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Project Manager: Crystal Rehder

South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watershed Management Plan

ARN A305-5-160

Prepared by:

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Executive Summary:

The South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watersheds are located within the larger Wildcat Creek Watershed in Clinton County, Indiana. The land use of the watersheds is predominately agricultural. The north-west portion of the City of Frankfort and the small community of Kilmore make up the urban and residential areas of the watersheds. Several stream reaches in the watersheds are listed on the Indiana Department of Environmental Management's 303(d) List of Impaired Waterbodies, and the South Fork of Wildcat Creek is designated as one of three State Scenic Rivers.

The purpose of the Watershed Management Plan is to evaluate the current state of each watershed and determine where future improvements and protection should be focused. The Planning Team for the Watershed Management Plan includes the Clinton County SWCD Board of Supervisors, the Steering Committee for the grant, and the many Stakeholders who have attended our events and provided input.

The South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watershed Management Plan addresses several causes of water quality impairments in the watersheds based on scientific data and visual observations by the Steering Committee and Soil & Water Conservation District staff. The causes addressed in this plan are atrazine; sediment and nutrients; *E. coli*; garbage, trash, appliances, tires, and debris; and stream corridor degradation.

Baseline water quality testing combined with stakeholder input pointed to the following sources of impairments: farm field runoff, construction site runoff, illegal dumping, lack of sufficient buffer strips, conventional tillage practices, lack of appreciation for the creek, and application of lawn fertilizer to name several.

Each cause of impairment is addressed by a goal that provides direction for specific objectives and action items that are identified in this Plan for the improvement of water quality in the watersheds. The Plan will be implemented utilizing funds from a two-and-a-half year Section 319 Clean Water grant to install conservation practices and begin fulfilling tasks set forth in the Plan beginning in June 2008. The plan will be reviewed every three to five years.

Copies of the Watershed Management Plan will be available in both electronic and hard copy format at the Clinton County Soil & Water Conservation District. Hard copies are also available at the Clinton County Purdue Cooperative Extension Office, the Clinton County Health Department, the Frankfort Library, Clinton County Surveyor's Office, and the Area Plan Commission.

If you have any questions regarding the content of this Plan or the implementation process, or would like to receive a copy of the Plan, please contact:

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Table of Contents

List of Figures

List of Tables

Appendices:

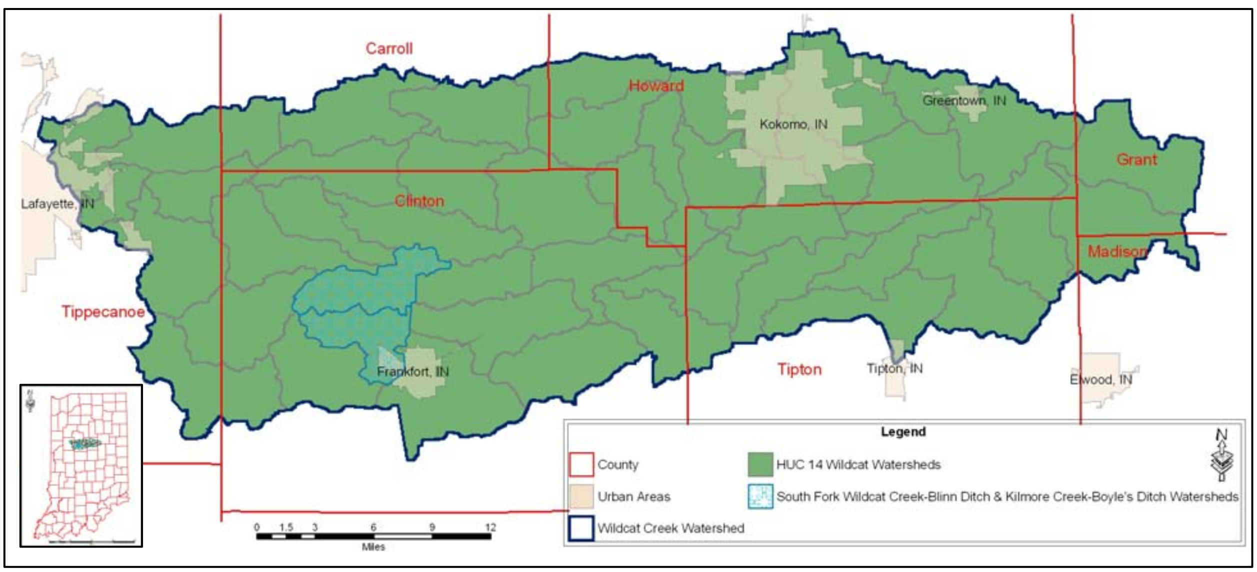
1.0 Introduction

In the spring of 2005, the Clinton County Soil and Water Conservation District submitted a Section 319 Clean Water Act project proposal to the Indiana Department of Environmental Management (IDEM) to address water quality issues in the Wildcat Creek watershed. The Federal Clean Water Act Section 319 program provides funding for various types of projects that work to reduce non-point source pollution (IDEM, 2002). Non-point source pollution stems from a wide range of sources and can not be traced to a single discharge point. The proposal was approved and the contract began on October 24th, 2005 and will close April 24th, 2008.

The Section 319 project grant requires the completion of the following tasks: production of a watershed management plan for the South Fork Wildcat Creek-Blinn Ditch (Hydrologic Unit Code (HUC 05120107040090) and the Kilmore Creek-Boyle's Ditch (HUC 05120107040040) watersheds (See Figure 2), completion of a chemical and biological monitoring program to establish baseline water quality and help with the development of the watershed management plan, development of an education and outreach program, and preparation and submission of written reports to the State with each invoice, on no less than a quarterly basis.

The Wildcat Creek Watershed (a portion of the greater Wabash River Watershed) has forty-four sub-watersheds. The South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds are two of the sub-watersheds within the greater Wildcat Creek Watershed (See Figure 1).

Figure 1: Wildcat Creek Watershed and Sub-watersheds



The South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds are predominately in agricultural production with a large percentage of acreage in corn and soybean cropland. The northwest portions of the City of Frankfort as well as the small town of Kilmore make up the majority of the urban and residential areas. Several rural residential non-farm homes can be found adjacent to the South Fork Wildcat Creek and Kilmore Creek. There is one nature preserve in the watershed and a recreation area known as the Lagoons. With increased industrialization along State Road 28, housing development along the creeks, and current agricultural production a continued potential for pollution in our waters exists.

The vision of the Steering Committee for the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch watersheds and the Clinton County Soil & Water Conservation District is to attain improved water quality in our community by instilling pride, educating citizens, collaborating with partners, and implementing the Watershed Management Plan..

The Watershed Management Plan is intended to be a working plan that is both flexible and dynamic. As the Plan is implemented and objectives are achieved, the Plan will be adapted by the Clinton County SWCD (the primary contact organization) to reflect changes in water quality data, innovative water quality improvement practices, and community interest.

1.1 Watershed Management Plan Purpose, Drivers, and Planning Team

The purpose of the Watershed Management Plan is to evaluate the current state of each watershed and determine where future improvements and protection should be focused. Several stream reaches in the watersheds are listed on the Indiana Department of Environmental Management's 303(d) List of Impaired Waterbodies, and the South Fork of Wildcat Creek is designated as one of three State Scenic Rivers. The Clinton County SWCD plans to utilize the WMP to educate stakeholders on the importance of water quality, create lasting partnerships, and improve water quality through the implementation of the plan.

The WMP is driven by the Clinton County SWCD Board of Supervisors and Staff whose Business Plan and Mission focus on the conservation of the soil and water resources of Clinton County.

The Planning Team for the Watershed Management Plan includes the Clinton County SWCD Board of Supervisors, the Steering Committee for the grant, and the many Stakeholders who have attended our events and provided input. Semi-monthly Steering Committee Meetings were held on the second Monday of the month at Camp Cullom's Nature Center for the duration of the grant. Steering Committee Members were invited to participate at the first stakeholder meeting and through direct mailings. The committee was made up of seven (7) individuals from backgrounds that included: education, health department, agricultural production, and concerned citizens. In addition, several meetings were held with local county and municipal departments to gather their input.

The mission of the Clinton County Soil and Water Conservation District and the Steering Committee for the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek Boyle's Ditch Watershed Management Plan is to create a comprehensive watershed management plan that will improve the quality of water in our community through education, collaboration, and implementation.

This plan belongs to the stakeholders, landowners, municipalities, and townships within the watershed. Information contained in the plan is the product of the hard work of this watershed community and reflects the goals and objectives to help improve and protect the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds from non-point source pollution.

1.2 Watershed Partnerships

Without the support and participation from the many partnerships for the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watersheds, the creation of this Watershed Management Plan would not be possible. Many partners contributed donations in the form monetary gifts, door prizes, time, expertise, and/or energy. Each partnership is unique and dynamic which adds to the diversity of input received during the Plan's creation. For a list of partners and sponsors who contributed to the grant, please see Appendix B.

1.3 Public Participation

Although the Clinton County Soil & Water Conservation District (CCSWCD) is a government agency, we rely heavily on input and participation from the public. Public participation is encouraged at each of the monthly CCSWCD Board Meetings and many programs and events are held throughout the year, geared toward educating the public on soil and water conservation issues.

Public participation in the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch 319 Grant was received in the form of surveys, quarterly stakeholder meetings, the Clinton County and 4-H Fair, the CCSWCD Annual Meeting, the Splash into Fall Festival, newspaper articles, and bimonthly Steering Committee Meetings.

Quarterly stakeholder meetings were held to educate the public about the grant and its opportunities for public participation as well as to gain valuable stakeholder input. Stakeholder input received from the meetings is summarized briefly in Appendix F.

The Clinton County & 4-H Fair is held annually at the Clinton County Fairgrounds located in the City of Frankfort. The fair lasts for approximately 10 days and is open to the public. A 200 square foot area was rented out where a display, informational brochures, water trivia game, and stream table were displayed. A separate poster was displayed with a brief description of the grant and a large map for visitors to pinpoint their home in the watersheds.

Photographs: Display booth at the Clinton County & 4H Fair (Left). Leah Harden, SWCD District Administrator demonstrates the Stream Table (Right).

The CCSWCD holds an annual meeting during the first quarter of the year, generally in March (as required by IC 14-32-4-6). The purpose of the meeting is for the supervisors to "make a full and an accurate report of the activities and financial affairs of the district since the previous annual meeting," and to conduct elections for vacated supervisor positions. The meeting is open to all residents in the district and is well attended. A short presentation describing the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch 319 Grant was given during the 2006 and 2007 Annual Meetings, and a display with information about the grant was also set up at the 2007 Annual Meeting.

The first Splash into Fall Festival (re-named Make a Splash Festival in 2007) was held at Camp Cullom on September 30th, 2006 and attracted more than 225 individuals. The event is hosted by the CCSWCD in partnership with the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Steering Committee to educate the community about water quality and its many facets. Several displays and demonstrations are spread out throughout the camp and in the past included: an Indiana Wildlife Federation Backyard Habitat presentation, a Live Macroinvertebrate Sampling demonstration, and a "Snakes Alive" presentation.

Photograph: Snakehead Ed presents the "Snakes Alive" program at the 2006 Splash into Fall Festival

Snakehead Ed educated attendees on snakes: habitat, environmental impacts on habitat, diet, adaptations, and more!

Several Project Wet "Make a Splash" activities were presented by volunteers (including Water Olympics, the Rain Stick Fable, Stormwater Obstacle Course, Take Aim at Groundwater, and Aquifer in a Cup). Other activities included a Rain Fall Simulator, a Wetlands Discovery area, and more!

Photograph: Two young ladies look through the Viewers at live macroinvertebrates.

Quarterly mailings vary between newsletter articles in the Clinton County Agriculture & Conservation Newsletter and postcards. This adds some variety to the informational message and style of message received and hopefully reaches more of our target audience in this manner.

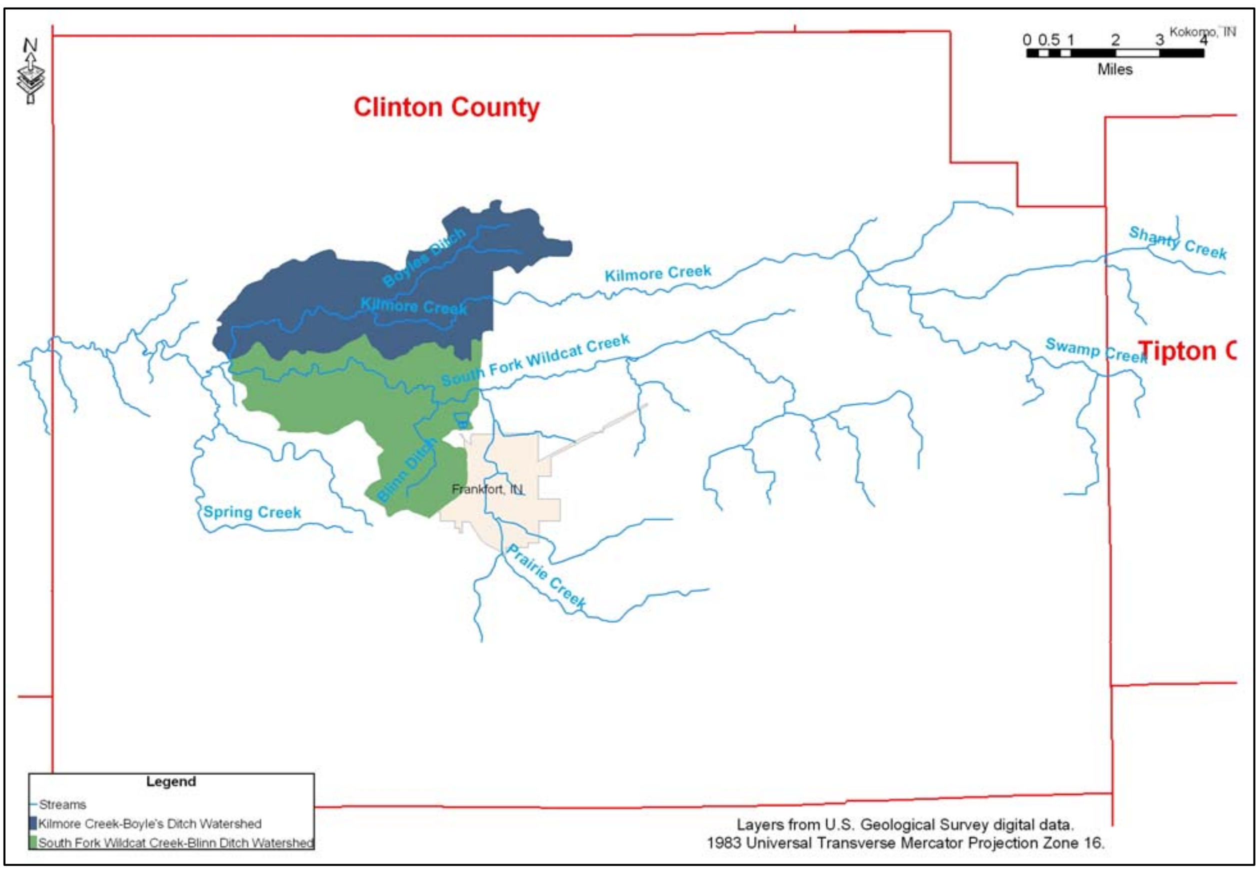
Newspaper articles are submitted on a quarterly basis as well to the Frankfort Times and periodically to the Lafayette Journal & Courier. Readers of both papers reside in the targeted watersheds. Articles are based around water quality topics and generally invite the public to a grant related event, such as a public meeting or field day.

2.0 Watershed Description

2.1 Watershed Location

The watersheds are located in the western-central portion of Clinton County, Indiana. The South Fork Wildcat Creek-Blinn Ditch watershed is approximately 8,360.9 acres and the Kilmore Creek-Boyle's Ditch watershed is approximately 9,582.1 acres. Kilmore Creek empties into the South Fork Wildcat Creek in the western portion of Clinton County just outside of these watershed boundaries. The South Fork Wildcat Creek flows for approximately 12.27 miles with 3.06 miles of that in the tributary Blinn Ditch. Kilmore Creek flows for approximately 15.12 miles with 5.48 miles of the length from the tributary Boyle's Ditch. Total project stream length is 27.39 miles. The headwaters for the South Fork Wildcat Creek are located in the eastern portion of Clinton County, and the headwaters for Kilmore Creek are located just east of the Clinton County line in Tipton County (See Figure 2).

Figure 2: South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watershed with Stream layer.

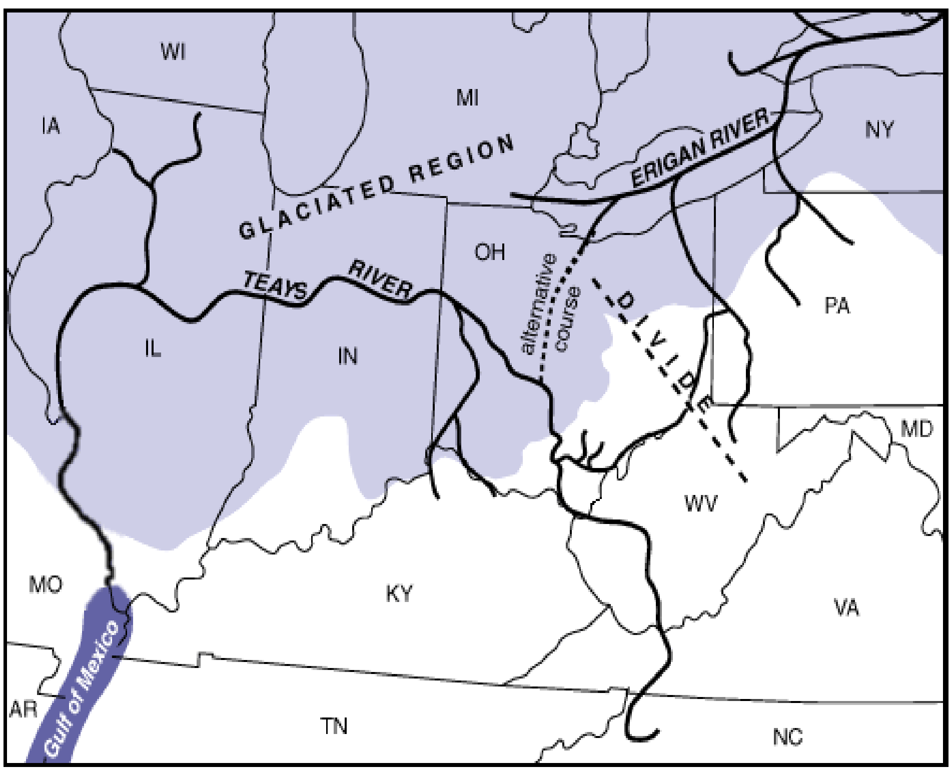


2.2 Description and History

2.2.1 Natural History

Glaciers covered the county until 20,000 years ago. The Wisconsin glacier was the most recent and influential glacier to affect the natural history of Clinton County. The glacial drift ranges from 100 to 400 feet thick and is thickest in the southern part of the county along lines that correspond to the Teays River System. The Teays River system is a pre-glacial system which ran in a general east-west direction across central Indiana (Ohio Department of Natural Resources, 2006). See Figure 3.

Figure 3: Pre-Pleistocene River System



"Traces of an old east-west drainage system, buried by glacial deposits not shown on the map, are conspicuous across northern Ohio and Indiana. Presence of the pre-Pleistocene Teays River is revealed as a sinuous, branching pattern of Ordovician rocks surrounded by overlying Silurian strata. The old river channel was abandoned when its course was diverted southward to the Ohio River drainage by the movements of early Pleistocene ice (light purple) and the emplacement of glacial deposits, probably about 2 million years ago (National Atlas, 2006)."

(Ohio Department of Natural Resources, 1995)

Most of the county was originally heavily forested except for the prairie regions in the south-central to south-western parts of the county. The Twelve Mile (or Kirk's Prairie) is in the southwest part of the county and runs for 12 miles towards the north east. This area of the county is perhaps one of the best for agriculture (Indiana County History Preservation Society [ICHPS], 2000). On the well-drained uplands, sugar maple, walnut, poplar, hickory, beech and oaks were the predominant species of trees. On the poorly-drained soils elm, ash, gum, and white oak were common. In the prairie region, patches of white oak and post oak formed islands on slightly elevated knolls.

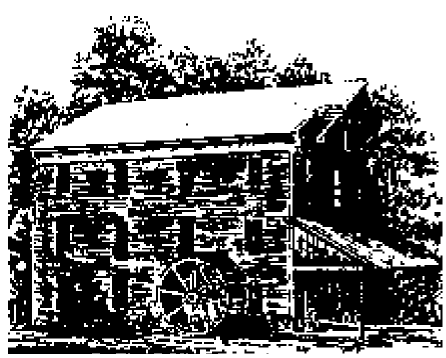
2.2.2 Clinton County History

Prior to European settlement, the Wea and Shawnee Indian tribes had settlements in the Wildcat valley. The Shawnees were considered the fiercest Indian tribe in the state and were continuously at war against the Americans and British. After the War of 1812, the Shawnees sold their land to the government and were moved west of the Mississippi. The Wildcat valley then became a part of the "Big Reserve" which was held by the Miami Indians and included a Wea reservation. In 1818, the Treaty of St. Mary's ceded this property to the government (Clinton County, 1993).

According to James Guthrie, Clinton County was founded January 29th, 1830 and was named for DeWitt Clinton, Governor of New York. Clinton County was formed from a section of Tippecanoe County. Clinton County's topography included expansive prairie in the eastern sections to rolling hills in the west. Originally, large areas of timber existed but as settlement increased, forests were cleared and agriculture developed as an economic force. The numerous creeks in the county, including Sugar Creek, Wildcat Creek, and Kilmore Creek supported another of the early industries: mills. Between 1829 and 1877 at least 12 mills were built on the forks of the Wildcat.

The Clinton County Interim Report published by the Historic Landmarks Foundation of Indiana states that the first permanent settlers came to the area during the 1820s and established two communities. The village of Jefferson in western Clinton County grew up around several mills, and Kirklin, in the southeastern corner, was built at the intersection of one of the state's earliest settlement routes. Frankfort is located near the geographic center of the county and the town was platted as the county seat in 1830 on 60 acres donated by a local landowner. The local landowner named the town for Frankfurt am Main, Germany. During the mid-nineteenth century, the county's rich soil enticed an increasing number of settlers to the area, including a large number of Germans who purchased land in the northwestern townships. Agriculture fast became the county's major industry.

The construction of the railroad through the county caused the formation of several new communities and enhanced established ones. The county seat of Frankfort became a major regional shipping center and at one time had over five railroads intersecting in the city. The railroads provided farmers with access to markets in Chicago, Indianapolis, Ohio, and Missouri (Historic Landmarks Foundation of Indiana [HLFI], 1997). And, today agriculture is still the main industry.



Adam's Mill, Wildcat Creek in Carroll County

2.2.3 Land Use

The land use of the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch watersheds began its change from dense forests and wetlands to agricultural production following settlement of the Europeans in the mid-1800's. These forested and wetland areas were cleared and drained to facilitate better crop production.

Agricultural production through row crops is the most significant land use in both of the watersheds. Over 12,649 acres of the total 17,943 combined watershed acreage is in row crops, primarily corn and soybeans. The following figures depict land use according to the United States Geological Survey Indiana Land Cover Data from 1992.

Table 1: Land Use by Watershed

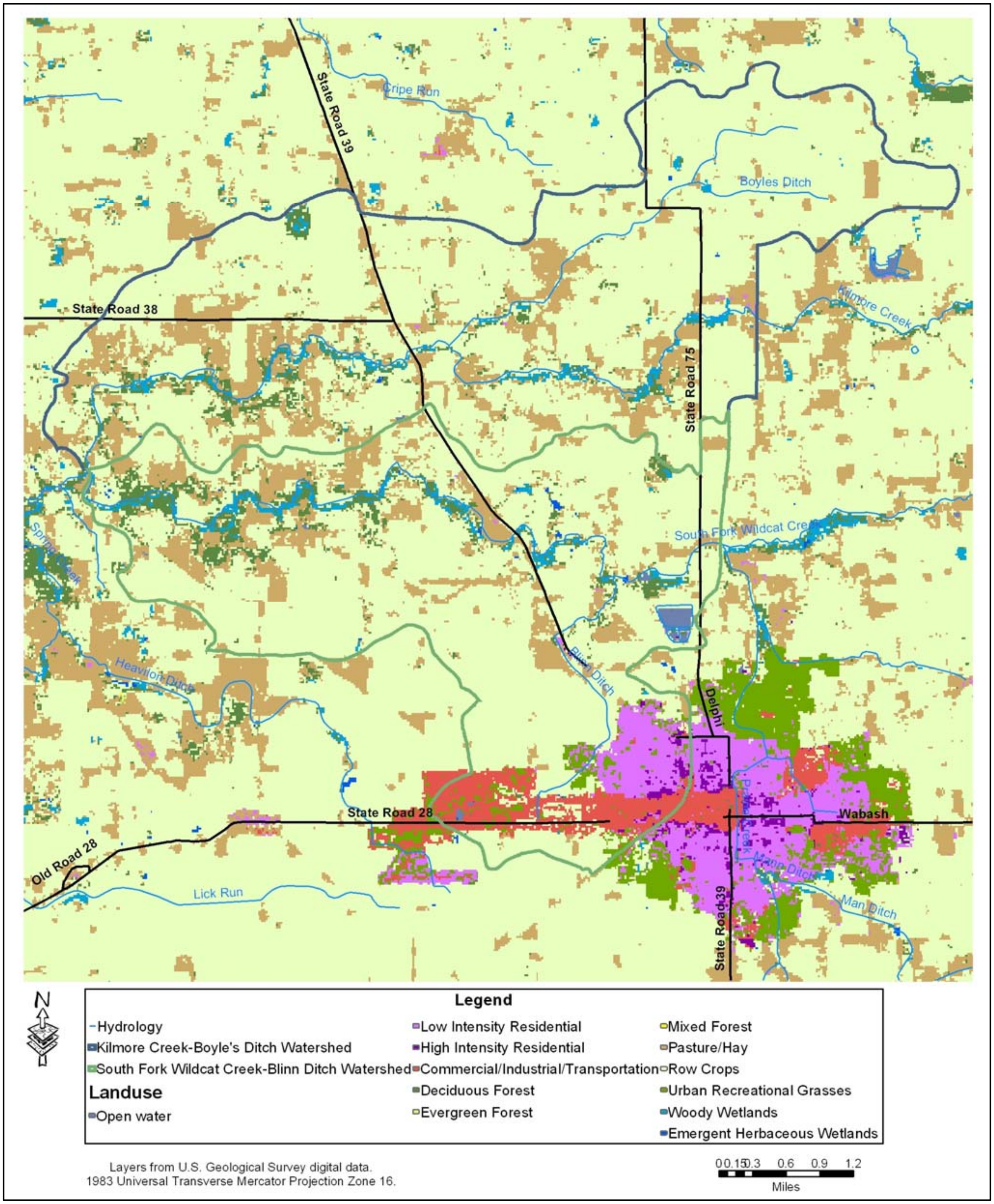
	South Fork Wildcat Creek-Blinn Ditch		Kilmore Creek-Boyle's Ditch	
Land Use Type	*Acres*	*Percentage*	*Acres*	*Percentage*
Open Water	47.6571	0.57	3.83284	0.04
Low Intensity Residential	314.37	3.76	3.83284	0.04
High Intensity Residential	42.6406	0.51	0.00	0.00
Commercial/Industrial/Transportation	426.406	5.1	0.00	0.00
Deciduous Forest	425.57	5.09	339.2063	3.54
Pasture/Hay	1255.81	15.02	1966.247	20.52
Row Crops	5524.05	66.07	7125.25	74.36
Urban/Recreational Grasses	174.743	2.09	0.00	0.00
Woody Wetlands	133.774	1.6	139.8987	1.46
Emergent Herbaceous Wetlands	15.8857	0.19	3.83284	0.04
Total	**8360.9**	**100**	**9582.1**	**100**

The waterways in the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds are small streams or drainage ditches. Only a small portion, 341.34 acres, of the combined watershed acreage is classified as wetland or open water. Several privately owned ponds dot the landscape as well; it is not known how many of these ponds are natural or man-made.

The high intensity residential acreage comes from the Northwestern section of the City of Frankfort. However, low intensity residential acreage is also fairly high in the South Fork Wildcat Creek-Blinn Ditch Watershed due to the scenic rolling hills surrounding the South Fork. Commercial/Industrial/Transportation acreage is nonexistent in the Kilmore Creek-Boyle's Ditch Watershed but accounts for 5% of the South Fork Wildcat Creek-Blinn Ditch Watershed. The industrial area of Frankfort is primarily located along State Road 28 west of Frankfort.

On the northern edge of the Kilmore Creek-Boyle's Ditch Watershed lies the Bryan Woods Nature Preserve (29 acres) which is owned by the Indiana Department of Natural Resources. The preserve is open to the public for hiking and wildlife viewing. The State of Indiana also owns Camp Walter S. Fowler (103 acres) which was used for military training, but is currently idle (see Figure 7).

Figure 4: Current Land Use Map



2.2.4 Soils

The parent material for the soils in Clinton County was deposited by the Wisconsin glacier, melt water from the glaciers, and by wind that blew silt or loess over the county. The soils in Clinton County formed from this glacial till, glacial outwash, and loess. The bedrock beneath the unconsolidated deposits consists of limestone and shale. In a strip from Rossville to Sircleville, it is Devonian age shale and limestone that forms the bedrock. The soils of the rest of the county are underlain by Silurian age limestone.

Glacial till is material that is laid down directly by glaciers with a minimal amount of water action; the small pebbles in glacial till still have some sharp edges, indicating that they have not been rounded by rushing water. The till consists of particles of all different sizes with sharp corners. The sharp corners indicate that they have not been rounded by the flow of water. The glacial till in Clinton County is mainly calcareous. Its texture is mostly loam, but in some areas it is sandy loam or clay loam. An example of soils that were formed from glacial till in the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch watersheds are those of the Hennepin series. Outwash material was deposited by flowing water from the melting glaciers. The size of the particles varies depending on the speed of the water that carried them. The outwash is mainly located along the South Fork Wildcat Creek and Kilmore Creek and the soils that formed are known as Ockley soils.

Soil parent material in the rolling end moraines ranges from loam till to loose sand and gravel. Two soils that formed in thin loess and glacial till are the Miami soils (mainly on end moraines) and the Crosby soils (mainly on ground moraines). Some of these moraine ridges are a source of a thin layer of sand and gravel. Lacustrine materials were deposited from ponded glacial melt water and are pre-dominantly silty or clayey but contain thin sand lenses. Lacustrine deposits are found mostly in potholes of the till plain. Alluvial material was deposited by floodwaters of streams in recent times. The material varies depending on the speed of the floodwater that deposited it. Examples of soils of this nature exist in our watersheds and reside in the Genesee and Landes soil categories.

Organic deposits consist of partially decomposed plant remains from grasses and sedges that died after the glaciers withdrew and water flooded shallow lakes and depressions. Because of the wetness, the plant remains were unable to decompose. The lakes eventually became filled with organic material and developed into muck. The plant remains decomposed after the lakes became filled and Houghton soils formed in organic matter.

The loess in our watersheds was carried by wind from western sources, likely from local streams and perhaps the Wabash River Valley. Fincastle soils, found in our regions, formed in 24 to 40 inches of loess over glacial till.

The soils in the county vary in maturity and in the process of soil formation from mature to young. The soils have been exposed long enough to form distinct soil horizons in the soil profile. However, some soils that have formed from recent alluvial material lack these distinct horizons. Processes that have been involved in the formation of the soils include: accumulation of organic matter; solution, transfer, and removal of calcium carbonates and bases; and the liberation and translocation of silicate clay minerals. Please refer to Table 2 for soil association descriptions and information and Figure 5 for a map of the associations and approximate highly Erodible soil areas (Soil Survey of Clinton County, Indiana, 1980).

Table 2: General Soil Associations and Characteristics found in these watersheds

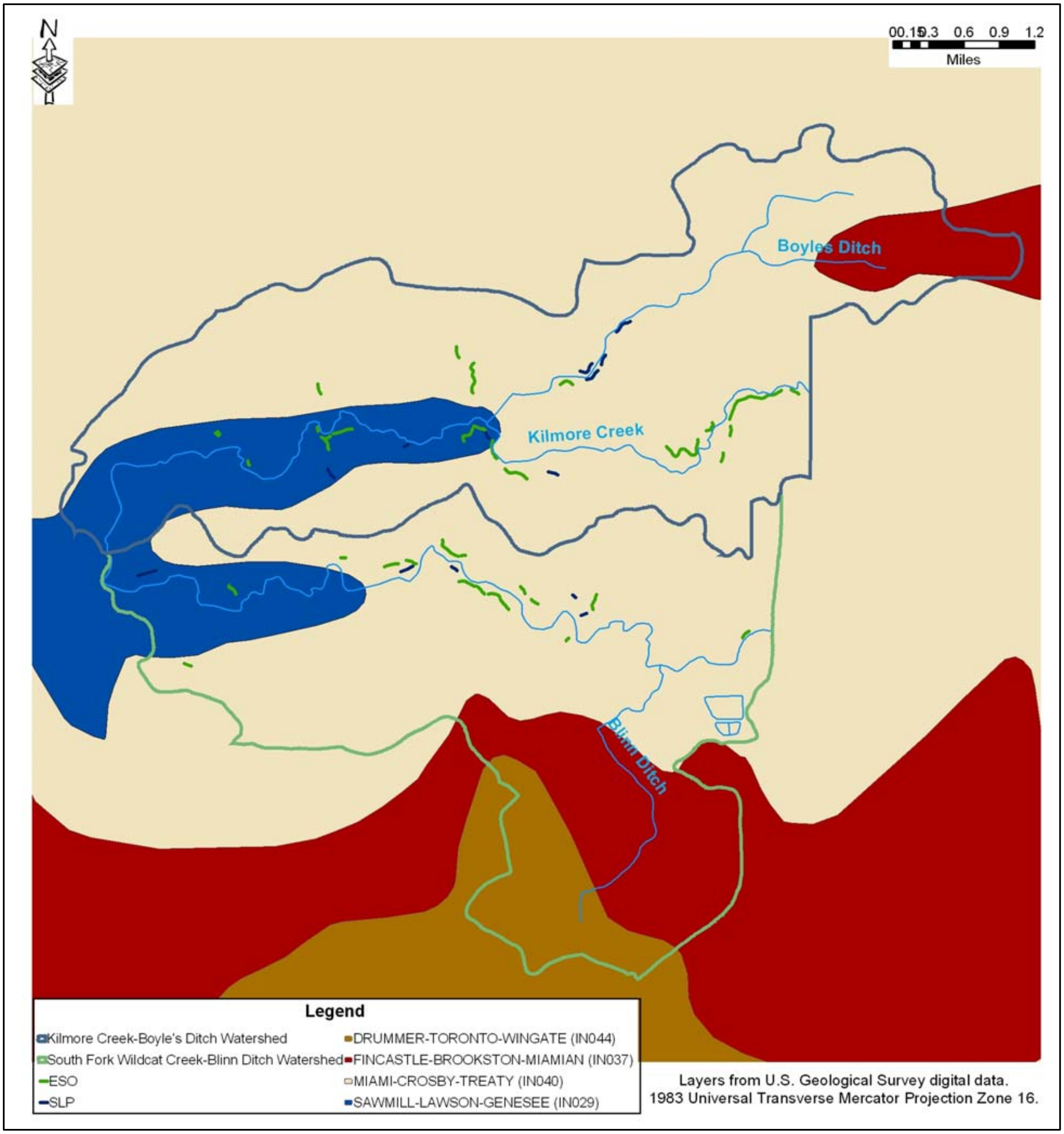
Drummer-Toronto-Wingate	*Sawmill-Lawson-Genesee*	*Fincastle-Brookston-Miamian*	*Miami-Crosby-Treaty*
Nearly level, poorly drained and somewhat poorly drained, silty soils; on till plains	Nearly level, well drained to very poorly drained, formed in loamy alluviaum; in bottomlands	Nearly level and gently sloping, poorly drained; silty soils; on uplands	Strongly sloping to nearly level, well drained and somewhat poorly drained, silty and loamy soils; on till plains

Soil erosion involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. Soil erosion on cropland is of interest because of its on-site impacts on soil quality and crop productivity, and its off-site impacts on water quality. Sedimentation, caused by soil erosion, is the number one pollutant to our lakes, rivers, and streams in the United States. According to the Natural Resources Conservation Service 2003 National Resources Inventory, between 1982 and 2003 soil erosion on U.S. cropland decreased by 43%. These findings were based on two types of erosion: Sheet and rill erosion (removal of soil from rainfall and runoff) and wind erosion (detachment of soil by wind). Although these declines in soil erosion are attractive, they have moderated since 1997.

Highly Erodible Lands are determined based on several different soil, climate, and chemical characteristics. An Erodibility Index (EI) is determined based on erosion equation factors from two erosion models: the Universal Soil Loss Equation (USLE) and the Wind Erosion Equation (WEQ). The EI is a numerical index that depicts the potential of a soil to erode and the higher the index, the greater is the investment needed to maintain the sustainability of the soil resource base. Cropped HEL is defined to have an EI of at least 8 (Natural Resources Conservation Service [NRCS], 2006).

Figure 5 displays the general soil associations and those areas with soils that have a high potential for erosion in the South Fork Wildcat Creek and Kilmore Creek watersheds. The green line indicates ESO (Escarpment, nonbedrock) and SLP (Short, steep slope) soils. ESO soils have a relatively continuous and steep slope or cliff, which generally is produced by erosion but can be produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil. SLP is a narrow soil area that has slopes that are at least two slope classes steeper than the slope class surrounding the map unit. Many of the ESO and SLP areas indicated on the map may be classified as HEL.

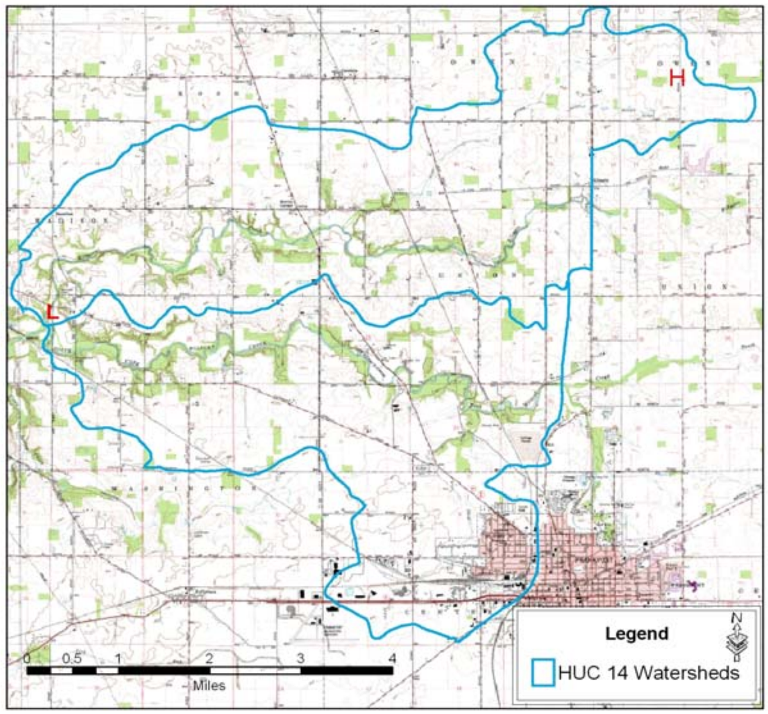
Figure 5: Soils Association Map with approximate Highly Erodible Soil Areas



2.2.5 Topography

The topography of the South Fork Wildcat Creek-Blinn Ditch Watershed varies greatly from that of the Kilmore Creek-Boyle's Ditch Watershed. Within the South Fork Wildcat Creek-Blinn Ditch Watershed, the southern portion is relatively flat, but as you approach the middle to northern regions of the watershed rolling hills prevail. The hills primarily follow the South Fork Wildcat Creek. However, along Kilmore Creek the land is less rolling and the entire watershed is more flat. Both watersheds floodplains are located along the banks of the South Fork Wildcat Creek and Kilmore Creek. The highest point in the watershed is in Owen Township on the northeastern side and is labeled "H" on the map at 876'. The lowest point is in Madison Township on the western side and labeled "L" on the map at 745'. The relief between the points is 131 feet. The general slope of the watersheds (from high to low) is in an east to west direction (see Figure 6).

Figure 6: Elevation of the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch watersheds



2.2.6 Hydrology

Two major stream systems exist within these watersheds and include the South Fork Wildcat Creek and Kilmore Creek. These creeks and their tributaries make up approximately 27.42 miles of waterways within the watersheds. The headwaters of South Fork Wildcat Creek are located in northwestern Tipton County, and the headwaters of Kilmore Creek are located in eastern Clinton County. All of the waterways in these watersheds drain to the South Fork Wildcat Creek, a State Scenic River. Most of the tributaries are also county regulated drains and have been modified through dredging for drainage ditch maintenance.

Approximately 2% of the entire watershed acreage is wetlands and open water. One of the larger open water areas is the Frankfort Lagoons. The Lagoons are a series of three holding ponds that were used by Del Monte until 1977 for treatment of their tomato slurry and are now owned by the City of Frankfort. Natural drainage in the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds is poor and drainage tiles are a necessity for crop production. Currently drainage tiles drain into the Lagoons, which now are characterized by two open fishing ponds and a larger wetland area filled with phragmites.

2.2.7 Impervious Surface Area

Impervious surfaces such as asphalt, concrete, rooftops, and compacted earth prevent the infiltration of water into the ground. According to the Center for Watershed Protection's '*Watershed Protection Techniques*', there is a direct relationship between the amount of impervious surfaces in a watershed and the quality and quantity of water found in that ecosystem. The following thresholds suggest the impact of impervious surface to a watershed based on percentage of impervious surface: where less than 10% of a watershed is covered in impervious surfaces, the streams are generally protected; where 11-25% of a watershed is covered in impervious surfaces, the streams are most likely impacted; where over 25% of a watershed is covered in impervious surfaces, the streams are most likely degraded.

The amount of impervious surface in the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch watersheds was calculated using the '*Watershed Inventory Tool for Indiana*' methodology (see Table 3).

The impervious surface area in the SFWC-BD watershed totals approximately 488.14 acres or 5.84%. This watershed contains a portion of the northwestern Frankfort city limits (located in the southern third of the watershed). The land use in that area is high density residential and commercial/industrial. Therefore, the impervious area of the SFWC-BD watershed is primarily concentrated in the Southern third of the watershed. So, while the impervious surface area is low over all, the impact of the highly concentrated area could cause stream degradation.

The impervious surface area in the KC-BD watershed totals approximately 96.55 acres or 1.01%. This watershed is primarily agricultural and does not house industries or high density residential properties.

Table 3: Impervious Surface Area

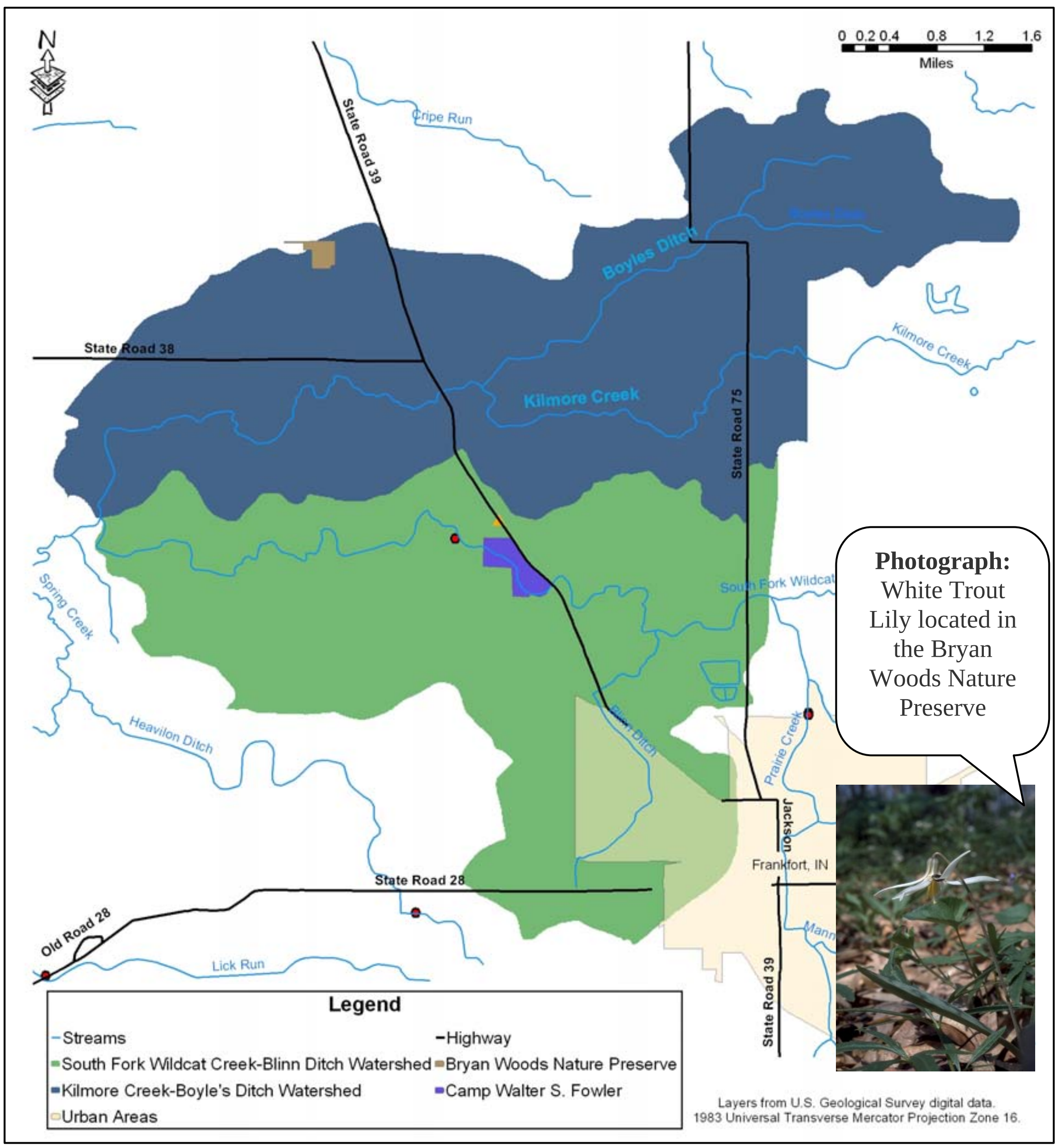
South Fork Wildcat Creek-Blinn Ditch Total Watershed Acres = 8,360.9				
Actual Land Use	*Area (acres)*	*Impervious Fraction*	*Impervious area (acres)*	*% of Acreage*
Low Density Residential	314.37	0.2	62.874	0.75%
High Density Residential	42.64	0.4	17.056	0.20%
Industrial/Commercial	426.406	0.78	332.59668	3.98%
Agricultural	6779.86	0.01	67.7986	0.81%
Wildlands/Forest	781.17	0.01	7.8117	0.09%
		Total Impervious Area	**488.13698**	**5.84%**

Kilmore Creek-Boyle's Ditch Total Watershed Acres = 9582.1				
Actual Land Use	*Area (acres)*	*Impervious Fraction*	*Impervious area (acres)*	*% of Acreage*
Low Density Residential	3.83	0.2	0.766	0.01%
High Density Residential	0	0.4	0	0.00%
Industrial/Commercial	0	0.78	0	0.00%
Agricultural	9091.49	0.01	90.9149	0.95%
Wildlands/Forest	486.38	0.01	4.8638	0.05%
		Total Impervious Area	**96.5447**	**1.01%**

2.2.8 Land Ownership

Primarily land within the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds is privately owned. However, several large areas of land are owned by industries, the Clinton County Landfill Partnership, and the state. One National Pollutant Discharge Elimination System facility is located within the watersheds- Frito Lay. The Clinton County Landfill is located off of State Road 39 and encompasses approximately 93 acres. The state owns a large section of land along South Fork Wildcat Creek known as Camp Walter S. Fowler. In addition, the Indiana Department of Natural Resources Bryan Memorial Nature Preserve is located off of 450W in Ross Township and is approximately 30 acres.

Figure 7: Public Land Areas including Bryan Woods Nature Preserve, Camp Walter S. Fowler, Clinton County Landfill, and NPDES Discharge Pipes



2.2.9 Endangered Species

According to the Indiana Department of Natural Resources Division of Nature Preserves, several species of endangered, threatened, and rare plants and animals have been identified in Clinton County (Table 4). A detailed field study was not conducted to verify whether or not these plants and animals were located in the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds. However, Indiana Natural Heritage Data was received from the Indiana Department of Natural Resources (Table 5).

Table 4: Endangered, Threatened, and Rare Plants and Animals

Type	**Species Name**	**Common Name**	**Federal Listing**	**State Listing**
Mussel	Alasmidonta viridis	Slippershell Mussel	Not listed	Concern
Bird	Ardea herodias	Great Blue Heron	Not listed	Concern
Bird	Buteo lineatus	Red-shouldered Hawk	Not listed	Special Concern
Bird	Nycticorax nycticorax	Black-crowned Night-Heron	Not listed	Endangered
Mammal	Lutra canadensis	Northern River Otter	Not listed	Endangered
Mammal	Lynx rufus	Bobcat	No status	Endangered
Mammal	Myotis sodalis	Indiana Bat	Endangered	Endangered
Mammal	Taxidea taxus	American Badger	Not listed	Endangered
Vascular Plant	Poa wolfii	Wolf Bluegrass	Not listed	Rare
High Quality Natural Community	Forest	Central Till Plain Flatwoods	Not listed	Significant
High Quality Natural Community	Prairie	Mesic Prairie	Not listed	Significant

Table 5: Indiana Natural Heritage Data

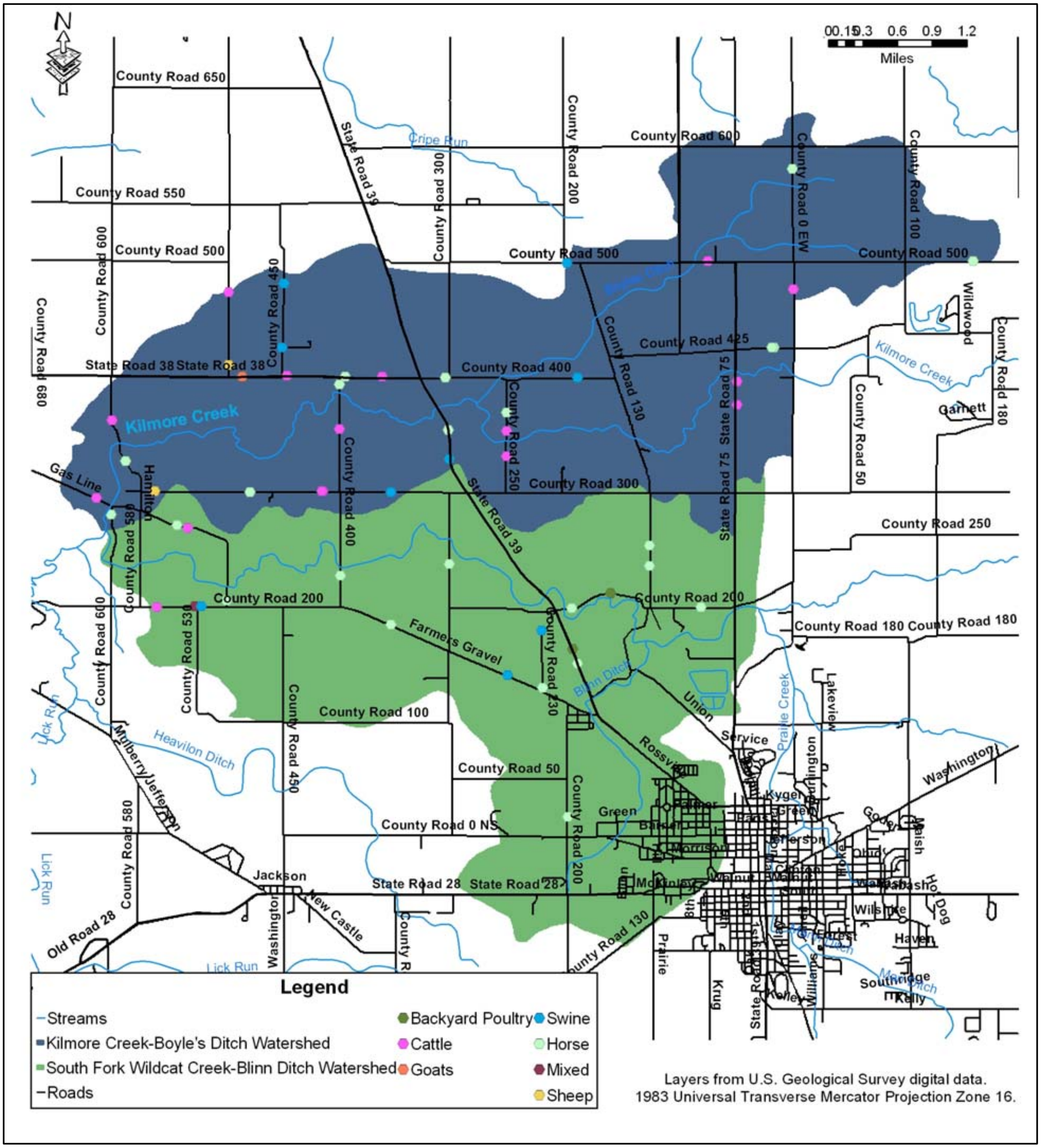
Kilmore Creek-Boyles Ditch			
Type	**Species Name**	**Common Name**	**Date Sited**
Mammal	Myotis sodalis	Indiana Bat	July 1999
Mammal	Taxidea taxus	American Badger	November 1984
Bird	Buteo lineatus	Red-shouldered Hawk	May 1986
Mammal	Lynx rufus	Bobcat	October 1982
Bryan Woods Nature Preserve			
High Quality Natural Comm.	Forest	Central Till Plain Flatwoods	No Date
Vascular Plant	Poa wolfii	Wolf Bluegrass	June 1972

(IDNR, 2006)

2.2.10 Livestock

The Clinton County Cooperative Extension Service conducted an inventory of Livestock in the county in 2003. This survey was overlayed onto the watershed map and provides a basic estimate of the amount and type of livestock found in the watershed. Of most interest to the plan, are those livestock that appear close enough to a water body that they may have access.

Figure 8: Livestock Inventory Map



3.0 Identifying Water Quality Problems

3.1 Stakeholder Concerns

The following list of stakeholder concerns stems from information gathered at the public meetings held for this project. These concerns are not based on scientific data; however, the concerns have been matched with the relevant Problem Statements (see Appendix D) which were created based on the Stakeholder Concerns and baseline water quality data.

Table 6: March 21st, 2006 Stakeholder Meeting Results. **X** indicates that research does not confirm the problem exists. **+** indicates that there is information that a problem exists.

Category	Problem Statement #	X – No Info. + - Proven Issue	Stakeholder Thoughts and Concerns
Erosion & Sedimentation	1, 2, 3, 4, & 9	X	Broken down field tiles causing excess field runoff
		+	Decline in fish population quantity and quality
		+	Stream bank erosion
		+	Low percentage of farmers practicing Conservation Tillage
		+	Heavy use areas of recreation from ATVs and horses cause sedimentation
		+	Excess sedimentation in streams
Stormwater Pollution	5 & 6	+	Oil/Gasoline runoff from junk cars stored in flood plains
		+	Runoff from storm drains
		X	Urban pet waste runoff
		+	Urban fertilizer runoff
Chemicals and Nutrients	1, 2, & 4	+	Excess nutrient loading
		+	Herbicides and pesticides reaching water
		+	Improper application of chemicals
Bacteria	6 & 7	+	High *E. coli* levels from septic systems
		X	High *E. coli* levels from wildlife & pets
		+	High *E. coli* levels from livestock
Education	8	+	Lack of community awareness
		+	Need for more community involvement
Recreation	10	X	Lack of quality fish for fishing
		+	Need for more trails
		+	Lack of access for canoes and kayaks

Although the above list is fairly extensive, it is important to note that most of the individuals at the March 21st, 2006 Stakeholder Meeting were concerned mainly with the recreational impacts of poor water quality. Fish quality and quantity was focused upon the most widely.

However, during the September 22nd, 2006 Stakeholder Meeting that was geared toward local government officials, recreational impacts were hardly discussed. Government officials were more focused on the impacts of septic systems, construction sites, salvage facilities, and drainage. It is important that we meld the critical issues discussed in these meetings to address all issues brought forth.

Table 7: September 22nd, 2006 Stakeholder Meeting Results. **X** indicates that research does not confirm the problem exists. **+** indicates there is information that a problem exists.

Category	Problem Statement #	X – No Info. + - Proven Issue	Stakeholder Concerns and Thoughts
Construction Site Erosion	9	+	Reaching those who do not qualify for a Rule 5 permit
		+	Large potential for new construction
Education	8	+	Stormwater Education does not seem to be working well
		+	Need for more newspaper articles, workshops, & brochures
		+	Encouragement of 66' buffers
		X	Partner with the Clinton County Commissioners
		X	Need for direct mailings to landowners in critical areas
		+	Need for more unique forms of education
Septic Systems	7	X	Education to landowners
		+	Awareness and education for Realtors and Financial institutions needed
		+	Do not focus only on septic maintenance
		+	Reach the septic providers with education
		+	Encourage a maintenance program
		+	Local government ordinances
		+	Funding for Septic Systems
		X	Barrett's Law
		X	Utilize the abandoned Rails to Trails program
		+	Formation of a regional sewer district
		+	Location of non-sewered areas (Kilmore)

Category	**Problem Statement #**	**X – No Info. + - Proven Issue**	**Stakeholder Concerns and Thoughts**
Salvage Facilities	5 & 8	+ X + +	Who inspects and what permits are required? Local involvement through APC is needed Compressed Steel just outside of boundary Encourage BMPs at salvage facilities
Railroad Yards	6	+ +	Contribute runoff Need new innovative methods of preventing runoff
County Wide Watershed Drainage Management	2	+ +	City and County need to form a strong partnership Drainage Planning is needed
Recreational Opportunities	10	+ +	Parks (i.e., Lagoons, Trails) Creeks (Water activities)

4.0 Known Water Quality Problems

The following section provides a summary of water quality monitoring efforts and identifies water quality impairments documented in studies of the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds.

4.1 303(d) List of Impaired Waters

In addition to the Upper Wabash River Basin Study of 1998, IDEM also produces a biennial list of streams with water quality impairments as required by Section 303(d) of the Clean Water Act. This list identified multiple waterbodies within the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds since the lists inception in 1998. The most recent 303(d) List of Impaired Waterbodies was published in 2006 as a part of the Indiana Integrated Water Monitoring and Assessment Report 2006. See Table 8 for the listings in these watersheds and Appendix F for a map depicting the impaired stream segments.

Table 8: 2006 303(d) List (abbreviated)

Basin	14-Digit HUC	County	Waterbody Segment ID	Waterbody Segment Name	Cause of Impairment
Upper Wabash	05120107 040040	Clinton	INB0744_T1019	South Fork Wildcat Creek-Mainstem	*E. coli*
Upper Wabash	05120107 040090	Clinton	INB0749_00	Kilmore Creek	*E. coli*
Upper Wabash	05120107 040090	Clinton	INB0749_T1001	Boyles Ditch-Unnamed Tributary	*E. coli*
Upper Wabash	05120107 040090	Clinton	INB0749_T1001	Boyles Ditch-Unnamed Tributary	Impaired Biotic communities
Upper Wabash	05120107 040090	Clinton	INB0749_T1002	Boyles Ditch	*E. coli*
Upper Wabash	05120107 040090	Clinton	INB0749_T1002	Boyles Ditch	Impaired Biotic communities

The IDEM Office of Water Quality prepared the "Indiana Integrated Water Monitoring and Assessment Report 2006" which is required by the United States Environmental Protection Agency. According to the 2006 Report, six Waterbody segments within the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyles Ditch Watersheds were reported as not supporting for some activity. Boyles Ditch and an unnamed tributary of Boyles Ditch are not supporting of Aquatic Life use. However, Kilmore Creek, South Fork Wildcat Creek, South Fork Wildcat Creek-Cary Camp, and South Fork Wildcat Creek-Mainstem are all fully supporting of aquatic life. Conversely, according to the Waterbody assessment, none of the waterbodies supported primary contact recreational use. *E. coli* impaired all of the waterbodies either slightly or moderately, and Boyles Ditch (and the unnamed tributary) was highly impaired for biotic communities (IDEM 2006).

4.2 Fish Consumption Advisories

Since 1972, the Indiana State Department of Health (ISDH), Indiana Department of Natural Resources (IDNR), and the Indiana Department of Environmental Management (IDEM), with support from Purdue University, have collaborated to produce an annual *Indiana Fish Consumption Advisory*. The advisory is based on a statewide survey of fish populations for long-lasting contaminants found in fish tissue such as polychlorinated biphenyls (PCBs), pesticides, and heavy metals.

According to the 2006 and 2007 FCA, a carp advisory for PCBs is in effect for all Indiana Rivers and streams. Specific fish consumption advisory listings for the South Fork Wildcat Creek-Blinn Ditch (SFWC-B) and Kilmore Creek-Boyles Ditch (KC-B) Watersheds are depicted in Table 9. The Indiana State Board of Health (ISBH) criterion for fish consumption advisory groups is available at http://www.in.gov/isdh/fca/index.htm.

Table 9: FCA for the SFWC-B and KC-B Watersheds

Location	Species	Fish Size (in)	Contaminant	Group
Kilmore Creek	Carp	Up to 12	-	1
Kilmore Creek	Creek Chub	Up to 7	-	1
South Fork Wildcat Creek	Black Redhorse	13+	PCBs	3
South Fork Wildcat Creek	Carp	Up to 18 18-26 26+	PCBs	2 3 4
South Fork Wildcat Creek	Channel Catfish	19+	PCBs	3
South Fork Wildcat Creek	Creek Chub	7+	PCBs	3
South Fork Wildcat Creek	Golden Redhorse	11+	PCBs	3
South Fork Wildcat Creek	Longear Sunfish	4+	PCBs	3
South Fork Wildcat Creek	Rock Bass	7+	PCBs	3
South Fork Wildcat Creek	Smallmouth Bass	10+	PCBs	3
South Fork Wildcat Creek	White Sucker	12+	PCBs	3

(ISDH, 2007)

4.3 Hoosier Riverwatch

Hoosier Riverwatch is a state-sponsored water quality monitoring program that was started to increase public awareness of water quality issues by training volunteers to monitor stream water quality. Hoosier Riverwatch is a collaboration between the Indiana Department of Natural Resources, Indiana Department of Environmental Management, Purdue University, and

Indiana Soil and Water Conservation Districts. Volunteer water quality data is uploaded to the Hoosier Riverwatch webpage (www.hoosierriverwatch.com) for volunteer and public use.

According to the website, water quality monitoring has been conducted on one site within the Kilmore Creek-Boyle's Ditch Watershed yearly since 2002. The site is located 1/8 mile west of the Hamilton Road Bridge on Kilmore Creek (Baseline Water Quality Study Site #1). The results from this site indicate excellent habitat and an overall water quality score of around 80.

It is important to note that the Hoosier Riverwatch monitoring program is not rigorous enough to identify the causes and sources of pollutants, but the results are consistent with our baseline water quality study, which indicates that habitat in Kilmore Creek is excellent but that a water quality problem does exist.

4.4 2006-2007 Baseline Water Quality Study

Commonwealth Biomonitoring, Inc. conducted a baseline water quality study for the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch sub watersheds as a part of this grant. In addition, the Watershed Coordinator was responsible for collecting *E. coli* samples and transporting them to the Frankfort Wastewater Treatment Plant where they were analyzed using the Colilert Quanti-Tray method. The study began in April 2006 and was completed in October of 2007. Sampling sites are depicted in Figure 9, and the physical, chemical, and biological parameters being measured are shown in Table 10.

Figure 9: Map of Baseline Water Quality Sampling Sites

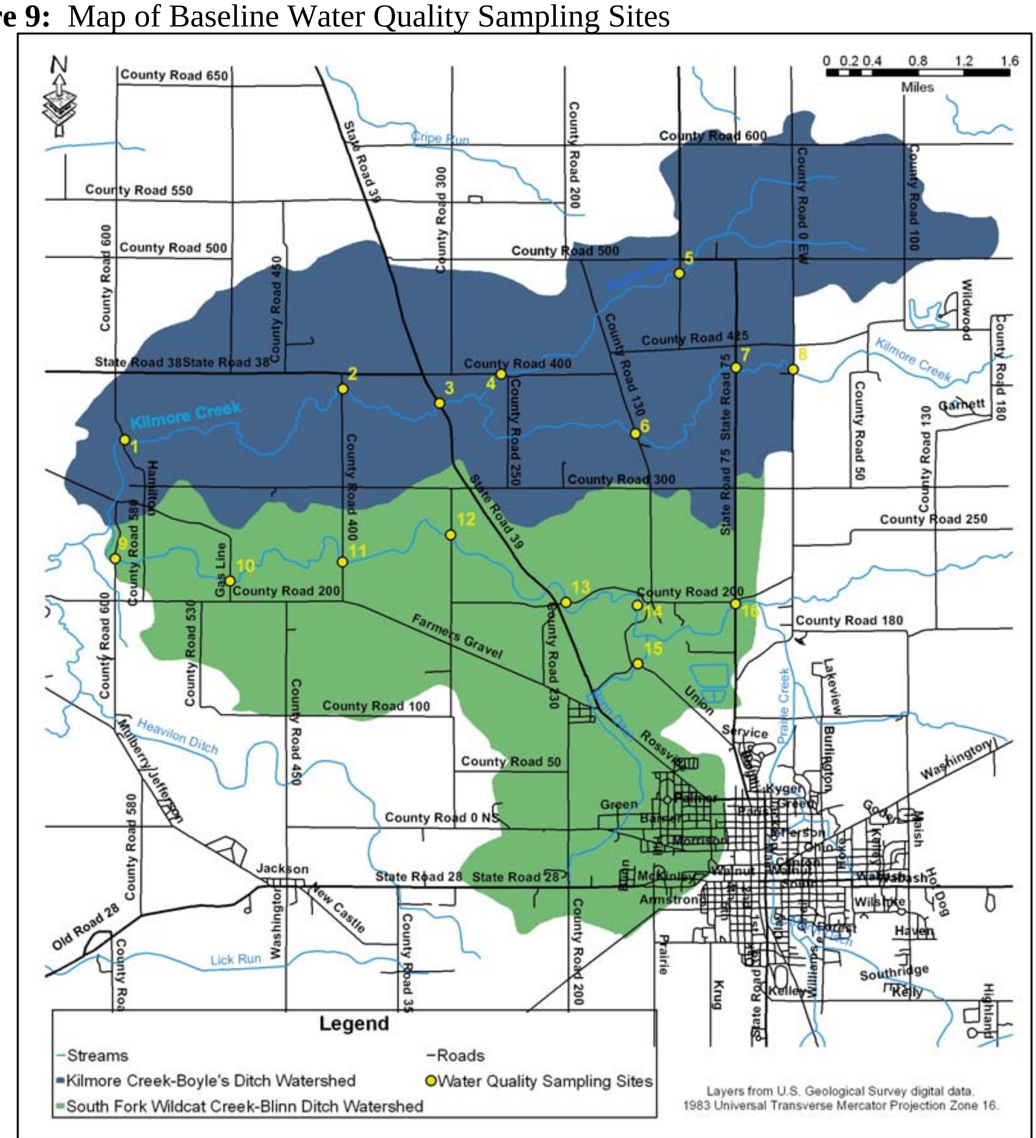


Table 10: Physical, chemical, and biological parameters. All methods of data collection are detailed in the Quality Assurance Project Plan (QAPP).

Measurement	Parameters	Timetable
Habitat	Qualitative Habitat Evaluation Index at 8 sites in each watershed (total of 16). One sample per year for two years.	▪ May 2006 & 2007
Biological	Macroinvertebrate IBI at 8 sites in each watershed (a total of 16 sites). One sampling event each year for two years using the Ohio EPA protocol.	▪ May 2006 & 2007
Chemical and Physical	Nitrogen (nitrates-nitrites), total phosphorus, total suspended solids, pH, temperature, conductivity, dissolved oxygen, stream flow. These parameters will be measured at 8 sites in each watershed (a total of 16 sites). Measurements will be made four times a year for two years. One event each year will be immediately following a storm.	▪ April, June, August, and October 2006 & 2007
Atrazine	Atrazine analysis at 4 sites in each watershed (a total of 8 sites). Three sampling events per year for two years.	▪ April -June 2006 - 2007
E. coli	*E. coli* will be measured at 8 sites in each watershed (a total of 16 sites). Samples will be collected and analyzed weekly from April 1 to October 31st during a two year period.	▪ April 1 to October 31 2006 & 2007

Of the two watersheds, Kilmore Creek was found to be in better ecological health. Biotic integrity scores were good to excellent in the Kilmore Creek watershed, but despite good aquatic habitat, the South Fork Wildcat Creek had degraded aquatic communities. This indicates that poor water quality, as opposed to lack of habitat, is the concern. Data from the baseline water quality study portrays elevated levels of *E. coli*, atrazine, total phosphorus, conductivity, and total suspended solids at many sites; while nitrates-nitrites were high only at one site in October 2007. Low levels of dissolved oxygen were continuously found on Boyle's Ditch, but low oxygen levels were not found to be a problem at other sites. All water chemistry data is included in Appendix K.

Figure 10: Average Conductivity data.

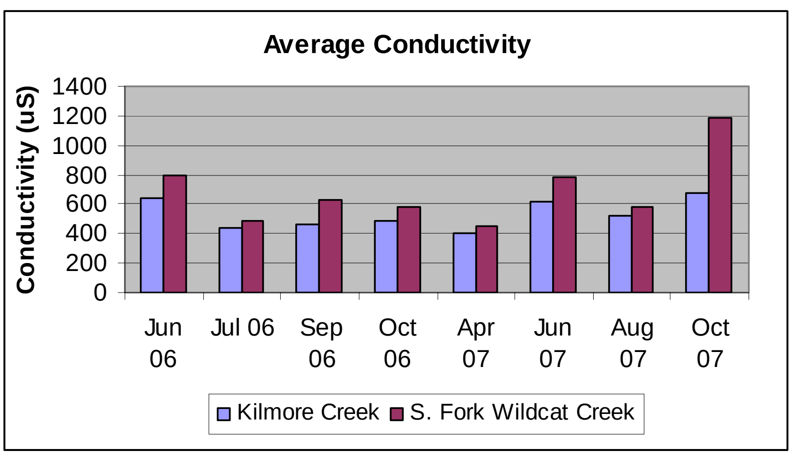


Figure 11: Average Dissolved Oxygen data.

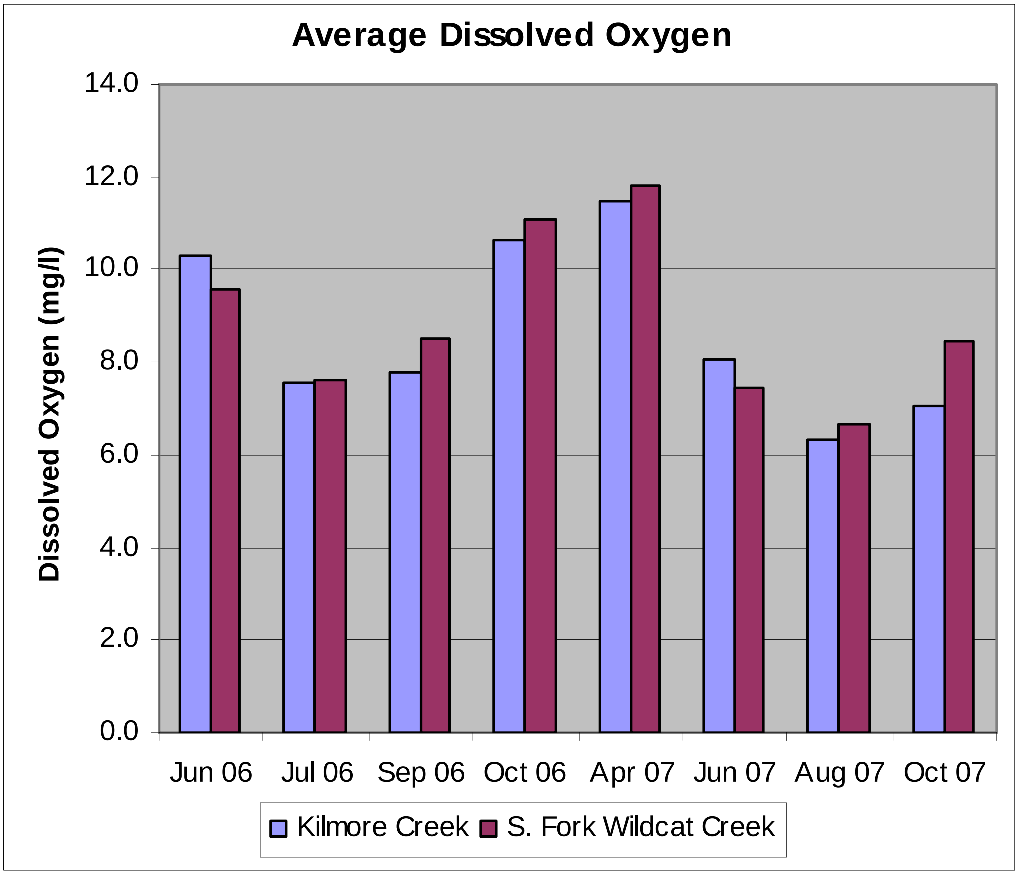


Figure 12: Average Total Suspended Solids during base flow.

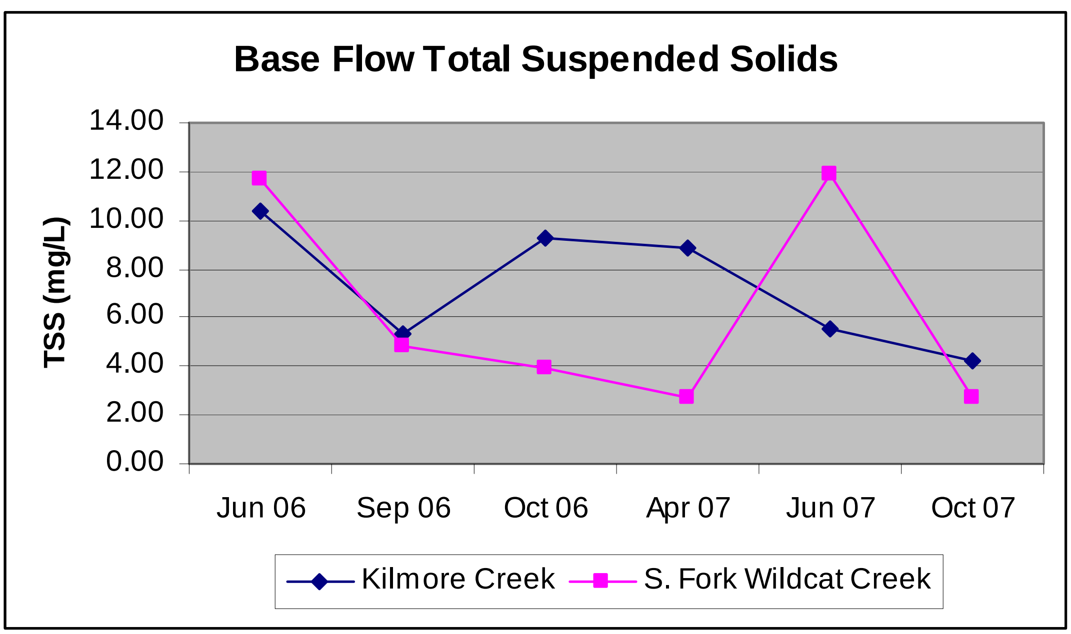
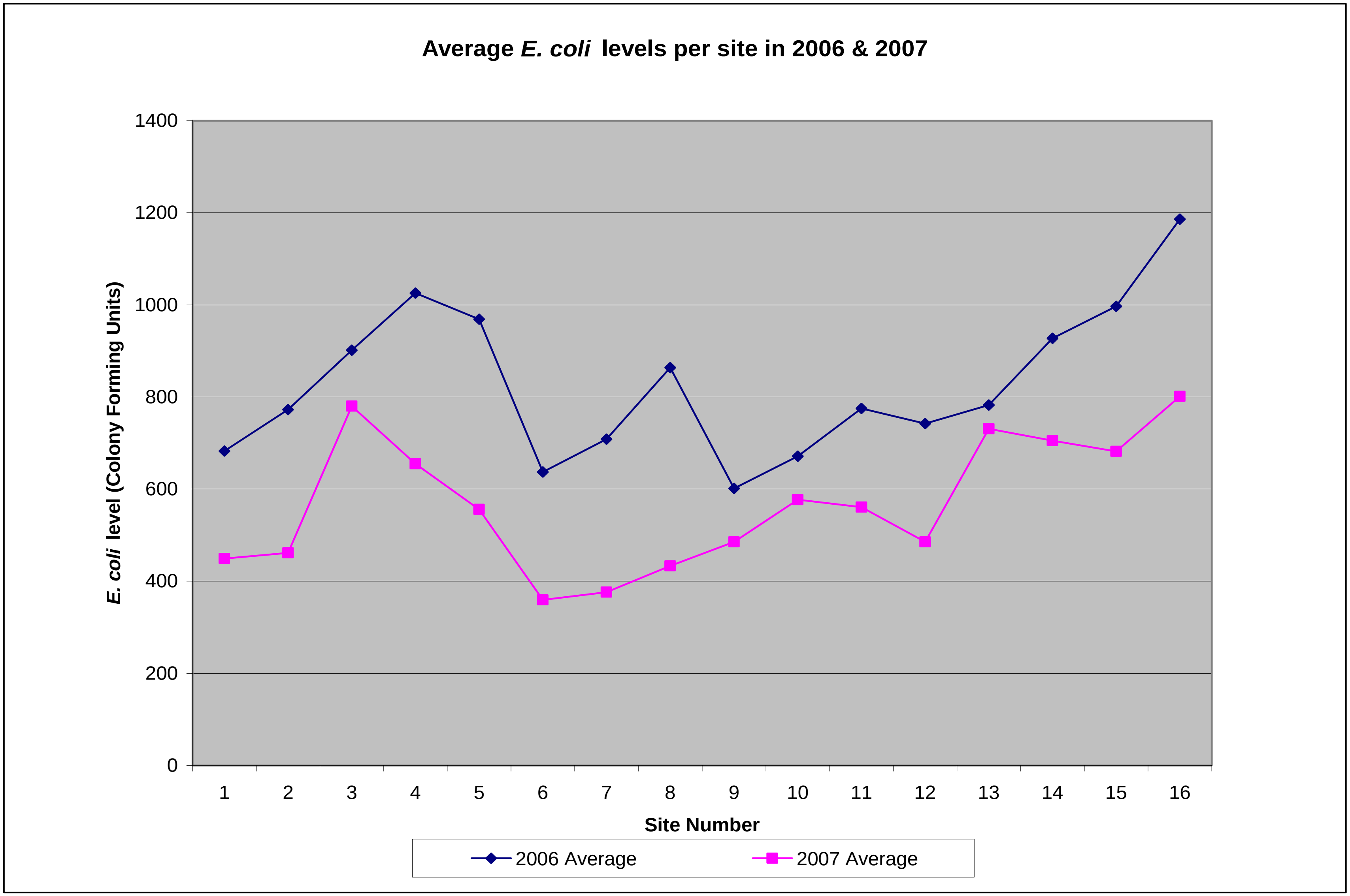


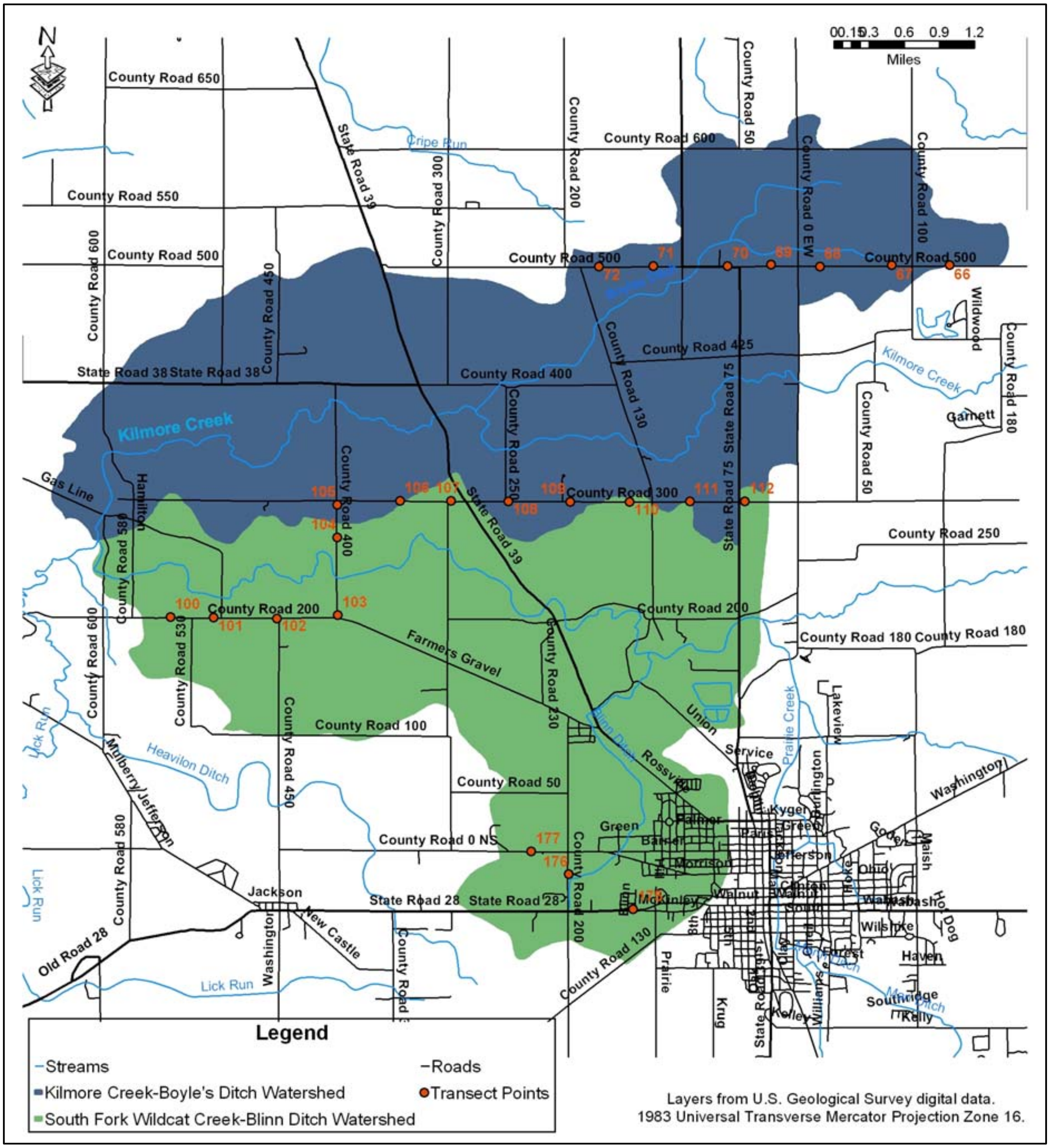
Figure 13: Average E. coli levels per site for 2006 & 2007.



4.5 2007 Tillage Transect

According to the 2007 Tillage Transect data, approximately 25% of the fields in the watersheds are being no-tilled, 54% of the fields are conventionally tilled, and 6% are being tilled with other conservation tillage techniques. The tillage transect data for these watersheds can be found in Appendix J. The transect does not cover the entire watershed, but an adequate sample of the watershed is checked (see Figure 14 for a map of the transect data sites).

Figure 14: Tillage Transect Data Points



4.6 2006-2007 Landowner Surveys

In addition to the chemical and physical baseline studies, a social study in the form of a survey was mailed out to each of the landowners within the two watersheds to allow us to gain information on their current knowledge of water quality along with their willingness to participate in our programs. The initial survey conducted by the CCSWCD was mailed to approximately 250 landowners and organizations. Out of the 250 surveys mailed, approximately 50 were completed and returned (approximately 20% participation). Of those surveys that were completed, approximately 60% own land connected to a stream, creek, pond, or wetland. 80% of the surveys returned felt that overall water quality was very important to their families and 83% of those respondents agreed that the South Fork Wildcat Creek and Kilmore Creek are polluted. A full summary of the initial survey results is located in Appendix L.

In the spring of 2007, our project was selected to be a Pilot Project for the Great Lakes Regional Water Program (a partnership of USDA CSREES & Land Grant Colleges and Universities) Social Indicators for Nonpoint Source Management (NPS) Study. The project is intended to improve and protect water quality through the design and implementation of a system for integrating social indicators into NPS planning, implementation, and evaluation. Locally, we worked with Professors and Grad Students of Purdue University to develop a survey that would allow us to compare current baseline social indicator information with changes that occur in the watershed over the project's lifetime. The survey was mailed to landowners in the summer of 2007 using a five-wave method: an advanced notice of the survey was mailed, the survey was sent, a postcard reminder was sent, and two replacement surveys were sent to non-respondents. The response rate for the survey was 45% and included both mail surveys and oral interview of landowners. Some interesting information taken from the survey is detailed in Table 11, and the full survey and survey results are located in Appendix I.

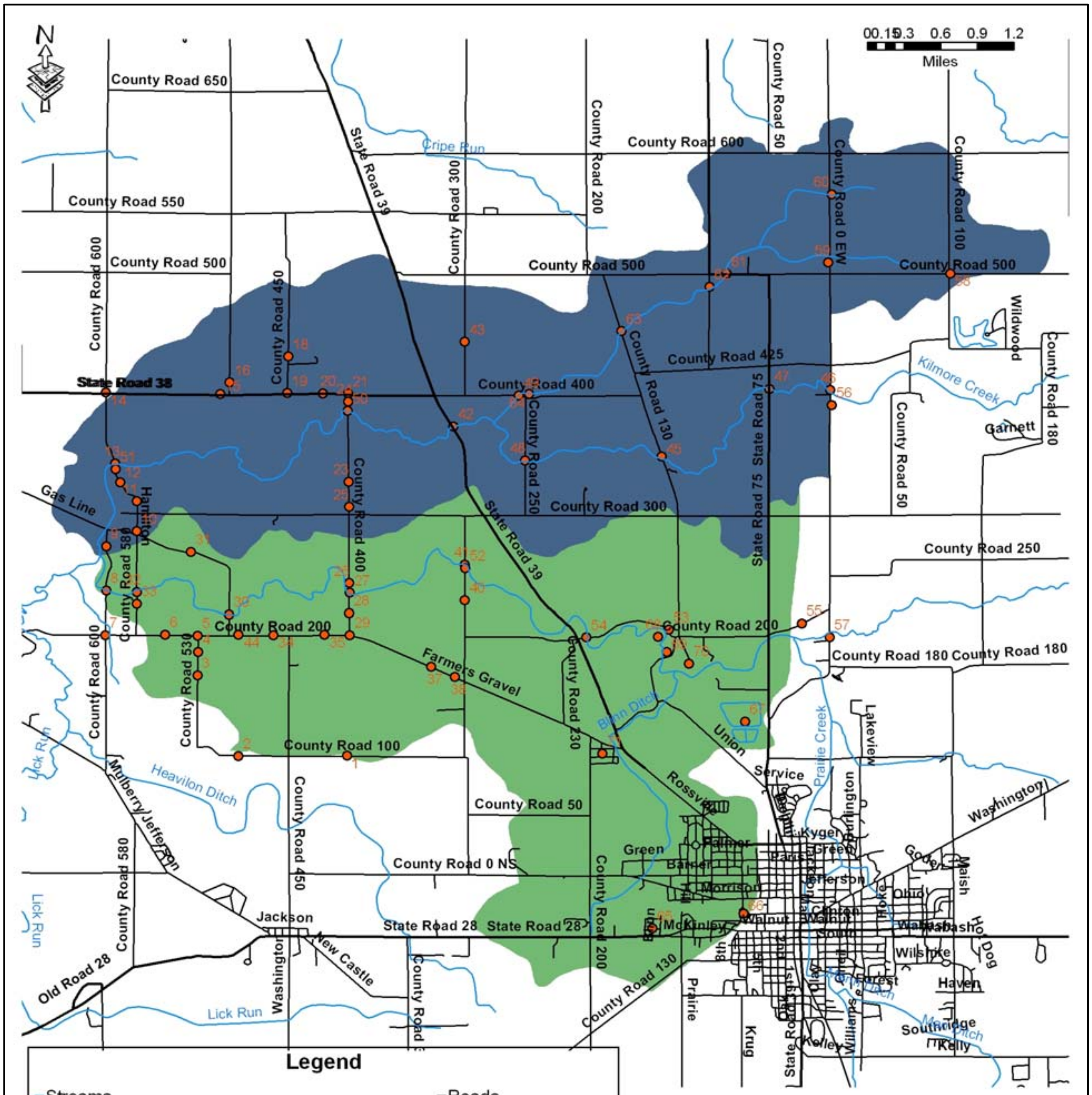
Table 11: Brief Summary of Purdue Survey Study

On Conservation Practices 74% of respondents use Grass Waterways. 70% of respondents use reduced tillage practices. 33% of respondents would not be willing to try cover crops.
On Septic Systems 12% of respondents have had problems with sewage flowing to the ditch in the last 5 years. 85% of respondents would NOT like a reminder from the health department regarding septic maintenance.
On Practice Adoption 32% of respondents feel that personal out-of-pocket expense is very important when making decisions about management practices. 62% of respondents feel that how easily a practice fits with current farming methods is important.
On Agency Knowledge 88% of respondents have heard of the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Project. 93% have heard of the SWCD. 91% trust the SWCD as a source of information about water quality.

4.7 Citizen Windshield Survey

A Windshield Survey was conducted by members of the Steering Committee in the spring of 2007. The Windshield Survey allowed the members of the Committee to become more familiar with the watershed boundary and to provide their own knowledge of the watershed's characteristics to other Committee members. Figure 15 depicts the points of interest noted by the Committee during the Windshield Survey, and Table 12 describes the notes taken at each point.

Figure 15: Windshield Survey Points of Interest



Windshield Survey data was collected by splitting the watersheds into four quadrants; a Steering Committee member or two then tackled the area of the watersheds they were most familiar with or most interested in. In addition, students from the Clinton Prairie Environmental Science class took a tour of two quadrants of the watershed and made comments on areas of interest.

Table 12: Windshield Survey data

ID #	LOCATION	DETAILS	Channel Modified	Pipes	Erosion	Bank Cover	Trash	Riparian cover	Riparian Buffer Width	Fish Hangouts	Insect Hangouts	Crop Status	Tillage	Signs of Erosion	Notes	DATE
1	Railroad Tracks & 100N	South side - No fall tillage; West side - tilled; Small tree line on either side of RR	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
2	West of 450W on 100N	Fall tillage on the South Side; Old pastured forest lot on the North side	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
3	CR 530W	West side of the road has a grassed waterway; no fall tillage	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
4	RR and 530W	House after railroad may have septic and oil tank	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
5	Intersection of 200N and 530W	Goats on North side of 200N; Possible pine tree wind break; 4-5 clustered homes	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
6	CR 200N and RailRoad	Ditch runs from S to N and drains to pond; 1 horse; no tillage; erosion on both sides of the ditch	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
7	CR 200N and CR 600W	Ditch on E drains to residential pond on W side of 600W	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
8	CR 600W and South Fork	Major erosion on W side on left bank stabilization attempt. Both undercut. Debris in side ditch.	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
9	CR 600W South of Gas Line Rd	Serious undercutting at Kilmore and SF intersection. 8 cattle on East side	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
10	Gas Line Rd and Hamilton Rd	Several houses; Small apple orchard; 1 mobile home	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
11	Hamilton Rd; .6 miles north of Gas Line	Pond with cattle access; Livestock present.	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
12	Hamilton Rd and Classified Forest	Classified forest on West side; possible Livestock E; Colonels Cove and pond on E	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007

ID #	LOCATION	DETAILS	Channel Modified	Pipes	Erosion	Bank Cover	Trash	Riparian cover	Riparian Buffer Width	Fish Hangouts	Insect Hangouts	Crop Status	Tillage	Signs of Erosion	Notes	DATE
13	Hamilton Rd and Kilmore Creek	Lg. log jam to W; Slight undercutting. N side ditch is undercutting w flowing tile outlet. Cattle	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
14	Hamilton Rd and SR 38	Sm. housing cluster. Small grass road side ditch	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
15	SR 38; .9 miles east of Hamilton Rd	Ditch on S side with several dirt mounds; bank erosion; meandering w/undercut	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
16	CR 500W and SR 38	Goats; plowed fields	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
18	CR 450W	CAFO; No fall tillage; Sm. grassed waterway; ditch is buffered	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
19	SR 38 and 450W	S. side breeding cattle farm "Walnut Ridge"; plowed end rows and no till	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
20	SR 38 .3 miles E of 450W	Small tributary near pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
21	SR 38 and CR 400W	Residential area; 3-4 horses	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
23	CR 400W	Residential area; pasture land on west side and pond	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
24	CR 400W just S of SR 38	Pond to the West	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
25	CR 400W .9 miles S of SR 38	Small drainage ditch	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
26	CR 400W south of 300N	Side ditch tributary (backwater area); lots of tire and litter debris	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
27	CR 400W and South Fork	Undercutting from seepage of ground H2O; Natural or old tiles	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
28	CR400W south of South Fork	Pond on west side; tree farm (certified?)	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
29	200N east of 400@	Woodlot south side; no fall tillage	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
30	Gas Line Rd and South Fork	Seepage causing undercutting; No till; Lg. ravines wooded & undisturbed	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
31	Gas Line Rd and small bridge	Ditch cut out; possible waterfall (lg drop); several horses in area	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
32	580W south of Gas Line Rd	South Fork has some undercutting; Tires; Wide flood plain area	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007

ID #	LOCATION	DETAILS	Channel Modified	Pipes	Erosion	Bank Cover	Trash	Riparian cover	Riparian Buffer Width	Fish Hangouts	Insect Hangouts	Crop Status	Tillage	Signs of Erosion	Notes	DATE
33	2218 580W	Cemetery and home	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
34	.4 miles east of Gas Line Road on 200N	Ditch with green algae (septic discharge?); meandering; wooded flood plain	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
35	200N east of 450W	Woodlot; no fall tillage; large hay field	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
37	1.7 miles east of 450W on 200N	2 field tiles converge on S side; N side drain?; Standing pipe; waterways	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
38	Farmers gravel just west of 300W	Bittersweet Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
40	.6 miles north of Farmers Gravel on 300W	East side grassed waterway	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
41	300W and South Fork	Bank erosion' brown sludge in creek; Many small tribs from landfill area	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
42	SR 39 near Kilmore	3 horses; nice floodplain; no fall tillage; concrete liner on road side ditch	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
43	300W	Ditch with a retaining wall; Trees and habitat area.	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
44	200N East of Gas Line Rd	Woodlot and pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	2/1/2007
45	CR 0 E/W and Kilmore Creek	Cemetery on the north side. Landscaped home lot SW. Pasture SE.	Yes	Yes	No	Yes	Yes	Trees, Grass	>100ft	Yes	Yes	residue	No-till	None	Buffer	2/9/2007
46	State Rd 75 and Kilmore Creek	Riparian forest areas on three of the corners	No	Yes	No	Yes	Yes	Trees, Grass, Crops	1-30ft	Yes	Yes	residue	No-till	None	Buffer	2/9/2007
47	130 W and Kilmore Creek	One corner field	No	Yes	No	Yes	No	" "	1-30ft	Yes	Yes	residue	Conservation	None	?	2/9/2007
48	250 W and Kilmore Creek	Cattle may have access	No	?	No	Yes	Yes	" "	1-30ft	Yes	Yes	residue	No-till	None	?	2/9/2007

ID #	LOCATION	DETAILS	Channel Modified	Pipes	Erosion	Bank Cover	Trash	Riparian cover	Riparian Buffer Width	Fish Hangouts	Insect Hangouts	Crop Status	Tillage	Signs of Erosion	Notes	DATE
49	State Rd 38 and Kilmore	Horses & Livestock border creek. May have access	No	?	No	Yes,No	No	" "	30-100ft	Yes	Yes	residue	Conventional	None	Grass	2/9/2007
50	CR 400 W and Kilmore Creek	Large tree farm	No	?	Yes	Yes	No	" "	30-100ft	Yes	Yes	residue	Conventional	Gully	?	2/9/2007
51	CR 600 W and Kilmore Creek	Large woodlot. Classified Forest and Adopt a River site	No	?	No	Yes	Yes	" "	30-100ft	Yes	Yes	residue	Conventional	None	?	2/9/2007
52	CR 300 W and South Fork Wildcat	Trash along the bank and tires in the creek. Riparian forest buffers all sides.	No	No	Yes	Yes	Yes	Trees, Grass	>100ft	Yes	Yes	-	-	-	-	1/12/2007
53	CR 200 N and South Fork Wildcat	Roots showing and undercut banks on the top	No	No	Yes	Yes	No	Trees, Grass, Crops	30-100ft	Yes	Yes	-	-	-	-	1/12/2007
54	CR 200 N overlook on the South Fork	Old City dump overlook. Steep slope. Concrete slabs	Yes	No	Yes	Yes	Yes	Trees, Grass	>100ft	Yes	Yes	-	-	-	-	1/12/2007
55	CR 200 N and Compressed Steel	Junk yard	No	No	Yes	No	No	Grass	1-30ft	Yes	Yes	-	-	-	-	1/12/2007
56	CR 0 E/W and Kilmore Creek	Cattle may have access	Yes	No	Yes	Yes	?	Trees, Grass	1-30ft	Yes	Yes	-	-	-	-	1/12/2007
57	CR 0 E/W and South Fork Wildcat	Compressed Steel	-	-	-	-	-	-	-	-	-	-	-	-	-	1/12/2007
58	100 East @ 500N	Depth 1'. Tree lined ditch.	-	-	Yes	Yes	-	-	-	-	-	bean stubble	No-till	-	-	-
59	0 EW @ 500N	Depth 2'. Active beaver dam. Building material present	-	-	-	-	-	Trees	-	-	-	corn stalks	No-till	-	-	-
60	0 EW toward 600N	Depth 1'. Open ditch grown up into trees and brush	-	-	-	-	-	-	-	-	-	bean stubble	?	-	some wheat	-
61	SR 75	Depth 2'-3'. Clean with CRP filter strips.	-	-	-	-	-	-	-	-	-	-	?	-	-	-
62	100 West at 500N	Depth 2'-3'. Clean with CRP filter strips. West side overgrown.	-	-	-	-	-	-	-	-	-	bean stubble	No-till	-	some wheat	-
63	130 West between 400 & 500N	Depth 3'. Overgrown with trees	-	-	-	-	-	-	-	-	-	bean stubble	?	-	-	-
64	400N near 250W	Depth 3'. Both sides wooded. Various gullies. Tree problems.	-	-	-	-	-	-	-	-	-	-	?	-	-	-

4.8 South Fork Wildcat Creek TMDL

A Total Maximum Daily Load (TMDL), which is required by the Environmental Protection Agency (EPA) under section 303(d) of the federal Clean Water Act, is a calculation of the maximum amount of pollutant that a waterbody can receive and still meet water quality standards. A TMDL is a tool for implementing water quality standards and establishes the allowable loadings for a water body. Each water body listed on the state 303(d) List is required to have a TMDL completed. The South Fork Wildcat Creek Watershed TMDL was conducted in 2007 and the Draft was made available in February 2008. A copy of the report is available at http://www.in.gov/idem/programs/water/tmdl/documents.html.

Parameters being evaluated for the South Fork Wildcat Creek TMDL include: Total Suspended Solids (TSS), Total phosphorus (T-P), Nitrate+Nitrite, and *E. coli*. Table 13 displays the target values that were used for developing the TMDLs.

Table 13: Target values for the South Fork Wildcat Creek TMDL

Pollutant	Water Quality Standard or Target Value
E. coli	125 colony forming units/100 mL
Total phosphorus	< .30 mg/L
Nitrate+Nitrite	< 10 mg/L
Total Suspended Solids	< 30 mg/L

Three assessment locations were evaluated within the project area: South Fork Wildcat Creek (WAW040-0001), Boyle's Ditch-Unnamed Tributary (WAW040-0154), and Kilmore Creek (WAW040-0028).

The South Fork Wildcat Creek location drains 72.4 square miles and the land use is approximately 80% agriculture and 12% urban. The most likely sources of *E. coli* in this drainage area include nonpoint source pollution from urban areas, rural runoff, and re-suspension of E. coli that might be present in the stream channel. Possible point sources of pollution include the Frankfort Combined Sewer Overflow (CSO) and the Michigantown Municipal Waste Water Treatment Plant. At this location, *E. coli* is the only pollutant being addressed in the TMDL and a 65% reduction is needed to meet the TMDL.

The Boyle's Ditch-Unnamed Tributary location showed allowable TSS loads being exceeded during dry flow periods. Since there are no National Pollutant Discharge Elimination System facilities upstream of this location, the source of the high TSS are believed to be a combination of agricultural runoff and streambank erosion. At this location, a 32% reduction in TSS is needed to meet the TMDL.

At the Kilmore Creek site, approximately 77 square miles drains to the location and the primary land use is agriculture-approximately 88%. Current loads of *E. coli* at this location exceed allowable loads during high, moist, and dry flow conditions. This indicates that the most likely sources of E.coli are nonpoint sources from rural runoff. At this location, a 45% reduction in *E. coli* is needed to meet the TMDL.

5.0 Causes of Water Quality Problems

E. coli, nutrients, pesticides, fertilizers, oil, metal, and soil are all substances that cause water pollution. The sources of these pollutants are divided into two categories: point source and nonpoint source pollution.

Point source pollution is defined as pollutants originating from a direct source: such as a culvert or pipe (Hoosier Riverwatch, 2006). The primary pollutants associated with point source discharges are oxygen demanding wastes, nutrients, sediment, toxic substances, and metals.

According to the United States Environmental Protection Agency, Nonpoint Source Pollution (NPS) comes from many diffuse sources and is caused by rainfall or snowmelt moving over and through the ground. As this runoff moves, it picks up and carries natural and human-made pollutants and deposits them into lakes, streams, creeks, and ditches (U.S. EPA, 2006). NPS includes excess fertilizer, oil, grease, sediment from construction sites and crop lands, road salt, bacteria and nutrients. NPS pollution is currently considered the main focus for addressing water quality problems in Indiana through water quality improvement programs.

5.1 Nutrients: Nitrogen and Phosphorous

Nutrients are common in components of fertilizers, fecal waste, vegetation, and industrial waste. Although nutrients are essential to the health of our waters, too high of a concentration can have very adverse effects. In excessive amounts, nutrients cause algal blooms, decline of biological communities, low dissolved oxygen, fish kills, and can even increase sediment accumulation rates. The 1998 National Water Quality Inventories have shown that roughly 25-50% of the impaired waters nationally were due to nutrients (U.S. EPA, 2000).

Major human influenced non-point sources of nutrients include stormwater runoff, animal waste, runoff from agricultural sites, and application of lawn fertilizers. Point sources of pollution also include permitted industrial discharge from factories using boilers, food processing plants, and laundering facilities; these are located in the industrial and urban land use areas of the South Fork Wildcat Creek-Blinn Ditch watershed.

According to the United States Environmental Protection Agency (U.S. EPA), nutrients are primarily measured by the variables of total nitrogen, total phosphorus, chlorophyll a, and turbidity. The baseline water quality study tested for total phosphorus and nitrate+nitrite.

Photograph: A Bullfrog sits on the edge of Boyle's Ditch in August. The ditch is covered in Duckweed.

Neither nitrate+nitrite nor total phosphorus were listed on the 2004 or 2006 303(d) List of Impaired Waterbodies as a cause of impairment. But, the baseline water quality study conducted by Commonwealth Biomonitoring shows that a few sites occasionally exceed the target value of 10 mg/l of nitrate+nitrite, and many sites exceed the recommended .3 mg/l of total phosphorus set forth in the 2008 South Fork Wildcat Creek Draft TMDL Report.

5.2 *E. Coli* Bacteria

Escherichia coli (*E. coli*) bacteria counts are utilized to indicate the presence of bacterial pathogens in surface water because measuring the pathogens is costly and difficult. The number of *E. coli* bacteria present in the water is an indication of the safety of the water for human contact and drinking water. *E. coli* bacteria are found in the intestinal tracts of all warm-blooded animals such as dogs, cats, humans, livestock, and wildlife and are passed through their feces.

E. coli enters surface water through failing septic systems, straight pipes, direct fecal contact, and runoff. These are primarily non-point source pollutants, however, point source pollutants of contamination include improperly treated wastewater and wastewater treatment plant overflows (Frankenberger, 1998).

Stream segments in both the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds were listed on the 2004 and 2006 303(d) list as being impaired by *E. coli*. In addition, the baseline water quality study being conducted through the grant validates this impairment with consistent results exceeding the water quality standards at all sites.

5.3 Erosion and sedimentation

Erosion is the displacement of soil and rock particles by wind, water, or man made disturbance. Many factors affect erosion and include climate, soil type, slope length and steepness, and vegetative cover. Water quality is significantly affected by soil erosion due to increased levels of nitrogen, phosphorus, and sedimentation loads. Runoff in the form of soil erosion carries nitrogen and phosphorus enriched sediment to our waterbodies. As a result, eutrophication occurs which decreases oxygen levels.

Sedimentation occurs when the flow of water slows down enough to allow suspended soil particles to settle. Sedimentation is generally measured by turbidity and total suspended solids and can reduce in-stream photosynthesis and alter stream ecology. According to the IDEM, sedimentation is the leading cause of water quality impairments in the state (IDEM, 2006).

Much of the South Fork Wildcat Creek and Kilmore Creek contain existing riparian buffer strips that limit sedimentation. These strips appear to be healthy; however, evidence of erosion and mass wasting is present. Probable causes of this include the addition of drain tiles since the mid-1800's which increases the amount of water in the stream and creates a greater hydraulic force.

Although erosion and sedimentation is difficult to directly measure, impaired biotic communities are often a result of excess sedimentation in streams. Impaired biotic communities are listed as the cause of impairment for several stream segments within these watersheds on the 2006 303(d) list. The baseline water quality study conducted as a part of this grant showed increased levels of total suspended solids during the summer of 2006.

5.4 Atrazine

Atrazine provides excellent, economical weed control for corn and sorghum producers. In the past, Clinton County farmers indicated that products containing atrazine are applied on 60% to 70% of county corn acreage. These products include Bullet, Leadoff, Surpass, and many more.

When atrazine is applied correctly, it is a very safe product to use. However, it is a problem when it becomes suspended in stormwater runoff and enters open ditches, streams, rivers, lakes, ponds, and wells. Pesticides have the potential to enter and contaminate water through direct application, runoff, wind, transport, and atmospheric deposition.

Once atrazine enters stormwater runoff, it is very difficult to remove and the repercussions include fish and wildlife kills, contamination of food and drinking water sources, and destruction of habitat that animals use for protective cover.

The United States Environmental Protection Agency states that atrazine levels above 12 parts per billion are detrimental to aquatic life. Results from sampling in April, May, and June of 2006 and 2007 during the Baseline Water Quality Study yielded some interesting results. The highest contaminant levels were seen on May 15th, 2006 with the average level being 21 ppb. The lowest and highest contaminant levels on the 15th were 5.37 ppb and 46.59 ppb respectively. Based on the results of the baseline water quality study, atrazine has proved to be a stressor in these watersheds.

5.5 Polychlorinated biphenyls (PCBs)

According to the 2006 Fish Consumption Advisory (FCA), PCBs are a major contaminant in the fish populations of the South Fork Wildcat Creek; however PCBs are not a major contaminant for fish populations in Kilmore Creek. Creek Chub, channel catfish, black redhorse, golden redhorse, carp, longear sunfish, rock bass, smallmouth bass, and white suckers are all on the FCA advisory for PCBs in the South Fork Wildcat Creek.

Polychlorinated biphenyls (PCBs) enter the environment through unregulated disposal of products such as waste oils, transformers, paints, sealants, and carbonless copy paper. Contamination in our surface water today is the result of historical waste disposal practices. PCBs are absorbed in fish and small organisms from the water and sediments in their habitat. The PCBs accumulate when smaller fish are consumed by larger fish and thus passed further along the food chain. PCBs have been shown to cause cancer in animals and a number of non-cancer health effects in humans as well (IDEM-Media, 2006).

Addressing PCBs is beyond the scope of this project as guidance for restoration should be provided by USEPA due to the Fish Consumption Advisories.

5.6 Garbage, Trash, Appliances, Tires, and Debris

Garbage, trash, appliances, tires, and debris are not only highly visible man made influences to our natural water ways but also a cause of water quality and habitat impairment. The most common litter in U.S. streams is household trash: including plastic cups, plastic bags, and plastic bottles. Plastic bags, cigarette butts, and bottles can strangle or suffocate fish, turtles, and birds when they become inhaled or entangled in the litter. Appliances can leak chemicals directly into the water causing fish kills and human health risk. Household hazardous waste such as used motor oil, paint, and solvents can poison fish as well as drinking water. Even organic waste such as grass clippings, branches, and mulch can have a negative chemical and biological impact on our streams.

During the Windshield Inventory conducted by the Steering Committee, garbage, trash, appliances, tires, and debris accumulating in streambeds was noted to be a concern in these watersheds. Several sites appear to be frequently used as locations for dumping items. In addition, the Steering Committee noted observations of Waste Disposal trucks with trash and debris exiting the confines of the truck as it traveled down its route. While some occurrences may be accidental, often times the addition of garbage, trash, appliances, tires, and debris to our waterways is not.

Photograph: Although tires can provide habitat for aquatic organisms and fish, their presence in streams are ultimately a sign of human neglect or disregard for aesthetic values and the natural ecosystem (Richmond & Clendenon, 2003).

5.7 Stream Corridor Degradation

Stream corridors are complex ecosystems that include the land, plants, animals, and network of streams within them. They perform numerous ecological functions that include controlling stream-flow, storing water, removing harmful pollutants from water, and providing habitat for aquatic and terrestrial plants and animals. Stream corridors also have vegetation and soil characteristics that support higher levels of species diversity, species densities, and rates of biological productivity than other landscape elements. Manipulation of stream corridor systems occurs for a variety of purposes: transportation, waste disposal, flood control, timber management, and recreation. These changes in the stream corridor cause: degradation of water quality due to increased stream temperature because of a lack of shade from trees, decreased water storage and conveyance capacity that leads to stream bank erosion, and loss of habitat for fish and wildlife (FISRWG, 10/1998).

During the windshield inventory, a couple of areas in the eastern portions of the watersheds were recognized as having degraded stream corridors due to recreation of ATVs and horses. Since the stream corridor is privately owned, it is likely that recreation is causing degradation in other less visible locations in the watershed as well.

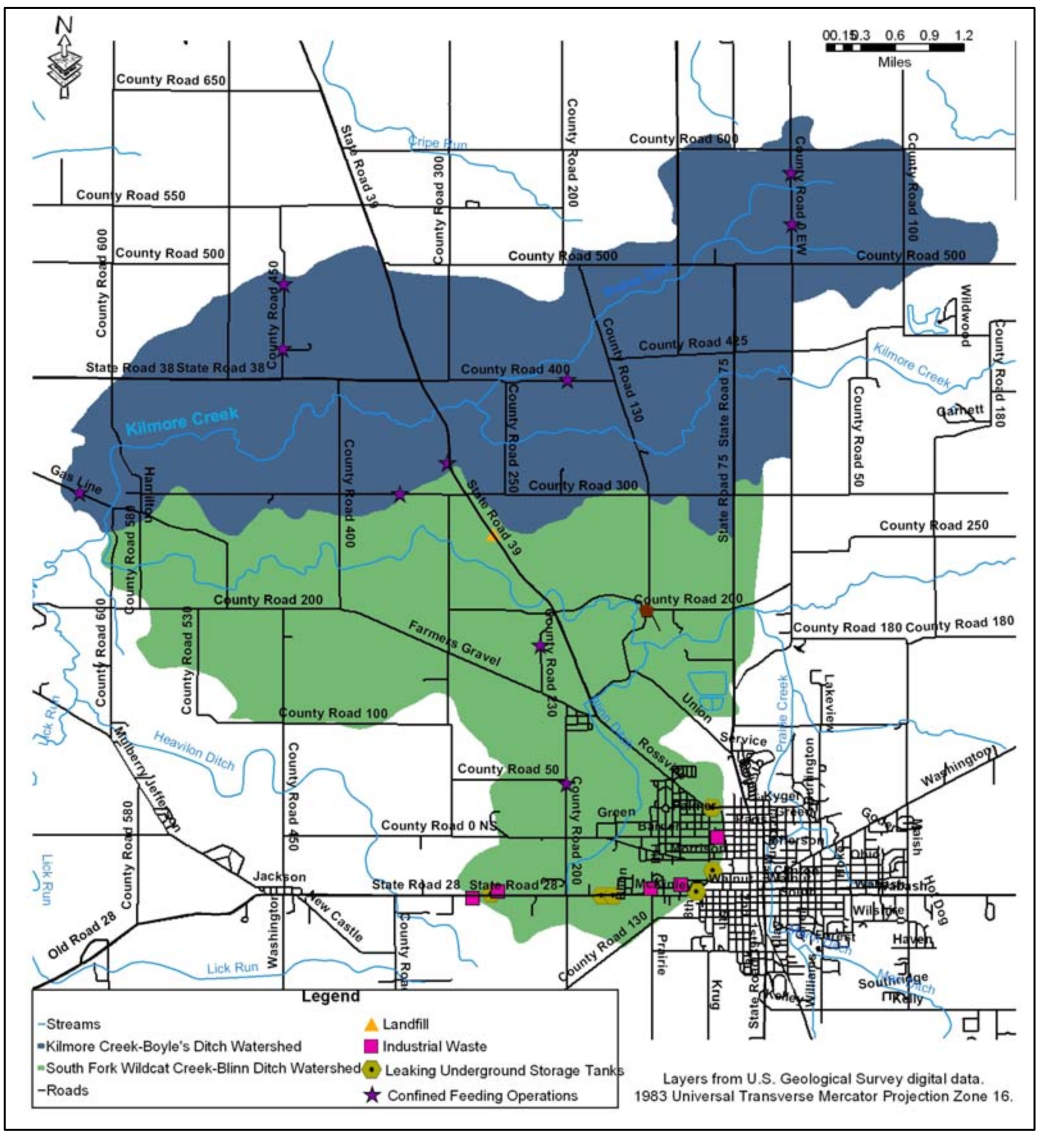
6.0 Sources of Water Quality Problems

6.1 Point sources of pollution

Within the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch Watersheds several point source pollutants potentially impact its waters. These potential sources include: Industrial corporations, wastewater treatment facilities, and stormwater discharge from municipal separate storm sewer systems (MS4s).

In Indiana, point source dischargers (such as factories) must obtain a National Pollutant Discharge Elimination System (NPDES) permit from IDEM. The purpose of the permit is to limit the amount of point source discharge of pollutants into the water. The NPDES industrial waste sites, solid waste facilities, confined feeding operations, and other potential pollutant sources within the watersheds are shown in Figure 14.

Figure 16: Potential Point Sources of Pollution



6.2 Non-Point sources of pollution

Nonpoint Source Pollution (NPS) comes from many different sources and moevvs in rainfall or snowmelt that runs off the land. As the NPS runoff moves, it picks up and carries natural and human-made pollutants and deposits them into lakes, streams, creeks, and ditches (U.S. EPA, 2006). NPS can come from many different sources as seen in Table 13.

Table 14: Nonpoint sources of pollution

Cause (Stressor)	Sources and conditions leading to causes
Atrazine	Pesticide over-application during the months of April, May, and June; application of pesticide during and directly before large rain events. Lack of buffer strips.
Sediment	Sheet erosion of cropland due to conventional tillage practices, large construction sites; gully erosion on farmland and construction sites; movement of sediment through drainage tiles; higher peak flow increases erosion and lower base flow allows increased deposition in stream channels; stream bank erosion; All-Terrain Vehicles, livestock, and horse recreation. Lack of buffer strips.
Nutrients (Phosphorus & Nitrate+Nitrite)	Attached to sediment particles, especially from crop fields, fertilizer, manure, human waste, sewage, combined sewer overflows, failed septic tanks, and urban stormwater runoff, abandoned wells; nitrogen fixation by legumes; transport of nutrients through tile drainage systems. Lack of buffer strips.
E. coli	Failed septic tanks; untreated sewage from bypasses and combined sewer overflows; manure runoff, livestock access to streams, pet and wildlife waste.
Garbage, trash, tires, appliances, and debris	Illegal dumping; blown trash from the landfill, garbage trucks, and construction sites; junkyards in flood prone areas.
Stream Corridor Degradation	All-Terrain Vehicle recreation; livestock with stream access; horseback recreation; lack of community pride.

The Clinton County Landfill is located at the intersection of State Road 39 and County Road 300 North in the South Fork Wildcat Creek-Blinn Ditch Watershed. The Clinton County Soil & Water Conservation District (CCSWCD) conducts bi-annual Landfill Sediment and Erosion Control Reviews for the Landfill as required by Indiana State Code. These reports have indicated a high potential for sedimentation to leave the site through wind erosion, gully erosion, and tracking on roadways.

In addition, the IDEM conducts regular monitoring of the wells and sediment basins within the landfill for pollutants such as ammonia, iron, manganese, lead, and more. In a letter from IDEM to the Landfill in May 1998, it was stated that there was a plume that consisted mainly of ammonia, iron, and manganese with low-levels of volatile organic compounds that flows toward the Wildcat Creek in an aquifer that outcrops on the creek's bank. A letter from the IDEM was also sent to the CCSWCD explaining the geology and environs of the Landfill.

The Landfill is situated on approximately 10 feet of surface till above 15 to 20 feet of coarse sand and grave. The base layer of the sand and gravel unit is at about the same elevation as the flood plain of the creek. Water within the unconfined minor aquifer flows from the north and east toward the creek where it exits in minor seeps along the bank (IDEM, 2/26/1999). This minor aquifer could potentially transport harmful pollutants directly to the creek.

7.0 Management Measures, Action Plan, Resources and Legal Matters

The overarching goal for the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Steering Committee is to improve water quality to meet Indiana's fishable, swimable, and drinkable standards; create aesthetically pleasing creeks; and buffer every foot of all streams and ditches within the watersheds. In order to meet this overarching goal, five specific goals and objectives were designed to create a plan for meeting the overarching goal. Each goal includes objectives with specific action items, timelines, and indicators that allow for tracking progress.

The Steering Committee for the grant used information from the windshield inventory, GIS Analyses, personal knowledge, the baseline water quality study, and information from the IDEM and Clinton County Health Department to create the goals and objectives for improving water quality in the watersheds. Stakeholders were presented the goals and objectives at multiple Steering Committee Meetings and public meetings. At these meetings, stakeholder input was received and often molded the current goals and objectives of the Plan.

A dinner meeting was held in the fall of 2007 to bring stakeholders and the steering committee together to discuss and determine the goals and objectives to be addressed in the plan. The meeting was facilitated by a Professor and grad students from Purdue University, and attendees were asked to provide input by voting and having facilitated group discussions. In winter 2007 & 2008, the steering committee used the information gained from the dinner meeting to expand on the goals and objectives by adding action items, responsible parties, time frames, milestones, and budget.

Due to the many partnerships that will be required to implement the plan, it is important to continue to enhance public understanding of the water quality issues in these watersheds and to encourage public participation in implementing the Plan. Therefore, several educational events, publications, media releases, and more are included within the Objectives of each goal.

In addition, each objective has a projected financial implication associated with the Tasks involved in reaching those objectives. These are estimates made from approximate calculations and current costs of installing the BMP. Technical assistance is not included in this estimated cost because all practices will be designed to NRCS FOTG standards (when applicable) by an NRCS representative or Technical staff of the SWCD.

7.1 Atrazine Goal (A): Decrease atrazine levels to below 12 parts per billion (ppb) in the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch subwatersheds.
Indicator: Water quality testing data for atrazine in ppb.

Table 15:

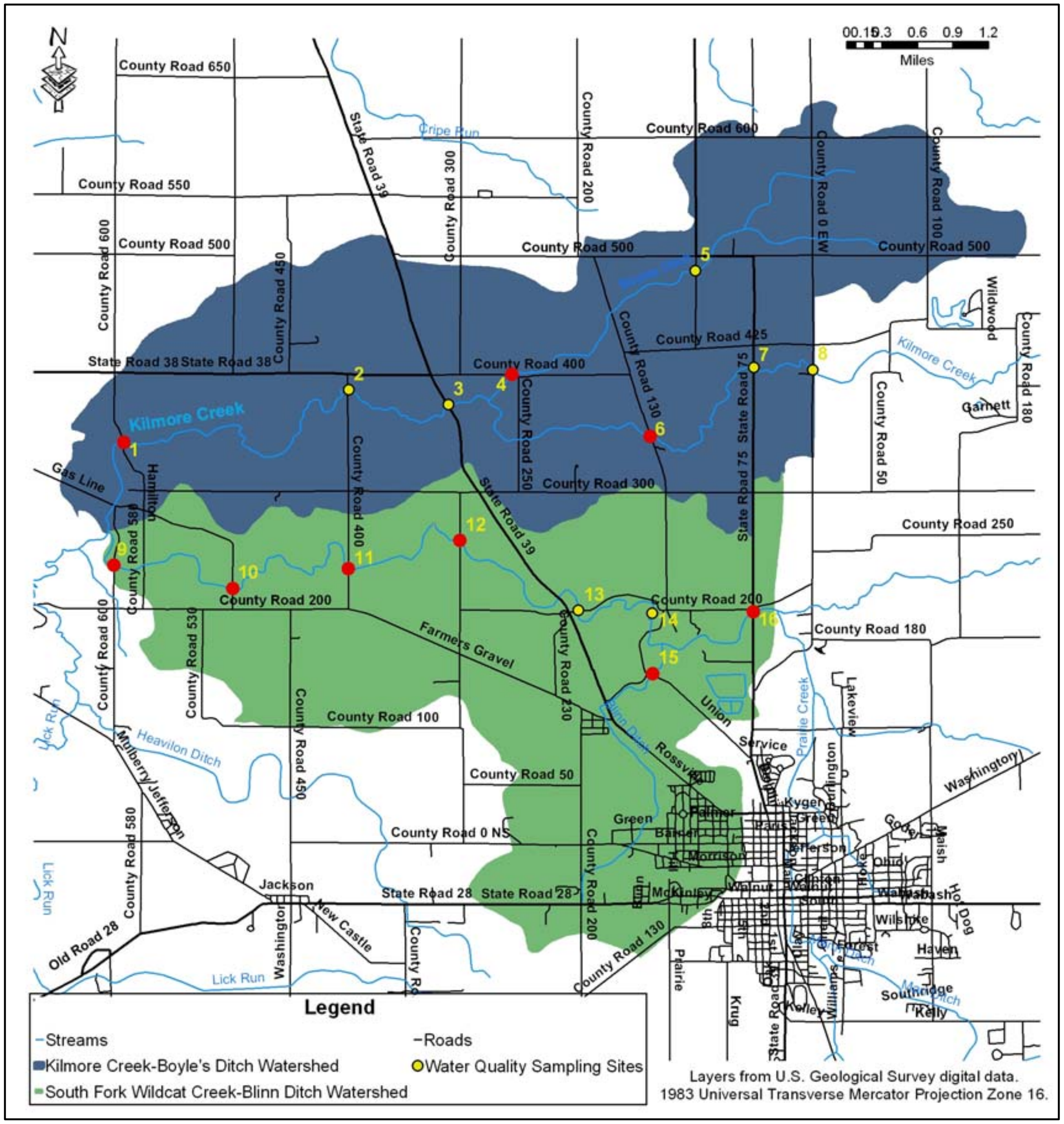
Objective (Milestone)	Action Plan	Target Audience	Responsible Party(s)/Partners	Milestone	Time Frame	Estimated Cost
1. Increase the amount of 30ft buffers in the watersheds from 81% to 95% (approximately 3.75 miles of additional field buffers).	Promote & implement a cost-share program.	Agricultural producers.	Clinton County SWCD/NRCS, Purdue Extension, Pheasants Forever	Miles of buffer installed.	1-3 Years	Approx. $1,210.00 total
	Provide incentives (in the form of dollars or labor for installation) on top of USDA payments				1-5 Years	
	Work with Pheasants Forever to provide information, assistance, and seeds.				On Going	
2. Increase the amount of 60ft buffers in the watersheds from 73% to 85% (approximately 3.2 miles of additional field buffers).	Promote and implement a cost-share program.	Agricultural producers and rural residents.	Clinton County SWCD/NRCS, Purdue Extension, Pheasants Forever	Miles of buffer installed.	1-3 Years	Approx. $1,030.00 total
	Provide incentives (in the form of dollars or labor for installation) on top of USDA payments				1-5 Years	
	Work with Pheasants Forever to provide information, assistance, and seeds.				On Going	
3. Increase the number of landowners who have a Pest & Nutrient Management Plan.	Education: Provide information within applicable workshops & field days (i.e. low-till workshop). Distribute pamphlets on P&NMPs at local venues & events.	Agricultural producers.	Clinton County SWCD and Purdue Cooperative Extension/NRCS, local Co-Ops	Number of producers implementing P&NMPs.	1-5 Years	$550.00 per plan
	Promote efficient and effective use of atrazine.				1-5 Years	$100.00
4. Properly close and seal abandoned wells located within critical areas of the watershed.	Research and identify abandoned wells using volunteers and local organizations.	All Landowners in the watershed	Clinton County SWCD/IDNR, Health Department, ISDA	Number of wells capped	1 Year	$100.00
	Provide community outreach and education (information at fair booth, newspaper, newsletters, etc.)				1-3 Years	$500.00
	Promote and implement a cost-share program.				1-3 Years	$750.00 per well

Atrazine Critical area:

The critical area for atrazine is based on the baseline water quality sampling results from 2006 and 2007. Sites with results above the 12 ppb atrazine standard include: Site # 1, 4, 6, 8, 9, 10, 11, 12, 15, and16. The entire 2 sub-watershed area has a large amount of agricultural land use and multiple sites with levels above water quality standards. However, since the highest result was found at site number 15 (located on Blinn Ditch) in May of 2006, priority ranking should be given to those water quality improvement practices that would directly impact Blinn Ditch and the South Fork of Wildcat Creek. Figure 17 depicts those sites within the South Fork Wildcat Creek-Blinn Ditch Watershed with atrazine levels above Indiana Water quality Standards (sites with red dots). Best Management Practices that would improve atrazine levels in the South Fork Wildcat Creek-Blinn Ditch Watershed include (but are not necessarily limited to) buffer strips, filter strips, Pest & Nutrient Management Plans, abandoned well plugging and capping, Guided Measure Technology, and conversion to no-tillage or conservation tillage.

Load Information: The maximum load measured for atrazine was 47 ppb in May 2006. In order to reach the Target Value of 12 ppb, a reduction of 35 ppb is needed.

Figure 17: Sites with high levels of atrazine.



7.2 Sediment & Nutrient Goal (B): Improve fish and macroinvertebrate communities by reducing sediment, total phosphorus, nitrate+nitrite levels, and improving habitat in the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch watersheds. **Indicators:** Water quality testing data for: Total Suspended Solids in mg/l, Total Phosphorus in mg/l, nitrate+nitrite in mg/l, Index of Biotic Integrity (IBI Score), and habitat in Qualitative Habitat Evaluation Index Scoring.

Table 16:

Objective (Milestone)	**Action Plan**	**Target Audience**	**Responsible Party(s)/Partners**	**Milestones**	**Time Frame**	**Estimated Cost**
1. Increase the amount of No-Till (from 25% to 35%) and Reduced-till from (6% to 20%) in 5-7 years.	Promote and Implement a cost-share program.	Agricultural producers.	Clinton County SWCD and Purdue Cooperative Extension/NRCS, Local media	Tillage Transect results	1-3 Years	Approx. $8,000.00 per planter
	Education: Host a no-till field day. Provide data and information on no-till through newsletters and brochures. Create a "no-till icon" to sign no-till fields and for newspaper advertisements. Utilize personal contact.				1-7 Years	$3,000.00
2. All developers actively follow 327 IAC 15-5 (Rule 5). (90% in 3-5 years)	Education: Contractor information packets and workshop/field day.	Developers and Contractors	Clinton County SWCD/APC, City of Frankfort, IDEM	# of Rule 5 permits applied for.	1-5 Years	$500.00
	Cooperate with the County Commissioners and Area Plan to create an ordinance requiring the approved SWPPP at time of giving a building permit.				On Going	$0.00
3. Increase amount buffers (see Table 8.1)	(see Atrazine)	(see Atrazine)	(see Atrazine)	(see Atrazine)	(see Atrazine)	(see Atrazine)
4. Reduce the over application of nutrients being applied to fields.	Promote and implement a cost-share program.	Agricultural producers.	Clinton County SWCD/Purdue Extension	# of BMPs installed.	1-3 Years	$100,000.00
	Education: Provide information on new technology at field day.					$500.00

Nutrient and Sediment Goal (continued):

Table 16:

Objective	**Action Plan**	**Target Audience**	**Responsible Party(s)/Partners**	**Milestones**	**Time Frame**	**Estimated Cost**
5. Properly close and seal 25% of the abandoned wells.	Inventory and locate abandoned wells.	Watershed Landowners	Clinton County SWCD/ IDNR, Health Department, ISDA	# of abandoned wells capped	1-3 Years	$500.00
	Promote and implement a cost-share program to close abandoned wells.				1-3 Years	$400 per well
6. Reduce homeowner pre and post-construction runoff.	Promote phosphorus free fertilizers at local lawn and garden stores.	Home builders and Homeowners	Clinton County SWCD/ APC, Purdue Extension	# of stores that sell phosphorus free fertilizer, completed Homeowners Guide	2-5 Years	$200.00
	Create and distribute a Homeowners Guide.				2 Years	$1,000.00
7. Livestock Exclusion	Promote and implement a cost-share program to exclude cattle from waterways.	Livestock Owners	Clinton County SWCD/NRCS	# of livestock excluded from the creek	1-3 Years	Approx. $1,000.00 per project
8. Promote, enhance, and preserve the riparian corridor.	Investigate possible alternative stream crossings and bank stabilization methods for recreational uses (ex: horses and ATVs).	Recreational land users on private land	Clinton County SWCD/NRCS, ISDA, Commissioners	# of BMPs installed, levels of TSS	1-5 Years	$8,000.00 per BMP

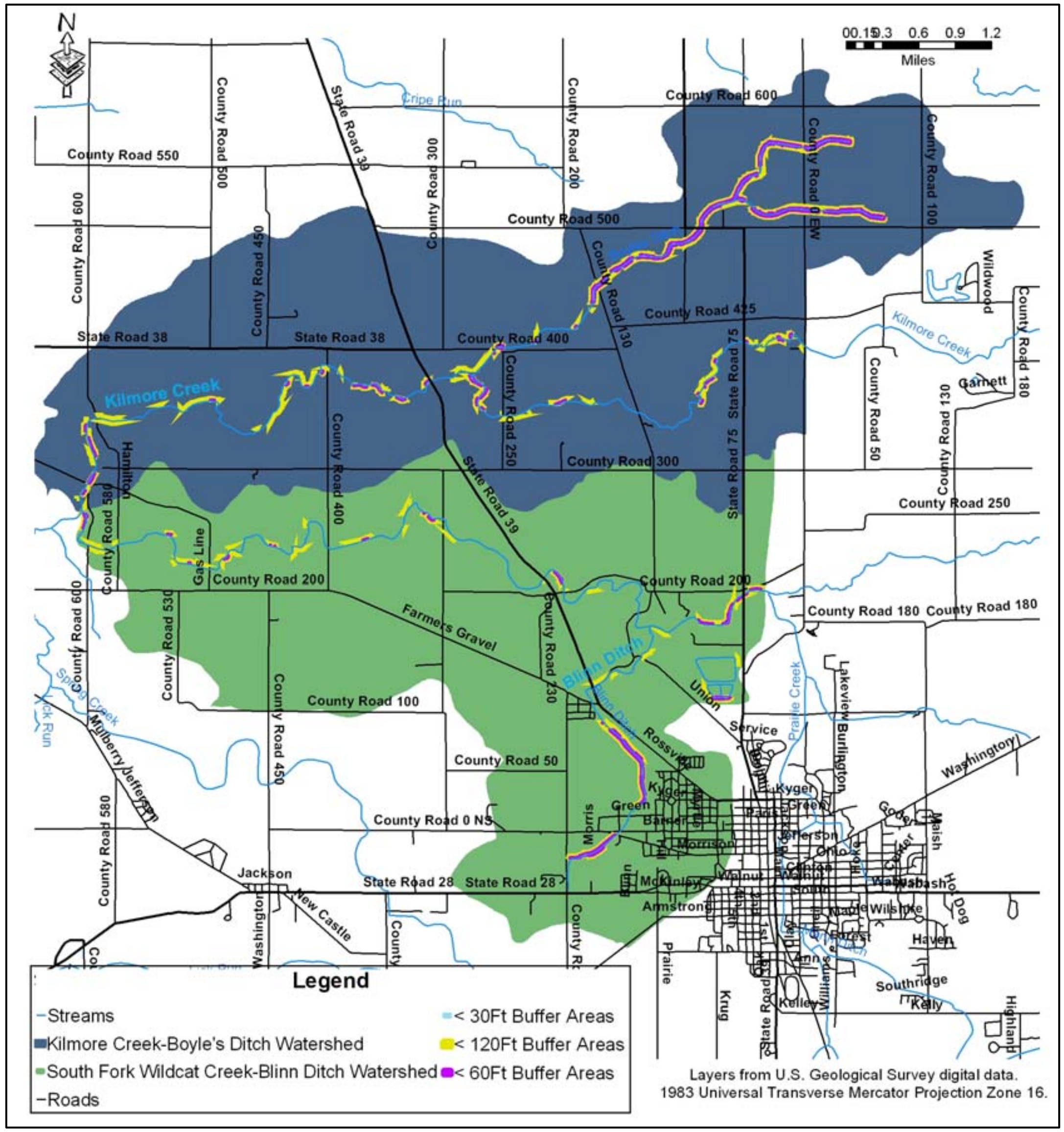
Nutrient and Sediment Critical Area:

The critical area for nutrients and sediment is based on the baseline water quality sampling results from 2006 and 2007, the South Fork Wildcat Creek TMDL, the windshield survey, and GIS analysis. Sites with total suspended solid levels above 30 mg/L (site 5 during normal flow, and all sites during high flow), total phosphorus levels above .30 mg/L (all sites except 6 and 15 during high flows, and sites 9, 10, 11, 12, 13, 14, 16), and nitrate+nitrite levels greater than 10 mg/L (most sites during high flow conditions, and site 2 and 16 during normal flow).

The entire watershed area has a large amount of agricultural land use and multiple sites with levels above water quality standards. Since the impairments vary by parameter, the critical area for nutrients and sediment takes into account all data relating to the impairment creating multiple critical areas.

Best Management Practices that would improve sediment and nutrient levels in the critical areas include (but are not necessarily limited to): buffer strips, filter strips, Pest & Nutrient Management Plans, abandoned well plugging and capping, Guided Measure Technology, conversion to no-tillage or conservation tillage, enhancement and preservation of the riparian corridor, construction site erosion control, stream bank stabilization, and livestock exclusion.

Figure 18: Critical Area for Buffer Strips and Filter Strips



Load Information: The existing loads for sediment and nitrogen were calculated using data from the July 2006 sampling event. This event yielded high levels of Total Suspended Solids, Nitrogen, and Total Phosphorus while the flow was above average but not at 100 year event levels. Table 16 depicts the existing, target, and reduction needed for each parameter and sampling site. Loads were calculated using the following formula: Tons/Year = [Z mg/L] x [1 ft^3/sec] x [.984457] where Z is actual data and the US short ton was used.

Figure 19: Load Calculations for Total Suspended Solids (TSS), Total Phosphorus (T-P), and Nitrate+Nitrite (N).

Total Suspended Solids Loads - Calculated based on July 2006 Data
Target Value: 30 mg/l

Site	Flow (cfs)	TSS (mg/l)	Current Load (tons/yr)	Target Load (tons/yr)	Reduction Needed (tons/yr)
1	154	205	31,000	4,500	26,000
4	20	88	1,700	600	1,100
6	130	197	25,000	3,800	21,000
9	165	159	26,000	4,900	21,000
12	159	250	39,000	4,700	34,000
16	139	129	18,000	4,100	14,000

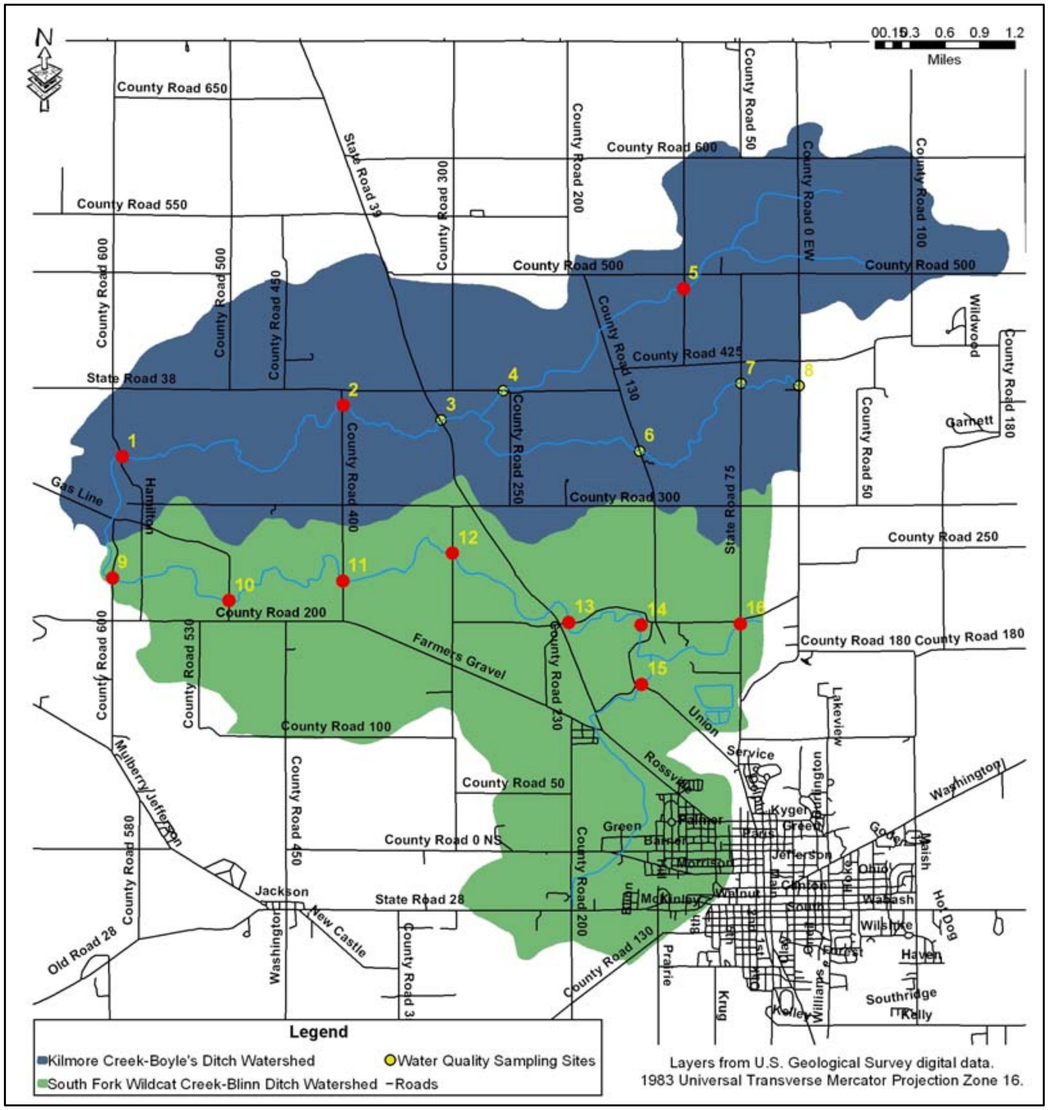
Nitrate+Nitrite - Calculated based on July 2006 Data
Target Value: 10 mg/l

Site	Flow (cfs)	N (mg/l)	Current Load (tons/yr)	Target Load (tons/yr)	Reduction Needed (tons/yr)
1	154	11	1,700	1,500	200
4	20	8	150	200	-50
6	130	9	1,100	1,300	-200
9	165	11	1,800	1,600	200
12	159	11	1,700	1,600	100
16	139	9	1,200	1,400	-200

Total Phosphorus - Calculated based on July 2006 Data
Target Value: 0.3 mg/l

Site	Flow (cfs)	T-P (mg/l)	Current Load (tons/yr)	Target Load (tons/yr)	Reduction Needed (tons/yr)
1	154	0.52	80	45	35
4	20	0.5	10	6	4
6	130	0.26	33	38	-5
9	165	0.32	52	49	3
12	159	0.4	63	47	16

Figure 20: Sampling sites with high levels of Sediment and Nutrients



The Kilmore Creek-Boyle's Ditch watershed has three sites with high levels of sediment and nutrients (see Figure 20). Site number 5 is upstream of site number 1 (sites are highlighted with a red dot), and therefore, the critical area within the Kilmore Creek-Boyle's Ditch watershed for nutrient and sediment BMPs is the area upstream of site 1.

Each of the sampling sites in the South Fork Wildcat Creek-Blinn Ditch watershed exceeds the South Fork Wildcat Creek TMDL standards for total phosphorus, nitrate+nitrite, and total suspended solids. Therefore, the entire South Fork Wildcat Creek-Blinn Ditch watershed with the exception of the City of Frankfort is considered a critical area for sediment and nutrient reduction.

7.3 *E. coli*/Pathogens Goal (C): To improve the water quality of the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch subwatersheds by decreasing *E. coli* levels in surface waters.
Indicator: Water quality testing data for *E. coli* in colony forming units per 100 ml.

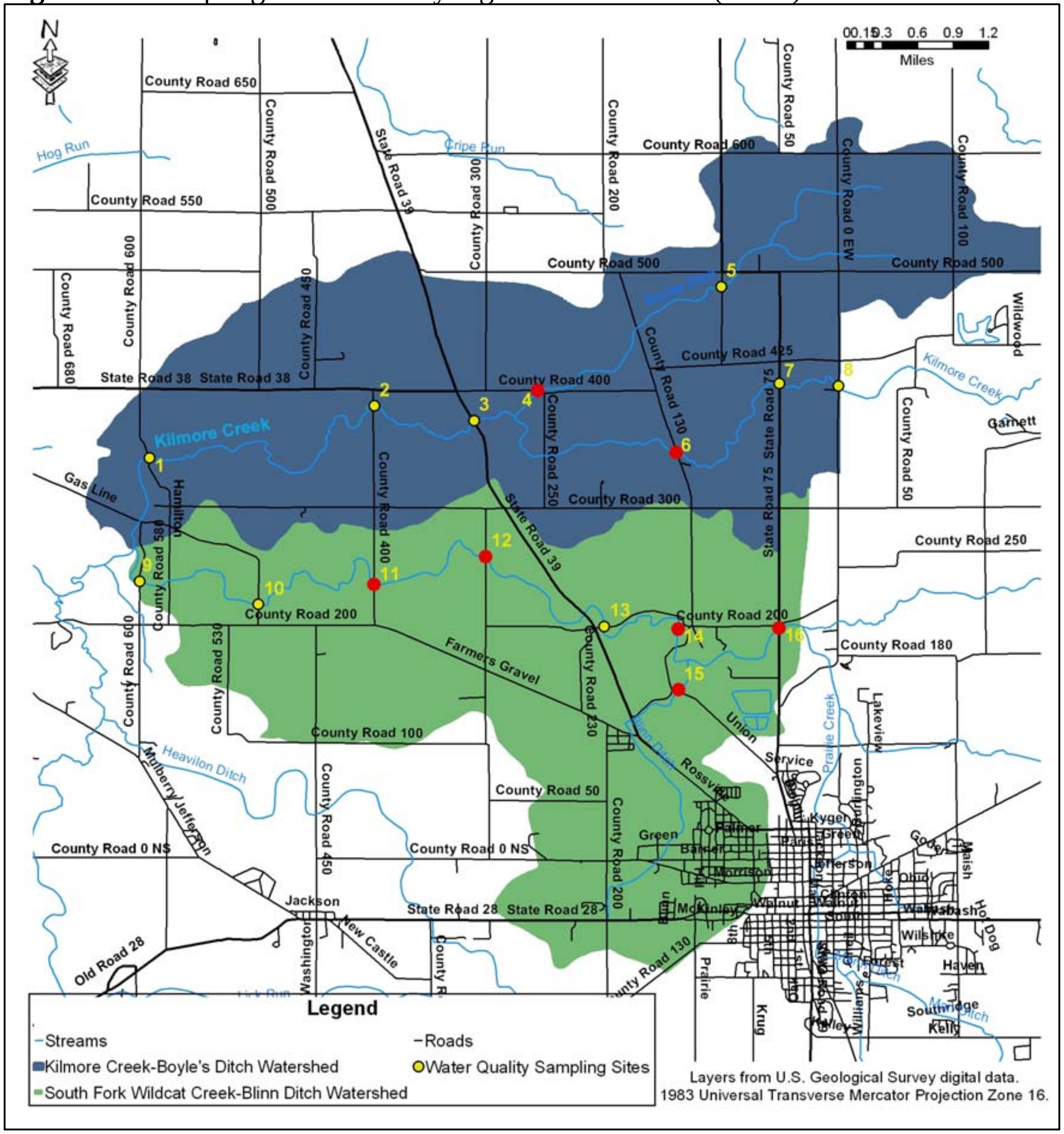
Table 17:

Objective	Action Plan	Target Audience	Responsible Party(s)/Partners	Milestones	Time Frame	Estimated Cost
1. Exclude 85% of livestock from waterways and provide alternative stream crossings.	Implement and promote a cost-share program.	Landowners owning livestock.	Clinton County SWCD	# Of cattle excluded from the stream.	1-5 years	Approx. $25,000.00
	Education: Livestock exclusion field day.				2-5 years	$1,000.00 a field day
2. Replace 50% of failed and non-functioning septic systems (focusing on those that are directly impacting a waterbody).	Education: Provide a workshop for lenders and septic companies. Provide publications to landowners in cooperation with the Clinton County Health Dept. Provide landowners with information on funding opportunities for the replacement and repair of septic systems.	Landowners not connected to city sewers.	Clinton County SWCD, Clinton County Health Department, Clinton County Regional Sewer District	# of septics repaired and replaced.	2-7 Years	$2,000.00 for a workshop and publications
	Partner with the County Regional Sewer District.				On Going	$250.00 (salary)
	Research ordinances that address septic system inspections when a property changes hands.				1-3 years	$500.00 (salary)
	Look for and secure funding to subsidize the cost of septic tank replacement.				1-10 years	$1,500.00 (salary)
3. Decrease the amount of pet waste entering storm drains in the City of Frankfort	Education: Provide info at community events and partner with the Clinton County Humane Society.	City of Frankfort citizens	Clinton County SWCD/Humane Society	# of publications distributed	On Going	$850.00 for booth rental and publications

***E. coli* Critical Areas:** Due to the widespread nature of this impairment, the critical area for *E. coli* is watershed wide. However, for the purpose of prioritizing the most impaired locations in the watershed, the areas of land draining to the highlighted sites in Figure 21 are the most critical. These areas were chosen because each site exceeded 1000 cfus/100mL at least 5 times throughout 2006 and 2007 outside of the highest flow periods. Best management practices to address *E. coli* include repairing, replacing, and maintaining septic systems; fencing livestock out of the stream and providing alternative watering sources; and educating the public on the sources of *E. coli*. Note that the southeastern portion of the watershed is not included in the critical area for E. coli due to its being a sewered portion of the City of Frankfort.

Load Information: The existing load for E. coli was calculated using the data from the 2006-2007 Baseline Water Quality Study (maximum existing load of 1.55987E+15 cfus/year with a flow of 100 ft^3/sec). The Target Load is 1.11637E+14 using 100 ft^3/sec and a Target Value of 125 cfu/100mL. This means that a reduction of 1.45 E+15 is needed to meet the Target Values set forth in the TMDL.

Figure 21: Sampling sites with very high levels of E. coli (in red)



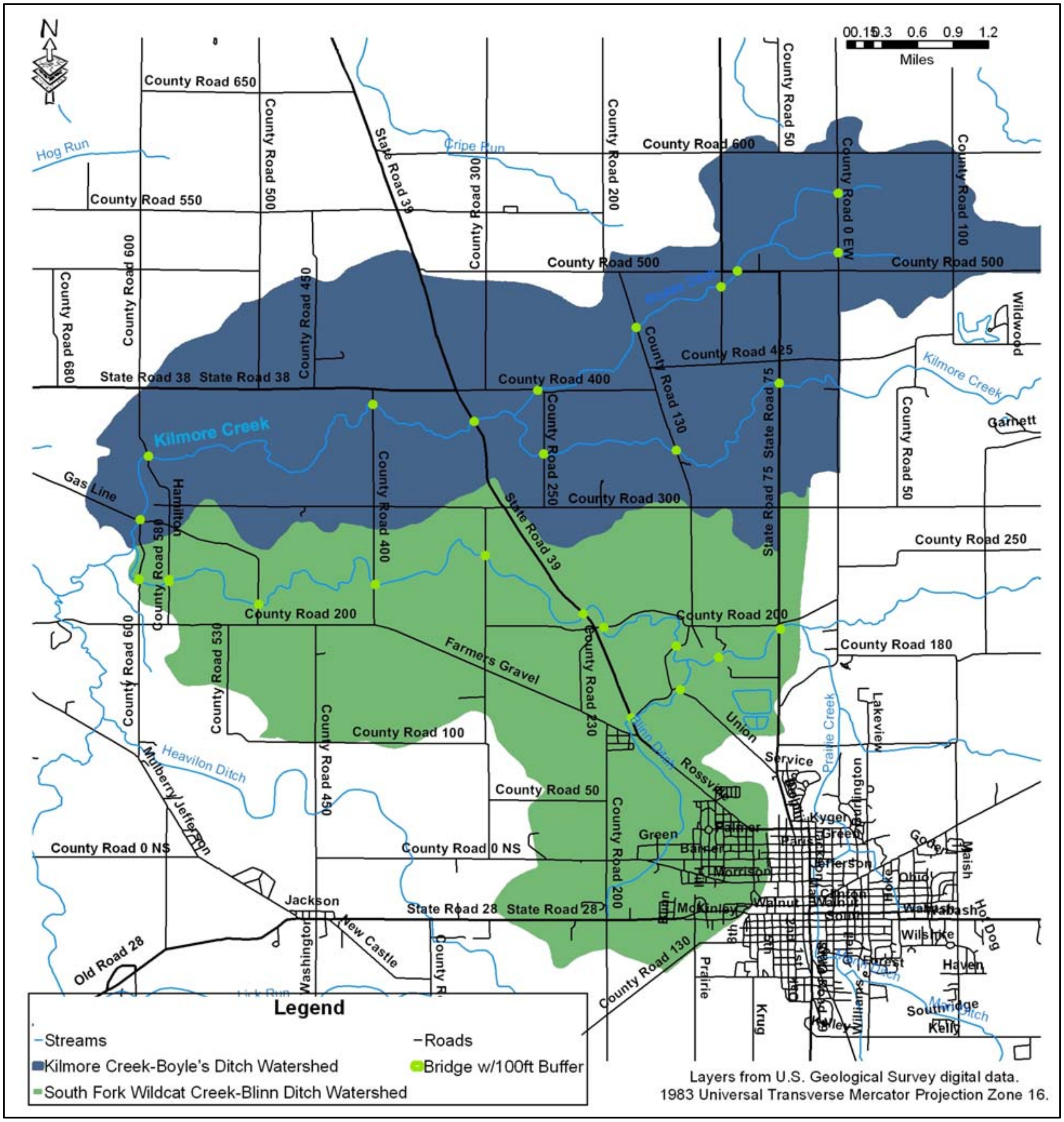
7.4 Garbage, Trash, Appliances, Tires, and Debris Goal (D): To improve the water quality of the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch subwatersheds by preventing and removing potentially hazardous and unnatural debris.
Indicator: Photographs of each site that indicate the amount of garbage, trash, appliances, tires, and debris has decreased.

Table 18:

Objective	Action Plan	Target Audience	Responsible Party/Partners	Milestones	Time Frame	Estimated Cost
1. Remove all garbage, trash, appliances, tires, and debris from the waterways and drainage paths to the waterways.	Stream clean-up days.	All Stakeholders	Clinton County SWCD & the Clinton County Landfill	Amount of trash at specific sites documented through photographs	Yearly	$200.00 per year
	Advertisement of free (or low cost) trash/appliance/tire pick up/drop off days. Signage at bridges on county roads.				Once per year	$500.00 per sign $100.00 a drop off day
2. Promote proper disposal of waste.	Education and outreach: Festivals, Radio Ads, Informational displays at community events.	All Stakeholders	Clinton County SWCD/Wildcat Creek Solid Waste District	# of materials distributed.	On Going - Quarterly	$3,000.00 per year

Garbage, Trash, Appliances, Tires, and Debris Critical Area: All watercourses and side ditches within 100 ft of a bridge. See Figure 22 for a general map of the buffer area surrounding each bridge location.

Figure 22: Bridge locations within the watersheds. Each site has a 100 foot circular buffer.



7.5 Riparian Corridor Protection, Enhancement, and Restoration Goal (E): To protect, enhance, and restore the riparian stream corridor of the South Fork Wildcat Creek-Blinn Ditch and Kilmore Creek-Boyle's Ditch watersheds by instilling pride and ownership in the community.
Indicator: Does not have evidence of degradation.

Table 19:

Objective	**Action Plan**	**Target Audience**	**Responsible Party/Partners**	**Milestones**	**Time Frame**	**Estimated Cost**
1. Instill pride and ownership of the streams in the watershed	Promote the creek and it's limitless resources	All Landowners	Clinton County SWCD	# of Signs installed	On Going	Approx. $250.00 per sign
	Install signs at key points on bridges noting the State Scenic River designation				1-3 Years	
2. Promote wise recreational use of the stream corridor	Education and Outreach	All Landowners	Clinton County SWCD	Amount of material distributed .	On Going	$2,000.00
	Provide alternative recreation opportunities				5-10 Years	

Riparian Corridor Protection, Enhancement, and Restoration Critical Area:

The South Fork Wildcat Creek is a State Scenic River, and signs will be installed along specific bridges and overpasses where degradation is occurring but signs of improvement can be seen visibly. Specific sites where signs should be installed will depend on discussions between the County Highway Department, the Steering Committee, and the Soil & Water Conservation District.

Promotion of the wise recreation and use of the stream corridor will be targeted to those landowners with property that a) borders the creek or ditch directly, b) is part of a contiguous riparian corridor connected to the creek, and/or c) public access sites.

7.6 The Connection

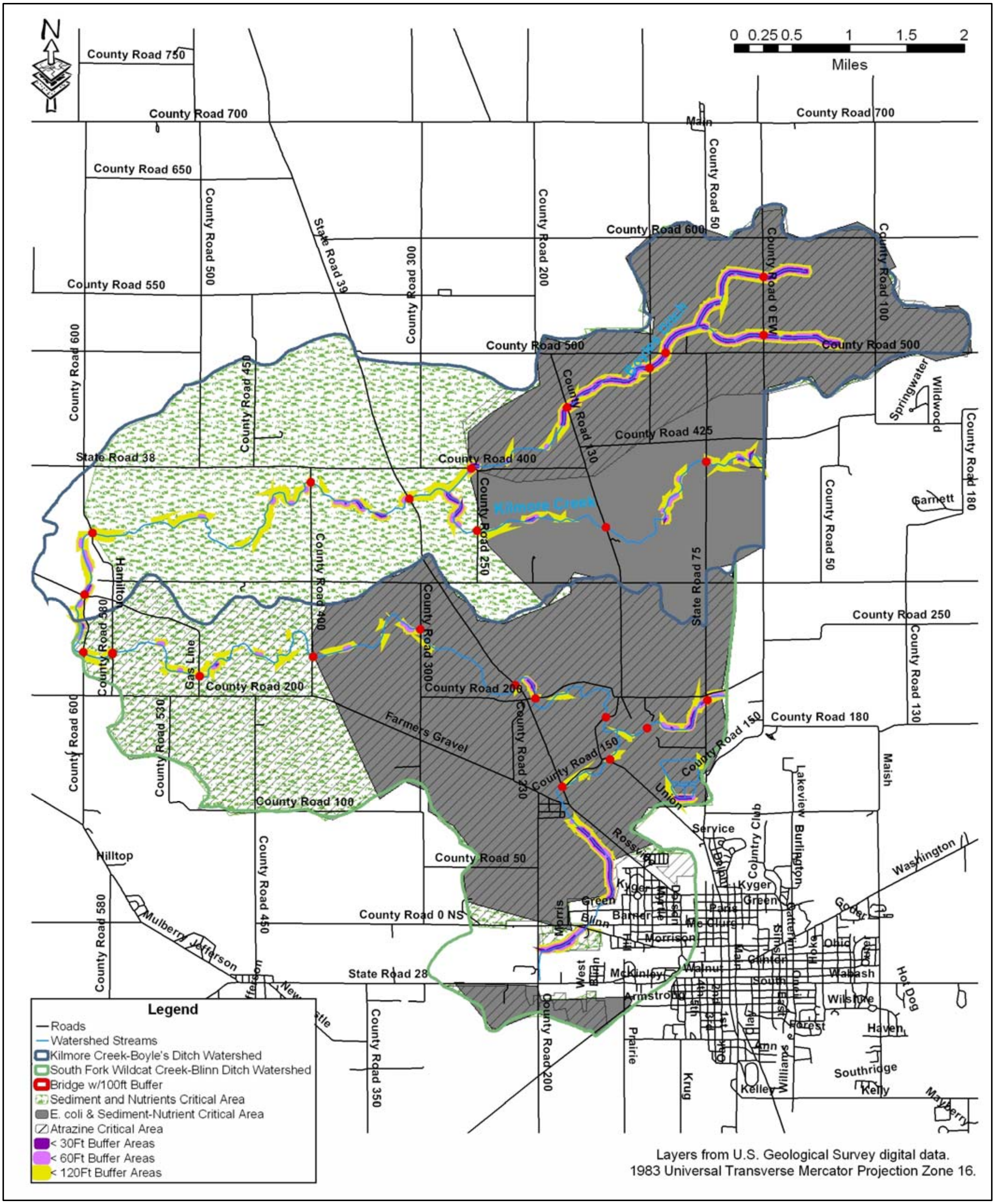
The following table displays the connection between the stakeholder concerns that turned into Problem Statements, the cause of the problem, the source of the problem, the critical area, the indicators, and the goal. Each goal can be fully reviewed on pages 42 through 53. And, the Problem Statements can be found in Appendix H. A comprehensive map of all Critical Areas can be found in Figure 23.

Table 20: The Connection

Critical Area	BMPs w/most impact (not inclusive)	Problem Statement #	Cause	Goal (Letter)	Indicators
South Fork Wildcat Creek-Blinn Ditch Watershed	Buffer strips, Pest Management, Education, Research	2 & 4	Atrazine	A & B	Atrazine level, # of buffer/filter strips installed
Areas with less than 30 feet of buffer. Kilmore Creek-Boyle's Ditch upstream of site 2. Entire South Fork Wildcat Creek-Blinn Ditch watershed.	Buffer strips, No-till, Windbreaks, Land retirement, Streambank stabilization, Education, Research, Pest & Nutrient Management, Manure Management	1, 2, 3, 4, 6, & 9	Sediment & Nutrients	A & B	TSS, T-P, Nitrate+Nitrite, Tillage transect results, # of Rule 5 permits applied for, # of BMPs installed, # of wells capped, # of stores that sell phosphorus free fertilizer, # of livestock excluded from the creek.
Area of land that drains to sampling sites 4, 6, 11, 12, 14, 15, and 16	Manure storage facilities, livestock exclusion, education, research	7	E. coli	C	# of livestock excluded from the creek, # of septics repaired or replaced, water quality sampling data for e.coli
100 foot buffer area surrounding each bridge	Enforcement of regulations, stream clean-ups, education	5, 6 & 8	Garbage, Trash, Appliances, Tires, & Debris	D	Amount of trash at each site documented by photographs, # of materials distributed

Critical Area	**BMPs w/most impact (not inclusive)**	**Problem Statement #**	**Cause**	**Goal (Letter)**	**Indicators**
Highly visible bridge sites on the South Fork Wildcat Creek. Properties that border the creek or ditch or that are a part of a contiguous riparian corridor connected to the creek	Forested buffer, land retirement, Park system formation, Regional Planning, Zoning, Education	10	Riparian & Stream Corridor Degradation	E	# of signs installed. Amount of material distributed.

Figure 23: Comprehensive Map of Critical Areas in the watersheds

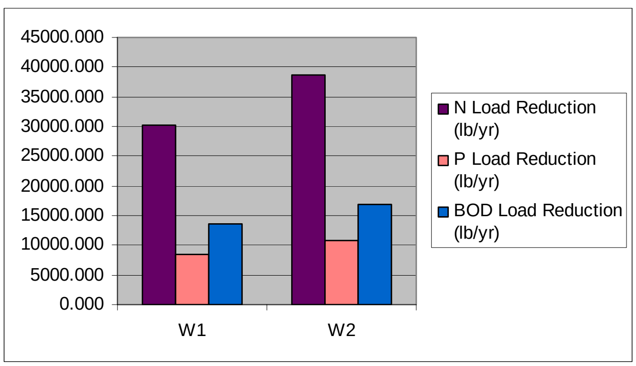


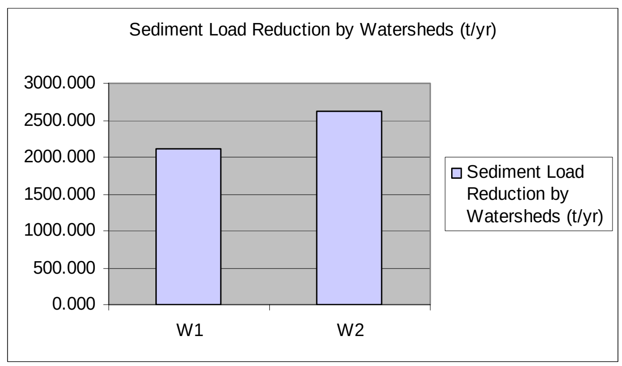
7.7 Best Management Practices

Improvements in water quality within the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watersheds will be a product of the installation and application of various Best Management Practices and Tools. The general applicability of these BMPs and Tools are outlined in Table 22. The effectiveness of the BMP and Tools is also indicated (large, medium, or small). The List of BMPs in Table 21 is not comprehensive, but covers the majority of practices and tools that we would expect to use while implementing the Plan. Several BMPs and Tools are effective at addressing more than one cause; as indicated in the goals, objectives, and critical areas.

Effectiveness of BMPs can be determined by using the STEP-L Model. The model provides estimated load reductions for a watershed based on previous inputs. The STEP-L calculation can be reviewed in Appendix O. According to the STEP-L Program, if the amount of filter strips in the watersheds increases from 81% to 95%, there will be approximately a 50% reduction in the amount of sediment, nitrogen, and phosphorus that enters surface water. By installing filter strips alone, we can meet our target loads for phosphorus and nitrogen.

Figure 24:

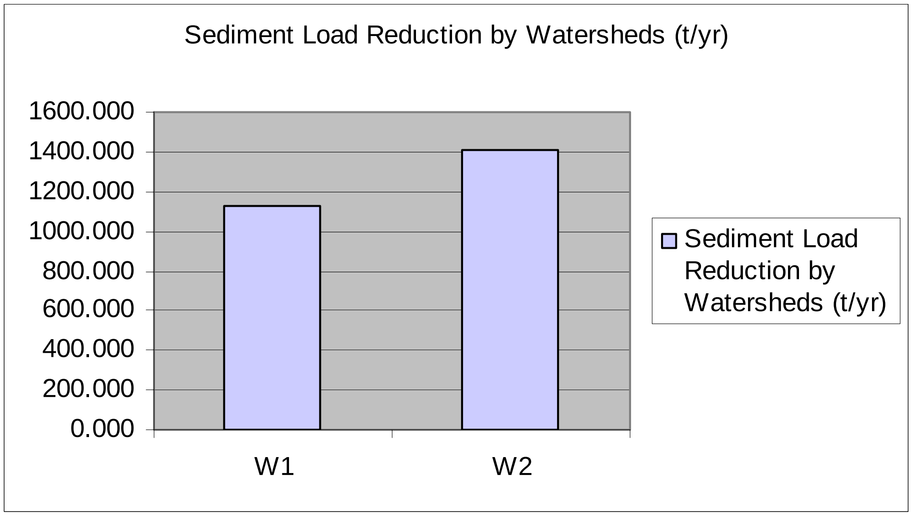




Estimated load reductions for each Best Management Practice that would enable us to meet our Target Load for Sediments are charted below. By implementing several types of BMPs (including filter strips, reduced tillage, livestock exclusion, and streambank stabilization), we can minimize the amount of sediment entering the waters.

Figure 25:

Reduced Tillage on 35% of Cropland can reduce the sediment load in the watersheds by up to 1,400 tons/year.



Streambank Stabilization and Fencing of 75% of Livestock can reduce the sediment load in the watersheds by up to 3,000 tons/year.

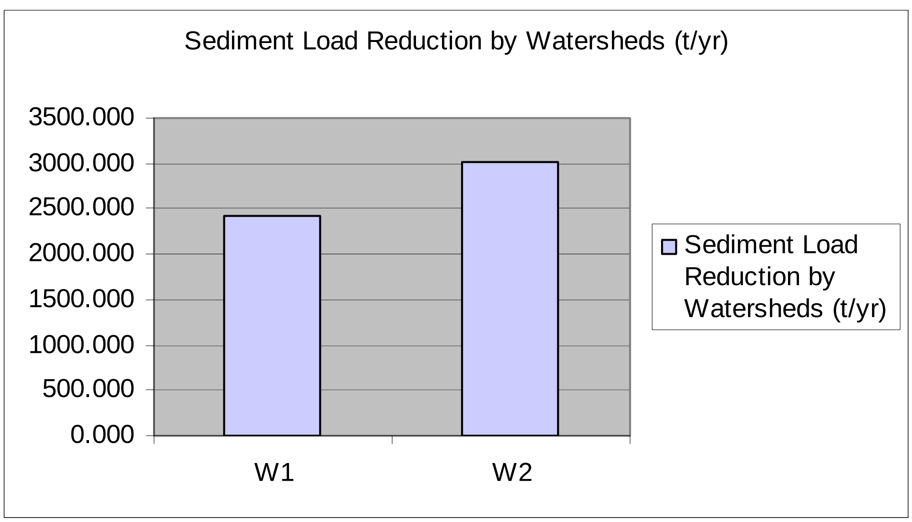


Table 21: Matrix summarizing the applicability of various Best Management Practices for improving water resources to the causes of water resource degradation (not a complete list).

BMPs & Tools	Atrazine	Sediment	Nutrients	E. coli	Garbage, Trash, Appliances, Tires, & Debris	Riparian Corridor Degradation
Grass buffer strips	L	L	L	S?		
Forested Riparian buffer	L	L	L	M		L
No-till	M	L	L			
Conservation Tillage	S	M	M			
Grassed water ways	S	M	M?			
Windbreak establishment		L	S			M
Land retirement	S	L	M	S?		L
Tile outlet maintenance		S	S			
Agricultural water management		S	S			
Nutrient Management Plans			L			
Pest Management Plan	L		L			
Manure nutrient management			L	M		
Manure storage facilities			L	L		
Livestock exclusion		M	M	L		
Stream bank stabilization		L				
Construction site BMPs		L				
Urban stormwater management		S	M		S	
Storm/Sanitary Sewer separation			L	L		
Regional Sewer District			L	L		
Septic tank replacement/Repair			M	L		
Park system formation						L
Regional planning				M		L
Zoning						L
Farmland protection						
Constructed ditch maintenance		M				N
Enforcement of existing regulations			L		L	
Stream Clean-ups					L	
Education	L	L	L	L	L	L
Research	L	L	L	L		

L = large effect in reducing the cause of impairment M = medium effect in reducing the cause of impairment
S = small effect in reducing the cause of impairment N=Negative effect ?=uncertain effect

8.0 Time Frame

The Watershed Management Plan is a working document, meaning that it should constantly be reviewed and revised. At the least, the WMP should be reviewed every 3-5 years to make additions, note objectives that have been completed, and determine the next plan of action to implement the plan. The general order of implementation for the plan is to promote and implement a cost-share program within 6 months of completion of the plan. Following the cost-share program, the second phase (approximately 3 years from plan completion) of implementation will focus on Best Management Practices to address urban issues within the City of Frankfort MS4. Throughout the implementation of both phases, education and outreach through newsletters, brochures, field days, and more will consistently occur.

In the event that a plan for the greater South Fork Wildcat Creek Watershed is completed, the Steering Committee and CCSWCD will submit this plan for inclusion into that document.

9.0 Plan Evaluation

In order to monitor the effectiveness and success of the Watershed Management Plan, several monitoring techniques will be utilized. Milestones will be measured on a bi-annual basis beginning in 2010. Following the review of achievements made during the first phase of implementation (scheduled for June 2008 – December 2010), milestones will be recorded and future milestone goals set forth.

In partnership with the CCSWCD, Hoosier Riverwatch, and other organizations conducting water quality monitoring in the South Fork Wildcat Creek watershed, water quality monitoring will continue at approximately 4 sites through out the watersheds for the duration of all phases of implementation. Hoosier Riverwatch values that will be recorded shall include: stream flow data, E. coli, pH, BOD, Water Temperature, Total Phosphate, Nitrate, Turbidity, Biological data, and Habitat Data.

To monitor the effectiveness of the education and outreach program, mail surveys will be sent to landowners towards the end of each phase of implementation. This will allow us to track social changes within the watersheds.

Best Management Practices will be tracked using GPS and GIS technology. It is important to have a digital file of the locations where these practices are installed so that our water quality monitoring locations can be chosen, our success can be tracked, and other organizations can easily view our practice locations. In addition to digitizing the site locations, spot checks of the BMPs will be completed every couple of years to insure that the practices are installed for the appropriate amount of time.

Another form of monitoring that will be important for the Garbage, Trash, Appliances, Tires, and Debris goal is the use of photography. By taking before and after photographs of the sites that are being focused on, it will be easy to track the changes in the amount of debris at each site.

Landowner participation will be tracked at field days, workshops, and meetings. The number of Pest & Nutrient Management Plans created as a result of the implementation of the WMP will be tracked.

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Acronyms

BMP: Best Management Practice

AFO: Animal Feeding Operation

CAFO: Confined Animal Feeding Operation

CNMP: Comprehensive Nutrient Management Plan

WMP: Watershed Management Plan

P&NMPs: Pest & Nutrient Management Plans

SWCD: Soil & Water Conservation District

IDEM: Indiana Department of Environmental Management

NRCS: Natural Resources Conservation Service

FSA: Farm Service Agency

IDNR: Indiana Department of Natural Resources

GIS: Geographic Information System

IBI: Index of Biological Integrity

MS4: Municipal Separate Storm Sewer System

NPS: Nonpoint Source (pollution)

TMDL: Total Maximum Daily Load

FOTG: Field Office Technical Guide

Glossary

Aquifer: A formation, group of formations, or part of a formation that contains enough saturated permeable material to yield significant quantities of water.

Baseline water quality study: A study of the current status of the water quality that will provide a current level to compare future study results to.

Bedrock: The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Best Management Practices (BMPs): State-approved and published practices that have been determined to be the most practical and effective means of controlling point and non-point pollutant levels for environmental goals.

Buffer: An upland area adjacent to a wetland, lake, or stream that is covered with natural vegetation that experience little to no human impact such as mowing. The buffer begins at the delineated wetland edge or top of the bank of a stream.

Combined Sewer Overflow (CSO): A pipe that, during storms, discharges untreated wastewater from a sewer system that carries both sanitary wastewater and stormwater. The overflow occurs because a system does not have the capacity to transport and treat the increased flow caused by the stormwater runoff.

Erosion: Process by which soil is displaced by water, wind, or human impact.

Hydric Soil: Soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper sections

Hydrology: The science concerned with waters of the earth, their occurrence, distribution, and circulation; their physical and chemical properties; and their reaction to the environment.

Impaired Biotic Communities: An Impaired Biotic Community (IBC) means that a waterbody's aquatic life differs from the expectation of water that was unaffected by human activity. Measuring aquatic life is an excellent way to measure overall stream health, more accurate than by chemically testing for pollutants alone. Because of this, the presence of an IBC means that the waterbody is not healthy.

Impervious Surface: A surface that cannot be easily penetrated.

Local City/Community: The member communities of the South Fork Wildcat Creek-Blinn Ditch & Kilmore Creek-Boyle's Ditch Watersheds.

Riparian Corridor: An area along the banks of a river or stream that separates water bodies from developed or agricultural land and is intended to protect the water way and water quality from chemical and physical impact.

Runoff: The part of precipitation that travels overland and appears in surface streams or other receiving water bodies.

Septic System: A facility used for the partial treatment and disposal of sanitary wastewater, generated by individual homes or small business, into the ground. Includes both a septic tank and a leaching facility.

Soil Association: A group of soils geographically associated in a characteristic repeating pattern defined and delineated as a single map unit.

Stakeholders: All agencies, organizations and individuals that could be affected by or have an interest in water quality decisions in a watershed.

Storm Drain: A system of gutters, pipes, or ditches used to carry stormwater from surrounding lands to streams and ditches. Storm drains carry a variety of substances such as oil and antifreeze which enter the system through runoff.

Stormwater: Precipitation that is often routed into drain systems in order to prevent flooding; primarily refers to runoff from the City of Frankfort.

Subwatershed: A minor drainage unit and a hydrologic component of a watershed.

Suspended Solids: Organic or inorganic particles that are suspended in and carried by water. The term includes sand, mud, and clay particles as well as organic solids in wastewater.

Watercourse: Any natural or man-made stream, pond, lake, wetland, or other body of water.

Watershed: All lands that are enclosed by a continuous hydrologic drainage divide and lie upslope from a specified outlet point.

Watershed Management Plan: A planning document that presents solutions for addressing the water quality problems identified in the Indiana 303(d) List of Impaired Waterbodies for a single watershed management area. The document includes assessment results, specific management strategies, and corresponding stakeholder roles for implementation to attain water quality goals.

Wetland: Transitional land between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

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Appendices:

Appendix A:

<u>List of Advisory Board and Committee Members</u>

Clinton County SWCD Board of Supervisors
Devin Bell, Chairman
Jerry Batts, Vice-Chairman
Larry Mennen
Matt Kelley
Chuck Calvert

Staff
Cindy Baker, Resource Conservation Specialist
Leah Harden, District Administrator

Steering Committee Members
Alan Ostler – Landowner
Mike Emens – Landowner
Glen Hart – Landowner
Steve Yeary – Health Department
Gail Fusaro – Clinton Prairie Teacher
Dawn Boston – Wildcat Creek Solid Waste District

Appendix B:

List of Partners

- Purdue Cooperative Extension of Clinton County
- Purdue University Forestry and Natural Resources Department
- Frankfort Waste Water Treatment Plant
- Clinton County Health Department
- Clinton County Commissioners
- Clinton County Council
- Clinton County Surveyor
- Clinton County Highway Department
- Clinton County Area Plan Commission
- Farm Bureau Inc. of Clinton County
- Clinton County Foundation for Youth (Camp Cullom)
- Wildcat Creek Solid Waste District
- Clinton Prairie High School
- Indiana Department of Environmental Management
- Indiana Department of Natural Resources (Project Wet and Indiana Master Naturalist)
- Indiana State Department of Agriculture, Division of Soil Conservation
- USDA Natural Resources Conservation Service
- USDA Farm Service Agency
- Commonwealth Biomonitoring, Inc.
- Boy Scouts of America Troop 338
- Girl Scouts of America
- Greater Wabash River Resource, Conservation, and Development
- Wildcat Creek Watershed Alliance

List of Sponsors

- Agri Drain
- Frito Lay
- Marsh Supermarket
- Wal-Mart of Frankfort
- Zachary Confections
- Rain Barrel USA
- Douglas Sewer & Septic Tank Pumping
- L. Edwards Sewer & Septic Tank Pumping

Appendix C:

Summary from Watershed Stakeholder Meetings

Date of Stakeholder Meeting	Description of Meeting	Information Received/Provided
March 21st, 2006	Meeting held at the Frankfort Public Library to Introduce the Community to the grant	▪ Perceived Areas and Issues of Concern ▪ Methods of Addressing Issues
September 22nd, 2006	Meeting held at the Frankfort Courthouse to involve the local government in the grant	▪ County agency concerns ▪ Individual concerns ▪ Goals and Methods of Addressing Issues ▪ Need to Act as a Partnership
October 26th, 2006	Meeting held at the Frankfort Neighborhood Center to Involve the Community in the TMDL process and update them on grant information	▪ Inform stakeholders and public about the TMDL process ▪ Gather information from attendees on possible pollutant sources and critical areas
February 27th, 2007	Meeting held at the Frankfort Neighborhood Center with guest speak Jennifer Sobecki (IDNR)	▪ Watershed conservation through forestry ▪ Trees impact on water quality ▪ Information on forestry programs for landowners
March 17th, 2007	Farm & Home Workshop held at the Frankfort Library	▪ Information on Tree & Woodland Care, Septic System Maintenance, Drainage Water Management, and Backyard Conservation
July 19th, 2007	Long Term Hydrologic Impact Assessment training for local governments and organizations	▪ Hydrologic impacts of development and urbanization on water quality ▪ Delineating watersheds using the on-line delineation tool
September 22nd, 2007	Make a Splash Festival	▪ Educational event with

		Project Wet activities, live demonstrations, and booths
November 13th, 2007	Clinton County Commissioners and County Council Meeting	▪ Provided information about the grant; reviewed the draft goals and objectives ▪ Discussed a possible ordinance for Rule 5

Appendix D:

Problem Statements

1) The fish population is declining in both quantity and quality of fish species; we believe this is due to the excess sedimentation and nutrients reaching the streams because of a lack of riparian buffers.
    a. What we want: a fish population healthy enough to allow for recreational fishing and safe fish consumption.
    b. Information we need: current fish population, cause of decline (lack of habitat for breeding, lack of food, etc), desired fish population.
    c. Location: based on the baseline water quality study conducted, the South Fork Wildcat Creek is more impaired for habitat and macroinvertebrates than Kilmore Creek.

2) Excess nutrients in the streams are causing algal blooms and lower dissolved oxygen levels; we believe this is due to over application of pesticides and fertilizers entering water through field runoff and abandoned wells.
    a. What we want: farmers to implement Pest and Nutrient Management Plans and utilize precision agriculture to limit over application, abandoned well capping.
    b. Information we need: current cause of excess nutrients, best methods of preventing over application, where is the most affected area
    c. Location: watershed wide

3) Undercutting stream bank erosion is increasing sedimentation in our creeks and occurs through-out the watersheds; we believe this is due to soil type, changes in hydrology, and land use.
    a. What we want: streams with stable banks, a decrease in the mass wasting that is occurring, and overall decrease of in-stream sedimentation by reducing the flashiness of the streams.
    b. Information we need: where are the worst cases, cause of stream bank erosion and mass wasting, desired amount of stabilized stream banks, adjacent land use and soil types.
    c. Location: Based on the baseline water quality study, sediment tolerant midges are more prevalent in the South Fork Wildcat Creek.

4) There is a small proportion of 100% no-till farmers and farmers practicing conservation tillage in the watersheds; we believe this is due to the cost of low-till equipment, possibility of a decrease in yield, and resistance to change.
    a. What we want: an increase in the percentage of no-till farmers in the watershed.
    b. Information we need: current percent of no-till farmers in the watershed, cause of resistance to low-till, and the target percentage of low-till farmers.
    c. Location: all farm fields within the watersheds not currently being low-tilled

5) There are a large amount of junk cars stored in the flood plains that can cause oil and gasoline to runoff to our streams after large storm events; we believe this is due to the

lack of proactive enforcement of the zoning ordinance preventing the storage of junk cars in flood plains.

a. What we want: a decrease in the number of junk cars and appliances in the flood plain and proactive enforcement of the county zoning ordinances to prevent future flood plain accumulation.
b. Information we need: current number of vehicles/appliances in the floodplain, locations of junk vehicles/appliances, current zoning ordinances dealing with flood plains.
c. Specific Locations: Compressed Steal and Kilmore and downstream

6) Storm drains in the City of Frankfort drain street runoff, garbage, and more directly to our ditches and streams; we believe that the cause is the lack of awareness of the community.
    a. What we want: decreased storm drain runoff through the use of urban best management practices such as rain gardens, rain barrels, washing cars in the lawn, recycling, picking up pet waste, following fertilizer directions, etc.
    b. Information we need: current number of people aware of storm drain runoff issues, locations of storm drains in the watershed, types of best management practices that make the most impact, educational materials explaining the practices.
    c. Location: City of Frankfort city limits

7) High *E. coli* levels are present in our streams and ditches causing them to be listed on Indiana's 303(d) List of Impaired Waterbodies. We believe this is due to failing septic systems, straight pipes, wildlife waste, pet waste, and livestock access to streams.
    a. What we want: decreased *E. coli* levels to meet the state standards of <235 colonies per 100 mL, ordinances requiring the replacement of old and failing septic systems.
    b. Information we need: current estimate of the number of failing septic systems, current estimate of the number of livestock with stream access, ordinances addressing septic systems, and current *E. coli* levels.
    c. Location: All sampling sites through out the watershed exceed the state standards. Consistently high sites include: 3,4, and 9-16 (sites 3 &4 are located on Kilmore Creek while 9-16 are in the South Fork Wildcat Creek)
    d. Location: all non-sewered businesses and residences, all waterways where livestock have stream access, all pet owners.

8) Garbage, trash, appliances, and debris is accumulating in the streams and on the stream banks potentially causing toxins and bacteria to enter the stream as well as cause habitat degradation; we believe this is due to the expensive disposal costs, lack of awareness of the impacts, and unsecured garbage, trash, and debris being blown out during transport.
    a. What we want: decreased amounts of garbage, trash, appliances, and debris in our streams, stronger ordinances and consequences for illegally dumping
    b. Information we need: current ordinances and consequences, locations of the most severely impacted stream segments, and the cause of the increased amount of dumping

    c. Location: bridge sites with accumulated garbage, trash, appliances, tires, and debris; construction sites (with a 30 foot buffer around site)

9) Construction sites located adjacent to water bodies or water ways can contribute sediment, trash, debris, oil, gas, and other toxins to our waters when proper storm water pollution prevention measures are not followed; we believe the lack of storm water pollution prevention measures are due to cost, lack of regulation, and lack of awareness.
    a. What we want: increased protection of construction sites using storm water pollution prevention measures and stronger over sight
    b. Information we need: location of current and future construction sites
    c. Location: all construction sites

10) Recreational opportunities in the watersheds are lacking in quantity and quality causing a disconnect between the community and our State Scenic River, and current ATV and horse recreation is causing stream bank deterioration; we believe this is due to the cost of recreational facilities, current land use in the watersheds, and the majority of the land is privately owned
    a. What we want: increased recreational opportunities (both in quality and quantity); enhancement, restoration, and protection of the riparian corridor from misuse.
    b. Information we need: current recreational areas, needed recreational facilities, estimated costs.
    c. Location: watershed wide

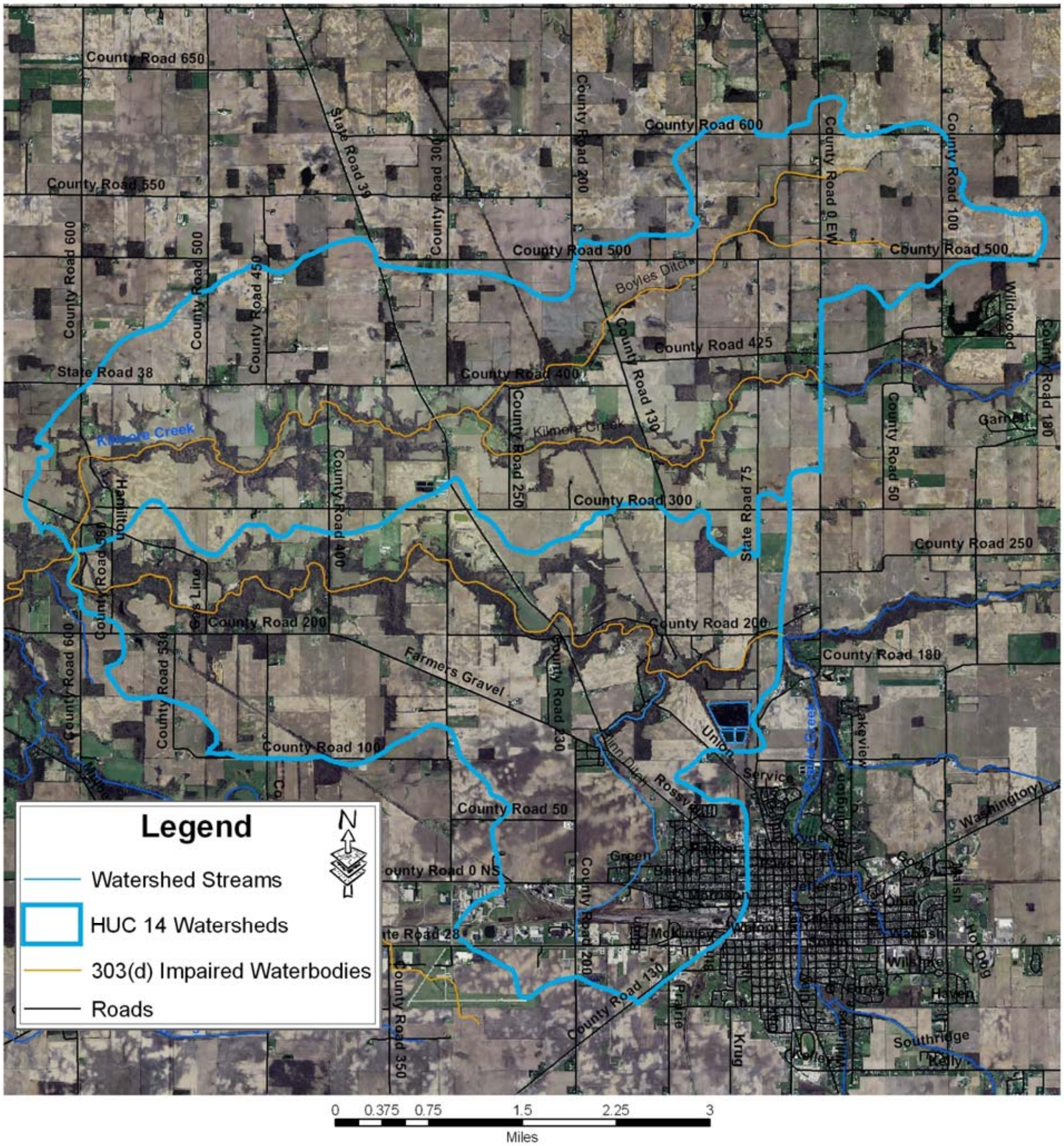
Appendix E:

Table 4.3: ISDH Definitions for FCA Groups

FCA Group	Description
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 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 15.
Group 3	Limit to one meal per month for adult males and females. Women who are pregnant, breast-feeding, may become pregnant, and children under 15 do not eat.
Group 4	Limit one meal every 2 months for adult males and females. Women who are pregnant, breast-feeding, may become pregnant, and children under 15 do not eat.
Group 5	No consumption (Do Not Eat).

Appendix F:

303(d) Impaired Streams in the Watersheds



Appendix G:

Water Chemistry Data

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: June 6, 2006
Base Flow Sample

	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	12.5	7.6	640	21	47	1300
Site 2. Kilmore Creek @ CR 400 W	11.5	7.7	650	21	45	1400
Site 3. Kilmore Creek @ Highway 421	9.1	7.7	640	19	42	1100
Site 4. Boyles Ditch @ CR 400 N	8.2	7.6	610	19	2	1115
Site 5. Boyles Ditch @ CR 500 N	14.8	8.0	650	19	1	1130
Site 6. Kilmore Creek @ CR 130 W	10.1	7.6	650	20	40	1145
Site 7. Kilmore Creek @ Highway 75	8.2	7.4	650	18	38	940
Site 8. Kilmore Creek @ CR 0	8.1	7.4	620	18	37	920
Site 9. South Fork of Wildcat Creek @ CR 600 W	12.0	8.1	790	20	50	1320
Site 10. South Fork of Wildcat Creek @ CR 500 W	12.2	8.1	800	21	48	1340
Site 11. South Fork of Wildcat Creek @ CR 400 W	12.1	7.7	810	22	47	1415
Site 12. South Fork of Wildcat Creek @ CR 300 W	10.5	7.6	830	21	46	1430
Site 13. South Fork of Wildcat Creek @ Highway 421	7.5	7.4	800	19	45	1045
Site 14. South Fork of Wildcat Creek @ CR 130 W	7.1	7.3	810	18	44	1025
Site 15. Blinn Ditch @ CR 130 W	8.0	7.4	710	15	4	1010
Site 16. South Fork of Wildcat Creek @ Highway 75	7.2	7.3	810	18	40	955

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	6.0	0.14	6.5
Site 2. Kilmore Creek @ CR 400 W	16.0	0.08	7.0
Site 3. Kilmore Creek @ Highway 421	8.4	0.11	7.5
Site 4. Boyles Ditch @ CR 400 N	2.0	0.32	6.5
Site 5. Boyles Ditch @ CR 500 N	7.6	0.12	7.0
Site 6. Kilmore Creek @ CR 130 W	14.0	0.09	9.0
Site 7. Kilmore Creek @ Highway 75	15.2	0.07	9.0
Site 8. Kilmore Creek @ CR 0	13.6	0.08	9.0
Site 9. South Fork of Wildcat Creek @ CR 600 W	10.8	0.34	7.0
Site 10. South Fork of Wildcat Creek @ CR 500 W	9.6	0.28	7.5
Site 11. South Fork of Wildcat Creek @ CR 400 W	14.4	0.30	8.3
Site 12. South Fork of Wildcat Creek @ CR 300 W	9.2	0.38	8.3
Site 13. South Fork of Wildcat Creek @ Highway 421	10.4	0.39	6.5
Site 14. South Fork of Wildcat Creek @ CR 130 W	16.0	0.48	5.6
Site 15. Blinn Ditch @ CR 130 W	2.8	0.06	4.1
Site 16. South Fork of Wildcat Creek @ Highway 75	17.2	0.38	4.6
Site 12 - quality assurance duplicate	10.4	0.36	8.3

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling

Date: July 12, 2006

Wet Weather Sample

	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	7.1	7.7	440	26	154	1400
Site 2. Kilmore Creek @ CR 400 W	7.8	7.7	425	24	152	1510
Site 3. Kilmore Creek @ Highway 421	7.5	7.6	420	24	150	1300
Site 4. Boyles Ditch @ CR 400 N	8.3	7.6	415	23	20	1310
Site 5. Boyles Ditch @ CR 500 N	6.9	7.3	510	23	14	1325
Site 6. Kilmore Creek @ CR 130 W	7.5	7.6	430	25	130	1345
Site 7. Kilmore Creek @ Highway 75	7.6	7.5	460	22	128	1020
Site 8. Kilmore Creek @ CR 0	8.0	7.3	435	21	125	1000
Site 9. South Fork of Wildcat Creek @ CR 600 W	7.5	7.7	500	26	165	1420
Site 10. South Fork of Wildcat Creek @ CR 500 W	7.5	7.7	510	25	163	1440
Site 11. South Fork of Wildcat Creek @ CR 400 W	8.0	7.7	500	24	161	1455
Site 12. South Fork of Wildcat Creek @ CR 300 W	7.8	7.6	420	24	159	1520
Site 13. South Fork of Wildcat Creek @ Highway 421	7.3	7.6	505	25	157	1245
Site 14. South Fork of Wildcat Creek @ CR 130 W	7.7	7.5	490	21	155	1130
Site 15. Blinn Ditch @ CR 130 W	7.6	7.6	490	22	24	1055
Site 16. South Fork of Wildcat Creek @ Highway 75	7.7	7.5	495	21	139	1040

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	205	0.52	11
Site 2. Kilmore Creek @ CR 400 W	181	0.45	11
Site 3. Kilmore Creek @ Highway 421	172	0.52	11
Site 4. Boyles Ditch @ CR 400 N	88	0.50	8
Site 5. Boyles Ditch @ CR 500 N	4	0.44	12
Site 6. Kilmore Creek @ CR 130 W	197	0.26	9
Site 7. Kilmore Creek @ Highway 75	167	0.55	11
Site 8. Kilmore Creek @ CR 0	123	0.40	13
Site 9. South Fork of Wildcat Creek @ CR 600 W	159	0.32	11
Site 10. South Fork of Wildcat Creek @ CR 500 W	179	0.52	11
Site 11. South Fork of Wildcat Creek @ CR 400 W	169	0.60	12
Site 12. South Fork of Wildcat Creek @ CR 300 W	250	0.40	11
Site 13. South Fork of Wildcat Creek @ Highway 421	110	0.40	13
Site 14. South Fork of Wildcat Creek @ CR 130 W	120	0.65	13
Site 15. Blinn Ditch @ CR 130 W	108	0.12	3.4
Site 16. South Fork of Wildcat Creek @ Highway 75	129	0.65	9
Site 12 - quality assurance duplicate	212	0.30	11

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: September 6, 2006
Base Flow Sample

	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	8.0	7.4	470	17	26	845
Site 2. Kilmore Creek @ CR 400 W	8.6	7.3	520	16	26	950
Site 3. Kilmore Creek @ Highway 421	8.0	7.4	480	17	24	1005
Site 4. Boyles Ditch @ CR 400 N	8.2	7.4	500	18	2	1030
Site 5. Boyles Ditch @ CR 500 N	4.3	7.3	480	18	0	1045
Site 6. Kilmore Creek @ CR 130 W	8.5	7.7	420	21	22	1130
Site 7. Kilmore Creek @ Highway 75	8.3	7.6	420	20	21	1110
Site 8. Kilmore Creek @ CR 0	8.2	7.6	410	19	20	1100
Site 9. South Fork of Wildcat Creek @ CR 600 W	8.5	7.3	580	16	34	905
Site 10. South Fork of Wildcat Creek @ CR 500 W	8.6	7.4	680	16	33	915
Site 11. South Fork of Wildcat Creek @ CR 400 W	8.3	7.4	710	17	32	940
Site 12. South Fork of Wildcat Creek @ CR 300 W	8.5	7.6	720	18	31	1015
Site 13. South Fork of Wildcat Creek @ Highway 421	9.4	7.7	580	22	30	1240
Site 14. South Fork of Wildcat Creek @ CR 130 W	9.3	7.6	580	25	29	1220
Site 15. Blinn Ditch @ CR 130 W	8.0	7.6	490	19	7	1200
Site 16. South Fork of Wildcat Creek @ Highway 75	7.7	7.6	660	21	22	1145

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	8	0.15	4.0
Site 2. Kilmore Creek @ CR 400 W	3	0.20	6.0
Site 3. Kilmore Creek @ Highway 421	3	0.26	2.0
Site 4. Boyles Ditch @ CR 400 N	1	0.16	1.0
Site 5. Boyles Ditch @ CR 500 N	14	0.18	1.0
Site 6. Kilmore Creek @ CR 130 W	1	0.20	1.0
Site 7. Kilmore Creek @ Highway 75	1	0.24	1.0
Site 8. Kilmore Creek @ CR 0	12	0.18	1.0
Site 9. South Fork of Wildcat Creek @ CR 600 W	15	0.85	1.0
Site 10. South Fork of Wildcat Creek @ CR 500 W	14	1.10	2.0
Site 11. South Fork of Wildcat Creek @ CR 400 W	13	1.10	5.0
Site 12. South Fork of Wildcat Creek @ CR 300 W	6	1.70	5.0
Site 13. South Fork of Wildcat Creek @ Highway 421	2	0.80	8.0
Site 14. South Fork of Wildcat Creek @ CR 130 W	2	0.48	1.0
Site 15. Blinn Ditch @ CR 130 W	2	0.17	1.0
Site 16. South Fork of Wildcat Creek @ Highway 75	4	0.85	16.0
Site 1 - quality assurance duplicate	9	0.14	4.0

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: October 25, 2006
Base Flow Sample

	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	12.0	7.9	410	8	32	1330
Site 2. Kilmore Creek @ CR 400 W	11.2	7.9	480	9	31	1320
Site 3. Kilmore Creek @ Highway 421	10.2	7.7	480	10	30	1205
Site 4. Boyles Ditch @ CR 400 N	10.8	7.6	490	8	4	1215
Site 5. Boyles Ditch @ CR 500 N	9.7	7.4	490	10	3	1230
Site 6. Kilmore Creek @ CR 130 W	10.9	7.8	500	9	27	1245
Site 7. Kilmore Creek @ Highway 75	10.0	7.3	510	6	26	1035
Site 8. Kilmore Creek @ CR 0	10.1	7.2	510	10	25	1025
Site 9. South Fork of Wildcat Creek @ CR 600 W	12.2	7.9	580	9	35	1345
Site 10. South Fork of Wildcat Creek @ CR 500 W	11.7	8.0	600	10	34	1400
Site 11. South Fork of Wildcat Creek @ CR 400 W	11.7	7.8	580	9	33	1310
Site 12. South Fork of Wildcat Creek @ CR 300 W	11.4	7.8	590	9	34	1255
Site 13. South Fork of Wildcat Creek @ Highway 421	9.9	7.5	590	9	31	1120
Site 14. South Fork of Wildcat Creek @ CR 130 W	10.3	7.5	590	9	30	1120
Site 15. Blinn Ditch @ CR 130 W	9.9	7.3	530	9	5	1105
Site 16. South Fork of Wildcat Creek @ Highway 75	11.4	7.4	600	8	28	1050

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	1.3	0.11	8.5
Site 2. Kilmore Creek @ CR 400 W	0.7	0.12	3.4
Site 3. Kilmore Creek @ Highway 421	2.0	0.15	7.0
Site 4. Boyles Ditch @ CR 400 N	2.0	0.07	2.2
Site 5. Boyles Ditch @ CR 500 N	63.0	0.13	3.5
Site 6. Kilmore Creek @ CR 130 W	3.3	0.13	8.0
Site 7. Kilmore Creek @ Highway 75	1.3	0.15	1.5
Site 8. Kilmore Creek @ CR 0	0.7	0.08	1.8
Site 9. South Fork of Wildcat Creek @ CR 600 W	1.3	0.22	3.4
Site 10. South Fork of Wildcat Creek @ CR 500 W	0.7	0.16	6.0
Site 11. South Fork of Wildcat Creek @ CR 400 W	2.6	0.30	3.9
Site 12. South Fork of Wildcat Creek @ CR 300 W	5.3	0.28	4.8
Site 13. South Fork of Wildcat Creek @ Highway 421	4.7	0.32	6.5
Site 14. South Fork of Wildcat Creek @ CR 130 W	2.0	0.24	8.5
Site 15. Blinn Ditch @ CR 130 W	4.0	0.08	0.4
Site 16. South Fork of Wildcat Creek @ Highway 75	4.7	0.40	12.0
Site 1 - quality assurance duplicate	2	0.12	11.0

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: April 16, 2007
Base Flow Sample

Field Chemistry	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	12.4	7.8	400	10	157	1315
Site 2. Kilmore Creek @ CR 400 W	12.3	7.8	400	10	154	1300
Site 3. Kilmore Creek @ Highway 421	11.5	7.7	400	12	147	1130
Site 4. Boyles Ditch @ CR 400 N	11.3	7.6	390	7	10	1200
Site 5. Boyles Ditch @ CR 500 N	11.3	7.4	390	11	10	1215
Site 6. Kilmore Creek @ CR 130 W	11.9	7.7	380	12	140	1230
Site 7. Kilmore Creek @ Highway 75	10.7	7.4	410	9	133	1030
Site 8. Kilmore Creek @ CR 0	10.6	7.4	420	9	126	1010
Site 9. South Fork of Wildcat Creek @ CR 600 W	12.6	7.9	440	10	166	1335
Site 10. South Fork of Wildcat Creek @ CR 500 W	12.6	8.0	440	11	162	1400
Site 11. South Fork of Wildcat Creek @ CR 400 W	12.6	8.0	450	11	156	1345
Site 12. South Fork of Wildcat Creek @ CR 300 W	12.7	7.6	440	10	152	1245
Site 13. South Fork of Wildcat Creek @ Highway 421	11.4	7.6	450	10	148	1135
Site 14. South Fork of Wildcat Creek @ CR 130 W	10.8	7.5	450	10	144	1115
Site 15. Blinn Ditch @ CR 130 W	11.4	7.5	480	9	15	1055
Site 16. South Fork of Wildcat Creek @ Highway 75	10.5	7.5	430	8	141	1040

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	7.0	0.10	8.0
Site 2. Kilmore Creek @ CR 400 W	22.0	0.05	8.0
Site 3. Kilmore Creek @ Highway 421	11.5	0.08	7.0
Site 4. Boyles Ditch @ CR 400 N	3.0	0.56	4.4
Site 5. Boyles Ditch @ CR 500 N	6.5	0.08	6.5
Site 6. Kilmore Creek @ CR 130 W	6.0	0.08	7.0
Site 7. Kilmore Creek @ Highway 75	7.5	0.05	9.0
Site 8. Kilmore Creek @ CR 0	7.5	0.08	9.0
Site 9. South Fork of Wildcat Creek @ CR 600 W	4.0	0.11	8.0
Site 10. South Fork of Wildcat Creek @ CR 500 W	3.5	0.12	6.5
Site 11. South Fork of Wildcat Creek @ CR 400 W	2.5	0.70	5.8
Site 12. South Fork of Wildcat Creek @ CR 300 W	3.0	0.18	7.0
Site 13. South Fork of Wildcat Creek @ Highway 421	4.5	0.16	7.5
Site 14. South Fork of Wildcat Creek @ CR 130 W	4.5	0.12	6.0
Site 15. Blinn Ditch @ CR 130 W	1.0	0.09	3.2
Site 16. South Fork of Wildcat Creek @ Highway 75	1.0	0.09	7.5
Site 1 - quality assurance duplicate	6	0.10	8.5

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: June 4, 2007
Base Flow Sample

Field Chemistry	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	8.6	7.9	641	21	34	1340
Site 2. Kilmore Creek @ CR 400 W	7.9	7.8	628	20	33	1250
Site 3. Kilmore Creek @ Highway 421	7.6	7.6	714	20	31	1135
Site 4. Boyles Ditch @ CR 400 N	7.7	7.6	591	19	5	1145
Site 5. Boyles Ditch @ CR 500 N	10.5	8.2	576	21	1	1200
Site 6. Kilmore Creek @ CR 130 W	8.6	7.7	603	20	30	1215
Site 7. Kilmore Creek @ Highway 75	7.0	7.5	602	21	29	1045
Site 8. Kilmore Creek @ CR 0	6.8	7.5	601	21	27	1025
Site 9. South Fork of Wildcat Creek @ CR 600 W	8.3	7.9	736	21	36	1400
Site 10. South Fork of Wildcat Creek @ CR 500 W	7.9	7.8	771	21	35	1320
Site 11. South Fork of Wildcat Creek @ CR 400 W	7.7	7.8	787	20	34	1305
Site 12. South Fork of Wildcat Creek @ CR 300 W	7.1	7.7	815	21	33	1235
Site 13. South Fork of Wildcat Creek @ Highway 421	7.2	7.6	793	20	32	1130
Site 14. South Fork of Wildcat Creek @ CR 130 W	7.2	7.6	791	20	31	1120
Site 15. Blinn Ditch @ CR 130 W	7.3	7.5	734	18	7	1110
Site 16. South Fork of Wildcat Creek @ Highway 75	7.0	7.6	818	20	30	1055

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	4.5	0.15	2.2
Site 2. Kilmore Creek @ CR 400 W	5.0	0.15	2.2
Site 3. Kilmore Creek @ Highway 421	5.0	0.17	2.0
Site 4. Boyles Ditch @ CR 400 N	5.0	0.24	1.2
Site 5. Boyles Ditch @ CR 500 N	5.0	0.03	2.2
Site 6. Kilmore Creek @ CR 130 W	4.0	0.16	1.9
Site 7. Kilmore Creek @ Highway 75	6.5	0.21	1.7
Site 8. Kilmore Creek @ CR 0	9.0	0.20	1.8
Site 9. South Fork of Wildcat Creek @ CR 600 W	13.0	0.70	2.4
Site 10. South Fork of Wildcat Creek @ CR 500 W	22.5	0.75	3.5
Site 11. South Fork of Wildcat Creek @ CR 400 W	14.0	0.80	4.0
Site 12. South Fork of Wildcat Creek @ CR 300 W	14.5	0.75	4.4
Site 13. South Fork of Wildcat Creek @ Highway 421	15.5	0.70	5.5
Site 14. South Fork of Wildcat Creek @ CR 130 W	13.0	0.85	4.8
Site 15. Blinn Ditch @ CR 130 W	5.5	0.14	0.9
Site 16. South Fork of Wildcat Creek @ Highway 75	9.0	0.58	4.8
Site 5 - quality assurance duplicate	6	0.03	2.3

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: August 21, 2007
Wet Weather Sample

Field Chemistry	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	8.0	7.7	624	25	40	1320
Site 2. Kilmore Creek @ CR 400 W	7.6	7.5	530	23	38	1245
Site 3. Kilmore Creek @ Highway 421	6.9	7.4	478	24	37	1135
Site 4. Boyles Ditch @ CR 400 N	4.6	7.1	505	22	5	1140
Site 5. Boyles Ditch @ CR 500 N	4.5	7.1	767	24	1	1200
Site 6. Kilmore Creek @ CR 130 W	6.6	7.4	467	24	35	1215
Site 7. Kilmore Creek @ Highway 75	6.0	7.3	432	23	34	1015
Site 8. Kilmore Creek @ CR 0	6.3	7.3	410	23	33	1000
Site 9. South Fork of Wildcat Creek @ CR 600 W	7.0	7.5	454	25	43	1335
Site 10. South Fork of Wildcat Creek @ CR 500 W	7.0	7.5	503	25	42	1310
Site 11. South Fork of Wildcat Creek @ CR 400 W	6.8	7.5	574	24	41	1250
Site 12. South Fork of Wildcat Creek @ CR 300 W	6.8	7.4	614	25	40	1230
Site 13. South Fork of Wildcat Creek @ Highway 421	6.6	7.3	603	24	39	1120
Site 14. South Fork of Wildcat Creek @ CR 130 W	6.1	7.3	661	25	38	1105
Site 15. Blinn Ditch @ CR 130 W	6.6	7.3	561	22	10	1040
Site 16. South Fork of Wildcat Creek @ Highway 75	6.5	7.3	700	23	36	1030

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	12.0	0.11	2.4
Site 2. Kilmore Creek @ CR 400 W	6.5	0.07	2.1
Site 3. Kilmore Creek @ Highway 421	10.5	0.18	0.9
Site 4. Boyles Ditch @ CR 400 N	16.0	0.08	0.7
Site 5. Boyles Ditch @ CR 500 N	42.5	0.32	1.5
Site 6. Kilmore Creek @ CR 130 W	11.5	0.18	0.8
Site 7. Kilmore Creek @ Highway 75	23.5	0.12	0.5
Site 8. Kilmore Creek @ CR 0	20.0	0.24	0.5
Site 9. South Fork of Wildcat Creek @ CR 600 W	23.0	0.26	1.7
Site 10. South Fork of Wildcat Creek @ CR 500 W	36.0	0.65	1.7
Site 11. South Fork of Wildcat Creek @ CR 400 W	25.5	0.18	2.3
Site 12. South Fork of Wildcat Creek @ CR 300 W	23.0	0.65	2.6
Site 13. South Fork of Wildcat Creek @ Highway 421	23.0	0.30	2.1
Site 14. South Fork of Wildcat Creek @ CR 130 W	16.5	0.48	2.3
Site 15. Blinn Ditch @ CR 130 W	8.0	0.06	1.0
Site 16. South Fork of Wildcat Creek @ Highway 75	15.0	0.26	2.6
Site 1 - quality assurance duplicate	13	0.09	2.4

Kilmore Creek / South Fork of Wildcat Creek Watershed Sampling
Date: October 2, 2007
Base Flow Sample

Field Chemistry	D.O. mg/l	pH SU	Cond. uS	Temp. deg. C	Flow cfs	Time
Site 1. Kilmore Creek @ CR 600 W	9.6	7.7	725	21	10	1330
Site 2. Kilmore Creek @ CR 400 W	8.0	7.5	820	20	10	1300
Site 3. Kilmore Creek @ Highway 421	7.4	7.4	665	20	9	1155
Site 4. Boyles Ditch @ CR 400 N	3.6	7.2	715	18	0	1200
Site 5. Boyles Ditch @ CR 500 N (site dry except 1 pool)	3.6	7.4	638	21	0	1215
Site 6. Kilmore Creek @ CR 130 W	8.9	7.5	635	23	9	1230
Site 7. Kilmore Creek @ Highway 75	7.2	7.4	574	18	8	1030
Site 8. Kilmore Creek @ CR 0	8.0	7.4	611	18	8	1015
Site 9. South Fork of Wildcat Creek @ CR 600 W	10.7	8.0	1094	20	11	1350
Site 10. South Fork of Wildcat Creek @ CR 500 W	8.3	7.7	1145	20	11	1320
Site 11. South Fork of Wildcat Creek @ CR 400 W	7.8	7.7	1200	20	10	1310
Site 12. South Fork of Wildcat Creek @ CR 300 W	8.7	7.6	1276	21	10	1245
Site 13. South Fork of Wildcat Creek @ Highway 421	8.9	7.5	1330	20	10	1125
Site 14. South Fork of Wildcat Creek @ CR 130 W	8.7	7.3	1150	21	9	1115
Site 15. Blinn Ditch @ CR 130 W	7.9	7.4	750	16	5	1050
Site 16. South Fork of Wildcat Creek @ Highway 75	6.6	7.4	1500	18	9	1040

Laboratory Chemistry

	TSS mg/l	T-P mg/l	NO_2+NO_3-N mg/l
Site 1. Kilmore Creek @ CR 600 W	0.5	0.12	5.3
Site 2. Kilmore Creek @ CR 400 W	2.5	0.11	18.0
Site 3. Kilmore Creek @ Highway 421	5.0	0.11	4.8
Site 4. Boyles Ditch @ CR 400 N	4.5	0.17	1.0
Site 5. Boyles Ditch @ CR 500 N	7.5	0.23	2.0
Site 6. Kilmore Creek @ CR 130 W	2.5	0.13	1.0
Site 7. Kilmore Creek @ Highway 75	5.0	0.13	1.0
Site 8. Kilmore Creek @ CR 0	6.5	0.11	1.0
Site 9. South Fork of Wildcat Creek @ CR 600 W	3.0	0.75	3.4
Site 10. South Fork of Wildcat Creek @ CR 500 W	5.0	0.95	4.4
Site 11. South Fork of Wildcat Creek @ CR 400 W	3.5	1.30	4.4
Site 12. South Fork of Wildcat Creek @ CR 300 W	2.0	1.40	4.4
Site 13. South Fork of Wildcat Creek @ Highway 421	3.0	2.00	4.4
Site 14. South Fork of Wildcat Creek @ CR 130 W	3.0	1.10	2.0
Site 15. Blinn Ditch @ CR 130 W	1.5	0.17	1.4
Site 16. South Fork of Wildcat Creek @ Highway 75	3.5	1.70	7.5
Site 1 - quality assurance duplicate	0.5	0.11	5.3

Atrazine Analysis

Kilmore Creek / South Fork of Wildcat Creek
18-Apr-06

Site #	Site Description	Atrazine (ug/l)
1	Kilmore Creek @ CR 600 W	No Sample
4	Boyles Ditch @ CR 400 N	5.12
6	Kilmore Creek @ CR 130 W	0.19
8	Kilmore Creek @ CR 0	0.64
9	South Fork @ CR 600 W	0.9
12	South Fork @ CR 300 W	No Sample
15	Blinn Ditch @ CR 130 W	0.37
16	South Fork @ Hwy 75	1.39

Kilmore Creek / South Fork of Wildcat Creek
15-May-06

Site #	Site Description	Atrazine (ug/l)
1	Kilmore Creek @ CR 600 W	17.49
4	Boyles Ditch @ CR 400 N	15.37
6	Kilmore Creek @ CR 130 W	22.92
8	Kilmore Creek @ CR 0	24.09
9	South Fork @ CR 600 W	22.8
12	South Fork @ CR 300 W	8.16
15	Blinn Ditch @ CR 130 W	46.59
16	South Fork @ Hwy 75	12.47

Kilmore Creek/South Fork Wildcat Creek
16-Jun-06

Site #	Site Description	Atrazine (ug/l)
1	Kilmore Creek @ CR 600 W	4.75
4	Boyles Ditch @ CR 400 N	1.42
6	Kilmore Creek @ CR 130 W	1.68
8	Kilmore Creek @ CR 0	1.63
9	South Fork @ CR 600 W	1.21
12	South Fork @ CR 300 W	3.48
15	Blinn Ditch @ CR 130 W	3.66
16	South Fork @ Hwy 75	1.07

Kilmore Creek / South Fork of Wildcat Creek
16-Apr-07

Site #	Site Description	Atrazine (ppb)
1	Kilmore Creek @ CR 600 W	0.32
3	Kilmore @ SR39 N	0.42
5	Boyles Ditch @ CR 100 W	0.3
8	Kilmore Creek @ CR 0	0.43
9	South Fork @ CR 600 W	1.25
12	South Fork @ CR 300 W	0.36
15	Blinn Ditch @ CR 130 W	0.28
16	South Fork @ Hwy 75	0.34

Kilmore Creek / South Fork of Wildcat Creek
1-May-07

Site #	Site Description	Atrazine (ppb)
3	Kilmore @ SR39 N	0.54
4	Boyles Ditch @ CR 400 N	1.89
6	Kilmore Creek @ CR 130 W	0.98
7	Kilmore Creek @ SR 75	0.52
10	South Fork @ Gas Line Rd	0.66
12	South Fork @ CR 300 W	0.45
15	Blinn Ditch @ CR 130 W	0
16	South Fork @ Hwy 75	0.49

Kilmore Creek/South Fork Wildcat Creek
4-Jun-07

Site #	Site Description	Atrazine (ppb)
1	Kilmore Creek @ CR 600 W	0.63
3	Kilmore @ SR39 N	0.52
5	Boyles Ditch @ CR 100 W	0.38
8	Kilmore Creek @ CR 0	0.48
10	South Fork @ Gas Line Rd	11.08
11	South Fork @ CR 400 W	14.53
12	Blinn Ditch @ CR 300 W	14.08
16	South Fork @ Hwy 75	6.79

E. coli Sampling Results Summary 2006

Site	4/7 Count	4/12 Count	4/13 Count	4/19 Count	4/26 Count	5/3 Count	5/10 Count	5/17 Count	5/24 Count	5/31 Count	6/7 Count	6/14 Count	6/21 Count	6/28 Count	7/5 Count	7/12 Count
1	25			1733	172	291	179	249	121	144	228	435	649	517	435	2420
2				1414	276	276	155	365	201	172	291	349	921	866	488	2420
3	25		147	980	214	317	308	308	238	345	365	816	579	727	687	2420
4	<25		135	276	649	613	194	124	248	152	411	1553	770	770	816	2420
5	<25		384	387	236	204	219	142	161	344	1414	980	1046	579	613	2420
6		99		1046	210	411	93	276	155	104	289	291	657	461	461	2420
7		276		1300	261	387	133	248	166	199	127	236	488	866	411	2420
8	<25			1120	291	230	214	185	90	210	197	276	579	921	326	2420
9	25			411	387	435	381	613	80	82	179	411	1120	1300	1120	2420
10	78			866	649	225	162	548	160	185	326	326	1203	1733	1203	2420
11	25		63	770	613	308	236	687	101	205	166	308	1986	1986	1300	2420
12			76	687	435	517	166	548	172	161	291	411	1733	1733	1300	2420
13		137		613	345	687	157	687	248	345	1553	308	1046	1986	1203	2420
14			85	649	770	411	517	816	365	488	687	548	1553	1553	1300	2420
15		249		291	291	517	179	866	461	727	1414	1414	727	1300	1553	2420
16	25			579	613	579	206	579	488	770	2420	613	1553	2420	1553	2420

Site	7/20 Count	7/26 Count	8/2 Count	8/9 Count	8/17 Count	8/23 Count	8/30 Count	9/7 Count	9/13 Count	9/20 Count	9/27 Count	10/5 Count	10/11 Count	10/18 Count	10/25 Count	AVG
1	344	613	727	613	365	579	615	579	2420	649	649	276	770	1960	387	683
2	476	613	613	308	435	727	1095	326	1986	613	435	345	1203	3973	291	773
3	651	548	866	548	461	687	922	1553	2420	770	488	387	2420	3973	250	902
4		649	1553	1986	613	980	2240	1203	1203	2420	687	365	1414	3106	276	1026
5		770	816	1120	548	365	4840	326	649	579	579	214	2420	3973	214	969
6		548	649	365	272	387	651	248	1300	411	548	308	1986	2407	249	637
7		461	326	345	272	365	615	435	2420	488	387	326	1553	3466	435	709
8		980	816	261	579	770	4839	488	2420	488	272	461	517	3106	272	864
9	177	326	236	133	201	162	420	365	2420	308	517	238	326	1961	109	601
10	372	579	228	210	326	365	496	488	2420	387	228	276	548	1633	236	671
11	421	770	517	249	285	344	775	488	2420	219	228	299	866	2599	142	775
12	519	435	517	150	248	210	626	548	2420	326	687	308	613	2407	194	742
13	357	461	687	548	435	387	821	435	2420	326	326	461	517	1842	291	783
14		613	548	548	517	345	977	461	2420	-	461	488	866	3466	326	927
15	2240	613	770	548	727	613	1961	579	2420	488	649	613	816	2407	308	997
16		816	816	548	727	488	1454	579	2420	345	613	2420	2420	3106	488	1186

E. coli Sampling Results Summary 2007

Site	4/4 Count	4/12 Count	4/19 Count	4/25 Count	5/2 Count	5/9 Count	5/16 Count	5/24 Count	5/30 Count	6/6 Count	6/13 Count	6/20 Count	6/26 Count	7/5 Count	7/11 Count	7/24 Count
1	388	613	152	1414	162	311	2420	192	179	219	488	387	461	411	461	345
2	261	866	142	2420	148	237	582	140	261	517	517	613	345	461	276	173
3	411	921	119	2420	179	498	300	210	488	335	1986	1120	1120	816	980	687
4	488	435	250	2420	387	670	294	435	411	236	687	1553	613	866	488	5
5	345	488	111	2420	261	313	358	345	488	548	1414	727	461	33	291	613
6	135	548	118	2420	233	106	144	93	172	205	387	326	205	238	121	152
7	142	579	108	2420	28	106	210	75	185	199	687	435	387	365	150	206
8	201	308	118	2420	91	139	234	81	145	206	488	488	687	291	225	308
9	435	1203	96	1300	179	4830	370	186	228	291	248	291	248	613	411	326
10	649	1553	186	1300	276	4830	236	140	517	210	365	411	291	335	276	326
11	770	1046	219	1046	225	4830	226	179	276	16	411	461	248	488	236	276
12	727	1119	152	1300	194	4830	204	131	461	365	411	411	248	435	308	145
13	980	2420	186	2420	276	4830	344	248	548	387	649	727	291	866	345	488
14	1300		185	2420	365	4830	870	210	345	276	548	816	345	1203	299	435
15	980	1203	517	2420	613	429	870	326	222	411	365	1300	326	2420	770	411
16	613	1299	304	2420	326	3106	1034	335	345	727	866	866	579	2420	365	204

Site	8/1 Count	8/8 Count	8/15 Count	8/22 Count	8/30 Count	9/6 Count	9/13 Count	9/20 Count	9/27 Count	10/3 Count	10/10 Count	10/17 Count	10/25 Count	11/1 Count	AVG
1	225	387	185	921	517	155	214	185	291	649	548	194	225	185	449
2	140	291	248	411	687	214	360	461	150	1414	770	172	387	192	462
3	866	488	435	1046	1733	770	517	1986	435	649	727	387	461	308	780
4	22	105		1120	461								44	2420	655
5	326	187		214	57								1414	816	556
6	147	248	276	387	345	1120	204	345	102	1300	291	147	210	66	360
7	127	194	37	687	2420	261	308	111	19	70	435	55	238	48	376
8	228	260	46	727	2420	210	411	261	148	816	548	86	326	80	433
9	461	387	172	517	411	155	186	152	93	411	102	133	105	28	486
10	214	276	248	687	488	548	435	313	261	1414	192	155	68	111	577
11	152	345	365	579	488	649	0	326	326	1733	210	345	157	201	561
12	157	238	219	517	291	225	173	172	261	365	261	110	53	88	486
13	194	135	201	866	365	387	138	261	150	435	2420	118	75	181	731
14	308	219	155	921	1553	435	517	214	308	548	548	141	62	77	705
15	219	260	249	1203	770	1733	488	96	166	770	579	115	185	40	682
16	261	579	411	461	1203	816	461	261	1046	1300	727	387	125	192	801

Appendix H:

Initial Survey & Results Summary

The following short survey will assist us in understanding your knowledge of our watershed. Your answers will act as a guide through out the planning process for the South Fork Wildcat Creek and Kilmore Creek Watershed Management Plan. These surveys are anonymous, neither your name or address will be returned on this form. After completing the survey, please detach this half of the sheet and place it in the mail. Postage has been paid. Thank you for taking the time to complete this survey!

1) What watershed do you live in?
___ South Fork Wildcat Creek
___ Kilmore Creek
___ I do not know

2) How many acres of land do you own or farm within the watershed?
___ less than 10 ___10-20 ___ 20-50 ___50-100 ___More than 100

3) Do you own land connected to a stream, creek, pond, or wetland?
___ Yes
___ No

4) What, if any, projects within the watershed have you completed on your land in conjunction with the Soil and Water Conservation District?

EQIP ____	CRP ____
CWI ____	CSP ____
GRP ____	EWP ____
WHIP ____	Other ______________________

5) What category best describes the primary use of your property?
___ Residential
___ Cropland
___ Livestock Pasture
___ Forest
___ Wildlife habitat
___ Other____

6) Please check any and all items listed below that are potential sources of nonpoint pollution in rivers/streams:
___ Residential lawn
___ Agricultural field
___ Industrial discharge
___ Sewage treatment plant
___ Roads/Driveway/Parking lot

7) Do you know how to properly dispose of household and/or agricultural chemicals and containers?
___ Yes
___ No

8) When was the last time you had your septic system checked?
___ 1-2 years ___ 2-5 years ___ More than 5 years ___ Unsure

9) I use South Fork Wildcat Creek and/or Kilmore Creek and their tributaries for:
___ Fishing
___ Swimming
___ Drinking Water
___ Watering Livestock
___ Other
____

Please complete the survey on the other side of this sheet.

10) The South Fork Wildcat Creek and Kilmore Creek are polluted.
___ Agree ___ Somewhat Agree ___Disagree ___ Highly Disagree

13) I agree with question #10, and I feel the largest contributor of this pollution to the creeks and their tributaries is:

___ agriculture	___ septic systems
___ flooding	___ urban runoff
___ junk yards	___ residential lawns
___ industry	___ landfills

12) How important do you think overall water quality is for you and/or your family?
___ Very important
___ Somewhat important
___ Not very important
___ Not at all important

12) Please include any additional comments regarding the subject of water quality in your county below:

____
____
____
____
____.

Clinton County SWCD
860 S. Prairie Ave, Suite 1
Frankfort, IN 46041

Clinton County Soil and Water
Conservation District
860 S. Prairie Ave, Suite 1
Frankfort, IN 46041

Appendix J:

2007 Tillage Transect Data

Field No	Pres Crp	Prev Crp	Tillage	Slope %	P Factor	Ephem?	T Level	K Factor	Residue
66L	N	C	N	1	1	N	5	d	3
66R	C	B	C	1	1	N	5	d	1
67L	C	B	C	1	1	N	5	d	1
67R	C	B	C	1	1	N	5	d	1
68L	D	C	N	1	1	N	5	e	4
68R	N	C	N	1	1	N	5	e	4
69L	C	B	C	1	1	N	4	b	1
69R	N	C	N	1	1	N	3	a	3
70L	C	B	C	1	1	N	3	a	1
70R	D	C	N	1	1	N	5	d	3
71L	C	B	C	1	1	N	5	b	1
71R	C	C	C	1	1	N	3	a	2
72L	C	B	C	1	1	N	?	?	1
72R	C	B	C	1	1	N	?	?	1
100L	N	C	N	2	1	N	5	d	3
102L	N	C	N	2	1	N	3	a	3
103R	C	B	C	2	1	N	3	a	1
104R	C	B	C	2	1	N	3	a	1
105L	N	C	N	2	1	N	4	b	3
105R	H	H	N	2	1	N	4	b	/
106L	C	B	C	2	1	N	4	b	1
107L	C	C	C	2	1	N	3	a	1
108L	N	C	N	2	1	N	4	b	3
108R	W	C	N	2	1	N	4	b	3
109L	C	B	C	2	1	N	3	a	1
109R	C	B	C	2	1	N	3	a	1
110L	D	C	E	2	1	N	3	a	2
110R	D	C	E	2	1	N	3	a	2
111L	D	C	N	2	1	N	3	a	3
111R	C	B	C	2	1	N	5	d	1
112L	C	B	C	2	1	N	3	a	1
112R	D	C	N	2	1	N	4	b	4
176R	C	B	C	2	1	N	5	b	1