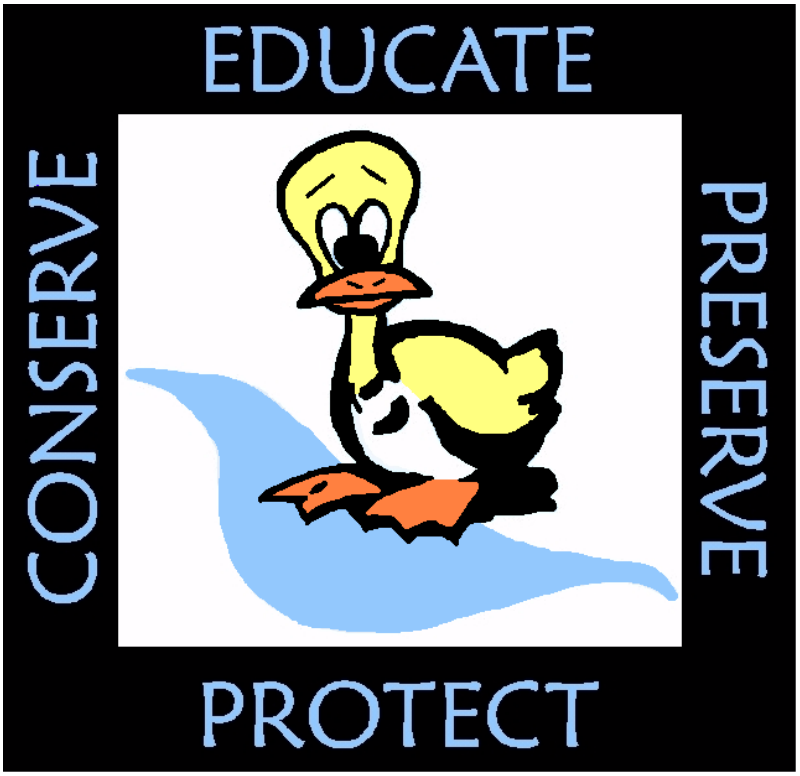
TANNERS CREEK WATERSHED MANAGEMENT PLAN



PREPARED BY:

TANNERS CREEK WATERSHED
STEERING COMMITTEE

UPDATED: MAY 2003

OUR MISSION

To provide leadership, education, and coordination that encourages public involvement in the conservation of all natural resources within the Tanners Creek watershed

OUR VISION

A healthy, productive environment in harmony with all land and water uses within the Tanners Creek watershed

Funding for this project has been obtained from a United States Environmental Protection Agency Clean Water Act #319 Grant

The Tanners Creek Watershed Steering Committee is a subcommittee of the Dearborn County Soil and Water Conservation District.

Edited by: Kris Streb; February 26, 2003

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INTRODUCTION

The purpose of this document and building a community partnership for the Tanners Creek watershed is to help provide leadership, education and coordination that encourages public involvement in the conservation of all natural resources within the Tanners Creek watershed. This document explains the vision and plan on how to improve the quality of Tanners Creek and its tributaries, providing the residents of the Tanners Creek watershed a cleaner place to call home.

Through a series of public events and surveys, the steering committee has acquired ideas and information to determine key areas of focus and necessary actions to make this plan a success.

Although improving our environment is a life-long commitment, we continue to challenge ourselves and meet new goals everyday. We invite the community to help us achieve these goals and make a significant difference in the watershed by 2010.

This plan is designed for the residents of the Tanners Creek watershed, inviting all to become active partners within the watershed project.

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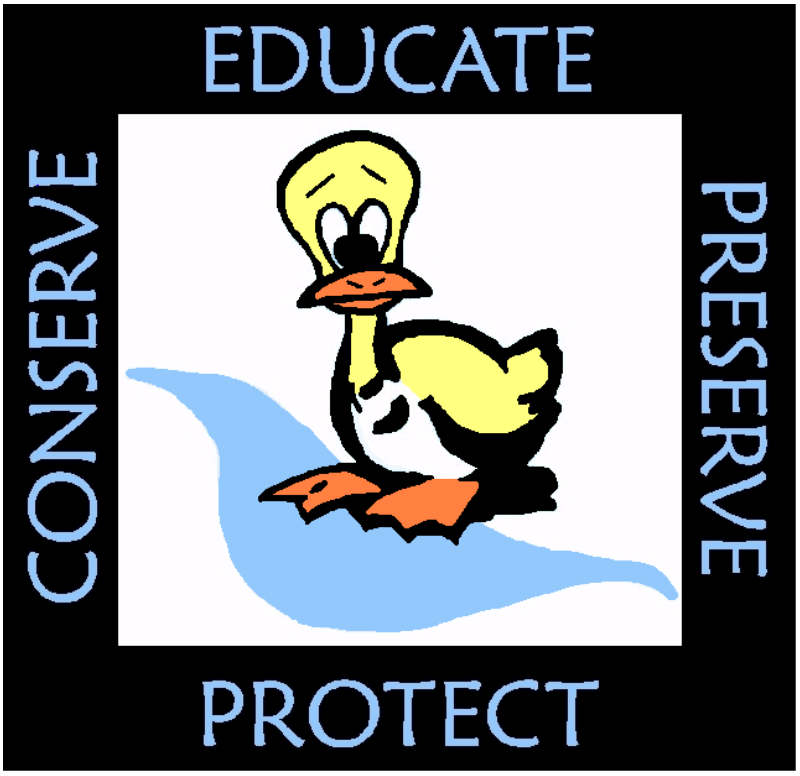
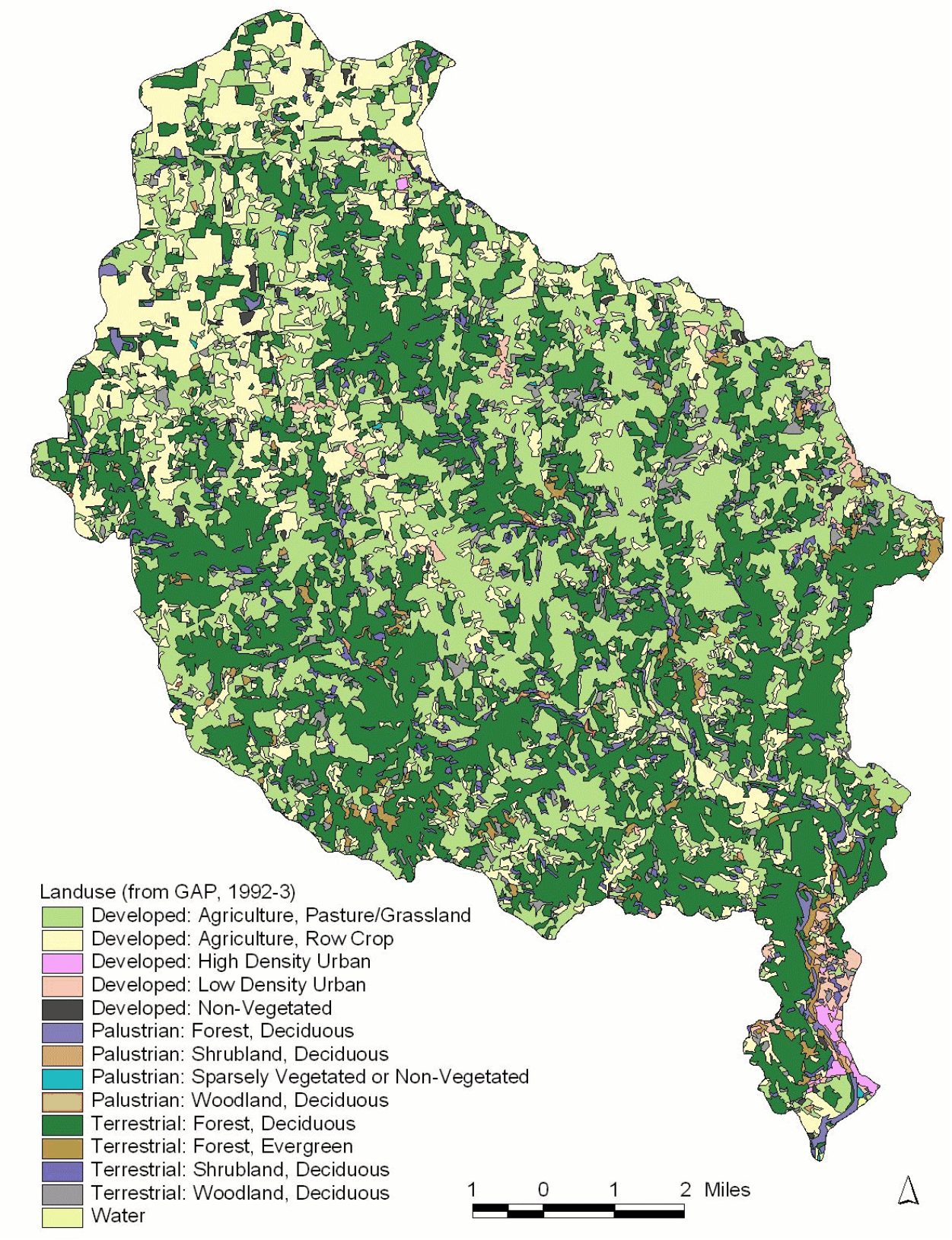


INTRODUCTION AND BACKGROUND


Landuse (from GAP, 1992-3)
Developed: Agriculture, Pasture/Grassland
Developed: Agriculture, Row Crop
Developed: High Density Urban
Developed: Low Density Urban
Developed: Non-Vegetated
Palustrian: Forest, Deciduous
Palustrian: Shrubland, Deciduous
Palustrian: Sparsely Vegetated or Non-Vegetated
Palustrian: Woodland, Deciduous
Terrestrial: Forest, Deciduous
Terrestrial: Forest, Evergreen
Terrestrial: Shrubland, Deciduous
Terrestrial: Woodland, Deciduous
Water
1 0 1 2 Miles

BACKGROUND

The Tanners Creek watershed passes over more than 68,000 acres of gently rolling hills and steep ravines. The headwaters begin at the southcentral section of Franklin County and flow approximately 20 miles until they reach its confluence with the Ohio River, just south of Lawrenceburg. Ninety-nine percent of the watershed's drainage area is located within Dearborn County with the other remaining one percent in Franklin County. The watershed is comprised mainly of cropland and forest land, together making up approximately ninety-seven percent of land usage. The remaining three percent includes urban areas and water. The highest elevation in the watershed is 850 feet and is located at Perfect North Slopes in Guilford. The lowest elevation is 500 feet located throughout the watershed. Tanners Creek and its tributaries flow through seven townships; Kelso, Jackson, Logan, Miller, York, Manchester, and Lawrenceburg. Several cities and towns, including Lawrenceburg, Guilford, Lawrenceville, Wright Corner, St. Leon, New Alsace, and Dover are in the watershed.

Big Tanners Creek, above Lawrenceburg

Hydrologic Unit Code Information

The 11-digit HUC for the Tanners Creek watershed is 05090203030. This is part of a much larger Middle Ohio-Laughery watershed (05090203). The subwatersheds for Tanners Creek include: Turkey Run (05090203030010), Slab Camp Creek (05090203030020), Brushy Fork (05090203030030), Taylor Creek (05090203030040), Leatherwood Creek (05090203030050), Flys Run (05090203030060), Mud Lick Creek (05090203030070), Salt Fork (05090203030080) and Greendale (05090203030090). Refer to Appendix A for a detailed map.

History

Prehistoric people lived mainly along the Ohio River and its tributaries because it provided them with means of transportation and a water supply. Archaelogists now considered this area prime hunting grounds for artifacts. In the late 1790's, after the Revoluntionary War, settlers began to inhabit the area surrounding the Ohio River. Dearborn County was formed in 1803 and included what is now Ohio County, Switzerland County, and part of Ripley County.

Population

In the year 2000, over 15,000 people lived within the watershed boundaries. This is over 18% higher than the population in 1990. It is estimated that in the year 2020, almost 20,000 people will live in the watershed, increasing the population from 2000 by more than 25%. Lawrenceburg is the county seat of Dearborn County and the most populated area in the watershed with more than 4,500 people.

Towns

Dover – Dover was settled mainly by Irish Catholics from Maryland and Pennsylvania. St. John's Catholic Church was Dover's first church, consecrated in 1824, making it one of the first churches founded in Indiana after Francis Xavier in Vincennes. Because it was the intersection of the trail from Lawrenceburg to Brookville and the trail from Harrison to Napoleon, Dover was popularly known as the "Crossroads". Many laborers took advantage of the "crossroads" and constructed their headquarters in Dover.

Guilford – Significant buildings in Guilford include the general store located at Bonnell and York Ridge Roads and the Gothic Revival style Tanner Valley United Methodist Church building, which was constructed in 1899. Also noteworthy is the Guilford Covered Bridge Park. Constructed in 1879, the covered bridge is the only remaining covered bridge in Dearborn County. The bridge was set fire in September of 1993, but has since been restored.

Manchester – Once called Green Briar Ridge, Manchester was settled in 1815 by Mark McCracken and his family. The area was settled predominately by natives of the northeastern United States. Historical buildings include the Zion Evangelical Lutheran Church of Manchester, which was established in 1898 and the Dearborn County "Asylum for the Poor" which was built in 1882 and now is where the James B. Wismann Youth Encouragement Services Home for the Disadvantaged Youth is located.

New Alsace – Originally settled by colonists from the east coast, New Alsace was soon settled by German and Irish families. Settlers from Alsace-Lorraine, Germany gave the town its name. Within time, New Alsace had several breweries, yet only one church, St. Paul's church built in 1837. It still remains the only church in the town.

St. Leon – Initially called St. Joe after its first church, St. Leon adopted its current name after the post office was termed St. Leon in 1852. It was settled in the early 1800s by Europeans of various origins, including Swiss, French and Germans. Dating back to the 1870s, St. Leon is widely known for its pole-raising each presidential election year. Democrats go into nearby woods with a crosscut saw to cut a straight, tall hickory tree, which they trim except for a few branches at the top. Brackets are attached to the tree so the American flag and the original Democrat emblem, a rooster, can be displayed. The "pole" remains up until the election is over.

Yorkville – The origin of Yorkville's name has been disputed for many years. Some believe the name was established from the large number of settlers from York, England, who dominated the town in its early history. Others believe it was given its name by David C. Perine of New York, who laid out Yorkville on March 24, 1841. The only surviving church is St. Martin Catholic Church, established in 1850 by the German Catholic immigration.

Temperature

The average daily maximum temperature for the county is 63.6 degrees Fahrenheit. The warmest month is July with an average temperature of 85.8 degrees. The average daily minimum temperature for the county is 39.1 degrees Fahrenheit with the coldest month being January with an average low of 17.7 degrees. The average daily temperature for July is 73.4 degrees and the average temperature in January is 27.9 degrees. For every two years over a ten-year period, the watershed may experience a maximum temperature for July, August, and September of 96 degrees. The temperature may go below –12 in January, two out of ten years.

Precipitation

Precipitation in Dearborn County ranges from an average low of 2.29 inches in October to an average high of 4.78 inches in July. The average yearly precipitation is 39.81 inches. Over a 10 year period, there may be two years with total precipitation less than 35.48 inches and there may be two years with more than 43.99 inches.

Soils

The watershed is underlain with Ordovician-age shale and limestone, which occurs under the entire area of Dearborn County. Three soil associations cover 90% of the Tanners Creek watershed.

Avonburg and Clermont soils are deep and somewhat poorly to poorly drained. They have a seasonal high water table and have 0 to 2 percent slopes. These soils are primarily used for cropland. Approximately 10% of the watershed is made up of these soils

The Cincinnati, Rossmoyne and Bonnell soils are deep and range from moderately well to well drained, with slopes ranging from 2 to 8 percent. These soils are primarily used for cropland, pasture, and woodland. Approximately 35% of the watershed is made up of these soils.

The Eden and Carmel soils are deep and well drained, with slopes ranging from 12 to 30 percent. These soils are primarily used for pasture and woodlands. For building sites, shrink-swell and slippage of these soils are concerns. About 45% of the watershed has these soils.

There are 27 different soil types within the Tanners Creek watershed. These soils have severe limitations for septic tank absorption fields due to wetness and/or slow percolation. A soil map for the Tanners Creek Watershed is located on Appendix B.

Public Land

The Tanners Creek Watershed does not have any publicly owned land with exception to its county and city parks. Descriptions of these parks can be found in Appendix G.

Public Contribution

This proposed project started when the Dearborn County Soil and Water Conservation District (SWCD) held a series of locally led meetings in the county. One of the resource concerns identified at the meetings was water quality and the need to address nutrient and sediment contamination in surface water runoff. The District Board took these comments plus others and developed their long-range plan of work. One goal of this plan was to assess resource needs in the county. The Tanners Creek watershed was a starting point for the SWCD board due to the high urban and agricultural activities occurring in the watershed.

In 1998, the SWCD headed up a monitoring program on Tanners Creek and its tributaries to locate potential sources of pollution. The water quality issues of Tanners Creek were brought to the public's attention at the District's annual meeting in February 2000. A short program was presented about the watershed and a call went out to the audience for individuals wanting to participate in the Tanners Creek Watershed Project. As a result of the annual meeting, the Tanners Creek Steering Committee was formed to continue the surveying process of Tanners Creek and its watershed.

Throughout the year, the steering committee has held a number of events to gather input from the public about the status of Tanners Creek. The information gathered has helped the committee prioritize the needs of the watershed. Key concerns include:

- Erosion
- Financial Assistance for landowners
- Lack of fish
- Garbage on private land
- Lack of Education
- Nutrient overloading

Although groundwater is used by many landowners within the watershed, is was not listed as a concern at the information-gathering events. Currently, Tanners Creek is not being used as a drinking source.

In addition to the "call for volunteers", the coordinator compiled a database of watershed landowners using the 2000 Dearborn County Plat Book. Landowners were informed of the newly formed committee and were encouraged to attend meetings and express their concerns. Futhermore, a list of key business stakeholders was gathered to solicit help with the project.

Watershed Partners

The Tanners Creek Steering Committee is made up of key stakeholders from a variety of backgrounds including landowners, environmental scientists, educators, technical experts, and concerned citizens. The steering committee is responsible for setting policies, supervising, and giving program direction to members of three long-term subcommittees. The steering committee meets on the second Tuesday of every month at the Dearborn County Hospital. There are three long-term subcommittees that address specific needs within the project:

The technical committee is made up of Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), and Soil and Water Conservation District (SWCD) employees and community members. This committee is responsible for conducting a watershed inventory, providing technical assistance to watershed landowners and administering the state and federal water quality programs.

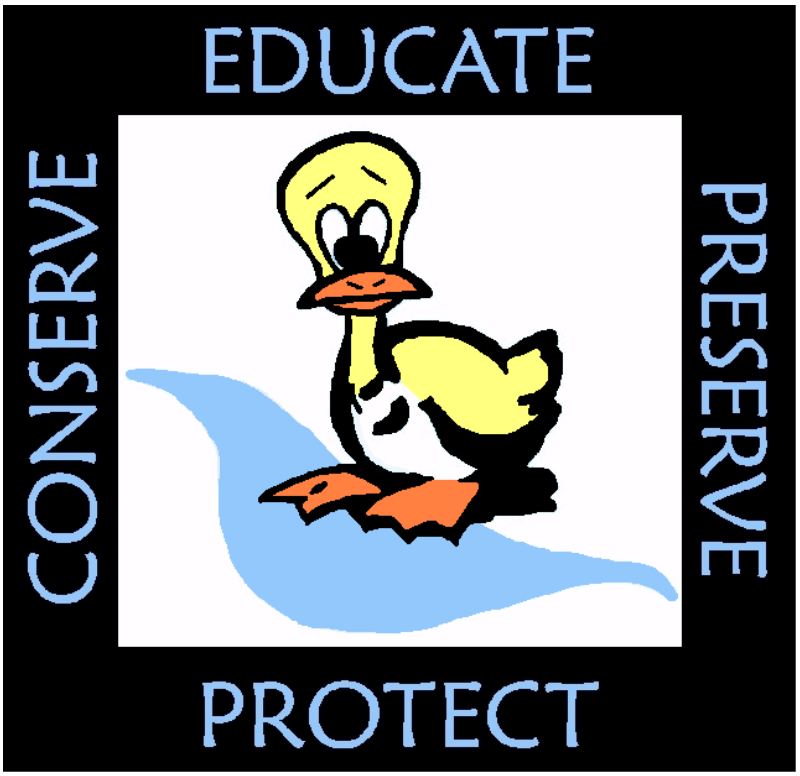
The Water Monitoring committee consists of volunteer RiverWatch water monitors called "The Dearborn County Stream Team". This committee is responsible for the chemical and biological monitoring of Tanners Creek and its tributaries.

Volunteers monitoring Salt Fork

The Education committee is made up of community residents and agency personnel. The main responsibilities for this committee include publicizing the project's activities and accomplishments, developing marketing techniques, and educating the overall public through a series of public meetings, educational field days, and school programs.

These key stakeholders assisted in the writing of this plan by completing watershed inventories, water monitoring, and researching important issues. Information from taken from these procedures was compiled, analyzed and formed into the Tanners Creek Watershed Management Plan.

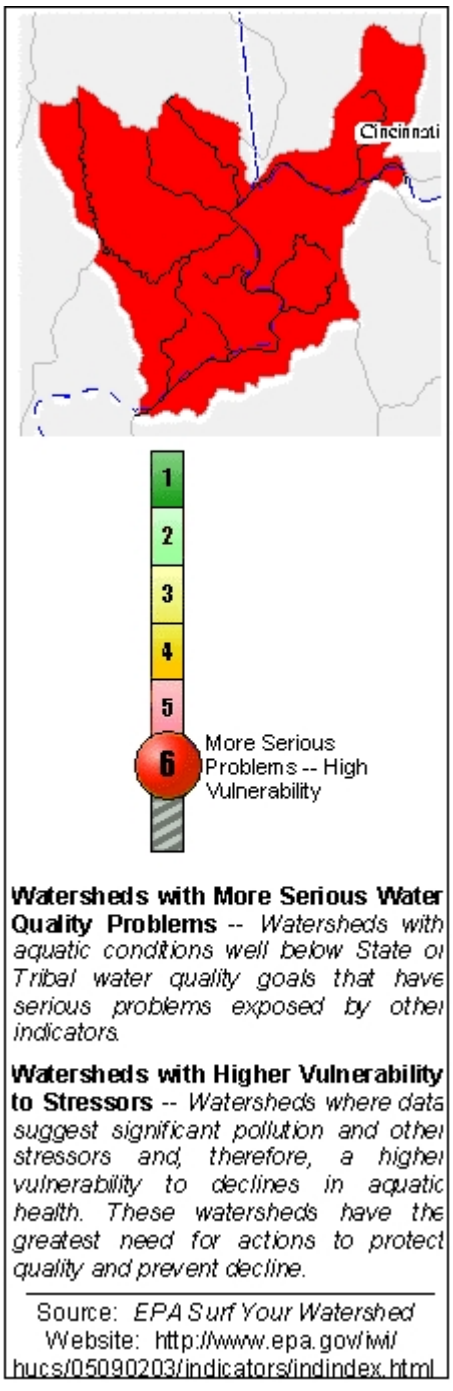
CHAPTER 2



PROBLEM IDENTIFICATION

WATER QUALITY CONCERNS

In 2000, the results of the Unified Watershed Assessment[1] for Middle Ohio-Laughery, indicated severe impairment in mussel diversity, river biodiversity, and stream fishery for the watershed. Sediment potential was given a low score on the assessment, meaning that there is not a perceived significant threat at this time. However, in Tanners Creek watershed, the increased development of commercial and light industrial land uses has begun to blossom in the southern reaches of the watershed near the last 2 miles of the main stem before its confluence with the Ohio River[2]. The sediment load from urban and construction stormwater runoff will begin to affect the water quality of the last few miles of the main stem of Tanners Creek to the confluence at the Ohio River.



According to the Environmental Protection Agency (EPA), the Middle Ohio-Laughery Watershed is listed as having serious problems in the following Condition Indicators (indicators designed to show existing watershed health):

I. *Designated Use Attainment* – States adopt water quality standards that include designated uses and criteria to protect those uses including: drinking water supplies, aquatic life use support, fish and shellfish consumption, primary and secondary contact recreation and agriculture.

II. *Fish and Wildlife Consumption Advisories* – Recommendations by the state to restrict consumption of locally harvested fish or game due to the presence of contaminants.

III. *Ambient Water Quality Data: Four Conventional Pollutants* – Ambient water quality data showing an accession of national criteria levels, over a six year period (1990-1996) of Ammonia, Dissolved Oxygen, Phosphorus, and pH.

IV. *Wetland Loss Index* – Percentage losses of wetlands over a historic period (1870-1980) and more recently (1986-1996)

[1] Natural Resources Conservation Service (2000). Unified Watershed Assessment for Indiana.
[2] 2001 Tanners Creek Watershed Inventory

The EPA also listed "High Vulnerability" in the following Vulnerability Indicators (indicators designed to indicate where pollution discharges and other activities put pressure on the watershed):

I. *Urban Runoff Potential* – Potential for urban runoff impacts based on percentage of impervious surface in the watershed.

II. *Index of Agriculture Runoff* – Composite index comprised of nitrogen runoff potential, modeled sediment delivery to rivers and pesticide runoff potential.

III. *Air Deposition* – Information from the National Atmospheric Deposition Program/National Trends Network depicting nitrogen deposition estimates

Tanners Creek was recently included on the 2002 303(d) impaired waterbody[3] list for impaired biotic communities. Visual inspections and tours by SWCD and USDA staff and agency partners have shown problems with nutrient loading, streambank erosion, shrinking habitat, construction site issues, urban runoff issues such as stormwater pollution, and sedimentation. These deficiencies are discussed, in further detail, throughout the document.

Volunteer monitoring through the Dearborn County SWCD and its Tanners Creek Watershed Steering Committee in 1999 yielded high counts of phosphate, coliform; harmful dissolved oxygen levels; and algae blooms in several segments of Tanners Creek main stem and its six tributaries. In 2000 and 2001, new sampling uncovered new problems with sediment loading throughout the main stem of Tanners Creek.

Algae in the East Fork at Zinser Road

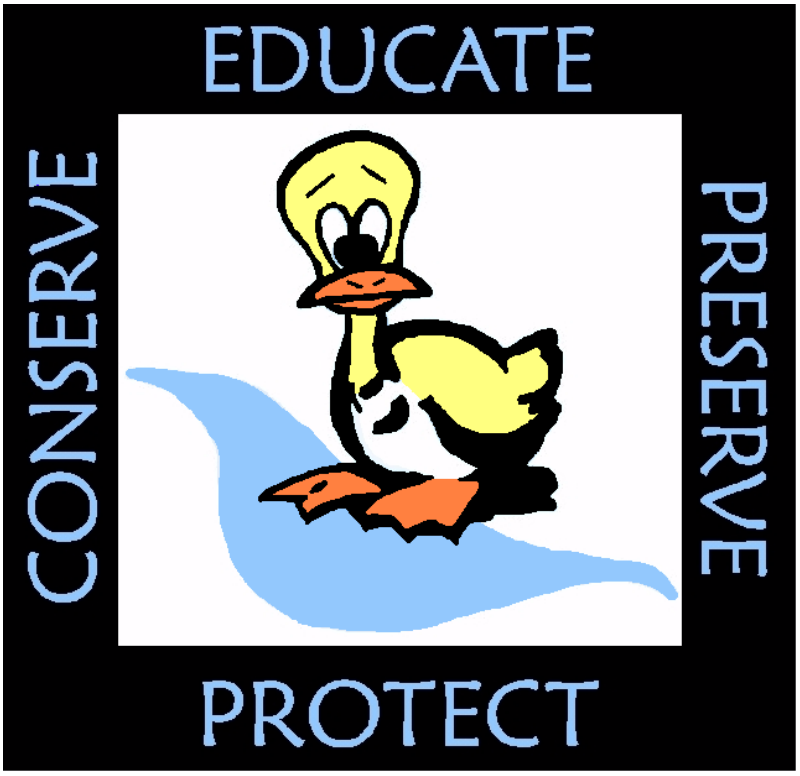
High phosphorous counts and suspected sediment problems are apparent through visual inspections and chemical water sampling near the mouth of Tanners Creek. Visual inspections showed a pea-green color which would indicate a presence of algae in the water. Increased phosphorus in the water can cause such algal blooms and stress aquatic life by masses of bacteria breaking down dead algae and using up all the oxygen present. Although there are no regulations on phosphorus in Indiana waterbodies, it is suggested in the Hoosier RiverWatch Manual that phosphorus levels higher than 0.03ppm contribute to increased plant growth. The Tanners Creek phosphorus levels average more than 18ppm with the highest reading at 50ppm at the main stem.

High E.Coli counts and unhealthy levels of dissolved oxygen were uncovered at 5 of the 6 sampling sites throughout the watershed. E.Coli levels exceeding the state standard of less than 235 colonies per 100 ml were documented throughout the watershed. The Salt Fork subwatershed has an average of more than double the state standards with

[3] Indiana Department of Environmental Management 303(d) list: www.in.gov/idem/water/planbr/wqs/303d.html

the highest reading at more than 1300 colonies per 100 ml. As discovered through visual inspections, cattle have access to the Salt Fork creek, which could be the largest contributor of the high amounts of E.Coli. These results suggest water pollution problems are starting to affect the water quality of Tanners Creek. For complete data and a monitoring sites map, see the water monitoring information in Appendix C and D.

CHAPTER 3



WATERSHED RESOURCE ASSESSMENT

AGRICULTURE

The Tanners Creek watershed is made up of 36,350 acres, or 53 percent, of cropland. There is an estimated 11,580 acres of row crop, with the remainder in wheat and hayland. As with all agricultural areas, we have a concern about nonpoint source pollution from farmland including sediment loading and nutrient runoff.

Tillage Practices

A continuing concern with agriculture we face in our watershed is soil erosion from cropland. Not only does this erosion affect the quality of soil, but it also carries extra nutrients into nearby bodies of water. Excess pesticides, herbicides, and sediment can be introduced into waterways through poor management of crops.

Example of no-till soybeans in corn residue

Conservation tillage is an ideal approach to helping control erosion. Conservation tillage consists of leaving thirty percent or more of the soil surface with crop residue, after planting, to reduce soil erosion by water[4]. Changing from conventional tillage to conservation tillage may be a difficult task, but it offers many benefits to landowners in the long run. Conservational tillage saves time and fuel by allowing as little as one trip for planting compared to two or more tillage operations. Keeping the crop residue on the surface traps water in the soil by providing shade. The shade will help reduce evaporation, which can increase the opportunity for water to soak into the soil[5]. Furthermore, a continuous no-till system increases soil particle aggregation, making it easier for plants to establish roots.

During the past four years, landowners in the watershed have changed their tillage habitats from conventional tillage to conservation tillage. According to the Dearborn County tillage transect reports[6], there has been a fifteen percent decrease in conventional tillage and a twenty-six percent increase in no-till. As of 2001, eight percent of the watershed continues to conventional till their land.

Although this percentage is not extraordinarily high, we are focusing our efforts in the Turkey Run (010) and northern Taylor Creek (040) subwatersheds, which make up almost 6355 acres of cropland and have a higher percentage of conventional tillage. Likewise, as the land use map on page two indicates, the majority of these two subwatersheds account for nearly all of the row crop in the watershed According to our predicted trends map (page 31), the Turkey Run and northern Taylor Creek areas will remain the major agricultural area within the watershed for many years to come. In addition, the East-Central Indiana Erosion Study (1987) shows these subwatersheds as

[4] Conservation Technology Information Center (CTIC) website: http://www.ctic.purdue.edu/Core4/Core4Main.html

[5] Conservation Technology Information Center (CTIC) website

[6] Department of Natural Resources Tillage Transect Reports; years 1998, 2000, 2001

a "major erosion problem area" (see Appendix I). In addition, the Soil survey of Dearborn and Ohio Counties lists the Cincinnati-Rossmoyne-Bonnell soil, a series located in these subwatersheds, as a "severe hazard" for erosion[7]. With such a high probability of sediment loads from these farmlands, we will concentrate most of our tillage efforts in this area.

It is projected that changing 250 acres of conventional tillage with a 0% "residue after planting" to a no-till system with a 60% "residue after planting" will reduce the load of sediment by 1,412 tons/year. Moreover, the phosphorus load will be reduced by 1,353 lbs/year and the nitrogen load will be reduced by 2,706 lbs/year[8]

If we continue to educate landowners about the benefits of changing from conventional tillage to conservation tillage and offer financial incentives for those landowners to switch, we should continue to see an increase not only in conservation tillage but in water quality, as well.

Estimated Pesticide Application

Pesticides are used to stop or limit any undesirable organism (insect, animal or weed) from damaging crops and products we use everyday. Many of the pesticides we use make our lives easier, like the pesticides in wood furniture, which stop the pests from creating holes in these objects. Furthermore, when used agriculturally, pesticides allow us to increase our harvest and feed more people[9].

In an ideal world, the pesticides would remain in the environment long enough to control the pests and then breakdown into harmless compounds. Unfortunately, in practice, pesticides are often transported into water supplies before they have enough time to breakdown. Because these pesticides are reaching our water supplies, it's important for us to understand just how much is contaminating our water sources. To get an idea of how much pesticide is entering Tanners Creek and its many tributaries, a rough estimation was calculated using the Purdue Extension's Guide for Watershed Partnerships.[10] Using the data given in the Middle Ohio-Laughery Watershed Restoration Action Strategy[11], the following table was set up to estimate the pesticides applied within the watershed.

[7] Soil Survey of Dearborn and Ohio Counties, Indiana; 1981

[8] Estimation comes from the Indiana Department of Environmental Management Load Reduction Estimate worksheet

[9] Duke University, Department of Chemistry website: www.chem.duke.edu/~jds/cruise_chem/pest/pestintro.html

[10] Alyson Faulkenburg and Jane Frankenberger. Watershed Inventory Tool for Indiana: A Guide for Watershed Partnerships. Department of Agricultural and Biological Engineering, Purdue University

[11] Indiana Department of Environmental Management, Office of Water. Middle Ohio-Laughery Watershed Resortation Action Strategy, June 2000.

Crop Type	Crop Acres in Watershed	X	Pesticide Type	Fraction of acres treated in the state (1998 figures	X	Average rate of application (lbs/acre) (1998 figures)	=	Estimated amount of pesticides applied (lbs)
Corn	4,635	X	Atrazine	0.89	X	1.36	=	5,610
			Metalachlor	0.42		2.04		3,971
			Acetochlor	0.32		1.97		2,922
			Primisulfuron	0.14		0.03		19
			Cyanazine	0.13		1.43		862
Soybean	6,953		Glyphosate	0.55		0.85		3,251
			Chlorimuronethyl	0.27		0.02		38
			2,4-D	0.26		0.39		705
			Imazethapyr	0.25		0.04		70
			Paraquat	0.19		0.89		1,176
						Total:		**18,624**

**Row crop data is taken from the Indiana Department of Environmental Management and multiplied by a percentage of soybeans and corn. Percentage is estimated from Dearborn County Farm Service Agency.*

Estimated Fertilizer Application

Like pesticides, fertilizer can make our lives easier by providing the necessary nutrients for crop growth. And, like pesticides, fertilizer can cause water quality problems when it is applied in excess in the environment. The nutrients of greatest concern in watershed management are nitrogen and phosphorus. Nitrogen decomposes into nitrate, which can cause serious health concerns in groundwater. One such health concern is Blue Baby Syndrome, which occurs when infants ingest large amounts of nitrates. In drained fields, Nitrate is able to flow directly into ditches and streams through field tiles. Phosphorus makes its way to a waterbody by attaching itself to soil particles. Too much phosphorus can cause algal blooms. Once algal blooms occur, dissolved oxygen is depleted and aquatic life has a difficult time surviving.

To estimate the amount of fertilizer applied in the Tanners Creek Watershed, we took the average amount of fertilizer applied to the Tanners Creek watershed from the 2000-2001 Indiana Agricultural Statistics publication.

Crop	Fertilizer type	Crop acres in the watershed	X	Fraction of acres treated in the state (1998 figures)	X	Average rate of application (lbs/acre)	=	Estimated amount of fertilizer applied (lbs)
Corn	Nitrogen	4,635	X	1.00	X	145	=	672,075
	Phosphorus			0.97		59		265,261
Soybean	Nitrogen	6,953		0.15		29		30,246
	Phosphorus			0.26		46		83,158
						Total Nitrogen:		**702,321**
						Total Phosphorus:		**348,419**

**Row crop data is taken from the Indiana Department of Environmental Management and multiplied by a percentage of soybeans and corn. Percentage is estimated from Dearborn County Farm Service Agency.*

Livestock

Manure from animals is a significant source of Nitrogen, Phosphorus, and more importantly, E.Coli. E.Coli is a specific species of fecal coliform bacteria commonly found in polluted waters. Some strains of E.Coli can lead to illness in humans. While not all strains of E.Coli are pathogenic themselves, they occur with other intestinal tract pathogens that may be dangerous to human health. The bacterium is able to enter the body through the mouth, nose, eyes, ears, or cuts in the skin[12].

To estimate the amount of manure potentially entering Tanners Creek or one of its tributaries, we first determined how many head of livestock is in the watershed. We obtained the number of livestock from the 2000-2001 Indiana Agricultural Statistics publication[13] and multiplied this number by the fraction of the county.

Livestock	Number of Animals in the County	X	Fraction of the county in the watershed	=	Number of animals in the watershed
Beef Cattle	4,100	X	0.35	=	1,435
Dairy Cattle	714*				250
Swine	1,868				653

In order to determine the amount of manure and nutrients produced within the watershed, we used the table provided by the Watershed Inventory Tool for Indiana[14].

Livestock	Number of Animals	X	Avg. amount of manure produced	=	Amount of manure produced (lbs/day)	X	Fraction of nutrients in a pound of manure		=	Pounds of N in the Manure	Pounds of P in the Manure
							Nitrogen	Phosphorus			
Beef Cattle	1,435	X	75 lb/day	=	107,625	X	0.008	0.0065	=	861	700
Dairy Cattle	250		115 lb/day		28,750		0.0045	0.002		129	58
Swine	653		11.7 lb/day		7,640		0.0045	0.004		34	31
Total amount of manure produced:					**144,015 lbs/day**		**Total amount of nutrients in the manure:**			**1,024 lbs/day**	**789 lbs/day**

Using the above worksheet, it is calculated that more than 950,000 pounds of manure per year can be reduced from entering our water systems if we manage about 75 head

[12] Lyn Hartman and Mandy Burk (November 2000). Hoosier Riverwatch Volunteer Stream Monitoring Training Manual. Indiana Department of Natural Resources, Purdue University

[13] Indiana Agricultural Statistics 2000-2001. Issued by United States Department of Agriculture and Purdue University.

* Number is estimated by the Dearborn County Farm Service Agency

[14] Alyson Faulkenburg and Jane Frankenberger. Watershed Inventory Tool for Indiana: A guide for watershed partnerships. Department of Agricultural and Biological Engineering, Purdue University

of beef cattle from reaching our streams*. Likewise, more than 7,500 lbs/year of nitrogen and 6,200 lbs/year of phosphorus will be reduced.

Through various windshield surveys and site reviews, evidence of cattle access to streams was discovered in three primary areas throughout the watershed; Salt Fork, Brushy Fork and one site on Big Tanners. The committee will work with landowners in these areas to help control livestock access to the streams through cost-share programs such as fencing, off-stream watering, and water crossings.

According to the previous information, it is apparent that proper measures are needed to ensure improved water quality. Marketing various financial and technical assistance programs such as planter upgrades and cost-share for no-till corn can help decrease soil erosion from our farmlands. In addition, providing cost-share money for livestock management and pasture renovation will assist in deceasing the amount of E.Coli entering our waterbodies.

Educating the community on the importance of good water quality and how they can benefit from it will result in implementing more conservation plans, including buffers and fencing, within the watershed. Developing mass media to inform the public about such practices and holding various field days will update landowners about the significance of water quality and conservation in their watershed.

Cattle access on Big Tanners

* Information is determined by an estimate of 35 lbs/day/cow directly entering water system

RECREATION

According to the 2000-2004 Statewide Comprehensive Outdoor Recreation Plan (SCORP), benefits are endless when it comes to outdoor recreation; people have better health and qualities of lives, crime can be reduced because individuals can expel energy and emotion while performing outdoor activities, property values may increase because there is ample outdoor leisure opportunities, the economy benefits by providing an attraction for tourism, and awareness of the environment is heightened because people are spending more time in nature[15].

Fishing

Recreational fishing is a very important component in the Tanners Creek watershed and we can see benefits almost immediately. With an estimated 15 fishing tournaments per year (see Appendix E), it is projected that Dearborn County acquires more than $500,000 a year from these tournaments alone[16]. Not only are individuals paying to participate in these tournaments, but they are also putting money into the economy by spending on food, lodging and various other activities.

While speaking with members of a bass club, we discovered there were concerns about the fish population diminishing at the mouth of Tanners Creek. The increase in sediment loading may be the cause of the declining population. Sediment can kill fish by obstructing the gills. Once the gills are clogged, the fish will no longer be able to intake oxygen and suffocation will become inevitable. In order to establish whether the declining of fish population is a conceived or real problem, the steering committee will work with the District Biologist to update the 1995 Tanners Creek Fisheries Study.

Other Outdoor Recreation

Unfortunately, other than fishing, outdoor recreation within the Tanners Creek watershed is limited. In a recent poll in Region 12 (Dearborn, Franklin, Jefferson, Jennings, Ohio, Ripley and Switzerland Counties), more than sixty-four percent of the respondents said they participated in Walking/Hiking/Jogging within the last year[17]. Of the twenty-five 'half-mile or longer' open trails, only two reside in the watershed. Furthermore, more than fifty-two percent of those surveyed indicated they camp on a regular basis. However, of the thirty-nine campsites in Region 12, only two are located in the watershed. A bar graph comparing Region 12 activity areas and those located in the Tanners Creek watershed is located in Appendix F.

With help from the Parks and Recreation Board and key stakeholders in the community, the watershed could be an area flourishing with recreational opportunities, such as hiking, canoeing, camping and nature watching. In particular, the boat ramp and Guilford Park area are ideal locations for an enhancement project that will improve recreational opportunities for the Tanners Creek community and Dearborn County.

SCHOOLS

[15] 2000-2004 Statewide Comprehensive Outdoor Recreation Plan
[16] Dearborn County Tourism Bureau
[17] 2000-2004 Statewide Comprehensive Outdoor Recreation Plan

Education is a key issue within the watershed. After working with several high school and elementary teachers, it is apparent education about our natural resources is needed throughout the school system. When asked why we need to keep our water clean, one student responded "I don't think we need to keep it clean because my water comes from the grocery store." This statement is indicative to the views of many young adults within Dearborn County. Implementing an education program and youth activities such as creek clean-ups and storm drain marking will provide the students with much needed information about water quality and help them become personalized with their watershed.

Students looking for macroinvertebrates

If we plan on changing the dynamics of the Tanners Creek watershed to be more environmentally friendly, the most likely place to start this trend would be in our schools. Each year, children and young adults are learning about key components used by environmental scientists everyday such as chemistry, biology, and mathematics. Unfortunately, these lessons are usually not connected to the environmental aspect, nor are they connected to local concerns. Unless students are enrolled in an environmental science or natural resource class, they may go through life without ever knowing what a watershed is or how it affects their lives. Educating our youth about the watershed they live in and how the quality of water is influenced by everyday activities will help students comprehend how great an impact the community has on our waterbodies. By understanding those impacts, students will be able to change their environmentally-unfriendly habits and turn into future stewards of our watershed.

Educational Field Days

Educational field days, such as Ag Day or W.O.W. (Watching Our Watersheds) Water Fest, promote hands-on learning for students. Environmental professionals are given the chance to provide engaging activities and exhibits on environmental issues such as water, wetlands, human health, pollution, aquatic life, etc. These field days teach students about the value of our environment and provide teachers with materials and lessons they can use for years to come.

"Life Below the Waterlines" exhibit at the 2002 Water Fest

The Tanners Creek Education Committee held its first Water Fest in September 2002. With more than 500 students in attendance, the Water Fest was a success. The education committee plans on continuing both Ag Days and the Water Fest in future years.

Community Projects

There are many advantages to having community projects throughout the watershed. Besides the fact that it provides quality education about environmental issues,

community projects also invite the students to become members of their own community. Young adults become learners, teachers, achievers and most importantly, leaders in society. Service participation appears to have its strongest effect on the student's decision to pursue a career in a service field[18]. This implies students who participate in environmental service projects, such as storm drain marking and creek clean-ups, have a greater chance of not only thinking environmentally throughout their lives, but also entering in the environmental workforce.

In 2002, the Aurora Boy Scouts, Bright Elementary Outdoor Club, and members of the steering committee marked more than 80 drains to promote storm drain pollution awareness. They adhered four inch, circular markers which read "No Dumping Drains to Creek – sponsored by Tanners Creek Watershed Project." Students were taught about the important role storm drains play in our community and actions they can take to help reduce pollution. Storm Drain marking will continue to be an annual event for the watershed project.

In 2001 and 2002, the Tanners Creek Education Committee partnered with the Solid Waste Management District, ORSANCO, and many other organizations to hold two local river sweeps. In 2001, more than 30 people attended the sweep, cleaning up more than 8 tons of trash along the banks of Tanners Creek and the Ohio River. In 2002, approximately 135 volunteers took time out of their busy Saturday to help clean more than 6 tons[*] of garbage, tires and various other objects within the Tanners Creek Watershed. The education committee will continue this event for many years to come.

In addition to providing countless benefits to students, community projects also provide benefits to communities. Service projects contribute thousands of hours of volunteer service, which might otherwise cost taxpayers a substantial amount of money. Furthermore, service projects unite communities through a common cause.

[18] UCLA Service-learning Clearinghouse: http://www.gseis.ucla.edu/slc/rhowas.html

[*] Recyclable and hazardous materials are not included in this figure

STREAMS

There are approximately 90 miles of streams found within the watershed. These streams include Turkey Run, Slab Camp Creek, Brushy Fork, Salt Fork, Taylor Creek, Leatherwood Creek, Flys Run, Mud Lick Creek, East Fork, and West Fork. These streams are the defining factor of the Tanners Creek watershed and flow into Big Tanners and the Ohio River. See Appendix A for a detailed map of the streams.

Impaired Streams

The federal Clean Water Act requires states to identify waterbodies that are not meeting applicable water quality standards. Those waterbodies that do not meet the quality standards are placed on the 303(d) list. Those waterbodies are then assessed and prioritized by the severity of the quality problem. Once the listing and ranking are complete, the states are required to develop Total Maximum Daily Loads (TMDL) for those waters in order to achieve compliance with water quality standards[19]. The main stem of Tanners Creek was recently added to the 303(d) list of the Clean Water Act for impaired biotic communities. Tanners Creek has a TMDL Development Schedule for the year 2010[20].

Riparian Buffers

To identify key places in the watershed that require buffer areas to ensure improved water quality, the committee looked at aerial photos of the watershed and completed a watershed inventory. As indicated by the land use map (see page 1), a majority of the streams are surrounded by forestland. After observing the aerial photographs of the area and completing the watershed inventory, it was determined that of the 90 miles of streams:

I. 58 miles (64%) are sufficiently buffered
II. 11 miles (12%) are lacking buffers
III. 21 miles (24%) are undeterminable

Because riparian buffers are an integral part of increased water quality, the committee will work with landowners one-on-one and through educational materials and field days to promote the installation of various buffers.

Stream Assessments

Throughout the year, members of the steering committee performed visual assessments on the streams within the watershed. Based on the Stream Visual Assessment Protocol[21], members judged the area on characteristics such as channel condition, hydrologic alterations, riparian zones, bank stability, water appearance, nutrient enrichment, in stream fish cover, invertebrate habitat, canopy cover, and riffle embeddedness.

[19] IDEM Office of Water Quality website, www.in.gov/idem/water/planbr/wqs/303d.html
[20] 2002 303(d) list for Indiana
[21] United States Department of Agriculture. *Stream Visual Assessment Protocol.* National Water and Climate Center Technical Note99-1. December 1998.

The banks of the streams are generally stable with some good riparian zones. We did, however, observe a few sites where banks were eroding and needed additional riparian buffers.

The stream channels have a few man-made alterations including bridges with culverts running underneath. They provide access to adequate flood plain but are a barrier to fish movement.

Although it appears that areas along Salt Fork and East Fork at Cook Road flood once a year, low flow was present at the time of the observation. The pool areas, which are about 2 feet in depth, have a slight pea-green color to the water, indicating algal blooms and, most likely, phosphorus present.

The fish cover includes: Logs and large woody debris, moderately deep pools that are inhabited by small fish, large boulders and cobble, and riffles with moderate to swift currents. Some areas in the streams were not ideal for fish habitat, although fish were present. Streams seem to be about 60% covered with canopy vegetation.

Overall, it was determined that the streams are in fair condition with respect to riparian zones and biological habitat. There is a need to improve riparian zones and eroded banks in the Brushy Fork, Salt Fork, and Mud Lick Creek subwatersheds. Additionally, there is a golf course in the Slab Camp Creek subwatershed, which is located on very steep, hilly terrain. Due to fertilizer application, this could be a major source of the algae identified in the streams. The committee will check for applications of fertilizer at this golf course.

URBANIZATION

The Tanners Creek watershed has approximately 2,050 acres of urbanized and residential land. The population of the watershed increased eighteen percent over the past 10 years and is projected to increase another twenty-five percent in the next twenty years. Improperly managed construction sites, trash, fertilizer and pesticides from residential areas, oil and gasoline from cars, household chemicals, and animal wastes are just a few critical components of urbanization that can influence our watershed and lead to the degradation of Tanners Creek and its tributaries.

Construction

There are many areas in Tanners Creek Watershed that have been converted into urban use over the past 20 years. Currently the lower eastern quadrant, subwatershed 090, of the watershed is undergoing change from agriculture to residential due to the proximity of I-275 and the short drive time to Cincinnati, Ohio and Florence, Kentucky.

The watershed has approximately 1,528 acres (two percent) of impervious area[22]. When broken down into subwatersheds, we find a significantly higher percentage of impervious area in the Tanners Creek – Greendale subwatershed, 090. Nearly ten percent of this subwatershed is considered impervious as construction in this area continues to grow. Furthermore, the 090 subwatershed makes up more than twenty-seven percent of the impervious area within the watershed as a whole. With an increase in impervious areas, a watershed is vulnerable to increased flooding, higher runoff rates, and excess nutrient loading due to loss of vegetation buffers.

Town of Bright in 1987

Development sites can add a tremendous amount of contaminants to waterbodies due to the lack of on site vegetation for extended periods of time. Converting land from agricultural or woodland use to urban development requires special considerations to avoid sediment and nutrient movement off site to adjoining properties and streams.

Data from water samples collected at different sites along Tanners Creek show a high level of turbidity and phosphorus at the lower reach (see Appendix C for detailed data). The watershed above this section of the creek is land being converted from agricultural use to residential. According to Jennifer Groves, Dearborn County Technician/Educator, over 800 acres* of agricultural land is currently being altered into residential areas

Town of Bright in 1999

[22] Alyson Faulkenburg and Jane Frankenberger. Watershed Inventory Tool for Indiana: A guide for watershed partnerships. Department of Agricultural and Biological Engineering, Purdue University

with many more plans in the future[23]. Without the use of proper erosion control techniques, sediment and phosphorus attached to the soil particles reach the creek and can impair water quality.

According to Section I of the NRCS Field Office Technical Guide, erosion rates from construction sites can range from 10 - 50 tons of soil loss per acre depending on the length of time lots remain bare and the amount and length of slope. Much of the slope in this watershed exceeds 5% which equates to a high erosion rate.

Addressing this situation requires a group willing to coordinate with individuals, business and governmental agencies to analyze completed studies and develop a plan of action. Action items may include educating developers and landowners on the effects of off site sediment and ways to control it. Education can be in the form of one-on-one contact, field days or mass media. Another action plan component is to locate sources of revenue to assist with expenses incurred by the group or the land user when adopting conservation practices. Technical assistance provided to the land user would also play an important part in the plan of action.

In addition, the Tanners Creek steering committee needs to work with the Dearborn County Soil and Water Conservation District's Urban Issues committee to to provide support towards more implementation of the Erosion Control Ordinance and to help facilitate Contractor workshops, field days, and educational materials.

Trash and Litter

A large problem with an area becoming urbanized is the increased amount of trash and litter dumped onto our streets and parking lots and into our waterbodies. Besides being aesthetically unappealing, trash can be a nuisance to wildlife and aquatic life. River Sweeps and other litter-preventing activities and education help in the reduction of this waste.

In the past years, the steering committee has coordinated two creek clean-ups in coordination with the Dearborn County Solid Waste Management District. Over these two years, almost 200 volunteers cleared greater than 15 tons of trash along Tanners Creek, including the boat ramp, US 50 over/underpass, Guilford Park and Mud Lick Creek. The Tanners Creek steering committee has made a commitment to make creek cleanups an annual event.

Stormwater Pollution

Storm drains help control flooding by carrying runoff water from our streets, parking lots and yards. Unlike household wastewater, which flows through sanitary sewers to a wastewater treatment plant, urban runoff is piped through storm drain systems, unfiltered, directly into the nearest stream, river or lake. This causes a real problem when residents treat storm drains as garbage cans and continually throw waste into them or practice pollution-causing behavior. In residential areas, these wastes include soil, lawn fertilizers, motor oil, antifreeze, pet waste, yard waste, paint and more. When

[23] Jennifer Groves, Dearborn County Technician/Educator.

*Estimate is just on Rule Five Projects (those developments disturbing more than 5acres of land).

introduced to natural waterways, these pollutants lower water quality and endanger or kill aquatic plants and animals. Urban stormwater is one of the most significant sources of pollution in our nation's rivers, lakes and estuaries. According to the U.S. Environmental Protection Agency, urban stormwater is the second largest source of water quality damage in estuaries and a significant contributor to the damage to lakes, rivers, and bays[24]. In other words, water pollution can be generated in our backyards through careless behavior and inappropriate disposal of household wastes.

In the summer of 2002, the education subcommittee initiated the Tanners Creek Storm Drain Marking Project. On May 14th, more than 35 cub scouts and 7 leaders learned about the importance of storm drain pollution and how they can help prevent future pollution. After a brief discussion, the scouts marked more than 50 storm drains in the downtown area and handed out flyers explaining the significance of pollution prevention. Another project is scheduled in September with the Bright Elementary Outdoor Classroom. The Storm Drain Marking Project will be held annually.

Boy Scouts marking drains in Aurora

Oil and Gas

The oil from a single automobile engine can produce an eight-acre oil slick and a single quart of motor oil can contaminate as much as two million gallons of drinking water[25]. With an increase in the construction of roads, there will inevitably be an increase in the usage of automobiles. Oil, grease, and other fluids that leak from poorly maintained vehicles can contaminate runoff from roads, parking lots and driveways which will, in turn, contaminate the nearest waterbody. The pollution caused by improper disposal or leaking of used motor oil in the United States is equal to almost fourteen Exxon Valdez spills every year[26]. With certain cautions and measures taken, this number can drastically decrease. Asking people to stop driving is unrealistic, however there are steps that can be taken to help reduce this problem. Educating travelers about the importance of properly maintaining vehicles and repairing leaks promptly, disposing of motor oil and antifreeze at local recycling centers, the benefits of carpooling, and avoiding gas tank overflows are just a few means in which we can take to improve water quality in our area.

[24] Natural Resources Defense Council website: http://www.nrdc.org/water/pollution/q2storm.asp
[25] "Turning the Tide – A Citizen's Guide to Reducing Runoff Pollution", South Carolina Department of Health and Environmental Control, Bureau of Water, Nonpoint Source Program.
[26] Turning the Tide

WILDLIFE AND FISHERIES

While problems were not voiced at a public meeting, we discovered the importance of wildlife and fisheries during our watershed inventories. Because this living document is aimed at identifying significant land use within the watershed and because they are vital in developing this ecosystem, we thought it was appropriate to address wildlife and fisheries in this management plan.

Wildlife

The rolling topography of Tanners Creek offers a variety of opportunities to improve various wildlife species with both upland and woodland habitat. Much of the watercourses themselves are bordered by trees and other woody vegetation, further enhancing their value to wildlife.

As should be well known, each wildlife species has certain habitat needs. Habitat can be defined as anything and everything a species needs to survive in an area, the year-a-round. These needs include nesting sites, resting areas, areas to find refuge, clean water, food, and so on. If any are of these requirements are missing, so too will be the wildlife species.

In general, woodland species such as tree squirrels, white-tailed deer and wild turkey are prospering in the watershed. Attempts to re-establish ruffed grouse have not been overly successful due to the loss, and non-replacement of early successional forest types. This gamebird is likely absent or rare in the watershed. Woodcock and certain woodland songbirds have been affected by the same lack of habitat type. Resident woodcock populations have decreased, however, migrating woodcock can be expected to occur during fall and spring in suitable areas. In addition to the loss of early woodland habitat, the abundance of cowbirds has caused problems for certain neotropical songbirds because of their parasitic habit of laying eggs in these birds' nests. Most native mammals, including coyotes, are doing well. Others such as rabbits, are either holding their own or decreasing in abundance. Rabbits are being most seriously affected by the preponderance of tall fescue that crowds out the beneficial cover and food plants rabbits need to prosper. Certain ground nesting birds such as bobwhite quail and songbirds are declining, once again due to the dominance of fescue and also loss and degradation of habitat[27].

American Woodcock

The Giant Canada Goose, the largest of the eleven or more subspecies of Canada goose, is becoming a nuisance in the Watershed. The large number of private ponds and the birds' innate ability to coexist in the presence of humans has allowed this bird to prosper. While capable of migrating, they will frequent an area year-round if not overly subjected to disturbance. Because of its nuisance potential, the Indiana Division of Fish

[27] Ed Guljas, Department of Natural Resources District Biologist

and Wildlife conducts an early goose hunting season each September 1-15th. Other options are being explored to decrease the Giant's population.

Another nuisance wildlife species is the white-tailed deer. Even though Dearborn County was second in deer kill in 2000 and consistently has been in the top five counties for a number of years, certain areas, including the Tanner's Creek Watershed, continue to experience deer related crop damage. The Division of Fish and Wildlife's approach has been to make the highest allowable number of bonus deer permits available during the regular hunting season and, under certain circumstances, to issue out of season deer kill permits.

Wild Turkey

The wild turkey was re-established as a native bird in the Watershed in 1984. Due to ideal habitat, it prospered and became abundant enough to be included on the list of game species starting in 1987. In 2001, Dearborn County, with much assistance from the Watershed area, was the third highest kill county for the 2001 spring season. While perceived by some to have nuisance potential, the wild turkey has not proven that so. Rather they have been shown to be highly beneficial, eating large quantities of crop pests including grasshoppers, tobacco worms and Japanese beetles.

Presently, the Indiana bat is the only known Federally Endangered Species that may be present in the Watershed. This secretive animal is known to roost beneath the loosened bark of dead and dying trees in several areas of the state. Between 1995 and 1999, river otters were re-established in a number of Indiana locations including two in the southeastern portion. The release at Big Oaks National Wildlife Refuge, formerly The Jefferson Proving Ground, is the nearest to the Watershed. While no otter sightings have been confirmed to date, due to its wandering nature, it is to be expected the animal will eventually find a home in the Watershed. Other state endangered or threatened mammals possibly occurring in the Watershed would be bobcat and badger, although no recent sightings have been confirmed. More information about the status of endangered and threatened plant and animal species is available from the Indiana Division of Fish and Wildlife's Nongame and Endangered Species Unit.

Since wildlife responds both positively and negatively to changes in habitat, willing landowners have the opportunity to encourage and promote the presence of targeted species. There are programs available through USDA and DNR agencies that provide financial incentives for landowners to create, restore and enhance habitat for upland, woodland and wetland wildlife species. The District Wildlife Biologist is available to draw up habitat management plans for private property and administers the Classified Wildlife Habitat Program through which property taxes are reduced on acreage devoted to the management of wildlife.

Fisheries

Fishing is the biggest recreational activity on Tanners Creek and its tributaries. According to Larry L. Lehman's 1995 Fish Management Report for Tanners Creek, a total of 1,790 fish, from 10 families, representing 43 species of fish, were collected at two sample sites along Tanners Creek in May and June of 1995. Gizzard shad was the most abundant species collected by number (46%) followed by Longear sunfish (12%), and Bluntnose minnow (8%). The remaining 40 species each comprised or 5% or less of the total by number. See Appendix H for a detailed list of Tanners Creek fish.

Although Tanners Creek supports a relatively diverse fish community, we are most concerned with the amount of bass found because tournaments are dependent on these fish. Of the 1,790 fish found in Tanners, only four percent or seventy-six bass were found. The committee will work with the District Biologist to schedule fish releases. Based on survey results, smallmouth bass comprise a minor part of the fish population in Tanners Creek by number or by weight[28].

To improve fish diversity and population, it is important that we preserve the existing wooded riparian zones. Woody vegetation, such as willows, should be used to control bank erosion while land management practices should be implemented to reduce soil erosion and silt loaded into the creek[29]. In addition, the steering committee will work with both the District Biologist and local bass clubs to schedule fish releases every five years.

Spotted Bass

[28] Lehman, L. 1995. Fisheries Survey of Tanners Creek. Indiana Department of Natural Resources, Indianapolis.
[29] Lehman, L. 1995. Fisheries Survey of Tanners Creek. Indiana Department of Natural Resources, Indianapolis.

WOODLANDS

Woodlands are a very valuable natural resource of the Tanners Creek watershed. Woodlands play a direct or indirect role in everyone's lives as well as the whole environment. Besides being the largest oxygen producers on the earth, woodlands protect and improve water quality. Woodlands not only filter water as it passes through, but it also stabilizes soil, resulting in less erosion, which leads to less sedimentation problems. Woodlands provide wildlife habitat, wood products, firewood, mushrooms, and places to hunt, hike and camp. They reduce noise and clean the air. Their benefits appear countless.

Woodlands occupy approximately 38% or 25,919 acres in the Tanners Creek watershed. For the most part, wooded parcels are scattered throughout the watershed and located along Tanners Creek and its tributaries.

Timber Harvesting

The majority of woodlands are owned privately. Woodlands are a renewable resource; proper management provides the landowner an excellent economic return while keeping all the benefits listed earlier. One well managed hardwood forest study showed a yield increase of $184/acre/year in the timber value, with the timber volume nearly doubling in twelve years[30]. Another study showed $183/acre/year through fourteen growing seasons. The harvested tops brought in an additional $16,000 in firewood sales[31]. Over a period of fifteen years, a southeast farm in Indiana had an annual compound rate of return of 13.7%[32]. Our plan is to further the education and implementation of tree planting, timber stand improvement and riparian areas/buffers (woodlands along the banks of streams and rivers) to landowners on a voluntary basis.

Classified Forests

Classified Forests are areas of 10 acres or more, supporting a growth of native or planted trees, which have been set aside for the production of timber and wildlife, the protection of watersheds, or the control of soil erosion. As an incentive for landowners to enter the Classified Forest program, land designated as such by the state forester is eligible for assessment at $1.00 per acre with taxes paid on that assessment[33]. In addition, the district forester will provide free technical advice and assistance.

There are approximately 405 acres of classified forest located throughout the Tanners Creek watershed. One goal of this management plan is to sustain the number of acres of classified forest to help keep Indiana's private forests intact for the variety of benefits it provides to watersheds.

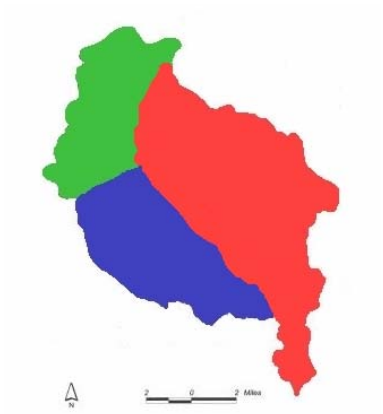
[30] Marshal County Mill Pond Demonstration Woodland 1999 Report
[31] Wakeland Forestry Consultants; The Luke Woods, 1996
[32] Southfork Tree Farms, 1997
[33] Indiana Department of Natural Resources, Division of Forestry. "Classified Forest" brochure.

Through the Tanners Creek watershed project partnership, technical and financial assistance will be offered. Programs available are the Classified Forest Program, USDA Conservation Reserve Program, and the 319 grant program. For more information contact your Dearborn County Soil and Water Conservation District at 812-926-2406 ext.3.

PRIORITY AREAS

Urbanization

Although agriculture is the largest land use within the watershed, we are increasingly concerned about the urbanization that is occuring within the community. The land use map on page 1 shows there are only two primary areas of urbanization, the Lawrenceburg and Bright area. After spending time driving through the watershed, we observed a lot of the agricultural land is quickly changing into residential developments and industrial areas. In studying this trend, we developed a Tanners Creek Trend Map, which shows the current trends in the watershed. Almost half of the watershed is currently under development.



Estimated Trend Map:
Red = Urbanization
Blue = Wildlife Habitat
Green = Agricultural land

A demonstration site is needed to help educate contractors and developers about the importance of erosion control practices. This demonstration site will be located in Lawrenceburg, the heart of industrial development for the watershed. The professionally designed demonstration site will include an area that is properly managed with a variety of erosion control methods and an adjacent area with bare soil. The Tanners Creek Watershed Project, with support from the Dearborn County Technician/Educator, will hold an annual contractors workshop at this site and demonstrate the importance and benefits of erosion control and different methods they can apply during construction. In addition to the demonstration site, the committee will work with the SWCD's urban steering committee in reevaluating, correcting deficiencies and promoting the current Erosion Control Ordinance.

Agriculture

According to the 1987 East-Central Indiana Erosion Study MEPA Map (Appendix I), the Tanners Creek watershed has major erosion problem areas from cropland in the Turkey Run (010) and Taylor Creek (040) subwatersheds. In addition, the major soil type in this area is Cincinnati-Rossmoyne-Bonnell. This soil type is listed as extremely vulnerable to erosion[34]. Because this is the only area where it is both agricultural and has vulnerable soil, we will concentrate on protecting the land and water within these two subwatersheds. Cost-share money for no-till corn, pasture renovation, and planter upgrades, along with education through field days and mass media will be needed to improve this situation.

It is projected that changing 250 acres of conventional tillage with a 0% "residue after planting" to a no-till system with a 60% "residue after planting" with reduce the load of sediment by 1,412 tons/year. Moreover, the phosphorus load will be reduced by 1,353 lbs/year and the nitrogen load will be reduced by 2,706 lbs/year[35]

[34] Soil Survey of Dearborn and Ohio Counties, Indiana, 1981
[35] Estimation comes from the Indiana Department of Environmental Management Load Reduction Estimate worksheet

After surveying the Salt Fork (080) and Brushy Fork (030) subwatersheds, we found these areas to play a significant part in our manure accumulations. Several sites along streams have indications of cattle access. In addition, sightings of cattle in the creek were observed in Salt Fork. E.Coli counts are elevated in these subwatersheds. Managing this problem will include providing cost-share money for fencing along the streams, installing water crossings, pasture improvement and providing off-stream water supplies for livestock.

Using the Watershed Inventory Tool for Indiana[36], it is calculated that more than 950,000 pounds of manure per year can be reduced from entering our water systems if we manage about 75 head of beef cattle from reaching our streams[**]. Likewise, more than 7,500 lbs/year of nitrogen and 6,200 lbs/year of phosphates will be reduced.

Cows in the Salt Fork Tributary

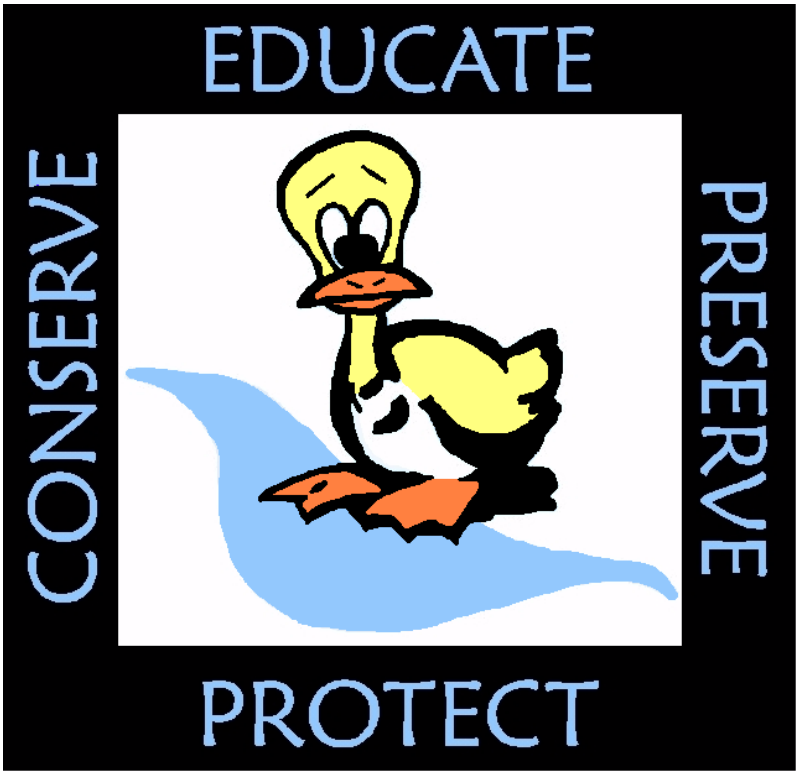
In addition to managing livestock from the streams, improving the quality of 1,550 acres of pasture will reduce sediment by 1,646 tons/year, phosphorus by 2,194 lbs/year, and nitrogen by 4,384 lbs/year[37]. Estimation comes from a "C factor" of 0.12 beginning at 60% cover and going to 0.003 at 70% cover.

[36] Alyson Faulkenburg and Jane Frankenberger. Watershed Inventory Tool for Indiana: A Guide for Watershed Partnerships. Department of Agricultural and Biological Engineering, Purdue University

[**] Information is determined by an estimate of 35 lbs/day/cow directly entering water system

[37] Estimation comes from the Indiana Department of Environmental Management Load Reduction Estimate worksheet

CHAPTER 4



GOALS AND DECISION-MAKING

PROBLEM STATEMENTS

I. Nonpoint source runoff of nutrients and sediment from agricultural land is impairing the water quality in the watershed's streams

II. Residents do not feel connected with their watershed because there is a lack of recreational activities

III. Tanners Creek is not adequately supporting aquatic life due to various water quality problems, diminishing our recreational uses on Tanners Creek.

IV. Education in the school systems is not sufficiently portraying water quality and conservation issues.

V. There is a lack of public involvement in community projects within the Tanners Creek Watershed community

VI. There is a need for stable streambanks and riparian zones adjacent to the waterbodies.

VII. Urban sprawl has led to increased runoff, diminishing Tanners Creek's water quality.

VIII. Poor erosion management on construction sites leads to an increase of sediment into our streams, causing water quality issues and a decrease of aquatic habitat.

IX. There is a need for increasing and improving wildlife habitat to support game and non-game species.

X. Forest areas are quickly declining due to increased urbanization

AGRICULTURAL OBJECTIVES

Goal 1

Reduce the amount of agricultural nutrient and sediment runoff entering the watershed's waterbodies

Objective 1:
Increase high residue cropping systems on 500 corn cropland acres in the Turkey Run and Taylor Creek Subwatersheds

Action	*Person Responsible*	*Completion Date*	*Budget*
Encourage landowners to apply for grants for planter upgrades	Watershed Coordinator	August 2003	$30,000
Facilitate an annual No-Till meeting	Education Committee	Annually	$2,500
Develop media education, including brochures, flyers, and fact sheets, to be distributed at workshops, mailings, etc.	Education Committee	Quarterly	$800
Encourage landowners to apply for EQIP cost-share for No-Till corn	Technical Committee	On-going	$9,000

Objective 2:
Increase quality/quantity of pasture/hayland areas on 1,550 acres of poorly managed[38] land in Salt Fork and Brushy Fork

Encourage landowners to apply for EQIP for seeding of improved species of grasses and legumes	Technical Committee	On-going	$139,000
Encourage landowners to apply for EQIP for Interior Fencing and establishing alternative watering systems	Technical Committee	On-going	$105,000
Education through Winter Workshop	Ed Committee & SWCD	Annually	$5,000
Education through annual Pasture Walk	Ed Committee & SWCD	Annually	$1,500

Objective 3:
Manage livestock access to stream on 3 farms with 25 head/farm in Salt and Brushy Fork

Encourage landowners to apply for EQIP for fencing along the streams	Technical Committee	On-going	$11,500
Encourage landowners to apply for EQIP to install water crossings	Technical Committee	On-going	$6,000

RECREATION OBJECTIVES

[38] Poorly managed Pasture/hayland is defined by an area that is overgrazed, has low fertility rates, and/or has a variety of weed problems.

Goal 2

Connect people with their watershed by increasing recreational activities in the watershed

Objective 1:
Develop enhancement projects within the watershed

Action	*Person Responsible*	*Completion Date*	*Budget*
Work with local park boards to develop canoe launch on Big Tanners	Watershed Coordinator & Ed Committee	June 2004	$50,000
Work with local bass clubs to hold annual Tanners Creek Fish Tournament	Watershed Coordinator & Ed Committee	September 2004 & 2005	$3,000

Goal 3

Determine fish population to improve recreational activities

Objective 2:
Work with District Biologist to improve fish quantity

Update 1995 Fisheries Study	Watershed Coordinator & District Biologist	October 2003	$350

EDUCATION OBJECTIVES

Goal 4
Increase awareness of watershed activities, concerns, and accomplishments

Objective 1:
Educate watershed community through media materials

Action	*Person Responsible*	*Completion Date*	*Budget*
Distribute quarterly newsletter to residents and teachers in the watershed	Watershed Coordinator & Ed Committee	Quarterly	$2,400
Set up informational booths at libraries, 4-H fairs, Antique Farm Days, Annual meetings, and other events	Watershed Coordinator & Ed Committee	Annually	$200
Submit monthly press releases to local newspapers	Watershed Coordinator	Quarterly	$150
Hold radio show to inform public about upcoming events and cost-share opportunities	Watershed Coordinator	Quarterly	$150

Goal 5
Encourage activities for their watershed residents to take part in community service

Objective 2:
Educate watershed community through field days

Hold field days including pond clinics, forestry field days, and pasture walks	SWCD, Ed Committee & Technical Committee	Annually	$4,500
Implement a yearly watershed education program for fourth grade students	Watershed Coordinator & Ed Committee	Annually	$7,000
Build large topographic relief model of Tanners Creek Watershed to educate people about topo maps and NPS pollution	South Dearborn High School Ag Class	February, 2003	$600
Educate community members about stormwater pollution through an annual Storm Drain Marking Project	Watershed Coordinator & Ed Committee	Annually	$3,000
Hold annual Level 1 and 2 RiverWatch trainings for community members to learn about chemical and biological monitoring	Water Monitoring Committee	Annually	$250

STREAM OBJECTIVES

Goal 6
Implement conservation practices to reduce pollutants from runoff

Objective 1:
Apply for funding to introduce conservation practices

Action	*Person Responsible*	*Completion Date*	*Budget*
Encourage landowners to apply for EQIP for streambank stabilization	Technical Committee	On-going	$120,000
Encourage landowners to apply for EQIP to install/improve buffers and riparian areas	Technical Committee	On-going	$120,000

URBAN OBJECTIVES

Goal 7
Reduce the impact of urban runoff pollution (i.e.- oil, gas, sediment)

Objective 1:
Promotion of Erosion Control Practices with Contractors/Developers

Action	*Person Responsible*	*Completion Date*	*Budget*
Hold yearly Contractor Workshops to teach about Erosion Control Practices	Ed Committee & Technical Committee	Annually	$10,000
Develop Erosion Control brochures to hand out at construction sites	SWCD Urban Technician	August, 2002	$2,000
Work with SWCD to promote Dearborn County Erosion Control ordinance through brochures, advertisements, articles, and billboards	SWCD Urban Committee & Technical Committee	Quarterly	$12,500

Objective 2:
Implement Erosion Control practices within the watershed

Work with SWCD to reopen Erosion Control Ordinance and correct deficiencies	SWCD Urban Committee & Technical Committee	August 2003	$300
Provide technical expertise and incentives to contractors/developers	SWCD Urban Technician	Quarterly	$500
Lease a FINN strawblower to be used at construction sites within the watershed	Watershed Coordinator	Quarterly	$75,000

Objective 3:
Create an urban erosion control demonstration site (explanation in 'Priority Areas')

Sketch a plan that demonstrates both good and bad practices	Watershed Coordinator	January 2004	$350
Hire contractor to develop site	Watershed Coordinator	February 2004	$10,000
Hire maintenance for upkeep 8 months a year	Contractor	June 2005	$2,000

WILDLIFE AND FISHERIES OBJECTIVES

Goal 8
Improve water quality by increasing riparian corridors and buffer strips

Objective 1:
Increase CRP or WHIP by 300 acres by 2005

Action	*Person Responsible*	*Completion Date*	*Budget*
Educate landowners about benefits of wildlife habitat development through flyers and brochures	Watershed Coordinator & Ed Committee	Quarterly	$3,000
Hold yearly Backyard Conservation field day	Watershed Coordinator, SWCD, & Ed Committee	Annually	$2,000
Submit news articles to local papers about the importance of wildlife habitat	Watershed Coordinator & Ed Committee	Quarterly	$100
Encourage landowners to apply for EQIP to install buffers, trees, and shrubs	Technical Committee	On-going	$48,000

WOODLAND OBJECTIVES

Goal 9
Maintain the 38% Forestland cover by promoting forest stewardship

Objective 1:
Increase Classified Forest Program from 425 acres to 700 by 2005

Action	*Person Responsible*	*Completion Date*	*Budget*
Technical assistance for owners in Timber Stand Improvement	SWCD Technician & Watershed Coordinator	On-going	$500
Educate landowners with forestland about benefits of Classified Forest Program	Watershed Coordinator & Ed Committee	Quarterly	$250

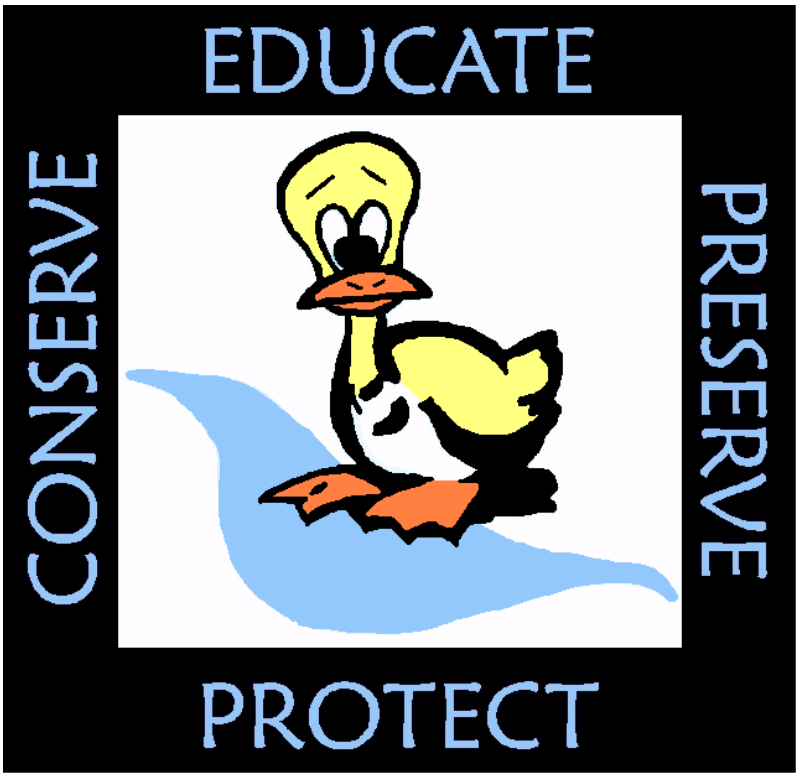
GOAL AREA MAP

GOAL PRIORITY TABLE

Priority One *Nonpoint source runoff of nutrients and sediment from agricultural land is impairing the water quality in the watershed's streams*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Reduce the amount of agricultural nutrient and sediment runoff entering waterbodies (including livestock)	P levels = 18ppm	P levels less than 0.03ppm	Water Monitoring	10 years
	E.Coli levels = 1300 colonies/ 100ml	E.Coli levels less than 235 colonies/ 100ml	Water Monitoring	6 years
Priority Two *Urban sprawl has led to increased runoff, diminishing Tanners Creek water quality*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Reduce the impact of urban runoff pollution (i.e.- oil, gas, sediment)	P levels = 18ppm	P levels less than 0.03ppm	Water Monitoring	10 years
	E.Coli levels = 1300 colonies/ 100ml	E.Coli levels less than 235 colonies/ 100ml	Water Monitoring	6 years
Priority Three *Education in schools and community is not sufficiently portraying water quality and conservation issues*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Develop adult and youth education programs that address water quality and conservation issues	400 attending	1,500 attending	Tracking attendance & surveys	On-going
Priority Four *There is a need for stable streambanks and riparian zones adjacent to the waterbodies*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Implement conservation practices to reduce pollutants from runoff	P levels = 18ppm	P levels less than 0.03ppm	Water Monitoring	10 years
	E.Coli levels = 1300 colonies/ 100ml	E.Coli levels less than 235 colonies/ 100ml	Water Monitoring	6 years
Priority Five *There is a lack of public involvement in community projects within the community*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**

Increase awareness of watershed activities, concerns, and accomplishments	More than 300 vols.	More than 1,000 vols.	Tracking attendance & surveys	5 years
Priority Six *Forests areas are quickly declining due to increased urbanization*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Maintain the 38% forestland cover by promoting forest stewardship	425 acres currently	700 acres	Tracking new applicants	10 years
Priority Seven *Residents do not feel connected with their watershed because there is a lack of recreational activities*				
Goal	**Baseline**	**Target**	**Indicator**	**Timeframe**
Connect people with their watershed by increasing recreational activities in the watershed	Zero rec. activities provided with 0 attending	At least one rec. day each year with over 50 attending	Tracking attendance & surveys	On-going

CHAPTER 5



MEASURING SUCCESS

Indicators

Throughout the implementation process, the committee will use several indicators to determine if improved water quality has been achieved. Such indicators include:

Goal 1: Reduce the amount of agricultural nutrient and sediment runoff entering the watershed's waterbodies.
Goal 6: Implement conservation practices to reduce runoff
Goal 7: Reduce the impact of urban runoff pollution
Goal 8: Improve water quality by increasing riparian corridors and buffer strips.

Indicators for the above goals include levels of phosphorus, E.Coli, Dissolved Oxygen, and pH.

The current average level of phosphorus in Tanners Creek is 18ppm. Although there is no state regulation on phosphorus, increased algae growth is evident at levels higher than 0.03ppm[39]. Within three years, the committee would like to see the levels of phosphorus decreased by half. Within six years, the level should be dropped by another half or 4.5ppm. In ten years, the committee would like to see the phosphorus levels drop to 0.03ppm or less.

Algae, seen above, is a key indicator of the presence of phosphorus

In addition, E.Coli levels are more than five times the state regulated limit of 235 colonies/100ml[40]. The committee would like to see a decrease of E.Coli from 1300 colonies/100ml to 500 colonies/100ml within three years. Within six years, E.Coli levels should meet the state requirements of 235 colonies/100ml.

Indicators will be monitored on a quarterly basis through water testing. The coordinator will monitor key sites throughout the watershed on the last two weeks of each quarter. In addition to water testing, the coordinator will perform site reviews at critical points throughout the watershed.

Goal 2: Connect people with their watershed by increasing recreation in the watershed
Goal 3: Increase fish population to improve recreational activities
Goal 4: Increase awareness of watershed activities, concerns, and accomplishments
Goal 5: Encourage activities for watershed residents to take part in community service

[39] Lyn Hartman and Mandy Burk, Hoosier Riverwatch Guide
[40] Lyn Hartman and Mandy Burk, Hoosier Riverwatch Guide

Indicators for the above goals include tracking attendance at community events and recreational activities, and generating surveys to document a change in people's attitudes toward their watershed community.

Tracking attendance will allow the committee to identify if more citizens are becoming involved in watershed activities. With each activity, the committee would like to see an increase in attendance and participation.

Surveying members of the watershed will offer important data for use by committee members to distinguish if current activities are helping citizens become connected with their watershed.

Goal 9: Maintain the 38% forestland cover by promoting forest stewardship

The indicator to determine the progress of Goal 9 will be tracking new applicants for the Classified Forest Program. The committee hopes to see an increase in from 425 acres to 550 acres in three years. The committee would like to reach the goal of 700 acres within ten years.

Monitoring Plan

The water monitoring subcommittee will chemically monitor Tanners Creek and its tributaries on a quarterly basis. They will monitor for eight tests; dissolved oxygen, pH, BOD5, water temperature change, nitrates, and turbidity, with an emphasis on phosphorus and E.Coli. In addition, biological monitoring will be done once a year at all sites, excluding the main stem. Volunteers will complete a Citizen's Qualitative Habitat Analysis at each they visit their site.

Monitoring at field days, community projects, and programs will be done through attendance sheets and surveys. The coordinator will keep a database of each of the project's programs and will update it after each event.

Operation and Maintenance

It is the landowners' responsibility to properly install and maintain any management practices on his/her land. Practices must be implemented for at least five to ten years and meet the NRCS technical guide standards to significantly improve water quality. Local agencies will provide technical assistance to landowners on management practices implemented throughout the watershed.

Annual Review

The Management Plan will be reviewed and updated annually, or on an as needed basis, to reflect accomplishments and to add additional information to the document. Updates will be distributed to the members of the Steering Committee and voted upon by the committee. If passed, the coordinator will be responsible for updating the plan and informing key stakeholders throughout the county about such changes. There will be a master copy of the plan, available to the public, at the Dearborn County SWCD office. In addition, the coordinator will see to it that there is a copy of the plan at the Lawrenceburg Library.

Practical Matters

For future reference, all management plan records and documents will be kept at the Dearborn County SWCD office. If you would like additional information on the Tanners Creek Management Plan or would like to be added to the distribution list to receive annual updates, please contact the coordinator at:

Kris Streb
10729 Randall Avenue, Suite 2
Aurora, IN 47001
Phone: 812-926-2406 ext 107
Fax: 812-926-4412
E-mail: kris-streb@iaswcd.org

Acronyms

DNR:	Department of Natural Resources
EPA:	Environmental Protection Agency
EQIP:	Environmental Quality Incentive Program
FSA:	Farm Service Agency
HUC:	Hydrologic Unit Code
LARE:	Lake and River Enhancement
MEPA:	Major Erosion Problem Areas
NRCS:	Natural Resources Conservation District
ppm:	parts per million
SCORP:	Statewide Comprehensive Outdoor Recreation Plan
SWCD:	Soil and Water Conservation District
SWMD:	Solid Waste Management District
TMDL:	Total Maximum Daily Load
USDA:	United States Department of Agriculture
WOW:	Watching Our Watershed

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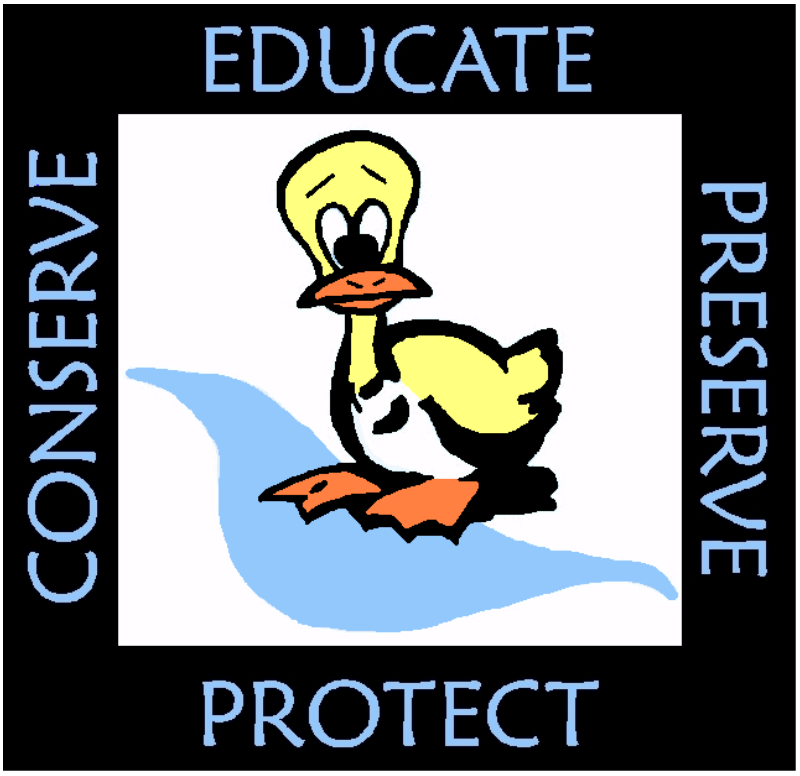
APPENDICES



A. Tanners Creek Stream Map
B. Tanners Creek Soil Map
C. Water Monitoring Data
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E. Tanners Creek Fish Tournaments
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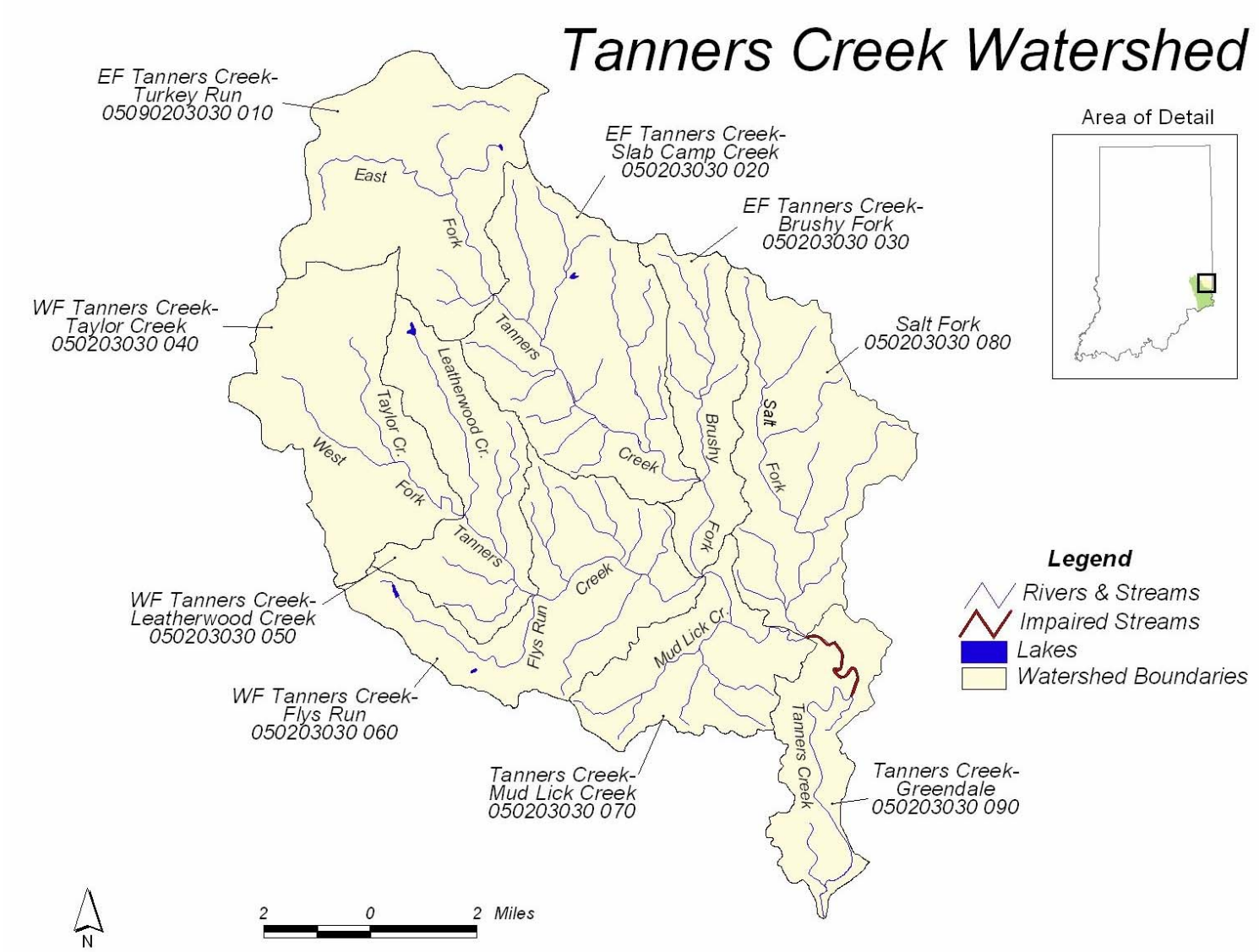
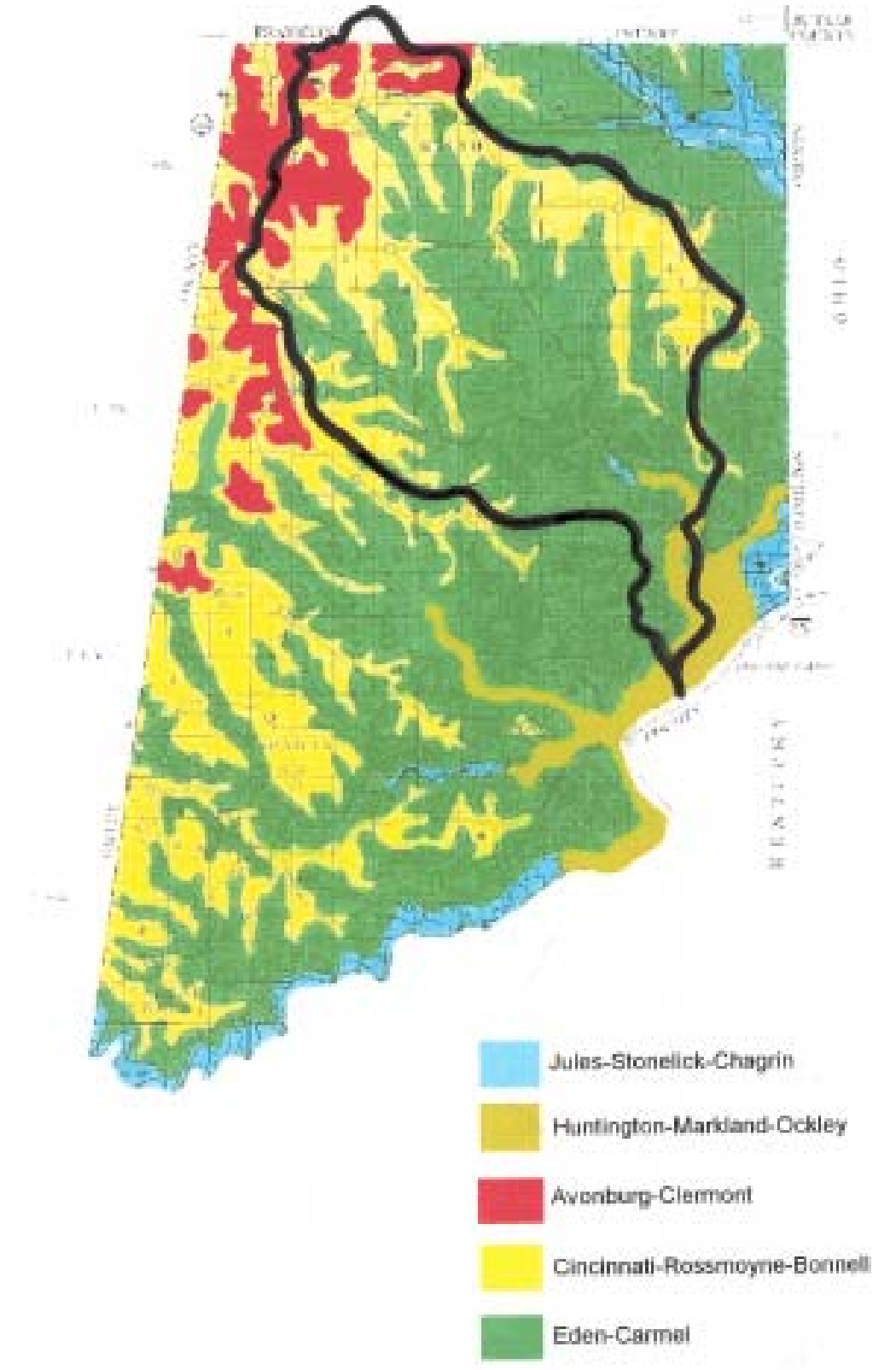
G. Parks in Tanners Creek Watershed
H. Fish Survey
I. Major Erosion Problem Areas Map
J. Sponsors
K. Endangered and Threatened Species
L. Maps of Tanners Creek Watershed in State, County and larger Watershed
M. Calendar of Events
N. Newsletters

APPENDIX A – Tanners Creek Stream Map



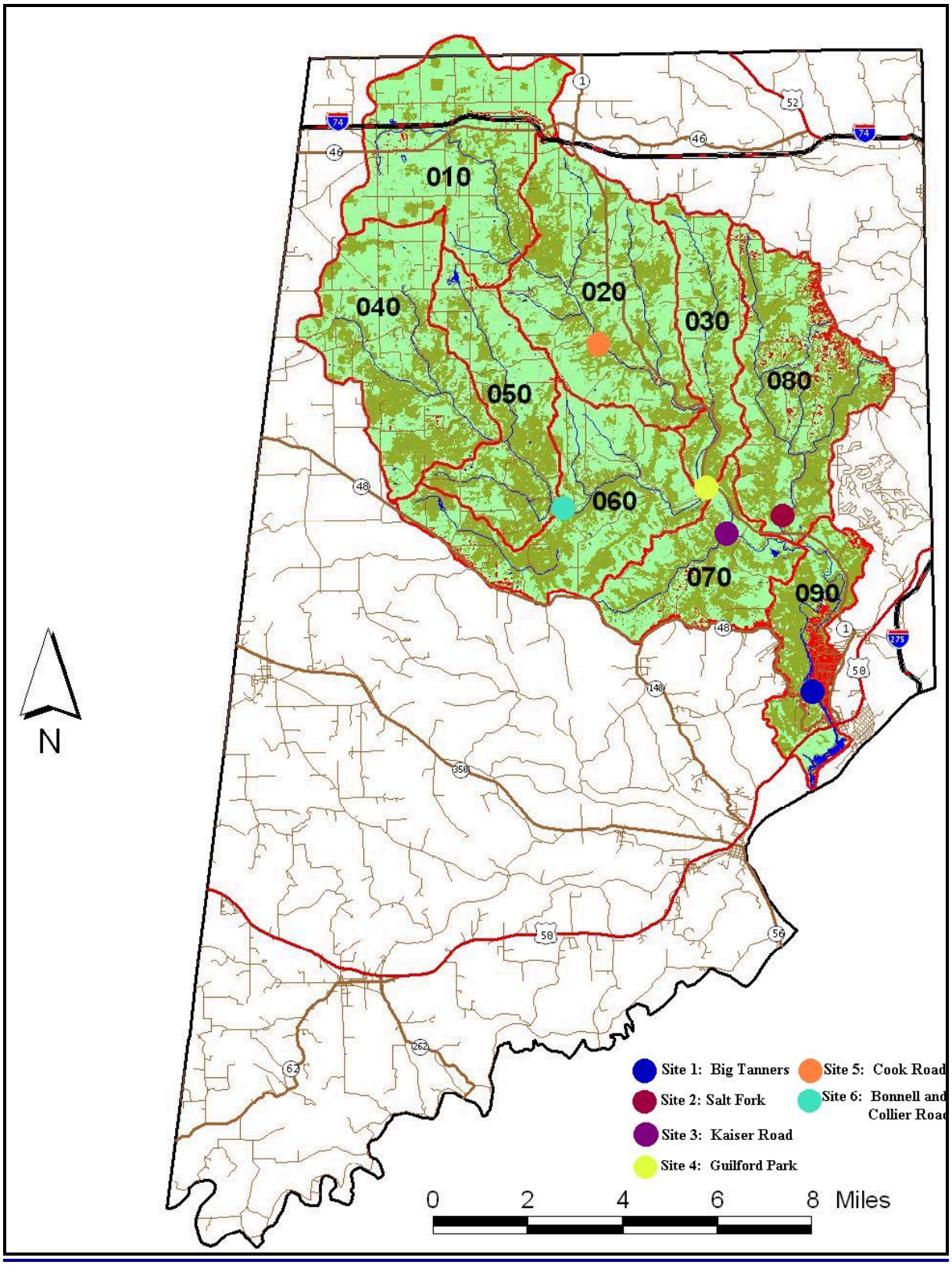
APPENDIX B – Tanners Creek Soils Map



APPENDIX C – Water Monitoring Data

Appendix B: Chemical Data for the Tanners Creek Watershed										
Site 1:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	06/29/2000	8.7	100	-	7.7	3	-1.1	6	0.79	-
	07/28/2000	2.83	33.33	927.6	7.03	1.33	0	9.67	0.85	24.62
	08/30/2000	4.8	55	765.9	8	2.2	0	50	0.02	25.67
	09/20/2000	2.79	28	666	8.2	1.5	0.1	7	0.1	23
Site 2:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	04/06/2000	19	140	0	8	2	2.3	0.1	0.001	0
	06/06/2000	10	120	166.5	8	2	3.9	7.75	0	
	07/26/2000	5.5	65	149.85	7.3	3.83	0	1.55	11.65	
	08/16/2000	7	80	882.5	7.8	2.1	-0.6	1	0.57	8
	09/26/2000	8.71	88.4	316.35	8.1	5	-1.7	5	1.76	42
	10/09/2000	9.65	85	1332	7.97	2.88	-0.8	3.5	0	12.82
	11/07/2000	8.26	74.83	390	7.97	2.92	-5.3	4.5	0.05	2.78
Site 3:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	05/31/2000	9.75	122		7.6	0.85	0	0	0	
	06/30/2000	9.5	120		7.9	0	0	0	2.64	
	08/25/2000	10	120	316.35	8	3.77	0.6	1	3	21.33
	09/29/2000	9.07	90	0	8.17	6.57	-0.36	4.33	0.07	15.52
	10/20/2000	8.13	76.27	2497.5	8	3.57	-1.9	3.33	6.17	10.37
	11/07/2000	9.29	85.2	833	7.9	4.73	-2.7	3.5	0	5.94
Site 4:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	04/29/2000	15	140		8.1	3	0	0	0	
	06/28/2000	11	130	110	8.5	1.5	-0.6	0	0.48	
	07/14/2000	7	95	366.3	8.47	5	0	0	0.25	
	08/15/2000	11.5	125		7.1		3	0.6	0.007	6
	09/17/2000	20	140	0	6.53	13	-0.25	0.16	14.3	
	10/19/2000	4.5	44		7.5		1	0.52	0	19
Site 6:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	05/08/2000	6.33	75		8.5	3.3	0	0.05	0	
	06/20/2000	8.83	96.67		8.3	2.3	0	0.25	15.18	
	07/18/2000	4.5	53	99.9	8.5	2	-3.3	0	0	13.5
	08/19/2000	7.5	85	649	7.43	5	0	3	0.07	21.5
	09/26/2000	9.4	84	283	8.1	3.4	-1.1	5	0.15	45
	10/23/2000	12.15	123.87	3912.5	8.43	3.01	-0.33	3.5	1.47	1.34
	11/15/2000	12.9	105	3263.5	8	4.95	-1.27	2	0.45	4.69
Site 7:	**Date**	**D.O.**	**% Saturation**	**E-Coli**	**pH**	**BOD 5**	**Temp Change**	**Phosphate**	**Nitrate**	**Turbidity**
	05/11/2000	13.2	140		8.3	3.2	-1	0.3	0	
	06/19/2000	9	97.5	199	8.2	2.35	0	0.01	0.44	
	07/21/2000	8	95	682.5	8.2	3.25	3.4	0.4	2.5	16
	08/22/2000	6	65	1548.5	8.1	0.9	-0.37	0.2	3	15
	09/24/2000	9	95	0.01	8.2		0	3	0.44	

APPENDIX D – Water Monitoring Sites

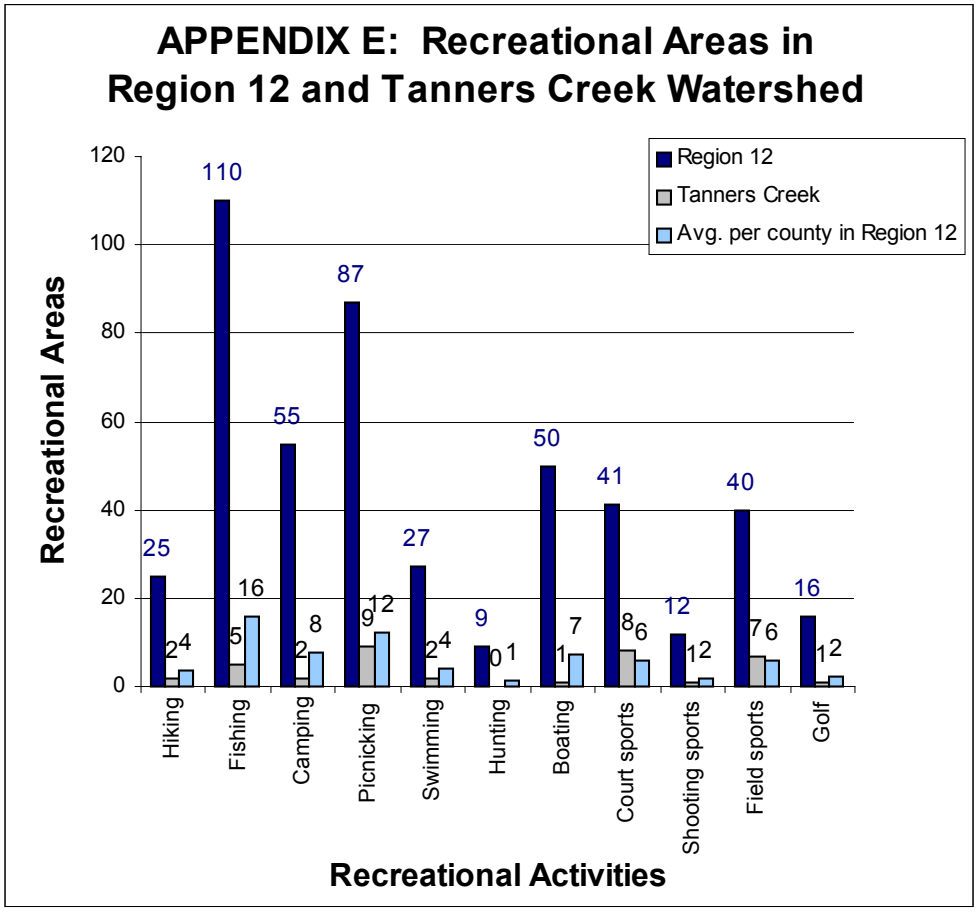


APPENDIX E – Fishing Tournaments

Date	Tournament	Cost	Type
May 6	***Anglers Outfitters***	$125	Team
May 12	***Salmoides Bass Tournament***	$100	Team
June 9-10	***Indiana Bass Federation***	$70	Draw
June 16-17	***Hoosier Open***	$150	Team
July 1	***Adopt a Bass***	$100	Team
July 14	***Salmoides Bass Tournament***	$100	Team
July 15	***Ohio Buddy Bass Circuit***	$100	Team
July 20-21	***Operation Bass – Walmart Fishing League***	$150/$75	Pro-Am
July 21-22	***Basswater Tournament Trail***	N/A	N/A
July 27-28	***Operation Bass – Walmart Fishing League***	$150/$75	Pro-Am
August 5	***Angler Outfitters***	$125	Team
September 15	***Salmoides Bass Tournament***	$100	Team
September 16	***Angler Outfitters***	$125	Team
October 28	***Four Man Dream Team***	$100	Team

Source: http://www.dbaits.com/localtournaments1.html

APPENDIX F – Recreation Graph



APPENDIX G – Tanners Creek Watershed Parks

Name	Location	Description
Guilford Covered Bridge	Indiana State Road 1, York and Miller Townships	Offers a picnic area, basketball court, ball fields and playground equipment. Historic covered bridge has been renovated
Bright Community Park	Brightwood Drive, Miller and Harrison Townships	Offers a shelter house, picnic tables, softball field, basketball court, playground and horseshoe pit
Greendale Park	Nowlin Avenue and Park Street	Offers two picnic shelters, camping, four tennis courts, a softball/baseball field, horseshoe pits, foot trails, cabin/meeting hall, basketball courts, and swimming pool
Oakey Park	Oakey Avenue and Sheldon Street	Offers picnicking and playground equipment
Schnebelt Park	Nowlin Avenue and Arthur Street	Offers canoeing, fishing, picnicking, playground equipment, foot trails, and ice skating
O'Brien Park	Ridge Avenue and Broadway Street	Offers picnicking
Homestead Park	Dorman Avenue	Provides a playground, basketball court and picnic area
Lorey Park	Ridge Avenue	Has playground equipment and a picnic area
Ludlow Hill Park	Indiana State Road 48	Offers three shelter houses, picnic areas, walking/jogging, two lakes with fishing, a football field, two tennis courts and a new basketball court

Source: 2000-2001 Guide to Dearborn and Ohio Counties

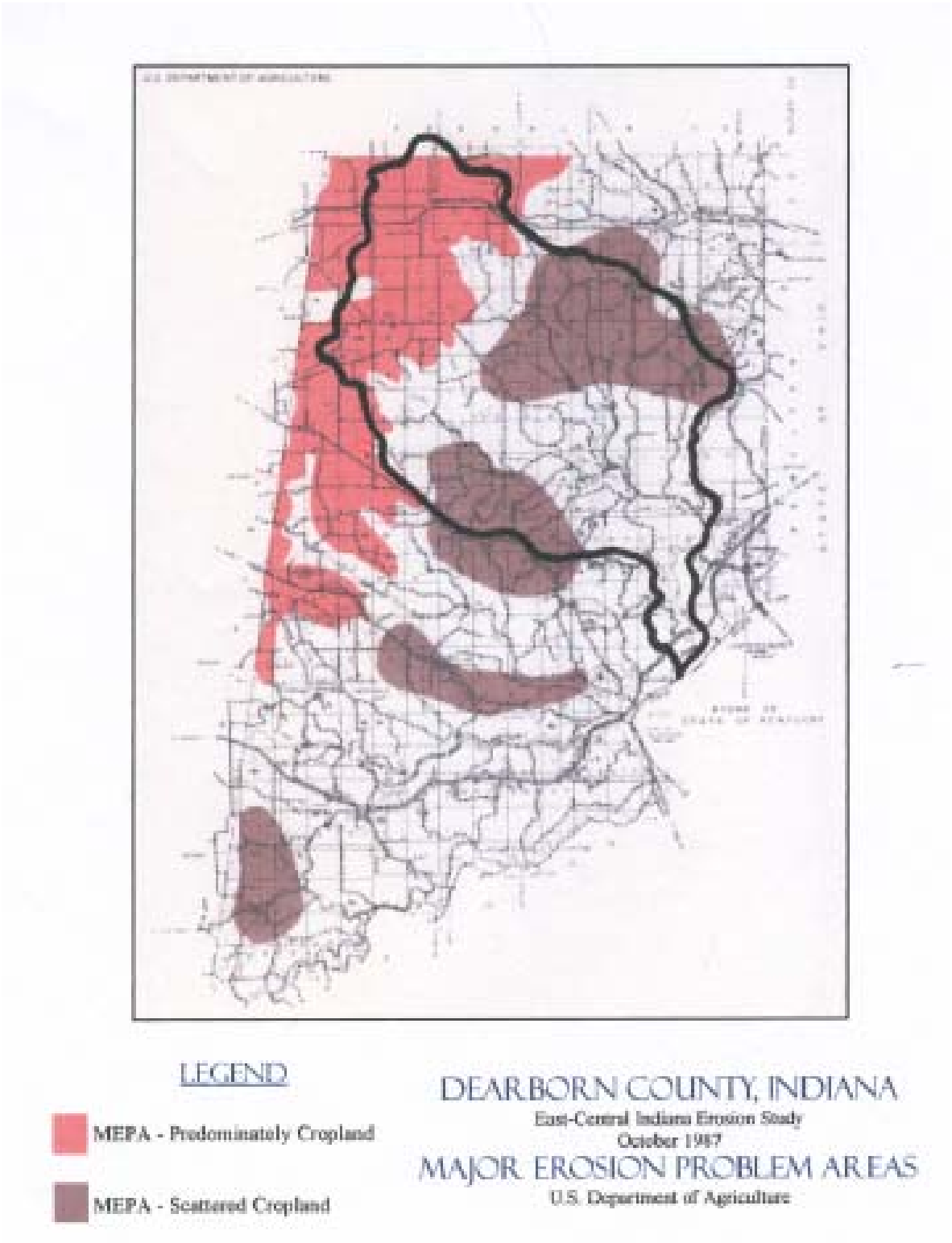
APPENDIX H – Fish Index

Common Name	Scientific Name	Number	%	Size Range (Inches)	Total Weight (Pounds)	%	Occurrence Index
Gizzard shad	*Dorosoma cepedianum*	830	46.4	7.0-12.2	144.14	39.5	2
Longear sunfish	*Lepomis megalotis*	211	11.8	1.5-5.9	8.33	2.3	2
Bluntnose minnow	*Pimephales notatus*	138	7.7	1.7-4.3	0.68	0.2	2
Golden redhorse	*Moxostoma erythrurum*	95	5.3	2.4-14.5	34.54	9.5	2
Central stoneroller	*Campostoma anomalum*	69	3.9	1.9-4.2	0.91	0.2	1
Bluegill	*Lepomis macrochirus*	65	3.6	1.1-7.0	4.95	1.4	2
Spotted bass	*Micropterus punctulatus*	47	2.6	3.0-13.7	13.07	3.6	2
Northern hog sucker	*Hypentelium nigricans*	46	2.6	2.6-11.5	5.11	1.4	1
Emerald shiner	*Notropis atherinoides*	43	2.4	1.7-3.2	0.14	*	1
Green sunfish	*Lepomis cyanellus*	37	2.1	1.6-6.5	3.03	0.8	2
Black redhorse	*Moxostoma duquesnei*	24	1.3	2.4-15.5	9.05	2.5	1
Striped shiner	*Luxilus chrysocephalus*	23	1.3	2.3-5.2	1.09	0.3	1
Fantail darter	*Etheostoma flabellare*	21	1.2	1.6-2.3	0.05	*	1
Freshwater drum	*Aplodinotud grunniens*	20	1.1	9.8-13.3	6.28	1.7	2
Largemouth bass	*Micropterus salmoides*	15	0.8	5.1-17.2	15.65	4.3	2
Common carp	*Cyprinus carpio*	9	0.5	21.1-28.7	68.10	18.7	2
Silver redhorse	*Moxostoma anisurun*	8	0.4	6.2-16.5	10.48	2.9	2
Warmouth	*Lepomis gulosus*	8	0.4	1.6-6.2	0.50	0.1	1
Rainbow darter	*Etheostoma caeruleum*	8	0.4	1.8-2.2	0.03	*	1
Smallmouth buffalo	*Ictiobus bubalus*	7	0.4	11.6-15.8	10.50	2.9	1
Rock bass	*Ambloplites rupestris*	7	0.4	2.5-7.2	0.87	0.2	1
Spotted sucker	*Minytrema melanops*	6	0.3	3.3-14.2	2.16	0.6	2
River carpsucker	*Carpiodes carpio*	5	0.3	15.8-18.1	11.44	3.1	1
White bass	*Morone chrysops*	5	0.3	8.0-12.0	3.28	0.9	1

Logperch	*Percina caprodes*	5	0.3	3.1-4.3	0.06	*	1
Yellow bullhead	*Ameiurus natalis*	4	0.2	2.6-10.4	1.25	0.3	1
Orangespotted sunfish	*Lepomis humilis*	4	0.2	1.3-3.0	0.03	*	1
Sand shiner	*Notropis stramineus*	4	0.2	1.3-3.0	0.03	*	1
Brook silverside	*Labidesthes sicculus*	4	0.2	2.7-3.1	0.01	*	1
Greenside darter	*Etheostoma blennioides*	3	0.2	2.8-3.6	0.02	*	1
Rosefin shiner	*Lythrurus ardens*	3	0.2	1.9-2.8	0.02	*	1
Channel catfish	*Ictalurus punctatus*	2	0.1	16.5-23.3	6.20	1.7	1
White sucker	*Catostomus commersoni*	2	0.1	10.3-12.3	1.26	0.3	1
Quillback	*Carpiodes cyprinus*	2	0.1	4.2-9.2	0.41	0.1	2
Sauger	*Stizostedion canadense*	2	0.1	7.3-9.7	0.36	0.1	1
White crappie	*Pomoxis annularis*	1	0.1	9.7	0.46	0.1	1
Longnose gar	*Lepisosteus osseus*	1	0.1	17.0	0.33	0.1	1
Striped bass	*Morone saxatilis*	1	0.1	6.3	0.13	*	1
Smallmouth bass	*Micropterus dolomieu*	1	0.1	5.9	0.11	*	1
Steelcolor shiner	*Cyprinella whipplei*	1	0.1	4.0	0.03	*	1
Spotfin shiner	*Cyprinella spiloptera*	1	0.1	3.5	0.01	*	1
Johnny darter	*Etheostoma nigrum*	1	0.1	2.0	**	*	1
Silverjaw minnow	*Notropis buccatus*	1	0.1	2.0	**	*	1
TOTALS		***1,790***			***365.09***		

**Less than 0.1%*
***Less than 0.01 Lb.*
Source: Fisheries Survey of Tanners Creek, 1996. Larry Lehman

APPENDIX I – Major Erosion Problem Areas



APPENDIX J – Sponsors

- American Electric Power
- American State Bank
- Argosy
- Beiersdorfer's Orchard
- Bigg's
- Cincinnati Reds
- City of Aurora
- City of Lawrenceburg
- CRIK (Creek Restoration in KY)
- Dawson's Greenworks
- Dearborn County Community Foundation
- Dearborn County Cub Scouts
- Dearborn County Hospital
- Dearborn County Purdue Extension
- Dearborn County Register
- Dearborn County Solid Waste Management District
- Dearborn County Water Rescue
- Dearborn Savings Bank
- Domino's Pizza
- Firstar National Bank
- Fluor Constructors
- Garden's Alive
- Gehring Group
- Guilford Volunteer Fire Department
- Hoosier Riverwatch
- Junior Leaders
- Lawrenceburg Key Club
- Lawrenceburg Library
- Lawrenceburg Youth Grant Program
- Newport Aquarium
- OKI
- ORSANCO
- Outdoor World Pro Bass Shops
- People's Federal Bank
- Perfect North Slopes
- PSE&G
- RSVP
- Seitz Agency, Inc.
- South Dearborn High School, Ag Class
- South Dearborn High School Student Government
- South Dearborn Regional Sewer District
- Southeastern Beverage
- Subway
- Walmart

APPENDIX K – Endangered and Threatened Species

Species Name	Common Name	State	Federal	Srank	Grank
VASCULAR PLANT					
Armoracia Aquatica	Lake Cress	SE	**	S1	G4?
Diodia Virginiana	Buttonweed	ST	**	S2	G5
Euphorbia Serpens	Matted Broomspurge	SX	**	SX	G5
Juglans Cinerea	Butternut	WL	**	S3	G3G4
Lilium Canadense	Canda Lily	SR	**	S2	G5
Ludwigia Decurrens	Primrose Willow	SR	**	S2	G5
Penstemon Canescens	Gray Beardtongue	ST	**	S2	G4?
Saxifraga Virginiensis	Virginia Saxifrage	SR	**	S2	G5
Trifolium Stoloniferum	Running Buffalo Clover	SE	LE	S1	G3G4
Viburnum Molle	Softleaf Arrow-wood	SR	**	S2	G5
COLEOPTERA					
Cicindela Marginipennis	Cobblestone Tiger Beetle	SE	**	S2	G2G3
FISH					
Etheostoma Variatum	Variegate Darter	SE	**	S1	G5
AMPHIBIANS					
Ambystoma Barbouri	Streamside Salamander	**	**	S3	G4
Plethodon Richmondi	Ravine Salamander	**	**	S2	G5
REPTILES					
Crotalus Horridus	Timber Rattlesnake	SE	**	S2	G4
BIRDS					
Lanius Ludovicianus	Loggerhead Shrike	SE	**	S3B,SZN	G5
Nycticorax Nycticorax	Black-crowned Night-Heron	SE	**	S1B,SAN	G5
Sterna Antillarum Athalassos	Interier Least Tern	SE	LE	S1B,SZN	G4T2Q
MAMMALS					
Lynx Rufus	Bobcat	SE	**	S1	G5
Taxidea Taxus	American Badger	SE	**	S2	G5

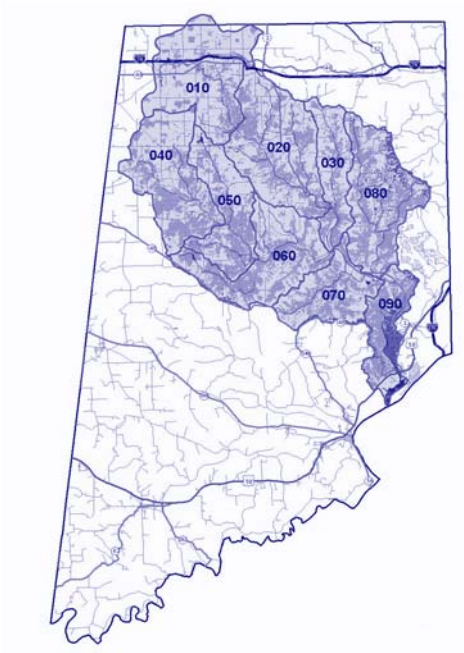
STATE: SX=extirpated, SE=endangered, ST=threatened, SR=rare, SSC=special concern, WL=watch list, SG=significant, **no status but rare

FEDERAL: LE=endangered

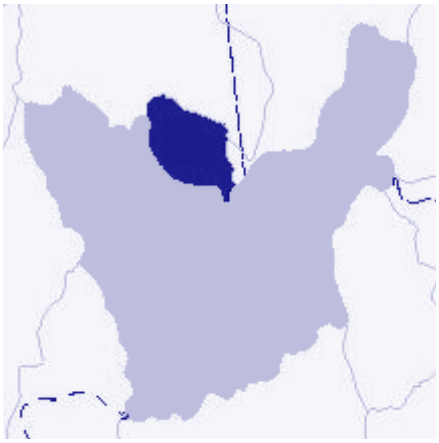
APPENDIX L – Maps Within State, County & Watershed

Within the State

Within the County



Within Middle Ohio-Laughery



APPENDIX M – Calendar of Events

March 2001

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	**8**	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	**27**	28	29	30	31

8 - Tanners Creek Meeting
27 - Presentation

April 2001

S	M	T	W	T	F	S
1	2	3	4	**5**	6	7
8	9	10	11	12	13	14
15	16	**17**	18	19	20	21
22	23	24	**25**	**26**	27	28
29	30					

5 - Tanners Creek Meeting
17 - Public Meeting
25 - Ag Day
26 - Ag Day

May 2001

S	M	T	W	T	F	S
		1	2	**3**	4	5
6	7	8	9	10	**11**	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	**29**	30	31		

1 - Tanners Creek Meeting
3 - Clean-up Meeting
11 - School Presentation
29 - Tanners Creek Meeting

June 2001

S	M	T	W	T	F	S
					1	2
3	4	5	6	**7**	**8**	**9**
10	11	**12**	13	14	15	16
17	**18**	**19**	**20**	**21**	**22**	23
24	25	26	27	**28**	29	30

7 - Clean-up Meeting
8 - Technical Meeting
9 - First Annual Clean-up
12 - Tanners Creek Meeting
18-22 - Dearborn County Fair

July 2001

S	M	T	W	T	F	S
1	2	3	4	5	**6**	7
8	9	**10**	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

6 - Technical Meeting
10 - Tanners Creek Meeting

August 2001

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	**13**	**14**	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

13 - Technical Meeting
14 - Tanners Creek Meeting

September 2001

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	**11**	**12**	13	**14**	**15**
16	17	18	19	20	21	**22**
23 30	24	25	26	27	28	29

11 - Tanners Creek Meeting
12 - Radio Show
14 - Antique Farm Day
15 - Antique Farm Day & 1 Riverwatch
22 - 2 Riverwatch Training

October 2001

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	**9**	10	11	12	13
14	15	16	**17**	18	19	20
21	**22**	23	**24**	25	26	27
28	29	30	31			

9 - Tanners Creek Meeting
17 - Technical Meeting
22 - Water Monitoring Meeting
24 - Radio Show

November 2001

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	**13**	14	15	16	17
18	19	**20**	21	22	23	24
25	26	27	28	29	30	

13 - Tanners Creek Meeting
20 - Technical Meeting

December 2001

S	M	T	W	T	F	S
						1
2	3	4	5	6	**7**	8
9	10	**11**	12	13	14	15
16	17	18	19	**20**	21	22
23 30	24 31	25	26	27	28	29

7 - River Sweep Meeting
11 - Tanners Creek Meeting
20 - Topo Map Project Meeting

January 2002

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	**17**	18	19
20	21	22	23	24	**25**	26
27	28	29	30	31		

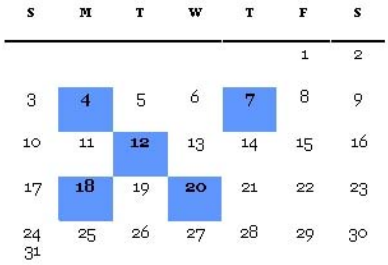
17 - Technical Meeting
25 - Water Monitoring Meeting

February 2002

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	**11**	**12**	13	14	15	16
17	18	19	20	**21**	22	23
24	25	26	27	**28**		

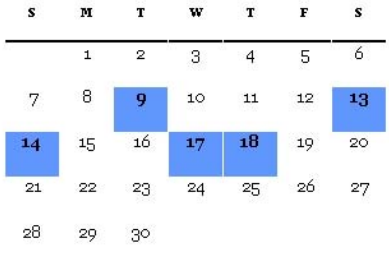
11 - Logo Project deadline
12 - Tanners Creek Meeting
21 - Presentation at Annual Meeting
28 - Technical Meeting

March 2002



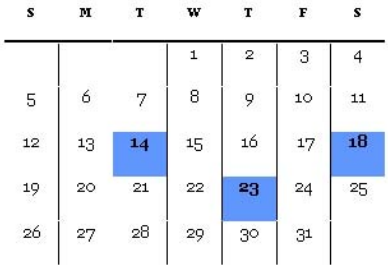
4 - Ag Day Meeting
7 - No-till Breakfast
12 - Tanners Creek Meeting
18 - Display at OKI Meeting
20 - River Sweep Meeting

April 2002



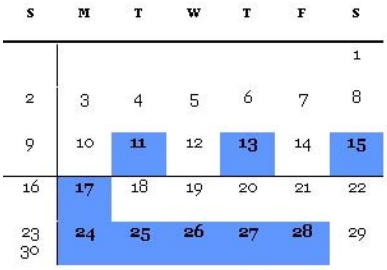
9 - Tanners Creek Meeting
13 - Level 1 Riverwatch Training
14 - Level 2 Riverwatch Training
17 - Ag Day
18 - Ag Day

May 2002



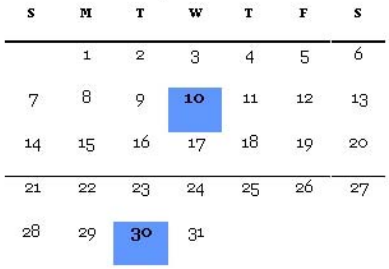
14 - River Sweep Meeting & Storm Drain Marking
18 - Pond Clinic
23 - Technical Meeting

June 2002



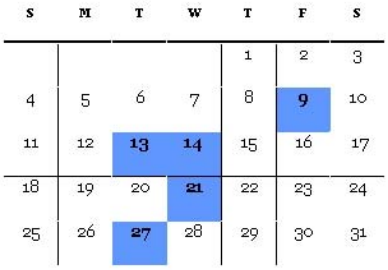
11 - River Sweep Conference & Tanners Creek Meeting
13 - River Sweep Meeting
15 - 2002 River Sweep; Duck Race
17 - Technical Meeting
24-28 - Dearborn County Fair
27 - Education Meeting

July 2002



10 - Technical Meeting
30 - Water Monitoring Meeting

August 2002



9 - Education Meeting
13 - Tanners Creek Meeting
14 - Technical Meeting
21 - Big Tanners Monitoring
27 - Topo Map Project Meeting

September 2002

S	M	T	W	T	F	S
1	2	**3**	4	5	6	7
8	9	10	11	12	13	14
15	16	**17**	18	19	20	21
22	**23**	**24**	25	**26**	27	28
29	30	31				

3 - Education Meeting
17 - Education Meeting
23-24 - First Annual WaterFest
26 - Presentation at Wet Weather Initiative Meeting

October 2002

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	**8**	**9**	10	11	12
13	14	15	16	17	**18**	19
20	21	22	23	24	25	26
27	28	29	30	31		

8 - Education presentation; Tanners Creek Meeting
9 - Storm Drain Marking Project
18 - National Water Monitoring Day

November 2002

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	**12**	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

12 - Watershed Signage Committee Meeting

December 2002

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	**10**	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

10 - Watershed Signage Committee Meeting; Tanners Creek Meeting

January 2003

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	**14**	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

14 - Watershed Signage Committee Meeting

February 2003

S	M	T	W	T	F	S
						1
2	3	4	5	6	**7**	8
9	10	**11**	**12**	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

7 - Deadline for Poem Contest
11 - Watershed Signage Committee Meeting; Tanners Creek Meeting
12 - Last day of 319 grant