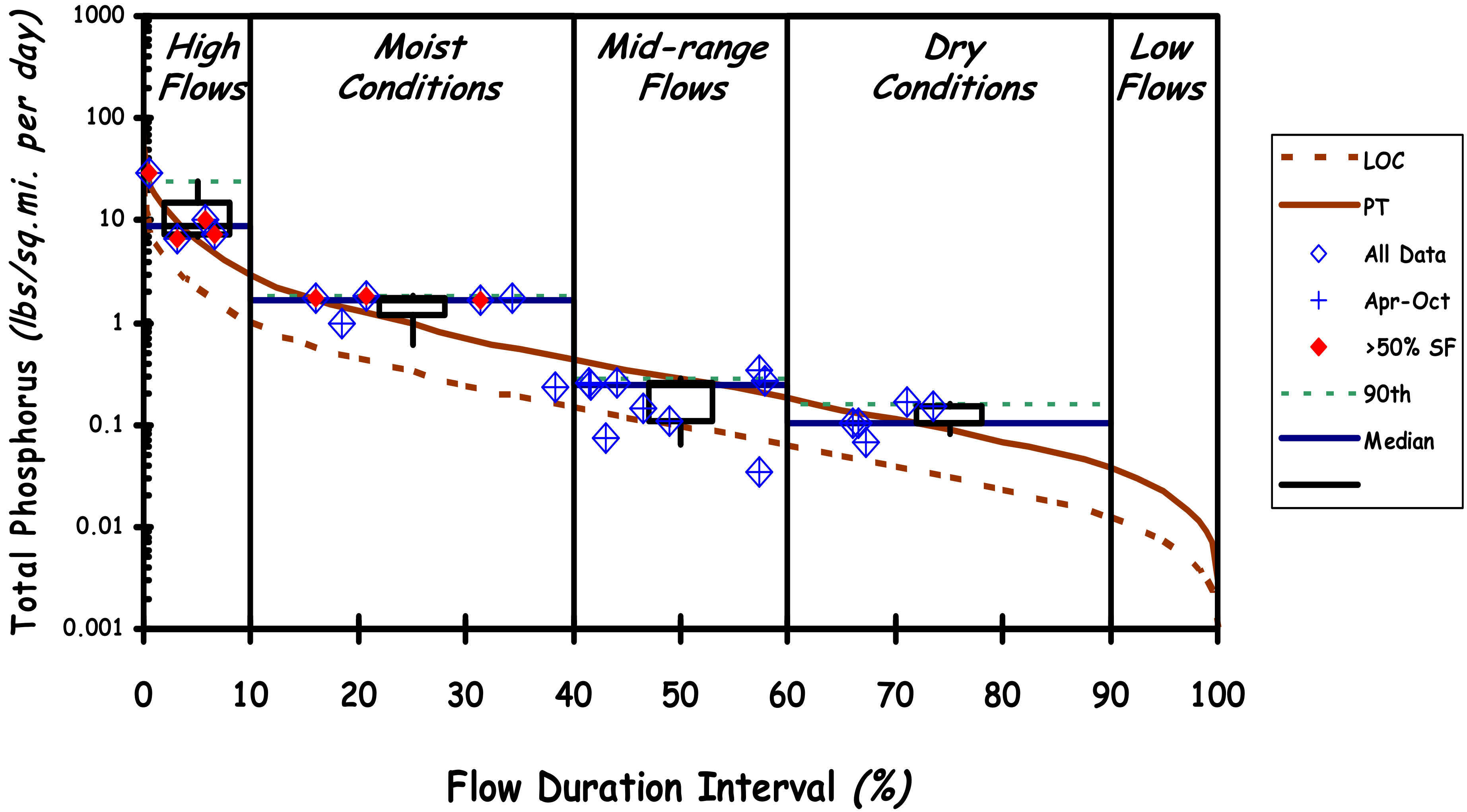


IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*

Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

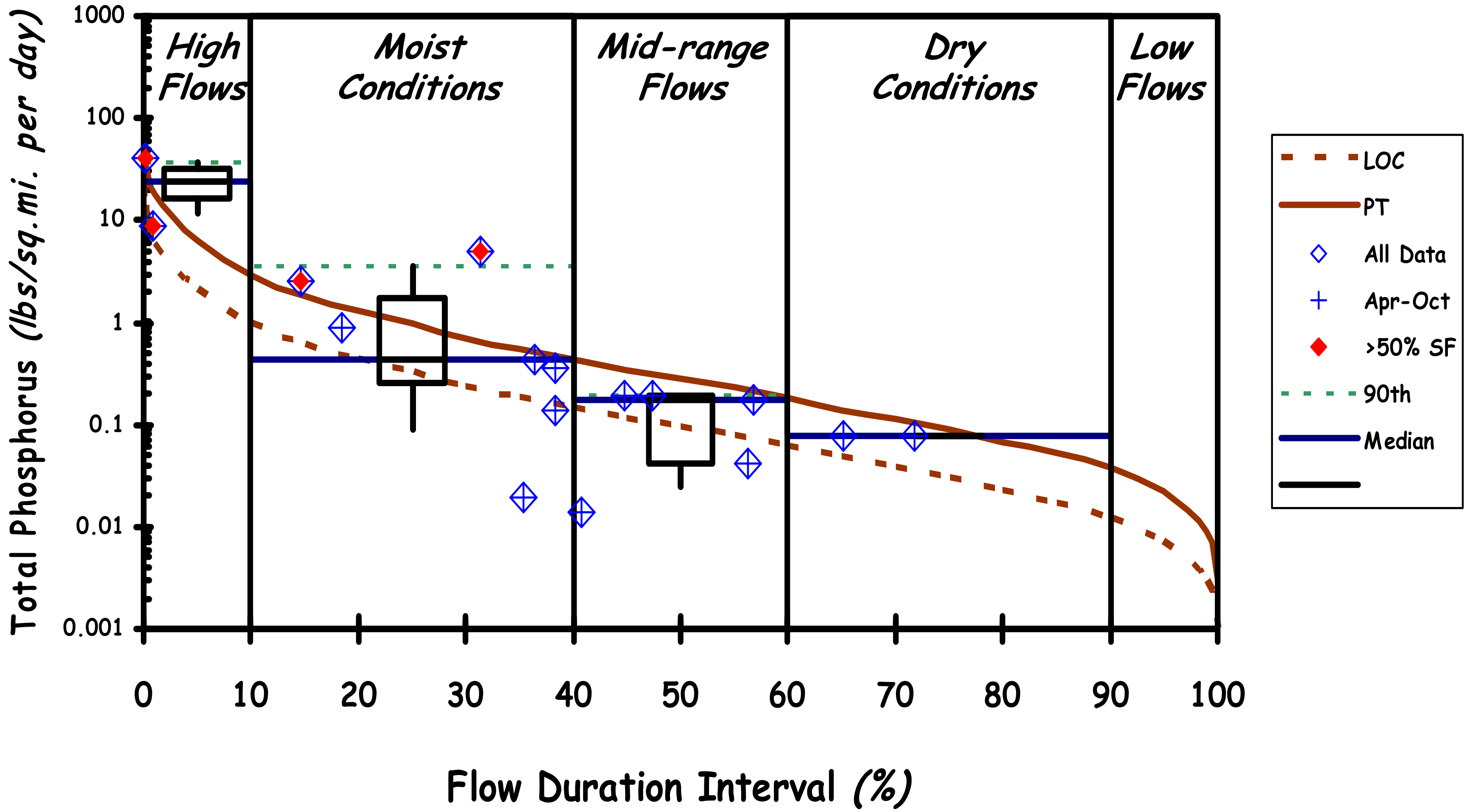


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Martz Creek -- CR 200 N

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0040

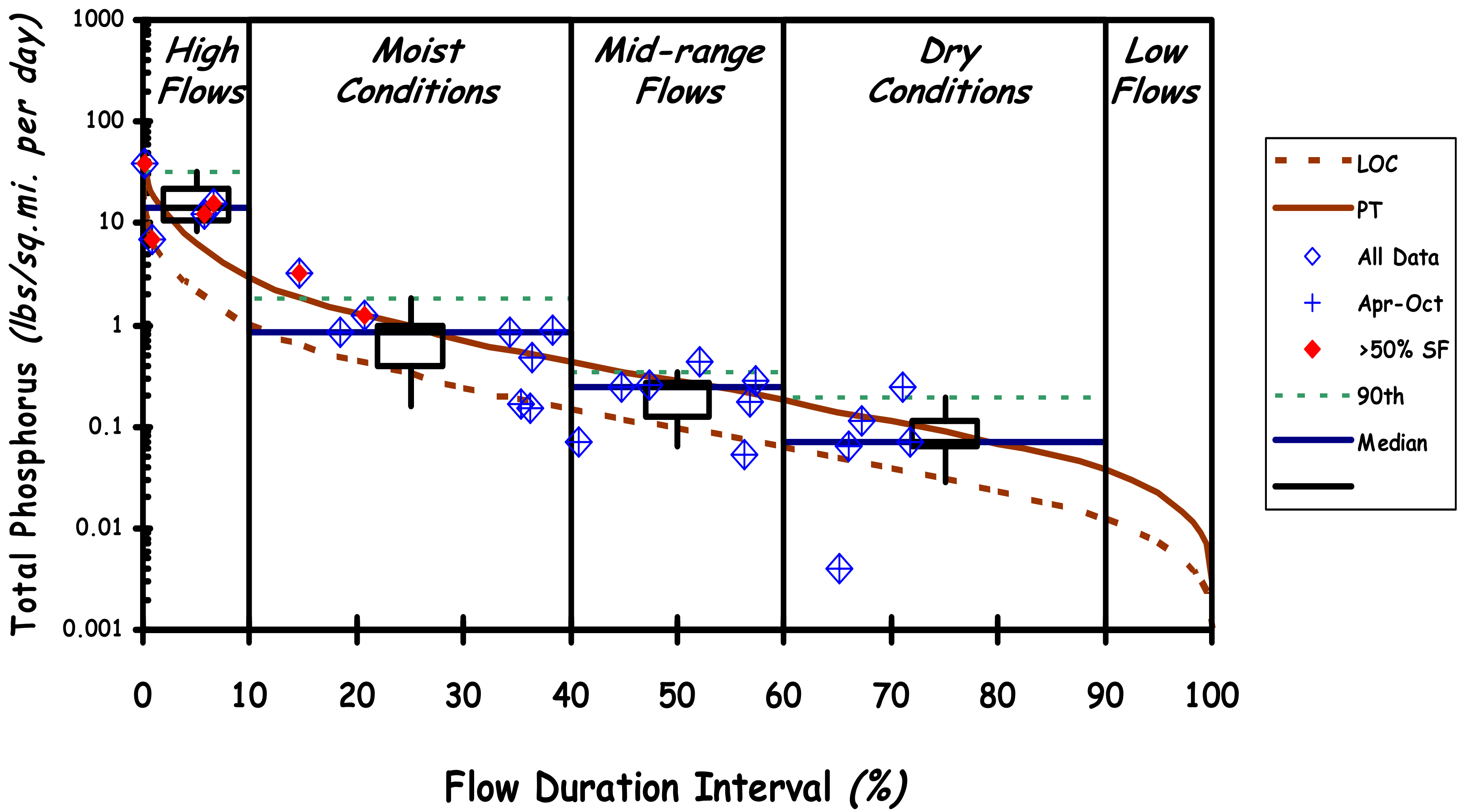


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038

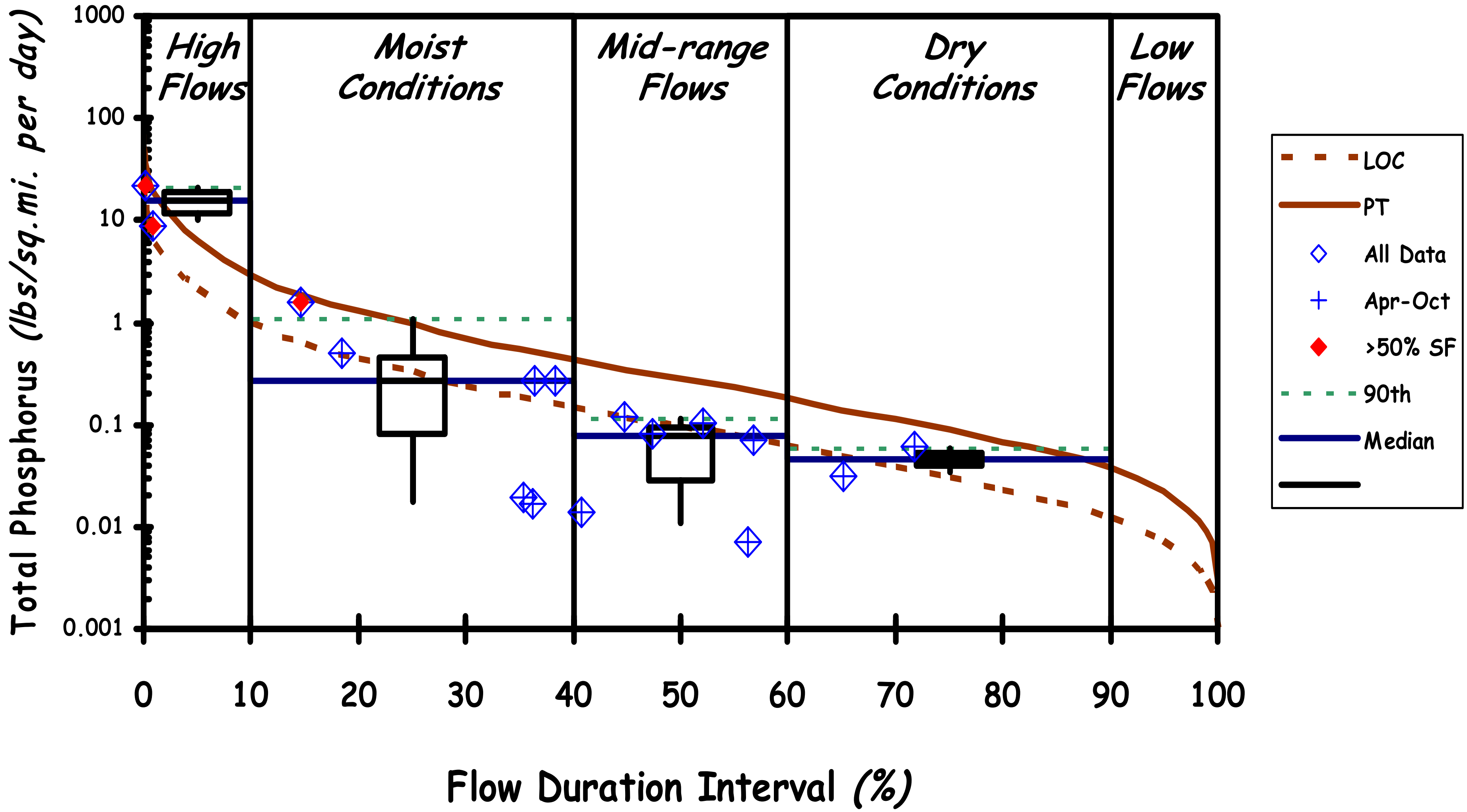


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

Borum Run -- Mercer Road

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0097

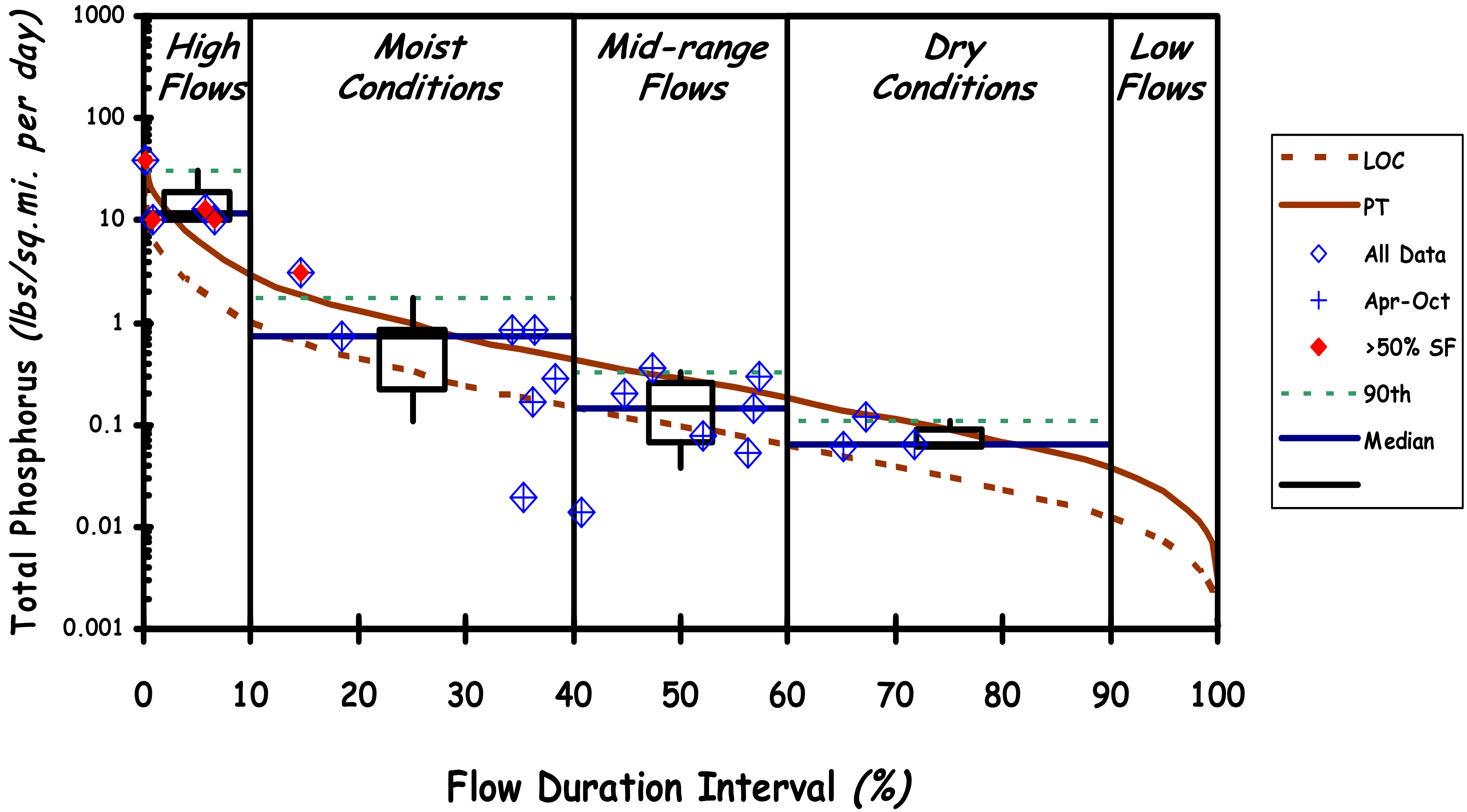


IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W

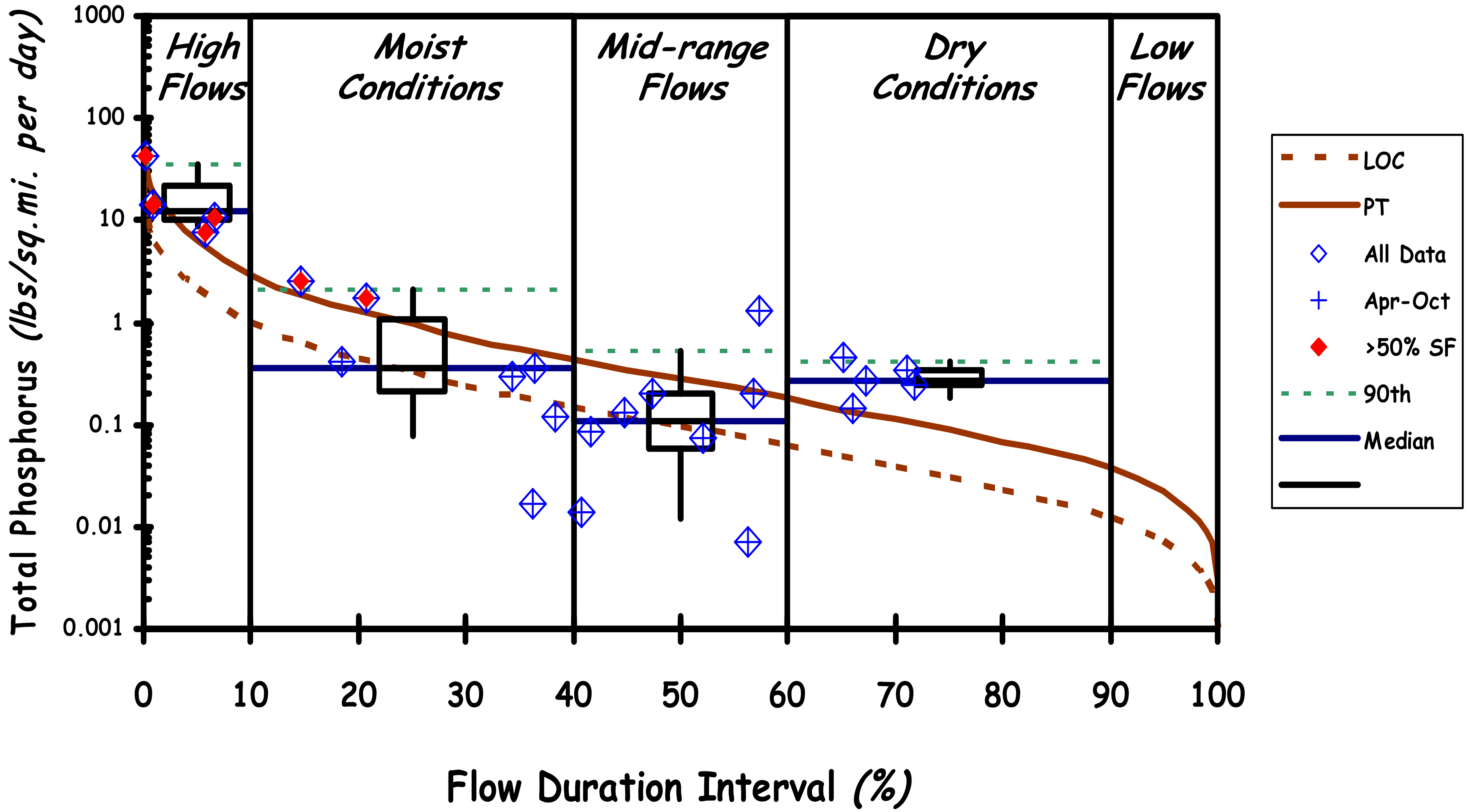
Load Duration Curve *(2004 Monitoring Data)*

Site: LES050-0008

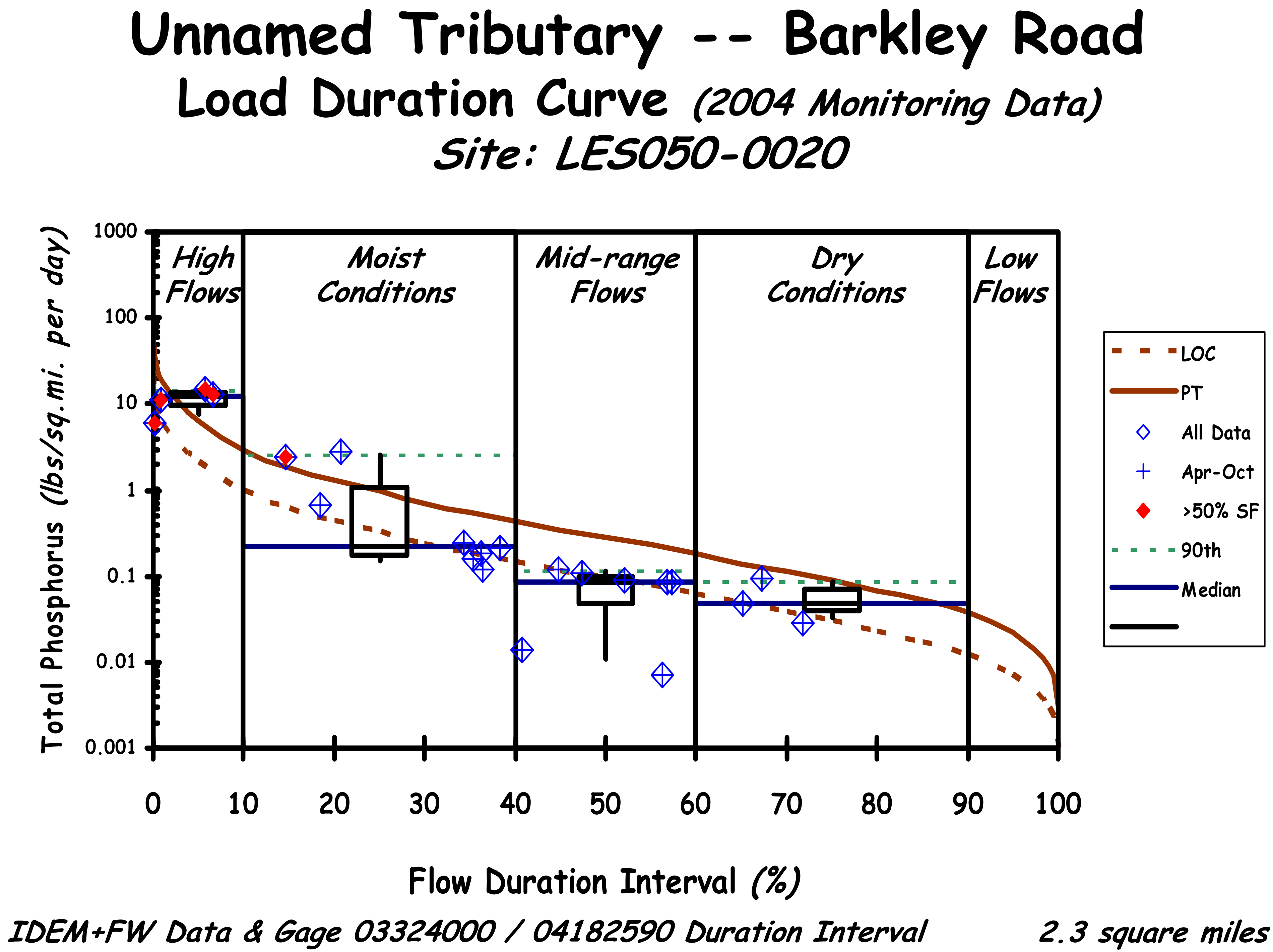


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*

Nickelsen Creek - CR 1100 N
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0015



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *12.2 square miles*

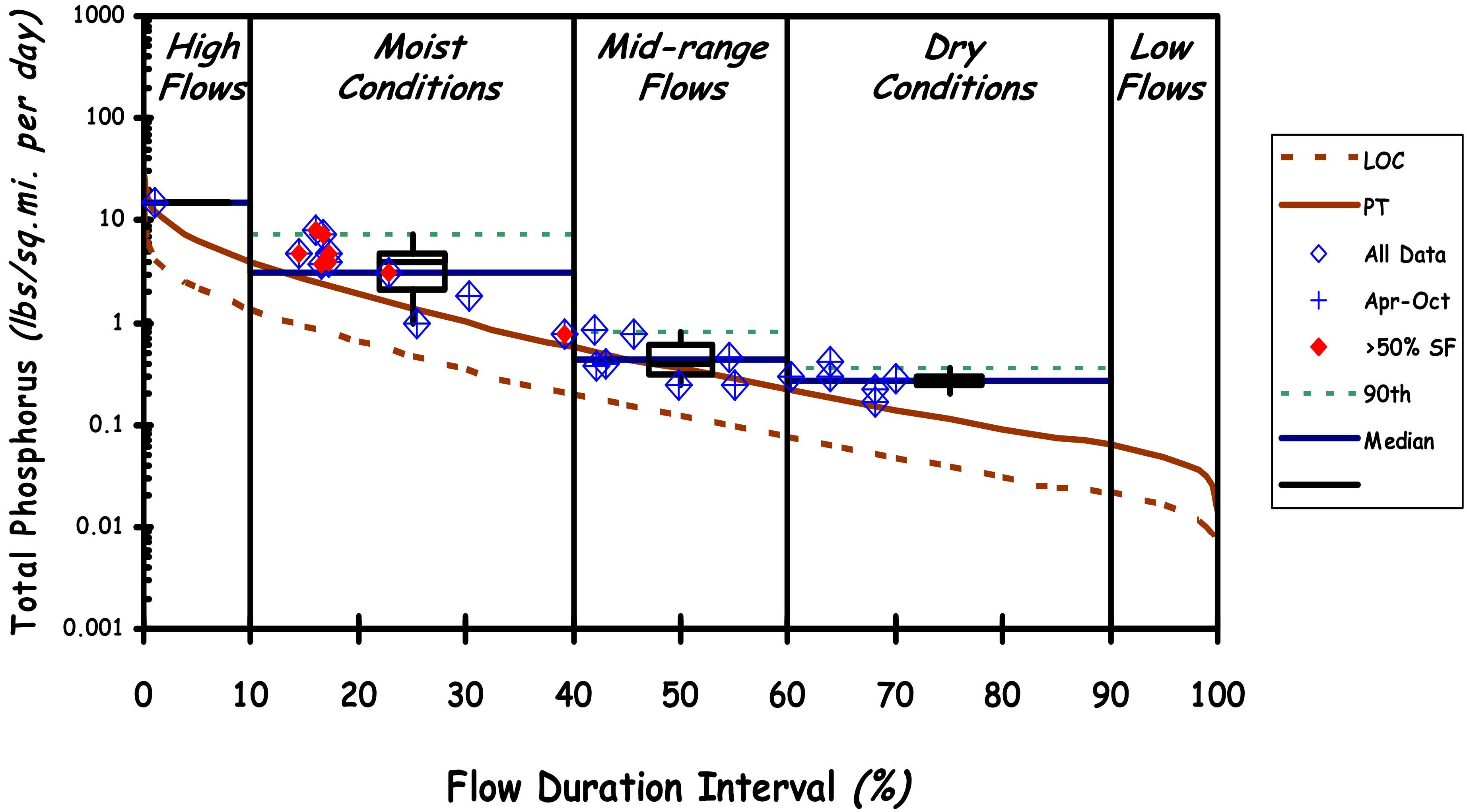


Unnamed Tributary -- Barkley Road
Load Duration Curve (2004 Monitoring Data)
Site: LES050-0020
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
Total Phosphorus (lbs/sq.mi. per day)
1000
100
10
1
0.1
0.01
0.001
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
LOC
PT
All Data
Apr-Oct
>50% SF
90th
Median
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval
2.3 square miles

St. Mary's River at Wilshire, OH

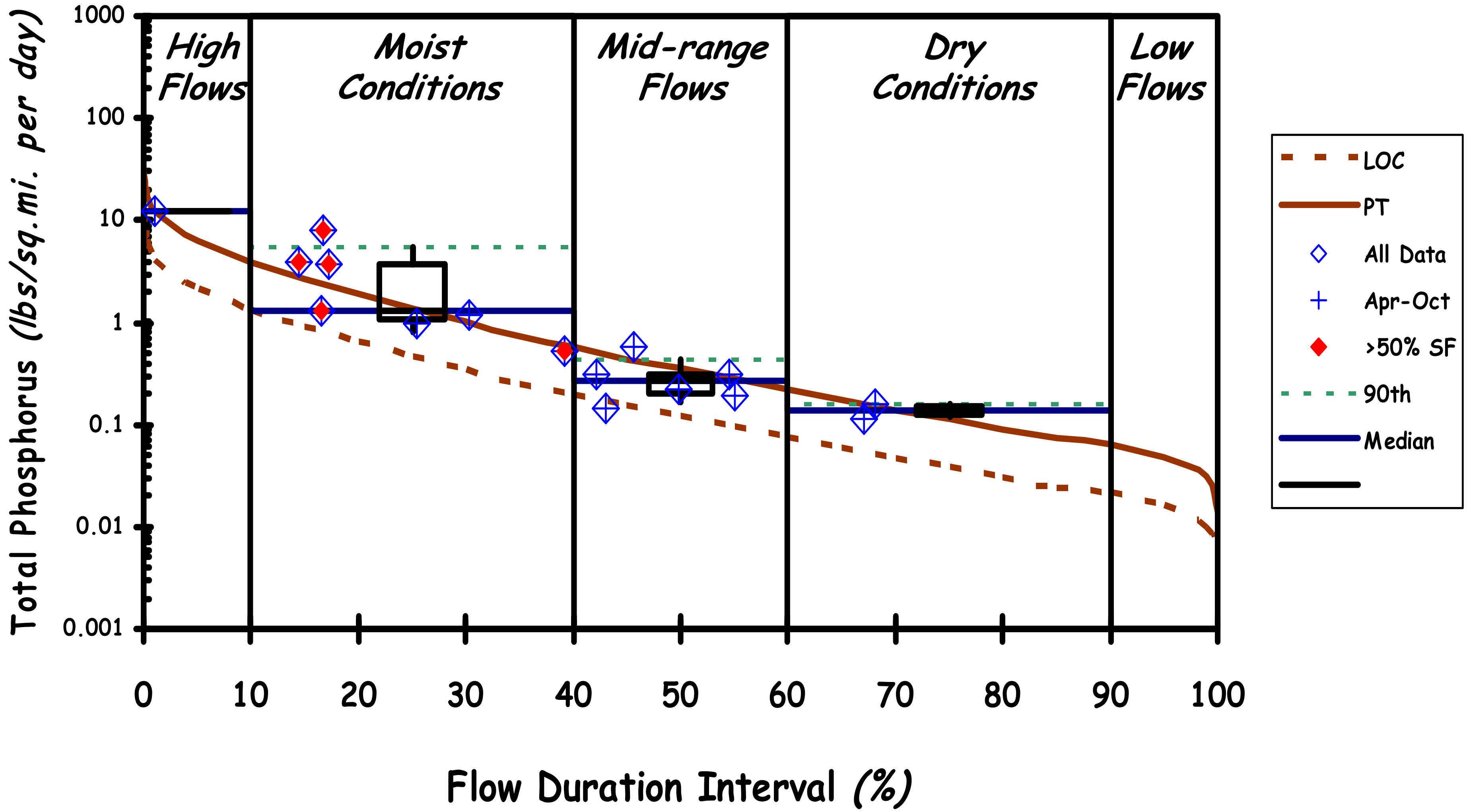
Load Duration Curve *(2004 Monitoring Data)*

Site: UNK000-0007



IDEM+FW Data & Gage 04181500 Duration Interval *354 square miles*

St. Mary's River at Pleasant Mills
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0007

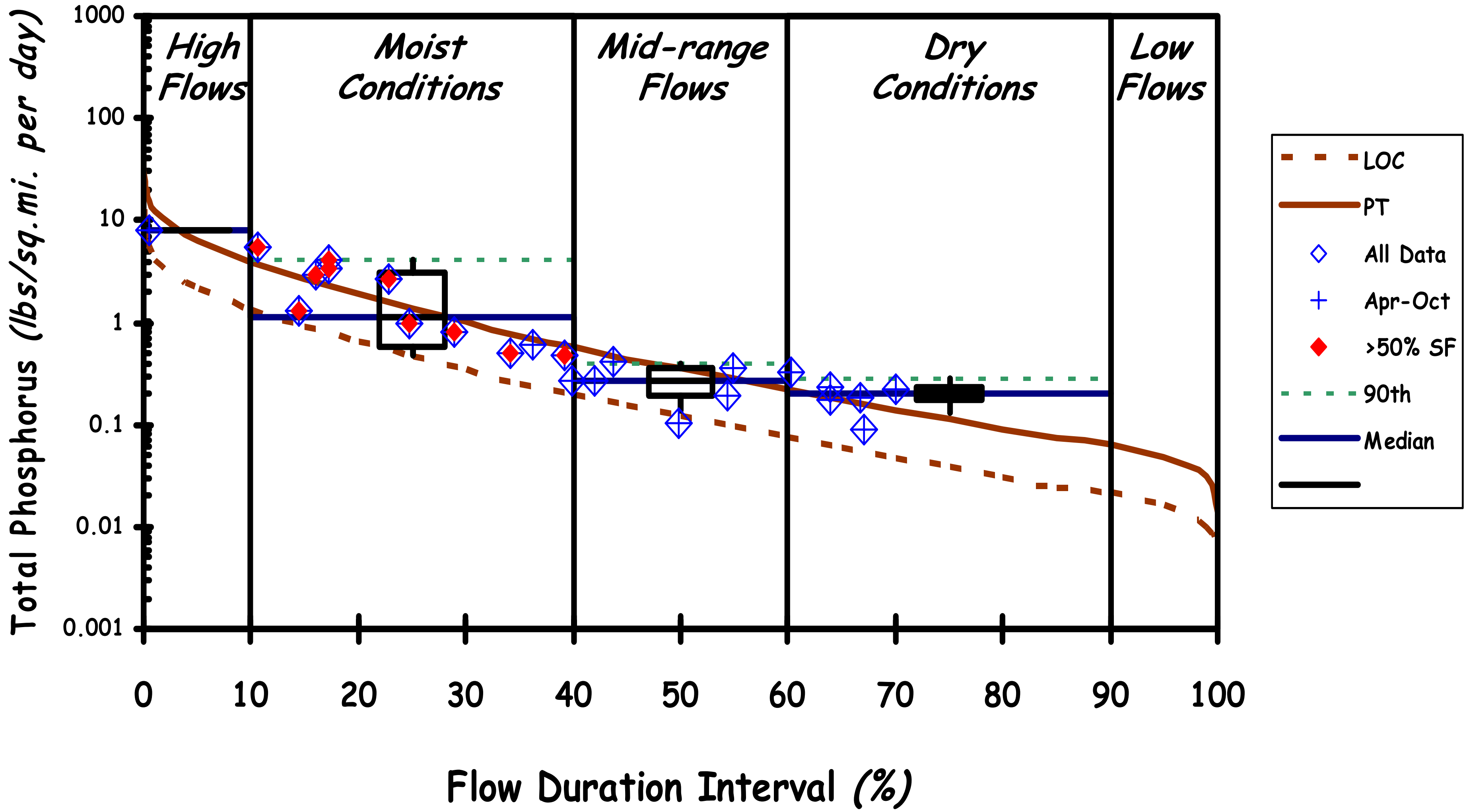


IDEM Data & Gage 04181500 Duration Interval *468 square miles*

St. Mary's River near Poe

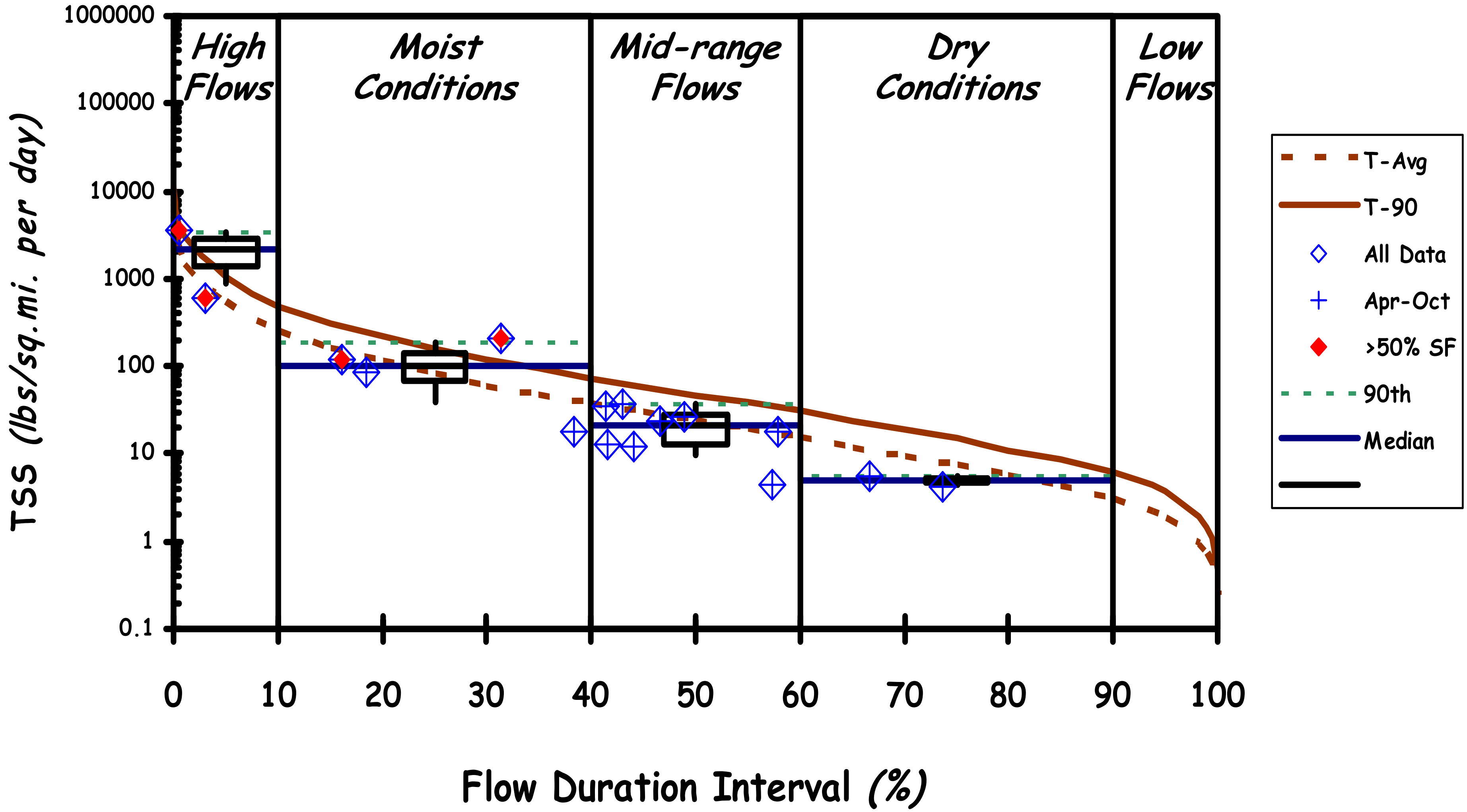
Load Duration Curve *(2004 Monitoring Data)*

Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval *643 square miles*

Habegger Ditch -- CR 150 E
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0099

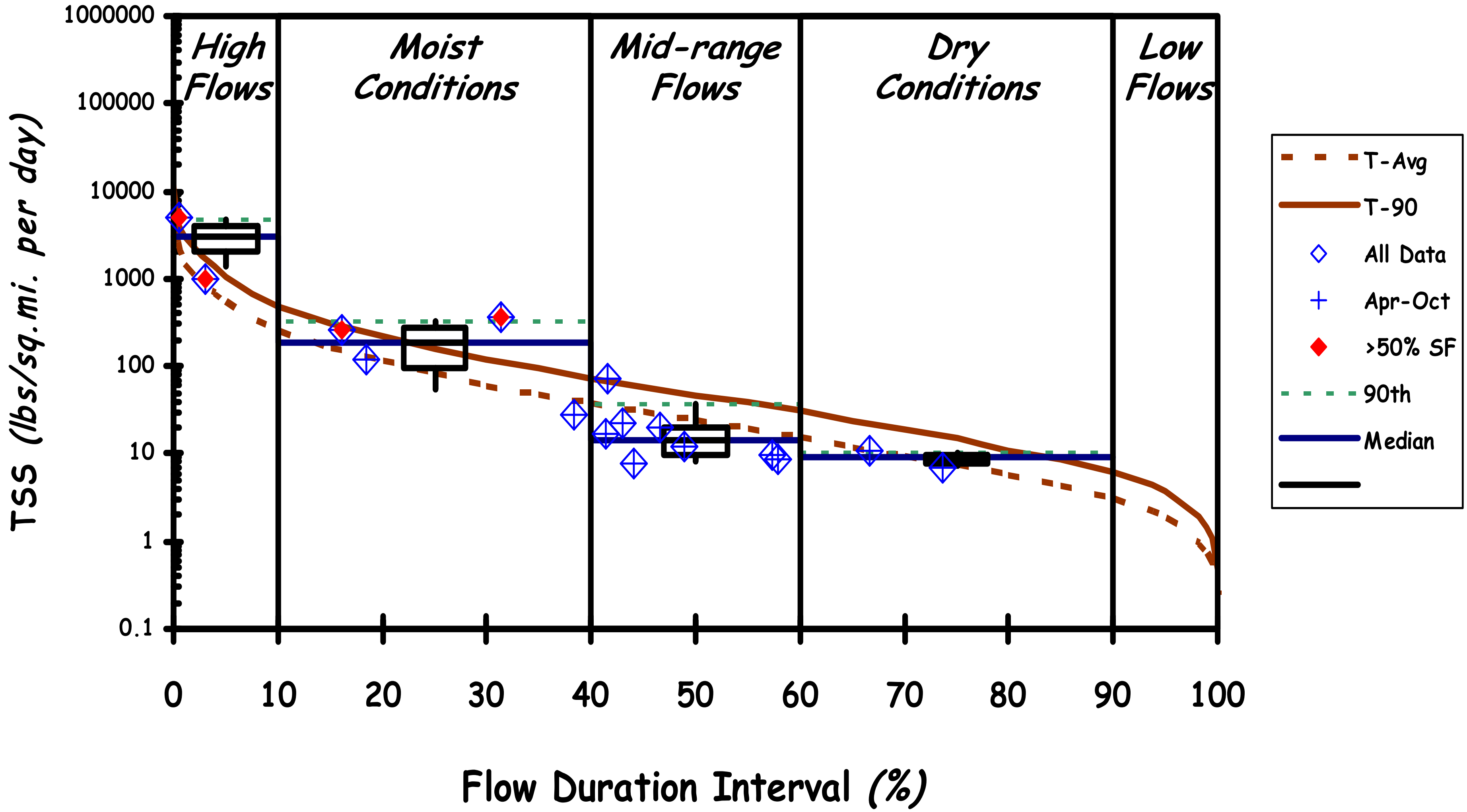


IDEM Data & Gage 03324000 / 04182590 Duration Interval *8.4 square miles*

Gates Ditch -- CR 400 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0023

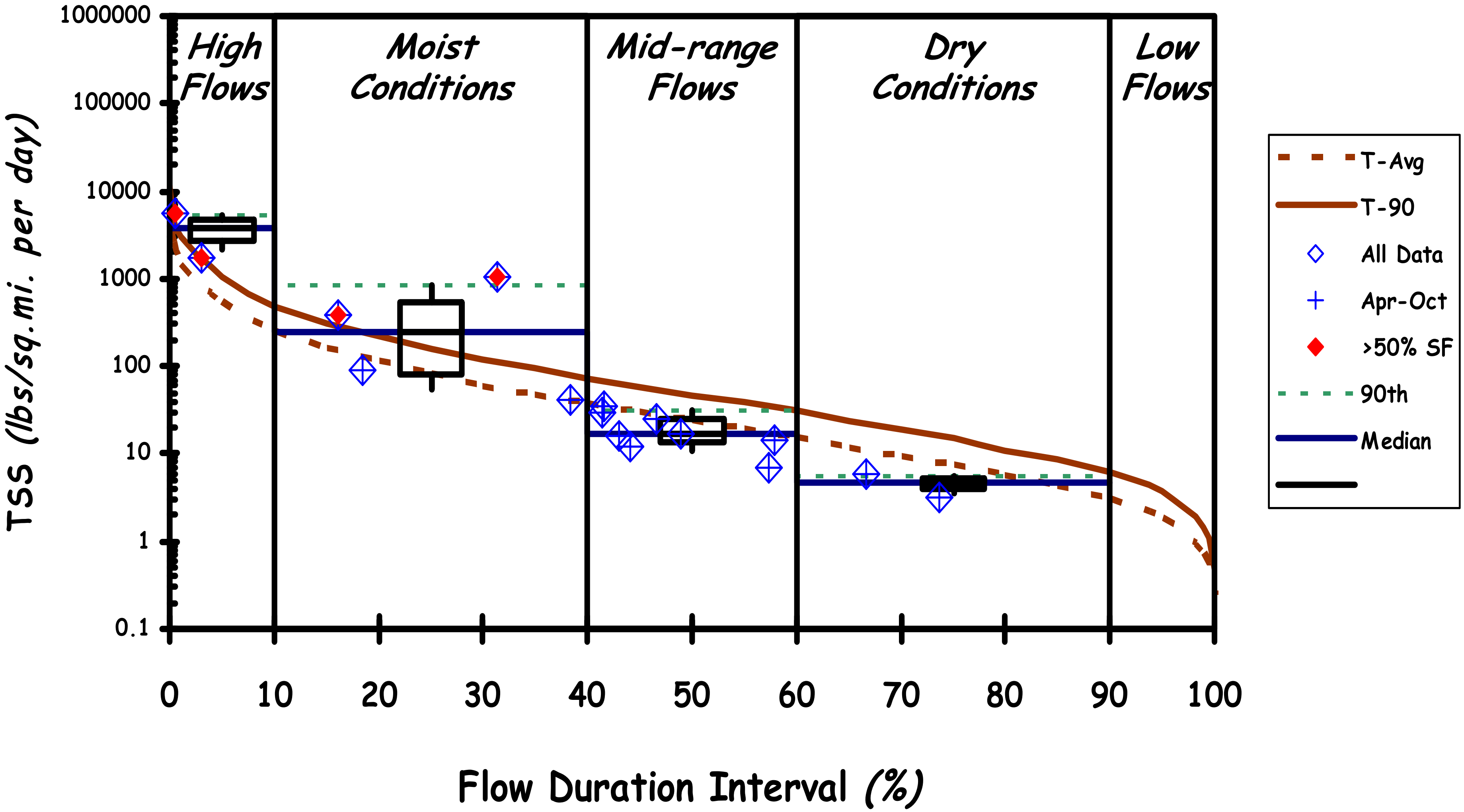


IDEM Data & Gage 03324000 / 04182590 Duration Interval *20.1 square miles*

Blue Creek -- Salem Road

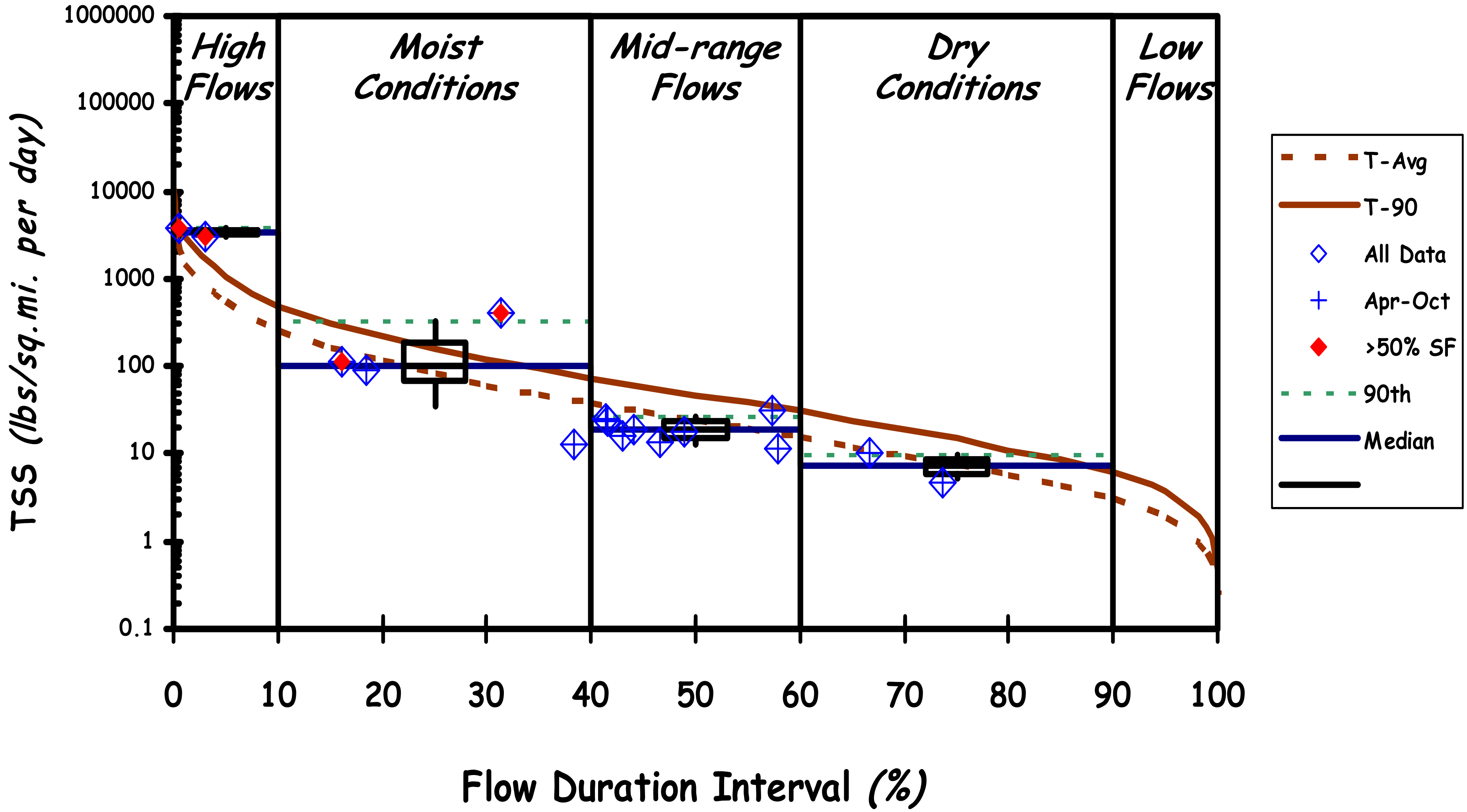
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0011



IDEM Data & Gage 03324000 / 04182590 Duration Interval *51.8 square miles*

Little Blue Creek -- CR 400 S
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0010

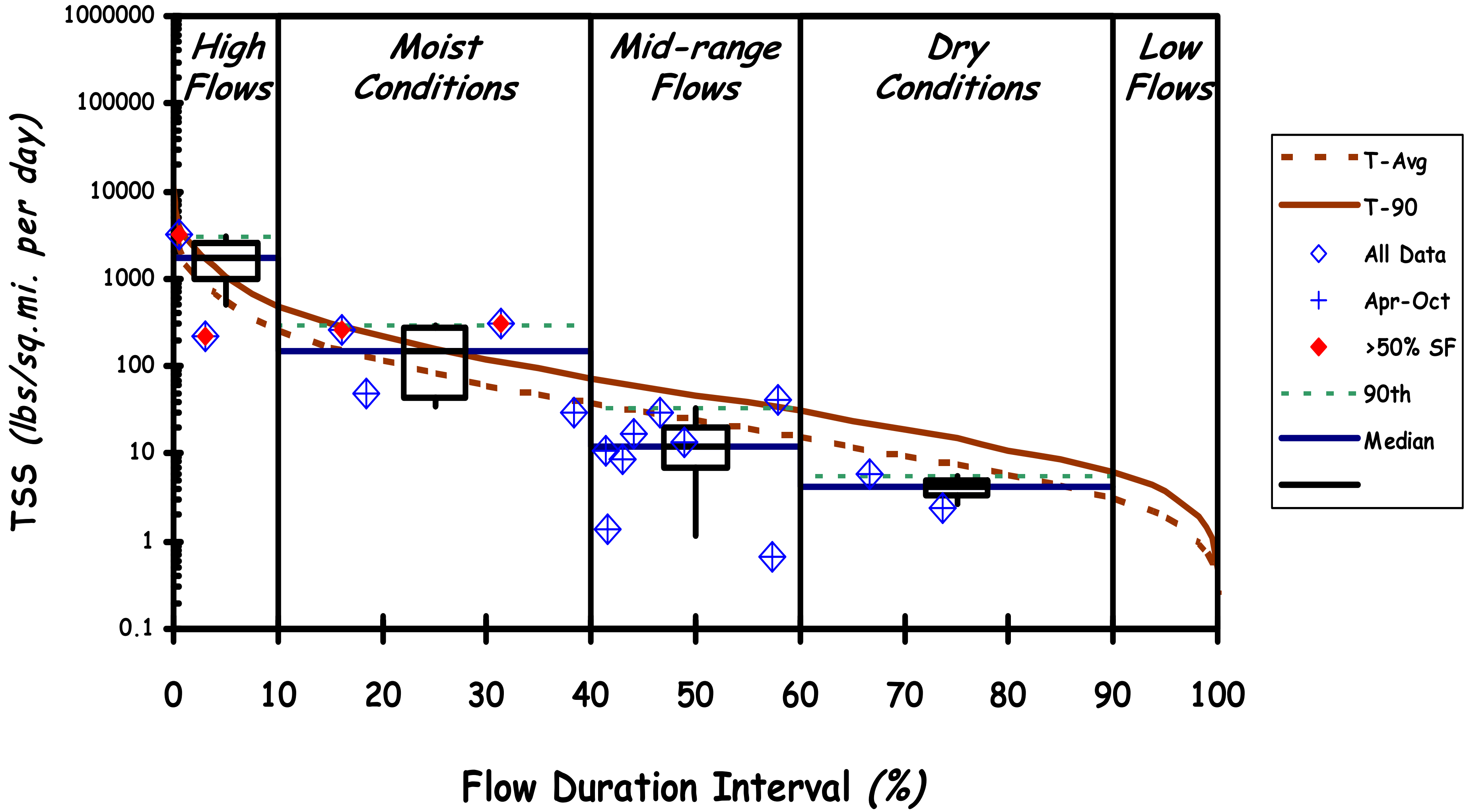


IDEM Data & Gage 03324000 / 04182590 Duration Interval *16.3 square miles*

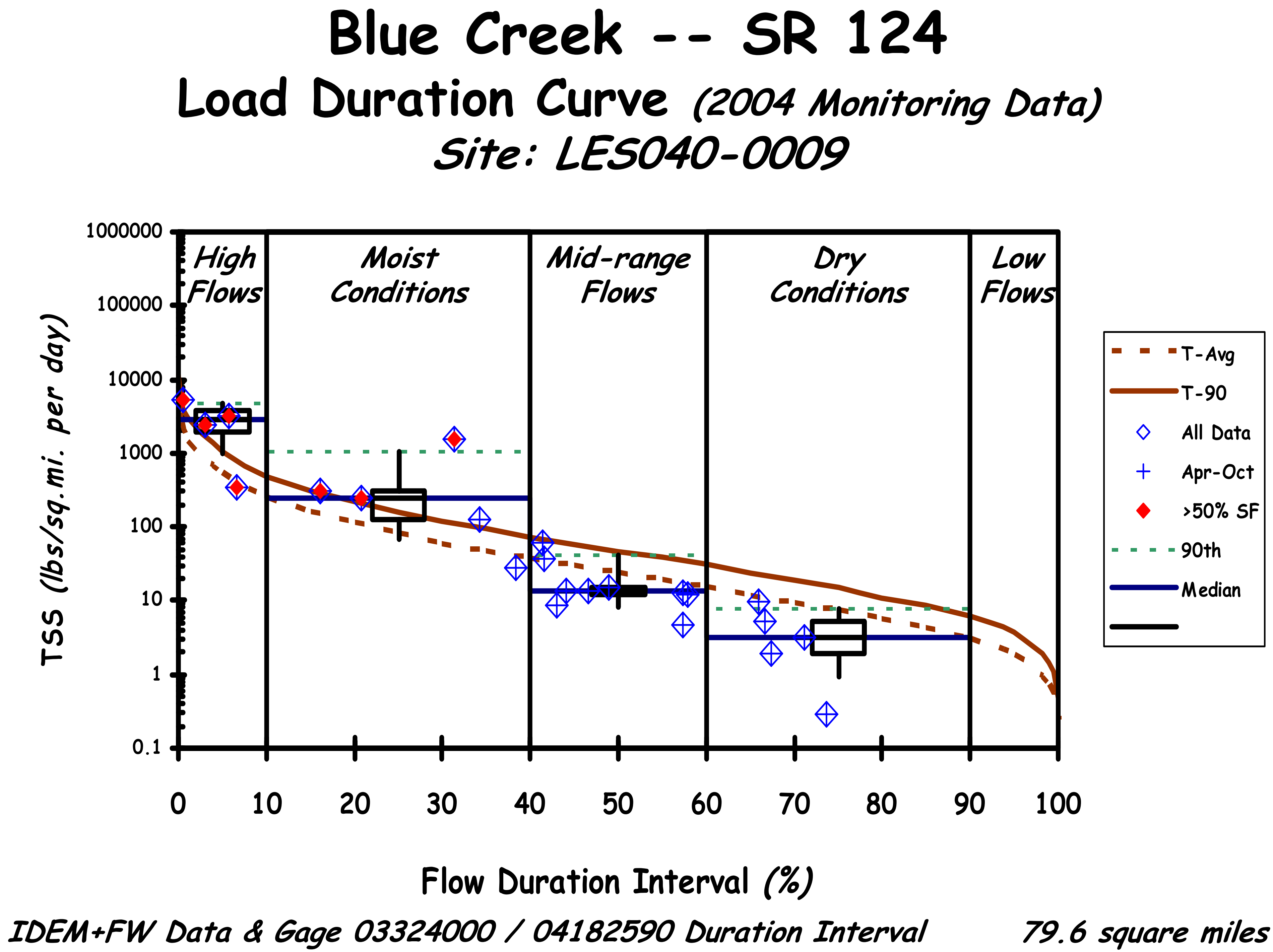
Blue Creek -- CR 300 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0066



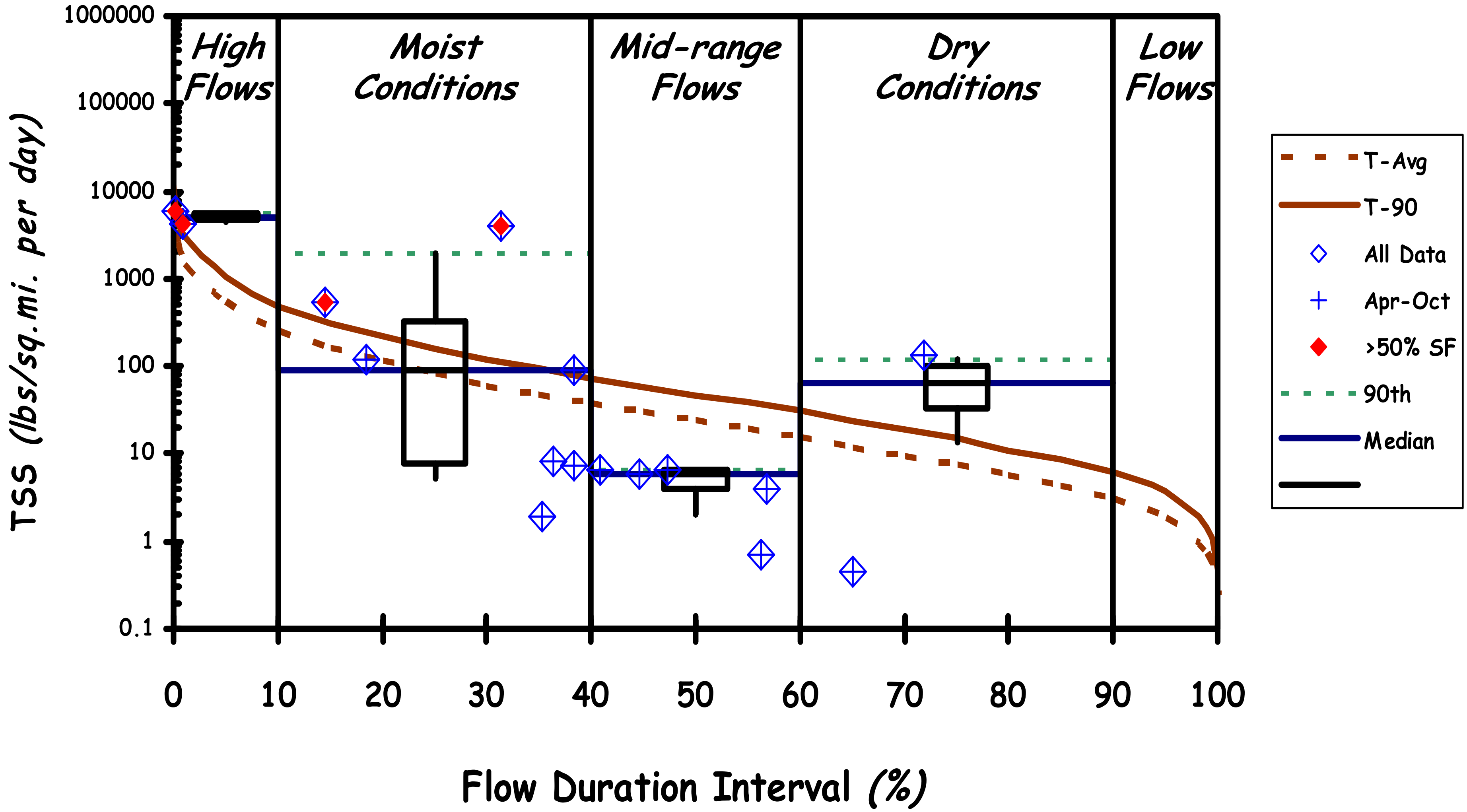
IDEM Data & Gage 03324000 / 04182590 Duration Interval *71.0 square miles*


Blue Creek -- SR 124
Load Duration Curve (2004 Monitoring Data)
Site: LES040-0009
TSS (lbs/sq.mi. per day)
1000000
100000
10000
1000
100
10
1
0.1
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
T-Avg
T-90
All Data
Apr-Oct
>50% SF
90th
Median
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval
79.6 square miles

Martz Creek -- CR 200 N

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0040

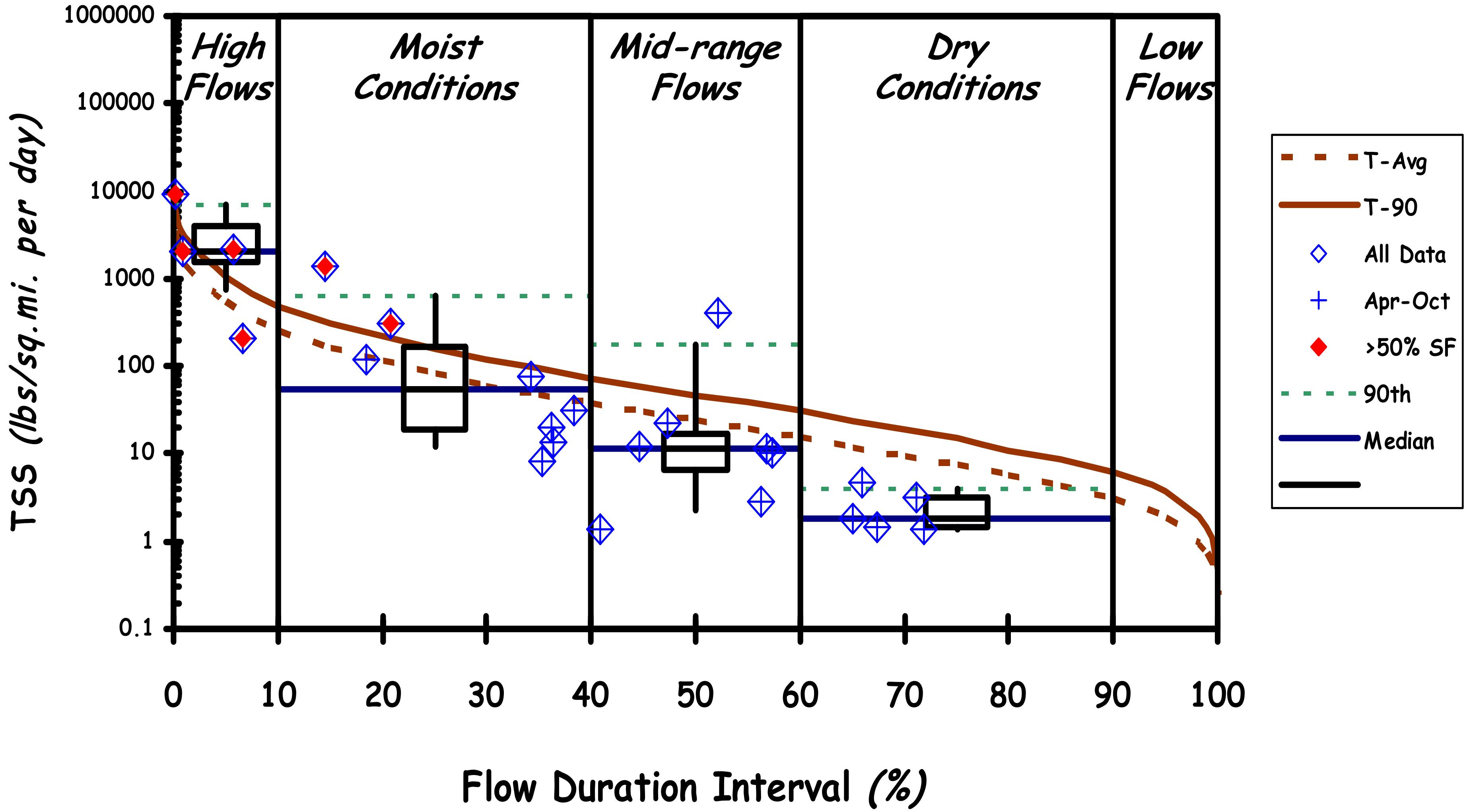


IDEM Data & Gage 03324000 / 04182590 Duration Interval *9.8 square miles*

Yellow Creek -- CR 250 S

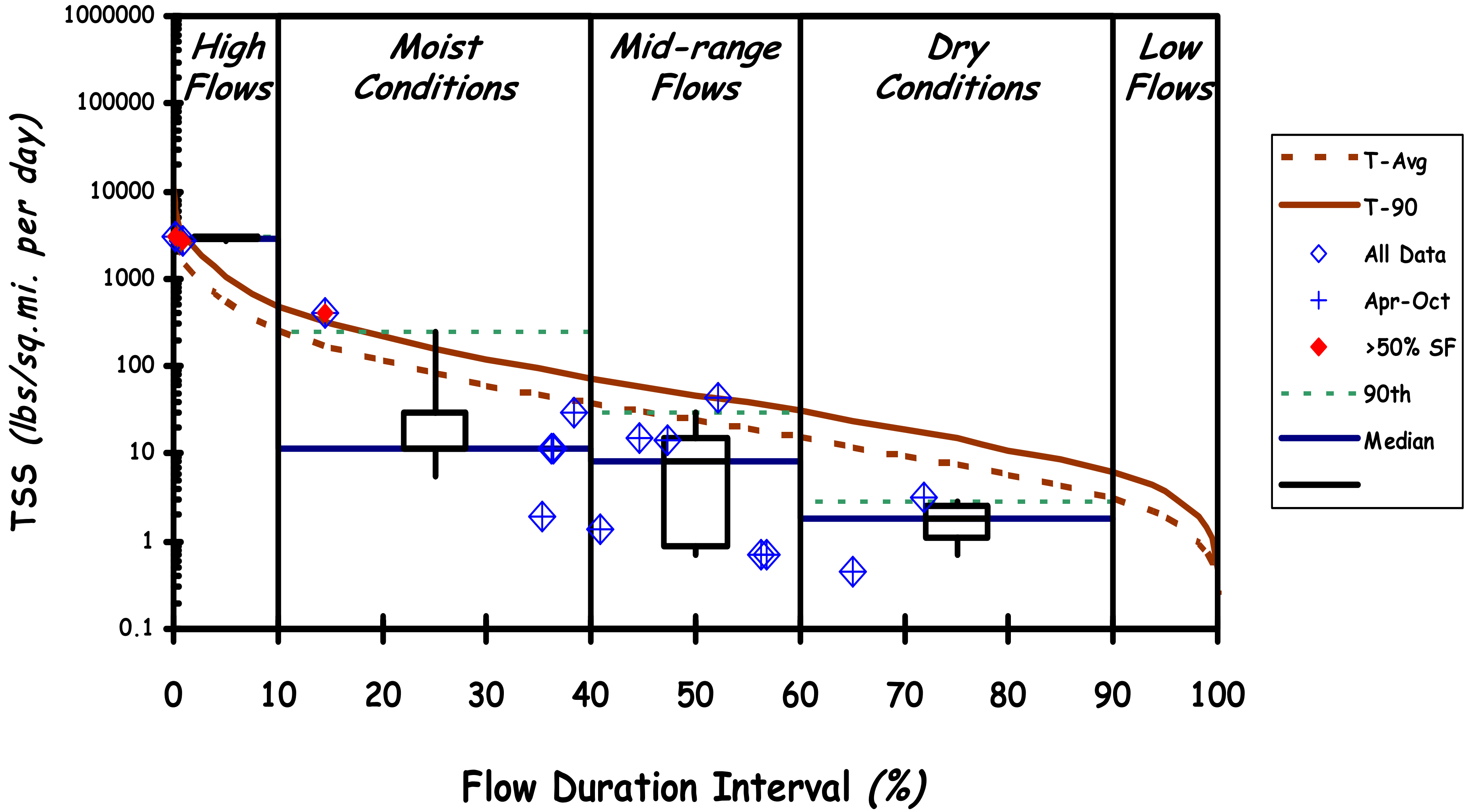
Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



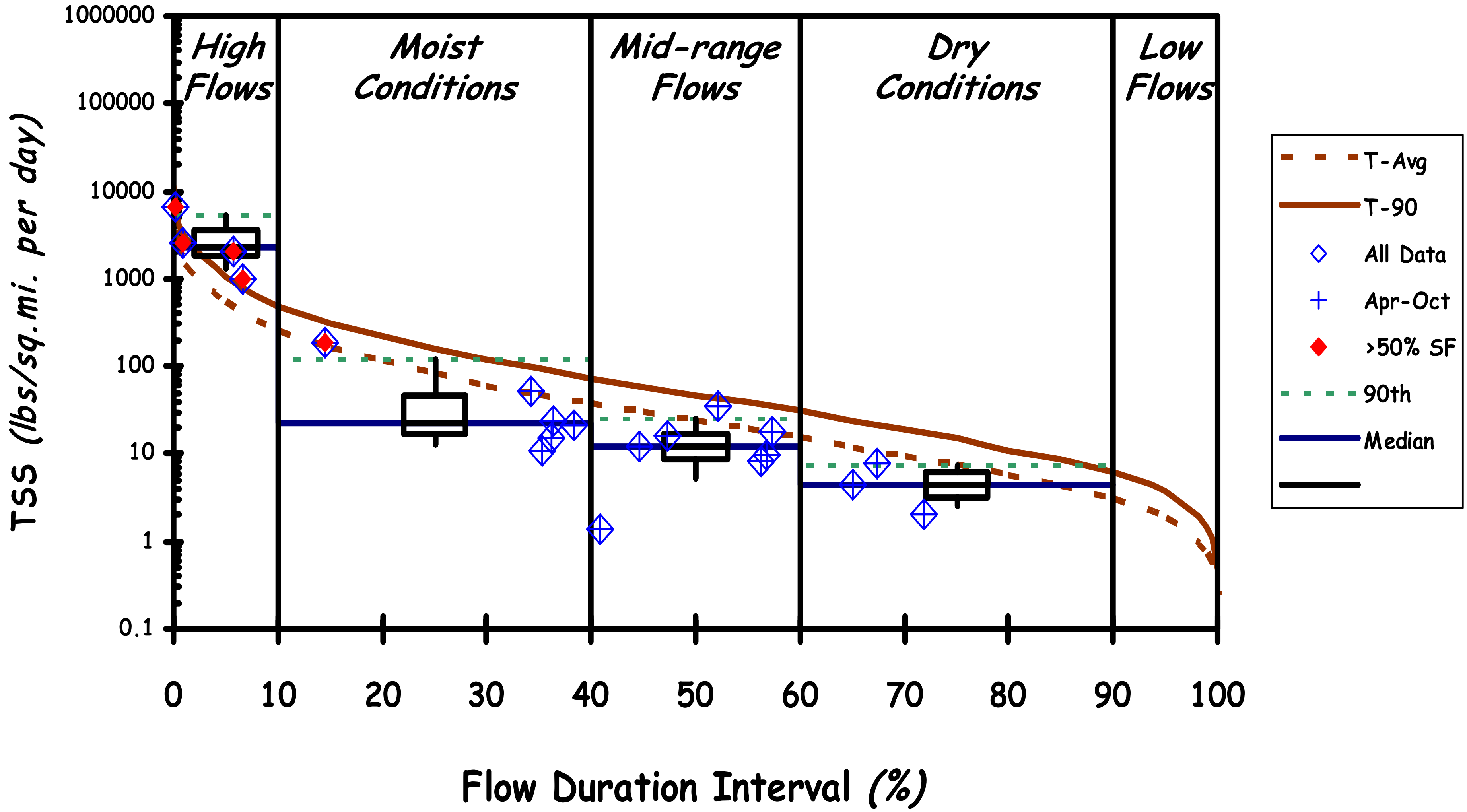
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

Borum Run -- Mercer Road
Load Duration Curve *(2004 Monitoring Data)*
Site: LES040-0097

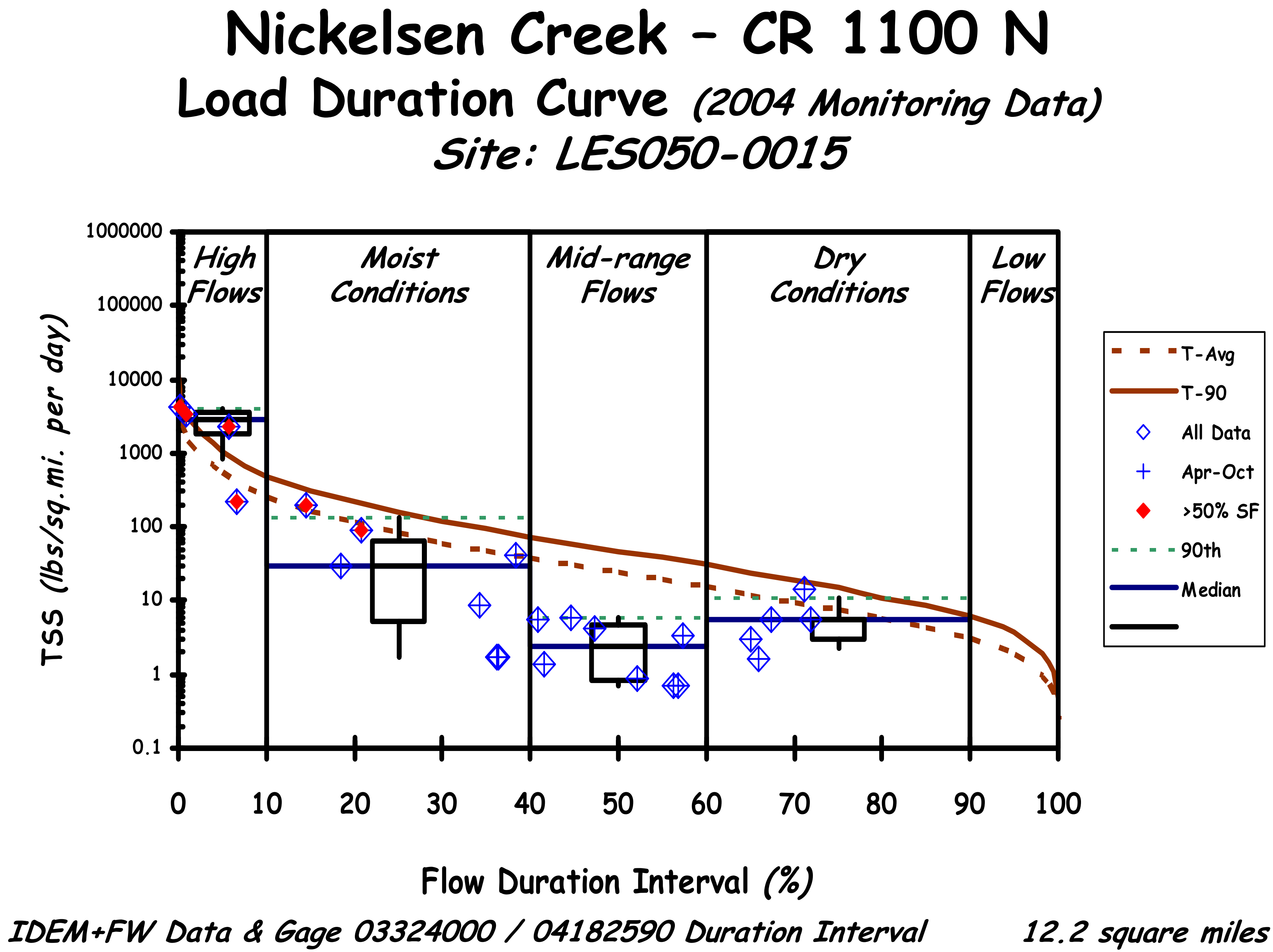


IDEM Data & Gage 03324000 / 04182590 Duration Interval *14.4 square miles*

Holthouse Ditch -- CR 200 W
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0008

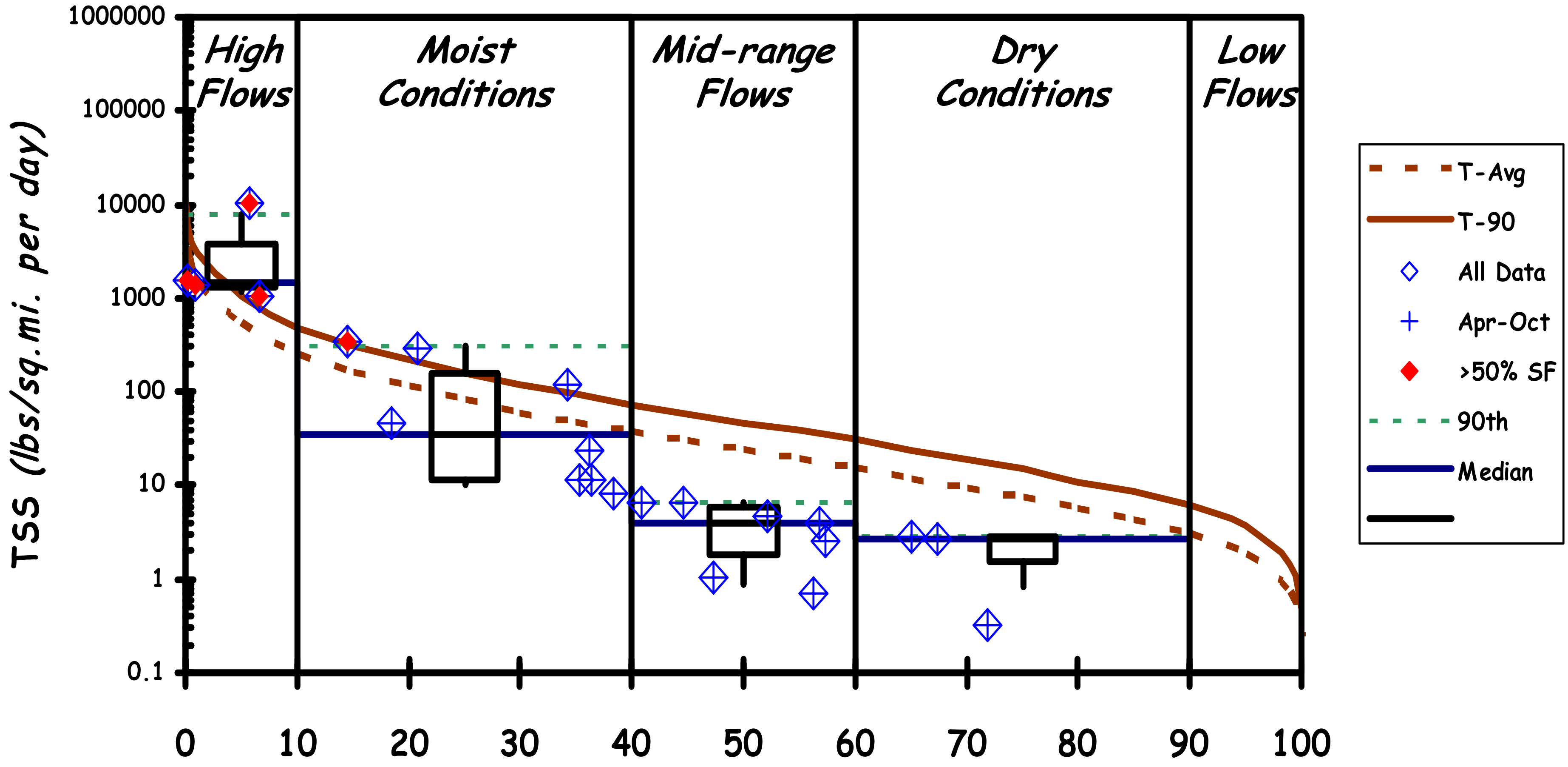


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *27.3 square miles*



Nickelsen Creek - CR 1100 N
Load Duration Curve (2004 Monitoring Data)
Site: LES050-0015
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
TSS (lbs/sq.mi. per day)
1000000
100000
10000
1000
100
10
1
0.1
0
10
20
30
40
50
60
70
80
90
100
Flow Duration Interval (%)
T-Avg
T-90
All Data
Apr-Oct
>50% SF
90th
Median
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval
12.2 square miles

Unnamed Tributary -- Barkley Road
Load Duration Curve *(2004 Monitoring Data)*
Site: LES050-0020



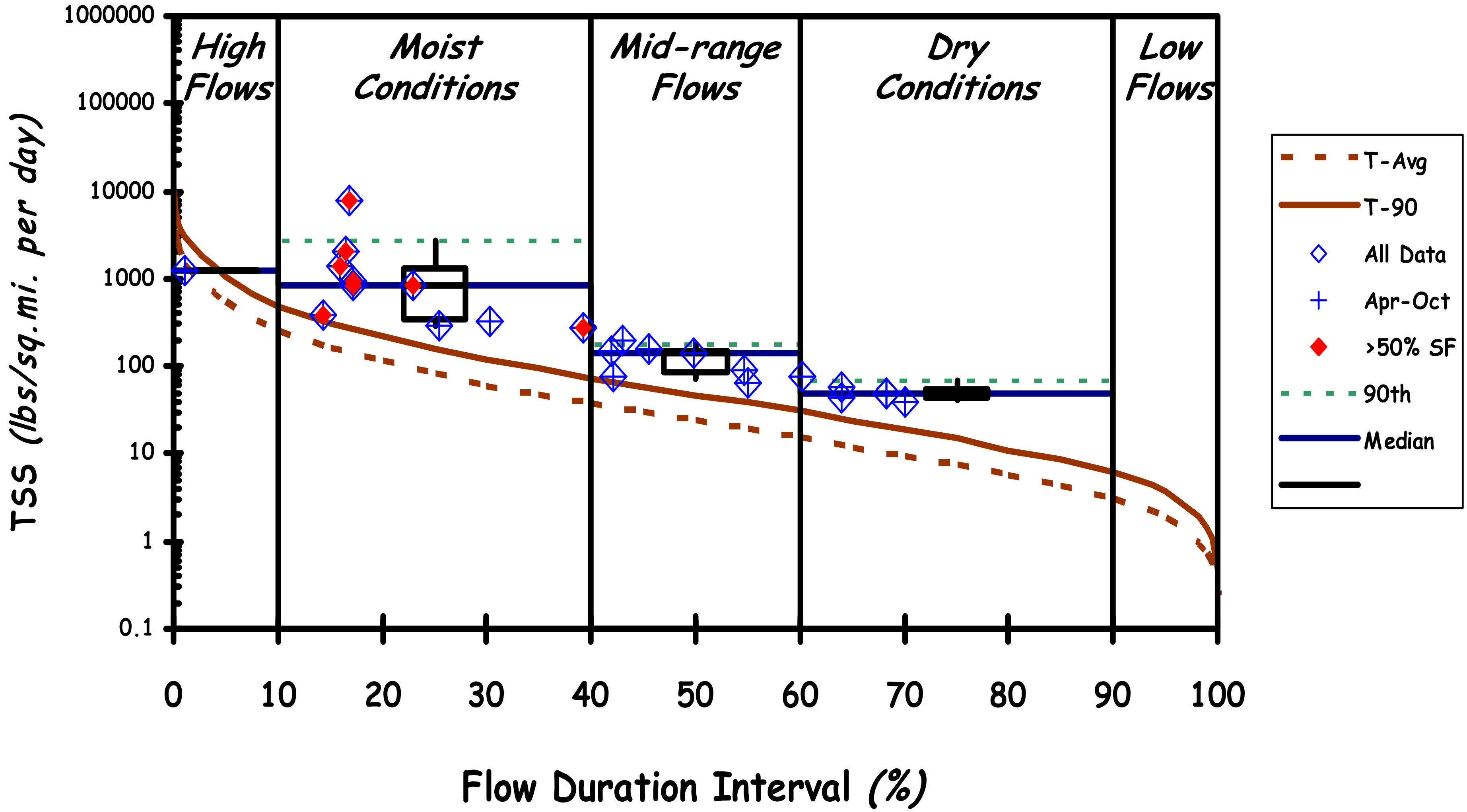
Flow Duration Interval *(%)*

IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *2.3 square miles*

St. Mary's River at Wilshire, OH

Load Duration Curve *(2004 Monitoring Data)*

Site: UNK000-0007

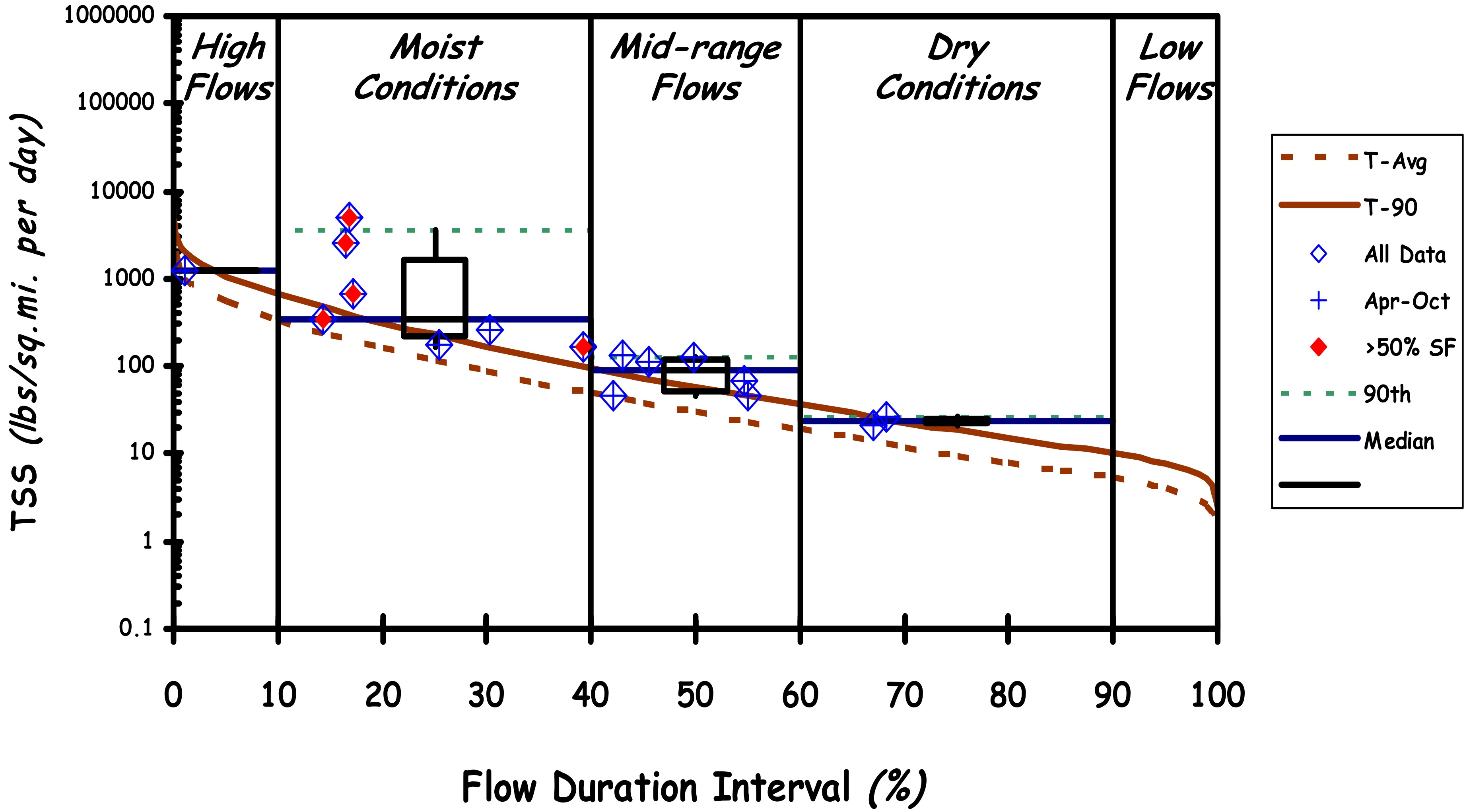


IDEM+FW Data & Gage 04181500 Duration Interval *354 square miles*

St. Mary's River at Pleasant Mills

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0007

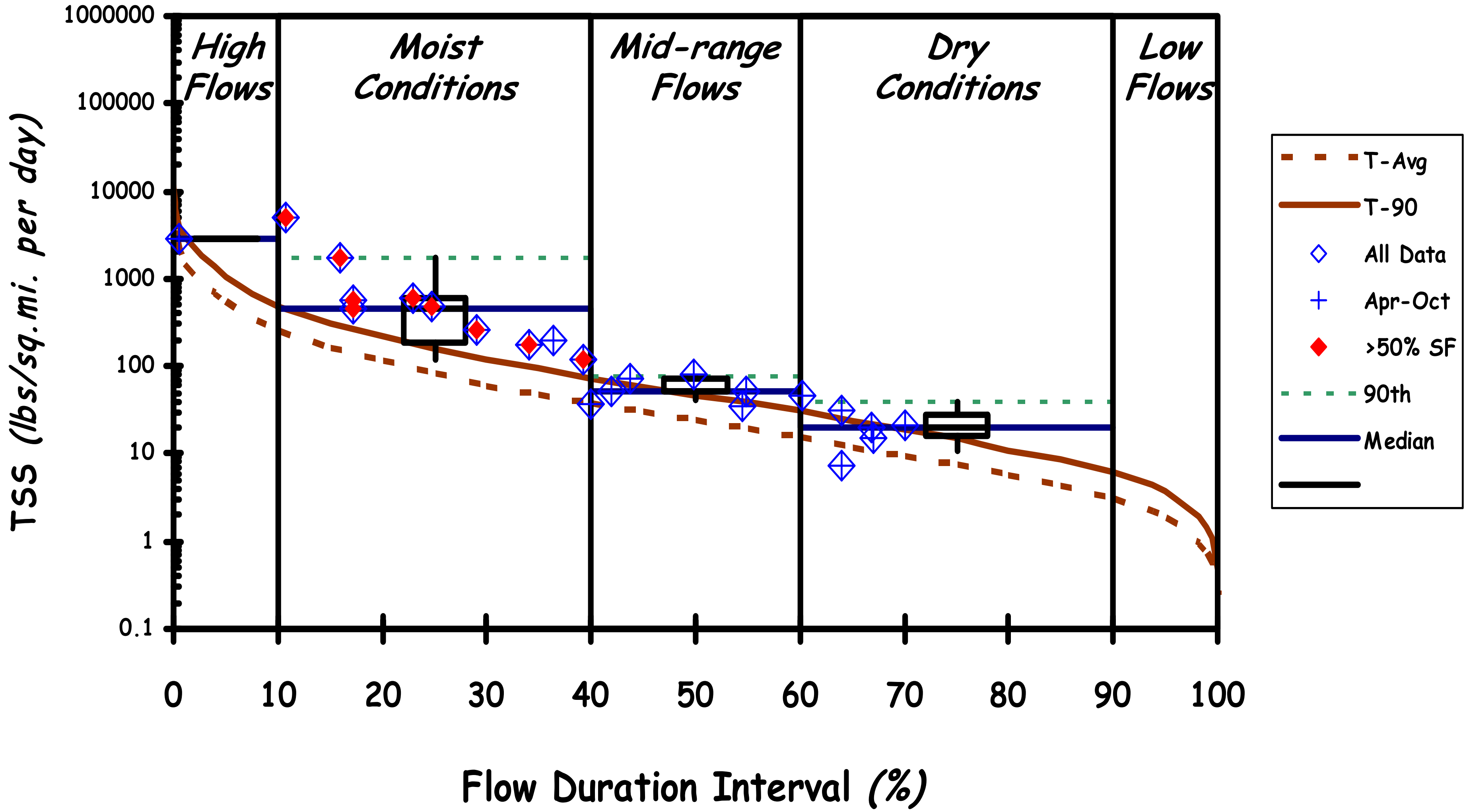


IDEM Data & Gage 04181500 Duration Interval *468 square miles*

St. Mary's River near Poe

Load Duration Curve *(2004 Monitoring Data)*

Site: LES060-0006



IDEM+FW Data & Gage 04181500 Duration Interval

643 square miles

Attachment D

E. coli Data for Maumee River TMDL

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Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
1	IDEM	2000 E Coli	Maumee River	LEM010-0015	Lake Ave Bridge, D/S of Filtration Plan	AA00227	6/13/2000	Normal	E. Coli	387.3	MPN/100mL	Allen			
1	IDEM	2000 E Coli	Maumee River	LEM010-0015	Lake Ave Bridge, D/S of Filtration Plan	AA00296	6/20/2000	Normal	E. Coli	426	MPN/100mL	Allen			
1	IDEM	2000 E Coli	Maumee River	LEM010-0015	Lake Ave Bridge, D/S of Filtration Plan	AA00461	6/28/2000	Normal	E. Coli	882	MPN/100mL	Allen			
1	IDEM	2000 E Coli	Maumee River	LEM010-0015	Lake Ave Bridge, D/S of Filtration Plan	AA00569	7/4/2000	Normal	E. Coli	3654	MPN/100mL	Allen			
1	IDEM	2000 E Coli	Maumee River	LEM010-0015	Lake Ave Bridge, D/S of Filtration Plan	AA00667	7/11/2000	Normal	E. Coli	172.3	MPN/100mL	Allen		620	
2	Ft. Wayne		Maumee River		Anthony Blvd		4/3/2001	Normal	E. coli	560	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/9/2001	Normal	E. coli	340	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/16/2001	Normal	E. coli	1320	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/23/2001	Normal	E. coli	1000	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/30/2001	Normal	E. coli	20	Colonies/100ml	Allen		347	April 3 to April 30
2	Ft. Wayne		Maumee River		Anthony Blvd		5/7/2001	Normal	E. coli	44	Colonies/100ml	Allen		209	April 9 to May 7
2	Ft. Wayne		Maumee River		Anthony Blvd		5/14/2001	Normal	E. coli	26	Colonies/100ml	Allen		125	April 16 to May 14
2	Ft. Wayne		Maumee River		Anthony Blvd		5/21/2001	Normal	E. coli	432	Colonies/100ml	Allen		100	April 23 to May 21
2	Ft. Wayne		Maumee River		Anthony Blvd		5/29/2001	Normal	E. coli	590	Colonies/100ml	Allen		90	April 30 to May 29
2	Ft. Wayne		Maumee River		Anthony Blvd		6/4/2001	Normal	E. coli	1000	Colonies/100ml	Allen		196	May 7 to June 4
2	Ft. Wayne		Maumee River		Anthony Blvd		6/11/2001	Normal	E. coli	570	Colonies/100ml	Allen		328	May 14 to June 11
2	Ft. Wayne		Maumee River		Anthony Blvd		6/18/2001	Normal	E. coli	230	Colonies/100ml	Allen		507	May 21 to June 18
2	Ft. Wayne		Maumee River		Anthony Blvd		6/26/2001	Normal	E. coli	1600	Colonies/100ml	Allen		658	May 29 to June 26
2	Ft. Wayne		Maumee River		Anthony Blvd		7/2/2001	Normal	E. coli	150	Colonies/100ml	Allen		501	June 4 to July 2
2	Ft. Wayne		Maumee River		Anthony Blvd		7/9/2001	Normal	E. coli	980	Colonies/100ml	Allen		499	June 11 to July 9
2	Ft. Wayne		Maumee River		Anthony Blvd		7/16/2001	Normal	E. coli	60	Colonies/100ml	Allen		318	June 18 to July 16
2	Ft. Wayne		Maumee River		Anthony Blvd		7/23/2001	Normal	E. coli	980	Colonies/100ml	Allen		425	June 26 to July 23
2	Ft. Wayne		Maumee River		Anthony Blvd		7/30/2001	Normal	E. coli	810	Colonies/100ml	Allen		371	June 26 to July 30
2	Ft. Wayne		Maumee River		Anthony Blvd		8/6/2001	Normal	E. coli	330	Colonies/100ml	Allen		434	July 2 to Aug 6
2	Ft. Wayne		Maumee River		Anthony Blvd		8/14/2001	Normal	E. coli	110	Colonies/100ml	Allen		280	July 9 to Aug 14
2	Ft. Wayne		Maumee River		Anthony Blvd		8/20/2001	Normal	E. coli	6000	Colonies/100ml	Allen		704	July 16 to Aug 20
2	Ft. Wayne		Maumee River		Anthony Blvd		8/27/2001	Normal	E. coli	1080	Colonies/100ml	Allen		718	July 23 to Aug 27
2	Ft. Wayne		Maumee River		Anthony Blvd		9/4/2001	Normal	E. coli	260	Colonies/100ml	Allen		572	July 30 to Sept 4
2	Ft. Wayne		Maumee River		Anthony Blvd		9/10/2001	Normal	E. coli	2400	Colonies/100ml	Allen		850	Aug 6 to Sept 10
2	Ft. Wayne		Maumee River		Anthony Blvd		9/17/2001	Normal	E. coli	8000	Colonies/100ml	Allen		2004	Aug 14 to Sept 17
2	Ft. Wayne		Maumee River		Anthony Blvd		9/24/2001	Normal	E. coli	20000	Colonies/100ml	Allen		2550	Aug 20 to Sept 24
2	Ft. Wayne		Maumee River		Anthony Blvd		10/1/2001	Normal	E. coli	460	Colonies/100ml	Allen		2150	Aug 27 to Oct 1
2	Ft. Wayne		Maumee River		Anthony Blvd		10/9/2001	Normal	E. coli	440	Colonies/100ml	Allen		2388	Sept 4 to Oct 9
2	Ft. Wayne		Maumee River		Anthony Blvd		10/15/2001	Normal	E. coli	3200	Colonies/100ml	Allen		2530	Sept 10 to Oct 15
2	Ft. Wayne		Maumee River		Anthony Blvd		10/22/2001	Normal	E. coli	700	Colonies/100ml	Allen		1554	Sept 17 to Oct 22
2	Ft. Wayne		Maumee River		Anthony Blvd		10/29/2001	Normal	E. coli	220	Colonies/100ml	Allen		631	Sept 24 to Oct 29
2	Ft. Wayne		Maumee River		Anthony Blvd		4/1/2002	Normal	E. coli	616	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/8/2002	Normal	E. coli	1040	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/15/2002	Normal	E. coli	460	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/22/2002	Normal	E. coli	360	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/29/2002	Normal	E. coli	4440	Colonies/100ml	Allen		860	April 1 to April 29
2	Ft. Wayne		Maumee River		Anthony Blvd		5/6/2002	Normal	E. coli	300	Colonies/100ml	Allen		745	April 8 to May 6
2	Ft. Wayne		Maumee River		Anthony Blvd		5/13/2002	Normal	E. coli	4300	Colonies/100ml	Allen		989	April 15 to May 13

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
2	Ft. Wayne		Maumee River		Anthony Blvd		5/20/2002	Normal	E. coli	100	Colonies/100ml	Allen		729	April 22 to May 20
2	Ft. Wayne		Maumee River		Anthony Blvd		5/29/2002	Normal	E. coli	1100	Colonies/100ml	Allen		912	April 29 to May 29
2	Ft. Wayne		Maumee River		Anthony Blvd		6/3/2002	Normal	E. coli	540	Colonies/100ml	Allen		598	May 6 to June 3
2	Ft. Wayne		Maumee River		Anthony Blvd		6/10/2002	Normal	E. coli	330	Colonies/100ml	Allen		610	May 13 to June 10
2	Ft. Wayne		Maumee River		Anthony Blvd		6/17/2002	Normal	E. coli	260	Colonies/100ml	Allen		348	May 20 to June 17
2	Ft. Wayne		Maumee River		Anthony Blvd		6/24/2002	Normal	E. coli	430	Colonies/100ml	Allen		466	May 29 to June 24
2	Ft. Wayne		Maumee River		Anthony Blvd		7/1/2002	Normal	E. coli	540	Colonies/100ml	Allen		404	June 3 to July 1
2	Ft. Wayne		Maumee River		Anthony Blvd		7/8/2002	Normal	E. coli	290	Colonies/100ml	Allen		357	June 10 to July 8
2	Ft. Wayne		Maumee River		Anthony Blvd		7/15/2002	Normal	E. coli	70	Colonies/100ml	Allen		262	June 17 to July 15
2	Ft. Wayne		Maumee River		Anthony Blvd		7/22/2002	Normal	E. coli	470	Colonies/100ml	Allen		295	June 24 to July 22
2	Ft. Wayne		Maumee River		Anthony Blvd		7/29/2002	Normal	E. coli	60	Colonies/100ml	Allen		199	July 1 to July 29
2	Ft. Wayne		Maumee River		Anthony Blvd		8/5/2002	Normal	E. coli	270	Colonies/100ml	Allen		173	July 8 to Aug 5
2	Ft. Wayne		Maumee River		Anthony Blvd		8/12/2002	Normal	E. coli	600	Colonies/100ml	Allen		200	July 15 to Aug 12
2	Ft. Wayne		Maumee River		Anthony Blvd		8/19/2002	Normal	E. coli	400	Colonies/100ml	Allen		283	July 22 to Aug 19
2	Ft. Wayne		Maumee River		Anthony Blvd		8/26/2002	Normal	E. coli	2400	Colonies/100ml	Allen		393	July 29 to Aug 26
2	Ft. Wayne		Maumee River		Anthony Blvd		9/3/2002	Normal	E. coli	110	Colonies/100ml	Allen		443	Aug 5 to Sept 3
2	Ft. Wayne		Maumee River		Anthony Blvd		9/9/2002	Normal	E. coli	50	Colonies/100ml	Allen		316	Aug 12 to Aug 9
2	Ft. Wayne		Maumee River		Anthony Blvd		9/16/2002	Normal	E. coli	90	Colonies/100ml	Allen		216	Aug 19 to Aug 16
2	Ft. Wayne		Maumee River		Anthony Blvd		9/24/2002	Normal	E. coli	310	Colonies/100ml	Allen		206	Aug 26 to Sept 24
2	Ft. Wayne		Maumee River		Anthony Blvd		9/30/2002	Normal	E. coli	900	Colonies/100ml	Allen		169	Sept 3 to Sept 30
2	Ft. Wayne		Maumee River		Anthony Blvd		10/7/2002	Normal	E. coli	220	Colonies/100ml	Allen		194	Sept 9 to Oct 7
2	Ft. Wayne		Maumee River		Anthony Blvd		10/14/2002	Normal	E. coli	70	Colonies/100ml	Allen		208	Sept 16 to Oct 14
2	Ft. Wayne		Maumee River		Anthony Blvd		10/21/2002	Normal	E. coli	115	Colonies/100ml	Allen		218	Sept 24 to Oct 21
2	Ft. Wayne		Maumee River		Anthony Blvd		10/28/2002	Normal	E. coli	800	Colonies/100ml	Allen		264	Sept 30 to Oct 28
2	Ft. Wayne		Maumee River		Anthony Blvd		4/7/2003	Normal	E. coli	Test Failed	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/14/2003	Normal	E. coli	80	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/21/2003	Normal	E. coli	9	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		4/28/2003	Normal	E. coli	13	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		5/5/2003	Normal	E. coli	28	Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		5/12/2003	Normal	E. coli	1100	Colonies/100ml	Allen		49	April 14 to May 12
2	Ft. Wayne		Maumee River		Anthony Blvd		5/19/2003	Normal	E. coli	146	Colonies/100ml	Allen		55	April 21 to May 19
2	Ft. Wayne		Maumee River		Anthony Blvd		5/27/2003	Normal	E. coli	84	Colonies/100ml	Allen		87	April 28 to May 27
2	Ft. Wayne		Maumee River		Anthony Blvd		6/2/2003	Normal	E. coli	40	Colonies/100ml	Allen		109	May 5 to June 2
2	Ft. Wayne		Maumee River		Anthony Blvd		6/9/2003	Normal	E. coli	44	Colonies/100ml	Allen		119	May 12 to June 9
2	Ft. Wayne		Maumee River		Anthony Blvd		6/16/2003	Normal	E. coli	495	Colonies/100ml	Allen		101	May 19 to June 16
2	Ft. Wayne		Maumee River		Anthony Blvd		6/23/2003	Normal	E. coli	320	Colonies/100ml	Allen		119	May 27 to June 23
2	Ft. Wayne		Maumee River		Anthony Blvd		6/30/2003	Normal	E. coli	400	Colonies/100ml	Allen		162	June 2 to June 30
2	Ft. Wayne		Maumee River		Anthony Blvd		7/7/2003	Normal	E. coli	250	Colonies/100ml	Allen		234	June 9 to July 7
2	Ft. Wayne		Maumee River		Anthony Blvd		7/15/2003	Normal	E. coli	300	Colonies/100ml	Allen		343	June 16 to July 15
2	Ft. Wayne		Maumee River		Anthony Blvd		7/21/2003	Normal	E. coli	140	Colonies/100ml	Allen		266	June 23 to July 21
2	Ft. Wayne		Maumee River		Anthony Blvd		7/28/2003	Normal	E. coli	10	Colonies/100ml	Allen		133	June 30 to July 28
2	Ft. Wayne		Maumee River		Anthony Blvd		8/4/2003	Normal	E. coli	760	Colonies/100ml	Allen		151	July 7 to Aug 4
2	Ft. Wayne		Maumee River		Anthony Blvd		8/11/2003	Normal	E. coli	230	Colonies/100ml	Allen		149	July 15 to Aug 11

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
2	Ft. Wayne		Maumee River		Anthony Blvd		8/18/2003	Normal	E. coli	42	Colonies/100ml	Allen		101	July 21 to Aug 18
2	Ft. Wayne		Maumee River		Anthony Blvd		8/25/2003	Normal	E. coli	26	Colonies/100ml	Allen		72	July 28 to Aug 25
2	Ft. Wayne		Maumee River		Anthony Blvd		9/2/2003	Normal	E. coli	10	Colonies/100ml	Allen		72	Aug 4 to Sept 2
2	Ft. Wayne		Maumee River		Anthony Blvd		9/8/2003	Normal	E. coli	14	Colonies/100ml	Allen		32	Aug 11 to Sept 8
2	Ft. Wayne		Maumee River		Anthony Blvd		9/15/2003	Normal	E. coli	3	Colonies/100ml	Allen		14	Aug 18 to Sept 15
2	Ft. Wayne		Maumee River		Anthony Blvd		9/22/2003	Normal	E. coli	5	Colonies/100ml	Allen		9	Aug 25 to Sept 22
2	Ft. Wayne		Maumee River		Anthony Blvd		9/29/2003	Normal	E. coli	104	Colonies/100ml	Allen		12	Sept 2 to Sept 29
2	Ft. Wayne		Maumee River		Anthony Blvd		10/6/2003	Normal	E. coli	80	Colonies/100ml	Allen		18	Sept 8 to Oct 8
2	Ft. Wayne		Maumee River		Anthony Blvd		10/13/2003	Normal	E. coli	136	Colonies/100ml	Allen		28	Sept 15 to Oct 13
2	Ft. Wayne		Maumee River		Anthony Blvd		10/20/2003	Normal	E. coli		Colonies/100ml	Allen			
2	Ft. Wayne		Maumee River		Anthony Blvd		10/27/2003	Normal	E. coli	15	Colonies/100ml	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI7451	4/2/1991	Normal	E. Coli	30	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI5905	5/29/1991	Normal	E. Coli	330	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI9173	6/19/1991	Normal	E. Coli	90	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI9231	7/17/1991	Normal	E. Coli	150	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI9384	8/20/1991	Normal	E. Coli	6200	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI9484	9/17/1991	Normal	E. Coli	5200	CFU/100mL	Allen			
3	IDEM	1991 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI9587	10/8/1991	Normal	E. Coli	2200	CFU/100mL	Allen			
3	IDEM	1992 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI12063	4/29/1992	Normal	E. Coli	210	CFU/100mL	Allen			
3	IDEM	1992 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI12304	5/12/1992	Normal	E. Coli	10	CFU/100mL	Allen			
3	IDEM	1992 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI8292	6/9/1992	Normal	E. Coli	550	CFU/100mL	Allen			
3	IDEM	1992 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI13227	9/15/1992	Normal	E. Coli	6300	CFU/100mL	Allen			
3	IDEM	1992 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI13412	10/15/1992	Normal	E. Coli	780	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI14389	4/7/1993	Normal	E. Coli	380	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI14692	6/17/1993	Normal	E. Coli	5400	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI14986	7/15/1993	Normal	E. Coli	1200	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI15152	8/10/1993	Normal	E. Coli	3500	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI15436	9/15/1993	Normal	E. Coli	18000	CFU/100mL	Allen			
3	IDEM	1993 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI15641	10/13/1993	Normal	E. Coli	190	CFU/100mL	Allen			
3	IDEM	1994 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI16755	6/20/1994	Normal	E. Coli	150	CFU/100mL	Allen			
3	IDEM	1994 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI17121	7/18/1994	Normal	E. Coli	150	CFU/100mL	Allen			
3	IDEM	1994 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI17590	8/16/1994	Normal	E. Coli	290	CFU/100mL	Allen			
3	IDEM	1994 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI17865	9/22/1994	Normal	E. Coli	20	CFU/100mL	Allen			
3	IDEM	1994 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI00046	10/12/1994	Normal	E. Coli	170	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI18737	5/4/1995	Normal	E. Coli	50	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI18968	6/1/1995	Normal	E. Coli	110	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI19285	7/5/1995	Normal	E. Coli	400	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI19392	7/20/1995	Normal	E. Coli	540	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI19796	8/28/1995	Normal	E. Coli	160	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI20200	9/20/1995	Normal	E. Coli	340	CFU/100mL	Allen			
3	IDEM	1995 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI20229	10/18/1995	Normal	E. Coli	200	CFU/100mL	Allen			
3	IDEM	1996 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI21228	5/1/1996	Normal	E. Coli	2600	CFU/100mL	Allen			
3	IDEM	1996 Fixed Statior	Maumee Rivei	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI21533	6/3/1996	Normal	E. Coli	320	CFU/100mL	Allen			

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
3	IDEM	1996 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI21637	6/27/1996	Normal	E. Coli	120	CFU/100mL	Allen			
3	IDEM	1996 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI21986	7/23/1996	Normal	E. Coli	630	CFU/100mL	Allen			
3	IDEM	1996 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI22109	8/27/1996	Normal	E. Coli	50	CFU/100mL	Allen			
3	IDEM	1996 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI22556	9/24/1996	Normal	E. Coli	2900	CFU/100mL	Allen			
3	IDEM	1996 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI22764	10/16/1996	Normal	E. Coli	170	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23411	4/23/1997	Normal	E. Coli	30	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23526	5/21/1997	Normal	E. Coli	2600	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23641	6/26/1997	Normal	E. Coli	8800	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23755	7/15/1997	Normal	E. Coli	540	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23861	8/12/1997	Normal	E. Coli	150	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI23992	9/17/1997	Normal	E. Coli	21000	CFU/100mL	Allen			
3	IDEM	1997 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI24227	10/15/1997	Normal	E. Coli	310	CFU/100mL	Allen			
3	IDEM	2000 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI29326	4/5/2000	Normal	E. Coli	240	CFU/100mL	Allen			
3	IDEM	2000 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	DI30130	8/9/2000	Normal	E. Coli	770	MPN/100mL	Allen			
3	IDEM	2003 Fixed Station	Maumee River	LEM010-0014	U/s of Landin Road bridge, d/s of county boat ramp, Ft. Wayne MWTF	AA15440	4/21/2003	Normal	E. Coli	57	MPN/100mL	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/3/2001	Normal	E. coli	600	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/9/2001	Normal	E. coli	270	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/16/2001	Normal	E. coli	390	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/23/2001	Normal	E. coli	480	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/30/2001	Normal	E. coli	10	Colonies/100ml	Allen		198	April 3 to April 30
3	Ft. Wayne		Maumee River		Landin Rd		5/7/2001	Normal	E. coli	44	Colonies/100ml	Allen		117	April 9 to May 7
3	Ft. Wayne		Maumee River		Landin Rd		5/14/2001	Normal	E. coli	64	Colonies/100ml	Allen		88	April 16 to May 14
3	Ft. Wayne		Maumee River		Landin Rd		5/21/2001	Normal	E. coli	308	Colonies/100ml	Allen		84	April 23 to May 21
3	Ft. Wayne		Maumee River		Landin Rd		5/29/2001	Normal	E. coli	650	Colonies/100ml	Allen		89	April 30 to May 29
3	Ft. Wayne		Maumee River		Landin Rd		6/4/2001	Normal	E. coli	600	Colonies/100ml	Allen		202	May 7 to June 4
3	Ft. Wayne		Maumee River		Landin Rd		6/11/2001	Normal	E. coli	360	Colonies/100ml	Allen		308	May 14 to June 11
3	Ft. Wayne		Maumee River		Landin Rd		6/18/2001	Normal	E. coli	170	Colonies/100ml	Allen		374	May 21 to June 18
3	Ft. Wayne		Maumee River		Landin Rd		6/26/2001	Normal	E. coli	1024	Colonies/100ml	Allen		476	May 21 to June 26
3	Ft. Wayne		Maumee River		Landin Rd		7/2/2001	Normal	E. coli	200	Colonies/100ml	Allen		376	May 29 to July 2
3	Ft. Wayne		Maumee River		Landin Rd		7/9/2001	Normal	E. coli	800	Colonies/100ml	Allen		398	June 4 to July 9
3	Ft. Wayne		Maumee River		Landin Rd		7/16/2001	Normal	E. coli	60	Colonies/100ml	Allen		278	June 11 to July 16
3	Ft. Wayne		Maumee River		Landin Rd		7/23/2001	Normal	E. coli	830	Colonies/100ml	Allen		382	June 18 to July 23
3	Ft. Wayne		Maumee River		Landin Rd		7/30/2001	Normal	E. coli	1020	Colonies/100ml	Allen		382	June 26 to July 30
3	Ft. Wayne		Maumee River		Landin Rd		8/6/2001	Normal	E. coli	440	Colonies/100ml	Allen		447	June 26 to Aug 6
3	Ft. Wayne		Maumee River		Landin Rd		8/14/2001	Normal	E. coli	60	Colonies/100ml	Allen		266	July 2 to Aug 14
3	Ft. Wayne		Maumee River		Landin Rd		8/20/2001	Normal	E. coli	3200	Colonies/100ml	Allen		590	July 9 to Aug 20
3	Ft. Wayne		Maumee River		Landin Rd		8/27/2001	Normal	E. coli	920	Colonies/100ml	Allen		602	July 16 to Aug 27
3	Ft. Wayne		Maumee River		Landin Rd		9/4/2001	Normal	E. coli	200	Colonies/100ml	Allen		435	July 23 to Sept 4
3	Ft. Wayne		Maumee River		Landin Rd		9/10/2001	Normal	E. coli	2240	Colonies/100ml	Allen		602	July 30 to Sept 10
3	Ft. Wayne		Maumee River		Landin Rd		9/17/2001	Normal	E. coli	1460	Colonies/100ml	Allen		1140	Aug 6 to Sept 17
3	Ft. Wayne		Maumee River		Landin Rd		9/24/2001	Normal	E. coli	8000	Colonies/100ml	Allen		1369	Aug 14 to Sept 24
3	Ft. Wayne		Maumee River		Landin Rd		10/1/2001	Normal	E. coli	500	Colonies/100ml	Allen		1212	Aug 20 to Oct 1
3	Ft. Wayne		Maumee River		Landin Rd		10/9/2001	Normal	E. coli	1020	Colonies/100ml	Allen		1679	Aug 27 to Oct 9

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
3	Ft. Wayne		Maumee River		Landin Rd		10/15/2001	Normal	E. coli	4600	Colonies/100ml	Allen		1939	Sept 4 to Oct 15
3	Ft. Wayne		Maumee River		Landin Rd		10/22/2001	Normal	E. coli	620	Colonies/100ml	Allen		1634	Sept 10 to Oct 22
3	Ft. Wayne		Maumee River		Landin Rd		10/29/2001	Normal	E. coli	1020	Colonies/100ml	Allen		1082	Sept 17 to Oct 29
3	Ft. Wayne		Maumee River		Landin Rd		4/1/2002	Normal	E. coli	768	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/8/2002	Normal	E. coli	440	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/15/2002	Normal	E. coli	400	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/22/2002	Normal	E. coli	300	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/29/2002	Normal	E. coli	5000	Colonies/100ml	Allen		727	April 1 to April 29
3	Ft. Wayne		Maumee River		Landin Rd		5/6/2002	Normal	E. coli	400	Colonies/100ml	Allen		638	April 8 to May 6
3	Ft. Wayne		Maumee River		Landin Rd		5/13/2002	Normal	E. coli	5400	Colonies/100ml	Allen		1053	April 15 to May 13
3	Ft. Wayne		Maumee River		Landin Rd		5/20/2002	Normal	E. coli	300	Colonies/100ml	Allen		994	April 22 to May 20
3	Ft. Wayne		Maumee River		Landin Rd		5/29/2002	Normal	E. coli	1800	Colonies/100ml	Allen		1423	April 29 to May 29
3	Ft. Wayne		Maumee River		Landin Rd		6/3/2002	Normal	E. coli	200	Colonies/100ml	Allen		747	May 6 to June 3
3	Ft. Wayne		Maumee River		Landin Rd		6/10/2002	Normal	E. coli	470	Colonies/100ml	Allen		772	May 13 to June 10
3	Ft. Wayne		Maumee River		Landin Rd		6/17/2002	Normal	E. coli	250	Colonies/100ml	Allen		418	May 20 to June 17
3	Ft. Wayne		Maumee River		Landin Rd		6/24/2002	Normal	E. coli	660	Colonies/100ml	Allen		489	May 29 to June 24
3	Ft. Wayne		Maumee River		Landin Rd		7/1/2002	Normal	E. coli	430	Colonies/100ml	Allen		367	June 3 to July 1
3	Ft. Wayne		Maumee River		Landin Rd		7/8/2002	Normal	E. coli	420	Colonies/100ml	Allen		426	June 10 to July 8
3	Ft. Wayne		Maumee River		Landin Rd		7/15/2002	Normal	E. coli	Test Failed	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		7/22/2002	Normal	E. coli	400	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		7/29/2002	Normal	E. coli	130	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		8/5/2002	Normal	E. coli	160	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		8/12/2002	Normal	E. coli	65	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		8/19/2002	Normal	E. coli	620	Colonies/100ml	Allen		202	July 22 to Aug 19
3	Ft. Wayne		Maumee River		Landin Rd		8/26/2002	Normal	E. coli	1480	Colonies/100ml	Allen		262	June 29 to Aug 26
3	Ft. Wayne		Maumee River		Landin Rd		9/3/2002	Normal	E. coli	420	Colonies/100ml	Allen		332	Aug 5 to Sept 3
3	Ft. Wayne		Maumee River		Landin Rd		9/9/2002	Normal	E. coli	560	Colonies/100ml	Allen		426	Aug 12 to Sept 9
3	Ft. Wayne		Maumee River		Landin Rd		9/16/2002	Normal	E. coli	370	Colonies/100ml	Allen		603	Aug 19 to Sept 16
3	Ft. Wayne		Maumee River		Landin Rd		9/24/2002	Normal	E. coli	680	Colonies/100ml	Allen		614	Aug 26 to Sept 30
3	Ft. Wayne		Maumee River		Landin Rd		9/30/2002	Normal	E. coli	640	Colonies/100ml	Allen		520	Sept 3 to Sept 24
3	Ft. Wayne		Maumee River		Landin Rd		10/7/2002	Normal	E. coli	220	Colonies/100ml	Allen		457	Sept 9 to Oct 7
3	Ft. Wayne		Maumee River		Landin Rd		10/14/2002	Normal	E. coli	130	Colonies/100ml	Allen		341	Sept 16 to Oct 14
3	Ft. Wayne		Maumee River		Landin Rd		10/21/2002	Normal	E. coli	105	Colonies/100ml	Allen		265	Sept 24 to Oct 21
3	Ft. Wayne		Maumee River		Landin Rd		10/28/2002	Normal	E. coli	270	Colonies/100ml	Allen		220	Sept 30 to Oct 28
3	Ft. Wayne		Maumee River		Landin Rd		4/7/2003	Normal	E. coli	32	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/14/2003	Normal	E. coli	36	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/21/2003	Normal	E. coli	7	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		4/28/2003	Normal	E. coli	48	Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		5/5/2003	Normal	E. coli	28	Colonies/100ml	Allen		26	April 7 to May 5
3	Ft. Wayne		Maumee River		Landin Rd		5/12/2003	Normal	E. coli	1000	Colonies/100ml	Allen		51	April 14 to May 12
3	Ft. Wayne		Maumee River		Landin Rd		5/19/2003	Normal	E. coli	152	Colonies/100ml	Allen		68	April 21 to May 19
3	Ft. Wayne		Maumee River		Landin Rd		5/27/2003	Normal	E. coli	64	Colonies/100ml	Allen		106	April 28 to May 27
3	Ft. Wayne		Maumee River		Landin Rd		6/2/2003	Normal	E. coli	352	Colonies/100ml	Allen		157	May 5 to June 2

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
3	Ft. Wayne		Maumee River		Landin Rd		6/9/2003	Normal	E. coli	296	Colonies/100ml	Allen		252	May 12 to June 9
3	Ft. Wayne		Maumee River		Landin Rd		6/16/2003	Normal	E. coli	500	Colonies/100ml	Allen		219	May 19 to June 16
3	Ft. Wayne		Maumee River		Landin Rd		6/23/2003	Normal	E. coli	340	Colonies/100ml	Allen		258	May 27 to June 23
3	Ft. Wayne		Maumee River		Landin Rd		6/30/2003	Normal	E. coli	500	Colonies/100ml	Allen		389	June 2 to June 30
3	Ft. Wayne		Maumee River		Landin Rd		7/7/2003	Normal	E. coli	200	Colonies/100ml	Allen		347	June 9 to July 7
3	Ft. Wayne		Maumee River		Landin Rd		7/15/2003	Normal	E. coli	1500	Colonies/100ml	Allen		480	June 16 to July 15
3	Ft. Wayne		Maumee River		Landin Rd		7/21/2003	Normal	E. coli	140	Colonies/100ml	Allen		372	June 23 to July 21
3	Ft. Wayne		Maumee River		Landin Rd		7/28/2003	Normal	E. coli	15	Colonies/100ml	Allen		199	June 30 to July 28
3	Ft. Wayne		Maumee River		Landin Rd		8/4/2003	Normal	E. coli	840	Colonies/100ml	Allen		221	July 7 to Aug 4
3	Ft. Wayne		Maumee River		Landin Rd		8/11/2003	Normal	E. coli	250	Colonies/100ml	Allen		231	July 15 to Aug 11
3	Ft. Wayne		Maumee River		Landin Rd		8/18/2003	Normal	E. coli	78	Colonies/100ml	Allen		128	July 21 to Aug 18
3	Ft. Wayne		Maumee River		Landin Rd		8/25/2003	Normal	E. coli	22	Colonies/100ml	Allen		88	July 28 to Aug 25
3	Ft. Wayne		Maumee River		Landin Rd		9/2/2003	Normal	E. coli	8	Colonies/100ml	Allen		78	Aug 4 to Sept2
3	Ft. Wayne		Maumee River		Landin Rd		9/8/2003	Normal	E. coli	20	Colonies/100ml	Allen		37	Aug 11 to Sept 8
3	Ft. Wayne		Maumee River		Landin Rd		9/15/2003	Normal	E. coli	1	Colonies/100ml	Allen		12	Aug 18 to Sept 15
3	Ft. Wayne		Maumee River		Landin Rd		9/22/2003	Normal	E. coli	7	Colonies/100ml	Allen		8	Aug 25 to Sept 22
3	Ft. Wayne		Maumee River		Landin Rd		9/29/2003	Normal	E. coli	24	Colonies/100ml	Allen		8	Sept 2 to Sept 29
3	Ft. Wayne		Maumee River		Landin Rd		10/6/2003	Normal	E. coli	78	Colonies/100ml	Allen		12	Sept 8 to Oct 6
3	Ft. Wayne		Maumee River		Landin Rd		10/13/2003	Normal	E. coli	84	Colonies/100ml	Allen		16	Sept 15 to Oct 13
3	Ft. Wayne		Maumee River		Landin Rd		10/20/2003	Normal	E. coli		Colonies/100ml	Allen			
3	Ft. Wayne		Maumee River		Landin Rd		10/27/2003	Normal	E. coli	52	Colonies/100ml	Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/2/2001		E. coli	10		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/9/2001		E. coli	320		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/16/2001		E. coli	50		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/23/2001		E. coli	250		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/30/2001		E. coli	10		Allen		53	April 2 to April 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/7/2001		E. coli	40		Allen		69	April 9 to May 7
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/14/2001		E. coli	40		Allen		46	April 16 to May 14
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/21/2001		E. coli	520		Allen		73	April 23 to May 21
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/28/2001		E. coli	1500		Allen		105	April 30 to May 28
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/4/2001		E. coli	1000		Allen		263	May 7 to June 4
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/11/2001		E. coli	200		Allen		362	May 14 to June 11
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/18/2001		E. coli	200		Allen		500	May 21 to June 18
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/25/2001		E. coli	1200		Allen		591	May 28 to June 25
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/2/2001		E. coli	320		Allen		434	June 4 to July 2
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/9/2001		E. coli	490		Allen		376	June 11 to July 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/16/2001		E. coli	12000		Allen		853	June 18 to July 16
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/23/2001		E. coli	18000		Allen		2098	June 25 to July 23
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/30/2001		E. coli	600		Allen		1826	July 2 to July 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/6/2001		E. coli	170		Allen		1609	July 9 to Aug 6
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/13/2001		E. coli	130		Allen		1234	July 16 to Aug 13
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/20/2001		E. coli	1200		Allen		779	July 23 to Aug 20
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/27/2001		E. coli	7000		Allen		645	July 30 to Aug 27

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/3/2001		E. coli	20		Allen		327	Aug 6 to Aug 27
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/10/2001		E. coli	3500		Allen		598	Aug 13 to Sept 10
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/17/2001		E. coli	20		Allen		411	Aug 20 to Sept 17
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/24/2001		E. coli	230		Allen		296	Aug 27 to Sept 24
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/1/2001		E. coli	230		Allen		149	Sept 3 to Oct 1
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/8/2001		E. coli	2100		Allen		379	Sept 10 to Oct 8
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/15/2001		E. coli	5000		Allen		407	Sept 17 to Oct 15
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/22/2001		E. coli	4000		Allen		1173	Sept 24 to Oct 22
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/2/2002		E. coli	500		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/9/2002		E. coli	520		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/16/2002		E. coli	20		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/23/2002		E. coli	10		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/30/2002		E. coli	110		Allen		89	April 2 to April 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/7/2002		E. coli	50		Allen		56	April 9 to May 7
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/14/2002		E. coli	1600		Allen		71	April 16 to May 14
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/21/2002		E. coli	200		Allen		112	April 23 to May 21
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/28/2002		E. coli	70		Allen		165	April 30 to May 28
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/4/2002		E. coli	300		Allen		202	May 7 to June 4
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/11/2002		E. coli	400		Allen		306	May 14 to June 11
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/18/2002		E. coli	3500		Allen		358	May 21 to June 18
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/25/2002		E. coli	1500		Allen		536	May 28 to June 25
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/2/2002		E. coli	600		Allen		823	June 4 to July 2
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/9/2002		E. coli	3500		Allen		1346	June 11 to July 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/16/2002		E. coli	1000		Allen		1616	June 18 to July 16
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/23/2002		E. coli	4600		Allen		1707	June 25 to July 23
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/30/2002		E. coli	14000		Allen		2668	July 2 to July 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/6/2002		E. coli	430		Allen		2496	July 9 to Aug 6
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/13/2002		E. coli	560		Allen		1730	July 16 to Aug 13
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/20/2002		E. coli	710		Allen		1616	July 23 to Aug 20
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/27/2002		E. coli	500		Allen		1037	July 30 to Aug 27
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/3/2002		E. coli	800		Allen		585	Aug 6 to Sept 3
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/10/2002		E. coli	110		Allen		445	Aug 13 to Sept 10
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/17/2002		E. coli	120		Allen		327	Aug 20 to Sept 17
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/24/2002		E. coli	100		Allen		221	Aug 27 to Sept 24
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/1/2002		E. coli	300		Allen		200	Sept 3 to Oct 1
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/9/2002		E. coli	200		Allen		151	Sept 10 to Oct 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/15/2002		E. coli	250		Allen		178	Sept 17 to Oct 15
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/22/2002		E. coli	800		Allen		261	Sept 24 to Oct 22
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/29/2002		E. coli	40		Allen		217	Oct 1 to Oct 29
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/3/2003		E. coli	170		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/8/2003		E. coli	650		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/17/2003	<	E. coli	10		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/24/2003		E. coli	100		Allen			

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/1/2003		E. coli	400		Allen		135	April 3 to May 1
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/6/2003		E. coli	600		Allen		173	April 8 to May 6
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/13/2003		E. coli	390		Allen		156	April 17 to May 13
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/20/2003		E. coli	15000		Allen		675	April 24 to May 20
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/27/2003		E. coli	300		Allen		841	May 1 to May 27
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/3/2003		E. coli	2200		Allen		1183	May 6 to June 3
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/10/2003		E. coli	1400		Allen		1401	May 13 to June 10
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/17/2003		E. coli	8000		Allen		2564	May 20 to June 17
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/26/2003		E. coli	90		Allen		922	May 27 to June 26
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/2/2003		E. coli	3200		Allen		1480	June 3 to July 2
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/9/2003		E. coli	1600		Allen		1389	June 10 to July 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/16/2003		E. coli	900		Allen		1271	June 17 to July 16
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/23/2003		E. coli	2100		Allen		973	June 26 to July 23
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/30/2003		E. coli	730		Allen		1478	July 2 to July 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/6/2003		E. coli	2000		Allen		1346	July 9 to Aug 6
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/13/2003		E. coli	1700		Allen		1362	July 16 to Aug 13
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/27/2003		E. coli	4000		Allen		1836	July 23 to Aug 27
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/4/2003		E. coli	600		Allen		1429	July 30 to Sept 4
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/10/2003		E. coli	210		Allen		1114	Aug 6 to Sept 10
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/17/2003		E. coli	1100		Allen		988	Aug 13 to Sept 17
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/23/2003		E. coli	2700		Allen		1084	Aug 27 to Sept 23
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/1/2003		E. coli	800		Allen		786	Sept 4 to Oct 1
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/9/2003		E. coli	160		Allen		603	Sept 10 to Oct 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/16/2003		E. coli	500		Allen		717	Sept 17 to Oct 16
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/22/2003		E. coli	60		Allen		401	Sept 23 to Oct 22
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/29/2003		E. coli	2000		Allen		378	Oct 1 to Oct 29
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/7/2004		E. coli	50		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/14/2004		E. coli	100		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/21/2004		E. coli	10		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	4/28/2004		E. coli	10		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/5/2004		E. coli	450		Allen		47	April 7 to May 5
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/12/2004		E. coli	1100		Allen		87	April 14 to May 12
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/19/2004		E. coli	3300		Allen		175	April 21 to May 19
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	5/26/2004		E. coli	1200		Allen		455	April 28 to May 26
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/3/2004		E. coli	1800		Allen		1287	May 5 to June 3
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/9/2004		E. coli	18000		Allen		2691	May 12 to June 9
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/16/2004		E. coli	800		Allen		2525	May 19 to June 16
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/23/2004		E. coli	31000		Allen		3952	May 26 to June 23
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	6/30/2004		E. coli	7000		Allen		5624	June 3 to June 30
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/8/2004		E. coli	22000		Allen		9278	June 9 to July 8
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/21/2004		E. coli	12000		Allen		8555	June 16 to July 21
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	7/28/2004		E. coli	2000		Allen		10276	June 23 to July 28
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/4/2004		E. coli	22000		Allen		9595	June 30 to Aug 4

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/10/2004		E. coli	1800		Allen		7312	July 8 to Aug 10
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	8/18/2004	>	E. coli	80000		Allen		9467	July 21 to Aug 18
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/1/2004		E. coli	800		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/9/2004		E. coli	360		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/15/2004		E. coli	110		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/22/2004		E. coli	900		Allen			
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	9/29/2004		E. coli	2800		Allen		603	Sept 1 to Sept 29
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/13/2004	<	E. coli	10		Allen		251	Sept 9 to Oct 13
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/20/2004		E. coli	10		Allen		123	Sept 15 to Oct 20
4	Allen County Health Dep		Trier Drain (Maumee Basin		Rose and Broadway by RR	30-13-12-51Y	10/27/2004	<	E. coli	10		Allen		76	Sept 22 to Oct 27
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/2/2001		E. coli	800		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/9/2001		E. coli	300		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/16/2001		E. coli	290		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/23/2001		E. coli	48000		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/30/2001		E. coli	28000		Allen		2479	April 2 to April 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/7/2001		E. coli	29000		Allen		5082	April 9 to May 7
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/14/2001		E. coli	28000		Allen		12591	April 16 to May 14
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/21/2001		E. coli	2400		Allen		19215	April 23 to May 21
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/28/2001		E. coli	7000		Allen		13074	April 30 to May 28
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/4/2001		E. coli	1400		Allen		7181	May 7 to June 4
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/11/2001		E. coli	13000		Allen		6117	May 14 to June 11
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/18/2001		E. coli	15000		Allen		5399	May 21 to June 18
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/25/2001		E. coli	3000		Allen		5645	May 28 to June 25
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/2/2001		E. coli	27000		Allen		7395	June 4 to July 2
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/9/2001		E. coli	420		Allen		5812	June 11 to July 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/16/2001		E. coli	60000		Allen		7892	June 18 to July 16
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/23/2001		E. coli	57000		Allen		10307	June 25 to July 23
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/30/2001		E. coli	800		Allen		7913	July 2 to July 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/6/2001		E. coli	130		Allen		2722	July 9 to Aug 6
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/13/2001		E. coli	3400		Allen		4135	July 16 to Aug 13
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/20/2001		E. coli	180		Allen		1294	July 23 to Aug 20
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/27/2001		E. coli	900		Allen		564	July 30 to Aug 27
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/3/2001		E. coli	180000		Allen		1667	Aug 6 to Sept 3
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/10/2001		E. coli	1600		Allen		2755	Aug 13 to Sept 10
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/17/2001		E. coli	90		Allen		1332	Aug 20 to Sept 17
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/24/2001		E. coli	4000		Allen		2477	Aug 27 to Sept 24
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/1/2001		E. coli	8000		Allen		3835	Sept 3 to Oct 1
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/8/2001		E. coli	63000		Allen		3109	Sept 10 to Oct 8
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/15/2001		E. coli	610		Allen		2563	Sept 17 to Oct 15
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/22/2001		E. coli	3000		Allen		5169	Sept 24 to Oct 22
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/2/2002		E. coli	300		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/9/2002		E. coli	1200		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/16/2002		E. coli	2000		Allen			

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/23/2002		E. coli	1000		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/30/2002		E. coli	5000		Allen		1292	April 2 to April 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/7/2002		E. coli	38000		Allen		3402	April 9 to May 7
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/14/2002		E. coli	2000		Allen		3768	April 16 to May 14
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/21/2002		E. coli	770		Allen		3114	April 23 to May 21
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/28/2002		E. coli	1400		Allen		3330	April 30 to May 28
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/4/2002		E. coli	1000		Allen		2414	May 7 to June 4
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/11/2002		E. coli	3900		Allen		1531	May 14 to June 11
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/18/2002		E. coli	3400		Allen		1702	May 21 to June 18
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/25/2002		E. coli	19000		Allen		3232	May 28 to June 25
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/2/2002		E. coli	6500		Allen		4394	June 4 to July 7
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/9/2002		E. coli	10000		Allen		6964	June 11 to July 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/16/2002	>	E. coli	200000		Allen		15305	June 18 to July 16
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/23/2002		E. coli	2700		Allen		14615	June 25 to July 23
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/30/2002		E. coli	18000		Allen		14458	July 2 to July 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/6/2002		E. coli	210		Allen		7277	July 9 to Aug 6
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/13/2002		E. coli	40		Allen		2412	July 16 to Aug 13
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/20/2002		E. coli	6600		Allen		1219	July 23 to Aug 20
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/27/2002		E. coli	2000		Allen		1148	July 30 to Aug 27
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/3/2002		E. coli	23000		Allen		1206	Aug 6 to Sept 3
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/10/2002		E. coli	3300		Allen		2092	Aug 13 to Sept 10
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/17/2002		E. coli	69000		Allen		9288	Aug 20 to Sept 17
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/24/2002		E. coli	4000		Allen		8403	Aug 27 to Sept 24
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/1/2002		E. coli	6000		Allen		10468	Sept 3 to Oct 1
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/8/2002		E. coli	33000		Allen		11252	Sept 10 to Oct 8
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/15/2002		E. coli	33000		Allen		17833	Sept 17 to Oct 15
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/22/2002		E. coli	43000		Allen		16223	Sept 24 to Oct 22
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/29/2002		E. coli	3700		Allen		15972	Oct 1 to Oct 29
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/2/2003		E. coli	29000		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/9/2003		E. coli			Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/16/2003		E. coli	2300		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/23/2003		E. coli	6000		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/30/2003		E. coli	180		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/6/2003		E. coli	2200		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/13/2003		E. coli	900		Allen		1375	April 16 to May 13
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/27/2003		E. coli	1100		Allen		1187	April 23 to May 27
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/3/2003		E. coli	2500		Allen		996	April 30 to June 3
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/10/2003		E. coli	5000		Allen		1936	May 6 to June 10
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/17/2003	>	E. coli	200000		Allen		4772	May 13 to June 17
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/26/2003		E. coli	3400		Allen		6225	May 27 to June 26
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/2/2003		E. coli	65000		Allen		14076	June 3 to July 2
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/9/2003		E. coli	300		Allen		9211	June 10 to July 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/16/2003		E. coli	78000		Allen		15956	June 17 to July 16

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/23/2003		E. coli	610		Allen		5009	June 26 to July 23
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/30/2003		E. coli	8200		Allen		5974	July 2 to July 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/6/2003		E. coli	1400		Allen		2773	July 9 to Aug 6
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/13/2003		E. coli	2700		Allen		4303	July 16 to Aug 13
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/20/2003		E. coli	400		Allen		1499	July 23 to Aug 20
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/27/2003		E. coli	15000		Allen		2844	July 30 to Aug 27
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/4/2003		E. coli	300		Allen		1467	Aug 6 to Sept 4
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/10/2003		E. coli	580		Allen		1230	Aug 13 to Sept 10
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/17/2003		E. coli	1500		Allen		1094	Aug 20 to Sept 17
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/23/2003		E. coli	7300		Allen		1955	Aug 27 to Sept 23
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/1/2003		E. coli	200		Allen		825	Sept 4 to Oct 1
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/9/2003		E. coli	3100		Allen		1315	Sept 10 to Oct 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/16/2003		E. coli	300		Allen		1153	Sept 17 to Oct 16
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/22/2003		E. coli	70		Allen		625	Sept 23 to Oct 22
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/29/2003		E. coli	6000		Allen		601	Oct 1 to Oct 29
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/7/2004		E. coli	4400		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/14/2004		E. coli	200		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/21/2004		E. coli	7000		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	4/28/2004		E. coli	4600		Allen			
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/5/2004		E. coli	420		Allen		1641	April 7 to May 5
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/12/2004		E. coli	700		Allen		1136	April 14 to May 12
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/19/2004		E. coli	2000		Allen		1801	April 21 to May 19
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	5/26/2004		E. coli	900		Allen		1195	April 28 to May 26
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/3/2004		E. coli	10000		Allen		1395	May 5 to June 3
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/9/2004		E. coli	20000		Allen		3022	May 12 to June 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/17/2004		E. coli	1000		Allen		3245	May 19 to June 17
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/23/2004		E. coli	27000		Allen		5462	May 26 to June 23
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	6/30/2004		E. coli	700		Allen		5194	June 3 to June 30
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/8/2004		E. coli	24000		Allen		6188	June 9 to July 8
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/14/2004		E. coli	4700		Allen		4632	June 17 to July 14
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/21/2004		E. coli	2000		Allen		5321	June 23 to July 21
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	7/28/2004		E. coli	2300		Allen		3251	June 30 to July 28
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/4/2004		E. coli	30000		Allen		6893	July 8 to Aug 4
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/10/2004		E. coli	1600		Allen		4011	July 14 to Aug 10
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/18/2004	>	E. coli	80000		Allen		7070	July 21 to Aug 18
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	8/26/2004		E. coli	7900		Allen		9305	July 28 to Aug 26
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/1/2004		E. coli	3000		Allen		9813	Aug 4 to Sept 1
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/9/2004		E. coli	4000		Allen		6558	Aug 10 to Sept 9
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/15/2004		E. coli	260		Allen		4560	Aug 18 to Sept 15
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/22/2004		E. coli	1600		Allen		2085	Aug 26 to Sept 22
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	9/29/2004		E. coli	1700		Allen		1534	Sept 1 to Sept 29
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/6/2004		E. coli	7200		Allen		1827	Sept 9 to Oct 6
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/13/2004		E. coli	120000		Allen		3608	Sept 15 to Oct 13

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/20/2004		E. coli	2000		Allen		5425	Sept 22 to Oct 20
5	Allen County Health Dep		Rushart Drain (Maumee Basin		Berthaud Rd. south of Slushe	31-14-34-51Y	10/27/2004		E. coli	3700		Allen		6416	Sept 29 to Oct 27
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI7450	4/2/1991	Normal	E. Coli	50	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI5904	5/29/1991	Normal	E. Coli	840	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI9172	6/19/1991	Normal	E. Coli	170	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI9230	7/17/1991	Normal	E. Coli	250	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI9383	8/20/1991	Normal	E. Coli	530	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI9483	9/17/1991	Normal	E. Coli	3100	CFU/100mL	Allen			
6	IDEM	1991 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI9586	10/8/1991	Normal	E. Coli	1600	CFU/100mL	Allen			
6	IDEM	1992 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI8291	6/9/1992	Normal	E. Coli	330	CFU/100mL	Allen			
6	IDEM	1992 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI13123	8/18/1992	Normal	E. Coli	1700	CFU/100mL	Allen			
6	IDEM	1992 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI13226	9/15/1992	Normal	E. Coli	700	CFU/100mL	Allen			
6	IDEM	1992 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI13411	10/15/1992	Normal	E. Coli	450	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI14388	4/6/1993	Normal	E. Coli	250	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI14691	6/17/1993	Normal	E. Coli	180	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI14985	7/15/1993	Normal	E. Coli	2500	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI15151	8/10/1993	Normal	E. Coli	210	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI15435	9/15/1993	Normal	E. Coli	39000	CFU/100mL	Allen			
6	IDEM	1993 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI15640	10/13/1993	Normal	E. Coli	630	CFU/100mL	Allen			
6	IDEM	1994 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI16754	6/20/1994	Normal	E. Coli	150	CFU/100mL	Allen			
6	IDEM	1994 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI17120	7/18/1994	Normal	E. Coli	20	CFU/100mL	Allen			
6	IDEM	1994 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI17589	8/16/1994	Normal	E. Coli	270	CFU/100mL	Allen			
6	IDEM	1994 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI17864	9/22/1994	Normal	E. Coli	< 10	CFU/100mL	Allen			
6	IDEM	1994 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI00045	10/12/1994	Normal	E. Coli	80	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI18736	5/4/1995	Normal	E. Coli	40	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI18967	6/1/1995	Normal	E. Coli	140	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI19284	7/5/1995	Normal	E. Coli	400	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI19391	7/20/1995	Normal	E. Coli	800	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI19795	8/28/1995	Normal	E. Coli	280	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI20199	9/20/1995	Normal	E. Coli	110	CFU/100mL	Allen			
6	IDEM	1995 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI20228	10/18/1995	Normal	E. Coli	130	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI21227	5/1/1996	Normal	E. Coli	800	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI21532	6/3/1996	Normal	E. Coli	120	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI21636	6/27/1996	Normal	E. Coli	240	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI21985	7/23/1996	Normal	E. Coli	590	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI22108	8/27/1996	Normal	E. Coli	350	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI22555	9/24/1996	Normal	E. Coli	380	CFU/100mL	Allen			
6	IDEM	1996 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI22763	10/16/1996	Normal	E. Coli	60	CFU/100mL	Allen			
6	IDEM	1997 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI23410	4/23/1997	Normal	E. Coli	190	CFU/100mL	Allen			
6	IDEM	1997 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI23525	5/21/1997	Normal	E. Coli	1700	CFU/100mL	Allen			
6	IDEM	1997 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI23640	6/26/1997	Normal	E. Coli	11000	CFU/100mL	Allen			
6	IDEM	1997 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI23754	7/15/1997	Normal	E. Coli	560	CFU/100mL	Allen			
6	IDEM	1997 Fixed Station	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburn	DI23860	8/12/1997	Normal	E. Coli	110	CFU/100mL	Allen			

Attachment D: *E. coli* Data for the Maumee River TMDL

Site #	Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action	geomean	Other
6	IDEM	1997 Fixed Statior	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	DI23991	9/17/1997	Normal	E. Coli	89000	CFU/100mL	Allen			
6	IDEM	1997 Fixed Statior	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	DI24226	10/15/1997	Normal	E. Coli	530	CFU/100mL	Allen			
6	IDEM	1999 Fixed Statior	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	DI27785	8/4/1999	Normal	E. Coli	150 (H)	CFU/100mL	Allen			
6	IDEM	2000 Fixed Statior	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	DI30129	8/9/2000	Normal	E. Coli	310 (HJ)	MPN/100mL	Allen			
6	IDEM	2000 E Coli	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	AA00221	6/12/2000	Normal	E. Coli	1553.07	MPN/100mL	Allen			
6	IDEM	2000 E Coli	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	AA00293	6/19/2000	Normal	E. Coli >	2420	MPN/100mL	Allen			
6	IDEM	2000 E Coli	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	AA00453	6/27/2000	Normal	E. Coli	1989	MPN/100mL	Allen			
6	IDEM	2000 E Coli	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	AA00564	7/3/2000	Normal	E. Coli	987	MPN/100mL	Allen			
6	IDEM	2000 E Coli	Maumee River	LEM010-0013	SR 101 Bridge, 3 Miles N of Woodburr	AA00664	7/10/2000	Normal	E. Coli	556	MPN/100mL	Allen		1326	June 12 to July 1C
7	IDEM	2005 Corvallis E. col	Maumee River	LEM010-0039	Coliseum Boulevarc	AA27280	12-Sep-05		E. Coli	61.3	MPN/100mL	Allen			
7	IDEM	2005 Corvallis E. col	Maumee River	LEM010-0039	Coliseum Boulevarc	AA27297	19-Sep-05		E. Coli	920.8	MPN/100mL	Allen			
7	IDEM	2005 Corvallis E. col	Maumee River	LEM010-0039	Coliseum Boulevarc	AA27313	26-Sep-05		E. Coli	12997	MPN/100mL	Allen			
7	IDEM	2005 Corvallis E. col	Maumee River	LEM010-0039	Coliseum Boulevarc	AA27330	03-Oct-05		E. Coli	387.3	MPN/100mL	Allen			
7	IDEM	2005 Corvallis E. col	Maumee River	LEM010-0039	Coliseum Boulevarc	AA27348	11-Oct-05		E. Coli	88.4	MPN/100mL	Allen			

Attachment E

Water Quality Duration Curves for Maumee River TMDL

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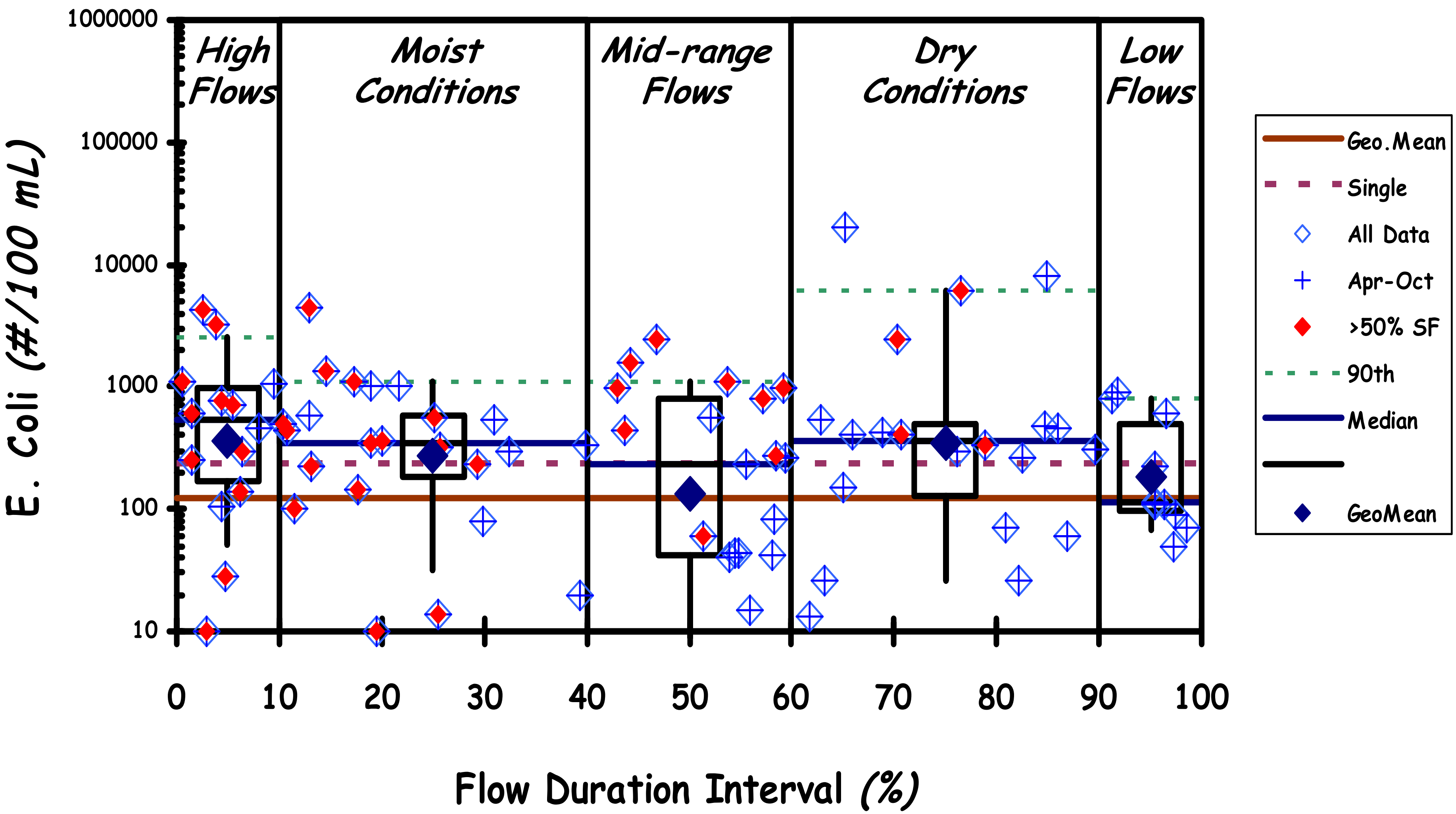
Maumee River at Anthony Boulevard

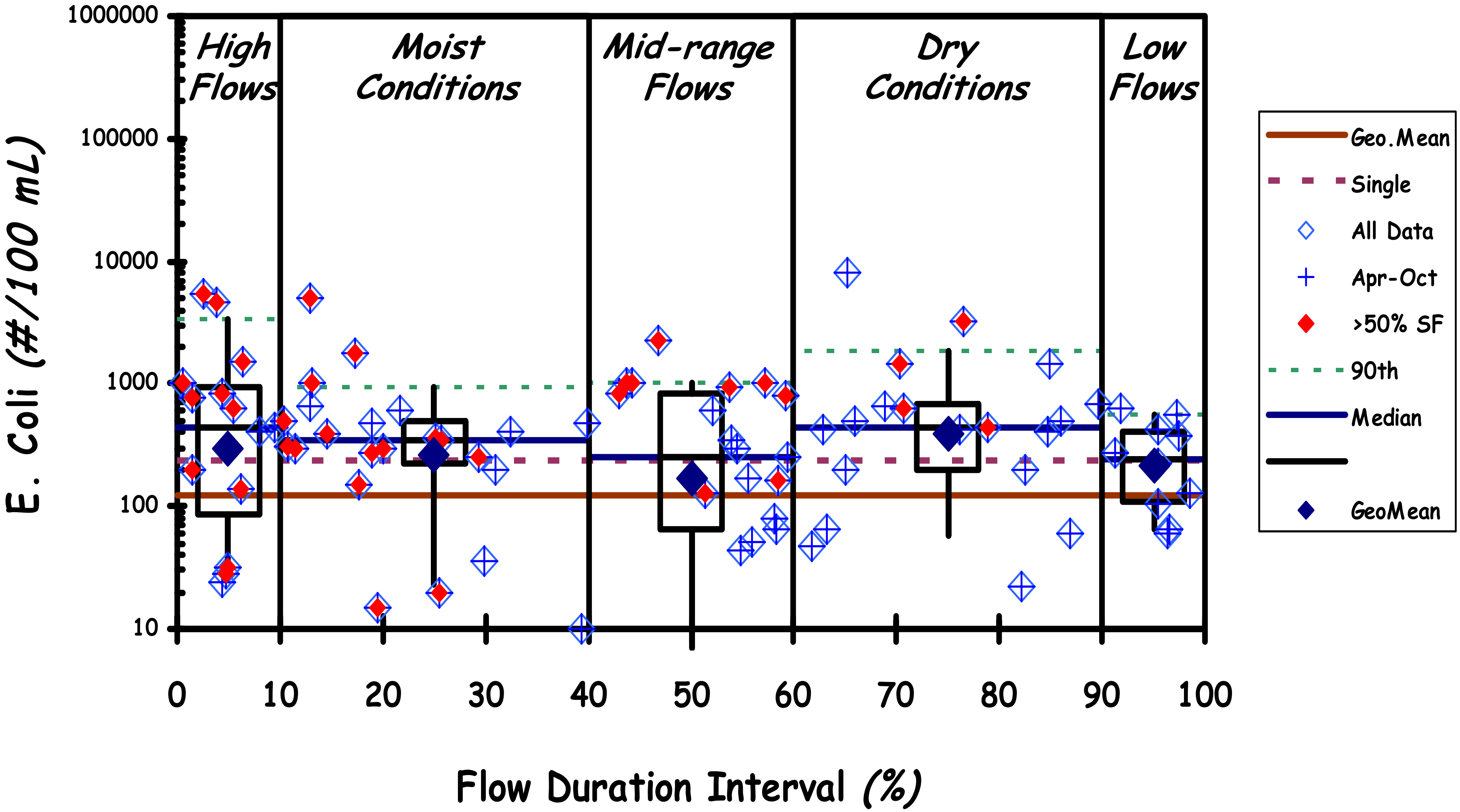
WQ Duration Curve *(2001-03 Monitoring Data)*

Site: MAU-ANT



FW Data & Gage 04183000 Duration Interval *1,900 square miles*

Maumee River at Landin Road
WQ Duration Curve *(2001-03 Monitoring Data)*
Site: MAU-LAN



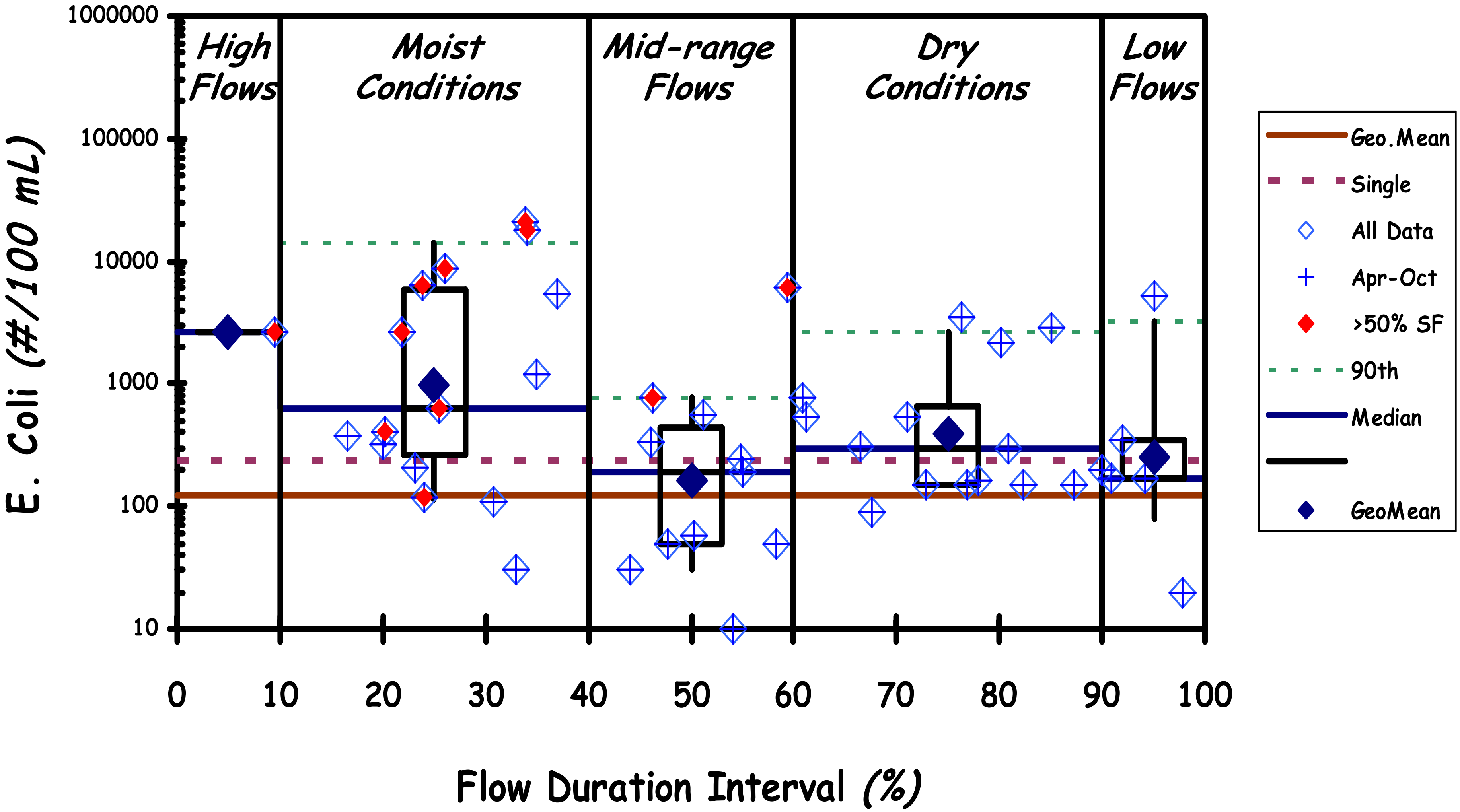
FW Data & Gage 04183000 Duration Interval

1,967 square miles

Maumee River at Landin Road

WQ Duration Curve *(1991 - 2000 Monitoring Data)*

Site: M-129



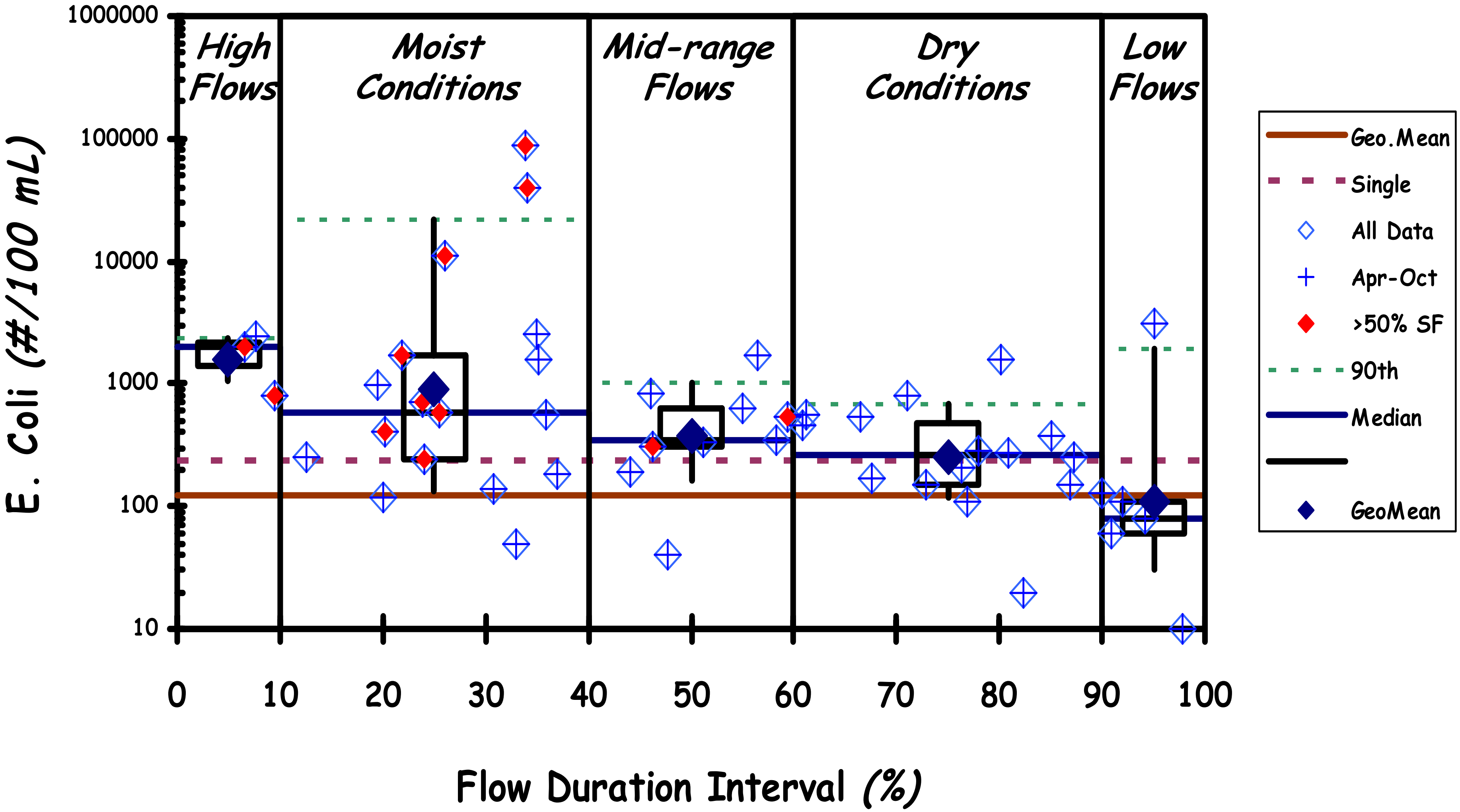
IDEM Data & Gage 04183000 Duration Interval

1,967 square miles

Maumee River near Woodburn

WQ Duration Curve *(1991 - 2000 Monitoring Data)*

Site: M-114



IDEM Data & Gage 04183000 Duration Interval

2,050 square miles

Attachment F

Load Duration Curves for Maumee River TMDL

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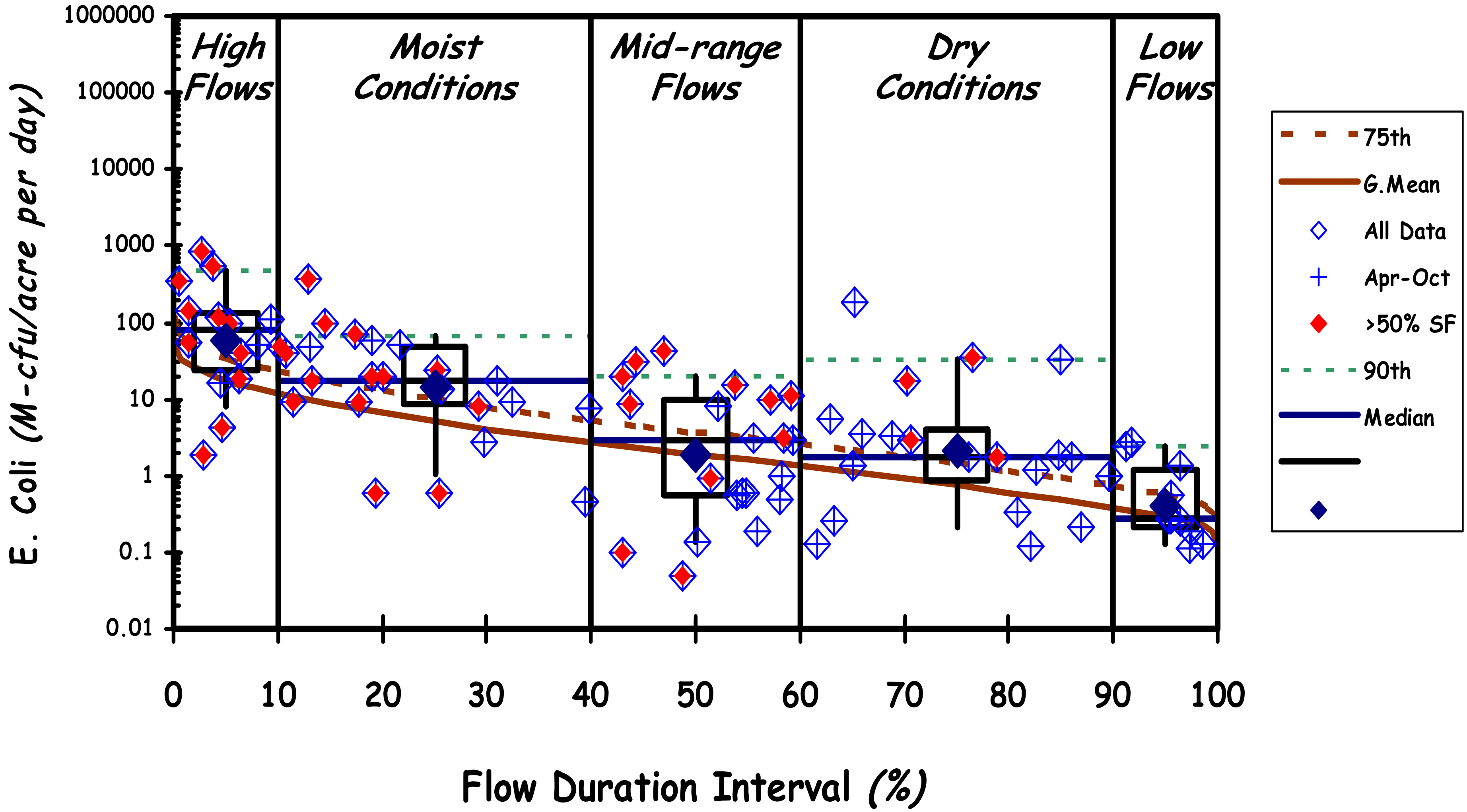
Maumee River at Anthony Boulevard

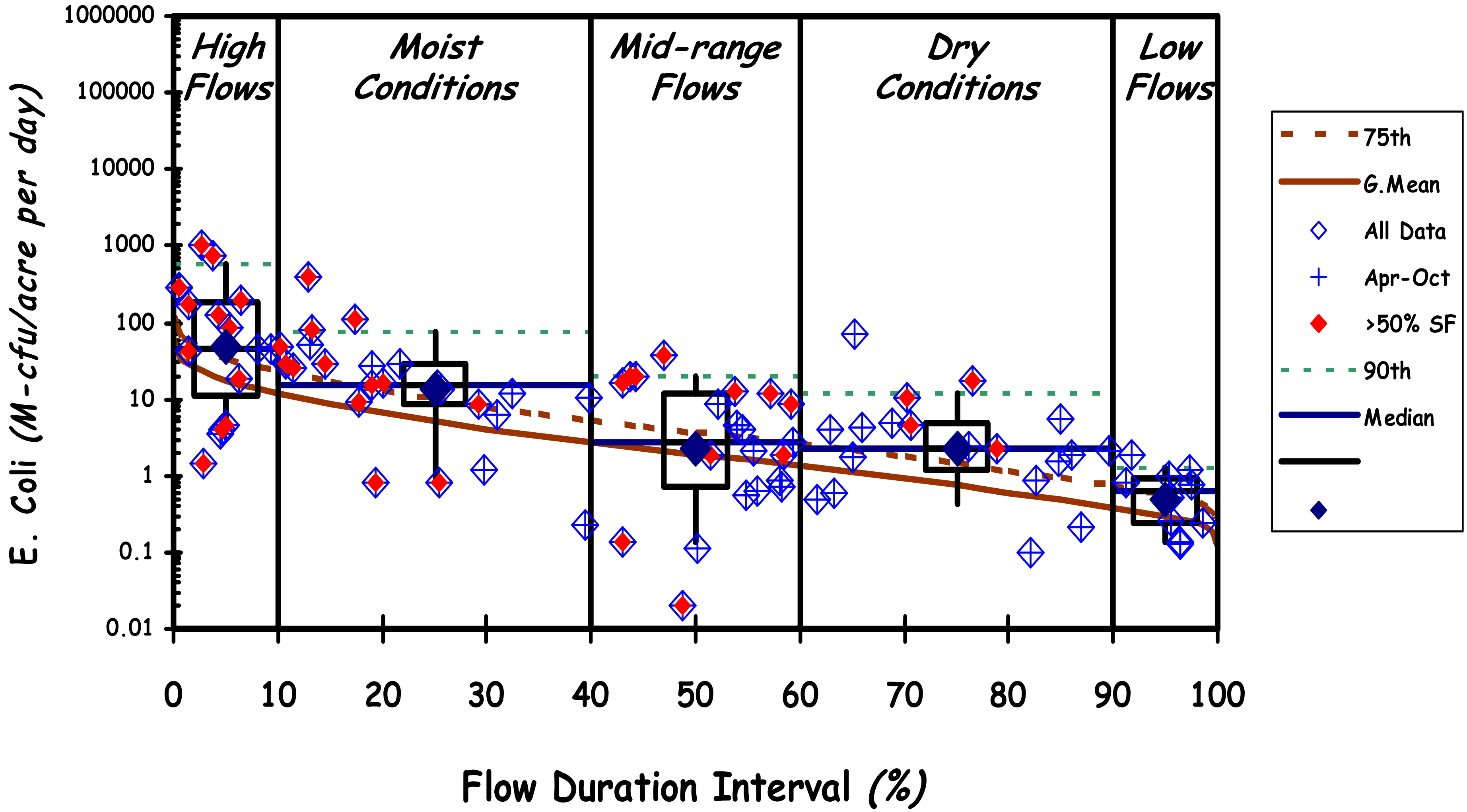
Load Duration Curve *(2001-03 Monitoring Data)*

Site: MAU-ANT



FW Data & Gage 04183000 Duration Interval *1,900 square miles*

Maumee River at Landin Road
Load Duration Curve *(2001-03 Monitoring Data)*
Site: MAU-LAN

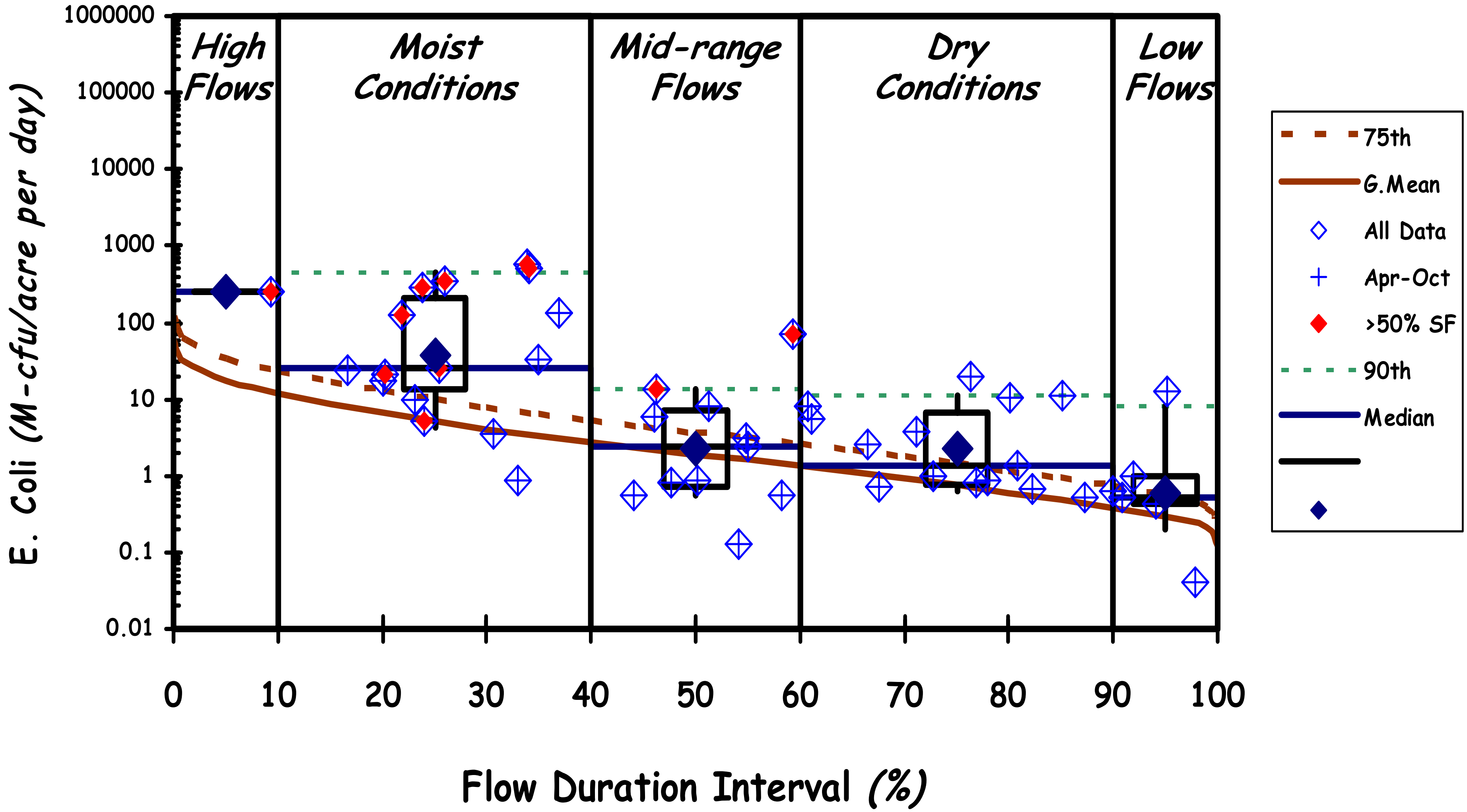


FW Data & Gage 04183000 Duration Interval *1,967 square miles*

Maumee River at Landin Road

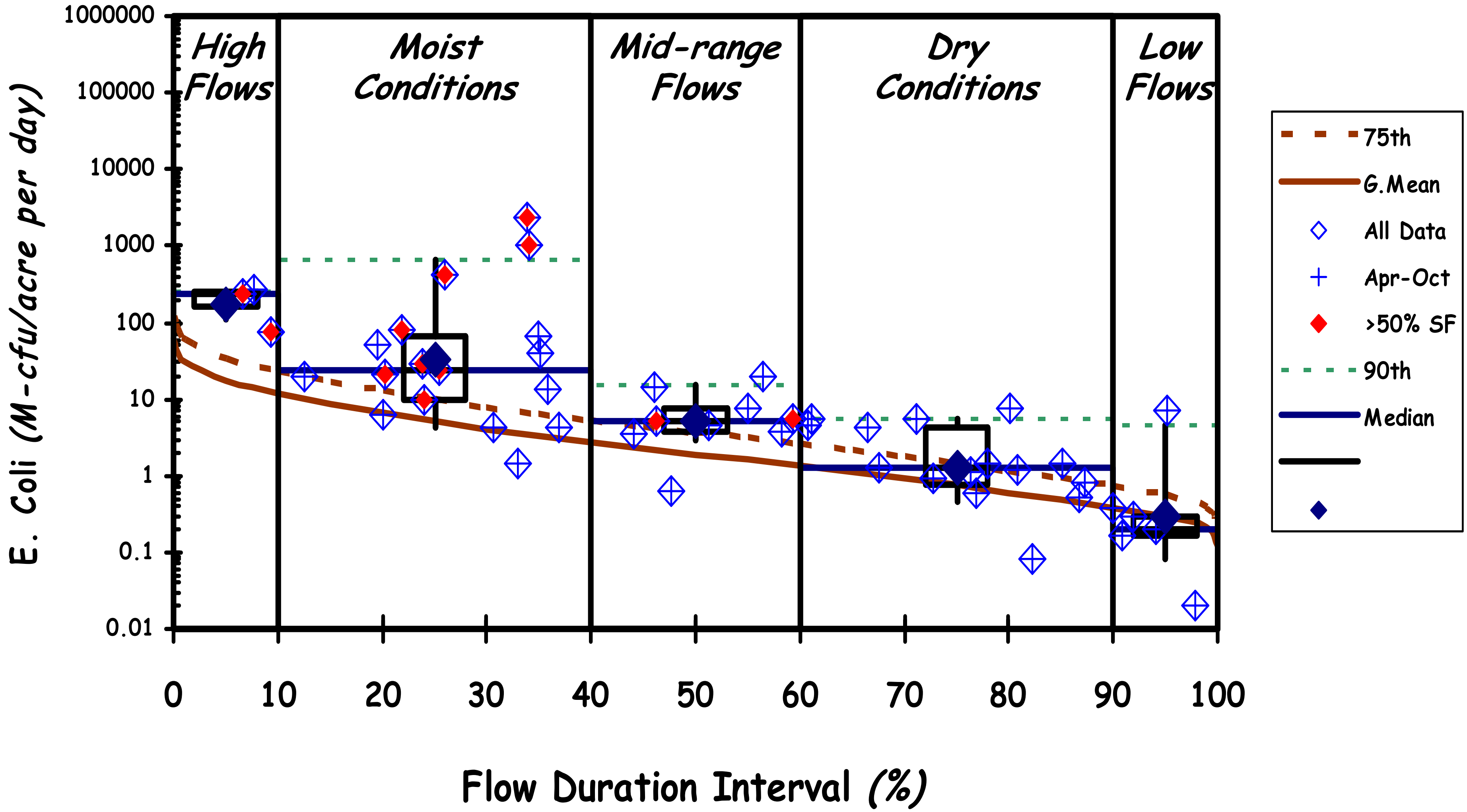
Load Duration Curve *(1991 - 2000 Monitoring Data)*

Site: M-129



IDEM Data & Gage 04183000 Duration Interval *1,967 square miles*

Maumee River near Woodburn
Load Duration Curve *(1991 - 2000 Monitoring Data)*
Site: M-114



IDEM Data & Gage 04183000 Duration Interval

2,050 square miles

Attachment G

Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watershed TMDL

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Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21366	04/06/04	MS/MSD	Nitrogen, Nitrate plus	3.96	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21385	04/20/04		Nitrogen, Nitrate plus	0.522	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21401	05/06/04		Nitrogen, Nitrate plus	6.99	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21418	05/19/04		Nitrogen, Nitrate plus	17.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21434	06/02/04		Nitrogen, Nitrate plus	13.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21452	06/16/04		Nitrogen, Nitrate plus	9.01	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21468	06/29/04	MS/MSD	Nitrogen, Nitrate plus	2.69	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21486	07/13/04		Nitrogen, Nitrate plus	2.13	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21502	07/27/04		Nitrogen, Nitrate plus	1.15	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21519	08/10/04		Nitrogen, Nitrate plus	1.56	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21537	08/25/04		Nitrogen, Nitrate plus	1.78	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21570	09/21/04		Nitrogen, Nitrate plus	1.05	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	ST 124, East of SR 101	AA20879	03/09/04		Nitrogen-Nitrate plus Nitrite	6.38	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21349	03/23/04		Nitrogen-Nitrate plus Nitrite	5.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	Salem Rd, South of CR	AA21554	9/8/2004		Nitrogen-Nitrate plus Nitrite	1.97	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21587	10/05/04		Nitrogen-Nitrate plus Nitrite	0.494	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	ST 124, East of SR 101	AA20879	03/09/04		Phosphorus	0.203	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21349	03/23/04		Phosphorus	0.15	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21366	04/06/04	MS/MSD	Phosphorus	0.058	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21385	04/20/04		Phosphorus	0.051	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21401	05/06/04		Phosphorus	0.182	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21418	05/19/04		Phosphorus	0.72	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21434	06/02/04		Phosphorus	0.215 (DJ)	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21452	06/16/04		Phosphorus	0.386	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21468	06/29/04	MS/MSD	Phosphorus	0.135	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21486	07/13/04		Phosphorus	0.404	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21502	07/27/04		Phosphorus	0.185	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21519	08/10/04		Phosphorus	0.11	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21537	08/25/04		Phosphorus	0.209	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	Salem Rd, South of CR	AA21554	9/8/2004		Phosphorus	0.282	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21570	09/21/04		Phosphorus	0.245	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21587	10/05/04		Phosphorus	0.51	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21349	03/23/04		Total Suspended	18.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21366	04/06/04	MS/MSD	Total Suspended	7.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21385	04/20/04		Total Suspended	7.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21401	05/06/04		Total Suspended	27.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21418	05/19/04		Total Suspended	692	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21434	06/02/04		Total Suspended	77.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21452	06/16/04		Total Suspended	69.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21468	06/29/04	MS/MSD	Total Suspended	12.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21486	07/13/04		Total Suspended	18.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21502	07/27/04		Total Suspended	45.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21519	08/10/04		Total Suspended	15.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21537	08/25/04		Total Suspended	11.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	Salem Rd, South of CR	AA21554	9/8/2004		Total Suspended	51.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21570	09/21/04		Total Suspended	12.7	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0009	SR 124, East of SR 101	AA21587	10/05/04		Total Suspended	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21367	04/06/04		Nitrogen, Nitrate plus	3.54	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21386	04/20/04	MS/MSD	Nitrogen, Nitrate plus	0.534	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21402	05/06/04	MS/MSD	Nitrogen, Nitrate plus	5.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21419	05/19/04		Nitrogen, Nitrate plus	28.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21435	06/02/04		Nitrogen, Nitrate plus	14.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21453	06/16/04		Nitrogen, Nitrate plus	10.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21469	06/29/04		Nitrogen, Nitrate plus	1.98	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21487	07/13/04		Nitrogen, Nitrate plus	0.801	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21503	07/27/04		Nitrogen, Nitrate plus	0.885	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21520	08/10/04		Nitrogen, Nitrate plus	0.652	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21538	08/25/04		Nitrogen, Nitrate plus	1.44	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21571	09/21/04		Nitrogen, Nitrate plus	0.917	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21336	03/09/04		Nitrogen-Nitrate plus Nitrite	6.64	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21337	03/09/04		Nitrogen-Nitrate plus Nitrite	6.65	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21350	03/23/04		Nitrogen-Nitrate plus Nitrite	6.11	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21553	9/8/2004		Nitrogen-Nitrate plus Nitrite	2.31	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	SR 124, East of SR 101	AA21553	9/8/2004		Nitrogen-Nitrate plus Nitrite	2.31	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21588	10/05/04		Nitrogen-Nitrate plus Nitrite	0.531	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21336	03/09/04		Phosphorus	0.201	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21337	03/09/04		Phosphorus	0.196	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21350	03/23/04		Phosphorus	0.055	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21367	04/06/04		Phosphorus	0.11	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21386	04/20/04	MS/MSD	Phosphorus	0.083	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21402	05/06/04	MS/MSD	Phosphorus	0.221	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21419	05/19/04		Phosphorus	1.03	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21435	06/02/04		Phosphorus	0.227 (DJ)	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21453	06/16/04		Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21469	06/29/04		Phosphorus	0.204	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21487	07/13/04		Phosphorus	0.518	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21503	07/27/04		Phosphorus	0.474	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21520	08/10/04		Phosphorus	0.114	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21538	08/25/04		Phosphorus	0.506	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21553	9/8/2004		Phosphorus	0.54	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	SR 124, East of SR 101	AA21553	9/8/2004		Phosphorus	0.54	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21571	09/21/04		Phosphorus	0.335	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21588	10/05/04		Phosphorus	0.27	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21336	03/09/04		Total Suspended	17.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21337	03/09/04		Total Suspended	18.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21350	03/23/04		Total Suspended	26	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21367	04/06/04		Total Suspended	12.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21386	04/20/04	MS/MSD	Total Suspended	10.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21402	05/06/04	MS/MSD	Total Suspended	26.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21419	05/19/04		Total Suspended	460	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21435	06/02/04		Total Suspended	55.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21453	06/16/04		Total Suspended	75.7	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21469	06/29/04		Total Suspended	22.7	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21487	07/13/04		Total Suspended	21.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21503	07/27/04		Total Suspended	21.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21520	08/10/04		Total Suspended	17.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21538	08/25/04		Total Suspended	10.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21553	9/8/2004		Total Suspended	63.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	SR 124, East of SR 101	AA21553	9/8/2004		Total Suspended	63.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd, South of CR	AA21571	09/21/04		Total Suspended	14.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0011	Salem Rd., South of CR	AA21588	10/05/04		Total Suspended	11	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21370	04/06/04		Nitrogen, Nitrate plus	3.95	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21371	04/06/04	Duplicate	Nitrogen, Nitrate plus	3.98	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21389	04/20/04		Nitrogen, Nitrate plus	0.666	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21405	05/06/04		Nitrogen, Nitrate plus	5.14	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21422	05/19/04		Nitrogen, Nitrate plus	36.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21438	06/02/04		Nitrogen, Nitrate plus	12.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21456	06/16/04		Nitrogen, Nitrate plus	8.25	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21472	06/29/04		Nitrogen, Nitrate plus	2.63	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21490	07/13/04		Nitrogen, Nitrate plus	0.0582	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21506	07/27/04	MS/MSD	Nitrogen, Nitrate plus	0.522	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21523	08/10/04		Nitrogen, Nitrate plus	0.387	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21541	08/25/04		Nitrogen, Nitrate plus	0.766	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21575	09/21/04		Nitrogen, Nitrate plus	0.611	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA20867	03/09/04		Nitrogen-Nitrate plus Nitrite	6.52	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21353	03/23/04		Nitrogen-Nitrate plus Nitrite	6.23	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21558	9/8/2004		Nitrogen-Nitrate plus Nitrite	2.81	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21592	10/05/04		Nitrogen-Nitrate plus Nitrite	0.593	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA20867	03/09/04		Phosphorus	0.186	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21353	03/23/04		Phosphorus	0.097	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21370	04/06/04		Phosphorus	0.085	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21371	04/06/04	Duplicate	Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21389	04/20/04		Phosphorus	0.116	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21405	05/06/04		Phosphorus	0.143	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21422	05/19/04		Phosphorus	0.373	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21438	06/02/04		Phosphorus	0.194 (DJ)	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21456	06/16/04		Phosphorus	0.437	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21472	06/29/04		Phosphorus	0.229	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21490	07/13/04		Phosphorus	0.534	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21506	07/27/04	MS/MSD	Phosphorus	0.662	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21523	08/10/04		Phosphorus	0.534	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21541	08/25/04		Phosphorus	0.571	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21558	9/8/2004		Phosphorus	0.409	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21575	09/21/04		Phosphorus	0.396	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21592	10/05/04		Phosphorus	0.512	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA20867	03/09/04		Total Suspended	10	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21353	03/23/04		Total Suspended	19.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21370	04/06/04		Total Suspended	6.9	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21371	04/06/04	Duplicate	Total Suspended	6.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21389	04/20/04		Total Suspended	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21405	05/06/04		Total Suspended	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21422	05/19/04		Total Suspended	139	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21438	06/02/04		Total Suspended	6.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21456	06/16/04		Total Suspended	43.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21472	06/29/04		Total Suspended	27.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21490	07/13/04		Total Suspended	62.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21506	07/27/04	MS/MSD	Total Suspended	8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21523	08/10/04		Total Suspended	14.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21541	08/25/04		Total Suspended	13.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21558	9/8/2004		Total Suspended	41.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21575	09/21/04		Total Suspended	14	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Blue Creek	LES040-0066	CR 300 S, E of CR 000	AA21592	10/05/04		Total Suspended	8.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 300 S, East of CR 200 E	AA21369	04/06/04		Nitrogen, Nitrate plus	3.37	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21388	04/20/04		Nitrogen, Nitrate plus	1.19	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21404	05/06/04		Nitrogen, Nitrate plus	4.61	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21421	05/19/04		Nitrogen, Nitrate plus	22.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21437	06/02/04		Nitrogen, Nitrate plus	9.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21455	06/16/04		Nitrogen, Nitrate plus	12.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21471	06/29/04		Nitrogen, Nitrate plus	1.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21489	07/13/04		Nitrogen, Nitrate plus	0.462	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21505	07/27/04		Nitrogen, Nitrate plus	1.32	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21522	08/10/04		Nitrogen, Nitrate plus	0.276	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21540	08/25/04		Nitrogen, Nitrate plus	0.787	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21574	09/21/04		Nitrogen, Nitrate plus	0.526	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR400 S, East of CR 200 E	AA20868	03/09/04		Nitrogen-Nitrate plus Nitrite	6.71	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21352	03/23/04		Nitrogen-Nitrate plus Nitrite	5.47	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21556	9/8/2004		Nitrogen-Nitrate plus Nitrite	1.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21557	9/8/2004	Duplicate	Nitrogen-Nitrate plus Nitrite	1.29	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21591	10/05/04		Nitrogen-Nitrate plus Nitrite	0.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR400 S, East of CR 200 E	AA20868	03/09/04		Phosphorus	0.224	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21352	03/23/04		Phosphorus	0.129	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 300 S, East of CR 200 E	AA21369	04/06/04		Phosphorus	0.133	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21388	04/20/04		Phosphorus	0.068	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21404	05/06/04		Phosphorus	0.262	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21421	05/19/04		Phosphorus	1.08	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21437	06/02/04		Phosphorus	0.398 (DJ)	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21455	06/16/04		Phosphorus	0.384	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21471	06/29/04		Phosphorus	0.253	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21489	07/13/04		Phosphorus	0.564	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21505	07/27/04		Phosphorus	0.588	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21522	08/10/04		Phosphorus	0.43	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21540	08/25/04		Phosphorus	0.453	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21556	9/8/2004		Phosphorus	0.826	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21557	9/8/2004	Duplicate	Phosphorus	0.565	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21574	09/21/04		Phosphorus	0.42	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21591	10/05/04		Phosphorus	0.314	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR400 S, East of CR 200 E	AA20868	03/09/04		Total Suspended	24.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21352	03/23/04		Total Suspended	17.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 300 S, East of CR 200 E	AA21369	04/06/04		Total Suspended	17.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21388	04/20/04		Total Suspended	14.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21404	05/06/04		Total Suspended	52.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21421	05/19/04		Total Suspended	157	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21437	06/02/04		Total Suspended	32.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21455	06/16/04		Total Suspended	66.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21471	06/29/04		Total Suspended	18.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21489	07/13/04		Total Suspended	13.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21505	07/27/04		Total Suspended	12.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21522	08/10/04		Total Suspended	12.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21540	08/25/04		Total Suspended	6.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21556	9/8/2004		Total Suspended	41.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21557	9/8/2004	Duplicate	Total Suspended	33.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21574	09/21/04		Total Suspended	26.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Gates Ditch	LES040-0023	CR 400 S, East of CR 200 E	AA21591	10/05/04		Total Suspended	23.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21372	04/06/04		Nitrogen, Nitrate plus	3.48	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21390	04/20/04		Nitrogen, Nitrate plus	1.93	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21406	05/06/04		Nitrogen, Nitrate plus	3.83	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21423	05/19/04		Nitrogen, Nitrate plus	20.1	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21439	06/02/04		Nitrogen, Nitrate plus	9.56	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21457	06/16/04		Nitrogen, Nitrate plus	7.02	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21473	06/29/04		Nitrogen, Nitrate plus	1.14	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21491	07/13/04		Nitrogen, Nitrate plus	0.0624	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21507	07/27/04		Nitrogen, Nitrate plus	1.65	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21524	08/10/04		Nitrogen, Nitrate plus	0.695	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21542	08/25/04		Nitrogen, Nitrate plus	0.86	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21576	09/21/04		Nitrogen, Nitrate plus	0.969	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21338	03/09/04		Nitrogen-Nitrate plus Nitrite	4.92	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21354	03/23/04		Nitrogen-Nitrate plus Nitrite	5.37	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21356	03/23/04		Nitrogen-Nitrate plus Nitrite	5.69	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21559	9/8/2004		Nitrogen-Nitrate plus Nitrite	2.38	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21593	10/05/04		Nitrogen-Nitrate plus Nitrite	0.287	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21338	03/09/04		Phosphorus	0.19	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21354	03/23/04		Phosphorus	0.091	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21356	03/23/04		Phosphorus	0.121	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21372	04/06/04		Phosphorus	0.11	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21390	04/20/04		Phosphorus	0.072	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21406	05/06/04		Phosphorus	0.384	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21423	05/19/04		Phosphorus	0.706	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21439	06/02/04		Phosphorus	0.458 (DJ)	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21457	06/16/04		Phosphorus	0.178	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21473	06/29/04		Phosphorus	0.29	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21491	07/13/04		Phosphorus	1.17	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21507	07/27/04		Phosphorus	0.527	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21524	08/10/04		Phosphorus	0.754	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21542	08/25/04		Phosphorus	0.449	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21559	9/8/2004		Phosphorus	0.477	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21576	09/21/04		Phosphorus	0.264	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21593	10/05/04		Phosphorus	0.221	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21338	03/09/04		Total Suspended	17.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21354	03/23/04		Total Suspended	11.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21356	03/23/04		Total Suspended	10.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21372	04/06/04		Total Suspended	29.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21390	04/20/04		Total Suspended	6.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21406	05/06/04		Total Suspended	9.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21423	05/19/04		Total Suspended	94.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21439	06/02/04		Total Suspended	19.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21457	06/16/04		Total Suspended	48.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21473	06/29/04		Total Suspended	22.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21491	07/13/04		Total Suspended	26.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21507	07/27/04		Total Suspended	26.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21524	08/10/04		Total Suspended	26.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21542	08/25/04		Total Suspended	10.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21559	9/8/2004		Total Suspended	19.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21576	09/21/04		Total Suspended	13.4	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Habegger Ditch	LES040-0099	CR 150 E at CR 500 S	AA21593	10/05/04		Total Suspended	14.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21368	04/06/04		Nitrogen, Nitrate plus	4.33	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21387	04/20/04		Nitrogen, Nitrate plus	2.39	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21403	05/06/04		Nitrogen, Nitrate plus	7.45	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21420	05/19/04		Nitrogen, Nitrate plus	15.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21436	06/02/04		Nitrogen, Nitrate plus	11.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21441	06/02/04	Duplicate	Nitrogen, Nitrate plus	11.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21454	06/16/04		Nitrogen, Nitrate plus	5.75	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21470	06/29/04		Nitrogen, Nitrate plus	3.98	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21488	07/13/04		Nitrogen, Nitrate plus	3.05	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21504	07/27/04		Nitrogen, Nitrate plus	2.09	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21521	08/10/04		Nitrogen, Nitrate plus	1.05	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21539	08/25/04		Nitrogen, Nitrate plus	1.36	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21572	09/21/04		Nitrogen, Nitrate plus	0.767	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21573	09/21/04	Duplicate	Nitrogen, Nitrate plus	0.741	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA20870	03/09/04		Nitrogen-Nitrate plus Nitrite	6.31	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21351	03/23/04		Nitrogen-Nitrate plus Nitrite	5.68	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21555	9/8/2004		Nitrogen-Nitrate plus Nitrite	1.56	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21589	10/05/04		Nitrogen-Nitrate plus Nitrite	0.0807	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21590	10/05/04		Nitrogen-Nitrate plus Nitrite	0.0941	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA20870	03/09/04		Phosphorus	0.125	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21351	03/23/04		Phosphorus	0.097	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21368	04/06/04		Phosphorus	0.055	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21387	04/20/04		Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21403	05/06/04		Phosphorus	0.05	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21420	05/19/04		Phosphorus	1.05	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21436	06/02/04		Phosphorus	0.122 (DJ)	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21441	06/02/04	Duplicate	Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21454	06/16/04		Phosphorus	0.242	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21470	06/29/04		Phosphorus	0.088	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21488	07/13/04		Phosphorus	0.314	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21504	07/27/04		Phosphorus	0.207	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21521	08/10/04		Phosphorus	0.088	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21539	08/25/04		Phosphorus	0.171	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21555	9/8/2004		Phosphorus	0.302	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21572	09/21/04		Phosphorus	0.192	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21573	09/21/04	Duplicate	Phosphorus	0.16	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21589	10/05/04		Phosphorus	0.053	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21590	10/05/04		Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA20870	03/09/04		Total Suspended	18	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21351	03/23/04		Total Suspended	8.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21368	04/06/04		Total Suspended	12.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21387	04/20/04		Total Suspended	46.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21403	05/06/04		Total Suspended	17.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21420	05/19/04		Total Suspended	183	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21436	06/02/04		Total Suspended	95	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21441	06/02/04	Duplicate	Total Suspended	96.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21454	06/16/04		Total Suspended	49.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21470	06/29/04		Total Suspended	12.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21488	07/13/04		Total Suspended	17.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21504	07/27/04		Total Suspended	18.3	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21521	08/10/04		Total Suspended	18.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21539	08/25/04		Total Suspended	16	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21555	9/8/2004		Total Suspended	18.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21572	09/21/04		Total Suspended	24	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21573	09/21/04	Duplicate	Total Suspended	23.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21589	10/05/04		Total Suspended	15.9	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Little Blue Creek	LES040-0010	CR 400 S (17 S Rd), West of	AA21590	10/05/04		Total Suspended	12.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21363	04/05/04		Nitrogen, Nitrate plus	2.62	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21381	04/19/04		Nitrogen, Nitrate plus	0.653	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21398	05/05/04		Nitrogen, Nitrate plus	4.81	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21415	05/18/04	MS/MSD	Nitrogen, Nitrate plus	3.85	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21431	06/01/04		Nitrogen, Nitrate plus	14.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21448	06/15/04		Nitrogen, Nitrate plus	6.04	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21465	06/28/04		Nitrogen, Nitrate plus	2.15	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21482	07/12/04		Nitrogen, Nitrate plus	0.606	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21483	07/12/04		Nitrogen, Nitrate plus	0.615	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21499	07/26/04		Nitrogen, Nitrate plus	1.55	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21509	07/26/04	Duplicate	Nitrogen, Nitrate plus	1.58	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21516	08/09/04		Nitrogen, Nitrate plus	0.787	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21534	08/24/04		Nitrogen, Nitrate plus	1.13	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21567	09/20/04		Nitrogen, Nitrate plus	0.388	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Road	AA20871	03/09/04		Nitrogen-Nitrate plus Nitrite	4.34	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21346	03/22/04		Nitrogen-Nitrate plus Nitrite	4.11	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21550	9/7/2004		Nitrogen-Nitrate plus Nitrite	1.34	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21584	10/04/04		Nitrogen-Nitrate plus Nitrite	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Road	AA20871	03/09/04		Phosphorus	0.173	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21346	03/22/04		Phosphorus	0.085	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21363	04/05/04		Phosphorus	0.051	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21381	04/19/04		Phosphorus	0.074	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21398	05/05/04		Phosphorus	0.087	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21415	05/18/04	MS/MSD	Phosphorus	0.509	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21431	06/01/04		Phosphorus	0.112 (DJ)	mg/L	Adams	Estimated
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21448	06/15/04		Phosphorus	0.334	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21465	06/28/04		Phosphorus	0.212	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21482	07/12/04		Phosphorus	0.255	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21483	07/12/04		Phosphorus	0.244	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21499	07/26/04		Phosphorus	0.529	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21509	07/26/04	Duplicate	Phosphorus	0.561	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21516	08/09/04		Phosphorus	0.249	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21534	08/24/04		Phosphorus	0.28	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21550	9/7/2004		Phosphorus	0.474	mg/L	Adams	

Attachment G: Nutrient and TSS Data for Blue Creek/Habegger and Yellow Creek Watersheds

Agency Name	Project ID	Stream Name	Lsite	Description	Sample Number	Sample Date	Sample Type	Parameter	Lab Result	Units	County	Action
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21567	09/20/04		Phosphorus	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21584	10/04/04		Phosphorus	0.221	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Road	AA20871	03/09/04		Total Suspended	24.7	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21346	03/22/04		Total Suspended	11.5	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21363	04/05/04		Total Suspended	ND	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21381	04/19/04		Total Suspended	4.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21398	05/05/04		Total Suspended	4.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21415	05/18/04	MS/MSD	Total Suspended	476	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21431	06/01/04		Total Suspended	32.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21448	06/15/04		Total Suspended	79.4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21465	06/28/04		Total Suspended	10.2	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21482	07/12/04		Total Suspended	17	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21483	07/12/04		Total Suspended	15.6	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21499	07/26/04		Total Suspended	5.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21509	07/26/04	Duplicate	Total Suspended	20.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21516	08/09/04		Total Suspended	21.1	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21534	08/24/04		Total Suspended	7.8	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21550	9/7/2004		Total Suspended	206	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N, East of Salem Rd	AA21567	09/20/04		Total Suspended	4	mg/L	Adams	
IDEM	2004 St. Marys Watershed	Yellow Creek	LES040-0038	CR 250 N East of Salem Rd	AA21584	10/04/04		Total Suspended	4.2	mg/L	Adams	

Attachment H

Water Quality Duration Curves for Blue Creek/Habegger and Yellow Creek Watershed TMDL

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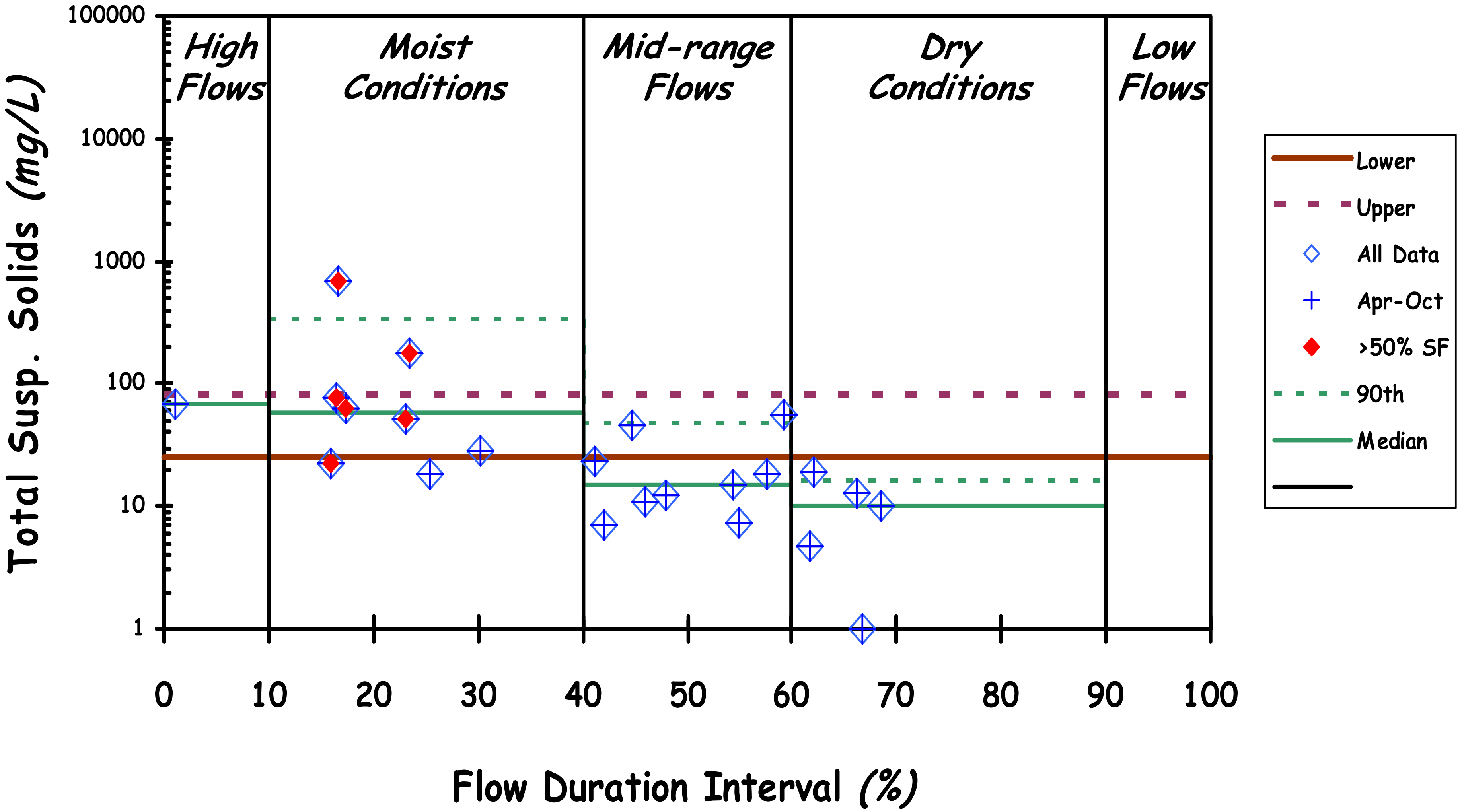
Blue Creek -- SR 124

WQ Duration Curve *(2004 Monitoring Data)*

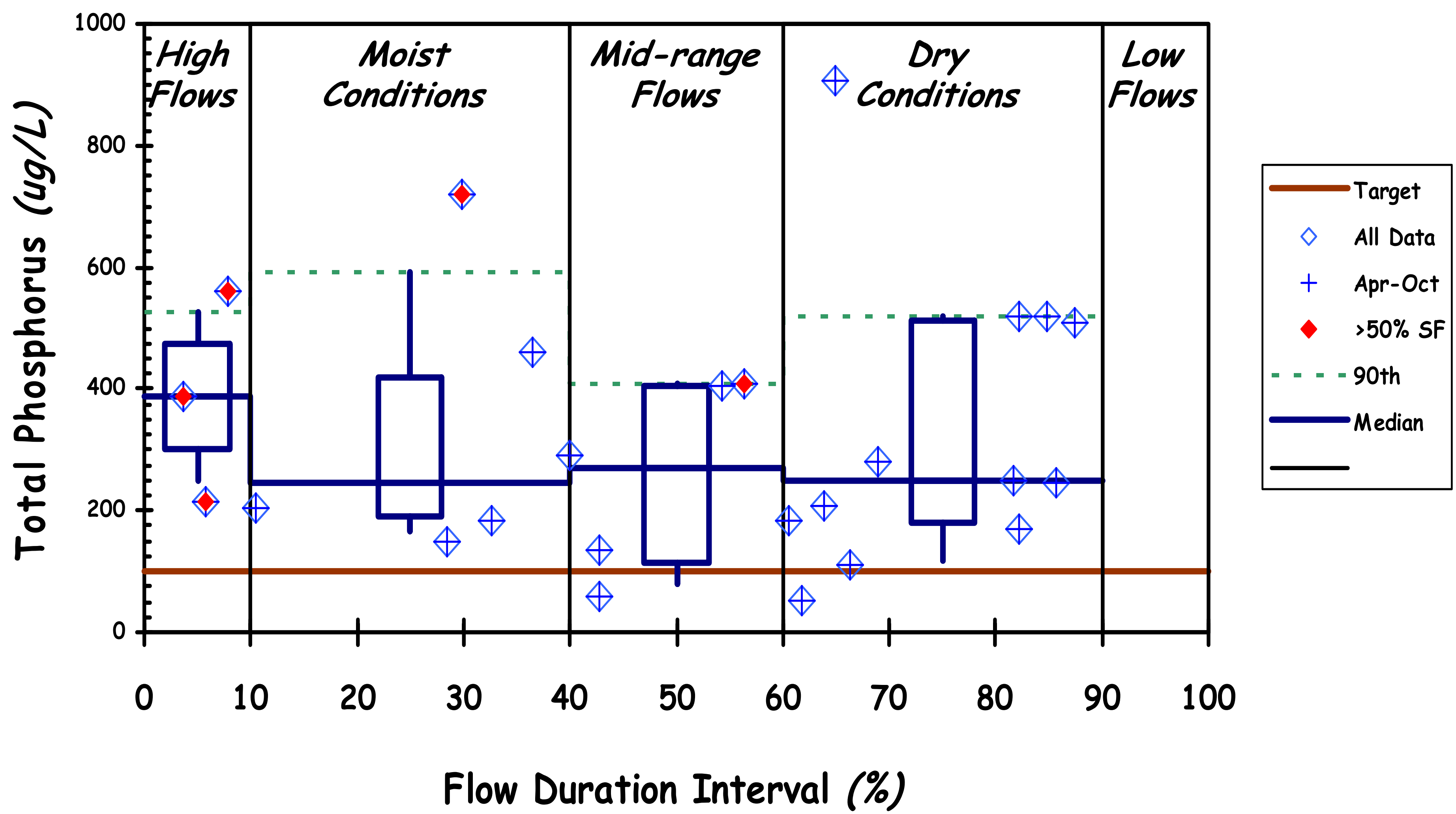
Site: LES040-0009



IDEM & FW WQ Data -- Decatur Gage Duration Interval

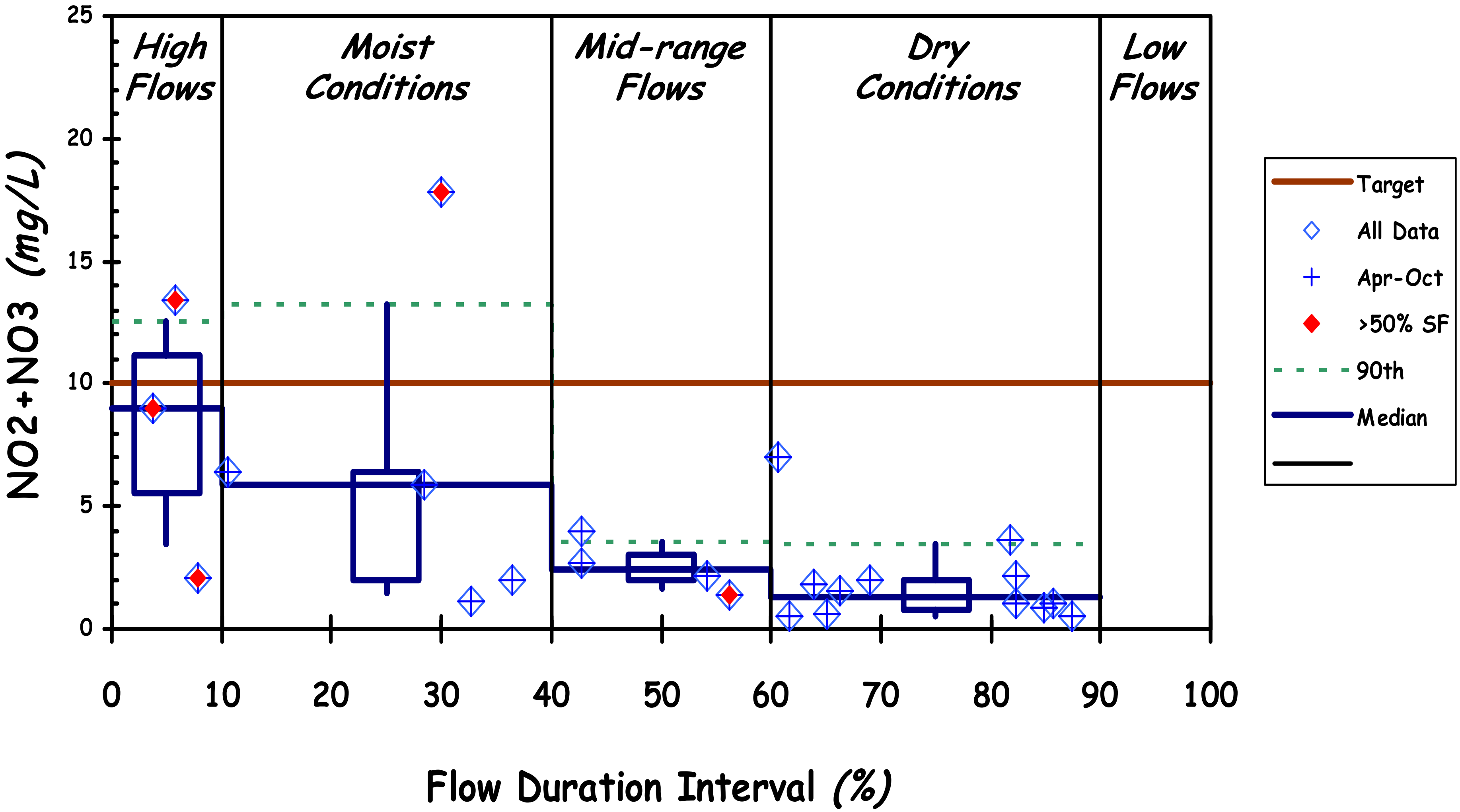
--- square miles

Blue Creek -- SR 124
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0009



*IDEM+FW Data & Gage 04180000** Duration Interval* *79.6 square miles*

Blue Creek -- SR 124
WQ Duration Curve *(2004 Monitoring Data)*
Site: LES040-0009



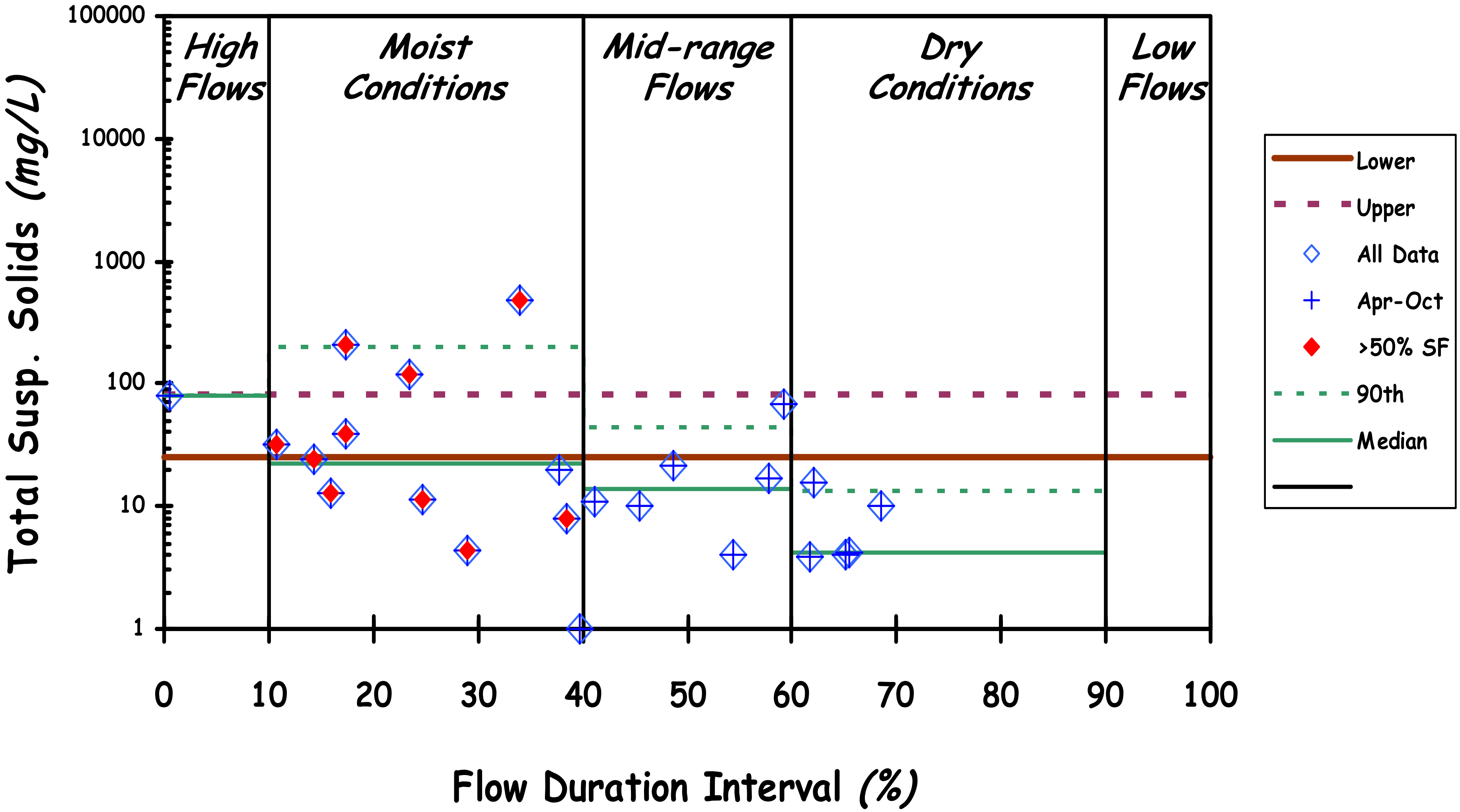
*IDEM+FW Data & Gage 04180000** Duration Interval*

79.6 square miles

Yellow Creek -- CR 250 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



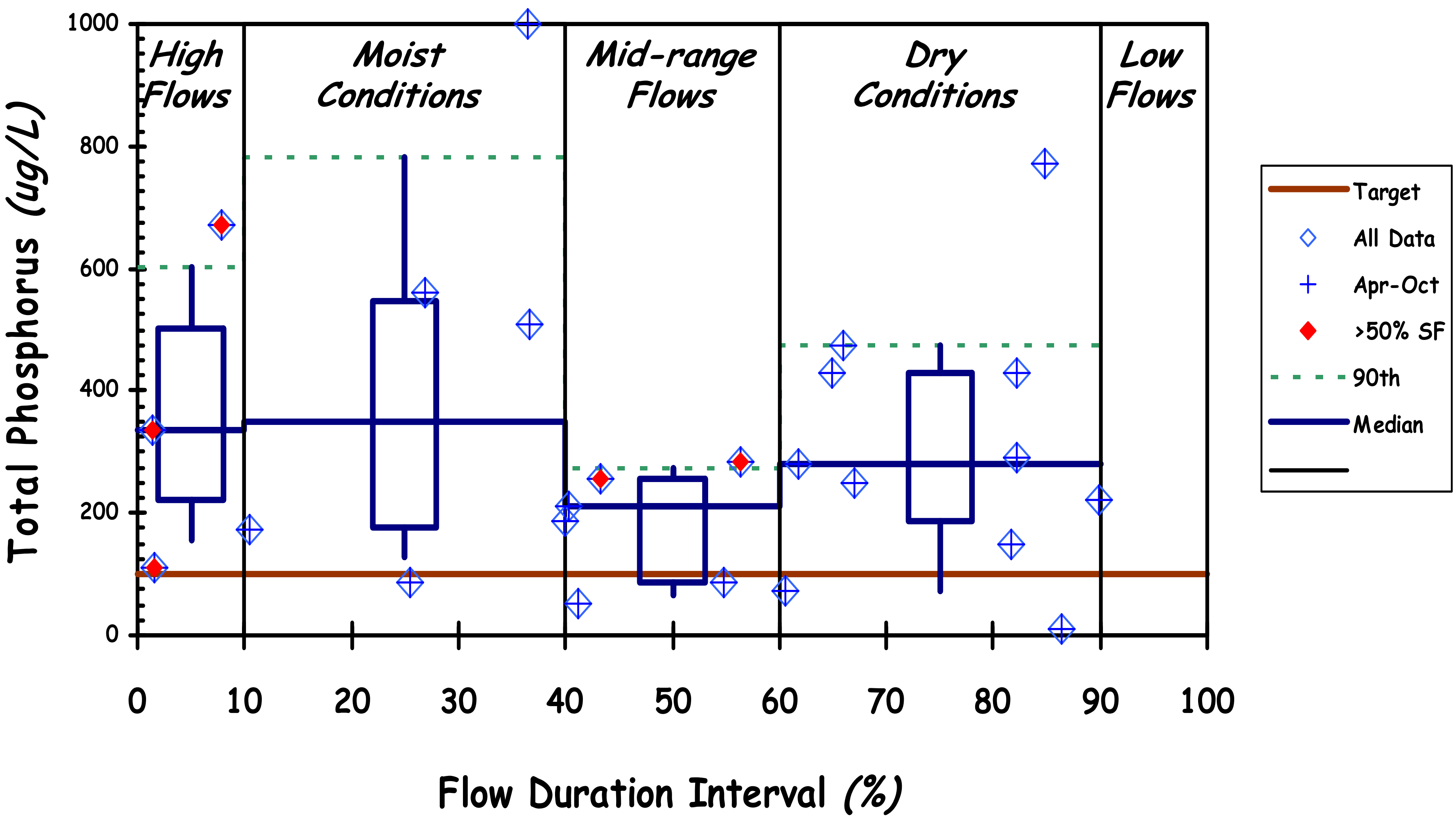
IDEM & FW WQ Data -- Decatur Gage Duration Interval

--- square miles

Yellow Creek -- CR 250 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038

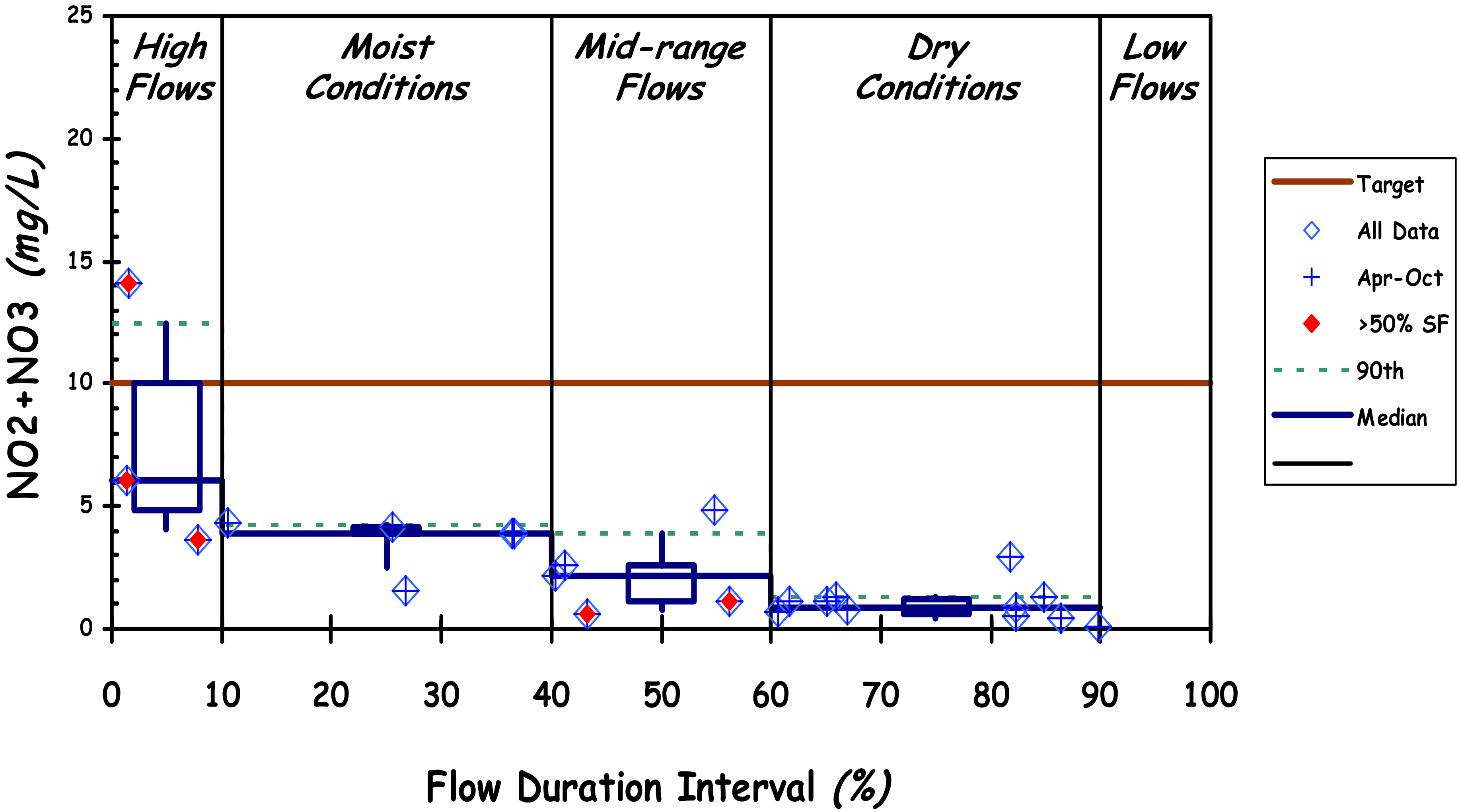


*IDEM+FW Data & Gage 04180000** Duration Interval* *24.5 square miles*

Yellow Creek -- CR 250 S

WQ Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



*IDEM+FW Data & Gage 04180000** Duration Interval* *24.5 square miles*

Attachment I

Load Duration Curves for Blue Creek/Habegger and Yellow Creek Watershed TMDL

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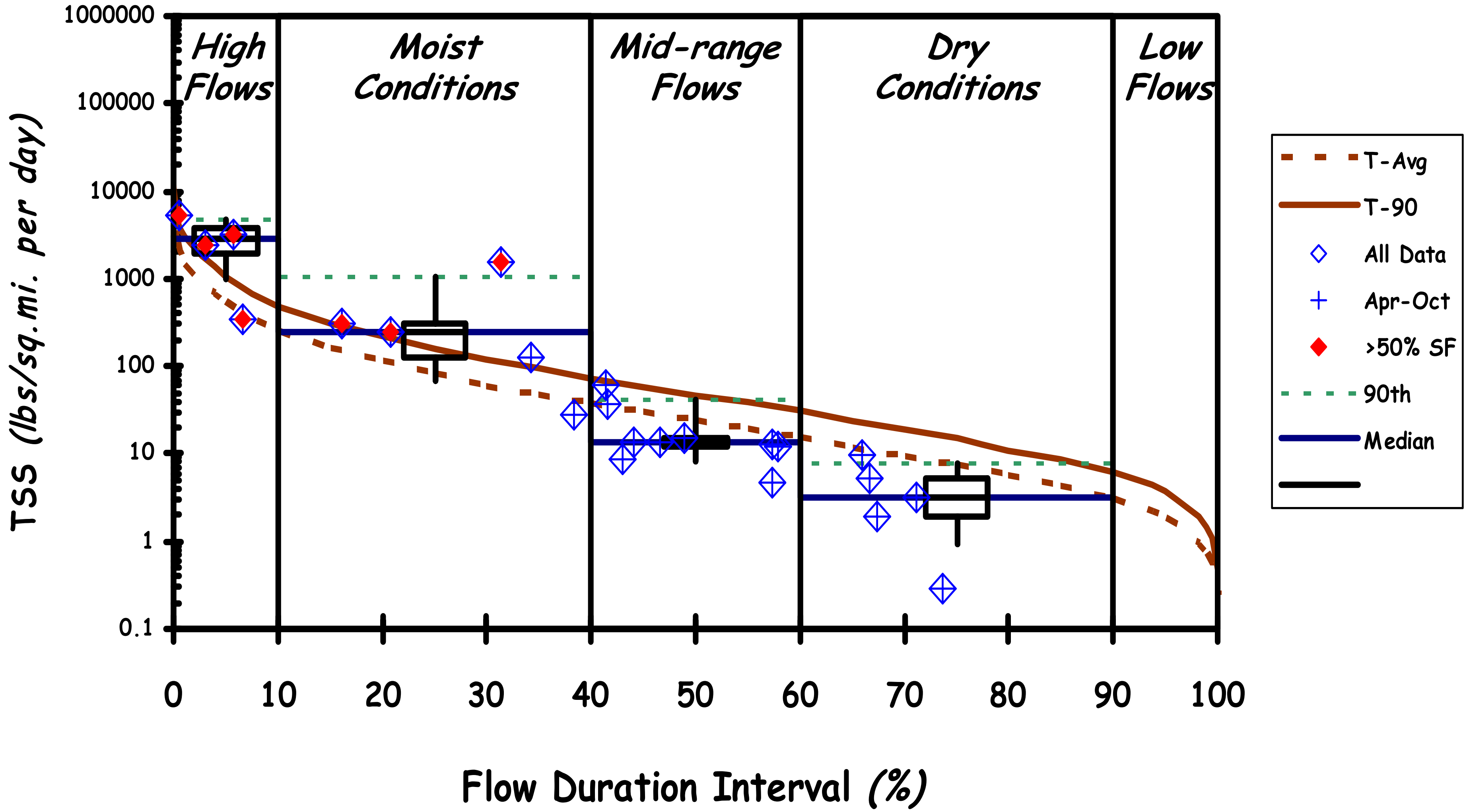
Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

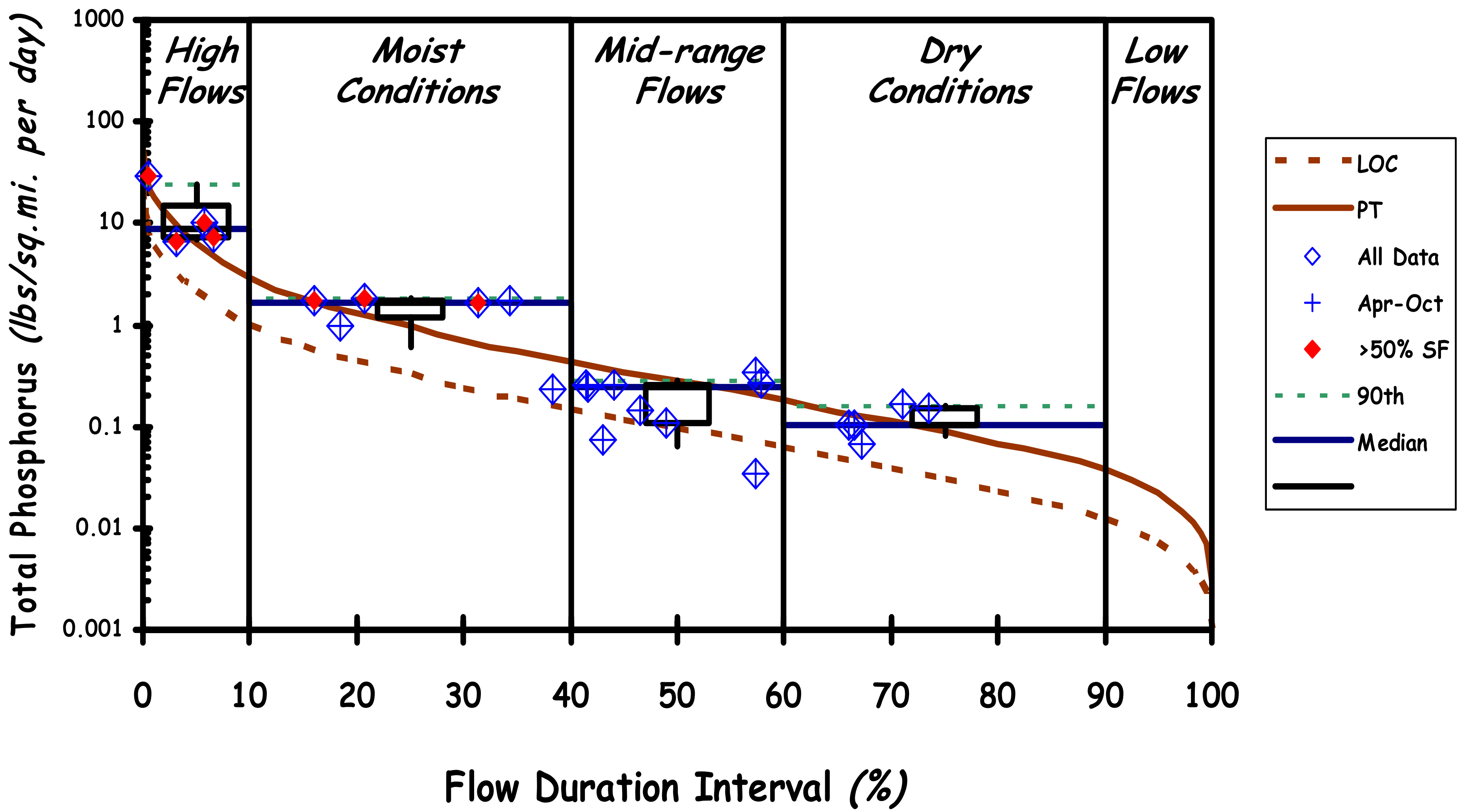


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

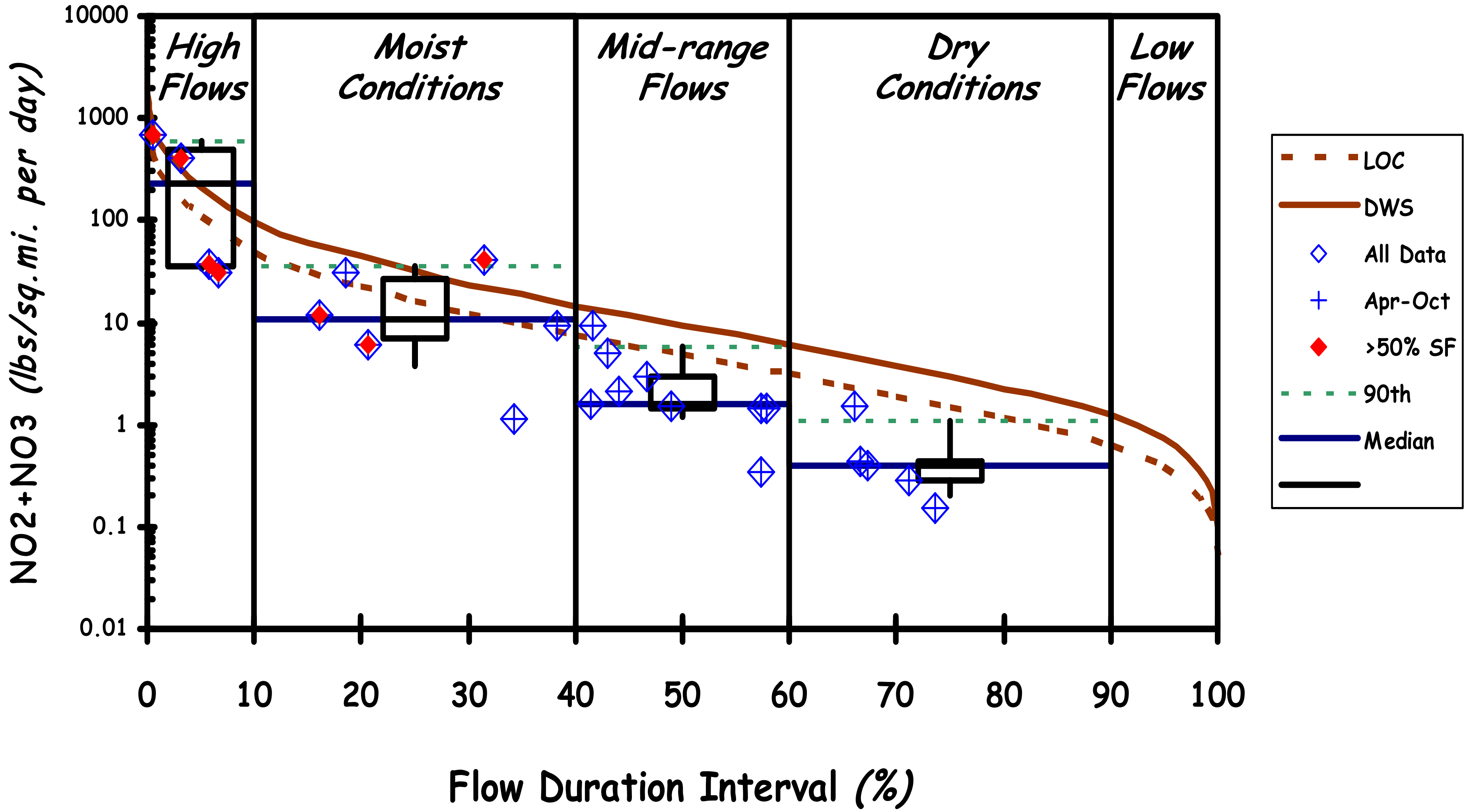


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

Blue Creek -- SR 124

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0009

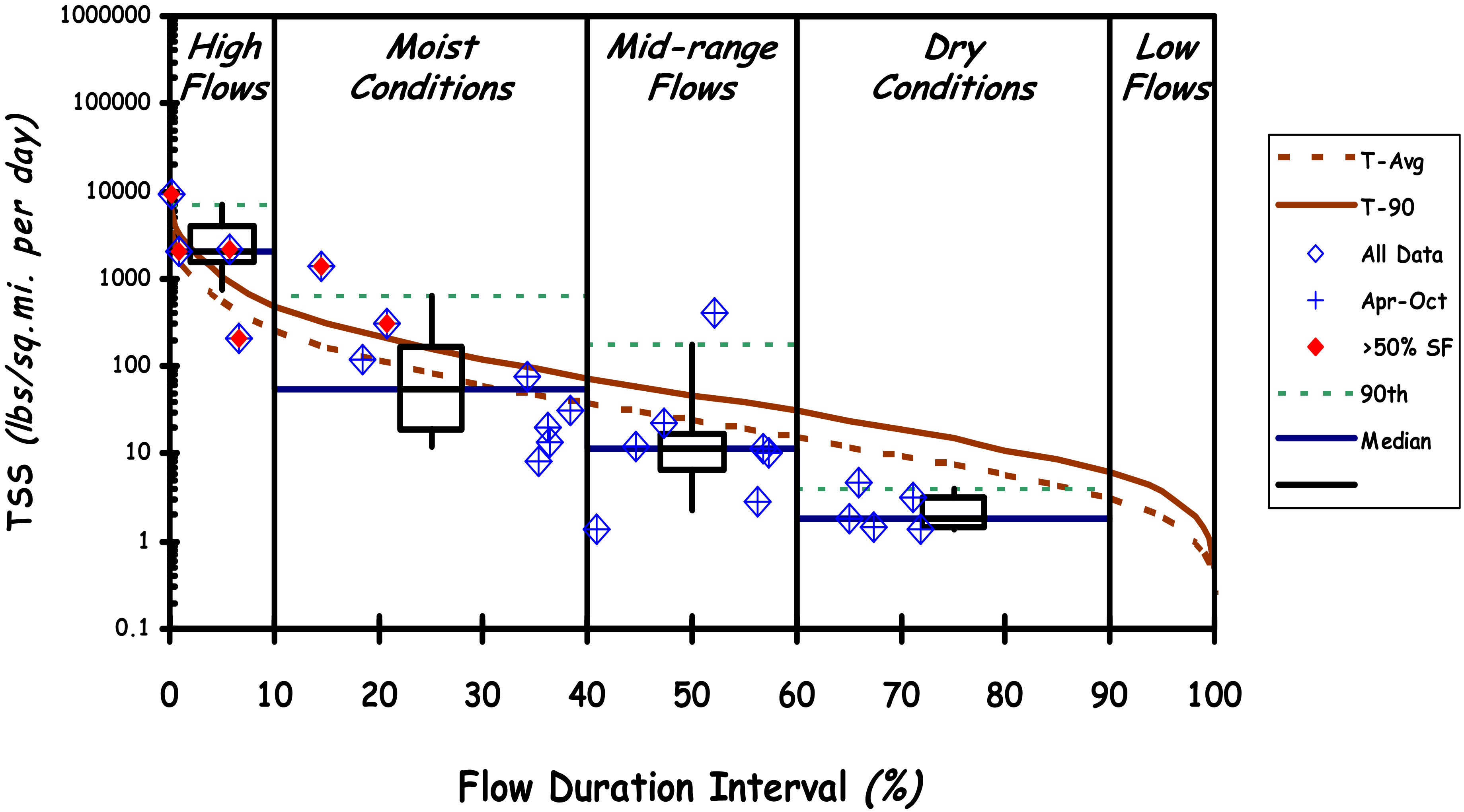


IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *79.6 square miles*

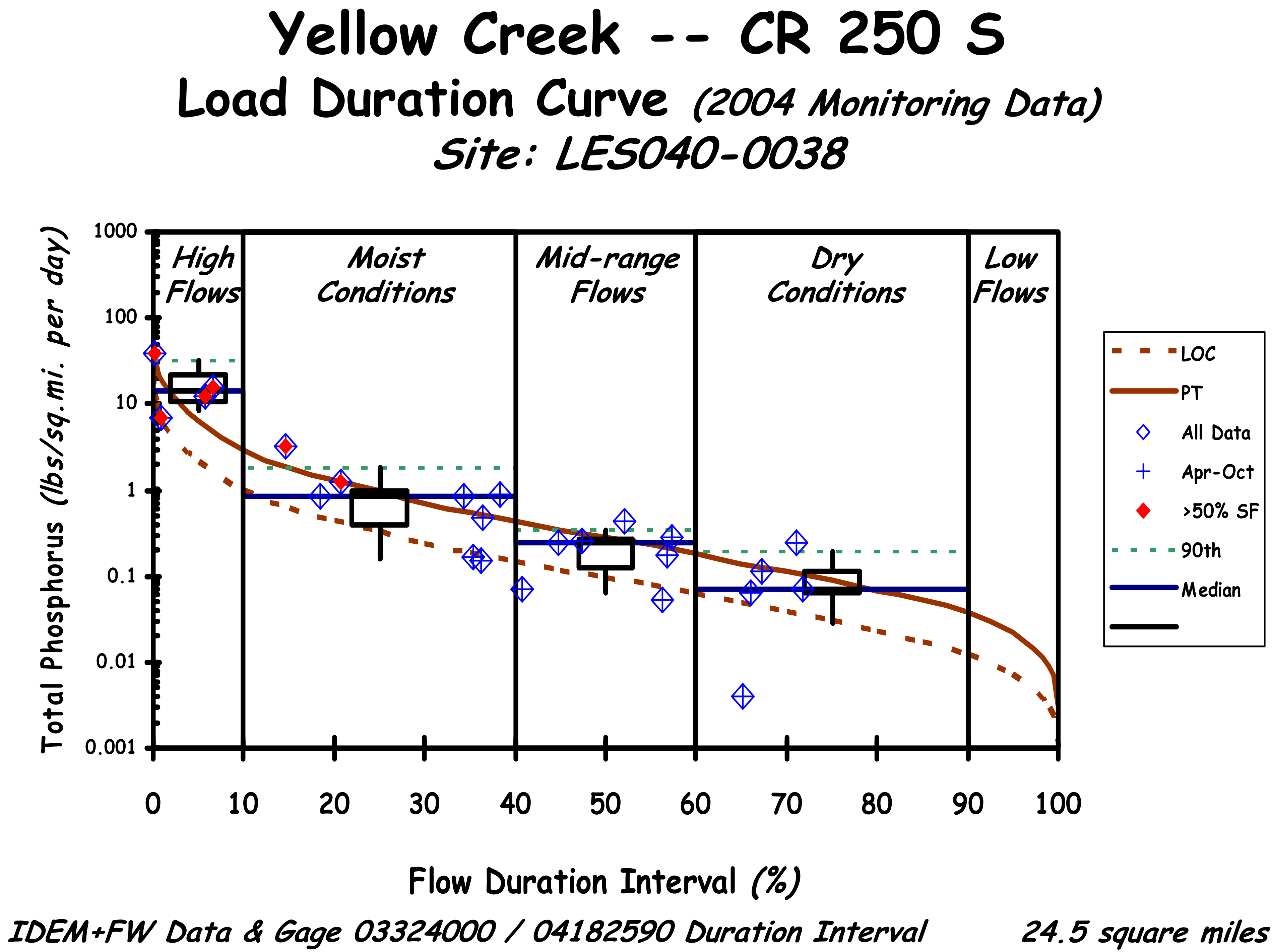
Yellow Creek -- CR 250 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

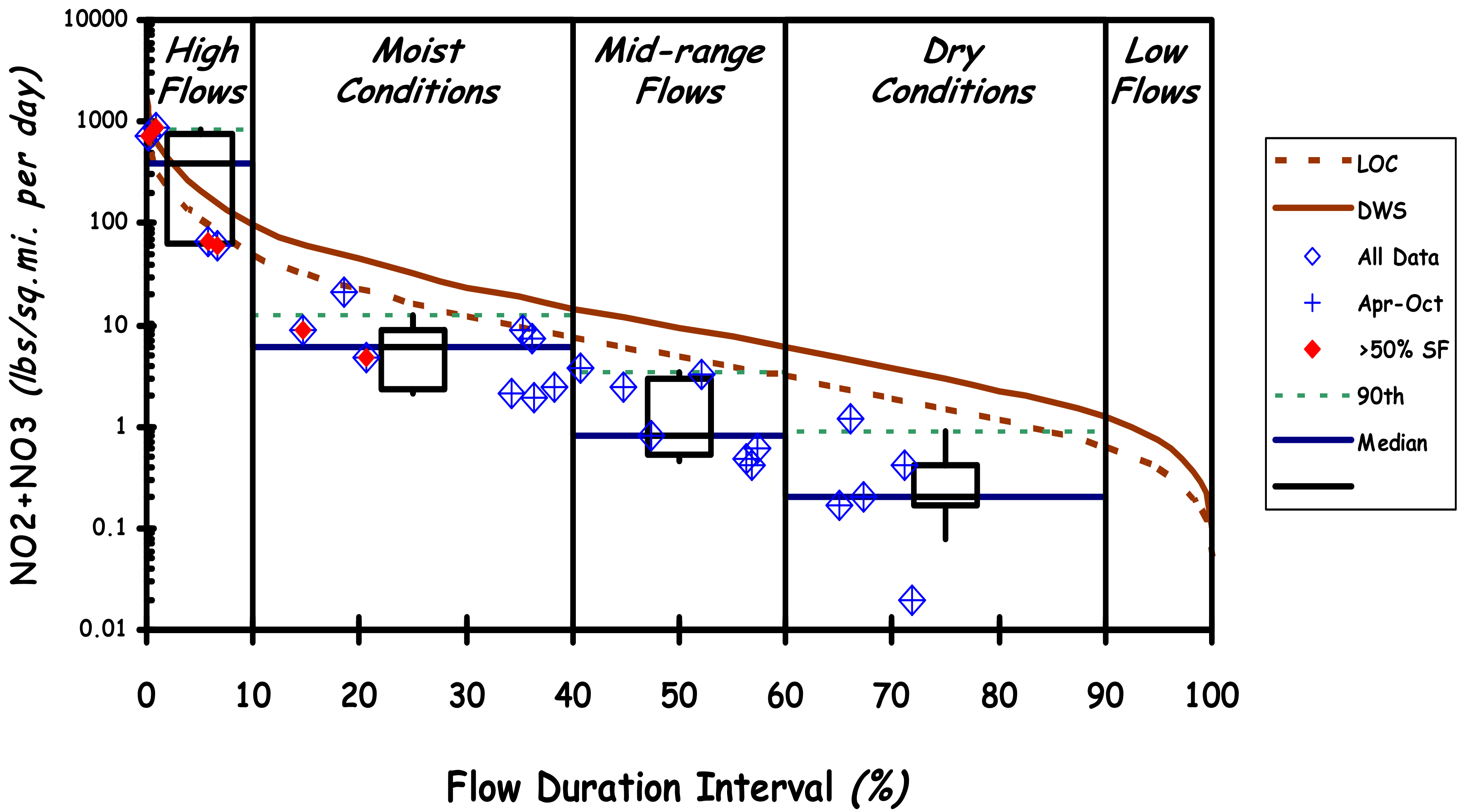


Yellow Creek -- CR 250 S
Load Duration Curve (2004 Monitoring Data)
Site: LES040-0038
Total Phosphorus (lbs/sq.mi. per day)
1000
100
10
1
0.1
0.01
0.001
High Flows
Moist Conditions
Mid-range Flows
Dry Conditions
Low Flows
0
10
20
30
40
50
60
70
80
90
100
LOC
PT
All Data
Apr-Oct
>50% SF
90th
Median
Flow Duration Interval (%)
IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval
24.5 square miles

Yellow Creek -- CR 250 S

Load Duration Curve *(2004 Monitoring Data)*

Site: LES040-0038



IDEM+FW Data & Gage 03324000 / 04182590 Duration Interval *24.5 square miles*

CCC	Habegger				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	7.9	14.96	0.368	1.5446	-1.18
9/19/2007	7.47	18.19	0.1	2.0987	-2.00
9/26/2007	7.56	21.17	0.75	1.9275	-1.18
10/3/2007	7.72	17.78	3.05	2.0348	**1.02**
10/10/2007	7.76	13.75	0.886	1.9485	-1.06
10/17/2007	7.41	15.23	0.908	2.1244	-1.22
10/24/2007	7.65	12.68	0.279	2.1735	-1.89
10/31/2007	7.76	7.21	2.53	2.0491	**0.48**
11/7/2007	8.09	4.21	0.517	1.1509	-0.63
11/14/2007	7.67	12.09	0.203	2.1837	-1.98
11/21/2007	7.39	12.2	0.342	2.1659	-1.82
11/28/2007	7.27	4.12	0.187	2.3425	-2.16
12/12/2007	7.23	2.69	0.1	2.3851	-2.29
12/26/2007	8.02	0.81	0.172	1.4052	-1.23
1/16/2008	7.4	0.19	0.234	2.4729	-2.24
2/20/2008	7.59	0.04	0.187	2.4827	-2.30
3/5/2008	7.98	1.2	0.242	1.515	-1.27
3/19/2008	7.76	5.16	0.275	2.0935	-1.82
4/2/2008	8.11	8.13	0.188	1.0608	-0.87
4/9/2008	7.37	10.96	0.101	2.1862	-2.09
4/16/2008	7.73	7.36	0.1	2.144	-2.04
4/23/2008	7.71	15.54	0.554	2.0837	-1.53
4/30/2008	7.54	7.95	15	2.2528	**12.75**
5/7/2008	7.38	15.49	0.494	2.1197	-1.63
5/14/2008	7.23	13.03	1.09	2.1472	-1.06
5/21/2008	7.76	10.85	0.216	1.9858	-1.77
5/28/2008	7.79	11.69	0.26	1.8827	-1.62
6/4/2008	7.38	18.27	2.39	2.092	**0.30**
6/18/2008	7.87	18.09	0.172	1.6071	-1.44
6/25/2008	7.69	20.4	5.67	2.0517	**3.62**
7/2/2008	7.79	19.85	0.582	1.8198	-1.24

CCC	Gates				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007	7.4	15.82	0.304	2.117	-1.81
9/19/2007	7.68	18.5	0.1	2.1169	-2.02
9/26/2007	7.54	21.36	1.03	1.8997	-0.87
10/3/2007	8.25	17.99	0.14	0.7553	-0.62
10/10/2007	7.78	14.69	0.1	1.8793	-1.78
10/17/2007	7.45	15.65	2.05	2.1217	-0.07
10/24/2007	7.36	12.95	1.12	2.1529	-1.03
10/31/2007	7.63	7.31	0.398	2.2714	-1.87
11/7/2007	7.92	4.58	0.135	1.6161	-1.48
11/14/2007	7.44	12.17	0.229	2.1685	-1.94
11/21/2007	7.3	12.22	0.461	2.1622	-1.70
11/28/2007	6.98	5.58	0.158	2.2979	-2.14
12/12/2007	7.2	2.52	0.1	2.3901	-2.29
12/26/2007	7.52	2.16	0.152	2.408	-2.26
1/16/2008	7.16	0.06	0.243	2.4743	-2.23
2/20/2008	7.2	0.67	0.206	2.4526	-2.25
3/5/2008	7.11	1.14	0.406	2.4351	-2.03
3/19/2008	7.57	5.33	0.25	2.3171	-2.07
4/2/2008	7.87	5.16	0.295	1.7492	-1.45
4/9/2008					
4/16/2008	7.34	7.07	0.182	2.2662	-2.08
4/23/2008					
4/30/2008	7.58	8.22	0.354	2.2488	-1.89
5/7/2008	7.27	15.89	0.393	2.1101	-1.72
5/14/2008	6.96	13.36	2.58	2.136	**0.44**
5/21/2008	7.43	10.81	0.318	2.1912	-1.87
5/28/2008	7.55	12.56	0.318	2.1683	-1.85
6/4/2008	7.28	17.45	3.59	2.094	**1.50**
6/18/2008	7.09	17.84	0.362	2.0831	-1.72
6/25/2008	7.45	21.01	0.275	1.9393	-1.66
7/2/2008	7.35	19.84	0.644	2.0785	-1.43

CCC	Little Blue Creek				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007	7.82	15.85	0.1	1.7547	-1.65
9/19/2007	7.69	18.43	0.22	2.1186	-1.90
9/26/2007	7.67	21.76	0.258	1.8619	-1.60
10/3/2007	7.93	18.12	0.1	1.455	-1.36
10/10/2007	7.76	14.16	0.1	1.9442	-1.84
10/17/2007	7.84	15.75	0.1	1.6997	-1.60
10/24/2007	7.61	12.54	0.133	2.1726	-2.04
10/31/2007	7.95	8.3	0.1	1.4789	-1.38
11/7/2007	8.31	4.74	0.1	0.6998	-0.60
11/14/2007	7.69	12.03	0.378	2.1862	-1.81
11/21/2007	7.82	12.15	0.1	1.7887	-1.69
11/28/2007	7.51	5.05	0.306	2.3224	-2.02
12/12/2007	7.23	2.8	0.319	2.3817	-2.06
12/26/2007	7.93	1.64	0.1	1.6457	-1.55
1/16/2008	7.52	0.18	0.1	2.4758	-2.38
2/20/2008	7.6	0.04	0.1	2.483	-2.38
3/5/2008	7.3	0.99	0.144	2.4427	-2.30
3/19/2008	7.61	5.44	0.438	2.3159	-1.88
4/2/2008	7.77	4.68	0.1	2.0718	-1.97
4/9/2008	7.77	11.38	0.1	1.9474	-1.85
4/16/2008	7.66	7.63	0.1	2.2658	-2.17
4/23/2008					
4/30/2008	7.79	8.23	0.1	1.9351	-1.84
5/7/2008	7.62	15.87	0.112	2.1319	-2.02
5/14/2008	7.37	13.52	0.327	2.145	-1.82
5/21/2008	7.78	11.31	0.1	1.9178	-1.82
5/28/2008	7.78	12.24	0.132	1.9058	-1.77
6/4/2008	7.38	17.42	0.347	2.0994	-1.75
6/18/2008	7.94	18.54	0.1	1.4298	-1.33
6/25/2008	7.75	20.71	0.1	1.8402	-1.74
7/2/2008	7.89	19.71	0.113	1.5515	-1.44

CCC	Blue Creek				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007	7.97	17.78	0.1	1.3605	-1.26
9/19/2007	7.95	19.55	0.1	1.4046	-1.30
9/26/2007	7.81	20.19	0.1	1.7401	-1.64
10/3/2007	7.89	17.66	0.1	1.5567	-1.46
10/10/2007	8.09	13.41	0.1	1.0744	-0.97
10/17/2007	7.79	16.33	0.699	1.8368	-1.14
10/24/2007	7.67	12.97	0.1	2.171	-2.07
10/31/2007	8.02	8.47	0.1	1.2939	-1.19
11/7/2007	8.13	6.67	0.132	1.0269	-0.89
11/14/2007	7.71	11.51	0.1	2.1339	-2.03
11/21/2007	7.99	11.55	0.199	1.3464	-1.15
11/28/2007	7.56	4.93	0.185	2.3274	-2.14
12/12/2007					
12/26/2007	7.9	1.41	0.15	1.739	-1.59
1/16/2008					
2/20/2008	7.67	0	0.163	2.4866	-2.32
3/5/2008	7.2	0.35	0.351	2.4641	-2.11
3/19/2008	7.51	5.72	0.354	2.3048	-1.95
4/2/2008	7.8	4.82	0.164	1.9713	-1.81
4/9/2008	7.87	12.56	0.1	1.6437	-1.54
4/16/2008	7.77	9.04	0.1	1.9834	-1.88
4/23/2008	8.38	17.32	0.1	0.5755	-0.48
4/30/2008	8.14	9.51	0.1	0.9824	-0.88
5/7/2008	7.81	17.2	0.1	1.7744	-1.67
5/14/2008	7.5	15.18	0.223	2.1303	-1.91
5/21/2008	7.87	12.47	0.1	1.6446	-1.54
5/28/2008	7.94	14.39	0.1	1.447	-1.35
6/4/2008	7.67	18.61	0.268	2.115	-1.85
6/18/2008	7.89	19.31	0.1	1.5522	-1.45
6/25/2008	8.04	20.62	0.1	1.1353	-1.04
7/2/2008	8	20.51	0.6	1.247	-0.65

CCC	St. Marys - OH				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	7.8	19.59	0.1	1.7924	-1.69
9/19/2007	7.88	19.84	0.1	1.5769	-1.48
9/26/2007	8.03	21.85	0.1	1.0674	-0.97
10/3/2007	8.08	18.49	0.1	1.0861	-0.99
10/10/2007	7.8	17.5	0.1	1.801	-1.70
10/17/2007	8.08	16.32	0.1	1.0887	-0.99
10/24/2007	7.88	12.13	0.132	1.6208	-1.49
10/31/2007	9.09	10.36	0.1	0.1434	-0.04
11/7/2007	8.19	5.89	0.1	0.9044	-0.80
11/14/2007	7.93	11.75	0.1	1.4926	-1.39
11/21/2007	7.97	11.36	0.1	1.3961	-1.30
11/28/2007	7.68	4.1	0.1	2.3552	-2.26
12/12/2007	7.43	3.49	0.105	2.3644	-2.26
12/26/2007	7.99	1.22	0.1	1.4876	-1.39
1/16/2008					
2/20/2008	7.82	1.1	0.14	1.9985	-1.86
3/5/2008	7.33	0.1	0.162	2.475	-2.31
3/19/2008	7.53	5.84	0.1	2.3024	-2.20
4/2/2008	7.82	6.3	0.1	1.8781	-1.78
4/9/2008	7.93	12.72	0.1	1.4841	-1.38
4/16/2008	7.83	9.97	0.01	1.7874	-1.78
4/23/2008	8.2	17.75	0.234	0.8395	-0.61
4/30/2008	8.2	11.42	0.1	0.8512	-0.75
5/7/2008	8.09	17.59	0.1	1.0634	-0.96
5/14/2008	7.69	14.86	0.224	2.1492	-1.93
5/21/2008	7.96	13.12	0.1	1.4064	-1.31
5/28/2008	8.09	14.89	0.1	1.0689	-0.97
6/4/2008	7.52	19.69	0.241	2.0926	-1.85
6/18/2008	7.8	19.9	0.1	1.7916	-1.69
6/25/2008	8.06	21.97	0.1	0.9931	-0.89
7/2/2008	7.71	21.04	0.1	1.9086	-1.81

CCC	Martz				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	8.07	16.17	0.1	1.113	-1.01
9/19/2007	8	19.05	0.1	1.2917	-1.19
9/26/2007	7.71	20.56	6.92	1.9742	**4.95**
10/3/2007	7.78	18.13	5.36	1.8549	**3.51**
10/10/2007	7.99	13.77	3.74	1.3307	**2.41**
10/17/2007	7.65	15.39	2.25	2.1397	**0.11**
10/24/2007	7.83	13	0.1	1.7509	-1.65
10/31/2007	8.1	8.69	0.211	1.0801	-0.87
11/7/2007	8.14	4.84	0.643	1.0217	-0.38
11/14/2007	7.92	11.99	0.1	1.5162	-1.42
11/21/2007	8	12.37	0.1	1.3179	-1.22
11/28/2007	7.72	5.73	0.1	2.214	-2.11
12/12/2007	7.44	2.54	0.1	2.3938	-2.29
12/26/2007	7.96	2.05	0.1	1.5528	-1.45
1/16/2008					
2/20/2008	7.85	0	0.173	1.9308	-1.76
3/5/2008	7.37	1.17	0.399	2.4376	-2.04
3/19/2008	7.5	4.73	0.23	2.3308	-2.10
4/2/2008	8.01	5.04	0.1	1.3663	-1.27
4/9/2008	7.99	10.86	0.178	1.3523	-1.17
4/16/2008	7.86	7.56	0.107	1.7363	-1.63
4/23/2008					
4/30/2008	8.25	8.06	0.1	0.7778	-0.68
5/7/2008	7.98	16.11	0.1	1.3425	-1.24
5/14/2008	7.57	12.95	0.202	2.1639	-1.96
5/21/2008	7.98	11.13	0.1	1.3739	-1.27
5/28/2008	7.63	12.85	0.1	2.1695	-2.07
6/4/2008	7.89	18.76	0.1	1.5533	-1.45
6/18/2008	8.06	18.7	0.1	1.1341	-1.03
6/25/2008	7.96	20.96	0.12	1.2925	-1.17
7/2/2008	8.04	21.13	0.1	1.0967	-1.00

CCC	Yellow				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	8.08	16.03	0.1	1.0893	-0.99
9/19/2007	7.93	18.79	0.1	1.4535	-1.35
9/26/2007	7.72	21.09	0.79	1.8741	-1.08
10/3/2007	7.7	17.68	0.596	2.0969	-1.50
10/10/2007	7.8	14.73	0.665	1.8205	-1.16
10/17/2007	7.63	15.03	0.1	2.1418	-2.04
10/24/2007	7.72	13.07	0.1	2.0801	-1.98
10/31/2007	8	8.8	0.1	1.3497	-1.25
11/7/2007	8.09	5.38	0.1	1.137	-1.04
11/14/2007	7.82	11.63	0.1	1.7949	-1.69
11/21/2007	7.93	11.79	0.1	1.4923	-1.39
11/28/2007	7.75	5.01	0.155	2.1303	-1.98
12/12/2007	7.35	2.66	0.143	2.3881	-2.25
12/26/2007	7.95	1.38	0.1	1.5943	-1.49
1/16/2008					
2/20/2008	7.81	0	0.199	2.0633	-1.86
3/5/2008	7.26	0.65	0.504	2.4541	-1.95
3/19/2008	7.45	5.05	0.31	2.3206	-2.01
4/2/2008	7.8	5.17	0.1	1.9637	-1.86
4/9/2008	8	11.77	0.1	1.3224	-1.22
4/16/2008	7.9	8.4	0.1	1.6108	-1.51
4/23/2008					
4/30/2008	8.11	8.53	0.1	1.0575	-0.96
5/7/2008	7.86	16.15	0.1	1.6428	-1.54
5/14/2008	7.56	13.88	0.278	2.1504	-1.87
5/21/2008	7.92	11.53	0.1	1.5205	-1.42
5/28/2008	7.81	13.46	0.1	1.8036	-1.70
6/4/2008	7.84	18.81	0.107	1.6846	-1.58
6/18/2008	7.98	18.25	0.1	1.3365	-1.24
6/25/2008	7.92	20.12	0.1	1.4641	-1.36
7/2/2008	7.98	20.19	0.1	1.3176	-1.22

CCC	Borum				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007	8.07	17.07	0.1	1.1113	-1.01
9/19/2007	7.93	19.62	0.1	1.4523	-1.35
9/26/2007	7.64	21.71	0.1	1.8645	-1.76
10/3/2007	7.59	18.08	0.1	2.1098	-2.01
10/10/2007	7.72	15.05	0.1	2.0574	-1.96
10/17/2007	7.65	15.69	0.1	2.1366	-2.04
10/24/2007	7.86	12.44	0.1	1.6724	-1.57
10/31/2007	7.94	8.5	0.1	1.5023	-1.40
11/7/2007	7.94	5.43	0.1	1.5465	-1.45
11/14/2007	7.93	11.85	0.1	1.4917	-1.39
11/21/2007	7.88	11.41	0.1	1.6283	-1.53
11/28/2007	7.83	5.16	0.1	1.8699	-1.77
12/12/2007	7.45	2.61	0.1	2.3919	-2.29
12/26/2007	8.07	1.46	0.1	1.2439	-1.14
1/16/2008					
2/20/2008	7.94	0.01	0.102	1.6534	-1.55
3/5/2008	7.49	0.81	0.1	2.4526	-2.35
3/19/2008	7.57	4.73	0.1	2.3332	-2.23
4/2/2008	7.86	5.05	0.123	1.781	-1.66
4/9/2008	8.07	11.12	0.1	1.136	-1.04
4/16/2008	8	8.11	0.1	1.3574	-1.26
4/23/2008					
4/30/2008	8.12	8.63	0.01	1.0334	-1.02
5/7/2008	7.83	16.46	0.1	1.7228	-1.62
5/14/2008	7.62	12.98	0.186	2.1669	-1.98
5/21/2008	7.92	11.35	0.1	1.5223	-1.42
5/28/2008	7.85	13.45	0.1	1.6903	-1.59
6/4/2008	7.77	18.4	0.1	1.8826	-1.78
6/18/2008	8.03	18.23	0.1	1.2107	-1.11
6/25/2008	7.88	19.79	0.1	1.5769	-1.48
7/2/2008	8.08	20.51	0.1	1.0497	-0.95

CCC	Holthouse				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	7.97	17.24	0.1	1.3619	-1.2619
9/19/2007	7.85	17.32	0.1	1.6635	-1.5635
9/26/2007	7.4	20.27	0.1	2.0409	-1.9409
10/3/2007	7.54	17.97	0.1	2.1061	-2.0061
10/10/2007	7.45	13.42	0.1	2.1502	-2.0502
10/17/2007	7.56	14.85	0.1	2.1383	-2.0383
10/24/2007	7.82	13.24	0.1	1.777	-1.677
10/31/2007	7.93	9.28	0.1	1.5189	-1.4189
11/7/2007	7.94	5.25	0.1	1.5495	-1.4495
11/14/2007	7.83	11.63	0.1	1.766	-1.666
11/21/2007					
11/28/2007	7.78	5.5	0.1	2.0205	-1.9205
12/12/2007	7.39	2.6	0.1	2.3908	-2.2908
12/26/2007	8.05	1.9	0.431	1.2942	-0.8632
1/16/2008					
2/20/2008	7.95	0	0.166	1.6247	-1.4587
3/5/2008	7.59	0.58	0.156	2.4633	-2.3073
3/19/2008	7.46	4.64	0.163	2.3321	-2.1691
4/2/2008	7.82	6.44	0.1	1.8754	-1.7754
4/9/2008	8.17	11.68	0.1	0.908	-0.808
4/16/2008	8.17	8.79	0.1	0.9237	-0.8237
4/23/2008					
4/30/2008	8.13	9.61	0.1	1.0037	-0.9037
5/7/2008	7.89	16.47	0.1	1.5619	-1.4619
5/14/2008	7.58	13.69	0.205	2.1543	-1.9493
5/21/2008	8.01	11.94	0.1	1.292	-1.192
5/28/2008	7.9	14.43	0.1	1.5482	-1.4482
6/4/2008	7.85	18.43	0.1	1.659	-1.559
6/18/2008	8.01	18.68	0.1	1.2642	-1.1642
6/25/2008	7.98	19.24	0.1	1.3353	-1.2353
7/2/2008	8.06	20.52	0.1	1.0949	-0.9949

CCC	Gerke				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007	8.15	17.39	0.1	0.9343	-0.83
9/19/2007	8.57	22.19	0.1	0.3536	-0.25
9/26/2007	7.61	21.46	0.303	1.8939	-1.59
10/3/2007	7.78	18.45	0.1	1.8534	-1.75
10/10/2007	7.98	16.45	0.1	1.3412	-1.24
10/17/2007	7.81	15.74	0.273	1.7837	-1.51
10/24/2007	7.97	12.68	0.1	1.3854	-1.29
10/31/2007	8.13	8.69	0.1	1.0102	-0.91
11/7/2007	8.1	5.67	0.1	1.1085	-1.01
11/14/2007	8.04	12.12	0.1	1.2074	-1.11
11/21/2007	8.03	11.28	0.234	1.2405	-1.01
11/28/2007	7.95	4.72	0.1	1.5313	-1.43
12/12/2007	7.42	3.15	0.1	2.3744	-2.27
12/26/2007	8.12	1.11	0.1	1.1158	-1.02
1/16/2008					
2/20/2008					
3/5/2008	7.71	0.04	0.131	2.4164	-2.29
3/19/2008	7.52	4.19	0.1	2.3465	-2.25
4/2/2008	7.93	5.79	0.1	1.5679	-1.47
4/9/2008	8.32	12.32	0.1	0.6537	-0.55
4/16/2008	8.38	9.55	0.1	0.5804	-0.48
4/23/2008					
4/30/2008	8.21	11.06	0.01	0.8342	-0.82
5/7/2008	7.97	17.01	0.1	1.3626	-1.26
5/14/2008	7.66	13.2	0.133	2.167	-2.03
5/21/2008	8.02	12.41	0.1	1.2603	-1.16
5/28/2008	8.02	15.99	0.1	1.2425	-1.14
6/4/2008	7.84	18.47	0.141	1.6858	-1.54
6/18/2008	8.07	20.06	0.1	1.1058	-1.01
6/25/2008	7.88	19.83	0.14	1.5769	-1.44
7/2/2008	8.14	22.65	0.119	0.802	-0.68

CCC	Nickelson				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	8.33	17.54	0.1	0.6385	-0.5385
9/19/2007	7.94	22.74	0.1	1.1839	-1.0839
9/26/2007	8.13	22.38	0.1	0.8335	-0.7335
10/3/2007	8.52	19.65	0.1	0.4405	-0.3405
10/10/2007	8.18	14.43	0.1	0.8795	-0.7795
10/17/2007	8.18	18.02	0.1	0.8762	-0.7762
10/24/2007	7.87	12.91	0.1	1.6404	-1.5404
10/31/2007	8.28	10.22	0.1	0.7188	-0.6188
11/7/2007	8.28	5.95	0.1	0.74	-0.64
11/14/2007	7.9	12.5	0.1	1.5637	-1.4637
11/21/2007	8.02	12.08	0.245	1.2625	-1.0175
11/28/2007	7.83	6.09	0.1	1.8515	-1.7515
12/12/2007	7.36	2.73	0.1	2.3861	-2.2861
12/26/2007	8.01	3.18	0.112	1.395	-1.283
1/16/2008					
2/20/2008	8	0.12	0.111	1.4844	-1.3734
3/5/2008	7.79	1.77	0.11	2.0799	-1.9699
3/19/2008	7.47	4.42	0.1	2.3385	-2.2385
4/2/2008	7.8	6.5	0.1	1.9362	-1.8362
4/9/2008	8.37	11.51	0.1	0.5886	-0.4886
4/16/2008	8.44	9.96	0.1	0.5094	-0.4094
4/23/2008					
4/30/2008	8.44	11.86	0.1	0.5068	-0.4068
5/7/2008	8.14	16.63	0.1	0.9552	-0.8552
5/14/2008	7.57	12.74	0.24	2.1669	-1.9269
5/21/2008	8.07	12.58	0.113	1.1271	-1.0141
5/28/2008	8.35	16	0.1	0.6111	-0.5111
6/4/2008	7.81	18.25	0.118	1.7692	-1.6512
6/18/2008	8.48	22.11	0.1	0.42	-0.32
6/25/2008	8.05	19.79	0.1	1.159	-1.059
7/2/2008	8.43	23.61	0.1	0.4226	-0.3226

CCC	St. Marys - Poe				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007	8.02	20.23	0.1	1.2174	-1.12
9/19/2007	7.96	20.91	0.1	1.2969	-1.20
9/26/2007	8.46	21.57	0.1	0.4507	-0.35
10/3/2007	8.58	20.16	0.1	0.3906	-0.29
10/10/2007	8.42	16.44	0.1	0.529	-0.43
10/17/2007	8.31	17.74	0.1	0.6659	-0.57
10/24/2007	7.98	13.09	0.1	1.3586	-1.26
10/31/2007	8.25	11.37	0.1	0.7633	-0.66
11/7/2007	8.41	5.98	0.1	0.5557	-0.46
11/14/2007	8.01	11.67	0.1	1.294	-1.19
11/21/2007	8.05	9.8	0.1	1.1978	-1.10
11/28/2007	7.99	4.99	0.103	1.4222	-1.32
12/12/2007	7.39	3.5	0.273	2.3632	-2.09
12/26/2007	8.12	2.37	0.1	1.0984	-1.00
1/16/2008					
2/20/2008	8.18	3.06	0.149	0.9519	-0.80
3/5/2008	7.77	0.23	0.242	2.194	-1.95
3/19/2008	7.43	5.13	0.14	2.3179	-2.18
4/2/2008	7.84	7.67	0.1	1.7931	-1.69
4/9/2008	8.32	12.39	0.1	0.6536	-0.55
4/16/2008	8.32	12.32	0.1	0.6537	-0.55
4/23/2008	8.24	18.9	0.411	0.7725	-0.36
4/30/2008	8.47	12.88	0.01	0.4753	-0.47
5/7/2008	8.42	18.06	0.1	0.5317	-0.43
5/14/2008	7.68	14.97	0.272	2.147	-1.88
5/21/2008	8.2	14.98	0.1	0.8412	-0.74
5/28/2008	8.44	17.22	0.1	0.509	-0.41
6/4/2008	7.63	20.27	0.162	2.0627	-1.90
6/18/2008	7.82	22.15	0.1	1.4949	-1.39
6/25/2008	8.14	20.87	0.1	0.9018	-0.80
7/2/2008	7.82	22.39	0.1	1.4704	-1.37

CCC	Upper Gates				
Date	**pH**	**Temp_C**	**NH3-N**	**CCC**	**Exceedances**
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	7.37	12.99	0.334	2.1528	-1.82
4/30/2008					
5/7/2008	7.16	13.9	0.542	2.1322	-1.59
5/14/2008	6.92	13.03	0.437	2.1405	-1.70
5/21/2008	7.45	10.22	0.346	2.2028	-1.86
5/28/2008	7.47	12.71	0.496	2.1616	-1.67
6/4/2008	7.25	17.42	3.7	2.0929	**1.61**
6/18/2008	6.98	18.05	0.448	2.0781	-1.63
6/25/2008	7.03	19.4	0.792	2.0675	-1.28
7/2/2008	7.11	18.44	0.464	2.0781	-1.61

CCC	Upper Blue				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	7.96	17.13	0.1	1.3858	-1.2858
4/30/2008					
5/7/2008	7.29	16.8	0.1	2.1009	-2.0009
5/14/2008	7.23	13.69	0.269	2.1373	-1.8683
5/21/2008	7.98	11.16	0.1	1.3736	-1.2736
5/28/2008	8.02	13.24	0.394	1.2551	-0.8611
6/4/2008	7.41	18.99	0.81	2.0883	-1.2783
6/18/2008	8.1	18.43	0.178	1.0402	-0.8622
6/25/2008	7.69	21.72	0.1	1.8698	-1.7698
7/2/2008	8.01	21.36	0.1	1.1517	-1.0517

CCC	Twentyseven Mile				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	8.11	16.95	0.1	1.0189	-0.9189
4/30/2008					
5/7/2008	7.92	17.19	0.1	1.4826	-1.3826
5/14/2008	7.56	15.68	0.128	2.1289	-2.0009
5/21/2008	7.9	12.39	0.1	1.5647	-1.4647
5/28/2008					
6/4/2008	7.85	19.62	0.1	1.6557	-1.5557
6/18/2008	7.99	19.14	0.1	1.3128	-1.2128
6/25/2008	7.87	21.27	0.1	1.4671	-1.3671
7/2/2008	7.87	20.76	0.1	1.5198	-1.4198

CCC	Houk				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	8.3	19.53	0.1	0.6831	-0.5831
4/30/2008					
5/7/2008	8.24	17.78	0.1	0.7713	-0.6713
5/14/2008	7.57	13.14	0.25	2.1612	-1.9112
5/21/2008	8.17	14.3	0.1	0.8991	-0.7991
5/28/2008	8.37	17.67	0.1	0.588	-0.488
6/4/2008	7.74	19.28	0.126	1.9667	-1.8407
6/18/2008	8.13	21.66	0.1	0.874	-0.774
6/25/2008	8.04	20	0.1	1.1844	-1.0844
7/2/2008	8.2	23.97	0.1	0.651	-0.551

CCC	Snyder				
Date	pH	Temp_C	NH3-N	CCC	Exceedanc
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	8.57	20.96	0.1	0.3796	-0.2796
4/30/2008					
5/7/2008	8.38	17.12	0.1	0.5752	-0.4752
5/14/2008	7.6	13.45	0.443	2.1589	-1.7159
5/21/2008	8.34	12.9	0.1	0.6254	-0.5254
5/28/2008	8.39	15.56	0.1	0.5619	-0.4619
6/4/2008	7.74	18.83	0.143	1.9687	-1.8257
6/18/2008	8.09	19.4	0.1	1.0631	-0.9631
6/25/2008	8.07	19.18	0.1	1.1098	-1.0098
7/2/2008	8.13	21.9	0.1	0.8603	-0.7603

CCC	Harber				
Date	pH	Temp_C	NH3-N	CCC	Exceedanc
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	8.54	20.6	0.1	0.4102	-0.3102
4/30/2008					
5/7/2008	8.17	17.39	0.1	0.895	-0.795
5/14/2008	7.57	13.69	0.214	2.1536	-1.9396
5/21/2008	8.19	14	0.1	0.8616	-0.7616
5/28/2008	8.2	18.03	0.1	0.8397	-0.7397
6/4/2008	7.69	19.41	0.156	2.1132	-1.9572
6/18/2008	7.89	22.14	0.1	1.3381	-1.2381
6/25/2008	7.93	20.19	0.1	1.433	-1.333
7/2/2008	8.12	24.64	0.1	0.7354	-0.6354

CCC	Junk				
Date	pH	Temp_C	NH3-N	CCC	Exceedanc
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	8.04	21.66	0.132	1.0582	-0.9262
4/30/2008					
5/7/2008	7.72	17.66	0.185	2.0356	-1.8506
5/14/2008	7.41	14.83	0.223	2.1293	-1.9063
5/21/2008	7.79	15.54	0.35	1.8427	-1.4927
5/28/2008	7.76	17.97	0.409	1.914	-1.505
6/4/2008	7.32	22.61	0.248	1.7225	-1.4745
6/18/2008	7.62	23.13	0.169	1.6864	-1.5174
6/25/2008	7.5	21.04	0.111	1.9395	-1.8285
7/2/2008	7.65	24.88	0.1	1.4988	-1.3988

CCC	Spy Run				
Date	pH	Temp_C	NH3-N	CCC	Exceedances
9/12/2007					
9/19/2007					
9/26/2007					
10/3/2007					
10/10/2007					
10/17/2007					
10/24/2007					
10/31/2007					
11/7/2007					
11/14/2007					
11/21/2007					
11/28/2007					
12/12/2007					
12/26/2007					
1/16/2008					
2/20/2008					
3/5/2008					
3/19/2008					
4/2/2008					
4/9/2008					
4/16/2008					
4/23/2008	7.82	21.56	0.1	1.557	-1.457
4/30/2008					
5/7/2008	7.65	17.32	0.1	2.1218	-2.0218
5/14/2008	7.5	14.49	0.158	2.1386	-1.9806
5/21/2008	7.63	14.26	0.277	2.1508	-1.8738
5/28/2008	7.64	18.31	0.215	2.1134	-1.8984
6/4/2008	7.7	22.45	0.134	1.7552	-1.6212
6/18/2008	6.89	20.75	0.1	1.9502	-1.8502
6/25/2008	7.74	21.13	0.1	1.8139	-1.7139
7/2/2008	7.76	24.91	0.1	1.3579	-1.2579

Habegger Ditch

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	5.488897338	17.5	0.368	0.45	2420	2.49	0.3	-71.4	10.9	13.3	33.3	3.25E+11	90.29	0.07353	-20.48192771
9/19/2007	0.955931559	9	0.1	0.265	411	0.78	0.0	-233.3	0.5	1.4	-13.2	9.61E+09	90.04	0.004011	-284.6153846
9/26/2007	0.801749049	23.2	0.75	0.671	24196	0.125	0.1	-29.3	3.2	2.9	55.3	4.75E+11	99.86	0.000539	-2300
10/3/2007	0.863422053	10	3.05	0.444	520	0.247	0.0	-200.0	14.2	2.1	32.4	1.10E+10	92.89	0.001147	-1114.574899
10/10/2007	0.863422053	26	0.886	0.475	7800	0.193	0.1	-15.4	4.1	2.2	36.8	1.65E+11	99.53	0.000897	-1454.404145
10/17/2007	1.356806084	29	0.908	0.635	2420	0.188	0.1	-3.4	6.6	4.6	52.8	8.03E+10	97.60	0.001372	-1495.744681
10/24/2007	2.867794677	20	0.279	0.867	19350	0.329	0.2	-50.0	4.3	13.4	65.4	1.36E+12	99.37	0.005076	-811.8541033
10/31/2007	1.14095057	39	2.53	0.03	1300	0.34	0.1	23.1	15.5	0.2	-900.0	3.63E+10	96.24	0.002087	-782.3529412
11/7/2007	1.048441065	41	0.517	0.263	517	0.277	0.1	26.8	2.9	1.5	-14.1	1.33E+10	91.32	0.001562	-983.032491
11/14/2007	7.400760456	32	0.203	0.532	5600	0.21	0.6	6.3	8.1	21.2	43.6	1.01E+12	94.34	0.008361	-1328.571429
11/21/2007	13.96893536	38	0.342	0.421	200		1.4	21.1	25.7	31.6	28.7	6.84E+10	-199.03		
11/28/2007	18.25520913	27	0.187	0.302	2599		1.3	-11.1	18.4	29.7	0.7	1.16E+12	69.93		
12/12/2007	84.18365019	127	0.1	0.835			28.8	76.4	45.3	378.2	64.1				
12/26/2007	17.45346008	38	0.172	0.125			1.8	21.1	16.2	11.7	-140.0				
1/16/2008	8.60338403	24.5	0.234	0.18			0.6	-22.4	10.8	8.3	-66.7				
1/30/2008	13.84558935	41	2.85	0.902			1.5	26.8	212.3	67.2	66.7				
2/6/2008	139.3809886	404	0.385	0.745			151.5	92.6	288.7	558.7	59.7				
2/20/2008	13.69140684	30	0.187	0.271			1.1	0.0	13.8	20.0	-10.7				
3/5/2008	28.52376426	75	0.242	0.384			5.8	60.0	37.1	58.9	21.9				
3/19/2008	63.52319392	696	0.275	1.438			118.9	95.7	94.0	491.4	79.1				
4/2/2008	28.83212928	120	0.188	0.475	4028	0.07	9.3	75.0	29.2	73.7	36.8	2.84E+12	69.35	0.010858	-4185.714286
4/9/2008	6.16730038	25	0.101	0.178	457	0.06	0.4	-20.0	3.4	5.9	-68.5	6.90E+10	42.22	0.001991	-4900
4/16/2008	6.96904943	23	0.1	0.153	219	0.03	0.4	-30.4	3.7	5.7	-96.1	3.73E+10	-36.24	0.001125	-9900
4/23/2008	3.052813688	37	0.554	0.274	261	0.47	0.3		9.1	4.5	-9.5	1.95E+10	49.92	0.007719	-538.2978723
4/30/2008	2.43608365	26	15	1.428	1203	3.97	0.2	-15.4	196.6	18.7	79.0	7.17E+10	91.33	0.052031	24.43324937
5/7/2008	1.911863118	21.5	0.494	0.224	816	0.5	0.1	-39.5	5.1	2.3	-33.9	3.82E+10	89.97	0.005143	-500
5/14/2008	14.46231939	122	1.09	0.268	48392	2.21	4.7	75.4	84.8	20.9	-11.9	1.71E+13	98.72	0.171954	-35.74660633
5/21/2008	3.453688213	17	0.216	0.109	1733	0.23	0.2	-76.5	4.0	2.0	-175.2	1.46E+11	91.47	0.004274	-1204.347826
5/28/2008	1.726844106	60	0.26	0.275	2420	0.38	0.3	50.0	2.4	2.6	-9.1	1.02E+11	96.94	0.00353	-689.4736842
6/4/2008	13.13634981	116	2.39	0.622	48392	5.97	4.1	74.1	168.9	44.0	51.8	1.56E+13	98.84	0.421921	49.74874372
6/11/2008	22.26395437	47	0.259	0.432	5206	1.77	2.8	36.2	31.0	51.7	30.6	2.84E+12	81.69	0.212011	-69.49152542
6/18/2008	3.515361217	27	0.172	0.244	1733	1.58	0.3	-11.1	3.3	4.6	-23.0	1.49E+11	91.32	0.029882	-89.87341772
6/25/2008	8.079163498	13.8	5.67	0.314	1553	6.27	0.3	-117.4	246.5	13.6	4.5	3.07E+11	77.73	0.272531	52.15311005
7/2/2008	2.744448669	22.4	0.582		2420	5.38	0.2	-33.9	8.6			1.62E+11	95.14	0.079436	44.23791822
7/9/2008	27.81452471	219	0.12	0.438	36540	3.52	16.4	86.3	18.0	65.5	31.5	2.49E+13	96.74	0.52674	14.77272727
7/16/2008	1.696007605	71.2	0.232	0.238	2420	1.04	0.3	57.9	2.1	2.2	-26.1	1.00E+11	97.00	0.00949	-188.4615385
7/23/2008	1.665171103	22.5	6.93	0.4	2420	8.17	0.1	-33.3	62.1	3.6	25.0	9.86E+10	97.05	0.073192	63.28029376

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Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	13.2721673	18	0.304	0.234	2420	0.93	0.6	-66.7	21.7	16.7	-28.2	7.86E+11	90.29	0.06640596	-222.580645
9/19/2007	2.311444867	9	0.1	0.113	1986	0.334	0.1	-233.3	1.2	1.4	-165.5	1.12E+11	88.17	0.00415348	-798.203593
9/26/2007	1.938631179	15.6	1.03	0.781	24196	0.097	0.1	-92.3	10.7	8.1	61.6	1.15E+12	99.03	0.00101169	-2992.78351
10/3/2007	2.087756654	44	0.14	0.585	1220	0.268	0.2	31.8	1.6	6.6	48.7	6.23E+10	80.74	0.00301021	-1019.40299
10/10/2007	2.087756654	34	0.1	0.401	2590	0.147	0.2	11.8	1.1	4.5	25.2	1.32E+11	90.93	0.00165112	-1940.81633
10/17/2007	3.280760456	30	2.05	0.687	2420	0.124	0.3	0.0	36.2	12.1	56.3	1.94E+11	90.29	0.00218866	-2319.35484
10/24/2007	6.934334601	19	1.12	1.105	104620	0.327	0.4	-57.9	41.8	41.2	72.9	1.77E+13	99.78	0.0121993	-817.431193
10/31/2007	2.758821293	35	0.398	0.206	435	0.46	0.3	14.3	5.9	3.1	-45.6	2.94E+10	45.98	0.00682753	-552.173913
11/7/2007	2.53513308	81	0.135	0.276	921	0.321	0.6	63.0	1.8	3.8	-8.7	5.71E+10	74.48	0.00437812	-834.579439
11/14/2007	17.89505703	28	0.229	0.512	7890	0.16	1.3	-7.1	22.0	49.3	41.4	3.45E+12	97.02	0.01540407	-1775
11/21/2007	33.77692015	29	0.461	0.259	980		2.6	-3.4	83.8	47.1	-15.8	8.10E+11	76.02		
11/28/2007	44.14114068	32	0.158	0.271	3466		3.8	6.2	37.5	64.4	-10.7	3.74E+12	93.22		
12/12/2007	203.5562738	129	0.1	0.435			70.6	76.7	109.5	476.4					
12/26/2007	42.20250951	32	0.152	0.223			3.6	6.3	34.5	50.6	-34.5				
1/16/2008	20.8030038	22	0.243	0.385			1.2	-36.4	27.2	43.1	22.1				
1/30/2008	33.4786692	63	2.55	0.42			5.7	52.4	459.3	75.6	28.6				
2/6/2008	337.0235741	468	0.34	1.062			424.3	93.6	616.5	1925.6	71.8				
2/20/2008	33.10585551	31	0.206	0.258			2.8	3.2	36.7	46.0	-16.3				
3/5/2008	68.97053232	128	0.406	0.525			23.7	76.6	150.7	194.8	42.9				
3/19/2008	153.5992395	748	0.25	1.432			309.1	96.0	206.6	1183.4	79.1				
4/2/2008	69.7161597	180	0.295	0.72	3232	0.02	33.8	83.3	110.6	270.1	58.3	5.51E+12	92.73	0.00750146	-14900
4/9/2008	14.91254753	2		0.205	649	0.06	0.1	-1400.0	0.0	16.4	-46.3	2.37E+11	63.79	0.00481377	-4900
4/16/2008	16.85117871	25	0.182	0.146	1733	0.02	1.1	-20.0	16.5	13.2	-105.5	7.14E+11	86.44	0.00181319	-14900
4/23/2008	7.381711027				649							1.17E+11	63.79		
4/30/2008	5.890456274	23.5	0.354	0.549	866.29	0.11	0.4	-27.7	11.2	17.4	45.4	1.25E+11	72.87	0.00348597	-2627.27273
5/7/2008	4.622889734	43	0.393	0.13	2420	0.46	0.5	30.2	9.8	3.2	-130.8	2.74E+11	90.29	0.01144073	-552.173913
5/14/2008	34.96992395	163	2.58	1.51	48392		15.3	81.6	485.4	284.1	80.1	4.14E+13	99.51		
5/21/2008	8.351026616	38	0.318	0.16	1120	0.35	0.9	21.1	14.3	7.2	-87.5	2.29E+11	79.02	0.01572498	-757.142857
5/28/2008	4.175513308	68	0.318	0.221	1046		0.8	55.9	7.1	5.0	-35.7	1.07E+11	77.53		
6/4/2008	31.76372624	410	3.59	1.089	48392	9.16	35.0	92.7	613.5	186.1	72.5	3.76E+13	99.51	1.56534184	67.2489083
6/11/2008	53.83429658	116	0.451	0.546	10344		16.8	74.1	130.6	158.1	45.1	1.36E+13	97.73		
6/18/2008	8.500152091	1004	0.362	0.499	2420	10.04	23.0	97.0	16.6	22.8	39.9	5.03E+11	90.29	0.45913742	70.11952191
6/25/2008	19.53543726	29.5	0.275	0.245	1986		1.6	-1.7	28.9	25.7	-22.4	9.49E+11	88.17		
7/2/2008	6.63608365	50	0.644	0.321	2420	3.72	0.9	40.0	23.0	11.5	6.5	3.93E+11	90.29	0.13281192	19.35483871
7/9/2008	67.25558935	296	0.136	0.633	36540		53.6	89.9	49.2	229.0	52.6	6.01E+13	99.36		
7/16/2008	4.10095057	27	0.166	0.122	2420	0.52	0.3	-11.1	3.7	2.7	-145.9	2.43E+11	90.29	0.01147282	-476.923077
7/23/2008	4.026387833	15.5	0.159	0.307	2420		0.2	-93.5	3.4	6.7	2.3	2.38E+11	90.29		

Little Blue Creek

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	10.96425856	43	0.1	0.136	1300	0.48	1.3	30.2	5.9	8.0	-120.6	3.49E+11	81.92	0.0283141	-525
9/19/2007	1.909505703	52	0.22	0.107	548	0.352	0.3	42.3	2.3	1.1	-180.4	2.56E+10	57.12	0.00361615	-752.2727273
9/26/2007	1.601520913	84.4	0.258	0.58	8664	0.341	0.4	64.5	2.2	5.0	48.3	3.39E+11	97.29	0.00293812	-779.7653959
10/3/2007	1.724714829	27	0.1	0.151	960	0.383	0.1	-11.1	0.9	1.4	-98.7	4.05E+10	75.52	0.00355384	-683.2898172
10/10/2007	1.724714829	11.5	0.1	0.03	100	0.341	0.1	-160.9	0.9	0.3	-900.0	4.22E+09	-135.00	0.00316413	-779.7653959
10/17/2007	2.71026616	10	0.1	0.131	102	0.377	0.1	-200.0	1.5	1.9	-129.0	6.76E+09	-130.39	0.00549712	-695.7559682
10/24/2007	5.72851711	9.5	0.133	0.595	8130	0.293	0.1	-215.8	4.1	18.3	49.6	1.14E+12	97.11	0.00903009	-923.890785
10/31/2007	2.279087452	38	0.1	0.03	488	0.403	0.2	21.1	1.2	0.4	-900.0	2.72E+10	51.84	0.00494138	-644.4168734
11/7/2007	2.094296578	23.5	0.1	0.107	980	0.403	0.1	-27.7	1.1	1.2	-180.4	5.02E+10	76.02	0.00454073	-644.4168734
11/14/2007	14.78326996	11	0.378	0.176	7760	0.2	0.4	-172.7	30.1	14.0	-70.5	2.81E+12	96.97	0.0159068	-1400
11/21/2007	27.90342205	75	0.1	0.153	6020		5.6	60.0	15.0	23.0	-96.1	4.11E+12	96.10		
11/28/2007	36.46539924	18	0.306	0.339	1733		1.8	-66.7	60.0	66.5	11.5	1.55E+12	86.44		
12/12/2007	168.1596958	214	0.319	0.859			96.8	86.0	288.6	777.1					
12/26/2007	34.86387833	18	0.1	0.139			1.7	-66.7	18.8	26.1	-115.8				
1/16/2008	17.18555133	17	0.1	0.03			0.8	-76.5	9.2	2.8	-900.0				
1/30/2008	27.65703422	40	0.22	0.186			3.0	25.0	32.7	27.7	-61.3				
2/6/2008	278.418251	604	0.32	0.824			452.4	95.0	479.3	1234.3	63.6				
2/20/2008	27.34904943	25	0.1	0.188			1.8	-20.0	14.7	27.7	-59.6				
3/5/2008	56.97718631	136	0.144	0.371			20.8	77.9	44.1	113.7	19.1				
3/19/2008	126.8897338	920	0.438	1.432			314.0	96.7	299.0	977.6	79.1				
4/2/2008	57.59315589	104	0.1	0.388	312	0.11	16.1	71.2	31.0	120.2	22.7	4.40E+11	24.68	0.03408363	-2627.272727
4/9/2008	12.31939163	26	0.1	0.107	248	0.01	0.9	-15.4	6.6	7.1	-180.4	7.47E+10	5.24	0.00066278	-29900
4/16/2008	13.92091255	15	0.1	0.015	238	0.03	0.6	-100.0	7.5	1.1	-1900.0	8.11E+10	1.26	0.00224684	-9900
4/23/2008	6.098098859				194							2.89E+10	-21.13		
4/30/2008	4.866159696	15	0.1	0.442	249	0.1	0.2	-100.0	2.6	11.6	32.1	2.96E+10	5.62	0.00261799	-2900
5/7/2008	3.819011407	43	0.112	0.165	1553	0.6	0.4	30.2	2.3	3.4	-81.8	1.45E+11	84.87	0.01232777	-400
5/14/2008	28.88897338	45	0.327	0.25	1866		3.5	33.3	50.8	38.9	-20.0	1.32E+12	87.41		
5/21/2008	6.898859316	20	0.1	0.079	980	2.95	0.4	-50.0	3.7	2.9	-279.7	1.65E+11	76.02	0.1094918	-1.694915254
5/28/2008	3.449429658	37	0.132	0.065	2420		0.3	18.9	2.4	1.2	-361.5	2.04E+11	90.29		
6/4/2008	26.24030418	230	0.347	0.489	16328	16.4	16.2	87.0	49.0	69.0	38.7	1.05E+13	98.56	2.31523452	81.70731707
6/11/2008	44.4730038	59	0.183	0.359	6896		7.1	49.2	43.8	85.9	16.4	7.50E+12	96.59		
6/18/2008	7.022053232	31.6	0.1	0.151	1553	3.44	0.6	5.1	3.8	5.7	-98.7	2.67E+11	84.87	0.12995854	12.79069767
6/25/2008	16.13840304	39.5	0.1	0.156	1300		1.7	24.1	8.7	13.5	-92.3	5.13E+11	81.92		
7/2/2008	5.482129278	46	0.113	0.17	1733	2.84	0.7	34.8	3.3	5.0	-76.5	2.32E+11	86.44	0.08376255	-5.633802817
7/9/2008	55.56045627	126	0.224	0.431	30760		18.8	76.2	67.0	128.8	30.4	4.18E+13	99.24		
7/16/2008	3.3878327	26.8	0.152	0.115	2420	0.53	0.2	-11.9	2.8	2.1	-160.9	2.01E+11	90.29	0.00966007	-466.0377358
7/23/2008	3.326235741	21	0.106	0.135	1300		0.2	-42.9	1.9	2.4	-122.2	1.06E+11	81.92		

Blue Creek

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9/12/2007	53.0954373	23	0.1	0.062	2420	4.24	3.3	-30.4	28.6	17.7	-383.9	3.14E+12	90.29	1.2111706	29.24528302
9/19/2007	9.24695817	9	0.1	0.043	488	0.466	0.2	-233.3	5.0	2.1	-597.7	1.10E+11	51.84	0.0231829	-543.776824
9/26/2007	7.75551331	13.8	0.1	0.038	1250	0.448	0.3	-117.4	4.2	1.6	-689.5	2.37E+11	81.20	0.0186926	-569.6428571
10/3/2007	8.35209125	3.3	0.1	0.038	200	0.529	0.1	-809.1	4.5	1.7	-689.5	4.09E+10	-17.50	0.0237702	-467.1077505
10/10/2007	8.35209125	3	0.1	0.131	860	0.447	0.1	-900.0	4.5	5.9	-129.0	1.76E+11	72.67	0.0200856	-571.1409396
10/17/2007	13.1247148	13.5	0.699	0.03	225	0.365	0.5	-122.2	49.4	2.1	-900.0	7.22E+10	-4.44	0.025773	-721.9178082
10/24/2007	27.7408745	15	0.1	0.03	23560	0.298	1.1	-100.0	14.9	4.5	-900.0	1.60E+13	99.00	0.0444753	-906.7114094
10/31/2007	11.036692	4.4	0.1	0.1	488	0.42	0.1	-581.8	5.9	5.9	-200.0	1.32E+11	51.84	0.0249385	-614.2857143
11/7/2007	10.1418251	5.6	0.132	0.176	96	0.406	0.2	-435.7	7.2	9.6	-70.5	2.38E+10	-144.79	0.0221526	-638.9162562
11/14/2007	71.5893536	24	0.1	0.153	10760	0.3	4.6	-25.0	38.5	58.9	-96.1	1.88E+13	97.82	0.1155452	-900
11/21/2007	135.124905	6	0.199	0.456	850		2.2	-400.0	144.7	331.5	34.2	2.81E+12	72.35		#DIV/0!
11/28/2007	176.587072	25.5	0.185	1.077	2827		12.1	-17.6	175.8	1023.2	72.1	1.22E+13	91.69		#DIV/0!
12/12/2007	814.328897	300					657.2	90.0							#DIV/0!
12/26/2007	168.831559	28	0.15	0.198			12.7	-7.1	136.2	179.8	-51.5				#DIV/0!
1/16/2008	83.2226236	13	0.1	0.03			2.9	-130.8	44.8	13.4	-900.0				#DIV/0!
1/30/2008	133.931749	26	0.907	0.101			9.4	-15.4	653.5	72.8	-197.0				#DIV/0!
2/6/2008	1348.26616	652	0.524	1.226			2364.7	95.4	3800.9	8893.0	75.5				#DIV/0!
2/20/2008	132.440304	37	0.163	0.348			13.2	18.9	116.1	248.0	13.8				#DIV/0!
3/5/2008	275.9173	178	0.351	0.179			132.1	83.1	521.0	265.7	-67.6				#DIV/0!
3/19/2008	614.475285	680	0.354	1.108			1124.0	95.6	1170.3	3662.9	72.9				#DIV/0!
4/2/2008	278.90019	345	0.164	0.99	4128	0.06	258.8	91.3	246.1	1485.5	69.7	2.82E+13	94.31	0.090029	-4900
4/9/2008	59.6577947	28	0.1	0.159	172	0.04	4.5	-7.1	32.1	51.0	-88.7	2.51E+11	-36.63	0.0128384	-7400
4/16/2008	67.413308	17.5	0.1	0.146	219	0.489	3.2	-71.4	36.3	53.0	-105.5	3.61E+11	-7.31	0.1773523	-513.4969325
4/23/2008	29.5306084	19	0.1	0.012	308	0.1	1.5	-57.9	15.9	1.9	-2400.0	2.23E+11	23.70	0.0158875	-2900
4/30/2008	23.5648289	9	0.1	0.404	291	0.18	0.6	-233.3	12.7	51.2	25.7	1.68E+11	19.24	0.0228202	-1566.666667
5/7/2008	18.4939163	14	0.1	0.112	517	0.4	0.7	-114.3	9.9	11.1	-167.9	2.34E+11	54.55	0.0397989	-650
5/14/2008	139.897529	53	0.223	0.305	1354	1.11	19.9	43.4	167.8	229.6	1.6	4.63E+12	82.64	0.8354401	-170.2702703
5/21/2008	33.408365	15	0.1	0.109	816	0.33	1.3	-100.0	18.0	19.6	-175.2	6.67E+11	71.20	0.0593132	-809.0909091
5/28/2008	16.7041825	12.9	0.1	0.161	308	0.41	0.6	-132.6	9.0	14.5	-86.3	1.26E+11	23.70	0.0368461	-631.7073171
6/4/2008	127.071103	150	0.268	0.443	9768	14.42	51.3	80.0	183.2	302.9	32.3	3.04E+13	97.59	9.8581253	79.19556172
6/11/2008	215.364639	137	0.595	0.599	8212	8.04	79.4	78.1	689.4	694.0	49.9	4.33E+13	97.14	9.3156405	62.68656716
6/18/2008	34.004943	55	0.1	0.362	770	7.06	5.0	45.5	18.3	66.2	17.1	6.41E+11	69.48	1.2916029	57.50708215
6/25/2008	78.151711	21.5	0.1	0.308	461	8.8	4.5	-39.5	42.0	129.5	2.6	8.81E+11	49.02	3.7000146	65.90909091
7/2/2008	26.5477186	31	0.6	0.264	921	4.9	2.2	3.2	85.7	37.7	-13.6	5.98E+11	74.48	0.699851	38.7755102
7/9/2008	269.056654	792	0.107	1.104	30760	2.66	573.2	96.2	154.9	1598.1	72.8	2.02E+14	99.24	3.850416	-12.78195489
7/16/2008	16.4058935	20.7	0.1	0.154	687	0.47	0.9	-44.9	8.8	13.6	-94.8	2.76E+11	65.79	0.0414839	-538.2978723
7/23/2008	16.1076046	30	0.1	0.369	1986	1.12	1.3	0.0	8.7	32.0	18.7	7.83E+11	88.17	0.097058	-167.8571429

St. Marys River - Willshire, Ohio

Sample Date	Calculated Flow (*cfs*)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	689.95	40	0.1	0.299	186	0.58	74.2	36.7	371.2	1109.9	15.3	3.14E+12	-26.34	2.15292526	-336.72168
9/19/2007	26.73	20.5	0.1	0.1	118	0.463	1.5	-124.7	14.4	14.4	-360.5	7.72E+10	-99.15	0.06657749	-894.703064
9/26/2007	19.89	33.6	0.1	0.075	160	0.346	1.8	-0.1	10.7	8.0	-348.2	7.79E+10	-46.88	0.03702577	-871.593237
10/3/2007	16.16	27	0.1	0.144	300	0.423	1.2	-18.4	8.7	12.5	-122.0	1.19E+11	21.67	0.0367783	-655.828189
10/10/2007	14.92	44	0.1	0.066	310	0.349	1.8	28.2	8.0	5.3	-378.5	1.13E+11	24.19	0.0280101	-804.863164
10/17/2007	16.78	42	0.1	0.305	261	0.377	1.9	22.4	9.0	27.5	-6.9	1.07E+11	9.96	0.03403949	-764.679713
10/24/2007	103.80	48	0.132	0.484	1210	0.267	13.4	29.2	73.7	270.3	29.8	3.07E+12	80.58	0.14910964	-1172.09087
10/31/2007	27.97	24.5	0.1	0.031	96	0.42	1.8	-73.0	15.0	4.7	-1267.0	6.57E+10	-144.79	0.0632033	-908.998875
11/7/2007	16.16	11	0.1	0.542	33	0.381	0.5	-207.7	8.7	47.1	37.5	1.30E+10	-612.12	0.03312656	-788.509469
11/14/2007	229.36	41	0.1	0.035	850	0.3	25.3	5.3	123.4	43.2	-1009.3	4.77E+12	72.35	0.37019078	-1194.21932
11/21/2007	92.62	21	0.1	0.03	200		5.2	-275.1	49.8	14.9	-2525.4	4.53E+11	-17.50		
11/28/2007	1174.78	28.2	0.1	0.148	313		89.1	-20.2	632.0	935.4	-129.0	9.00E+12	24.92		
12/12/2007	2492.53	101	0.105	1.241			677.2	72.3	1408.0	16641.6	77.4				
12/26/2007	839.13	38.5	0.1	0.117			86.9	20.0	451.5	528.2	-163.1				
1/16/2008	457.48	41.5	0.1	0.178			51.1	8.7	246.1	438.1	-112.7				
1/30/2008	91.99	10	0.184	0.03			2.5	-208.9	91.1	14.8	-929.7				
2/6/2008	4295.10	352	0.259	0.702			4066.9	92.1	5984.9	16221.6	60.6				
2/20/2008	484.83	71	0.14	0.392			92.6	61.3	365.2	1022.5	30.0				
3/5/2008	2107.15	79	0.162	0.298			447.8	63.2	1836.5	3378.3	2.5				
3/19/2008	1982.83	208	0.1	0.538			1109.4	86.5	1066.8	5739.2	47.9				
4/2/2008	1802.58	98	0.1	0.432	240	0.14	475.2	67.7	969.8	4189.5	26.6	1.06E+13	2.08	1.35770061	-2164.22559
4/9/2008	395.32	92.8	0.1	0.29	56	0.06	98.7	67.9	212.7	616.8	-2.6	5.42E+11	-319.64	0.12761048	-4858.95855
4/16/2008	356.16	36	0.01	0.192	116	0.09	34.5	14.4	19.2	367.9	-60.4	1.01E+12	-102.59	0.17245473	-3322.92946
4/23/2008	242.42	12	0.234	0.261	201	0.13	7.8	-114.2	305.2	340.4	1.5	1.19E+12	-16.92	0.16954537	-1877.12342
4/30/2008	90.75	31	0.1	0.599	68	0.25	7.6	30.9	48.8	292.5	64.2	1.51E+11	-245.59	0.12205929	-757.383238
5/7/2008	110.02	62	0.1	0.118	276	1.58	18.3	61.9	59.2	69.8	-100.2	7.43E+11	14.86	0.93520826	-49.4939581
5/14/2008	1367.47	59	0.224	0.287	316	8.92	217.0	46.7	1648.0	2111.5	-9.6	1.06E+13	25.63	65.6244256	64.74207222
5/21/2008	200.77	34.5	0.1	0.094	58	0.96	18.6	100.0	108.0	101.5	100.0	2.85E+11		1.03693548	100
5/28/2008	77.08	32	0.1	0.173	69	1.48	6.6	29.8	41.5	71.7	-29.9	1.30E+11	-240.58	0.61370743	-51.8725673
6/4/2008	514.05	109	0.241	0.082	1816	14.75	150.7	75.4	666.5	226.8	-227.0	2.28E+13	87.06	40.792048	81.82109832
6/11/2008	820.48	67	0.229	0.439	2472	6.82	147.9	52.7	1010.9	1937.8	27.9	4.96E+13	90.49	30.1048374	53.55962819
6/18/2008	180.88	90	0.1	0.338	260	5.01	43.8	62.9	97.3	328.9	1.3	1.15E+12	9.62	4.87538251	33.42400352
6/25/2008	129.91	82	0.1	0.302	142	10.72	28.7	77.0	69.9	211.1	37.6	4.51E+11	-65.49	7.49236716	82.43117617
7/2/2008	497.26	71	0.1	0.346	308	4.71	95.0	59.6	267.5	925.6	17.1	3.75E+12	23.70	12.6005318	39.13749436
7/9/2008	521.50	324	0.175	0.373	9080	1.93	454.5	93.2	491.0	1046.5	40.8	1.16E+14	97.41	5.4149849	-14.4478977
7/16/2008	94.48	69	0.1	0.192	308	0.4	17.5	51.7	50.8	97.6	-73.4	7.12E+11	23.70	0.20332068	-732.385775
7/23/2008	47.24	58.4	0.1	0.307	114	0.84	7.4	57.0	25.4	78.0	18.3	1.32E+11	-106.14	0.21348672	-198.716772

Martz Ditch

Sample Date	Calculated Flow (*cfs*)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	6.61	29.5	0.1	0.626	980	0.5	0.5	-1.7	3.6	22.3	52.1	1.59E+11	76.02	0.0177873	-500
9/19/2007	1.15	18.4	0.1	0.138	2420	0.351	0.1	-63.0	0.6	0.9	-117.4	6.82E+10	90.29	0.0021747	-754.7008547
9/26/2007	0.97	42.4	6.92	1.16	5172	0.244	0.1	29.2	36.0	6.0	74.1	1.22E+11	95.46	0.0012679	-1129.508197
10/3/2007	1.04	19	5.36	1.118	48840	0.366	0.1	-57.9	30.0	6.3	73.2	1.24E+12	99.52	0.0020481	-719.6721311
10/10/2007	1.04	27	3.74	0.341	4430	0.296	0.1	-11.1	20.9	1.9	12.0	1.13E+11	94.70	0.0016564	-913.5135135
10/17/2007	1.63	87	2.25	1.327	1986	0.337	0.4	65.5	19.8	11.7	77.4	7.94E+10	88.17	0.0029635	-790.2077151
10/24/2007	3.45	10	0.1	0.03	9090	0.336	0.1	-200.0	1.9	0.6	-900.0	7.68E+11	97.41	0.0062452	-792.8571429
10/31/2007	1.37	11.5	0.211	0.03	2420	0.436	0.0	-160.9	1.6	0.2	-900.0	8.14E+10	90.29	0.0032241	-588.0733945
11/7/2007	1.26	13.5	0.643	0.126	1203	0.4	0.0	-122.2	4.4	0.9	-138.1	3.72E+10	80.47	0.0027181	-650
11/14/2007	8.92	10	0.1	0.042	2790	0.29	0.2	-200.0	4.8	2.0	-614.3	6.09E+11	91.58	0.0139101	-934.4827586
11/21/2007	16.83	9.6	0.1	0.11	630		0.4	-212.5	9.1	10.0	-172.7	2.59E+11	62.70		
11/28/2007	21.99	18	0.1	0.173	1095		1.1	-66.7	11.8	20.5	-73.4	5.89E+11	78.54		
12/12/2007	101.41	96	0.1	0.799			26.2	68.8	54.6	435.9	62.5				
12/26/2007	21.03	28	0.1	0.235			1.6	-7.1	11.3	26.6	-27.7				
1/16/2008	10.36	26	0.107	0.1			0.7	-15.4	6.0	5.6	-200.0				
1/30/2008	16.68	29	0.147	0.094			1.3	-3.4	13.2	8.4	-219.1				
2/6/2008	167.91	272	0.254	0.72			122.9	89.0	229.5	650.4	58.3				
2/20/2008	16.49	32	0.173	0.328			1.4	6.2	15.4	29.1	8.5				
3/5/2008	34.36	74	0.399	4.076			6.8	59.5	73.8	753.5	92.6				
3/19/2008	76.53	416	0.23	0.862			85.6	92.8	94.7	354.9	65.2				
4/2/2008	34.73	122	0.1	0.507	1476	0.05	11.4	75.4	18.7	94.7	40.8	1.25E+12	84.08	0.0093434	-5900
4/9/2008	7.43	20.8	0.178	0.113	2420	0.05	0.4	-44.2	7.1	4.5	-165.5	4.40E+11	90.29	0.0019986	-5900
4/16/2008	8.40	15	0.107	0.101	345	0.03	0.3	-100.0	4.8	4.6	-197.0	7.09E+10	31.88	0.001355	-9900
4/23/2008	3.68				579							5.21E+10	59.41		
4/30/2008	2.93	10.5	0.1	0.492	488	0.05	0.1	-185.7	1.6	7.8	39.0	3.50E+10	51.84	0.0007894	-5900
5/7/2008	2.30	7.5	0.1	0.089	866	0.25	0.0	-300.0	1.2	1.1	-237.1	4.88E+10	72.86	0.0030978	-1100
5/14/2008	17.42	46	0.202	0.569	22398		2.2	34.8	18.9	53.3	47.3	9.55E+12	98.95		
5/21/2008	4.16	13.8	0.1	0.089	613	0.84	0.2	-117.4	2.2	2.0	-237.1	6.24E+10	61.66	0.0188026	-257.1428571
5/28/2008	2.08	14.1	0.1	0.059	1553		0.1	-112.8	1.1	0.7	-408.5	7.90E+10	84.87		
6/4/2008	15.83	8.1	0.1	0.069	1120	0.5	0.3	-270.4	8.5	5.9	-334.8	4.34E+11	79.02	0.0425697	-500
6/11/2008	26.82	26	0.171	0.312	1816		1.9	-15.4	24.7	45.0	3.8	1.19E+12	87.06		
6/18/2008	4.23	13.8	0.1	0.151	1733	1.48	0.2	-117.4	2.3	3.4	-98.7	1.80E+11	86.44	0.03372	-102.7027027
6/25/2008	9.73	12.3	0.12	0.188	2420		0.3	-143.9	6.3	9.8	-59.6	5.76E+11	90.29		
7/2/2008	3.31	9	0.1	0.22	2420	1.42	0.1	-233.3	1.8	3.9	-36.4	1.96E+11	90.29	0.025258	-111.2676056
7/9/2008	33.51	98	0.277	0.351	21870		8.8	69.4	49.9	63.3	14.5	1.79E+13	98.93		
7/16/2008	2.04	19.8	0.1	0.18	921	0.06	0.1	-51.5	1.1	2.0	-66.7	4.60E+10	74.48	0.0006595	-4900
7/23/2008	2.01	12.6	0.266	0.27	921		0.1	-138.1	2.9	2.9	-11.1	4.52E+10	74.48		

Yellow Creek

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	16.44	23.5	0.1	0.319	921	0.39	1.0	-27.7	8.8	28.2	6.0	3.70E+11	74.48	0.0344936	-669.230769
9/19/2007	2.86	6.9	0.1	0.322	387	0.334	0.1	-334.8	1.5	5.0	6.8	2.71E+10	39.28	0.0051447	-798.203593
9/26/2007	2.40	12.4	0.79	0.296	9804	0.266	0.1	-141.9	10.2	3.8	-1.4	5.76E+11	97.60	0.0034364	-1027.81955
10/3/2007	2.59	9.5	0.596	0.424	11690	0.307	0.1	-215.8	8.3	5.9	29.2	7.40E+11	97.99	0.0042712	-877.198697
10/10/2007	2.59	9	0.665	0.03	100	0.225	0.1	-233.3	9.3	0.4	-900.0	6.33E+09	-135.00	0.0031304	-1233.33333
10/17/2007	4.06	148	0.1	0.577	1414	0.214	1.6	79.7	2.2	12.6	48.0	1.41E+11	83.38	0.0046786	-1301.86916
10/24/2007	8.59	6	0.1	0.702	4800	0.363	0.1	-400.0	4.6	32.4	57.3	1.01E+12	95.10	0.0167743	-726.446281
10/31/2007	3.42	8.4	0.1	0.03	185	0.481	0.1	-257.1	1.8	0.6	-900.0	1.55E+10	-27.03	0.008843	-523.700624
11/7/2007	3.14	9.5	0.1	0.113	157	0.385	0.1	-215.8	1.7	1.9	-165.5	1.21E+10	-49.68	0.0065042	-679.220779
11/14/2007	22.17	25	0.1	0.277	2750	0.13	1.5	-20.0	11.9	33.0	-8.3	1.49E+12	91.45	0.0155027	-2207.69231
11/21/2007	41.84	5	0.1	0.079	740		0.6	-500.0	22.5	17.8	-279.7	7.57E+11	68.24		
11/28/2007	54.68	26.5	0.155	0.247	775		3.9	-13.2	45.6	72.7	-21.5	1.04E+12	69.68		
12/12/2007	252.14	140	0.143	0.902			95.0	78.6	194.0	1223.6	66.7				
12/26/2007	52.27	35.5	0.1	0.037			5.0	15.5	28.1	10.4	-710.8				
1/16/2008	25.77	34.5	0.166	0.03			2.4	13.0	23.0	4.2	-900.0				
1/30/2008	41.47	FROZE	FROZE	FROZE			FROZE	FROZE	FROZE	FROZE	FROZE				
2/6/2008	417.46	360	0.324	0.678			404.3	91.7	727.7	1522.7	55.8				
2/20/2008	41.01	34	0.199	0.309			3.8	11.8	43.9	68.2	2.9				
3/5/2008	85.43	73	0.504	0.429			16.8	58.9	231.6	197.2	30.1				
3/19/2008	190.26	460	0.31	0.888			235.4	93.5	317.3	908.9	66.2				
4/2/2008	86.35	146	0.1	0.557	1340	0.08	33.9	79.5	46.5	258.8	46.1	2.83E+12	82.46	0.0371668	-3650
4/9/2008	18.47	26.8	0.1	0.185	194	0.03	1.3	-11.9	9.9	18.4	-62.2	8.77E+10	-21.13	0.0029813	-9900
4/16/2008	20.87	10.5	0.1	0.133	96	0.03	0.6	-185.7	11.2	14.9	-125.6	4.90E+10	-144.79	0.0033689	-9900
4/23/2008	9.14				411							9.19E+10	42.82		
4/30/2008	7.30	11	0.1	0.411	1553	0.08	0.2	-172.7	3.9	16.1	27.0	2.77E+11	84.87	0.0031403	-3650
5/7/2008	5.73	12.3	0.1	0.124	687	0.14	0.2	-143.9	3.1	3.8	-141.9	9.62E+10	65.79	0.0043129	-2042.85714
5/14/2008	43.32	45	0.278	0.651	15402		5.2	33.3	64.8	151.7	53.9	1.63E+13	98.47		
5/21/2008	10.34	15.9	0.1	0.089	517	0.21	0.4	-88.7	5.6	5.0	-237.1	1.31E+11	54.55	0.0116867	-1328.57143
5/28/2008	5.17	22.4	0.1	0.107	980		0.3	-33.9	2.8	3.0	-180.4	1.24E+11	76.02		
6/4/2008	39.34	28	0.107	0.166	1733	3.19	3.0	-7.1	22.6	35.1	-80.7	1.67E+12	86.44	0.675234	5.956112853
6/11/2008	66.68	37.5	0.251	0.286	2668		6.7	20.0	90.0	102.6	-4.9	4.35E+12	91.19		
6/18/2008	10.53	26.8	0.1	0.275	1553	2.79	0.8	-11.9	5.7	15.6	-9.1	4.00E+11	84.87	0.1580386	-7.52688172
6/25/2008	24.20	26	0.1	0.2	921		1.7	-15.4	13.0	26.0	-50.0	5.45E+11	74.48		
7/2/2008	8.22	25.5	0.1	0.182	1414	10.42	0.6	-17.6	4.4	8.0	-64.8	2.84E+11	83.38	0.4607993	71.20921305
7/9/2008	83.31	142	0.213	0.272	30760		31.8	78.9	95.5	121.9	-10.3	6.27E+13	99.24		
7/16/2008	5.08	27	0.1	0.167	1203	0.52	0.4	-11.1	2.7	4.6	-79.6	1.50E+11	80.47	0.0142109	-476.923077
7/23/2008	4.99	17.7	0.1	0.276	1120		0.2	-69.5	2.7	7.4	-8.7	1.37E+11	79.02		

Borum Run

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	9.27	8.3	0.1	0.096	345	0.26	0.2	-261.4	5.0	4.8	-212.5	7.83E+10	31.88	0.01297001	-1053.846154
9/19/2007	1.61	18	0.1	0.062	10	0.37	0.1	-66.7	0.9	0.5	-383.9	3.95E+08	-2250.00	0.00321448	-710.8108108
9/26/2007	1.35	15.6	0.1	0.121	3873	0.435	0.1	-92.3	0.7	0.9	-147.9	1.28E+11	93.93	0.00316964	-589.6551724
10/3/2007	1.46	11	0.1	0.238	100	0.449	0.0	-172.7	0.8	1.9	-26.1	3.57E+09	-135.00	0.00352331	-568.1514477
10/10/2007	1.46	5	0.1	0.03	100	0.381	0.0	-500.0	0.8	0.2	-900.0	3.57E+09	-135.00	0.00298972	-687.4015748
10/17/2007	2.29	4.2	0.1	0.085	411	0.42	0.0	-614.3	1.2	1.0	-252.9	2.30E+10	42.82	0.00517904	-614.2857143
10/24/2007	4.84	2	0.1	0.828	2430	0.367	0.0	-1400.0	2.6	21.6	63.8	2.88E+11	90.33	0.00956525	-717.4386921
10/31/2007	1.93	3	0.1	0.03	33	0.59	0.0	-900.0	1.0	0.3	-900.0	1.56E+09	-612.12	0.00611788	-408.4745763
11/7/2007	1.77	6	0.1	0.09	1	0.418	0.0	-400.0	1.0	0.9	-233.3	4.33E+07	-23400.00	0.00398293	-617.7033493
11/14/2007	12.50	7	0.1	0.432	630	0.1	0.2	-328.6	6.7	29.1	30.6	1.93E+11	62.70	0.00672602	-2900
11/21/2007	23.60	5.5	0.1	0.03	100		0.3	-445.5	12.7	3.8	-900.0	5.77E+10	-135.00		
11/28/2007	30.84	23.5	0.1	0.03	321		1.9	-27.7	16.6	5.0	-900.0	2.42E+11	26.79		
12/12/2007	142.21	208	0.1	0.635			79.6	85.6	76.5	485.8	52.8				
12/26/2007	29.48	23.5	0.1	0.103			1.9	-27.7	15.9	16.3	-191.3				
1/16/2008	14.53	12.9	0.1	0.03			0.5	-132.6	7.8	2.3	-900.0				
1/30/2008	23.39	26	0.302	0.359			1.6	-15.4	38.0	45.2	16.4				
2/6/2008	235.45	576	0.121	0.556			364.8	94.8	153.3	704.3	46.0				
2/20/2008	23.13	12	0.102	0.194			0.7	-150.0	12.7	24.1	-54.6				
3/5/2008	48.18	58	0.1	0.256			7.5	48.3	25.9	66.4	-17.2				
3/19/2008	107.31	752	0.1	0.836			217.1	96.0	57.7	482.6	64.1				
4/2/2008	48.71	110	0.123	0.406	778	0.04	14.4	72.7	32.2	106.4	26.1	9.27E+11	69.79	0.01048139	-7400
4/9/2008	10.42	13.2	0.1	0.093	308	0.05	0.4	-127.3	5.6	5.2	-222.6	7.85E+10	23.70	0.00280251	-5900
4/16/2008	11.77	5.1	0.1	0.133	148	0.03	0.2	-488.2	6.3	8.4	-125.6	4.26E+10	-58.78	0.0019001	-9900
4/23/2008	5.16				70							8.83E+09	-235.71		
4/30/2008	4.12	10.5	0.01	0.58	184	0.12	0.1	-185.7	0.2	12.8	48.3	1.85E+10	-27.72	0.00265678	-2400
5/7/2008	3.23	3.3	0.1	0.089	365	0.25	0.0	-809.1	1.7	1.5	-237.1	2.88E+10	35.62	0.00434389	-1100
5/14/2008	24.43	45	0.186	0.478	5510		3.0	33.3	24.4	62.8	37.2	3.29E+12	95.74		
5/21/2008	5.83	7.2	0.1	0.013	461	0.7	0.1	-316.7	3.1	0.4	-2207.7	6.58E+10	49.02	0.02197167	-328.5714286
5/28/2008	2.92	4.8	0.1	0.095	250		0.0	-525.0	1.6	1.5	-215.8	1.78E+10	6.00		
6/4/2008	22.19	30	0.1	0.056	3444	1.31	1.8	0.0	11.9	6.7	-435.7	1.87E+12	93.18	0.15639685	-129.0076336
6/11/2008	37.61	23.7	1.21	0.179	1864		2.4	-26.6	244.8	36.2	-67.6	1.72E+12	87.39		
6/18/2008	5.94	17.1	0.1	0.132	1203	4.82	0.3	-75.4	3.2	4.2	-127.3	1.75E+11	80.47	0.15399229	37.7593361
6/25/2008	13.65	12.8	0.1	0.131	517		0.5	-134.4	7.3	9.6	-129.0	1.73E+11	54.55		
7/2/2008	4.64	16.2	0.1	0.144	866	8.59	0.2	-85.2	2.5	3.6	-108.3	9.82E+10	72.86	0.21425465	65.07566938
7/9/2008	46.99	54.5	0.1	0.084	3590		6.9	45.0	25.3	21.2	-257.1	4.13E+12	93.45		
7/16/2008	2.87	12.3	0.1	0.076	1203	0.46	0.1	-143.9	1.5	1.2	-294.7	8.43E+10	80.47	0.00709035	-552.173913
7/23/2008	2.81	14.8	0.1	0.153	1046		0.1	-102.7	1.5	2.3	-96.1	7.20E+10	77.53		

Holthouse Ditch

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	18.71	25	0.1	0.666	461	0.89	1.3	-20.0	10.1	67.1	55.0	2.11E+11	49.02	0.08960488	-237.0786517
9/19/2007	3.26	25.5	0.1	0.164	127	0.31	0.2	-17.6	1.8	2.9	-82.9	1.01E+10	-85.04	0.00543557	-867.7419355
9/26/2007	2.73	24.4	0.1	0.315	203	0.282	0.2	-23.0	1.5	4.6	4.8	1.36E+10	-15.76	0.0041471	-963.8297872
10/3/2007	2.94	8	0.1	0.451	100	0.321	0.1	-275.0	1.6	7.1	33.5	7.20E+09	-135.00	0.00508376	-834.5794393
10/10/2007	2.94	24	0.1	0.797	980	0.262	0.2	-25.0	1.6	12.6	62.4	7.06E+10	76.02	0.00414936	-1045.038168
10/17/2007	4.63	16.4	0.1	0.486	61	0.319	0.2	-82.9	2.5	12.1	38.3	6.90E+09	-285.25	0.00793899	-840.4388715
10/24/2007	9.78	14	0.1	0.624	2650	0.335	0.4	-114.3	5.3	32.8	51.9	6.34E+11	91.13	0.01762177	-795.5223881
10/31/2007	3.89	6.8	0.1	0.03	34	0.454	0.1	-341.2	2.1	0.6	-900.0	3.24E+09	-591.18	0.00950122	-560.7929515
11/7/2007	3.57	6	0.1	0.243	22	0.355	0.1	-400.0	1.9	4.7	-23.5	1.92E+09	-968.18	0.00682698	-745.0704225
11/14/2007	25.23	20	0.1	0.492	1080	0.19	1.4	-50.0	13.6	66.8	39.0	6.67E+11	78.24	0.02579209	-1478.947368
11/21/2007	47.63	13.5	0.1	0.079	100		1.7	-122.2	25.6	20.2	-279.7	1.17E+11	-135.00		
11/28/2007	62.24	25.5	0.1	0.586	977		4.3	-17.6	33.5	196.2	48.8	1.49E+12	75.95		
12/12/2007	287.01	190	0.1	0.302			146.7	84.2	154.4	466.3	0.7				
12/26/2007	59.51	19	0.431	0.271			3.0	-57.9	138.0	86.8	-10.7				
1/16/2008	29.33	21	0.112	0.165			1.7	-42.9	17.7	26.0	-81.8				
1/30/2008	47.20	29	0.367	0.087			3.7	-3.4	93.2	22.1	-244.8				
2/6/2008	475.20	624	0.198	1.074			797.7	95.2	506.2	2745.8	72.1				
2/20/2008	46.68	25	0.166	0.328			3.1	-20.0	41.7	82.4	8.5				
3/5/2008	97.25	64	0.156	0.461			16.7	53.1	81.6	241.2	34.9				
3/19/2008	216.57	720	0.163	1.166			419.5	95.8	189.9	1358.6	74.3				
4/2/2008	98.30	130	0.1	0.62	320	0.13	34.4	76.9	52.9	327.9	51.6	7.70E+11	26.56	0.06875062	-2207.692308
4/9/2008	21.03	15	0.1	0.721	225	0.03	0.8	-100.0	11.3	81.6	58.4	1.16E+11	-4.44	0.0033937	-9900
4/16/2008	23.76	6	0.1	0.009	228	0.08	0.4	-400.0	12.8	1.2	-3233.3	1.33E+11	-3.07	0.01022634	-3650
4/23/2008	10.41				579							1.47E+11	59.41		
4/30/2008	8.31	10	0.1	0.436	64	0.21	0.2	-200.0	4.5	19.5	31.2	1.30E+10	-267.19	0.00938357	-1328.571429
5/7/2008	6.52	14.1	0.1	0.341	1553	0.82	0.2	-112.8	3.5	12.0	12.0	2.48E+11	84.87	0.02875592	-265.8536585
5/14/2008	49.31	72	0.205	0.569	2752		9.5	58.3	54.4	150.9	47.3	3.32E+12	91.46		
5/21/2008	11.77	12	0.1	0.058	435	0.55	0.4	-150.0	6.3	3.7	-417.2	1.25E+11	45.98	0.03484194	-445.4545455
5/28/2008	5.89	13.8	0.1	0.119	770		0.2	-117.4	3.2	3.8	-152.1	1.11E+11	69.48		
6/4/2008	44.79	44.5	0.1	0.265	1918	6.63	5.4	32.6	24.1	63.9	-13.2	2.10E+12	87.75	1.59751443	54.75113122
6/11/2008	75.91	46	1.65	0.452	2044		9.4	34.8	673.8	184.6	33.6	3.80E+12	88.50		
6/18/2008	11.99	35.5	0.1	0.232	866	2.96	1.1	15.5	6.4	15.0	-29.3	2.54E+11	72.86	0.19086145	-1.351351351
6/25/2008	27.54	32	0.1	0.15	1553		2.4	6.3	14.8	22.2	-100.0	1.05E+12	84.87		
7/2/2008	9.36	19.2	0.1	0.182	1414	0.91	0.5	-56.3	5.0	9.2	-64.8	3.24E+11	83.38	0.04580924	-229.6703297
7/9/2008	94.83	127	0.1	0.163	8600		32.4	76.4	51.0	83.2	-84.0	2.00E+13	97.27		
7/16/2008	5.78	20	0.1	0.167	1046	0.57	0.3	-50.0	3.1	5.2	-79.6	1.48E+11	77.53	0.01773206	-426.3157895
7/23/2008	5.68	26.5	0.121	0.326	387		0.4	-13.2	3.7	10.0	8.0	5.38E+10	39.28		

Gerke Ditch

Sample Date	Calculated Flow (*cfs*)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	7.39	13.2	0.1	0.149	613	0.5	0.26243	-127.27273	3.97621	5.92455	-101.34228	1.11E+11	61.66	0.01988104	-500
9/19/2007	1.29	10.8	0.1	0.107	770	0.377	0.03739	-177.77778	0.69249	0.74096	-180.37383	2.42E+10	69.48	0.00261067	-695.7559682
9/26/2007	1.08	12.8	0.303	0.114	211	0.347	0.03717	-134.37500	1.75981	0.66211	-163.15789	5.57E+09	-11.37	0.00201536	-764.5533141
10/3/2007	1.16	9.5	0.1	0.118	100	0.399	0.02971	-215.78947	0.62547	0.73806	-154.23729	2.84E+09	-135.00	0.00249563	-651.8796992
10/10/2007	1.16	39	0.1	0.1	970	0.314	0.12197	23.07692	0.62547	0.62547	-200.00000	2.76E+10	75.77	0.00196398	-855.4140127
10/17/2007	1.83	13.2	0.273	0.241	2420	0.351	0.06487	-127.27273	2.68327	2.36875	-24.48133	1.08E+11	90.29	0.00344992	-754.7008547
10/24/2007	3.86	25	0.1	0.789	1350	0.373	0.25968	-20.00000	2.07746	16.39114	61.97719	1.28E+11	82.59	0.00774892	-704.2895442
10/31/2007	1.54	6.4	0.1	0.03	365	0.485	0.02645	-368.75000	0.82652	0.24795	-900.00000	1.37E+10	35.62	0.0040086	-518.556701
11/7/2007	1.41	3.9	0.1	0.146	727	0.409	0.01481	-669.23077	0.75950	1.10887	-105.47945	2.51E+10	67.68	0.00310636	-633.4963325
11/14/2007	9.97	10.5	0.1	0.223	1340	0.08	0.28146	-185.71429	5.36118	11.95543	-34.52915	3.27E+11	82.46	0.00428894	-3650
11/21/2007	18.81	8.5	0.234	0.166	1340		0.43007	-252.94118	23.67899	16.79792	-80.72289	6.17E+11	82.46		
11/28/2007	24.58	13	0.1	0.327	1842		0.85958	-130.76923	13.22424	43.24328	8.25688	1.11E+12	87.24		
12/12/2007	113.35	140	0.1	0.46			42.68840	78.57143	60.98343	280.52376	34.78261				
12/26/2007	23.50	9.6	0.1	0.066			0.60689	-212.50000	12.64345	8.34468	-354.54545				
1/16/2008	11.58	5.7	0.129	0.085			0.17762	-426.31579	8.03976	5.29752	-252.94118				
1/30/2008	18.64	FROZE	FROZE	FROZE			FROZE	FROZE	FROZE	FROZE	FROZE				
2/6/2008	187.67	480	0.147	0.708			242.32535	93.75000	148.42427	714.85977	57.62712				
2/20/2008	18.44	FROZE	FROZE	FROZE			FROZE	FROZE	FROZE	FROZE	FROZE				
3/5/2008	38.41	47	0.131	0.858			4.85578	36.17021	27.06838	177.28753	65.03497				
3/19/2008	85.53	620	0.1	1.056			142.65207	95.16129	46.01680	485.93738	71.59091				
4/2/2008	38.82	96	0.1	0.356	374	0	10.02541	68.75000	20.88626	74.35510	15.73034	3.55E+11	37.17		
4/9/2008	8.30	12.6	0.1	0.093	816	0.06	0.28146	-138.09524	4.46765	4.15491	-222.58065	1.66E+11	71.20	0.00268059	-4900
4/16/2008	9.38	5.4	0.1	0.074	179	0.05	0.13631	-455.55556	5.04844	3.73585	-305.40541	4.11E+10	-31.28	0.00252422	-5900
4/23/2008	4.11				126							1.27E+10	-86.51		
4/30/2008	3.28	9.5	0.01	0.947	185	0.27	0.08382	-215.78947	0.17647	16.71192	68.32101	1.48E+10	-27.03	0.00476475	-1011.111111
5/7/2008	2.57	11.4	0.1	0.177	770	2.67	0.07894	-163.15789	1.38497	2.45140	-69.49153	4.85E+10	69.48	0.03697874	-12.35955056
5/14/2008	19.47	165	0.133	0.998	3564		8.64323	81.81818	13.93393	104.55686	69.93988	1.70E+12	93.41		
5/21/2008	4.65	9.9	0.1	0.043	461	0.51	0.12384	-203.03030	2.50188	1.07581	-597.67442	5.25E+10	49.02	0.01275961	-488.2352941
5/28/2008	2.33	5.4	0.1	0.059	387		0.03378	-455.55556	1.25094	0.73806	-408.47458	2.20E+10	39.28		
6/4/2008	17.69	40.5	0.141	0.204	1508	9.16	1.92701	25.92593	13.41769	19.41283	-47.05882	6.53E+11	84.42	0.87167429	67.2489083
6/11/2008	29.98	49	0.675	0.306	2374		3.95141	38.77551	108.86547	49.35234	1.96078	1.74E+12	90.10		
6/18/2008	4.73	24	0.1	0.157	687	2.09	0.30559	-25.00000	2.54656	3.99810	-91.08280	7.96E+10	65.79	0.05322312	-43.54066986
6/25/2008	10.88	24.5	0.14	0.162	1300		0.71695	-22.44898	8.19367	9.48125	-85.18519	3.46E+11	81.92		
7/2/2008	3.70	16.4	0.119	0.264	1120	1.58	0.16302	-82.92683	2.36584	5.24860	-13.63636	1.01E+11	79.02	0.03141205	-89.87341772
7/9/2008	37.45	88	0.1	0.055	4710		8.86561	65.90909	20.14910	11.08201	-445.45455	4.32E+12	95.01		
7/16/2008	2.28	12.3	0.1	0.18	326	0.89	0.07556	-143.90244	1.22860	2.21149	-66.66667	1.82E+10	27.91	0.01093457	-237.0786517
7/23/2008	2.24	12.4	0.1	0.202	411		0.07479	-141.93548	1.20627	2.43666	-48.51485	2.25E+10	42.82		

Nickelson Creek

Sample Date	Calculated Flow (*cfs*)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	8.85	3	0.1	0.214	179	0.46	0.1	-900.0	4.8	10.2	-40.2	3.88E+10	-31.28	0.02190847	-552.173913
9/19/2007	1.54	3.2	0.1	0.081	201	0.378	0.0	-837.5	0.8	0.7	-270.4	7.58E+09	-16.92	0.00313536	-693.6507937
9/26/2007	1.29	10.4	0.1	0.205	327	0.321	0.0	-188.5	0.7	1.4	-46.3	1.03E+10	28.13	0.00223312	-834.5794393
10/3/2007	1.39	8.8	0.1	0.218	200	0.403	0.0	-240.9	0.7	1.6	-37.6	6.81E+09	-17.50	0.00301924	-644.4168734
10/10/2007	1.39	5	0.1	0.214	100	0.307	0.0	-500.0	0.7	1.6	-40.2	3.41E+09	-135.00	0.00230002	-877.1986971
10/17/2007	2.19	4.4	0.1	0.137	435	0.373	0.0	-581.8	1.2	1.6	-119.0	2.33E+10	45.98	0.00439133	-704.2895442
10/24/2007	4.63	0.8	0.1	0.722	1810	0.35	0.0	-3650.0	2.5	18.0	58.4	2.05E+11	87.02	0.00870934	-757.1428571
10/31/2007	1.84	3.3	0.1	0.03	548	0.456	0.0	-809.1	1.0	0.3	-900.0	2.47E+10	57.12	0.00451441	-557.8947368
11/7/2007	1.69	7.8	0.1	0.185	173	0.412	0.0	-284.6	0.9	1.7	-62.2	7.16E+09	-35.84	0.00374809	-628.1553398
11/14/2007	11.94	9	0.1	0.089	1320	0.16	0.3	-233.3	6.4	5.7	-237.1	3.85E+11	82.20	0.01027461	-1775
11/21/2007	22.53	25.6	0.245	0.353	7540		1.6	-17.2	29.7	42.8	15.0	4.16E+12	96.88		
11/28/2007	29.44	14	0.1	0.16	821		1.1	-114.3	15.8	25.3	-87.5	5.91E+11	71.38		
12/12/2007	135.77	117	0.1	0.732			42.7	74.4	73.0	534.7	59.0				
12/26/2007	28.15	14.1	0.112	0.191			1.1	-112.8	17.0	28.9	-57.1				
1/16/2008	13.88	8.1	0.1	0.067			0.3	-270.4	7.5	5.0	-347.8				
1/30/2008	22.33	19	0.305	0.03			1.1		36.6	3.6					
2/6/2008	224.80	396	0.149	0.58			239.5	92.4	180.2	701.5	48.3				
2/20/2008	22.08	10	0.111	0.15			0.6		13.2	17.8					
3/5/2008	46.00	53	0.11	5.409			6.6	43.4	27.2	1338.7	94.5				
3/19/2008	102.45	456	0.1	0.791			125.7	93.4	55.1	436.0	62.1				
4/2/2008	46.50	68	0.1	0.362	1666	0	8.5	55.9	25.0	90.6	17.1	1.90E+12	85.89		
4/9/2008	9.95	10.5	0.1	0.1	272	0	0.3	-185.7	5.4	5.4	-200.0	6.62E+10	13.60		
4/16/2008	11.24	5.1	0.1	0.087	142	0.13	0.2	-488.2	6.0	5.3	-244.8	3.90E+10	-65.49	0.00786115	-2207.692308
4/23/2008	4.92				770							9.28E+10	69.48		
4/30/2008	3.93	9.5	0.1	0.947	185	0.27	0.1	-215.8	2.1	20.0	68.3	1.78E+10	-27.03	0.00570723	-1011.111111
5/7/2008	3.08	6	0.1	0.259	517	2.34	0.0	-400.0	1.7	4.3	-15.8	3.90E+10	54.55	0.03881877	-28.20512821
5/14/2008	23.33	98	0.24	0.615	4280		6.1	69.4	30.1	77.2	51.2	2.44E+12	94.51		
5/21/2008	5.57	6.3	0.113	0.043	214	1.35	0.1	-376.2	3.4	1.3	-597.7	2.92E+10	-9.81	0.04045629	-122.2222222
5/28/2008	2.79	4.5	0.1	0.059	285		0.0	-566.7	1.5	0.9	-408.5	1.94E+10	17.54		
6/4/2008	21.19	11.1	0.118	0.146	1553	1.2	0.6	-170.3	13.5	16.6	-105.5	8.05E+11	84.87	0.13678079	-150
6/11/2008	35.91	31.5	0.221	0.352	3870		3.0	4.8	42.7	68.0	14.8	3.40E+12	93.93		
6/18/2008	5.67	6.6	0.1	0.126	548	2.12	0.1	-354.5	3.1	3.8	-138.1	7.60E+10	57.12	0.06466585	-41.50943396
6/25/2008	13.03	8.4	0.1	0.245	2420		0.3	-257.1	7.0	17.2	-22.4	7.71E+11	90.29		
7/2/2008	4.43	4.5	0.1	0.088	517	0.93	0.1	-566.7	2.4	2.1	-240.9	5.60E+10	54.55	0.02214661	-222.5806452
7/9/2008	44.86	31.5	0.108	0.364	2530		3.8	4.8	26.1	87.9	17.6	2.78E+12	90.71		
7/16/2008	2.74	16	0.1	0.192	1203	0.56	0.1	-87.5	1.5	2.8	-56.3	8.05E+10	80.47	0.0082411	-435.7142857
7/23/2008	2.69	20.5	0.1	0.474	687		0.1	-46.3	1.4	6.8	36.7	4.51E+10	65.79		

St. Marys River - Poe, IN

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
9/12/2007	1102.32	118	0.1	0.352	770	0.56	349.9	74.6	593.1	2087.5	14.8	2.08E+13	69.48	3.32108417	-435.714286
9/19/2007	77.64	28	0.1	0.17	276	0.37	5.8	-7.1	41.8	71.0	-76.5	5.24E+11	14.86	0.15455418	-710.810811
9/26/2007	42.18	33.6	0.1	0.218	75	0.346	3.8	10.7	22.7	49.5	-37.6	7.74E+10	-213.33	0.0785096	-767.052023
10/3/2007	32.59	35	0.1	0.238	100	0.422	3.1	14.3	17.5	41.7	-26.1	7.97E+10	-135.00	0.07399211	-610.900474
10/10/2007	29.71	32	0.1	0.086	100	0.344	2.6	6.3	16.0	13.7	-248.8	7.27E+10	-135.00	0.05499385	-772.093023
10/17/2007	34.51	35.2	0.1	0.169	291	0.391	3.3	14.8	18.6	31.4	-77.5	2.46E+11	19.24	0.07258941	-667.263427
10/24/2007	222.38	17	0.1	0.741	8570	0.333	10.2	-76.5	119.6	886.5	59.5	4.66E+13	97.26	0.39840633	-800.900901
10/31/2007	74.77	19.2	0.1	0.03	40	0.408	3.9	-56.3	40.2	12.1	-900.0	7.32E+10	-487.50	0.16411519	-635.294118
11/7/2007	34.51	10	0.1	0.269	52	0.392	0.9	-200.0	18.6	49.9	-11.5	4.39E+10	-351.92	0.07277506	-665.306122
11/14/2007	561.71	51	0.1	0.526	1480	0.38	77.1	41.2	302.2	1589.6	43.0	2.03E+13	84.12	1.14835252	-689.473684
11/21/2007	460.10	16.2	0.1	0.03	100		20.1	-85.2	247.5	74.3	-900.0	1.13E+12	-135.00		
11/28/2007	2511.38	48.8	0.103	0.03	1733		329.7	38.5	1391.7	405.3	-900.0	1.06E+14	86.44		
12/12/2007	4399.71	179	0.273	0.853			2118.5	83.2	6462.0	20190.9	64.8				
12/26/2007	1629.52	32.5	0.1	0.187			142.5	7.7	876.7	1639.4	-60.4				
1/16/2008	1092.74	50	0.1	0.187			147.0	40.0	587.9	1099.4	-60.4				
1/30/2008	179.25	22	0.929	0.269			10.6		895.9	259.4					
2/6/2008	7486.22	544	0.392	0.361			10955.0	94.5	15788.1	14539.6	16.9				
2/20/2008	839.68	83	0.149	0.322			187.5		673.1	1454.6					
3/5/2008	3862.93	154	0.242	4.465			1600.3	80.5	5029.4	92794.1	93.3				
3/19/2008	3508.27	232	0.14	0.544			2189.4	87.1	2642.4	10267.7	44.9				
4/2/2008	3604.12	288	0.1	0.827	1024	0	2792.2	89.6	1939.0	16035.7	63.7	9.03E+13	77.05		
4/9/2008	741.91	94.4	0.1	0.362	649	0.11	188.4	68.2	399.1	1444.9	17.1	1.18E+13	63.79	0.43906383	-2627.27273
4/16/2008	692.07	65.5	0.1	0.304	150	0.04	121.9	54.2	372.3	1131.9	1.3	2.54E+12	-56.67	0.14893309	-7400
4/23/2008	393.00	176	0.411	0.418	276	0.1	186.1		869.0	883.8		2.65E+12	14.86	0.21143548	-2900
4/30/2008	122.69	35	0.01	0.997	127	0.16	11.6	14.3	6.6	658.1	69.9	3.81E+11	-85.04	0.1056146	-1775
5/7/2008	163.91	55	0.1	0.212	197	2.53	24.3	45.5	88.2	187.0	-41.5	7.90E+11	-19.29	2.2310569	-18.5770751
5/14/2008	2712.68	52	0.272	0.679	530	8.92	379.4	42.3	3969.6	9909.5	55.8	3.52E+13	55.66	130.180311	66.367713
5/21/2008	0.00	27.5	0.1	0.145	152	2.72									
5/28/2008	109.27	24	0.1	0.119	64	2.09	7.1	-25.0	58.8	70.0	-152.1	1.71E+11	-267.19	1.228698	-43.5406699
6/4/2008	869.40	212	0.162	0.405	1146	16.4	495.8	85.8	757.7	1894.3	25.9	2.44E+13	79.49	76.7087931	81.70731707
6/11/2008	1639.11	231	0.948	0.686	5702	8.04	1018.5	87.0	8359.8	6049.4	56.3	2.29E+14	95.88	70.89999	62.68656716
6/18/2008	380.54	29	0.1	0.35	770	4.21	29.7	-3.4	204.7	716.6	14.3	7.17E+12	69.48	8.61919324	28.74109264
6/25/2008	154.33	71	0.1	0.219	214	4.36	29.5	57.7	83.0	181.8	-37.0	8.08E+11	-9.81	3.61998174	31.19266055
7/2/2008	899.11	90	0.1	0.34	649	5.38	217.7	66.7	483.7	1644.7	11.8	1.43E+13	63.79	26.0243043	44.23791822
7/9/2008	726.58	131	0.1	0.033	4320	1.22	256.0	77.1	390.9	129.0	-809.1	7.68E+13	94.56	4.7689531	-145.901639
7/16/2008	198.42	74	0.1	0.18	194	1.38	39.5	59.5	106.7	192.1	-66.7	9.42E+11	-21.13	1.47313805	-117.391304
7/23/2008	74.77	56.8	0.1	0.283	147	1.6	11.4	47.2	40.2	113.8	-6.0	2.69E+11	-59.86	0.64358898	-87.5

Upper Gates Ditch

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	3.25	46	0.334	0.267	613	0.08	0.4	34.8	5.8	4.7	-12.4	4.88E+10	61.66	0.0013998	-3650
4/30/2008	2.60														
5/7/2008	2.04	48	0.542	0.048	1414		0.3	37.5	5.9	0.5	-525.0	7.05E+10	83.38		
5/14/2008	15.41	91	0.437	0.314	4374	0.61	3.8	67.0	36.2	26.0	4.5	1.65E+12	94.63	0.05056418	-391.803279
5/21/2008	3.68	51.5	0.346	0.18	1203		0.5	41.7	6.8	3.6	-66.7	1.08E+11	80.47		
5/28/2008	1.84	72	0.496	0.293	613	0.177	0.4	58.3	4.9	2.9	-2.4	2.76E+10	61.66	0.00175187	-1594.91525
6/4/2008	13.99	586	3.7	1.664	48392		22.1	94.9	278.6	125.3	82.0	1.66E+13	99.51		
6/11/2008	23.72	98	0.453	0.486	8704	9.45	6.3	69.4	57.8	62.0	38.3	5.05E+12	97.30	1.20589439	68.25396825
6/18/2008	3.75	109	0.448	0.599	1046		1.1	72.5	9.0	12.1	49.9	9.58E+10	77.53		
6/25/2008	8.61	90	0.792	0.035	1986	2.86	2.1	66.7	36.7	1.6	-757.1	4.18E+11	88.17	0.13243647	-4.8951049
7/2/2008	2.92	92	0.464	0.724	2420		0.7	67.4	7.3	11.4	58.6	1.73E+11	90.29		
7/9/2008	29.63	203	0.13	0.424	38730	4.61	16.2	85.2	20.7	67.6	29.2	2.81E+13	99.39	0.73493297	34.92407809
7/16/2008	1.81	64	0.202	0.321	2420		0.3	53.1	2.0	3.1	6.5	1.07E+11	90.29		
7/23/2008	1.77	172	0.668	1.121	2420	0.48	0.8	82.6	6.4	10.7	73.2	1.05E+11	90.29	0.00458116	-525

Upper Blue Creek

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	8.96	11.5	0.1	0.228	291	6	0.3	-160.9	4.8	11.0	-31.6	6.38E+10	19.24	0.28931594	50
4/30/2008	7.15														
5/7/2008	5.61	17.5	0.1	0.276	1414		0.3	-71.4	3.0	8.3	-8.7	1.94E+11	83.38		
5/14/2008	42.46	110	0.269	0.04	3684	0.8	12.6	72.7	61.4	9.1	-650.0	3.83E+12	93.62	0.18274637	-275
5/21/2008	10.14	21	0.1	0.124	411		0.6	-42.9	5.5	6.8	-141.9	1.02E+11	42.82		
5/28/2008	5.07	13.5	0.394	0.221	1203	0.57	0.2	-122.2	10.7	6.0	-35.7	1.49E+11	80.47	0.01554708	-426.315789
6/4/2008	38.57	99	0.81	0.476	9768		10.3	69.7	168.1	98.8	37.0	9.22E+12	97.59		
6/11/2008	65.36	57	2	0.572	5510	6.76	10.0	47.4	703.3	201.1	47.6	8.81E+12	95.74	2.37722241	55.62130178
6/18/2008	10.32	15.5	0.178	0.251	921		0.4	-93.5	9.9	13.9	-19.5	2.33E+11	74.48		
6/25/2008	23.72	11.4	0.1	0.175	488	6.83	0.7	-163.2	12.8	22.3	-71.4	2.83E+11	51.84	0.87158133	56.0761347
7/2/2008	8.06	26.5	0.1	0.27	1414		0.6	-13.2	4.3	11.7	-11.1	2.79E+11	83.38		
7/9/2008	81.66	254	0.143	0.778	43520	2.16	55.8	88.2	62.8	341.8	61.4	8.69E+13	99.46	0.9489563	-38.8888889
7/16/2008	4.98	17.6	0.155	0.16	185		0.2	-70.5	4.2	4.3	-87.5	2.25E+10	-27.03		
7/23/2008	4.89	18.5	0.237	0.338	98	1.31	0.2	-62.2	6.2	8.9	11.2	1.17E+10	-139.80	0.0344549	-129.007634

Twentyseven Mile Creek

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	10.73	15	0.1	0.045	248	0.26	0.4	-100.0	5.8	2.6	-566.7	6.51E+10	5.24	0.0150118	-1053.846154
4/30/2008	8.56														
5/7/2008	6.72	57	0.1	0.071	387		1.0	47.4	3.6	2.6	-322.5	6.36E+10	39.28		
5/14/2008	50.84	22	0.128	0.423	518	2.85	3.0	-36.4	35.0	115.7	29.1	6.44E+11	54.63	0.7795455	-5.263157895
5/21/2008	12.14	15.9	0.1	0.241	613		0.5	-88.7	6.5	15.7	-24.5	1.82E+11	61.66		
5/28/2008	6.07	146	0.1	0.143	219	1.29	2.4	79.5	3.3	4.7	-109.8	3.25E+10	-7.31	0.042131	-132.5581395
6/4/2008	46.18	40.5	0.1	0.075	1542		5.0	25.9	24.8	18.6	-300.0	1.74E+12	84.76		
6/11/2008	78.27	54	0.714	0.292	2212	7.77	11.4	44.4	300.6	123.0	-2.7	4.24E+12	89.38	3.2717639	61.38996139
6/18/2008	12.36	35	0.1	0.213	1414		1.2	14.3	6.6	14.2	-40.8	4.28E+11	83.38		
6/25/2008	28.40	31	0.1	0.181	345	8.8	2.4	3.2	15.3	27.7	-65.7	2.40E+11	31.88	1.3446452	65.90909091
7/2/2008	9.65	26.8	0.1	0.063	517		0.7	-11.9	5.2	3.3	-376.2	1.22E+11	54.55		
7/9/2008	97.78	101	0.1	0.105	8130	2.49	26.6	70.3	52.6	55.2	-185.7	1.94E+13	97.11	1.3098743	-20.48192771
7/16/2008	5.96	18.4	0.1	0.064	387		0.3	-63.0	3.2	2.1	-368.8	5.65E+10	39.28		
7/23/2008	5.85	21.5	0.169	0.246	249	0.44	0.3	-39.5	5.3	7.7	-22.0	3.57E+10	5.62	0.013857	-581.8181818

Houk Ditch

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	5.12	7.5	0.1	0.071	75	0.04	0.1	-300.0	2.8	2.0	-322.5	9.39E+09	-213.33	0.0011017	-7400
4/30/2008	4.09														
5/7/2008	3.21	9.9	0.1	0.241	147		0.1	-203.0	1.7	4.2	-24.5	1.15E+10	-59.86		
5/14/2008	24.25	168	0.25	0.897	6896	6.4	11.0	82.1	32.6	117.0	66.6	4.09E+12	96.59	0.8350611	53.125
5/21/2008	5.79	9.9	0.1	0.155	261		0.2	-203.0	3.1	4.8	-93.5	3.70E+10	9.96		
5/28/2008	2.90	11.4	0.1	0.185	105	0.37	0.1	-163.2	1.6	2.9	-62.2	7.44E+09	-123.81	0.0057644	-710.8108108
6/4/2008	22.03	88	0.126	0.34	2860		5.2	65.9	14.9	40.3	11.8	1.54E+12	91.78		
6/11/2008	37.34	56.5	0.133	0.239	2306	3.69	5.7	46.9	26.7	48.0	-25.5	2.11E+12	89.81	0.7411891	18.69918699
6/18/2008	5.90	18.9	0.1	0.145	770		0.3	-58.7	3.2	4.6	-106.9	1.11E+11	69.48		
6/25/2008	13.55	30	0.1	0.162	2420	1.58	1.1	0.0	7.3	11.8	-85.2	8.02E+11	90.29	0.1151659	-89.87341772
7/2/2008	4.60	16	0.1	0.113	866		0.2	-87.5	2.5	2.8	-165.5	9.75E+10	72.86		
7/9/2008	46.64	12.3	0.1	0.105	6500	0.66	1.5	-143.9	25.1	26.3	-185.7	7.42E+12	96.38	0.1656212	-354.5454545
7/16/2008	2.84	12	0.1	0.025	980		0.1	-150.0	1.5	0.4	-1100.0	6.82E+10	76.02		
7/23/2008	2.79	7.5	0.1	0.196	411	0.35	0.1	-300.0	1.5	2.9	-53.1	2.81E+10	42.82	0.0052581	-757.1428571

Snyder Ditch

Sample Date	Calculated Flow (*cfs*)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	2.89	4.8	0.1	0.222	411	0.08	0.0	-525.0	1.6	3.4	-35.1	2.90E+10	42.82	0.00124264	-3650
4/30/2008	2.30														
5/7/2008	1.81	7.8	0.1	0.118	214		0.0	-284.6	1.0	1.1	-154.2	9.47E+09	-9.81		
5/14/2008	13.68	37	0.443	0.505	2934	5.38	1.4	18.9	32.6	37.2	40.6	9.82E+11	91.99	0.39589226	44.23791822
5/21/2008	3.27	3.6	0.1	0.089	249		0.0	-733.3	1.8	1.6	-237.1	1.99E+10	5.62		
5/28/2008	1.63	45.9	0.1	0.131	276	0.78	0.2	34.6	0.9	1.2	-129.0	1.10E+10	14.86	0.00685338	-284.615385
6/4/2008	12.42	17.1	0.143	0.166	1986		0.6	-75.4	9.6	11.1	-80.7	6.04E+11	88.17		
6/11/2008	21.06	14.1	0.1	0.219	900	4.29	0.8	-112.8	11.3	24.8	-37.0	4.64E+11	73.89	0.48597774	30.06993007
6/18/2008	3.32	10.2	0.1	0.114	1203		0.1	-194.1	1.8	2.0	-163.2	9.79E+10	80.47		
6/25/2008	7.64	2.6	17.4	0.1	0.169	1.66	0.1	-1053.8	715.3	4.1	-200.0	3.16E+07	-138953.25	0.06823878	-80.7228916
7/2/2008	2.60	12.8	0.1	0.107	727		0.1	-134.4	1.4	1.5	-180.4	4.62E+10	67.68		
7/9/2008	26.31	50	0.1	0.142	7980	0.85	3.5	40.0	14.2	20.1	-111.3	5.14E+12	97.06	0.12029494	-252.941176
7/16/2008	1.60	7.8	0.1	0.012	517		0.0	-284.6	0.9	0.1	-2400.0	2.03E+10	54.55		
7/23/2008	1.57	7.8	0.1	0.283	579	0.68	0.0	-284.6	0.8	2.4	-6.0	2.23E+10	59.41	0.00576135	-341.176471

Harber Ditch

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	7.08	24	0.1	0.11	727	0.09	0.5	-25.0	3.8	4.2	-172.7	1.26E+11	67.68	0.00342659	-3233.33333
4/30/2008	5.65														
5/7/2008	4.43	7.8	0.1	0.183	866		0.1	-284.6	2.4	4.4	-63.9	9.39E+10	72.86		
5/14/2008	33.53	40	0.214	0.56	1760	5.94	3.6	25.0	38.6	101.0	46.4	1.44E+12	86.65	1.07138032	49.49494949
5/21/2008	8.01	11.1	0.1	0.079	1203		0.2	-170.3	4.3	3.4	-279.7	2.36E+11	80.47		
5/28/2008	4.00	23.1	0.1	0.089	387	0.29	0.2	-29.9	2.2	1.9	-237.1	3.79E+10	39.28	0.00624555	-934.482759
6/4/2008	30.45	24	0.156	0.146	1733		2.0	-25.0	25.6	23.9	-105.5	1.29E+12	86.44		
6/11/2008	51.61	36.4	0.158	0.232	728	3.21	5.1	17.6	43.9	64.4	-29.3	9.19E+11	67.72	0.89130554	6.542056075
6/18/2008	8.15	24.4	0.1	0.126	980		0.5	-23.0	4.4	5.5	-138.1	1.95E+11	76.02		
6/25/2008	18.73	21.2	0.1	0.143	2420	4.36	1.1	-41.5	10.1	14.4	-109.8	1.11E+12	90.29	0.43931108	31.19266055
7/2/2008	6.36	9.9	0.1	0.075	276		0.2	-203.0	3.4	2.6	-300.0	4.30E+10	14.86		
7/9/2008	64.48	95	0.209	0.142	7890	0.77	16.5	68.4	72.5	49.3	-111.3	1.24E+13	97.02	0.26710477	-289.61039
7/16/2008	3.93	6.6	0.1	0.064	159		0.1	-354.5	2.1	1.4	-368.8	1.53E+10	-47.80		
7/23/2008	3.86	8.7	0.1	0.301	24	0.74	0.1	-244.8	2.1	6.3	0.3	2.27E+09	-879.17	0.01536773	-305.405405

Junk Ditch

Sample Date	Calculated Flow *(cfs)*	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	2.66	56	0.132	0.169	387	0.01	0.4	46.4	1.9	2.4	-77.5	2.52E+10	39.28	0.000143	-29900
4/30/2008	2.12														
5/7/2008	1.66	40	0.185	0.833	548		0.2	25.0	1.7	7.5	64.0	2.23E+10	57.12		
5/14/2008	12.59	47	0.223	0.496	2172	0.25	1.6	36.2	15.1	33.6	39.5	6.69E+11	89.18	0.016933	-1100
5/21/2008	3.01	37.6	0.35	0.17	308		0.3	20.2	5.7	2.7	-76.5	2.27E+10	23.70		
5/28/2008	1.50	42.6	0.409	0.269	2420	0.11	0.2	29.6	3.3	2.2	-11.5	8.90E+10	90.29	0.00089	-2627.272727
6/4/2008	11.44	35.5	0.248	0.359	980		1.1	15.5	15.3	22.1	16.4	2.74E+11	76.02		
6/11/2008	19.38	41	0.27	0.372	524	0.25	2.1	26.8	28.2	38.8	19.4	2.48E+11	55.15	0.026068	-1100
6/18/2008	3.06	24.5	0.169	0.306	313		0.2	-22.4	2.8	5.0	2.0	2.34E+10	24.92		
6/25/2008	7.03	44.5	0.111	0.188	2420	0.3	0.8	32.6	4.2	7.1	-59.6	4.16E+11	90.29	0.011352	-900
7/2/2008	2.39	11.6	0.1	0.214	461		0.1	-158.6	1.3	2.8	-40.2	2.69E+10	49.02		
7/9/2008	24.21	34.5	0.1	0.313	4350	0.16	2.2	13.0	13.0	40.8	4.2	2.58E+12	94.60	0.020843	-1775
7/16/2008	1.48	12	0.1	0.173	201		0.0	-150.0	0.8	1.4	-73.4	7.26E+09	-16.92		
7/23/2008	1.45	6.6	0.1	0.369	194	0.06	0.0	-354.5	0.8	2.9	18.7	6.88E+09	-21.13	0.000468	-4900

Spy Run Creek

Sample Date	Calculated Flow (cfs)	TSS (mg/L)	NH3-N (mg/L)	Phosphorus, Total (mg/L)	E. Coli (CFU/100mL)	Atrazine (ug/L)	TSS Load (tons/day)	TSS: % Reduction	NH3-N Load (lbs/day)	Total Phosphorus Load (lbs/day)	Phos: % Reduction	E. Coli Load (cfu/day)	E. coli: % Reduction	Atrazine Load (lbs/day)	Atrazine: % Reduction
4/23/2008	5.66	10.5	0.1	0.078	76	0.03	0.2	-185.7	3.0	2.4	-284.6	1.05E+10	-209.21	0.000913757	-9900.00
4/30/2008	4.52														
5/7/2008	3.55	15.5	0.1	0.147	210		0.1	-93.5	1.9	2.8	-104.1	1.82E+10	-11.90		
5/14/2008	26.82	45	0.158	0.72	2224	0.24	3.2	33.3	22.8	103.9	58.3	1.46E+12	89.43	0.034630475	-1150.00
5/21/2008	6.40	9.9	0.277	0.089	579		0.2	-203.0	9.5	3.1	-237.1	9.07E+10	59.41		
5/28/2008	3.20	9.9	0.215	0.053	186	0.09	0.1	-203.0	3.7	0.9	-466.0	1.46E+10	-26.34	0.001550618	-3233.33
6/4/2008	24.36	42.5	0.134	0.204	980		2.8	29.4	17.6	26.7	-47.1	5.84E+11	76.02		
6/11/2008	41.29	37	0.1	0.206	1920	0.73	4.1	18.9	22.2	45.8	-45.6	1.94E+12	87.76	0.162156522	-310.96
6/18/2008	6.52	25.5	0.1	0.089	727		0.4	-17.6	3.5	3.1	-237.1	1.16E+11	67.68		
6/25/2008	14.98	37.5	0.1	0.2	2420	0.57	1.5	20.0	8.1	16.1	-50.0	8.87E+11	90.29	0.045946296	-426.32
7/2/2008	5.09	44.5	0.1	0.163	727		0.6	32.6	2.7	4.5	-84.0	9.05E+10	67.68		
7/9/2008	51.58	49	0.1	0.19	6310	0.56	6.8	38.8	27.8	52.7	-57.9	7.96E+12	96.28	0.15540641	-435.71
7/16/2008	3.15	62	0.1	0.134	687		0.5	51.6	1.7	2.3	-123.9	5.29E+10	65.79		
7/23/2008	3.09	10.5	0.1	0.098	687	0.34	0.1	-185.7	1.7	1.6	-206.1	5.19E+10	65.79	0.005648681	-782.35

Habegger Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		34	0	31	31	31	31	31	35	37	37	36	29	27	27	10	27
9/12/2007	9:00	1	1	14'9"	14.96	7.9	6.69	668	16.1	1.92	17.5	0.368	0.45	2420	2.49	0.58	0.01	3.38
9/19/2007	9:20	1	1	14'9"	18.19	7.47	4	732	11.2	4.82	9	0.1	0.265	411	0.78	0.56	0	3.1
9/26/2007	8:45	3	1	14' 7"	21.17	7.56	3.87	379	34.1	6.8	23.2	0.75	0.671	24196	0.125	0.307	0.368	0.301
10/3/2007	9:25	3	1	14' 9"	17.78	7.72	3.05	763	18.7	7.88	10	3.05	0.444	520	0.247	0.306	0.401	0.349
10/10/2007	9:25	2	3	14' 10"	13.75	7.76	2.34	763	41.2	6.45	26	0.886	0.475	7800	0.193	0.281	0.405	0.314
10/17/2007	9:40	2	1	14' 8"	15.23	7.41	3.19	487	42.7	9.86	29	0.908	0.635	2420	0.188	0.296	0.327	0.347
10/24/2007	9:20	3	2	14' 4"	12.68	7.65	6.78	485	49.2	4.04	20	0.279	0.867	19350	0.329	0.275	0.366	0.361
10/31/2007	9:50	1	2	14' 9"	7.21	7.76	6.77	686	46.1	2.5	39	2.53	0.03	1300	0.34	0.295	0.334	0.334
11/7/2007	10:00	2	1	14' 9"	4.21	8.09	7.21	768	40	7.55	41	0.517	0.263	517	0.277	0.259	0.323	0.287
11/14/2007	10:00	2	4	14' 5"	12.09	7.67	7.68	513	54.7	5.58	32	0.203	0.532	5600	0.21	0.23	0	1.04
11/21/2007	9:30	3	1	14' 9"	12.2	7.39	3.28	761	44.1	5.92	38	0.342	0.421	200				
11/28/2007	9:45	1	2	14' 2"	4.12	7.27	11.23	359	66.3	3.02	27	0.187	0.302	2599				
12/12/2007	9:40	2	2	8' 9"	2.69	7.23	11.89	128	213.5	3.9	127	0.1	0.835					
12/26/2007	10:00	1	1	14' 4"	0.81	8.02	13.15	385	54	2.98	38	0.172	0.125					
1/16/2008	9:45	1	3	14' 6"	0.19	7.4	12.41	410	39	1.35	24.5	0.234	0.18					
1/30/2008	11:40			14' 9"							41	2.85	0.902					
2/6/2008	10:30			8' 6"						6.21	404	0.385	0.745					
2/20/2008	10:40	2	2	14' 4"	0.04	7.59	12.18	606	63.9	2.24	30	0.187	0.271					
3/5/2008	10:00			14' 2"	1.2	7.98	11.95	510	111.8	3.34	75	0.242	0.384					
3/19/2008	9:45	3	2	8' 1"	5.16	7.76	10.79	211	700.9	5.6	696	0.275	1.438					
4/2/2008	10:00	1	1	13' 9"	8.13	8.11	11.06	446	256	2.82	120	0.188	0.475	4028	0.07	0.08		0.06
4/9/2008	10:00	3	3	14' 4"	10.96	7.37	10.28	661	29.2	2.17	25	0.101	0.178	457	0.06	0.08		0.82
4/16/2008	9:00	1	2	14' 5"	7.36	7.73	10.62	716	37.6	1.82	23	0.1	0.153	219	0.03	0.04		0.41
4/23/2008	10:00	1	1	14'7"	15.54	7.71	11.47	827	52.2	3.23	37	0.554	0.274	261	0.47	0.06		0.64
4/30/2008	9:20	1	1	14' 9"	7.95	7.54	9.81	1069	39	5.4	26	15	1.428	1203	3.97	0.41		1.67
5/7/2008	9:10	1	1	14'7"	15.49	7.38	5.06	825	37.5	3.74	21.5	0.494	0.224	816	0.5	0.05		0.27
5/14/2008	9:05	3	2	13'6"	13.03	7.23	8.01	461	163.8	8.04	122	1.09	0.268	48392	2.21	0.7		1.2
5/21/2008	8:55	2	2	14'6"	10.85	7.76	8.88	760	39.1	3.01	17	0.216	0.109	1733	0.23	0.09		0.53
5/28/2008	9:05	1	3	14'11"	11.69	7.79	8.01	903	69.4	6.31	60	0.26	0.275	2420	0.38	0.11		0.51
6/4/2008	9:00	3	2	13'1"	18.27	7.38	5.72	516	206		116	2.39	0.622	48392	5.97	0.71		2.07
6/11/2008	9:30	1	2	14'2"						4.58	47	0.259	0.432	5206	1.77	0.31		1.78
6/18/2008	9:00	1	2	14'5"	18.09	7.87	6.39	756	49	2.29	27	0.172	0.244	1733	1.58	0.26		0.9
6/25/2008	9:30	2	2	14'8"	20.4	7.69	4.88	965	27.7	5.34	13.8	5.67	0.314	1553	6.27	0.45		1.75
7/2/2008	9:40	1	3	14'7"	19.85	7.79	5.6	825	42.9	4.39	22.4	0.582		2420	5.38	0.36		7.74
7/9/2008	9:25	1	2	10'7"						7.53	219	0.12	0.438	36540	3.52	0.36		2.82
7/16/2008	8:30	1	1	14'8"						4.79	71.2	0.232	0.238	2420	1.04	0.39		1.81
7/23/2008	9:10	1	2	14'9"						5.73	22.5	6.93	0.4	2420	8.17	0.42		4.28

Gates Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		33	0	30	30	30	30	30	29	36	35	36	29	20	19	10	20
9/12/2007	9:30	1	1	18'1"	15.82	7.4	5.38	894	19.1	1.39	18	0.304	0.234	2420	0.93	0.44	0.02	1.53
9/19/2007	9:30	1	1	16' 5"	18.5	7.68	5.26	862	13.4	4.82	9	0.1	0.113	1986	0.334	0.352	0.419	0.463
9/26/2007	9:00	3	1	16' 2"	21.36	7.54	2.45	498	26.1	5.3	15.6	1.03	0.781	24196	0.097	0.375	0.415	0.412
10/3/2007	9:40	3	1	16' 7"	17.99	8.25	5.93	863	48.2	3.78	44	0.14	0.585	1220	0.268	0.284	0.377	0.407
10/10/2007	9:40	2	3	16' 5"	14.69	7.78	1.02	740	48.1	6.28	34	0.1	0.401	2590	0.147	0.345	0.394	0.325
10/17/2007	9:50	2	1	16' 4"	15.65	7.45	2.43	694	29.7	5.2	30	2.05	0.687	2420	0.124	0.255	0.269	0.29
10/24/2007	9:35	3	2	15' 9"	12.95	7.36	4.36	658	44.7	5.96	19	1.12	1.105	104620	0.327	0.31	0.355	0.329
10/31/2007	10:05	1	2	16' 4"	7.31	7.63	6.93	746	36.7	4.26	35	0.398	0.206	435	0.46	0.35	0.374	0.381
11/7/2007	10:15	2	1	16' 5"	4.58	7.92	9.82	809	61.4	5.6	81	0.135	0.276	921	0.321	0.231	0.255	0.283
11/14/2007	10:15	2	4	15' 9"	12.17	7.44	6.49	664	50.7	5.03	28	0.229	0.512	7890	0.16	0.22	0	0.84
11/21/2007	9:50	3	1	16' 4"	12.22	7.3	6.21	829	51.7	1.63	29	0.461	0.259	980				
11/28/2007	10:00	1	3	15' 4"	5.58	6.98	8.3	524	64.8	1.99	32	0.158	0.271	3466				
12/12/2007	9:50	2	2	7' 5"	2.52	7.2	12.05	128	220.4	3.68	129	0.1	0.435					
12/26/2007	10:30	1	1	15' 7"	2.16	7.52	9.55	456	63.6	1.65	32	0.152	0.223					
1/16/2008	10:10	1	3	15' 10"	0.06	7.16	10.5	417	37.9	1.38	22	0.243	0.385					
1/30/2008	11:50			16' 0"							63	2.55	0.42					
2/6/2008	10:45			5' 0"						6.22	468	0.34	1.062					
2/20/2008	10:55	2	3	15' 8"	0.67	7.2	9.72	633	68	2.24	31	0.206	0.258					
3/5/2008	10:15			14' 1"	1.14	7.11	10.28	424	184.8	4.43	128	0.406	0.525					
3/19/2008	10:00	3	2	7' 6"	5.33	7.57	10.82	216	815.4	5.28	748	0.25	1.432					
4/2/2008	10:15	1	1	14' 0"	5.16	7.87	9.86	426	423	3.61	180	0.295	0.72	3232	0.02	0.07		0
4/9/2008	10:30	3	3	15' 11"	11.15	7.26	8.29	629	48.2	1	2		0.205	649	0.06	0.07		0.37
4/16/2008	9:10	1	2	16'0"	7.07	7.34	8.47	705	45.2	2.11	25	0.182	0.146	1733	0.02	0.05		0.17
4/23/2008	9:40													649				
4/30/2008	9:35	1	1	16' 5"	8.22	7.58	9.4	867	34.4	4.58	23.5	0.354	0.549	866.29	0.11			0.2
5/7/2008	9:30	3	3	16'2"	15.89	7.27	5.2	839	53.3	4.3	43	0.393	0.13	2420	0.46	0.19		0.19
5/14/2008	9:30	3	2	15'3"	13.36	6.96	6.53	635	168.7	11.73	163	2.58	1.51	48392				
5/21/2008	9:10	1	2	16'0"	10.81	7.43	7.85	803	66	2.7	38	0.318	0.16	1120	0.35	0.19		0.29
5/28/2008	9:25	1	3	16'5"	12.56	7.55	7.17	932	87.2		68	0.318	0.221	1046				
6/4/2008	9:20	3	2	14'10"	17.45	7.28	5.76	623	841		410	3.59	1.089	48392	9.16	1.47		0.94
6/11/2008	9:50	1	2	15'3"							116	0.451	0.546	10344				
6/18/2008	9:30	1	2	15'11"	17.84	7.09	5.72	684	192	2.98	1004	0.362	0.499	2420	10.04	1.3		1.32
6/25/2008	9:50	1	2	16'4"	21.01	7.45	5.04	873	69.1		29.5	0.275	0.245	1986				
7/2/2008	10:00	1	3	16'3"	19.84	7.35	4.78	836	102	5.01	50	0.644	0.321	2420	3.72	0.65		1.2
7/9/2008	9:45	1	2	8'9"							296	0.136	0.633	36540				
7/16/2008	8:50	1	1	16'5"						3.98	27	0.166	0.122	2420	0.52	0.37		1.06
7/23/2008	9:30	1	2	16'6"							15.5	0.159	0.307	2420				

Little Blue Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		33	0	30	30	30	30	30	30	36	36	36	29	20	20	10	20
9/12/2007	9:40	1	1	14'1"	15.85	7.82	6.26	612	27.8	1.53	43	0.1	0.136	1300	0.48	0.06	0.01	0.93
9/19/2007	9:50	1	1	17' 6"	18.43	7.69	6.38	676	49.5	2.99	52	0.22	0.107	548	0.352	0.399	0.463	0.446
9/26/2007	9:20	3	1	17' 6"	21.76	7.67	4.84	909	29	6	84.4	0.258	0.58	8664	0.341	0.379	0.407	0.422
10/3/2007	9:55	3	2	17' 7"	18.12	7.93	7.61	1067	28.5	3.94	27	0.1	0.151	960	0.383	0.345	0.405	0.428
10/10/2007	10:00	2	3	17' 8"	14.16	7.76	4.76	1464	27.1	2.59	11.5	0.1	0.03	100	0.341	0.341	0.411	0.395
10/17/2007	10:10	2	1	17' 7"	15.75	7.84	8.07	1776	8.8	1.84	10	0.1	0.131	102	0.377	0.35	0.347	0.412
10/24/2007	9:50	3	3	16' 10"	12.54	7.61	6.94	503	28.9	3.13	9.5	0.133	0.595	8130	0.293	0.306	0.359	0.305
10/31/2007	10:15	1	2	17' 2"	8.3	7.95	8.46	514	34.7	1.79	38	0.1	0.03	488	0.403	0.367	0.405	0.348
11/7/2007	10:30	2	1	17' 3"	4.74	8.31	13.03	479	50.4	1.66	23.5	0.1	0.107	980	0.403	0.336	0.309	0.399
11/14/2007	15:02	2	4	16' 9"	12.03	7.69	8.85	515	35.6	2.83	11	0.378	0.176	7760	0.2	0.14	0.03	0.63
11/21/2007	10:00	3	1	17' 4"	12.15	7.82	7.68	592	90.8	1.23	75	0.1	0.153	6020				
11/28/2007	10:10	1	3	16' 5"	5.05	7.51	11.2	371	54	3.02	18	0.306	0.339	1733				
12/12/2007	10:10	2	2	9' 4"	2.8	7.23	12.12	116	303.2	3.82	214	0.319	0.859					
12/26/2007	10:45	1	1	16' 8"	1.64	7.93	13.54	355	42.2	1.55	18	0.1	0.139					
1/16/2008	10:15	1	2	18' 11"	0.18	7.52	13.24	331	28	1.35	17	0.1	0.03					
1/30/2008	12:00			17' 3"						2.83	40	0.22	0.186					
2/6/2008	10:50			7' 0"						5.12	604	0.32	0.824					
2/20/2008	11:10	2	3	16' 6"	0.04	7.6	12.73	535	55.5	2.24	25	0.1	0.188					
3/5/2008	10:25			15' 5"	0.99	7.3	12.13	329	183	2.36	136	0.144	0.371					
3/19/2008	10:15	3	2	9' 7"	5.44	7.61	10.89	192	840.6	5.08	920	0.438	1.432					
4/2/2008	10:30	1	1	15' 11"	4.68	7.77	11.51	310	301	2.28	104	0.1	0.388	312	0.11	0.07		0
4/9/2008	10:40	3	3	16' 10"	11.38	7.77	10.62	570	35.4	1.34	26	0.1	0.107	248	0.01	0.03		0.03
4/16/2008	9:20	1	2	16'8"	7.63	7.66	10.86	618	35.1	1.17	15	0.1	0.015	238	0.03	0.03		0.06
4/23/2008	9:45													194				
4/30/2008	9:45	1	1	17' 2"	8.23	7.79	9.79	67.3	27.4	1.55	15	0.1	0.442	249	0.1	0.08		0.09
5/7/2008	9:40	3	3	17'3"	15.87	7.62	6.82	616	62.4	3.07	43	0.112	0.165	1553	0.6	0.08		0.74
5/14/2008	9:40	3	2	16'8"	13.52	7.37	9.09	554	59.2		45	0.327	0.25	1866				
5/21/2008	9:20	2	2	16'11"	11.31	7.78	9.93	674	38.3	1.52	20	0.1	0.079	980	2.95	0.07		0.23
5/28/2008	9:40	1	3	17'2"	12.24	7.78	8.08	711	54.7		37	0.132	0.065	2420				
6/4/2008	9:30	3	3	15'0"	17.42	7.38	6.75	459	478	5.34	230	0.347	0.489	16328	16.4	1.43		2.58
6/11/2008	10:00	1	2	16'1"							59	0.183	0.359	6896				
6/18/2008	9:40	1	2	16'11"	18.54	7.94	6.98	649	67.8	1.63	31.6	0.1	0.151	1553	3.44	0.61		0.56
6/25/2008	10:00	1	2	17'3"	20.71	7.75	4.84	650	66.8		39.5	0.1	0.156	1300				
7/2/2008	10:10	1	3	17'2"	19.71	7.89	5.95	643	82.8	2.05	46	0.113	0.17	1733	2.84	0.32		1.14
7/9/2008	9:50	1	2	14'3"							126	0.224	0.431	30760				
7/16/2008	9:00	1	1	17'3"						3.61	26.8	0.152	0.115	2420	0.53	0.27		0.62
7/23/2008	9:40	1	2	17'4"							21	0.106	0.135	1300				

Blue Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		34	0	30	30	30	30	30	36	37	36	36	29	27	27	10	27
9/12/2007	9:50	1	1	21'9"	17.78	7.97	8.47	725	21.9	1.4	23	0.1	0.062	2420	4.24	1.27	0.02	5.06
9/19/2007	10:00	1	1	22' 3"	19.55	7.95	9.44	1281	16	0.66	9	0.1	0.043	488	0.466	0.414	0.537	0.469
9/26/2007	9:45	2	1	22' 1"	20.19	7.81	8.2	1435	20.5	0.71	13.8	0.1	0.038	1250	0.448	0.487	0.417	0.518
10/3/2007	10:10	3	1	22' 5"	17.66	7.89	7.93	1379	13.3	1.98	3.3	0.1	0.038	200	0.529	0.45	0.431	0.512
10/10/2007	10:15	1	3	22' 5"	13.41	8.09	8.88	1282	13.5	1.22	3	0.1	0.131	860	0.447	0.434	0.444	0.481
10/17/2007	10:20	2	1	21' 7"	16.33	7.79	7.95	1137	10.7	1.54	13.5	0.699	0.03	225	0.365	0.05	0.374	0.452
10/24/2007	10:05	3	3	20' 5"	12.97	7.67	6.15	601	42.4	5.34	15	0.1	0.03	23560	0.298	0.294	0.382	0.267
10/31/2007	10:30	1	2	22' 2"	8.47	8.02	9.59	636	2	1.3	4.4	0.1	0.1	488	0.42	0.356	0.362	0.342
11/7/2007	10:40	2	1	22' 3"	6.67	8.13	14.31	896	0.9	1.2	5.6	0.132	0.176	96	0.406	0.366	0.295	0.412
11/14/2007	10:45	3	4	NA	11.51	7.71	7.73	541	51.3	6.02	24	0.1	0.153	10760	0.3	0.17	0.02	1.36
11/21/2007	10:15	3	1	22'	11.55	7.99	8.84	653	11.9	1.05	6	0.199	0.456	850				
11/28/2007	10:30	2	2	18' 9"	4.93	7.56	10.96	387	95.6	1.85	25.5	0.185	1.077	2827				
12/12/2007	10:10	2	2	10' 9"	2.97	7.35	11.99	134	323.1	3.64	300							
12/26/2007	10:55	1	1	20' 4"	1.41	7.9	13.31	396	65.1	1.55	28	0.15	0.198					
1/16/2008	10:30	1	3	21'						1.35	13	0.1	0.03					
1/30/2008	12:10			20' 7"							26	0.907	0.101					
2/6/2008	11:00			9' 6"						8.04	652	0.524	1.226					
2/20/2008	11:25	2	2	19' 5"	0	7.67	12.5	552	100.1	2.24	37	0.163	0.348					
3/5/2008	10:35			15' 10"	0.35	7.2	12.09	354	215.1	4.39	178	0.351	0.179					
3/19/2008	10:30	3	2	11' 7"	5.72	7.51	10.63	271	744	5.58	680	0.354	1.108					
4/2/2008	10:50	1	1	16' 6"	4.82	7.8	11.64	326	840	3.63	345	0.164	0.99	4128	0.06	0.09		0
4/9/2008	10:55	2	3	21'0"	12.56	7.87	9.44	619	37.8	1.29	28	0.1	0.159	172	0.04	0.03		0.23
4/16/2008	9:40	1	2	21' 0"	9.04	7.77	10.33	667	40.3	1.51	17.5	0.1	0.146	219	0.489	0.01		0.08
4/23/2008	11:00	1	1	21'5"	17.32	8.38	10.69	678	29.7	2.94	19	0.1	0.012	308	0.1	0.04		0.26
4/30/2008	10:00	1	1	21' 8"	9.51	8.14	11.45	755	18.2	2.32	9	0.1	0.404	291	0.18	0.06		0.31
5/7/2008	10:00	3	3	21'7"	17.2	7.81	7.4	728	30.8	2.75	14	0.1	0.112	517	0.4	0.15		0.27
5/14/2008	10:00	3	2	19'6"	15.18	7.5	8.49	589	74.1	2.22	53	0.223	0.305	1354	1.11	0.23		0.38
5/21/2008	9:40	2	2	21'6"	12.47	7.87	9.27	712	38.2	2.05	15	0.1	0.109	816	0.33	0.46		0.31
5/28/2008	9:50	1	3	21'9"	14.39	7.94	8.84	767	29.6	2.17	12.9	0.1	0.161	308	0.41	0.2		0.19
6/4/2008	9:50	3	3	20'3"	18.61	7.67	6.49	484	326	5.54	150	0.268	0.443	9768	14.42	2.04		3.37
6/11/2008	10:10	1	2	19'1"						6.23	137	0.595	0.599	8212	8.04	0.81		4.01
6/18/2008	9:50	1	2	21'1"	19.31	7.89	6.66	640	112	2.39	55	0.1	0.362	770	7.06	0.84		1.94
6/25/2008	10:10	2	2	21'9"	20.62	8.04	6.61	735	46.8	2.59	21.5	0.1	0.308	461	8.8	0.5		1.37
7/2/2008	10:20	1	3	21'9"	20.51	8	5.96	643	82.8	3.42	31	0.6	0.264	921	4.9	0.56		7.35
7/9/2008	10:00	1	2	13'10"						5.45	792	0.107	1.104	30760	2.66	0.39		3.17
7/16/2008	9:10	1	1	21'8"						2.54	20.7	0.1	0.154	687	0.47	0.23		1.2
7/23/2008	9:50	1	2	21'10"						2.78	30	0.1	0.369	1986	1.12	0.25		2.56

St. Marys River - Willshire, Ohio

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		34	0	30	30	30	30	30	37	37	37	37	29	27	27	10	27
9/12/2007	10:05	1	1	17'4"	19.59	7.8	6.3	325	60.7	2.42	40	0.1	0.299	186	0.58	0.21	0.01	2.05
9/19/2007	10:20	1	1	22' 2"	19.84	7.88	7.84	605	23.9	1.73	20.5	0.1	0.1	118	0.463	0.382	0.471	0.422
9/26/2007	10:00	2	2	22' 5"	21.85	8.03	7.15	706	37.5	4.16	33.6	0.1	0.075	160	0.346	0.404	0.418	0.452
10/3/2007	10:30	3	2	22' 4"	18.49	8.08	7.83	739	36	4.56	27	0.1	0.144	300	0.423	0.368	0.424	0.444
10/10/2007	10:25	1	3	22' 7"	17.5	7.8	1.67	1049	15	7.2	44	0.1	0.066	310	0.349	0.36	0.452	0.445
10/17/2007	10:40	2	1	22' 4"	16.32	8.08	8.18	803	39.4	5.17	42	0.1	0.305	261	0.377	0.055	0.368	0.455
10/24/2007	10:20	3	2	21' 10"	12.13	7.88	7.67	536	58.4	4.33	48	0.132	0.484	1210	0.267	0.331	0.381	0.361
10/31/2007	10:45	1	2	22' 2"	10.36	9.09	9.69	292	25.7	3.46	24.5	0.1	0.031	96	0.42	0.391	0.357	0.399
11/7/2007	10:55	2	1	22' 4"	5.89	8.19	10.35	292	8.4	2.72	11	0.1	0.542	33	0.381	0.359	0.329	0.394
11/14/2007	10:55	3	4	21' 3"	11.75	7.93	8.54	528	52.8	4.13	41	0.1	0.035	850	0.3	0.28	0	0.66
11/21/2007	10:30	3	1	22'	11.36	7.97	8.94	518	26.6	1.85	21	0.1	0.03	200				
11/28/2007	10:40	2	2	13' 5"	4.1	7.68	10.27	301	79.6	2.79	28.2	0.1	0.148	313				
12/12/2007	10:20	2	2	12' 8"	3.49	7.43	12.09	176	193.4	3.06	101	0.105	1.241					
12/26/2007	11:05	1	1	16' 3"	1.22	7.99	13.18	236	148	2.29	38.5	0.1	0.117					
1/16/2008	11:00	1	3	19'4"						1.35	41.5	0.1	0.178					
1/30/2008	12:20			21' 2"						1.43	10	0.184	0.03					
2/6/2008	11:10			9' 7"						5.06	352	0.259	0.702					
2/20/2008	11:40	2	2	18' 9"	1.1	7.82	12.3	398	196.5	2.28	71	0.14	0.392					
3/5/2008	10:50			11' 2"	0.1	7.33	12.25	285	163.4	3.96	79	0.162	0.298					
3/19/2008	10:45	3	2	13' 7"	5.84	7.53	11.22	335	284.5	3.2	208	0.1	0.538					
4/2/2008	11:00	1	1	14' 9"	6.3	7.82	10.3	374	338	2.31	98	0.1	0.432	240	0.14	0.1		0
4/9/2008	11:10	3	3	19'5"	12.72	7.93	9.42	490	110.8	2.64	92.8	0.1	0.29	56	0.06	0		0.14
4/16/2008	9:50	1	2	19' 9"	9.97	7.83	10.01	547	106.8	3.21	36	0.01	0.192	116	0.09	0		0.28
4/23/2008	11:10	1	1	20'4"	17.75	8.2	8.14	458	167	5.85	12	0.234	0.261	201	0.13	0.03		0.25
4/30/2008	10:15	1	1	21' 10"	11.42	8.2	10.57	666	39	4.88	31	0.1	0.599	68	0.25	0.09		0.45
5/7/2008	10:10	3	2	21'9"	17.59	8.09	10.2	651	62	6.43	62	0.1	0.118	276	1.58	0.07		0.49
5/14/2008	10:10	3	2	14'4"	14.86	7.69	7.86	355	150	2	59	0.224	0.287	316	8.92	0.73		3.44
5/21/2008	9:50	3	2	21'2"	13.12	7.96	9.38	628	49.6	3.19	34.5	0.1	0.094	58	0.96	0.47		1.33
5/28/2008	10:10	1	3	21'10"	14.89	8.09	9.31	760	41.7	5.99	32	0.1	0.173	69	1.48	0.27		0.46
6/4/2008	10:00	3	2	18'9"	19.69	7.52	5.53	422	202	4.93	109	0.241	0.082	1816	14.75	1.97		3.68
6/11/2008	10:20	1	2	18'4"						5.29	67	0.229	0.439	2472	6.82	1.65		2.7
6/18/2008	10:00	1	2	21'7"	19.9	7.8	6.18	625	136	3.81	90	0.1	0.338	260	5.01	0.57		1.74
6/25/2008	10:20	2	2	22'0"	21.97	8.06	7.01	661	110	6.63	82	0.1	0.302	142	10.72	0.91		2.21
7/2/2008	10:30	1	3	18'5"	21.04	7.71	5.35	379	111	2.94	71	0.1	0.346	308	4.71	0.87		2.42
7/9/2008	10:10	1	2	19'5"						7.64	324	0.175	0.373	9080	1.93	0.66		2.48
7/16/2008	9:20	1	1	21'8"						4.07	69	0.1	0.192	308	0.4	0.31		1.43
7/23/2008	10:00	1	1	22'3"						6.28	58.4	0.1	0.307	114	0.84	0.08		1.82

Martz Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor
	Number of samples >>		33	0	29	29	29	29	29	30	36	36	36	29	20	20
9/12/2007	10:20	1	1	14'3"	16.17	8.07	8.98	652	32.1	1.39	29.5	0.1	0.626	980	0.5	0.15
9/19/2007	10:35	1	1	14' 5"	19.05	8	8.02	723	40.9	1.44	18.4	0.1	0.138	2420	0.351	0.47
9/26/2007	10:15	3	1	14' 5"	20.56	7.71	3.16	1032	38.3	6.1	42.4	6.92	1.16	5172	0.244	0.376
10/3/2007	10:45	2	2	14' 5"	18.13	7.78	2.35	1096	44.7	9.84	19	5.36	1.118	48840	0.366	0.344
10/10/2007	10:50	2	3	14' 5"	13.77	7.99	4.33	991	35.1	5.2	27	3.74	0.341	4430	0.296	0.336
10/17/2007	10:55	1	1	14' 5"	15.39	7.65	2.23	919	70	7.04	87	2.25	1.327	1986	0.337	0.047
10/24/2007	10:40	3	3	12' 10"	13	7.83	7.94	470	30.4	2.8	10	0.1	0.03	9090	0.336	0.345
10/31/2007	11:00	1	2	14' 2"	8.69	8.1	9.4	570	14.3	2.5	11.5	0.211	0.03	2420	0.436	0.401
11/7/2007	11:10	2	1	14' 2"	4.84	8.14	10.83	586	11.1	6.3	13.5	0.643	0.126	1203	0.4	0.38
11/14/2007	11:10	2	4	12' 9"	11.99	7.92	9.1	456	32.2	1.75	10	0.1	0.042	2790	0.29	0.15
11/21/2007	10:45	3	1	13' 11"	12.37	8	8.38	582	21.4	1.77	9.6	0.1	0.11	630		
11/28/2007	11:00	2	2	13' 3"	5.73	7.72	11.42	380	43.7	2	18	0.1	0.173	1095		
12/12/2007	10:40	2	2	6' 10"	2.54	7.44	12.09	89	193.8	3.27	96	0.1	0.799			
12/26/2007	11:10	1	1	13' 8"	2.05	7.96	13.75	310	48.2	2.13	28	0.1	0.235			
1/16/2008	11:15	1	2	13' 7"						1.35	26	0.107	0.1			
1/30/2008	12:35			13' 9"						2.34	29	0.147	0.094			
2/6/2008	11:20			5' 6"						5.3	272	0.254	0.72			
2/20/2008	11:55	2	3	13' 5"	0	7.85	12.51	481	66.9	2.24	32	0.173	0.328			
3/5/2008	11:00			12' 8"	1.17	7.37	11.84	352	118.9	3.88	74	0.399	4.076			
3/19/2008	11:00	3	2	7' 3"	4.73	7.5	10.84	169	488.2	4.74	416	0.23	0.862			
4/2/2008	11:15	1	1	12' 5"	5.04	8.01	11	354	322	2.52	122	0.1	0.507	1476	0.05	0.1
4/9/2008	11:20	3	3	13'8"	10.86	7.99	19.97	597	25.7	2.48	20.8	0.178	0.113	2420	0.05	0.03
4/16/2008	10:10	1	2	13' 8"	7.56	7.86	11.38	636	33	2.02	15	0.107	0.101	345	0.03	0.02
4/23/2008	10:00													579		
4/30/2008	10:30	1	1	14' 0"	8.06	8.25	13.74	679	21.4	2.63	10.5	0.1	0.492	488	0.05	0.09
5/7/2008	10:30	3	3	13'10"	16.11	7.98	9.83	618	22.8	6.46	7.5	0.1	0.089	866	0.25	0.04
5/14/2008	10:40	3	2	13'6"	12.95	7.57	9.27	515	80.6		46	0.202	0.569	22398		
5/21/2008	10:10	3	2	13'10"	11.13	7.98	10.09	644	29.5	1.57	13.8	0.1	0.089	613	0.84	0.13
5/28/2008	10:40	1	3	14'0"	12.85	7.63	10.33	658	34.5		14.1	0.1	0.059	1553		
6/4/2008	10:20	3	2	13'10"	18.76	7.89	6.62	677	22	2.01	8.1	0.1	0.069	1120	0.5	0.18
6/11/2008	10:55	1	2	13'4"							26	0.171	0.312	1816		
6/18/2008	10:30	1	2	13'11"	18.7	8.06	7.13	631	33.5	2.2	13.8	0.1	0.151	1733	1.48	0.13
6/25/2008	10:50	2	2	14'1"	20.96	7.96	6.51	670	30.3		12.3	0.12	0.188	2420		
7/2/2008	10:50	1	3	14'0"	21.13	8.04	6.51	654	22.7	1.75	9	0.1	0.22	2420	1.42	0.2
7/9/2008	10:35	1	2	11'10"							98	0.277	0.351	21870		
7/16/2008	9:40	1	1	14'1"						2.07	19.8	0.1	0.18	921	0.06	0.11
7/23/2008	10:30	1	1	14'1"							12.6	0.266	0.27	921		

Yellow Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		33	0	29	29	29	29	29	28	35	35	35	29	20	20	10	20
9/12/2007	10:30	1	1	15'8"	16.03	8.08	8.5	659	29.6	1.39	23.5	0.1	0.319	921	0.39	0.08	0	1.2
9/19/2007	10:45	1	1	15"	18.79	7.93	7.14	818	18.1	1.11	6.9	0.1	0.322	387	0.334	0.416	0.45	0.48
9/26/2007	10:30	3	1	15' 1"	21.09	7.72	3.77	1002	22.7	5.09	12.4	0.79	0.296	9804	0.266	0.419	0.407	0.44
10/3/2007	11:00	2	2	15'	17.68	7.7	3.14	1097	26.3	4.88	9.5	0.596	0.424	11690	0.307	0.366	0.398	0.405
10/10/2007	11:00	1	3	15'	14.73	7.8	1.67	1049	15	4.25	9	0.665	0.03	100	0.225	0.339	0.442	0.396
10/17/2007	11:10	1	1	14' 8"	15.03	7.63	3.08	1120	11.1	3.7	148	0.1	0.577	1414	0.214	0.061	0.351	0.342
10/24/2007	10:50	3	2	13' 5"	13.07	7.72	7.28	472	35.7	3.75	6	0.1	0.702	4800	0.363	0.321	0.357	0.318
10/31/2007	11:10	1	2	14' 8"	8.8	8	7.66	573	7.2	1.36	8.4	0.1	0.03	185	0.481	0.382	0.355	0.368
11/7/2007	11:20	3	1	15'	5.38	8.09	11.24	641	1.2	1.34	9.5	0.1	0.113	157	0.385	0.352	0.398	0.274
11/14/2007	11:20	2	4	13' 6"	11.63	7.82	8.28	456	46	4.46	25	0.1	0.277	2750	0.13	0.27	0	0.91
11/21/2007	10:55	3	1	14' 6"	11.79	7.93	7.16	633	14.3	1.49	5	0.1	0.079	740				
11/28/2007	11:05	2	2	13'	5.01	7.75	11.49	341	69.8	2.33	26.5	0.155	0.247	775				
12/12/2007	10:50	2	2	5' 9"	2.66	7.35	12.01	107	224.8	3.84	140	0.143	0.902					
12/26/2007	11:20	1	1	13' 8"	1.38	7.95	13.78	352	76	1.55	35.5	0.1	0.037					
1/16/2008	11:25	1	2	13' 11"						1.35	34.5	0.166	0.03					
1/30/2008	12:45			13' 2"	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE					
2/6/2008	11:30			4' 4"						5.99	360	0.324	0.678					
2/20/2008	12:10	2	2	13' 6"	0	7.81	12.48	469	98	2.24	34	0.199	0.309					
3/5/2008	11:15			12' 3"	0.65	7.26	12.38	387	126.3		73	0.504	0.429					
3/19/2008	11:10	3	2	6' 4"	5.05	7.45	10.51	232	521.9	4.88	460	0.31	0.888					
4/2/2008	11:30	1	1	12' 1"	5.17	7.8	11.3	349	401	2.93	146	0.1	0.557	1340	0.08	0.07		0
4/9/2008	11:30	3	3	14' 1"	11.77	8	9.97	587	42.6	1.68	26.8	0.1	0.185	194	0.03	0.03		0.06
4/16/2008	10:20	1	2	14' 1"	8.4	7.9	10.72	647	30.6	1.48	10.5	0.1	0.133	96	0.03	0.01		0.32
4/23/2008	10:05													411				
4/30/2008	10:45	1	1	14' 9"	8.53	8.11	10.87	800	21	2.21	11	0.1	0.411	1553	0.08	0.05		0.3
5/7/2008	10:45	3	2	14'7"	16.15	7.86	7.25	708	26.9	2.34	12.3	0.1	0.124	687	0.14	0.05		0.19
5/14/2008	10:50	3	2	13'8"	13.88	7.56	8.48	526	76.5		45	0.278	0.651	15402				
5/21/2008	10:20	3	2	14'3"	11.53	7.92	9.45	662	36	1.7	15.9	0.1	0.089	517	0.21	0.07		0.19
5/28/2008	10:50	1	2	14'8"	13.46	7.81	8.85	782	41		22.4	0.1	0.107	980				
6/4/2008	10:30	3	2	14'3"	18.81	7.84	6.2	679	43.5	2.47	28	0.107	0.166	1733	3.19	0.3		0.98
6/11/2008	11:00	1	2	12'11"							37.5	0.251	0.286	2668				
6/18/2008	10:40	1	2	14'4"	18.25	7.98	6.74	640	52.7	1.63	26.8	0.1	0.275	1553	2.79	0.28		0.91
6/25/2008	11:00	3	2	14'9"	20.12	7.92	5.67	708	54.8		26	0.1	0.2	921				
7/2/2008	11:05	1	3	14'5"	20.19	7.98	6.34	595	60.3	1.68	25.5	0.1	0.182	1414	10.42	0.66		6.14
7/9/2008	10:45	1	2	11'9"							142	0.213	0.272	30760				
7/16/2008	9:50	1	1	14'7"						2.55	27	0.1	0.167	1203	0.52	0.21		1.06
7/23/2008	10:40	1	2	14'8"							17.7	0.1	0.276	1120				

Borum Run

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		33	0	29	29	29	29	29	30	36	36	36	29	20	20	10	20
9/12/2007	10:50	1	1	11"	17.07	8.07	8.08	676	15.2	1.39	8.3	0.1	0.096	345	0.26	0.08	0	0.43
9/19/2007	11:00	1	2	11' 2"	19.62	7.93	9.14	882	12.9	2.11	18	0.1	0.062	10	0.37	0.502	0.46	0.531
9/26/2007	10:45	3	1	11'	21.71	7.64	4.74	364	39.1	4.89	15.6	0.1	0.121	3873	0.435	0.466	0.443	0.495
10/3/2007	11:20	3	1	11' 2"	18.08	7.59	2.34	936	26.4	3.64	11	0.1	0.238	100	0.449	0.418	0.407	0.476
10/10/2007	11:15	1	3	11' 1"	15.05	7.72	1.04	1056	10.1	2.94	5	0.1	0.03	100	0.381	0.396	0.424	0.448
10/17/2007	11:30	1	1	11'	15.69	7.65	1.67	414	5.5	2.83	4.2	0.1	0.085	411	0.42	0.056	0.36	0.481
10/24/2007	11:20	3	2	10' 9"	12.44	7.86	8.2	518	20.5	2.19	2	0.1	0.828	2430	0.367	0.333	0.377	0.371
10/31/2007	11:25	1	2	11'	8.5	7.94	7.45	666	0.2	1.3	3	0.1	0.03	33	0.59	0.468	0.373	0.401
11/7/2007	11:30	2	1	11' 1"	5.43	7.94	9.16	856	0.4	1.66	6	0.1	0.09	1	0.418	0.388	0.32	0.419
11/14/2007	11:40	2	3	10' 10"	11.85	7.93	9.25	529	21.6	1.66	7	0.1	0.432	630	0.1	0.04	0	0.28
11/21/2007	11:10	3	1	10' 11"	11.41	7.88	6.2	679	9.6	1.42	5.5	0.1	0.03	100				
11/28/2007	11:20	2	2	10' 7"	5.16	7.83	11.7	330	70.3	1.9	23.5	0.1	0.03	321				
12/12/2007	11:00	2	2	5' 6"	2.61	7.45	12.47	108	267.1	3.6	208	0.1	0.635					
12/26/2007	11:30	1	1	10' 8"	1.46	8.07	13.99	365	54.4	1.55	23.5	0.1	0.103					
1/16/2008	11:40	1	2	10' 10"						1.35	12.9	0.1	0.03					
1/30/2008	12:50			11' 0"						3.69	26	0.302	0.359					
2/6/2008	11:40			4' 2"						4.37	576	0.121	0.556					
2/20/2008	12:30	2	2	10' 8"	0.01	7.94	12.99	581	64	2.24	12	0.102	0.194					
3/5/2008	11:25			9' 4"	0.81	7.49	12.53	478	125.1	2.48	58	0.1	0.256					
3/19/2008	11:20	3	2	5' 11"	4.73	7.57	11.2	219	746.5	3.5	752	0.1	0.836					
4/2/2008	11:40	1	1	9' 10"	5.05	7.86	11.42	339	342	2.76	110	0.123	0.406	778	0.04	0		0
4/9/2008	11:45	3	3	10' 10"	11.12	8.07	10.93	667	22.7	1.21	13.2	0.1	0.093	308	0.05	0.03		0.32
4/16/2008	10:30	1	2	10' 9"	8.11	8	12.01	676	23.3	1.05	5.1	0.1	0.133	148	0.03	0.03		0.08
4/23/2008	10:20													70				
4/30/2008	11:00	1	1	11' 0"	8.63	8.12	10.79	836	20.4	1.99	10.5	0.01	0.58	184	0.12	0.05		0.3
5/7/2008	11:00	3	2	11'1"	16.46	7.83	6.87	888	17.4	2.01	3.3	0.1	0.089	365	0.25	0.06		0.24
5/14/2008	11:10	3	2	10'5"	12.98	7.62	9.11	472	97.4		45	0.186	0.478	5510				
5/21/2008	10:35	2	2	10'11"	11.35	7.92	10.06	690	26.1	1.29	7.2	0.1	0.013	461	0.7	0.07		0.19
5/28/2008	11:00	1	2	11'1"	13.45	7.85	12.3	82.4	26.9		4.8	0.1	0.095	250				
6/4/2008	10:45	3	2	10'9"	18.4	7.77	6.51	594	64.3	3.53	30	0.1	0.056	3444	1.31	0.24		0.41
6/11/2008	11:15	1	2	10'6"							23.7	1.21	0.179	1864				
6/18/2008	11:00	1	2	10'10"	18.23	8.03	7.05	688	37.4	1.63	17.1	0.1	0.132	1203	4.82	0.1		0.32
6/25/2008	11:10	3	3	10'6"	19.79	7.88	7.5	780	30.6		12.8	0.1	0.131	517				
7/2/2008	11:15	1	3	10'11"	20.51	8.08	6.6	632	39.2	1.68	16.2	0.1	0.144	866	8.59	0.11		1.16
7/9/2008	11:00	1	2	10'8"							54.5	0.1	0.084	3590				
7/16/2008	10:00	1	1	11'0"						2.25	12.3	0.1	0.076	1203	0.46	0.05		0.25
7/23/2008	10:50	1	2	11'0"							14.8	0.1	0.153	1046				

Holthouse Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
Date	Number of samples >>		33	1	28	29	29	29	29	30	36	36	36	29	20	20	10	20
9/12/2007	11:15	2	1	18.6	17.24	7.97	8.62	675	24.4	1.76	25	0.1	0.666	461	0.89	0.45	0	1.25
9/19/2007	11:20	1	1	18' 9"	17.32	7.85	6.43	739	24.8	1.99	25.5	0.1	0.164	127	0.31	0.388	0.44	0.463
9/26/2007	11:10	3	1	18' 10"	20.27	7.4	1.75	742	19.6	5.9	24.4	0.1	0.315	203	0.282	0.375	0.432	0.432
10/3/2007	11:40	1	1	18' 9"	17.97	7.54	2.05	894	14.9	9.38	8	0.1	0.451	100	0.321	0.353	0.357	0.376
10/10/2007	11:40	3	3	18' 11"	13.42	7.45	0.66	845	81.9	11.7	24	0.1	0.797	980	0.262	0.31	0.425	0.363
10/17/2007	11:50	1	1	18' 8"	14.85	7.56	0.15	1037	6.4	10.47	16.4	0.1	0.486	61	0.319	0.05	0.344	0.412
10/24/2007	11:40	3	2	17' 8"	13.24	7.82	7.7	524	38.8	3.17	14	0.1	0.624	2650	0.335	0.329	0.395	0.333
10/31/2007	11:45	1	2	14' 5"	9.28	7.93	6.75	648	1.3	2.5	6.8	0.1	0.03	34	0.454	0.37	0.36	0.352
11/7/2007	11:50	2	1	18' 5"	5.25	7.94	8.08	633	0.4	2.1	6	0.1	0.243	22	0.355	0.333	0.337	0.378
11/14/2007	11:55	2	3	18'	11.63	7.83	8.54	500	42	3.02	20	0.1	0.492	1080	0.19	0.18	0.01	0.66
11/21/2007	11:30	3	1	18' 5"		7.98	7.74	690	10.5	1.3	13.5	0.1	0.079	100				
11/28/2007	11:40	2	2	17' 10"	5.5	7.78	11.36	373	68.8	1.7	25.5	0.1	0.586	977				
12/12/2007	11:15	2	2	11' 5"	2.6	7.39	12.33	107	286.3	3.47	190	0.1	0.302					
12/26/2007	11:45	1	1	18'	1.9	8.05	13.59	376	42.7	1.55	19	0.431	0.271					
1/16/2008	11:50	1	2	18' 2"						1.35	21	0.112	0.165					
1/30/2008	1:00			18' 6"						2.27	29	0.367	0.087					
2/6/2008	11:50			10' 3"						5.1	624	0.198	1.074					
2/20/2008	12:50	2	2	18' 0"	0	7.95	12.88	529	75.6	2.24	25	0.166	0.328					
3/5/2008	11:35			17' 10"	0.58	7.59	12.43	373	142.1	2.38	64	0.156	0.461					
3/19/2008	11:45	3	2	12' 5"	4.64	7.46	10.96	226	688.3	4.18	720	0.163	1.166					
4/2/2008	12:00	1	1	17' 6"	6.44	7.82	11.35	364	369	2.28	130	0.1	0.62	320	0.13	0.06		0.01
4/9/2008	12:00	3	3	18'5"	11.68	8.17	10.97	609	24.8	1.21	15	0.1	0.721	225	0.03	0		0.32
4/16/2008	10:50	1	2	18'3"	8.79	8.17	11.77	655	24	1.08	6	0.1	0.009	228	0.08	0.01		0.17
4/23/2008	10:30													579				
4/30/2008	11:20	1	1	18' 6"	9.61	8.13	10.24	768	18.2	2.15	10	0.1	0.436	64	0.21	0.05		0.25
5/7/2008	11:10	3	3	18'6"	16.47	7.89	7.52	687	30.2	1.92	14.1	0.1	0.341	1553	0.82	0.07		0.5
5/14/2008	11:20	3	2	17'10"	13.69	7.58	8.98	529	116.9		72	0.205	0.569	2752				
5/21/2008	10:55	2	2	18'2"	11.94	8.01	9.74	682	32.2	1.63	12	0.1	0.058	435	0.55	0.1		0.7
5/28/2008	11:15	1	2	18'4"	14.43	7.9	8.3	770	41.6		13.8	0.1	0.119	770				
6/4/2008	11:00	3	2	18'0"	18.43	7.85	6.72	656	74.1	2.65	44.5	0.1	0.265	1918	6.63	0.47		1.13
6/11/2008	11:30	1	2	17'7"							46	1.65	0.452	2044				
6/18/2008	11:10	1	2	18'5"	18.68	8.01	6.72	666	60.5	2.11	35.5	0.1	0.232	866	2.96	0.61		0.94
6/25/2008	11:30	3	3	18'9"	19.24	7.98	6.01	775	58.3		32	0.1	0.15	1553				
7/2/2008	11:30	1	3	18'4"	20.52	8.06	6.47	682	38.8	1.86	19.2	0.1	0.182	1414	0.91	0.29		0.93
7/9/2008	11:15	1	2	17'9"							127	0.1	0.163	8600				
7/16/2008	10:20	1	1	18'7"						2.15	20	0.1	0.167	1046	0.57	0.11		0.5
7/23/2008	11:20	1	2	18'7"							26.5	0.121	0.326	387				

Gerke Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
Date	Number of samples >>		32	1	28	28	28	28	28	28	33	33	33	28	20	20	10	20
9/12/2007	11:35	2	1	13.2	17.39	8.15	9.46	612	20.1	1.39	13.2	0.1	0.149	613	0.5	0.36	0.03	1.35
9/19/2007	11:40	1	1	13' 3"	22.19	8.57	10.21	825	17	1.14	10.8	0.1	0.107	770	0.377	0.462	0.47	0.465
9/26/2007	11:30	3	1	13' 2"	21.46	7.61	4.42	1033	19	2.26	12.8	0.303	0.114	211	0.347	0.405	0.418	0.436
10/3/2007	12:00	2	1	13' 2"	18.45	7.78	6.3	1297	24.7	3.72	9.5	0.1	0.118	100	0.399	0.377	0.437	0.428
10/10/2007	11:55	3	2	13' 3"	16.45	7.98	6.77	1408	30.4	6.39	39	0.1	0.1	970	0.314	0.362	0.426	0.407
10/17/2007	12:15	1	1	13' 1"	15.74	7.81	5.45	1459	10.9	4.19	13.2	0.273	0.241	2420	0.351	0.049	0.386	0.451
10/24/2007	12:00	3	2	12' 9"	12.68	7.97	8.64	466	27.2	1.74	25	0.1	0.789	1350	0.373	0.328	0.373	0.316
10/31/2007	12:10	1	2	13' 1"	8.69	8.13	10.76	587	1.4	1.39	6.4	0.1	0.03	365	0.485	0.394	0.339	0.349
11/7/2007	12:15	2	1	13' 1"	5.67	8.1	12.06	694	0.3	1.9	3.9	0.1	0.146	727	0.409	0.373	0.332	0.413
11/14/2007	12:15	2	2	12' 7"	12.12	8.04	9.96	458	36	2.02	10.5	0.1	0.223	1340	0.08	0.06	0	0.76
11/21/2007	11:45	3	1	13' 1"	11.28	8.03	9.01	610	16	2.66	8.5	0.234	0.166	1340				
11/28/2007	12:00	2	2	12' 7"	4.72	7.95	12.21	357	55.9	1.39	13	0.1	0.327	1842				
12/12/2007	11:35	2	2	8' 8"	3.15	7.42	12.26	109	292.3	2.64	140	0.1	0.46					
12/26/2007	12:00	1	1	12' 9"	1.11	8.12	14.27	380	30.1	1.55	9.6	0.1	0.066					
1/16/2008	12:10	1	2	12' 11"						1.35	5.7	0.129	0.085					
1/30/2008	1:15			13' 5"	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE					
2/6/2008	12:00			5' 3"						4.63	480	0.147	0.708					
2/20/2008	1:10	2	2	12' 10"	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE	FROZE					
3/5/2008	11:50			10' 4"	0.04	7.71	12.5	354	138.9	2.71	47	0.131	0.858					
3/19/2008	12:10	3	2	8' 11"	4.19	7.52	11.44	185	671.4	3.88	620	0.1	1.056					
4/2/2008	12:20	1	1	11' 0"	5.79	7.93	11.87	385	294	2.28	96	0.1	0.356	374	0	0.06		0.05
4/9/2008	12:30	2	3	12' 11"	12.32	8.32	13.61	626	21.9	1.21	12.6	0.1	0.093	816	0.06	0.03		0.04
4/16/2008	11:10	1	2	13'0"	9.55	8.38	15.38	638	20.6	1.53	5.4	0.1	0.074	179	0.05	0.01		0.14
4/23/2008	10:45													126				
4/30/2008	11:40	1	1	13' 2"	11.06	8.21	12.93	797	17.6	2.55	9.5	0.01	0.947	185	0.27	0.07		0.12
5/7/2008	11:30	3	3	13'1"	17.01	7.97	9.28	701	25.6	2.83	11.4	0.1	0.177	770	2.67	0.23		0.76
5/14/2008	11:45	3	2	12'5"	13.2	7.66	9.17	407	262.9		165	0.133	0.998	3564				
5/21/2008	11:10	2	2	13'5"	12.41	8.02	11.45	701	28	1.51	9.9	0.1	0.043	461	0.51	0.21		0.91
5/28/2008	11:35	1	2	13'4"	15.99	8.02	12.95	826	27.7		5.4	0.1	0.059	387				
6/4/2008	11:15	3	2	12'10"	18.47	7.84	6.84	607	75.8	2.82	40.5	0.141	0.204	1508	9.16	0.46		1.28
6/11/2008	11:45	1	2	14'6"							49	0.675	0.306	2374				
6/18/2008	11:30	1	2	13'3"	20.06	8.07	7.7	742	45.5	1.63	24	0.1	0.157	687	2.09	0.48		0.43
6/25/2008	11:45	3	2	13'2"	19.83	7.88	6.6	914	50.9		24.5	0.14	0.162	1300				
7/2/2008	11:45	1	3	13'4"	22.65	8.14	7.74	622	43	2.93	16.4	0.119	0.264	1120	1.58	0.14		0.66
7/9/2008	11:30	1	2	13'1"							88	0.1	0.055	4710				
7/16/2008	10:35	1	1	13'4"						3.25	12.3	0.1	0.18	326	0.89	0.15		0.75
7/23/2008	11:40	1	2	13'3"							12.4	0.1	0.202	411				

Nickelson Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		33	0	29	29	29	29	29	30	36	36	36	29	20	20	10	19
9/12/2007	11:50	1	1	12'5"	17.54	8.33	11.93	828	5.1	1.39	3	0.1	0.214	179	0.46	0.22	0.04	0.83
9/19/2007	12:00	1	1	12' 2"	22.74	7.94	7.9	983	10.2	2.08	3.2	0.1	0.081	201	0.378	0.45	0.437	0.475
9/26/2007	11:50	3	1	12' 2"	22.38	8.13	5	1126	16.3	3.44	10.4	0.1	0.205	327	0.321	0.413	0.425	0.429
10/3/2007	12:15	1	1	12' 2"	19.65	8.52	9.23	1196	22.9	1.96	8.8	0.1	0.218	200	0.403	0.369	0.399	0.437
10/10/2007	12:15	3	3	12' 3"	14.43	8.18	6.67	1198	13.2	2.72	5	0.1	0.214	100	0.307	0.345	0.454	0.4
10/17/2007	12:35	1	1	12' 2"	18.02	8.18	10.8	1442	10.2	3.24	4.4	0.1	0.137	435	0.373	0.046	0.356	
10/24/2007	12:15	3	2	11' 7"	12.91	7.87	8.24	518	14.4	2.02	0.8	0.1	0.722	1810	0.35	0.307	0.378	0.288
10/31/2007	12:20	1	3	12'	10.22	8.28	13.41	711	0.1	1.66	3.3	0.1	0.03	548	0.456	0.377	0.369	0.384
11/7/2007	12:30	2	1	12'	5.95	8.28	15.84	773	3	5.64	7.8	0.1	0.185	173	0.412	0.347	0.299	0.4
11/14/2007	12:40	1	3	11' 6"	12.5	7.9	9.73	471	28.1	2.72	9	0.1	0.089	1320	0.16	0.43	0.01	1.23
11/21/2007	12:00	3	1	11' 10"	12.08	8.02	8.26	664	41.4	6.18	25.6	0.245	0.353	7540				
11/28/2007	12:15	2	2	11' 3"	6.09	7.83	11.49	366	49.4	1.39	14	0.1	0.16	821				
12/12/2007	11:50	2	2	7' 2"	2.73	7.36	12.16	105	234.3	3.42	117	0.1	0.732					
12/26/2007	12:20	1	1	11' 8"	3.18	8.01	13.61	369	40.3	1.55	14.1	0.112	0.191					
1/16/2008	12:30	1	2	11' 8"						1.35	8.1	0.1	0.067					
1/30/2008	1:30			12' 0"						2.25	19	0.305	0.03					
2/6/2008	12:10			5' 11"						4.52	396	0.149	0.58					
2/20/2008	1:25	2	2	11' 8"	0.12	8	13.25	577	45.2	2.24	10	0.111	0.15					
3/5/2008	12:10			11' 3"	1.77	7.79	12.44	393	107.1	2.07	53	0.11	5.409					
3/19/2008	12:25	3	2	7' 6"	4.42	7.47	11.21	195	529.6	4	456	0.1	0.791					
4/2/2008	12:40	1	1	11' 0"	6.5	7.8	11.33	391	207	2.28	68	0.1	0.362	1666	0	0.04		0
4/9/2008	12:45	3	3	11' 9"	11.51	8.37	14.05	574	17.2	1.21	10.5	0.1	0.1	272	0	0		0
4/16/2008	11:30	1	2	11' 10"	9.96	8.44	16.14	631	22.1	1.66	5.1	0.1	0.087	142	0.13	0.01		0.32
4/23/2006	11:00													770				
4/30/2008	12:00	1	1	12'0"	11.86	8.44	18.2	777	17.5	2.55	9.5	0.1	0.947	185	0.27	0.07		0.12
5/7/2008	11:45	2	2	12'0"	16.63	8.14	11.63	705	18.2	2.35	6	0.1	0.259	517	2.34	0.02		0.23
5/14/2008	12:00	3	2	11'1"	12.74	7.57	8.85	416	157.5		98	0.24	0.615	4280				
5/21/2008	11:30	1	2	11'11"	12.58	8.07	11.23	682	24	1.8	6.3	0.113	0.043	214	1.35	0.22		0.6
5/28/2008	11:55	1	2	12'0"	16	8.35	12.51	809	24.2		4.5	0.1	0.059	285				
6/4/2008	11:30	3	2	11'8"	18.25	7.81	7.09	642	26.5	1.91	11.1	0.118	0.146	1553	1.2	0.17		0.66
6/11/2008	12:00	1	2	11'6"							31.5	0.221	0.352	3870				
6/18/2008	11:50	1	2	11'11"	22.11	8.48	11.59	653	15.8	1.63	6.6	0.1	0.126	548	2.12	1.53		0.75
6/25/2008	12:00	3	2	12'2"	19.79	8.05	7.51	719	16.2		8.4	0.1	0.245	2420				
7/2/2008	12:00	1	3	12'0"	23.61	8.43	11	708	15.7	1.68	4.5	0.1	0.088	517	0.93	0.16		0.07
7/9/2008	11:50	1	2	11'7"							31.5	0.108	0.364	2530				
7/16/2008	10:50	1	1	12'2"						5.26	16	0.1	0.192	1203	0.56	0.14		0.99
7/23/2008	11:50	1	2								20.5	0.1	0.474	687				

St. Marys River - Poe

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
Date	Number of samples >>		34	0	30	30	30	30	30	35	37	37	37	29	27	27	10	27
9/12/2007	12:00	1	1	25.10.	20.23	8.02	7.28	336	106	3.88	118	0.1	0.352	770	0.56	0.44	0.02	1.42
9/19/2007	12:15	1	1	29' 8"	20.91	7.96	8.42	616	33.4	1.9	28	0.1	0.17	276	0.37	0.423	0.455	0.448
9/26/2007	12:10	3	1	30'	21.57	8.46	9.52	940	332	5.4	33.6	0.1	0.218	75	0.346	0.414	0.433	0.471
10/3/2007	12:30	2	1	29' 11"	20.16	8.58	13.3	1068	29.2	11.64	35	0.1	0.238	100	0.422	0.402	0.422	0.444
10/10/2007	12:30	2	3	30'	16.44	8.42	9.09	1089	36.2	6.88	32	0.1	0.086	100	0.344	0.377	0.438	0.433
10/17/2007	12:50	1	1	29' 11"	17.74	8.31	9.76	1224	40.4	4.52	35.2	0.1	0.169	291	0.391	0.057	0.373	0.461
10/24/2007	12:40	3	2	28' 9"	13.09	7.98	7.65	332	54.7	4.2	17	0.1	0.741	8570	0.333	0.359	0.375	0.362
10/31/2007	12:40	2	3	29' 3"	11.37	8.25	10.46	337	18.8	3.84	19.2	0.1	0.03	40	0.408	0.363	0.355	0.354
11/7/2007	12:45	2	1	30' 3"	5.98	8.41	10.77	715	7.8	2.8	10	0.1	0.269	52	0.392	0.358	0.325	0.42
11/14/2007	12:50	1	3	27' 3"	11.67	8.01	8.9	264	82.4	4.67	51	0.1	0.526	1480	0.38	0.21	0	1.16
11/21/2007	12:20	3	1	28' 11"	9.8	8.05	9.1	504	87.6	2.3	16.2	0.1	0.03	100				
11/28/2007	12:30	2	2	22'	4.99	7.99	10.98	157	118.7	3.52	48.8	0.103	0.03	1733				
12/12/2007	12:00	1	2	18' 4"	3.5	7.39	12.53	168	212.3	2.63	179	0.273	0.853					
12/26/2007	12:30	1	1	24' 3"	2.37	8.12	13.48	265	133.1	2.98	32.5	0.1	0.187					
1/16/2008	12:40	1	2	26' 2"						1.35	50	0.1	0.187					
1/30/2008	1:40			29' 5"							22	0.929	0.269					
2/6/2008	12:30			15' 8"						7.7	544	0.392	0.361					
2/20/2008	1:45	1	2	26' 0"	3.06	8.18	13.71	488	150.5	2.24	83	0.149	0.322					
3/5/2008	12:30			19' 2"	0.23	7.77	12.01	292	142.9	4.16	154	0.242	4.465					
3/19/2008	12:40	3	2	19' 6"	5.13	7.43	11.48	321	251.4	3.14	232	0.14	0.544					
4/2/2008	1:00	1	1	19' 11"	7.67	7.84	9.89	276	811	3.79	288	0.1	0.827	1024	0	0.01		0.02
4/9/2008	13:00	3	3	26'0"	12.39	8.32	9.61	260	104.6	2.71	94.4	0.1	0.362	649	0.11	0.05		0.08
4/16/2008	11:50	1	2	26'8"	12.32	8.32	10.22	543	124	3.39	65.5	0.1	0.304	150	0.04	0.06		0.41
4/23/2008	12:15	1	1	28'0"	18.9	8.24	8.35	461	245.2	6.46	176	0.411	0.418	276	0.1	0.05		0.93
4/30/2008	12:15	1	1	29' 2"	12.88	8.47	13.24	777	35.7	6.13	35	0.01	0.997	127	0.16	0.06		0.15
5/7/2008	12:00	2	3	29'1"	18.06	8.42	12.09	714	45.4	6.76	55	0.1	0.212	197	2.53	0.35		0.81
5/14/2008	12:15	3	2	21'6"	14.97	7.68	8.35	382	118.8	2.57	52	0.272	0.679	530	8.92	1.23		2.55
5/21/2008	11:45	1	2	28'0"	14.98	8.2	9.83	637	42.7	3.07	27.5	0.1	0.145	152	2.72	0.46		1.52
5/28/2008	12:10	1	2	29'3"	17.22	8.44	12.44	829	33.5	7.02	24	0.1	0.119	64	2.09	0.24		0.78
6/4/2008	11:45	2	2	26'4"	20.27	7.63	5.59	455	222	6.54	212	0.162	0.405	1146	16.4	1.7		2.72
6/11/2008	12:10	1	2	24'1"							231	0.948	0.686	5702	8.04	1.38		4.24
6/18/2008	12:00	1	2	28'4"	22.15	7.82	6.09	616	156	3.47	29	0.1	0.35	770	4.21	0.89		2.09
6/25/2008	12:15	3	2	29'4"	20.87	8.14	7.17	762	94.8	6.25	71	0.1	0.219	214	4.36	0.47		1.87
7/2/2008	12:10	1	3	26'4"	22.39	7.82	5.81	396	139	2.41	90	0.1	0.34	649	5.38	0.63		3.41
7/9/2008	12:00	1	2	27'9"						4.86	131	0.1	0.033	4320	1.22	0.15		0.89
7/16/2008	11:10	1	1	29'1"						3.28	74	0.1	0.18	194	1.38	0.21		1.38
7/23/2008	12:10	1	2	29'10"						5.72	56.8	0.1	0.283	147	1.6	0.26		1.33

Upper Gates Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	5	13	13	13	13	7	7	0	7
4/23/2008	10:30	1	1	16'4"	12.99	7.37	5.05	804	54.9	3.34	46	0.334	0.267	613	0.08	0.21		0.96
5/7/2008	9:20	3	3	16'4"	13.9	7.16	2.35	852	71.5		48	0.542	0.048	1414				
5/14/2008	9:20	3	2	15'10"	13.03	6.92	6.05	610	104.2		91	0.437	0.314	4374	0.61	0.38		0.14
5/21/2008	9:00	1	2	16'3"	10.22	7.45	6.29	805	70.4		51.5	0.346	0.18	1203				
5/28/2008	9:15	1	3	16'2"	12.71	7.47	4.4	892	105	3.81	72	0.496	0.293	613	0.177	0.49		0.12
6/4/2008	9:10	3	2	15'0"	17.42	7.25	5.95	536	1040		586	3.7	1.664	48392				
6/11/2008	9:50	1	2	15'3"						4.22	98	0.453	0.486	8704	9.45	0.68		1.28
6/18/2008	9:20	1	2	16'0"	18.05	6.98	4.83	665	222		109	0.448	0.599	1046				
6/25/2008	9:40	2	2	16'9"	19.4	7.03	3.37	905	142	6.06	90	0.792	0.035	1986	2.86	0.49		0.39
7/2/2008	9:50	1	3	16'5"	18.44	7.11	4.14	862	144		92	0.464	0.724	2420				
7/9/2008	9:35	1	2	11'9"						7.3	203	0.13	0.424	38730	4.61	0.4		2.82
7/16/2008	8:40	1	1	16'11"							64	0.202	0.321	2420				
7/23/2008	9:20	1	2	17'0"							172	0.668	1.121	2420	0.48	0.39		1.1

Upper Blue Creek

Date	Time	Cloud Cov	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	7	13	13	13	13	7	7	0	7
4/23/2008	10:40	1	1	16'11"	17.13	7.96	9.96	706	29.4	2.91	11.5	0.1	0.228	291	6	0.04		0.22
5/7/2008	9:00	3	3	17'0"	16.8	7.29	5.93	705	36		17.5	0.1	0.276	1414				
5/14/2008	9:00	3	2	15'2"	13.69	7.23	8.61	574	152.6	2.52	110	0.269	0.04	3684	0.8	0.13		0.13
5/21/2008	8:45	2	2	16'8"	11.16	7.98	9.21	723	41.2		21	0.1	0.124	411				
5/28/2008	9:00	1	3	16'10"	13.24	8.02	8.62	820	29.6	5.09	13.5	0.394	0.221	1203	0.57	0.08		0.27
6/4/2008	8:50	3	2	16'2"	18.99	7.41	6.5	578	166		99	0.81	0.476	9768				
6/11/2008	9:20	1	2	15'5"						5.02	57	2	0.572	5510	6.76	0.76		4.44
6/18/2008	9:00	1	1	16'9"	18.43	8.1	6.82	701	35.1		15.5	0.178	0.251	921				
6/25/2008	9:15	2	2	16'10"	21.72	7.69	5.13	591	25.4	2.32	11.4	0.1	0.175	488	6.83	0.18		0.94
7/2/2008	9:30	1	3	16'7"	21.36	8.01	6.11	730	48.6		26.5	0.1	0.27	1414				
7/9/2008	9:15	1	2	10'7"						7.61	254	0.143	0.778	43520	2.16	0.25		2.79
7/16/2008	8:20	1	1	16'8"							17.6	0.155	0.16	185				
7/23/2008	9:00	1	2	16'6"						5.52	18.5	0.237	0.338	98	1.31	0.22		1.5

Twentyseven Mile Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>			0	8	8	8	8	8	7	13	13	13	13	7	7	0	7
4/23/2008	11:30	1	1	19'3"	16.95	8.11	11.61	627	25.1	2.95	15	0.1	0.045	248	0.26	0.03		0.57
5/7/2008	10:20	2	2	19'4"	17.19	7.92	7.52	553	29.2		57	0.1	0.071	387				
5/14/2008	10:20	3	2	14'10"	15.68	7.56	8.4	508	98.4	1.51	22	0.128	0.423	518	2.85	0.5		1.11
5/21/2008	10:00	3	2	19'1"	12.39	7.9	9.27	637	38.9		15.9	0.1	0.241	613				
5/28/2008	10:20	1	3	19'7"						3.38	146	0.1	0.143	219	1.29	0.37		0.59
6/4/2008	10:10	3	2	19'0"	19.62	7.85	6.45	623	73.5		40.5	0.1	0.075	1542				
6/11/2008	10:45	1	2	17'10"						3.77	54	0.714	0.292	2212	7.77	1.06		4.32
6/18/2008	10:20	1	1	19'4"	19.14	7.99	6.42	595	60		35	0.1	0.213	1414				
6/25/2008	10:30	2	2	19'9"	21.27	7.87	5.63	647	50.4	2.93	31	0.1	0.181	345	8.8	0.52		2.44
7/2/2008	10:40	1	4	18'10"	20.76	7.87	5.89	644	34.1		26.8	0.1	0.063	517				
7/9/2008	10:25	1	2	16'7"						6.04	101	0.1	0.105	8130	2.49	0.45		2.48
7/16/2008	9:30	1	1	19'6"							18.4	0.1	0.064	387				
7/23/2008	10:20	1	2	19'4"						4.91	21.5	0.169	0.246	249	0.44	0.1		1.32

Houk Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	7	13	13	13	13	7	7	0	7
4/23/2008	12:40	1	2	13'3"	19.53	8.3	13.64	661	22	2.41	7.5	0.1	0.071	75	0.04	0.01		0.32
5/7/2008	12:15	3	3	13'5"	17.78	8.24	9.5	885	14.1		9.9	0.1	0.241	147				
5/14/2008	12:45	3	2	12'6"	13.14	7.57	9.09	400	228.3	5.66	168	0.25	0.897	6896	6.4	0.44		1.13
5/21/2008	12:00	1	2	13'2"	14.3	8.17	11.14	760	28.8		9.9	0.1	0.155	261				
5/28/2008	12:30	1	2	13'3"	17.67	8.37	11.71	926	32.2	1.78	11.4	0.1	0.185	105	0.37	0.03		0.41
6/4/2008	12:00	2	2	12'8"	19.28	7.74	7.06	457	190		88	0.126	0.34	2860				
6/11/2008	12:25	1	2	12'11"						1.75	56.5	0.133	0.239	2306	3.69	0.53		2.73
6/18/2008	12:25	1	2	13'1"	21.66	8.13	7.66	664	46.1		18.9	0.1	0.145	770				
6/25/2008	12:40	3	2	13'3"	20	8.04	7.19	711	62	2.96	30	0.1	0.162	2420	1.58	0.16		1.07
7/2/2008	12:30	1	3	13'3"	23.97	8.2	7.4	608	38.7		16	0.1	0.113	866				
7/9/2008	12:20	1	2	12'5"						4.54	12.3	0.1	0.105	6500	0.66	0.2		1.95
7/16/2008	11:30	1	1	13'4"							12	0.1	0.025	980				
7/23/2008	12:30	1	2	13'6"						1.86	7.5	0.1	0.196	411	0.35	0.21		1.3

Snyder Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	7	13	13	13	13	7	7	0	7
4/23/2008	12:50	1	1	15'0"	20.96	8.57	15.55	607	21.9	2.31	4.8	0.1	0.222	411	0.08	0.01		0.45
5/7/2008	12:25	3	3	15'1"	17.12	8.38	10.34	664	17.9		7.8	0.1	0.118	214				
5/14/2008	13:00	3	2	14'4"	13.45	7.6	9.22	583	56	2.46	37	0.443	0.505	2934	5.38	0.59		0.74
5/21/2008	12:20	1	2	14'11"	12.9	8.34	12.21	631	20.5		3.6	0.1	0.089	249				
5/28/2008	12:45	1	2	15'1	15.56	8.39	13.65	685	23.2	4.96	45.9	0.1	0.131	276	0.78	0.14		0.46
6/4/2008	12:15	2	2	14'7"	18.83	7.74	7.24	539	44.4		17.1	0.143	0.166	1986				
6/11/2008	12:40	1	2	13'11"						1.75	14.1	0.1	0.219	900	4.29	0.47		2.62
6/18/2008	12:40	1	2	14'11	19.4	8.09	7.96	609	24.3		10.2	0.1	0.114	1203				
6/25/2008	13:00	2	2	15'0"	19.18	8.07	7.39	682	39.4	2.6	17.4	0.1	0.169	1986	1.66	0.27		0.95
7/2/2008	12:40	1	3	14'10"	21.9	8.13	7.47	566	28.7		12.8	0.1	0.107	727				
7/9/2008	12:35	1	2	14'0"						4.27	50	0.1	0.142	7980	0.85	0.3		2.39
7/16/2008	11:40	1	1	15'1"							7.8	0.1	0.012	517				
7/23/2008	12:40	1	2	14'1						1.48	7.8	0.1	0.283	579	0.68	0.23		0.81

Harber Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	7	13	13	13	13	7	7	0	7
4/23/2008	13:10	1	1	16'0"	20.6	8.54	14.12	608	22	3.69	24	0.1	0.11	727	0.09	0.07		0.4
5/7/2008	12:45	3	3	16'3"	17.39	8.17	8.3	699	20.2		7.8	0.1	0.183	866				
5/14/2008	13:10	3	2	15'1"	13.69	7.57	8.87	513	68.2	2.45	40	0.214	0.56	1760	5.94	0.57		2.87
5/21/2008	12:35	1	2	15'10"	14	8.19	9.75	628	30.2		11.1	0.1	0.079	1203				
5/28/2008	13:00	1	2	16'2"	18.03	8.2	9.88	669	42.8	2.06	23.1	0.1	0.089	387	0.29	0.07		0.4
6/4/2008	12:30	1	2	15'5"	19.41	7.69	7.22	550	42.6		24	0.156	0.146	1733				
6/11/2008	12:50	1	2	15'6"						2.3	36.4	0.158	0.232	728	3.21	0.34		1
6/18/2008	12:50	1	2	16'0"	22.14	7.89	7.93	626	41.3		24.4	0.1	0.126	980				
6/25/2008	13:15	2	2	15'9"	20.19	7.93	6.81	522	41.4	3.89	21.2	0.1	0.143	2420	4.36	0.29		1.18
7/2/2008	12:50	1	3	16'1"	24.64	8.12	8.37	593	23.3		9.9	0.1	0.075	276				
7/9/2008	12:50	1	2	14'5"						4.54	95	0.209	0.142	7890	0.77	0.22		0.99
7/16/2008	11:50	1	1	16'2"							6.6	0.1	0.064	159				
7/23/2008	12:50	1	2	16'4"						2.78	8.7	0.1	0.301	24	0.74	0.17		0.8

Junk Ditch

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	5	13	13	13	13	7	7	0	7
4/23/2008	13:30	1	1	11'5"	21.66	8.04	11.23	747	67	4.34	56	0.132	0.169	387	0.01	0.01		0.13
5/7/2008	13:10	3	3	11'6"	17.66	7.72	6.92	861	53.5		40	0.185	0.833	548				
5/14/2008	13:30	3	2	11'0"	14.83	7.41	7.13	641	57.4	6.9	47	0.223	0.496	2172	0.25	0.21		0.12
5/21/2008	13:00	1	2	11'6"	15.54	7.79	7.78	803	51.8		37.6	0.35	0.17	308				
5/28/2008	13:30	1	2	11'7"	17.97	7.76	6.05	910	49.7	3.05	42.6	0.409	0.269	2420	0.11	0.05		0.37
6/4/2008	12:50	1	2	10'10"	22.61	7.32	4.38	480	47.8		35.5	0.248	0.359	980				
6/11/2008	13:15	1	2	10'10"						4.71	41	0.27	0.372	524	0.25	0.26		0.21
6/18/2008	13:15	1	2	11'5"	23.13	7.62	6.89	611	38.3		24.5	0.169	0.306	313				
6/25/2008	13:40	2	2	10'10"	21.04	7.5	5.2	477	91		44.5	0.111	0.188	2420	0.3	0.11		0.47
7/2/2008	13:10	1	3	11'7"	24.88	7.65	7.05	662	19.2		11.6	0.1	0.214	461				
7/9/2008	13:15	1	2	10'8"						4.47	34.5	0.1	0.313	4350	0.16	0		0.21
7/16/2008	12:10	1	1	11'7"							12	0.1	0.173	201				
7/23/2008	13:10	1	2	11'8"							6.6	0.1	0.369	194	0.06	0.04		0.94

Spy Run Creek

Date	Time	Cloud Cover	Wind	Flow Height	Temp.	pH	DO	Conductivity	Turbidity	BOD	TSS	NH3-N	TP	E.coli	Atrazine	Alachlor	Cyanzine	Metolachlor
	Number of samples >>		13	0	9	9	9	9	9	7	13	13	13	13	7	7	0	7
4/23/2008	13:50	1	1	16'6"	21.56	7.82	9.79	972	22.8	2.9	10.5	0.1	0.078	76	0.03	0		0.08
5/7/2008	13:30	3	2	16'7"	17.32	7.65	8.03	938	28.2		15.5	0.1	0.147	210				
5/14/2008	13:50	3	2	14'8"	14.49	7.5	9.05	482	57.9	4.76	45	0.158	0.72	2224	0.24	0.07		0.12
5/21/2008	13:15	1	3	15'10"	14.26	7.63	8.69	879	28.2		9.9	0.277	0.089	579				
5/28/2008	13:45	1	2	16'8"	18.31	7.64	8.86	1032	26.1	2.04	9.9	0.215	0.053	186	0.09	0		0.17
6/4/2008	13:15	1	2	16'0"	22.45	7.7	6.81	287	69.4		42.5	0.134	0.204	980				
6/11/2008	13:30	1	2	14'11"						3.65	37	0.1	0.206	1920	0.73	0.14		0.42
6/18/2008	13:30	1	2	16'6"	20.75	6.89	6.84	676	35.3		25.5	0.1	0.089	727				
6/25/2008	14:00	2	2	16'4"	21.13	7.74	6.7	468	66	5.69	37.5	0.1	0.2	2420	0.57	0.03		0.33
7/2/2008	13:30	1	3	15'11"	24.91	7.76	5.72	521	87.4		44.5	0.1	0.163	727				
7/9/2008	13:30	1	2	15'6"						4.36	49	0.1	0.19	6310	0.56	0.05		0.21
7/16/2008	12:25	1	1	16'2"							62	0.1	0.134	687				
7/23/2008	13:30	1	2	18'7"						2.22	10.5	0.1	0.098	687	0.34	0.02		0.93

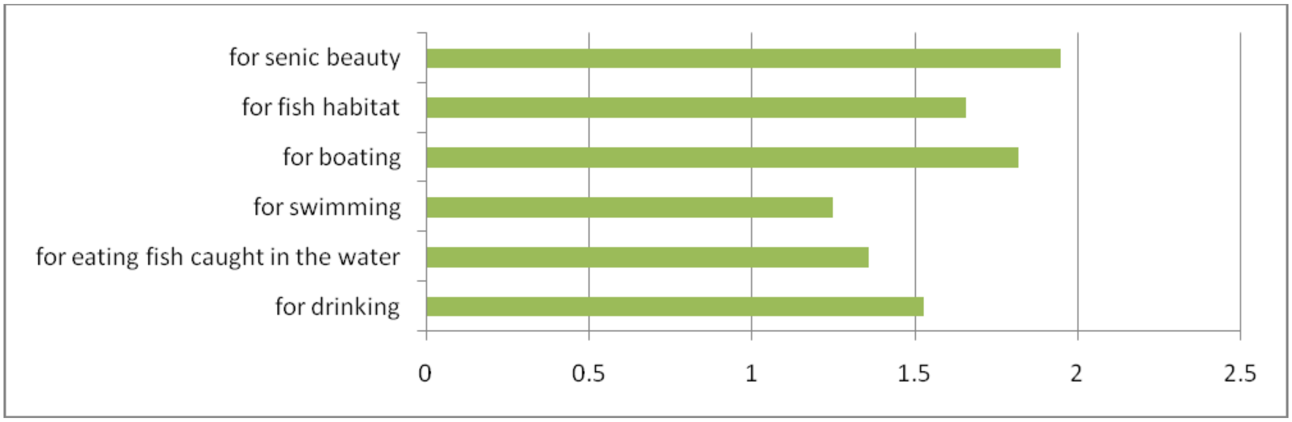
St. Marys River Watershed Project / Purdue Univ. Social Indicator Survey

St Mary's Analysis

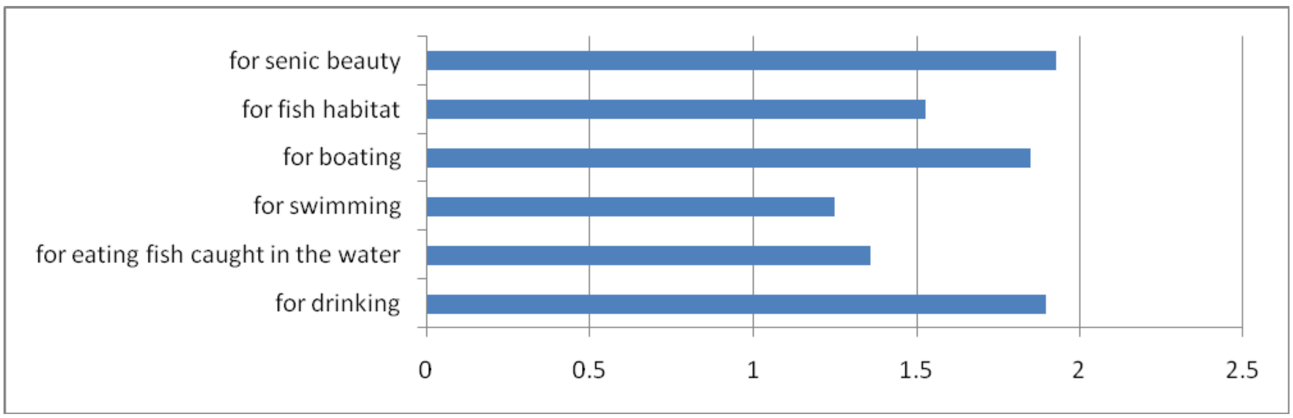
1. Rating of Water Quality:

    None for either are "okay" (all averages under 2), swimming is lowest for both

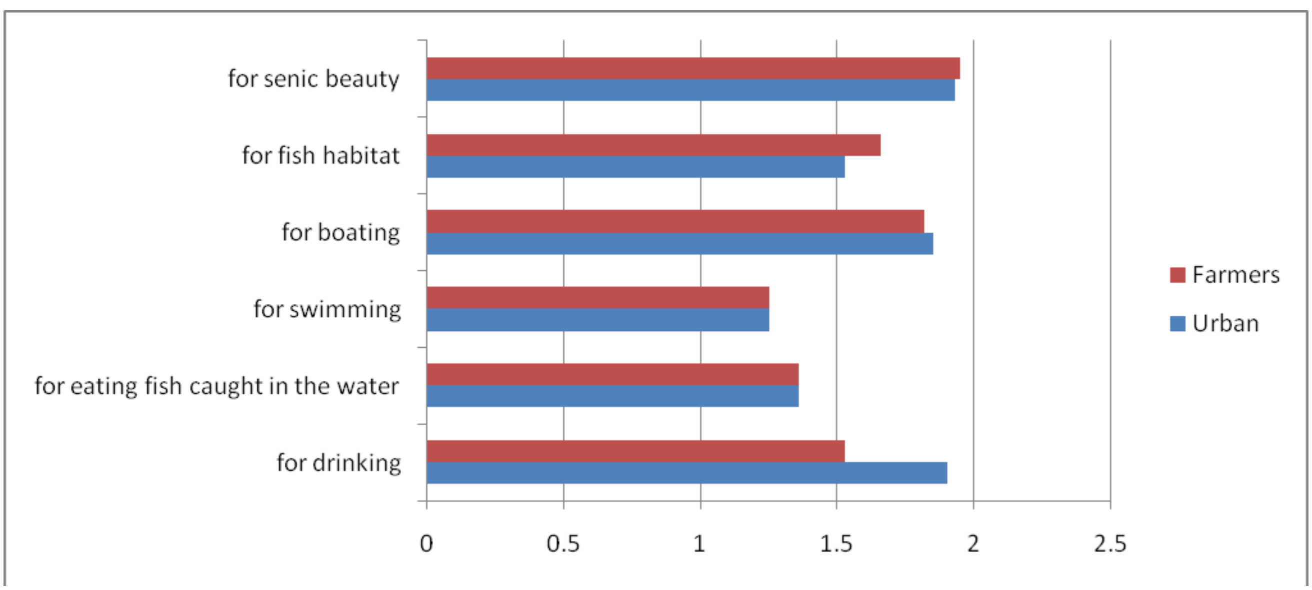
    Farmers:



Urban:



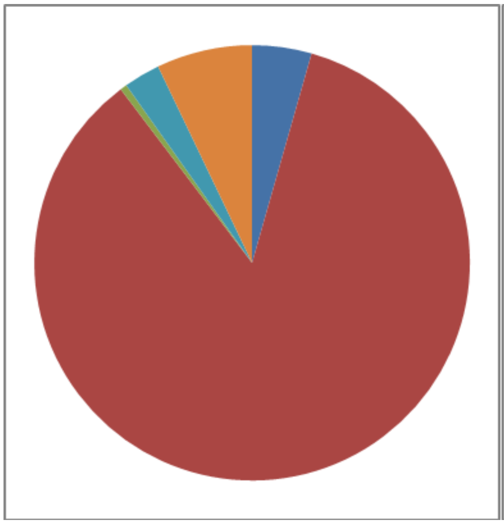
Both:



2. Your Watershed:

Farmers were right 85.2% of the time, urban only 64.6%

Farmers:



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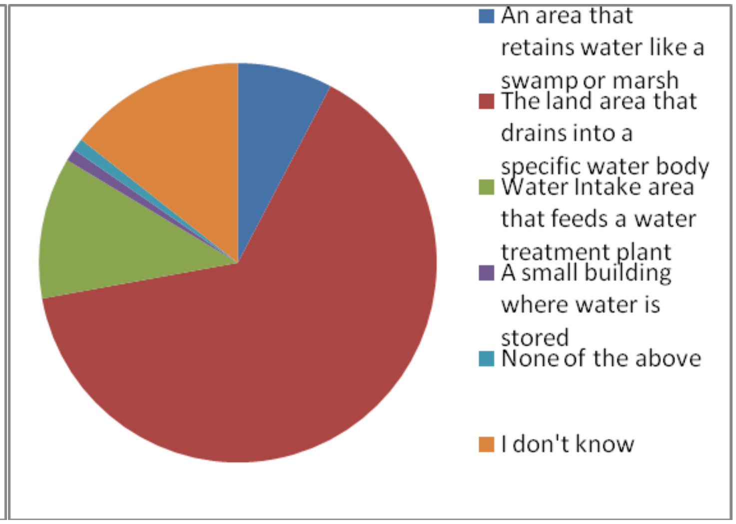


3. General Water Quality Attitudes:

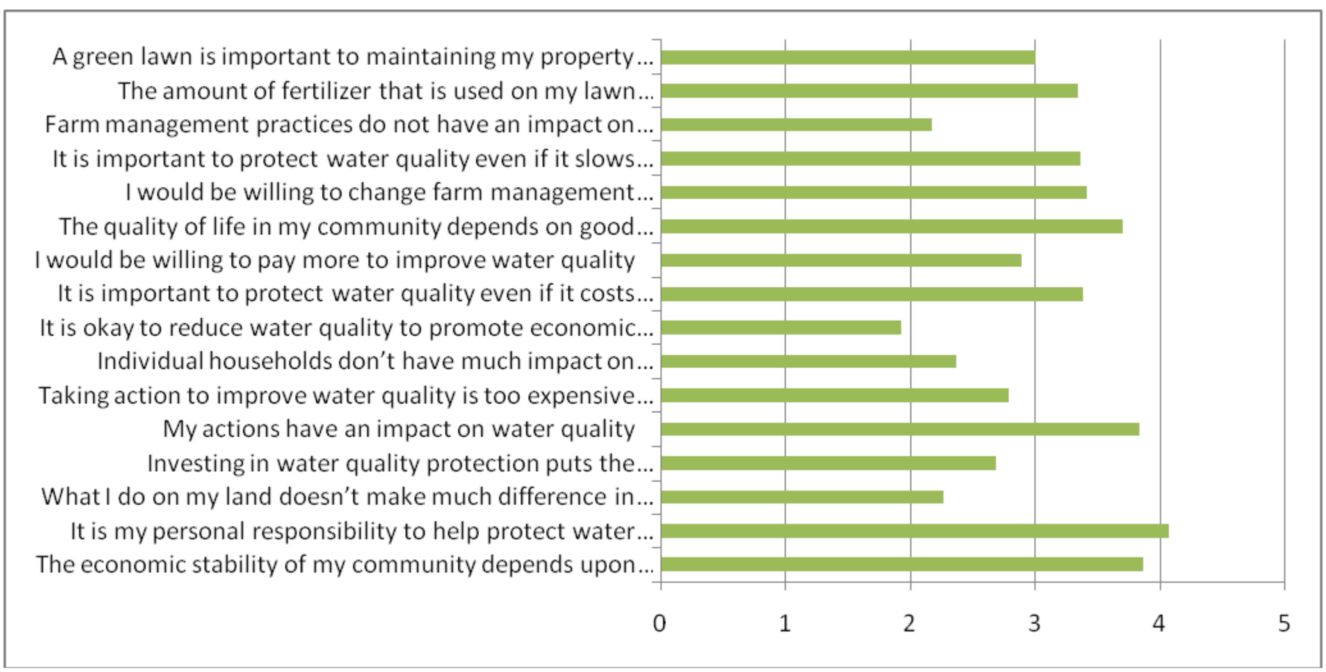
Urban seem to be more concerned about water quality, some examples:

-c. What I do on my land doesn't make much difference in overall water quality, urban disagree more than farmers (2.16 vs 2.26)

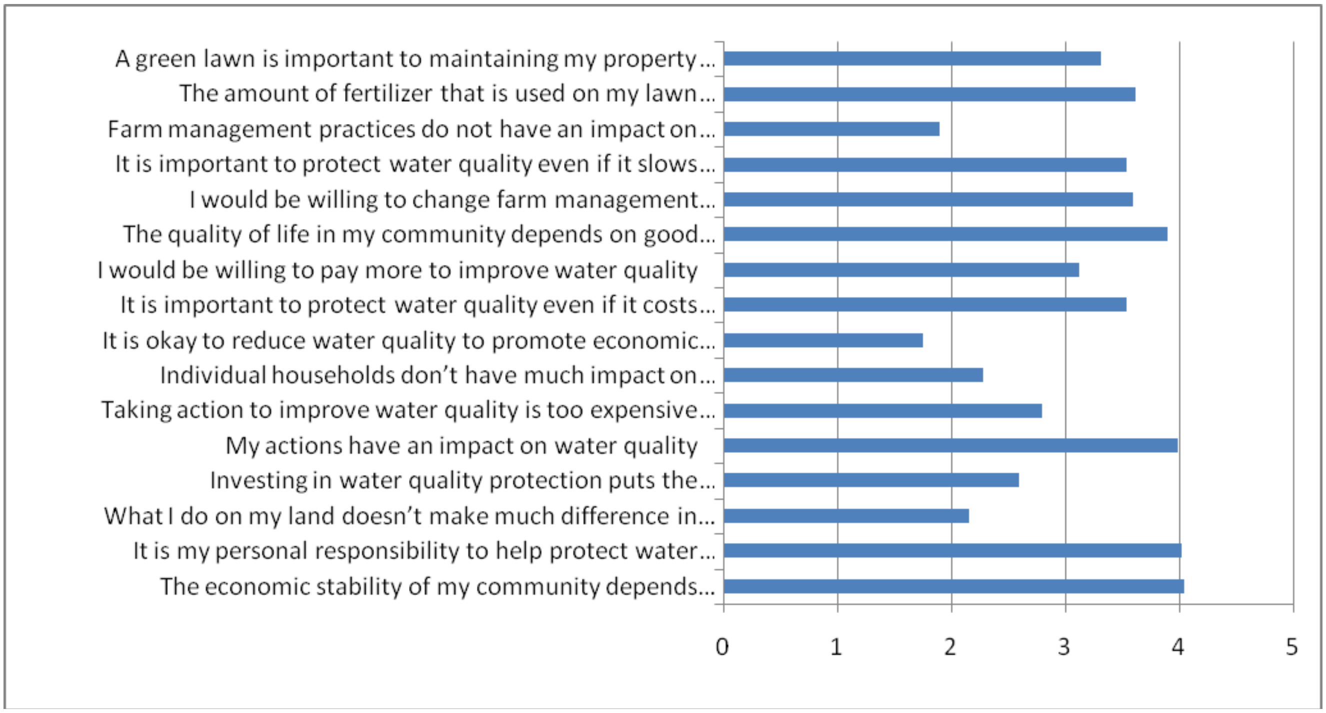
-e. My actions have an impact on water quality is higher(3.99 vs 3.83)

-h. It is okay to reduce water quality to promote economic development urban disagree more (1.75 vs 1.93)

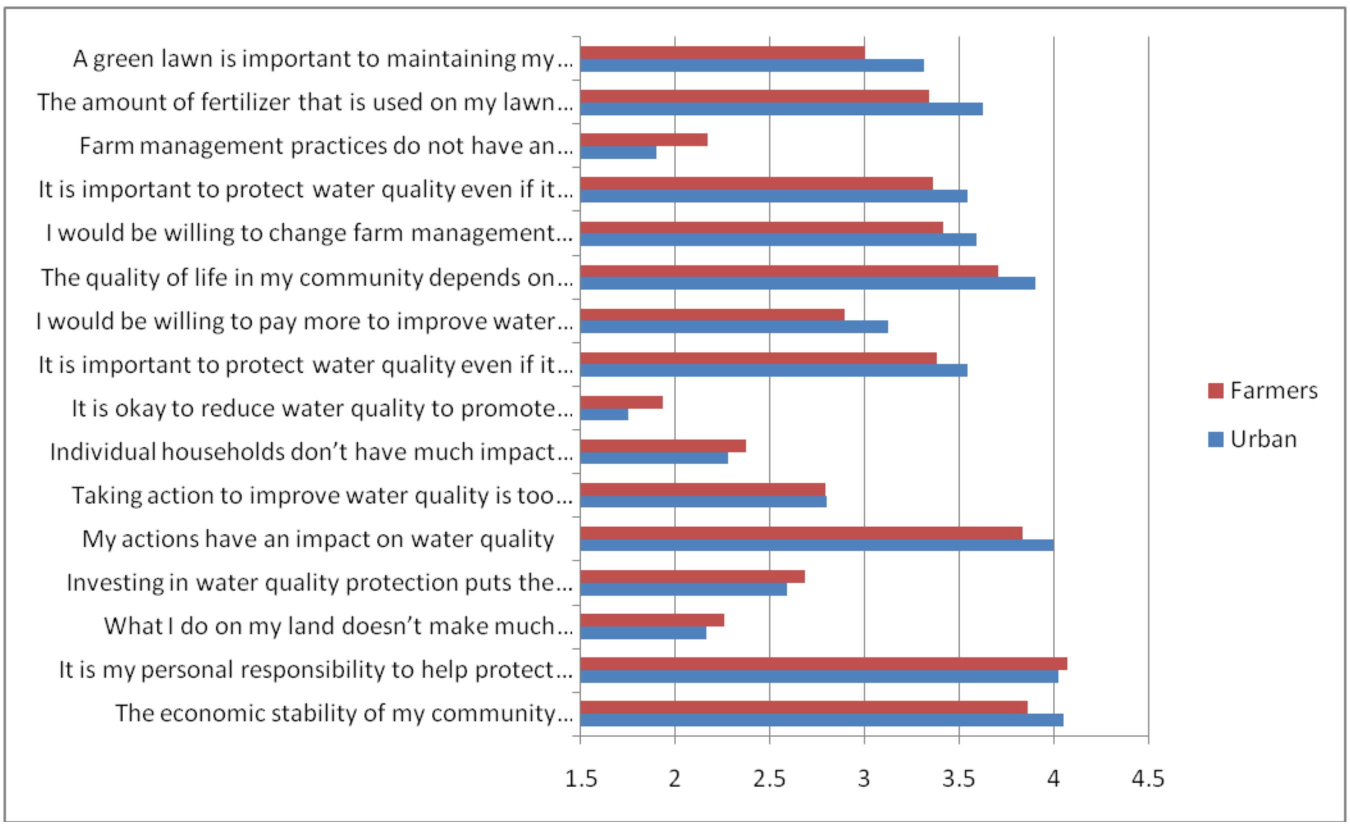
Farmers:



Urban:


A green lawn is important to maintaining my property…
The amount of fertilizer that is used on my lawn…
Farm management practices do not have an impact on…
It is important to protect water quality even if it slows…
I would be willing to change farm management…
The quality of life in my community depends on good…
I would be willing to pay more to improve water quality
It is important to protect water quality even if it costs…
It is okay to reduce water quality to promote economic…
Individual households don't have much impact on…
Taking action to improve water quality is too expensive…
My actions have an impact on water quality
Investing in water quality protection puts the…
What I do on my land doesn't make much difference in…
It is my personal responsibility to help protect water…
The economic stability of my community depends…
0
1
2
3
4
5

Both:


A green lawn is important to maintaining my…
The amount of fertilizer that is used on my lawn…
Farm management practices do not have an…
It is important to protect water quality even if it…
I would be willing to change farm management…
The quality of life in my community depends on…
I would be willing to pay more to improve water…
It is important to protect water quality even if it…
It is okay to reduce water quality to promote…
Individual households don't have much impact…
Taking action to improve water quality is too…
My actions have an impact on water quality
Investing in water quality protection puts the…
What I do on my land doesn't make much…
It is my personal responsibility to help protect…
The economic stability of my community…
1.5
2
2.5
3
3.5
4
4.5
Farmers
Urban

4. Types of Water Pollutants:

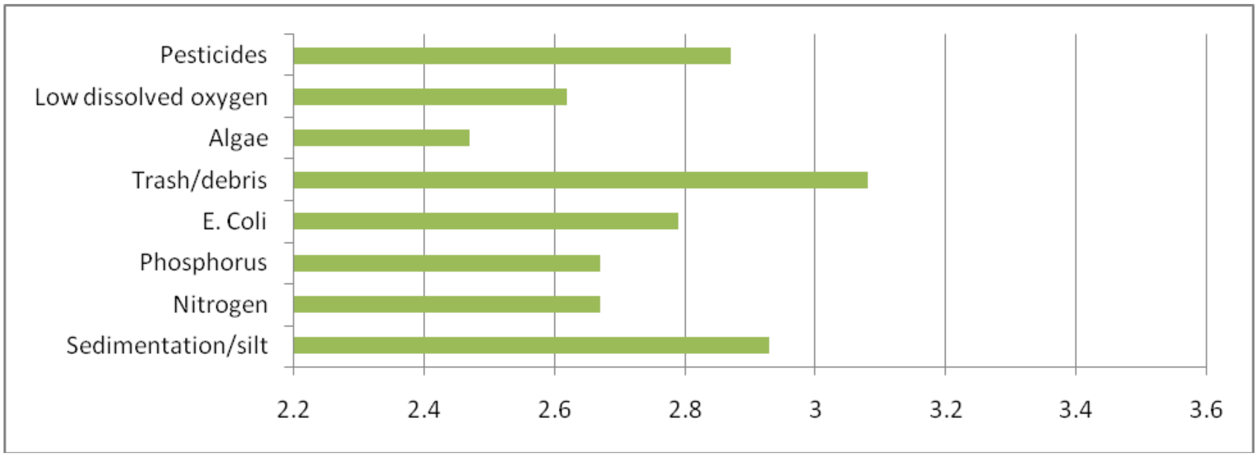
Don't know answers are high for both

Urban don't knows were higher than farmers for all pollutants

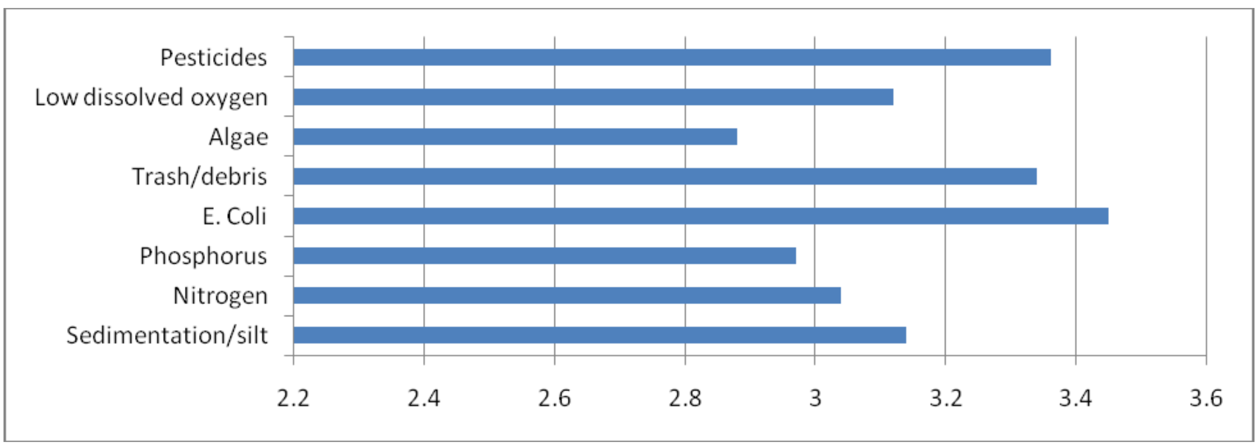
Urban said ALL were more of a problem than farmers

Farmers thought that trash/debris was the biggest problem (3.08) while urban thought that E. coli was the biggest problem (3.45)

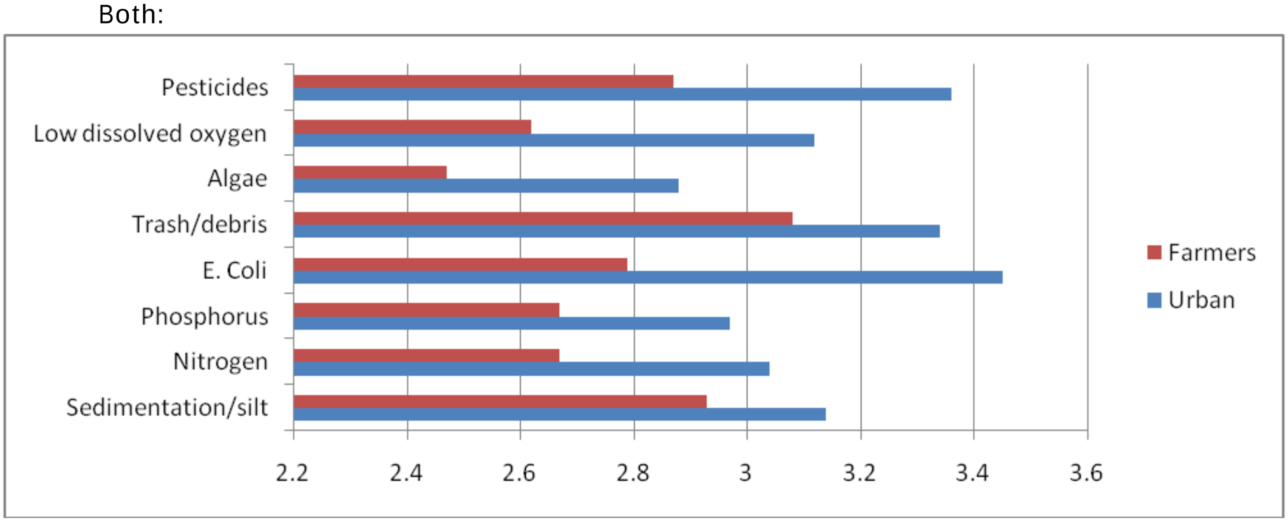
Farmers:



Urban:



Both:



5. Consequences of Poor Water Quality:

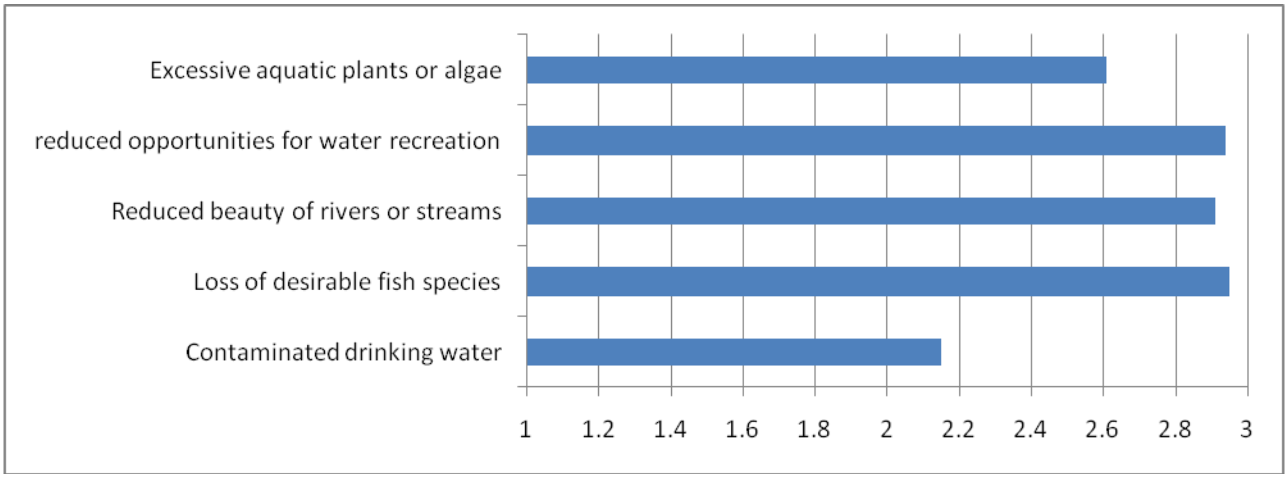
Don't know answers are high for both (but not as high as for types of water pollutants)

Urban don't knows were higher than farmers for all consequences

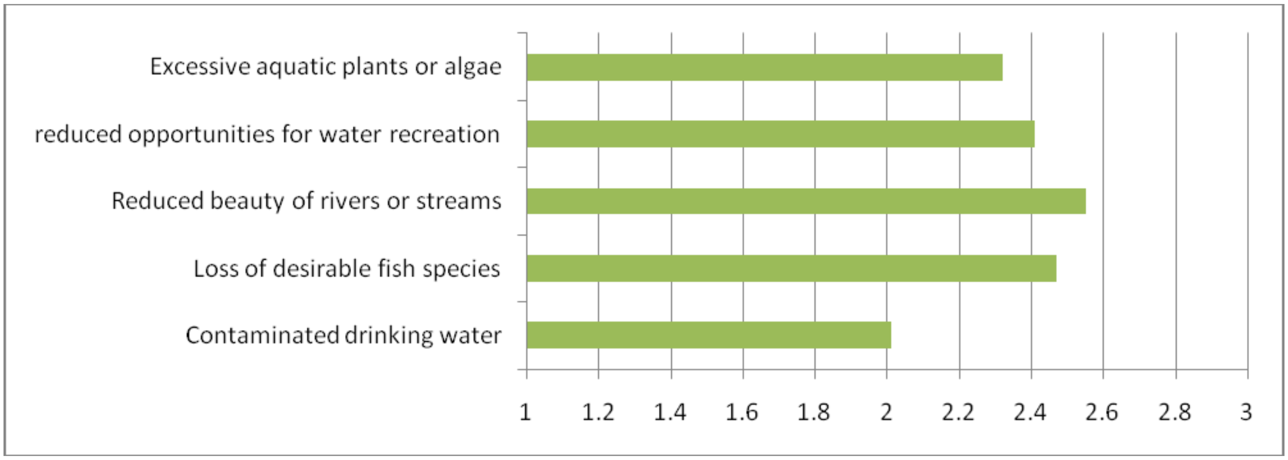
Urban said ALL were more of a problem than farmers

Both listed contaminated drinking water as the least problem

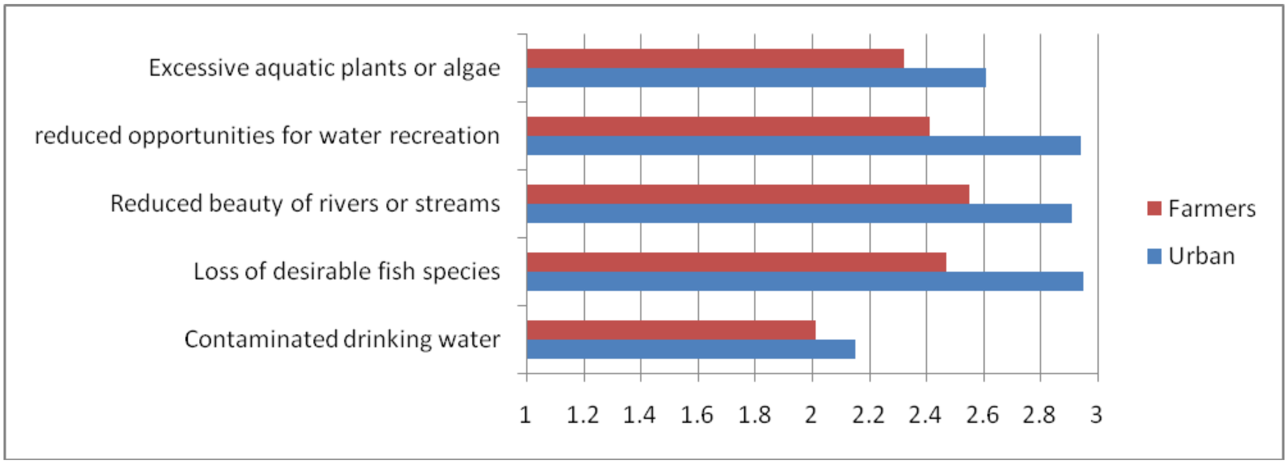
Urban:



Farmers:



Both:



6. Sources of Water Pollutants:

Don't know answers are high for both

Urban don't knows were higher than farmers for all sources

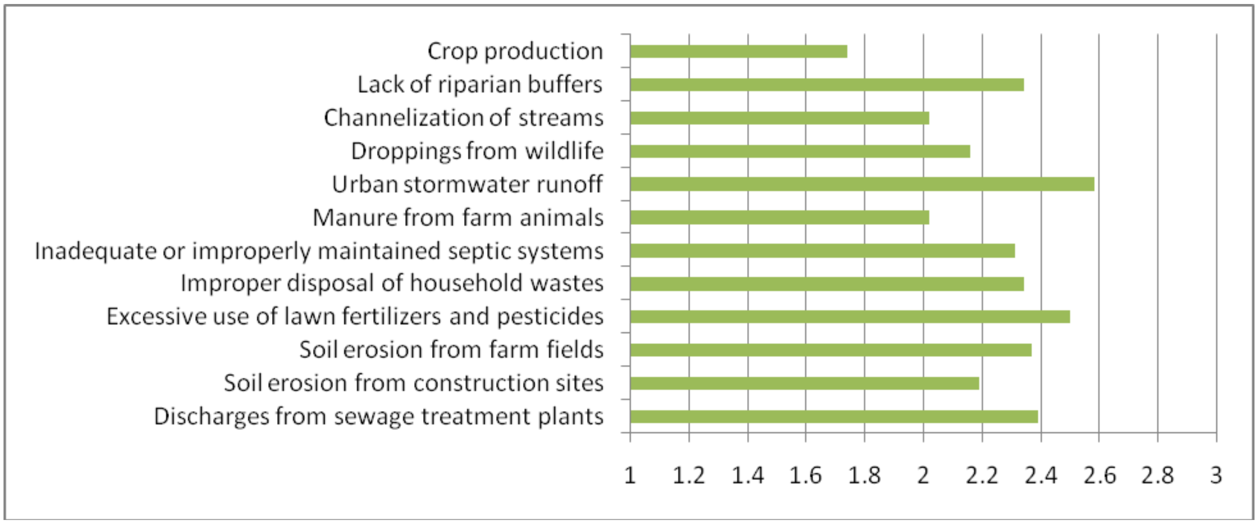
Urban said all were more of a problem except for k. Lack of riparian buffers

Farmers said urban stormwater runoff was the most severe problem (2.58)

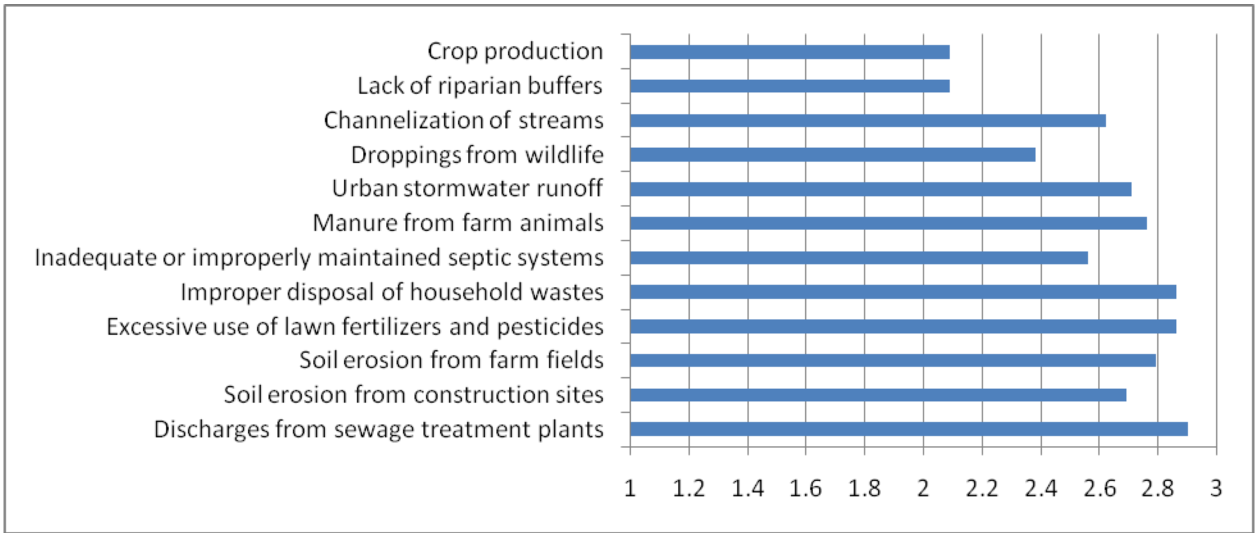
Urban said most severe were improper disposal of household wastes and excessive use of lawn fertilizers and pesticides were the most severe (2.86)

Farmers listed crop production as the lowest source of water pollutants (1.74) as did urban (2.09, tied with lack of riparian buffers)

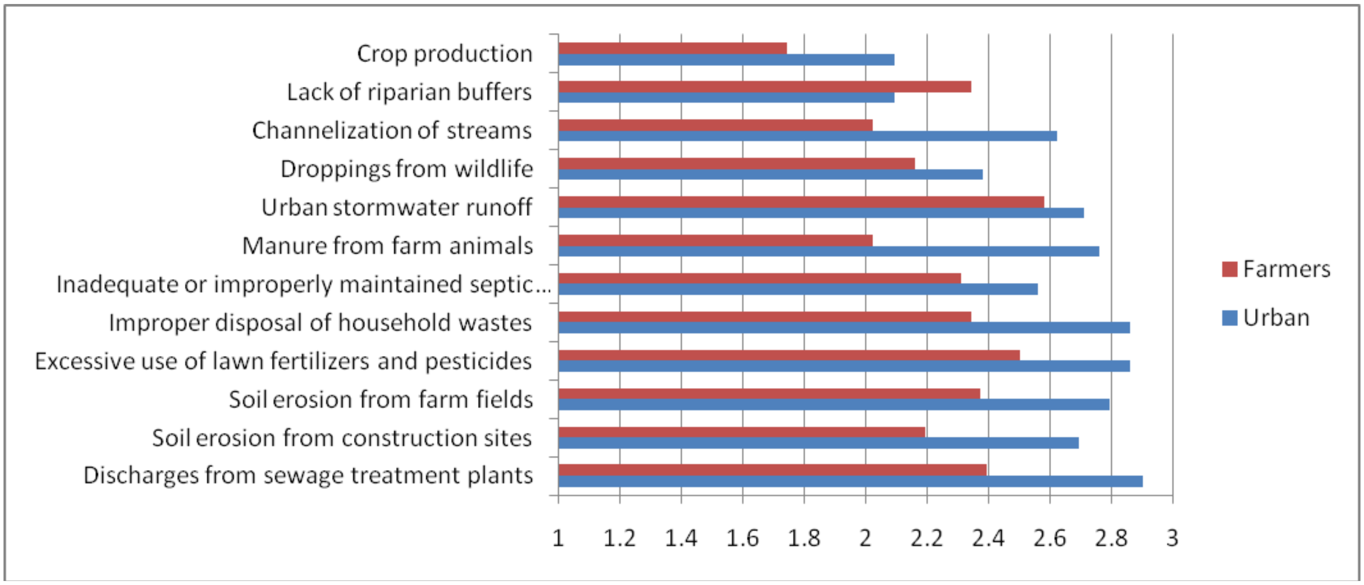
Farmers:



Urban:



Both:



7. Practices to Improve Water Quality:

Generally farmers were higher in the "I currently use it" column

c. Using phosphate free fertilizer is very low for both (16.6%U &17.4%F), and has lower willing to try responses

h. Regular maintenance of septic system much higher for farmers (73.9%) than urban (31%), however "does not apply" is 51.6%

f.&h. For both are low for using it (all under 25%) but higher for willing to try (highest no is 17.6%)

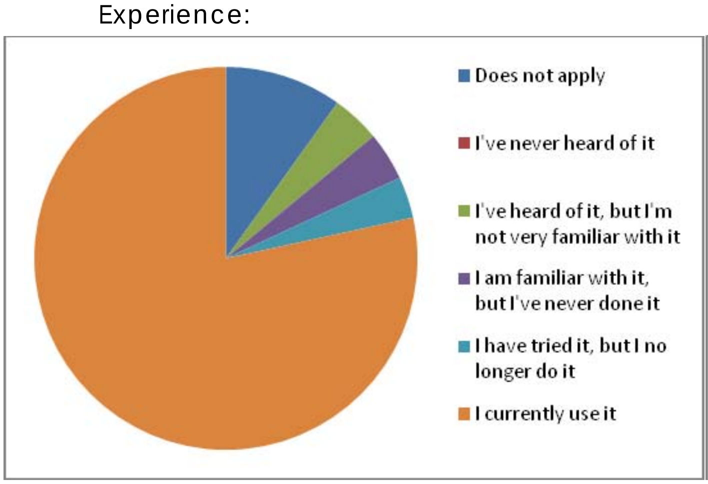
Farmer only part:

- -i. Only 23.9% use manure in accordance with its nutrient content, but only 6% said no for willing to try
- -n. Only 38.6% use cover crops, but only 9.7 said no for willing to try
- -Only 16.5% use fencing with livestock, but only 16.7% said no for willing to try

a. Following manufacturer's instructions when fertilizing lawn or garden:

Farmers:

Experience:



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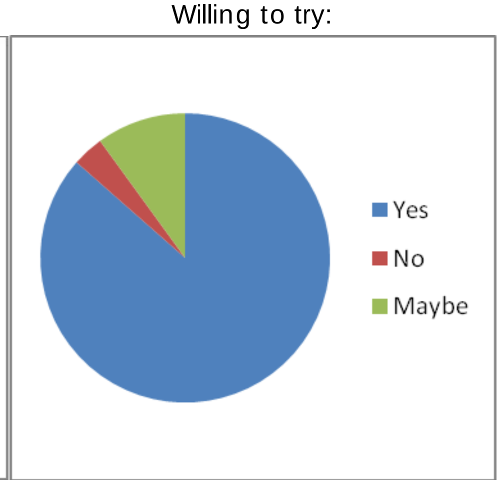
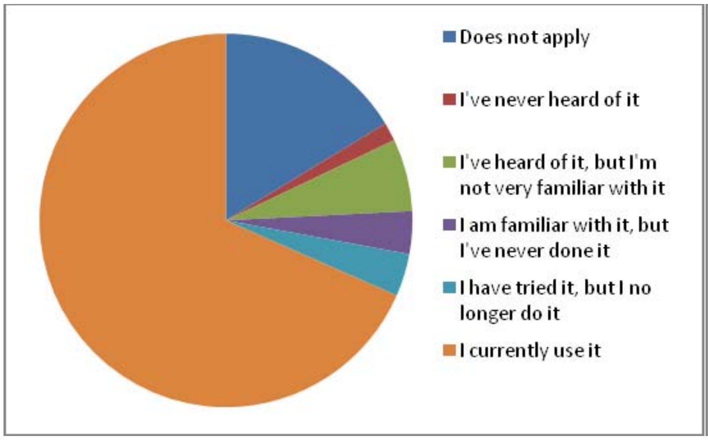
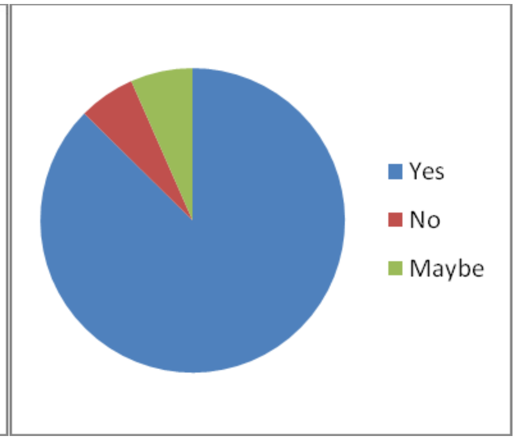


Urban:

Experience: Wiling to try:

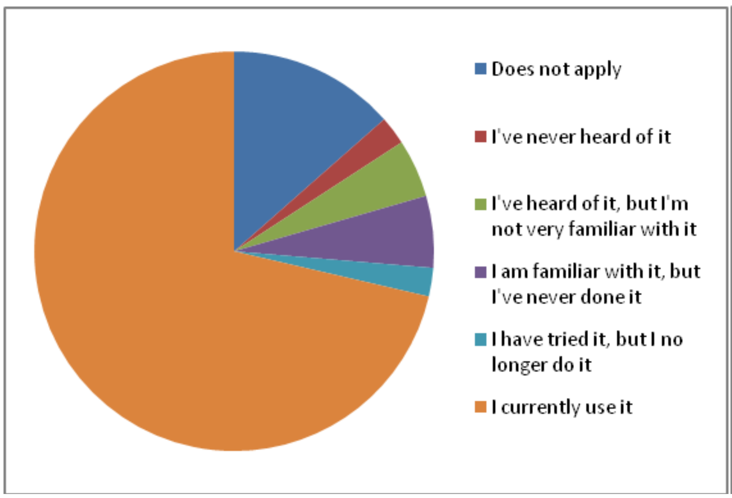


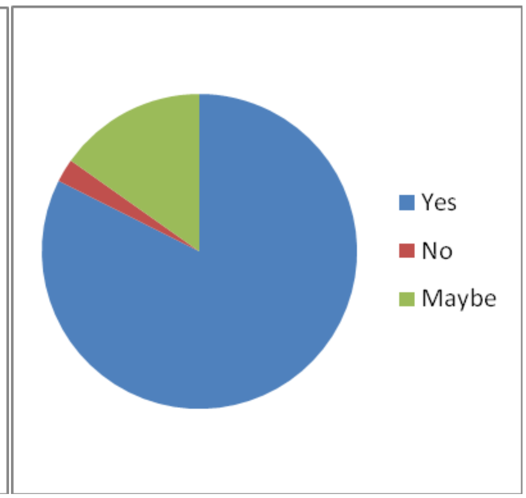


b. Keeping grass clippings and leaves out of storm drains, roads, ditches and gutters:

Farmers:

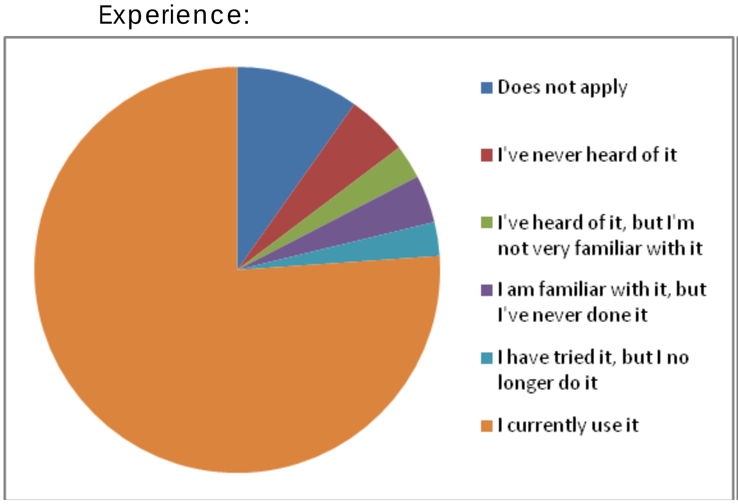
Experience: Willing to try:

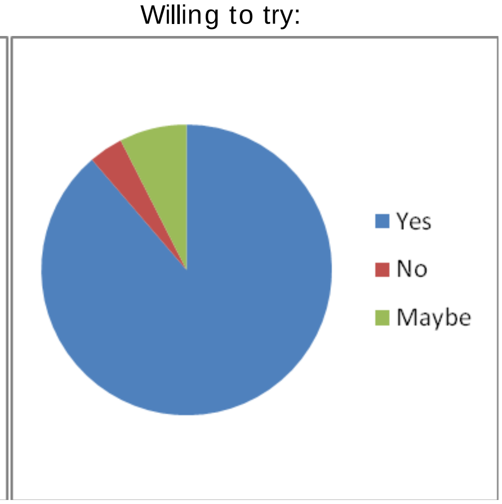




Urban:

Experience: Willing to try:

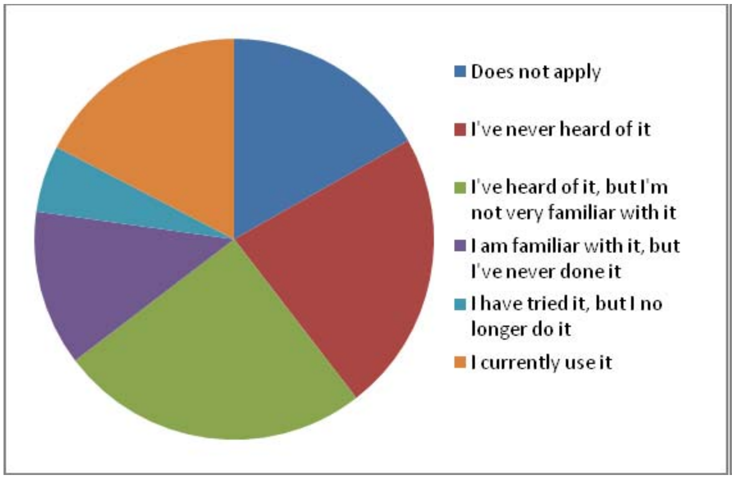




c. Using phosphate free fertilizer:

Farmers:

Experience:



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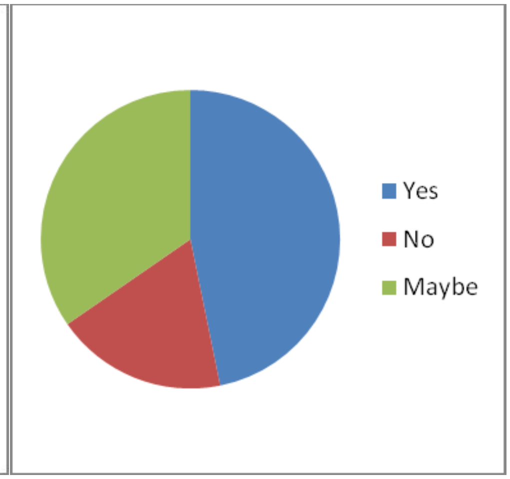
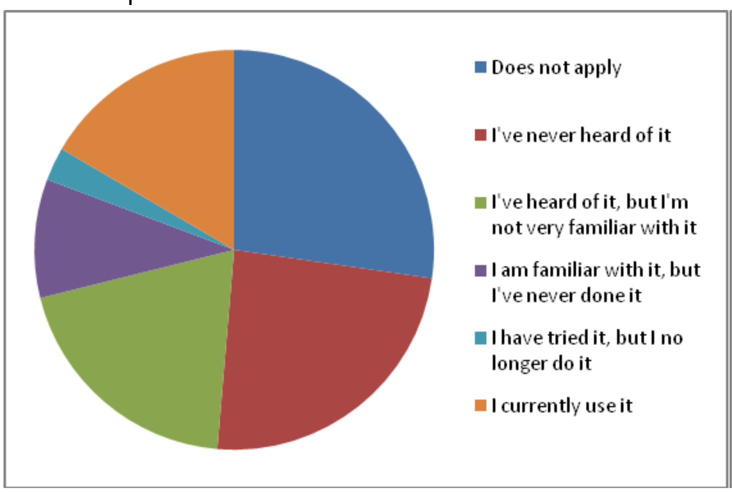


Urban:

Experience:



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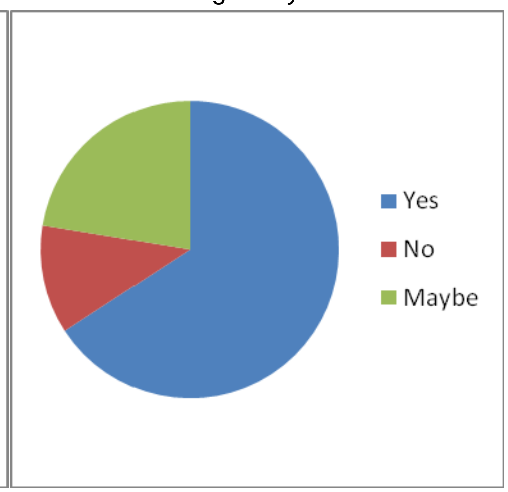
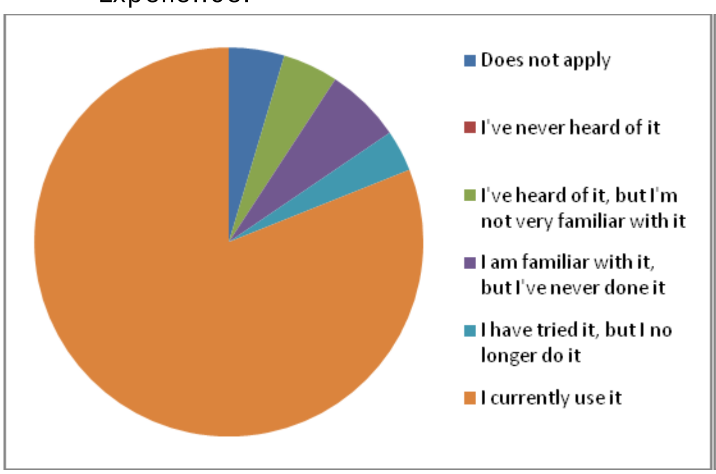


d. Properly disposing of household waste (chemicals, batteries, florescent light bulbs:

Farmers:

Experience:



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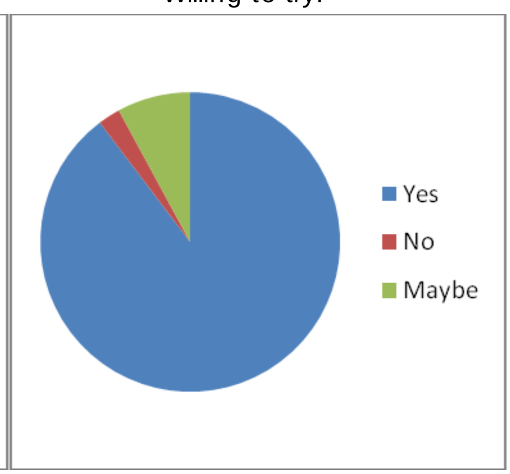
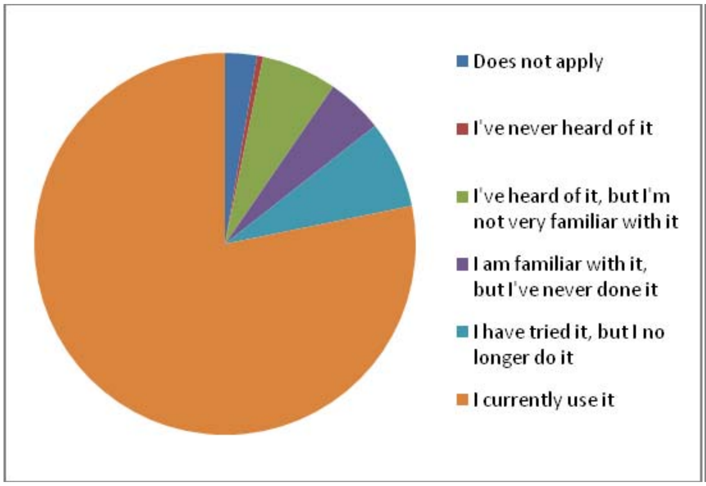


Urban:

Experience:



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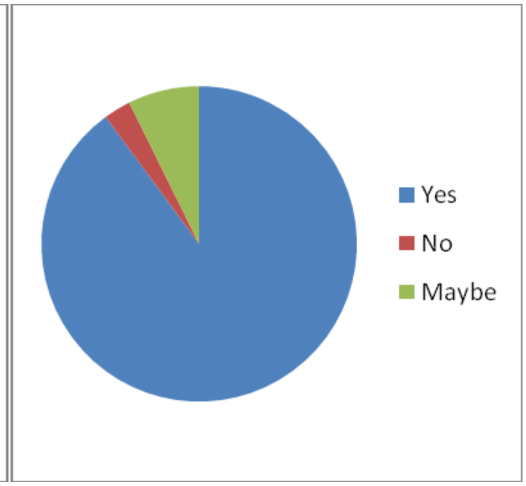
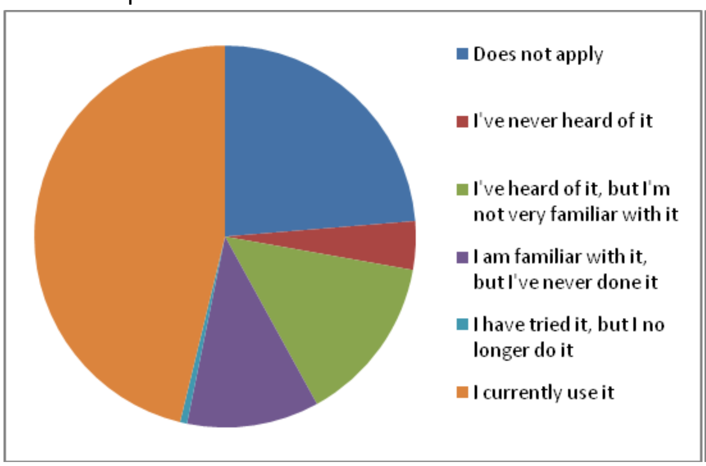


e. Stabilizing and protecting stream banks:

Farmers:

Experience:



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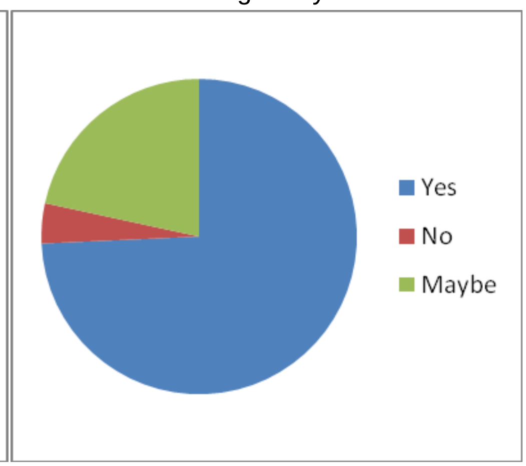
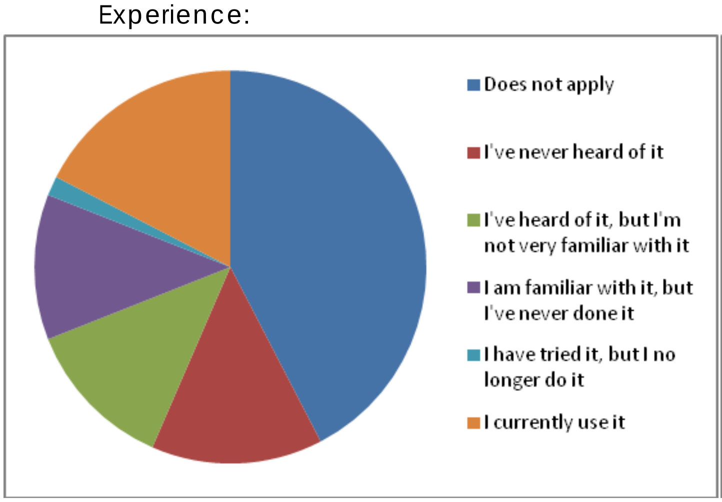


Urban:

Experience:



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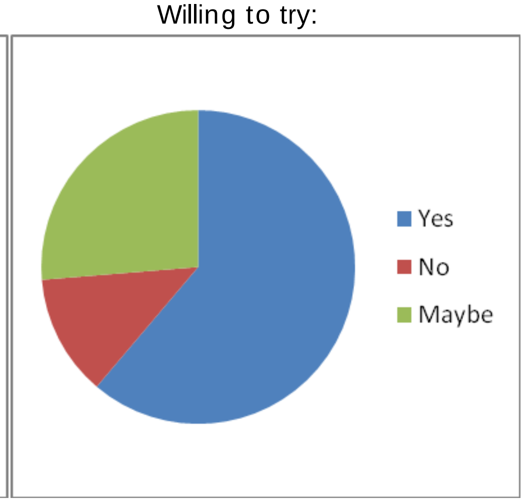
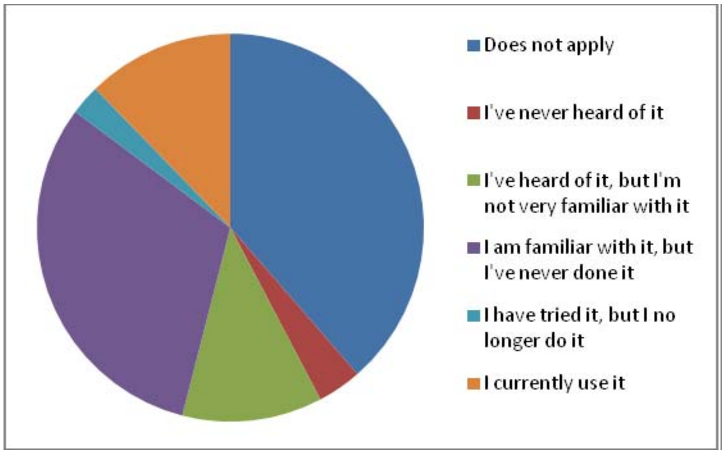


f. Restoring/enhancing wetland:

Farmers:

Experience:



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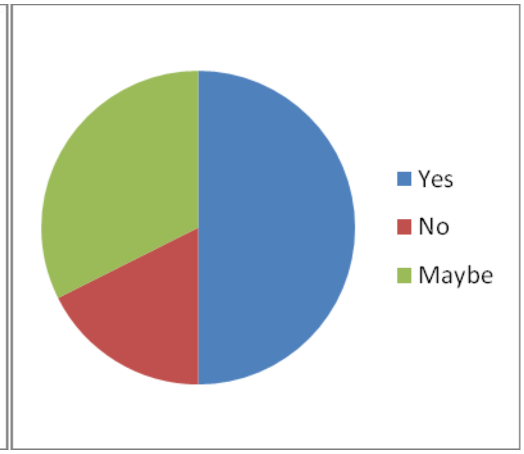
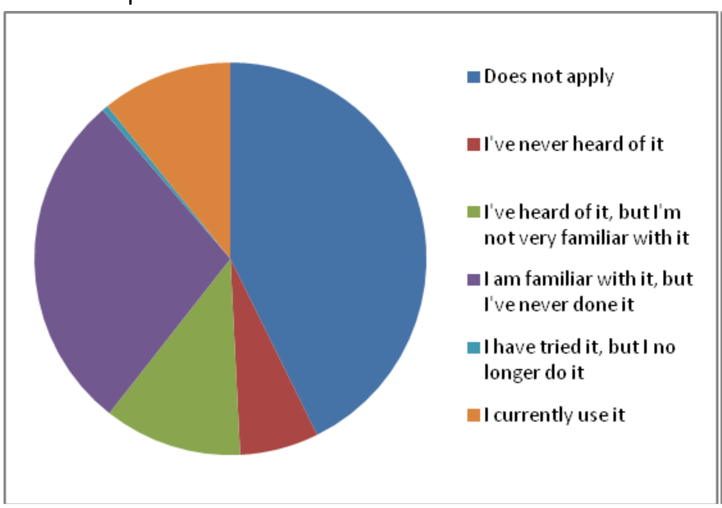


Urban:

Experience:



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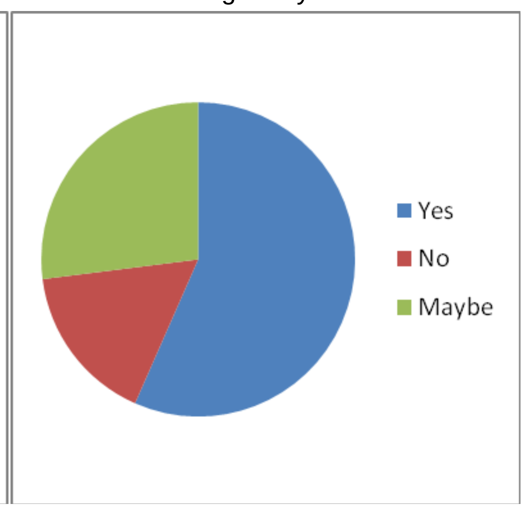
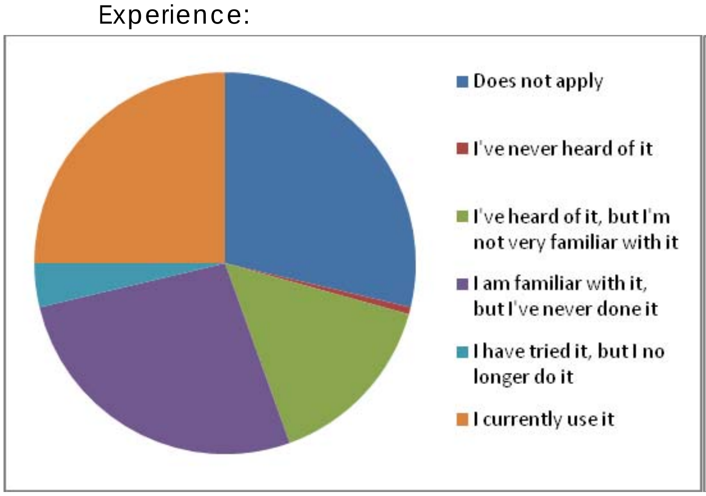


g. Restoring and/or managing declining wildlife habitats:

Farmers:

Experience:



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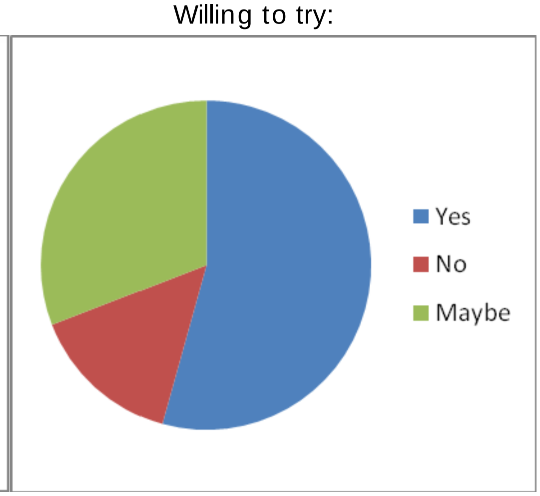
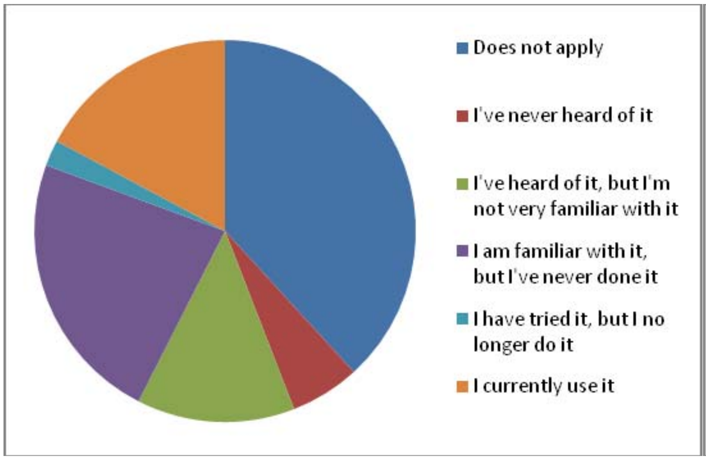


Urban:

Experience:



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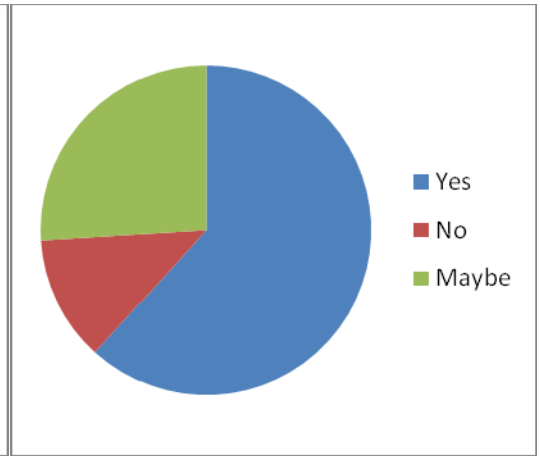
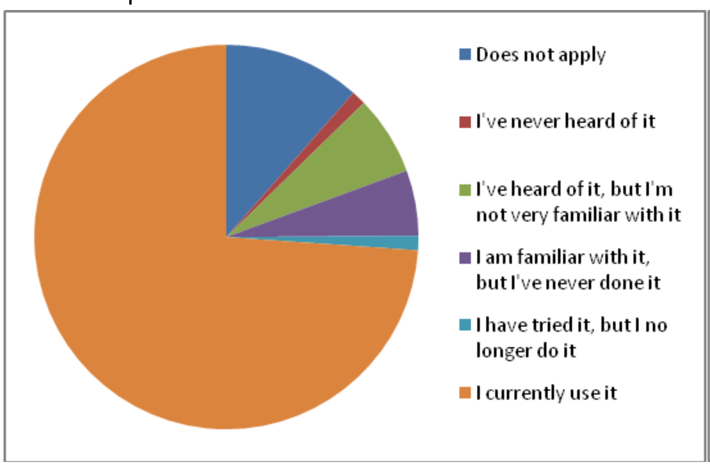


h. Regular maintenance of septic system:

Farmers:

Experience:



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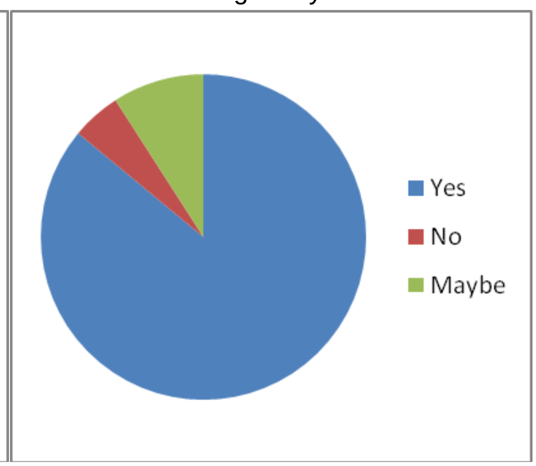
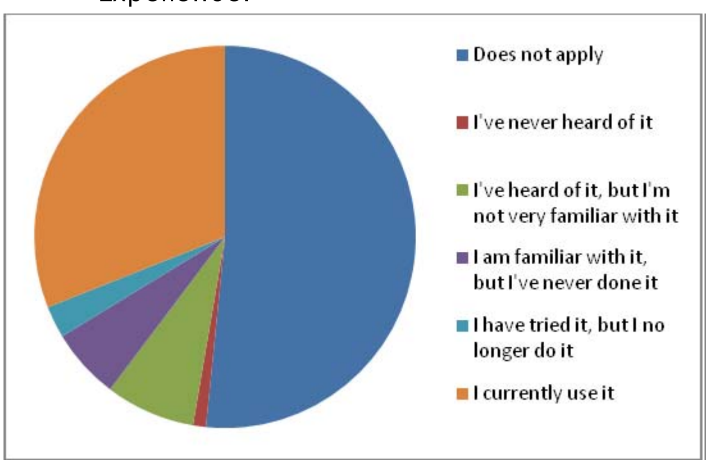


Urban:

Experience:



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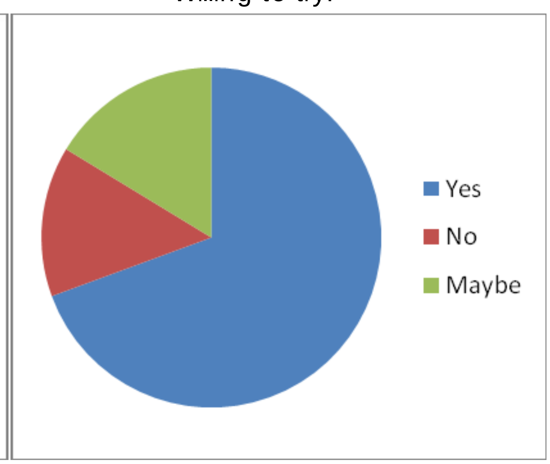
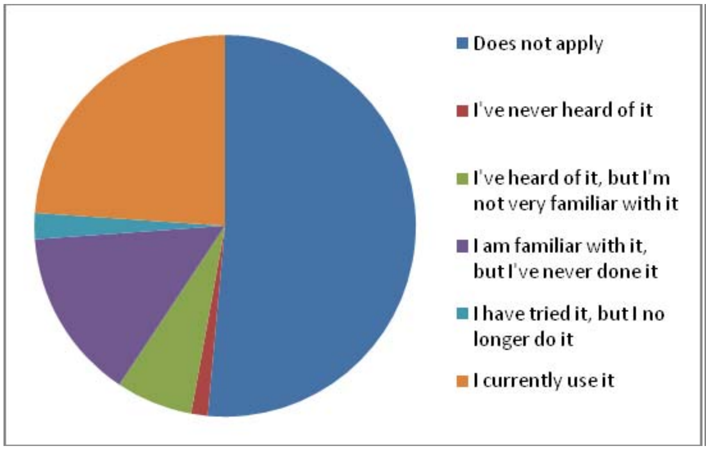


The rest of the questions in this section apply to farmers only:

i. Using manure in accordance with its nutrient content:

Experience:



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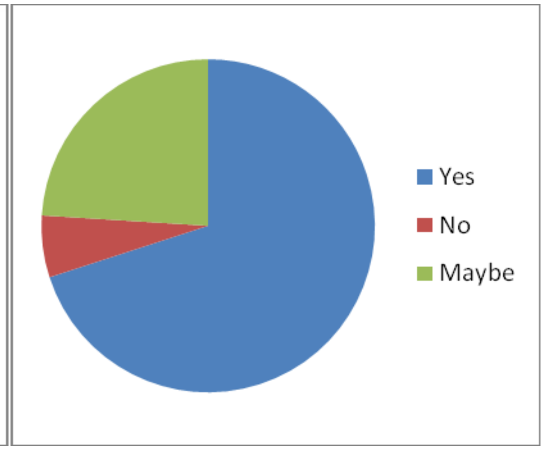
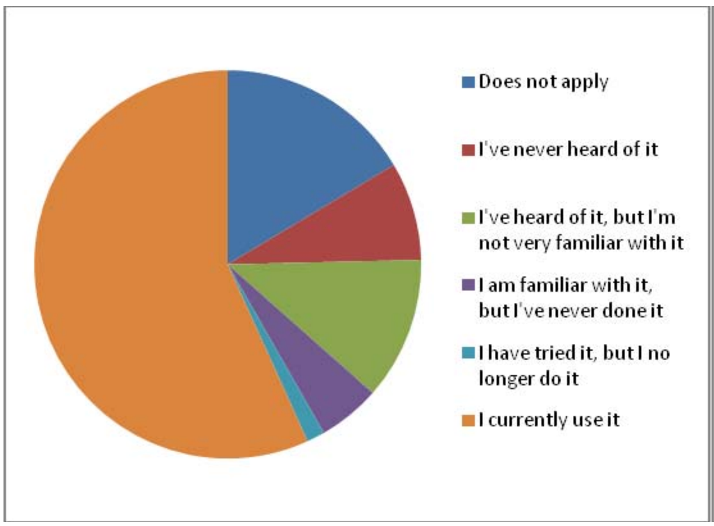


j. Following university or CCA recommendations for fertilization rates:

Experience:



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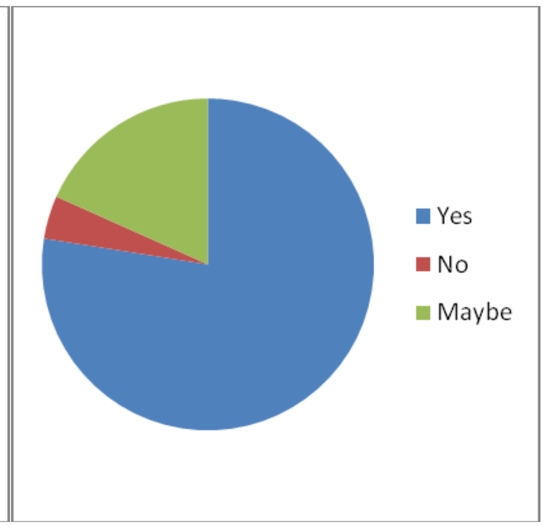
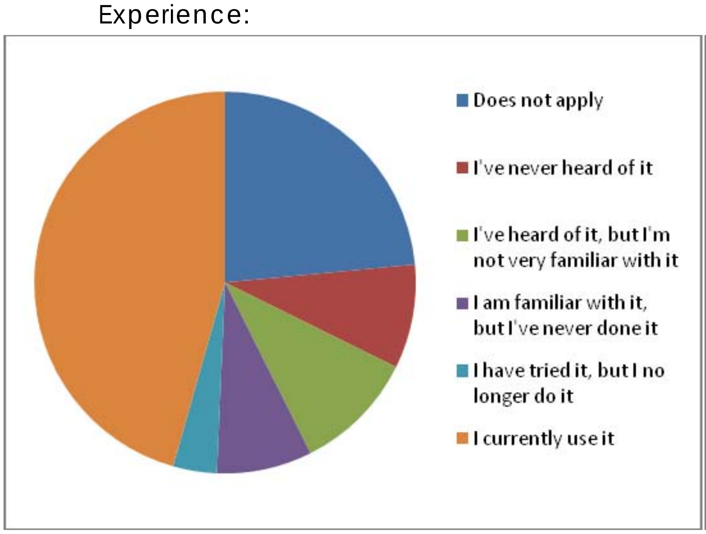


k. Using field records of crops, pests and pesticide use to help develop pest control strategies:

Experience:



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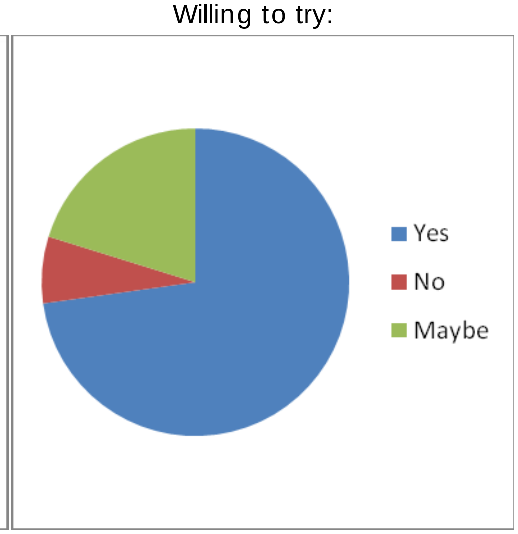
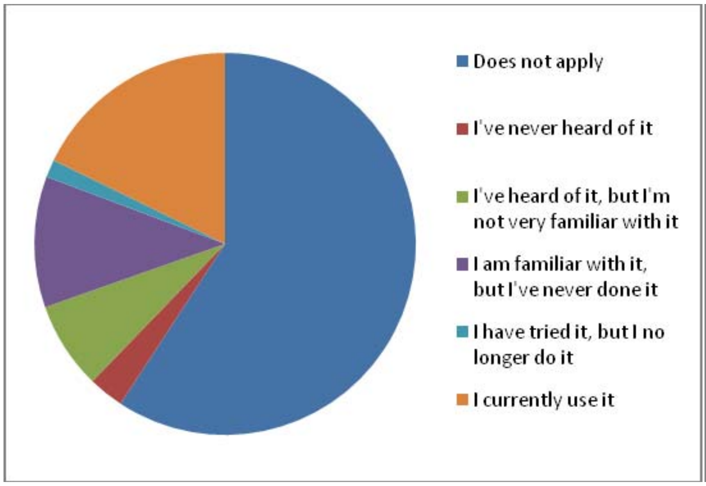


l. Constructing facilities to ensure adequate waste storage:

Experience:



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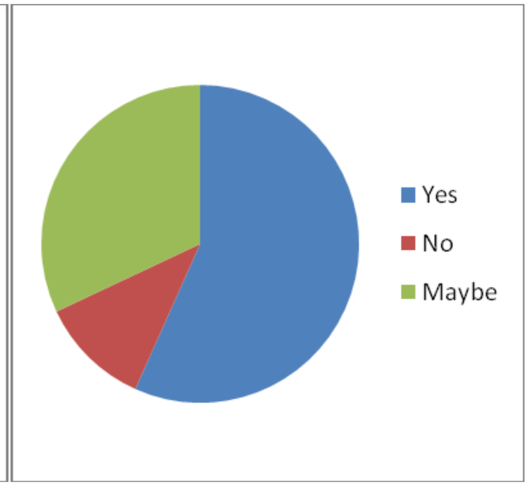
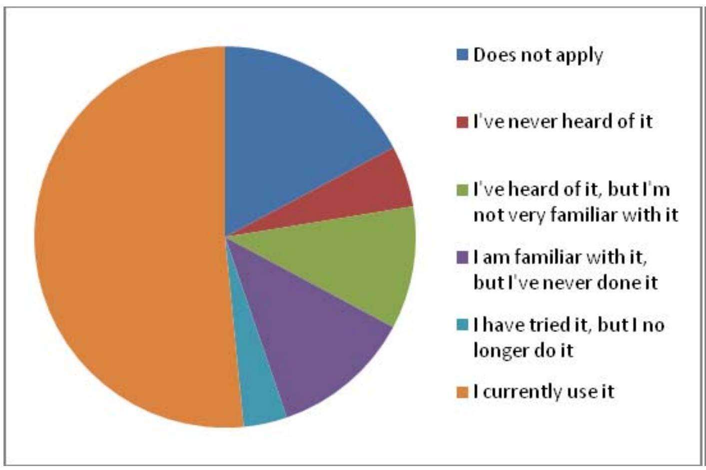


m. Using high residue tillage system to reduce erosion:

Experience:



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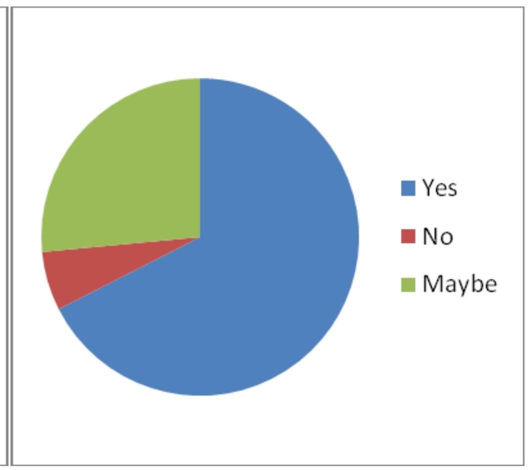
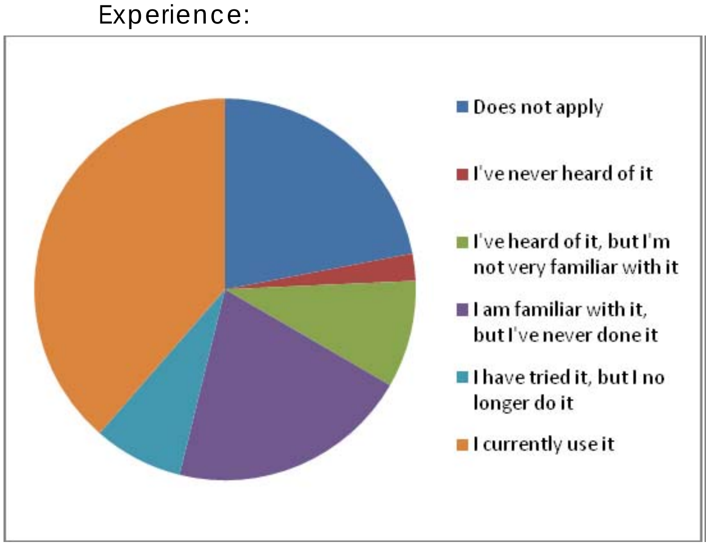


n. Using cover crops:

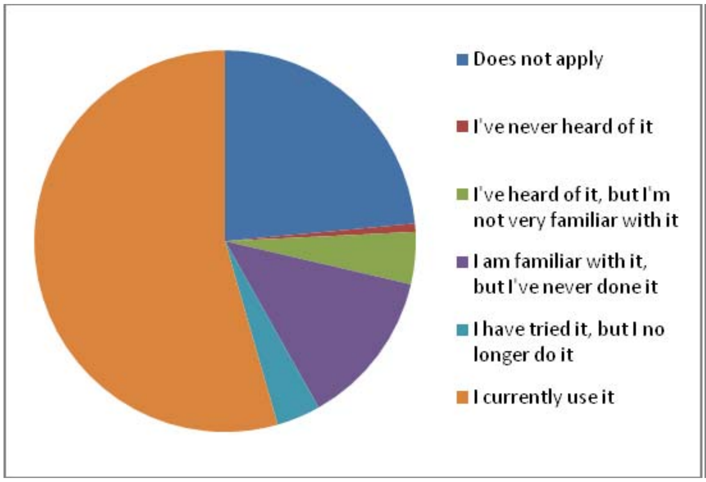
Experience:



Willing to try:

o. Using grassed waterways or filter strips:

Experience:



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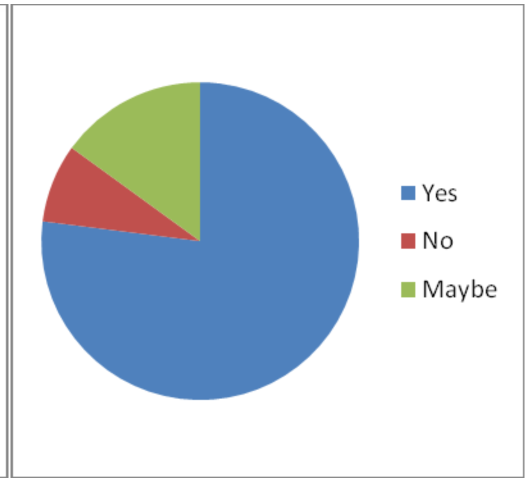
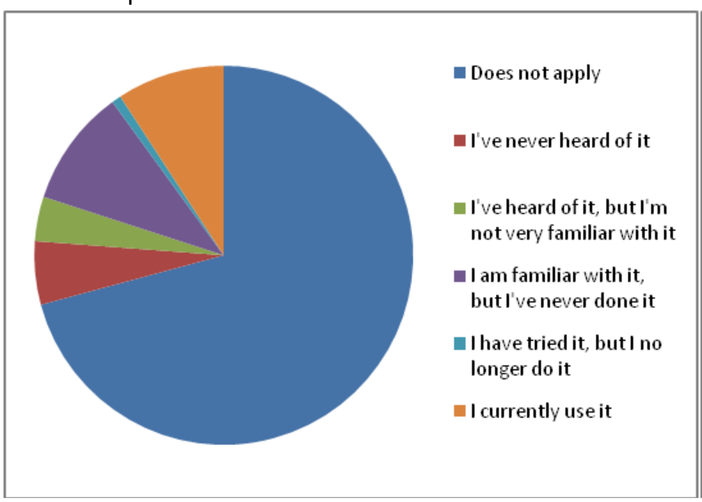


p. Following an approved grazing plan:

Experience:



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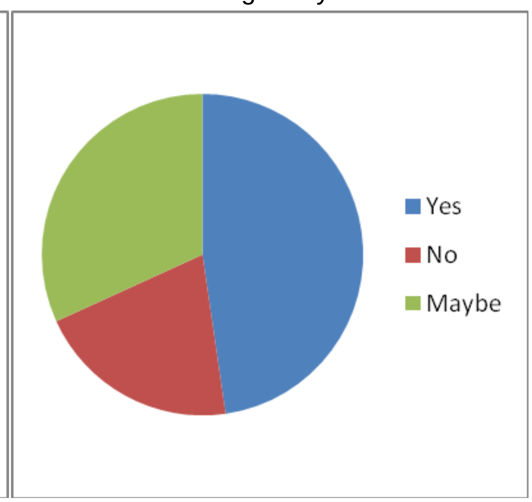
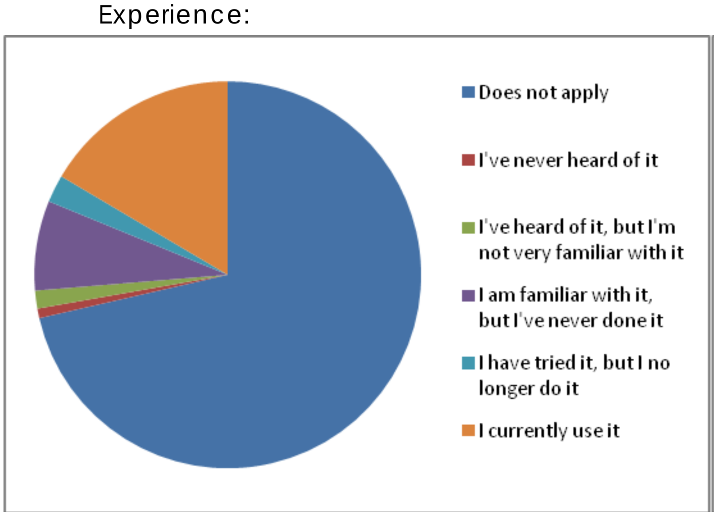


q. Using fencing to exclude livestock from critical areas:

Experience:



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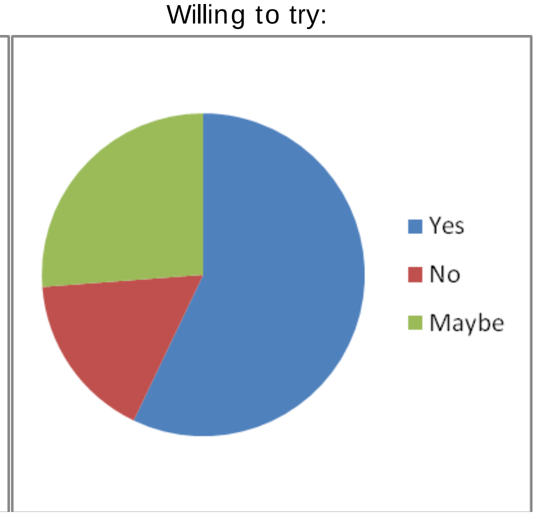
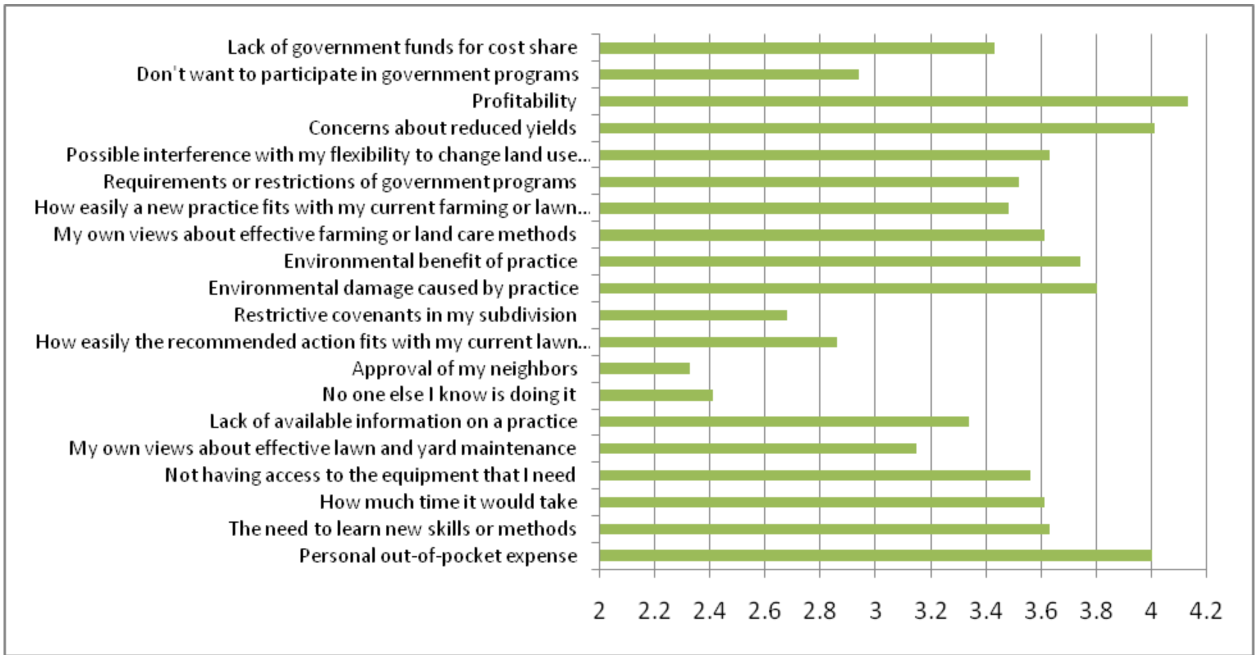


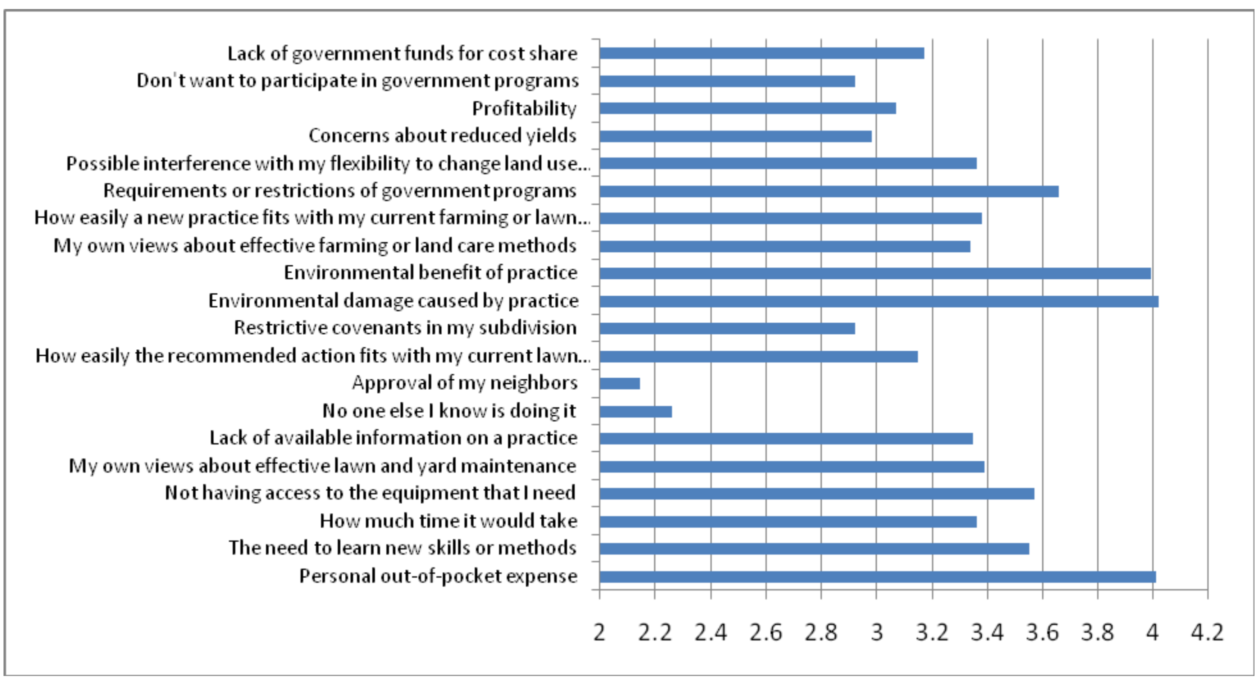
8. Challenges Associated with Improving Water Quality:

Both farmers and urban said personal out of pocket expense, environmental damage and environmental benefit were among the most important
Farmers rated profitability(4.13=highest) and concerns about reduced yields (4.01) highly where urban rated them more neutral (3.07 & 2.98)
Farmers rated approval of my neighbors 2.33 and no one else I know is doing it 2.41 (the two lowest for both farmers and urban) which conflicts with what was said at the Clifty meeting about farmers catching on to practices through their neighbors

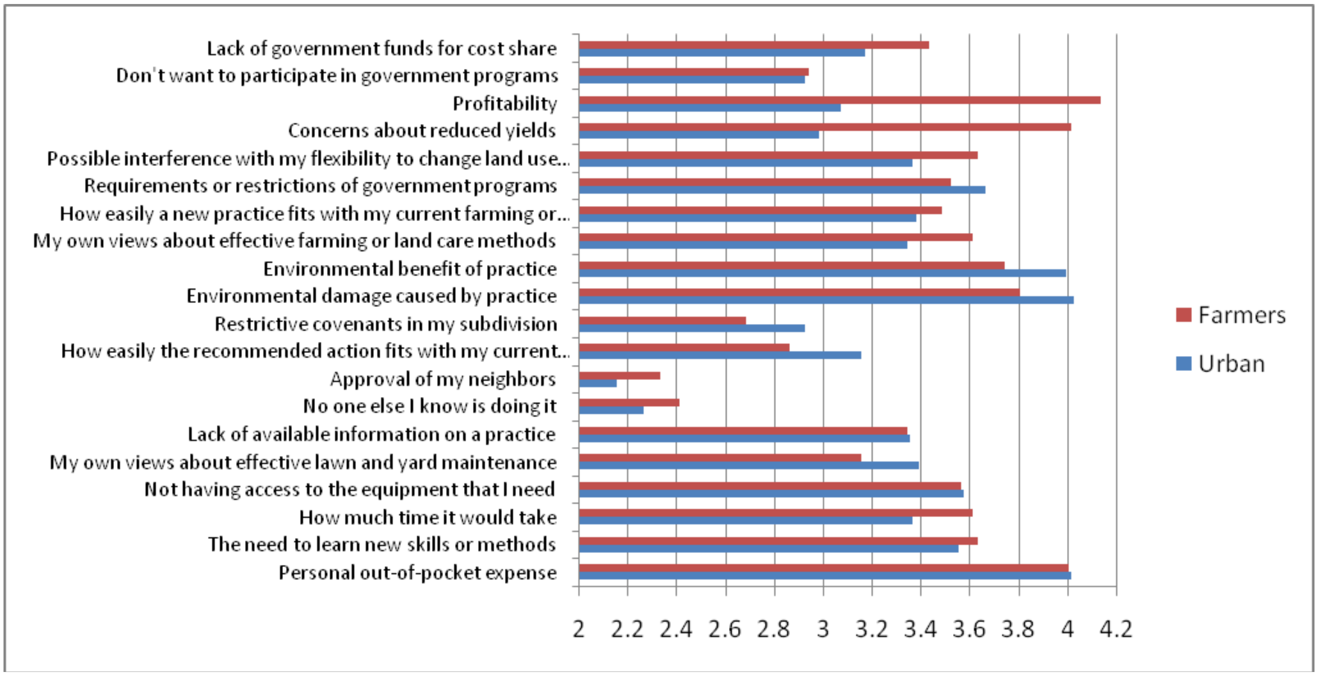
Farmers:



Urban:



Both:



9. Trust in Various Sources:

Farmers trust SWCD most (3.86) but also rated NRCS (3.76), University Extension (3.75), and Indiana State Department of Agriculture (3.75) high

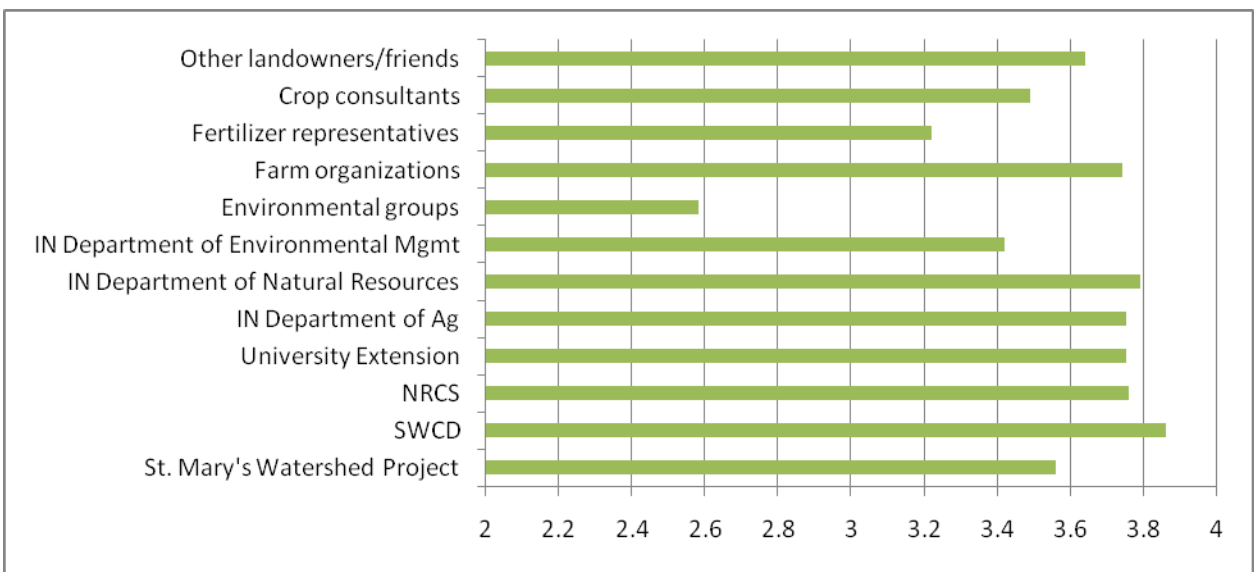
Urban trust University Extension(3.83) most but also rated Indiana Department of Natural Resources(3.81) highly

Farmers trust environmental groups the least (2.58) which is also low for urban (2.86)

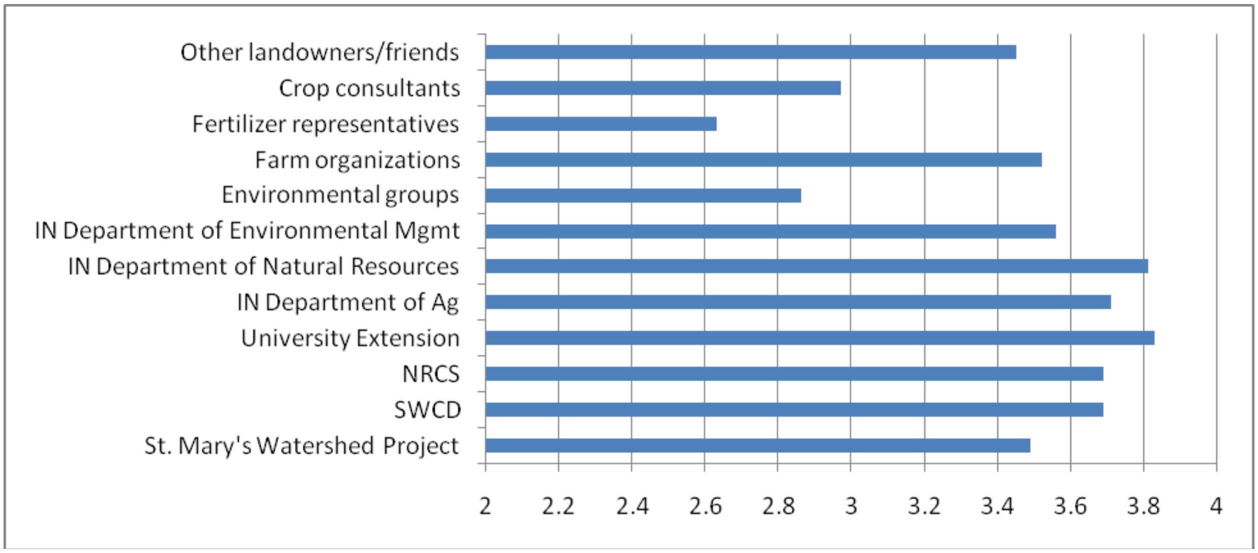
Urban rated fertilizer representatives as the least trustworthy (2.63)

Urban selected never heard of more often than farmers for all sources

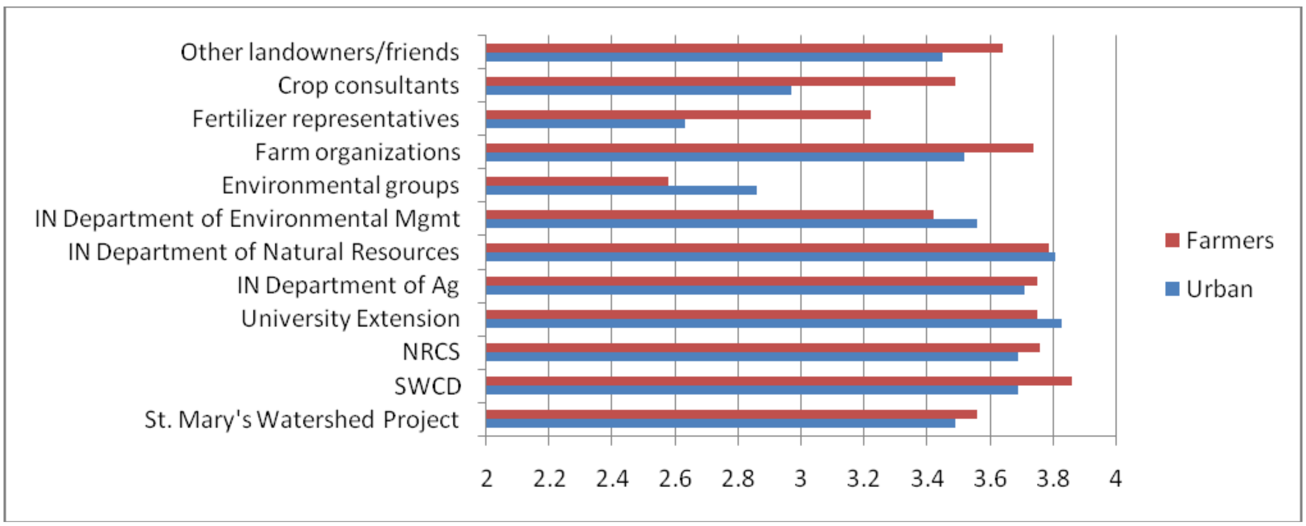
Farmers:



Urban:



Both:

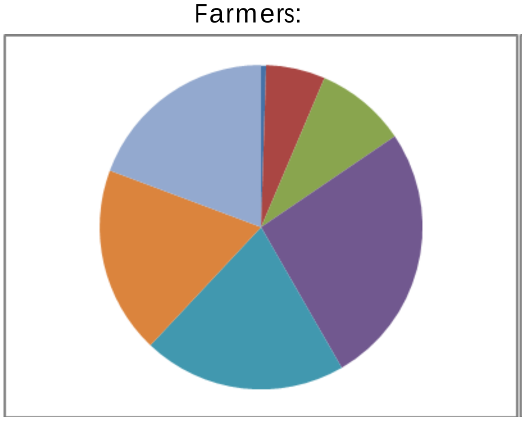


10. About You

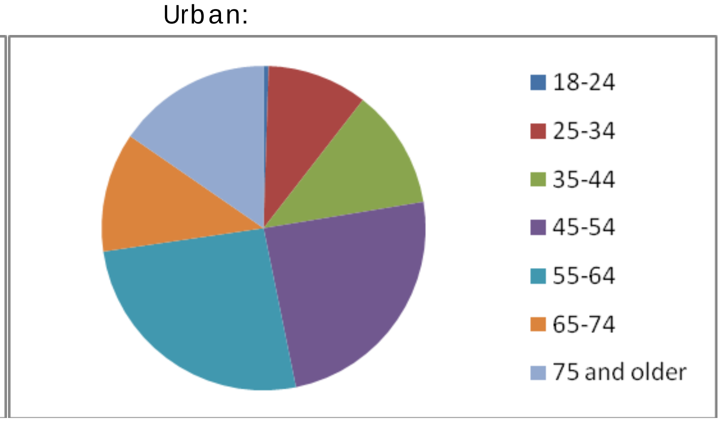
a. What is your age:

Farmers had the most in the 45-54 age group, Urban 55-54, but farmers had more people 58.3% 55 or older where urban had 53.2%

Farmers:

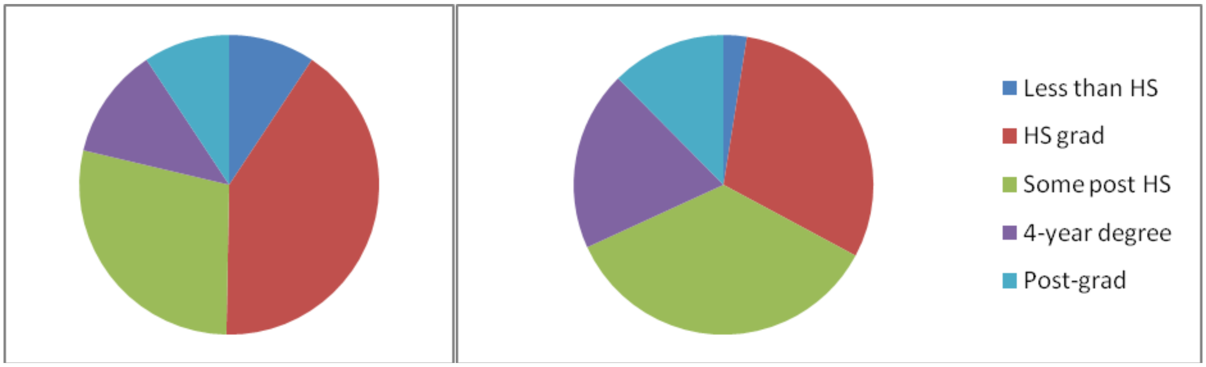


Urban:



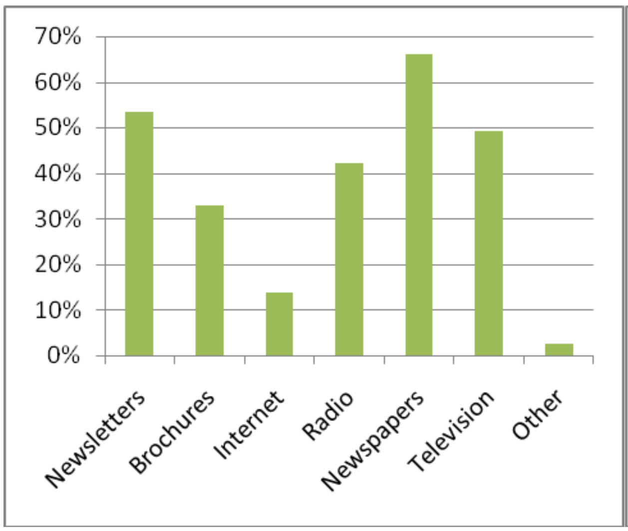
b. What is the highest level of education you have achieved:
Only 46.7% of farmers had a higher level of education than high school where 61.4% of urban said they had at least some college or higher

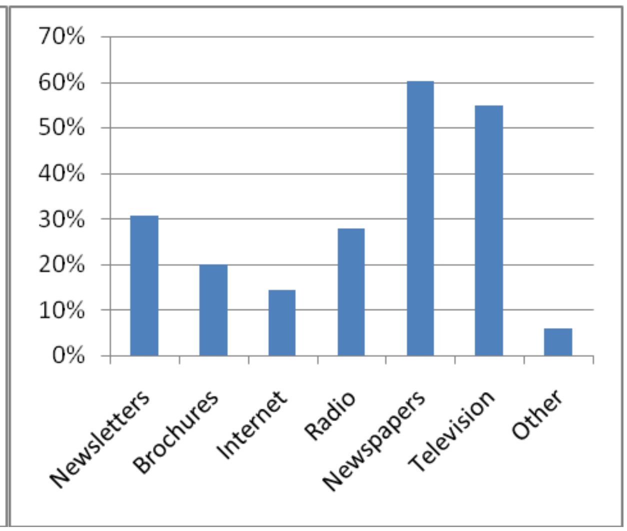
Farmers: Urban:



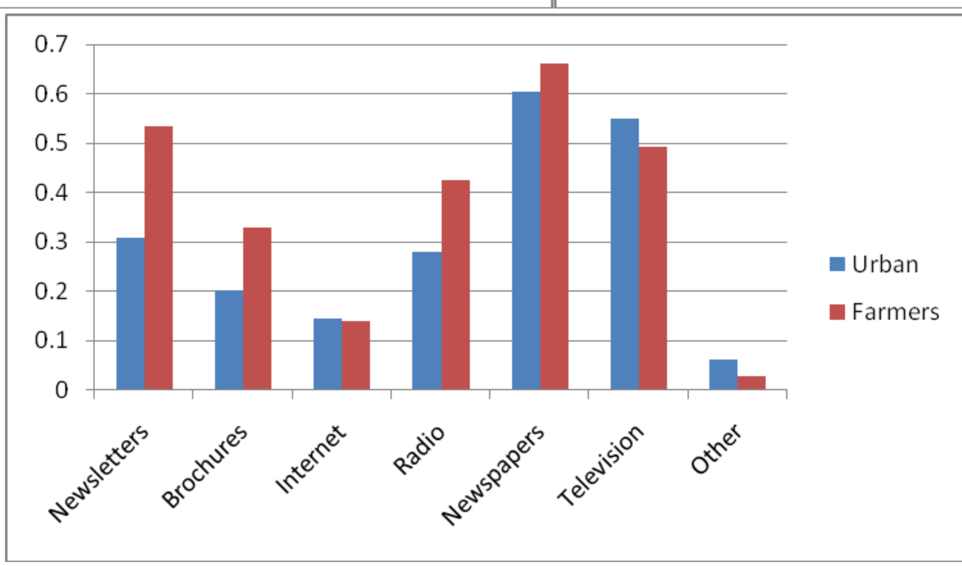
c. Where hear about water quality issues:
Both farmers and urban rated newsletters, newspapers and television the highest

Farmers: Urban:





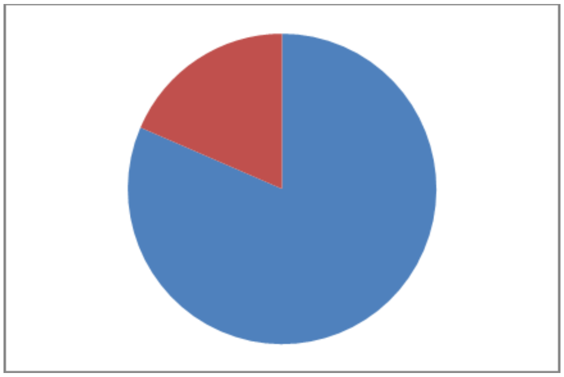
Both:

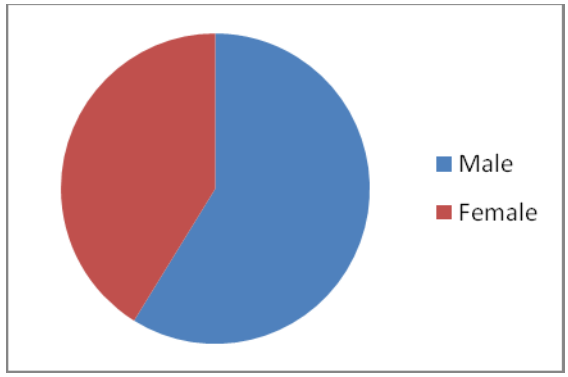


d. What is your gender:

81.5% of the farmers were male while urban was more even with 58.8% male

Farmers: Urban:

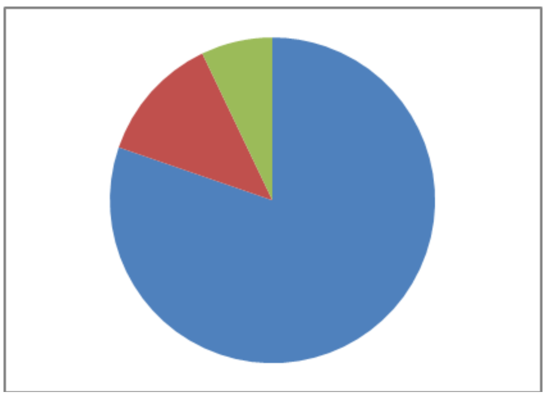


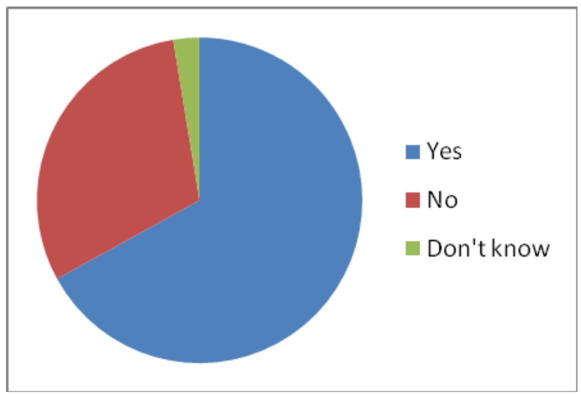


e. Do you have a septic system:

80.2% of farmers said yes while only 67% of urban did

Farmers: Urban:

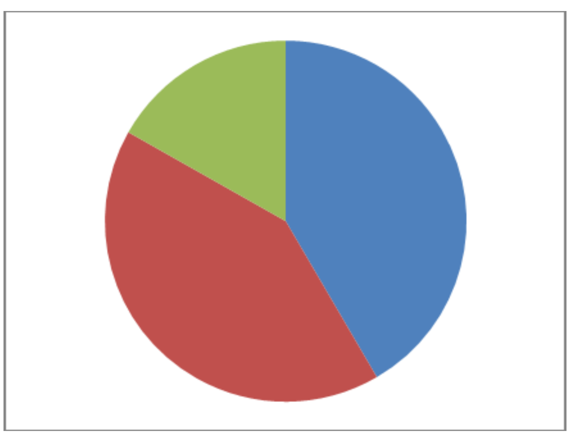


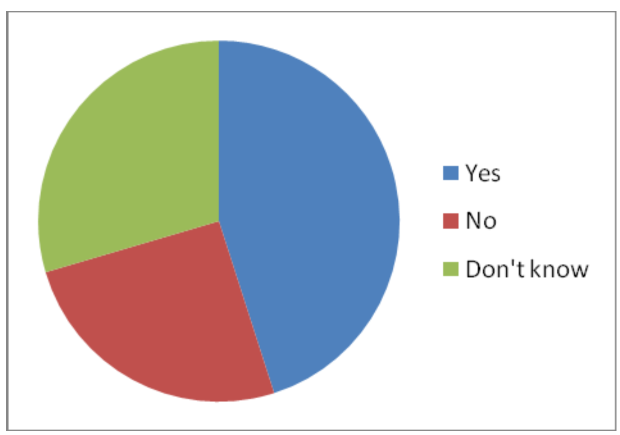


f. Does your septic system have an absorption field?

Both had a little over 40% say yes, but urban had almost 30% say they don't know

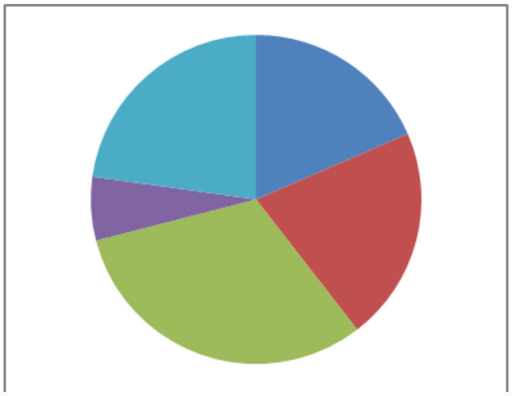
Farmers: Urban:



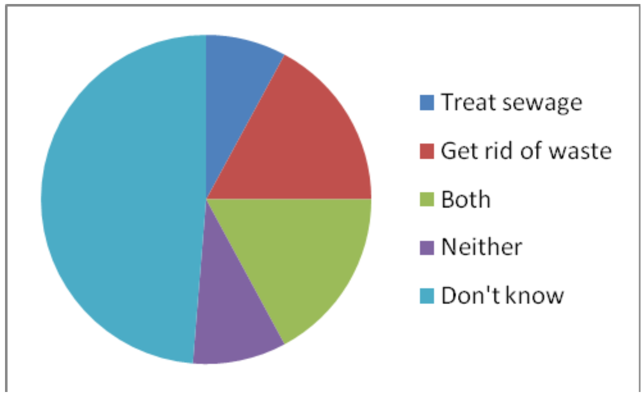


g. Was your septic system designed to get rid of waste or treat sewage?
48.7% of urban said they didn't know

Farmers:

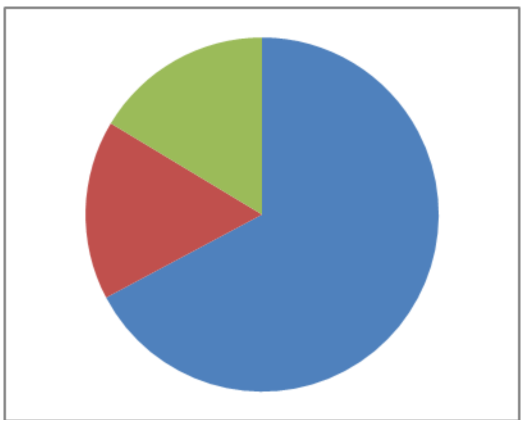


Urban:

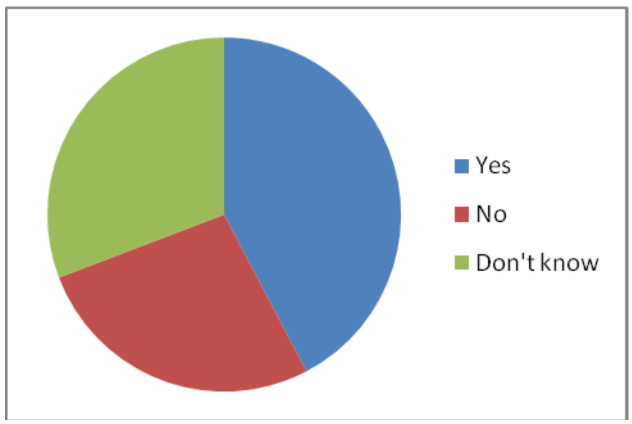


h. Do you think a local government agency should handle inspection and maintenance of septic systems?
Farmers had a high yes of 67.3% while only 42.3% of urban said yes (and 30.8% said they didn't know)

Farmers:

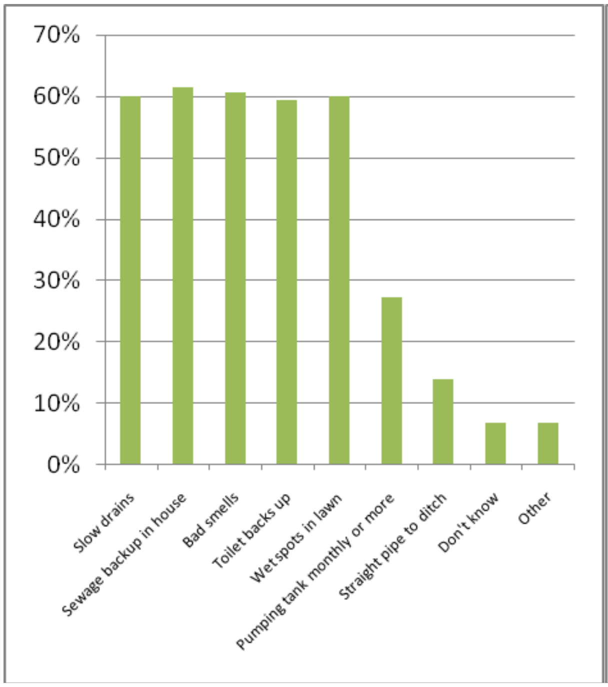


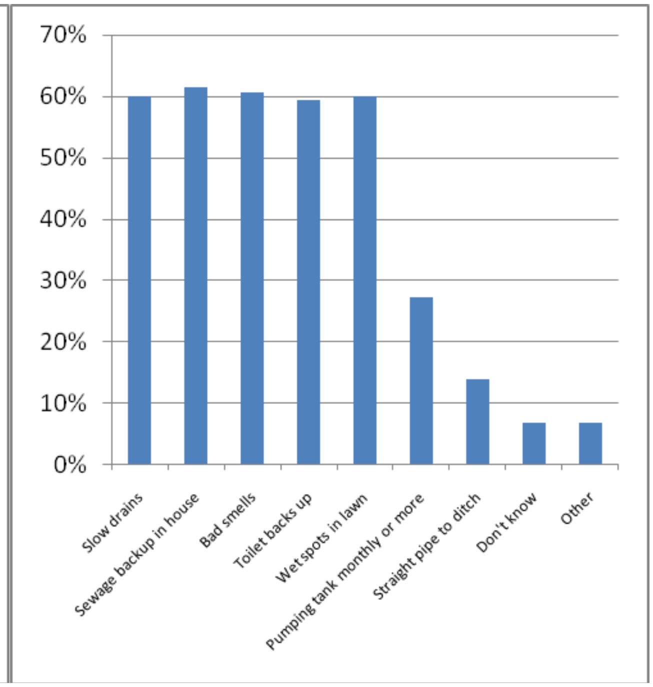
Urban:



i. How would you know if your septic system was NOT working properly?
Lowest two for both were by pumping tank monthly or more and straight pipe to ditch, don't know was low for both as well

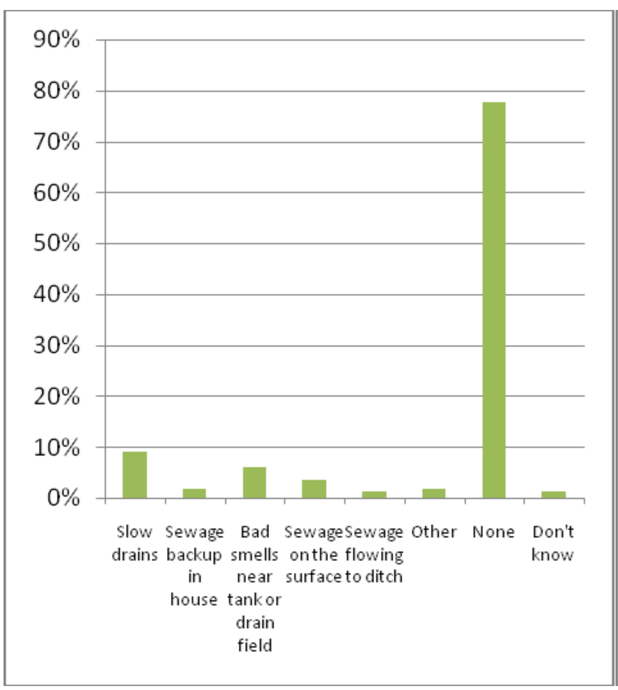
Farmers: Urban:

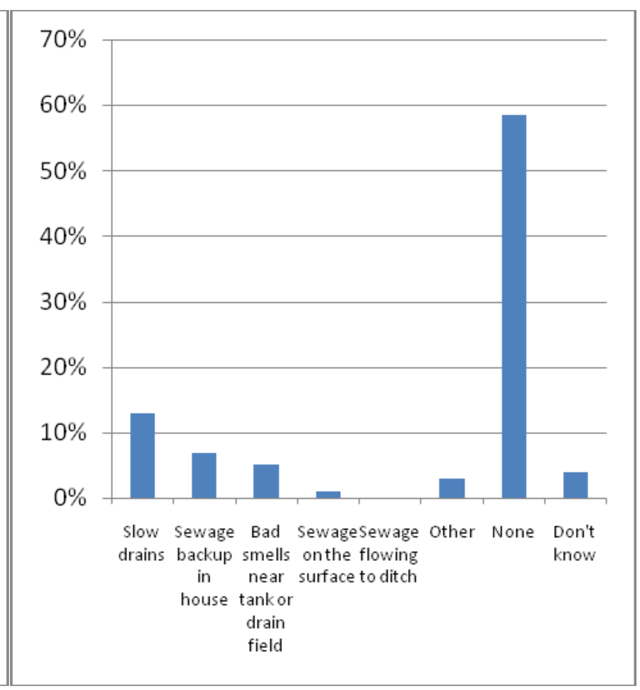




j. Within the last five years have you had any of the following problems?
Both had high none responses (58.4% of urban and 77.8% of farmers)

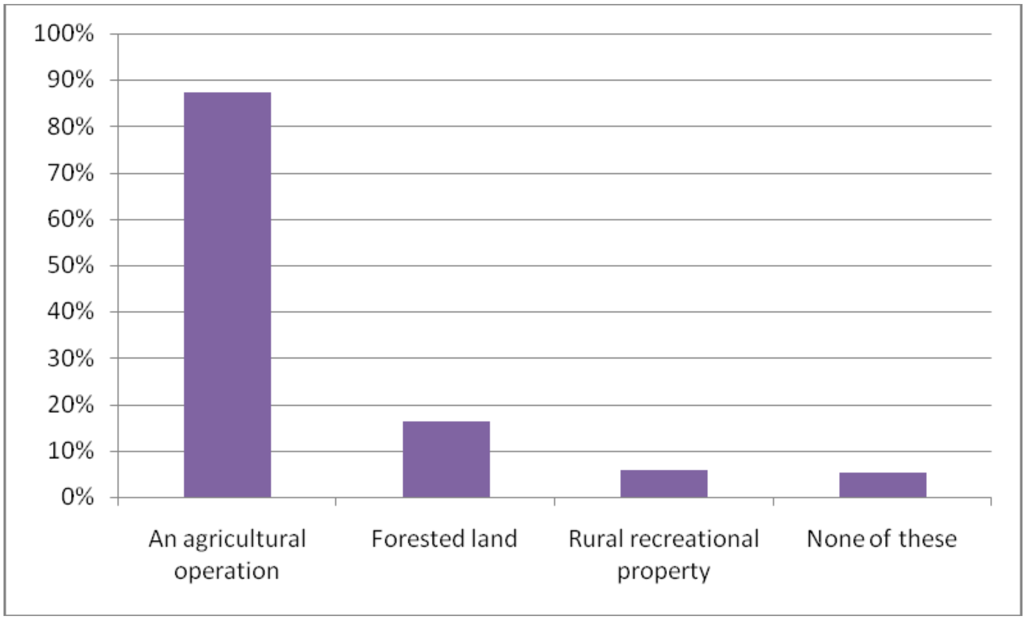
Farmers: Urban:



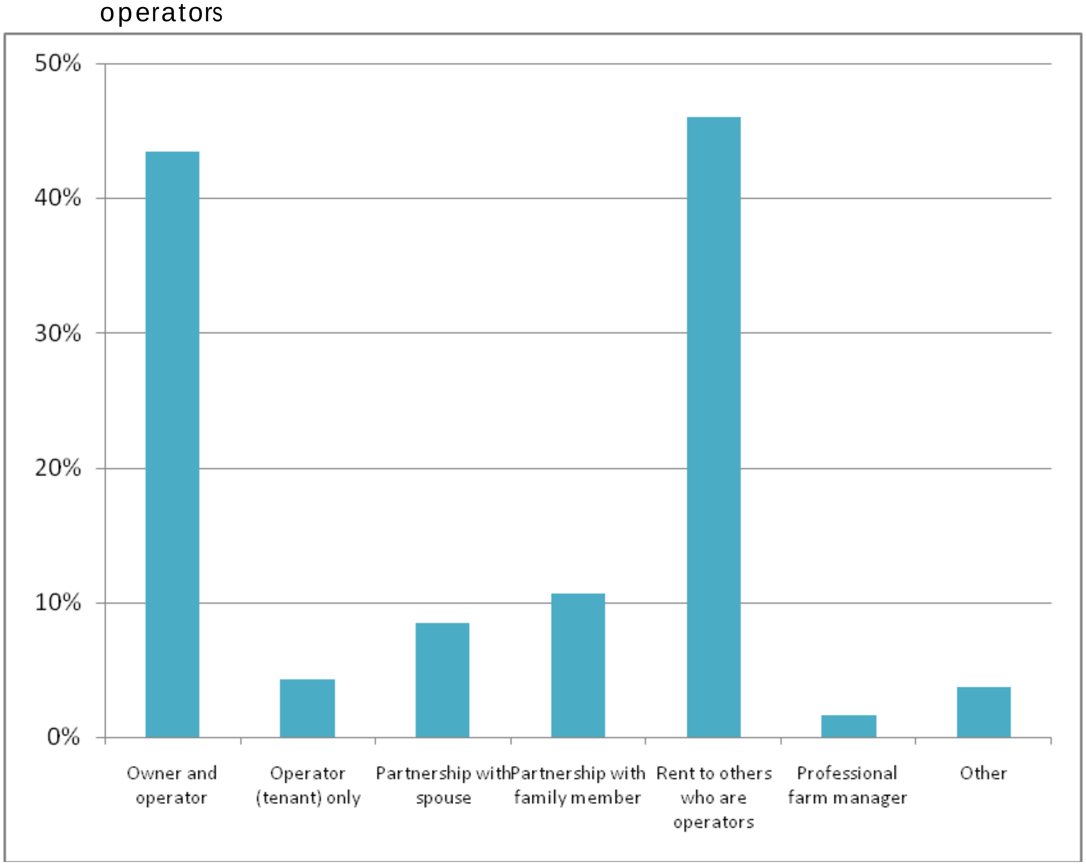


11. About Your Farm Operation: (only analyzing responses from farmers)

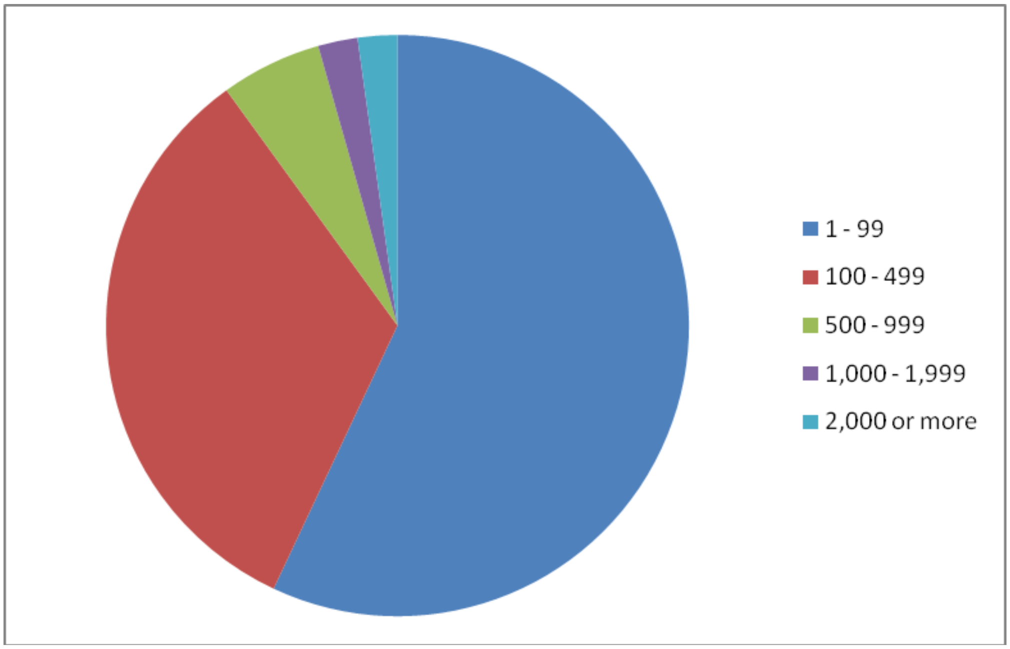
a. In addition to your residence which of the following to you own or manage?
87.3% own an agricultural operation



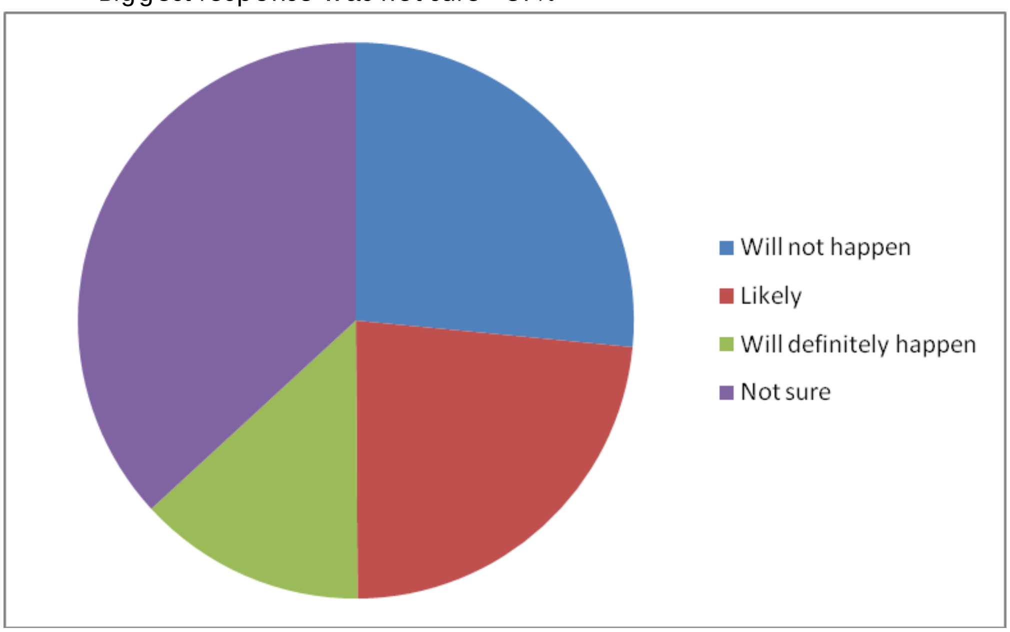
b. Which of the following best describes your position as farm operator?
46% rent farmland to others who are farm operators and 43.2% are owner and operators



c. Please estimate the tillable acreage of your farming operation this year:
57% own 1-99 acres and 33% own 100-499 acres (mostly small farms)

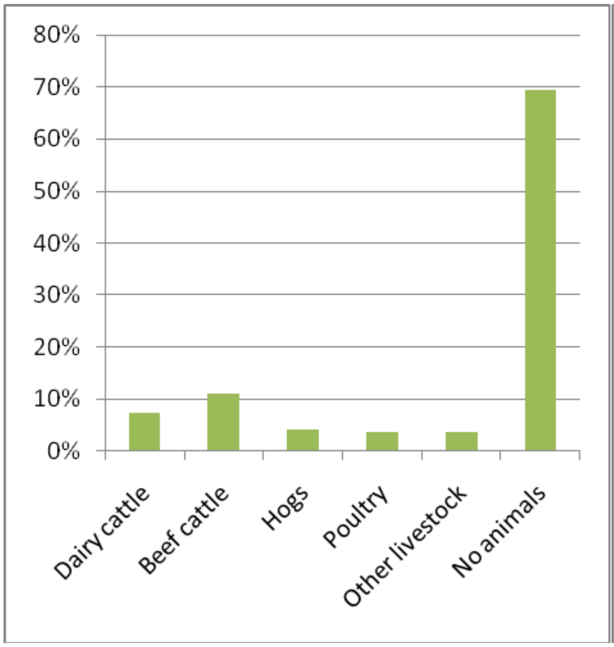


d. How likely is it that any family member will continue farm operations when you retire or quit farming?
Biggest response was not sure - 37%

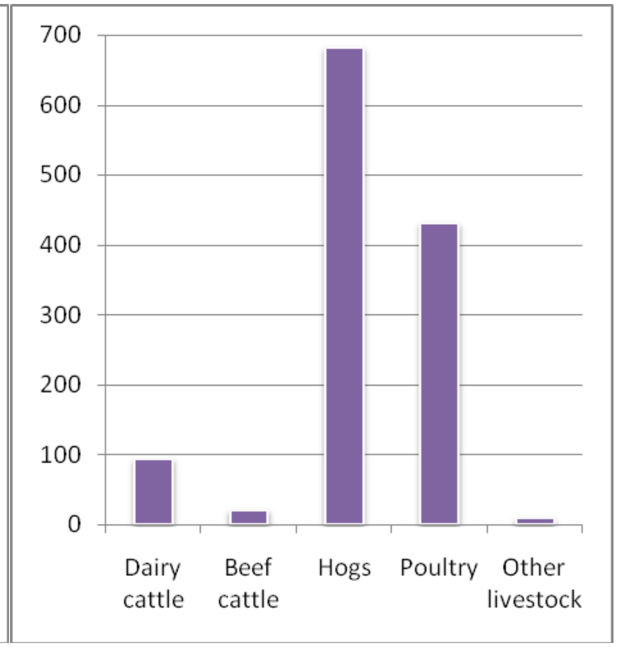


e. How many of the following animals are part of your farming operation?
69.3% selected no animals

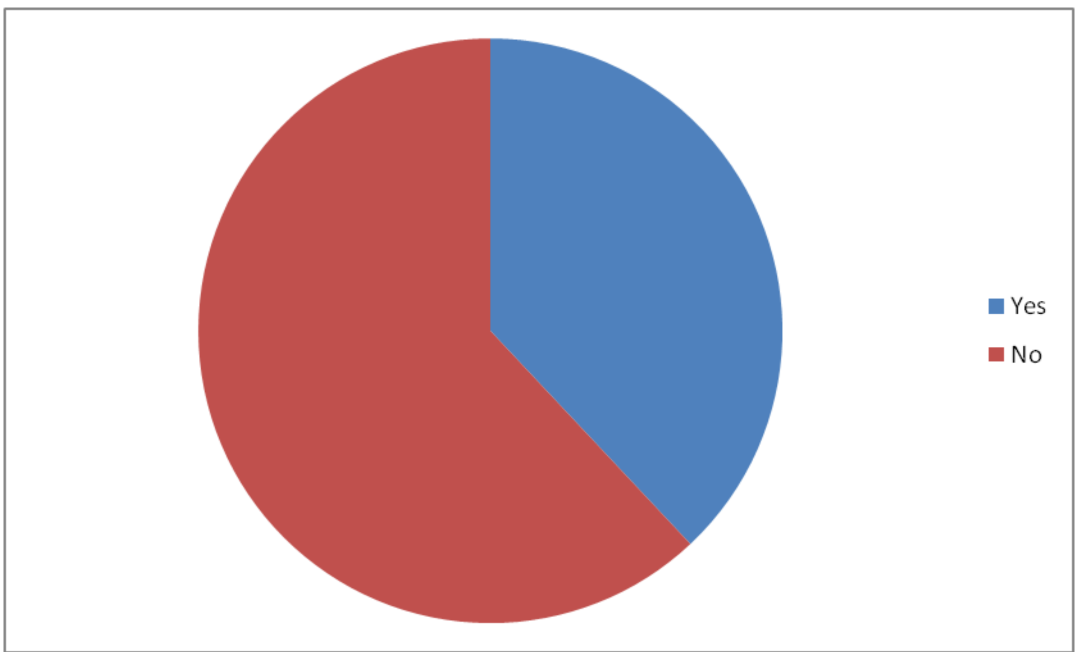
Percent Owned:



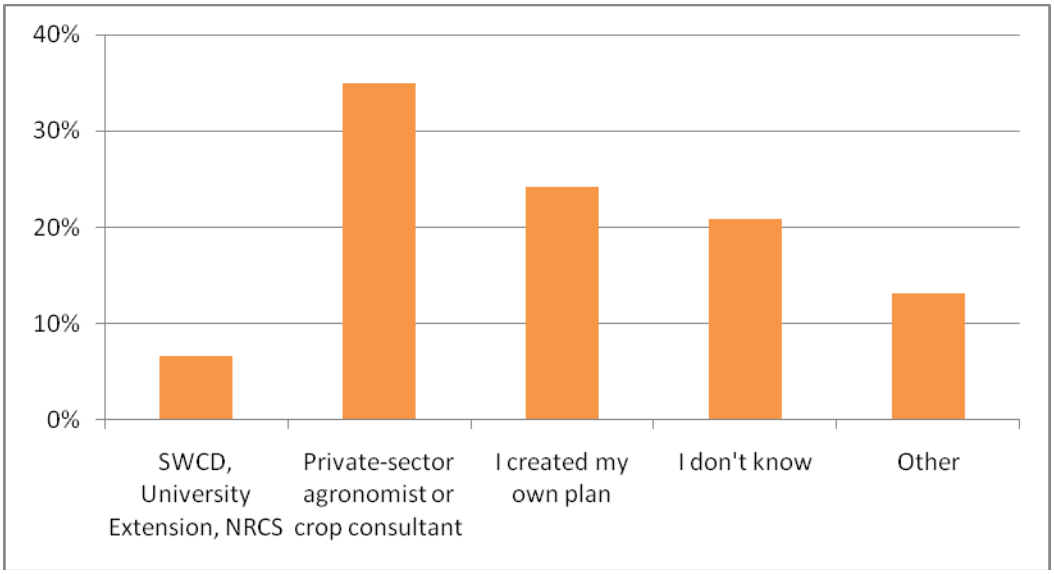
Average Herd Size:



f. Do you follow a nutrient management plan for your farm operation?
62% said no!

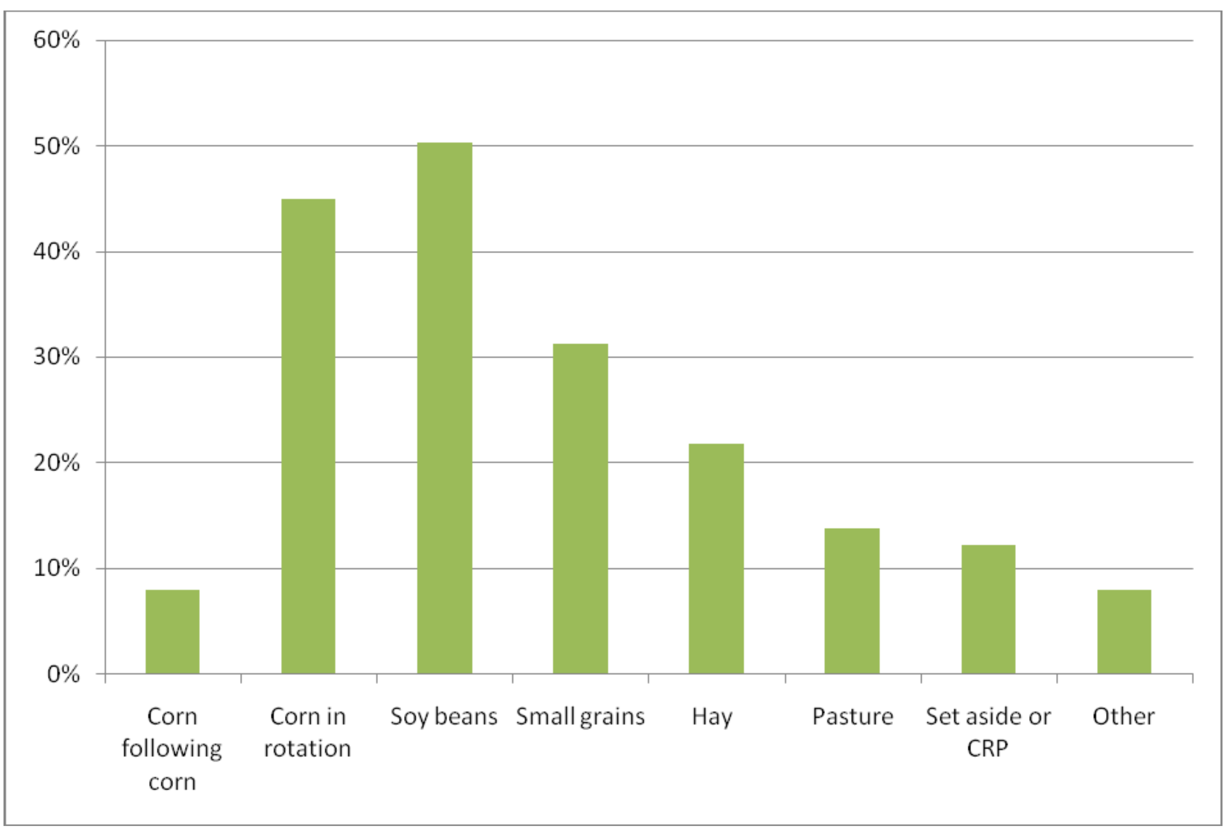


g. Who developed your current nutrient management plan?
More people answered this question(91) than said yes for f.(62) even those who said no were instructed to skip question. Also the largest response was 35% said a private-sector agronomist or crop consultant.

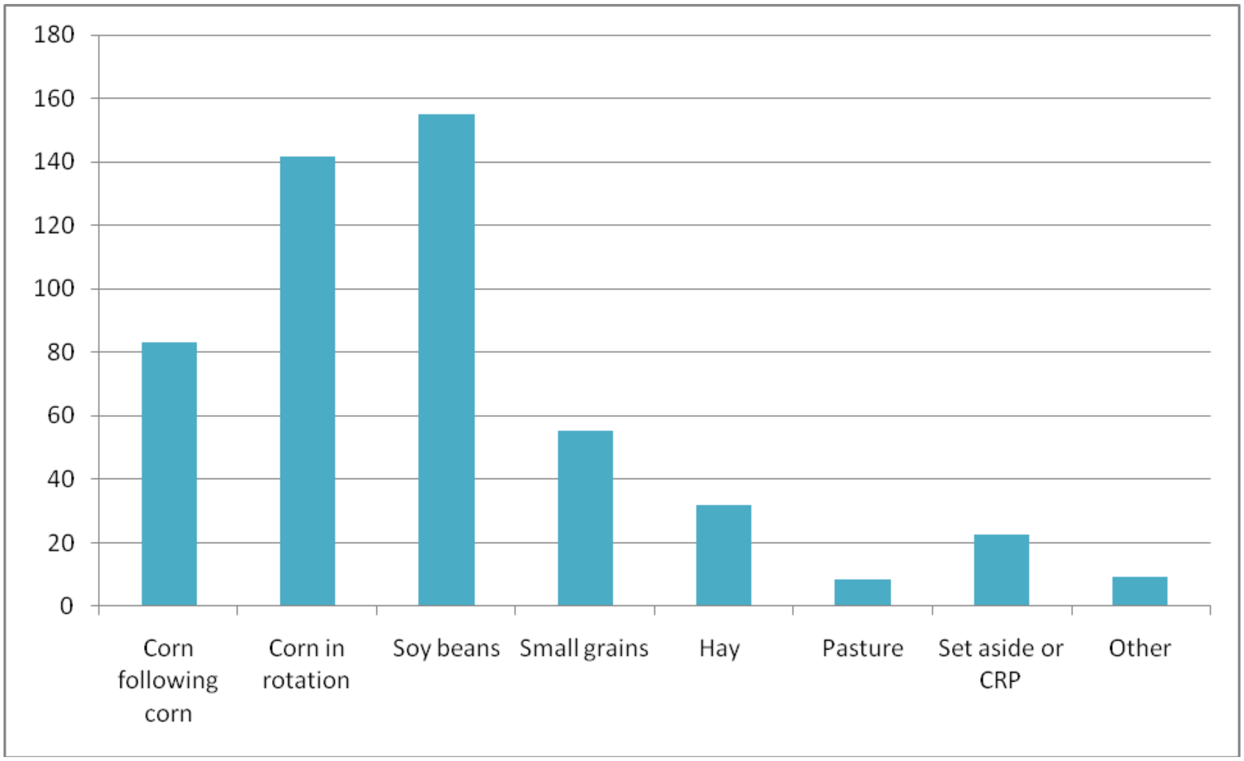


h. This year how many acres of the following do you manage?
Largest number of people (95) said soybeans and this was also the highest average acres (154.98)

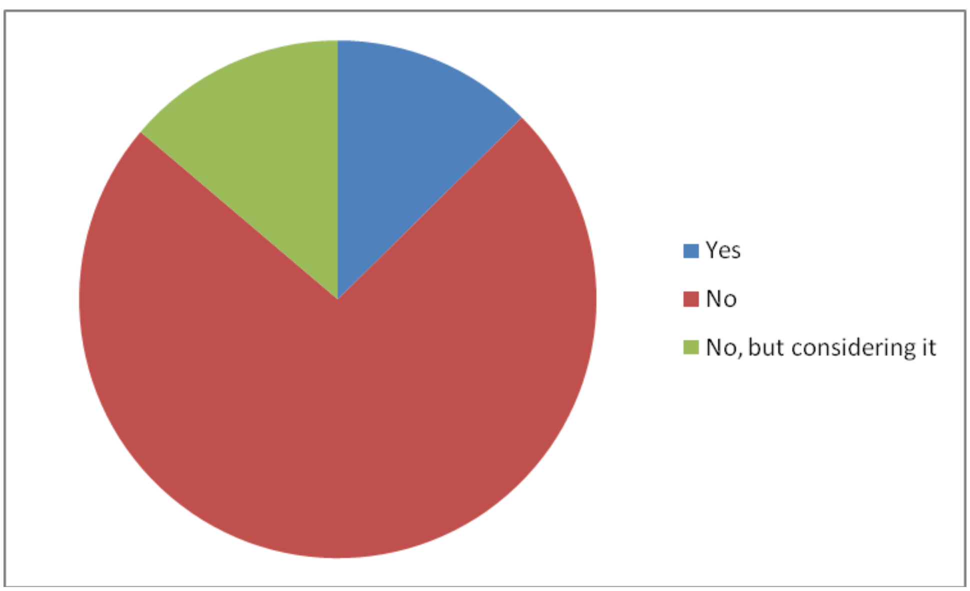
Percent Own:



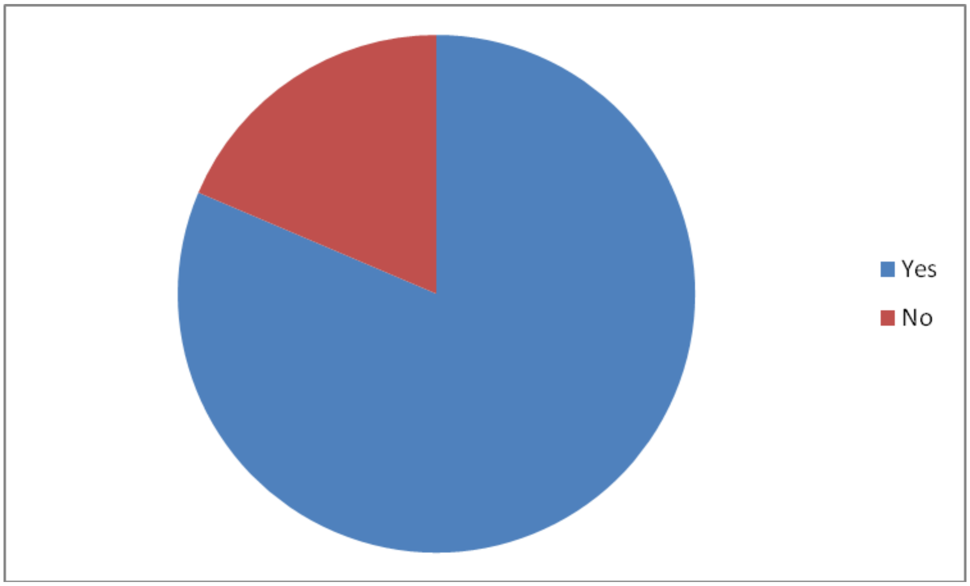
Mean Acreage:



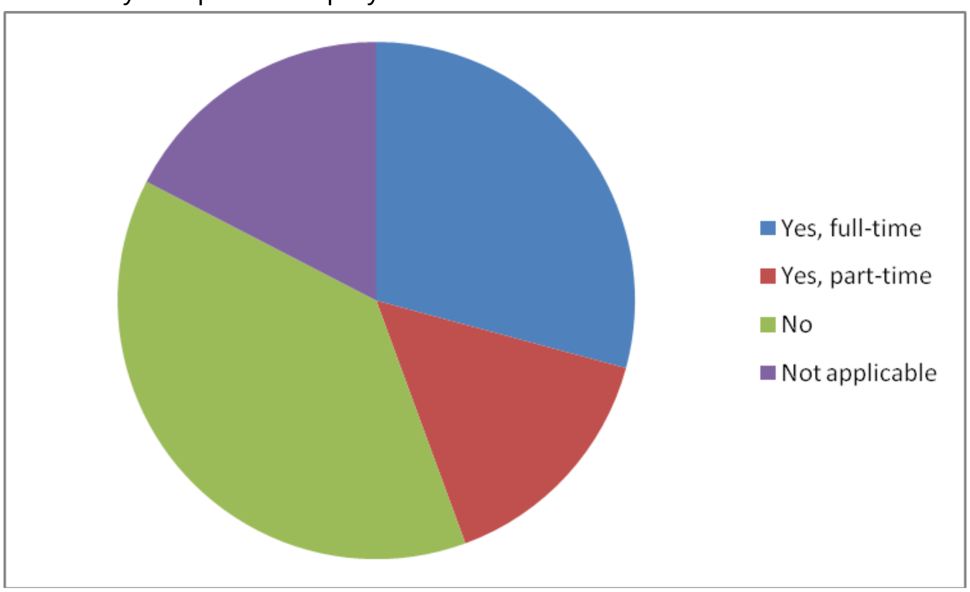
i. Have you changed your planned crop rotation because of increased crop prices do to energy or ethanol production?
73.6% said no



j. Do you personally derive income from any other source other than your grain and/or livestock operation?
A lot of farmers (81.4%) said yes!



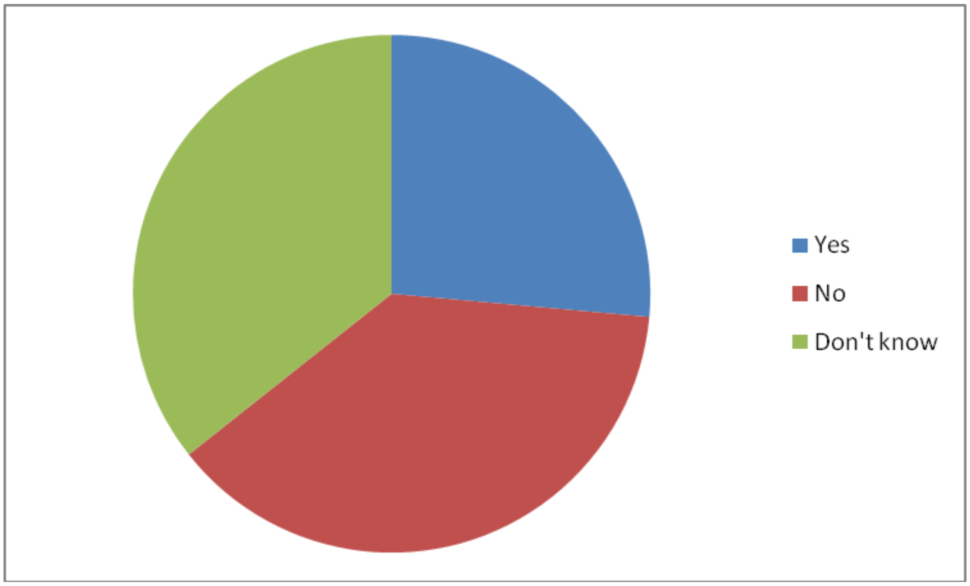
k. Is your spouse employed off-farm?



l. How many years have you been farming at your current location?
Average = 29.66 years

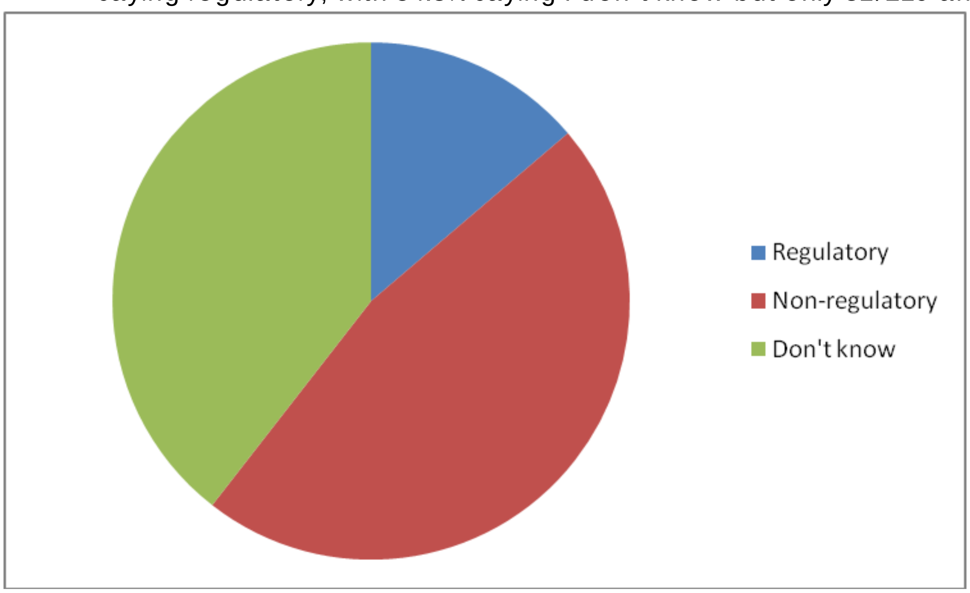
m. Do current cost share and/or incentive payment programs meet your current needs?

Only 26.9% said yes and 36.3% said they didn't know

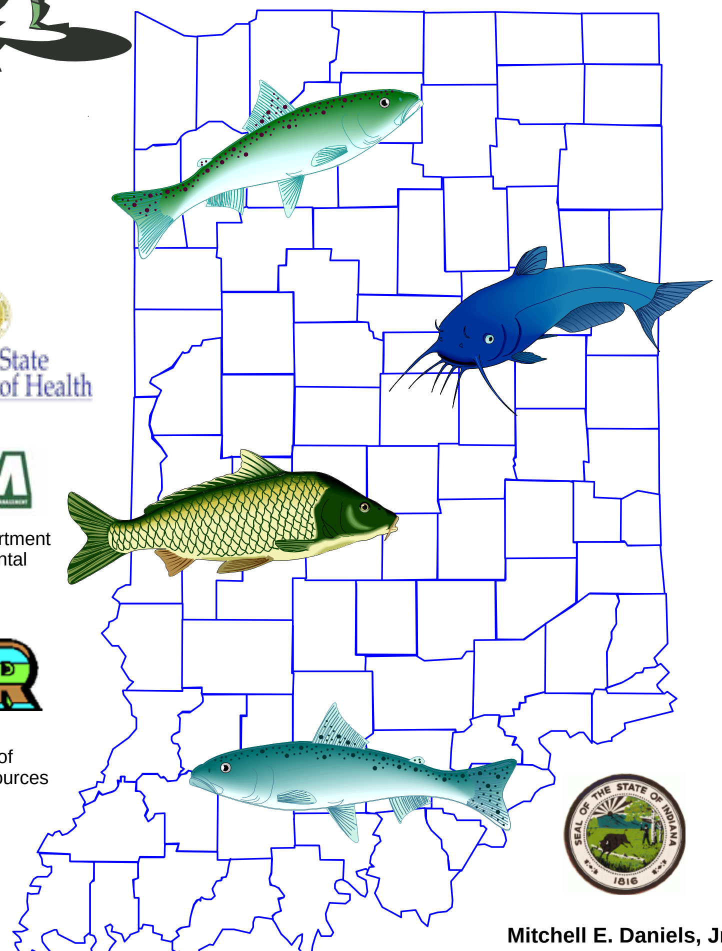


n. Should minimum water quality standards be met through regulatory or non regulatory methods?

Only 14.5% think regulatory and 41.6% said they didn't know (urban had 32.3% saying regulatory, with 54.8% saying I don't know but only 31/219 answered)



2008 INDIANA FISH CONSUMPTION ADVISORY



Indiana State Department of Health

Indiana Department of Environmental Management

Indiana Department of Natural Resources

Mitchell E. Daniels, Jr.
Governor

Table of Contents

2008 Indiana Fish Consumption Advisory

Background

We have prepared this booklet to support fishermen and those who like to eat fish by providing helpful information to make healthy choices. Fishing and eating fish from Indiana waterways can be safe and fun if you follow the suggestions on the following pages. In addition to describing healthy eating of sport-caught fish, interest has increased over the years about consuming commercial and farm-raised fish. We have, therefore, included information in the Advisory.

The Indiana State Department of Health (ISDH), Indiana Department of Natural Resources (DNR), and the Indiana Department of Environmental Management (IDEM), with support from Purdue University, collaborate to produce this annual *Indiana Fish Consumption Advisory* .

The Advisory is based on the statewide collection and analysis of fish samples for long-lasting contaminants found in fish tissue, such as polychlorinated biphenyls (PCBs), pesticides, and/or heavy metals (e.g., mercury). Samples were taken from fish that feed at all depths of the water, predatory and bottom-feeding.

Well over 200 Indiana water bodies have been tested for fish contaminants through the years. Because testing is expensive, the focus of samples generally is to:

- Check water with known or suspected pollution sources
- Check lakes susceptible to mercury contamination
- Check waters where long-term contaminant trends are tracked

Criteria for the *2008 Indiana Fish Consumption Advisory* were developed from the Great Lakes Sport Fish Advisory Task Force.

We have condensed this booklet to include only the most important points about sport fishing and fish consumption (including sport and commercial fish). **We also removed most Group 2 fish from the tables, since the Guidelines on page 2 of the Advisory state "that a person should assume any fish you catch is a Group 2..." if it is not specifically listed**.

Using the Advisory

It may not be legal to catch and keep all sizes of fish that we have included in this Advisory.

Please refer to the DNR's Indiana Fishing Guide for information about the legal size limits and number of fish that can be caught based upon the species of fish. Turn to page 24 in this Advisory to find out how to obtain a copy of the Indiana Fishing Guide, or log on to DNR's Web site at: www.IN.gov/dnr/fishwild/3699.htm

Carefully read the instructions below, since meal advice depends upon the species and size of fish.

1. Measure the fish from the tip of the nose to the end of the tail fin.
2. Find the table that includes your fishing site. Look for the symbol showing the type of contaminant and the size of the fish that you caught. If there is no listing for the size of fish, keep in mind that larger fish are likely to be as contaminated, or more, than any that were tested. If you do not find the species of fish in the Advisory, then assume that the fish is in a Group 2 advisory.
3. While fish may have been tested for more than one contaminant, the symbol indicates the contaminant of greatest concern.

Guidelines to Reduce Your Risks

Follow this guidance:

☞**Use the groupings** in the Advisory to determine the number of fish meals you can eat in a week or month.

☞ **Assume that any fish you catch is a Group 2** if it is not listed or the site where you are fishing is not listed in the Advisory.

☞ **Eat smaller, less fatty fish** like pan fish (bluegill, perch, and crappie).

☞ **Remove fat near the skin of the fish prior to cooking** and **broil, bake, or grill fish** so the fat drips away.

☞**Eat at least 2 servings (3-4 ounces/serving) of fish per week** (see page 5 for more information).

Risk Comparisons Risk of Death		
Estimated Advisory Group	Level of Risk (chances out of 1,000)	Activity
	35-125	Smoking 1-2 packs of cigarettes per day
	7-30	Having 200 chest x-rays per year
Level 5	5-30	Eating one 10-oz. meal per week of Group 5 fish
	17	Driving a motor vehicle
Level 4	11-12	Eating one 8-oz meal per week of mixed Great Lakes salmonids at 1984 contaminant levels
Level 3	3-6	Eating one 8-oz meal per week of mixed Great Lakes salmonids at 1987 contaminant levels
	0.1-6	Breathing air in the U.S. urban areas at early 1980's contaminant levels
	3.5	Recreational boating
	1-2	Drinking one 12-oz. beer per day
	1.5	Recreational hunting
Level 2	0.014	Complications from an insect bite or sting

Health Risks & Benefits from Eating Sport & Commercial Fish

General Health Risk

Your risk of getting cancer from eating contaminated fish cannot be predicted with certainty. Currently, cancer affects about 1 out of every 4 people by the age of 70, primarily due to smoking, diet, and hereditary risk factors. Exposure to contaminants in fish you eat may not increase your cancer risk at all. If you follow this Advisory over your lifetime, you should be able to lower your exposure, thus reducing your cancer risk from contaminants in fish.

Fish provide a diet high in protein and low in saturated fats when properly prepared. Many doctors suggest that eating one-half pound (8 ounces/ uncooked) of fish each week is helpful in preventing heart disease. Almost all fish may provide health benefits, since fish often replaces a high-fat food in the diet.

Since fish species differ in diet, habitat, growth rate, and physiology, they build up contaminants in their bodies at different rates. Long-term effects of human exposure to PCBs and pesticides have not been fully determined by health experts. People who regularly eat sport fish, including women of childbearing age and children, are particularly susceptible to contaminants that build up in the body over time. Because contaminants may produce harmful effects when consumed over a period of time, the Indiana State Department of Health (ISDH) advises that intake of these fish be limited. (See page 5.)

Contaminants in Fish

Polychlorinated biphenyls (PCBs), pesticides, and mercury collect in the soil, water, sediment, and in microscopic animals. They build up in greater amounts in larger, older fish and in predatory fish (fish that eat other fish). Contaminants are not usually found in smaller panfish such as bluegill and crappie.

Once in a lake, mercury is changed into methylmercury by bacteria and other processes. Fish absorb methylmercury from their food and it is tightly bound to the fish’s muscles. There is no method of cooking or cleaning fish that will reduce the mercury.

PCBs and pesticides tend to be stored in the fat of fish, especially fatty fish such as carp and catfish. Unlike mercury, cleaning and cooking a fish to remove fat will lower the amount of PCBs in a fish meal. Most of the fat is located near the skin of the fish.

Eating a boneless, skinless fillet, with the fat layer along the belly flap and the midpoint of the back removed, will limit the amount of fat consumed.

PCBs and methylmercury build up in your body over time. It may take months or years of regularly eating contaminated fish to accumulate levels that are a health concern. If you follow this Advisory, the amount of methylmercury you take into your body is safely eliminated over time. Larger amounts of methylmercury may harm your nervous system. An unborn child is especially at risk of mercury poisoning.

Men typically face fewer health risks following exposure to contaminants. However, animal studies have also shown that mercury can damage sperm, which could result in fertility problems.

The Advisory advice for PCBs is intended to protect children from developmental problems. PCBs also cause changes in human blood and in the liver and immune function of adults. The meal advice for PCB-contaminated fish is based on the developmental delays that have been measured in infants. It is difficult to say what other effects PCBs may have on anglers and their families, but PCBs cause cancer in laboratory animals and may cause cancer in humans.

Purchased Fish

People often ask about the levels of contaminants in fish bought in stores or restaurants. The U.S. Food and Drug Administration (FDA) sets tolerance levels for contaminants to regulate the interstate sale of fish. Recently, the FDA and the U.S. Environmental Protection Agency (EPA) issued fish consumption advice for women (of childbearing age) and children about commonly eaten commercial fish species. The FDA/EPA advice recommends that up to 12 ounces of fish that are low in mercury be eaten per week to gain the health benefits from fish and shellfish.

Please see the FDA/EPA Consumer Advice for more information and to determine which commercial fish species are safest. Their Web site is:
http://www.cfsan.fdams/admehg3.html

A fact sheet which gives detailed advice about consuming fish that is targeted at women and children can be seen at:
http://fn.cfs.purdue.edu/fish4health/

Because fish bought in a store or restaurant do not come with labels that tell you the contaminant levels or even where the fish came from, it is up to the consumer to ask about the source of the fish. In addition to checking the FDA/EPA advice, it is important to eat a variety of fish species to make certain that you benefit the most from fish.

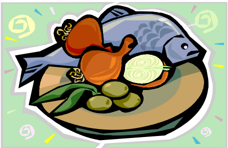
The *Commercial Fish Consumption Table* (page 5) separates two types of canned tuna into different categories by the amount a person can eat. "Light" tuna is made from young fish, while "white" tuna like albacore comes from older fish that have higher levels of mercury. When choosing canned tuna, "light" tuna is lowest in mercury but is also lower in the "healthy" fats found in fish.

Fish sticks from the grocery, fast-food sandwiches, or restaurant-prepared fish most often come from pollock, which is low in mercury.

Recent studies have discussed the levels of contaminants in farm-raised salmon versus wild salmon. Wild salmon have been shown to have very low levels of contaminants. While farm-raised salmon are said to have "significantly" higher levels than wild salmon, these levels of contaminants are still NOT high enough to be of serious concern. Farm-raised salmon are actually slightly higher in "helpful" omega-3 fatty acids than wild salmon.

There may be times when friends and family catch fish that you may want to eat. If there is no advice about how much you can eat, then assume it is a Group 2. (Refer to page 5 of this Advisory.) This means eating no more than 8 ounces (before cooking) in one week.

It is also likely that, at some point, you may eat more fish and shellfish in one week than you ordinarily would. There is little change in the level of methylmercury in that short period of time. Just lower the amount of fish that you eat over the next couple of weeks.



Advisory Groups

The chart on page 5 explains the fish groupings used throughout this Advisory to help in choosing the amount and type of fish that are safe to eat. Additionally, a list of fish species affected by "mercury" on a statewide basis has also been added to this chart.

For certain waters, more or less restrictive advice is needed, because fish have been found to contain higher or lower levels of mercury or PCBs. Please check the tables on pages 8-22.

Carp Advisory for all Indiana Rivers and Streams

Generally, carp are contaminated with PCBs. *Unless noted otherwise, carp in all Indiana rivers and streams fall under the following risk groups:*

Carp	15-20 inches	Group 3
Carp	20-25 inches	Group 4
Carp	**over 25 inches**	**Group 5**

Group 5 Waterways

All fish from the following waters are in the Group 5 advisory due to the high levels of contaminants.

DO NOT EAT ANY FISH CAUGHT IN THESE WATERS:

Clear Creek, Monroe County
Salt Creek, Downstream of Clear Creek in Monroe County and Lawrence County
Pleasant Run Creek, Lawrence County
Elliot Ditch, Tippecanoe County
Wea Creek, Tippecanoe County
Grand Calumet River/Indiana Harbor Canal, Lake County
Kokomo Creek, Howard County from U.S. 31 to Wildcat Creek
Wildcat Creek, Downstream of the Waterworks Dam in Kokomo through Howard and Carroll Counties
Little Mississinewa River, Randolph County
Little Sugar Creek/Walnut Fork, Montgomery County
Sugar Creek, Montgomery County (I-74 to SR-32)
Stony Creek, Hamilton County
Stouts Creek , Monroe County

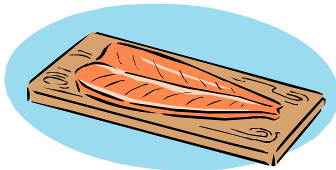
Advisory Groups of the Indiana Fish Consumption Advisory	
Group 1	Unrestricted consumption. **One meal per week for women who are pregnant or breast-feeding, women who plan to have children, and children under the age of 15.**
Group 2	Limit to one meal per week (52 meals per year) for adult males and females. **One meal per month for women who are pregnant or breast-feeding, women who plan to have children, and children under the age of 15.**
Group 3	Limit to one meal per month (12 meals per year) for adult males and females. **Women who are pregnant or breast-feeding, women who plan to have children, and children under the age of 15 do not eat.**
Group 4	Limit to one meal every 2 months (6 meals per year) for adult males and females. **Women who are pregnant or breast-feeding, women who plan to have children, and children under the age of 15 do not eat.**
Group 5	**No consumption (DO NOT EAT).**

IMPORTANT NOTE: For more detailed information, especially for the at-risk population, please review the 2008 Safe Eating Guidelines for Selected Sport Fish from Most of Indiana's Inland Waters.

Commercial Fish Consumption*	
Fresh or canned salmon; shellfish like shrimp, crab, and oysters; tilapia; herring; canned "light" tuna; scallops; sardines; pollock; cod; and catfish	Unlimited for all adults **One meal per week ****
Canned albacore "white" tuna (6 oz.), tuna steak, halibut, and lobster	1 meal per week for adults **One meal per month****
Shark, swordfish, tile fish, king mackerel	1 meal per month for adult males and females **Do not eat****

*References:
1. USDHHS and US EPA - 2004 EPA & FDA: Advice for Women Who Might Become Pregnant
2. Choose Wisely 2004, Wisconsin DNR
3. An Expectant Mother's Guide to Eating Minnesota Fish, 2004
**Consumption guidelines for the at-risk population: women of childbearing years, nursing mothers, and all children under the age of 15 years.

A meal is 8 ounces (before cooking) of fish for a 150-pound person, or 2 ounces of uncooked fish for a 40-pound child. Tip: Subtract or add 1 ounce of uncooked fish for every 20 pounds of body weight.



Health Benefits

A 2002 touchscreen survey* conducted for the ISDH showed that **nearly 44 percent of Indiana residents eat little, if any, fish, whether commercially purchased or recreationally caught.** For this reason, the most important message the ISDH wants to share is, "Include fish as a part of your regular diet." The key to gaining the most health benefits from fish is to eat a variety of fish that are low in contaminants. (See pages 3 and 5.) Unlike women of childbearing age and young children, most men and postmenopausal women can eat moderate amounts of fish without being harmed by contaminants. Fish provide a high-protein, low-fat food, which is low in saturated fats. Many researchers suggest, and nutritionists recommend, that consuming 6 ounces of fish a week is beneficial in preventing heart disease.

It is important for people to continue eating fish, including salmon, whether or not it is farm-raised or wild, but at levels that are recommended by the ISDH to maximize benefits and minimize risks.

The health benefits gained from eating either farm-raised or sport-caught fish may far outweigh the risks associated with the low levels of contaminants found in these fish or the choice of eating no fish.

Fish of almost any species, lean or fat, may have substantial health benefits when they replace a high-fat food in the diet. Nutritionists recommend eating at least 2 servings (2-3 ounces/serving) per week. **Three ounces of cooked fish is about the size of a deck of cards.**

The information on the Grouping table for Indiana sport fish and the commercial Fish Consumption table (page 5) helps to provide safe and healthy choices.

*****Indiana State Department of Health's *Fish Consumption Advisory Booklet Survey,* Survey of America, Aug-Sept. 2002

Commonly Asked Questions

What are PCBs?

PCBs are synthetic oils that were once widely used in electrical transformers and capacitors. PCBs break down very slowly in the environment.

What is mercury?

Mercury is a naturally occurring metal that does not break down but cycles between land, water, and air. Some mercury that reaches Indiana waters occurs naturally. Mercury is also released from coal-burning power plants and from burning household and industrial waste.

How can I tell if a fish is contaminated?

Although contaminated fish may not smell, taste, or look different, they can still pose an increased risk to anyone who eats them. This is especially true for pregnant mothers and their fetuses, babies, and children. The Fish Advisory informs you about which fish are contaminated.

What about pay-to-fish lakes?

Generally, fish caught in pay lakes are safe to eat. The ISDH recommends that consumption be limited to no more than one meal per week. (See page 5 to define a meal.)

Parasites and Tumors in Fish

Parasites

Anglers sometimes catch fish that contain worms, grubs, cysts, or lumps in the flesh. When cleaning fish, anglers may notice worms in or around the intestines of the fish or fungus growths on the skin, fins, or gills. These fish parasites are a normal part of the ecosystem in which the fish lives. While not nice to look at, the edible parts of the fish that have parasites can be eaten, provided they are thoroughly cooked.

Some of the most commonly seen parasites of fish are black spots, yellow grubs, and tapeworms. Most fish have parasites, and they seldom affect the well-being of the fish except under unusual conditions. **Parasites in fish are only a problem when fish are not thoroughly cooked or are eaten raw.**

<u>Black Spot</u>

Black spot is caused by a parasite called a fluke, which burrows into the skin of fish. The black pigment (about pinhead size) forms in the tissue surrounding the fluke and is a fish's reaction to the parasite. The fluke itself is actually a whitish color.

<u>Yellow Grub</u>

Yellow grubs are also caused by a fluke, which penetrates the skin of fish and curls up into a sac under the skin or in the muscle where it grows to be the grub. The grubs are often found in the flesh of fish near the dorsal fins. When freed from the sac, the grub may be up to ½-inch long.

<u>Tapeworms</u>

Young tapeworms are common in the organs and body cavity of many fish. They usually live in the internal organs of the fish. They resemble long, thin ribbons about 1/16-inch wide.

Tumors

Occasionally, anglers catch fish with external growths, tumors, sores, or other lesions. Such abnormalities generally result from viral or bacterial infections. Abnormalities in the liver or intestines are sometimes seen in fish such as white suckers and brown bullheads and can be caused by parasites or tumors. Concern about the potential effects of these diseases on the fish themselves, and the possible role of pollution in causing tumors in some coarse fish, has prompted ongoing investigations into these abnormalities. Growths on game fish caused by viruses include lymphocystis, dermal sarcoma, and lymphosarcoma.

Viruses infect fish skin through contact with infected fish during the spring spawning run, forming pale or white cauliflower-like growths. Lymphocystis does not kill affected fish, and tagging studies have shown that these fish can lose the growths by the following spring. There is no known health risk from consuming an infected fish once it has been skinned and cooked.

Dermal sarcoma, another viral disease affecting walleye, is caused by viruses that infect cells and cause growths just under the skin. These growths can be removed by skinning the fish.

The appearance of viral or bacterial infections in fish may be unattractive, but there is no evidence to suggest that these infections pose a threat to consumers.

Summary

Fish is a good source of protein, minerals, and vitamins and can be very healthy for you. As with many foods, you should eat certain fish in moderation. How fish is prepared, age, gender, and health are factors to consider when choosing fish. **Use the chart on page 5 as a guide if you eat recreationally caught fish**. Recommendations are also provided for store-bought/commercial (fresh, frozen, or canned fish) on page 5.

Some fish may absorb contaminants from the water where they live and from the food that they eat. The amount of these contaminants in the fish can increase over time. It is important to keep your exposure to these contaminants to a minimum by remembering four important facts:

- For sport-caught fish: larger, older, or fattier fish (e.g., catfish, carp, and bass) take in more contaminants such as PCBs.
- Mercury is bound to the meat and not to the fat of the fish.
- Cooking fish can reduce some contaminants, such as PCBs, but not mercury.
- Women of childbearing age, infants, and children are more at risk from consuming contaminated fish than men (see table on page 5).

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

2008 Indiana Fish Consumption Advisory

Streams and Rivers

Location	Species	Fish Size (inches)	Contaminant	Group
All Indiana Rivers and Streams				
All Counties (unless specified otherwise)	**Carp**	15-20	□	3
		20-25	□	4
		25+	**□**	**5**
Aboit Creek				
Allen County	Creek Chub	Up to 5		1
Anderson River	Black Buffalo	25+	□	3
Perry County	Bluegill	Up to 7		1
	Carp	22+	□○	2
Spencer County	Channel Catfish	13+	□	3
Beanblossom Creek				
Monroe County	Channel Catfish	13+	□	3
Big Blue River				
Henry County	Carp	19-24	□	3
		24+	□	4
	Rock Bass	4-7	□	3
		7+	□	4
	White Sucker	8-10	□	3
		10+	□	4
Rush County	Carp	19-24	□	3
		24+	□	4
Shelby County	Carp	19-24	□	3
		24+	□	4
	Golden Redhorse	Up to 18	□	3
		18+	□	4
	Northern Hogsucker	9-10	□	3
		10+	□	4
	River Redhorse	14+	□	3
	Rock Bass	4+	□	3
	Smallmouth Bass	15+	□	3
Johnson County	Carp	19-24	□	3
		24+	□	4
	Longear Sunfish	5+	□	3
	Northern Hogsucker	8-10	□	3
		10+	□	4
	Rock Bass	7+	□	3
	Smallmouth Bass	5-8	□	3
		8+	□	4
Big Camp Creek				
Jefferson County	Longear Sunfish	Up to 5		1

Location	Species	Fish Size (inches)	Contaminant	Group
Big Creek				
Jefferson County	Longear Sunfish	Up to 5		1
Big Monon Creek				
White County	Longear Sunfish	Up to 4		1
	White Sucker	Up to 10		1
Big Pine Creek				
Warren County	Black Redhorse	Up to 13		1
	Flathead Catfish	Up to 10		1
	Longear Sunfish	Up to 5		1
	Smallmouth Bass	11+	□	3
Big Raccoon Creek				
Parke County	Black Redhorse	Up to 11		1
	Carp	Up to 22	□○	2
		22+	□○	3
Big Walnut Creek				
Putnam County	Carp	Up to 24	□	2
		24+	□	3
	Channel Catfish	Up to 14		1
	Longear Sunfish	Up to 6		1
Blue River	Carp	28-29	○	2
Harrison County	Channel Catfish	15+	□	3
	Longear Sunfish	Up to 5		1
	Rock Bass	Up to 7		1
	Shorthead Redhorse	17+	□	3
	Spotted Bass	10+	□	3
Buck Creek	Longear Sunfish	5-6	□	3
Delaware County		6+	□	4
	Smallmouth Bass	11+	□	3
	White Sucker	14+	□	3
Cedar Creek	Carp	Up to 22	□○	2
Allen County	River Chub	4+	□	3
	Channel Catfish	18+	□	3
Christiana Creek				
Elkhart County	Northern Hogsucker	Up to 14		1
	Rock Bass	Up to 7		1
	Yellow Bullhead	Up to 9		1

General Population ○ **= Mercury** □ **= PCBs**

Group 1 = Unlimited meals Group 2 = 1 meal/week Group 3 = 1 meal/month

Group 4 = 1 meal/2 months Group 5 = DO NOT EAT

(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Cicero Creek (upstream of Morse Reservoir)				
Hamilton County	Carp	Up to 20		1
		20+	□	2
	Channel Catfish	24+	□	3
	Longear Sunfish	Up to 6		1
Clear Creek				
Monroe County	**ALL SPECIES**	**ALL**	□	**5**
Whitley County	Creek Chub	Up to 7		1
Crooked Creek				
Steuben County	Carp	23+	□	2
Deer Creek				
Carroll County	Carp	Up to 19	□○	2
		19+	□	3
	Longear Sunfish	Up to 5		1
	Smallmouth Bass	10+	□	3
Eagle Creek (upstream Eagle Creek Reservoir)				
Boone/Marion Counties	Bluegill	Up to 7		1
	Carp	Up to 22	□○	2
		22+	□	3
	Channel Catfish	Up to 16		1
	White Crappie	Up to 9		1
Marion County downstream Eagle Creek Reservoir to 10th St.	Black Crappie	Up to 10		1
	Black Redhorse	Up to 13		1
	Rock Bass	Up to 8		1
Marion County 10th St. to confluence with White River West Fork	Carp	Follow statewide rivers advice		
	Channel Catfish	17+	□	3
	Smallmouth Bass	14+	□	3
	White Sucker	All	□	3
Easterday Ditch				
Kosciusko County	Carp	Up to 23	□○	2
		23+	□	3
East Fork of White Lick Creek				
Hendricks County	Creek Chub	9+	□	3
	Northern Hogsucker	11+	□	3
	Yellow Bullhead	10+	□	3
East Fork of White River				
Bartholomew County	Carp	Up to 18		1
		18-23	□	2
		23+	□	3

Location	Species	Fish Size (inches)	Contaminant	Group
East Fork of White River (Cont.)				
Bartholomew County	Flathead Catfish	Up to 13		1
		24+	□	3
	Golden Redhorse	13+	□	3
Jackson County	Bigmouth Buffalo	18+	□	3
	Carp	Up to 18		1
		18-23	□	2
		23+	□	3
	Channel Catfish	Up to 14		1
	Flathead Catfish	Up to 13		1
	Golden Redhorse	14-16	□	3
		16+	□	4
	Silver Redhorse	22+	□	3
	Smallmouth Bass	13+	□	3
	Smallmouth Buffalo	19-26	□	3
		26+	□	4
Lawrence County	**Channel Catfish**	Up to 15	□	3
		15-21	□	4
		21+	□	**5**
	Freshwater Drum	10+	□	3
	Bigmouth Buffalo	Up to 18	□	3
		18+	□	4
	Flathead Catfish	10-16	□	3
		16+	□	4
	Largemouth Bass	Up to 11	□	3
		11-14	□	4
		14+	□	**5**
	Longear Sunfish	3+	□	3
	River Carpsucker	15+	□	3
	Sauger	14+	□	3
	Shorthead Redhorse	Up to 14	□	3
		14-16	□	4
		16+	□	**5**
	Smallmouth Buffalo	Up to 15	□	4
		15+	□	**5**
	Spotted Sucker	17+	□	3
	Striped Bass	22+	□	4

General Population ○ = **Mercury** □ = **PCBs**

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
East Fork of White River (Cont.)				
Martin County	Carp	Up to 23	□	3
		23+	□	4
	Channel Catfish	12-19	□	3
		20+	□	4
	Freshwater Drum	10+	□	3
	Longear Sunfish	3+	□	3
	Shorthead Redhorse	Up to 14	□	3
		14-16	□	4
		16+	□	**5**
	Smallmouth Buffalo	Up to 15	□	4
		15+	□	**5**
Dubois County	Carp	22-24	□	3
		24+	□	4
	Channel Catfish	19+	□	3
	Flathead Catfish	24+	□○	3
	Longear Sunfish	4+	□	3
East Fork of Whitewater River				
Wayne County	Channel Catfish	12-16	□	3
		16+	□	4
	Longear Sunfish	Up to 6		1
	Northern Hogsucker	Up to 9		1
East Fork of Wildcat Creek				
Howard County	Carp	Up to 23	□○	2
		23+	□	3
Eel River (West Fork White River Basin)				
Clay/Greene Counties	Channel Catfish	23+	□	3
	Sauger	18+	□	3
Eel River (Upper Wabash River Basin)				
Whitley/Wabash/Miami/Cass Counties				
Consumption of fish from the Eel River should be limited to no more than one meal per month (Group 3) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:				
	Bluegill	6+	□	4
	Carp	24+	□	4

Location	Species	Fish Size (inches)	Contaminant	Group
Elkhart River				
Elkhart County	Rock Bass	9+	□	3
	Smallmouth Bass	17+	□	3
	White Sucker	16+	□	3
Elkhorn Creek				
Randolph County	Creek Chub	Up to 3		1
Elliot Ditch				
Tippecanoe County	**ALL SPECIES**	**ALL**	□	**5**
Fall Creek				
Hamilton/Madison Counties	Bluegill	Up to 7		1
(Upstream of Geist Reservoir)	Carp	Up to 22	□	2
		22+	□	3
	Channel Catfish	24+	□	3
	Redhorse spp.	Up to 14		1
	Spotted Bass	Up to 12		1
	White Crappie	Up to 9		1
Marion County (Downstream Geist Reservoir to Keystone Ave.)				
	Black Crappie	Up to 9		1
	Bluegill	Up to 7		1
	Carp	Up to 23	□	2
		23+	□	3
	Redhorse spp.	Up to 17		1
Marion County				
(Downstream Keystone Ave. to confluence with White River West Fork)				
	Carp	Up to 20	□	4
		20+	□	**5**
	Channel Catfish	Up to 18	□	3
		18-20	□	4
		20+	□	**5**
	Largemouth Bass	14+	□	3
Flatrock River				
Rush County	Longear Sunfish	All		1
Shelby County	Carp	22-23	□○	2
		23+	□	3
	Flathead Catfish	Up to 18		1
	Longear Sunfish	All		1
Bartholomew County	Longear Sunfish	All		1
Galena River (South Branch)				
LaPorte County	Creek Chub	Up to 7	□	3
Graham Creek				
Jennings County	Longear Sunfish	Up to 6		1

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Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Great Miami River				
Dearborn County	**Carp**	16-20	□	4
		20+	□	**5**
	Channel Catfish	Up to 15	□	4
		15+	□	**5**
	Largemouth Bass	18+	□	3
	White Crappie	8-11	□	3
		11+	□	4
Hanna Creek	Carp	Up to 16		1
Union County		16+	□○	2
Honey Creek				
White County	Largemouth Bass	20+	□○	3
Indian Creek (Whitewater Basin)				
Union County	Carp	Up to 9		1
		9+	○	2
Indian Creek (Ohio River Valley)				
Harrison County	Flathead Catfish	Up to 13		1
	Longear Sunfish	Up to 6		1
Iroquois River				
Jasper/Newton Counties	Carp	Up to 19		1
		28+	□	3
	Channel Catfish	Up to 18		1
	Golden Redhorse	Up to 15		1
	Rock Bass	Up to 6		1
	Shorthead Redhorse	Up to 12		1
Juday Creek				
St. Joseph County	White Sucker	17+	□	3
Kankakee River				
LaPorte/Lake/Newton Counties	Bigmouth Buffalo	22+	□	3
	Black Crappie	Up to 10		1
	Bluegill	Up to 6		1
	Quillback	15+	□	3
	Rock Bass	Up to 8		1
	Shorthead Redhorse	Up to 13		1
	Silver Redhorse	20+	□	3
	Smallmouth Buffalo	22-28	□	3
		28-32	□	4
		32+	□	**5**
	White Crappie	Up to 9		1

Location	Species	Fish Size (inches)	Contaminant	Group
Killbuck Creek	Carp	Up to 25	□	2
Madison County		25+	□	3
	Black Crappie	Up to 10		1
	Bluegill	Up to 7		1
	Rock Bass	Up to 8		1
	Smallmouth Bass	Up to 13		1
	Yellow Bullhead	Up to 10		1
Kilmore Creek	Carp	Up to 12		1
Clinton County	Creek Chub	Up to 7		1
Kokomo Creek				
Howard County	**ALL SPECIES**	**ALL**	□	**5**
Laughery Creek				
Dearborn/Ohio Counties	Carp	All	□○	2
Dearborn County	White Crappie	Up to 10		1
Little Blue River (Ohio River Basin)				
Crawford County	Bluegill	Up to 7		1
	Carp	Up to 23		1
	Channel Catfish	16+	□	3
	Freshwater Drum	18+	□	3
	Largemouth Bass	Up to 10		1
		18+	□	3
	Sauger	14+	□	3
	White Crappie	Up to 9		1
Little Blue River				
Shelby County	Northern Hogsucker	11+	□	3
Little Calumet River				
Lake County	**Carp**	**ALL**	□	**5**
	White Sucker	Up to 11		1
	Yellow Bullhead	Up to 10		1
Porter County	Black Buffalo	All	□	3
	Bluegill	Up to 7		1
	Carp	Up to 22	□	3
		23+	□	4
	Flathead Catfish	All	□	3
Little Mississinewa River				
Randolph County	**ALL SPECIES**	**ALL**	□	**5**

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Little Pigeon Creek	Bluegill	Up to 5		1
Warrick County	Channel Catfish	17+	□	3
	Freshwater Drum	19+	□	3
	Largemouth Bass	11+	□	3
	Sauger	18+	□	3
Little Pipe Creek				
Miami County	Creek Chub	Up to 5		1
Little Salt Creek				
Lawrence County	Longear Sunfish	Up to 4		1
Little Sugar Creek/East Fork White River Basin				
Hancock County	Creek Chub	All	□	3
Little Sugar Creek/Walnut Fork Sugar Creek to Sugar Creek				
Montgomery County	**ALL**	**ALL**	□	**5**
Maumee River	Bigmouth Buffalo	20+	□	3
Allen County	**Carp**	Up to 20	□	4
		20-22	□	**5**
	Channel Catfish	14-16	□	3
		16+	□	4
	Freshwater Drum	All	□	3
	Largemouth Bass	9+	□	3
	River Redhorse	12-14	□	3
		14+	□	4
	Rock Bass	7-8	□	3
		8+	□	4
	Sauger	24+	□	3
	Shorthead Redhorse	14-16	□	3
		16+	□	4
	Walleye	Up to 21	□	4
		21+	□	**5**
Middle Fork Wildcat Creek				
Tippecanoe County	Black Redhorse	Up to 10		1
	Carp	Up to 22	□○	2
		22+	□○	3
	Golden Redhorse	Up to 10		1
Mill Creek				
Fulton County	Creek Chub	Up to 5		1
Mississinewa River: Consumption of fish from the Mississinewa River should be limited to no more than one meal per month (Group 3) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:				
Randolph County	**Carp**	Up to 18	□	4
		18+	□	**5**
	Channel Catfish	Up to 15	□	4
		15+	□	**5**
	Green Sunfish	**3+**	□	**5**
	Quillback	15+	□	4
	Smallmouth Bass	14+	□	4

Location	Species	Fish Size (inches)	Contaminant	Group
Mississinewa River (Cont.)				
Randolph County (Cont.)	White Crappie	10+	□	4
	White Sucker	10+	□	4
Delaware County	Carp	21+	□	4
	Channel Catfish	21+	□	4
	Quillback	15+	□	4
	White Sucker	10+	□	4
Grant County	Carp	21+	□	4
	Channel Catfish	24+	□	4
	Flathead Catfish	17+	□	4
	Quillback	13+	□	4
	White Sucker	10+	□	4
Miami County	**Carp**	15-20	□	3
		20-25	□	4
		25+	□	**5**
Mud Creek				
Fulton County	Creek Chub	Up to 7		1
	White Sucker	Up to 11		1
Muddy Fork of Sand Creek				
Decatur County	Black Redhorse	15+	○	3
	Largemouth Bass	6-11	□	3
		11+	□	4
	Longear Sunfish	Up to 4		1
	Northern Hogsucker	6-10	□	3
		10+	□	4
	White Sucker	10-12		1
Muscatatuck River	Bigmouth Buffalo	26+	□	3
Jackson/Washington Counties	Carp	23+	○	3
	Channel Catfish	Up to 21		1
	Smallmouth Buffalo	23+	□○	3
North Fork Salt Creek				
Brown County	Carp	23+	○	2
	Longear Sunfish	All		1
North Fork Vernon Fork Muscatatuck River				
Jennings County	Carp	20+	○	2
	Longear Sunfish	All		1
Otter Creek				
Vigo County	Black Redhorse	14+	□	3
	Spotted Bass	8+	○	3
	White Sucker	Up to 10		1

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Patoka River				
Dubois/Gibson/Pike Counties	Buffalo species	21+	□	3
	Carp	All	□○	2
	Channel Catfish	Up to 14		1
	Carpsucker species	14+		3
	White Crappie	Up to 9		1
	Wiper	25+	□	3
Pigeon Creek (St. Joseph River Basin)				
Steuben County	Carp	21-25	□	3
		25+	□	4
Pigeon Creek (Ohio River Basin)				
Vanderburgh County	Channel Catfish	11-13	□	3
		14+	□	4
	Flathead Catfish	Up to 18	□	3
	Freshwater Drum	19+	□	3
Pigeon River				
LaGrange County	Hornyhead Chub	Up to 6		1
	Rock Bass	Up to 8		1
Pipe Creek (White River Basin)				
Madison County	Carp	All	□	3
	Channel Catfish	All	□	3
	White Sucker	12+	□	3
Pipe Creek Wabash Basin				
Miami County	Creek Chub	Up to 7		1
	White Sucker	Up to 10		1
Pleasant Run Creek				
Lawrence County	**ALL SPECIES**	**ALL**	□	**5**
Prairie Creek				
Boone County	Creek Chub	6-7	□	3

Richland Creek

Monroe/Greene/Owen Counties to Newark Road near Solsberry in Greene County

Consumption of any fish from this portion of Richland Creek should be limited to no more than one meal per month (Group 3) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:

Location	Species	Fish Size (inches)	Contaminant	Group
	Longear Sunfish	Up to 5	□	2
	Rock Bass	Up to 6	□	2

Greene County from Newark Road near Solsberry in Greene County to its confluence with the White River West Fork

Consumption of any fish from this portion of Richland Creek should be limited to no more than one meal per week (Group 2) by the general population and limited to one meal per month by the at-risk population. Exceptions to this advice for the general population are:

Location	Species	Fish Size (inches)	Contaminant	Group
	Longear Sunfish	Up to 6		1

Location	Species	Fish Size (inches)	Contaminant	Group
Rock Creek				
Huntington County	Carp	20+	○	2
	Longear Sunfish	Up to 4		1
Salamonie River				
Jay/Blackford/Huntington/ Wabash Counties	Carp	Up to 19		1
		19+	□○	2
	Freshwater Drum	Up to 11		1
	Golden Redhorse	Up to 11		1
	Rock Bass	Up to 6		1
	Spotted Sucker	Up to 10		1
	White Crappie	Up to 7		1
	White Sucker	Up to 10		1
Salt Creek Monroe County** (tailwaters of Monroe Reservoir Dam to Clear Creek)				
	Freshwater Drum	Up to 16	□	4
		16+	□	**5**
	Striped Bass	12+	□	3
	Walleye	15-21	□	3
		21+	□	4
Lawrence County	**ALL SPECIES**	**ALL**	□	**5**

***This listing is based on limited data. It should be noted that fish migrate. Fish not sampled from these waters may migrate from the confluence of Clear Creek and Salt Creek, 1.3 miles south. Those water bodies have No Consumption advisories. Future sampling of the Salt Creek tailwaters below the Monroe Reservoir Dam is planned for more comprehensive results.*

Location	Species	Fish Size (inches)	Contaminant	Group
Sand Creek				
Decatur/Jackson/Jennings Counties	Black Redhorse	Up to 7		1
	Carp	13-27	○	2
		27+	○	3
	Longear Sunfish	Up to 4		1
	Northern Hogsucker	Up to 8		1
	River Carpsucker	Up to 12		1
	White Sucker	Up to 8		1
	Yellow Bullhead	10-12	□	3
		12+	□	4
Silver Creek				
Floyd County	Carp	21-25	□	3
		25+	□	4
	Channel Catfish	Up to 10		1
	Freshwater Drum	18+	□	3
	Longear Sunfish	Up to 5		1

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
South Fork Wildcat Creek				
Clinton/Tippecanoe Counties	Black Redhorse	13+	□	3
	Carp	Up to 18	□	2
		18-26	□	3
		26+	□	4
	Channel Catfish	19+	□	3
	Creek Chub	7+	□	3
	Golden Redhorse	11+	□	3
	Longear Sunfish	4+	□	3
	Rock Bass	7+	□	3
	Smallmouth Bass	10+	□	3
	White Sucker	12+	□	3
Stony Creek				
Hamilton County	**ALL SPECIES**	**ALL**	□	**5**
Stouts Creek				
Monroe County	**ALL SPECIES**	**ALL**	□	**5**
St. Joseph River (Lake Erie Basin)				
Allen County	Black Crappie	9-11	□	3
		11+	□	4
	Black Redhorse	13-16	□	3
		16+	□	4
	Carp	Up to 20	□	2
	Channel Catfish	16+	□	3
	Golden Redhorse	12-13	□	3
		13+	□	4
	Largemouth Bass	Up to 11		1
	Rock Bass	7-9	□	3
		9+	□	4
	Spotted Sucker	Up to 14		1
	White Crappie	Up to 11		1
St. Joseph County (downstream Park to Indiana State Line at St. Patrick's Park)	Bluegill	Up to 7	□	3
		7+	□	4
	Carp	**ALL**	□	**5**
	Channel Catfish	All	□	4
	Chinook Salmon	Up to 28	□	3
		28+	□	4
	Largemouth Bass	14+	□	3
	Carpsucker species	Up to 19	□	4
		19+	□	**5**
	Redhorse species	**ALL**	□	**5**
	Rock Bass	8+	□	3
	Smallmouth Bass	10-14	□	3
		14+	□	4
	Steelhead	Up to 28	□	3
		28+	□	4
St. Joseph River (Lake Michigan Basin)				
Elkhart County	Bluegill	Up to 8		1
	Carp	25-28	□	3
		28+	□	4
	Channel Catfish	29+	□○	3
	Northern Hogsucker	15+	□	3
	Rock Bass	Up to 7		1
	Redhorse species	17+	□	3
	Walleye	16+	□	3
	White Sucker	Up to 14		1
St. Joseph County (Baugo Bay Area)	Bluegill	Up to 8		1
	Channel Catfish	Up to 22	□	3
		22+	□	4
	Largemouth Bass	Up to 13		1
	Rock Bass	Up to 8		1
	White Sucker	Up to 14		1
St. Joseph County	Black Redhorse	16-18	□	3
		18+	□	4
	Bluegill	Up to 7	□	3
		7+	□	4
	Carp	Up to 20	□	4
	Channel Catfish	All	□○	4
	Golden Redhorse	**ALL**	□	**5**
	Largemouth Bass	14+	□	3
	Quillback	18+	□	3
	Rainbow Trout (also known as Steelhead)	25-31	□	3
		31+	□	4
	Shorthead Redhorse	15-19	□	3
		19+	□	4
	Smallmouth Bass	9+	□	3
	White Sucker	14-16	□	3
	Yellow Bullhead	Up to 10	□	2
St. Marys River				
Allen County	Black Redhorse	15+	□	3
	Carp	Up to 20	□	3
		20+	□	4
	Channel Catfish	13-15	□	3
		15+	□	4
	Largemouth Bass	Up to 15	□○	3
		15+	□	4
	Silver Redhorse	17+	□	3
	White Sucker	11+	□	3

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Location	Species	Fish Size (inches)	Contaminant	Group
Sugar Creek (East Fork White River Basin)				
Hancock/Johnson/Shelby Counties	Black Redhorse	9-16		1
	Carp	Up to 24	○	2
		24+	○	*3*
	Longear Sunfish	Up to 5		1
	Northern Hogsucker	Up to 11		1
Sugar Creek, Walnut Fork				
Montgomery County				
Consumption of all fish in this upstream portion of the Walnut Fork of Sugar Creek should be limited to no more than one meal per week (Group 2) by the general population and one meal per month by the at-risk population. Exceptions to this advice for the general population are:				
	Black Redhorse	Up to 14	□	3
		14+	□	4
Sugar Creek (Middle Wabash River Basin)				
Montgomery County - Upstream of I-74				
All fish upstream of I-74 are located well above the known PCB contamination sources. They have been found to be much lower in contaminants. Follow the General Safe Eating Guidelines. Exceptions to this are:				
	Black Redhorse	Up to 13		1
	Longear Sunfish	Up to 6		1
Montgomery County - I-74 to State Road 32				
Consumption of any fish from this reach of Sugar Creek should be limited to no more than six meals per year (Group 4) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:				
	Black Redhorse	**13+**	□	**5**
	Channel Catfish	**14+**	□	**5**
	Freshwater Drum	**13+**	□	**5**
	Rock Bass	**9+**	□	**5**
	Smallmouth Bass	**9+**	□	**5**

Location	Species	Fish Size (inches)	Contaminant	Group
Sugar Creek (Middle Wabash River Basin) (Cont.)				
Montgomery County - State Road 32 to Parke County including stream reaches along Shades and Turkey Run State Parks				
Consumption of any fish from this portion of Sugar Creek should be limited to no more than one meal per month (Group 3) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:				
	Black Redhorse	15+	□	4
	Channel Catfish	Up to 13	□	2
		20+	□	4
	Flathead Catfish	23+	□	4
	Rock Bass	All	□	2
	Shorthead Redhorse	Up to 13	□	2
		15+	□	4
	Smallmouth Bass	19+	□	4
Parke County to the Wabash River				
Consumption of any fish from this portion of Sugar Creek should be limited to no more than one meal per week (Group 2) by the general population and one meal per month by the at-risk population. Exceptions to this advice for the general population are:				
	Black Redhorse	14+	□	3
	Channel Catfish	13-20	□	3
		20+	□	4
	Freshwater Drum	16+	□	3
	Sauger	17+	□	3
	Smallmouth Bass	15+	□	3
	Spotted Bass	15+	□	4

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Location	Species	Fish Size (inches)	Contaminant	Group
Tanners Creek				
Dearborn County	Bluegill	Up to 6		1
	Carp	19-21	□○	2
		21+	□	3
	Largemouth Bass	Up to 13		1
		17+	□○	3
Tippecanoe River				
Kosciusko County (Oswego to State Road 15)				
	Bluegill	Up to 5		1
	Carp	Up to 23	□	2
		23+	□	3
	Longear Sunfish	Up to 5		1
	Rock Bass	Up to 6		1
	Warmouth	Up to 6		1
Kosciusko County (Downstream of State Road 15)				
	Bluegill	6+	□	3
	Carp	20-27	□	3
		27+	□	4
	Redhorse Species	16-18	□	3
		18+	□	4
Fulton County	Carp	Up to 24	□○	2
		24+	□	3
Pulaski County	Carp	16-25	□○	2
		25+	□	3
	Longear Sunfish	Up to 4		1
Carroll County	Carp	21-22	□○	2
		22+	□	3
Trail Creek				
LaPorte County	Brown Trout	18+	□	3
	Carp	Up to 23	□	4
		23+	**□**	**5**
	Rock Bass	10+	□	3
	Smallmouth Bass	14-19	□	3
		19+	□	4
	Walleye	18-27	□	3
		27+	□	4
Travers Ditch				
Fulton County	Blacknose Dace	Up to 2		1
Unnamed Tributary of Eel River				
Miami County	Creek Chub	Up to 3		1

Location	Species	Fish Size (inches)	Contaminant	Group
Wabash River				
Adams/Wells Counties	Channel Catfish	21+	□	3
	Freshwater Drum	Up to 12		1
	Golden Redhorse	Up to 13		1
	White Crappie	Up to 9		1
Huntington/Wabash Counties	Blue Sucker	21-26	□	3
		26+	□	4
	Freshwater Drum	Up to 12		1
	White Bass	11-21	□○	3
		21+	□	4
Miami/Cass/Carroll/Tippecanoe *(upstream of Lafayette)* Counties	Black Redhorse	19+	□	3
	Blue Sucker	21-26	□	3
		26+	□	4
	Channel Catfish	15+	□	3
	Sauger	13+	□	3
	Shorthead Redhorse	15+	□	3
	Smallmouth Buffalo	Up to 20	□	3
		20+	□	4
Tippecanoe *(downstream from Lafayette)*/ Fountain/Warren/ Vermillion/Parke Counties	Bigmouth Buffalo	18+	□	3
	Blue Sucker	21-26	□	3
		26+	□	4
	Carpsuckers	Up to 13	□	3
		13-19	□	4
		19+	**□**	**5**
	Channel Catfish	Up to 20	□	3
		20+	□	4
	Flathead Catfish	21+	□	3
	Paddlefish	34+	□	3
	Sauger	13+	□	3
	Smallmouth Buffalo	Up to 20	□	3
		20+	□	4
Vigo/Sullivan/Knox Counties	Bigmouth Buffalo	21-24	□	3
		24+	□	4
	Blue Sucker	21-26	□	3
		26+	□	4
	Carpsuckers	17+	□	3
	Channel Catfish	13-22	□	3
		22+	□	4
	Flathead Catfish	21+	□	3

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Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Wabash River (Cont.)	Freshwater Drum	16+	□	3
	Paddlefish	34+	□	3
	Sauger	13+	□	3
	Shovelnose Sturgeon	30+	□	3
	Striped/Wiper Bass	10-12	□	3
		12+	□	4
Gibson/Posey Counties	Bigmouth Buffalo	21-24	□	3
		24+	□	4
	Blue Sucker	21-26	□	3
		26+	□	4
	Bluegill	Up to 6		1
	Carpsuckers	17+	□	3
	Channel Catfish	20+	□	3
	Flathead Catfish	21+	□	3
	Freshwater Drum	16+	□	3
	Paddlefish	34+	□	3
	Sauger	13+	□	3
	Shovelnose Sturgeon	30+	□	3
	Striped/Wiper Bass	10-12	□	3
		12+	□	4
	White Bass	11-21	□	3
		21+	□	4
Wea Creek				
Tippecanoe County	**ALL SPECIES**	**ALL**	□	**5**
West Fork of White River				
Randolph County	Black Redhorse	Up to 13		1
	Bluegill	Up to 6		1
	Carp	Up to 24	□	2
		24+	□	3
	Channel Catfish	14-16	□	3
		16+	□	4
	Longear Sunfish	5+	□	3
	Quillback	13-18	□	3
		18+	□	4
	Spotted Sucker	11-13	□	3
		13+	□	4
Delaware/Madison/Hamilton Counties to Stony Creek in Noblesville	Black Bullhead	9+	□	3
	Bluegill	6+	□	3
	Channel Catfish	**ALL**	□	**5**
	Green Sunfish	6+	□	3
	Largemouth Bass	10-15	□○	3
		15+	□	4
	Quillback	13-18	□	3
		18+	□	4
	Redhorse species	Up to 16	□	3
		16+	□	4
	Rock Bass	9+	□	3
	Spotted Sucker	11-13		3
		13+	□	4
	White Sucker	15+	□	3

Location	Species	Fish Size (inches)	Contaminant	Group
West Fork of White River (Cont.)				
	Bluegill	6+	□	3
Hamilton/Marion Counties from Stony Creek to Broad Ripple Dam	**Channel Catfish**	**ALL**	□	**5**
	Largemouth Bass	Up to 14	□	3
		14+	□	4
	Longear Sunfish	All	□	3
	Quillback	13-18	□	3
		18+	□	4
	Redhorse species	Up to 16	□	3
		16+	□	4
	Rock Bass	9+	□	3
	Spotted Sucker	11-13	□	3
		13+	□	4
	White Sucker	15+	□	3
Marion County (Downstream of Broad Ripple Dam)	Black Bass species	11+	□	3
	Bluegill	6+	□	3
	Carp	Up to 19	□	4
		19+	□	**5**
	Channel Catfish	12-17	□	3
		17+	□	4
	Flathead Catfish	13-15	□○	3
		15+	□	4
	Redhorse species	Up to 16	□	3
		16+	□	4
	Carpsucker species	13-17	□	3
		17+	□	4
Morgan/Owen/Greene/Daviess/ Pike/Gibson Counties to the confluence with the Wabash River	Black Bass species	12+	□	3
	Buffalo species	20+	□	3
	Carp	16-27	□	3
		27+	□	4
	Carpsucker species	16+	□	3
	Channel Catfish	12-20	□	3
		20+	□	4
	Flathead Catfish	Up to 16	□	3
		16-30	□	4
		30+	□	**5**
	Freshwater Drum	15+	□	3
	Sauger/Walleye	Up to 14	□○	3
		14+	□	4
	Spotted Sucker	11-13	□	3
		13+	□	4
	White Bass	14-15	□○	3
		15+	□	4

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Location	Species	Fish Size (inches)	Contaminant	Group
White River				
Pike/Gibson Counties	Bigmouth Buffalo	25+	□	3
	Channel Catfish	18+	□	3
	Flathead Catfish	16+	□	3
	Largemouth Bass	17+	○	3
	Quillback	13-18	□	3
		18+	□	4
	Smallmouth Bass	12+	○	3
	Smallmouth Buffalo	18-22	□	3
		22+	□	4
	Spotted Bass	9+	□	3
	Spotted Sucker	11-13	□	3
		13+	□	4
White Lick Creek				
Hendricks County	Channel Catfish	22+	□	3
	Smallmouth Bass	14+	□	3
Morgan County	Channel Catfish	22+	□	3
	Smallmouth Bass	12+	□	3
Whitewater River				
(Greens Fork, Martindale Creek, Middle Fork, Nolands Fork, West Fork)				
Wayne/Fayette/ Franklin/Dearborn Counties	Black Redhorse	22+	○	3
	Carp	19-25	□○	2
		25+	□○	3
	Channel Catfish	20+	□	3
	Freshwater Drum	15+	□	3
	Golden Redhorse	Up to 14		1
	Longear Sunfish	Up to 5		1
	Northern Hogsucker	Up to 9		1
	Rock Bass	Up to 7		1
	Smallmouth Bass	Up to 10		1
	White Sucker	Up to 10		1

Location	Species	Fish Size (inches)	Contaminant	Group
Whitewater River (West Fork of the East Fork)				
Wayne County	White Sucker	Up to 7		1
Wildcat Creek				
Howard County (Upstream of the Waterworks Dam in Kokomo)				
	Bluegill	Up to 6		1
	Carp	Up to 21	□	3
	Longear Sunfish	Up to 5		1
	Rock Bass	Up to 6		1
Howard County (Downstream of the Waterworks Dam in Kokomo)				
	All Species	**ALL**	□	**5**
Carroll County	**All Species**	**ALL**	□	**5**
Consumption of fish from the Wildcat Creek in Tippecanoe County should be limited to no more than one meal every two months or six meals per year (Group 4) by the general population and NO CONSUMPTION by the at-risk population. Exceptions to this advice for the general population are:				
Tippecanoe County	Black bass species	10+	□	3
	Carp	**ALL**	□	**5**
	Carpsucker	12-13	□	3
	Channel Catfish	Up to 22	□	3
	Flathead Catfish	**18+**	□	**5**
	Freshwater Drum	**16+**	□	**5**
	Golden Redhorse	12-14	□	3
	Longear Sunfish	Up to 5	□	3
	Shorthead Redhorse	**13+**	□	**5**
	White Bass	**ALL**	□	**5**
Wilson Ditch				
Miami County	Creek Chub	Up to 5		1
Young's Creek				
Johnson County	Northern Hogsucker	10+	□	3

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Location	Species	Fish Size (inches)	Contaminant	Group
Adams Lake				
LaGrange County	Walleye	20+	○	3
	Yellow Perch	Up to 13		1
Atwood Lake				
LaGrange County	Bluegill	Up to 7		1
Ball Lake				
Steuben County	Bluegill	Up to 6		1
	Largemouth Bass	Up to 15		1
	White Sucker	Up to 16		1
Big Turkey Lake				
LaGrange County	Black Crappie	Up to 8		1
	Bluegill	Up to 7		1
Blue Lake				
Whitley County	Bluegill	Up to 8		1
Brookville Reservoir				
Franklin/Union Counties	Bluegill	Up to 7		1
	Largemouth Bass	Up to 14		1
		15+	□	3
	White Crappie	Up to 9		1
Cagles Mill Reservoir (Cataract Lake)				
Putnam County	Bluegill	Up to 7		1
	Whtie Crappie	Up to 9		1
Cedar Lake	Carp	20+	□	3
Lake County	Channel Catfish	15+	□	3
Cedarville Reservoir				
Allen County	Bluegill	Up to 7		1
	Carp	All	□○	2
	Largemouth Bass	Up to 14		1
	White Crappie	Up to 11		1
	Yellow Bullhead	Up to 10		1
Center Lake				
Kosciusko County	Black Bullhead	11-14	□	3
		14+	□	4
	Bluegill	7+	□	3
	Largemouth Bass	14+	□	3
Clear Lake				
Steuben County	Rainbow Trout	Up to 18		1
	Rock Bass	Up to 10		1
Dewart Lake				
Kosciusko County	Black Crappie	Up to 12		1
	Bluegill	Up to 8		1
	Northern Pike	30+	○	3
Dogwood Lake				
Daviess County	Bluegill	Up to 7		1
	Redear Sunfish	Up to 8		1
	Warmouth	Up to 6		1

Location	Species	Fish Size (inches)	Contaminant	Group
Dugger Lake				
Sullivan County	Catfish	All	□	3
Eagle Creek Reservoir				
Marion County	Bluegill	Up to 7		1
	Carp	Up to 21		1
	Largemouth Bass	Up to 17		1
Eagle Lake				
Noble County	Bluegill	Up to 5		1
	White Sucker	Up to 20		1
Fish (Plato) Lake				
LaGrange County	Golden Redhorse	Up to 18		1
	White Sucker	Up to 19		1
Flint Lake				
Porter County	Bluegill	Up to 7		1
	Warmouth	Up to 7		1
Fox Lake				
Steuben County	Black Crappie	Up to 9		1
	Bluegill	Up to 8		1
Geist Reservoir				
Hamilton/Marion Counties	Bluegill	Up to 6		1
	Brown Bullhead	Up to 12		1
	Carp	22+	□	3
	Channel Catfish	22-27	□	3
		27+	□	4
	Largemouth Bass	Up to 14		1
	Spotted Sucker	Up to 14		1
Greensburg Reservoir				
Decatur County	Bluegill	Up to 8		1
	Largemouth Bass	Up to 9		1
Griffy Lake				
Monroe County	Largemouth Bass	11+	○	3
Harden Reservoir				
Parke County	Black Crappie	Up to 8		1
	Bluegill	Up to 6		1
	Carp	All	□	2
	Striped Bass	Up to 23		1
Hamilton Lake				
Steuben County	Black Crappie	Up to 13		1
	Brown Bullhead	Up to 11		1
	Largemouth Bass	Up to 15		1
Hardy Lake				
Scott County	Black Crappie	Up to 9		1
	Channel Catfish	Up to 22		1
	Redear Sunfish	Up to 9		1
	Striped Bass	Up to 14		1
	Walleye	Up to 16		1
		22+	○	3

General Population ○ = **Mercury** □ = **PCBs**
Group 1 = Unlimited meals Group 2 = 1 meal/week Group 3 = 1 meal/month
Group 4 = 1 meal/2 months Group 5 = DO NOT EAT
(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
Henderson Lake				
Noble County	Bluegill	5-6	□	3
		6+	□	4
	Carp	17+	□	3
Hominy Ridge Lake				
Wabash County	Largemouth Bass	12+	○	3
	Redear Sunfish	Up to 6		1
Hovey Lake				
Posey County	Carp	30+	□	3
	Channel Catfish	17-19	□	3
		19+	□	4
	Flathead Catfish	17+	□	3
	Largemouth Bass	15+	□	3
	River Carpsucker	12+	□	3
	Smallmouth Buffalo	16-19	□	3
		19+	□	4
	White Bass	9-12	□	3
		12+	□	4
J. Edward Roush Lake				
Huntington County	Bigmouth Buffalo	Up to 16		1
	Carp	22+	□	3
	Channel Catfish	24-28	□	3
		28+	□	4
	White Crappie	Up to 9		1
Kunkel Lake				
Wells County	Bluegill	Up to 6		1
Lake George				
Steuben County	Redear Sunfish	Up to 9		1
Lake James				
Steuben County	Northern Pike	20-36	○	3
		36+	○	4
Lake Lemon				
Monroe County	Black Crappie	Up to 7		1
	Bluegill	Up to 6		1
	Flathead Catfish	20+	□	3
	Redear Sunfish	Up to 9		1
	White Crappie	Up to 9		1
Lake Maxinkuckee				
Marshall County	Channel Catfish	21+	□	3
	Walleye	23+	○	3
Lake Shafer				
White County	Bluegill	Up to 7		1
	Carp	23+	□	3
	Longear Sunfish	Up to 5		1
	River Carpsucker	Up to 17	□	3
		17+	□	4

Location	Species	Fish Size (inches)	Contaminant	Group
Lake Shipshewana				
LaGrange County	Carp	30+	□	3
Lake Wapehani				
Monroe County	Bluegill	Up to 6		1
Lake Wawasee				
Kosciusko County	Bullhead	15+	□	3
Lake of the Woods				
LaGrange County	Bluegill	Up to 6		1
Marshall County	Bluegill	Up to 9		1
	Carp	22+	□	3
Little Barbee Lake				
Kosciusko County	Bluegill	Up to 7		1
Loomis Lake				
Porter County	Bluegill	Up to 8		1
Loon Lake				
Whitley County	Bluegill	Up to 7		1
	Yellow Perch	Up to 9		1
Lower Fish Lake				
LaPorte County	Bluegill	Up to 8		1
	Channel Catfish	30+	□	3
	Walleye	18+	○	3
McClish Lake				
Steuben County	Bluegill	Up to 7		1
Marquette Lagoon				
Lake County	Bluegill	4-7	□	3
		7+	□	4
	Largemouth Bass	12+	□	3
Mill Pond				
Marshall County	Redear Sunfish	Up to 7		1
Mississinewa Reservoir				
Wabash County	Carp	20+	□	3
	Channel Catfish	18+	□	3
	White Crappie	Up to 10		1
Monroe Reservoir				
Brown/Monroe Counties	Bluegill	Up to 7		1
	Carp	Up to 21		1
Morse Reservoir				
Hamilton County	Bluegill	Up to 7		1
	Carp	Up to 21		1
	Golden Redhorse	Up to 18		1
	Largemouth Bass	Up to 17		1
	River Carpsucker	Up to 17		1
	White Bass	Up to 16		1
	White Crappie	Up to 11		1

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

Location	Species	Fish Size (inches)	Contaminant	Group
North Chain Lake				
St. Joseph County	Channel Catfish	22+	□	3
	Walleye	20+	○	3
Olin Lake				
LaGrange County	Carp	All	□	2
	Rainbow Trout	Up to 15		1
Oliver Lake				
LaGrange County	Carp	All		1
Palestine Lake				
Kosciusko County	Bluegill	8+	□	3
	Largemouth Bass	12-15	□○	3
		15+	□	4
Patoka Reservoir	Bluegill	Up to 7		1
Dubois/Orange Counties	Carp	All	□○	2
	Freshwater Drum	Up to 16	○	1
Pike Lake				
Kosciusko County	Largemouth Bass	11-13	○	3
		13+	○	4
	Walleye	14+	□	3
Pleasant Lake				
Steuben County	Bullhead	12+	□	3
Prairie Creek Reservoir				
Delaware County	Bluegill	Up to 8		1
	Carp	Up to 19		1
		19+	□○	2
	Largemouth Bass	Up to 11		1
	Smallmouth Bass	Up to 11		1
	Yellow Perch	Up to 7		1
	Walleye	Up to 14		1
	White Crappie	Up to 8		1
Reservoir 29				
Sullivan County	Bluegill	Up to 9		1
	Redear Sunfish	Up to 9		1
	Yellow Bullhead	Up to 12		1
Rockville Lake				
Parke County	Bluegill	Up to 6		1
	Redear Sunfish	Up to 9		1
Salamonie Reservoir				
Wabash County	Bluegill	Up to 7		1
	Carp	23+	○	3
	White Crappie	All		1
Simonton Lake				
Elkhart County	Black Crappie	Up to 11		1
	Walleye	Up to 16		1
Skinner Lake				
Noble County	Black Crappie	Up to 8		1
	Bluegill	Up to 7		1
	Carp	Up to 25		1
	Largemouth Bass	Up to 10		1
	Yellow Bullhead	Up to 11		1

Location	Species	Fish Size (inches)	Contaminant	Group
Starve Hollow Lake				
Jackson County	Bluegill	Up to 6		1
	Carp	Up to 25		1
	Green Sunfish	Up to 7		1
	Redear Sunfish	Up to 6		1
Stone Lake				
LaPorte County	Black Crappie	Up to 11		1
Sylvan Lake				
Noble County	Black Bullhead	Up to 13		1
	Black Crappie	Up to 10		1
	Bluegill	Up to 8		1
	Carp	Up to 28	□	3
		28+	□	4
	Largemouth Bass	Up to 12		1
	Northern Pike	Up to 28		1
	Walleye	Up to 18		1
	White Sucker	Up to 15		1
Tippecanoe Lake				
Kosciusko County	Largemouth Bass	12+	○	3
Tucker Lake				
Orange County	Yellow Bullhead	Up to 10		1
	Warmouth	Up to 7		1
Turtle Creek Reservoir				
Sullivan County	Bluegill	Up to 6		1
	Carp	26+	□	3
	Channel Catfish	Up to 11		1
	Redear Sunfish	Up to 6		1
Upper Fish Lake	Redear Sunfish	Up to 9		1
LaPorte County	Warmouth	Up to 7		1
Winona Lake				
Kosciusko County	Bluegill	Up to 8		1
	Carp	24-26	□	3
		26+	□	4
	Largemouth Bass	12+	□	3
	Walleye	24+	□○	3
	White Bass	15-16	□	3
		16+	□	4
	White Sucker	19+	□	3
	Yellow Perch	Up to 8		1
Wolf Lake				
Lake County	Largemouth Bass	13-17	□	3
		17+	□	4
	White Bass	13-15	□	3
Worster Lake				
St. Joseph County	Black Crappie	Up to 8		1
	Bluegill	Up to 7		1
	Brown Bullhead	16+	□	3
	Redear Sunfish	Up to 11		1

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(For women and children, please refer to the Guidelines on page 5.)

Don't see your fish or site listed? Assume it is a Group 2 (general population: 1 meal/week; women/children: 1 meal/month).

2008 Lake Michigan and Tributaries Advisory

Location	Species	Fish Size (inches)	Contaminant	Group
Grand Calumet River/Indiana Harbor Canal				
Lake County	**ALL**	**ALL**	□	**5**
Lake Michigan				
(and tributaries except Grand Calumet River/Indiana Harbor Canal)	Black Crappie	7-8	□	3
		8+	□	4
	Bloater	10+	□	3
	Bluegill	8+	○	3
	Brook Trout	All	□	3
	Brown Trout	Up to 22	□	3
		22+	□	4
	Carp	**ALL**	□	**5**
	Channel Catfish	**ALL**	□	**5**
	Chinook Salmon	Up to 32	□	3
		32+	□	4
	Chubs	All	□	2
	Coho Salmon	All	□	3
	Freshwater Drum	Up to 16	□	3
		16+	□	4
	Lake Trout	Up to 23	□	3
		23-27	□	4
		27+	□	**5**
	Lake Whitefish	All	□	3
	Largemouth Bass	Up to 7*	□	3
		7+	□	4
	Longnose Sucker	20+	□	3
	Northern Pike	Up to 14*	□	3
		14+	□	4
	Pink Salmon	All	□	3
	Quillback	20+	□	3
	Rainbow Trout (also known as Steelhead)	Up to 22	□	2
		22+	□	3

Location	Species	Fish Size (inches)	Contaminant	Group
Lake Michigan (Cont.)				
	Rock Bass	9+	□	3
	Silver Redhorse	**25+**	□	**5**
	Smallmouth Bass	16+	□○	3
	Walleye	17-21	□	3
		21+	□	4
	White Sucker	15-23	□○	4
		23+	□	4
2008 Ohio River Advisory				
	Carp	Up to 33	□	3
		33+	□	4
	Channel Catfish	14-19	□	3
		19-26	□	4
		26+	□	**5**
	Flathead Catfish	17-23	□	3
		23+	□	4
	Freshwater Drum	>13	□	3
	Largemouth Bass	13+	□	3
	Paddlefish**	All	□	3
	**Paddlefish has been added as a precaution due to elevated levels of PCBs that have been noted in preliminary tissue and egg samples.			
	Sauger/Walleye/ Saugeye	13-17	□	3
		>17	□	4
	Smallmouth Bass	13-15	□	4
		15+	□	**5**
	Spotted Bass	13+	□	3
	White/Striped/Hybrid Bass	10-20	□	3
		20+	□	4

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(For women and children, please refer to the Guidelines on page 5.)

Where can I get more information?

Indiana State Department of Health (ISDH)

If you have any questions or comments, please contact the ISDH Enviromental Epidemiology Section at 317.351.7190, Ext. 253, or write:

Indiana State Department of Health
Environmental Epidemiology Section
2525 North Shadeland Avenue, E-3
Indianapolis, Indiana 46219

To access the Fish Advisory online: http://www.IN.gov/isdhfca/

For more information on health risks of fish contaminants or to request a copy of this booklet, please call the ISDH at 317.351.7190, Ext. 253.

Indiana Department of Environmental Management (IDEM)

www.idem.IN.gov/

For information on sources of contaminants in Indiana waterways and collecting and testing of fish, link to the IDEM Web site or call 317.232.8596.

Indiana Department of Natural Resources (DNR)

www.IN.gov/dnr/

For information on good places to fish in Indiana or the Fishing Rules and Regulations, link to the DNR Web site or call 317.232.4060

Indiana Fish Identification

White Bass - Single tooth patch on back of tongue, first stripe below lateral line not complete to tail
Hybrid Striped - Two tooth patches on back of tongue are joined, first stripe below lateral line complete to tail, stripes above lateral line usually broken
CATFISH
Channel Catfish - 24-29 rays in rounded anal fin, caudal fin is deeply forked, dark spots on sides
Blue Catfish - 30-35 anal fin rays, anal fin margin is straight, caudal fin is deeply forked
White Catfish - Caudal fin margin is nearly straight (slightly forked), no dark spots on sides
Bullhead Catfish - Caudal fin is straight
PERCH
Walleye - No spots on dorsal fin, dusky spot at rear of spiny dorsal fin, tip of lower caudal tail and anal ring are white
Sauger - 3 or 4 saddle shaped blotches on back and sides, spotted dorsal fin
SUNFISH
Bluegill - 5-9 vertical bars on sides, black opercula flat (ear) with no margin, dark spot at rear of dorsal fin
Black Crappie - 7-8 dorsal spines, random blotches on sides
White Crappie - 6 dorsal spines, black side markings from vertical bars rather than random spots
TROUT and SALMON
Rainbow Trout - Or steelhead: white mouth, teeth and gums; small black spots on back, sides, caudal and dorsal fins; caudal fin margin is square
Lake Trout - White mouth, teeth, and gums; some orange or red spots on sides, some spots enriched with light blue; caudal fin margin is square
Chinook Salmon - Or king salmon: teeth are set in dark gum; black spots on back and both lobes of caudal fin; 15-17 anal fin rays

To see pictures of these and other fish, visit http://fn.cfs.purdue.edu/anglingindiana/ and select "Fishes of Indiana" from the menu.

1.800.TIP.IDNR

Turn in a Poacher/Turn in a Polluter (TIP) is a joint effort between Hoosier outdoor enthusiasts and the Indiana Department of Natural Resources (DNR) to eliminate the illegal taking of Indiana's fish and wildlife and the polluting of Indiana's environment.

TIP offers rewards for information leading to the arrest of wildlife law violators. Citizens may report violators by calling the toll-free TIP number. Callers are not required to give their names or testify in court.

TIP offers a minimum reward of $200 for information on cases involving big game and endangered species. For other cases, the minimum reward is $100.

Free Fishing Information from DNR

The annual Indiana Fishing Guide, distributed by the DNR, provides anglers with information on general rules and regulations, where to fish, fish identification, record fish program, special regulations for Lake Michigan and the Ohio River and public access. A copy of the Fishing Guide is available at most bait and tackle stores, or you may contact the Division of Fish and Wildlife's Indianapolis office, IGC-W273, 402 West Washington Street, Indianapolis, Indiana 46204, 317.232.4080. Information is also available online at:

www.IN.gov/dnr/.

REDUCING MERCURY IN YOUR ENVIRONMENT

In an effort to reduce mercury in Indiana's lakes, rivers, and streams and their respective fish populations, the Indiana Department of Environmental Management (IDEM) created the Mercury Awareness Program (M.A.P.). The M.A.P. was created in partnership with Indiana Solid Waste Management Districts and several Indiana cities to allow residents to safely recycle their mercury-containing items. Listed below are common household items that can be recycled through the M.A.P. program. Remember, never put mercury in the trash, down the drain, or in a burn barrel.

Common household items that may contain mercury	
Mercury Thermostats	Replace with electronic thermostats Recycle old thermostats
Mercury Thermometers	Replace with digital or alcohol (red bulb) Recycle old thermometers
Elemental Mercury	Recycle elemental mercury
Mercury Switches	Replace with mechanical or electrical switches Recycle old switches
Batteries	Replace with mercury-free batteries Recycle old batteries

For additional information on alternatives to mercury or the Mercury Awareness Program, visit our Web site at www.idem.IN.gov/your_environment/mercury or contact:

Kristin Brier
IDEM
1.800.988.7901 kbrier@idem.IN.gov

Table 5-1
Illicit Discharge Detection and Elimination BMPs

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Stormwater System Map	• Map 25% of the conveyance system between 2005 and 2008 in conjunction with screening efforts. • Track using Programmatic Indicators #5 and #6.	• Begin March 2005, then on-going. • 25% complete end of 2005 • 50% complete end of 2006 • 75% complete end of 2007 • 100% complete end of 2008	• Map all main trunk lines of conveyances with 12" and larger diameter and open conveyances with a 2' and larger bottom width. • Begin mapping activities in priority watershed areas: 1. Cedar Creek-Cedar Canyons 2. Maumee River-Bullerman Ditch 3. Maumee River-River Haven 4. Maumee River Sixmile Creek 5. Willow Creek-Willow Creek Ditch 6. St. Mary's River-Spy Run Creek 7. St. Mary's River-Snyder Ditch 8. Becketts Run 9. St. Joseph River-Ely Run 10. St. Joseph River-Tiernan Ditch 11. St. Joseph River-Cedarville Reservoir 12. Aboite Creek-Big Indian/Little Indian Creeks 13. Wilbur Ditch-Bottern Ditch 14. St. Joseph River-Schoppman Drain	Surveyor's Office.

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Illicit Discharge Detection and Elimination (IDDE) Ordinance.	Adopt Stormwater Management Ordinance by March 30, 2005.	Implementation beginning March 30, 2005.	Countywide.	Surveyor's Office.
IDDE Plan	• Identify and eliminate illicit storm sewer connections. • Enhance existing Health Department die screening program. • Check 25% of the conveyance system for years 2-5 of the permit in conjunction with mapping and screening efforts. • Update program priorities annually. • Track using Programmatic Indicators #7, #8, and #9.	Implementation beginning March 2005, then updated annually.	• Begin in and work through 14-digit watersheds areas that have E. coli listings in 305(b) or 303(d) reports. • Prioritize outfalls checked for further, detailed follow up investigations.	Surveyor's Office.
Citizen Complaints	• Listen and respond to citizen complaints. • Take appropriate follow up actions. • Document citizen reports and responses in ASIST database. • Track using Programmatic Indicators #2 and #3.	On-going.	Countywide.	ACPWQ and Surveyor's Office.

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Storm Drain Marking	• Develop and implement program by November 2005. • Track using Programmatic Indicators #3 and #4.	Begin 2005, then on-going.	Countywide as volunteers are found.	ACPWQ and Surveyor's Office.
Solid Waste Management District Promotions	• Promote activities of the ACSWMD as a means to educate community members on the importance of pollution prevention and available recycling programs, as these activities occur. • Track using Programmatic Indicators #10, #11, and #12.	Begin 2005, then on-going.	Countywide.	SWMD, ACPWQ, and Surveyor's Office.
Annual IDDE, Good Housekeeping, & Pollution Prevention Staff Training	• Develop training program and conduct one in 2005. • Conduct annual refresher training. • Track using Programmatic Indicator #2.	Begin in 2005, then annual updates.	Focus on MS4 conveyance system, MS4 operational areas, and Highway Department Facilities.	Outsourced.

6.0 MINIMUM CONTROL MEASURE #4 CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

Rule 13 requires the development of an ordinance or other regulatory mechanism and establishment of a construction program that controls polluted runoff from construction activities that disturb one or more acres of land in the MS4 area. This construction program must include a permitting process, erosion control plan review process, site inspections, and enforcement. The permitting process must include a requirement for the construction project site owner to submit a copy of the permit application directly to IDEM. MS4 entities must provide an opportunity to the local SWCD to provide comments and recommendations to the MS4 operator on individual projects.

The construction program must include requirements for the implementation of appropriate BMPs on construction sites to control sediment, erosion, and other waste. MS4 entities must review and approve construction plans submitted by the construction site operator before construction activity commences. Procedures must be developed for site inspection and enforcement to ensure that BMPs are properly installed. These procedures must include a means to identify priority sites for inspection and enforcement, as well as, a means to receive and consider public inquiries, concerns, and information submitted regarding local construction activities. A tracking process must be implemented in which submitted public information is documented and then given to appropriate staff for follow up.

MS4 area personnel responsible for plan review, inspection, and enforcement of construction activities shall receive annual training.

6.1 EXISTING CONSTRUCTION SITE STORMWATER RUNOFF CONTROL BMPs

Compliance with MCM #4 requires MS4s to develop, implement, manage, and enforce an erosion and sediment control program for construction activities that disturb one or more acres of land within the MS4 area. In Allen County, stormwater runoff controls for all construction activities are currently regulated under the Allen County Drainage and Sediment Control Ordinance. In the Town of Huntertown and Town of Leo-Cedarville, stormwater runoff controls for all construction activities are currently regulated via the Allen County's Drainage and Sediment Control Ordinance. Additionally, Allen County relies on the SWCD and the IDNR Division of Soil Conservation for implementation of Indiana's Rule 5 program for minimizing stormwater runoff from construction activities.

Existing local Construction Site Runoff Control activities implemented by Allen County are as follows:

- The Allen County Drainage and Sediment Control Ordinance contains enforcement language relating to runoff control, but not for site inspections. The ordinance states that all erosion control measures required by the ordinance shall meet the design criteria, standards, and specifications for erosion control measures outlined in "Indiana Handbook for Erosion Control in Developing Areas, Guidelines for Protecting Water Quality Through the Control of Soil Erosion and Sedimentation on Construction Sites", published by the Division of Soil Conservation, IDNR (October, 1992). If the requirements of the ordinance are not met, no building permit will be issued.

- The Allen County Surveyor's Office conducts plan review items regarding new construction, including plat reviews, detention requirements, construction plans, and permit applications.

- The SWCD reviews and approves erosion and sediment control plans according to Rule 5 requirements (sites disturbing 5 acres or more of land) for Allen County.

- The Complaint Section of the Allen County Surveyor's Office handles complaints received by the general public. A representative follows up with the complaint by performing a site visit and assessing the issue. The Surveyor's Office handles the complaint if it pertains to agricultural drainage issues or water quantity issues within subdivisions. If the complaint relates to erosion control within subdivisions, then the complaint is redirected to the NRCS, which has enforcement capabilities through the issuance of fines.

Existing local Construction Site Runoff Control activities implemented by Huntertown are as follows:

- All plan reviews for the Town are conducted by the Allen County Plan Commission.

- All new construction plans are submitted to the Allen County Surveyor's Office, which conducts plan review items regarding new construction, including plat reviews, detention requirements, construction plans, and permit applications.

- Inspection of sites is performed at the recommendation of the Allen County Surveyor's Office or through citizen complaints.

Existing local Construction Site Runoff Control activities implemented by Leo-Cedarville are as follows:

- All new construction plans are submitted to the Allen County Surveyor's Office, which conducts plan review items regarding new construction, including plat reviews, detention requirements, construction plans, and permit applications.

- All street projects are submitted to the Allen County Highway Department for review.

- Citizen complaints regarding construction activities are handled by the Clerk Treasurer or Town Council. The Town Council reviews the complaint and directs it toward the Town Engineer or Allen County Surveyor's Office.

The existing Construction Site Stormwater Control activities discussed above will help ensure the County's compliance with requirements of Rule 13. However, these activities are currently not sufficient to address the requirements of Rule 13.

6.2 PROPOSED CONSTRUCTION SITE STORMWATER RUNOFF CONTROL BMPs

The following Construction Site Stormwater Runoff Control BMPs will be developed and implemented by Allen County in order to comply with the minimum requirements of MCM #4. Existing BMPs identified in subsection 6.1 with any needed enhancements, as well as, any new BMPs are included in this section. The County's stormwater ordinance will be implemented on a county-wide basis.

As of March 2005, Allen County has initiated the implementation of a Construction Site Stormwater Runoff Control Program as part of this Part C Plan, which outlines the overall strategy for gradually implementing the program and its corresponding BMPs over the next four years. The County's program is designed to minimize the amount of sediment and other pollutants from being discharged from construction sites. The presumptive approach of implementing this program assumes that these pollutants will be reduced each year.

Table 6-1 provides a summary of the Construction Site, stormwater quality BMPs to be implemented and identifies the associated measurable goals, programmatic indicators, tracking, timeline, priority areas, and responsible parties associated with each BMP. Detailed description of each BMP is provided below.

Erosion and Sediment Control Ordinance

To minimize water quality impacts of development occurring within Allen County and ensure that new and redevelopment within the County's MS4 area is managed as efficiently as possible, the County is in the process of updating their existing Storm Drainage, and Erosion and Sediment Control Ordinance (SDESCO) into a comprehensive, Stormwater Management Ordinance to meet the minimum requirements of 327 IAC 15-5 (Rule 5). Adoption of the Ordinance is anticipated at the March 30, 2005 public meeting of the County Commissioners. This updated ordinance will be administered and enforced through the County Surveyor's Office. This ordinance addresses illicit discharges, construction runoff, and post-construction runoff. The County will review the Stormwater Management Ordinance annually to ensure it meets the minimum requirements of Rule 5. The County's comprehensive Stormwater Management Ordinance is a supplemental document that is bound separately from this report. Any activities towards revising the ordinance will be documented in the County's Rule 13 Annual Reports submitted to IDEM.

Plan Review, Site Inspection, and Enforcement

The County Surveyor's Office will hire new staff or outsource services to conduct Erosion and Sediment Control plan reviews, constructions site inspections, and if necessary to refer sites for enforcement actions. A copy of each development plan will be sent to the SWCD for review as well. The Surveyor's Office will perform construction site inspections and, if necessary, refer sites for enforcement actions. This will ensure that construction plans are being implemented properly and that sites are in compliance with the County's ordinance. Activities will be prioritized in accordance with the County's "Procedure for Prioritizing Construction Program Activities" (described on the next page). Beginning March 2005, review 100% of construction plans and inspect 100% of sites once and 50% of sites twice. Construction site operator compliance improvement will be documented via requested plan revisions made, corrections made in response to inspection reports and forms requests, and enforcement action required corrections. Enforcement actions include requiring corrective actions, fines, and/or stop work orders. Activities will be documented as part of the Monthly Construction Site Project Summary submitted to IDEM as described in Section 10.3.

Staff Training

The County Surveyor's office will hire new staff or outsource services and conduct annual staff trainings for new and existing staff. The County will ensure that an adequate amount and skill level of staffing is in place or services can be outsourced to account for increased workloads associated with performing erosion and sediment control plan review, inspection, and enforcement as mandated by Rule 13. All County staff or hired consultants involved in plan review and site inspection activities will be trained. Training program content will include information on construction and post-construction BMPs and priority watershed concerns. Current staff and/or new staff, or hired consultants, responsible for construction site plan review and construction site inspections will receive, at a minimum, annual erosion and sediment control training. All training activities including the specific curriculum, as well as the number of staff trained, will be included in the County's Rule 13 Annual Reports submitted to IDEM. Staff and/or outsourced services contracts will be in place and trained by March 2005.

Erosion and Sediment Control and Post-Construction BMP Tracking Database

The County Surveyor's Office will use the County's ASIST database to track the status of construction projects, Erosion and Sediment Control activities, and post-construction BMPs. The database will ensure efficient management and accurate reporting on the status of development within Allen County. The database will be utilized to track and document Erosion and Sediment Control violations, community complaints, public informational requests, and location of sites in relation to priority watershed areas identified in subsection 2.3. The database will therefore serve as an aid to inspection staff for follow-up inspections and, if necessary, enforcement actions. The database will be implemented in March of 2005. The County Surveyor's Office will submit reports from the database to the IDEM monthly. All activities associated with the database will be summarized and included in the County's Rule 13 Annual Reports submitted to IDEM.

Training for Construction Professionals

The County Surveyor's Office will administer a local construction and development community education program, which will increase the construction and development community's awareness of changing erosion and sediment control standards. The training will include annual erosion and sediment control BMP training workshops (the first starting in 2005), which focus on the County's erosion and sediment control program, construction and post-construction stormwater BMPs, special protective measures needed within the County's identified priority watersheds and sensitive areas, and dealing with highly erodible soils. IDEM and IDNR will be consulted on program content. As applicable trainings are offered by other entities, such as, IDNR, the Surveyor's office will promote these activities to construction professionals. Educating construction professionals about the proper selection, installation, inspection, and maintenance of BMPs will help to ensure compliance with the County's erosion and sediment control requirements contained in their ordinance. Information on training activities conducted will be included in the County's Rule 13 Annual Reports submitted to IDEM.

Procedure for Prioritizing Construction Activities

The County will prioritize construction activities for the inspection and enforcement process to ensure that construction and development site inspections are as effective as possible. For each project site, County staff will evaluate the nature and extent of the construction activity, topography, highly erodible soils, soil suitability for septic systems, and priority watersheds (as well as their receiving waters) as described in Part B to determine how frequently these sites need to be inspected. Sites great than or equal to 5 acres in size, located near a receiving water, as well as sites containing slopes greater than or equal to 4%, wetlands, and/or endangered, threatened, or rare species will likely be prioritized for more frequent inspections. As the County's construction program develops, the County will periodically evaluate their priorities for construction activities. Updates to County procedures will be submitted in the County's Rule 13 Annual Reports.

Inspection and Enforcement Documentation

The County will use IDNR's existing inspection and enforcement form for their Erosion and Sediment Control inspectors to complete following each site inspection to ensure that County procedures are consistent with State's Rule 5 program. County inspectors will be required to document Erosion and sediment control BMP adequacies and inadequacies identified during each visit. All construction site managers will be given a copy of the form following each inspection and be required to sign suggesting their understanding and willingness to address any BMP inadequacies identified. If follow-up inspections prove that the identified BMP inadequacies were not addressed, the form will identify enforcement measures to be taken by the County. Information from completed forms will be entered into the County's ASIST database.

Quality Assurance/Quality Control (QA/QC) of overall program

In order to ensure consistency with the State's Rule 5 program and maintain overall program quality, the County will comply with Rule 5 on County owned and operated projects. In March 2005, the County will work with IDEM & IDNR to seek approval for program and to review County owned and operated projects. The County will request meetings with the agencies to review the County's program at least annually. The County will track the number of County projects subject to Rule 5, the number of IDNR and IDEM meetings, and information discussed in meetings. This action will correct program deficiencies or make updates based on new information or technology.

Table 6-1
Construction Site Stormwater Runoff Control BMPs

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Erosion and Sediment Control Ordinance	• Adopt Comprehensive Stormwater Management Ordinance by March 30, 2005. • Track permits issued using Programmatic Indicator #13.	Implementation beginning March 30, 2005.	Countywide.	Surveyor's Office.
Plan Review, Site Inspection, and Enforcement	Review 100% of construction plans and inspect 100% of sites once and 50% of sites twice, beginning March 2005.	Beginning March 2005, then on-going.	Use written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.
Staff Training	• Hire and train staff by March 2005. • Conduct annual staff trainings.	First training of all staff by March 2005, then annually.	Include training on erosion and sediment control, post-construction BMPs, priority watersheds, and sensitive areas.	Surveyor's Office and outsourced.
Erosion and Sediment Control and Post-Construction BMP Tracking Database	• Implement tracking system by March 2005. • Send reports to IDEM monthly. • Track using Programmatic Indicators #13, #14, #15, #16, #17, #18, #20, and #21.	• Begin tracking March 2005, then on-going. • Monthly reports to IDEM.	Countywide.	Surveyor's Office and outsourced.
Training for Construction Professionals	• Administer a local construction and development community education program. • Conduct first workshop in 2005, then annually. • Promote other activities, such as regional IDNR	• Offer first workshop in 2005, then annually. • On-going, promote other applicable training opportunities.	Include training on erosion and sediment control, post-construction BMPs, priority watersheds, and sensitive areas.	Surveyor's Office and outsourced.

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
	trainings. • Track using Programmatic Indicator #2.			
Procedure for Prioritizing Construction Activities	• Implement procedure by March 30, 2005. • Track using Programmatic Indicator #15.	Begin March 30, 2005.	Use written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.
Inspection and Enforcement Documentation	• Complete IDNR forms as part of on-going program. • Enter information into ASIST.	Start in 2005, then on-going.	Use written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.
QA/QC of Overall Program	• Comply with Rule 5 on County owned and operated projects. • In March 2005, work with IDEM & IDNR to seek approval for program and to review County owned and operated projects. • Review with agencies at least annually.	First in March 2005, then annually.	Ensure that projects are meeting goals for written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.

7.0 MINIMUM CONTROL MEASURE #5 POST-CONSTRUCTION STORM WATER RUNOFF CONTROL

Rule 13 requires the development of an ordinance or other regulatory mechanism and establishment of a post-construction program that addresses runoff from new development and redevelopment areas that disturb one or more acres of land in the MS4 area. This program must include a permitting process, plan review process, site inspections, and enforcement. MS4 area personnel responsible for plan review, inspection, and enforcement of post-construction BMPs shall receive annual training.

Where appropriate, MS4 entities must use a combination of storage, infiltration, filtering, or vegetative practices to reduce the impact of pollutants in storm water runoff on receiving waters in areas that are the responsibility of the MS4 entity. A written Operational and Maintenance (O&M) Plan must be developed and implemented for all existing storm water structural BMPs, which are under the control of the MS4 entity. As new post-construction BMPs are added to areas under the control of the MS4 entity, the O&M Plan must be updated accordingly.

7.1 EXISTING POST-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL BMPs

Compliance with MCM #5 requires MS4s to develop a program for managing post-construction BMPs that will ensure adequate, long-term stormwater quality benefits in new development and redevelopment activities. Once construction is complete, post-construction practices specified by the MS4 must be implemented to ensure stormwater quality is maintained from the developed site via an enforceable ordinance or other regulatory mechanism.

Existing Post-Construction Site Stormwater Runoff Control activities implemented by Allen County are as follows:

- The Allen County Surveyor's Office requires the following structural controls for post construction runoff:
  - excavated excess spoil from detention basins shall have a slope no steeper than 4:1 for safety, erosion control, stability, and ease of maintenance
  - grass or other suitable vegetative cover shall be provided throughout the entire detention storage basin area
  - safety ledge and maintenance ledge required for wet-bottom basins
  - for detention ponds with a normal pool greater that 3.0 acres, material such as stone, riprap, or other material/planting is required to prevent erosion due to wave action
  - periodic maintenance is required in lakes to control weeds
  - debris removal from stormwater detention basins is required
  - if required, aeration facilities to prevent pond stagnation should be provided

- open channels side slopes shall be no steeper than 3:1 and flatter slopes may be required to prevent erosion and ease of maintenance
- channel stability inspection of open channels created to convey stormwater runoff is required after construction is complete

- The Allen County Surveyor's Office has established guidelines for managing files pertaining to the County's stormwater management program. Data sets including design plans, reports, previously approved projects, and as-builts. All files are kept on-site and indefinably in hard copy format. The ACSO also maintains the Rule 5 plans, applications, and correspondence. These too are kept on-site in hard copy format indefinitely.

- The Allen County Surveyor's Office requires a permanent erosion control plan of all graded and non-hard surface areas within the proposed development, as planned for completion.

- The Allen County Surveyor's Office requires maintenance procedures by responsible parties to keep all of the land under adequate cover and erosion at an acceptable minimum.

- The Allen County Surveyor's Office requires as-built plans, which include storm drainage and erosion control systems, before final acceptance of the proposed project.

- The County maintains a MicroStation GIS database. The Allen County Surveyor's Office uses ArcView for its GIS data, which contains descriptions of known BMPs in the St. Joseph Watershed.

Existing Post-Construction Site Stormwater Runoff Control activities implemented by Leo-Cedarville are as follows:

- The Town requires as-built drawings to be submitted once the project has been constructed.

The existing Post-Construction Stormwater Runoff Control activities discussed above will help ensure the County's compliance with requirements of Rule 13. However, these activities are currently not sufficient to address the requirements of Rule 13.

7.2 PROPOSED POST-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL BMPs

The following Post-Construction Site Stormwater Runoff Control BMPs will be developed and implemented by Allen County in order to comply with the minimum requirements of MCM #5. Existing BMPs identified in subsection 7.1 with any needed enhancements, as well as, any new BMPs are included in this section. The County's ordinance will be implemented on a countywide basis.

As of March 2005, Allen County has initiated the implementation of a Post-Construction Site Stormwater Runoff Control Program as part of this Part C Plan, which outlines the overall strategy for gradually implementing the program and its corresponding BMPs over the next four years. The County's program is designed to ensure adequate stormwater quality is maintained from developed sites. The presumptive approach of implementing this program assumes that overall stormwater quality will improve each year. The technological standards required as part of the County's ordinance contains specific reduction goal percentages for each BMP.

Table 7-2 provides a summary of the Post-Construction Site Runoff BMPs to be implemented and identifies the associated measurable goals, programmatic indicators, tracking, timeline, priority areas, and responsible parties associated with each BMP. Detailed description of each BMP is provided below.

Post-Construction Control Ordinance

The County is in the adoption process of a comprehensive, county-wide ordinance that meets the minimum requirements of 327 IAC 15-13 (Rule 13) by including post-construction site runoff control measures. The post-construction provisions are part of a comprehensive, Stormwater Management Ordinance that addresses illicit discharges, construction runoff, and post-construction runoff. Adoption of the Ordinance is anticipated at the March 30, 2005 public meeting of the County Commissioners. The post-construction provisions will minimize the water quality impacts from new development within Allen County and ensure that new/redevelopment within the County's MS4 area is managed as efficiently as possible. The ordinance will be administered and enforced through the County Surveyor's Office. The County will review the ordinance annually to ensure it meets the minimum requirements of Rule 5. The County's comprehensive Stormwater Management Ordinance is a supplemental document that is bound separately from this report.

Post-construction BMPs continue to treat stormwater after construction has been completed and the site has been stabilized. Installing certain BMPs, such as bioretention areas and sand filters, prior to stabilization can cause failure of the measure due to clogging from sediment. If such BMPs are installed prior to site stabilization, Allen County will require that they will be protected by traditional erosion control measures.

Conversely, detention ponds and other BMPs can be installed during construction and used as sediment control measures. In those instances, Allen County will require that the construction sequence ensures the pond is cleaned out with pertinent elevations and storage and treatment capacities reestablished as noted in the accepted stormwater management plan.

Allen County has adopted a policy that the control of stormwater runoff quality will be based on the management of Total Suspended Solids (TSS). This requirement is being adopted as the basis of Allen County's stormwater quality management program for all areas of jurisdiction.

Allen County has designated 12 pre-approved BMP methods to be used alone or in combination to achieve the 80% TSS removal stormwater quality goals for a given project. These BMP measures are listed along with their anticipated average TSS removal rates in **Table 7-1**. Pre-approved BMPs have been proven/are assumed to achieve the average TSS removal rates indicated in Table 7-1. Anyone applying for a County permit desiring to use a different TSS removal rate for these BMPs must follow the requirements discussed in the County's Technical Standards Document for Innovative BMPs. Details regarding the applicability and design of these pre-approved BMPs are contained within fact sheets presented in Appendix D of the County's Technical Standards Document.

Note that a single BMP measure may not be adequate to achieve the water quality goals for a project. It is for this reason that a "treatment train", a number of BMPs in series, is often required for a project.

TABLE 7-1
Pre-approved Post-construction BMPs

BMP Description	Anticipated Average % TSS Removal Rate[E]
Bioretention[A]	75
Constructed Wetland	65
Underground detention	70
Extended Dry Detention[B]	72
Infiltration Basin[A]	87
Infiltration Trench[A]	87
Media Filtration – Underground Sand	80
Media Filtration – Surface Sand	83
Storm Drain Insert[D]	NA[C]
Filter Strip	48
Vegetated Swale	60
Wet Detention	80

Notes:

A. Based on capture of 0.5-inch of runoff volume as best available data. Effectiveness directly related to captured runoff volume, increasing with larger capture volumes.
B. Test results are for three types of ponds: extended wet detention, wet pond and extended dry detention

C. NA may indicate that the BMP is not applicable for the pollutant, but may also indicate that the information is simply Not Available. Independent testing should be provided, rather than the manufacturer's testing data.
D. Must provide vendor data for removal rates.
E. Removal rates shown are based on typical results. These rates are also dependent on proper installation and maintenance. The ultimate responsibility for determining whether additional measures must be taken to meet the Ordinance requirements for site-specific conditions rests with the applicant.

Allen County has established minimum standards for the selection and design of construction water quality BMPs in their Technical Standards document. The information provided establishes performance criteria for stormwater quality management and procedures to be followed when preparing a BMP plan for compliance. Post-Construction BMPs must be sized to treat the water quality volume, WQv, for detention-based BMPs or the water quality discharge, Qwq, for flow-through BMPs. The Technical Standards Document provides the methodology for calculating the WQv and Qwq values.

BMPs not previously accepted by Allen County must be certified by a professional engineer licensed in State of Indiana and accepted through Allen County. American Society for Testing and Materials (ASTM) standard methods must be followed when verifying performance of new measures. New BMPs, individually or in combination, must meet the 80% TSS removal rate at 50-125 micron range (silt/fine sand) without reintrainment and must have a low to medium maintenance requirement to be considered by Allen County. Testing to establish the TSS removal rate must be conducted by an independent testing facility, not the BMP manufacturer.

Plan Review, Site Inspection, and Enforcement

The County Surveyor's Office will hire new staff or outsource services to conduct post-construction BMP plan reviews in conjunction with Erosion and Sediment Control plan reviews, post-construction BMP inspections in conjunction with construction site inspections, and if necessary to refer sites for enforcement actions. Plans will be reviewed to ensure compliance with the technological standards required as part of the County's ordinance containing specific reduction goal percentages for each BMP. A copy of each development plan will be sent to the SWCD for review as well. The Surveyor's Office will perform construction site inspections and, if necessary, refer sites for enforcement actions. This will ensure that post-construction BMP plans are being implemented properly and that sites and BMPs are in compliance with the County's ordinance. Activities will be prioritized in accordance with the County's "Procedure for Prioritizing Construction Program Activities". Beginning March 2005, review 100% of construction and post-construction plans and inspect 100% of sites once and 50% of sites twice. Construction site operator compliance improvement will be documented via requested plan revisions made, corrections made in response to inspection reports and forms requests, and enforcement action required corrections. Enforcement actions include requiring corrective actions, fines, and/or stop work orders. Activities will be documented as part of the Monthly Construction Site Project Summary submitted to

IDEM as described in Section 10.3.

Staff Training

The County will hire new staff or outsource services and conduct annual staff trainings for new and existing staff. The County will ensure that an adequate amount and skill level of staffing is in place or services can be outsourced to account for increased workloads associated with performing Erosion and Sediment Control plan review, inspection, and enforcement as mandated by Rule 13. All County staff and hired consultants involved in plan review and site inspection activities will be trained in accordance with the County's ordinance. Training program content will include information on construction and post-construction BMPs and priority watershed concerns. Current staff and/or new staff, or hired consultants responsible for construction site plan review and construction site inspections will receive, at a minimum, annual post-construction BMP training. Staff/outsourced service contracts will be in place and trained by March 2005. The County will track number of construction sites inspected.

Inspection and Enforcement Documentation

The County will use the inspection and enforcement forms from their Technical Standards Manual in conjunction with the exiting IDNR form for Erosion and Sediment Control and Post-construction BMP inspectors to complete following each site inspection. County inspectors will be required to document Erosion and Sediment Control and Post-construction BMP adequacies and inadequacies identified during each visit. All construction site managers will be given a copy of the form(s) following each inspection and be required to sign suggesting their understanding and willingness to address any BMP inadequacies identified. If follow-up inspections prove that the identified BMP inadequacies were not addressed, the form will identify enforcement measures to be taken by the County. Information from completed forms will be entered into the County's ASIST database.

Post-construction BMP Operation and Maintenance Plan

Currently, the County does not own or operate any stormwater quality BMPs. If the County has need of this in the future then, the County will develop and implement an Operation and Maintenance (O&M) Plan for County owned post-construction BMPs to ensure long-term effectiveness and adequacy of newly installed BMPs.

Erosion and Sediment Control and Post-Construction BMP Tracking Database

The County Surveyor's Office will use the County's ASIST database to track the status of construction projects, Erosion and Sediment Control activities, and post-construction BMPs. The database will ensure efficient management and accurate reporting on the status of development within Allen County. The database will be utilized to track and document Erosion and Sediment Control violations, community complaints, public informational requests, and location of sites in relation to priority watershed areas identified in subsection 2.3. The database will therefore serve as an aid to inspection staff for follow-up inspections and, if necessary, enforcement actions. The database will be implemented in March of 2005. The County Surveyor's Office will submit reports from the database to the IDEM monthly. All activities associated with the database will be summarized and included in the County's Rule 13 Annual Reports submitted to IDEM.

Training for Construction Professionals

The County Surveyor's office will administer a local construction and development community education program, which will increase the construction and development community's awareness of changing erosion and sediment control standards. The training will include annual erosion and sediment control BMP training Workshops (the first starting in 2005), which focus on the County's erosion and sediment control program, construction and post-construction stormwater BMPs, special protective measures needed within the County's identified priority watersheds and sensitive areas, and dealing with highly erodible soils. IDEM and IDNR will be consulted on program content. As applicable trainings are offered by other entities, such as, IDNR, the Surveyor's office will promote these activities to construction professionals. Educating construction professionals about the proper selection, installation, inspection, and maintenance of BMPs will help to ensure compliance with the County's erosion and sediment control requirements contained in their ordinance. Information on training activities conducted will be included in the County's Rule 13 Annual Reports.

Table 7-2
Post-construction Site Stormwater Runoff Control BMPs

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Post-Construction Control Ordinance	• Adopt Comprehensive Stormwater Management Ordinance by March 30, 2005. • Review construction and post-construction plans as part of MCM #4. • Track permits issued using Programmatic Indicator #13.	Implementation beginning March 30, 2005.	Countywide.	Surveyor's Office.
Plan Review, Site Inspection, and Enforcement	Review 100% of construction plans and inspect 100% of sites once and 50% of sites twice, beginning March 2005.	Beginning March 2005, then on-going.	Use written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.
Staff Training	• Hire and train staff by March 2005. • Conduct annual staff trainings.	First training of all staff by March 2005, then annually.	Include training on erosion and sediment control, post-construction BMPs, priority watersheds, and sensitive areas.	Surveyor's Office and outsourced.
Inspection and Enforcement Documentation	• Complete forms as part of on-going program. • Enter information into ASIST database.	Start in 2005, then on-going.	Use written Procedure for Prioritizing Construction Program Activities.	Surveyor's Office and outsourced.
Post-construction BMP Operation and Maintenance (O&M) Plan	• If necessary, develop Post-construction BMP O&M Plan. • Track using Programmatic Indicator #19.	If situation arises.	County owned & operated structural stormwater quality BMPs.	Surveyor's Office and outsourced.

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Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Erosion and Sediment Control and Post-Construction BMP Tracking Database	• Implement tracking system by March 2005. • Send reports to IDEM monthly. • Track using Programmatic Indicators #13, #14, #15, #16, #17, #18, #20, and #21.	• Begin tracking March 2005, then on-going. • Monthly reports to IDEM.	Countywide.	Surveyor's Office and outsourced.
Training for Construction Professionals	• Administer a local construction and development community education program. • Conduct first workshop in 2005, then annually. • Promote other activities, such as regional IDNR trainings. • Track using Programmatic Indicator #2.	• Offer first workshop in 2005, then annually. • On-going, promote other applicable training opportunities.	Include training on erosion and sediment control, post-construction BMPs, priority watersheds, and sensitive areas.	Surveyor's Office and outsourced.

8.0 MINIMUM CONTROL MEASURE #6 POLLUTION PREVENTION AND GOOD HOUSEKEEPING

Rule 13 requires the development and implementation of a program to prevent or reduce polluted runoff from municipal operations within the MS4 area. The program must include written documentation of maintenance activities, maintenance schedules, and long term inspection procedures for BMPs to reduce floatables and other pollutants discharged from the separate storm sewers.

Controls must be implemented for reducing or eliminating the discharge of pollutants from operational areas, including roads, parking lots, maintenance and storage yards, and waste transfer stations. Written procedures must be developed and implemented for the proper disposal of waste or materials removed from separate storm sewer systems and operational areas. New flood management projects must be assessed via written documentation for their impacts on water quality and existing flood management projects must be examined for incorporation of additional water quality protection devices or practices. MS4 entity employees must be properly trained on various topics, such as, fertilizer and pesticide application, and the function of BMPs. Such training must be documented in writing.

8.1 EXISTING POLLUTION PREVENTION AND GOOD HOUSEKEEPING BMPs

Compliance with MCM #6 requires MS4s to develop and implement a program to prevent or reduce pollutant runoff from municipal operations within the MS4 area. Allen County and the Town of Huntertown are currently implementing a number of recommended Stormwater Pollution Prevention BMPs. The Town of Leo-Cedarville does not own any municipal operation facilities at this time.

Existing Pollution Prevention and Good Housekeeping BMPs implemented by Allen County are as follows:

- The Allen County Parks Department has an in-service employee training for chemical handling.
- The Allen County Highway Department maintains three (3) barns for road salt storage.
- The Highway Department employees attend annual training on the handling and application of herbicides utilized in roadside spraying.
- The Highway Department notifies the Allen County Emergency Agency regarding any roadside spills.
- The Highway Department submits a Rule 5 plan to the Allen County Surveyor's Office and SWCD for all road projects.

Existing Pollution Prevention and Good Housekeeping BMPs implemented by the Town of Huntertown are as follows:

- The Town's Street Department performs vehicle wash downs at a privately owned car wash facility.
- The Street Department purchases salt from the Allen County Highway Department and has barns for salt storage.

The existing Pollution Prevention and Good Housekeeping activities discussed above will help ensure the County's compliance with requirements of Rule 13. However, these activities are currently not sufficient to address the requirements of Rule 13.

8.2 PROPOSED POLLUTION PREVENTION AND GOOD HOUSEKEEPING BMPs

The following Pollution Prevention and Good Housekeeping BMPs will be developed and implemented by Allen County in order to comply with the minimum requirements of MCM #6. Existing BMPs identified in subsection 8.1 with any needed enhancements, as well as, any new BMPs are included in this section.

As of March 2005, Allen County has initiated the implementation of a Pollution Prevention and Good Housekeeping Program as part of this Part C Plan, which outlines the overall strategy for gradually implementing the program and its corresponding BMPs over the next four years. The County's program is designed to address the quality of stormwater discharges from County activities to their MS4 conveyance system. The presumptive approach of implementing this program assumes that overall stormwater quality will improve each year by reducing the amounts of pollutants entering the conveyance system. Reduction goal percentages will be correlated to amounts of BMPs installed, amounts of material collected from BMPs, and plans implemented. For example, when a certain amount of street sweeping material is collected, it is assumed that the unknown total amount of material entering the conveyance system is reduced by the amount collected.

Table 8-2 provides a summary of the Pollution Prevention and Good Housekeeping BMPs to be implemented and identifies the associated measurable goals, programmatic indicators, tracking, timeline, priority areas, and responsible parties associated with each BMP. Detailed description of each BMP is provided below.

MS4 Conveyance System Maintenance

Beginning in 2005, the County will begin a program designed to inspect and maintain the County's MS4 conveyance system. Regular maintenance allows the conveyance system to work efficiently and removes pollutants. The County will only focus upon those portions of the conveyance system with twelve-inch pipes or ditches with two-foot bottom widths. The program will focus on stabilizing unvegetated portions of the County's conveyance system (ditches, swales and road side shoulders) since unvegetated areas can produce erosion and sediment pollution, as well as repairing and cleaning catch basins, trash racks and other structural components of the County's conveyance system. Currently the County has a hydroseeder that is used for stabilization. Inspection and maintenance activities will be performed by staff from the County Surveyor's office and/or the County Highway Department. The County intends to inspect the entire system within the County's MS4 area in the first permit term. Maintenance needs will be prioritized and improvement needs will be conducted as funding allows.

All inspection staff will receive annual training on proper inspection and maintenance techniques. The county will document, in the County's ASIST database, the estimated or actual linear feet of the County's conveyance system that is cleaned, repaired and or vegetated as well as the specific locations at which these activities are conducted. In addition, the County will estimate the amount of material collected from catch basins, trash racks and other structural BMPs. County staff will also be trained on the County's SWQMP tracking requirements to ensure all activities associated with conveyance system inspections and maintenance are documented. The County will document all activities associated with conveyance system maintenance. This information will be included in the County's Rule 13 Annual Reports submitted to IDEM. **Table 8-1** outlines the County's MS4 conveyance system maintenance activities.

Table 8-1
Storm Sewer System Maintenance Scheduled Activities

Activity	Schedule for Performing Activity
A. Periodic Litter Pickup	County staff will annually conduct litter pickup events along major thoroughfares, at stormwater outfalls, and other areas to be prioritized during the first permit term.
B. Periodic BMP Structure Cleaning	County owned and operated BMPs will be maintained as specified in their O&M manuals. However, long term storm sewer catch basin maintenance schedules will be determined after the first permit term. During the first permit term all town catch basins will be cleaned on an annual basis.
C. Periodic Pavement Sweeping	All streets and MS4 owned parking lots will be swept two times per year.
D. Roadside Shoulder and Ditch Stabilization	All road side shoulder and ditches will be inspected annually.
E. Planting and Proper Care of Roadside	Roadside inspections will include

Activity	Schedule for Performing Activity
Vegetation	vegetative inspections.
F. Remediation of Outfall Scouring	All stormwater outfalls will be evaluated for scouring and erosion on an annual basis. Decisions for remedial actions will be made at the time of problem identification.

Street Sweeping Program

The County will use its ASIST database for tracking street sweeping activities. Currently, street sweeping is done annually in the spring in subdivisions to remove debris accumulated over the winter and to keep potential pollutants from entering the storm drains. Otherwise, sweeping is done only on an "on call" basis when the County is contracted by groups, such as, home owners associations. The County has contracted with a waste disposal company to collect and dispose of all materials collected. To ensure accurate reporting and documentation of the County's pollution prevention programs, the County will track the estimated or actual amount of material by weight collected from street sweeping, as well as, the street miles swept in the maintenance database. This information will be consolidated and included in the County's Rule 13 Annual Reports submitted to IDEM.

Salt and Sand Management

The County Highway Department will manage their salt and sand storage and application in an effort to maintain public safety while minimizing the potential for salt and sand runoff. Currently salt is stored in three barns with asphalt floors that were recently constructed on the grounds of the Highway Department facilities. Sand is currently stored in the salt barns as well so the County currently has all storage areas covered or otherwise improved to minimize stormwater exposure. Beginning in 2005, the County will investigate the feasibility of utilizing catch basin inserts in the stormwater inlets at the Highway Department facilities in an effort to trap sand and other debris that may originate from the facilities. If installed, the inserts will be inspected by Highway Department personnel monthly and after significant rain events and replaced as necessary.

In addition, salt and sand is mixed and loaded into trucks on asphalt areas by the storage barns. The County makes every effort to keep this mixed material dry and from being exposed to precipitation since wet sand is more difficult for the trucks to spread. Beginning in 2005, the Highway Department will annually document the total weight/cubic yards of salt and sand applied. Also, Highway Department personnel will be instructed to contain salt and sand spilled during mixing and loading by utilizing machinery and hand tools to maintain cleanliness and minimize the risks of stormwater runoff. Also, once the snow and/or ice has melted, Highway Department personnel will sweep, as necessary, those areas of the facility that have accumulated sand and other debris as a result of day-to-day operations.

County staff will be trained annually on the importance of containing salt and sand, the proper methods of maintaining catch basin inserts (if applicable), and documenting the amount of salt and sand applied annually. County staff will also be trained on the County's SWQMP tracking requirements and ASIST database to ensure all activities associated with salt and sand management are documented. All activities associated with salt and sand management will be included in the County's Rule 13 Annual Reports submitted to IDEM, including documenting the number and location of and the estimated or actual amount, in tons, of salt and sand used for snow and ice control.

Snow Disposal Areas

The County does not have any large accumulations of snow from highway clearing activities due to the relatively light amount of snow fall in the County. Snow is simply pushed off to the side of highways. However, beginning in 2005, snow that is cleared and pushed into large piles from County operational areas, such as, the Highway Department Facility and the Government Center will be located away from stormwater inlets and conveyances to ensure that there is minimal potential for pollutant runoff impact on MS4 area receiving waters.

Spill Prevention and Clean Up

Beginning in 2006, the County will begin implementing spill prevention and clean up procedures at County owned and operated facilities. The County Highway Department facilities will primarily be the location for which these measures will be implemented in order to reduce the impact of accidental spills of concentrated solutions, acids, alkalis, salts, oils, or other polluting materials that could contaminate stormwater runoff from areas like the maintenance facility. Measures will include using products like leak and spill wipers, mats, absorbents, and drain covers.

County has a spill response plan posted at the County Highway Department where fuels and other chemicals are used, mixed and or stored. The posting of these plans will ensure efficient and effective response to accidental chemical spills thereby reducing the potential for spills to come into contact with stormwater runoff.

If a County refueling area replaces an existing tank system or adds a new tank system, the project will be evaluated for the feasibility of installing storm water quality BMPs. If this situation occurs, the County will report on the project in the County's Rule 13 Annual Reports submitted to IDEM.

County staff will also be trained on the County's SWQMP tracking requirements to ensure all activities associated with chemical spill response are documented. The County will document all activities associated with chemical spill response. This information will be included in the County's Rule 13 Annual Reports submitted to IDEM.

Vehicle Maintenance Areas

Vehicle maintenance areas can be significant sources of stormwater pollutants. To minimize the impacts vehicle maintenance areas have on stormwater runoff, the County utilizes oil and water separators within the Highway Department's two maintenance facilities. The oil and water separators are operated and maintained according to the manufacturer's specifications. Beginning in 2005, the County will begin documenting all maintenance activities associated with the oil and water separators. Relevant staff will receive annual training on the function and importance of the separator, how to maintain the separator and how to properly dispose of the oil and grit collected. The County will document training activities, maintenance activities, and estimate the amount of waste collected via the separator. The County will also document the methods by which all materials collected were disposed of. This information will be included in the County's Rule 13 Annual Reports submitted to IDEM.

In 2005, the County will investigate where discharges flow from their shop floor drains and other conveyances in their highway facility. All shop floor drains will either be sealed or connected to a publicly owned treatment works. All stockpiled materials will be located away from storm inlets and other stormwater conveyances. The Highway Facility yard will be keep in an orderly manner and clear of debris or other materials that may be mobilized in stormwater runoff.

County staff will also be trained on the County's SWQMP tracking requirements to ensure all activities related to improving storm water quality associated with oil and water separator and vehicle maintenance area are documented. All activities associated with this BMP will be included with the County's Rule 13 Annual Reports submitted to IDEM.

Wash Water Management

All wash waters and wastewaters are currently prohibited from entering waters of the state without a valid NPDES Wastewater Permit. Pollutants from washing activities, such as, detergents and solids can not enter into separate storm water conveyances unless they are properly controlled. As identified in Part B, the County will implement procedures, such as, requiring vehicles to be washed at a commercial car wash to eliminate all equipment or vehicle wash waters and concrete or asphalt hydro demolition wastewaters from entering stormwater runoff beginning in March 2005. Currently, all County cars are taken to commercial car washes. In 2005, the County will investigate the best method for handling washing activities for 36 large trucks. The County will report on wash waters eliminated and new BMPs installed, if applicable in the County's Rule 13 Annual Reports submitted to IDEM.

Fertilizer and Pesticide Management

County Staff members utilize fertilizers and pesticides for a variety of purposes. The following actions will help minimize pesticide and fertilizer use for the County and will help minimize the impacts of these chemicals on stormwater runoff. In 2005, the County will develop a list of all County staff who store, transport, or apply fertilizer and/or pesticides as well as which facilities are utilized for storage purposes. These staff members will be required, beginning in 2005, to receive annual training on proper handling, mixing, use, and storage of fertilizers and pesticides. If necessary, additional County staff will be required to obtain training to apply pesticides from the Office of the State Chemist (OISC). Currently the County has four staff members that have their OISC commercial applicator certification and attend annual training.

All facilities in which fertilizers and pesticides are stored will be evaluated annually for safety. In the event a facility is determined to pose a stormwater risk, the County will take the proper steps to ensure fertilizers and pesticides are stored properly. The County will document all activities associated with fertilizer and pesticide management including the areas within the County's MS4 area on which fertilizers and pesticides are utilized and to estimate the amount of each material utilized. County staff will receive annual training on the County's SWQMP tracking requirements to ensure all activities associated with fertilizers and pesticides are documented. All information specific to fertilizer and pesticide management will be included in the County's Rule 13 Annual Reports submitted to IDEM.

Canine Park Location

Pet waste has been shown to be a major contributor of stormwater pollution. If applicable and necessary, Allen County will require that all Canine Parks must be sited at least one hundred fifty (150) feet away from a surface waterbody. The County will track the number or percentage and location of Canine Parks sited at least one hundred fifty (150) feet away from a surface waterbody. Special attention will be paid to any potential Canine Parks being located in priority watershed areas. The Surveyor's office will review sites in conjunction with construction plan reviews and report results in the County's Rule 13 Annual Reports submitted to IDEM.

Waste Disposal

Removal of accumulated materials (wastes) is part of routine maintenance of the conveyance system. Wastes are also generated from County operational areas. The County will ensure that wastes collected are disposed of in a manner that prevents them from contaminating stormwater runoff. Beginning in 2005, the County will document the disposal of all waste generated from operational areas and from maintaining the County's stormwater conveyance system. Such wastes include, but are not limited to, dredge spoil, accumulated sediments, floatables and debris. Currently adjacent property owners are contacted by the County to see if they would like to reuse the material as fill. County staff will continue to determine if the waste generated can be reused, recycled or requires disposal in a sanitary landfill. The County will contract with a private firm for those wastes that require disposal in a landfill. Relevant County staff will receive training on the County's SWQMP tracking requirements to ensure all activities associated with waste disposal are documented. The County will document all activities associated with waste disposal including the types of waste generated, the amount of waste generated and the method by which the waste was disposed. This information will be included in the County's Rule 13 Annual Reports submitted to IDEM.

Flood Management Projects

The County will document that new county-owned flood management projects are assessed for their impacts on water quality on an on-going basis and in 2007, existing county owned flood management projects (if there are any) are examined for incorporation of additional water quality protection devices or practices. During the pre-construction phase for new projects, a determination will be made to see if a practice can be modified to address the reduction of pollutants associated with stormwater runoff or if additional BMPs can be designed into the watershed of the project to improve the water quality. This preliminary review will better use limited resources to plan for water quality BMPs before a project is constructed since water quality and water quantity issues are interrelated.

Existing flood management projects and structural BMPs built to address stormwater quantity problems will be reviewed to determine if it is feasible to retrofit them with stormwater quality control measures. Where it is not feasible to retrofit the practice, alternative approaches may include implementation of practices within the watershed of a basin. Each existing project and BMP may not support a retrofit, but the review will be conducted and results will be reported in the County's Rule 13 Annual Reports submitted to IDEM.

Annual IDDE, Good Housekeeping, and Pollution Prevention Staff Training

The County will conduct training for staff on the hazards associated with illicit discharges and improper disposal of waste and pollution prevention, including ways to manage activities to prevent substantial quantities of chemicals and water from entering the conveyance system. Appropriate MS4 entity staff with be trained beginning in 2006 and periodic refresher sessions will be conducted at least annually. The County will document training opportunities provided and attendees. Trainings will emphasize how substantial quantities of chemicals and water can lead to elevated levels of nutrients and toxins in receiving waters. Information will be presented on priority watersheds and sensitive areas. Additional topics will include proper storage and disposal of hazardous wastes, vegetative waste handling, fertilizer and pesticide application, and the function of implemented BMPs. The number of trainings, number of staff attending trainings, and information presented will be tracked and reported in the County's Rule 13 Annual Reports submitted to IDEM.

Table 8-2
Pollution Prevention and Good Housekeeping BMPs

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
MS4 Conveyance System Maintenance	• Conduct inspection and maintenance program beginning in 2005. • Prioritize maintenance needs based on inspections and improve as funding allows. • Conduct annual training, beginning in 2005. • Track using Programmatic Indicators #26, #27, #28, #29, and #32.	Begin in 2005, then on-going.	Unstable, unvegetated, scoured, or eroded roadside shoulders and/or ditches.	Outsourced and Highway Department.
Street Sweeping Program	• Implement tracking system by March 2005. • Track using Programmatic Indicator #33.	Begin tracking March 2005.	Remove salt, sand, and debris from winter activities.	Highway Department.
Salt and Sand Management	• Implement BMPs beginning in 2005 and as part of on-going permit activities and as budgets allow. • Track using Programmatic Indicators #30 & #31.	• Begin in 2005, then on-going. • In 2005, investigate catch basin insert use. .	Application on County Highways and Highway Department Facilities.	Highway Department
Snow Disposal Areas	Use designated areas beginning in Winter 2005, then on-going each Winter.	Begin in 2005, then on-going each winter.	Highway Department Facilities and Government Center.	Highway Department

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
Spill Prevention and Clean Up	• Conduct as part of on-going permit activities. • Track using Programmatic Indicator #23, if applicable, & #24.	Begin in 2006, then on-going.	Highway Department Facilities	Highway Department
Vehicle Maintenance Areas	Begin in 2005, then activities will be on-going as part of regular good housekeeping practices.	Begin in 2005, then on-going.	Highway Department Facilities, especially around storm inlets and/or conveyances.	Outsourced and Highway Department.
Wash Water Management	Eliminate wash waters from entering separate storm system in 2005.	• Begin in 2005, then on-going. • In 2005, investigate alternative for large truck washing.	Highway Department Facilities	Outsourced and Highway Department.
Fertilizer and Pesticide Management	• Ensure contractors are certified by OISC. • Track using Programmatic Indicator #25.	Begin in 2005, then on-going.	Train contract staff on priority watersheds and sensitive areas, as well as, stormwater program.	Outsourced and Highway Department.
Canine Park Location	If applicable, Allen County will track the number or percentage and location of canine parks sited at least one hundred fifty (150) feet away from a surface waterbody to compile with Programmatic Indicator #34.	If necessary.	Special attention will be paid to any potential canine parks being located in priority watershed areas.	Surveyor's office
Waste Disposal	• Document disposal of all wastes, beginning in 2005. • On-going, determine if waste can be recycled, reused, or	Begin in 2005, then on-going.	Highway Department Facilities	Outsourced and Highway Department.

Best Management Practice (BMP)	Measurable Goals, Tracking, and Programmatic Indicators	Timeline	Priority Areas	Responsible Party
	goes to landfill • Contract with private firm in 2005.			
Flood Management Projects	• On-going, document that all new and existing flood management projects are assessed for incorporation of additional water quality devices or practices. • Review of existing projects completed by 2007.	On-going documentation and review in 2007.	Projects in priority watershed areas will be reviewed first.	Surveyor's office.
Annual IDDE, Good Housekeeping, & Pollution Prevention Staff Training	• Develop training program by March 2006. • Conduct first training course in 2006. • Conduct annual refresher training. • Track using Programmatic Indicator #2.	Training held in 2006, then annual updates.	Focus on MS4 conveyance system, MS4 operational areas, and Highway Department Facilities.	Outsourced.

9.0 MS4 PROGRAM COSTS

Rule 13 requires a summary of the current storm water budget, expected or actual funding sources, and a projection of the budget for each year within the five-year permit term. Resources used for developing and implementing the storm water program should be documents in order to demonstrate that monies, equipment, and staff are being and will be utilized for the program.

The overall fiscal impact of the requirement of Rule 13 may be grouped under three categories: SWQMP Development costs, Part C Implementation costs, and "other" compliance costs. This chapter details the cost of plan implementation (Part C) and it includes the additional expense for developing the SWQMP, continuous characterization, and data reporting. In the numbers detailed below, no monetary value is placed on volunteer hours.

9.1 SWQMP DEVELOPMENT COSTS

The development of the SWQMP must be completed by the end of the first year of the permit term. Tasks include completion of a Notice of Intent (NOI), and completion of Part A, Part B, and Part C (this document) of the SWQMP.

NOI and Part A: The costs associated with completion of the NOI and Part A are mainly organizational and administrative. An initial list of known receiving waters was compiled. Public Notice was published in the local newspaper. Preliminary estimates of existing and expected budgets had to be included, and an Operator was identified. The estimated cost to compile the information needed for the NOI and Part A submittal was $4,000.

Part B Baseline Characterization: Part B involved collection and assessment of existing data for the receiving waters identified in Part A. This data was then used to characterize the baseline water quality conditions in the MS4 area, identify sensitive areas, and guide the development of Part C. Existing BMPs had to be identified and their effectiveness evaluated. The tasks associated with Part B were research, analysis, and report writing. The estimated cost to complete Part B was $22,000. This cost does not include additional costs associates with responding to the NOD that the IDEM issued the County.

Development of the Part C Implementation Plan: The estimated cost for developing an Implementation Plan is $49,000 and includes fees for engineering consultants and includes time and materials contributed by Allen County.

9.2 DETAILED PART C IMPLEMENTATION COSTS BY MCM OVER 2004-2008

This section details the cost of implementing the program described in this document. There are 6 MCMs within the implementation plan. Costs for each individual MCM are summarized below. Since different plan elements have different start-up timelines, costs are also broken down by permit year, March through December.

MCM #1 Public Education and Outreach: The cost to implement this MCM throughout the first 5-year permit term is estimated to be $95,000. Most of the implementation deadlines for this MCM are in the second permit year with some start-up costs incurred during the second permit year. Estimated annual costs for this MCM are $25,000 for the second year, $24,000 for the third year, and $23,000 for the fourth and fifth years. These costs will cover such tasks as reproduction and distribution of educational brochures, web site development and maintenance, and other tasks as outlined in Chapter 3. The County will work with the ACPWQ to complete the BMPs in this plan.

MCM #2 Public Participation and Involvement: The cost to implement this MCM throughout the first 5-year permit term is estimated to be $138,000. Most of the implementation deadlines for this MCM are in the second permit year with some start-up costs incurred during the second permit year. Estimated annual costs for this MCM are $14,000 for the first year and $31,000 for the second, third, fourth, and fifth years. These costs will cover such tasks as public involvement in plan development, promotion of Clean-Up Events, the "Report-A-Polluter" Program, and Storm Drain Marking events. The costs include presentation materials for public meetings and hearings, mailings to volunteer groups.

MCM #3 Illicit Discharge Detection and Elimination: The cost to implement this MCM throughout the first 5-year permit term is estimated to be $946,000. The implementation deadlines for this MCM are mainly in the second permit year, with some start-up costs beginning in the first permit year. Annual costs for this MCM are $18,000 for the first year, $238,000 for the second year, and $230,000 for the third, fourth and fifth years. These costs will cover such tasks as mapping the storm sewer system and screening for pollutants, development of an illicit discharge ordinance, and collection of household hazardous wastes and lawn wastes. The costs include training for system inspectors, field equipment for system inspectors, computer hardware and software upgrades for GIS mapping, and staff hours.

MCM #4 Construction Site Runoff Control: The cost to implement this MCM throughout the first 5-year permit term is estimated to be $1,813,000. The implementation deadlines for this MCM are mainly in the second permit year, with some preparation work beginning in the first permit year. Annual costs for this MCM are $13,000 for the first year and $450,000 for the second, third, fourth, and fifth years. These costs will cover such tasks as development of an ordinance for controlling construction site runoff, establishment of a local stormwater permit procedure, and an inspection and enforcement program. The costs include training for plan reviewers, and site inspectors, computer hardware and software upgrades tracking, and staff hours.

MCM #5 Post-Construction Stormwater Management: The cost to implement this MCM throughout the permit life is estimated to be $131,000. The implementation deadlines for this MCM are mainly in the second permit year, with some preparation work beginning in the first permit year. Annual costs for this MCM are $27,000 for the first year and $26,000 for the second, third, fourth, and fifth years. These costs will cover such tasks as development of an ordinance for post-construction stormwater quality management, establishment of a local stormwater permit procedure, and an inspection and enforcement program. The costs include training for plan reviewers, site inspectors, computer hardware and software upgrades for tracking, and staff hours.

MCM #6 Pollution Prevention and Good Housekeeping: The cost to implement this MCM throughout the first 5-year permit term is estimated to be $478,000. The implementation deadlines for this MCM are entirely delayed until after the first permit year. Annual costs for this MCM are $30,000 for the first year and $112,000 for the second, third, fourth, and fifth years. These costs will cover such tasks as the development of maintenance schedules and a database, the implementation of Salt and Sand Storage BMPs, an MS4 Conveyance System Maintenance Plan, and staff training.

9.3 OTHER COMPLIANCE COSTS 2005 – 2008

Beyond development and implementation of the SWQMP, Rule 13 requires on-going MS4 area characterization, monthly and annual status reports, and renewal of permit application at the end of the 5 year permit term.

On-going Characterization: Rule 13 requires regulated communities to continue collecting and evaluating data on water quality throughout the permit life. The cost for this on-going characterization assumes that the County will implement a River Watch program, conduct a watershed study in a priority watershed, and encourage other watershed groups to do water quality characterization studies. The estimated cost for on-going characterization is $25,000 dollars per year. This cost estimate includes report generation. On-going mapping and screening are included in the cost for MCM 3 implementation.

Status Reporting: Much of the data collection and data management cost of this task is absorbed by the implementation of the MCMs. The estimated cost to compile and organize the volume of data that will be generated is $5,000 per year. IDEM has provided a template for monthly and annual reports. For each annual report, some additional time and effort will be needed to evaluate the effectiveness of the plan and to determine if adjustments are needed to the BMPs and/or measurable goals. This cost is included in the estimates above.

Permit Application Renewal: At the end of this five-year permit term, the County will need to take a close look at what is and is not working with their plan. Additional BMPs can be added and ineffective BMPs can be dropped. It is expected that the level of effort needed to complete the evaluation of the existing program, make changes, and submit a permit renewal application to IDEM will be similar to the effort required for the original. Therefore, the estimated cost to prepare the permit renewal application is $50,000 (includes 5 years of inflation).

On-going As Needed Technical Assistance: Throughout the term of the permit, the County may require assistance in the form of professional engineering services in order to address tasks associated with NPDES Phase II compliance issues. These tasks may include, but are not limited to, BMP evaluation, MS4 conveyance mapping, plan reviews, inspections, training modules, ordinances, and coordination with IDEM. The cost for on-going technical assistance is estimated to be $25,000 for each year.

New Staff: The County will need to hire at least three additional staff to meet the workload demands of the Rule 13 program. It is anticipated that the County will hire an MS4 Coordinator, Technical/Engineer position, and an inspector. The estimated cost for these three staff positions is estimated to be $200,000 for each year.

9.4 TOTAL SWQMP PROGRAM COSTS 2004 – 2008

Table 9-1 summarizes total program costs, which includes the costs for all tasks described above in Sections 9.1, 9.2, and 9.3. The total estimated cost of compliance with Rule 13 is $4,746,000 for the first 5-year permit term.

Table 9-1
Total Program Costs

	November 2003-Mar. 2005	Mar. 2005-Dec. 2005	Mar. 2006-Dec. 2006	Mar. 2007-Dec. 2007	Mar. 2008-Nov. 2008	Total
NOI and SWQMP Part A	$4,000	N/A	N/A	N/A	N/A	$4,000
SWQMP Part B	$22,000	N/A	N/A	N/A	N/A	$22,000
SWQMP Part C (development)	$49,000	N/A	N/A	N/A	N/A	$49,000
Implement MCM1	$0	$25,000	$24,000	$23,000	$23,000	$95,000
Implement MCM2	$14,000	$31,000	$31,000	$31,000	$31,000	$138,000
Implement MCM3	$18,000	$238,000	$230,000	$230,000	$230,000	$946,000
Implement MCM4	$13,000	$450,000	$450,000	$450,000	$450,000	$1,813,000
Implement MCM5	$27,000	$26,000	$26,000	$26,000	$26,000	$131,000
Implement MCM6	$30,000	$112,000	$112,000	$112,000	$112,000	$478,000
On-going Characterization	N/A	$25,000	$25,000	$25,000	$25,000	$100,000
Annual Report	N/A	$5,000	$5,000	$5,000	$5,000	$20,000
Permit Renewal	N/A	N/A	N/A	N/A	$50,000	$50,000
On-going Assistance	N/A	$25,000	$25,000	$25,000	$25,000	$100,000
New Staff	$0	$200,000	$200,000	$200,000	$200,000	$800,000
Total	$177,000	$1,137,000	$1,128,000	$1,127,000	$1,177,000	$4,746,000

9.5 BUDGETARY NEEDS

The total estimated costs provided above are gross costs. Some of the costs are already covered by existing budgets or passed on to the permit applicants/development communities. If these costs/resources are taken into account, the additional amount needed to achieve compliance with Rule 13 would reduce to approximately $2,093,000. The estimated net annual costs breakdown is $38,000 for the first year (2004), $507,000 for the second year (2005), $499,000 for the third year (2006), $499,000 for the fourth year (2007), and $550,000 for the fifth year (2008). In order begin implementing requirements of Rule 13; the County will rely on a combination of permit fees, general fund dollars, and potentially additional user fees.

10.0 SUMMARY

Implementation of Allen County's Rule 13 required stormwater quality program will improve the overall quality of stormwater discharges entering into the County's separate storm sewer system. In order to successfully implement the Rule 13 program, the County must pay attention to reporting requirements contained in the programmatic indicators, adhere to mandated time lines, and be aware of next steps beyond the Part C document.

10.1 PROGRAMMATIC INDICATORS

As a visual aid to Allen County and to help evaluate Rule 13 permit compliance, **Table 10-1** lists the programmatic indicators that are required in Rule 13. The table further identifies those required and chosen BMPs that will fulfill these required programmatic indicators.

Table 10-1
Programmatic Indicators

Programmatic Indicator	Description	BMP addressing Programmatic Indicator
1	Number or percentage of citizens, segregated by type of constituent that have an awareness of storm water quality issues.	Stormwater Survey
2	Number and description of meetings, training sessions, and events conducted to involve citizen constituents in the storm water program.	• Rule 13 Public Participation Lists • Public Meetings • Training for Construction Professionals • Storm Drain Marking • Annual IDDE, Good Housekeeping, & Pollution Prevention Staff Training • "Report-A-Polluter" Program
3	Number or percentage of citizen constituents that participate in storm water quality improvement programs.	• Rule 13 Public Participation Lists • Public Meetings • Training for Construction Professionals • Storm Drain Marking • "Report-A-Polluter" Program
4	Number and location of storm drains marked or cast, segregated by marking method.	Storm Drain Marking
5	Estimated or actual linear feet or percentage of MS4 mapped and indicated on an MS4 area map.	Stormwater System Map
6	Number and location of MS4 area outfalls mapped.	Stormwater System Map
7	Number and location of MS4 area outfalls screened for illicit discharges.	Illicit Discharge Detection and Elimination Plan
8	Number and location of illicit discharges detected.	Illicit Discharge Detection and Elimination Plan
9	Number and location of illicit discharges eliminated.	Illicit Discharge Detection and Elimination Plan
10	Number of and estimated or actual amount of material, segregated by type, collected from HHW collections in the MS4 area.	Solid Waste Management District Promotions
11	Number and location of constituent drop-off centers for automotive fluid recycling.	Solid Waste Management District Promotions

Programmatic Indicator	Description	BMP addressing Programmatic Indicator
12	Number or percentage of constituents that participate in the HHW collections.	Solid Waste Management District Promotions
13	Number of construction sites obtaining an MS4 entity-issued storm water run-off permit in the MS4 area.	• Erosion and Sediment Control and Post-Construction BMP Tracking Database • Erosion and Sediment Control Ordinance • Post-Construction Control Ordinance
14	Number of construction sites inspected.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
15	Number and type of enforcement actions taken against construction site operators.	• Erosion and Sediment Control and Post-Construction BMP Tracking Database • Procedures for Prioritizing Construction Activities
16	Number of, and associated construction site name and location for, public informational requests received.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
17	Number, type, and location of structural BMPs installed.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
18	Number, type, and location of structural BMPs inspected.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
19	Number, type, and location of structural BMPs maintained or improved to function properly.	Post-Construction BMP Operation and Maintenance Plan
20	Type and location of nonstructural BMPs utilized.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
21	Estimated or actual acreage or square footage of open space preserved and mapped in the MS4 area, if applicable.	Erosion and Sediment Control and Post-Construction BMP Tracking Database
22	Estimated or actual acreage or square footage of pervious and impervious surfaces mapped in the MS4 area, if applicable.	Not Applicable; County not set up to track
23	Number and location of new retail gasoline outlets or municipal, state, federal, or institutional refueling areas, or outlets or refueling areas that replaced existing tank systems that have installed storm water BMPs.	Not Applicable; County not set up to track

Programmatic Indicator	Description	BMP addressing Programmatic Indicator
24	Number and location of MS4 entity facilities that have containment for accidental releases of stored polluting materials.	Spill Prevention and Clean Up
25	Estimated or actual acreage or square footage, amount, and location where pesticides and fertilizers are applied by a regulated MS4 entity to places where storm water can be exposed within the MS4 area.	Fertilizer and Pesticide Management
26	Estimated or actual linear feet or percentage and location of unvegetated swales and ditches that have an appropriately-sized vegetated filter strip.	MS4 Conveyance System Maintenance
27	Estimated or actual linear feet or percentage and location of MS4 conveyances cleaned or repaired.	MS4 Conveyance System Maintenance
28	Estimated or actual linear feet or percentage and location of roadside shoulders and ditches stabilized, if applicable.	MS4 Conveyance System Maintenance
29	Number and location of storm water outfall areas remediated from scouring conditions, if applicable.	MS4 Conveyance System Maintenance
30	Number and location of deicing salt and sand storage areas covered or otherwise improved to minimize storm water exposure.	Sand and Sand Management
31	Estimated or actual amount, in tons, of salt and sand used for snow and ice control.	Salt and Sand Management
32	Estimated or actual amount of material by weight collected from catch basin, trash rack, or other structural BMP cleaning.	• MS4 Conveyance System Maintenance • Waste Disposal
33	Estimated or actual amount of material by weight collected from street sweeping, if utilized.	Street Sweeping Program
34	If applicable, number or percentage and location of canine parks sited at least one hundred fifty (150) feet away from a surface waterbody.	Canine Park Location

10.2 Master Timeline

The following Master Time outlines all BMPs that have been and will be completed by Allen County during their first five-year permit term.

Permit Year	MCM	BMP
2004	1	• Newsletter Articles (4) • Soil & Water Conservation District Activities
	2	• Public Meetings
	3	• Illicit Discharge Detection & Elimination (IDDE) Ordinance Development
	4	• Erosion & Sediment Control Ordinance
	5	• Post-Construction Control Ordinance • Post-Construction BMP Operation and Maintenance Plan
2005	1	• Training for Construction Professionals • Newsletter Articles (4) • Web site • Stormwater Survey • Distribute Stormwater Educational Brochures • Solid Waste Management District Promotions • Soil & Water Conservation District Activities • Mass Media Opportunities
	2	• Develop Rule 13 Public Participation List • Public Meeting • Storm Drain Marking
	3	• Stormwater System Map • IDDE Plan • IDDE and Good Housekeeping & Pollution Prevention Staff Training
	4	• Plan Review, Site Inspection, and Enforcement • Staff Training • Use Erosion & Sediment Control and Post-construction BMP Tracking Database • Develop and Implement Procedure for Prioritizing Construction Activities • Inspection and Enforcement Documentation • QA/QC of Overall Program
	5	• Included with MCM #4

Permit Year	MCM	BMP
	6	• MS4 Conveyance System Maintenance • Street Sweeping Program • Salt and Sand Management • Snow Disposal Areas • Spill Prevention and Clean Up • Vehicle Maintenance Areas • Wash Water Management • Fertilizer and Pesticide Management • Canine Park Location, if applicable • Waste Disposal • Flood Management Projects
2006	1	• Training for Construction Professionals • Newsletter Articles (4) • Web Site • Distribute Stormwater Educational Brochures • Solid Waste Management District Promotions • Soil & Water Conservation District Activities
	2	• Update Rule 13 Public Participation List • Storm Drain Marking • "Report-A-Polluter" Program
	3	• Stormwater System Map • IDDE Plan • IDDE and Good Housekeeping & Pollution Prevention Staff Training
	4	• Plan Review, Site Inspection, and Enforcement • Staff Training • Use Erosion & Sediment Control and Post-construction BMP Tracking Database • Implement Procedure for Prioritizing Construction Activities • Inspection and Enforcement Documentation • QA/QC of Overall Program
	5	• Included with MCM #4

Permit Year	MCM	BMP
	6	• MS4 Conveyance System Maintenance • Street Sweeping Program • Salt and Sand Management • Snow Disposal Areas • Spill Prevention and Clean Up • Vehicle Maintenance Areas • Wash Water Management • Fertilizer and Pesticide Management • Canine Park Location, if applicable • Waste Disposal • Flood Management Projects
2007	1	• Training for Construction Professionals • Newsletter Articles (4) • Web Site • Distribute Stormwater Educational Brochures • Solid Waste Management District Promotions • Soil & Water Conservation District Activities
	2	• Update Rule 13 Public Participation List • Storm Drain Marking • "Report-A-Polluter" Program
	3	• Stormwater System Map • IDDE Plan • IDDE and Good Housekeeping & Pollution Prevention Staff Training
	4	• Plan Review, Site Inspection, and Enforcement • Staff Training • Use Erosion & Sediment Control and Post-construction BMP Tracking Database • Implement Procedure for Prioritizing Construction Activities • Inspection and Enforcement Documentation • QA/QC of Overall Program
	5	• Included with MCM #4

Permit Year	MCM	BMP
	6	• MS4 Conveyance System Maintenance • Street Sweeping Program • Salt and Sand Management • Snow Disposal Areas • Spill Prevention and Clean Up • Vehicle Maintenance Areas • Wash Water Management • Fertilizer and Pesticide Management • Canine Park Location, if applicable • Waste Disposal • Flood Management Projects
2008	1	• Training for Construction Professionals • Newsletter Articles (4) • Web Site • Stormwater Survey • Distribute Stormwater Educational Brochures • Solid Waste Management District Promotions • Soil & Water Conservation District Activities
	2	• Update Rule 13 Public Participation List • Storm Drain Marking • "Report-A-Polluter" Program
	3	• Stormwater System Map • IDDE Plan • IDDE and Good Housekeeping & Pollution Prevention Staff Training
	4	• Plan Review, Site Inspection, and Enforcement • Staff Training • Use Erosion & Sediment Control and Post-construction BMP Tracking Database • Implement Procedure for Prioritizing Construction Activities • Inspection and Enforcement Documentation • QA/QC of Overall Program
	5	• Included with MCM #4

Permit Year	MCM	BMP
	6	• MS4 Conveyance System Maintenance • Street Sweeping Program • Salt and Sand Management • Snow Disposal Areas • Spill Prevention and Clean Up • Vehicle Maintenance Areas • Wash Water Management • Fertilizer and Pesticide Management • Canine Park Location, if applicable • Waste Disposal • Flood Management Projects

Stormwater Quality Management Plan
Part C: Program Implementation

327 IAC 15-13
IDEM Rule 13 Stormwater Run-Off Associated with Municipal Separate Storm Sewer Conveyances

City of Fort Wayne

January 2005

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Appendices

1.0 INTRODUCTION

This report presents the Stormwater Quality Management Plan (SWQMP) Part C: Program Implementation, as required under 327 IAC 15-13-8, for the following entities covered under IDEM Rule 13 Permit Number INR040029:

- City of Fort Wayne (MS4 Operator)
- Indiana University-Purdue University Fort Wayne
- Ivy Tech State College
- Indiana Institute of Technology
- University of Saint Francis

The purpose of this report is to identify the implementation plan for the six Minimum Control Measures that serve as the focus of the City's SWQMP. This report also includes the other elements required under 327 IAC 15-13-8. This report is organized to follow the order of the requirements identified under 327 IAC 15-13-8 and includes the following sections:

1.0	Introduction	Provides an overview of this document.
2.0	Initial Stormwater Program Evaluation	Identifies a "starting point" for the City's SWQMP and existing activities that are relevant to stormwater quality.
3.0	On-Going Characterization Schedule	Includes a schedule for on-going characterization of Fort Wayne's receiving streams.
4.0	MS4 Boundary Description	Provides both a map and narrative description of the City's MS4 area.
5.0	MS4 Conveyance Estimate	Includes an estimate of the length of storm sewers 12 inches and larger and ditches with a bottom width of 2 feet or more.
6.0	Structural BMPs for New Development and Redevelopment	Describes the types of structural BMPs that will be allowed in new development and redevelopment sites.
7.0	Selection Criteria and Performance Standards for Structural BMPs	Summarizes selection criteria and performance standards for structural BMPs.
8.0	Stormwater Budget	Includes the City's current and projected stormwater budget along with funding sources.
9.0	MCM Measurable Goals	Identifies specific measurable goals for each of the six MCMs. Several appendices are referenced in this section detailing the BMPs.
10.0	Programmatic Indicators	Lists the programmatic indicators applicable to Fort Wayne's program and identifies reasons if a specific indicator is not applicable.

2.0 INITIAL STORMWATER PROGRAM EVALUATION

2.1 Existing Activities – City of Fort Wayne

The City of Fort Wayne has several existing activities that provide a positive impact to stormwater quality and that the City desires to take credit for in its SWQMP Part C: Program Implementation. A summary of existing activities is presented below and organized by Minimum Control Measure.

2.1.1 Public Education and Outreach

Fort Wayne currently has a proactive Public Education and Outreach program that will be expanded as needed to address the requirements of this MCM. Existing activities include:

- The City of Fort Wayne, City of New Haven, and Allen County have partnered to jointly create the Allen County Partnership for Water Quality (ACPWQ). The partnership created a position of Water Resource Education Specialist. This position is designed to serve as a liaison to the public, civic groups, and schools and provide information and outreach on watershed based issues, activities, and services. The ACPWQ focuses its work on education and outreach efforts related to combined sewer overflows as well as stormwater pollution, conservation efforts, drinking water protection and other water resource issues.

  The Partnership provides public education opportunities through: presentations at neighborhood association meetings; classroom demonstrations and workshops; displays and information at local events such as the Three Rivers Festival, Earth Day Celebration, the Fort Wayne Farm Show, and the Allen County 4-H Fair. The Partnership has sought and used grant funding to distribute a documentary on water quality and associated material to teachers.

- The City's web page (www.ci.ft-wayne.in.us) contains links to various City departments that post information related to stormwater quality. The telephone directory for the water and sewer department includes a "water quality hotline".

- Several civic and environmental organizations exist that can be used to coordinate distribution of educational materials:
  - St. Joe Watershed Initiative
  - Sewer Advisory Group
  - Community Service Council
  - Annual River Clean Up Program
  - Adopt a River Greenway Program
  - Greenway Consortium Group
  - Hoosier Riverwatch
  - Wetland Training Center

- Several public festivals and events, such as the Three Rivers Festival, Earth Day, and others provide an opportunity to distribute educational materials.

- A stormwater education book has been produced by the Allen County Partnership for Water Quality in conjunction with students at Fort Wayne's Anthis Career Center. The book is designed for students in Kindergarten through third grade and explains how stormwater affects our lives. The book is free to all schools and residents in Fort Wayne, Allen County and New Haven. The book was featured in IDEM's *The Notepad*, an e-newsletter for Indiana Educators. The Partnership has given away approximately 4000 books in Allen County and has sold over 4,000 to other communities.

2.1.2 Public Involvement/Participation

The City of Fort Wayne, through various departments and organizations, undertakes several public involvement and participation activities related to water quality. These include:

- The Fort Wayne Parks and Recreation manages an "Adopt a Greenway" program. Organizations agree to adopt a two-mile section of the Rivergreenway Trail, which is a 15-mile long linear park along the banks of the St. Mary's, St. Joseph, and Maumee Rivers. The trails are used for recreation, fitness and conservation. Participating organizations agree to clean their two-mile section of Rivergreenway Trail three times a year for a two-year period. In exchange for a group's assistance, a sign is placed along their section recognizing them. This program helps keep trash and debris from entering the adjacent rivers. Current participant organizations include:

    - Downtown Rotary Club
    - Essex Employee Club
    - Fort Wayne Central Lion's Club
    - Koehlinger Cycling & Fitness
    - Mayor's Youth Council
    - Northeast Indiana Juvenile Correctional Facility
    - Sigma Pi Fraternity - Gamma Kappa Chapter
    - Stress Operations Group
    - Summit City Bicycle & Fitness
    - Three Rivers Velo Sports Club

- The City of Fort Wayne's Solid Waste Office organizes an annual spring cleanup as part of the Great American Cleanup. This program includes activities such as litter cleanups, litter prevention education, river cleanups, etc., that help keep trash from migrating into the City's waterways. In the May 15, 2004 event, more than 2,400 volunteers participated, representing nearly 90 neighborhood associations, schools, churches, businesses, and non-profit organizations.

- There are various advisory groups that the City of Fort Wayne has worked with in the past and plans to continue to work with in the future. Though these groups may work with the City on a variety of issues, stormwater quality issues are sometimes discussed. Specific groups the City has participated with include:

    - St. Joe Watershed Initiative
    - Sewer Advisory Group
    - Community Service Council

- Greenway Consortium Group
- Maumee River Basin Partnership of Local Governments (MRBPLG)
- Hoosier Riverwatch

2.1.3 Illicit Discharge Detection & Elimination

The City has an existing ordinance, Chapter 53 (Stormwater Management Department) of Title V (Public Works) of the City Code that contains language prohibiting illicit discharges. Section 53.12(B) contains language stating "…it is determined to be a violation of this chapter to permit, allow, or engage in the dumping or disposal of materials other than stormwater into the city's municipal separate stormwater system." There is also a penalty clause (Section 53.13) stating that "Any user found in violation of 53.12(B) shall be subject to a fine of up to $2,500 per day. In addition, that user may also be held responsible for any costs incurred by the city in rectifying a situation of pollution to the waterways of the United States and/or for repairing any damage to the public stormwater facility and/or the stormwater system."

As part of its Part 1 NPDES application for an individual Phase I permit (Fort Wayne has subsequently been designated a Phase II NPDES – Rule 13 regulated entity), the City (at that time) field screened all known major outfalls (36 inches and larger in diameter plus those outfalls in industrial areas that were 12 inches and larger in diameter). Approximately 135 major outfalls were identified and field screened in 1994. The City generally has adequate storm sewer mapping from which to conduct an illicit discharge field screening program (see Section 5.0). As part of the field screening program completed in 1994, the City developed a "Manual of Operation for Field Screening of the Municipal Storm Sewer System" and "Manual of Operation for Field Investigation of Illicit Connections and Illegal Discharges". These manuals, in conjunction with more recent guidance manuals made available through organizations such as the Center for Watershed Protection, will provide a good starting point for the City to undertake an Illicit Discharge Detection and Elimination Program.

2.1.4 Construction Site Runoff Control

The City's stormwater ordinance (Chapter 53: Stormwater Management Department, Fort Wayne City Code) previously provided minimal requirements and guidance for construction site runoff control. The ordinance is being revised to reflect the requirements of Rule 13 and provide the City with the proper legal authority for its construction site runoff control program.

Previously (and until the City's SWQMP Part C is approved), construction site runoff control, including plan review, inspection and enforcement, was implemented by the Allen County Soil and Water Conservation District office (under Rule 5). As the City's construction site runoff control program is implemented, this responsibility will be transferred to the City's plan review and inspection staff. The Allen County SWCD will remain responsible for reviewing and inspecting "City-owned" construction projects that disturb one or acre or more of land.

2.1.5 Post Construction Site Runoff Control

Currently, Fort Wayne's program for managing the stormwater quality side of Post Construction Runoff Control is minimal. However, every proposed site development (excluding home construction on individual platted lots) receives a detailed review to determine how stormwater quantity can best be managed. In general, post construction runoff is limited to a release rate of 0.18 cubic feet per second (cfs) per acre for a 100-year storm event and 0.05 cfs per acre for a 10-year storm event. In areas where the capacity of the receiving stream is limited, lower release rates may be required. In general, the intent is that stormwater from any increased impervious surface must be managed on-site until capacity is available in the stormwater conveyance system.

Grading plans are also reviewed for every site development to ensure that drainage will not cause flooding or damage to public property or to private property owned by others. Where developments are required to provide stormwater detention, owners also agree to operate and maintain their detention facilities in compliance with City standards and specifications. Fort Wayne has created a Development Criteria/Standards Manual that provides guidance for meeting the stormwater management provisions of the City Code and Stormwater Utility Rules and Regulations.

The City has a zoning district that helps direct growth away from sensitive areas. A River Greenway Overlay District is provided in Section 157.180 of the City Code. It includes lands abutting the Maumee, St. Joseph, and St. Mary's Rivers, Spy Run Creek, and other creeks and tributaries that may be designated by the Plan Commission. The boundaries of the district are 100 feet from the riverbank. "Riverbank" is defined as the landward edge of the floodway area as determined by the Indiana Department of Natural Resources and/or Federal Emergency Management Agency, on both sides of the river or creek. If any portion of a lot or parcel is within that boundary, the entire lot or parcel is included. The intent of the district is to "provide for maximum public benefit from any future development of these areas through a sharing of river orientation, with emphasis on the opportunity for enjoyment of river vistas, continuity of river greenway paths, and access to the rivers and banks to the maximum number of citizens. It is further the purpose of this subchapter to eliminate or minimize adverse environmental impacts and to improve scenic and aesthetic controls." Any development in these areas requires special review by the River Greenway Committee to ensure that land alteration is consistent with the intent of the Greenway District.

2.1.6 Pollution Prevention/Good Housekeeping

The City has many existing activities to take credit for under the Pollution Prevention/Good Housekeeping for its Municipal Operations. These include:

- The City Parks Department maintains the greenway trails and there is also an "Adopt a Greenway" program where volunteers help clean up debris and trash along trails.

- The City cleans all drainage inlets and catch basins every 2½ years. A total of 14,000 structures are cleaned during this cycle (5,600 per year; 7 to 8 per day; two trucks).

- The City performs sewer cleaning and televising. The primary focus of the cleaning and televising program is in the sanitary and combined sewer area; however some separate storm sewer systems have been televised (approx. 50,000 feet in the northeast portion of the City).

- The City currently has a street sweeping program that covers a good portion of the MS4 area. The City has seven sweepers, one for downtown and six for the outlying areas. Downtown streets are swept weekly while residential streets are swept four times per year. Public parking lots and municipal yards are also swept periodically.

- De-icing salt is stored at City yards and is covered with tarpaulins. Yard drains for this area drain to catch basins in the combined sewer system.

- City Operations & Maintenance Department trucks are washed outdoors; however, wash water drains to the combined sewer system and is treated at the wastewater treatment plant. Most vehicles are stored inside to protect equipment. Inlets in vehicle storage areas have oil water separators. These areas are also located in the combined sewer area. The vehicle refueling station is covered and has a concrete floor and a containment area.

- The City provides weekly garbage pickup and has curbside recycling, yard waste collection, and fall leaf collection programs.

    - The City of Fort Wayne employs a private firm to collect trash/garbage on a weekly basis. The same company provides curbside recycling on the same day as trash collection but on a bi-weekly basis. Each household is provided with two recycling bins – one for newspapers, magazines, catalogues, cardboard, fiberboard and phonebooks and the other for glass, plastic and metal recyclables. Information on what can be recycled is provided through annual flyers and utility bill stuffers, mailings to newly annexed residents, the City website and cooperative publications with the Allen County Solid Waste District.

    - A special area on the City's website provides information on disposal of unusual items that are not acceptable for garbage collection or recycling. The City encourages private collection companies to keep charges as reasonable as possible to discourage illegal dumping.

    - Yard waste, except leaves, can be placed with the garbage for collection all year long. Grass clippings may be bagged in plastic bags or placed in refuse containers. Biodegradable yard bags may also be used. One City-operated site and one privately-operated site are also available for yard waste disposal. The City-operated yard waste recycling facility accepts leaves, garden waste, prunings, vines, grass clippings and brush. There is a small charge for dumping at both sites. Fort Wayne's Solid Waste Department encourages property owners to mulch grass clippings rather than put them out for trash collection.

    - The City's Street Department operates a neighborhood leaf collection program annually from mid-October through mid-December. The City is divided into three areas, north, central and south, and leaf collection crews spend three weeks in each area on a rotating basis. Residents receive utility bill stuffers notifying them of the dates when leaf crews will be in their area of the City. Residents are asked to rake their leaves to the curb but not into the street. Leaves may also be placed in biodegradable yard waste bags and placed at the curb. Street Department crews use front end loaders to collect the leaves, placing them in dump trucks for transport to the City's yard waste recycling facility. In some areas, particularly areas with unimproved streets, leaf vacuums are used to collect leaves. A street sweeper also follows each leaf collection crew.

- The City Parks Department uses pesticides, herbicides and fertilizers, but minimizes their use. The Street Maintenance Department uses herbicides to control roadside vegetation. Applicators are licensed through the State Chemist's Office.

- Channel stabilization work is completed as problems arise. The City generally completes about one channel project per year. The City has five stormwater detention basin sites it controls (Hamilton Park, Southgate, Summerfield, Camp Scott, and Washington Natural Drain #6). Water quality has generally not been included in flood management projects.

2.2 Existing Activities – University Co-Applicants

The four university co-applicants each have existing programs and activities in place that represent a good starting point for the implementation of most of the minimum control measures. The following sections provide descriptions of those programs and activities.

2.2.1 Public Education and Outreach

The University of Saint Francis provides information to the Campus community regarding the damage that can be done by disposal of chemicals into the storm drains and by pouring used motor oil onto stone drives. The University is also distributing copies of City-provided fliers on the hazards of contaminating storm water.

Indiana University Purdue University Fort Wayne currently sponsors Public Education via the Biology and Geology departments, and provides community programs and speakers from staff and students in these departments. The University also sponsors an Earth Day forum and event that encourages knowledge of water quality issues through the distribution of brochures, speakers, and displays.

Ivy Tech State College has no current public outreach program related to stormwater quality, but plans to participate in the activities identified in the City's stormwater quality management program.

The Indiana Institute of Technology has no current public outreach program related to stormwater quality, but plans to participate in the activities identified in the City's stormwater quality management program.

2.2.2 Public Participation and Involvement

The University of Saint Francis has no current public involvement program related to stormwater quality, but plans to participate in the activities identified in the City's stormwater quality management program.

Indiana University Purdue University Fort Wayne staff and faculty are involved in litter clean-up days and river clean-up days. The biology club is involved in numerous activities that promote the awareness of water quality issues.

Ivy Tech State College has no current public involvement program related to stormwater quality, but plans to participate in the activities identified in the City's stormwater quality management program.

The Indiana Institute of Technology has no current public involvement program related to stormwater quality, but plans to participate in the activities identified in the City's stormwater quality management program.

2.2.3 Illicit Discharge Detection and Elimination

The University of Saint Francis has made all of the Physical Plant personnel aware of the risks and damage to the environment that can result from illicit discharges and improper disposal. This includes Security, Maintenance, Custodial, Grounds, and Print Shop. The Chief of Security has instructed the Campus Community to contact him in reference to all potentially hazardous materials that need to be disposed of.

Indiana University Purdue University Fort Wayne currently has in place mapping of the entire campus storm water system. The University has recycling programs for oil, used batteries, and other hazardous materials. The University maintains a hazardous material storage location that is managed and inspected by campus Radiological and Environmental Management (REM) staff. This information is on file with local agencies.

Ivy Tech State College currently collects used motor oil and antifreeze and disposes of these products through approved disposal companies.

The Indiana Institute of Technology currently recycles all used motor oil consumed by the maintenance and grounds departments. The Institute also maintains a list of locations on campus where hazardous materials are used and stored. The locations are inspected annually.

2.2.4 Construction Site Runoff Control

The University of Saint Francis oversees campus construction projects and explains to its contractors the university's concern that they follow all guidelines relating to erosion and sediment control during construction.

Indiana University Purdue University Fort Wayne currently adheres to and maintains all requirements set forth by IDEM for construction project erosion control. This includes the preparation of ESCP's that are submitted to Soil and Water Conservation District staff and that are inspected by IDEM field personnel.

Ivy Tech State College requires all site development contractors to provide erosion & sediment control during construction.

The Indiana Institute of Technology currently requires all contractors to follow all current IDEM rules and regulations related to erosion and sediment control.

2.2.5 Post-Construction Runoff Control

The University of Saint Francis currently has several programs in place that are intended to control development. The activities currently in place are buffer stream restrictions, open space preservation, lands set aside from future growth, and brownfields clean-up. The university also plans to enlarge its on-campus lake to provide additional detention capacity for future development projects.

Indiana University Purdue University Fort Wayne has a qualitative master plan (available on the University web site) that indicates areas to be preserved as open space and several sensitive areas to be protected. This document is maintained on a constant basis. The University also maintains storm water detention in areas that have been developed, most recently with Student Housing construction which now possesses a fully Rule 13 compliant detention and infiltration basin.

Ivy Tech State College requires the Architect of Record to inspect post-construction runoff controls.

The Indiana Institute of Technology currently requires all contractors to follow all current IDEM rules and regulations for post construction controls as required by Rule 5.

2.2.6 Pollution Prevention / Good Housekeeping

The University of Saint Francis preformed a shoreline stabilization project in 2004 A clean up project behind the lake was performed jointly by Physical Plant personnel and students from an environmental science class. The university maintains the lake shoreline and recently rip-rapped the shore to protect against erosion. Grounds personnel understand the importance of prohibiting grass from being discharged into the lake.

Indiana University Purdue University Fort Wayne currently performs daily litter pick-up of the campus and weekly street sweeping. The University maintains all shoulder and ditch structures to a high level of repair. The University has enclosed storage for deicing sand

and salt mix. The University has a standard operation procedure (SOP) for spill containment and clean-up. The University provides sanitary sewer drains as a BMP for vehicle wash facilities. The University promotes campus-wide recycling of paper and aluminum.

Ivy Tech State College contracts daily with an outside contractor for litter pick up and annually contracts for leaf disposal.

The Indiana Institute of Technology currently performs periodic litter pick up and pavement sweeping. The Institute has a standard operating procedure for spill prevention and clean-up during fueling operations. The Institute has a minimal use policy in place for pesticides and does not currently apply any restricted use products that require an applicators license.

3.0 ONGOING CHARACTERIZATION SCHEDULE

To be completed upon resolution of Part B Notice of Deficiency.

4.0 MS4 BOUNDARY DESCRIPTION

The City of Fort Wayne's MS4 Boundary corresponds to its corporate limits (i.e. area of jurisdiction). This area is shown in the Figure 1. The gray shaded area depicts the current corporate limits with respect to major streets, thoroughfares and interstate highways in the City.

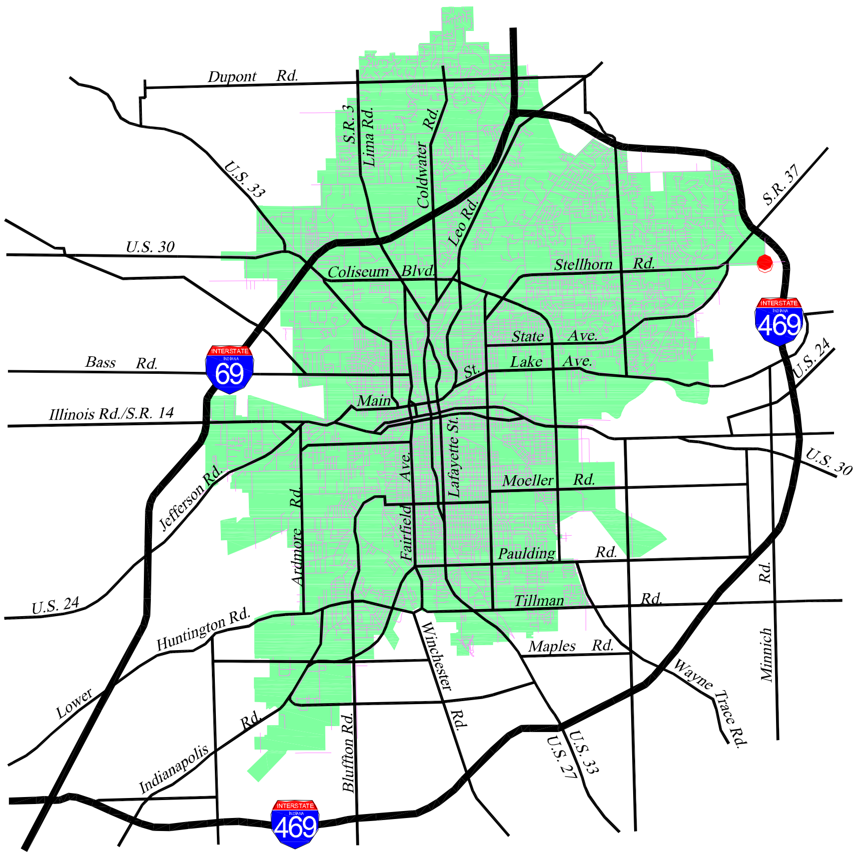

Figure 1 – Fort Wayne MS4 Boundary Map
(MS4 area shown as green shaded area)

The following is a narrative description of the MS4 boundary. The starting point is shown as the red dot on Figure 1 and proceeds around the MS4 boundary in a counterclockwise direction.

Starting at the intersection of Schwartz Road and Stellhorn Road, proceed north to Interstate 469, north/northwest to Wheelock Road, south to Rothman Road, west to Hazelett Avenue, south 3,000 ft, west 1,700 ft, north to Rothman Road, west to Tanbark Lane, north to Interstate 469, northwest to St. Joe Road, southwest to a point 300 ft northeast of Northwest Drive, northwest to St. Joseph River, follow river 1,400 ft, northwest to intersection of North Clinton Street and Diebold Road, continue north to State Road 1, west to Parkview Plaza Drive, north to Corporate Drive, west to I-69, north to Northway Drive, west to Auburn Road, north 1,300 ft, west 2,540 ft, north 1,300 ft, east 860 ft, north to Union Chapel Road, west to State Road 327, south 2,640 ft, west 1,340 ft, south to Badiac Road, west 1,300 ft, south 1,400 ft, west to State Road 3, south 4,600 ft, west 1,200 ft, south to Till Road, west to CSX Railroad, south 5,300 ft, west 1,150 ft, south 1,300 ft, west 1,000 ft, south to Ludwig Road, west to Goshen Road, due south (not following Goshen Road) to U.S. 30, west 3,870 ft, south 960 ft, east to Kroemer Road, south to California Road, east 3,600 ft, south to Butler Road, east to Hillegas Road, south

6,865 ft, east to Lindenwood Avenue, south to Scholtz Road, northwest 8,770 ft, south to Illinois Road, west 1,350 ft, north 2,200 ft, west to I-69, south 5,500 ft, east 1,040 ft, south to West Jefferson Boulevard, northeast to Covington Road, east to South Bend Road, southwest to Fairway Drive, south to Langford Lane, east to Anneta Avenue, south 400 ft, east to Smith Road, south to Engle Road, west 3,200 ft, south 2,150 ft, east 700 ft, south 1,620 ft, northeast 7,160 ft, south to Knoll Road, east to Ardmore Avenue, south to Lower Huntington Road, west to Smith Road, south to Airport Expressway, east 1,640 ft, south 2,130 ft, west to Smith Road, south 2,660 ft, southeast to Keller Road, south 1,980 ft, west 1,320 ft, south 1,250 ft, west to Smith Road, south to Winters Road, east 1,560 ft, southwest 3,400 ft, southeast 1,660 ft, northeast to Winters Road, east 4,200 ft, north 2,560 ft, east 1,600 ft, north to Ferguson Road, east to Bluffton Road, north to Dunkelberg Road, east 2,600 ft, north 2,650 ft, east 1,200 ft, southeast 2,000 ft to Kinnerk Road, northeast to Boggs Avenue, northwest 1,270 ft, northeast to Lower Huntington Road, east to Tillman Road, southeast 7,000 ft to Maples Road, north 2,000 ft, east 9,800 ft, north to Tillman Road, east to Wayne Trace, northwest to Bueter Road, north to Sherwood Terrace, northeast to intersection of McKinnie Avenue and Meyer Road, southeast 7,300 ft to intersection of Paulding Road and Adams Center Road, northeast 4,600 ft, northwest 6,660 ft, north 5,200 ft, west to Meyer Road, north to Old Lincoln Highway, east 2,600 ft, north 800 ft to Maumee River, follow river 16,500 ft to point near North River Road, north to Shordon Road, west to Long Road, north to Maysville Road, northeast to Stellhorn, east to starting point.

5.0 MS4 CONVEYANCE ESTIMATE

The purpose of providing an estimate of MS4 conveyances is to determine the amount that will need to be mapped each year of the Rule 13 permit. The purpose of having MS4 conveyance mapping is to aid in the investigation of illicit discharges and determine appropriate placement of best management practices. The rule requirement is for 25% of the conveyance system to be mapped each year in years 2 through 5 of the City’s first permit term (Note: The permit term began with the submittal of the Notice of Intent, on November 3, 2003; hence, Year 2 of the permit began on November 4, 2004.). For the City of Fort Wayne, most of the storm sewer system is already mapped, so the 25% will apply to ditch mapping (2-foot and larger bottom width) and mapping of storm sewers and ditches in newly annexed areas.

An estimate of the City of Fort Wayne’s MS4 conveyances was made using a combination of existing paper maps, Geographic Information System (GIS) data, and field investigations. MS4 conveyances include storm sewers with a diameter of 12 inches or larger and ditches with a bottom width of 2 feet or greater.

The City has paper maps of its storm sewer system on a series of quarter section maps. The maps primarily show the underground pipe system. Ditch systems are generally not shown. Outfalls are identified by a unique alpha-numeric identifier. The storm sewers were recently digitized and incorporated into the City’s GIS. An excerpt from the GIS is shown in Figure 2 below. Separate storm sewers are shown in the tan colored lines. The green lines are sanitary sewers.

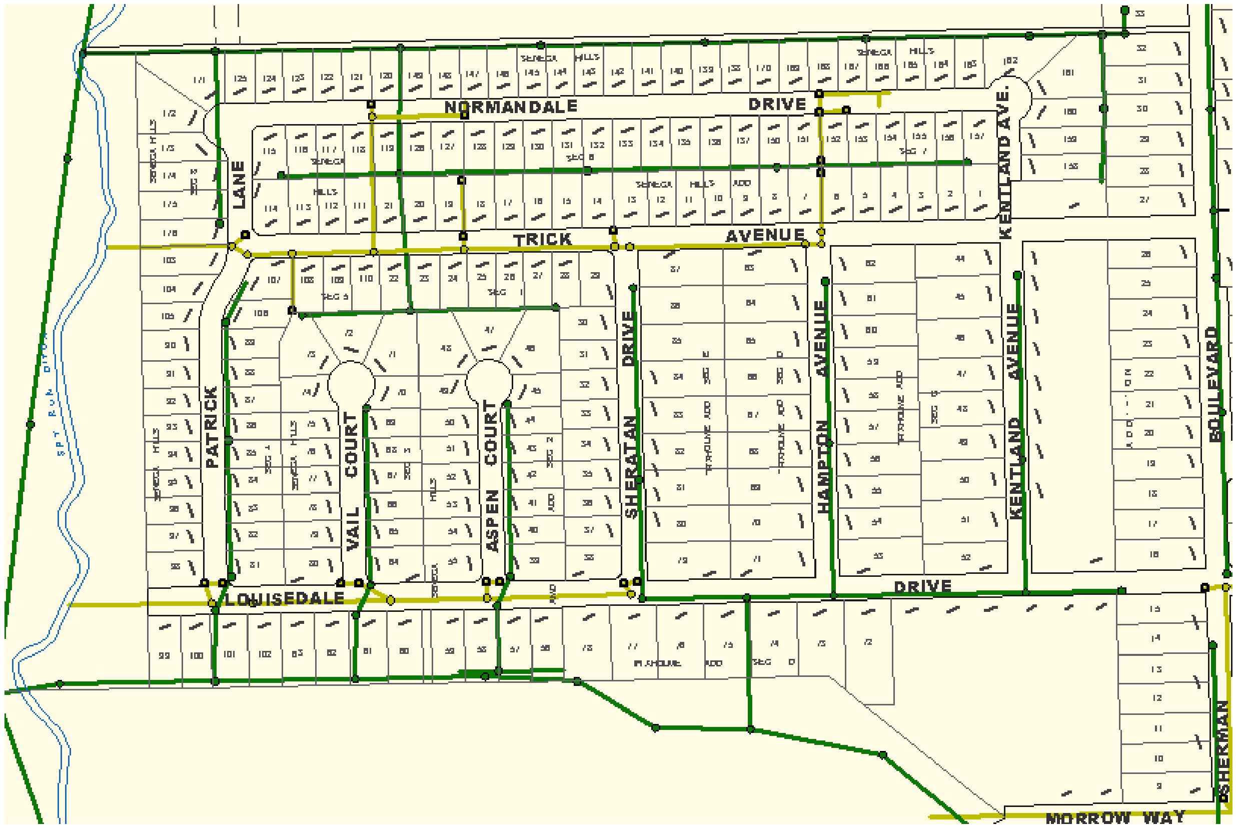

Figure 2 – GIS Excerpt Showing Storm Sewers
(Note: storm sewers are shown as tan colored lines)

The length of storm sewer was estimated by querying the GIS. The GIS contains the storm sewer segment length as an attribute. A summation of all storm sewer segment lengths in the database showed a total length of approximately 1.9 million feet, or 360 miles. With a total MS4 area of approximately 72.4 square miles, there is an average length of 26,250 feet of storm sewer per square mile of MS4 area.

Most ditches are not shown on either the paper quarter section maps or the GIS. To estimate the length of ditch conveyances, representative quarter section map areas were selected and field investigations were performed to physically measure the length of ditches (2-foot and larger bottom width). The information gathered in the field investigations was used to determine a unit ditch length per square mile for each land use type (i.e., residential, commercial, industrial, undeveloped, recreational, and institutional). This information was extrapolated using total acreage for each land use type across the remainder of the MS4 area to arrive at a total estimate of the length of ditches in the MS4 area. Based on this sampling and extrapolation, the estimated length of ditches with 2-foot and wider bottom is 760,000 feet, which equates to an average of 10,500 feet per square mile of MS4 area. It should also be noted that the City now has 2-foot contour mapping as part of its GIS. This data, along with aerial photography will greatly aid the mapping of ditches.

In addition to mapping ditches, the City will need to map MS4 conveyances (both storm sewers and ditches) for upcoming annexation areas. These areas are shown as the blue shaded area in Figure 3 and comprise approximately 15 square miles. There are two annexation areas shown, the Northeast Phase V and the Southwest Extended. The Northeast Phase V became part of the City on January 1, 2005. The Southwest Extended area is scheduled to become part of the City in January 2006. Based on the average length of storm sewer found in the current City limits, an estimated 300,000 feet of storm sewer and 160,000 feet of ditches will need to be mapped in the recently annexed and upcoming annexation areas.

To summarize, the City already has an adequate map of its storm sewer system. The information is contained in a GIS which allows for easy identification of outfall coordinates and access to information needed to follow up on potential illicit discharges. Ditch mapping does not currently exist, but identification of ditches will be facilitated by the orthophotography and 2-foot contour information contained in the City's GIS. The estimated length of storm sewers and ditches (ditches in the City's current MS4 area plus both storm sewers and ditches in the upcoming annexation areas) that have yet to be mapped into the City's GIS is as follows:

Storm Sewers	300,000 ft
Ditches (2-foot or wider bottom)	920,000 ft (i.e. 760,000 + 160,000)
Total	**1,220,000 ft**

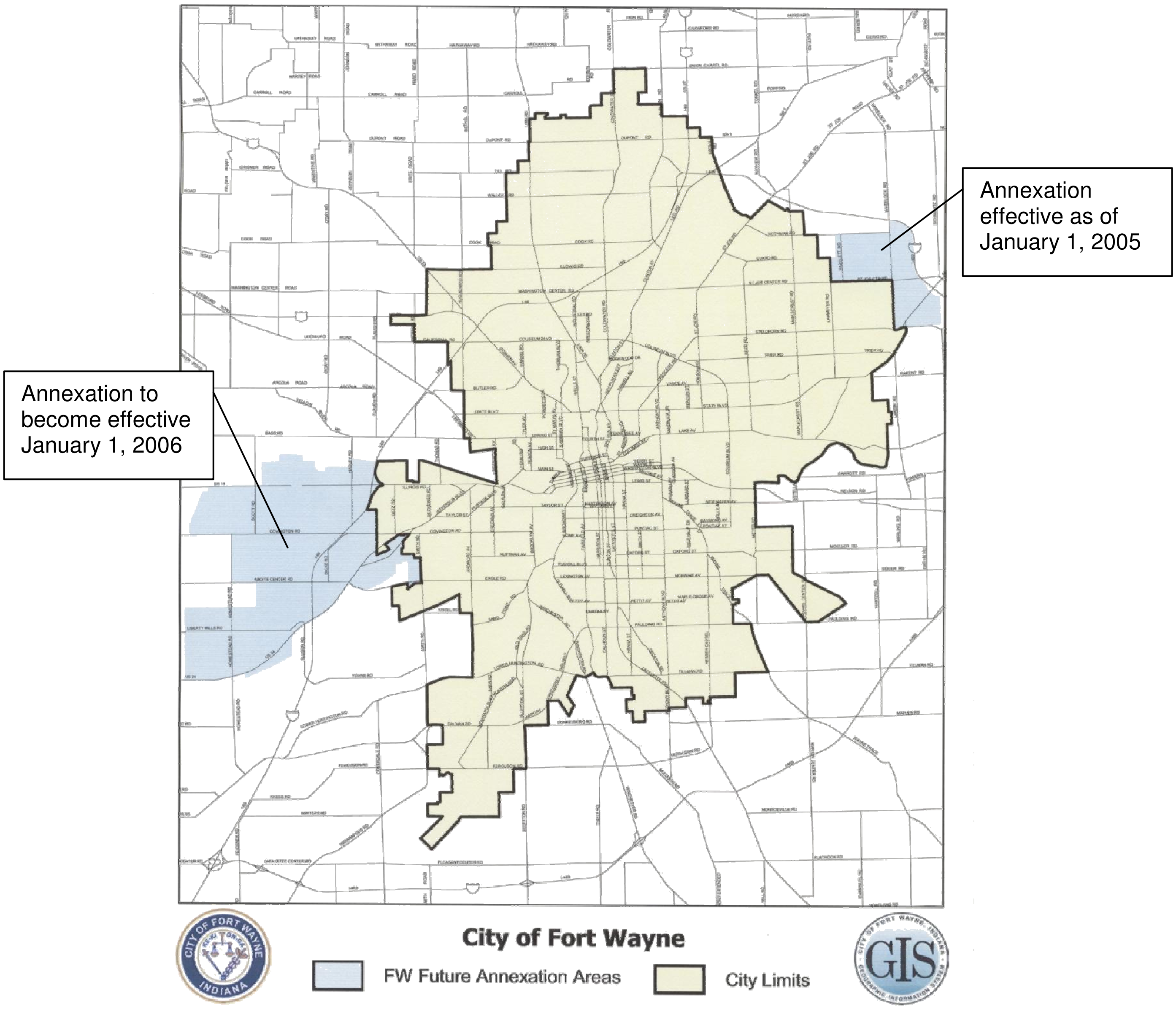

Figure 3 – Future Annexation Areas
(Source: Fort Wayne Planning Department)

6.0 STRUCTURAL BMPs FOR NEW AND RE-DEVELOPMENT

The City of Fort Wayne will allow for a variety of structural BMPs in new development and re-development areas to address post construction runoff. The BMPs must, however, be capable of providing targeted pollutant removal, that being removal of 80% of Total Suspended Solids (see Section 7.0). Post construction BMPs will be required in new development and re-development to treat stormwater after construction has been completed and the site has been stabilized.

The City of Fort Wayne has designated a list of 12 pre-approved BMP methods to be used alone or in combination to achieve the 80% TSS removal goal. These BMPs, along with their average TSS removal rates, are listed in Table 1 below. A single BMP may not be adequate to achieve the target removal rates. A series of BMPs, or treatment train approach, may be needed to achieve the goal.

Table 1
Pre-Approved Post Construction BMPs

BMP Description	Anticipated Average % TSS Removal Rate(3)
Bioretention(1)	75
Constructed Wetland	65
Underground detention	70
Extended Dry Detention	72
Infiltration Basin(1)	87
Infiltration Trench(1)	87
Media Filtration – Underground Sand	80
Media Filtration – Surface Sand	83
Filter Strip	48
Vegetated Swale	60
Wet Detention	80

Notes to Table 1:

1 Based on capture of 0.5-inch of runoff volume as best available data. Effectiveness directly related to captured runoff volume, increasing with larger capture volumes.

2 NA may indicate that the BMP is not applicable for the pollutant, but may also indicate that the information is simply Not Available. Independent (third party) testing should be provided, rather than the manufacturer's testing data. Testing must follow ASTM standard methods.

3 Removal rates are dependant on proper installation and maintenance.

Proposed BMPs not on the Pre-Approved list must be certified by a professional engineer licensed in the State of Indiana and approved through the City of Fort Wayne. ASTM standard methods must be followed when verifying performance of new measures. To be considered, new BMPs, individually or in combination, must meet the 80% TSS removal rate at 50 – 125 micron range (silt/fine sand) without re-entrainment and must have a low to medium maintenance requirement. Testing to establish the TSS removal rate must be conducted by an independent testing facility, not the BMP manufacturer.

7.0 SELECTION CRITERIA AND PERFORMANCE STANDARDS FOR STRUCTURAL BMPS

The City of Fort Wayne has adopted a policy that the control of stormwater runoff quality will be based on the management of Total Suspended Solids (TSS). This policy is being adopted as the basis of the City of Fort Wayne's stormwater quality management program for all areas of the City. A minimum TSS removal rate of 80% is the performance standard for post construction structural BMPs. Any project that includes clearing, grading, excavation, and other land disturbing activities resulting in the disturbance of one acre or more will be required to implement structural BMPs to control post construction runoff. Additionally, new gasoline outlets and refueling areas (or existing facilities that replace their tanks) must install appropriate practices to reduce lead, copper, zinc, and polyaromatic hydrocarbons in stormwater runoff.

TSS was selected as the performance standard for BMPs because many pollutants are highly associated with TSS. These pollutants include heavy metals, phosphorus, nitrogen, pesticides, trash and debris, and oxygen-demanding substances. Reducing TSS will improve water quality. High levels of TSS can cause streams to lose their ability to support diverse aquatic organisms. Suspended solids can also directly impact aquatic life by clogging fish gills, reducing growth rates and decreasing resistance to disease. Excessive sediment deposited in the stream bed can prevent egg and larvae development. Hence, controlling TSS on new development and re-development will have a positive impact on water quality.

8.0 STORMWATER BUDGET

The majority of the City of Fort Wayne's stormwater budget comes from the City Utilities Division, which includes the Water Utility, Sewer Utility, and Stormwater Utility. The City's Stormwater Utility generates revenue from a stormwater user fee, which provides approximately $5.1 million annually in revenue. The 2005 budget for the Stormwater Utility is summarized in Table 2.

Table 2
Current (2005) Stormwater Utility Budget

Item	Budget
Engineering	183,000
Maintenance	3,209,000
General & Administration	1,029,000
Capital	3,097,000
Stormwater Total	***$7,518,000***

Some of the activities that will be performed under implementation of the SWQMP are provided by departments outside City Utilities. These departments include Community & Economic Development (Planning) and Public Works (flood control, street maintenance, solid waste, fleet management). Existing activities that have a positive impact to stormwater quality that these departments perform include planning and zoning, street sweeping, curbside recycling, leaf collection and others. For those activities performed by other departments, it is difficult to estimate how much of the departmental budgets can be defined as stormwater quality management, other than to say that the amounts are relatively minor. As such, budget figures for these activities by the other departments are not included.

In Year 1 of the permit (2004), the City primarily allocated Rule 13 compliance budget to the development of Parts B and C of its SWQMP. This expenditure was approximately $165,000. Fort Wayne budget estimates for new programs that will need to be implemented over the remaining four years of the permit are summarized in Table 3.

Table 3
Fort Wayne Projected Budget – New Activities
MS4 Program

Compliance Area	2005	2006	2007	2008
Annual Report Preparation	$20,000	$20,000	$20,000	$75,000
Program Management	$40,000	$40,000	$40,000	$40,000
Public Education and Outreach	$15,000	$15,000	$15,000	$15,000
Public Participation and Involvement	$15,000	$15,000	$15,000	$15,000
Illicit Discharge Detection/Elimination	$200,000	$200,000	$200,000	$200,000
Construction Site Runoff Control	$85,000	$100,000	$90,000	$90,000
Post Construction Runoff Control	$50,000	$30,000	$30,000	$30,000
Municipal Operations Pollution Prevention and Good Housekeeping	$30,000	$30,000	$30,000	$30,000
TOTALS	**$455,000**	**$450,000**	**$440,000**	**$495,000**

Funds needed to implement the MS4 program will primarily come from revenue generated by the City's Stormwater Utility. Other supplementary sources may include plan review and inspection fees. The four University Co-Applicants will also be allocating resources toward implementation of the Rule 13 MCMs, through in-kind services and facilities operations budgets.

9.0 MCM – BMPS AND MEASUREABLE GOALS

This section presents the City of Fort Wayne's proposed program for each of the six Minimum Control Measures. For each MCM, an overview and program objectives are provided. Corresponding BMPs are provided in Appendices A through F. Each of the proposed BMPs is organized on a single page that includes a description, identified measurable goal(s), responsibility assignments, a schedule for implementation, defined reporting and record keeping requirements, an owning department assignment, supporting department assignments, and an indication as to whether the BMP is an on-going or new initiative.

The four University Co-Applicants will also be participating in implementation of the BMPs and measurable goals presented herein. The City of Fort Wayne and the four University Co-Applicants entered into Service Agreements prior to the submittal of the SWQMP Part A. These Service Agreements summarized obligations on the part of the City and each University MS4. These obligations are summarized below.

City of Fort Wayne's Obligations:

- Serve as, and perform all tasks required of, the NOI designated MS4 Operator.
- Prepare and submit to IDEM the NOI, and Parts A, B, and C of the SWQMP.
- Prepare and submit to IDEM annual reports in accordance with 327 IAC 15-13-18.
- Prepare and submit to IDEM monthly reports on Rule 13-regulated construction sites.
- Share programmatic materials for, and provide assistance to the Universities in implementing public education and outreach and public involvement and participation activities.
- Perform field screening of Universities' outfalls.
- Provide assistance to the Universities in locating the source of any potential illicit discharges detected during field screening of the Universities outfalls.

Universities' Obligations:

- Provide the City with monthly reports regarding Rule 13-regulated construction sites on the Universities' property.
- Provide the City with information required for each annual report.
- Participate in the development of Part C of the SWQMP.
- Provide input and feedback on the City's development of ordinances for the control of construction and post construction stormwater runoff.
- Comply with the City's ordinances and standards for construction and post construction runoff control, once adopted and in effect.
- Share programmatic materials and provide assistance to the City in implementing public education and outreach and public involvement and participation activities.
- Develop and implement pollution prevention and good housekeeping measures, including BMPs, as appropriate, on University properties consistent with Rule 13.

The following sections, along with Appendices A through F present the MS4 program for the City and its University Co-Applicants.

9.1 Public Education and Outreach

Public education was identified by USEPA as one of the three areas where cities could see the quickest return in their stormwater quality management programs when the Phase I stormwater rule was published in December 1990. The City of Fort Wayne, by itself and in conjunction with Allen County and the City of New Haven, has a very strong public education, outreach, and involvement program. Since 2002, the Allen County Partnership for Water Quality has been staffed by a full-time coordinator who is jointly funded by the three entities. The public education program makes use of both traditional and innovative public awareness tools, such as fliers, activity / coloring books, and training programs at local home supply stores. The proposed public education and outreach program will include the distribution of educational materials to the community, as well as outreach activities on the impacts that stormwater discharges have on local water bodies and the role that the citizens can take to reduce stormwater pollution.

The objective of the Public Education and Outreach section of the SWQMP – Part C is as follows:

> *To develop a program that includes methods and measurable goals that will be used to inform residents, visitors, public service employees, commercial and industrial facilities, and construction site personnel within the MS4 area about the impacts polluted stormwater run-off can have on water quality and ways they can minimize their impact on stormwater quality. The MS4 operator shall ensure, via documentation, that a reasonable attempt was made to reach all constituents within the MS4 area to meet this measure.*

The BMPs for the Public Education and Outreach program are provided in Appendix A. Each BMP contains the prefix "PE" for Public Education. The individual BMP elements each have measurable goals that the element will accomplish in support of the overall objective.

9.2 Public Participation and Involvement

The public can provide valuable input and assistance to the development and implementation of the City's stormwater program. The advantages of active public involvement include reduced pollutant loads, increased program support, and vigilant protection of water bodies. The City and local organizations have focused this MCM on creating opportunities for public involvement in local activities and on making the public aware of these opportunities.

The objective of the Public Participation and Involvement section of the SWQMP – Part C is as follows:

> *To develop an SWQMP that includes provisions to allow opportunities for constituents within the MS4 area to participate in the stormwater management program development and implementation. An MS4 operator shall ensure, via documented efforts, that sufficient opportunities were allotted to involve all constituents interested in participating in the program process to meet this measure.*

The BMPs for the Public Participation and Involvement program are provided in Appendix B. Each BMP contains the prefix "PI" for Public Involvement. The individual BMP elements each have measurable goals that will be accomplished in support of the overall objective of this MCM.

9.3 Illicit Discharge Detection and Elimination

The City of Fort Wayne's program to detect and eliminate illicit discharges will rely on a number of programs that are, for the most part, already in place. The City has very good digital mapping of its in-ground MS4 and outfalls. The activities related to the MS4 mapping requirement will be primarily verification of the existing mapping and the addition of that portion of the MS4 made up of open ditches and MS4 mapping in annexation areas.

During NPDES Phase I, the City developed in-house guidance on field screening and the follow-up actions to be employed when suspected illicit discharges are discovered. This program will be reviewed, revised (if necessary) and implemented in conjunction with the requirements to screen the MS4 outfalls during dry weather and to eliminate illicit connections and discharges that are found.

The potential industrial pollution sources will be organized in a database and then will be geo-referenced and added to the City's mapping as a potential pollution source attribute. These industries will include the Rule 6 permittees and other significant pollutant sources as identified by the City for this program.

Allen County has a well-defined household hazardous waste and recycling program. There is currently a Tox-Away Day and vendors have been identified that accept recyclable or household waste products, such as oil, batteries, paint, etc. This information is available on the City's website.

The objective of the Illicit Discharge Detection and Elimination section of the SWQMP – Part C is as follows:

> *To develop and implement a strategy to detect and eliminate illicit discharges to the MS4 conveyances.*

The BMPs for the Illicit Discharge Detection and Elimination program are provided in Appendix C. Each BMP contains the prefix "ID" for Illicit Discharge. The individual BMP elements each have measurable goals that the element will accomplish in support of the overall objective.

9.4 Construction Site Runoff Control

The City of Fort Wayne does not currently have a comprehensive erosion and sediment control program. The City has drafted updates and modifications to its current stormwater ordinance (Chapter 53, Stormwater Management Department of Title V of the City Code) to reflect the requirements of this MCM. However, the updated/modified ordinance has not been adopted at the time of the submittal of the Part C SWQMP. The City plans to present the updated Chapter 53 to Council for approval in the first quarter of 2005. The City will pursue a Memorandum of Agreement that defines roles and responsibilities for compliance with "Rule 5" (327 IAC 15-5) with either the Indiana Department of Natural Resources (IDNR) - Division of Soil Conservation or the Allen County Soil and Water Conservation District (SWCD), for reviewing the erosion control plans. Until the City's program is in place, the Allen County SWCD will continue to provide plan review and inspection/enforcement for construction sites disturbing one or more acres (as it currently does under Rule 5).

Once in place, the City's construction site runoff control program will include an ordinance, plan review, site inspection, enforcement, and technical guidance criteria for the design, installation and maintenance of erosion and sediment control measures during site construction activities.

The objective of the Construction Site Runoff Control section of the SWQMP – Part C is as follows:

> *To develop, implement, manage, and enforce an erosion and sediment control program for construction activities that disturb one (1) or more acres of land within the MS4 area.*

The BMPs for the Construction Site Runoff Control program are provided in Appendix D. Each BMP contains the prefix "CS" for construction site. The individual BMP elements each have measurable goals that the element will accomplish in support of the overall objective.

9.5 Post Construction Runoff Control

Similar to the Construction Site Runoff Control, the City does not currently have a comprehensive post construction runoff control program. The City has drafted updates and modifications to its current stormwater ordinance (Chapter 53, Stormwater Management Department of Title V of the City Code) to reflect the requirements of this MCM. However, the updated/modified ordinance has not been adopted at the time of the submittal of the Part C SWQMP. The City plans to present the updated Chapter 53 to Council for approval in the first quarter of 2005. Until the City's program is in place, the Allen County SWCD will continue to provide plan review and inspection/enforcement for post construction runoff control for sites disturbing one or more acres (as it currently does under Rule 5).

The cornerstone of the Post Construction Runoff Control program will be the adoption (through modifications to Chapter 53 of the City Code) of post construction runoff control requirements. The City will also be developing a manual for the control of post construction runoff control. The new manual will be either an update of the City's existing manual, adoption of the Indiana Water Quality Manual that is currently in production by the Indiana Department of Natural Resources (INDNR), or the adoption of a composite of the two manuals.

The City has set the water quality goal at 80% removal of total suspended solids (TSS). The program will be a performance-based program. In order to insure the anticipated performance, maintenance requirements will be prescribed for all new BMPs that will be built in the City of Fort Wayne.

The following is the objective of the Post Construction Runoff Control section of the SWQMP – Part C.

> *To develop, implement, manage, and enforce a program to address discharges of post construction stormwater run-off from new development and redevelopment areas that disturb one (1), or more, acre of land, or disturbances of less than one (1) acre of land that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one (1) or more acres of land, within the MS4 area.*

The BMPs for the Post Construction Site Runoff Control program are provided in Appendix E. Each BMP contains the prefix "PC" for Post Construction. The individual BMP elements each have measurable goals that the element will accomplish in support of the overall objective.

9.6 Municipal Operations Pollution Prevention and Good Housekeeping

The City currently has programs for street sweeping, catch basin maintenance and cleaning, and litter removal during right-of-way maintenance. These programs remove potential stormwater pollution before it enters the MS4 and these activities will continue. Modified record keeping for some existing programs will allow the City to quantify how effective these programs are and will help in future prioritization of services. Many municipal activities have the potential to positively or negatively impact stormwater runoff quality. In order to minimize negative impact those activities have on stormwater runoff quality, standard operating procedures will be modified and / or developed that provide guidance on how to perform these activities with stormwater pollution prevention in mind. Training programs will be developed for staff that are targeted to the types of pollution or pollution prevention opportunities that staff may encounter in the performance of their jobs.

The objective of the Municipal Operations Pollution Prevention and Good Housekeeping section of the SWQMP – Part C is as follows:

> *To develop and implement a program to prevent or reduce pollutant runoff from municipal operations within the MS4 area.*

The BMPs for the Municipal Operations Pollution Prevention and Good Housekeeping program are provided in Appendix F. Each BMP contains the prefix "GH" for Good Housekeeping. The individual BMP elements each have measurable goals that the element will accomplish in support of the overall objective.

10.0 PROGRAMMATIC INDICATORS

Programmatic indicators refer to any data collected by an MS4 entity that is used to indicate implementation of one (1) or more MCM. These indicators will be used during the term of the permit to track the collection of data that will be submitted with annual reports to IDEM. These indicators may be adjusted during the term of the permit to be more reflective of local conditions and practices. Table 4 provides a listing of the 34 programmatic indicators required by Rule 13. The corresponding applicability to each MCM is also provided in the table.

Table 4
Programmatic Indicators and Corresponding MCMs

Programmatic Indicator	MCM					
	Public Education and Outreach	Public Participation and Involvement	Illicit Discharge Detection/ Elimination	Construction Site Runoff Control	Post Construction Runoff Control	Pollution Prevention / Good Housekeeping
1. Number or percentage of citizens, segregated by type of constituent as referenced in section 327 IAC 15-13-12(a) of Rule 13, that have an awareness of stormwater quality issues.	☒	☒	☐	☐	☐	☐
2. Number and description of meetings, training sessions, and events conducted to involve citizen constituents in the stormwater program.	☐	☒	☐	☐	☐	☐
3. Number or percentage of citizen constituents that participate in stormwater quality improvement programs.	☒	☒	☐	☐	☐	☐
4. Number and location of storm drains marked or cast, segregated by marking method.	☒	☒	☒	☐	☐	☐
5. Estimated or actual linear feet or percentage of MS4 mapped and indicated on an MS4 area map.	☐	☐	☒	☐	☐	☐
6. Number and location of MS4 area outfalls mapped.	☐	☐	☒	☐	☐	☐
7. Number and location of MS4 area outfalls screened for illicit discharges.	☐	☐	☒	☐	☐	☐
8. Number and location of illicit discharges detected.	☐	☐	☒	☐	☐	☐
9. Number and location of illicit discharges eliminated.	☐	☐	☒	☐	☐	☐
10. Number of, and estimated or actual amount of material, segregated by type, collected from Household Hazardous Waste collections in the area.	☐	☐	☒	☐	☐	☐
11. Number and location of constituent drop-off centers for automotive fluid recycling.	☐	☐	☒	☐	☐	☐
12. Number or percentage of constituents that participate in the HHW Collection program.	☐	☐	☒	☐	☐	☐
13. Number of construction sites obtaining an MS4 entity-issued stormwater run-off permit in the MS4 area.	☐	☐	☐	☒	☐	☐
14. Number of construction sites inspected.	☐	☐	☐	☒	☐	☐
15. Number and type for enforcement actions taken against construction site operators.	☐	☐	☐	☒	☐	☐
16. Number of, and associated construction site name and location for, public information requests received.	☐	☐	☐	☒	☐	☐

Programmatic Indicator	MCM					
	Public Education and Outreach	Public Participation and Involvement	Illicit Discharge Detection/ Elimination	Construction Site Runoff Control	Post Construction Runoff Control	Pollution Prevention / Good Housekeeping
17. Number, type and location of structural BMPs installed.	☐	☐	☐	☐	☒	☐
18. Number, type and location of structural BMPs inspected.	☐	☐	☐	☐	☒	☐
19. Number, type and location of structural BMPs maintained or improved to function properly.	☐	☐	☐	☐	☒	☐
20. Type and location of nonstructural BMPs utilized.	☐	☐	☐	☐	☒	☐
21. Estimated or actual acreage or square footage of open space preserved and mapped in the MS4 area, if applicable.	☐	☐	☐	☐	☒	☐
22. Estimated or actual acreage or square footage of pervious and impervious surfaces mapped in the MS4 area, if applicable.	☐	☐	☐	☐	☒	☐
23. Number and location of new retail gasoline outlets or municipal, state, federal or institutional refueling areas, or outlets or refueling areas that replaced existing tank systems that have installed stormwater BMPs.	☐	☐	☐	☐	☒	☐
24. Number and location of MS4 entity facilities that have containment for accidental releases of stored polluting materials.	☐	☐	☐	☐	☐	☒
25. Estimated or actual acreage or square footage, amount, and location where pesticides and fertilizers are applied by a regulated MS4 entity to places where stormwater an be exposed within the MS4 area.	☐	☐	☐	☐	☐	☒
26. Estimated or actual linear feet or percentage and location of unvegetated swales and ditches that have an appropriately-sized vegetated filter strip.	☐	☐	☐	☐	☐	☒
27. Estimated or actual linear feet or percentage and location of MS4 conveyances cleaned or repaired.	☐	☐	☐	☐	☐	☒
28. Estimated or actual linear feet or percentage and location of roadside shoulders and ditches stabilized, if applicable.	☐	☐	☐	☐	☐	☒
29. Number and location of stormwater outfall areas remediated from scouring conditions, if applicable.	☐	☐	☐	☐	☐	☒
30. Number and location of deicing salt and sand storage areas covered or otherwise improved to minimize stormwater exposure.	☐	☐	☐	☐	☐	☒
31. Estimated or actual amount, in tons, of salt and sand used for snow and ice control.	☐	☐	☐	☐	☐	☒

Programmatic Indicator	MCM					
	Public Education and Outreach	Public Participation and Involvement	Illicit Discharge Detection/ Elimination	Construction Site Runoff Control	Post Construction Runoff Control	Pollution Prevention / Good Housekeeping
32. Estimated or actual amount of material by weight collected from catch basin, trash rack, or other structural BMP cleaning.	☐	☐	☐	☐	☐	☒
33. Estimated or actual amount of material by weight collected from street sweeping, if utilized.	☐	☐	☐	☐	☐	☒
34. If applicable, number or percentage and location of canine parks sited at least one hundred fifty (150) feet away from a surface water body.	☐	☐	☐	☐	☐	☒

Appendix A

Public Education and Outreach BMPs and Measurable Goals

PE - 1 Public Information Materials

BMP Description

The City of Fort Wayne, in conjunction with the Allen County Partnership for Water Quality, has numerous public information programs in place that are intended to educate and notify the public of water quality concerns and programs. The public information programs related to stormwater management and stormwater quality have been very successful. Those programs focused on stormwater quality management and pollution prevention will be continued through the term of the second NPDES permit.

Measurable Goals

1. Produce and distribute at least two (2) documents with stormwater related topics annually. The topics will include:
   - septic tank maintenance
   - green landscaping
   - household hazardous wastes
   - drinking water supply protection
   - West Nile Virus
   - Stormwater pollution
   - Stormwater pollution prevention at home
2. Produce and distribute a stormwater activity book with stormwater and/or environmental related topics.

Responsibility

1. Utility Administration, with assistance from the Allen County Partnership for Water Quality, will be responsible for the implementation of this BMP.

Schedule

1. Annually produce and distribute at least two (2) brochures.
2. Produce an activity book in Year 1 and distribute throughout the five year period.

Reporting and Record Keeping

1. Track number of publications created and distributed to public.
2. Include copies of the public education materials in the annual reports required by the NPDES stormwater discharge permit.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Allen County Partnership for Water Quality	☒ Current Program ☐ New Program

PE - 2 Posting of Public Education Materials on City Web Site

BMP Description

The City will utilize its website and the website of the Allen County Partnership for Water Quality to disseminate information on the City's stormwater management programs, including the brochures and coloring book that will be produced under PE-1.

Measurable Goals

1. Create a stormwater page on the City's website.
2. Create a link to the Allen County Partnership for Water Quality website.
3. Post public education materials on the City's stormwater website.
4. Post public meeting notifications on the City's stormwater website.

Responsibility

1. Utility Administration and the Public Information Office will be responsible for the implementation of this BMP. The City's webmaster and the Allen County Partnership for Water Quality will assist as needed to complete each task.

Schedule

1. Establish stormwater web page in Year 1.
2. Create link to ACPWQ website in Year 1.
3. Post materials throughout Years 1 – 5.
4. Post public meeting notices throughout Years 1 – 5.

Reporting and Record Keeping

1. Create the stormwater web site.
2. Track items placed on the stormwater web site.
3. Track hits on specific stormwater program web pages and report annually.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Allen County Partnership for Water Quality • City webmaster • Public Information Office	☐ Current Program ☒ New Program

PE - 3 Develop Speakers' Bureau Resource Materials		
BMP Description The City and the Allen County Partnership for Water Quality have collected "speaker's bureau" materials to inform agencies, school and civic organizations about stormwater issues and how they are being addressed in the City of Fort Wayne and Allen County. This program will be enhanced with additional materials and information.		
Measurable Goals 1. Develop PowerPoint presentations and other materials for staff who speak about stormwater related topics throughout the City. The materials will be targeted to specific audiences, such as neighborhood associations, businesses, schools, and civic groups.		
Responsibility 1. Utility Administration, with assistance from the Allen County Partnership for Water Quality, will be responsible for the implementation of this BMP. Other departments will assist as needed.		
Schedule 1. Ongoing		
Reporting and Record Keeping 1. Track number of presentations and information materials that are produced and that are requested annually.		
BMP Owner: • Utility Administration	***BMP Support:*** • Allen County Partnership for Water Quality	☒ Current Program ☐ New Program

PE - 4 Promote Stormwater Program at Community Functions		
BMP Description The City and the Allen County Partnership for Water Quality are sponsors and participants in Earth Day activities and the Three Rivers Festival. Typically, at least one booth has been focused on water quality issues and how the local wet weather programs are addressing those issues.		
Measurable Goals 1. Participate in the Earth Day activities with at least one stormwater related booth. 2. Participate in the Three Rivers Festival with at least one stormwater related booth.		
Responsibility 1. Utility Administration, with assistance from the Allen County Partnership for Water Quality, will be responsible for the implementation of this BMP.		
Schedule 1. Annual Events.		
Reporting and Record Keeping 1. Track participation at Earth Day activities. 2. Track participation at Three Rivers Festival. 3. Record the types and numbers of materials distributed.		
BMP Owner: • Utility Administration	***BMP Support:*** • Allen County Partnership for Water Quality	☒ Current Program ☐ New Program

PE - 5 Coordinate With Other Wet Weather Education Programs

BMP Description

A wide variety of organizations and government entities have established wet weather-related programs in Allen County. The Allen County Partnership for Water Quality was jointly created by the City of Fort Wayne, Allen County, and the City of New Haven for the specific purpose to coordinate with these entities to better organize local wet weather programs.

Measurable Goals

1. Meet with public information/public education officers at the Indiana Department of Environmental Management, Indiana Department of Natural Resources, Allen County Health Department, the Soil and Water Conservation District and other organizations as necessary in order to coordinate and expand existing water quality related public education efforts.

Responsibility

1. Utility Administration, with assistance from the Allen County Partnership for Water Quality, will be responsible for the implementation of this BMP.

Schedule

1. Meet semi-annually as a group.

Reporting and Record Keeping

1. Develop a comprehensive list of public education efforts in the County annually.
2. Maintain meeting notes for each coordination meeting.

BMP Owner:	BMP Support:	
• Utility Administration	• Allen County Partnership for Water Quality	☒ Current Program ☐ New Program

PE - 6 Assess the Public's Existing Awareness Level of Wet Weather Issues

BMP Description

The public has been informed about stormwater issues through numerous programs over the years. The Allen County Partnership for Water Quality has been surveying the community to determine the general awareness level of stormwater quality issues. The City will evaluate the effectiveness of the public information efforts to determine how to tailor the public information programs in the future through the process of surveying the public early in the compliance program and then again near the end of the permit term.

Measurable Goals

1. Conduct an initial survey to estimate the level of awareness of wet weather issues at the start of the permit term.
2. Conduct survey during the final year of the permit term to assess trends in the level of public awareness of wet weather issues.

Responsibility

1. Utility Administration and the Public Information Office will be responsible for the implementation of this BMP.

Schedule

1. Year 2 – Develop and perform survey.
2. Year 5 – Perform second survey and compare results.

Reporting and Record Keeping

1. Track the number and constituent type of participants in each survey.
2. Based on the type of survey created, track the number of questions answered correctly, assess the general interest level, and evaluate the public education program content, its target audiences, and the frequency based on the trends developed from the second survey.
3. Keep copies of the survey forms on file.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Allen County Partnership for Water Quality • Public Information Office	☒ Current Program ☐ New Program

PE - 7 Promote Household Hazardous Waste Programs		
BMP Description Allen County runs and maintains operations to accept household hazardous waste. There is an annual household hazardous waste turn-in day (Tox Away Day) that allows homeowners to turn in a variety of waste and unused products for proper disposal by the city. There are also a number of private businesses around the City and County that will accept used automotive fluids for recycling. These private companies are identified in a brochure produced by the Allen County Partnership for Water Quality.		
Measurable Goals 1. Promote and publicize recycling and proper disposal of household hazardous waste to reduce the potential for improper disposal and illegal dumping.		
Responsibility 1. The Solid Waste Department, Public Information Office, and then Allen County Partnership for Water Quality will be responsible for developing information promoting the household hazardous waste programs available to the residents of the City of Fort Wayne and Allen County.		
Schedule 1. Ongoing.		
Reporting and Record Keeping 1. Provide a copy with the first annual report. 2. Track number of household hazardous waste brochures distributed. 3. Document other public notices of the event.		
BMP Owner: • Solid Waste Department	***BMP Support:*** • Allen County Partnership for Water Quality • Public Information Office	☒ Current Program ☐ New Program

PE - 8 Promote A Public Reporting Program		
BMP Description Currently a statewide hot-line number goes to IDEM for reporting spills and dumping. Calls related to spills within the City of Fort Wayne would generally be routed to the Fire Department. Most industries know the proper number to call and spills are taken care of promptly. This BMP will be to develop and implement a process to be used to report non-emergency spills or dumping to complement the other spill response numbers.		
Measurable Goals 1. Develop and publicize a process for reporting non-emergency spills, illicit discharges, illegal dumping, construction site runoff issues, and other water quality problems.		
Responsibility 1. The Public Information Office will be responsible for promoting telephone access to City offices .		
Schedule 1. Year 2 – Develop non-emergency notification procedures and publicize. 2. Years 2-5 – Implement new procedures.		
Reporting and Record Keeping 1. Report on number of emergency and non-emergency spill and dumping reports and the action(s) taken. 2. Report on the trend in reports and incident responses.		
BMP Owner: • Public Information Office	***BMP Support:*** • Allen County Partnership for Water Quality • Water Resource Department	☒ Current Program ☐ New Program

PE - 9 Promote Water Quality Education in the Schools

BMP Description

The Allen County Partnership for Water Quality (ACPWQ) recently received an Environmental Education Grant from the USEPA. The grant will allow teachers and home school educators in Allen County to attend one of six free water education workshops called Project WET: Water Education for Teachers. After attending the workshop, attendees will receive the Project WET curriculum and activity guide. The attendees will also have access to the ACPWQ's new water resource education library that features water testing kits, videos, books, and educational supplies.

Measurable Goals

1. Provide access to nationally supported curriculum guides and materials to facilitate the development of water resources education in local schools.

Responsibility

1. Utility Administration, with assistance from the Allen County Partnership for Water Quality, will be responsible for the implementation of this BMP.

Schedule

1. Year 1 – Provide six workshops for teachers and home school educators in the City and County.
2. Years 2-5 – Provide support to educators that elect to incorporate the Project WET curriculum into their classrooms.

Reporting and Record Keeping

1. Report the number of attendees at the Project WET introductory workshops.
2. Report the number of educators that request the Project WET materials for their classes.
3. Report on the number of schools and classes that have integrated Project WET into their curricula annually beginning in Year 2, and the number of students in the classes.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Allen County Partnership for Water Quality	☐ Current Program ☒ New Program

Appendix B

Public Participation and Involvement BMPs and Measurable Goals

PI - 1 Public Involvement Programs

BMP Description

The City has utilized and continues to utilize citizen advisory committees related to several programs, including the NPDES stormwater permit. The City intends to continue to utilize citizens in advisory roles and is reviewing the structure and functions of the current committees for possible modification, reorganization or consolidation.

Measurable Goals

1. Create a citizens advisory committee.
2. Facilitate meetings with citizen advisory committee.
3. Advertise citizen advisory committee meetings.
4. Post citizen advisory committee meeting agendas on website.

Responsibility

1. Utility Administration will be responsible creating the citizen group.
2. Water Resources will be responsible for facilitating meetings of the group.
3. Utility Administration and the Public Information Office will be responsible for advertising meetings.
4. Public Information Office and webmaster will be responsible for posting agendas.

Schedule

1. Year 2 – Set up citizen advisory committee.
2. Years 2-5 – Facilitate citizen advisory committee.

Reporting and Record Keeping

1. Track the number of advisory committee meetings and attendees.
2. Post stormwater advisory committee agendas and meeting minutes on the City web page.

BMP Owner:	***BMP Support:***	
• Utility Administration • Water Resources Department	• Public Information Office	☒ Current Program ☐ New Program

PI - 2 Stream And Greenway Clean-Up Programs

BMP Description

Stream and Greenway Clean-up Programs have operated for a number of years within the City of Fort Wayne. These programs have provided an opportunity for the public to be involved in pollution prevention along the streams. ***These programs are not City of Fort Wayne initiatives, but are supported by the City through public service announcements and by providing solid waste removal services for the groups.***

Measurable Goals

1. Organize one volunteer cleanup activity per year.
2. Publicize and volunteer clean up program and recruit volunteers.
3. Provide disposal of materials and/or supplies as requested.
4. Promote Adopt-A-Greenway.

Responsibility

1. The Solid Waste Department will lead this initiative with support from Water Resources, Parks, and Public Information as appropriate based on the selected volunteer event(s).
2. The Allen County Partnership for Water Quality will assist in publicizing the events and coordinating volunteers.

Schedule

1. Annually.

Reporting and Record Keeping

1. Track number of clean-up activities, number of volunteers, and amount of trash removed by each group annually.
2. Track number of Adopt a Greenway sponsors.

BMP Owner:	***BMP Support:***	
• Parks Department • Water Resources Department	• Allen Co. Partnership for WQ • Solid Waste	☒ Current Program ☐ New Program

PI - 3 Wet Weather Program Workshops		
BMP Description The Allen County Partnership for Water Quality has started an outreach and involvement program through which citizens, particularly home and business owners, are provided "how to" instruction on a variety of topics. The City will continue to provide this service and will diversify the subject matter of the workshops that are available.		
Measurable Goals 1. Host at least one workshop annually. 2. Advertise workshops on the City's web site, through mailings, and public service announcements.		
Responsibility 1. The Water Resources, in conjunction with the Allen County Partnership for Water Quality will be responsible for the implementation of this BMP. Other departments will assist as needed to complete each task.		
Schedule 1. Annually.		
Reporting and Record Keeping 1. Track number of participants. 2. Provide exit questionnaire for participants to provide input and suggestions on workshop.		
BMP Owner: • Water Resources Department	***BMP Support:*** • Allen Co Partnership for Water Quality • Flood Control	☒ Current Program ☐ New Program

PI - 4 Advertise Volunteer Opportunities Related To Stormwater

BMP Description

The City will help local citizen groups publicize their activities related to wet weather programs.

Measurable Goals

1. Post information on volunteer opportunities with local volunteer groups on the City's website, local newspapers, government access channel, and other venues.
2. Post links to local citizen groups on City web site.

Responsibility

1. Utility Administration and the Public Information Office will be responsible for the implementation of this BMP.
2. The Allen County Partnership for Water Quality will be responsible for coordinating with volunteer organizations.

Schedule

1. Start in Year 2 and continue through the permit term.

Reporting and Record Keeping

1. Track number of web page hits to City web site containing volunteer information.

BMP Owner:	***BMP Support:***	
• Utility Administration • Public Information Office	• Allen Co Partnership for Water Quality • City Webmaster	☐ Current Program ☒ New Program

PI – 5 Storm Drain Marking

BMP Description

Citizens sometimes believe that all drainage inlets go to the wastewater plant, particularly in a city where some drainage inlets do go to the treatment plant in the combined sewer service area. One of the most effective methods of "getting the word out" about this erroneous assumption is with inlet stencils or placards. By placing a placard on storm inlets the City will reduce the incidence of improper disposal in the storm drainage system. This BMP has two phases; first is to identify the criteria for determining the inlets that should be marked, and the second phase is the actual inlet marking. The city will provide the materials, safety vests, etc. for use by drain marking volunteers.

Measurable Goals

1. Develop the drain marking program plan.
2. Select and procure stencils or placards.
3. Recruit and train volunteers.
4. Install stencils or placards.

Responsibility

1. The Water Resources Department will be the primary responsible department. The Allen County Partnership for Water Quality will assist by soliciting help from community service organizations, such as the girl and boy scouts.

Schedule

1. Year 2 – Planning and procurement of materials.
2. Years 2-5 – Recruit and train volunteers and install placards or stencils.

Reporting and Record Keeping

1. Track number of storm drains marked.
2. Track number of volunteers involved – number and constituent type.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Allen County Partnership for Water Quality • Stormwater Maintenance Department • Public Information Office	☐ Current Program ☒ New Program

Appendix C

Illicit Discharge Detection and Elimination BMPs and Measurable Goals

ID - 1 Storm Sewer Mapping

BMP Description

In order to implement both an effective illicit discharge detection and elimination program and a comprehensive water quality planning program it is important to have accurate mapping of outfall locations and the storm drainage system. The City has very good digital mapping of its in-ground MS4 and outfalls. The activities related to the MS4 mapping requirement will be primarily verification of the existing mapping and the addition of that portion of the MS4 made up of open ditches and MS4 mapping in upcoming annexation areas.

Measurable Goals

1. The City will map the entire (known) municipal separate storm sewer system (MS4) that discharges to waters of the state through pipes with at least a twelve inch diameter (or equivalent) or through ditches with at least a two foot bottom width.
2. The goal of the mapping program is to map 25% of the MS4 in Years 2, 3, 4, and 5.

Responsibility

1. The Water Resources Department, Water Pollution Control Maintenance, and GIS will be responsible for the mapping of the MS4.

Schedule

1. Years 2, 3, 4, and 5 – perform 25% of the mapping annually.

Reporting and Record Keeping

1. Track the number of miles of storm sewers mapped.
2. Track the number of open ditches mapped.
3. Track unvegetated ditches / swales with and without buffers.
4. Track outfalls found.
5. Report the percent of mapping completed at the end of each year.

BMP Owner: • GIS	***BMP Support:*** • Water Pollution Control Maintenance • Water Resources Department	☒ Current Program ☐ New Program

ID - 2 Illicit Discharge Ordinance		
BMP Description The City has a Comprehensive Stormwater Management Ordinance that includes language prohibiting illicit discharges, and addresses enforcement procedures and penalties.		
Measurable Goals 1. Verify consistency of the ordinance with the Combined Sewer Overflow Operations Plan (CSOOP) and a Long Term Control Plan (LTCP). 2. Publicize the ordinance through the public education and outreach program. 3. Enforce the illicit discharge ordinance.		
Responsibility 1. Utility Administration is responsible for overseeing the revisions to and implementation of the illicit discharge ordinance.		
Schedule 1. Year 1 - 2 – Ordinance revision and adoption. 2. Years 2-5 – Ordinance enforcement.		
Reporting and Record Keeping 1. Certify that the review of the CSOOP and the LTCP were performed. 2. Track methods used to publicize the ordinance. 3. Track the number of violations reported or found each year.		
BMP Owner: • Utility Administration	***BMP Support:*** • Legal Department	☒ Current Program ☐New Program

ID - 3 Illicit Discharge Detection and Elimination Plan		
BMP Description The City developed a plan to detect, address, and eliminate illicit discharges, including illegal dumping, into the MS4 conveyance system several years ago. The plan will be reviewed to verify its continued applicability under Rule 13. Once developed, the plan will be implemented on a city-wide basis.		
Measurable Goals 1. Verification of the illicit discharge detection and elimination plan. 2. Implementation of the illicit discharge detection and elimination plan.		
Responsibility 1. Stormwater Maintenance will verify the illicit discharge detection and elimination plan. 2. Stormwater Maintenance will implement the illicit discharge detection and elimination plan.		
Schedule 1. Years 1-2 – Review and verify the illicit discharge detection and elimination plan. 2. Years 2-5 – Implement the plan.		
Reporting and Record Keeping 1. Document the plan was created. 2. Track number of illicit discharges found. 3. Track number of illicit discharges eliminated.		
BMP Owner: • Stormwater Maintenance	***BMP Support:*** • Water Resources Department • Legal Department • Health Department	☐ Current Program ☒ New Program

ID - 4 Dry Weather Outfall Observation		
BMP Description The City will verify and then implement the procedures and documentation process needed to perform dry-weather screening for all of the MS4 outfalls. Each outfall will be screened visually to determine if a dry weather discharge exists or if there is an indication that contaminated discharges existed in the past.		
Measurable Goals 1. Implement dry weather screening of outfalls as described in the plan described in ID-3. 2. Implement illicit discharge follow-up procedures as described in the plan described in ID-3.		
Responsibility 1. Stormwater Maintenance will review and verify the procedures and screen the outfalls. 2. Stormwater Maintenance will identify the discharge sources and eliminate illicit discharges.		
Schedule 1. Year 2 – Review and verify procedures and plan dry weather screening. 2. Years 2-5 – Implement plan and screen prioritized outfalls.		
Reporting and Record Keeping 1. Track number of outfalls screened. 2. Track number of illicit discharges found and eliminated.		
BMP Owner: • Stormwater Maintenance	***BMP Support:*** • Water Resources Department • Health Department	☐ Current Program ☒ New Program

ID - 5 Industrial Facility Program

BMP Description

The City of Fort Wayne will create an industrial facilities database of all facilities subject to Rule 6 and other potentially significant pollutant sources in the City. The data sources for this database will include the Rule 6 database and other databases containing information on industries with SIC codes identified in the regulation that have the potential to contribute to stormwater pollution.

Measurable Goals

1. Create the initial industrial pollutant source database.
2. Update the industrial pollutant source database annually.

Responsibility

1. Industrial Pretreatment and the Water Resources Department will be responsible for creation and maintenance of the industrial pollution source database.

Schedule

1. Year 2 – Develop the initial industrial pollution source database.
2. Years 3-5 – Maintain the database.

Reporting and Record Keeping

1. Report on the initial development of the industrial pollutant source database.
2. Report on number of industrial pollution sources added and deleted annually.
3. Report annually on the use of the database in tracking down pollution sources.

BMP Owner:	***BMP Support:***	
• Industrial Pretreatment	o Water Resources Department o Allen County Emergency Management o GIS	☐ Current Program ☒ New Program

ID - 6 Household Hazardous Waste And Recycling

BMP Description

Allen County runs and maintains operations to accept household hazardous waste. There is an annual household hazardous waste turn-in day (Tox Away Day) that allows homeowners to turn in a variety of waste and unused products for proper disposal by the County. There are also a number of private businesses around the City and County that will accept used automotive fluids, batteries, tires, etc. for recycling. These private companies are identified in a brochure produced by the Allen County Partnership for Water Quality (ACPWQ).

Measurable Goals

1. Promote and publicize recycling and household hazardous programs in Fort Wayne.
2. Promote and publicize proper disposal of non-hazardous wastes, such as used oil and antifreeze, to reduce the potential for improper disposal and illegal dumping.

Responsibility

1. The Allen County Solid Waste Management District will be responsible for providing the annual household hazardous waste program, with coordination from the Water Resources Department.
2. The Allen County Partnership for Water Quality will provide information to the community on drop-off sites for non-hazardous household wastes.

Schedule

1. Year 2 – Work with Allen County officials to "track" drop-offs at Tox Away Day and other events from City of Fort Wayne residents.
2. Years 3-5 – Distribute the flyer to key businesses and provide flyers at fairs and festivals, and advertise on the City's website.

Reporting and Record Keeping

1. Document promotion/advertisement of the household hazardous waste program.
2. Track number of Fort Wayne citizens that participated.
3. Report the turn-in numbers (hazardous materials) from Allen County Solid Waste.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Allen County Solid Waste Management District • Allen County Partnership for Water Quality • Solid Waste Management Department • Webmaster	☒ Current Program ☐ New Program

Appendix D

Construction Site Runoff Control BMPs and Measurable Goals

CS - 1 Stormwater Ordinance

BMP Description

The City has developed a comprehensive stormwater ordinance that requires erosion and sediment control plans for all new development and redevelopment that disturb one (1) or more acres of land surface. The ordinance provides controls for construction site and post construction site runoff, requires plan review and inspections, and defines enforcement penalties.

Measurable Goals

1. Develop an ordinance that addresses reduction of sediment and erosion from construction site runoff.
2. Publicize the ordinance and its requirements to the development, engineering, and construction communities.

Responsibility

1. Utility Administration will be responsible for coordinating with the Legal Department to get the sediment and erosion control requirements written and adopted.
2. The Water Resources Department will be responsible for representing the City in the joint efforts to develop, publicize, and enforce the ordinance.

Schedule

1. Year 1 – Develop the ordinance language.
2. Year 2 – Adopt the ordinance.
3. Years 2-5 – Publicize and enforce the ordinance.

Reporting and Record Keeping

1. Document the ordinance was adopted by the City Council.
2. Document how the ordinance was publicized (copies of the ads or articles).
3. Track the types of violations encountered and enforcement actions were taken.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Legal Department • Water Resources Department	☐ Current Program ☒ New Program

CS - 2 Erosion and Sediment Control BMP Manual

BMP Description

The City intends to adopt an erosion and sediment control BMP manual that complements its stormwater ordinance. The manual will provide acceptable BMPs for erosion and sediment control with the Fort Wayne city limits. It will also provide design and construction guidelines for each of the BMPs with example drawings and submittal checklists. The intent is to adopt the practices in the *Indiana Water Quality Manual* that is currently in production by the Indiana Department of Natural Resources (INDNR).

Measurable Goals

1. Adopt a BMP manual for erosion and sediment control that complements the stormwater ordinance.

Responsibility

1. The Water Resources Department will oversee the adoption of the BMP manual.

Schedule

1. Years 1 - 2 – Adopt BMP manual.
2. Years 2 - 5 – Publicize manual to engineering and development community.

Reporting and Record Keeping

1. Keep copy of BMP manual on file.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Public Information Officer • Water & Sewer Permits • Planning Department • Transportation Engineering Services	☐ Current Program ☒ New Program

CS - 3 Plan Review Process Modification

BMP Description

The City of Fort Wayne has well-defined site plan review and approval procedures. General requirements such as submittal requirements, design approach guidelines, utility coordination procedures, surveying and easement requirements, drafting standards, design criteria, reference data, computation methods, detention requirements, and erosion and sediment control requirements. The intent is to modify those criteria to be consistent with the new construction site runoff control ordinance and the soon to be adopted BMP Manual.

Measurable Goals

1. Modify the existing plan review procedures.
2. Train staff on the modified plan review procedures.
3. Implement the modified plan review procedures.

Responsibility

1. Development Services and the Planning Department will oversee the revision of the plan review process in the city.

Schedule

1. Years 1 & 2 – Revise the plan review process.
2. Year 2 – Train plan reviewers on the new plan review process.
3. Year 2 – 5 – Implement the new plan review process.

Reporting and Record Keeping

1. Document how new plan review procedures were modified.
2. Document that training programs for plan review staff were completed.

BMP Owner:	***BMP Support:***	
• Development Services	• Planning Department	☒ Current Program ☐ New Program

CS - 4 Construction Site Inspection Program		
BMP Description The City of Fort Wayne does not have a comprehensive construction site inspection program at the current time. During the construction phase of development projects on-site inspections are made only for pipe systems and final walk-throughs. Routine or periodic inspection to verify conformance and/or enforce the erosion and sediment control plan is not currently performed. This BMP will add the inspection program for the sediment and erosion controls.		
Measurable Goals 1. Develop an inspection program for construction site runoff controls. 2. Train the inspectors on the new construction site runoff controls. 3. Implement the construction site runoff control inspection program.		
Responsibility 1. The Water Resources Department will oversee the development and roll-out of a construction site runoff control inspection program.		
Schedule 1. Years 1 & 2 – Revise the construction site runoff control inspection program. 2. Year 2 – Provide training on the construction site runoff control inspection program. 3. Years 2 - 5 – Implement the construction site runoff control inspection program.		
Reporting and Record Keeping 1. Document how new construction site inspection procedures were modified. 2. Document that training programs for construction site inspection staff were completed. 3. Track monthly and annually how many construction sites are inspected how contractors are properly installing and maintaining construction site runoff controls.		
BMP Owner: • Water Resources Department	***BMP Support:***	☐ Current Program ☒ New Program

CS - 5 Construction Site Runoff Control Training		
BMP Description The City will provide training for staff, developers, engineers, and inspectors for the construction site runoff control portion of the stormwater ordinance. The training will be provided at two levels of detail. An executive or overview training will be provided for staff members that need to know what the sediment and erosion control program is about but that will not be involved in design, plan review, or inspections. A more in-depth training will be provided for inspectors, plan reviewers, developers, contractors and engineers.		
Measurable Goals 1. Development of a training course(s). 2. Provide annual training.		
Responsibility 1. Utility Administration will be responsible for developing and providing the training sessions.		
Schedule 1. Years 1 & 2 – Develop training materials. 2. Years 2-5 – Conduct training courses for developers, engineers, inspectors and staff.		
Reporting and Record Keeping 1. Document that training materials were developed. 2. Document the number of training sessions that were provided. 3. Track the number of people attending the training sessions.		
BMP Owner: • Utility Administration	***BMP Support:*** • Water Resources Department	☐ Current Program ☒ New Program

CS - 6 Coordination with IDEM, IDNR, and SWCD

BMP Description

The City of Fort Wayne is required to coordinate the construction site runoff control program with the Indiana Department of Environmental Management (IDEM), the Indiana Department of Natural Resources (INDNR) Division of Soil Conservation, and with the Allen County Soil and Water Management District (SWCD). The SWCD will be offered the opportunity to provide timely comments on permit applications and plans for all projects that disturb one (1) or more acres (qualifying projects). For all qualifying projects not owned by the City the project owners will submit NOIs to IDEM. For all qualifying projects owned by the City a process will be agreed upon whereby the city submits plans for review by either INDNR, by the SWCD, or another third party entity.

Measurable Goals

1. Make certain that NOIs for qualifying projects are submitted to IDEM.
2. Provide SWCD the opportunity to provide timely review of plans for projects not owned by the City.
3. Develop a MOA with INDNR, SWCD, or a qualified third party to provide review of the construction site controls of all City-owned qualifying projects.

Responsibility

1. Utility Administration will oversee the development and implementation of these agreements.

Schedule

1. Years 1 & 2 – Enter into agreements as needed.
2. Years 2 - 5 – Provide SWCD a chance to review construction site runoff control portion of qualifying plans.
3. Years 2 – 5 – Have either SWCD or INDNR review plans for qualifying city-owned projects.

Reporting and Record Keeping

1. Keep agreements or MOAs on file.
2. Track and report numbers of qualifying projects.
3. Track and report the number of instances where SWCD, INDNR, or a third party plan reviewer provided plan reviews and the number of timely responses.
4. Track enforcement actions resulting from the inspection program.

BMP Owner:	***BMP Support:***	
• Utility Administration		☐ Current Program ☒ New Program

CS - 7 Construction Site Public Information Program

BMP Description

The will develop a program for the receipt and dissemination of information on active construction sites. The program will provide information on request on active permits and will provide citizens the opportunity to register complaints about construction sites where problems have been observed.

Measurable Goals

1. Develop Standard Operating Procedures to track and respond to public complaints regarding construction site erosion
2. Develop Standard Operating Procedures to respond public information requests.

Responsibility

1. Utility Administration will be responsible for coordinating the public information and complaints programs development.

Schedule

1. Year 2 – Develop the public information and public complaints programs.
2. Years 3-5 – Implement the public information and complaints SOPs.

Reporting and Record Keeping

1. Document the number of public information requests and public complaints made.

BMP Owner:	***BMP Support:***	
• Utility Administration	• Water Resources Department	☐ Current Program ☒ New Program

Appendix E

Post Construction Runoff Control BMPs and Measurable Goals

PC - 1 Post Construction Runoff Ordinance		
BMP Description The City of Fort Wayne is developing a stormwater ordinance that will address the quality of post construction runoff. This ordinance will require that post construction controls be installed at qualifying newly developed sites. This ordinance will require ongoing maintenance and inspections of BMPs approved and constructed or installed after the effective date of the ordinance. The City will provide training for staff, developers, engineers, and inspectors. Qualifying development sites are those sites that disturb one (1), or more, acre of land, or disturbances of less than one (1) acre of land that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one (1) or more acres of land.		
Measurable Goals 1. Develop and adopt a post construction runoff control ordinance. 2. Publicize the adoption of the ordinance. 3. Provide support materials for the ordinance (FAQ and technical manual). 4. Enforce the terms of the ordinance through the plan review and inspection process and through imposition of penalties for offenders.		
Responsibility The Legal Department in conjunction with the Water Resources Department will be responsible for developing and supporting the ordinance.		
Schedule 1. Years 1-2 – Develop the ordinance and supporting training materials. 2. Years 3-5 – Publicize the ordinance and provide training for staff, developers, engineers and inspectors. 3. Years 3-5 – Enforce the ordinance.		
Reporting and Record Keeping 1. Provide documentation that the ordinance was adopted by the City Council. 2. Report the publication of the ordinance adoption. 3. Report the training for the new ordinance, including attendance. 4. Report on enforcement actions that were necessary during the years 3, 4, and 5.		
BMP Owner: • Legal Department	***BMP Support:*** • Water Resources Department • Planning Department • Development Services	☐ Current Program ☒ New Program

PC - 2 Post Construction BMP Manual

BMP Description

The City will adopt a BMP manual that contains acceptable designs and design methodology for post construction runoff controls. The manual will use the practices identified in the *Indiana Water Quality Manual* that is currently in production by the Indiana Department of Natural Resources (INDNR).

Measurable Goals

1. Adopt a BMP manual to provide technical guidance to designers and developers on the approved BMPs, including design criteria, operations and maintenance requirements, and owner information.

Responsibility

1. The Water Resources Department will oversee the adoption of the BMP manual.

Schedule

1. Years 1-2 – Adopt the BMP manual.
2. Years 3-5 – Continue to identify BMPs for approval and addition to the manual.

Reporting and Record Keeping

1. Report that a BMP manual was adopted.
2. Report the publication / notification of the adoption of the manual.
3. Report the additional BMPs approved for addition to the manual in years 3, 4, and 5.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Development Services	☐ Current Program ☒ New Program

PC - 3 Plan Review Procedure

BMP Description

The plan review process will be modified to address the requirements for best management practices (BMPs) as required by the BMP manual and accompanying policies. Training will be provided for plan reviewers.

Measurable Goals

1. Develop new plan review procedures that address requirements for post construction BMPs.
2. Develop and provide training for plan reviewers.
3. Implement the plan review procedures.
4. Provide on-going training for plan reviewers, inspectors, developers and engineers addressing the design, installation, and maintenance of BMPs.

Responsibility

1. The Water Resources Department and Development Services will insure that the revised plan review process is developed and that training is provided.

Schedule

1. Year 2 – Develop the plan review program.
2. Years 3-5 – Provide training to the plan review and inspection staff annually.
3. Years 3-5 – Provide training to the design and development community annually.

Reporting and Record Keeping

1. Report that the training program has been developed.
2. Report the annual attendance of the plan review and inspector training sessions.
3. Report the attendance by local engineers, architects, and other design professionals showed up for the designer / developer training.
4. Report information on approved BMP types, developed site characteristics (PC – 6)

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Development Services • Planning Department	☐ Current Program ☒ New Program

PC - 4 BMP Inspections

BMP Description

An inspection program for BMPs approved under the new stormwater ordinance will be developed to insure that BMPs are installed and maintained per the criteria in the stormwater manual. The maintenance of the BMPs is a crucial step to assure that the BMPs perform as expected on the ground, which is essential to the implementation of a performance-based BMP program.

Measurable Goals

1. Develop an inspection priority matrix for BMPs.
2. Train inspectors.
3. Inspect all high priority post construction BMPs annually.

Responsibility

1. The Water Resources Department will be responsible for the inspection program for post construction BMPs.

Schedule

1. Year 2 - Develop the Post Construction BMP inspection program.
2. Years 3-5 - Perform Post Construction BMP inspections.

Reporting and Record Keeping

1. Track the number of new BMPs installed annually.
2. Track inspections and deficiencies of installed BMPs.
3. Track maintenance violations by owners to determine type and frequency.
4. Track maintenance performed by the City, when needed.

BMP Owner:	***BMP Support:***	
• Water Resources Department		☐ Current Program ☒ New Program

PC - 5 BMP Operation Manuals

BMP Description

The City of Fort Wayne will require that the property owner of any new BMP, public or private, be provided with a user's manual for each BMP that describes the function of the BMP, the operations and maintenance requirements, and provides a copy of an inspection checklist that should be used for annual inspections of the BMP.

Measurable Goals

1. Require production of BMP owner manuals in the stormwater ordinance or supporting policies.
2. Develop owner manual templates for the BMPs recommended for use in the Stormwater BMP Manual.
3. Insure that innovate or alternative BMPs that are approved for use have owner manuals provided by the developer.
4. Add a checklist item to the plan review process to see that BMP owner manuals are provided.

Responsibility

1. The Water Resources Department is responsible for the implementation of this BMP, with assistance from Development Services.

Schedule

1. Years 1-2 – Develop the policy and user manual templates for approved BMPs.
2. Years 1-2 – Modify the plan review checklist to include a requirement that the BMP user manual(s) be submitted with construction plans for review.

Reporting and Record Keeping

1. Report on completion of the BMP user manual requirement and inclusion in the plan review process.
2. Track the number of innovative or alternative BMPs for which user manuals were approved and keep copies of those user manuals.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Development Services	☐ Current Program ☒ New Program

PC - 6 BMP Database

BMP Description

The City will create a database and GIS coverage of structural and non-structural BMP related information to facilitate annual reporting on its NPDES stormwater permit. Information to be tracked includes:

- Total imperviousness in the City of Fort Wayne.
- Estimated preserved open space in the City of Fort Wayne.
- Type and location of approved non-structural BMPs.
- Type and location of approved structural BMPs.
- New and/or renovated retail or government gas dispensing station BMPs.
- Industries (known) with secondary containment for (potential) pollutants.
- Canine parks – total number and number within 150 feet of a receiving water body.

Measurable Goals

1. Maintain information on BMPs that have been constructed or implemented in compliance with the regulations and policies of the City of Fort Wayne.

Responsibility

1. The Water Resources Department is responsible for the implementation of this BMP, with assistance from Development Services.

Schedule

1. Year 2 – Develop the policy and user manual templates for approved BMPs.
2. Years 2 -5 – Keep track of all new BMP related information in the City of Fort Wayne.

Reporting and Record Keeping

1. Report on status of the BMP database for the annual report annually.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Development Services	☐ Current Program ☒ New Program

Appendix F

Pollution Prevention and Good Housekeeping BMPs and Measurable Goals

GH - 1 Street Sweeping

BMP Description

Street sweeping programs assist municipal water quality management programs by reducing the loads of floatable materials and solids on street surfaces that would otherwise be washed into the storm sewers. The City of Fort Wayne has a street sweeping program that sweeps downtown streets weekly and residential streets four times a year. The City continually prioritizes its sweeping program to insure that identified hot spots for solids accumulation are swept more frequently than others. ***This BMP is only an obligation to report on an existing program that impacts water quality.***

Measurable Goals

1. Sweep downtown streets weekly and residential streets four times per year.

Responsibility

1. The Street Department will be responsible for the street sweeping program.

Schedule

1. Ongoing.

Reporting and Record Keeping

1. Curb miles of streets swept annually in the MS4 area.
2. Volume or mass of material removed from the MS4 area annually.

BMP Owner:	***BMP Support:***	
• Street Department		☒ Current Program ☐ New Program

GH - 2 Catch Basin Cleaning		
BMP Description The City of Fort Wayne has over 15,000 inlets and catch basins in its storm drainage collection system. Currently catch basins and inlets are cleaned on a two and a half year cycle. There is an existing program for catch basin cleaning that focuses on the cleaning of grate tops and the cleaning of catch basin vaults. The grate top cleaning portion of the program maintains the inlet capacity by removing materials that are "strained" from the stormwater runoff entering the drainage system through the grates. The vault cleaning portion of this program removes materials captured in the vaults that were small enough or flexible enough to enter through the grates but coarse enough to be captured. ***This BMP is only an obligation to report on an existing program that impacts water quality***.		
Measurable Goals 1. Clean at least 5100 catch basins and/or inlets per year.		
Responsibility 1. The Stormwater Maintenance Department will be responsible for the catch basin cleaning program.		
Schedule 1. On-going.		
Reporting and Record Keeping 1. Record the number of catch basins and inlets cleaned annually in the MS4 area. 2. Track the mass or volume of material removed by the cleaning program in the MS4 area.		
BMP Owner: • Stormwater Maintenance Department	***BMP Support:*** • Street Department	☒ Current Program ☐ New Program

GH - 3 Storm Sewer Cleaning & Maintenance

BMP Description

The City cleans its storm sewers whenever there is sufficient blockage to reduce the capacity of a particular portion of the drainage system. ***This BMP is only an obligation to report on an existing program that impacts water quality.***

Measurable Goals

1. Remove sediment and coarse solid materials from storm sewers before they leave the drainage system as part of the operation and maintenance of the storm sewer system when system capacity is impaired.

Responsibility

1. The Stormwater Maintenance Department will be responsible for the storm sewer cleaning program.

Schedule

1. On-going.

Reporting and Record Keeping

1. Record the length of storm sewer cleaned and/or repaired annually.
2. Estimate the mass of material removed by the storm sewer cleaning program in the MS4 area.
3. Track streambank and channel stabilization projects required near MS4 outfalls.

BMP Owner:	***BMP Support:***	
• Stormwater Maintenance Department		☒ Current Program ☐ New Program

GH - 4 Winter Weather Chemical Applications

BMP Description

The City of Fort Wayne uses salt and calcium chloride to deice roadways during winter weather events in order to maintain safe driving conditions. The salt storage areas are protected from the storm drainage system. On an annual basis the salt spreading equipment is electronically calibrated for the proper spreading rate when the hoppers are installed on the trucks for the winter season. When hauling of snow is required the City has designated snow disposal areas where the snow is dumped. This program will continue but is not part of the stormwater program. ***This BMP is only an obligation to report on an existing program that impacts water quality.***

Measurable Goals

1. Manage the use of winter weather roadway deicers to minimize adverse environmental impacts to the maximum extent practicable.

Responsibility

1. The Street Department and the Parks Department are responsible for the winter weather chemical application program.

Schedule

1. On-going.

Reporting and Record Keeping

1. Record the number of spreaders calibrated annually.
2. Track the amount of salt and calcium chloride applied to roadways annually.

BMP Owner:	***BMP Support:***	
• Street Department • Parks Department		☒ Current Program ☐ New Program

GH - 5 Pesticide and Herbicide Applications

BMP Description

The City Parks Department uses pesticides, herbicides and fertilizers, but minimizes their use. The Street Maintenance Department uses herbicides to control roadside vegetation. Flood Control contracts weed control for ten miles of levees. Stormwater Maintenance uses herbicides periodically. Applicators are licensed through the State Chemists Office.

Measurable Goals

1. Minimize the use of pesticides and herbicides in the stormwater runoff through use of certified applicators.
2. Track the use of pesticide and fertilizers.

Responsibility

1. The Street, Parks, Stormwater Maintenance, and Flood Control Departments will minimize use of pesticides and herbicides.

Schedule

1. Ongoing.

Reporting and Record Keeping

1. Document that applicators have proper training and certification.
2. Track the chemical types, locations and application amounts.

BMP Owner:	***BMP Support:***	
• Street Department • Parks Department • Flood Control • Stormwater Maintenance Department	• Property Manager	☒ Current Program ☐ New Program

GH - 6 Standard Operating Procedures (SOPs) for Municipal Operations

BMP Description

The City of Fort Wayne manages and maintains vehicles and equipment, material storage, fuel dispensing operations, storm sewer systems, and various other facilities. Several departments are involved in these activities. The City will develop standard operating procedures (SOPs) to be used by each of the departments that address issues related to pollution prevention, materials management, and good housekeeping at its maintenance facilities. The SOPs will address maintenance facilities and associated activities, such as washing areas, fueling operations, and storage areas for fluids, parts, and vehicles and equipment awaiting maintenance.

The SOPs will include a schedule of periodic inspections for the facilities.

Measurable Goals

1. Prepare SOPs covering the following areas:
   - Vehicle and Equipment Maintenance Operations
   - Materials Management
   - Fuel Dispensing Operations
   - Roadway / Right-of-Way Maintenance (includes litter and erosion control)
   - Stormwater System Maintenance Operations (includes channel and bank stabilization)
   - Facilities Maintenance Operations

Responsibility

1. All departments maintaining vehicles and equipment.

Schedule

1. Year 2 – develop the SOPs.
2. Years 2-5 – implement the SOPs.

Reporting and Record Keeping

1. Document that SOPs were developed.
2. Track number of periodic inspections performed.
3. Track number and type of deficiencies found and corrected.

BMP Owner:	***BMP Support:***	
• Departments performing maintenance	• Water Resources Department	☐ Current Program ☒ New Program

GH – 7 Evaluate Flood Control Projects For Water Quality Issues		
BMP Description As new storm drainage and flood control projects are being planned, designed and constructed, the City will continue to identify how water quality considerations can be incorporated into the designs.		
Measurable Goals 1. New storm drainage and flood control projects will be evaluated for the potential to address water quality issues within the projects.		
Responsibility 1. All City Engineering Departments are responsible for the continued implementation of this BMP.		
Schedule 1. Ongoing		
Reporting and Record Keeping 1. Track new storm drainage and flood control projects and the results of the evaluation of the projects for water quality control opportunities.		
BMP Owner: • All Engineering Departments	***BMP Support:*** • Stormwater Maintenance Department	☐ Current Program ☒ New Program

GH – 8 Staff Training on Stormwater Pollution Prevention

BMP Description

The success of the city's stormwater quality management program is dependent on leading by example. To insure that this example can be made staff should be trained to recognize the impact that the execution of their tasks may have on the quality of stormwater runoff.

Measurable Goals

a. A staff training program will be developed that includes both general training on stormwater pollution prevention, and job specific training.
b. Training will be made available annually.

Responsibility

1. The Water Resources Department is responsible for the continued implementation of this BMP.

Schedule

1. Annual

Reporting and Record Keeping

1. Track the dates and attendance for the training sessions.

BMP Owner:	***BMP Support:***	
• Water Resources Department	• Allen Co. Partnership for Water Quality • All impacted departments	☐ Current Program ☒ New Program