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Spring Creek-Lick Run Watershed Management Plan

Wildcat Creek Watershed Alliance, Inc.

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Environmental Consulting
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The Wildcat Creek Watershed Alliance is a partnership of concerned citizens dedicated to developing and implementing successful watershed plans to improve and protect water resources in the Wildcat Creek Watershed.

July 2001 – June 2003
IDEM 319 Project: ARN # 00-199

Spring Creek-Lick Run Watershed Management Plan

Wildcat Creek Watershed Alliance, Inc.

Executive Summary

The Spring Creek-Lick Run Watershed is a 14-digit watershed located in North Central Indiana. It is one of 44 subwatersheds located in the Wildcat Creek Watershed. The Spring Creek-Lick Run Watershed drains 10,842 acres of predominantly agricultural land in Clinton County.

Early settlers began clearing and farming the land in 1826. A 12 x 4 mile stretch of prime farmland known as the "Twelve Mile Prairie" is located in Clinton County and the southern portion of the Spring Creek-Lick Run Watershed. The Twelve Mile Prairie is considered some of the finest soil in the state for crop production.

There are approximately 16.8 miles of natural and constructed waterways in the Spring Creek-Lick Run Watershed that drain into the South Fork of Wildcat Creek. The streams are small, headwater streams. Forty-five percent of the streams are well buffered with trees, shrubs, and grasses beneficial for filtering sediments and pollutants. Areas that lack well-established streamside vegetation show signs of erosion and bank failure. The drainage ditches have very small, if any filter strips and could benefit from grass buffers to filter sediments and pollutants carried by stormwater.

According to the most recent data available from the Indiana Department of Environmental Management, there are two stretches of waterways in the Spring Creek-Lick Run Watershed that do not meet or are not expected to water quality standards. These are Heavilon Ditch and the South Fork of Wildcat Creek. Heavilon Ditch is listed for *E.coli*, Ammonia, Organic Enrichment, and dissolved oxygen. The South Fork of Wildcat Creek is listed for cyanide and *E.coli*.

The Spring Creek-Lick Run Watershed Management Plan is the result of 18 months of meetings and discussion among federal, state, and local government staff, local industry, agriculture, developer, environmental, and concerned citizens. The emphasis of this Plan is improving water quality and addressing non-point sources of pollution from agricultural practices and urban development.

The discussion on agricultural practices focuses on both row crop and livestock operations. These include nutrients, pesticides, erosion and sedimentation, tillage practices, and conservation buffers for row crops and manure and pasture management for livestock operations.

The discussion on urban development looks at human and animal waste; household and yard waste; as well as development practices and encroachment of development in natural areas. The issue of failing septic systems in the Town of Jefferson has been well documented by both the local and state Board of Health as a source of water quality impairment. Wildlife and pet waste is also addressed as a water

quality concern. The Plan discusses the importance of the proper use, storage, and disposal of everyday household hazardous waste and lawn and garden chemicals to minimize impacts on water quality. And finally, the Plan explores the relationship of land use planning and development practices to water quality.

The discussion on agricultural practices and urban development resulted in the development of five goals. Each goal represents a specific topic or issue as it relates to water quality concerns in the Spring Creek-Lick Run Watershed. The goals for this Watershed Management Plan are as follows:

Education Goal: Improve water quality in the Spring Creek-Lick Run Watershed through education and outreach efforts that focus on changing stakeholders' habits and behaviors.

Septic System Goal: Improve water quality in the Spring Creek-Lick Run Watershed through proper planning, installation, and long-term maintenance of septic systems.

Agriculture Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better agricultural practices and management programs.

Land Use Planning Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better land use planning and land development practices.

Natural & Constructed Waterway Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better protection and maintenance of streams and drainage ditches.

The Spring Creek-Lick Run Watershed Management Plan was made possible through a 319 grant from the IDEM. A grant for $109,500 was awarded to the Wildcat Creek Watershed Alliance (WCWA) via the Indiana Soil & Water Conservation District for the period from July 2001 through June 2003. The Spring Creek-Lick Run Watershed is one of two watershed management plans that the WCWA is preparing as part of this grant.

The WCWA is a partnership of federal, state and local governments, local industry, agriculture, development, and environmental groups. There are currently over 500 individuals and organizations that are members of the WCWA. A 13-member Advisory Board governs the WCWA. There are 4 committees focusing on education, funding, land use, and technical issues.

Information to the membership is disseminated through newspaper articles, a quarterly newsletter, workshops, annual and quarterly membership meetings as well as regularly scheduled Advisory Board and committee meetings. Quarterly Stakeholder or WCWA Membership meetings are held on the second Tuesday of January, April, July, and October.

Spring Creek-Lick Run Watershed Management Plan

Wildcat Creek Watershed Alliance, Inc.

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I. Introduction

In the spring of 2000, an organization assembled by the Indiana Department of Environmental Management (IDEM) called the Wildcat Creek Watershed Alliance (WCWA), formally know as the Wildcat Creek Watershed Network, submitted a Section 319 project proposal through the Indiana Association of Soil and Water Conservation Districts (IASWCD) 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 nonpoint source water pollution (IDEM, 2002). The Section 319 project proposal included the following goals:

1) Hire an Executive Director/Watershed Coordinator,
2) Build upon the recommendations of the Wildcat Creek Watershed Restoration Action Strategy (WRAS),
3) Coordinate planning efforts throughout watershed, and
4) Develop two subwatershed management plans in the Wildcat Creek watershed.

A grant of $109,500 was awarded to the IASWCD from the US EPA through the IDEM. The grant period is from July 1, 2001 through June 30, 2003. Eleven consulting firms and/or individuals responded to the advertisement for an Executive Director/Watershed Coordinator position for the Wildcat Creek Watershed planning effort. Representatives from the Wildcat Creek Watershed Network, the NRCS, and the IDEM selected Goode & Associates, Inc. from Indianapolis as the contractor for the two-year watershed planning project.

The Wildcat Creek Watershed has forty-four subwatersheds. The Spring Creek-Lick Run Watershed was one of the two subwatersheds that were selected for detailed study and development of a Watershed Management Plan.

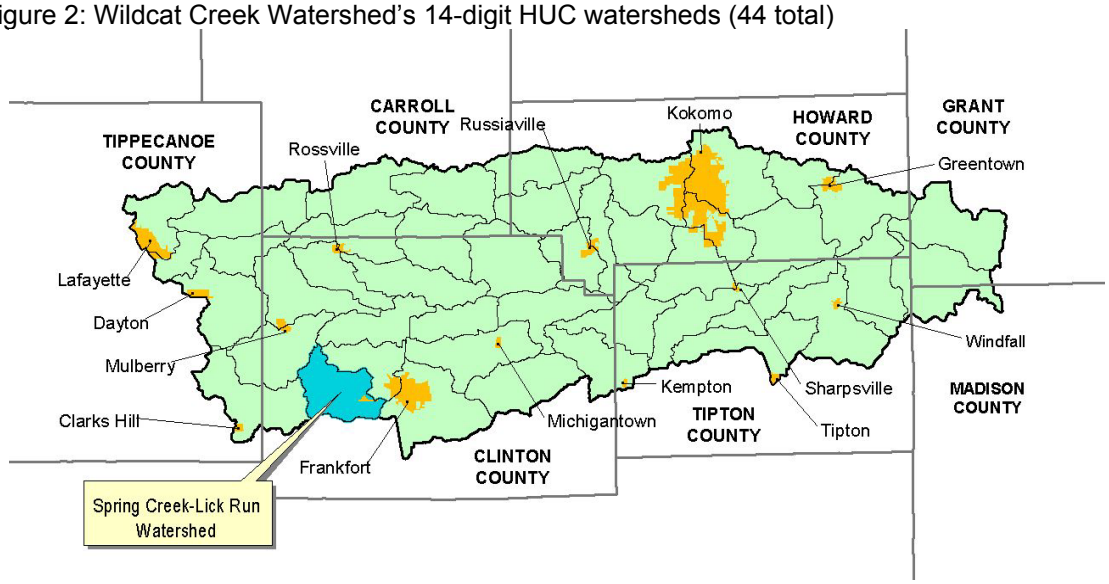
This Watershed Management Plan meets the checklist requirements of the "What Needs to be in a Watershed Management Plan" FFY 2003 (IDEM, 2002).

WATERSHED LOCATION

The Spring Creek-Lick Run Watershed is a subwatershed within the 8-digit HUC Wildcat Creek Watershed located in North Central Indiana (Figure 1).

Figure 1: Indiana 8-digit HUC watersheds

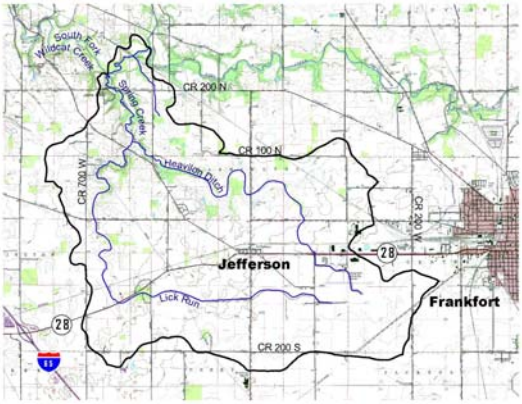
Figure 2: Wildcat Creek Watershed's 14-digit HUC watersheds (44 total)



The Spring Creek-Lick Run Watershed is one of forty-four 14-digit subwatersheds in the Wildcat Creek Watershed (HUC 05120107040100) (Figure 2).

The Spring Creek-Lick Run Watershed drains 10,842 acres of predominantly agricultural land in Clinton County. There are approximately 16.8 miles of perennial streams and drainage ditches in the Spring Creek-Lick Run Watershed, all of which eventually drain to the South Fork Wildcat Creek (Figure 3).

Figure 3: Spring Creek-Lick Run Watershed



DESCRIPTION & HISTORY

The following is an overview of the physical and cultural characteristics of the Spring Creek-Lick Run Watershed. The WCWA determined that some issues needed to be studied in detail during the two-year grant period. These include: environmental education, septic systems, agriculture, land use planning, and waterways. A detailed assessment of these items is available in the Goals & Decisions section of this Watershed Management Plan.

Watershed Description

The Spring Creek-Lick Run Watershed can best be described in terms of its unique physical features. The southern portion of the watershed is relatively flat with large fields of row crops and little development outside of the Town of Jefferson (Figure 4). Whereas the landscape in the northern portion is much more rolling with scattered residential development, natural areas, and small farms with pasture for cattle or horses (Figure 5).

Figure 4: The southern part of the watershed is flat and dominated by crop production.

Figure 5: The northern part of the watershed is hilly with pastures and natural areas.

Natural History

The Wisconsin Glacier formed the present landscape of the Spring Creek-Lick Run Watershed. When the glacier receded it deposited as much as 100 to 400 feet glacial till over shale and limestone bedrock. The soils found in the Spring Creek-Lick Run Watershed are the result of direct glacial deposits or materials carried by the streams of melting ice and snow (see discussion on Soils in this section) (USDA, 1997).

Prior to settlement in the mid-1800s, much of the Spring Creek-Lick Run Watershed was covered in prairie, wetlands, and woods. The trees removed by the early settlers to make room for farming would have consisted of upland hardwood forest species characteristic of a Maple-Beech association. Plant associations or communities are broad generalizations of vegetation based on a geographic region (Lindsey, 1966). The upland areas of the Spring Creek-Lick Run Watershed would have been densely covered in sugar maple, basswood, beech, yellow birch, American elm, ironwood, and red maple.
Species such as silver maple, American elm, willow, basswood, sycamore, and ash would have been more abundant in the river corridors and low-lying marsh areas.

According to the 1997 Gap Analysis Program (GAP) datum, only 5% of the Spring Creek-Lick Run Watershed land use is wooded or wetland (Table 1). Although nonnative and invasive species such as serviceberry now dominate much of the understory of existing wooded areas, evidence of the native hardwood forest still prevails.

Fragmentation of wooded and natural areas caused by increased human settlement as well as trapping and hunting has limited the number of deer, wildcats, bears, beavers, wolves, and otters that once were abundant in the Spring Creek-Lick Run Watershed (Unknown Source).

Land Use

The land use of the Spring Creek-Lick Run Watershed began to significantly change from dense woods and wetlands to agriculture following settlement of the Europeans in the mid-1800s. The upland areas were cleared and drained to facilitate better crop production.

Agricultural land uses dominate the current day landscape. In fact, 94% of

Table 1: Spring Creek-Lick Run Watershed Land Use

Land Use Types	Acres	Percentage
Row Crops	9976	92 %
Wetlands (several wetland types)	285	2.6 %
Deciduous Forest (mixed woodland & shrubland)	255	2.4 %
Pasture	242	2.2 %
Urban High Density	43	0.4 %
Urban Low Density	35	0.3 %
Open Water	6	0.1 %
Total	**10,842**	**100.00 %**

(USGS, 1997)

the Spring Creek-Lick Run Watershed is in agricultural production. Row crops dominate the land use with 9976 acres in production (Table 1).

The waterways in the Spring Creek-Lick Run Watershed are small headwater streams or drainage ditches. Only a small portion, 546 acres (5%), of the watershed is classified as wetland, deciduous forest, or open water.

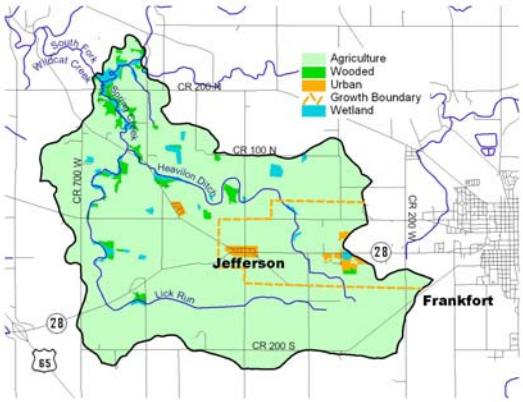
On the northern edge of the Spring Creek-Lick Run Watershed is Camp Cullom, a 100-acre outdoor education facility with 5 acres of restored tall-grass prairie, constructed wetland for sewage treatment, and access to Spring Creek. There is one golf course in the Spring Creek-Lick Run Watershed. The Deer Track Golf Club is approximately 60 acres and is public course that is privately owned and operated.

Very little of the Spring Creek-Lick Run Watershed has been developed for residential, commercial, or industrial use (78 acres). Although individual residential developments are somewhat scattered through the watershed, the Town of Jefferson and western edge of the City of Frankfort comprise the urban development calculated by the GAP data (Figure 6).

The Area Plan Commission for Clinton County is responsible for guiding growth and development throughout the county. The Area Plan Commission has delineated urban growth area boundaries around existing urban centers in an effort to minimize scattered development on prime agricultural lands (Area Plan Commission of Clinton County, 1993)

The WCWA determined that land use planning has significant impact on the water quality of the Spring Creek-Lick Run Watershed. A detailed assessment of land use planning is in the Goals and Decisions section of this Plan.

Figure 6: Land Use in the Spring Creek-Lick Run Watershed



(USGS, 1997)

Table 2: Soil Associations

Soil Association	Characteristics
Drummer-Raub	Nearly level, poorly drained and somewhat poorly drained, silty soils; on till plains.
Ragsdale-Fincastle	Nearly level, very poorly drained and somewhat poorly drained, silty soils; on till plains
Miami-Crosby-Fincastle	Strongly sloping to nearly level, well drained and somewhat poorly drained, silty and loamy soils; on till plains
Ceresco-Ockley	Nearly level and gently sloping, somewhat poorly drained and well drained, loamy and silty soils; on flood plains and terraces

(USDA, 1979)

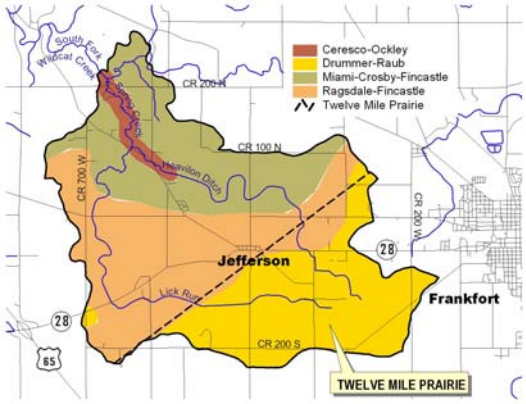
Soils

The soils of the Spring Creek-Lick Run Watershed formed from Wisconsin glacial till, glacial outwash, and recently deposited alluvium resulting in deep rich loam mixed with sand and clay.

A 12 by 4 mile stretch of prime farmland know as the "Twelve Mile Prairie" traverses Clinton County on a diagonal from the northeast to the southwest. This area is considered some of the finest soil in the state for crop production (Source Unknown). Approximately one-third of the Spring Creek-Lick Run Watershed is within the Twelve Mile Prairie.

According to the Soil Surveys for Clinton County, there are four predominant soil associations in the Spring Creek-Lick Run Watershed (Table 2). The Drummer-Raub and Ragsdale-Fincastle soil associations dominate the central and southern portion of the Spring Creek-Lick Run Watershed. The Miami-Crosby-Fincastle soils are located in the northern third of the watershed. Figure 7 illustrates the distribution of the four soil associations in the Spring Creek-Lick Run Watershed as well as the approximate location of the Twelve Mile Prairie.

Figure 7: Soil Associations in the Spring Creek-Lick Run Watershed



The NRCS has assigned a soil erodibility index to each soil type. This value is based on the soils chemical and physical properties, as well as climatic conditions. Highly erodible soils in the Spring Creek-Lick Run Watershed are primarily from the Miami-Crosby association. The WCWA determined that erodible soils were a primary concern in the Spring Creek-Lick Run Watershed and specifically addresses issues related to erodible soils and water quality in the Goals and Decision section of this Plan.

Septic systems need well-drained soils to properly function. Much of the soil in the Spring Creek-Lick Run Watershed has severe limitations for septic systems due to wetness, ponding, and slow

percolation. The WCWA recognized the impact failing septic systems can have on water quality and addresses these issues in detail in the Goals and Decisions section of this Plan.

Agriculture is the predominant land use in the Spring Creek-Lick Run Watershed. Soil is a determining factor in agriculture production. The Drummer-Raub association represents the prime agricultural soils in the Spring Creek-Lick Run Watershed.

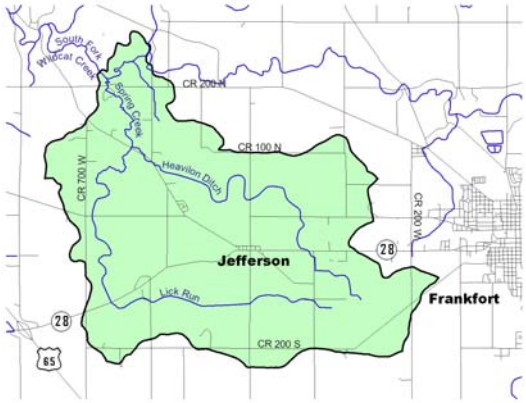
Topography

The topography of the Spring Creek-Lick Run Watershed is unique in that it is relatively flat at the south end of the watershed and then much more rolling toward the confluence of Spring Creek with the South Fork of Wildcat Creek.

Hydrology

There are approximately 16.8 miles of waterways in the Spring Creek-Lick Run Watershed. These waterways are comprised of natural streams and constructed drainage ditches. Spring Creek, Lick Run and Heavilon Ditch are the major waterways and drain into the South Fork of Wildcat Creek (Figure 8).

Figure 8: Major streams and drainage ditches in the Spring Creek-Lick Run Watershed



The South Fork of Wildcat Creek is designated as a State of Indiana Outstanding River, an Indiana Scenic River, and a State Heritage Program Site.

Only 2.7% of the watershed is classified as open water or wetland. Natural drainage in the Spring Creek-Lick Run Watershed is poor. Prior to settlement in the mid-1800s, marshes and swamps were common and subsurface drains remain a necessity for crop production (USDA, 1997).

The WCWA conducted a windshield survey of the drainage ditches and stream corridors in the Spring Creek-Lick Run Watershed. Filter strips along drainage ditches and riparian corridors adjacent to natural streams are an effective technique to improve water quality by trapping and filtering sediments and pollutants carried by stormwater runoff.

Few of the drainage ditches in the Spring Creek-Lick Run Watershed have filter strips sufficient to filter sediments and pollutants from stormwater (Figure 9). The riparian corridor along the natural streams appeared to be healthy with little evidence of erosion (Figure 10).

The WCWA identified streambank erosion as an area that needed to be addressed in more detail. Recommendations specific to streambank erosion issues can be found in the Goals and Decisions section of this Plan.

Land Ownership

Although the Deer Track Golf Club and Camp Cullom are available for use by the general public, land within the

Spring Creek-Lick Run Watershed is privately owned. There are no significant holdings of land by the State, land trust, or military in the Spring Creek-Lick Run Watershed.

Figure 9: Filter strips along drainage ditches in the Spring Creek-Lick Run Watershed.

Figure 10: Wooded stream corridors in the Spring Creek-Lick Run Watershed.

Cultural Resources

The Miami Indians of the Algonquin family first inhabited the Spring Creek-Lick Run Watershed until 1826 when William Clark settled and begin farming in Clinton County. The rich soil and favorable climate for farming attracted many early settlers – especially a large number of German settlers.

The first farms where small and diverse with cattle, hogs, chickens, and horses as well as fields of corn, wheat, oats, and pasture. The favorable farming conditions resulted in prosperous yields, allowing early farmers enough harvest to feed their families and a surplus for sale or trade (Williams, 1980).

Wildcat Creek, Kilmore Creek, and Sugar Creek in Clinton County supported many early industrial mills. The Village of Jefferson had several of these mills and became one of the earliest communities established in Clinton County. The City of Frankfort, named after Frankfurt am Main in Germany, was platted in 1830 and eventually became the county seat (Source Unknown).

The evolution of farming technology resulted in significant increases to crops and livestock production. Such improvements allowed more non-farm related economic growth in Clinton County and a focus on prosperous corn and soybean crops. Hog farms increased as well due to the availability of corn feed (Williams, 1980).

The construction of the railroads fueled economic development in Clinton County. Five different railroads intersected in Frankfort making it a regional shipping center. The railroads allowed farmers to sell their harvest in distant cities including Indianapolis, Chicago, Columbus (OH), and St Louis (Source Unknown). Today there is less dependence on the railroad network however corn, soybeans, and swine remain the predominant agricultural production in Clinton County.

According to the 2000 Census, the population of Clinton County has increased 9.3% to 33,749 since 1990. Forty-nine percent of the county's

population lives in Frankfort (16,662) part of which is located in the Spring Creek-Lick Run Watershed. Only 5.4% of the workforce in Clinton County continues to work in the agricultural industry. The majority of the workforce in Clinton County works in manufacturing (30.6%), services (22.5%), or retail (14.6%) (US Census, 2000).

Endangered Species

There are a number of endangered, threatened, and rare plants and animals that have been identified in Clinton County (Table 3). The WCWA did not conduct a detailed study to verify if these plants and animals were located in the Spring Creek-Lick Run Watershed.

Table 3: Endangered, Threatened and Rare Species for Clinton County

Species Name	Common Name	State Listing	Federal Listing
Poa wolfii	Wolf Bluegrass	Rare	Not Listed
Veronica anagallis-aquatica	Brook-pimpernell	Threatened	Not Listed
Alasmidonta viridis	Slippershell Mussel	Warrants Concern	Not Listed
Ardea herodias	Great Blue Heron	Warrants Concern	Not Listed
Buteo lineatus	Red-shouldered Hawk	Special Concern	Not Listed
Nycticorax nycticorax	Black-crowned Night Heron	Endangered	Not Listed
Lutra Canadensis	Northern River Otter	Endangered	Not Listed
Lynx rufus	Bobcat	Endangered	Not Listed
Myotis sodalis	Indiana Bat	Endangered	Endangered
Taxidea taxus	American Badger	Endangered	Not Listed
Forest	Central Till Plain Flatwoods	Significant	Not Listed
Prairie – Mesic	Mesic Prairie	Significant	Not Listed

(IDNR, 1999)

WATERSHED PARTNERSHIPS

The WCWA is a partnership of concerned citizens. Currently, over 500 individuals representing local government, industry, agriculture, development, environmental, and concerned citizens are active in the WCWA (Figure 11). Membership into the WCWA is open to:

1) Any individual person over the age of 18 who resides in, owes real property in, or does business in the watershed,
2) Any business, community or industry group concerned about water resources in the watershed, or
3) Any governmental entity whose geographic jurisdiction lies in the whole or part in the watershed.

The mission of the WCWA is to develop and implement successful watershed plans to improve and protect the water resources of the Wildcat Creek Watershed.

The efforts of the WCWA are led by a 13-member Advisory Board. Each member of the Advisory Board is elected at the WCWA Annual Meeting and serves a 3-year term. There are four officer positions including President, Vice President, Treasurer, and Secretary (Table 4).

According to the WCWA By-laws, the Advisory Board must consist of one representative from Tippecanoe, Carroll, Clinton, Clinton, and Clinton Counties and one from either Madison or Grant Counties. The 4 remaining members can be from any of the 7 counties in the Wildcat Creek watershed as long as 2 represent the public education system, universities, or colleges; 2 represent businesses or industries; 2 represent the agricultural businesses, farm bureau, or related agricultural related associations; and the remaining 5 from any vocational field.

The WCWA has 4 committees that are open to the general membership. The Education & Outreach Committee focuses its efforts on educating the general public and decision-makers in the Spring Creek-Lick Run Watershed through workshops, newspaper articles, and field days. The Funding Committee is working toward securing long-term funding sources for the entire Wildcat Creek Watershed. The Land Use

Figure 11: Distribution of membership in the Wildcat Creek Watershed Alliance

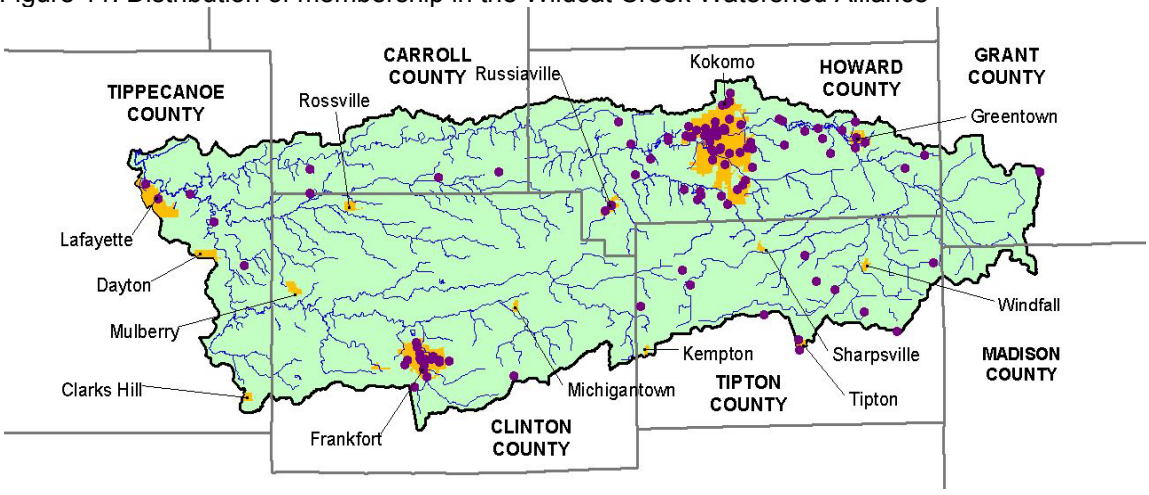
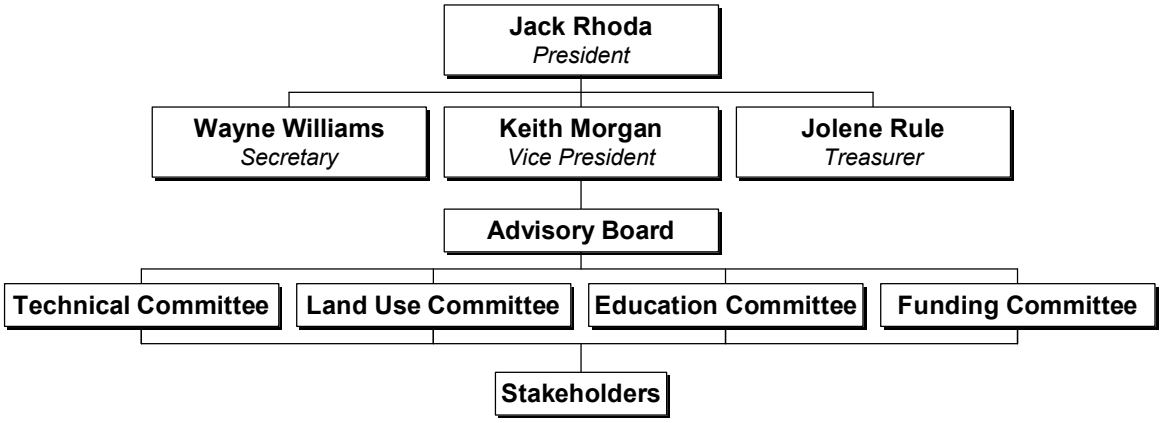


Table 4: Wildcat Creek Watershed Alliance organization chart



Committee targets land use and water quality issues and the Technical Committee coordinates, collects and analyzes water quality data throughout the Spring Creek-Lick Run Watershed. A full list of Advisory Board and Committee Members is available in the Appendix.

PUBLIC PARTICPATION

The WCWA is volunteer-based and public participation is essential to maintaining the strength of the organization. Education and outreach efforts can effectively change the general public's behaviors and habits toward water quality and make a strong connection between land use and water quality and how the decisions people make everyday directly affect water quality.

Information to the membership is disseminated through the WCWA webpage, newspaper articles, a quarterly newsletter, workshops, annual and quarterly membership meetings as well as regularly scheduled Advisory Board and committee meetings (Figure 12, 13, & 14).

The Annual Meeting for the general membership is held the first quarter of each year. Quarterly Stakeholder or Membership meetings are held on the second Tuesday of January, April, July, and October. These meetings typically alternate between Kokomo (east) and Frankfort (west) to maintain interest and membership throughout the entire Wildcat Creek Watershed.

Figure 12: Informative displays were prepared for community events.

During this two-year grant period, two of the seven Quarterly Stakeholder meetings were held in the Spring Creek-Lick Run Watershed. Prior to each meeting, two hundred postcards were mailed to residents and landowners in the Spring Creek-Lick Run Watershed (Figure 15 & 16).

Figure 13: WCWA webpage has proven to be a good venue to distribute information.

www.wildcatalliance.org

Figure 14: Quarterly Newsletters are distributed via email and mail to keep membership aware of WCWA activities.


Wildcat Creek Watershed Alliance, Inc.
Newsletter
Summer 2002 Volume 1, Issue 4

"Wildcat Creek Watershed Alliance is a partnership of concerned citizens dedicated to developing and implementing successful watershed plans to improve and protect water resources in the Wildcat Creek Watershed."

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Wildcat Creek Watershed Alliance Advisory Board Members
Jack Rhoda, President
Keith Morgan
Joiene Rule
Glen Boise
Tony Bonaccorsi
Garry Hill
Bill Hillman
Ralph Kirkpatrick
Joe O'Donnell
Rex Schnapp
Tony Yun
Wayne Williams

WCWA Hosts a Successful Developers' Workshop

On Wednesday, May 15, 2002, the Wildcat Creek Watershed Alliance hosted a Developers' Workshop at the Johanning Center in Kokomo. This free workshop was well attended by developers, builders, contractors, and plan commission members from the Wildcat Creek Watershed.

The Developers' Workshop featured a wide range of speakers and development-related topics, informative displays from local vendors, and a tour of a local residential development under construction.

The speakers included:
- Bob McCormick, Purdue University, presented an overview of the Planning with POWER (Protecting Our Water & Environmental Resources) program,
- Sherry Fulk-Bringman, Purdue University, lead an interactive discussion on soils,
- Brent Ladd, Purdue University, provided pollution prevention techniques specifically for homeowners,
- Bob Kleinops, Normandy Farms Development Company, discussed residential development design and implementation to minimize impacts on the local water resources,
- Gwen White, IDNR, presented the relationship of development on fish and wildlife habitats, and
- Don Cree, Howard County SWCD and Chuck Westfall, IDNR, led a tour of Abbey Place, and demonstrated sediment and erosion control techniques.

Sponsors for the Developers' Workshop included: Turfscape, J.F. New & Associates, NuTex Supply, IOWPA, ASHCO, and the Howard County SWCD.

Upcoming Wildcat Creek Watershed Alliance Meetings

Quarterly Stakeholder Meetings	7/9/02 Jackson Morrow Park & 10/8/02 Location TBA (7pm)
Advisory Board Meetings	7/24/02 Russiaville Library, 8/28/02 Rossville Bennett Center, 9/25/02 Russiaville Library (6:30pm)
Technical Committee Meetings	7/1/02, 8/26/02, 9/17/02 Kokomo South Library (10am)
Land Use Committee Meetings	7/4/02 meeting cancelled, 8/1/02 Russiaville Library, 9/5/02 Rossville Library, 10/3/02 Russiaville Library (5:30pm)
Education Committee Meetings	7/17/02 Rossville Bennett Center, 8/21/02 Russiaville Library, 9/18/02 Rossville Bennett Center (1pm)

The purpose of these meetings was to present known water quality data and collect local information specific to the Spring Creek-Lick Run Watershed. Table 5 highlights the issues discussed at the meetings. This Plan is an attempt to address many of these concerns. A full summary of the Spring Creek-Lick Run Watershed Stakeholder meetings is available in the Appendix.

Figure 15: Town Hall type meeting to share important background information at Stakeholder meetings.

Figure 16: Small groups were used to facilitate better discussion during the Stakeholder meetings.

As part of this 319 grant, the WCWA sponsored two educational workshops. These included a Developers' Workshop and Environmental Education Workshop for Kids. Both of these workshops were advertised throughout the entire Wildcat Creek Watershed.

The Developers' Workshop was held in May 2002 at the Johanning Civic Center in Kokomo. The Workshop provided valuable water quality and land development information to developers, builders, contractors, and plan commission members in the Wildcat Creek Watershed.

Topics of discussion included tools for better land use planning; an overview of soil basics for good development practices; the impact of urbanization and development on natural stream systems; pollution prevention techniques; and successful conservation design case studies (Figure 17, 18, & 19).

Figure 17: The Developers' Workshops provided an opportunity for focused education for developers and decision-makers

Figure 18: A variety of planning and development issues were presented during the Developers' Workshop.

The Kids Workshop, "Ready, Set, Get Wet" was held in May 2003 at Camp Cullom near Frankfort. The Workshop focused on environmental education for the entire family. Several interactive stations of water-related games, activities, and story telling were used to raise awareness about the chemical, physical, and biological qualities of water (Figure 20, 21, & 22).

Figure 19: A demonstration during the Developers' Workshop on installation of BMPs during construction activities.

Figure 20: Flyer distributed to membership, media, local schools and scout troops.

Figure 21: Rainsticks were personalized with photos, yarn, and colored markers.

Figure 22: Educational displays. Frito Lay and Perrier Group donated snacks and drinks.

In addition to the Quarterly Stakeholder meetings, members of the WCWA have been active and have participated in a number of speaking engagements and events sponsored by other organizations.

These include:

- Presentation to the Tecumseth Middle School (October 2001),
- Presentation to the Howard County Builder's Association (May 2002),
- Participation in the Wildcat Guardian's "Celebrate the Wildcat" event in Lafayette and Kokomo (June 2002 and June 2003),
- Presented at the Wildcat Creek Foundation Annual Meeting (June 2002 and June 2003),
- Presentation to the Kokomo Kiwanis Club (July, 2002),
- Participation in the National Wildlife Federation and Alcoa "Workday for Wildlife" in Lafayette (October 2002),
- Participation in the Kokomo Parks Community Day (October 2002), and
- Participation in the Wildcat Foundation's "Conservation Easement Seminar" (March 2003)

Table 5: Comments gathered at Stakeholder Meetings in the Spring Creek-Lick Run Watershed

Information Requested	Summary of Public Comments Received
What are the water quality issues in the Spring Creek-Lick Run Watershed?	Positive: • Plans to study septic issue in Jefferson ($40,000 for study due in Spring 2003) possibly extend sewer from Frankfort or consider own WWTP • Mobile home park has own sewer line to Frankfort • Frito Lay own WWTP before discharging into Heavilon Ditch • Camp Cullom – preserved open space, well-wooded stream corridor • Open, undeveloped areas • Agricultural practices improved last 30 years, greater awareness among farmers Negative: • Failing septic systems/straight pipe discharge in Jefferson and elsewhere • Lack of trees along creek esp. southern portion (intensive agriculture) • Lack of grassed waterways, filter strips, etc. • Overspray manure, soil erosion, tillage practices • Fertilizer application of residential homeowners • Large lot development along Jefferson-Mulberry blacktop • Amoco oil pipe under creek (recently buried deeper due to downcutting of stream) • Industrial runoff and development • Golf Course (18-hole) • Confined Animal Feeding Operations (CAFO) edge of watershed • SR 28 bypass with limited access, may increase traffic and encourage development in watershed • Drainage pipes to Heavilon Ditch • More sediment in Heavilon Ditch • Less wildlife (beavers) in Heavilon Ditch • Changes in land use • Poor drainage/flooding esp. SE Jefferson • Abandoned wells may become contaminated if not properly sealed
What would you consider to be “Critical Areas” in the Spring Creek-Lick Run Watershed?	Positive: • Wooded areas, wooded stream corridors (north) • Camp Cullom (Nature Preserve) • Frankfort Storm Water Phase II community (mandate to address water quality) • WWTP (mobile home, industrial development with sewers) Negative: • Confined Animal Feeding Operations (CAFO) • Little or no stream cover (south) • Industrial development pressure (Airport, Frankfort, and SR 28) • Heavilon Ditch (303(d) list) • Jefferson (failing septic systems)

Information Requested	Summary of Public Comments Received
What recommendations would you make to improve water quality in the Spring Creek-Lick Run Watershed?	Stream Buffers: • Encourage landowners to participate in buffer program • Concerns with respect to maintenance/management of stream corridor • More natural corridor has more water quality benefits • Encourage grassed waterways (no mow, native grasses) • Important to protect since residential development is forced to wooded areas due to agricultural zoning restrictions • Increase State setback for septic systems (25') • Encourage participation in CRP/Wetland Reserve Program • Prohibit filling of floodplain (need for water quality/quantity) Agriculture: • Continue to protect prime agricultural land with zoning • Continue to improve tillage practices (no till – 55% county no till soybeans) south of watershed no till won't work due to soil characteristics (10% yield reduction) • Recognize farmers that are good stewards Planning/Urban Sprawl: • Require treatment of storm water before leaves site • Develop a plan for use along SR 28 (currently County has no plan) • Better design for retention/detention ponds (wetland edges, better filtration, wildlife habitat, more aesthetic) • Require older industry to meet new storm water detention standards (no grand fathering of old practices) • Support septic/sewer study for Jefferson • Protect Camp Cullom with wooded buffer • Require non-sewer development to have sufficient space for second septic system should the first fail • Consider a tax credit for individuals who upgrade septic system Education/Outreach: • Better understanding of impacts of septic systems on water quality (especially impacts for resale) • Consider tax program for county to loan money to make improvements to land/water quality • Landowners fear expense of upgrading septic system if required to attach new sewers • Develop a pamphlet that explains the 303(d) list and distribute to residents/business owning property along listed streams • Determine exact source of contaminants (industry, agriculture, residential, natural) • More sampling needed (with community involvement) especially Spring and Fall for macro-invertebrate collection

II. Identifying Water Quality Problems

The Indiana Department of Environmental Management (IDEM) is the primary agency involved in surface water quality monitoring and assessment in the State of Indiana. In conjunction with the requirements of the Clean Water Act and the State's goals for protecting its natural and recreational resources, the IDEM operates several monitoring programs designed to monitor and assess the chemical, physical, and biological conditions of Indiana's rivers, streams, and lakes.

The Hoosier Riverwatch is a volunteer-based program sponsored by the Indiana Department of Natural Resources (IDNR), Division of Soil Conservation and Purdue University. Hoosier Riverwatch trains volunteers to collect chemical, biological, and physical water quality data in local waterways. The data that is collected is distributed to anyone that is interested via the internet (www.hoosierriverwatch.com).

In preparation for the Spring Creek-Lick Run Watershed Management Plan, the WCWA elected to use existing water quality data rather than conduct its own water quality monitoring program.

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 Spring Creek-Lick Run Watershed.

IDEM 1998 Upper Wabash Basin Survey

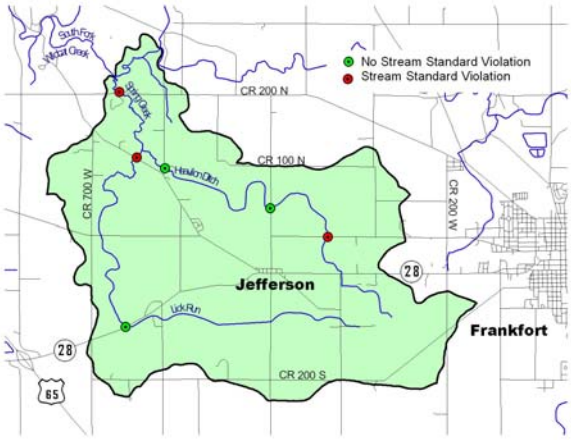
In 1998, the IDEM's Assessment Branch, Office of Water Management, operated multiple surface water quality monitoring programs within the Upper Wabash River Basin. These programs, operated in concordance with the Assessment Branch Surface Water Quality Monitoring Strategy (IDEM, 1996), included the Watershed Monitoring Program, the Fixed Station Monitoring Program, the *E.coli* Monitoring Program, and an intensive Total Maximum Daily Load (TMDL) study of the Wildcat Creek Watershed. These programs were designed to collect chemical surface water quality data from both targeted and probabilistically (randomly) selected sites that were used for making comprehensive assessments of the surface water quality in the Upper Wabash River Basin.

The IDEM monitored 6 sites within the Spring Creek-Lick Run Watershed, via the TMDL Program, for a variety of bacteriological, chemical, and physical indicators of water quality. Of the 6 sites tested, 3 were found in violation of water quality standards (Figure 23).

The 1998 Upper Wabash Basin Survey is the most thorough study of the watershed completed within the past five years however, the data collected in this study are somewhat limited in spatial extent, depth, and duration since all samples were collected on a single day (October 15, 1998) and are therefore not representative of seasonal characteristics, and the samples are not representative of diurnal (day vs. night time) characteristics; especially important

where dissolved oxygen violations were observed.

Figure 23: IDEM Monitoring Sites in the Spring Creek-Lick Run Watershed



(IDEM, 1998)

The data in this study indicate a concern regarding violations of state water quality standards for *E.coli* bacteria. The data indicate exceedance of the existing water quality standard (WQS) of 235 colony forming units/ 100ml of sample water at many monitoring locations throughout the Spring Creek-Lick Run Watershed as well low concentrations of dissolved oxygen (DO) (Table 6).

This 1998 Upper Wabash River Basin Report did not identify the causes or sources of the *E.coli* and dissolved oxygen. However, comments listed in the data summary for the study noted a straight pipe discharge from the Town of Jefferson.

1998 303(d) List of Impaired Waters

In addition to the Upper Wabash Basin Study, the IDEM also produced its biennial list of streams with water quality "impairments", as required by Section 303(d) of the Clean Water Act. This list did not include any impairment identified in the Spring Creek-Lick Run Watershed.

2000 Water Quality Report

Indiana 2000 Water Quality Report (Section 305(b) of the Clean Water Act) requires states to prepare and submit to the U.S. Environmental Protection Agency (EPA) a water quality assessment report of state water resources every two years.

The IDEM Office of Water Management prepared the Indiana 2000 Water Quality Report (305(b) Report) to meet this reporting requirement (Table 7).

According to the 2000 Waterbody Assessment, both Spring Creek-Lick Run and the South Fork of Wildcat Creek fully support aquatic life however; Heavilon Ditch does not due to low dissolved oxygen levels and evidence of pathogens and ammonia. Drinking water supply and Fish Consumption Advisory was not applicable or not assessed. Only the Spring Creek-Lick Run fully supported contact during recreational activities according to the water quality standards (IDEM, 2000).

2002 303(d) List of Impaired Waters

Section 303(d) of the Clean Water Act requires that surface waterbodies not meeting or not expected to meet water quality standards after the implementation of regulatory controls (NPDES permits) be compiled and listed as "impaired waters" by IDEM. Impaired waters are considered to be those waterbodies that do not meet the state's water quality standards for one or more designated uses.

Table 6: Summary of IDEM Water Quality Data for the Spring Creek-Lick Run Watershed

5120107	SITE	PGM	LOCATION	VIOLATIONS	CONC.	UNIT	DATE	COMMENTS
040100	23-0145	TMDL	Lick Run at SR28	None				
	23-146	TMDL	Lick Run at Jefferson Rd.	*E.coli*	320	100mL	10/15/98	
	23-147	TMDL	Heavilon Ditch at CR00	*E.coli*	610	100mL	10/15/98	Town of Jefferson straight pipe discharge
	23-147	TMDL	Heavilon Ditch at CR00	DO	2.47	mg/L	10/15/98	Low D.O.
	23-147A	TMDL	Heavilon Ditch at CR600W	None				
	23-148	TMDL	Spring Creek at CR600W	None				
	23-149	TMDL	Spring Creek at CR200N	*E.coli*	260	100mL	10/15/98	

(IDEM Upper Wabash Basin Study, 1998)

Table 7: IDEM's 2000 Water Quality Report

South Fork Wildcat Creek Spring Creek-Lick Run	Aquatic Life	Drinking Supply	FCA	Contact Recreation	Cause/ Stressor
Spring Creek-Lick Run	F	N/A	X	F	
South Fork Wildcat Creek – mainstem	F	N/A	X	N	Pathogens
Heavilon Ditch – headwater	N	N/A	X	P	Low DO, Pathogens, Ammonia

F-Full support, P-Partial support, N-Non support, X-Not Assessed, N/A –Not Applicable
(IDEM, 2000)

The statewide list of impaired streams was updated in February 2002. The list identifies the stretch of the waterbody that is impaired; the pollutant(s) not meeting water quality standards thus causing the impairment; and a schedule for development of a Total Maximum Daily Load (TMDL) for the pollutant causing the impairment (Table 8). Figure 24 illustrates the locations of 303(d) listed streams within the Spring Creek-Lick Run Watershed that will be required to undergo TMDL development.

A TMDL is a process that leads to the quantification of the amount of a specific pollutant discharged into a waterbody that can be assimilated and still meet the water quality standards. What constitutes a pollutant is described in Section 502(6) of the Clean Water Act, and includes materials such as sewage, chemical wastes, biological materials, and industrial, municipal, and agricultural waste. The definition also encompasses drinking water contaminants that are regulated under Section 1412 of the Safe Drinking Water Act.

Table 8: 2002 303(d) Listed Streams in the Spring Creek-Lick Run Watershed

Waterbody Name	County	Major Basin	Parameter of Concern	TMDL Development Schedule
Heavilon Ditch	Clinton	Upper Wabash	Ammonia, DO, Organic Enrichment, *E.coli*	2003-2008
South Fork Wildcat Creek - mainstem	Clinton	Upper Wabash	Cyanide, *E.coli*	2013-2018

(IDEM, 2002)

A TMDL will identify how much of a pollutant is coming from point sources and nonpoint sources. It will also specify the amount of pollutant reduction necessary from each source in order to meet the water quality standard set for that pollutant. A plan to reduce the amount of the pollutant coming from each source is being developed and implemented by the IDEM.

Figure 24: Impaired streams in the Spring Creek-Lick Run Watershed

(IDEM, 2002)

At the time of writing this Watershed Management Plan, the IDEM's Office of Water Quality has begun the process to develop TMDLs for the Wildcat Creek Watershed. Staff within the Office of Water Quality has solicited water quality information from groups working in the watershed and held a stakeholder meeting. Fieldwork for the Spring Creek-Lick Run Watershed TMDL is scheduled to begin in 2003.

Several Wildcat Creek Watershed Alliance members attended the TMDL stakeholder meeting on May 29, 2003 in Kokomo. All of the Advisory Board and Technical Committee members are on the IDEM's mailing list to receive future meeting dates and project updates.

Fish Consumption Advisory (FCA)

Each year since 1972, three agencies have collaborated to create the Indiana Fish Advisory. These agencies include the Indiana Department of Environmental Management (IDEM), the Indiana Department of Natural Resources (IDNR), and the Indiana State Board of Health (ISBH). Each year, members from these agencies meet to discuss the findings of recent fish monitoring data and to develop the new statewide fish consumption advisory.

The 2001 advisory is based on levels of polychlorinated biphenyls (PCBs) and mercury found in fish tissue. In each area, samples were taken of bottom-feeding fish, top-feeding fish, and fish feeding in between. More than 1,600 fish tissue samples were analyzed for polychlorinated biphenyls (PCBs), pesticides, and heavy metals. Of those samples, the majority contained at least some mercury. However, not all fish tissue samples had mercury at levels considered harmful to human health. If they did, they are listed in the fish consumption advisory.

Table 9: FCA for the Spring Creek-Lick Run Watershed

Fish Species	Size	Contaminant	FCA Group (Table 10)
Carp	15-20 inches	Mercury, PCB	3
Carp	20-25 inches	Mercury, PCB	4
Carp	25+ inches	Mercury, PCB	5

Table 10: ISDH Definitions for FCA Groups

FCA Group	Description
1	Unrestricted consumption
2	One meal per week (52 meals per year) for adult males and females. One meal per month for women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15.
3	One meal per month (12 meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.
4	One meal every two months (six meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.
5	No consumption (DO NOT EAT)

Because of past, widespread agricultural and industrial use of these materials, their great stability and persistence in the environment, and the potential for bioaccumulation, it is not surprising that concentrations exceeding safe levels have been found in some species. Criteria for the statewide 2000 Indiana Fish Consumption Advisory are developed from the Great Lakes Task Force risk-based approach.

Although there are no specific fish consumption advisory listings for the Spring Creek-Lick Run Watershed, a statewide PCB advisory for carp in all Indiana streams, the Indiana portion of Lake Michigan, and inland lakes is in effect (Table 9). Indiana State Board of Health (ISBH) criteria for fish consumption advisory groups are outlined in Table 10.

Unified Watershed Assessment (UWA)

The federal Clean Water Action Plan, released in February 1998, presented a plan and certain incentives directed toward accelerating the control of nonpoint source pollution in America. States were requested, as one of the 111 Action Items presented in the Plan, to prepare a Unified Watershed Assessment.

This Assessment was developed through the cooperation of state, federal, and local agencies and the public. The guidance for completing the UWA, published by the USEPA in June 1998, charged the USDA Natural Resources Conservation Service (NRCS) and the state water quality agency (the IDEM) with convening the assessment process. The following lists the data layers and decision criteria:

- Lake Fishery (game fish) Condition
- Eurasian Milfoil Problems
- Mussel Diversity
- Stream Biodiversity
- ALUS Status
- Fish Consumption Advisories
- Recreation/Swimming Status
- Index of Biological Integrity (fishes)
- Index of Biological Integrity (macro-invertebrates)
- Qualitative Habitat Evaluation Index
- Lake Trophic Status
- Stream (game fish) Fishery Status
- Sediment Delivery Potential

The data provided information about the water column, organisms living in the water, or the suitability of the water for supporting aquatic ecosystems. Each layer of data was partitioned by percentiles into 5 scores, with "1" being indicative of good water quality or minimal impairment, and "5" indicating heavily impacted or degraded water quality.

Scores for each 8-digit watershed were compiled, and the watersheds were sorted into four categories as required by the USEPA guidance. The four categories are as follows:

1) Watersheds in need of restoration, waters do not meet designated uses or other natural resource goals. 25% or more of the waters that have been assessed do not meet state water quality standards. (Note that in some watersheds, only a very small percentage of waters have been recently assessed.)
2) Watersheds that on average meet state water quality goals and require attention to sustain water quality. In most of these watersheds, there is habitat that is recognized as critical for threatened or endangered species.
3) Watersheds with pristine or sensitive aquatic systems on federal or state managed lands.
4) Watersheds with insufficient data to make an assessment.

What sets this assessment apart from other lists and reports regarding watersheds is the involvement of numerous organizations and the recognition of both impaired and healthy watersheds.

1999-2000 UWA

During the summer of 1999, the UWA workgroup used additional layers of information to identify resource concerns and stressors for each of the 361 11-digit watersheds in Indiana. This time, the UWA examination included more information about human activities that have the potential to impact ecosystems and information to help planners to focus on those areas where restoration may be most critical.

The UWA process was conducted to identify areas where the interests of two or more partner agencies may converge. It was intended that this would lead to more effective allocation of resources for restoration and protection activities. At the local level, it was hoped that the UWA could assist groups in prioritizing watershed activities and providing discussion points for planning.

The amended UWA assessment was seen to provide the following benefits:

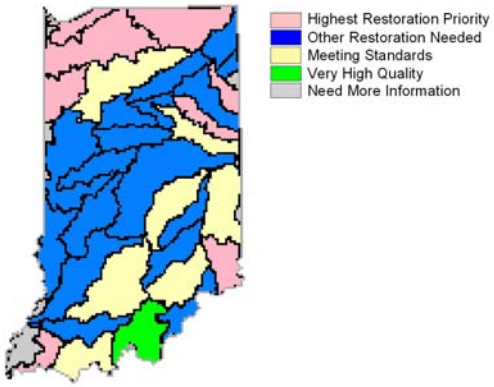
1) Provided a logical process for targeting funds, which may be expanded or updated without changing the basic framework.
2) Provided information at a finer resolution (11-digit HUC) to agencies and local groups interested in watershed assessment.
3) Identified data gaps could be used as a complement to other assessments, such as the 305(b) Report and 303(d) List.

According to the 1999-2000 UWA fact sheet, the entire Wildcat Creek Watershed, and surrounding 8-digit watersheds in Central Indiana are classified as “Other Restoration Needed” (Figure 25).

2000-2001 UWA

In order to target the allocation of FFY 2001-2002 Section 319 funds that were made available through the Clean Water Action Plan, 11-digit hydrologic units with the greatest indication of existing or potential problems were given a higher priority. Based on the additional

Figure 25: 1999-2000 UWA classifications.

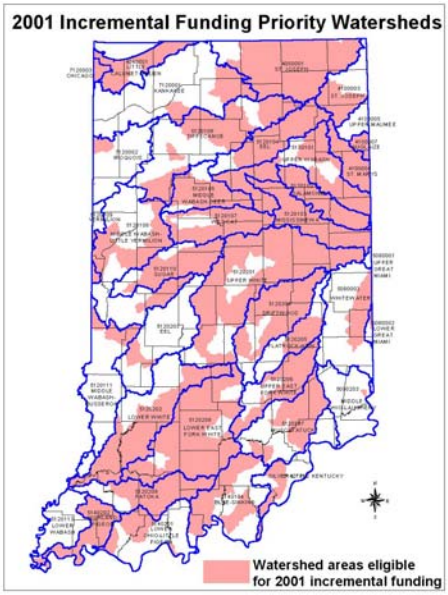


(1999-2000 UWA Fact Sheet)

information gathered in this iteration of the UWA, all watersheds in the state are now considered to be in Category I.

Watersheds (11 HUC) with two or more scores of 5, one score of 5 and two or more scores of 4, or three or more scores of 4 (in any category) were given a higher priority. Figure 26 illustrates which 11-digit watershed are priorities to incremental funding in 2001.

Figure 26: Funding priorities based on 2000-2001 Unified Watershed Assessment.



(2000-2001 UWA)

According to this ranking system, the South Fork Wildcat Creek Watershed received "5" scores for aquatic vulnerability and percent cropland placing it in a higher priority for funding (Table 11). This funding targeting process is known to be imperfect, but used the best information available at the time. The Spring Creek-Lick Run Watershed falls within the portion Wildcat Creek Watershed that is eligible for 2001 incremental funding.

Hoosier Riverwatch

The Hoosier Riverwatch provides water quality education for volunteers interested in conducting water quality monitoring throughout the State of Indiana. The IDNR, Division of Soil Conservation and Purdue University sponsor the Hoosier Riverwatch program. Water quality data is posted on the Hoosier Riverwatch webpage (www.hoosierriverwatch.com) for other volunteers and the general public to use.

In 2001 and 2002, water quality monitoring has been conducted at two sites in the Spring Creek-Lick Run Watershed. Both sites are on Spring Creek, one site at CR 450 W and the other at Camp Cullom. Monitoring at these sites seems to indicate the presence of elevated concentrations of *E.coli* bacteria and potentially low dissolved oxygen concentrations. It should be noted, however, that elevated pollutant concentrations at the Camp Cullom site are likely caused from the impacts from Heavilon Ditch, a 303(d) listed impaired waterbody in the Spring Creek-Lick Run Watershed.

Although the Hoosier RiverWatch monitoring program is not rigorous enough to specifically identify the causes and/or sources of these pollutants, these results are consistent with the findings of other monitoring programs (i.e. IDEM), which indicate consistently elevated concentrations of *E.coli* and ammonia throughout the larger

Table 11: Hydrologic Unit Scores for 2000-2001 Unified Watershed Assessment Parameters for South Fork Wildcat Creek Watershed (11-digit HUC 05120107040)

Parameter	Score
Mussel Diversity and Occurrence	Not Determined
Aquatic Life Use Support	Not Determined
Recreation Use Attainment	Not Determined
Stream Fishery	1
Lake Fishery	Not Determined
Eurasian Milfoil Infestation Status	Not Determined
Lake Trophic Status	Not Determined
Critical Biodiversity Resource	2
Aquifer Vulnerability	5
Population Using Surface Water for Drinking	2
Residential Septic System Density	2
Degree of Urbanizations	2
Density of Livestock	3
Percent Cropland	5
Mineral Extraction Activities	1

(2000-2001 Unified Watershed Assessment)

Wildcat Creek Watershed. Possible sources of these pollutants include failing septic systems, agricultural runoff, and urban runoff.

As a committee, the WCWA identified what they felt were the major sources of pollution in the Spring Creek-Lick Run Watershed (Table 12). The WCWA used this laundry list as the basis of the water quality discussion and to formulate the goals for this Watershed Management Plan. These include:

1. Agricultural Practices

a) Row Crop (nutrients, pesticides, erosion/sediment, conservation tillage, conservation buffers)
b) Livestock (bacteria/pathogens, pasture)

2. Urban Development

a) Human & Animal Waste (failing septic systems and wildlife/pet waste)
b) Household & Yard Waste (toxic substances and lawn/garden practices)
c) Development Practices & Encroachment (erosion/sediment control, streamside forests, impervious areas)

Table 12: Committee derived list of pollutants in the Spring Creek-Lick Run Watershed

Agriculture	• Tillage practices • Livestock • Highly erodible lands • Nutrient & pest management • Tile systems • Failing septic systems • Lack of riparian buffers • Chemical storage & handling • Manure storage & handling
Residential and Urban	• Erosion from construction • Topsoil removed from developments • Illegal dumping • Household hazardous waste • Pet wastes • Over application of fertilizers & pesticides • Failing septic systems • Impermeable surfaces • Vehicular fluids (oils, greases, gasoline) • De-icing salt & sand • Road construction • Golf course
Streams	• ATV access • Livestock access • Streambank erosion • Floodplain development • Streamside dumping • Fisherman and litter

CAUSES OF WATER QUALITY PROBLEMS

A number of substances including oxygen demanding wastes, nutrients, bacteria, metals, and toxic substances, cause water pollution. Sources of these pollution-causing substances are divided into two broad categories: point sources and nonpoint sources (IDEM, 2002). Point and nonpoint sources of pollution are described as follows:

Point source pollution refers to discharges that enter surface waters through a pipe, ditch, or other well-defined point of discharge. The term applies to wastewater and stormwater discharges from a variety of sources. Wastewater point source discharges include municipal (city and county) and industrial wastewater treatment plants and small domestic wastewater treatment systems that may serve schools, commercial offices, residential subdivisions and individual homes. Stormwater point source discharges include stormwater discharges associated with industrial activities and stormwater discharges from municipal separate storm sewer systems (MS4s) for municipalities that meet the requirements of 327 IAC 15-13.

The primary pollutants associated with point source discharges are oxygen demanding wastes, nutrients, sediment, toxic substances, ammonia and metals. Point source dischargers in Indiana must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit from the state. Discharge permits are issued under the NPDES program, which is delegated to Indiana by the EPA.

Nonpoint source pollution refers to runoff that enters surface waters by stormwater runoff, contaminated ground water, snowmelt or atmospheric deposition. There are many types of land use activities that can serve as sources of nonpoint source pollution due to the presence of impervious surfaces, including land development, construction, mining operations, crop production, animal feeding lots, agricultural drainage tiles, timber harvesting, failing septic systems, landfills, roads and paved areas, and wildlife.

Sediment and nutrients are major pollution causing substances associated with nonpoint source pollution. Others include *E.coli* bacteria, heavy metals, pesticides, oil and grease, and any other substance that may be washed off the ground or removed from the atmosphere and carried into surface waters. Unlike point sources of pollution, nonpoint pollution sources are diffuse in nature and occur at random depending on rainfall events.

Causes of pollution refer to the specific substances that enter surface waters from point and nonpoint sources and result in water quality degradation and/or impairment. Major causes of water quality impairment include biochemical oxygen demand (BOD), nutrients, toxic substances (such as polychlorinated biphenyls [PCBs] and ammonia), and *E.coli* bacteria (IDEM, 2002).

Oxygen Consuming Wastes

Since maintaining sufficient levels of dissolved oxygen in a waterbody is critical to the survival of most forms of aquatic life, evaluating oxygen-consuming wastes in a river or stream is central to diagnosing the health of a river system. Pollutants associated with oxygen consuming wastes are typically composed of either decomposing organic matter or chemicals that bind with available in stream oxygen to

reduce the available concentrations of dissolved oxygen in the water column. Organic causes of oxygen consuming wastes are measured as biochemical oxygen demand (BOD) and chemical causes of oxygen consuming wastes are measured as chemical oxygen demand (COD); however, the concentration of dissolved oxygen in a waterbody is used as a common indicator of the general health of an aquatic ecosystem.

327 IAC Section 6 (b)(3) states that concentrations of dissolved oxygen shall average at least five milligrams per liter per calendar day and shall not be less than four milligrams per liter at any time. Dissolved oxygen concentrations are affected by a number of factors. Physical conditions, such as lower water temperatures generally allow for retention of higher dissolved oxygen concentrations. In addition, higher dissolved oxygen concentrations can be naturally or artificially produced by turbulent actions, such as by in stream riffles or by the cascading effect of a waterbody spilling over a dam, which inject air into surface waters. Low dissolved oxygen levels tend to occur more often in warmer, slow moving waters.

The process of photosynthesis in algae produces a large volume of oxygen during periods of daylight and respiration by algae during the nighttime hours absorbs more oxygen than the water column can maintain, resulting in times when dissolved oxygen concentrations are significantly reduced or depleted. This situation can be is intensified in hot weather and low flow conditions due to the reduced capacity of water to retain dissolved oxygen.

The 1998 Upper Wabash River Basin Study, the IDEM's 2000 Water Quality Report, and the IDEM's 2002 303(d) list of impaired stream identified low dissolved oxygen as a water quality concern in Heavilon Ditch.

Nutrients

The term "nutrients" primarily refers to the two major plant macronutrients, phosphorus and nitrogen. These nutrients are common components of fertilizers, animal and human wastes, vegetation, and some industrial processes. Nutrients in surface waters come from both point and nonpoint sources. Nutrients are beneficial to aquatic life in small amounts. However, in over abundance and under certain conditions, they can stimulate the occurrence of algal blooms and excessive plant growth in quiet waters or low flow conditions. Algae blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and the decomposition of dead algae and other plants (IDEM, 2002).

Phosphorus

Nonpoint source discharges are the major sources of phosphorus in most watersheds. Phosphorus can be present as organic matter (living or dead organisms and excreted organic material) and can be either dissolved or suspended in the water column. Phosphorus may also occur in inorganic compounds released from various minerals, fertilizers or detergents that may also be either dissolved or suspended in the water column. Phosphorus is the primary nutrient associated with production of algae and macrophytes (plants) in waterbodies, as it is generally the nutrient in shortest supply in aquatic systems (Phillips et al, 2000).

Ammonia (NH_3)

Point source dischargers, such as wastewater treatment plants, can be a significant source of ammonia in surface waters; however, nonpoint source discharges of untreated septic effluent, decaying organisms, and bacterial decomposition of animal waste from improper disposal or fertilizers in

stormwater runoff can also contribute to the level of ammonia in a waterbody.

In wet weather conditions, additional sources of ammonia can enter rivers and streams from stormwater runoff from agricultural uses of nitrogen. Rain events can also exacerbate runoff of fertilizers from residential and commercial land uses and saturate soils, which raises the groundwater table and causes additional flushing pollutants from failing systems.

The IDEM's 2000 Water Quality Report and the IDEM's 2002 303(d) list of impaired streams listed ammonia as a water quality concern in Heavilon Ditch.

E.coli Bacteria

E.coli bacteria are associated with the intestinal tract of warm-blooded animals. Although not a pollutant in itself, *E.coli* is widely used as an indicator of the sewage pollution, which may harbor additional waterborne disease causing (pathogenic) bacteria, protozoa, and viruses.

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

Water quality standards (WQS) for *E.coli* have been established in order to ensure safe use of waters for drinking water supplies and recreation. 327 IAC 2-1-6 Section 6(d) states that *E.coli* bacteria, using membrane filter count (MF), shall not exceed 125 per 100 milliliters as a geometric mean based on not less than five samples equally spaced over a 30 day period nor exceed 235 per 100 mL in any one sample in a 30-day period.

E.coli bacteria may enter surface waters from nonpoint source runoff from failing septic systems, straight pipe discharges from septic tanks, livestock, domestic pets, and wildlife. In addition, *E.coli* can also come from improperly treated discharges of domestic wastewater. Common sources of *E.coli* bacteria include leaking or failing septic systems, direct septic discharge, leaking sewer lines or pump station overflows, runoff from livestock operations, urban stormwater and wildlife. *E.coli* bacteria in treatment plant effluent are controlled through disinfecting methods including chlorination, ozonation or ultraviolet light radiation.

E.coli monitoring by the IDEM in the Spring Creek-Lick Run Watershed identified several locations where the WQS for *E.coli* was violated during 1998, 2000, and 2002. Two stream segments are listed as impaired by *E.coli* on the 2002 Indiana 303(d) list. These waterbodies include the South Fork Wildcat Creek and Heavilon Ditch. These stream segments are scheduled for TMDL development from 2013-2018 and 2003-2008 respectively.

Erosion and Sedimentation

Sedimentation is the largest NPS pollutant impacting Indiana streams. Sediment fills in waterways affecting water quality, wildlife habitats and recreational opportunities (Frankenberger, 2000).

Sedimentation occurs when wind or water runoff carries soil particles from an area, such as a farm field or stream bank, and transports them to a water body, such as a stream or lake. Excessive sedimentation clouds the water, which reduces the amount

of sunlight reaching aquatic plants; covers fish spawning areas and food supplies; and clogs the gills of fish. In addition, other pollutants like phosphorus, pathogens, and heavy metals are often attached to the soil particles and wind up in the water bodies with the sediment.

Toxic Substances

327 IAC 2-1-9(45) identifies toxic substances as substances that are or may These substances can be toxic to aquatic organisms and their effects may be evident immediately or may only be manifested after long-term exposure or accumulation in living tissue (IDEM, 2002).

Whole effluent toxicity testing is required for major NPDES dischargers (discharge over 1 million gallons per day or population greater than 10,000). This test shows if the effluent from a treatment plant is toxic, but it does not identify the specific cause of toxicity. If the effluent is found to be toxic, further testing is done to determine the specific cause. Other testing, or monitoring, done to detect a toxicity problem includes fish tissue analyses, chemical water quality sampling, and biological monitoring.

Polychlorinated biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) were first created in 1881 and subsequently began to be commercially manufactured around 1929 (Bunce, 1994). Because of their fire-resistant and insulating properties, PCBs were widely used in transformers, capacitors, and in hydraulic and heat transfer systems. In addition, PCBs were used in products such as plasticizers, rubber, ink, and wax. In 1966, PCBs were first detected in wildlife, and were soon found to be ubiquitous in the environment (Bunce, 1994). PCBs entered the environment through unregulated disposal of products such as waste oils, transformers, capacitors, sealants, paints, and carbonless copy paper. In 1977, production of PCBs in North America was halted. Subsequently, PCB contamination present in our surface waters and environment today is the result of historical waste disposal practices (IDEM, 2002).

become harmful to plant or animal life, or to food chains when present in sufficient concentrations or combinations. Toxic substances include those pollutants identified as toxic under Section 307 (a)(1) of the Clean Water Act. Indiana's standards for individual toxic substances are listed in 327 IAC 2-1-6. Toxic substances frequently encountered include chlorine, ammonia, organic pollutants, heavy metals, and pH.

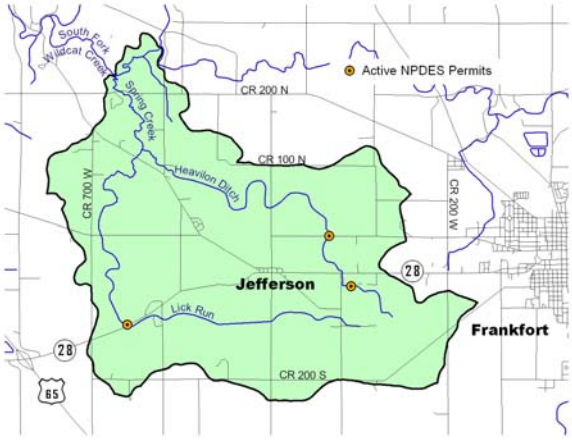
Although there are no waterbodies within the Spring Creek-Lick Run Watershed specifically listed for PCB contamination, there is statewide fish consumption advisory for carp greater than 15 inches in length.

SOURCES OF WATER QUALITY PROBLEMS

Point Sources of Pollution

The Clean Water Act prohibits the discharge of pollutant into the "waters of the United States" as a point source discharge without a National Pollution Discharge Elimination System (NPDES) permit. The IDEM's Office of Water Quality is responsible for issuing and enforcing NPDES permits in Indiana. In Indiana's case, "Waters of the State" include surface and ground water, natural and artificial, public and private, which are wholly or partially within, flow through, or border the State (IDEM, 2002)

Figure 27: NPDES Facilities in the Spring Creek-Lick Run Watershed



(IDEM, 2002)

As of November 2001, there were three active permitted NPDES facilities within the Spring Creek-Lick Run Watershed (Table 13). Figure 27 illustrates where in the Spring Creek Lick Run Watershed the NPDES permitted facilities are located.

In addition to the NPDES permitted dischargers in the watershed, there are illegal discharges to the waterbodies in the Spring Creek-Lick Run Watershed. Illegal discharges of residential wastewater (septic tank effluent) to streams and ditches from straight pipe discharges and old inadequate systems are a problem within the watershed as documented in the Wildcat Creek Watershed Restoration Action Strategy (IDEM, 2000).

Stormwater from urban areas and from certain industrial and construction sites is also considered a point source since NPDES permits are required for discharges of stormwater from these areas. In March 2003, the State of Indiana adopted regulations to implement phase two of the federal Stormwater NPDES Program. The Storm Water Phase II program will require designated entities to develop stormwater management programs. The City of Frankfort is the only Stormwater Phase II entity in the Spring Creek-Lick Run Watershed.

Table 13: NPDES Facilities in the Spring Creek-Lick Run Watershed

PERMIT NUMBER	FACILITY NAME	CITY	COUNTY	RECEIVING STREAM
IN0044245	Frito Lay, Inc.	Frankfort	Clinton	Heavilon Ditch
IN0058793	Emerson Appliance Controls	Frankfort	Clinton	Heavilon Ditch
IN0051624	C.F. Industries, Inc.	Frankfort	Clinton	Lick Run

(IDEM, 2002)

Nonpoint Sources of Pollution

Sediment, nutrients, and *E.coli* bacteria are major pollution causing substances associated with nonpoint source pollution (NPS). Others include heavy metals, pesticides, oil and grease, and any other substance that may be washed off the ground or removed from the atmosphere and carried into surface waters. The following discussion on NPS pollution in the Spring Creek-Lick Run Watershed is divided into sources of pollution from agricultural practices and sources from urban development.

1. Sources from Agricultural Practices

The National Water Quality Inventory (NWQI), sponsored by the EPA, reports that agricultural nonpoint source pollution is the leading source of water quality impacts to surveyed rivers and lakes, the third largest source of impairments to surveyed estuaries, and a major contributor to ground water contamination and wetlands degradation (EPA, 2002).

NPS pollutants that result from agricultural activities are nutrients, pesticides, and sediment (Table 14). Nutrients, pesticides, and sediment can migrate from agricultural lands to surface and ground waters through processes including surface runoff, erosion, and infiltration. It is important to note that these pollutants are not specific to agriculture and can originate from residential and urban lands as well.

Table 14: NPS Pollution and Agriculture

Pollutants	Agriculture Sources
Nutrients	Commercial Fertilizers and Manure
Toxic Chemicals	Herbicides, Insecticides, Fungicides
Sediment	Tillage, sheet, rill, gully and streambank erosion
Animal Waste	Manure runoff from fields, pastures, and feedlots

(EPA, 2000)

There are a number of activities associated with agriculture that can serve as potential sources of water pollution.

1) Land clearing and tilling make soils susceptible to erosion, which can then cause stream sedimentation,
2) Pesticides and fertilizers (including synthetic fertilizers and animal wastes) can be washed from fields or improperly designed storage or disposal sites, and
3) Construction of drainage ditches on poorly drained soils enhances the movement of oxygen consuming wastes, sediment and soluble nutrients into groundwater and surface waters (IDEM, 2002).

Agriculture is the predominant land use in the Spring Creek-Lick Run Watershed and Clinton County. According to the 1197 Indiana Agricultural Census, approximately 91% or 236,320 acres of land in Clinton County is used for crop and livestock production. Although only 4% of the county's agricultural land is within the Spring Creek-Lick Run Watershed, 94% (10,218 acres) of the watershed is in crop or livestock production (Indiana Agriculture Census, 1997).

The discussion on agricultural practices is separated into crop production and livestock production.

Crop Production

Like most of Indiana, corn and soybeans dominate the crops grown in Clinton County. The 2000, Clinton County producers planted 107,000 acres of corn, 104,700 acres of soybeans, 2,600 acres of wheat, and 1,700 acres of alfalfa. The county ranks 8th in the State for corn production and 3rd in the State for soybean production (Indiana Agriculture Census, 1997).

Table 15: Estimate of Nutrient Applications in the Spring Creek-Lick Run Watershed

County	% of county in the watershed	x	Total Nutrients (tons)		X 2,000 lbs/ton	Nutrients in watershed (lbs)	
			N	P2O5		N	P2O5
Clinton	.04	x	6,553	2,538	X 2000	524,240	203,040

(Purdue University, 2000)

Table 16: Estimate of Pounds of Pesticides Applied in the Spring Creek-Lick Run Watershed

Crop	Crop Acres	X	Pesticide	1998 Fraction of Acres Treated in Indiana	X	1998 Average Rate of Application	=	Estimated Pounds of Pesticides Applied
Corn	5,109	X	Atrazine	.89	X	1.36	=	6183.93
			Metolachlor	.42		2.04		4377.39
			Acetochlor	.32		1.97		3220.71
			Primisulfuron	.14		0.03		21.46
			Cyanazine	.13		1.43		949.76
Soy-bean	5,109		Glyphosate	.55		.85		2388.46
			Chlorimuronethyl	.27		0.02		27.59
			2,4-D	.26		0.39		518.05
			Imazethapyr	.25		0.04		51.09
			Paraquat	.19		0.89		863.93
Total								18,602.37

(Purdue University, 2000)

Nutrients

Nutrients such as phosphorus (P) and nitrogen (N) in the form of commercial fertilizers, manure, sludge, legumes, and crop residues are applied to enhance crop production. In small amounts, N and P are beneficial to aquatic life, however, in over abundance, they can stimulate the occurrence of algal blooms and excessive plant growth.

Algal blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and decomposition of dead algae and other plants. This situation can be accelerated in hot weather and low flow conditions because of the reduced capacity of the water to retain dissolved oxygen. Fish and aquatic insects need the oxygen that is dissolved in water to live, and when decaying algae uses up that oxygen, fish kills can result. Massive fish kills can devastate the aquatic ecosystem.

The Office Of Indiana State Chemist annually publishes the total tonnages of commercial fertilizers sold in each Indiana County. The list includes single nutrient fertilizers, multi-nutrient fertilizers, as well as, organic and micronutrient fertilizers (Table 15).

Pesticides

Pesticides include a broad array of chemicals used to control plant growth (herbicides), insects (insecticides), and fungi (fungicides). These chemicals have the potential to enter and contaminate water through direct application, runoff, wind transport, and atmospheric deposition. They can kill fish and wildlife, contaminate food and drinking water sources, and destroy the habitat that animals use for protective cover.

While some pesticides undergo biological degradation by soil and water bacteria, others are very resistant to degradation. Such nonbiodegradable compounds may become "fixed" or bound to clay particles and organic matter in the soil, making them less available. However, many pesticides are not permanently fixed by the soil. Instead they collect on plant surfaces and enter the food chain, eventually accumulating in wildlife such as fish and birds. Many pesticides have been found to negatively affect both humans and wildlife by damaging the nervous, endocrine, and reproductive systems or causing cancer (Kormondy 1996).

Unfortunately, the Office of Indiana State Chemist does not track pesticide sales within Indiana Counties. In order to determine how much pesticide is being applied within the Spring Creek-Lick Run Watershed, a rough estimation was calculated using Purdue University's Guide for Watershed Partnerships (Table 16).

Erosion and Sedimentation

Only a small percentage of the soils in the Spring Creek-Lick Run Watershed are classified as highly erodible lands (HEL) (Table 17).

Table 17: Highly erodible lands in the Spring Creek-Lick Run Watershed

Symbol	Soil Name	Slope	Slope Length
HeF	HENNEPIN	20%	50
MnD	MIAMI	16%	50
MsD3	MIAMI	16%	50

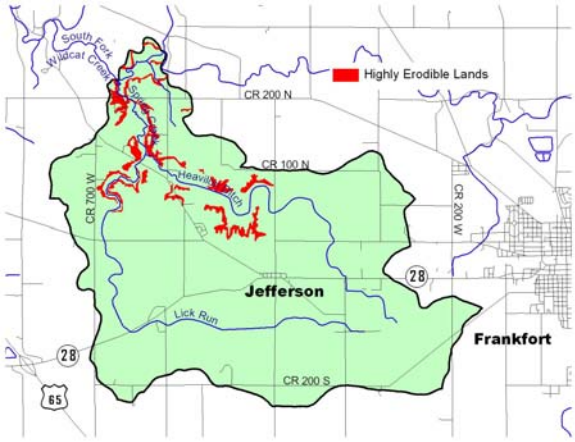
(USDA-NRCS, 1979)

HELs are determined based on slope and other erodibility factors and if not managed properly can erode at a rate higher than the tolerable rate. According to the USDA, the soil of an entire crop field is considered erodible if at least one-third of the field has HEL soils.

Livestock with access to a creek can accelerate soil erosion of the stream bank by walking up and down the bank.

The WCWA Land Use Committee identified erosion from agricultural lands as a primary concern. HELs in the Spring Creek-Lick Run Watershed are illustrated in Figure 28. These digitized soils will serve as an aid to the SWCD staff when targeting landowners and producers for conservation practices.

Figure 28: Highly Erodible Lands in the Spring Creek-Lick Run Watershed



Tillage Practices

According to the 2002 Cropland Tillage Data from Purdue University, 10% of corn and 72% of soybeans acreage in Clinton County was in no-till or mulch till. No till refers to any direct seeding system including strip preparation, with minimal soil disturbance. Mulch till refers to any tillage system leaving greater than 30% crop residue cover after planting, excluding no-till. No-till and mulch till are often grouped together into conservation tillage.

The low no-till corn numbers can be attributed to the fact that many of the soils within the Spring Creek-Lick Run Watershed are not conducive to no-till farming due to their naturally hydric

conditions. Hydric soils covered by crop residue delays the drying time of soils potentially creating an unsuitable seedbed for spring planting. (Clinton County NRCS, 2001). Table 18 shows an estimation of the percentage of crop acres in no-till, mulch, and conventional tillage practices.

Table 18: Percent of Crop Acres in No-Till, Mulch, and Conventional Tillage Practices

Tillage Practice	Soybeans	Corn
No-Till	49%	5%
Mulch Till	23%	5%
Conventional Till	28%	90%

(Purdue, 2002)

Conservation Buffers

Conservation buffers are vegetated corridors along natural waterways and drainage ditches. Such buffers are an integral part of the form and function of a healthy waterway system. Although the appearance of conservation buffers differs between natural streams and drainage ditches, the functions remain the same - to improve water quality by filtering and trapping sediments and pollutants carried by stormwater; to store large quantities of stormwater and gradually release it to receiving waterways; and to create important aquatic and terrestrial habitats.

Conservation buffers along natural streams consist of a natural and dense network of grasses, shrubs, and trees. Whereas buffers along drainage ditches are swaths of mowed cool season grasses, regularly maintained to prevent the development of woody plants.

The farmers in Clinton County have made significant efforts to reduce the amount of sediment leaving their farms fields through conservation tillage practices however the adoption of conservation buffers has not widespread. Funds are available through the Conservation Reserve Program (CRP) and the Environmental Quality Incentives Program (EQIP) to assist with the implementation of a conservation buffer initiative. These programs function as cost share programs and are accessible through the Clinton County SWCD.

In an effort to determine natural streams and drainage ditches that lacked sufficient conservation buffers, the WCWA conducted a windshield survey of the waterways and carefully reviewed the most recent aerial photography (Purdue, 1999). Sufficient buffer width was determined using a minimum of 20 feet for filter strips (Clinton County SWCD) and 95 feet for riparian corridors (NRCS, 1996).

Of the 16.8 miles of waterways in the Spring Creek-Lick Run Watershed, the WCWA estimated 9.21 miles of natural streams and drainage ditches lacked sufficient conservation buffers (Figure 29). The areas shown in Figure 29 should be field verified to ensure accuracy.

Figure 29: Waterways in the Spring Creek-Lick Run Watershed needing conservation buffers

Livestock Production

Clinton County ranks second in the State for hog production. There are 110 regulated hog facilities or 350,000 finished hogs annually in Clinton County (Census of Agricultural, 1997).

A Confined Animal Feeding Operation (CAFO) is an individual hog operation that has in excess of 600 hogs. These facilities are required, by IAC 16-2-5, to obtain a permit from IDEM's Office of Land Quality. According to IDEM's CAFO records, there are not any regulated hog facilities or CAFOs in the Spring Creek-Lick Run Watershed. There are, however, regulated hog operations just outside of the watershed boundary. Based on the saturation of hog operations in Clinton County and the fact that hog producers do own land in the Spring Creek-Lick Run Watershed, the construction of a regulated hog facility inside the watershed is certainly a possibility.

Clinton County ranks eighty-seventh in the State for cattle production. Both beef and dairy cattle reside in the Spring Creek-Lick Run Watershed. Cattle operations in excess of 300 head are considered a CAFO and required by IAC 16-2-5, to obtain a permit from the IDEM's Office of Land Quality. Based on a review of the IDEM's records, there are not any regulated cattle facilities within the Spring Creek-Lick Run Watershed. The cattle operations in the watershed are below the regulatory threshold level.

There are a number of small (hobby) farms in the central and northern portions of the Spring Creek-Lick Run Watershed with small numbers of horse, sheep, and/or poultry.

Bacteria & Pathogens

Manure, whether applied for crop nutrition or simply the by-product of grazing is a definite water quality concern in the Spring Creek-Lick Run Watershed. The nitrogen and phosphorus that make manure so productive on farm fields and pastureland can create an over-fertilized "soup" when they run off into the water, leading to undesirable algae blooms. These effects are not only unpleasant for recreation and aesthetics, but they also deteriorate the underwater habitat necessary for fish and other aquatic organisms to live.

Aside from the runoff of manure from farm fields and pastureland, many livestock farms within the Spring Creek-Lick Run Watershed allow cattle and horses direct access to the creeks for watering purposes. This direct access creates a definite risk of nutrient loadings to surface waters.

Pasture

Pasture management leads to better weed control, better soil structure, increased productivity over longer periods of time, and healthier animals. It helps the soil absorb excess water, manure, nutrients and other pollutants and ultimately protects water quality by reducing the amount and improving the quality of runoff.

Pastures can be grazed intensively during peak periods of growth, but they need regular attention. Rest periods are critical to proper pasture growth. A grazing rotation that allows 21 to 28 days of regrowth between grazing periods is usually best.

Pasturing too many animals on a given parcel of land or allowing them to graze for too long in the same area reduces plant vigor and compacts soils, reducing absorption capacity and pasture recovery. Overgrazing can lead to additional runoff and a poorer quality of runoff.

It is important to note that horses are especially hard on pastures. They graze plants down to the soil surface, so regrowth takes more time. They do not graze evenly and trample much of the forage area. Facilities with horses should develop pasture

management plans that include controlled grazing and rotation.

2. Sources from Urbanization

A change in land use, especially from field or forest to urban development, has a significant impact on water quality. Not only is the permeability of the soil affected by construction compaction and impervious coverage such as rooftops, driveways, and parking areas but there is an increase of biological and chemical waste from human use. The sources of water quality pollution from urbanization focus on three main topics: human & animal waste, household & yard waste, and development practices.

Human & Animal Waste

Urban sources of *E.coli* bacteria are most commonly associated with point source discharges from municipal wastewater treatment plants and regulated stormwater programs; however, failing septic systems and waste from wildlife and pets are additional contributors of NPS pollution to the Spring Creek-Lick Run Watershed.

Failing Septic Systems

Septic systems can be a safe and effective method for treating wastewater if they are sized, sited, and maintained properly. However, in Clinton County, 96.4% of the soils have severe limitations for conventional septic systems (Frankenberger, 2000).

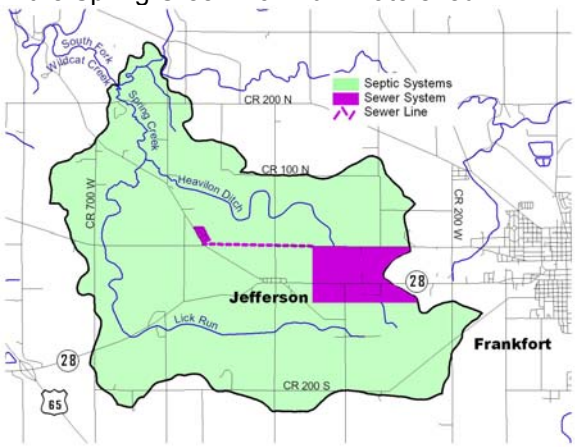
If the tank or absorption field malfunctions or if they are improperly sited, constructed or maintained, nearby wells and surface waters may become contaminated (IDEM, 2002). Some of the potential problems from malfunctioning septic systems include polluted groundwater, bacteria, nutrients, toxic substances, and oxygen consuming wastes.

It has been well documented that in the Town of Jefferson there are approximately 125 septic tanks and failed systems that directly discharge untreated effluent into Heavilon Ditch. Although, 327 IAC 5-1-1.5 specifically states that "point source discharge of sewage treated or untreated, from a dwelling or its associated residential sewage disposal system, to the waters of the state is prohibited", many cities, towns, and county health departments are overwhelmed by the magnitude of the failing septic system problem.

During the planning process for the Spring Creek-Lick Run Watershed Management Plan, stakeholders made many comments regarding instances of failing septic systems or straight pipe discharges. Discussions with staff from the Clinton County Health Department confirmed that failing septic systems are in deed a significant source of water quality problems in the Spring Creek-Lick Run Watershed.

Development in the Spring Creek-Lick Run Watershed is predominantly dependent upon septic systems for wastewater disposal with the exception of the City of Frankfort and the mobile home park on Mulberry-Jefferson (Figure 30).

Figure 30: Approximate areas served by sewer in the Spring Creek Lick Run Watershed



Wildlife and Pet Waste

Wildlife and pet wastes contribute significantly to the numbers of bacteria and organic matter in stormwater runoff.

Habitually, ducks and geese nest in colonies located in trees and bushes around rivers, streams, and lakes. The presence of waterfowl has been shown to result in elevated levels of ammonia, organic nitrogen, and *E.coli* bacteria (USGS 1997). In addition, waterfowl activity can increase sediment loadings by pulling up grasses and sprouts and trampling emergent vegetation along streambanks and shorelines, significantly impacting erosion and sediment.

Recent studies have shown that pet waste is the third or fourth most common source of bacteria in contaminated waters (Watson, 2002). Pet wastes can be controlled through ordinances requiring collection and removal of the waste from curbsides, yards, parks, roadways and other areas where the waste can be washed directly into receiving waters.

Household & Yard Waste

Every home, regardless of size or age, has potential pollution sources that can impact ground and surface water quality. These may include the use, storage and disposal of pesticides, solvents, and petroleum products. In Clinton County, the Wildcat Creek Waste District sponsors a tox-drop and recycling program one day a week for the safe dispose of household hazardous waste. Also, the Purdue Cooperative Extension has created a "Home-A-Syst" program that allows homeowners to conduct a confidential self-assessment of the environmental risks of their home.

Toxic Materials

Proper use, storage, and disposal of household waste such as used motor oil, paints, furniture stains, and mercury thermostats for example are important to prevent contamination of ground and surface water. The Wildcat Creek Waste District has an excellent education and tox-drop program for residents in the Spring Creek-Lick Run Watershed.

Lawn & Garden Practices

Urban activities may create conditions that result in higher-than-normal concentrations of ammonia and phosphorus in water bodies downstream.

While professional lawn and garden chemical applicators receive training and are required to maintain application records, the average homeowner does not. This results often in over-application of lawn and garden chemicals and contributes to significant nutrient loads to urban waterbodies (USGS, 1995).

Yard waste such as grass clippings, leaves, and dead plants are high in organic matter. Yard waste that is piled or dumped on nearby streambank results in:

1. Smothering of the vegetation that is naturally stabilizing the bank and preventing soil erosion, and
2. The decomposition of yard waste in nearby streams can rapidly deplete dissolved oxygen levels of the water affecting aquatic habitats.

The Wildcat Creek Waste District has information on the benefits of composting or mulching yard waste as opposed to disposing of it.

Development Practices & Encroachment

Nationwide, more than 1.5 million acres of land is developed each year (Schueler, 1998). Even through very little of that development is occurring in the Spring Creek-Lick Run Watershed development practices and encroachment directly impact water quality and should to be discussed as a source of pollution. Planning and development practices are effective methods to control not only where development occurs but also how it occurs.

Land Use Planning

Comprehensive Plans, Zoning Ordinances, and Subdivision Control Ordinances are documents that almost every community uses to guide growth and development. These same documents can also be used to effectively protect natural resources and improve water quality.

The Clinton County Plan Commission has done a good job of controlling haphazard and unplanned growth outside of designated urban areas. In the Spring Creek-Lick Run Watershed, the Zoning Ordinance identifies urban growth boundaries around the Town of Jefferson and the City of Frankfort.

Agriculture is recognized as the predominant land use in the county and non-farm related development and public services including sewers are discouraged on prime agricultural soils. While this has worked well to preserve farmland, it has had the reverse affect on natural areas in the County and the Spring Creek-Lick Run Watershed. River corridors and wooded areas have become targets for residential development. Increased development and depletion of natural drainage and filtration systems will have an adverse effect on water quality.

Erosion & Sediment Control

Soil erosion from construction activities can contribute to filling of nearby waterways affecting water quality, aquatic habitats and recreational opportunities. There are a number of best management practices (BMP) including silt fencing, straw bales, and turf seeding, that when installed and maintained properly, can successfully limit sediment from leaving the site.

Streambank erosion is a natural process. However in developing areas, the process is accelerated by alterations to the streams natural hydrology such as more frequent and larger stormwater flows. Sedimentation from streambank erosion is compounded by increased imperviousness, loss of floodplain, and loss of riparian corridor.

Riparian Corridors

Interchangeably called streamside forests, riparian corridors are an integral part of the stream ecosystem. These areas consist of large overstory trees, smaller woody shrubs, and herbaceous groundcover. Riparian corridors naturally function to filter and trap sediments and pollutants; anchor the streambank to prevent erosion; and shade the creek making it more habitable for aquatic species.

The Land Use Committee reviewed aerial photography, photos, and notes from the windshield survey to determine that approximately 45% of the waterways in the Spring Creek-Lick Run Watershed are sufficiently covered with at least 95 feet of mature vegetation. Riparian buffers provide a valuable water quality benefit and should be protected from encroaching development or neighboring land uses and stretches lacking sufficient cover should be reforested.

Ideally, the corridor is divided into three distinct zones. Zone 1 is 15' minimum in width and composed of undisturbed forest; Zone 2 is 60' minimum in width and contains a managed forest; and Zone 3 is 20' minimum in width and serves to control the velocity and volume of stormwater runoff (NRCS, 1996).

Impervious Areas

Many activities associated with urban or residential land uses can generate NPS pollution. In most urbanized areas, large quantities of impervious or hard surfaces such as roads, driveways, parking lots, and rooftops, cause an increase in stormwater runoff resulting in flash floods and streambank erosion. As a result, managing NPS pollution in urban areas typically includes practices for managing water quantity, as well as water quality. In urban environments, NPS pollutants typically include *E.coli* bacteria, sediments, nutrients, heavy metals, oil and grease, and pesticides.

The amount of imperviousness in a watershed can be directly related to the health of the receiving streams (Schueler, 2000). The Center for Watershed Protection has developed a classification system for managing headwater streams based on the percent of impervious land in the watershed (Table 30). According to the Center for Watershed Protection, watersheds with more than 10% imperviousness are considered impaired and poise an additional challenge to achieve water quality standards.

In the Spring Creek-Lick Run Watershed there are only 78 acres of land classified as high and low density urban. In order to calculate imperviousness, the WCWA assumed that three-quarters of high density urban and half of low density urban is impervious. The estimated imperviousness of the Spring Creek-Lick Run Watershed is 0.5%.

According to Table 19, the streams in the Spring Creek-Lick Run Watershed fall into the most protective category known as "Sensitive Streams". In order to prevent further degradation of these waterways, the Center for Watershed Protection suggests strict zoning, site impervious restrictions, stream buffers, and stormwater practices (Schueler, 2000).

Table 19: Stream Classification based on Imperviousness in Watershed

Urban Stream Classification	**Sensitive Stream (0-10% Impervious)**	**Impacted Stream (11-25% Impervious)**	**Non-supporting Stream (26-100% Impervious)**
Channel stability	Stable	Unstable	Highly Unstable
Water quality	Good	Fair	Fair-Poor
Stream biodiversity	Good-Excellent	Fair-Good	Poor
Resource objective	Protect biodiversity and channel stability	Maintain critical elements of stream quality	Minimize downstream pollutant loads
Water quality objectives	Sediment and temperature	Nutrient and metal loads	Control bacteria
Stormwater practice selection factors	Secondary environmental impacts	Removal efficiency	Removal efficiency
Land use controls	Watershed-wide	Site limits	Additional infill and redevelopment
Monitoring and enforcement	GIS mapping of impervious areas and biomonitoring	GIS mapping of impervious areas and biomonitoring	Pollutant load modeling
Development rights	Transferred out	None	Transferred in
Riparian buffers	Widest buffer network	Average bufferwidth	Greenways

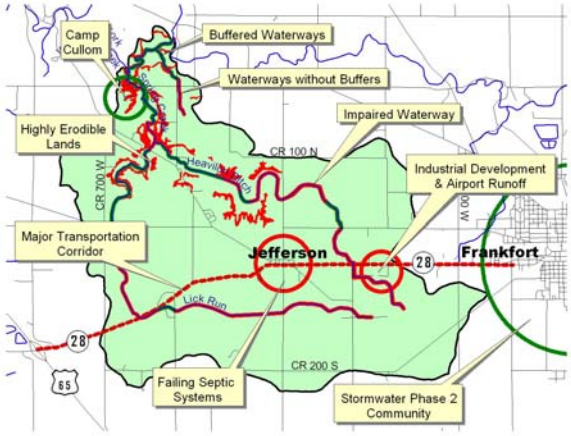
(Schueler, 2000)

PRIORIZATION OF WATER QUALITY PROBLEMS

The WCWA carefully reviewed the most recent water quality data, trends in land development, and comments from the watershed stakeholders to identify critical areas and establish priorities for the Spring Creek-Lick Run Watershed Management Plan.

The WCWA decided to identify critical areas that benefited water quality as well as those known or suspected of causing water quality impairments (Figure 31). Critical areas that benefit water quality should be protected and enhanced whereas those resulting in water quality impairments should be mitigated. These issues will be discussed in more detail in the Goals and Decisions section of this Plan.

Figure 31: Critical areas in the Spring Creek-Lick Run Watershed



Beneficial Critical Areas

Camp Cullom is a 100-acre natural area located along Spring Creek. The large undeveloped areas along the creek allow for natural infiltration and cleansing of stormwater before draining into Spring Creek. Buffers along streams and drainage ditches are important for filtering sediments and pollutants from stormwater. There are 7.4 miles (45%) of the stream in the Spring Creek-Lick Run Watershed that have a good riparian buffer. Riparian buffers (streamside forests) are important to water quality since they naturally filter and trap sediments and pollutants carried by overland flow; prevent erosion by stabilizing the streambank; shade and cool the stream creating better aquatic habitats; and although not related to water quality, create more aesthetic environs for human enjoyment. These areas should be protected from further encroachment of agricultural practices or urban development.

The City of Frankfort has been designated as a Stormwater Phase II community through the Municipal Separate Storm Sewer System Program (MS4). The program requires designated communities to apply and obtain a NPDES permit for stormwater discharge; develop a stormwater management plan; and implement BMPs and control measures for stormwater. The benefit of the MS4 program to the Spring Creek-Lick Run Watershed will be improved water quality, better land development and planning, as well as, public participation and education about water quality issues.

Critical Areas as a Pollutant Source

There are two stretches of waterways in the Spring Creek-Lick Run Watershed listed on the IDEM's 303(d) list of impaired streams. These are Heavilon Ditch and the South Fork of Wildcat Creek. The 303(d) List identifies waterways that do not or are not expected to meet water quality standards. In order to achieve compliance with water quality standards, with the assistance of watershed stakeholders, the IDEM will develop TMDLs for these waterways (IDEM, 2002).

Heavilon Ditch is listed for Ammonia, DO, *E.coli*, and organic enrichment. The South Fork of Wildcat Creek is listed for cyanide and *E.coli*. The TMDL development is

scheduled for 2003-2008 and 2013-2018 respectively. IDEM has begun the TMDL development process on the Heavilon Ditch.

There are approximately 9.4 miles of drainage ditches and natural streams with insufficient vegetative cover or buffer. Wooded buffers or riparian corridors along natural streams and grassed filter strips along drainage ditches are important for water quality. Both systems filter and trap sediments and pollutants as well as stabilizing the bank and prevent erosion. In natural streams, aquatic species also benefit from the cooling effect of large shade trees.

The Clinton County SWCD has applied for a Section 319 grant to increase participation in the existing Conservation Reserve Program (CRP) in the Spring Creek-Lick Run Watershed. The program requires landowners to create a 20-foot wide filter strip along drainage ditches in exchange for a 50% cost-share and 40% incentive match ($86-$162/acre/year varies depending on soil type) for a ten-year period.

Clinton County does not have a comprehensive program for cleaning drainage ditches and as a result, the ditches are cleaned on an "as needed" basis. Although filter strips would reduce the volume of sediment from filling the ditch, regular maintenance of the ditches by both the County Surveyor and landowner is needed.

The issue of failing septic systems and direct discharge of effluent into the Heavilon Ditch from the Town of Jefferson has been well documented. According to the Clinton County Sanitarian, only 29 of the 125 residents in Jefferson have permitted septic systems.

In an effort to secure state and federal funds, the County Health Department has just completed an income survey of residents in the Town of Jefferson. By the end of 2003, the County Commissioners hope to complete a study that identifies the various options to address the septic issue in Jefferson – most likely extending a sewer line from the City of Frankfort. The Town is aware of the issue and although they are concerned about what the outcome may cost, the majority of residents are in support of conducting the study.

State Route 28 is a major transportation corridor from I-65 through the Town of Jefferson into the City of Frankfort. In 2004, the INDOT plans to increase this stretch of SR 28 from 2 to 4 lanes. The Clinton County Plan Commission has hired HNTB in Indianapolis to complete a corridor study for SR 28. The intention is to develop SR 28 as a gateway into Frankfort and provide light to heavy industrial space for businesses. As far as water quality is concerned, since SR 28 is a major transportation route for trucks, the incidences of an accidental spill is increased. Stormwater runoff may carry more vehicular fluids, debris, and road salt.

Large industrial developments like those along SR 28 in Frankfort have more impervious surface (parking lots, rooftops, etc.) and more stormwater runoff than less developed areas. Untreated stormwater runoff from impervious areas carries potential pollutants such as vehicular fluids, glass, rubber, and road salt into nearby waterways.

Stormwater runoff also carries pesticides, nutrients, and sediments from neighboring agricultural practices. The Spring Creek-Lick Run Watershed contains some of the best soil in the State and as a result is

intensively farmed. The soils in much of the farmed portion of the Spring Creek-Lick Run Watershed are not conducive to conservation tillage or no-till practices because of their heavy clay content. To overcome loss of soil from erosion, some farmers have opted to till their fields in the spring as opposed to the fall.

Although significant improvements have been made in tillage practices and the storage and application of pesticides and nutrients, runoff and erosion is inevitable. Areas with highly erodible soils are of particular concern. The Clinton County SWCD works closely with landowners to provide educational materials, training, and access to funds to interested landowners.

Land use is directly related to water quality, especially with when land is converted from field or forest to urban development. The Clinton County Zoning Ordinance does an excellent job of protecting prime agricultural lands from non-farm related development but unfortunately has forced residential development into the river corridors and wooded areas of the County. This is evident in the Spring Creek-Lick Run Watershed where the majority of single-family development is in the northern portion of the watershed along the Spring Creek.

The priorities identified here are the foundation for the Goals and Management Measures listed in the Goals and Decision section of this Plan.

III. Goals & Decisions

Setting realistic and measurable goals is key to the successful implementation of this Plan. A goal is the desired change or outcome as a result of the watershed planning effort. Depending on the magnitude of the problem, goals may be general, specific, long-term, or short-term. The goals in this Plan specify a target amount and timeframe for improving water quality. The IDEM suggests watershed groups focus on developing goals, management measures, action plans, resources, and legal matters as part of the watershed planning process.

According to the IDEM, management measures describe what needs to be controlled or changed in order to achieve the goal. The timeline or milestones to accomplish the individual management measure is identified in an action plan. In order to successfully implement the Plan, resources such as people, programs, and money need to be identified. It is important to have the support of individuals identified as resources to successfully execute the goals of the Plan. Successful implementation may require some legal matters such as obtaining permits, purchasing easements or the adoption of an ordinance (IDEM, 2002).

The WCWA developed the following goals and management measures for the Spring Creek-Lick Run Watershed Management Plan based on the known sources of pollution. These include:

1. Agricultural Practices

a) Row Crop (nutrients, pesticides, erosion/sediment, tillage practices, conservation buffers)
b) Livestock (bacteria/pathogens, pasture)

2. Urban Development

a) Human & Animal Waste (failing septic systems and wildlife/pet waste)
b) Household & Yard Waste (toxic substances and lawn/garden practices)
c) Development Practices & Encroachment (erosion/sediment control, streamside forests, impervious areas)

Table 20: Relationship of land use, pollutant source, and resulting goals.

Land Use	Pollutant Source	Resulting Goal		
Agriculture	Row Crop	Agriculture	Waterways	Education
	Livestock			
Urban	Human & Animal Waste	Septic Systems		
	Household & Yard Waste			
	Development Practices	Land Use Planning		

The WCWA decided to focus on goals that improve water quality in the Spring Creek-Lick Run Watershed based on education, septic systems, agriculture, land use planning, and natural and constructed waterways. Table 20 illustrates the relationship of land use, source of pollution to the resulting goal. The following goals were identified and agreed upon by the WCWA.

Education Goal: Improve water quality in the Spring Creek-Lick Run Watershed through education and outreach efforts that focus on changing stakeholders' habits and behaviors.

Septic System Goal: Improve water quality in the Spring Creek-Lick Run Watershed through proper planning, installation, and long-term maintenance of septic systems.

Agriculture Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better agricultural practices and management programs.

Land Use Planning Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better land use planning and land development practices.

Natural & Constructed Waterway Goal: Improve water quality in the Spring Creek-Lick Run Watershed through better protection and maintenance of streams and drainage ditches.

The successful implementation of this Plan requires the continued partnership of the general membership of the WCWA as well as the Clinton County SWCDs, Health Departments, Plan Commissions, and Drainage Board.

The following tables identify goals, management measures, action plan, resources/cost, and legal matters for addressing education, septic systems, agriculture, land use planning, and waterways issues in the Spring Creek-Lick Run Watershed. Cost is identified as "Low", "Moderate" and "High". Low is defined as those items costing less than $1,000; moderate between $1,001 and $10,000; and high for those items costing more than $10,000. These are only estimates based on discussions with professionals in education, sanitation, agriculture, land use planning, and streambank restoration.

Education Goal: Improve water quality in the Spring Creek-Lick Run Watershed through education and outreach efforts that focus on changing stakeholders' habits and behaviors.

Table 21: Education Management Practices

Management Measures	Action Plan	Resources/Cost	Legal Matters
Survey 15% of watershed stakeholders to determine awareness of water quality issues. Fifteen percent is consider a statistically rigorous sample size.	• 2004 – Determine initial awareness by distributing a survey using the Internet, newspapers, and newsletters. • 2006 – Determine change in awareness by distributing a survey using the Internet, newspapers, and newsletters. • 2006 – Modify education and outreach efforts (especially in areas that are not showing improvement) until desired improvement obtained.	• WCWA, Wildcat Guardians, SWCD, websites and newspapers for survey distribution. • Low cost	
Submit quarterly articles and updates to the newspapers and community organizations in the Spring Creek-Lick Run Watershed.	• Quarterly submissions (January, April, July, and October) of each year.	• Low cost	
Maintain communication with watershed stakeholders through Quarterly mailings, meetings, and newsletters.	• Quarterly mailings, meetings, and newsletter (January, April, July, and October) of each year.	• Low cost	
Prepare educational displays and participate in at least four community events annually. These may include: Clinton County fair, SWCD annual meeting, AgStravaganza, Wildcat Guardian festival, etc.	• Identify community events that will provide the best results to improve awareness of water quality issues in the watershed. • Maintain a display that can easily be updated or manipulated to emphasis an issue pertinent to the targeted audience (i.e. impacts of residential land use such as car washing, dog waste, and lawn care at the county fair).	• List of events and contact person. • Display board, laminated images, brochures, flyers, etc. • Low cost	

Management Measures	Action Plan	Resources/Cost	Legal Matters
Conduct annual field days and workshops. Partner with local government, businesses, and organizations to maximize impact.	• 2002 – Conducted a Developers' Workshop in May 2002 to address land development and conservation practices. • 2003 – Conducted a family friendly environmental education workshop with games and activities about water quality. • 2004 – Conduct a septic system maintenance workshop to improve operation of system resulting in improved water quality. • 2005 – Conduct a buffer initiative workshop to improve land for filtration and storage along natural stream and drainage ditches. • 2006 – Conduct a workshop for crop and livestock producers addressing nutrient and pest management and manure management to reduce water quality concerns. • 2007 – Conduct a backyard conservation workshop to build residential wildlife habitats, plant native species, and reduce the use of lawn and garden chemicals.	• Cooperation of local government, businesses, and organizations (level of participation may dependent on workshop topic). • Fundraising, sponsorship, and/or grant writing to cover cost of hosting individual workshops. • 319 Grant. • Low cost (each workshop)	
Increase participation in Wildcat Creek Waste District Tox-Drop and Recycling Program.	• Include pollution prevention information in published or distributed materials. • Enforce illegal dumping ordinance.	• Copies of Wildcat Creek Waste District Recycling Guides. • Tox-Drop • Low cost	

Septic System Goal: Improve water quality in the Spring Creek-Lick Run Watershed through proper planning, installation, and long-term maintenance of septic systems.

Table 22: Septic System Management Practices

Management Measures	Action Plan	Resources/Cost	Legal Matters
Prepare and distribute an educational brochure about proper septic system operation and maintenance.	• 2003 – Identify landowners and distribute brochure. Deliver materials in person if possible.	• SWCD, Health Department, WCWA, Wildcat Guardians, Plan Commission • 319 Grant • Low cost	
Conduct a septic system maintenance workshop to improve operation of system resulting in improved water quality.	• 2004 – Locate one or more landowners that are willing to have their septic system become a demonstration site.	• SWCD, Health Department, WCWA, Wildcat Guardians, Plan Commission. • Cooperative landowner • 319 Grant • Low cost	
Increase detection and enforcement of illicit discharge by 50%.	• 2004 – Review records to determine exact number of failing septic systems. • 2005 – Conduct volunteer dye testing of septic systems to identify failing systems and illicit connections. • 2006 – Require residents to provide proof that their septic system has been cleaned and inspected every five years by a licensed inspector/hauler. • 2007 – Build GIS database to track operational status of septic systems.	• Health Departments. • Secure additional funds to build GIS database. • Moderate-High cost	County Health Department and Commissioners will need to decide how to enforce proof of cleaning and inspection.

Management Measures	Action Plan	Resources/Cost	Legal Matters
Improve planning process to minimize impacts of septic systems on water quality.	• 2003 – Ensure that Health Department participates in development review and approval process. • 2004 – Include language in updated Comprehensive Plan for that addresses potential impacts of septic systems on water quality. • 2005 – Explore feasibility of implementing a Septic Maintenance District. • 2006 – Provide economic incentives to homeowners to repair or replace aging septic systems. • 2007 – Build a GIS layer that identifies land suitable for septic systems.	• Health Department and Planning Commission. • Secure additional funds to provide economic incentives for updating failing septic systems. • Moderate-High cost	Legal, financial, and leadership support from municipality to establish a Septic Maintenance District.
Compile comprehensive list of all funding sources available for septic system improvement projects.	• 2004 – Research all available private and public sources of funds for addressing septic systems issues including sewer extensions and private WWTP.	• Low cost	

Agriculture Goal: Improve the water quality of the Spring Creek-Lick Run Watershed through better agricultural practices and management programs.

Table 23: Agriculture Management Practices

Management Measures	Action Plan	Resources/Cost	Legal Matters
Increase nutrient management and pest management practices among crop producers.	• 2004 – Identify landowners and evaluate current manure, nutrient, and /or pest management practices. • 2006 – Conduct a workshop for crop and livestock producers addressing manure, nutrient, and pest management.	• SWCD, NRCS, DNR, and Purdue Extension staff. • CORE 4 • EQIP funds • 319 Grant • Low cost	
Increase the number of acres in no-till or mulch till practices by 5% for corn and 10% for soybeans. Est. Load Reductions: 310 ton/yr Sediment 473 lb/yr Phosphorus 945 lb/yr Nitrogen (Load reductions determined using NRCS RUSLE worksheets, see Appendix for more information)	• Provide educational materials to farmers at Clinton County SWCD annual meeting, county fair, and AgStravaganza. • 2005 – Research and implement incentive programs to improve participation.	• SWCD, NRCS, DNR, and Purdue Extension staff. • CORE 4 • EQIP funds. • 319 Grant • Low cost	
Improve pasture management techniques including rotational grazing and fencing livestock from waterways.	• 2004 – Create educational materials for livestock landowners about pasture management and limiting access to waterways. • 2005 – Secure funds to fence livestock from waterways and provide alternative watering mechanisms.	• SWCD, NRCS, DNR, and Purdue Extension staff • EQIP funds • 319 Grant • Low cost	

Management Measures	Action Plan	Resources/Cost	Legal Matters
Establish 5.9 miles of buffer along natural streams and artificial drainage ditches. A total of 9.4 miles needs buffered. Est. Load Reductions: 49 ton/yr Sediment 150 lb/yr Phosphorus 278 lb/yr Nitrogen (Load reductions determined using NRCS RUSLE worksheets, see Appendix for more information)	• 2005 – Conduct a buffer initiative workshop to improve land for filtration and storage along natural stream and drainage ditches. • 2007 – Use GIS to maintain a graphical database of the installation of buffers. Use the images to illustrate the success of this effort and display at local events.	• SWCD, NRCS, Surveyor, and Drainage Board. • CRP and EQIP funds • GIS • 319 Grant • Moderate-High cost	• Indiana Filter Strip Program
Secure funding for livestock and crop producers that may need financial assistance or assistance implementing appropriate measure.	• 2006 – Research and secure grant opportunities and incentives to assist livestock and crop producers implement programs. • 2007 – Research, build support, and draft Tax Incremental Funding (TIF) District language.	• Low cost	Adoption of TIF District will require the support and approval of the Clinton County Commissioners.

Land Use Planning Goal: Improve the water quality of Spring Creek-Lick Run Watershed through better land use planning and land development practices.

Table 24: Land Use Planning Management Practices

Management Measures	Action Plan	Resources/Cost	Legal Matters
Update current Comprehensive Plan, Zoning Ordinance, and Subdivision Control Ordinance to address water quality issues including: • Erosion and sediment control ordinance • Stormwater and drainage requirements • Floodplain management • Wetland protection • Riparian corridor protection • Tree preservation/protection • Setbacks and buffer protection • Drainage (ROW) easements • Overlay zoning districts • Treatment of sewage (septic/sewer) • Limit impervious areas • Conservation design • Flexible development standards • Sanitation ordinance	• 2004 – Participate in the update of the Comprehensive Plan for Clinton County. • 2005 – Participate in the update of the Zoning Ordinance and Subdivision Control Ordinance for Clinton County.	• List of definitions, suggested language, and model ordinances. • Cooperation from Plan Commission. • Moderate cost	Approval and adoption of updated planning documents.
Improve water quality through effective storage and treatment of urban, suburban, and rural stormwater runoff including: • On-site stormwater treatment • Constructed wetlands • Detention/retention ponds • Infiltration basins/trenches • Vegetated filters strips/swales • Stream buffers • Limit impervious areas • Road salting and storage facility • Tree conservation/protection	• 2005 – Participate in the update of the Zoning Ordinance and Subdivision Control Ordinance for Clinton County. • 2005 – Review drainage ordinance and make recommendations for improvement for Clinton County Drainage Board.	• List of BMPs • Cooperation from Plan Commission, Surveyor, and Drainage Board • Moderate cost	Approval and adoption of updated planning documents and ordinances. Enforcement of existing fines for construction violations.

Management Measures	Action Plan	Resources/Cost	Legal Matters
Minimize soil erosion and sediment in waterways with better construction management and practices including: • Education for developers and decision-makers. • Regular inspection of construction sites • Enforce fines for construction violations • Proper installation and maintenance of erosion and sediment controls • Require removed topsoil to be replaced • Tree preservation/protection • Temporary seeding/mulching • Stabilization and vegetation of streambanks	• 2004 – Create a handbook to distribute to contractors, developers, and decision-makers identifying appropriate BMPs. • 2004 – Train building inspectors to conduct erosion and sediment control review.	• List of BMPs • Cooperation of contractors, developers, and landowners. • Support from decision-makers and community leaders. • Support from local Builders Association. • Funds to create a Development Handbook. • Train inspectors • Moderate cost	Enforcement of existing fines for construction violations.
Use geographic information system (GIS) and an updated soil information to establish future land use and zoning districts based on appropriateness for: • Development • Agriculture • Wetland • Flood storage • Forest	• 2007 – Support the development of a countywide GIS database.	• Funding to develop GIS • Digital soil, property, and drainage layers • Cooperation from Plan Commission. • High cost	Approval and adoption of the updated planning documents.
Determine short-term and long-term impacts of development through Purdue's SedSpec and L-THIA (Long-Term Hydrologic Impact Assessment) programs to identify: • Runoff rates • Erosion problems • BMP effectiveness • Impact of past and proposed development	• 2007 – Support land planning and GIS research at Purdue.	• GIS and digital layers. • Permission to use Purdue programs • Cooperation from Plan Commission. • High cost	

Natural & Constructed Waterway Goal: Improve the water quality of Spring Creek-Lick Run Watershed through better protection and maintenance of streams and drainage ditches.

Table 25: Waterway Management Practices

Management Measures	Action Plan	Resources/Cost	Legal Matters
Establish 2.4 miles of riparian buffer along natural streams (2.4 miles total needed). Est. Load Reductions: 22 ton/yr Sediment 67 lb/yr Phosphorus 124 lb/yr Nitrogen (Load reductions determined using NRCS RUSLE worksheets, see Appendix for more information)	• 2005 – Identify landowners and stretches of natural waterways that need buffered. • 2005 – Conduct a buffer initiative workshop to improve land for filtration and storage along natural waterways. • 2007 – Build partnership with SWCD, landowner, and WCWA to implement riparian corridor program.	• Landowners, NRCS, SWCD, and Wildcat Foundation. • 319 Grant • Low cost	Riparian corridors protected in perpetuity through volunteer participation, conservation easement, or out-right purchase. The Wildcat Foundation or WCWA could hold easements.
Establish 3.5 miles of filter strips along drainage ditches (7 miles total needed) Est. Load Reductions: 31 ton/yr Sediment 94 lb/yr Phosphorus 174 lb/yr Nitrogen (Load reductions determined using NRCS RUSLE worksheets, see Appendix for more information)	• 2005 – Identify landowners and stretches of drainage ditches that need buffered. • 2005 – Conduct a buffer initiative workshop to improve land for filtration and storage along drainage ditches. • 2007 – Build partnership with SWCD, landowner, and WCWA to implement filter strips program.	• Landowners, SWCD, NRCS • CRP and EQIP funds • 319 Grant • Low cost	
Write a Greenways Plan to establish healthy riparian/aquatic buffers along Spring Creek-Lick Run Watershed and tributaries.	• 2004 – Work with landowners, planners, SWCD staff, and Wildcat Foundation to develop a Greenways Plan.	• Support and interest of landowners, SWCD, and planning departments. • Secure additional funds to pay for study writing, and distribution of plan. • Moderate cost	Language for Comprehensive Plan and Zoning Ordinance would have to be approved and adopted by Plan Commission.

Management Measures	Action Plan	Resources/Cost	Legal Matters
Promote streambank stabilization techniques that utilize a combination of vegetation, soil bioengineering, and structural systems.	• 2004 – Inventory waterways for erosion problems. • 2005 – Distribute educational materials to landowners on how to be good neighbors to streams. • 2007 – Identify funding sources to assist with stabilizing eroded banks.	• Landowners, SWCD, NRCS, and DNR. • High cost	
Establish watercourse protection overlay zone (or ordinance) to protect the land adjacent to the natural waterways or drainage ditches.	• 2005 – Include watercourse overlay zone in the updated Zoning Ordinance for Clinton County. • 2007 – Expand language used in Zoning Ordinance to create a separate Watercourse Protection Ordinance.	• Plan Commission • High cost	Ordinances need to be approved and adopted by Plan Commission before implementation.
Modify design and maintenance of drainage ditches to reduce the amount of sediment being deposited into natural waterways.	• 2005 – Establish a comprehensive schedule for regular maintenance of drainage ditches • 2006 – Create a design and maintenance manual for drainage ditches.	• SWCD, NRCS, Surveyor, and Drainage Board • Moderate cost	Both schedule and manual will need to be approved and adopted by Drainage Board.

IV. Measuring Progress

In June 2003, the funding for the Section 319 grant that made this Watershed Management Plan possible will end. The development of this Plan has created awareness and momentum in the Spring Creek-Lick Run Watershed. The WCWA, with the cooperation of the Clinton County SWCDs, Health Departments, Drainage Boards, and Plan Commissions as well as the Wildcat Guardians, intends to implement as much of this Plan as possible.

The timeline identified by the Goals and Decisions section of this Plan extends over a 5-year period through 2007. Milestones have been set to ensure that the Plan is implemented in an orderly and systematic process.

This section identifies the four key components, as identified by the IDEM, to successfully implement the goals of this Plan. These include: progress indicators, monitoring progress, operation and maintenance of installed practices, and evaluation of the Plan (IDEM, 2002).

Much of the implementation of the goals and decisions identified in this Plan will require funding from outside sources. The Appendix contains a detailed list of possible funding opportunities for implementing this Plan.

Progress Indicators

Progress indicators are used to identify milestones or benchmarks to gauge the progress, and success, of the watershed planning effort. Indicators may be administrative such as language added to an ordinance, or programmatic, indicating the total acreage added to a filter strip program. Assigning dates to progress indicators is an effective method to ensuring that the implementation of the Plan stays on target.

Monitoring Progress

Monitoring describes how the indicators will be evaluated to determine their success at achieving the goals of this Plan. Monitoring progress can be general or very specific such as increasing the number of participants at quarterly meetings or improving water quality by a specific amount. Maintaining a list of successful programs and policies as a result of this Plan will help keep the momentum this watershed planning effort.

Operation & Maintenance of Installed Practices

Proper operation and maintenance of installed practices is essential to long-term water quality improvement. Much of the land in the Spring Creek-Lick Run Watershed is privately owned and BMPs installed will be done, as they are currently installed, as either a cost-share or through an incentive program. Structural BMPs that will be installed as a result of this Plan, such as filter strips, conservation tillage practices, and streambank stabilization will directly benefit the landowner. The landowner will assume responsibility for the ensuring that the BMPs are properly maintained. Non-structural BMPs such

as zoning ordinances and educational programs will be operated and maintained by the Plan Commission.

Plan Evaluation

The WCWA Advisory Board in partnership with the Clinton County SWCD will be responsible for the regular review and update of the Spring Creek-Lick Run Watershed Management Plan. This Plan should be evaluated on an annual basis to document and celebrate progress; assess effectiveness of efforts; modify activities, if needed, to better target water quality issues; and keep implementation of the Plan on track. The Plan should be revised as needed to better meet the needs of the watershed stakeholders and meet water quality goals.

A summary of the goals, indicators, and monitoring progress of indicators can be found in Table 26.

Table 26: Indicators and Monitoring Progress

Priority	Goal	Indicators & Monitoring Progress
#1	**Education Goal:** Improve water quality in the Spring Creek-Lick Run Watershed through education and outreach efforts that focus on changing stakeholders' habits and behaviors.	• **Indicators:** Conduct surveys on an annual basis to determine increased awareness of water quality issues among watershed stakeholders. Conduct annual workshops on septic systems (2004), buffer initiative (2005), crop & livestock producers (2006), and backyard conservation (2007). Maintain regular communication with stakeholders through quarterly newspaper articles, newsletters, and meetings. • **Monitoring Progress:** Increased participation in quarterly meetings and membership to the WCWA.
#2	**Septic System Goal:** Improve water quality in the Spring Creek-Lick Run Watershed through proper planning, installation, and long-term maintenance of septic systems.	• **Indicators:** Conduct workshop on septic systems (2004). Compile records of failing septic systems (2004). Research funding opportunities and incentives to improve operation of private septic systems (2004). Conduct volunteer dye testing (2005). Improve planning process and permit process. Require residents to provide proof of regular maintenance of septic systems (2006). • **Monitoring Progress:** Reduce illicit discharge from failing septic systems by 50%.
#3	**Agriculture Goal:** Improve water quality in the Spring Creek-Lick Run Watershed through better agricultural practices and management programs.	• **Indicators:** Conduct workshops on buffers (2005) and nutrient and pest management (2006). Prepare a display booth for SWCD annual meetings and County Fairs. Educate livestock owners and secure funds to fence livestock from waterways (2005). Research funding and incentives to increase participation in programs (2005). Implement a TIF District for crop and livestock producers (2007). • **Monitoring Progress:** Increased participation of farmers at WCWA meetings. Adoption of a TIF District (2007).
#4	**Land Use Planning Goal:** Improve water quality in the Spring Creek-Lick Run Watershed through better land use planning and land development practices.	• **Indicators:** Distribution of development handbook (2004). Erosion and sediment control training for building inspectors (2004). Recommendations to Drainage Ordinances (2005). Develop land use layers in GIS (2007). • **Monitoring Progress:** Water quality issues addressed in updated Comprehensive Plans (2004) and Zoning Ordinances (2005).
#5	**Natural & Constructed Waterway Goal:** Improve water quality in the Spring Creek-Lick Run Watershed through better protection and maintenance of streams and drainage ditches.	• **Indicators:** Conduct a buffer workshop (2005). Develop a Greenways Plan (2004). Inventory and document locations of erosion (2004). Distribute educational materials (2005). Distribute a manual for cleaning drainage ditches (2006). Identify funding to assist landowners (2007). • **Monitoring Progress:** Increased participation in filter strip program. Adoption of an ordinance (2007) or overlay zone (2005).

V. Practical Matters

Contact Information

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Plan Distribution

Full color, printer-friendly copy of the Spring Creek-Lick Run Watershed Management Plan is available via the Wildcat Creek Watershed web page at www.wildcatalliance.org

Calendar of Events & Activities

See Table 27.

Acronyms

Table 28: Acronyms

Acronym Used	Represents
BOD	Biochemical Oxygen Demand
BMP	Best Management Practice
CSO	Combined Sewer Overflow
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
FCA	Fish Consumption Advisory
GAP	Gap Analysis Program
HUC	Hydrologic Unit Code
IASWCD	Indiana Association of Soil & Water Conservation Districts
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
ISDH	Indiana State Health Department
SCLR	Spring Creek-Lick Run Watershed
NPS	Nonpoint Source Pollution
NRCS	Natural Resource Conservation Service
SWCD	Soil & Water Conservation District
USDA	U.S. Department of Agriculture
UWEP	Upper Wabash Ecosystem Project
WCWA	Wildcat Creek Watershed Alliance
WRAS	Watershed Restoration Action Strategy

Table 27: Timeline of Events and Activities

Year	Goal	Activity
Quarterly	Education	• Submit articles to the local media. • Conduct quarterly mailings and meetings. • Distribute a quarterly newsletter.
Annual	Education Agriculture	• Participate in the Clinton County Fair. • Participate in the Clinton County SWCD annual meeting.
2002	Education	• Conduct Developers' Workshop. • Design webpage. • Design and distribute brochures.
2003	Education	• Secure funds to produce and distribute 1000 copies of a multi-media CD. • Conduct family friendly environmental education workshop.
2004	Education Septic Agriculture Land Use Waterways	• Determine a statistically rigorous sample size for the watershed and an acceptable percentage for survey response as the base number of responses for comparison. • Determine initial awareness by distributing a survey using the Internet, newspapers, and newsletters. • Conduct a workshop on septic system maintenance. • Review records to determine exact number of failing septic systems. • Research all available private and public funds to address septic system issues. • Include language in updated Comprehensive Plan regarding septic systems. • Identify landowners and evaluate current manure/nutrient/pest management practices. • Create educational materials for landowners with livestock for pasture management. • Create a BMP handbook for contractors, developers, and decision-makers. • Train building inspectors to conduct erosion and sediment control review. • Participate in update of Comprehensive Plan. • Work with landowners, planners, SWCD staff, and Wildcat Foundation to develop a Greenways Plan. • Inventory waterways for erosion problems.
2005	Septic Agriculture Land Use Waterways	• Conduct volunteer dye testing of septic systems to identify failing systems and illicit connections. • Explore feasibility of implementing a Septic Maintenance District. • Research and implement incentive programs to improve participation in conservation tillage practices. • Conduct a buffer initiative workshop to improve streams and drainage ditches. • Secure funds to fence livestock from waterways. • Participate in the update of the Zoning Ordinance and Subdivision Control Ordinance. • Review drainage ordinance and make recommendations for improvement for Drainage Board. • Identify landowners and stretches of natural waterways and drainage ditches that need buffered. • Conduct a buffer initiative workshop to improve streams and drainage ditches. • Distribute educational materials to landowners on how to be good neighbors to streams. • Include watercourse overlay zone in the updated Zoning Ordinance. • Establish a comprehensive schedule for regular maintenance of drainage ditches.

Year	Goal	Activity
2006	Education	• Determine change in awareness by distributing a survey using the Internet, newspapers, and newsletters. • Modify education and outreach efforts (especially in areas that are not showing improvement).
	Septic	• Require residents to provide proof of cleaning and inspection. • Provide economic incentives to homeowners to repair septic systems. • Work with Clinton County and Clinton County Health Departments to standardize training and protocol.
	Agriculture	• Conduct a workshop for crop and livestock producers addressing manure, nutrient, and pest management. • Research and secure grant opportunities and incentives to assist livestock and crop producers implement programs.
	Waterways	• Create a design and maintenance manual for drainage ditches.
2007	Education	• Conduct workshop on Backyard Conservation
	Septic	• Build GIS database to track operational status of septic systems. • Construct an educational demonstration site for data collection on alternative septic systems.
	Agriculture	• Research, build support, and draft TIF District language for adoption by County Commissioners. • Use GIS to maintain a graphical database of the installation of buffers.
	Land Use	• Support the development of a countywide GIS. • Support land planning and GIS research at Purdue.
	Waterways	• Implement riparian corridor and filter strip programs. • Identify funding sources to assist with stabilizing eroded banks. • Expand language used in Zoning Ordinance to create a separate Watercourse Protection Ordinance

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Appendices

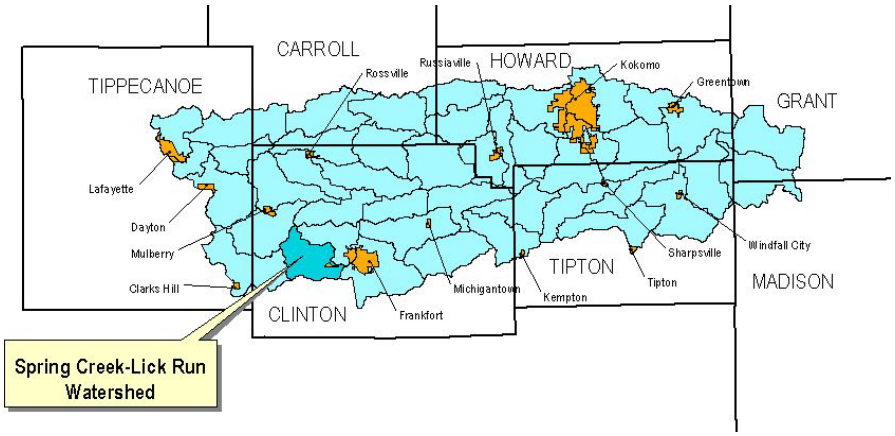
Advisory Board Member	Affiliation
Jack Rhoda, President	Tippecanoe County & Lafayette Middle School
Keith Morgan, Vice President & Funding Chair	Indiana-American Water Company
Jolene Rule, Treasurer	Wildcat Guardians
Wayne Williams, Secretary	Clinton County Commissioners
Glen Boise, Land Use Committee Chair	Kokomo-Clinton County Plan Commission
Tony Bonaccorsi, Education Committee Chair	Daimler Chrysler
Bill Hillman, Technical Committee Chair	Delphi Delco
Garry Hill	Wildcat Guardians
Ralph Kirkpatrick	Grant County SWCD
Joseph O'Donnell	Carroll County NRCS
Tony Vyn	Purdue University Agronomy Department
Chuck Weis	Wildcat Creek Foundation
Vacant	Clinton County

Education & Outreach Committee Member	Affiliation
Tony Bonaccorsi, Chair	Daimler Chrysler
Carrie Kinsey, Chair	Wildcat Guardians
Judy Baird	Clinton County SWCD
Stacy Baugh	Frankfort High School
Brett Canaday	Madison County SWCD
Linda Eastman	Tippecanoe County SWCD
Sarah Garrison	Clinton County SWCD
Leah Harden	Clinton County SWCD
Rhonda Hicks	Carroll County SWCD
Mary Hull	Grant County SWCD
Jack Rhoda	Lafayette Middle School
Jolene Rule	Wildcat Guardians
Kenli Schaaf	Purdue University, Forestry Department
Angie Tilton	Tippecanoe SWCD
Chuck Weis	Wildcat Creek Foundation

Funding Committee Member	Affiliation
Keith Morgan, Chair	Indiana-American Water Company
Jack Rhoda	City Council, City of Lafayette

Land Use Committee Member	Affiliation
Glen Boise, Chair	Kokomo-Clinton County Plan Commission
Dan Bloodgood	Clinton County Health Department
Sarah Garrison	Clinton County SWCD
Garry Hill	Wildcat Guardians
Matt Jarvis	Carroll County USDA/NRCS
Greg Lake	Clinton County Health Department
Ben Lambeck	Clinton County SWCD
Rollin Machtmes	Clinton County Extension Office
Ed McCabe	Farmcraft Services, Inc.
Robert McCormick	Purdue University, Planning with POWER
Clark McCreedy	IDNR
Bob McKean	Clinton County Homebuilders Association
Nolan Pyke	Clinton County Health Department
Sarah Reymann	RCAP
Jack Rhoda	City Council, City of Lafayette
Kenli Schaaf	Purdue University, Forestry Department
Rae Schnapp	Wildcat Creek Foundation
Wayne Williams	Clinton County Commissioners

Technical Committee Member	Affiliation
Bill Hillman, Chair	Delphi Delco
Michelle Arvin	Clinton County Health Department
Dale Beal	Delphi Delco
Jeff Blankenberger	Delphi Delco
Tony Bonaccorsi	Daimler Chrysler
Jennifer Bratthauar	IDNR
Sarah Brichford	Wildcat Guardians
Sarah Garrison	Clinton County SWCD
Sue Gerlach	IDNR
Leah Harden	Clinton County SWCD
Garry Hill	Wildcat Guardians
Mike Jones	Western High School
Ralph Kirkpatrick	Grant County SWCD
Amber Larimore	Tippecanoe County Health Department
Monty Maggert	Eastern High School
John Maher	Delphi Delco
Jeff Myers	
Rick Parsons	Kokomo High School
Gail Peas	Clinton County NRCS
Nolan Pyke	Clinton County Health Department
Jack Rhoda	Lafayette Middle School
Mark Rowe	Wildcat Guardians
Rae Schnapp	Wildcat Creek Foundation
Jennifer Sobecki	Purdue University
David Wagner	Millennium Environmental
Wayne West	



Spring Creek-Lick Run Watershed Meeting

Wildcat Creek Watershed Alliance, Inc.

Quarterly Stakeholder Meeting Summary

October 8, 2002 @ 7:00PM
Frankfort Community Library
Frankfort, Indiana

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1. **Welcome and Introductions**

   Jack Rhoda welcomed everyone to the Spring Creek-Lick Run Watershed meeting. Jack expressed his gratitude to those in attendance, approximately half of those in attendance where new to the Wildcat Creek watershed planning effort. Jack reviewed the Mission Statement of the Wildcat Creek Watershed Alliance and acknowledged members of the Advisory Board that were in attendance.

2. **Spring Creek-Lick Run Watershed Presentation**

   Sheila McKinley gave a brief overview and purpose of the meeting. The purpose of the meeting was to 1) introduce landowners and residents in the Spring Creek-Lick Run watershed to the Alliance, 2) to share the land use and water quality information collected to date on the Spring Creek, Lick Run and Heavilon Ditch, and 3) to gather additional information from landowners and residents – the local experts of the Spring Creek-Lick Run watershed. Sheila presented background information on the Wildcat Creek Watershed Alliance; it's mission, organizational structure, committees, and funding. Sheila showed an illustration of the 44 subwatersheds in the Wildcat Creek Watershed and explained that the Spring Creek-Lick Run watershed was selected as a targeted watershed since it contained headwater streams and was unable to support aquatic life and recreational use (according to IDEM 305(b) report).

   Wade Amos presented a colored land use map of the Spring Creek-Lick Run watershed and using several examples, illustrated how all land uses affect water quality. Wade identified several land use issues in the Spring Creek-Lick Run

watershed including: tillage practices, fertilizer/pesticide use, lack of streamside forests, soil erosion, failing septic systems, livestock/manure management, development/construction practices, and increased impervious surface.

Wade also presented water quality impairment issues in the Spring Creek-Lick Run watershed. Wade highlighted the findings of the 2001 Fish Consumption Advisory and the 2002 303(d) Impaired Stream List. These reports specify stretches of waterways and their associated water quality impairment. Wade provided some information on the cause and possible source of pollution in the Spring Creek-Lick Run watershed. These included: 1) E.coli from failing septic systems, animal waste, and plant effluent, 2) Ammonia from untreated septic effluent, decaying organisms, and bacterial decomposition of animal wastes, 3) Dissolved Oxygen (DO) from untreated septic effluent, decomposition of organic matter, and excess nutrient loading that lead to increased algal respiration, and 4) Organic Enrichment from untreated septic effluent and decaying organisms.

Sheila McKinley explained how the Spring Creek-Lick Run watershed planning exercise would work and asked the larger group to break into two smaller groups.

3. **Spring Creek-Lick Run Watershed Planning Exercise**
The group of participants broke into two smaller groups. Wade Amos and Zach Bishton facilitated one group and Sheila McKinley facilitated the second group. Using a large flipchart, markers, and a large map of the Spring Creek-Lick Run watershed, the facilitators initiated discussion of water quality issues in the watershed:

Water Quality Issues

Positive:

- Plans to study septic issue in Jefferson ($40,000 for study due in Spring 2003) possibly extend sewer from Frankfort or consider own WWTP
- Mobile home park has own sewer line to Frankfort
- Frito Lay own WWTP before discharging into Heavilon Ditch
- Camp Cullom – preserved open space, well-wooded stream corridor
- Open, undeveloped areas
- Agricultural practices improved last 30 years, greater awareness among farmers

Negative:

- Failing septic systems/straight pipe discharge in Jefferson and elsewhere
- Lack of trees along creek esp. southern portion (intensive agriculture)
- Lack of grassed waterways, filter strips, etc.
- Overspray manure, soil erosion, tillage practices
- Fertilizer application of residential homeowners
- Large lot development along Jefferson-Mulberry blacktop
- Amoco oil pipe under creek (recently buried deeper due to downcutting)
- Industrial runoff and development
- Golf Course (18-hole)
- Confined Animal Feeding Operations (CAFO) edge of watershed
- SR 28 bypass with limited access, may increase traffic and encourage development in watershed
- Drainage pipes to Heavilon Ditch
- More sediment in Heavilon Ditch
- Less wildlife (beavers) in Heavilon Ditch

- Changes in land use
- Poor drainage/flooding esp. SE Jefferson
- Abandoned wells may become contaminated if not properly sealed

Identify Critical Areas for Water Quality

Positive:

- Wooded areas, wooded stream corridors (north)
- Camp Cullom (Nature Preserve)
- Frankfort Storm Water Phase II community (mandate to address water quality)
- WWTP (mobile home, industrial development with sewers)

Negative:

- Confined Animal Feeding Operations (CAFO)
- Little or no stream cover (south)
- Industrial development pressure (Airport, Frankfort, and SR 28)
- Heavilon Ditch (303(d) list)
- Jefferson (failing septic systems)

Recommendations for Improvement & Enhancement

Stream Buffers:

- Encourage landowners to participate in buffer program
- Concerns with respect to maintenance/management of stream corridor
- More natural corridor has more water quality benefits
- Encourage grassed waterways (no mow, native grasses)
- Important to protect since residential development is forced to wooded areas due to agricultural zoning restrictions
- Increase State setback for septic systems (25')
- Encourage participation in CRP/Wetland Reserve Program
- Prohibit filling of floodplain (need for water quality/quantity)

Agriculture:

- Continue to protect prime agricultural land with zoning
- Continue to improve tillage practices (no till – 55% county no till soybeans) south of watershed no till won't work due to soil characteristics (10% yield reduction)
- Recognize farmers that are good stewards

Planning/Urban Sprawl:

- Require treatment of storm water before leaves site
- Develop a plan for use along SR 28 (currently County has no plan)
- Better design for retention/detention ponds (wetland edges, better filtration, wildlife habitat, more aesthetic)
- Require older industry to meet new storm water detention standards (no grandfathering of old practices)
- Support septic/sewer study for Jefferson
- Protect Camp Cullom with wooded buffer
- Require non-sewer development to have sufficient space for second septic system should the first fail
- Consider a tax credit for individuals who upgrade septic system

Education/Outreach:

- Better understanding of impacts of septic systems on water quality (especially impacts for resale)
- Consider tax program for county to loan money to make improvements to land/water quality

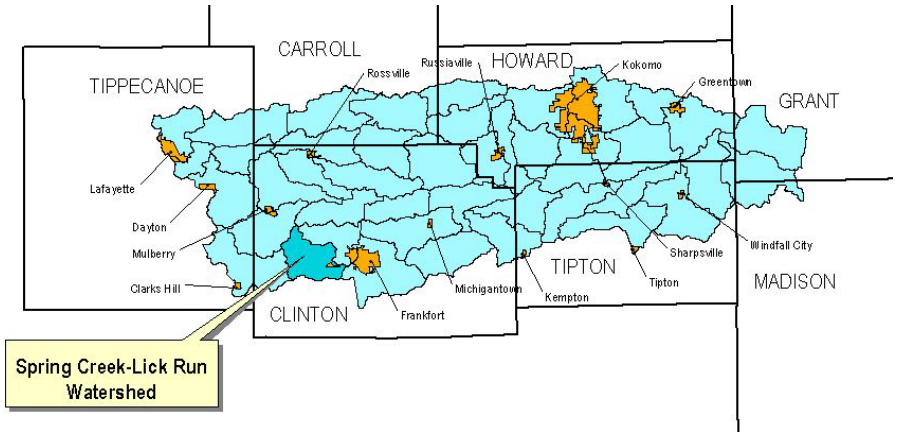
- Landowners fear expense of upgrading septic system if required to attach new sewers
- Develop a pamphlet that explains the 303(d) list and distribute to residents/business owning property along listed streams
- Determine exact source of contaminants (industry, agriculture, residential, natural)
- More sampling needed (with community involvement) especially Spring and Fall for macro-invertebrate collection

4. Group Discussion

The two small groups reconvened into one large group and the facilitators reported highlights from the small group discussion (see lists above).

5. Conclusion and Adjourn

At 9:00 pm, Jack Rhoda thanked everyone for coming and asked that they continue to stay involved with the Wildcat Creek Watershed Alliance by adding their name to the mailing list or joining one of the committees.



Spring Creek-Lick Run Watershed Meeting

Wildcat Creek Watershed Alliance, Inc.

Quarterly Stakeholder Meeting Summary

April 8, 2003 @ 7:00PM
Frankfort Neighborhood Center
Frankfort, Indiana

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1. **Welcome and Introductions**

   Jack Rhoda welcomed everyone to the Spring Creek-Lick Run Watershed meeting – especially the many new faces in the crowd. Jack reviewed the Mission Statement of the Wildcat Creek Watershed Alliance and acknowledged members of the Advisory Board that were in attendance.

2. **Presentation of the Draft Spring Creek-Lick Run Watershed Management Plan**

   Sheila McKinley gave a brief overview for the meeting including 1) welcome & introductions, 2) background on the Wildcat Creek Watershed Alliance, 3) highlights of the draft Spring Creek-Lick Run Watershed Management Plan, and 4) to collect comments and suggestions from the stakeholders in the watershed.

   Sheila presented background information on the Wildcat Creek Watershed Alliance; it's mission, organizational structure, committees, and funding. Sheila showed an illustration of the 44 subwatershed in the Wildcat Creek Watershed and explained that the Spring Creek-Lick Run Watershed was selected as a targeted watershed since it contained headwater streams and was unable to support aquatic life and recreational use (according to IDEM 305(b) report). Sheila presented some background information on the Spring Creek-Lick Run Watershed including location, drainage area, waterways, and land use.

   Sheila highlighted the findings of the 1998 Upper Wabash River Basin Report, 2000 Water Quality Report 2001 Fish Consumption Advisory, and the 2002 303(d) Impaired Stream List. These reports specify stretches of waterways and their associated water quality impairment. Sheila provided some information on the cause

and possible source of pollution in the Spring Creek-Lick Run watershed. These included: 1) E.coli from failing septic systems, animal waste, and plant effluent, 2) Ammonia from untreated septic effluent, decaying organisms, and bacterial decomposition of animal wastes, 3) Dissolved Oxygen (DO) from untreated septic effluent, decomposition of organic matter, and excess nutrient loading that lead to increased algal respiration, and 4) Organic Enrichment from untreated septic effluent and decaying organisms.

Sheila noted that the Spring Creek-Lick Run Watershed Management Plan focuses on the two predominant land uses in the watershed:

1) Agriculture Practices
    - Crop Production – nutrients, pesticides, erosion & sedimentation, tillage practices, and conservation buffers
    - Livestock Production – pasture management and bacteria
2) Urban Development
    - Human and Animal Waste – failing septic systems and wildlife and pet waste
    - Household and Yard Waste – household hazardous waste and lawn and garden chemicals
    - Development Practices and Encroachment – land use planning, erosion and sediment control, riparian corridors, and impervious surfaces

Sheila reviewed an illustrative map that depicted a number of critical areas in the Spring Creek-Lick Run Watershed. Sheila discussed each of these as either a benefit to water quality (Camp Cullom, buffered waterways, and Frankfort as a Stormwater Phase 2 community) or a potential source of pollution (waterways needing a buffer, impaired streams, runoff from industrial development, widening and volume of traffic on SR 28, highly erodible lands, and failing septic systems in Jefferson).

Sheila reviewed highlights from the goals and decisions developed as part of this planning process. These goals were the result of discussions among the Wildcat Creek Watershed Alliance Committees and Advisory Boards members as well as the Stakeholder Meeting held in Frankfort in October 2002. These goals focus on education, septic systems, agricultural practices, land use planning, and natural and constructed waterways. Sheila noted that the Clinton County SWCD has applied for a Section 319 grant to implement many of the septic and agricultural goals.

1) Education
    - Survey stakeholders to determine awareness
    - Submit quarterly updates to newspaper
    - Maintain quarterly mailings, meetings, and newsletters
    - Conduct workshops
    - Participate in community events
2) Septic Systems
    - Conduct septic system workshop
    - Improve detection and enforcement of illicit discharge
    - Improve planning process to minimize impact
    - Compile list of funding source
3) Agriculture
    - Increase participation in pest and nutrient management programs

- Increase number of acres in conservation tillage
- Improve pasture management techniques
- Establish buffers on streams and drainage ditches
- Explore Tax Incremental Funding (TIF) District

4) Land Use Planning
   - Include water quality issues in planning documents
   - Minimize soil erosion from construction
   - Require better storage and filtration of stormwater runoff
   - Establish zoning districts based on soils map
5) Natural & Constructed Waterways
   - Buffer streams and drainage ditches
   - Prepare a greenways plan
   - Stabilize streambanks using combination of vegetation and structural systems
   - Establish a Watercourse Protection Ordinance
   - Modify maintenance procedures for ditches

Sheila reminded attendees of the meeting that the Spring Creek-Lick Run Watershed Management Plan is available online at www.wildcatalliance.org or at the Frankfort Public Library. Sheila stated that the Plan is only a draft and the Wildcat Creek Watershed Alliance welcomed any comments that the watershed stakeholders may have. Comments will be accepted through May 30, 2003.

3. Comments & Suggestions

Sheila McKinley asked the audience if there were any comments or suggestions based on the presentation.

Question: Who is Goode & Associates, Inc. and how we were hired as the Watershed Coordinator?
Answer: Sheila explained that Goode & Associates, Inc. is an environmental consulting firm from Indianapolis. The firm specialized in watershed coordination with expertise in public policy, water quality biology, land use planning, and agriculture. Jack Rhoda added that the Wildcat Creek Watershed Alliance selected Goode & Associates, Inc. through an interview process. Jack added that the Wildcat Creek Watershed Alliance has been very pleased with the quality of work produced to date.

Question: What kind of regulatory teeth does this document have?
Answer: Sheila explained that the intention of the Watershed Management Plan is not regulatory or enforcement. The purpose is to bring stakeholders together and build awareness about water quality issues. The goals developed in this Plan will be implemented through the SWCD, Plan Commission, and Health Department as part of their day-to-day activities.

Question: Of the 500+ members of the Wildcat Creek Watershed Alliance, how many are farmers?
Answer: Sheila explained that the membership does not have to specify what their livelihood is but the Wildcat Creek Watershed Alliance has excellent participation from the SWCD, NRCS, and DNR staff that work daily with farmers. Wayne Williams commented that he personally contacted forty or more farmers in the Spring Creek-Lick Run Watershed and invited them to attend a special meeting to discuss

water quality and agricultural issues however only 3 or 4 showed up. Sheila added that the Wildcat Creek Watershed Alliance depends on the local media and regular mailings to the membership to distribute information.

Question: How valid is the water quality data collected by IDEM?
Answer: Dan Bloodgood offered to field this question. Dan stated that much of IDEM's data is limited to sampling only on one day, which doesn't necessarily provide the best results. Through the Health Department, Dan has collected numerous water samples and analyzed them. The Hoosier Riverwatch also conducts water quality data but this is a volunteer based program that does not have any of their samples analyzed by a lab. Sheila added that IDEM has begun their TMDL process for the Wildcat Creek Watershed and will begin fieldwork in the Spring Creek-Lick Run Watershed in the fall of 2003. The community will be invited to participate in the TMDL development process. Sheila also noted that the Wildcat Creek Watershed Alliance applied for Section 319 grant funds for a Regional Water Quality Monitoring Program but were denied since IDEM felt that there had already been enough water quality data collected in the Wildcat Creek Watershed.

4. **Conclusion and Adjourn**
   Jack Rhoda thanked everyone for coming and asked that they continue to stay involved with the Wildcat Creek Watershed Alliance by adding their name to the mailing list or joining one of the committees. He invited attendees to stick around for a while if they would like to discuss any of these issues further. Interested attendees continued various discussions in small groups for about another 30-45 minutes.

Load Reduction Calculations

Load reductions were calculated using the Revised Universal Soil Loss Equation (RUSLE). RUSLE is a conservation-planning tool that predicts annual average soil loss. It is a mathematical equation that considers climate, soil, topography, and land use. RUSLE is commonly used by federal, state, and local governments to prevent excessive soil erosion. Values input into the equation directly represent the conditions of the site under a particular condition. The Howard and Tipton County SWCD and NRCS staff provided input data used in the following tables.

1. Load Reduction Worksheet for Agricultural Field Practices
(Adapted from NRCS worksheet available at
http://www.in.gov/idem/water/planbr/wsm/loadredest.xls)
Project ARN: 00-199
Watershed: Spring Creek-Lick Run

RUSLE	Before Treatment	After Treatment
Rainfall-Runoff Erosivity Factor (R)	150	150
Soil Erodibility Factor (K)	0.34	0.34
Length-Slope Factor (LS)	0.06	0.06
Cover Management Factor (C)	0.19	0.02
Support Practice Factor (P)	2	1
Predicted Ave. Annual Soil Loss (ton/ac/yr)	2.00	0.2
Contributing Area (Ac)	364.11	364.11

Gross soil texture: Silt (silt, silty, clay loan, and silt loam)

Estimated Load Reductions from Agricultural Field Practices

Sediment Load Reduction (ton/yr)	310
Phosphorus Load Reduction (lb/yr)	473
Nitrogen Load Reduction (lb/yr)	945

2. Load Reduction Worksheet for Filter Strips & Riparian Buffers Combined
(Adapted from NRCS worksheet available at
http://www.in.gov/idem/water/planbr/wsm/loadredest.xls)
Project ARN: 00-199
Watershed: Spring Creek-Lick Run

RUSLE	Before Treatment	After Treatment
Rainfall-Runoff Erosivity Factor (R)	150	150
Soil Erodibility Factor (K)	0.34	0.34
Length-Slope Factor (LS)	0.06	0.06
Cover Management Factor (C)	0.19	0.02
Support Practice Factor (P)	2	1
Predicted Ave. Annual Soil Loss (ton/ac/yr)	2.00	0.2
Contributing Area (Ac)	939.23	939.23

Gross soil texture: Silt (silt, silty, clay loan, and silt loam)

Estimated Load Reductions from Filter Strips

Sediment Load Reduction (ton/yr)	49
Phosphorus Load Reduction (lb/yr)	150
Nitrogen Load Reduction (lb/yr)	278

3. Load Reduction Worksheet for Riparian Buffers Only
(Adapted from NRCS worksheet available at
http://www.in.gov/idem/water/planbr/wsm/loadredest.xls)
Project ARN: 00-199
Watershed: Spring Creek-Lick Run

RUSLE	Before Treatment	After Treatment
Rainfall-Runoff Erosivity Factor (R)	150	150
Soil Erodibility Factor (K)	0.34	0.34
Length-Slope Factor (LS)	0.06	0.06
Cover Management Factor (C)	0.19	0.02
Support Practice Factor (P)	2	1
Predicted Ave. Annual Soil Loss (ton/ac/yr)	2.00	0.2
Contributing Area (Ac)	382.10	382.10

Gross soil texture: Silt (silt, silty, clay loan, and silt loam)

Estimated Load Reductions from Agricultural Field Practices

Sediment Load Reduction (ton/yr)	22
Phosphorus Load Reduction (lb/yr)	67
Nitrogen Load Reduction (lb/yr)	124

4. Load Reduction Worksheet for Filter Strips Only
(Adapted from NRCS worksheet available at
http://www.in.gov/idem/water/planbr/wsm/loadredest.xls)
Project ARN: 00-199
Watershed: Spring Creek-Lick Run

RUSLE	Before Treatment	After Treatment
Rainfall-Runoff Erosivity Factor (R)	150	150
Soil Erodibility Factor (K)	0.34	0.34
Length-Slope Factor (LS)	0.06	0.06
Cover Management Factor (C)	0.19	0.02
Support Practice Factor (P)	2	1
Predicted Ave. Annual Soil Loss (ton/ac/yr)	2.00	0.2
Contributing Area (Ac)	557.20	557.20

Gross soil texture: Silt (silt, silty, clay loan, and silt loam)

Estimated Load Reductions from Agricultural Field Practices

Sediment Load Reduction (ton/yr)	31
Phosphorus Load Reduction (lb/yr)	94
Nitrogen Load Reduction (lb/yr)	174

WCWA Funding Opportunities

Prepared by Goode & Associates, Inc. August 2002

Non Point Source Implementation Grants (319)
Administered: EPA/IDEM
Summary: Projects to control nonpoint source pollution are eligible. Funds can be used for TMDL development and implementation, watershed management plans, education programs and more.
Eligibility: Non-profit groups, universities, municipalities, etc.
How Much: Twenty Five percent match with a maximum award of $112,500.
Application Deadline: October 1
Web Pages/Links: http://www.in.gov/idem/water/planbr/wsm/index.html

State Revolving Fund Program
Administered: EPA/IDEM
Summary: Low interest loans designed to assist communities with wastewater and drinking water needs. Projects include traditional wastewater treatment methods as well as nonpoint source management programs.
Eligibility: Cities, towns, regional sewer districts.
How Much: Fixed low interest loans (20yr) are provided to recipients (80% Federal : 20% State)
Deadlines: February 22
Web Pages/Links: http://www.in.gov/idem/water/fasb/srflp.html

Water Quality Cooperative Agreements (104 (b)(3))
Administered: EPA
Summary: Funding for programs developing, implementing, and demonstrating new concepts or requirements that will improve the effectiveness of NPDES programs (CSO and Stormwater).
Eligibility: Non-profit organizations
How Much: There is a 5% in-kind or cash match required for 104(b)(3).
Application Deadline: End of January
Web Pages/Links: http://www.in.gov/idem/water/planbr/wsm/Section104b3_main.html
http://aspe.os.dhhs.gov/cfda/p66463.htm

Wetlands Protection Development Grants Program
Administered: EPA
Summary: Provides financial assistance to support wetlands programs/projects or augmentation and enhancement of existing programs.
Eligibility: States, Local Governments
How Much: 1999 grants ranged from $20,000 - +$594,000. Federal non-federal cost share is 75% - 25%.
Application Deadline: December 14
Web Pages/Links:
http://www.epa.gov/r5water/wshednps/pdf/r5wetlandgrants2002_info.pdf
http://www.epa.gov/owow/wetlands/2002grant/

Environmental Education Program
Administered: EPA
Summary: To support environmental education programs and projects.
Eligibility: Non-profit organizations
Application Deadlines: Mid to late November
How Much: $25,000, or less. Federal non-federal cost share of 75%-25%.
Web Pages/Links: http://www.epa.gov/Region5/enved/grants.html

Section 205(j) Water Quality Management Planning Program
Administered: IDEM
Summary: Grants are for water quality projects such as, studies of non-point source pollution impacts, nonagricultural NPS mapping, and the development and implementation of watershed management projects.
Eligibility: Available to municipalities, counties, conservation districts, drainage districts, and other public organizations. For-profit entities, non-profit organizations, private associations, and individuals are NOT eligible for this funding.
Application Deadline: January 31
How Much: Funds can be requested for up to $100,000 and no match is required.
Web Pages/Links: http://www.in.gov/idem/water/planbr/wsm/205jgeninfo.pdf
http://www.in.gov/idem/water/planbr/wsm/Section205j_main.html

Environmental Quality Incentives Program
Administered: USDA/NRCS
Summary: Funding for projects to treat identified soil, water and related natural resource concerns on eligible land. Technical, financial and educational support are available. Half of which is targeted towards livestock related concerns and half of it toward general conservation.
Eligibility: Non-federal landowners engaged in livestock operations or agricultural productions.
How Much: Up to $10,000 per person per year and up to $50,000 over the length of a contract. Federal cost share support of up to 75%.
Application Deadline:
Web Pages/Links: http://www.nrcs.usda.gov/programs/eqip/

Conservation Reserve Program
Administered: USDA/ Indiana Farm Service Agency
Summary: Funding for projects to control soil erosion. The goal of the program is to give farmers incentives to convert highly erodible land or other sensitive areas into vegetative cover such as native grasses, trees, and riparian buffers.
Eligibility: Agricultural land owners
How Much: Annual rental payments for the term of a multi year contract of up to $50,000 per fiscal year. Funds are also available for up to 50% of cost of establishing vegetative cover.
Application Deadline: Continual sing up period
Web Pages/Links: http://www.fsa.usda.gov/dafp/cepd/crp.htm

Wetland Reserve Program
Administered: USDA/NRCS
Summary: Program provides technical and financial assistance to land owners restoring marginal agricultural land to wetland. Easements range from 10-30 years. Landowners retain ownership.
Eligibility: Land owners who have owned their land for at least 12 months.
How Much: NRCS easement and restoration payments range from 75% - 100%
Application Deadline: Applications are always accepted.
Web pages and Links: http://www.nhq.nrcs.usda.gov/PROGRAMS/wrp/

Wildlife Habitat Incentive Program
Administered: USDA/NRCS
Summary: Cost share and technical assistance to develop and improve wildlife habitat on private land.
Eligibility: Private landowners who are agricultural producers are eligible
How Much: 75% Federal Cost Share
Application Deadline: Continual Sign Up
Web Pages/Links: http://www.nhq.nrcs.usda.gov/PROGRAMS/whip/

Conservation Security Program
Administered: USDA/NRCS
Summary: Provides incentive payments for maintaining and increasing farm and ranch stewardship practices on working lands. The program promotes conservation and improvements to soil, water, and air quality.
Eligibility: Participation in the program stipulates that land practices must achieve resource and environmental benefits. Removal of land from production is not required.
How Much: 75% federal reimbursement on conservation practice chosen, with potential for additional assistance.
Application Deadline:
Web Pages/Links: http://www.extension.iastate.edu/Publications/FM1872B.pdf

Emergency Watershed Protection Program
Administered: USDA/NRCS
Summary: The program is set up to respond to natural disaster induced emergencies. The project must be economically and environmentally justifiable.
Eligibility: Any land on floodplains that has been impaired within the last 12 months is eligible for funding, but landowners must be represented by a project sponsor, who must be a public agency.
How Much: NRCS may bear up to 75 percent of the construction cost of emergency measures. The remaining 25percent must come from local sources and can be in the form of cash or in-kind services.
Application Deadline: All applications must be submitted within 10 days of the disaster for exigency situations and within 60 days of the disaster for nonexigency situations
Web Pages/Links: http://www.nrcs.usda.gov/programs/ewp/ewp.html

SARE Producer Grant Program
Administered: USDA
Summary: Grants for farm projects such as erosion and runoff control that are economically viable, environmentally sound, and socially responsible.
Eligibility: States and non-profit organizations.
Application Deadline: Mid July
How Much: Awards range from $2,000 - $15,000
Web Pages/Links: http://www.sare.org/ncrsare/prod.htm

Soil and Water Conservation Assistance
Administered: USDA/NRCS
Summary: Cost share program available to farmers and ranchers addressing threats to soil, water, and related natural resources, including, grazing land, wetlands, and wildlife habitat.
Eligibility: Land owners and operators not in EQIP/WRP/CRP priority areas
How Much: The federal cost share will cover up to 75 percent of the cost of an eligible practice.
Application Deadline: Continual sign up
Web Pages/Links: http://www.nrcs.usda.gov.programs/swca/swca.info.html

Resource Conservation and Development Program
Summary: Technical assistance is available for the planning and installation of approved projects specified in RC&D area plans, for land conservation, water management, community development, and environmental enhancement projects.
Eligibility: Land must be in RC&D area.
How Much: Cost share of up to 25% of the total cost of a project, not to exceed $50,000
Application Deadline: Continual sign up
Web Pages/Links: http://www.nrcs.usda.gov/programs/swca/

Forest Legacy Program
Administered: USDA Forest Service
Summary: Designed to encourage the protection of privately owned forest lands. The program encourages and supports acquisition of conservation easements. Landowners are required to prepare a multiple resource management plan for the land as part of the conservation easement acquisition.
Eligibility: Private forest landowners
How Much: Federal government may fund up to 75% of program costs, with at least 25% coming from private, state or local sources.
Application Deadline: January 31, for priority but applications are accepted anytime.
Web Pages/Links: http://www.fs.fed.us/spf/coop/flp.htm

Forest Land Enhancement Program
Administered: USDA/NRCS
Summary: The program provides cost-share support for non-industrial private forest landowners to help them develop and implement Forest Stewardship Plans.
Eligibility: Non-industrial private forest land owners
How Much: Landowners are reimbursed for up to 75% of approved expenses, with a maximum of $10,000 per year per landowner. In exchange, the landowner agrees to maintain and protect FLEP funded practices for a minimum of 10 years.
Application Deadline:
Web Pages/Links: http://www.pinchot.org/pic/farmbill/CScompare.htm
http://www.usda.gov/farmbill/forestry_fb.html

Coastal Wetlands Planning, Protection, and Restoration Act
Administered: U.S Fish and Wildlife Service
Summary: Funds can be used for acquisition of interests in coastal lands or waters, and for restoration, enhancement, or management of coastal wetland ecosystems.
Eligibility: All states bordering coastal areas including the Great Lakes
How Much: Federal cost share of up to 50%.
Application Date: June 8th
Web Page/Links: http://www.epa.gov/owow/watershed/wacademy/fund/coastalwet.html

North American Wetlands Conservation Act Grants
Administered: U.S Fish and Wildlife Service
Summary: Provides matching grants to private or public organizations or to individuals who have developed partnerships to carry out wetlands conservation projects including acquisition, enhancement, and restoration in the United States, Canada, and Mexico.
Eligibility: Public or private, profit or non-profit agencies.
How Much: Cost share must be at a 1:1 federal to non-federal ratio.
Application Deadline: March 23 and July 6
Web Page/Links: http://northamerican.fws.gov/NAWCA/grants.htm
http://www.nws.usace.army.mil/pm/cw/planning.cfm

Partners for Fish and Wildlife Program
Administered: U.S. Fish and Wildlife Service
Summary: Provides financial and technical assistance to private landowners through voluntary cooperative agreements. Priority projects include restoration of degraded wetlands, streams, and riparian areas.
Eligibility: Private landowners
How Much: Dollar for dollar federal to non-federal match.
Web Pages/Links: http://partners.fws.gov/pdfs/partnersfs.pdf

Planning Assistance to States Program
Administered: U.S. Army Corps of Engineers
Summary: Funding assistance for preparation of comprehensive plans for development, utilization, and conservation of water and related land resources. Recent projects include water quality and conservation projects.
Eligibility: Non Federal entities
How Much: One to one federal to non-federal cost share, with annual allotments per state not to exceed $500,000 per year.
Application Deadline: No deadline
Web Pages and Links: http://www.cfda.gov/public/viewprog.asp?progid=250

Project Modifications for Improvement of the Environment
Administered: U.S. Army Corps of Engineers
Summary: Used to restore habitat and improve habitat that has been impacted by existing Corps projects.
Eligibility: States and non-governmental groups
How Much: 75% - 25% federal non-federal cost share.
Application Deadlines: Continual sign up
Web Pages and Links: http://www.swg.usace.army.mil/pe-p/projmod.asp

Aquatic Ecosystems Restoration
Administered: U.S. Army Corps of Engineers
Summary: Funds can be used for restoration and protection of aquatic habitat and water quality in lakes, rivers, and streams without any connection to existing Corps projects.
Eligibility: State and non-governmental groups.
How Much: 65% 35% federal non-federal cost share.
Application Deadline: Submit request for study at any time.
Web Pages and Links:
http://www.mvp.usace.army.mil/enviro_protection/aqua_eco_rstor/

Lake and River Enhancement Program
Administered: Indiana DNR
Summary: Funding to reduce inflow of sediments and nutrients into lakes and rivers. Eligible projects include water quality monitoring and watershed projects.
Eligibility: Local entities, land planners, and development organizations.
How Much: Financial assistance of up to $100,000 is available. Program also provides up to 80% cost share of approved watershed land treatment practices.
Application Deadline:
Web Pages and Links: http://www.in.gov/dnr/soilcons/pdfs/lare.pdf
http://www.in.gov/dnr/soilcons

Urban Forest Conservation Grants
Administered: Indiana DNR
Summary: Projects that help to improve and protect trees and associated resources in urban areas.
Eligibility: Municipalities, non-profit organizations
How Much: One to one matches ranging from $2,000 to $20,000
Web Pages and Links:
http://www.state.in.us./dnr/outdoor/planning/scorp/dnrresourcemanual.pdf

Hometown Indiana Grant Program
Administered: DNR
Summary: Provides grants for acquisition and or development of recreation sites and facilities, historic preservation and forestry.
Eligibility: Municipal corporations with a five year park and recreation master plan.
How Much: One to one state match of funds ranging from $10,000 - $200,000.
Web Pages and Links: http://www.in.gov/dnr/outdoor/grants/hometown.html

Classified Wildlife Habitat Program
Administered: Indiana DNR
Summary: Incentive program to foster private wildlife habitat management through tax reduction and technical assistance. Landowners need 15 or more acres of habitat to be eligible.
Eligibility: Private landowners with at least 15 acres of land.
How Much: Tax reductions
Application Deadlines:
Web Pages and Links: http://www.ai.org/dnr/fishwild/about/habitat.htm

Classified Forest Program
Administered: DNR
Summary: Program allows landowners to set aside at least 10 acres of land as forest. In return owners receive property tax breaks, forestry literature, and technical assistance.
Eligibility: Private landowners with 10 acres of land.
How Much: Lands are eligible for Assessments at $1.00 an acre. Property taxes are then paid based on that assessment.
Application Deadline:
Web Pages/Links: http://www.state.in.us/dnr/forestry/privateland/clasfor.htm

Classified Wind Break Act
Administered: U.S Fish and Wildlife
Summary: Establishment of windbreaks at least 450 feet long adjacent to tillable land.
Eligibility:
How Much:
Application Deadlines:
Web Pages and Links:

Nisource Environmental Challenge Fund
Administered: NiSource
Summary: Funding for projects designed to preserve, protect, or enhance the environment in areas served by NiSource or a subsidiary.
Eligibility: Non-profit and grassroots organizations and other community groups.
How Much: Awards are usually between $500 and $5000. Funding available for up to 80% of a projects cost.
Application Deadline:
Web Pages/Links: http://www.nisource.com/enviro/ecf.asp

2002 IPL Golden Eagle Environmental Grant
Administered: Indianapolis Power & Light
Summary: Provide funds for projects that will preserve, protect, enhance or restore environmental and biological resources throughout the state.
Eligibility: Municipalities, states, non-for profits, etc.
How Much: Grants will not exceed $10,000.
Application Deadline:
Web Pages/Links:
http://www.ipalco.com/ABOUTIPALCO/Environment/Golden_Eagle/Golden_Eagle_Application.html

Watershed Assistance Grants
Administered: EPA and the River Network
Summary: Program is designed support the growth and sustainability of local watershed partnerships in the United States. For the purpose of this program, a "watershed partnership" is defined as an inclusive, enduring, diverse, community-based group organized to identify and resolve watershed problems and issues.
Eligibility: Watershed partnerships.
How Much: Awards ranging from $1,000 - $3,100
Web Pages/Links: http://www.rivernetwork.org/howwecanhelp/howwag_2002cri.cfm

Re-Grants
Administered: CS Mott Foundation
Summary: This Program is designed to help staff members, board members, and volunteers develop skills important to their duties with river and watershed organizations. Funding is used to cover travel expenses and/or registration fees for selective river training opportunities.
Eligibility: Non Profit organizations, watershed staffs, volunteers in the Great Lakes Basin.
How Much: $300-$500
Web pages/links: http://www.rivernetwork.org/howwecanhelp/howregrant.cfm

Hoosier Riverwatch Water Quality Monitoring Equipment
Administered: Hoosier Riverwatch
Summary: Grant provides equipment for participating in the statewide volunteer stream-monitoring program.
Eligibility: Schools, government agencies, non-profit organizations
How Much: Up to $500 worth of water quality testing equipment.
Application Deadline: March 15
Web Pages/Links: http://www.state.in.us/dnr/soilcons/riverwatch/

Core Four Alliance Grants
Summary: Grants are provided to alliances throughout the country implementing programs that will advance the Core 4 Conservation Campaign to realize better soil, cleaner water, greater profits for agriculture, and a brighter future for all of us.
Eligibility: Alliances promoting Core 4 Campaign.
How much: Up to $2500 with a dollar for dollar match from non-federal funds.
Web Pages/Links: **http://www.ctic.purdue.edu/Tammy/Application.pdf**

General Challenge Grant
Administered: National Fish and Wildlife Federation
Summary: Funding for projects that address priority actions promoting fish, wildlife, plants and the habitats on which they depend.
Eligibility: Federal, tribal, state, local governments, education institutions, non-profit, and conservation organizations.
How Much: $10,000 - $150,000. The match is 1:1 federal to non-federal.
Web Pages/Links: http://www.nfwf.org/programs/guidelines.htm

Bring Back the Natives
Administered: National Fish and Wildlife Foundation
Summary: Program provides funds to restore damaged or degraded riverine habitats and their native aquatic species through watershed restoration and improved land management.
Eligibility: Local governments, states, and non-profit organizations.
How Much: Non federal to federal matching is 2:1.
We Pages/Links: **http://www.nfwf.org**
http://www.epa.gov/owow/watershed/wacademy/fund/natives.html

Tipmont REMC Envirowatts Trust
Administered: Tipmont REMC
Summary: Provide funds to support environmental projects and activities in surrounding communities.
Eligibility: Local groups working on environmental projects.
How Much:
Application Deadlines: 3 cycles (1st Monday of January/April/July/October).
Web Pages/Links: http://www.tipmont.org/services/envirowatts.org.