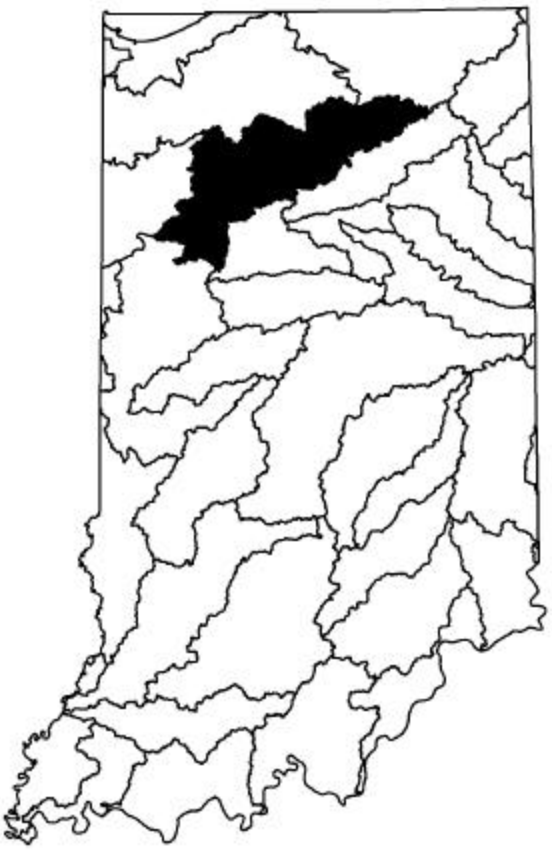
Tippecanoe River Watershed Restoration Action Strategy

Part I: Characterization and Responsibilities



Prepared by

Indiana Department of
Environmental Management
Office of Water Management

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FOREWORD

The Tippecanoe River Watershed Restoration Action Strategy (WRAS) is intended to be a living document to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The first draft of the Tippecanoe River WRAS was released for public review during April 2001. This version of the WRAS incorporates public comments received during that time period.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

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TABLE OF CONTENTS

List of Tables

List of Figures

Appenices

EXECUTIVE SUMMARY

The overall goal and purpose of Part I of the Watershed Restoration Action Strategy (WRAS) is to provide a reference point and map to assist local citizens with improving water quality. The major water quality concerns and recommended management strategies will be addressed in Part II: Concerns and Recommendations of the WRAS.

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

This Strategy is intended to be a fluid document in order to respond to the changing and dynamic quality of our environment. Therefore, this Strategy will require revision when updated information becomes available.

Overview of the Tippecanoe River Watershed

The Tippecanoe River watershed is located in north-central Indiana. The watershed encompasses approximately 1947 square miles in 14 different counties and approximately 2,500 miles of perennial streams.

The land use in the watershed is predominantly agriculture, which represents approximately 87 percent of the land cover. Corn and soybeans comprise the majority of crops produced in the Tippecanoe River watershed. Other land uses include forest, wetlands, and urban areas.

Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity ranks the Tippecanoe River as the eighth most important freshwater site in North America for protection of imperiled aquatic life (Master and others, 1998).

Current Status of Water Quality in the Tippecanoe River Watershed

Section 303(d) of the Clean Water Act requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards. The Clean Water Act Section 303(d) list for Indiana provides a basis for understanding the current status of water quality in the Tippecanoe River Watershed. The following waterbodies are on Indiana's 1998 Clean Water Act Section 303(d) list submitted to and approved by EPA:

Water Body	Location/Reach	County	Parameter(s) of Concern	HUC	Subwatershed(s)
Crooked Lake	Burr Oak	Noble / Whitley	FCA for Hg	5120106	10
Center Lake	Warsaw	Kosciusko	FCA for PCB	5120106	20
Lake Manitou	Rochester	Fulton	FCA for Hg	5120106	50
Lake Maxinkuckee	Culver	Marshall	FCA for Hg	5120106	61
Pike Lake	Warsaw	Kosciusko	FCA for Hg	5120106	20
Tippecanoe Lake	Oswego	Kosciusko	FCA for Hg	5120106	10
Tippecanoe River	Rochester	Fulton	Cyanide	5120106	50

Water Body	Location/Reach	County	Parameter(s) of Concern	HUC	Subwatershed(s)
Tippecanoe River	All	Kosciusko / Fulton / Pulaski	FCA for PCB & Hg	5120106	020 030 040 050 060 080
Winona Lake	Warsaw	Kosciusko	FCA for PCB	5120106	20

FCA - Fish Consumption Advisory
PCB - Polychlorinated Biphenyls
Hg - Mercury
***Only waters for which fish tissue data support issuance of fish consumption advisories are individually cited above. The Indiana Department of Health has issued a general fish consumption advisory for all other waters of the state. This advisory was based on extrapolation of the fish tissue data that were available and generally recommends that if no site-specific advisory is in place for a waterbody, the public should eat no more than one meal (8 oz.) per week of fish caught in these waters. Women of child bearing age, women who are breast feeding, and children up to 15 years of age should eat no more than one meal per month. The basis for this general advisory is widespread occurrence of mercury or PCBs (or both) in most fish sampled throughout the state. Please refer to the most recent Fish Consumption Advisory booklet available through the Indiana Department of Health (317/233-7808). Sources of the mercury and PCBs are unknown for the most part, but it is suspected that they result from air deposition.

Water Quality Goal

The overall water quality goal for the Tippecanoe River Watershed is that all waterbodies meet the applicable water quality standards for their designated uses as determined by the State of Indiana, under the provisions of the Clean Water Act.

Tippecanoe River Watershed Restoration Action Strategy

Part I: Characterization and Responsibilities

1. Introduction

The Clean Water Action Plan states that "States and tribes should work with public agencies and private-sector organizations and citizens to develop, based on the initial schedule for the first two years, Watershed Restoration Action Strategies, for watersheds most in need of restoration." A WRAS is essentially a large-scale coordination plan for an eight-digit hydrologic unit watershed. Each year, more assessments and data may become available. This will require amendments to the WRAS, which must be flexible and broad enough to accommodate change. The WRAS will also foster greater cooperation among State and Federal agencies, which should result in more effective use of personnel and resources.

The WRAS provides an opportunity to assemble, in one place, projects and monitoring that has been completed or is on going within a watershed. It also allows agencies and stakeholders to compare watershed goals and provides a guide for future work within a watershed.

The WRAS for the Tippecanoe River watershed contains two parts. Part I provides a characterization of water quality in the watershed and agency responsibilities. Part II provides a discussion of resource concerns and recommended strategies.

1.1 Purpose of This Document

The overall goal and purpose of the Watershed Restoration Action Strategy Part I is to provide a reference point and roadmap to assist with improving water quality. Part I is a compilation of information, facts, and local concerns in this watershed. It will serve as a reference document for watershed groups and others involved in the assessment and planning of watershed restoration activities.

Part I of the Strategy is intended to be a fluid document in order to respond to the changing and dynamic quality of our environment. Therefore, it will require revision when updated information becomes available.

1.2 Guide to the Use of This Document

Chapter 1: Introduction - This Chapter provides a non-technical description of the purpose of Part 1 of the Strategy. This Chapter also provides an overview of stakeholder groups in the Tippecanoe River watershed.

Chapter 2: General Watershed Description- Some of the specific topics covered in this chapter include:

An overview of the watershed
Hydrology of the watershed

A summary of land use within the watershed
Natural resources in the watershed
Population statistics
Major water uses in the watershed
Water quality classifications and standards

Chapter 3: Causes and Sources of Water Pollution - This Chapter describes a number of important causes of water quality impacts including biochemical oxygen demand (BOD), toxic substances, nutrients, E. coli bacteria and others. This Chapter also describes both point and nonpoint sources of pollution.

Chapter 4: Water Quality and Use Support Ratings - This Chapter describes the various types of water quality monitoring conducted by IDEM. It summarizes water quality in the watershed based on Office of Water Management data, and presents a summary of use support ratings for those surface waters that have been monitored or evaluated.

Chapter 5: State and Federal Water Quality Programs - Chapter 5 summarizes the existing State and Federal point and nonpoint source pollution control programs available to address water quality problems. These programs are management tools available for addressing the priority water quality concerns and issues that are discussed in Part II of the Strategy. Chapter 5 also describes the concept of Total Maximum Daily Loads (TMDLs). TMDLs represent management strategies aimed at controlling point and nonpoint source pollutants. IDEM's TMDL Strategy will also be discussed.

1.3 Stakeholder Groups in the Watershed

The Tippecanoe River watershed contains several stakeholder groups that have different missions (Appendix C). Many of these groups have a long history of conservation work in the Tippecanoe River watershed. The following discussions briefly describe some of the watershed groups.

Arrowhead Country Resource Conservation & Development Area, Inc.

The Resource Conservation & Development (RC&D) Area is a region where residents work to improve their environment and economy through conservation, development, and better utilization of natural resources. RC&D areas receive direct funding and technical assistance through the US Department of Agriculture Natural Resources Conservation Service, as well as other sources. The Arrowhead Country RC&D covers Newton, Jasper, White, Starke, Pulaski, Cass, Miami, Fulton, Marshall, and Kosciusko counties in northern Indiana. The Arrowhead Country RC&D conducts a river raft field day each year and is currently working on a septic assistance program for all the counties included in the RC&D. In addition, the Arrowhead RC&D is working with the White County Soil and Water Conservation District on erosion control/fish habitat and windbreak programs.

Lake Maxinkuckee Environmental Council

The Lake Maxinkuckee Environmental Council (LMEC) is a not-for-profit organization whose mission is the of protection and improvement of water quality in Lake Maxinkuckee. The LMEC works with such projects as fund raising, physical maintenance of the lake, treating stormwater runoff, wetland stewardship, and education campaigns.

Tippecanoe Environmental Lake & Watershed Foundation

The Tippecanoe Environmental Lake & Watershed Foundation (Foundation) led by an eleven member Board of Directors. In 1999, the Foundation established an office and hired a Coordinator. The Foundation has numerous ongoing restoration and water quality monitoring projects located in the upper portion of the Tippecanoe River watershed.

Shafer-Freeman Lakes Environmental Conservation Corporation

The Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC) is a "grass-roots" organization focused on the restoration and protection of Lakes Shafer and Freeman. The SFLECC controls over 2000 acres of land immediately around and under both reservoirs. An immediate concern of the SFLECC is the preservation of recreational, environmental, and financial qualities of the reservoirs.

Northern Indiana Citizens Helping Ecosystems Survive (NICHES)

NICHES is a private land trust working in Tippecanoe, Benton, Carroll, Clinton, Fountain, Montgomery, and Pulaski counties. The primary focus of NICHES is the preservation of natural land and significant natural areas. More information about NICHES can be obtained by visiting http://www.dcwi.com/~niches/.

The Nature Conservancy

The Indiana Chapter of The Nature Conservancy (TNC) has designated the Tippecanoe River as a priority site for conservation action. Due to the size and diversity of the watershed, TNC decided to break the watershed into smaller parts in order to ease some of the start-up problems associated with planning and implementation. Since the upper end of the river is rich in fish and unionid fauna and diversity, TNC started their efforts there, with the goal of working their way downstream as the project matured. TNC is targeting an area encompassing roughly 100 river miles in the upper reaches of the watershed. TNC chose not to include the areas upstream of the upper reservoirs because the reservoirs themselves are settling basins that enhance water quality downstream. Furthermore, most of the tributaries north of the lakes are dredged streams, supporting disparate unionid life and fish communities. Finally, the recreational value of the reservoirs has led to the existence of programs designated to control point and non-point source inputs to the reservoirs to maintain the recreational value.

Since TNC's project is in the beginning phases, one of the main priorities is to develop a citizen advisory group comprised of stakeholders from the watershed area. This group can help identify threats to the system, and unique natural areas that are locally specific and be otherwise unknown. This group will also help to develop “community friendly” strategies to abate local environmental threats, and work as an “on-the-ground sales force” for both the project, and TNC. TNC is also working in the watershed to foster relationships with potential project partners such as the county Soil and Water Conservation Districts and the state and federal natural resources agency personnel that work in the watershed. TNC is educating the public on the national significance of the river by talking to civic groups and holding field days and informational sessions to highlight the watershed's unparalleled diversity.

Due to the size of this watershed, it is unreasonable to think that any one group with limited staff and resources can make an appreciable difference in positively affecting the watershed and river. For that reason, one of TNC's our long-term strategies will be to coordinate with

other groups to undertake land-based conservation efforts aimed at the preservation of species. TNC feels that their best role is maintaining the conservation momentum in the watershed, and working to inspire others to assist us in the mission, thereby multiplying the overall impact in the watershed and extending the reach of the project.

Another priority of the TNC project is to develop a monitoring program that will help develop a basis for determining long-term ecological trends in the Tippecanoe River. This will help develop strategies that will possibly lead toward abating the known environmental threats. TNC has established seven (7) monitoring stations on the River that represent a wide cross section of habitat types, river stretches, substrates, Natural Regions and transitional areas between Natural Regions. The information obtained from these seven sites will serve as a barometer of stream health in those particular areas, and provide the information needed to create adaptive solutions to ecological trends in the system. TNC plans to inventory some of the larger tributaries to the river that have high quality habitat for fish and mussel species. It is TNC's hope that, if some conservation work were done in these smaller watersheds, they can be developed into refuges for species in the event of a catastrophic event on the main river.

TNC's overall goal is build relationships with local landowners and conservation-minded agencies in order to work with them to adopt and promote more Earth friendly land use practices, and work towards developing and promoting more "sustainable" forms of agricultural practices that would be more widely adopted in the watershed. TNC will work with the property owners directly along the river's riparian corridor; working toward making land use changes that will benefit the river and its species through such strategies as tree plantings and buffering practices along the open agricultural drains. TNC is striving to build relationships with potential project partners and working toward establishing TNC as a natural resources leader and information/technical assistance source in the watershed. TNC is also working toward developing success stories in the watershed that can be used as a foothold to gain trust and credibility with local landowners and decision makers.

2 General Watershed Description

This Chapter provides a general description of Tippecanoe River and its watershed and includes the following:

Section 2.1 Tippecanoe River Watershed Overview
Section 2.2 Land Cover, Population, and Growth Trends
Section 2.3 Agricultural Activities in the Tippecanoe River Watershed
Section 2.4 Significant Natural Areas in the Tippecanoe River Watershed
Section 2.5 Surface Water Use Designations and Classifications
Section 2.6 US Geological Survey Water Use Information for the Tippecanoe River Watershed

2.1 Tippecanoe River Watershed Overview

The Tippecanoe River watershed is an 8 digit (05120107) hydrologic unit code (HUC) watershed located in north-central Indiana (Figure 2-1). The watershed encompasses approximately 1,947 square miles in 14 different counties and approximately 2,500 miles of perennial streams. It is subdivided into 116 subbasins represented on the map by 14 digit HUCs (figure 2-2).

For description purposes, the Tippecanoe River can be discussed in terms of three general segments: the headwater portion, the middle portion, and the lower portion. The Tippecanoe River originates in the Northern Lakes Natural Region in northeastern Indiana. The northeastern third of the Tippecanoe River (headwater portion) is characterized by a gravel and cobble substrate and is particularly rich in fish and unionid fauna.

The middle portion of the Tippecanoe River flows through the Kankakee Sands Natural Region. The river in this region is characterized by a sandy substrate that contains some pea gravel. Two hydroelectric dams, Norway and Oakdale dams, form Lakes Shafer and Freeman, respectively, at the downstream end of the middle portion. The soils of the middle portion of the watershed are generally characterized as sandy-loam soils.

The lower portion of the Tippecanoe River, from Oakdale Dam to the Wabash River, is located in the Tipton Till Plain section of the Central Plains Natural Region. This portion is characterized by a stony, gravel river substrate. Oakdale dam at Lake Freeman is a man-made barrier for faunal movement; therefore, the fauna populations in the lower portion are more affected affected by the Wabash River than in the other two portions. The land in this portion is characterized by intensive agricultural grain production on flat, black, prairie soils.

Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity ranks the Tippecanoe River as the eighth most important freshwater site in North America for protection of imperiled aquatic life (Master and others, 1998). This report also states that the Tippecanoe River supports 21 species of fish and mussels that are considered to be "at risk," and another six species that are listed on the federal endangered species list.

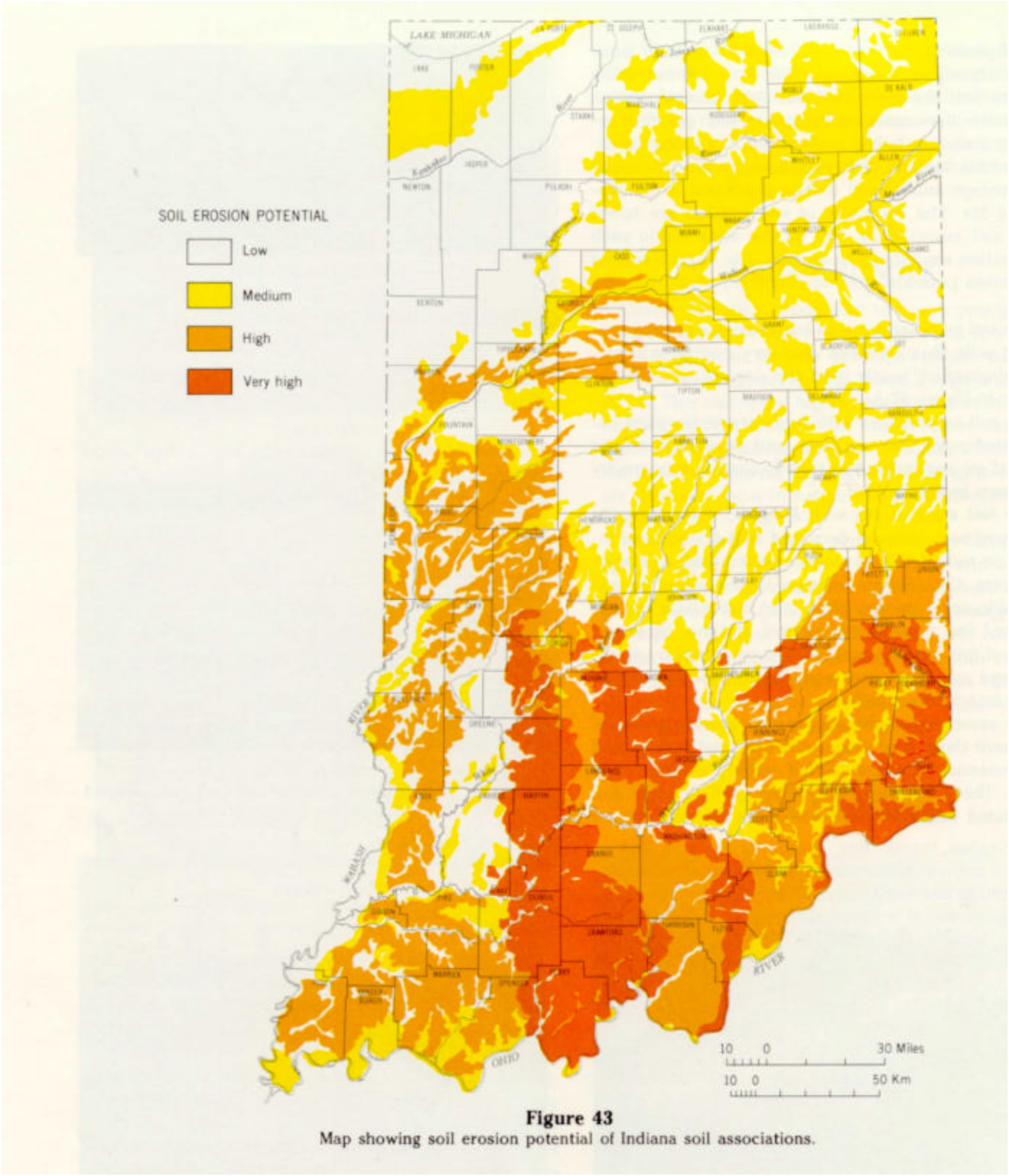

Figure 43
Map showing soil erosion potential of Indiana soil associations.

Figure 2-3 Erosion Potential *
**** from The Indiana Water Resource, IDNR, 1980***

2.2 Land Cover, Population, and Growth Trends

2.2.1 General Land Cover

The U.S. Geological Survey - Biological Resources Division and the U.S. Fish and Wildlife Service are overseeing the National Gap Analysis Program (GAP). In Indiana, Indiana State University and Indiana University are carrying out the Indiana GAP Project which involves an analysis of current vegetative land cover through remote sensing (ISU 1999). This analysis provides vegetative land cover data in 30 by 30-meter grids (Figure 2-4). The following is a summary of vegetative cover in the watershed determined from the GAP image:

1.12%	Urban (impervious, low and high density)
86.94%	Agricultural vegetation (row crop and pasture)
6.51%	Forest vegetation (shrubland, woodland, forest)
4.21%	Wetland vegetation (Palustrine: forest, shrubland, herbaceous)
1.22%	Open Water

2.2.2 Population

The 1990 total population in the 14 counties that have land portions in the watershed was 509,617 (IRBC 1993). Table 2-1 shows a break down of population by county and estimated population projections. It should be noted that these numbers do not reflect the actual population living in the Tippecanoe River watershed. For example, only a portion of Tippecanoe and Benton counties is within the land area of the Tippecanoe River watershed (Figure 2-1). A better estimate of the population within the Tippecanoe River watershed may be the 995 U.S. Geological Survey Water Use Reports, which show a total population in the watershed of 125,100 in 1995 (Table 2-7).

The U.S. Census and the Indiana Business Research Center also provide information about the population in cities and towns. Table 2-2 contains population estimates for various cities and towns located wholly within the watershed. Warsaw is the largest city located in the watershed in terms of population.

TABLE 2-1
TIPPECANOE RIVER COUNTY POPULATION PROJECTIONS 1990-2020*

County	1990	2000	2010	2020	Percent Change (1990 to 2020)
Benton County	9,441	9,614	9,699	9,751	+3.18
Carroll County	18,809	21,135	22,876	23,912	+21.34
Cass County	38,413	38,923	39,456	39,772	+3.42
Fulton County	18,840	21,157	22,379	23,108	+18.47
Jasper County	24,960	30,303	32,741	34,193	+27.00
Kosciusko County	65,294	73,039	77,101	79,520	+17.89
Marshall County	42,182	46,587	48,485	49,616	+14.98
Miami County	36,897	34,661	36,881	38,203	+3.42
Noble County	37,877	43,771	46,584	48,260	+21.51
Pulaski County	12,643	13,681	14,393	14,818	+14.68
Starke County	22,747	24,981	26,836	27,941	+18.59
Tippecanoe County	130,598	141,165	145,504	148,087	+11.81
White County	23,265	25,545	26,311	26,767	+13.08
Whitley County	27,651	30,946	32,429	33,312	+16.99

* Source: Indiana Business Research Center, Indiana University Kelley School of Business
1998 Preliminary Series - Indiana County Population Projections.
Last Updated on 3/10/99 By IBRC Email: ibrc@iupui.edu

TABLE 2-2
TIPPECANOE RIVER CITY AND TOWN POPULATION ESTIMATES*

City/Town	Census 1990	Estimate 1996	Percent Change (1990 to 1996)
Akron	1,037	1,069	3.1
Argos	1,620	1,803	11.3
Bourbon	1,775	1,850	4.2
Brookston	1,800	1,935	7.5
Burket	202	215	6.4
Chalmers	514	535	4.1
Claypool	411	439	6.8
Culver	1,598	1,518	-5
East Germantown	372	362	-2.7
Etna Green	609	631	3.6
Francesville	915	914	-0.1
Fulton	341	361	5.9
Kewanna	563	606	7.6
Larwill	266	290	9
Medaryville	689	698	1.3
Mentone	920	905	-1.6
Monon	1,583	1,744	10.2
Monterey	230	228	-0.9
Monticello	5,342	5,655	5.9
North Webster	946	1,049	10.9
Pierceton	1,033	1,071	3.7
Pottawattomie Park	318	295	-7.2
Reynolds	517	567	9.7
Rochester	6,492	7,283	12.2
Royal Center	863	906	5
Warsaw	11,239	11,802	5
Winamac	2,403	2,566	6.8
Winona Lake	4,108	4,400	7.1
Wolcott	911	959	5.3

* IBRC 1997

2.3 Agricultural Activities in the Tippecanoe River Watershed

Agriculture is the dominant land use in the Tippecanoe River Watershed. Section 2.2.1 shows that 86.94 percent of land cover in the watershed is agricultural vegetation. This section provides an overview of the agricultural activities in the watershed.

2.3.1 Livestock Operations

Livestock production within the watershed encompasses several species, and the overall composition changes from county to county. Hogs and cattle are produced in almost every county, and Kosciusko County produces significant numbers of ducks, geese, and other poultry. See Table 2-3 for livestock inventory numbers. Some animals are raised in open lots or pastures and some are raised in confined feeding lots or buildings.

Confined feeding is the raising of animals for food, fur or recreation in lots, pens, ponds, sheds or buildings, where they are confined, fed and maintained for at least 45 days during any year, and where there is no ground cover or vegetation present over at least half of the animals' confinement area. Livestock markets and sale barns are generally excluded (IDEM 1999).

Indiana law defines a confined feeding operation as any livestock operation engaged in the confined feeding of at least 300 cattle, or 600 swine or sheep, or 30,000 fowl, such as chickens, ducks and other poultry. The IDEM regulates these confined feeding operations, as well as smaller livestock operations which have violated water pollution rules or laws, under IC 13-18-10.

As of October 1999, there were 939 livestock producers operating under the Confined Feeding Rules in the 14 counties of the watershed. Tables 2-3 and 2-3b show livestock numbers from the USDA Agricultural Census (USDA-NASS 1997) “inventory” animals in each county.

TABLE 2-3
LIVESTOCK IN THE TIPPECANOE RIVER WATERSHED

	1997 Livestock Inventory*							
	Hogs and pigs		Cattle and calves		Sheep and lamb		Layers 20 weeks and older	
County	Number	State Rank**	Number	State Rank**	Number	State Rank**	Number	State Rank**
Benton County	6982	75	3865	78	866	23	127	81
Carroll County	255176	1	6084	65	751	31	636	46
Cass County	72036	18	12323	28	1502	7	381	60
Fulton County	33912	40	10394	35	570	42	D	22
Jasper County	93813	13	10734	33	@	@	D	12
Kosciusko County	SEE SPECIAL TABLE 2-3b							
Marshall County	15124	65	15452	18	@	@	D	26
Miami County	99543	11	14578	21	808	26	529	48
Noble County	43481	33	16262	15	1243	8	@	@
Pulaski County	54160	27	6106	64	486	48	D	8
Starke County	2268	84	1702	91	@	@	892	40
Tippecanoe County	90874	15	7761	53	1941	2	D	33
White County	110596	7	6965	57	519	45	D	4
Whitley County	59829	24	9534	37	934	16	D	28

* USDA-NASS 1997

@ indicates specie is not in the top 4 for this county

** State Rank is out of a total of 92 counties in Indiana

D Numbers not disclosed by USDA-NASS

TABLE 2-3b
LIVESTOCK IN THE TIPPECANOE RIVER WATERSHED

	1997 Livestock Inventory*							
	Ducks, geese, and other poultry		Pullets 13 to less than 20 weeks		Broiler		Layers 20 weeks and older	
County	Number	State Rank**	Number	State Rank**	Number	State Rank**	Number	State Rank**
Kosciusko County	552118	1	D	1	D	6	2461526	3

* USDA-NASS 1997

** State Rank is out of a total of 92 counties in Indiana

D Numbers not disclosed by USDA-NASS

2.3.2 Crop Production

As discussed previously, the soils of the Tippecanoe River watershed are good for crop production. Table 2-4 lists the 1997 acres of the major crops produced in 1997 throughout the 14 counties in the watershed. For 1997, total acres of corn for grain edged out total acres of soybeans for beans as the number one crop produced in the 14 counties. Corn and soybeans are clearly the primary crops produced in the watershed on basis of total acres.

TABLE 2-4
CROPS PRODUCED IN THE TIPPECANOE RIVER WATERSHED

	1997 Crops*							
	Corn for grain		Soybeans for beans		Wheat		Hay crops	
County	Acres	State Rank**	Acres	State Rank**	Acres	State Rank**	Acres	State Rank**
Benton County	120732	2	116750	1	2055	78	2074	86
Carroll County	103130	11	73613	27	4185	50	2787	82
Cass County	84862	20	71078	29	5110	36	6306	38
Fulton County	70435	33	57125	42	2727	71	5951	43
Jasper County	138246	1	100441	7	1901	79	2625	84
Kosciusko County	93186	16	71941	28	6528	24	11851	11
Marshall County	84829	21	55868	46	5158	35	10776	21

	1997 Crops*							
	Corn for grain		Soybeans for beans		Wheat		Hay crops	
Miami County	73862	28	76551	23	5706	32	7456	31
Noble County	58456	54	48990	53	6481	25	11470	15
Pulaski County	106040	9	83250	17	@	@	3556	71
Starke County	59664	50	25900	74	616	85	2448	85
Tippecanoe County	104188	10	95325	11	6350	26	5516	49
White County	118282	3	108409	2	3961	57	4423	62
Whitley County	48496	61	51150	51	12588	6	6883	33

* USDA-NASS 1997

** State Rank is out of a total of 92 counties in Indiana

@ indicates specie is not in the top 4 for this county

2.4 Significant Natural Areas in the Tippecanoe River Watershed

In 1993, the Indiana Natural Resources Commission (NRC) adopted its “Outstanding Rivers” List for Indiana. This listing is referenced in the standards for utility line crossings within floodways, formerly governed by IC 14-28-2 and now controlled by 310 IAC 6-1-16 through 310 IAC 6-1-18. Except where incorporated into a statute or rule, the "Outstanding Rivers List" is intended to provide guidance rather than to have regulatory application (NRC 1997). To help identify the rivers and streams which have particular environmental or aesthetic interest, a special listing has been prepared by IDNR's Division of Outdoor Recreation. This listing is a corrected and condensed version of a list compiled by American Rivers and dated October 1990. The NRC has adopted the IDNR listing as an official recognition of the resource values of these waters. A river included in the "Outstanding Rivers List" qualifies under one or more of 22 categories. Table 2-5 presents the rivers in the Tippecanoe River watershed which are on the "Outstanding Rivers List" and their significance.

State Parks, Forests, Nature Preserves, and Recreation Areas

Table 2-6 lists a number of parks, forests, nature preserves and other recreational areas within the Tippecanoe River Watershed.

TABLE 2-5
WATERS OF THE TIPPECANOE RIVER WATERSHED ON THE OUTSTANDING RIVERS LIST FOR INDIANA*

River Segment	County	Significance
Tippecanoe River: Source (Lake Tippecanoe) to Norway and from Oakdale Dam to the confluence with Wabash River	Carroll, Fulton, Kosciusko, Marshall, Pulaski, Tippecanoe, White	5, 13, 16

Significance of numbering system:

5. Nationwide Rivers Inventory Rivers. The 1,524 river segments identified by the National Park Service in its 1982 "Nationwide Rivers Inventory" as qualified for consideration for inclusion in the National Wild and Scenic Rivers System.

13. Canoe Trails. State-designated canoe/boating routes.

16. State Park Rivers. Rivers protected by inclusion in a state park or state preserve.

*NRC 1997

Table 2-6
Special Areas in the Tippecanoe River Watershed

County	Special Area	Manager	Access
Carroll	Oakdale Dam Public Access Site	DNR Fish & Wildlife	Open
Carroll	Carroll Co. (Hufford) Gamebird Habitat	DNR Fish & Wildlife	Open
Fulton	Talma (Tippecanoe River) Public Access Site	DNR Fish & Wildlife	Open
Fulton	Menominee P.F.A.	DNR Fish & Wildlife	Open
Fulton	Lakeview Park	Rochester Park Board	Open
Fulton	National Fish Hatchery	Rochester Park Board	Closed
Fulton	Akron Park	Akron Park Board	Open
Fulton	Nyona Lake Public Access Site	DNR Fish & Wildlife	Open
Fulton	South Mud Lake Public Access Site	DNR Fish & Wildlife	Open
Fulton	Fletcher Lake Public Access Site	DNR Fish & Wildlife	Open
Fulton	Manitou (Lake) Islands Wetland Conservation Area	DNR Fish & Wildlife	Open
Fulton	Manitou Islands Nature Preserve And WCA	DNR Fish & Wildlife	Open
Fulton	Manitou (Lake) Islands Wetland Conservation Area	DNR Fish & Wildlife	Open
Jasper/Pulaski/Starke	Jasper-Pulaski Fish And Wildlife Area	DNR Fish & Wildlife	Open
Kosciusko/Noble	Tri-County Fish And Wildlife Area	DNR Fish & Wildlife	Open
Kosciusko	Webster Lake Park	North Webster Park Board	Open
Kosciusko	Backwater / Webster Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Grassy Creek Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Backwaters (Pisgah Marsh) Nongame Area	DNR Fish & Wildlife	Restricted
Kosciusko	Kuhn Lake Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Chapman Lake Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Center Lake Wetland Conservation Area	DNR Fish & Wildlife	Open
Kosciusko	Camp Lucerne	Girls Club	Open
Kosciusko	Levin Salvage Yard	Warsaw Park Board	Open
Kosciusko	Winona Lake Park	Winona Park Board	Open
Kosciusko	Kelley Park	Warsaw Park Board	Open

County	Special Area	Manager	Access
Kosciusko	Burket Leatherleaf Bog	The Nature Conservancy	Restricted
Kosciusko	Pierceton Park	Pierceton-Washington Twp. Parks	Open
Kosciusko	Palestine Lake Water Control Structure	DNR Fish & Wildlife	Open
Kosciusko	Palestine Lake Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Carr Lake Public Access Site	DNR Fish & Wildlife	Open
Kosciusko	Ball Wetlands Nature Preserve	Muncie YMCA	Restricted
Kosciusko	Big Chapman Lake Nature Preserve	DNR Nature Preserves	Open
Kosciusko	Little Chapman Lake Nature Preserve	DNR Fish & Wildlife	Open
Kosciusko	Little Chapman Lake (Hogan) Natural Area	DNR Fish & Wildlife	Open
Marshall	Lake Maxinkuckee Fish Hatchery	DNR Fish & Wildlife	Restricted
Marshall	Old Tip Town Public Access Site	DNR Fish & Wildlife	Open
Marshall	Lake Maxinkuckee Public Access Site	DNR Fish & Wildlife	Open
Marshall	Lake Maxinkuckee Wetland Conservation Area	DNR Fish & Wildlife	Open
Marshall	Culver Town Park	Culver Park Board	Open
Noble	Smalley Lake Public Access Site	DNR Fish & Wildlife	Open
Noble	Crane Lake Public Access Site	DNR Fish & Wildlife	Open
Noble	Big Lake Public Access Site	DNR Fish & Wildlife	Open
Noble	Crooked Lake Nature Preserve (Ralph Gates Addtn.)	Acres Inc.	Open
Pulaski	Bruce Lake Public Access Site	DNR Fish & Wildlife	Open
Pulaski	Berns-Meyer Nature Preserve	DNR Nature Preserves	Open
Pulaski	Winamac Fish And Wildlife Area	DNR Fish & Wildlife	Open
Pulaski	Sandhill Nature Preserve	DNR State Parks	Open
Pulaski	Tippecanoe River State Park	DNR State Parks	Open
Pulaski	Tippecanoe River Nature Preserve	DNR State Parks	Open
White	White County Gamebird Habitat Area	DNR Fish & Wildlife	Open
White	Spinn Prairie Nature Preserve	The Nature Conservancy	Open
Whitley/Noble	Crooked Lake Nature Preserve	DNR Nature Preserves	Open

2.5 Surface Water Use Designations and Classifications

The following uses are designated by the Indiana Water Pollution Control Board (327 IAC 2-1-3):

- Surface waters of the state are designated for full-body contact recreation during the recreational season (April through October).
- All waters, except limited use waters, will be capable of supporting a well-balanced, warm water aquatic community.
- All waters, which are used for public or industrial water supply, must meet the standards for those uses at the point where water is withdrawn.
- All waters, which are used for agricultural purposes, must meet minimum surface water quality standards.
- All waters in which naturally poor physical characteristics (including lack of sufficient flow), naturally poor or reversible man-induced conditions, which came into existence prior to January 1, 1983, and having been established by use attainability analysis, public comment period, and hearing may qualify to be classified for limited use and must be evaluated for restoration and upgrading at each triennial review of this rule.
- All waters, which provide unusual aquatic habitat, which are an integral feature of an area of exceptional natural beauty or character, or which support unique assemblages of aquatic organisms may be classified for exceptional use.

All waters of the state, at all times and at all places, including the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges:

- that will settle to form putrescent or otherwise objectionable deposits,
- that are in amounts sufficient to be unsightly or deleterious,
- that produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance,
- which are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill aquatic life, other animals, plants, or humans, or
- which are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such degree as to create a nuisance, be unsightly, or otherwise impair designated uses.

2.5.1 Surface Water Classifications in the Tippecanoe River Watershed

The statewide classifications discussed in Section 2.5 apply to all stream segments in the Tippecanoe River watershed.

2.6 US Geological Survey Water Use Information for the Tippecanoe River Watershed

The U.S. Geological Survey's (USGS) National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The USGS works in cooperation with local, State, and Federal environmental agencies to collect water-use information at a site-specific level. USGS also compiles the data from hundreds of thousands of sites to produce water-use information aggregated up to the county, state, and national levels. Every five years, data at the state and hydrologic region level are compiled into a national water-use data system. Table 2-6 shows the USGS Water-Use information for the Tippecanoe River Watershed for 1995.

TABLE 2-7
1995 Water Use Information for the Tippecanoe River Watershed

Population and Water Use totals	1995
Total population in the watershed (thousands)	125.1
Public Water Supply	**1995**
Population served by public groundwater supply (thousands)	40.38
Population served by surface water supply (thousands)	5.08
Total population served by public water supply (thousands)	45.46
Total groundwater withdrawals (mgd)	6.42
Total surface water withdrawals (mgd)	1.03
Total water withdrawals (mgd)	7.45
Total per capita withdrawal (gal/day)	163.88
Population self-supplied with water (thousands)	79.64
Commercial Water Use	**1995**
Groundwater withdrawal for commercial use (mgd)	1.71
Surface water withdrawal for commercial use (mgd)	0.45
Deliveries from public water supplies for commercial use (mgd)	1.45
Total commercial water use (mgd)	3.61
Industrial Water Use	**1995**
Groundwater withdrawal for industrial use (mgd)	2.51
Surface water withdrawals for industrial use (mgd)	1.89
Deliveries from public water suppliers for industrial use (mgd)	1.53
Total industrial water use (mgd)	5.93
Agricultural Water Use	**1995**
Groundwater withdrawals for livestock use (mgd)	2.54
Surface water withdrawals for livestock use (mgd)	0.98
Total livestock water use (mgd)	3.52
Groundwater withdrawals for irrigation (mgd)	12.15
Surface water withdrawals for irrigation (mgd)	2.22
Total irrigation water use (mgd)	14.37

Notes:

mgd million gallon per day
gal/day gallon per day

- The water-use information presented in this table was compiled from information provided in the U.S. Geological Survey's National Water-Use Information Program data system for 1990 and 1995. The National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The U.S. Geological Survey works in cooperation with local, State, and Federal environmental agencies to collect water-use information at a site-specific level. Every five years, the U.S. Geological Survey compiles data at the state and hydrologic region level into a national water-use data system and are published in a national circular.

3 Causes and Sources of Water Pollution

A number of substances including nutrients, bacteria, oxygen-demanding wastes, metals, and toxic substances, cause water pollution. Sources of these pollution-causing substances are divided into two broad categories: point sources and nonpoint sources. Point sources are typically piped discharges from wastewater treatment plants, large urban and industrial stormwater systems, and other facilities. Nonpoint sources can include atmospheric deposition, groundwater inputs, and runoff from urban areas, agricultural lands and others. Chapter 3 includes the following:

Section 3.1 Causes of Pollution
Section 3.2 Point Sources of Pollution
Section 3.3 Nonpoint Sources of Pollution

3.1 Causes of Pollution

'Causes of pollution' refer to the substances which enter surface waters from point and nonpoint sources and result in water quality degradation and impairment. Major causes of water quality impairment include biochemical oxygen demand (BOD), nutrients, toxicants (such as heavy metals, polychlorinated biphenyls [PCBs], chlorine, pH and ammonia) and E. coli bacteria. Table 3-1 provides a general overview of causes of impairment and the activities that may lead to their introduction into surface waters. Each of these causes is discussed in the following sections.

TABLE 3-1
CAUSES OF WATER POLLUTION AND CONTRIBUTING ACTIVITIES

Cause	Activity associated with cause
Nutrients	Fertilizer on agricultural crops and residential/ commercial lawns, animal wastes, leaky sewers and septic tanks, direct septic discharge, atmospheric deposition, wastewater treatment plants
Toxic Chemicals	Pesticide applications, disinfectants, automobile fluids, accidental spills, illegal dumping, urban stormwater runoff, direct septic discharge, industrial effluent
Oxygen-Consuming Substances	Wastewater effluent, leaking sewers and septic tanks, direct septic discharge, animal waste
E. coli	Failing septic systems, direct septic discharge, animal waste (including runoff from livestock operations and impacts from wildlife), improperly disinfected wastewater treatment plant effluent

3.1.1 E. coli Bacteria

E. coli bacteria are associated with the intestinal tract of warm-blooded animals. They are widely used as an indicator of the potential presence of waterborne disease-causing (pathogenic) bacteria, protozoa, and viruses because they are easier and less costly to detect than the actual pathogenic organisms. The presence of waterborne disease-causing organisms can lead to outbreaks of such diseases as typhoid fever, dysentery, cholera, and cryptosporidiosis. The detection and identification of specific bacteria, viruses, and protozoa, (such as Giardia, Cryptosporidium, and Shigella) require special sampling protocols and very sophisticated laboratory techniques which are not commonly available.

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

E. coli bacteria may enter surface waters from nonpoint source runoff, but they also come from improperly treated discharges of domestic wastewater. Common potential sources of *E. coli* bacteria include leaking or failing septic systems, direct septic discharge, leaking sewer lines or pump station overflows, runoff from livestock operations, urban stormwater and wildlife. *E. coli* bacteria in treatment plant effluent are controlled through disinfection methods including chlorination (often followed by dechlorination), ozonation or ultraviolet light radiation.

3.1.2 Toxic Substances

327 IAC 2-1-9(45) defines toxic substances as substances, which are or may become harmful to plant or animal life, or to food chains when present in sufficient concentrations or combinations. Toxic substances include, but are not limited to, those pollutants identified as toxic under Section 307 (a)(1) of the Clean Water Act. Standards for individual toxic substances are listed 327 IAC 2-1-6. Toxic substances frequently encountered include chlorine, ammonia, organics (hydrocarbons and pesticides) heavy metals and pH. These materials are toxic to different organisms in varying amounts, and the effects may be evident immediately or may only be manifested after long-term exposure or accumulation in living tissue.

Whole effluent toxicity testing is required for major NPDES dischargers (discharge over 1 million gallons per day or population greater than 10,000). This test shows whether the effluent from a treatment plant is toxic, but it does not identify the specific cause of toxicity. If the effluent is found to be toxic, further testing is done to determine the specific cause. This follow-up testing is called a toxicity reduction evaluation. Other testing, or monitoring, done to detect aquatic toxicity problems include fish tissue analyses, chemical water quality sampling and assessment of fish community and bottom-dwelling organisms such as aquatic insect larvae. These monitoring programs are discussed in Chapter 4.

Each of the substances below can be toxic in sufficient quantity or concentration.

<u>Metals</u>

Municipal and industrial dischargers and urban runoff are the main sources of metal contamination in surface water. Indiana has stream standards for many heavy metals, but the

most common ones in municipal permits are cadmium, chromium, copper, nickel, lead, mercury, and zinc. Standards are listed in 327 IAC 2-1-6. Point source discharges of metals are controlled through the National Pollution Discharge Elimination System (NPDES) permit process. Mass balance models are employed to determine allowable concentrations for a permit limit. Municipalities with significant industrial users discharging wastes to their treatment facilities limit the heavy metals from these industries through a pretreatment program. Source reduction and wastewater recycling at waste water treatment plants (WWTP) also reduces the amount of metals being discharged to a stream. Nonpoint sources of pollution are controlled through best management practices.

In Indiana, as well as many other areas of the country, mercury contamination in fish has caused the need to post widespread fish consumption advisories. The source of the mercury is unclear; however, atmospheric sources are suspected and are currently being studied.

Polychlorinated biphenyls (PCBs)

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

Ammonia (NH_3)

Point source dischargers are one of the major sources of ammonia. In addition, discharge of untreated septic effluent, decaying organisms which may come from nonpoint source runoff and bacterial decomposition of animal waste also contribute to the level of ammonia in a waterbody. Standards for ammonia are listed in 327 IAC 2-1-6.

3.1.3 Oxygen-Consuming Wastes

Oxygen-consuming wastes include decomposing organic matter or chemicals, which reduce dissolved oxygen in water through chemical reactions. Raw domestic wastewater contains high concentrations of oxygen-consuming wastes that need to be removed from the wastewater before it can be discharged into a waterway. Maintaining a sufficient level of dissolved oxygen in the water is critical to most forms of aquatic life.

The concentration of dissolved oxygen in a water body is one indicator of the general health of an aquatic ecosystem. 327 IAC Section 6 (b)(3) states that concentrations of dissolved oxygen shall average at least five milligrams per liter per calendar day and shall not be less than four milligrams per liter at any time. Dissolved oxygen concentrations are affected by a number of factors. Higher dissolved oxygen is produced by turbulent actions, such as waves, which mix air and water. Lower water temperatures also generally allows for retention of higher dissolved oxygen concentrations. Low dissolved oxygen levels tend to occur more often in warmer,

slow-moving waters. In general, the lowest dissolved oxygen concentrations occur during the warmest summer months and particularly during low flow periods.

Sources of dissolved oxygen depletion include wastewater treatment plant effluent, the decomposition of organic matter (such as leaves, dead plants and animals) and organic waste matter that is washed or discharged into the water. Sewage from human and household wastes is high in organic waste matter. Bacterial decomposition can rapidly deplete dissolved oxygen levels unless these wastes are adequately treated at a wastewater treatment plant. In addition, excess nutrients in a water body may lead to an over-abundance of algae and reduce dissolved oxygen in the water through algal respiration and decomposition of dead algae. Also, some chemicals may react with and bind up dissolved oxygen. Industrial discharges with oxygen consuming wasteflow may be resilient instream and continue to use oxygen for a long distance downstream.

3.1.4 Nutrients

The term "nutrients" in this Strategy refers to two major plant nutrients, phosphorus and nitrogen. These are common components of fertilizers, animal and human wastes, vegetation, and some industrial processes. Nutrients in surface waters come from both point and nonpoint sources. Nutrients are beneficial to aquatic life in small amounts. However, in over-abundance and under favorable conditions, they can stimulate the occurrence of algal blooms and excessive plant growth in quiet waters or low flow conditions. The algal blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and decomposition of dead algae and other plants. This is accentuated in hot weather and low flow conditions because of the reduced capacity of the water to retain dissolved oxygen.

3.2 Point Sources of Pollution

As discussed previously, sources of water pollution are divided into two broad categories: point sources and nonpoint sources. This section focuses on point sources. Section 3.3.1 defines point sources and Section 3.3.2 discusses point sources in the Tippecanoe River Watershed.

3.2.1 Defining Point Sources

Point sources refer to discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge. The term applies to wastewater and stormwater discharges from a variety of sources. Wastewater point source discharges include municipal (city and county) and industrial wastewater treatment plants and small domestic wastewater treatment systems that may serve schools, commercial offices, residential subdivisions and individual homes. Stormwater point source discharges include stormwater collection systems for medium and large municipalities which serve populations greater than 100,000 and stormwater discharges associated with industrial activity as defined in the Code of Federal Regulations (40 CFR 122.26(a)(14)). The primary pollutants associated with point source discharges are Oxygen demanding wastes, nutrients, sediment, color and toxic substances including chlorine, ammonia and metals.

Point source dischargers in Indiana must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit from the state. Discharge permits are issued under the NPDES program, which is delegated to Indiana by the US Environmental Protection Agency (EPA). See Chapter 5 for a description of the NPDES program and permitting strategies.

3.2.2 Point Source Discharges in the Tippecanoe River Watershed

As of June 1999, there were 96 active NPDES permits within the Tippecanoe River watershed (Table 3-2, Figure 3-1). Four of the 96 active NPDES permits are for major discharges (see Table 5-1 for a definition of a major discharge).

Another point source covered by NPDES permits is combined sewer overflows (CSO). A combined sewer system is a wastewater collection system that conveys sanitary wastewater (domestic, commercial and industrial wastewater) and stormwater through a single-pipe system to a Publicly Owned Treatment Works. A CSO is the discharge from a combined sewer system at a point prior to the Publicly Owned Treatment Works. CSOs are point sources subject to NPDES permit requirements including both technology-based and water quality-based requirements of the Clean Water Act.

Community	**CSO Outfalls**
Akron	3
Monticello	5
Royal Center	1
Warsaw	1
Winamac	5

In addition to the NPDES permitted dischargers in the watershed, there may be many unpermitted, illegal discharges to the Tippecanoe River system. Illegal discharges of residential wastewater (septic tank effluent) to streams and ditches from straight pipe discharges and old inadequate systems are a problem within the watershed.

Table 3-2
NPDES PERMITTED FACILITIES
TIPPECANOE RIVER WATERSHED

NPDES	Facility Name	Maj/Mi	City	County	Status
IN0001287	WHIRLPOOL, INC. -NPR	MINOR		KOSCIUSKO	INACTIVE
IN0001554	ASSOCIATED MILK	MINOR		KOSCIUSKO	INACTIVE
IN0001678	WARSAW PWS UNITED WATER	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0001716	DEAN FOODS COMPANY	MINOR	ROCHESTER	FULTON	INACTIVE
IN0002135	GATKE CORPORATION	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0003069	BIOMET, INC.	MINOR		MARSHALL	INACTIVE
IN0003255	VULCAN MATERIALS, #341	MINOR	MONON	WHITE	ACTIVE
IN0003263	VULCAN MATERIALS, #342	MINOR	FRANCESVILL	PULASKI	ACTIVE
IN0003387	R. R. DONNELLEY & SONS	MAJOR	WARSAW	KOSCIUSKO	ACTIVE
IN0003522	SEALED POWER	MINOR	ROCHESTER	FULTON	INACTIVE
IN0003654	WARSAW PLATING WORKS INC	MAJOR		KOSCIUSKO	INACTIVE
IN0003662	ROCHESTER WATER WORKS	MINOR	ROCHESTER	FULTON	ACTIVE
IN0003760	KRALIS BROS. FOOD, INC.	MINOR	MENTONE	KOSCIUSKO	INACTIVE
IN0003816	HEINZ, USA	MINOR		FULTON	INACTIVE
IN0004189	CORETECH INC.	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0004278	WARSAW BLACK OXIDE CO.,	MAJOR	BURKET,	KOSCIUSKO	ACTIVE
IN0004847	PLYMOUTH TUBE CO.	MINOR	WINAMAC	PULASKI	ACTIVE
IN0004936	WOLCOTT WATER WORKS	MINOR	WOLCOTT	WHITE	INACTIVE
IN0020125	ROYAL CENTER MUNICIPAL	MINOR	ROYAL	CASS	ACTIVE
IN0020176	MONTICELLO MUNICIPAL STP	MINOR	MONTICELLO	WHITE	ACTIVE
IN0020516	WINAMAC MUNICIPAL STP.	MINOR	WINAMAC	PULASKI	ACTIVE
IN0020541	PIERCETON MUNICIPAL STP	MINOR	PIERCETON	KOSCIUSKO	ACTIVE
IN0020974	BROOKSTON MUNICIPAL STP	MINOR	BROOKSTON	WHITE	ACTIVE
IN0021288	CULVER MUNICIPAL STP	MINOR	CULVER	MARSHALL	ACTIVE
IN0021580	MONON MUNICIPAL STP	MINOR	MONON	WHITE	ACTIVE
IN0021661	ROCHESTER MUNICIPAL STP	MAJOR	ROCHESTER	FULTON	ACTIVE
IN0021750	STARLITE CORPORATION	MINOR	PIERCETON	KOSCIUSKO	INACTIVE
IN0022128	AKRON SWG TRMT PLT	MINOR		FULTON	INACTIVE
IN0022438	BOURBON MUNICIPAL STP	MINOR	BOURBON	MARSHALL	ACTIVE
IN0024805	WARSAW MUNICIPAL STP	MAJOR	WARSAW	KOSCIUSKO	ACTIVE
IN0024881	WINONA LAKE TOWN OF	MINOR		KOSCIUSKO	INACTIVE
IN0025208	SUBURBAN ACRES M.H.P.	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0025232	AKRON MUNICIPAL STP	MINOR	AKRON	FULTON	ACTIVE
IN0030031	TRI-COUNTY JR.-SR. HIGH	MINOR	WOLCOTT	WHITE	ACTIVE
IN0030571	CHALMERS MUNICIPAL STP	MINOR	CHALMERS	WHITE	ACTIVE
IN0030589	REYNOLDS MUNICIPAL STP	MINOR	REYNOLDS	WHITE	ACTIVE
IN0030881	HIDE-AWAY HILLS M.H.P.	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0030911	YOGI BEAR'S JELLYSTONE	MINOR	PIERCETON	KOSCIUSKO	ACTIVE
IN0030945	SUBURBAN ACRES MOBILE	MINOR		KOSCIUSKO	INACTIVE
IN0030996	WHITLEY PRODUCTS	MINOR	PIERCETON	KOSCIUSKO	INACTIVE
IN0032344	HOFFERT, ARCHIE AND	MINOR		KOSCIUSKO	INACTIVE
IN0034967	MAPLE LEAF FARMS-	MINOR		KOSCIUSKO	INACTIVE
IN0035114	MAPLE LEAF FARMS-LONG	MINOR		KOSCIUSKO	INACTIVE
IN0035246	REYNOLDS TOWN OF	MINOR		WHITE	INACTIVE
IN0036188	GREEN ACRES MOBILE HOME	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0036480	CLAYPOOL TOWN OF	MINOR		KOSCIUSKO	INACTIVE
IN0036943	LANDINGS HOME OWNERS	MINOR	MONTICELLO	CARROLL	ACTIVE

Table 3-2 (Continued)

NPDES	Facility Name	Maj/Min	City	County	Status
IN0037044	TIPPECANOE VALLEY HIGH SCHOOL	MINOR	AKRON	KOSCIUSKO	ACTIVE
IN0037087	EPWORTH FOREST FOUNDATION INC-	MINOR		KOSCIUSKO	INACTIVE
IN0038377	WINAMAC DIVISION,NI IND.INC.	MINOR		PULASKI	INACTIVE
IN0038679	LITE BREEZE ASSOCIATES	MINOR		KOSCIUSKO	INACTIVE
IN0038725	SONOCO PRODUCTS CO.	MINOR	AKRON	FULTON	INACTIVE
IN0039209	WEST CENTRAL JR-SR HIGH SCHOOL	MINOR	FRANCESVILLE	PULASKI	INACTIVE
IN0039870	CLAYPOOL MUNICIPAL STP	MINOR	CLAYPOOL	KOSCIUSKO	ACTIVE
IN0040002	ETNA GREEN MUNICIPAL STP	MINOR	ETNA GREEN	KOSCIUSKO	ACTIVE
IN0040037	FRANCESVILLE MUNICIPAL STP	MINOR	FRANCESVILLE	PULASKI	ACTIVE
IN0040169	KEWANNA TOWN OF	MINOR		FULTON	INACTIVE
IN0040231	LARWILL MUNICIPAL STP	MINOR		WHITLEY	INACTIVE
IN0040339	MEDARYVILLE MUNICIPAL STP	MINOR		PULASKI	INACTIVE
IN0040347	MENTONE MUNICIPAL STP	MINOR	MENTONE	KOSCIUSKO	ACTIVE
IN0040444	NORTH WEBSTER MUNICIPAL STP	MINOR	N. WEBSTER	KOSCIUSKO	ACTIVE
IN0040797	WOLCOTT MUNICIPAL STP	MINOR	WOLCOTT	WHITE	ACTIVE
IN0041726	WESTHAVEN ESTATES MHP	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0041742	VIN-LEE-RON MEAT PACKING, INC.	MINOR	MENTONE	KOSCIUSKO	ACTIVE
IN0042501	CHALMERS PUBLIC WATER SUPPLY	MINOR	CHALMERS	WHITE	ACTIVE
IN0043451	MEDARYVILLE WTR CO	MINOR	MEDARYVILLE	PULASKI	INACTIVE
IN0043958	SHAMROCK MOBILE HOME PARK	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0044024	TRUNKLINE GAS CO	MINOR		KOSCIUSKO	INACTIVE
IN0045438	AKRON LOCKER PLANT	MINOR		FULTON	INACTIVE
IN0045578	DALTON FOUNDRIES, INC., THE	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0045799	OTHY, INC.	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0045829	ZIMMER INC.	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0046191	CRYSTAL LAKE EGG PRODUCTS, INC	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0046299	NORTH SHORE PUBLIC UTILITIES	MINOR	N. WEBSTER	KOSCIUSKO	INACTIVE
IN0046817	DA-LITE SCREEN COMPANY	MINOR		KOSCIUSKO	INACTIVE
IN0047210	U.S. ABRASIVES DIV., JUMBO MFG	MINOR	TIPPECANOE	MARSHALL	INACTIVE
IN0048097	FOUR COUNTY LANDFILL	MINOR	ROCHESTER	FULTON	INACTIVE
IN0048411	PIERCETON PUBLIC WATER SUPPLY	MINOR	PIERCETON	KOSCIUSKO	ACTIVE
IN0049042	IN. DEPT. OF HIGHWAYS, WINAMAC	MINOR	WINAMAC	PULASKI	ACTIVE
IN0049930	MATERIAL SERVICE CORP. WARD ST	MINOR	FRANCESVILLE	PULASKI	INACTIVE
IN0050326	PINEVIEW LODGE AND GOLF COURSE	MINOR	MONTICELLO	WHITE	ACTIVE
IN0050652	TIPPECANOE RIVER STATE PARK	MINOR	WINAMAC	PULASKI	ACTIVE
IN0051110	TALMA FASTENER CORPORATION	MINOR	ROCHESTER	FULTON	INACTIVE
IN0052078	INDIANA BEACH RESORTS, INC.	MINOR	MONTICELLO	WHITE	ACTIVE
IN0052221	PARKVIEW HAVEN RETIREMENT HOME	MINOR	FRANCESVILLE	PULASKI	INACTIVE
IN0052337	ALLOY RODS DIVISION	MINOR		WHITE	INACTIVE
IN0052426	WOLCOTT REST AREA I-65	MINOR	WOLCOTT	WHITE	ACTIVE
IN0053767	CULVER EDUCATIONAL FOUNDATION	MINOR	CULVER	MARSHALL	INACTIVE
IN0054445	WHITE OAKS ON THE LAKE	MINOR	MONTICELLO	WHITE	ACTIVE
IN0054640	SUN METALS PRODUCTS, INC.	MINOR	WARSAW,	KOSCIUSKO	ACTIVE
IN0054704	MECKS WHISPERING PINES, INC.	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0054836	WARSAW PLATING WORKS, INC.	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0055115	T. T. P., INC.	MINOR		KOSCIUSKO	INACTIVE

Table 3-2 (Continued)

NPDES	Facility Name	Maj/Min	City	County	Status
IN0055778	AMOCO OIL COMPANY - BROOKSTON	MINOR	BROOKSTON	WHITE	INACTIVE
IN0056162	ZIMMER, INC. CORP OFFICE BLDG	MINOR	WARSAW	KOSCIUSKO	INACTIVE
IN0056456	YCL CAMP/MINISTRY CENTER	MINOR	CLAYPOOL	KOSCIUSKO	ACTIVE
IN0057185	APPLIED THERMAL TECHNOLOGIES	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0057860	SMALL PARTS, INC.	MINOR	MONTICELLO	WHITE	INACTIVE
IN0058327	MEDARYVILLE MUNICIPAL STP	MINOR	MEDARYVILLE	PULASKI	ACTIVE
IN0059081	FLINT INK CORPORATION	MINOR	WARSAW	KOSCIUSKO	ACTIVE
IN0059137	MONTICELLO WATER WORKS	MINOR	MONTICELLO	WHITE	ACTIVE
IN0060101	FULTON, TOWN OF	MINOR	FULTON	FULTON	ACTIVE
IN0060852	TOWN OF MONTEREY WWTP	MINOR		PULASKI	ACTIVE
IN0060887	TWIN LAKES REGIONAL SEWER DIST	MINOR		WHITE	ACTIVE
IN0109665	REIMER'S ICE SERVICE, INC.	MINOR		KOSCIUSKO	INACTIVE
ING040169	AML SITE #1305, RED LAKE	MINOR	ARTHUR	PIKE	INACTIVE
ING080045	BP SCENT SAVER QUICK MART	MINOR	WARSAW,	KOSCIUSKO	INACTIVE
ING080110	WINAMAC, TOWN OF	MINOR	WINAMAC	PULASKI	INACTIVE
ING250011	UNITED TECHNOLOGIES AUTOMOTIVE	MINOR	BOURBON,	MARSHALL	INACTIVE
ING250016	ZIMMER, INC.	MINOR	WARSAW,	KOSCIUSKO	ACTIVE
ING250021	ZIMMER, INC. CORP. OFFICE BLDG	MINOR	WARSAW,	KOSCIUSKO	ACTIVE
ING250025	CULVER EDUCATIONAL FOUNDATION	MINOR	CULVER	MARSHALL	ACTIVE
ING250028	ABC INDUSTRIES, INC.	MINOR	WINONA LAKE	KOSCIUSKO	ACTIVE
ING250036	DEAN FOODS	MINOR	ROCHESTER	FULTON	ACTIVE
ING340013	BP AMOCO, BROOKSTON TERMINAL	MINOR	BROOKSTON	WHITE	ACTIVE
ING490044	COWLES SAND & GRAVEL, INC.	MINOR	ROCHESTER	FULTON	ACTIVE
ING490074	MATERIAL SERVICE CORP. YARD 49	MINOR	MONON	WHITE	ACTIVE
ING490075	WARD STONE DIV, MATERIAL SERVI	MINOR	FRANCESVILLE	PULASKI	ACTIVE
INL020125	ROYAL CENTER MUNICIPAL STP	MINOR		CASS	ACTIVE
INL020176	MONTICELLO MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL020516	WINAMAC MUNICIPAL STP.	MINOR		PULASKI	ACTIVE
INL020541	PIERCETON MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE
INL020974	BROOKSTON MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL021288	CULVER MUNICIPAL STP	MINOR		MARSHALL	ACTIVE
INL021580	MONON MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL021661	ROCHESTER MUNICIPAL STP	MINOR		FULTON	ACTIVE
INL022438	BOURBON MUNICIPAL STP	MINOR		MARSHALL	ACTIVE
INL024805	WARSAW MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE
INL025232	AKRON MUNICIPAL STP	MINOR		FULTON	ACTIVE
INL030031	TRI-COUNTY MIDDLE-SR HIGH SCH.	MINOR		WHITE	ACTIVE
INL030571	CHALMERS MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL030589	REYNOLDS MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL031798	CASTON EDUCATIONAL CENTER	MINOR		FULTON	ACTIVE
INL037044	TIPPECANOE VALLEY HIGH SCHOOL	MINOR		KOSCIUSKO	ACTIVE
INL039209	WEST CENTRAL JR-SR HIGH SCHOOL	MINOR		PULASKI	ACTIVE
INL039870	CLAYPOOL MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE
INL040002	ETNA GREEN MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE
INL040347	MENTONE MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE
INL040444	NORTH WEBSTER MUNICIPAL STP	MINOR		KOSCIUSKO	ACTIVE

Table 3-2 (Continued)

NPDES	Facility Name	Maj/Min	City	County	Status
INL040797	WOLCOTT MUNICIPAL STP	MINOR		WHITE	ACTIVE
INL053767	CULVER EDUCATIONAL FOUNDATION	MINOR		MARSHALL	ACTIVE
INP000018	PRECISION FABRICATION TECH. IN	MINOR	MONON	WHITE	ACTIVE
INP000061	SEALED POWER DIV. OF DANA CORP	MINOR	ROCHESTER	FULTON	INACTIVE
INP000073	MODERN MATERIALS, INC.	MINOR	ROCHESTER	FULTON	ACTIVE
INP000074	LAU INDUSTRIES	MINOR	ROCHESTER	FULTON	ACTIVE
INP000113	BALL METAL BEVERAGE CONTAINER	MINOR	MONTICELLO	WHITE	ACTIVE
INP000142	WINONA POWDER, LLC	MINOR	MENTONE	KOSCIUSKO	ACTIVE
INP000145	AKRON FOUNDRY, INC.	MINOR	AKRON	FULTON	INACTIVE
INP000152	BRAUN CORPORATION	MINOR	WINAMAC	PULASKI	ACTIVE
INP000164	DEAN FOODS COMPANY	MINOR	ROCHESTER	FULTON	ACTIVE
INP000198	KEWANNA METAL SPECIALTIES, INC	MINOR	KEWANNA	FULTON	ACTIVE
INU000032	AMPEL COMPANY	MINOR		PULASKI	ACTIVE
INU000355	AKRON FOUNDRY, INC.	MINOR		FULTON	ACTIVE
INU000401	MONTICELLO PUBLIC WATER SUPPLY	MINOR		WHITE	ACTIVE
INU046299	NORTHSHORE PUBLIC UTIL. WWTP	MINOR	N. WEBSTER	KOSCIUSKO	ACTIVE

3.3 Nonpoint Sources of Pollution

Nonpoint source pollution refers to runoff that enters surface waters through stormwater runoff, contaminated ground water, snowmelt or atmospheric deposition. There are many types of land use activities that can serve as sources of nonpoint source pollution including land development, construction, mining operations, crop production, animal feeding lots, timber harvesting, failing septic systems, landfills, roads and paved areas. Stormwater from large urban areas (greater than 100,000 people) and from certain industrial and construction sites is technically considered a point source since NPDES permits are required for discharges of stormwater from these areas.

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

3.3.1 Agriculture

There are a number of activities associated with agriculture that can serve as potential sources of water pollution. Land clearing and tilling make soils susceptible to erosion, which can then cause stream sedimentation. Pesticides and fertilizers (including synthetic fertilizers and animal wastes) can be washed from fields or improperly designed storage or disposal sites. Construction of drainage ditches on poorly drained soils enhances the movement of oxygen consuming wastes, sediment and soluble nutrients into groundwater and surface waters.

Concentrated animal operations can be a significant source of nutrients, biochemical oxygen demand and *E. coli* bacteria if wastes are not properly managed. Impacts can result from over application of wastes to fields, from leaking lagoons and from flows of lagoon liquids to surface waters due to improper waste lagoon management. Also there are potential concerns associated with nitrate-nitrogen movement through the soil from poorly constructed lagoons and from wastes applied to the soil surface.

Grassed waterways, conservation tillage, and no-till practices are several common practices used by many farmers to minimize soil loss. Maintaining a vegetated buffer between fields and streams is another excellent way to minimize sediment and nutrient loads to streams.

3.3.2 Urban/Residential

Runoff from urbanized areas, as a rule, is more localized and can often be more severe in magnitude than agricultural runoff. Any type of land-disturbing activity such as land clearing or excavation can result in soil loss and sedimentation. The rate and volume of runoff in urban areas is much greater due both to the high concentration of impervious surface areas and to storm drainage systems that rapidly transport stormwater to nearby surface waters. This increase in volume and rate of runoff can result in streambank erosion and sedimentation in surface waters.

Urban drainage systems, including curb and guttered roadways, also allow urban pollutants to reach surface waters quickly and with little or no filtering. Pollutants include lawn care pesticides and fertilizers; automobile fluids; lawn and household wastes; road salts, and E. coli bacteria (from animals and failing septic systems). The diversity of these pollutants makes it very challenging to attribute water quality degradation to any one pollutant.

Replacement of natural vegetation with pavement and removal of buffers reduces the ability of the watershed to filter pollutants before they enter surface waters. The chronic introduction of these pollutants and increased flow and velocity into a stream results in degraded waters. Many waters adjacent to urban areas are rated as biologically poor. This degradation also exists in lakes, which have been heavily influenced by adjacent urban development.

The population figures discussed in Section 2.3.2 are good indicators of where urban development and potential urban water quality impacts are likely to occur. Concentrated areas where urban development is high may lead to further water quality problems associated with the addition of impervious surfaces next to surface waters.

3.3.3 Onsite Wastewater Disposal

Septic systems contain all of the wastewater from a household or business. A complete septic system consists of a septic tank and an absorption field to receive effluent from the septic tank. The septic tank removes some wastes, but the soil absorption field provides further absorption and treatment. Septic systems can be a safe and effective method for treating wastewater if they are sized, sited, and maintained properly. However, if the tank or absorption field malfunction or are improperly placed, constructed or maintained, nearby wells and surface waters may become contaminated.

Some of the potential problems from malfunctioning septic systems include:

- Polluted groundwater: Pollutants in septic effluent include bacteria, nutrients, toxic substances, and oxygen-consuming wastes. Nearby wells can become contaminated by failing septic systems.

- Polluted surface water: Groundwater often carries the pollutants mentioned above into surface waters, where they can cause serious harm to aquatic ecosystems. Leaking septic tanks can also leak into surface waters through or over the soil. In addition, some septic tanks may directly discharge to surface waters.

- Risks to human health: Septic system malfunctions can endanger human health when they contaminate nearby wells, drinking water supplies, and fishing and swimming areas.

Pollutants associated with onsite wastewater disposal may also be discharged directly to surface waters through direct pipe connections between the septic system and surface waters (straight pipe discharge). However, 327 IAC 5-1-1.5 specifically states that “point source discharge of sewage treated or untreated, from a dwelling or its associated residential sewage disposal system, to the waters of the state is prohibited”.

3.3.4 Construction

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

As a pollution source, construction activities are typically temporary, but the impacts on water quality can be severe and long lasting. Construction activities tend to be concentrated in the more rapidly developing areas of the watershed.

4. Water Quality and Use Support Ratings in the Tippecanoe River Watershed

This section provides a detailed overview of water quality monitoring, water quality, and use support ratings in the Tippecanoe River watershed and includes the following:

Section 4.1 Water Quality Monitoring Programs
Section 4.2 Summary of Ambient Monitoring Data for the Tippecanoe River Watershed
Section 4.3 Fish Consumption Advisories
Section 4.4 Clean Water Act Section 305(b) Report
Section 4.5 Clean Water Act Section 305(b) Assessment and Use-Support: Methodology
Section 4.6 Summary of Other Monitoring Efforts

4.1 Water Quality Monitoring Programs

This section discusses water quality monitoring programs. Specifically, Section 4.1.1 describes IDEM's Office of Water Management monitoring programs and Section 4.1.2 discusses other monitoring efforts in the watershed.

4.1.1 Office of Water Management Programs

The Water Quality Assessment Branch of the Office of Water Management is responsible for assessing the quality of water in Indiana's lakes, rivers and streams. This assessment is performed by field staff from the Survey Section and the Biological Studies Section. Virtually every element of IDEM's surface water quality management program of IDEM is directly or indirectly related to activities currently carried out by this Branch. The biological and surface water monitoring activities identify stream reaches, watersheds or segments where physical, chemical and/or biological quality has been or would be impaired by either point or nonpoint sources. This information is used to help allocate waste loads equitably among various sources in a way that would ensure that water quality standards are met along stream reaches in each of the nearly 100 stream segments in Indiana.

The purpose of the Surveys Section is to provide the water quality and hydrological data required for the assessment of Indiana's waters by conducting Watershed/Basin Surveys and Stream Reach Surveys. In 1996, the Section began a five-year synoptic study (Basin Monitoring Strategy) of the State's ten major watersheds. Information from these studies will be integrated with data from biological and nonpoint source studies as well as the Fixed Station Monitoring Program to make a major assessment of the State's waters. Such surveys determine the extent to which water quality standards are being met and whether the fishable, swimmable and water supply uses are being maintained.

Information derived from this strategy will contribute significantly to improved planning processes throughout the Office of Water Management. This plan should initiate the development of interrelated action plans, which encompass the wide range of responsibilities,

such as rule making, permitting, compliance, nonpoint source issues, and wastewater treatment facility oversight.

The Biological Studies Section conducts studies of fish and macroinvertebrate communities as well as stream habitats to establish biological conditions to which other streams may be compared in order to identify impaired streams or watersheds. The Biological Studies Section also conducts fish tissue and sediment sampling to pinpoint sources of toxic and bioconcentrating substances. Fish tissue data serve as the basis for fish consumption advisories, which are issued, through the Indiana State Department of Health, to protect the health of Indiana citizens. This Section also participates in the development of site-specific water quality standards.

The Biological Studies Section relies on the Volunteer Water Quality Monitoring Programs to provide additional data on lakes and wetlands that may not be sampling sites in the Monitoring Strategy. Volunteer collected data provides IDEM scientists with an overall view of water quality trends and early warning of problems that may be occurring in a lake or wetland. If volunteers detect that a lake or wetland is severely degraded, professional IDEM scientists will conduct follow up investigation.

4.1.2 Other Monitoring Efforts

Numerous past and present water quality monitoring efforts exist in the Tippecanoe River watershed. Listed below are the organizations involved with these monitoring efforts and a contact person, where available :

U.S. Fish and Wildlife Service	Tom Simon	812/334-4261
IDNR Fish and Wildlife	Brant Fisher	
The Nature Conservancy	Chad Watts	219/946-7491
Purdue University - ECASE	Robert Swihart	765/494-3566

4.2 Summary of Ambient Monitoring Data for the Tippecanoe River Watershed

The fixed station-monitoring program managed by IDEM's Office of Water Management has been monitoring surface water chemistry throughout the state since 1957. The data set from 1986 to 1995 was analyzed using the Seasonal Kendall test. This test deduces if a statistical change in the surface water chemistry occurred over a time period. The results of the Seasonal Kendall analysis for stations located in the Tippecanoe River watershed are provided in Table 4-1. The data collected from 1991 to 1997 from this monitoring program was also analyzed to determine benchmark characteristics. The results of the benchmark characteristic analysis for stations located in the Tippecanoe River watershed are provided in Appendix B. For a more in depth discussion of this analysis, please refer to the Indiana Fixed Station Statistical Analysis 1997 (IDEM 32/02/005/1998), published in May 1998 by the Assessment Branch of the Office of Water Management - IDEM.

TABLE 4-1
RESULTS OF SEASONAL KENDALL ANALYSIS FOR STATIONS LOCATED IN THE TIPPECANOE RIVER WATERSHED 1986 TO 1995

Parameter	TR-9 Tippecanoe River S.R. 18 Bridge, 5 Miles West of Delphi	TR-107 Tippecaone River U.S. 31 Bridge, Rochester
Biological Oxygen Demand	↘	↘
Chemical Oxygen Demand	?	«
Dissolved Oxygen	«	↑
E. coli	«	↓
Ammonia	«	«
Nitrite + Nitrate	↘	«
Total phosphorus	↓	«
Total Residue	↓	↗
Total Residue, Filterable	?	?
Total Residue, Nonfilterable	↓	«

Notes

« No Statistical Change; significance < 80% or reported slope = 0.00000

↓ Statistically Decreasing; significance >95% with a negative slope

↘ Potentially Decreasing; significance >80% with a negative slope

↗ Potentially Increasing; significance >80% with a positive slope

↑ Statistically Increasing; significance >95 % with a positive slope

? Insufficient Data for analysis

4.3 Fish Consumption Advisories

Since 1972, the Indiana Department of Natural Resources, the IDEM, and the Indiana State Department of Health (ISDH) have worked together to create the Indiana Fish Consumption Advisory. Each year members from these three agencies meet to discuss the findings of recent fish monitoring data and to develop the new statewide fish consumption advisory.

The 2000 advisory is based on levels of PCBs and mercury found in fish tissue. Fish are tested regularly only in areas where there is suspected contamination. In each area, samples were taken of bottom-feeding fish, top-feeding fish, and fish feeding in between. Over 1,600 fish tissue samples collected throughout the state were analyzed for PCBs, pesticides, and heavy metals. Of those samples, 99 percent contained mercury. Criteria for placing fish Indiana Fish Consumption Advisory have changed from using the Food and Drug Administration guidelines to using the Great Lakes Task Force risk-based approach.

The ISDH defines the Advisory Groups as follows:

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

Carp generally are contaminated with both PCBs and mercury. Except as otherwise noted, carp in all Indiana rivers and streams fall under the following risk groups:

Carp, 15-20 inches - Group 3
Carp, 20-25 inches - Group 4
Carp over 25 inches - Group 5

In the Tippecanoe River Watershed, the following waterbodies are under the 2000 fish consumption advisory:

Waterbody/County	Species	Size	Contaminant	Group
Grassy Creek/ Kosciusko	Largemouth bass	<14"	Mercury	2
		>14"	Mercury	3
Honey Creek/White	Largemouth bass	<20"	PCB/Mercury	2
		>20"	PCB/Mercury	3
Tippecanoe River				
Kosciusko	Bluegill	>6"	Mercury	2
	Redhorse	17-18"	PCB	3
		>18"	PCB	4
	River redhorse	>17"	Mercury	3
	Rock bass	>5"	Mercury	2
Marshall	Rock bass	9-10"	Mercury	2
		>10"	Mercury	
Fulton	Channel catfish	12-23"	PCB/Mercury	2
		>23"	PCB/Mercury	3
	Northern hogsucker	7-12"	Mercury	2
		>12"	Mercury	3
	Spotted sucker	>13"	Mercury	2
	Golden redhorse	15-16"	PCB/Mercury	2
		>16"	PCB/Mercury	3
	Carp	30-31"	PCB/Mercury	2
Pulaski	Black redhorse	16-17"	PCB	3
		>17"	PCB	4
	Channel catfish	11-12"	PCB/Mercury	2
		>12"	PCB/Mercury	3
	Longear sunfish	3-5"	Mercury	2
		>5"	Mercury	3
	Northern hogsucker	13-15"	Mercury	2
		>15"	Mercury	3
Carroll	Carp	21-22	PCB	2
Center Lake/Kosciusko	Black bullhead	11-14"	PCB	3
		>14"	PCB	4
	Bluegill	6-7"	PCB	2
		>7"	PCB	3
	Largemouth bass	8-14"	PCB	2
Lake Freeman/Carroll	Carp	26-27"	PCB	2
Lake Manitou/Fulton	Bullhead	<12"	Mercury	2
		>12"	Mercury	3
	Largemouth bass	8-13"	Mercury	2
		>13"	Mercury	3
Lake Maxinkuckee	Channel catfish	16-21"	PCB/Mercury	2
Marshall		>21"	PCB/Mercury	3
	Largemouth bass	6-17"	Mercury	2
		>17"	Mercury	3
	Walleye	22-23"	Mercury	2
		>23"	Mercury	3
Lake Shafer/White	Carp	20-23"	PCB	2
	Largemouth bass	12-13"	PCB	3
		>13"	PCB	4
Little Barbee Lake				

Waterbody / County	Species	Size	Contaminant	Group
Kosciusko	Largemouth bass	>12"	Mercury	2
Palestine Lake / Kosciusko	Bluegill	6-8"	PCB/Mercury	2
		>8"	PCB/Mercury	3
	Largemouth bass	8-12"	PCB/Mercury	2
		12-15"	PCB/Mercury	3
		>15"	PCB/Mercury	4
Pike Lake / Kosciusko	Largemouth bass	11-13"	Mercury	3
		>13"	Mercury	4
	Walleye	9-14"	PCB/Mercury	2
		>14"	Mercury	3
Tippecanoe Lake Kosciusko	Largemouth bass	6-12"	Mercury	2
		>12"	Mercury	3
Webster Lake / Kosciusko	Largemouth bass	14-20"	Mercury	2
		>20"	Mercury	3
Winona Lake / Kosciusko	Black bullhead	>12"	PCB	2
	Largemouth bass	9-12"	PCB	2
		>12"	PCB	3
	Carp	24-26"	PCB	3

4.4 Clean Water Act Section 305(b) Report

Section 305(b) of the Clean Water Act requires states to prepare and submit to the EPA a water quality assessment report of state water resources. A new surface water monitoring strategy for the Office of Water Management was implemented in 1996 with the goal of monitoring all waters of the state by 2001 and reporting the assessments by 2003. Each year approximately 20 percent of the waterbodies in the state will be assessed and reported the following year. The 2000 305(b) report is the most current and comprehensive assessment of the Tippecanoe River watershed. Appendix C contains the listing of the Tippecanoe River watershed waterbodies assessed, status of designated use support, probable causes of impairment, and stream miles affected. The methodologies of the Clean Water Act Section 305(b) assessment and use support ratings are discussed in Section 4.5.

4.5 Clean Water Act Section 305(b) Assessment and Use-Support: Methodology

The Office of Water Management determines use support status for each stream and waterbody in accordance with the assessment guidelines provided by EPA (1997). Results from four monitoring programs are integrated to provide an assessment for each stream and waterbody:

- Physical/chemical water column results,
- Benthic aquatic macroinvertebrate community assessments,
- Fish tissue and surficial aquatic sediment contaminant results, and
- *E. coli* monitoring results.

The assessment process was applied to each data sampling program. The individual assessments were integrated into an overall assessment for each waterbody by use designation: aquatic life support, fish consumption, and recreational use. River miles in a

watershed appear as one waterbody while each lake in a watershed is reported as a separate waterbody.

Physical/chemical data for toxicants (total recoverable metals), conventional water chemistry parameters (dissolved oxygen, pH, and temperature), and bacteria (*E. coli*) were evaluated for exceedance of the Indiana Water Quality Standards (327 IAC 2-1-6). U.S. EPA 305(b) Guidelines were applied to sample results as indicated in Table 4-3 (U.S. EPA 1997b).

TABLE 4-2
CRITERIA FOR USE SUPPORT ASSESSMENT*

Parameter	Fully Supporting	Partially Supporting	Not Supporting
Aquatic Life Use Support			
Toxicants	Metals were evaluated on a site by site basis and judged according to magnitude of exceedance and the number of times exceedances occurred.		
Conventional inorganics	There were very few water quality violations, almost all of which were due to natural conditions.		
Benthic aquatic macroinvertebrate Index of Biotic Integrity (mIBI)	mIBI $\geq$ 4.	mIBI $<$ 4 and $\geq$ 2.	mIBI $<$ 2.
Qualitative habitat use evaluation (QHEI)	QHEI $\geq$ 64.	QHEI $<$ 64 and $\geq$ 51.	QHEI $<$ 51.
Fish community (fIBI) (Lower White River only)	IBI $\geq$ 44.	IBI $<$ 44 and $\geq$ 22	IBI $<$ 22.
Sediment (PAHs = polynuclear aromatic hydrocarbons. AVS/SEM = acid volatile sulfide/ simultaneously extracted metals.)	All PAHs $\leq$ 75th percentile. All AVS/SEMs $\leq$ 75th percentile. All other parameters $\leq$ 95th percentile.	PAHs or AVS/SEMs $>$ 75th percentile. (Includes Grand Calumet River and Indiana Harbor Canal sediment results, and so is a conservative number.)	Parameters $>$ 95thpercentile as derived from IDEM Sediment Contaminants Database.
Indiana Trophic State Index (lakes only)	Nutrients, dissolved oxygen, turbidity, algal growth, and sometimes pH were evaluated on a lake-by-lake basis. Each parameter judged according to magnitude.		
Fish Consumption			
Fish tissue	No specific Advisory*	Limited Group 2 - 4 Advisory*	Group 5 Advisory*
* Indiana Fish Consumption Advisory, 1997, includes a state wide advisory for carp consumption. This was not included in individual waterbody reports because it obscures the magnitude of impairment caused by other parameters.			
Recreational Use Support (Swimmable)			
Bacteria (cfu = colony forming units.)	No more than one grab sample slightly $>$ 235 cfu/100ml, and geometric mean not exceeded.	No samples in this classification.	One or more grab sample exceeded 235 cfu/100ml, and geometric mean exceeded.

*From Indiana Water Quality Report for 1998

5 State and Federal Water Programs

This Chapter summarizes the existing point and nonpoint source pollution control programs available for addressing water quality problems in the Tippecanoe River watershed. Chapter 5 includes:

Section 5.1 Indiana Department of Environmental Management Water Quality Programs
Section 5.2 Indiana Department of Natural Resources Water Programs
Section 5.3 USDA/Natural Resources Conservation Service Water Programs

5.1 Indiana Department of Environmental Management Water Quality Programs

This Section describes the water quality programs managed by the Office of Water Management within IDEM and includes:

Section 5.1.1 State and Federal Legislative Authorities for Indiana's Water Quality Program
Section 5.1.2 Indiana's Point Source Control Program
Section 5.1.3 Indiana's Nonpoint Source Control Programs
Section 5.1.4 Integrating Point and Nonpoint Source Pollution Control Strategies
Section 5.1.5 Potential Sources of Funding for Water Quality Projects

5.1.1 State and Federal Legislative Authorities for Indiana's Water Quality Program

Authorities for some of the programs and responsibilities carried out by the Office of Water Management are derived from a number of federal and state legislative mandates outlined below. The major federal authorities for the state's water quality program are found in sections of the Clean Water Act. State authorities are from state statutes.

Federal Authorities for Indiana's Water Quality Program

- The Clean Water Act Section 301 - Prohibits the discharge of pollutants into surface waters unless permitted by EPA.
- The Clean Water Act Section 303(c) - States are responsible for reviewing, establishing and revising water quality standards for all surface waters.
- The Clean Water Act Section 303(d) - Each state shall identify waters within its boundaries for which the effluent limits required by 301(b)(1) A and B are not stringent enough to protect any water quality standards applicable to such waters.
- The Clean Water Act Section 305(b) - Each state is required to submit a biennial report to the EPA describing the status of surface waters in that state.
- The Clean Water Act Section 319 - Each state is required to develop and implement a nonpoint source pollution management program.

- The Clean Water Act Section 402 - Establishes the National Pollutant Discharge Elimination System (NPDES) permitting program. Allows for delegation of permitting authority to qualifying states (which Indiana has received).

- The Clean Water Act Section 404/401 - Section 404 regulates the discharge of dredge and fill materials into navigable waters and adjoining wetlands. Section 401 requires the U.S. Army Corps of Engineers to receive a state Water Quality Certification prior to issuance a 404 permit.

State Authorities for Indiana's Water Quality Program

IC 13-13-5 Designation of Department for Purposes of Federal Law: Designates the Indiana Department of Environmental Management as the water pollution agency for Indiana for all purposes of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) effective January 1, 1988, and the federal Safe Drinking Water Act (42 U.S.C. 300f through 300j) effective January 1, 1988.

5.1.2 Indiana's Point Source Control Program

The State of Indiana's efforts to control the direct discharge of pollutants to waters of the State were inaugurated by the passage of the Stream Pollution Control Law of 1943. The vehicle currently used to control direct discharges to waters of the State is the NPDES (National Pollutant Discharge Elimination System) permit program. This was made possible by the passage of the Federal Water Pollution Control Act Amendments of 1972 (also referred to as the Clean Water Act). These permits place limits on the amount of pollutants that may be discharged to waters of the State by each discharger. These limits are set at levels protective of both the aquatic life in the waters which receive the discharge and human health.

The State of Indiana was granted primacy from U.S. EPA to issue NPDES permits on January 1, 1975 through a Memorandum of Agreement.

U.S. EPA, Region V, has oversight authority for the NPDES permits program. Under terms of the Memorandum of Agreement, Region V has the right to comment on all draft Major discharger permits. In addition to NPDES, the Office of Water Management Permits Section has a pretreatment group which regulates municipalities in their development of municipal pretreatment programs and indirect discharges, or those discharges of process wastewater to municipal sewage treatment plants through Industrial Waste Pretreatment permits and regulation of Stormwater, CSO's, and variance requests through a special projects group currently known as the Urban Wet Weather Group. Land Application of waste treatment plant sludge is no longer a part of the Office of Water Management but is now a part of the Office of Land Quality (formerly, Office of Solid and Hazardous Waste).

The purpose of the NPDES permit is to control the point source discharge of pollutants into the waters of the State such that the quality of the water of the State is maintained in accordance with the standards contained in 327 IAC 2. The NPDES permit requirements must ensure that the minimum amount of control is imposed upon any new or existing point source through the application of technology-based treatment requirement contained in 327 IAC 5-5-2. According to 327 IAC 5-2-2, "Any discharge of pollutants into waters of the State as a point source discharge, except for exclusions made in 327 IAC 5-2-4 is prohibited unless in conformity with a

valid NPDES permit obtained prior to discharge." This is the most basic principal of the NPDES permit program.

The majority of NPDES permits have existed since 1974. This means that most of the permit writing is for permit renewals. Approximately 10 percent of each year's workload is attributed to new permits, modifications and requests for estimated limits. NPDES permits are designed to be re-issued every five years but are administratively extended in full force and effect indefinitely if the permittee applied for a renewal before the current permit expires.

There are several different types of permits that are issued in the NPDES permitting program. Table 5-1 lists and describes the various permits.

TABLE 5-1
TYPES OF PERMITS ISSUED UNDER THE NPDES PROGRAM

Type of Permit	Subtype	Comment
Municipal, Semi-Public or State (sanitary discharger)	Major	A facility owned by a municipality with a design flow Municipal of 1 MGD or greater (Cities, Towns, Regional Sewer Districts)
	Minor	Any municipally owned facility with a design flow of less than 1 MGD (Cities, Towns, Regional Sewer Districts)
	Semipublic	Any facility not municipally, State or Federally owned (i.e.- mobile home parks, schools, restaurants, etc.)
	State Owned	A facility owned or managed by a State agency (State parks, prisons, etc.)
	Federally Owned	A facility owned by a federal agency (military Owned installation, national park, federal penitentiary, etc.)
Industrial (Wastewater generated in the process of producing a product)	Major	Any point source discharger designated annually by agreement between the commissioner and EPA. Classification of discharger as a major involves consideration of factors relating to significance of impact on the environment, such as: Nature and quantity of pollutants discharged; Character and assimilative capacity of receiving waters; Presence of toxic pollutants in discharge; Compliance history of discharger.
	Minor	All dischargers which are not designated as major dischargers.
	General	General permit rule provides streamlined NPDES permitting process for certain categories of industrial point source discharges under requirements of the applicable general permit rule, rather than requirements of an individual permit specific to a single discharge. General permit rules: 327 IAC 15-7 Coal mining, coal processing, and reclamation activities; 327 IAC 15-8 Non-contact cooling water; 327 IAC 15-9 Petroleum product terminals; 327 IAC 15-10 Groundwater petroleum remediation systems; 327 IAC 15-11 Hydrostatic testing of commercial pipelines; 327 IAC 15-12 Sand, gravel, dimension stone or crushed stone operations.
	Cooling Water	Water which is used to remove heat from a product or process; the water may or may not come in contact with the product.
	Public Water Supply	Wastewater generated from the process of removing pollutants from ground or surface water for the purpose of producing drinking water.
Pretreatment Urban Wet Weather Group (Associated with NPDES but do not fall under same rule.)	Stormwater-related	Wastewater resulting from precipitation coming in contact with a substance which is dissolved or suspended in the water.
	Industrial Wastewater Pre-treatment	Processed wastewater generated by Industries that contribute to the overall wastewater received by the wastewater treatment plant.
	Combined Sewer Overflow (CSO)	Wastewater discharged from combined storm and sanitary sewers due to precipitation events. Municipal and Industrial Urban Wet Weather Programs

5.1.3 Nonpoint Source Control Programs

Nonpoint source (NPS) pollution is so named because the pollutants do not originate at single point sources, such as industrial and municipal waste discharge pipes. Instead, NPS pollutants are carried over fields, lawns, and streets by rainwater, wind, or snowmelt. This runoff may carry with it such things as fertilizer, road salt, sediment, motor oil, or pesticides. These pollutants either enter lakes and streams or seep into groundwater. While some NPS pollution is naturally occurring, most of it is a result of human activities.

Reducing NPS pollution requires careful attention to land use management and local geographic and economic conditions. The NPS Program was established to fully integrate methods for coping with the state's varied NPS water pollution problems. While a number of agencies and organizations currently have their own programs for addressing specific NPS issues, overall NPS coordination is being aided through the consolidated NPS Management Plan that was developed in the early stages of the Program's formation. Approximately, over 180 NPS-related projects have been funded and managed by the NPS Program since 1990. The NPS Management Plan was prepared in 1989, partially based on findings from the NPS Assessment Report, which was also completed that year. The NPS Management Plan was updated and received EPA approval in 1999. Some of the objectives of the Management Plan included the education of land users, the reduction and remediation of NPS pollution caused by erosion and sedimentation of forested and agricultural lands, and urban runoff. Other objectives addressed pesticide and fertilizer use, land application of sludge, animal waste practices, past and present mining practices, on-site sewage disposal, and atmospheric deposition.

The state's NPS Program, administered by the IDEM Office of Water Management's Watershed Management Section, focuses on the assessment and prevention of NPS water pollution. The program also provides for the exchange of education and information in order to improve the way land is managed. Through the use of federal funding for the installation of best management practices (BMPs), the NPS Program effectively reaches out to citizens and assists in the development of BMPs to manage land in such a way that less pollution is generated. The NPS program promotes a non-regulatory, voluntary approach to solving water quality problems.

The many nonpoint source projects funded through the Office of Water Management are a combination of local, regional, and statewide efforts sponsored by various public and not-for-profit organizations. The emphasis of these projects has been on the local, voluntary implementation of NPS water pollution controls. Since the inception of the program in the late 1980s, it has utilized over $12 million of federal funds for the development of over 180 projects.

The federal Clean Water Act contains nonpoint source provisions in several sections of the Act including the Section 319 Nonpoint Source Program, the Section 314 Clean Lakes Program (no longer funded), the Section 104(b)(3) Watershed Management Program, and the Section 205(j) Water Quality Planning Program. The Section 319 program provides for various voluntary projects throughout the state to prevent water pollution and also provides for assessment and management plans related to water bodies in Indiana impacted by NPS pollution. Section 314 has assessment provisions that assist in determining the nonpoint and point source water quality impacts on lakes and provides recommendations for improvements, but no longer receives funding. Section 104(b)(3) provides assistance in the development of watershed management planning efforts and education/information and implementation projects. Section 604(b) provides for planning activities relating to the improvement of water quality from

nonpoint and point sources. The Watershed Management Section within the Planning Branch of the Office of Water Management provides for the administration of the Section 319 funding source for the NPS-related projects. The Financial Management Services Branch of the Office of Water Management administers the Section 104(b)(3) and Section 604(b) grants.

Clean Water Act Section 319(h) grant monies are made available to the states on an annual basis by EPA. Agencies and organizations in the state that deal with NPS problems submit proposals to the Office of Water Management each year for use of these funds in various projects.

One of the most important aspects of all NPS pollution prevention programs is the emphasis on the watershed approach to these programs. This calls for users in the watershed to become involved in the planning and implementation of practices, which are designed to prevent pollution. By looking at the watershed as a whole, all situations causing the degradation of water quality will be addressed, not just a few. Appendix C lists the conservation partners and local stakeholders located in the Tippecanoe River watershed.

5.1.4 Integrating Point and Nonpoint Source Pollution Control Strategies

Integrating point and nonpoint source pollution controls and determining the amount and location of the remaining assimilative capacity in a watershed are key long-term objectives of watershed management. The information is used for a number of purposes including: determining if and where new or expanded municipal or industrial wastewater treatment facilities can be allowed; setting the recommended treatment level at these facilities; and identifying where point and nonpoint source pollution controls must be implemented to restore capacity and maintain water quality standards.

Total Maximum Daily Loads

The Clean Water Act mandates an integrated point and nonpoint source pollution control approach. This approach, called a total maximum daily load (TMDL), uses the concept of determining the total pollutant loading from point and nonpoint sources that a waterbody can assimilate while still maintaining its designated use (maintaining water quality standards). EPA is responsible for ensuring that TMDLs are completed by States and for approving the completed TMDLs.

Under the TMDL approach, waterbodies that do not meet water quality standards are identified. States establish priorities for action, and then determine reductions in pollutant loads or other actions needed to meet water quality goals. The approach is flexible and promotes a watershed approach driven by local needs and directed by the State's list of priority waterbodies. The overall goal in establishing the TMDL is to establish the management actions on point and nonpoint sources of pollution necessary for a waterbody to meet water quality standards.

The Office of Water Management at IDEM is in the process of reorganizing its work activities around a five year rotating basin schedule. The waters of the state have been grouped geographically into major river basins, and water quality data and other information will be collected and analyzed from each basin, or group of basins, once every five years. The schedule for implementing the TMDL Strategy is proposed to follow this rotating basin plan to the extent possible. The TMDL Strategy discusses activities to be accomplished in three phases. Phase One involves planning, sampling and data collection and would take place the first year. Phase Two involves TMDL development and would occur in the second year, and Phase Three is

the TMDL implementation and would occur the third year. It is expected that some phases, especially implementation of TMDLs (Phase Three) in the basin(s), may take more than one year to fully accomplish.

Initially, as part of the TMDL Strategy in a watershed, the IDEM TMDL Program Manager, in coordination with the IDEM Basin Coordinator of the target basin, will develop an activity reference guide for each TMDL. This activity reference guide will provide: (1) a list of the necessary activities and tasks, (2) a schedule for completing activities and tasks associated with an individual TMDL, and (3) a roster that indicates which Section, staff, and /or contractor are responsible for completion of each activity/task.

In Phase Three, the TMDL scenario chosen in conjunction with watershed stakeholders during Phase Two will be used to develop a plan to implement the TMDL. During this process, stakeholder participation will be essential. The Basin Coordinator, in conjunction with the stakeholder groups, will develop a plan to implement the TMDL. Once the draft plan has been finalized through comments from stakeholder groups and IDEM, the plan becomes 'draft-final' and open public review. Public meetings will be held in areas affected to solicit comments.

5.1.5 Potential Sources of Funding for Water Quality Projects

There are numerous sources of funding for all types of water quality projects. The sources of funding include federal and state agencies, nonprofits, and private funding. Funds may be loans, cost-share projects, or grants. Section 319(h) grants and other funding sources are discussed below.

If a local government, environmental group, university researcher, or other individual or agency wants to find funding to address a local water quality problem, it is well worth the time to prepare a thorough but concise proposal and submit it to applicable funding agencies. Even if a project is not funded, follow-up should be done to determine what changes may be needed in order to make the application more competitive.

Section 319(h) Grants

EPA offers to the state Clean Water Act Section 319(h) grant moneys on an annual basis. These grants must be used to fund projects that address nonpoint source pollution issues. Some projects which the Office of Water Management has funded with this money in the past include best management practice (BMP) demonstrations, watershed water quality improvements, data management, educational programs, modeling, stream restoration, and riparian buffer establishment. Units of government, nonprofit groups, and universities in the state that have expertise in nonpoint source pollution problems are invited to submit Section 319(h) proposals to the Office of Water Management.

Office of Water Management staff review proposals for minimum 319 eligibility criteria such as:

- Does it support the state NPS Management Program milestones?
- Does the project address targeted, high priority watersheds?
- Is there sufficient non-federal cost-share match available (25% of project costs)?
- Are measurable outputs identified?
- Is monitoring required? Is there a Quality Assurance/Quality Control plan for monitoring?
- If a Geographical Information System is used, is it compatible with that of the state?

- Is there a commitment for educational activities and a final report?
- Are upstream sources of NPS pollution addressed?
- Are stakeholders involved in the project?

Office of Water Management staff separately review and rank each proposal which meets the minimum 319 eligibility criteria. In their review, members consider such factors as: technical soundness; likelihood of achieving water quality results; degree of balance lent to the statewide NPS Program in terms of project type; and competence/reliability of contracting agency. They then convene to discuss individual project merits, to pool all rankings and to arrive at final rankings for the projects. Comments are also sought from outside experts in other governmental agencies, nonprofit groups, and universities. The Office of Water Management seeks a balance between geographic regions of the state and types of projects. All proposals that rank above the funding target are included in the annual grant application to EPA, with EPA reserving the right to make final changes to the list. Actual funding depends on approval from EPA and yearly congressional appropriations.

To obtain more information about applying for a Section 319(h) grant, contact:

Susan McLoud, Watershed Management Section Chief
IDEM Office of Water Management
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
(317) 232-0019

Other Sources of Funding

Besides Section 319(h) funding, there are numerous sources of funding for all types of water quality projects. The sources of funding include federal and state agencies, nonprofit, and private funding. Funds may be loans, cost-shares, or grants. Appendix D provides a summary list of agencies and funding opportunities.

5.2 Indiana Department of Natural Resources Water Programs

5.2.1 Division of Soil Conservation

The Division of Soil Conservation's mission is to ensure the protection, wise use, and enhancement of Indiana's soil and water resources. The Division's employees are part of Indiana's Conservation Partnership, which includes the 92 soil and water conservation districts (SWCDs), the USDA Natural Resources Conservation Service, and the Purdue University Cooperative Extension Service. Working together, the partnership provides technical, educational, and financial assistance to citizens to solve erosion and sediment-related problems occurring on the land or impacting public waters.

The Division administers the Clean Water Indiana soil conservation and water quality program under guidelines established by the State Soil Conservation Board, primarily through the SWCDs in direct service to landusers. The Division staff includes field-based resource specialists who work closely with landusers, assisting in the selection, design, and installation of practices to reduce soil erosion on their land. Regional Urban Conservation Specialists work primarily with

developers, contractors, and others to address erosion and sediment concerns in urban settings, developments under construction, and in landfills. The Lake and River Enhancement staff (LARE) oversee all administrative, operational, and technical aspects of the LARE program, which provides financial assistance to local entities concerned with improving and maintaining water quality in public-access lakes, rivers, and streams.

5.2.2 Division of Water

The IDNR, Division of Water (DOW) is charged by the State of Indiana to maintain, regulate, collect data, and evaluate Indiana's surface and ground water resources.

The Engineering Branch of the DOW includes Dam and Levee Safety, Project Development, Surveying, Drafting, and Computer Services. The Dam and Levee Safety Section performs geotechnical and hydraulic evaluation on existing and proposed dams and levees throughout the State. The Project Development Section provides technical support to locally funded water resource projects along with engineering leadership and construction management to State funded water resource projects. The remaining sections provide support services to all Sections within the DOW such as reservoir depth mapping, topographic mapping, highwater marks, design of publications and brochures, and computer procurement and maintenance.

The Planning Branch of the DOW consists of Basin Studies, Coastal Coordination, Floodplain Management, Ground Water, Hydrology and Hydraulics, and Water Rights. Basin Studies are comprehensive reports on surface-and ground-water availability and use. Coastal Coordination is a communication vehicle to address Lake Michigan's diverse shoreline issues. Floodplain Management involves various floodplain management aspects including coordination with the National Flood Insurance Program and with State and Federal Emergency Management agencies during major flooding events. The Ground Water Section maintains the water-well record computer database and publishes reports and maps on the ground-water resource for the State. Hydrology and Hydraulics Section develops and reviews floodplain mapping and performs hydrologic studies and modeling. The Water Rights Section investigates and mediates groundwater/surface water rights issues, licenses water-well drillers, and develops well construction and abandonment procedures.

The Regulations Branch of DOW is made up of Stream Permits, Lake Permits, Permit Administration, Public Assistance, and Legal Counsel. The Stream Permits Section is responsible for reviewing permit applications for construction activity in the 100-year regulatory floodway along Indiana's waterways. The Lake Permits Section reviews construction projects at or below the legal lake level for all of Indiana's public freshwater lakes. Permit Administration Section provides administrative support to Branch staff, maintains the application database, and coordinates the application review process with other Divisions. The Public Assistance Section provides technical assistance on possible permit applications on proposed construction projects, investigates and mediates unpermitted construction activities and in some cases with the support of Legal Counsel pursues legal action for violation of State laws.

5.3 USDA/Natural Resources Conservation Service Water Quality Programs

While there are a variety of USDA programs available to assist people with their conservation needs. The following assistance programs are the principal programs available.

Conservation Technical Assistance (CTA)

The purpose of the program is to assist landusers, communities, units of state and local government, and other Federal agencies in planning and implementing conservation systems. The purpose of the conservation systems are to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.

The objective of the program is to: Assist individual landusers, communities, conservation districts, and other units of State and local government and Federal agencies to meet their goals for resource stewardship and assist individuals to comply with State and local requirements. NRCS assistance to individuals is provided through conservation districts in accordance with the Memorandum of Understanding signed by the Secretary of Agriculture, the Governor of the State, and the conservation district. Assistance is provided to landusers voluntarily applying conservation and to those who must comply with local or State laws and regulations. Assistance is also provided to agricultural producers to comply with the highly erodible land (HEL) and wetland (Swampbuster) provisions of the 1985 Food Security Act as amended by the Food, Agriculture, Conservation and Trade Act of 1990 (16 U.S.C. 3801 et. seq.); the Federal Agriculture Improvement and Reform Act of 1996, and wetlands requirements of Section 404 of the Clean Water Act. NRCS makes HEL and wetland determinations and helps land users develop and implement conservation plans to comply with the law. They also provide technical assistance to participants in USDA cost-share and conservation incentive programs. NRCS collects, analyzes, interprets, displays, and disseminates information about the condition and trends of the Nation's soil and other natural resources so that people can make good decisions about resource use and about public policies for resource conservation. They also develop effective science-based technologies for natural resource assessment, management, and conservation.

Conservation of Private Grazing Land Initiative (CPGL)

The Conservation of Private Grazing Land initiative will ensure that technical, educational, and related assistance is provided to those who own private grazing lands. It is not a cost-share program. This technical assistance will offer opportunities for: better grazing land management; protecting soil from erosive wind and water; using more energy-efficient ways to produce food and fiber; conserving water; providing habitat for wildlife; sustaining forage and grazing plants; using plants to sequester greenhouse gases and increase soil organic matter; and using grazing lands as a source of biomass energy and raw materials for industrial products.

Conservation Reserve Program (CRP)

NRCS provides technical assistance to landowners interested in participating in the Conservation Reserve Program administered by the USDA Farm Service Agency. The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost-share funding is provided to establish the vegetative cover practices.

Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan, which includes structural, vegetative, and land management practices on eligible land. Five to ten year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management.

Fifty percent of the funding available for the program is targeted at natural resource concerns relating to livestock production. The program is carried out primarily in priority areas that may be watersheds, regions, or multi-state areas, and for signif icant statewide natural resource concerns that are outside of geographic priority areas.

Watershed Surveys and Planning

The Watershed and Flood Prevention Act, P.L. 83-566, August 4, 1954, (16 U.S.C. 1001-1008) authorized this program. Prior to fiscal year 1996, small watershed planning activities and the cooperative river basin surveys and investigations authorized by Section 6 of the Act were operated as separate programs. The 1996 appropriations act combined the activities into a single program entitled the Watershed Surveys and Planning program. Activities under both programs are continuing under this authority.

The purpose of the program is to assist Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries.

Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and non-structural measures to solve resource problems.

Watershed Program and Flood Prevention Program (WF 08 or FP 03)

The Small Watershed Program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.

Wetlands Reserve Program (WRP)

The Wetlands Reserve Program is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30 year duration, or can enter into restoration cost-share agreements where no easement is involved. In exchange for establishing a permanent easement, the landowner receives payment up to the agricultural value of the land and 100 percent of the restoration costs for restoring the wetlands. The 30 year easement payment is 75 percent of what would be provided for a permanent easement on the same site and 75 percent of the restoration cost. The voluntary agreements are for a minimum 10 year duration and provide for 75 percent of the cost of restoring the involved wetlands. Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the easement or agreement. In all instances, landowners continue to control access to their land.

Wildlife Habitat Incentives Program (WHIP)

The Wildlife Habitat Incentives Program provides financial incentives to develop habitat for fish and wildlife on private lands. Participants agree to implement a wildlife habitat development plan and USDA agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. USDA and program participants enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts a minimum of 10 years from the date that the contract is signed.

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APPENDIX A

BENCHMARK CHARACTERISTIC ANALYSIS OF DATA FROM FIXED STATIONS IN THE TIPPECANOE RIVER WATERSHED 1991 TO 1997

Station: TR-9

	Valid N	Mean	Confid -95.000%	Confid +95.000%	Median	Sum	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.	Standard Error	Skewness	Std.Err. Skewness	Kurtosis	Std.Err. Kurtosis
Alkalinity (mg/l)	79	195	187.2573	202.7427	199	15405	112	269	176	219	157	43	1194.897	34.56729	3.889124	-0.50551	0.270545	-0.00057	0.534952
Ammonia (mg/l as N)	79	0.072785	0.056467	0.089103	0.05	5.75	0.05	0.6	0.05	0.05	0.55	0	0.005308	0.072853	0.008197	5.383879	0.270545	35.63783	0.534952
BOD (mg/l)	37	1.956757	1.556538	2.356976	1.8	72.4	0.5	6.5	1.3	2.5	6	1.2	1.440856	1.200357	0.197337	1.653509	0.387589	4.682229	0.758719
COD (mg/l)	0																		
Cyanide (mg/l)	0																		
Nitrate (mg/l as N)	79	2.928608	2.497679	3.359537	3	231.36	0.05	7.9	1.2	4.4	7.85	3.2	3.701371	1.923895	0.216455	0.323715	0.270545	-0.67308	0.534952
Total Phosphorus (mg/l as P)	79	0.087025	0.072627	0.101424	0.07	6.875	0.015	0.46	0.05	0.1	0.445	0.05	0.004132	0.064284	0.007232	3.220716	0.270545	14.56582	0.534952
Total Solids (mg/l)	79	398.3165	384.5381	412.0948	390	31467	251	691	360	425	440	65	3783.963	61.51392	6.920857	1.692306	0.270545	8.700348	0.534952
Suspended Solids (mg/l)	79	19.64557	12.40643	26.88471	11	1552	2	252	5	20	250	15	1044.539	32.31934	3.636209	5.273937	0.270545	34.88929	0.534952
Dissolved Solids (mg/l)	0																		
Sulfate (mg/l)	0																		
TKN (mg/l as N)	0																		
E. coli (CFU/100ml)	77	432.5325	78.00574	787.0592	30	33305	5	9600	10	110	9595	100	2439792	1561.983	178.0045	4.937893	0.273908	24.77746	0.54146
TOC (mg/l)	0																		
Hardness (mg/l)	79	270.3544	258.9451	281.7638	280	21358	124	364	236	312	240	76	2594.616	50.93738	5.730903	-0.7127	0.270545	0.007919	0.534952
Chloride (mg/l)	0																		
Dissolved Oxygen (mg/l)	60	10.88317	10.31405	11.45228	11.09	652.99	6.8	16.68	9.38	12.43	9.88	3.05	4.853527	2.203072	0.284415	0.418377	0.308694	-0.12827	0.608492
pH	61	8.069016	7.973883	8.164149	8.13	492.21	7.12	8.77	7.93	8.32	1.65	0.39	0.137976	0.371451	0.047559	-0.84198	0.30627	0.140192	0.603837
Copper (ug/l)	8	2.6375	1.650391	3.624609	2	21.1	2	4.6	2	3.25	2.6	1.25	1.394107	1.180723	0.417449	1.442378	0.752101	0.01434	1.48088
Iron (ug/l)	8	250.125	155.2971	344.9529	240	2001	81	450	185	310	369	125	12865.84	113.4277	40.10274	0.499432	0.752101	0.501045	1.48088
Zinc (ug/l)	8	2.80625	1.490928	4.121572	2.25	22.45	2.25	6.7	2.25	2.25	4.45	0	2.475312	1.573313	0.55625	2.828427	0.752101	8	1.48088

Station: TR-107

	Valid N	Mean	Confid. -95.000%	Confid +95.000%	Median	Sum	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.	Standard Error	Skewness	Std.Err. Skewness	Kurtosis	Std.Err. Kurtosis
Alkalinity (mg/l)	70	216.2714	210.4186	222.1243	223.5	15139	131	248	204	233	117	29	602.5195	24.54627	2.933841	-1.69899	0.28675	3.595153	0.566265
Ammonia (mg/l as N)	71	0.103521	0.081578	0.125464	0.05	7.35	0.05	0.5	0.05	0.1	0.45	0.05	0.008595	0.092707	0.011002	2.121956	0.284805	4.940714	0.562511
BOD (mg/l)	34	1.573529	1.239157	1.907902	1.3	53.5	0.5	4.4	1	2	3.9	1	0.918369	0.958316	0.16435	1.056186	0.403053	1.053606	0.787898
COD (mg/l)	71	22.99296	20.92665	25.05926	21.8	1632.5	2.5	60	19	25	57.5	6	76.20895	8.729774	1.036034	1.487228	0.284805	4.539227	0.562511
Cyanide (mg/l)	68	0.005338	0.004999	0.005677	0.005	0.363	0.005	0.013	0.005	0.005	0.008	0	2E-06	0.001399	0.00017	4.551318	0.290765	20.89071	0.574005
Nitrate (mg/l as N)	71	2.309155	1.982443	2.635867	2	163.95	0.05	7.1	1.4	3.1	7.05	1.7	1.905236	1.380303	0.163812	1.678313	0.284805	3.791191	0.562511
Total Phosphorus (mg/l as P)	71	0.130986	0.11055	0.151421	0.11	9.3	0.015	0.43	0.08	0.15	0.415	0.07	0.007454	0.086337	0.010246	1.570013	0.284805	2.322975	0.562511
Total Solids (mg/l)	70	402.3714	394.5942	410.1486	407.5	28166	298	462	383	424	164	41	1063.86	32.61687	3.898461	-0.65259	0.28675	0.619242	0.566265
Suspended Solids (mg/l)	69	16.94203	10.92002	22.96404	12	1169	2	171	6	16	169	10	628.4084	25.06807	3.017842	4.362803	0.288737	22.68982	0.570095
Dissolved Solids (mg/l)	0																		
Sulfate (mg/l)	0																		
TKN (mg/l as N)	1	0.05				0.05	0.05	0.05											
E. coli (CFU/100ml)	69	933.0435	322.2137	1543.873	180	64380	5	18400	60	680	8395	620	6465462	2542.727	306.1084	5.473416	0.288737	34.26042	0.570095
TOC (mg/l)	0																		
Hardness (mg/l)	70	283.3286	274.0192	292.6379	296	19833	52	337	274	308		34	1524.311	39.04242	4.666462	-1.54427	0.28675	2.115923	0.566265
Chloride (mg/l)	0																		
Dissolved Oxygen (mg/l)	57	9.931754	9.428344	10.43517	10.06	566.11	6.4	14	8.3	11.26	7.6	2.96	3.599593	1.897259	0.251298	0.039587	0.316327	-0.73766	0.623134
pH	57	7.919649	7.841247	7.998051	7.95	451.42	6.89	8.36	7.79	8.13	1.47	0.34	0.087311	0.295484	0.039138	-0.97759	0.316327	1.470046	0.623134
Copper (ug/l)	14	3.321429	2.202717	4.44014	2	46.5	2	7	2	5.5	5	3.5	3.754121	1.937555	0.517833	0.963583	0.59738	-0.92118	1.15405
Iron (ug/l)	6	758.3333	-3.80312	1520.47	505	4550	230	2100	230	980	1870	750	527416.7	726.2346	296.484	1.583354	0.845154	2.433931	1.740777
Zinc (ug/l)	14	8.964286	6.375966	11.55261	10	125.5	2.25	20	6.1	10	17.75	3.9	20.09593	4.482849	1.198092	0.672596	0.59738	2.041946	1.15405

APPENDIX B

TIPPECANOE RIVER WATERS ASSESSED IN THE 2000 CLEAN WATER ACT SECTION 305(B) REPORT

Identification	Waterbody and Segment names	Hydrologic unit	Segment size (miles)	YEAR 303D	Aquatic Life	Drink Water	Fish Cons	Contact (Recr)	Biotic comm.	Copper	Cyanide	Lead	Mercury	Low DO	Pathogens	PCBs	Pesticides	Priority organic	Salinity/ TDS/chloride	Ammonia	Assess date
	AGNEW DITCH - HOOVER DITCH	**5120106080010**																			
INB0681_00	AGNEW DITCH - HOOVER DITCH		31.19		X		X	X													
	ATRIUM DITCH - DUNKER DITCH	**5120106110070**																			
INB06B7_00	ATRIUM DITCH - DUNKER DITCH		25.36		X		X	X													
	ATRIUM DITCH - STUMP DITCH	**5120106110060**																			
INB06B6_00	ATRIUM DITCH - STUMP DITCH		31.66		X		X	X													
	BIG CREEK - BELL DITCH	**5120106150010**																			
INB06F1_00	BIG CREEK - BELL DITCH		19.18		X		X	X													
	BIG CREEK - DORSEY/ DIETER DITCHES	**5120106150020**																			
INB06F2_00	BIG CREEK - DORSEY/ DIETER DITCHES		18.94		X		X	X													
	BIG CREEK - MOUTH	**5120106150030**																			
INB06F3_00	BIG CREEK - MOUTH		11.90		F		X	X													
	BIG MONON CREEK - BROWN DITCH	**5120106110130**																			
INB06BD_00	BIG MONON CREEK - BROWN DITCH		28.23		X		X	X													
	BIG MONON DITCH - DRESSKE DITCH	**5120106110030**																			
INB06B3_00	BIG MONON DITCH - DRESSKE DITCH		22.27		X		X	X													
	BIG MONON DITCH - HEADWATERS	**5120106110010**																			
INB06B1_00	BIG MONON DITCH - HEADWATERS		24.90		X		X	X													
	BIG MONON DITCH - LINCOLN DITCH	**5120106110050**																			
INB06B5_00	BIG MONON DITCH - LINCOLN DITCH		28.68		X		X	X													
	BIG MONON DITCH - LOWER ATRIUM DITCH/ STEIN DITCH	**5120106110080**																			
INB06B8_00	BIG MONON DITCH - LOWER ATRIUM DITCH/ STEIN DITCH		24.61		X		X	X													
	BIG MONON DITCH - OUTLET	**5120106110110**																			
INB06BB_00	BIG MONON DITCH - OUTLET		16.86		F		X	N							S						19991108
	BIG MONON DITCH - PELSEY DITCH	**5120106110100**																			
INB06BA_00	BIG MONON DITCH - PELSEY DITCH		15.03		X		X	X													
	BIG MONON DITCH - THOMPSON DITCH	**5120106110040**																			
INB06B4_00	BIG MONON DITCH - THOMPSON DITCH		32.57		X		X	X													
	BRUCE LAKE	**5120106060080**																			
INB0668_00	BRUCE LAKE		5.04		X		X	X													
	CHIPPEWANUCK CREEK - BRYANT LEININGER DITCH	**5120106040120**																			
INB064C_00	CHIPPEWANUCK CREEK - BRYANT LEININGER DITCH		10.29		X		X	X													
	CHIPPEWANUCK CREEK - GAST DITCH	**5120106040110**																			
INB064B_00	CHIPPEWANUCK CREEK and tributary		3.23		X		X	X													
INB064B_T1043	Chippewanuck Creek - Gast Ditch		8.18		F		X	X													
	CHIPPEWANUCK CREEK - LAKE 16 OUTLET	**5120106040100**																			
INB064A_00	CHIPPEWANUCK CREEK - LAKE 16 OUTLET		17.40		X		X	X													
	COLLINS DITCH - BAILEY DITCH	**5120106050090**																			
INB0659_00	COLLINS DITCH - BAILEY DITCH		20.91		X		X	X													
	DANNER DITCH - RIDENOUR DITCH	**5120106030070**																			
INB0637_00	DANNER DITCH - RIDENOUR DITCH		9.10		X		X	X													
	DEEDS CREEK - HEETER DT - CHAPMAN LAKES	**5120106020030**																			
INB0623_00	HEETER DT - CHAPMAN LAKES		1.96		X		X	X													
	DICKEY CREEK	**5120106080050**																			

Uses: F-Full support,P-Partial support,N-nonsupport,X-Not assessed,A-Not Attainable
Cause/ Stressormagnitude: S-slight,M-moderate,H=high,T-Not impaired;more information needed.
*Biological community response;stressor not identified.

Identification	Waterbody and Segment names	Hydrologic unit	Segment size (miles)	YEAR 303D	Aquatic Life	Drink Water	Fish Cons	Contact (Recr)	Biotic comm.	Copper	Cyanide	Lead	Mercury	Low DO	Pathogens	PCBs	Pesticides	Priority organic	Salinity/ TDS/chloride	Ammonia	Assess date
INB0685_00	DICKEY CREEK		12.32		X		X	X													
	EDDY CREEK - COWAN DITCH	**5120106050120**																			
INB065C_00	EDDY CREEK - COWAN DITCH		13.99		X		X	X													
	EDDY CREEK - HEADWATERS	**5120106050110**																			
INB065B_00	EDDY CREEK - HEADWATERS		11.55		X		X	X													
	ELDER DITCH - CEDAR LAKE BRANCH	**5120106010050**																			
INB0615_00	ELDER DITCH - CEDAR LAKE BRANCH		14.45		X		X	X													
	FRASER DITCH	**5120106120100**																			
INB06CA_00	FRASER DITCH		12.06		X		X	X													
	GRASSY CREEK - BIG BARBEE/ SECHRIST LAKES	**5120106010070**																			
INB0617_00	GRASSY CREEK - BIG BARBEE/ SECHRIST LAKES		5.19		X		X	X													
	GRASSY CREEK - FLETCHER LAKE OUTLET	**5120106080080**																			
INB0688_00	GRASSY CREEK - FLETCHER LAKE OUTLET		16.41		X		X	X													
	GRASSY CREEK - ROBINSON LAKE/ RIDINGER LAKE	**5120106010060**																			
INB0616_00	GRASSY CREEK - ROBINSON LAKE/ RIDINGER LAKE		18.07		X		X	X													
	GRASSY CREEK - WALSH DITCH	**5120106080090**																			
INB0689_00	GRASSY CREEK - WALSH DITCH		11.32		X		X	X													
	GRASSY CREEK-FLETCHER LAKE OUTLET	**5120106090020**																			
INB0692_00	GRASSY CREEK-FLETCHER LAKE OUTLET		16.34		X		X	X													
	HILL DITCH	**5120106110120**																			
INB06BC_00	HILL DITCH		18.76		X		X	X													
	HOAGLAND DITCH - HEADWATERS	**5120106120040**																			
INB06C4_00	HOAGLAND DITCH - HEADWATERS		10.65		X		X	X													
	HOAGLAND DITCH - LAKE SHAFER	**5120106120080**																			
INB06C8_00	HOAGLAND DITCH - LAKE SHAFER		15.51		X		X	X													
	HOAGLAND DITCH - MINCH DITCH	**5120106120070**																			
INB06C7_00	HOAGLAND DITCH - MINCH DITCH		10.23		F		X	X													
	HOAGLAND DITCH - WINTERS DITCH	**5120106120060**																			
INB06C6_00	HOAGLAND DITCH - WINTERS DITCH		11.78		X		X	X													
	HOLLINGSWORTH DITCH	**5120106120050**																			
INB06C5_00	HOLLINGSWORTH DITCH		16.61		X		X	X													
	HONEY CREEK - HEADWATERS (WHITE)	**5120106120090**																			
INB06C9_00	HONEY CREEK - HEADWATERS (WHITE)		15.67		X		X	X													
	HONEY CREEK - SHAFER DAM	**5120106120110**																			
INB06CB_00	HONEY CREEK - SHAFER DAM		10.59		F		X	X													
	HOUSE DITCH - MCGAFFEY BRANCH	**5120106060050**																			
INB0665_00	HOUSE DITCH - MCGAFFEY BRANCH		25.09		X		X	X													
	INDIAN CREEK - HEADWATERS (PULASKI)	**5120106080070**																			
INB0687_00	INDIAN CREEK - HEADWATERS (PULASKI)		13.50		X		X	X													
	INDIAN CREEK - LOWER	**5120106080130**																			
INB068D_00	INDIAN CREEK - LOWER		8.97		X		X	X													
	INDIAN CREEK-HEADWATERS (PULASKI)	**5120106090010**																			
INB0691_00	INDIAN CREEK-HEADWATERS (PULASKI)		13.45		X		X	X													
	INDIANA CREEK - THORNHOPE	**5120106080100**																			

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INB068A_00	INDIANA CREEK - THORNHOPE		15.96		X		X	X													
	LAKE MANITOU - RAIN CREEK/ GRAHAM DITCH	**5120106050020**																			
INB0652_00	Rain Creek/ Graham Ditch		19.99		X		X	X													
INB0652_P1016	Lake Manitou		2.92		X		P	X						S							19980301
	LAKE MAXINKUCKEE - LOST LAKE	**5120106060010**																			
INB0661_00	LAKE MAXINKUCKEE - LOST LAKE		16.62		X		X	X													
	LAKE SHAFER - CARNAHAN/ TIMMONS DITCHES	**5120106130010**																			
INB06D1_00	LAKE SHAFER - CARNAHAN/ TIMMONS DITCHES		32.67		X		X	X													
	LAKE SHAFER - KEANS CREEK - BURGETT DITCH	**5120106130020**																			
INB06D2_00	LAKE SHAFER - KEANS CREEK - BURGETT DITCH		34.16		X		X	X													
	LITTLE INDIAN CREEK - FREERICKS DITCH	**5120106080110**																			
INB068B_00	LITTLE INDIAN CREEK - FREERICKS DITCH		10.81		X		X	X													
	LITTLE INDIAN CREEK - STRUBER/ HANCOCK/ KENNEL DT	**5120106080120**																			
INB068C_00	LITTLE INDIAN CREEK - STRUBER/ HANCOCK/ KENNEL DT		22.37		X		X	X													
	LITTLE MILL CREEK (FULTON)	**5120106070040**																			
INB0674_00	LITTLE MILL CREEK (FULTON)		25.25		X		X	X													
	LOON LAKE - GOOSE LAKE/ OLD LAKE	**5120106010020**																			
INB0612_00	LOON LAKE - GOOSE LAKE/ OLD LAKE		6.50		X		X	X													
	MCKILLIP DITCH - KESLER DITCH	**5120106120020**																			
INB06C2_00	MCKILLIP DITCH - KESLER DITCH		17.96		X		X	X													
	MCKILLIP DITCH - MCKILLIP BRANCH DITCH	**5120106120010**																			
INB06C1_00	MCKILLIP DITCH - MCKILLIP BRANCH DITCH		15.77		X		X	X													
	MCKILLIP DITCH - MONON	**5120106120030**																			
INB06C3_00	MCKILLIP DITCH - MONON		18.27		F		X	X													
	MILL CREEK - HEADWATERS (FULTON)	**5120106070010**																			
INB0671_00	MILL CREEK - HEADWATERS (FULTON)		19.69		X		X	X													
	MILL CREEK - PRATHER CREEK	**5120106070050**																			
INB0675_00	MILL CREEK - PRATHER CREEK		18.90		F		X	X													
	MILL CREEK - REED OLMSTEAD DITCH	**5120106070020**																			
INB0672_00	MILL CREEK - REED OLMSTEAD DITCH		15.87		X		X	X													
	MILL CREEK - WILSON DITCH	**5120106070030**																			
INB0673_00	MILL CREEK - WILSON DITCH		22.23		F		X	X													
	MOOTS CREEK - CHILTON DITCH	**5120106150070**																			
INB06F7_00	MOOTS CREEK - CHILTON DITCH		8.59		X		X	X													
	MOSLEY DITCH - MOSLEY BRANCH	**5120106110090**																			
INB06B9_00	MOSLEY DITCH - MOSLEY BRANCH		26.12		X		X	X													
	MUD CREEK - GRUBE/ WILSON DITCHES	**5120106050080**																			
INB0658_00	MUD CREEK - GRUBE/ WILSON DITCHES		26.89		X		X	X													
	MUD CREEK - HOFFMAN DITCH	**5120106080030**																			
INB0683_00	MUD CREEK - HOFFMAN DITCH		17.88		F		X	X													
	MUD CREEK - HOLTZ/ TILDEN DITCHES	**5120106050100**																			
INB065A_00	MUD CREEK - HOLTZ/ TILDEN DITCHES		16.38		X		X	X													
	MUD CREEK - NEFF/ BAKER DITCHES	**5120106050070**																			
INB0657_00	MUD CREEK - NEFF/ BAKER DITCHES		24.34		P		X	X	S												19991108

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	MUD CREEK - SMITH DITCH	**5120106050060**																			
INB0656_00	MUD CREEK - SMITH DITCH		14.80		N		X	X	M												19991108
	MUD CREEK - SOUTH BRANCH	**5120106050050**																			
INB0655_00	MUD CREEK - SOUTH BRANCH		8.24		X		X	X													
	OUTLET CREEK - DEER CREEK	**5120106040030**																			
INB0643_00	OUTLET CREEK - DEER CREEK		19.74		X		X	X													
	OUTLET CREEK - HEADWATERS	**5120106040020**																			
INB0642_00	OUTLET CREEK - HEADWATERS		17.17		X		X	X													
	PALESTINE LAKE - WILLIAMS DITCH/ ROBBINS DITCH	**5120106030040**																			
INB0634_00	PALESTINE LAKE - WILLIAMS DITCH/ ROBBINS DITCH		7.81		X		X	X													
	PIKE CREEK (WHITE)	**5120106140010**																			
INB06E1_00	PIKE CREEK (WHITE)		29.17		F		X	X													
	QUIGLEY MARSH DITCH	**5120106060100**																			
INB066A_00	QUIGLEY MARSH DITCH		30.31		X		X	X													
	RAYMAN DITCH/ MYERS DITCH	**5120106150060**																			
INB06F6_00	RAYMAN DITCH/ MYERS DITCH		15.31		X		X	X													
	RING DITCH/ ADAMS DITCH	**5120106030030**																			
INB0633_00	RING DITCH/ ADAMS DITCH		16.88		X		X	X													
	ROBIN TAYLOR DITCH/ STREBE DITCH	**5120106050010**																			
INB0651_00	ROBIN TAYLOR DITCH/ STREBE DITCH		13.84		X		X	X													
	ROBINSON DITCH - HOFFMAN LAKE	**5120106030060**																			
INB0636_00	ROBINSON DITCH - HOFFMAN LAKE		7.19		X		X	X													
	SCHOLTZ DITCH	**5120106110020**																			
INB06B2_00	SCHOLTZ DITCH		51.26		X		X	X													
	SPRING CREEK - CHALMERS/ ENGE DITCH	**5120106150040**																			
INB06F4_00	SPRING CREEK - CHALMERS/ ENGE DITCH		13.52		X		X	X													
	TIPPECANOE RIVER	**5120106150050**																			
INB06F5_00	TIPPECANOE RIVER		0.74		F		X	F													
	TIPPECANOE RIVER - AGNEW DITCH - MOSS DITCH	**5120106080020**																			
INB0682_00	TIPPECANOE RIVER - AGNEW DITCH - MOSS DITCH		18.08		F		X	N							S						19991108
	TIPPECANOE RIVER - BARTEE/ TAYLOR DITCHES	**5120106060060**																			
INB0666_00	TIPPECANOE RIVER - BARTEE/ TAYLOR DITCHES		25.31		X		X	N							S						19991108
	TIPPECANOE RIVER - BRUCE LAKE OUTLET	**5120106060090**																			
INB0669_00	TIPPECANOE RIVER - BRUCE LAKE OUTLET		23.34		F		X	X													
	TIPPECANOE RIVER - BUDD FISHER DITCH	**5120106080040**																			
INB0684_00	TIPPECANOE RIVER - BUDD FISHER DITCH		25.77		X		X	X													
	TIPPECANOE RIVER - CLARENCE BAKER DITCH	**5120106040040**																			
INB0644_00	TIPPECANOE RIVER - CLARENCE BAKER DITCH		3.52		X		X	X													
INB0644_T1041	Tippecanoe River and tributary		13.21		X		X	N							S						19991108
	TIPPECANOE RIVER - CROOKED LAKE/ BIG LAKE	**5120106010010**																			
INB0611_00	Tippecanoe River and tributaries		8.76		X		X	X													
INB0611_P1001	Crooked Lake		1.45	1998	X		P	X					S								19980301
	TIPPECANOE RIVER - DANNER DITCH(LOWER) - ARM2	**5120106030080**																			
INB0638_00	Danner Ditch(lower) - arm2		9.59		X		X	X													

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Cause/ Stressormagnitude: S-slight,M-moderate,H=high,T-Not impaired;more information needed.
*Biological community response;stressor not identified.

Identification	Waterbody and Segment names	Hydrologic unit	Segment size (miles)	YEAR 303D	Aquatic Life	Drink Water	Fish Cons	Contact (Recr)	Biotic comm.	Copper	Cyanide	Lead	Mercury	Low DO	Pathogens	PCBs	Pesticides	Priority organic	Salinity/ TDS/chloride	Ammonia	Assess date
INB0638_T1012	Tippecanoe River - mainstem		1.03		X		P	X								M					19980301
	TIPPECANOE RIVER - DEEDS CREEK - PIKE LAKE	**5120106020040**																			
INB0624_00	Deeds Creek and other tributaries		8.96		X		X	X													
	TIPPECANOE RIVER - DITTS ANSTIS/ STADDEN DITCHES	**5120106060070**																			
INB0667_00	TIPPECANOE RIVER - DITTS ANSTIS/ STADDEN DITCHES		28.23		X		X	X													
	TIPPECANOE RIVER - HARP DITCH	**5120106100030**																			
INB06A3_00	Harp Ditch and other tributaries		26.87		X		X	N							S						19991108
	TIPPECANOE RIVER - HUFFER DITCH	**5120106030010**																			
INB0631_00	Huffer and Marsh Ditches		5.50		X		X	X													
INB0631_T1009	Tippecanoe River - mainstem		5.58		X		P	X								M					19980301
	TIPPECANOE RIVER - JAMES/ TIPPECANOE LAKES	**5120106010080**																			
INB0618_00	Tippecanoe R and tributaries above Tippecanoe Lake		5.98		X		X	X													
INB0618_P1002	Tippecanoe Lake		4.13	1998	X		P	X					S								19980301
	TIPPECANOE RIVER - LAKE FREEMAN	**5120106140020**																			
INB06E2_00	TIPPECANOE RIVER - LAKE FREEMAN		33.59		X		X	N							S						19991108
	TIPPECANOE RIVER - MCMAHAN DT/ MILL CREEK	**5120106050030**																			
INB0653_00	TIPPECANOE RIVER - MCMAHAN DT		9.54		X		X	N							S						19991108
INB0653_T1044	Mill Creek and tributary		5.03		X		X	X													
	TIPPECANOE RIVER - MOOTS CREEK	**5120106150080**																			
INB06F8_00	TIPPECANOE RIVER - MOOTS CREEK		10.58		X		X	X													
	TIPPECANOE RIVER - PYLE/ POLE RUN DITCHES	**5120106030020**																			
INB0632_00	Pyle/ Pole Run Ditches		12.57		X		X	X													
INB0632_T1010	Tippecanoe River - mainstem		1.94	1998	X		P	X								M					19980301
	TIPPECANOE RIVER - REDINGER DITCH	**5120106040080**																			
INB0648_00	Redinger Ditch		13.37		X		X	X													
INB0648_T1014	Tippecanoe River - mainstem		2.25		F		P	X					S			M					19991108
INB0648_T1042	Tippecanoe River - mainstem		1.08		X		P	X					S			M					19980301
	TIPPECANOE RIVER - REISTER CREEK	**5120106040090**																			
INB0649_00	Reister Creek		14.52		X		X	X													
INB0649_T1015	Tippecanoe River - mainstem		3.91		X		P	X					S			M					19980301
	TIPPECANOE RIVER - RUPLE DITCH	**5120106020010**																			
INB0621_00	Ruple Ditch and Long Ditch		4.51		X		X	X													
INB0621_T1004	Tippecanoe River - mainstem		6.16	1998	X		P	X								M					19980301
INB0621_T1037	Tippecanoe River - mainstem		0.64	1998	X		P	F								M					19991108
	TIPPECANOE RIVER - SHATTO DITCH	**5120106040010**																			
INB0641_00	TIPPECANOE RIVER - SHATTO DITCH		23.18		F		X	X													
INB0641_T1013	Tippecanoe River - mainstem		3.95		F		P	X								M					19980301
	TIPPECANOE RIVER - SLONAKER DITCH	**5120106060030**																			
INB0663_00	TIPPECANOE RIVER - SLONAKER DITCH		26.41		X		X	X													
	TIPPECANOE RIVER - SMALLEY LAKE/ WILMOT POND	**5120106010030**																			
INB0613_00	TIPPECANOE RIVER - SMALLEY LAKE/ WILMOT POND		12.81		F		X	F													
	TIPPECANOE RIVER - STOUT DITCH	**5120106080060**																			
INB0686_00	TIPPECANOE RIVER - STOUT DITCH		18.51		X		X	X													

Uses: F-Full support,P-Partial support,N-nonsupport,X-Not assessed,A-Not Attainable
Cause/ Stressormagnitude: S-slight,M-moderate,H=high,T-Not impaired;more information needed.
*Biological community response;stressor not identified.

Identification	Waterbody and Segment names	Hydrologic unit	Segment size (miles)	YEAR 303D	Aquatic Life	Drink Water	Fish Cons	Contact (Recr)	Biotic comm.	Copper	Cyanide	Lead	Mercury	Low DO	Pathogens	PCBs	Pesticides	Priority organic	Salinity/ TDS/chloride	Ammonia	Assess date
	TIPPECANOE RIVER - TRIMBLE/ DORSEY DITCH	**5120106030050**																			
INB0635_00	Trimble/ Dorsey Ditch		17.40		X		X	X													
INB0635_T1011	Tippecanoe River - mainstem		2.76		X		P	X								M					19980301
INB0635_T1040	Tippecanoe River - mainstem		1.74		F		P	N							S	M					19991108
	TIPPECANOE RIVER - TYER WEISJAHN DITCH	**5120106060110**																			
INB066B_00	TIPPECANOE RIVER - TYER WEISJAHN DITCH		20.56		F		X	X													
	TIPPECANOE RIVER - WEBSTER LAKE	**5120106010040**																			
INB0614_00	Tippecanoe River - Gaff Ditch		10.87		F		X	X													
INB0614_P1034	Webster Lake		1.07		X		P	X					S								19980301
	TIPPECANOE RIVER - WILSON/ COLLINS DITCHES	**5120106060020**																			
INB0662_00	TIPPECANOE RIVER - WILSON/ COLLINS DITCHES		23.49		X		X	N							S						19991108
	TIPPECANOE RIVER - ZINK LAKE OUTLET	**5120106050040**																			
INB0654_00	ZINK LAKE OUTLET and other tributaries		11.34		X		X	X													
INB0654_T1018	Tippecanoe River - mainstem		10.27		F		P	X					S			M					19991130
	WALNUT CREEK - CARR/FISH/MUSKELONGE LAKES	**5120106020070**																			
INB0627_00	WALNUT CREEK - CARR/FISH/MUSKELONGE LAKES		11.27		X		X	X													
	WALNUT CREEK - EAGLE CREEK/ CENTER LAKE	**5120106020080**																			
INB0628_00	Walnut and Eagle Creeks		10.04		X		X	X													
INB0628_P1008	Center Lake		0.60	1998	X	X	P	X								M					19980301
	WINONA LAKE - PETERSON/ KEEFER-EVANS DITCHES	**5120106020060**																			
INB0626_00	Keefer-Evans Ditches		5.15		X		X	X													
INB0626_P1007	Winona Lake		1.80	1998	X		P	X								M					19980301
INB0626_T1039	Peterson Ditch basin		13.82		F		X	X													
	WYLAND DITCH - SELLERS/ SHERBURN LAKES	**5120106020050**																			
INB0625_00	WYLAND DITCH - SELLERS/ SHERBURN LAKES		15.17		F		X	X													
	YELLOW CREEK - LITTLE YELLOW CREEK	**5120106040070**																			
INB0647_00	YELLOW CREEK - LITTLE YELLOW CREEK		15.56		X		X	X													
	YELLOW CREEK - RICKLE DITCH	**5120106040060**																			
INB0646_00	YELLOW CREEK - RICKLE DITCH		14.56		X		X	X													
	YELLOW CREEK - YELLOW CREEK LAKE	**5120106040050**																			
INB0645_00	YELLOW CREEK - YELLOW CREEK LAKE		3.65		X		X	X													
	ZECHIEL ARM	**5120106060040**																			
INB0664_00	ZECHIEL ARM		13.44		X		X	X													

Uses: F-Full support,P-Partial support,N-nonsupport,X-Not assessed,A-Not Attainable
Cause/ Stressormagnitude: S-slight,M-moderate,H=high,T-Not impaired;more information needed.
*Biological community response;stressor not identified.

APPENDIX C

Potential Stakeholders in the Tippecanoe River Watershed

Potential Stakeholders in the Tippecanoe River Watershed

Syracuse Lake Association
1177 E. Northshore Drive
Syracuse, IN 46567
(219) 457-5112

Lake Manitou Association
2114 Ford Court
Rochester, IN 46975
(219) 223-3426

Chapman Lakes Conservation Club, Inc.
P.O. Box 776
Warsaw, IN 46581

Shafer-Freeman Lakes
Environmental Conservation
Corporation
P.O. Box 372
Monticello, IN 47960
(219) 583-9784

Lake Maxinkuckee
Environmental Council
110 N. Main Street
P.O. Box 187
Culver, IN 45611
(219) 842-3686

Tippecanoe Environmental
Lake & Watershed Foundation
Lynn Stevens
PO Box 55
North Webster, IN 46555
(219) 834-3242

Noble County SWCD
100 E Park Drive
Albion, IN 46701-9797
(219) 636-7682

USDA-NRCS
100 E. Park Drive
Albion, IN 46701-9797
(219) 636-7682

Noble County Health Department
2090 N State Road 9, Suite C
Albion, IN 46701-9566
(219) 636-2191

Noble County Commissioners
101 N Orange Street
Albion, IN 46701
(219) 636-7877

Noble County Extension Agent
2090 N State Road 9, Suite D
Albion, IN 46701
(219) 636-2111

Noble County Plan Commission
2090 N State Road 9, Suite A
Albion, IN 46701
(219) 636-7217

Noble County Surveyor
2090 N State Road 9, Suite B
Albion, IN 46701
(219) 636-2131

Argos Waste Water Treatment
16720 Linden Rd
Argos, IN 46501
(219) 892-5878

Argos Water Dept
101 S 1st St
Argos, IN 46501
(219) 892-6321

US Consolidated Farm Svc Agcy
1919 E Business 30
Columbia City, IN 46725
(219) 244-6266

Whitley County Board Of Comm
101 W Van Buren St
Columbia City, IN 46725
(219) 248-3100

Whitley County Council
101 W Van Buren St
Columbia City, IN 46725
(219) 248-3100

Whitley County Drainage Board
101 W Van Buren St
Columbia City, IN 46725
(219) 248-3108

Whitley County Engineer
101 W Van Buren St
Columbia City, IN 46725
(219) 248-3107

Whitley County Extension Ofc
115 S Line St
Columbia City, IN 46725
(219) 244-7615

Whitley County Health Dept
101 W Market St # A
Columbia City, IN 46725
(219) 248-3121

Whitley County Planning Comm
101 W Market St # B
Columbia City, IN 46725
(219) 248-3112

Whitley County SWCD
1919 E. Business 30
Columbia City, IN 46725-9809
(219) 244-6266

Culver City Sewage Plant
1280 Hoosier Ln
Culver, IN 46511
(219) 842-2412

Carroll County Health Department
Courthouse, 101 W Main
Delphi, IN 46923-1566
(765) 564-3420

Carroll County SWCD
1523 N. US Hwy. 421, Suite #2
Delphi, IN 46923-9396
(765) 564-4480

Cooperative Extension Service - Carroll County
1523 N. U.S. Highway 421, Suite 3
Delphi, IN 46923-0317
(765) 564-3169

Carroll County Plan Comm
101 W Main St
Delphi, IN 46923
(765) 564-4468

Carroll County Surveyor
101 W Main St
Delphi, IN 46923
(765) 564-3310

US Consolidated Farm Svc Agcy
1523 N US Highway 421
Delphi, IN 46923
(765) 564-2849

Benton County Co-Op Extension
604 E 2nd St
Fowler, IN 47944-0130
(765) 884-0140

Benton County Commissioners
706 E 5th St
Fowler, IN 47944-0155
(765) 884-1687

Benton County Council
706 E 5th St
Fowler, IN 47944-0155
(765) 884-1687

Benton County Health Dept
706 E 5th St # 12
Fowler, IN 47944-0155
(765) 884-1343

Benton County Surveyor
706 E 5th St # 17
Fowler, IN 47944-0155
(765) 884-0095

US Consolidated Farm Svc Agcy
109 S Grant Ave # A
Fowler, IN 47944-0154
(765) 884-0660

Benton County SWCD
l09 S. Grant Avenue, Suite B
Fowler, IN 47944-1540
(765) 884-0660

Starke County Health Department
53 East Mound Street
Knox, IN 46534-1148
(219) 772-9137

Starke County SWCD
1406 South Heaton Street
Knox, IN 46534-2395
(219) 772-3066

USDA-NRCS
1406 South Heaton Street
Knox, IN 46534-2395
(219) 772-3066

Starke County Commissioners
53 East Mound Street
Knox, IN 46534
(219) 772-9106

Starke County Cooperative Extension Service
1 East Washington, Street
Knox, IN 46534
(219) 772-9141

Starke County Surveyor
53 East Mound Street
Knox, IN 46534
(219) 772-9135

Tippecanoe County Health Department
20 N 3rd St
Lafayette, IN 47901-1211
(765) 423-9221

Tippecanoe County SWCD
184 Professional Court
Lafayette, IN 47905-5153
(765) 448-1810

Cooperative Extension Service - Tippecanoe County
3150 Sagamore Parkway South
Lafayette, IN 47905-5156
(765) 474-0793

Lafayette Water Pollution Cntl
1700 Wabash Ave
Lafayette, IN 47905
(765) 742-1424

Tippecanoe Area Planning
20 N 3rd St
Lafayette, IN 47901-0122
(765) 423-9242

Tippecanoe Cnty Commissioners
20 N 3rd St
Lafayette, IN 47901-0122
(765) 423-9215

Tippecanoe County Drainage Brd
20 N 3rd St
Lafayette, IN 47901-0122
(765) 423-9228

Tippecanoe County Surveyor
20 N 3rd St
Lafayette, IN 47901-0122
(765) 423-9228

US Consolidated Farm Svc Agcy
180 Professional Ct
Lafayette, IN 47905-0515
(765) 448-1805

Cass County Commissioner
200 Court Park
Logansport, IN 46947-0311
(219) 753-7890

Cass County Drainage Board
200 Court Park # 316
Logansport, IN 46947-0311
(219) 753-7770

Cass County Engineer
200 Court Park
Logansport, IN 46947-0311

Cass County Health Dept
200 Court Park # 106
Logansport, IN 46947-0311

(219) 753-7760

Cass County Information
200 Court Park # 303
Logansport, IN 46947-0311
(219) 753-7700

Cass County Planning Director
200 Court Park # 314
Logansport, IN 46947-0311
(219) 753-7775

Cass County Surveyor's Office
200 Court Park # 306
Logansport, IN 46947-0311
(219) 753-7840

Cass County Zoning Adm
601 E Broadway # 303
Logansport, IN 46947
(219) 753-4023

Cooperative Extension Agents
200 Court Park # 302
Logansport, IN 46947-0311
(219) 753-7750

Cass County SWCD
906 W Broadway
Logansport, IN 46947-2978
(219) 753-4705

Waste Water Treatment Plant
3519 S State Road 19
Mentone, IN 46539
(219) 353-7554

Monon City Water Works
422 N Market St
Monon, IN 47959
(219) 253-6441

Monon Waste Water Treatment
100 S Pine St
Monon, IN 47959
(219) 253-6275

Monticello Mayor's Office
227 N Main St
Monticello, IN 47960
(219) 583-9889

Monticello Water Works
225 N Main St
Monticello, IN 47960
(219) 583-5443

US Consolidated Farm Svc Agcy
515 S Country Ln
Monticello, IN 47960
(219) 583-7622

White County Area Plan Dept
110 N Main St # 208
Monticello, IN 47960
(219) 583-7355

White County Circuit Ct Clerk
110 N Main St
Monticello, IN 47960
(219) 583-7032

White County Commissioners
PO Box 269
Monticello, IN 47960
(219) 583-4879

White County Health Dept
110 N Main St
Monticello, IN 47960
(219) 583-8254

White County Surveyor
110 N Main St
Monticello, IN 47960
(219) 583-7883

White County SWCD
103 Country Lane
Monticello, IN 47960-1819
(219) 583-7622

USDA-NRCS
103 Country Lane
Monticello, IN 47960-1819
(219) 583-7622

White County Cooperative Extension Service
Main Street and Broadway

Monticello, IN 47960
(219)583-7442

White County Surveyor
P.O. Box 357
Monticello, IN 47960
(219) 583-7883

Sewage Treatment Plant
7203 E 650 N
North Webster, IN 46555
(219) 834-7241

Miami County Co-Op Extension
21 Court St
Peru, IN 46970
(765) 472-1921

Miami County Offices
25 Court St # 211a
Peru, IN 46970
(765) 473-4649

Miami County SWCD
1170 US Highway 24 W
Peru, IN 46970
(765) 473-6110

Natural Resources Dept
1124 N Mexico Rd
Peru, IN 46970
(765) 473-9722

Industrial Pretreatment
900 Oakhill Ave
Plymouth, IN 46563
(219) 936-2368

Industrial Waste Section
900 Oakhill Ave
Plymouth, IN 46563
(219) 936-2368

Marshall Commissioner's Office
112 W Jefferson St # 205
Plymouth, IN 46563
(219) 935-8510

Marshall Cooperative Extension
112 W Jefferson St # 304
Plymouth, IN 46563
(219) 935-8545

Marshall County Clerk's Office
211 W Madison St
Plymouth, IN 46563
(219) 936-8922

Marshall County Health Dept
112 W Jefferson St # 103
Plymouth, IN 46563
(219) 935-8565

Marshall County Planning Comm
112 W Jefferson St # 302
Plymouth, IN 46563
(219) 935-8540

Marshall County Surveyor's Ofc
112 W Jefferson St # 301
Plymouth, IN 46563
(219) 935-8530

Marshall Drainage Board
112 W Jefferson St
Plymouth, IN 46563
(219) 935-8510

Marshall Solid Waste Mgmt Dist
112 W Jefferson St # 306
Plymouth, IN 46563
(219) 935-8618

Marshall County SWCD
2903 Gary Drive, Suite 1
Plymouth, IN 46563-0000
(219) 936-2024

Jasper County Surveyor
115 West Washington Street
Rensselaer, IN 47978
(219) 866-4907

Jasper County Health Department
105 W Kellner Blvd.
Rensselaer, IN 47978-2626
(219) 866-4917

Jasper County SWCD
800 South College Avenue

Rensselaer, IN 47978-3054
(219) 866-8554

USDA-NRCS
800 South College Avenue
Rensselaer, IN 47978-3054
(219) 866-8554

Jasper County Cooperative Extension Service
122 North Cullen Street
Rensselaer, IN 47978
(219) 866-5741

Jasper County Planning and Development
115 West Washington Strret
Rensselaer, IN 47978
(219) 866-4908

Jasper County Courthouse
County Commissioners
Rensselaer, IN 47978
(219) 956-3606

Fulton County Agent
1009 W 3rd St
Rochester, IN 46975
(219) 223-3397

Fulton County Co-Op Extension
1009 W 3rd St
Rochester, IN 46975
(219) 223-3397

Fulton County Commissioners
815 Main St
Rochester, IN 46975
(219) 223-3869

Fulton County Drainage Board
815 Main St
Rochester, IN 46975
(219) 223-3492

Fulton County Health Dept
1009 W 3rd St
Rochester, IN 46975
(219) 223-2881

Fulton County Solid Waste Dist
1452 Wentzel St
Rochester, IN 46975
(219) 223-4939

Fulton County Surveyor
815 Main St
Rochester, IN 46975
(219) 223-3317

Mill Creek Conservancy
1252 E 100 S # G
Rochester, IN 46975
(219) 223-2403

Fulton County SWCD
1252 E 100 S # D
Rochester, IN 46975
(219) 223-3220

Rochester City Hall
320 Main St
Rochester, IN 46975
(219) 223-2510

Rochester Mayor
122 E 7th St
Rochester, IN 46975
(219) 223-4555

Rochester Sewage Disposal
610 Monticello Rd
Rochester, IN 46975
(219) 223-3485

Rochester Water Works
310 Main St
Rochester, IN 46975
(219) 223-3412

Rochester Sewage Disposal
610 Monticello Rd
Rochester, IN 46975
(219) 223-3485

Rochester Water Works
310 Main St
Rochester, IN 46975
(219) 223-3412

Kosciusko Area Plan Commission

100 W Center St
Warsaw, IN 46580
(219) 372-2304

Kosciusko County Co-Op Ext Svc
100 W Center St # 24
Warsaw, IN 46580
(219) 372-2340

Kosciusko County Commissioner
100 W Center St # 12
Warsaw, IN 46580
(219) 372-2433

Kosciusko County Health Dept
100 W Center St
Warsaw, IN 46580
(219) 372-2356

Kosciusko County Information
100 W Center St
Warsaw, IN 46580
(219) 267-4444

Kosciusko County Surveyor
100 W Center St
Warsaw, IN 46580
(219) 372-2366

Solid Waste District
112 E Center St
Warsaw, IN 46580
(219) 372-3087

US Consolidated Farm Svc Agcy
217 E Bell Dr
Warsaw, IN 46582
(219) 267-7445

US Fish & Wildlife Svc
120 S Lake St
Warsaw, IN 46580
(219) 269-7640

Warsaw Building & Planning
794 W Center St # A
Warsaw, IN 46580
(219) 372-9548

Warsaw Mayor
302 E Market St
Warsaw, IN 46580
(219) 372-9595

Warsaw Sewage Collection Dept
794 W Center St # B
Warsaw, IN 46580
(219) 372-9560

Warsaw Wastewater Treatment
794 W Center St
Warsaw, IN 46580
(219) 372-9562

Kosciusko County SWCD
217 E. Bell Drive
Warsaw, IN 46582-9350
(219) 267-7445

Winamac Water Plant
Plymouth Rd
Winamac, IN 46996
(219) 946-3251

Pulaski County Health Department
Pulaski Co. Building, Suite 205
Winamac, IN 46996-1528
(219) 946-6080

Pulaski County SWCD
309 North West Street
Winamac, IN 46996-1247
(219) 946-3243

USDA-NRCS
309 North West Street
Winamac, IN 46996-1247
(219) 946-3243

Pulaski County Cooperative Extension Service
125 South Riverside Drive # 120
Winimac, IN 46996
(219) 946-3412

Pulaski County Surveyor
112 East Main Street
Winimac, IN 46996
(219) 946-3253

Winona Lake Sewage Dept
1310 Park Ave
Winona Lake, IN 46590
(219) 267-7581

STATE STAKEHOLDERS

Indiana Farm Bureau Inc.
225 S East St
Indianapolis, IN 46202
(317) 692-7851

Indiana Department of Environmental Management
100 N. Senate Ave
P.O. Box 6015
Indianapolis, IN 46206-6015

IDEM Switchboard
(317) 232-8603 or (800) 451-6027

Agricultural Liaison
(317) 232-8587

Air Management
(317) 233-0178

Community Relations
(317) 233-6648

Compliance and Technical Assistance
(317) 232-8172

Criminal Investigations
(317) 232-8128

Enforcement
(317) 233-5529

Environmental Response
(317) 308-3017

Legal Counsel
(317) 232-8493

Media and Communication Services
(317) 232-8560

Pollution Prevention and Technical Assistance
(317) 232-8172

Solid and Hazardous Waste Management
(317) 233-3656

Water Management
(317) 232-8670

Indiana Department of Natural Resources
402 West Washington Street
Indianapolis, IN 46204-2748

IDNR, Division of Soil Conservation, Field Representatives are generally located with the SWCD office in each county.
Division of Engineering
(317) 232-4150

Division of Entomology and Plant Pathology
(317) 232-4120

Division of Fish & Wildlife
(317) 232-4080

Division of Forestry
(317)-232-4105

Division of Historic Preservation & Archaeology
(317) 232-1646

Division of Law Enforcement
(317) 232-4010

Division of State Parks and Reservoirs
(317)-232-4124

Division of Water
(317)-232-4160

Division of Public
Information and Education
(317) 232-4200

Division of Reclamation
(317)-232-1547

Division of Safety and Training
(317) 232-4145

Division of Soil Conservation
(317)-233-3870

Division of Oil and Gas
(317) 232-4055

Division of Outdoor Recreation
(317)-232-4070

Division of Nature Preserves
(317)-232-4052

Indiana State Department of Health
2 North Meridian St.
Indianapolis, IN 46204
(317) 233-1325

FEDERAL STAKEHOLDERS

Natural Resources
Conservation Service
6013 Lakeside Blvd
Indianapolis, In 46278
(317) 290-3200

NRCS Field Representatives are generally located with the SWCD office in each county.

U.S. EPA Region 5
77 West Jackson Blvd
Chicago, IL 60604
(312) 353-2000
(800) 632-8431

APPENDIX D

FUNDING SOURCES

FUNDING SOURCES

This listing of funding sources was derived from the November 1998 *Watershed Action Guide for Indiana*, which is available from the Watershed Management Section of IDEM.

FEDERAL CONSERVATION AND WATERSHED PROGRAMS

Environmental Protection Agency

Section 319, 604(b), and 104(b)3 Grants

Grants for conservation practices, water body assessment, watershed planning, and watershed projects. Available to non-profit or governmental entities. These monies, enabled by the Clean Water Act, are funneled through the Indiana Department of Environmental Management. *For details see IDEM below*.

U.S. Department of Agriculture (See county listings for local federal agency contacts.)

EQIP: Environmental Quality Incentive Program. Administered by the Natural Resources Conservation Service. Conservation cost-share program for implementing Best Management Practices, available to agricultural producers who agree to implement a whole-farm plan that addresses major resource concerns. Up to $50,000 over a 5- to 10-year period. Some parts of the state are designated Conservation Priority Areas and receive a larger funding allotments.

WRP: Wetland Reserve Program. Administered by the Natural Resources Conservation Service. Easement and restoration program to restore agricultural production land to wetland. Easements may be for 10 years, 30 years, or permanent. Longer easements are preferred. Partnerships with other acquisition programs are encouraged. Restoration and legal costs are paid by NRCS. Landowner retains ownership of the property and may use the land in ways that do not interfere with wetland function and habitat, such as hunting, recreational development, and timber harvesting.

CRP: Conservation Reserve Program. Administered by the Farm Service Agency with technical assistance from NRCS. Conservation easements in certain critical areas on private property. Agricultural producers are eligible. Easements are for 10 or 15 years, depending on vegetative cover, and compensation payments are made yearly to replace income lost through not farming the land. Cost share is available for planting vegetative cover on restored areas.

WHIP: Wildlife Habitat Incentive Program. Administered by the Natural Resources Conservation Service. Cost share to restore habitat on previously farmed land. Private landowners who are agricultural producers are eligible. Cost share up to 75%, and contracts are for 10 years.

FIP: Forestry Incentive Program. Administered by the Natural Resources Conservation Service. Cost-share to assist forest management on private lands. Funds may be limited.

U.S. Fish & Wildlife Service

Partners for Wildlife: assistance for habitat restoration.

STATE CONSERVATION AND WATERSHED PROGRAMS

IDNR Division of Soil Conservation

LARE: Lake & River Enhancement Program. Funds diagnostic and feasibility studies in selected watersheds and cost-share programs through local Soil & Water Conservation Districts. Project oversight provided through county-based Resource Specialists and Lake & River Enhancement Watershed Coordinators. Funding requests for Watershed Land Treatment projects must come from Soil & Water Conservation Districts. If a proposed project area includes more than one district, the affected SWCDs should work together to develop an implementation plan. The SWCDs should then apply for the funding necessary to administer the watershed project. Before applying for funding, the SWCDs should contact the Lake & River Enhancement Coordinators to determine (1) the appropriate watershed to include in the project, (2) if the proposed project meets the eligibility criteria, and (3) if funding is available.

IDNR Division of Fish & Wildlife

Classified Wildlife Habitat Program: Incentive program to foster private wildlife habitat management through tax reduction and technical assistance. Landowners need 15 or more acres of habitat to be eligible. IDNR provides management plans and assistance through District Wildlife Managers. See county listings.

Wildlife Habitat Cost-share Program: Similar to above.

IDNR Division of Forestry

Classified Forest Program: Incentive program to foster private forest management through tax reduction and technical assistance. Landowners need 10 or more acres of woods to be eligible. IDNR provides management plans and assistance through District Foresters. (See county listings.)

Classified Windbreak Act: Establishment of windbreaks at least 450 feet long adjacent to tillable land. Provides tax incentive, technical assistance through IDNR District Foresters.

Forest Stewardship Program & Stewardship Incentives Program: Cost share and technical assistance to encourage responsibly managed and productive private forests.

IDNR Division of Reclamation

Appalachian Clean Streams Initiative: Funds for acid mine drainage abatement.

IDNR Division of Nature Preserves

State Nature Preserve Dedication: Acquisition and management of threatened habitat.

IDEM Office of Water Management

State Revolving Fund: Available to municipalities and counties for facilities development. Will be available in 1999 for nonpoint source projects as well. Funding is through very low-interest loans.

Section 319 Grants: Available to nonprofit groups, municipalities, counties, and institutions for implementing water quality improvement projects that address nonpoint source pollution concerns. Twenty-five percent match is required, which may be cash or in-kind. Maximum grant amount is $112,500. Projects are allowed two years for completion. Projects may be for land treatment through implementing Best Management Practices, for education, and for developing tools and applications for state-wide use.

Section 205(j) Grants, formerly called 604(b) Grants: Available to municipalities, counties, conservation districts, drainage districts. These are for water quality management projects such as studies of nonpoint pollution impacts, nonagricultural NPS mapping, and watershed management projects targeted to Northwest Indiana (including BMPs, wetland restoration, etc.)

Section 104(b)(3) Grants: These are watershed project grants for innovative demonstration projects to promote statewide watershed approaches for permitted discharges, development of storm water management plans by small municipalities, projects involving a watershed approach to municipal separate sewer systems, and projects that directly promote community based environmental protection. NOTE: the application time frame for IDEM grant programs is annually, by March 31st.

PRIVATE FUNDING SOURCES

National Fish and Wildlife Foundation

1120 Connecticut Avenue, NW Suite 900, Washington DC 20036. Nonprofit, established by Congress 1984, awards challenge grants for natural resource conservation. Federally appropriated funds are used to match private sector funds. Six program areas include wetland conservation, conservation education, fisheries, migratory bird conservation, conservation policy, and wildlife habitat.

Individual Utilities

Check local utilities such as IPALCO, CINergy, REMC, NIPSCO. Many have grants for educational and environmental purposes.

Indiana Hardwood Lumbermen's Association

Indiana Tree Farm Program

The Nature Conservancy

Land acquisition and restoration.

Southern Lake Michigan Conservation Initiative
Blue River Focus Area
Fish Creek Focus Area
Natural Areas Registry
Hoosier Landscapes Capitol Campaign

Conservation Technology Information Center (CTIC)

'Know Your Watershed' educational materials are available

Indiana Heritage Trust

Land acquisition programs

Ducks Unlimited

Land acquisition and habitat restoration assistance

Quail Unlimited

Pheasants Forever

Sycamore Land Trust

Acres Inc.

Land trust

Oxbow, Inc.

Land trust

SOURCES OF ADDITIONAL FUNDING OPPORTUNITIES

Catalog of Federal Funding Sources for Watershed Protection
EPA Office of Water (EPA841-B-97-008) September 1997

GrantsWeb: http://www.srainternational.org/cws/sra/resource.htm

Tippecanoe River Watershed Restoration Action Strategy

Part II: Concerns and Recommendations

Prepared by

Indiana Department of
Environmental Management
Office of Water Quality

May 2001

Foreword

The Tippecanoe River Watershed Restoration Action Strategy (WRAS) is intended to be a living document to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The first draft of the Tippecanoe River WRAS was released for public review during April 2001. This version of the WRAS incorporates public comments received during that time period.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

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Tippecanoe River Watershed Restoration Action Strategy Part II: Concerns and Recommendations

Part II of the Watershed Restoration Action Strategy discusses the water quality concerns identified for the Tippecanoe River Watershed and lists recommended management strategies to address these concerns.

Part II includes:

1 Water Quality Concerns and Priority Issues Identified by Stakeholder Groups

The Tippecanoe River watershed contains potential stakeholder groups that have different missions. Many of these groups have a long history of working in the Tippecanoe River watershed. The following discussion briefly describes some of the watershed groups and lists their priorities and concerns.

Arrowhead Country Resource Conservation & Development Area, Inc.

The Resource Conservation & Development (RC&D) Area is a region where residents work to improve their environment and economy through conservation, development, and better utilization of natural resources. RC&D areas receive direct funding and technical assistance through the US Department of Agriculture Natural Resources Conservation Service, as well as other sources. The Arrowhead Country RC&D covers Newton, Jasper, White, Starke, Pulaski, Cass, Miami, Fulton, Marshall, and Kosciusko counties in northern Indiana. The Arrowhead Country RC&D conducts a river raft field day each year and is currently working on a septic assistance program for all the counties included in the RC&D. In addition, the Arrowhead RC&D is working with the White County Soil and Water Conservation District on erosion control/fish habitat and windbreak programs.

Lake Maxinkuckee

The Lake Maxinkuckee Environmental Council (LMEC) is a not-for-profit organization whose mission is the of protection and improvement of water quality in Lake Maxinkuckee. The LMEC works with such projects as fund raising, physical maintenance of the lake, treating stormwater runoff, wetland stewardship, and education campaigns.

Tippecanoe Environmental Lake & Watershed Foundation

The Tippecanoe Environmental Lake & Watershed Foundation (Foundation) led by an eleven member Board of Directors. In 1999, the Foundation established an office and hired a Coordinator. The Foundation has numerous ongoing restoration and water quality monitoring projects located in the upper portion of the Tippecanoe River watershed.

Shafer-Freeman Lakes Environmental Conservation Corporation

The Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC) is a "grass-roots" organization focused on the restoration and protection of Lakes Shafer and Freeman. The SFLECC controls over 2000 acres of land immediately around and under both reservoirs. An immediate concern of the SFLECC is the preservation of recreational, environmental, and financial qualities of the reservoirs.

Northern Indiana Citizens Helping Ecosystems Survive (NICHES)

NICHES is a private land trust working in Tippecanoe, Benton, Carroll, Clinton, Fountain, Montgomery, and Pulaski counties. The primary focus of NICHES is the preservation of natural land and significant natural areas. More information about NICHES can be obtained by visiting http://www.dcwi.com/~niches/.

The Nature Conservancy

The Indiana Chapter of The Nature Conservancy (TNC) has designated the Tippecanoe River as a priority site for conservation action. Due to the size and diversity of the watershed, TNC decided to break the watershed into smaller parts in order to ease some of the start-up problems associated with planning and implementation. Since the upper end of the river is rich in fish and unionid fauna and diversity, TNC started their efforts there, with the goal of working their way downstream as the project matured. TNC is targeting an area encompassing roughly 100 river miles in the upper reaches of the watershed. TNC chose not to include the areas upstream of the upper reservoirs because the reservoirs themselves are settling basins that enhance water quality downstream. Furthermore, most of the tributaries north of the lakes are dredged streams, supporting disparate unionid life and fish communities. Finally, the recreational value of the reservoirs has led to the existence of programs designated to control point and non-point source inputs to the reservoirs to maintain the recreational value.

Since TNC's project is in the beginning phases, one of the main priorities is to develop a citizen advisory group comprised of stakeholders from the watershed area. This group can help identify threats to the system, and unique natural areas that are locally specific and be otherwise unknown. This group will also help to develop “community friendly” strategies to abate local environmental threats, and work as an “on-the-ground sales force” for both the project, and TNC. TNC is also working in the watershed to foster relationships with potential project partners such as the county Soil and Water Conservation Districts and the state and federal natural resources agency personnel that work in the watershed. TNC is educating the public on the national significance of the river by talking to civic groups and holding field days and informational sessions to highlight the watershed's unparalleled diversity.

Due to the size of this watershed, it is unreasonable to think that any one group with limited staff and resources can make an appreciable difference in positively affecting the watershed and river. For that reason, one of TNC's our long-term strategies will be to coordinate with other groups to undertake land-based conservation efforts aimed at the preservation of species.

TNC feels that their best role is maintaining the conservation momentum in the watershed, and working to inspire others to assist us in the mission, thereby multiplying the overall impact in the watershed and extending the reach of the project.

Another priority of the TNC project is to develop a monitoring program that will help develop a basis for determining long-term ecological trends in the Tippecanoe River. This will help develop strategies that will possibly lead toward abating the known environmental threats. TNC has established seven (7) monitoring stations on the River that represent a wide cross section of habitat types, river stretches, substrates, Natural Regions and transitional areas between Natural Regions. The information obtained from these seven sites will serve as a barometer of stream health in those particular areas, and provide the information needed to create adaptive solutions to ecological trends in the system. TNC plans to inventory some of the larger tributaries to the river that have high quality habitat for fish and mussel species. It is TNC's hope that, if some conservation work were done in these smaller watersheds, they can be developed into refuges for species in the event of a catastrophic event on the main river.

TNC's overall goal is build relationships with local landowners and conservation-minded agencies in order to work with them to adopt and promote more Earth friendly land use practices, and work towards developing and promoting more "sustainable" forms of agricultural practices that would be more widely adopted in the watershed. TNC will work with the property owners directly along the river's riparian corridor; working toward making land use changes that will benefit the river and its species through such strategies as tree plantings and buffering practices along the open agricultural drains. TNC is striving to build relationships with potential project partners and working toward establishing TNC as a natural resources leader and information/technical assistance source in the watershed. TNC is also working toward developing success stories in the watershed that can be used as a foothold to gain trust and credibility with local landowners and decision makers.

2 Water Quality Concerns and Priority Issues Identified by State and Federal Agencies

This section presents the combined efforts of state and federal agencies, and universities (such as IDEM, IDNR, USDA-Natural Resources Conservation Service, Ohio River Valley Water Sanitation Commission, Purdue University, Indiana University, Indiana Geologic Survey, and US Geological Survey) to assess water quality concerns and priority issues in the Tippecanoe River Watershed. This multi-organization effort formed the basis of the Unified Watershed Assessment for Indiana. At this time, the Unified Watershed Assessment has been completed for 1998 and updated for 2000-2001.

Indiana's Unified Watershed Assessment (UWA)

The UWA workgroup gathered a wide range of water quality data that could be used to characterize Indiana's water resources. These data were used in 'layers' in order to sort the 8-digit HUC watersheds according to the present condition of the water in lakes, rivers, and streams. The workgroup used only those data which concerned the water column, organisms living in the water, or the suitability of the water for supporting aquatic ecosystems. Each 'layer' of information/data was partitioned by percentiles into scores. The scores ranged

between one and five, with a score of one indicative of good water quality or minimum impairment, and a score of five indicating heavily impacted or degraded water quality.

The data layers used in the 1998 and the 2000-2001 update include:

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

The sources and additional information for these data layers include:

- Lake Fishery: From IDNR fisheries surveys of lakes and reservoirs from 1972 to 1994. Raw scores were averaged for all lakes in the watershed
- Stream Fishery: From IDNR fisheries surveys of streams from 1970 to 1994. Raw scores were averaged for all streams in the watershed
- Aquatic Life Use Support: IDEM, Office of Water Quality, Assessment Branch
- Fish Consumption Advisories: ISDH and IDEM, Office of Water Quality, Assessment Branch
- Fish Index of Biotic Integrity: IDEM, Office of Water Quality, Assessment Branch
- Qualitative Habitat Evaluation Index: IDEM, Office of Water Quality, Assessment Branch
- Lake Trophic Scores: Indiana Clean Lakes Program through IDEM, Office of Water Quality, Assessment Branch. This score was based on information gathered from sampling conducted in the 1970's and 1980's

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

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

This amended assessment has the following benefits:

- Provides a logical process for targeting funds, which may be expanded or updated without changing the basic framework.

- Provides information at a finer resolution (11-digit hydrologic units) to agencies and local groups interested in watershed assessment.
- Identifies data gaps.
- Can be used as a compliment to other assessments, such as the 305(b) Report and 303(d) List.

Table 2-1 and Figure 2-1 show the results of the 2000-2001 UWA for the Tippecanoe River watershed.

3 Identification of Impaired Waters

Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with federal technology based standards alone. States are also required to develop a priority ranking for these waters taking into account the severity of the pollution and the designated uses of the waters. Indiana's 303(d) list was approved by EPA on February 16, 1999.

Once the Section 303(d) list and ranking of waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards. The TMDL is an allocation that determines the point and nonpoint source (plus margin of safety) load reductions required in order for the waterbody to meet water quality standards. IDEM's Office of Water Quality has and continues to perform point source waste load allocations for receiving waters. Part I of the WRAS briefly outlines IDEM's strategy for developing TMDLs.

The following Tippecanoe River Watershed waterbodies are on Indiana's 1998 Clean Water Act Section 303(d) list submitted and approved by EPA 303(d) list (Figure 3-1):

Water Body	Location/Reach	County	Parameter(s) of Concern	HUC	Subwatershed(s)
Crooked Lake	Burr Oak	Noble / Whitley	FCA for Hg	5120106	10
Center Lake	Warsaw	Kosciusko	FCA for PCB	5120106	20
Lake Manitou	Rochester	Fulton	FCA for Hg	5120106	50
Lake Maxinkuckee	Culver	Marshall	FCA for Hg	5120106	61
Pike Lake	Warsaw	Kosciusko	FCA for Hg	5120106	20
Tippecanoe Lake	Oswego	Kosciusko	FCA for Hg	5120106	10
Tippecanoe River	Rochester	Fulton	Cyanide	5120106	50
Tippecanoe River	All	Kosciusko / Fulton / Pulaski	FCA for PCB & Hg	5120106	020 030 040 050 060 080
Winona Lake	Warsaw	Kosciusko	FCA for PCB	5120106	20

FCA - Fish Consumption Advisory
PCB - Polychlorinated Biphenyls
Hg - Mercury
***Only waters for which fish tissue data support issuance of fish consumption advisories are individually cited above. The Indiana Department of Health has issued a general fish consumption advisory for all other waters of the state. This advisory was based on extrapolation of the fish tissue data that were available and generally recommends that if no site-specific advisory is in place for a waterbody, the public should eat no more than one meal (8 oz.) per week of fish caught in these waters. Women of child bearing age, women who are breast feeding, and children up to 15 years of age should eat no more than one meal per month. The basis for this general advisory is widespread occurrence of mercury or PCBs (or both) in most fish sampled throughout the state. Please refer to the most recent Fish Consumption Advisory booklet available through the Indiana Department of Health (317/233-7808). Sources of the mercury and PCBs are unknown for the most part, but it is suspected that they result from air deposition.

4 Priority Issues and Recommended Management Strategies

Part I provided the existing water quality information for the Tippecanoe River watershed and Part II lists priority issues and concerns from local, state, and federal stakeholders in the watershed. This section pulls together the priority issues and concerns held by all stakeholders and recommends management strategies. Underlying all discussions of priority issues and concerns is the fact that improving water quality in the Tippecanoe River Watershed will also enhance the natural and recreational values of Tippecanoe River. Each subsection below focuses on a single priority issue.

4.1 Data/ Information and Targeting

The success in restoring water quality in the Tippecanoe River Watershed is fundamentally based on identifying the specific geographic problem areas; identifying all sources contributing to the impairment of the waterbody; and quantifying the contribution of a pollutant by each source.

Recommended Management Strategy 1: Numerous data collection efforts are ongoing in the Tippecanoe River Watershed. This information should be used in prioritizing and targeting specific problems and geographic areas in the watershed. The scale at which targeting and prioritization should occur is the 14-digit HUC watershed area (Figure 2-2 of Part I). Targeting and prioritization will require input from stakeholders living in those geographic areas. The purpose of prioritization and targeting is to enhance allocation of resources in the effort of improving water quality.

Recommended Management Strategy 2: Through the development of Total Maximum Daily Loads (TMDLs) for impaired waterbodies in the Tippecanoe River Watershed, all sources contributing to the impairment of a waterbody will be identified and quantified in terms of their contribution to the waterbody. This includes gathering more data and information on nonpoint sources of water pollution. Throughout the TMDL process, information and feedback from watershed stakeholders will be required in order to generate appropriate allocation scenarios. The result of developing TMDLs will be an understanding of the impact of nonpoint sources on water quality in the watershed.

4.2 Streambank Erosion and Stabilization

The cutting and erosion of streambanks within the Tippecanoe River Watershed is a major concern. This cutting and erosion increases the sediment load in waterbodies and directly impacts the scenic and recreational values of waterbodies in the Tippecanoe River Watershed. Streambank cutting and erosion is often a function of many factors that include: stream energy and velocity, flooding, and land management. Increased drainage in headwater streams and ditches increases stream energies during rainfall events and often leads to increased streambank cutting and erosion downstream. Land clearing and urban development also impact volume and velocity of runoff. Hence, this problem is not easily solved.

Recommended Management Strategy 1: Structural stabilization of specific streambank areas in the Tippecanoe River watershed may solve problems on a temporary basis. However,

a comprehensive understanding of drainage, stream flows and energies, and land management practices is required to adequately approach this problem. Conservation partners (local, state, and federal) are actively working within their specific geographic areas (typically at the county level); however, this may not facilitate solving the streambank cutting and erosion problems because efforts may not be coordinated between headwater and downstream areas. For example, drainage should take into account the work and efforts of downstream partners to reduce flooding and streambank cutting. Conservation efforts should be in the context of watersheds and span county boundaries in order to account for downstream impacts. Local Drainage Boards, Planning and Zoning Boards, and County Commissioners could effectively address this issue by involving local stakeholders in the decision making process and approaching the issue on a watershed basis.

4.3 Failing Septic Systems and Straight Pipe Discharges

Local county health departments and other stakeholders have identified failing septic systems and straight pipe discharge from septic tanks as significant sources of water pollution in the Tippecanoe River watershed. Straight pipe discharges from septic tanks and septic tanks connected to drainage tiles are illegal (327 IAC 5-1-1.5); however, these practices still exist in the Tippecanoe River watershed.

Recommended Management Strategy 1: The direct impact of communities discharging their septic tank effluent to waterbodies needs to be adequately characterized. This will involve coordination between the Office of Water Quality, local health departments, Indiana State Department of Health, and other stakeholders. The option of choice to eliminate the illegal discharges will be a cooperative effort between homeowners and local, state, and federal stakeholders.

Recommended Management Strategy 2: Local planning, zoning, and health ordinances could be adopted or strengthened to address this problem during new development. Existing local ordinances could be enforced more vigorously to correct problems with existing systems. Both of these strategies will require input from local stakeholders.

Recommended Management Strategy 3: An education/ outreach program on the health and environmental risks of septic system discharges, system maintenance, and system function would provide homeowners and others with basic information to better understand the impacts of inadequate systems. This kind of education effort would involve local health departments, Indiana State Department of Health, IDEM, and other stakeholders. The ArrowHead RC&D is working on a project to demonstrate proper septic system installation.

4.4 Water Quality - General

The Clean Water Act Section 303(d) list presented in Section 3 lists impaired waterbodies for the Tippecanoe River watershed.

Recommended Management Strategy: The Clean Water Act requires states to complete TMDLs for waterbodies listed on the Section 303(d) list. The Office of Water Quality is currently evaluating and exploring the modeling process and data needs required to complete TMDLs for the Section 303(d) listed waterbodies. Completion of a TMDL will involve loading allocations of a pollutant to both point and nonpoint sources. The development of TMDLs will involve meetings with stakeholder groups linked to the Section 303(d) waterbodies. As TMDLs are

developed, this Watershed Restoration Action Strategy will be amended to incorporate the final TMDLs.

4.5 Fish Consumption Advisories

As noted in Part I and Part II, fish consumption advisories are concerns within the Tippecanoe River watershed.

Recommended Management Strategy 1: In many cases, the source of the contamination is unknown and may be from atmospheric deposition or some unknown discharge. To address this concern, the cause or source must be identified. Until that is accomplished, the fish consumption advisories should be followed.

4.6 Nonpoint Source Pollution - General

Nonpoint source pollution contributions are often difficult to assess or quantify. They can include sediment deposition from soil erosion, nutrient runoff from animal wastes and commercial fertilizer, herbicide and insecticide runoff, and oil or fuel waste runoff. Nonpoint pollution can emanate from agricultural as well as urban lands. Currently, loadings of nonpoint source pollutants to water are often inferred by examination of land use practices, without actual measurements. In addition, the actual water quality impairments related to nonpoint source pollutants have not been well characterized in the Tippecanoe River watershed. Finally, very few regulatory control mechanisms exist to control nonpoint source pollution.

Recommended Management Strategy 1: Through the TMDL development process, the Office of Water Quality will identify, assess, and quantify nonpoint source pollutant loadings to impaired waterbodies. In order to accomplish this task, the Office of Water Quality will work closely with local, state, and federal stakeholders at the watershed and subwatershed level. Loading scenarios for nonpoint source pollutants will be developed by the Office of Water Quality and reviewed by local, state, and federal stakeholders. Implementation of nonpoint source controls will involve a blend of funding assistance and regulatory action, where applicable.

Recommended Management Strategy 2: Numerous funding mechanisms, such as Conservation Reserve Program, Environmental Quality Incentive Program, Lake and River Enhancement program, and 319(h) grants, exist to promote practices to reduce nonpoint source pollution in the watershed. To more efficiently and effectively address nonpoint source pollution in the watershed, the prioritization and targeting discussed previously in Part II should be used to allocate further application of resources.

Recommended Management Strategy 3: The management of urban nonpoint sources can be addressed through effective land use planning and site design. Designs that incorporate less impervious area and more natural infiltration areas have proven effective in reducing urban nonpoint pollution. Local stakeholders working with local planning and zoning authorities, and developers, should implement more stringent site design requirements to reduce nonpoint source contaminants. This effort would be supported by the state and federal stakeholders.

4.6.1 Nonpoint Source Pollution- Education and Outreach

This Watershed Restoration Action Strategy is a beginning point for education and outreach efforts. It compiles existing knowledge about the water resource in this watershed and presents it to the stakeholders who live in the Tippecanoe River. It brings to a public forum the available information and local concerns. However, the education process does not stop with the publication of this document.

Recommended Management Strategy: Local stakeholders, in cooperation with state and federal agencies, need to seek additional information on water quality concerns and issues addressed in this document and make that information available to the public. Additionally, the problems associated with septic failures, soil erosion, land use issues, and riparian zones can be emphasized through meetings, training sessions, and stakeholder group discussions. Field days are excellent ways to present information and encourage discussion. Use of experts with strong background knowledge coupled with local sponsors is an effective method to convey solutions to these problems.

4.7 Point Sources - General

There are 96 active NPDES permitted dischargers, and 15 CSO discharge points in the Tippecanoe River watershed. Additionally there are illegal point source discharges, such as tiles discharging septic tank effluent that exist in the watershed.

Recommended Management Strategy: The Permitting and Compliance Branch of the Office of Water Quality is responsible for issuing and monitoring compliance of NPDES permit holders. Clearly, more emphasis and resources are needed to identify and correct illegal point sources and noncomplying point sources. Improving compliance of NPDES dischargers and identifying illegal dischargers will involve fostering a working relationship with other local, state, and federal stakeholders to monitor compliance and report unusual discharges or stream appearance. In regards to illegal discharges, the Office of Water Quality will work with local, state, and federal stakeholders to identify and eliminate these sources of water pollution.

5 Future Expectations and Actions

As discussed in Part I, this Watershed Restoration Action Strategy is intended to be fluid document that will be revised or amended as new information becomes available. Section 5.1 discusses expectations derived from the Strategy and how progress will be measured. Specific revisions and amendments to the Watershed Restoration Action Strategy are discussed in Section 5.2. Finally, the Watershed Restoration Action Strategy will be reviewed by all stakeholders before it becomes final, as described in Section 5.3.

5.1 Expectations and Measuring Progress

The Tippecanoe River Strategy provides a starting point to address water quality concerns held by local, state, and federal stakeholders. Part II provides recommended management strategies to address these concerns. Through cooperative efforts with stakeholders, all of the recommended management strategies listed will begin implementation by the summer of 2002.

Measurement of progress is critical to the success of any plan. Water quality improvements will not take place overnight. Measuring of progress in terms of water quality will be provided through the Office of Water Quality Assessment Branch's rotating basin monitoring strategy.

5.2 Expected Revisions and Amendments

This Watershed Restoration Action Strategy is intended to provide a starting point to improve water quality and measure the improvement. Hence, this document will require revisions and amendments as new information becomes available. The future revisions and amendments have been divided into those that are expected within the next year (Section 5.2.1) and those that will occur over a long-term basis (Section 5.2.2).

5.2.1 Short Term Revisions and Amendments

The most significant revisions and amendments will likely occur during 2001 and after, as a result of stakeholder review.

5.2.2 Long Term Revisions and Amendments

The Office of Water Quality is moving toward adopting a watershed management approach to solve water quality problems. Part of the watershed approach is the use of a rotating basin management cycle. The Assessment Branch of the Office of Water Quality has already adopted this rotating basin cycle in its intensive monitoring and assessment of Indiana waterbodies (this is in addition to the already established fixed monitoring station monitoring which occurs on a monthly basis). The Watershed Restoration Action Strategy may be revised or amended when sufficient information becomes available.

5.3 Review of the Watershed Restoration Action Strategy

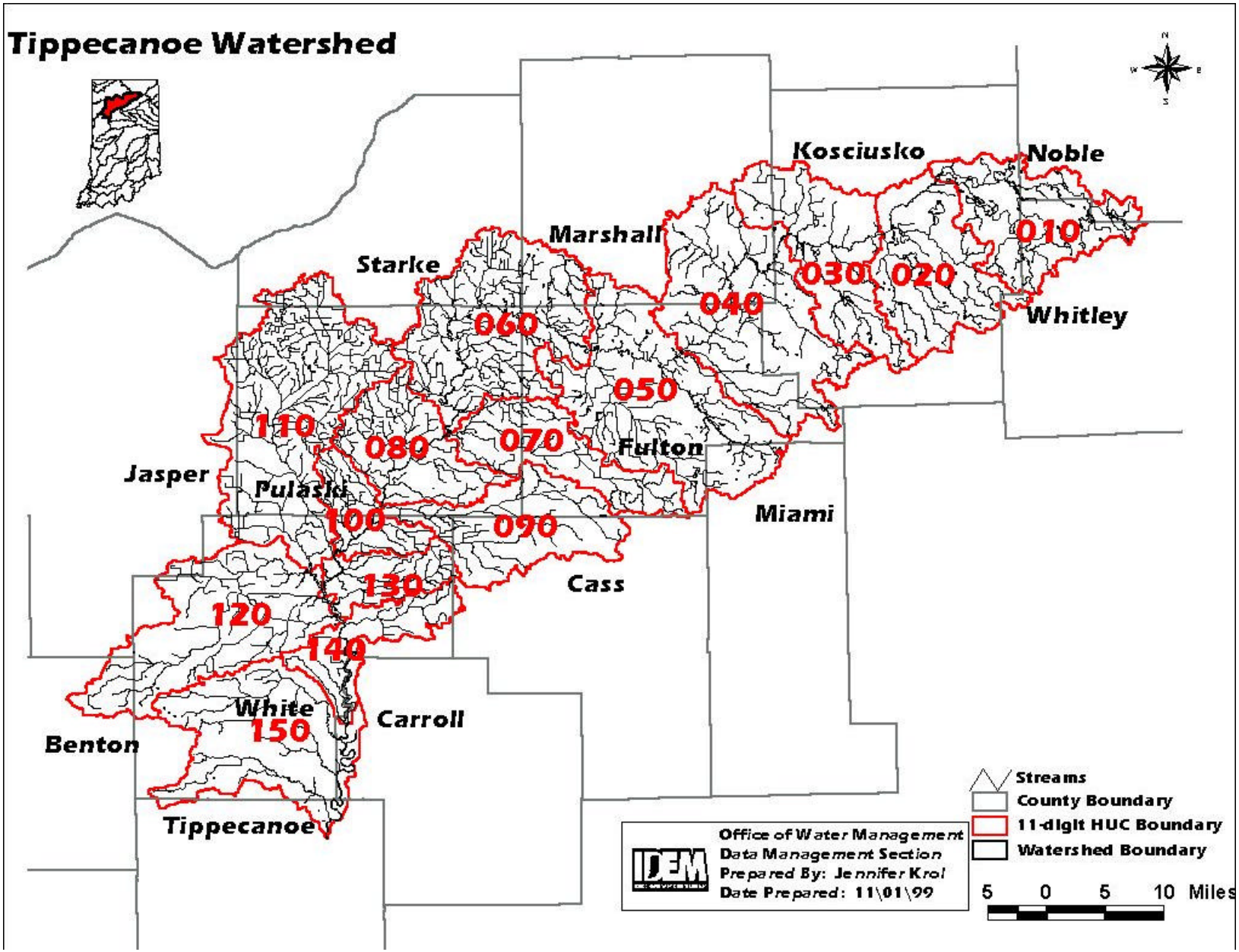
Before this Watershed Restoration Action Strategy becomes final, it will undergo rigorous review. The first stage of review will be performed internally by the Office of Water Quality. Once the Watershed Restoration Action Strategy has been revised to address internal Office of Water Quality comments, it will be circulated to local, state, and federal stakeholders in the watershed. Written comments from local, state, and federal stakeholders will be addressed and the Watershed Restoration Action Strategy will again be revised to incorporate applicable comments. Once internal and external comments have been addressed, the final version of the Watershed Restoration Action Strategy will be released.

Table 2-1

HYDROLOGIC UNIT SCORES for Each Parameter Used in the Unified Watershed Assessment [2000-2001]																
11 Digit Hydrologic Unit		Mussel Diversity and Occurrence	Aquatic Life Use Support	Recreational Use Attainment	Stream Fishery	Lake Fishery	Eurasian Milfoil Infestation Status	Lake Trophic Status	Critical Biodiversity Resource	Aquifer Vulnerability	Population Using Surface Water for Drinking Water	Residential Septic System Density	Degree of Urbanization	Density of Livestock	% Cropland	Mineral Extraction Activities
Tippecanoe	05120106010	5	nd	nd	nd	2	3	nd	5	3	2	5	2	5	3	1
	05120106020	5	nd	nd	nd	4	4	1	5	3	2	5	2	5	3	1
	05120106030	5	nd	nd	nd	nd	nd	2	3	2	2	4	2	5	3	1
	05120106040	5	nd	nd	nd	2	3	3	4	2	2	3	2	4	4	1
	05120106050	5	nd	nd	nd	3	4	3	4	2	2	2	2	3	4	1
	05120106060	5	nd	nd	nd	4	4	nd	5	2	2	3	2	3	4	1
	05120106070	5	nd	nd	nd	nd	nd	nd	2	2	2	1	1	3	4	1
	05120106080	5	nd	nd	nd	nd	nd	3	4	2	2	1	2	2	5	1
	05120106090	nd	nd	nd	nd	3	nd	nd	2	2	2	2	1	3	4	1
	05120106100	2	nd	nd	nd	nd	nd	nd	2	2	2	4	1	3	5	1
	05120106110	nd	nd	nd	nd	nd	nd	nd	4	2	2	1	2	3	5	1
	05120106120	nd	nd	nd	nd	nd	nd	nd	3	2	2	1	2	3	5	2
	05120106130	nd	nd	nd	nd	nd	nd	2	2	2	2	4	1	3	5	2
	05120106140	nd	nd	nd	nd	5	nd	3	2	2	2	4	2	3	5	2
	05120106150	5	nd	nd	nd	nd	nd	nd	5	3	2	3	2	3	5	2

Note:
The UWA scores range from 1 to 5, with a score of 1 indicating good water quality and a score of 5 indicating severe impairment.
Nd = No data

Figure 2-1


Tippecanoe Watershed
Kosciusko
Noble
Marshall
Starke
010
020
030
040
050
060
070
080
090
100
110
120
130
140
150
Whitley
Fulton
Miami
Jasper
Pulaski
Cass
White
Carroll
Benton
Tippecanoe
Streams
County Boundary
11-digit HUC Boundary
Watershed Boundary
Office of Water Management
Data Management Section
Prepared By: Jennifer Krol
Date Prepared: 11\01\99
IDEM
5 0 5 10 Miles

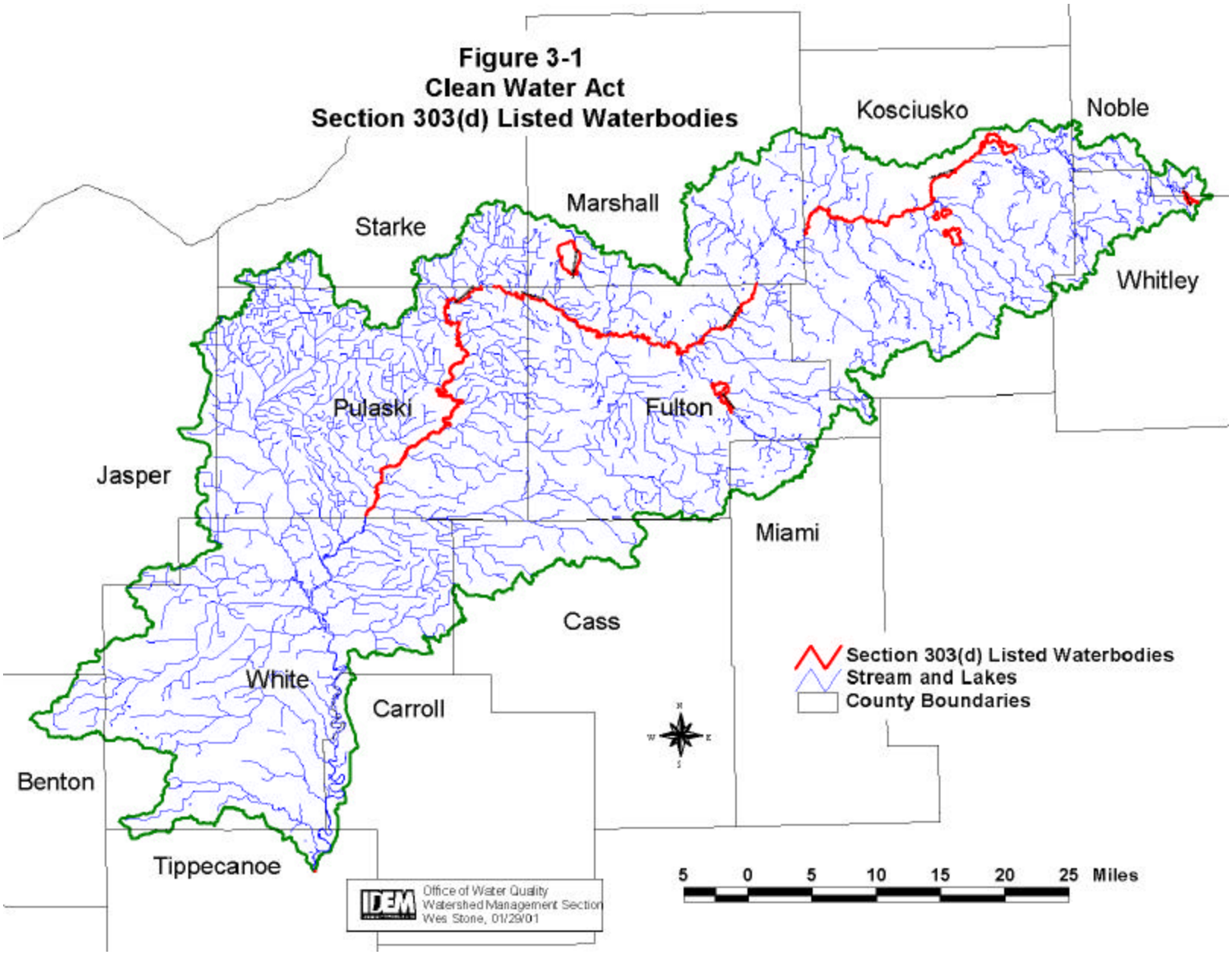


Figure 3-1
Clean Water Act
Section 303(d) Listed Waterbodies
Kosciusko
Noble
Marshall
Starke
Whitley
Pulaski
Fulton
Jasper
Miami
Cass
White
Carroll
Benton
Tippecanoe
Section 303(d) Listed Waterbodies
Stream and Lakes
County Boundaries
5 0 5 10 15 20 25 Miles
IDEM
Office of Water Quality
Watershed Management Section
Wes Stone, 01/29/01

Figure 2-1
Tippecanoe River Watershed

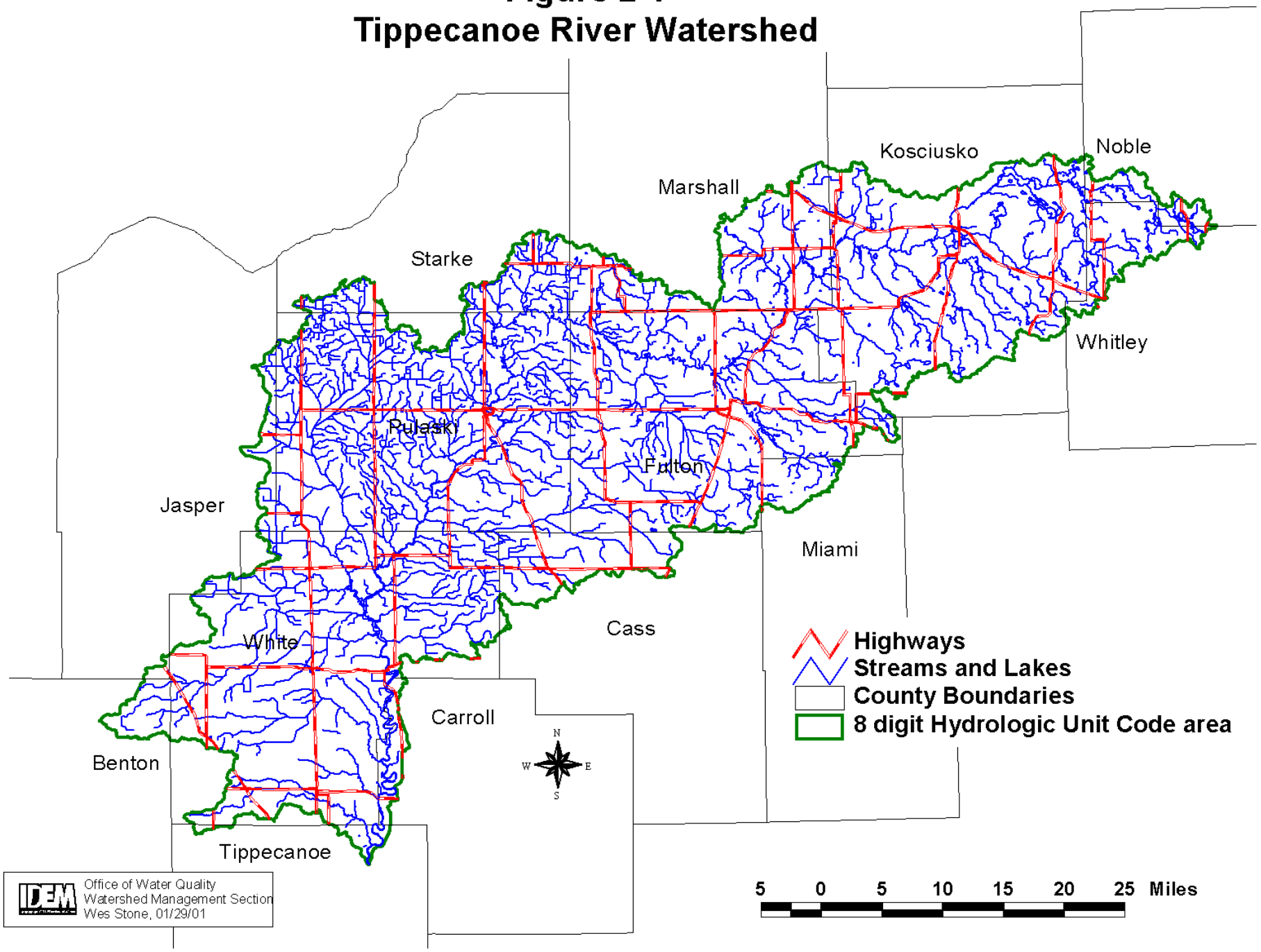


Figure 2-2
14 digit Hydrologic Unit Code areas

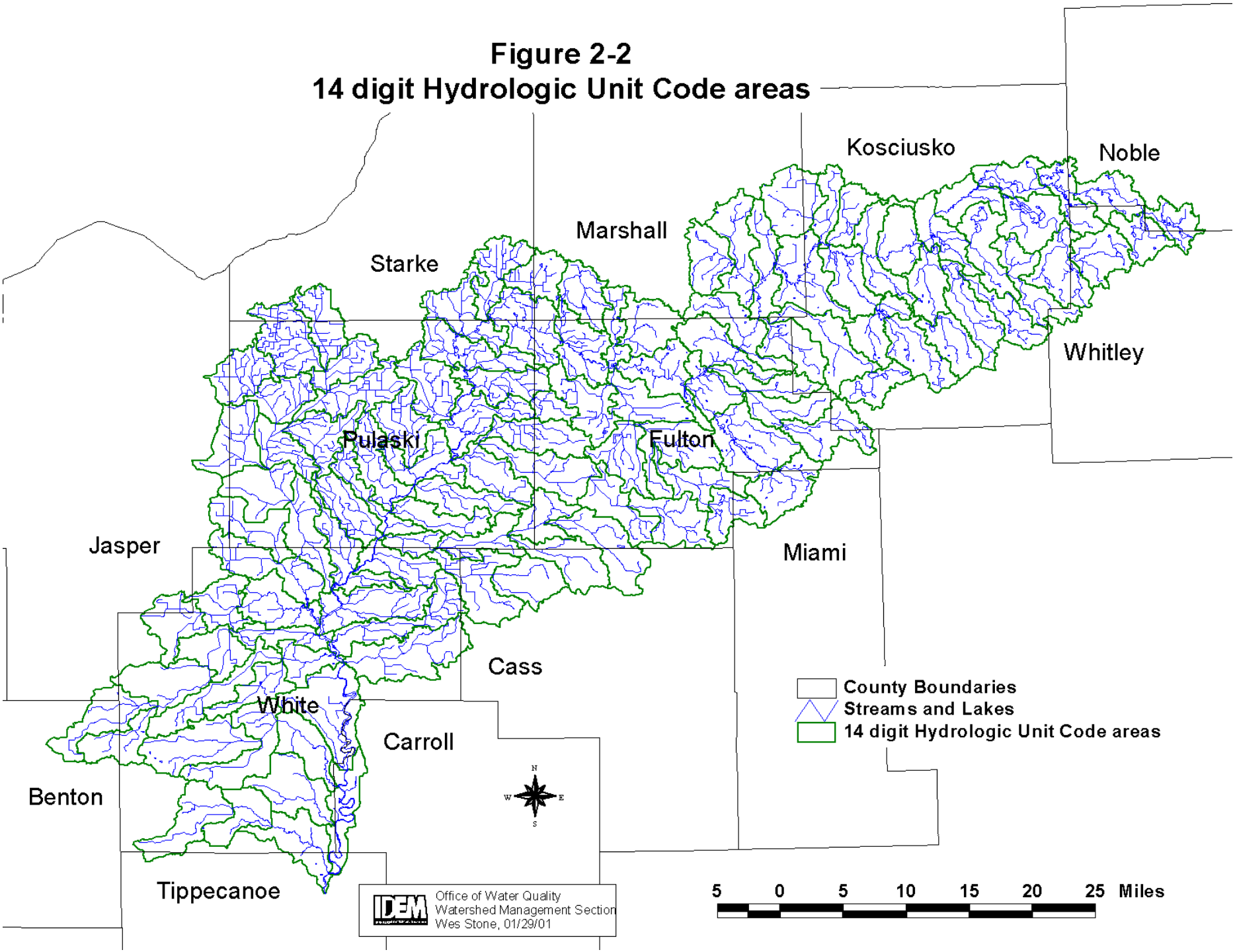
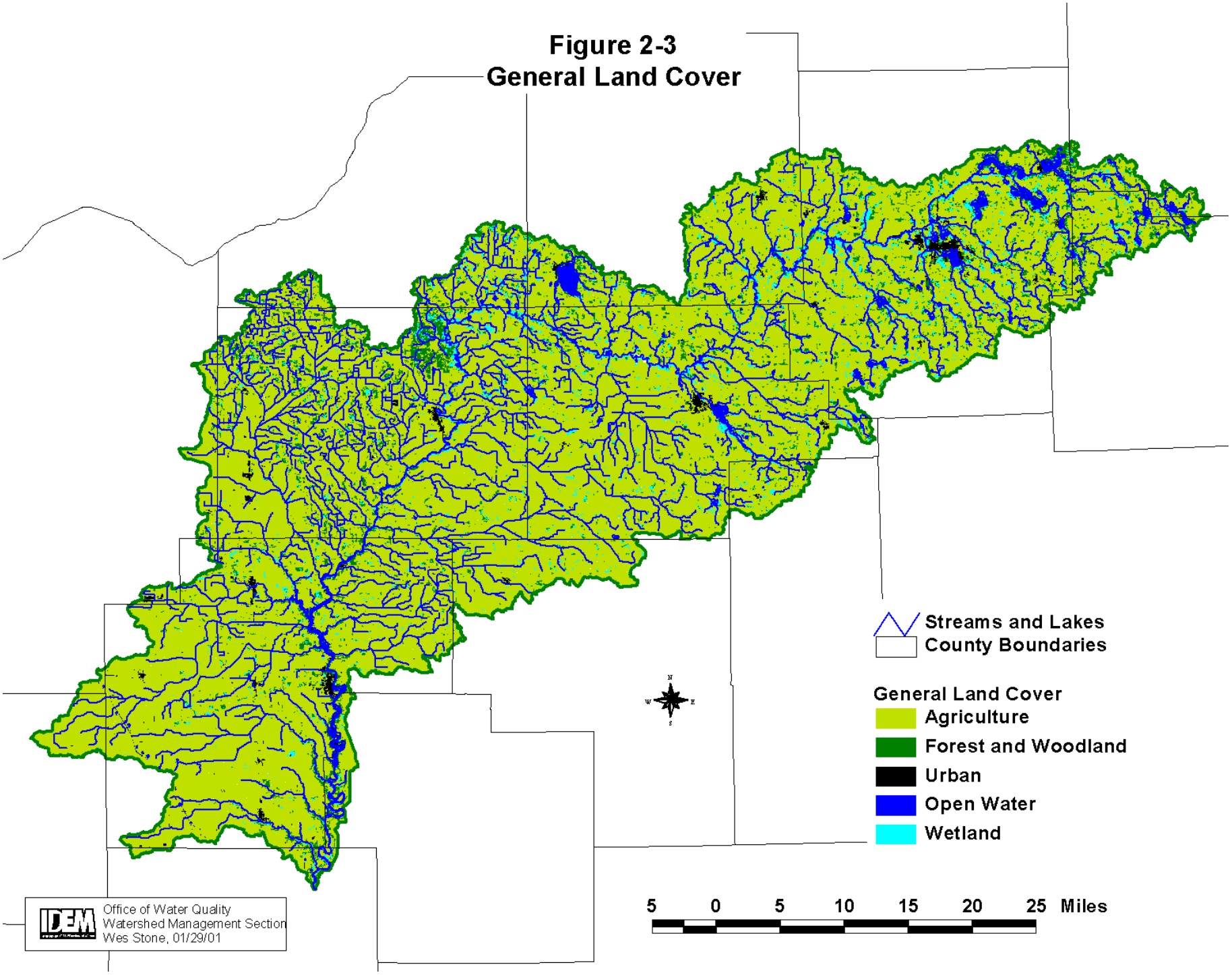


Figure 2-3
General Land Cover



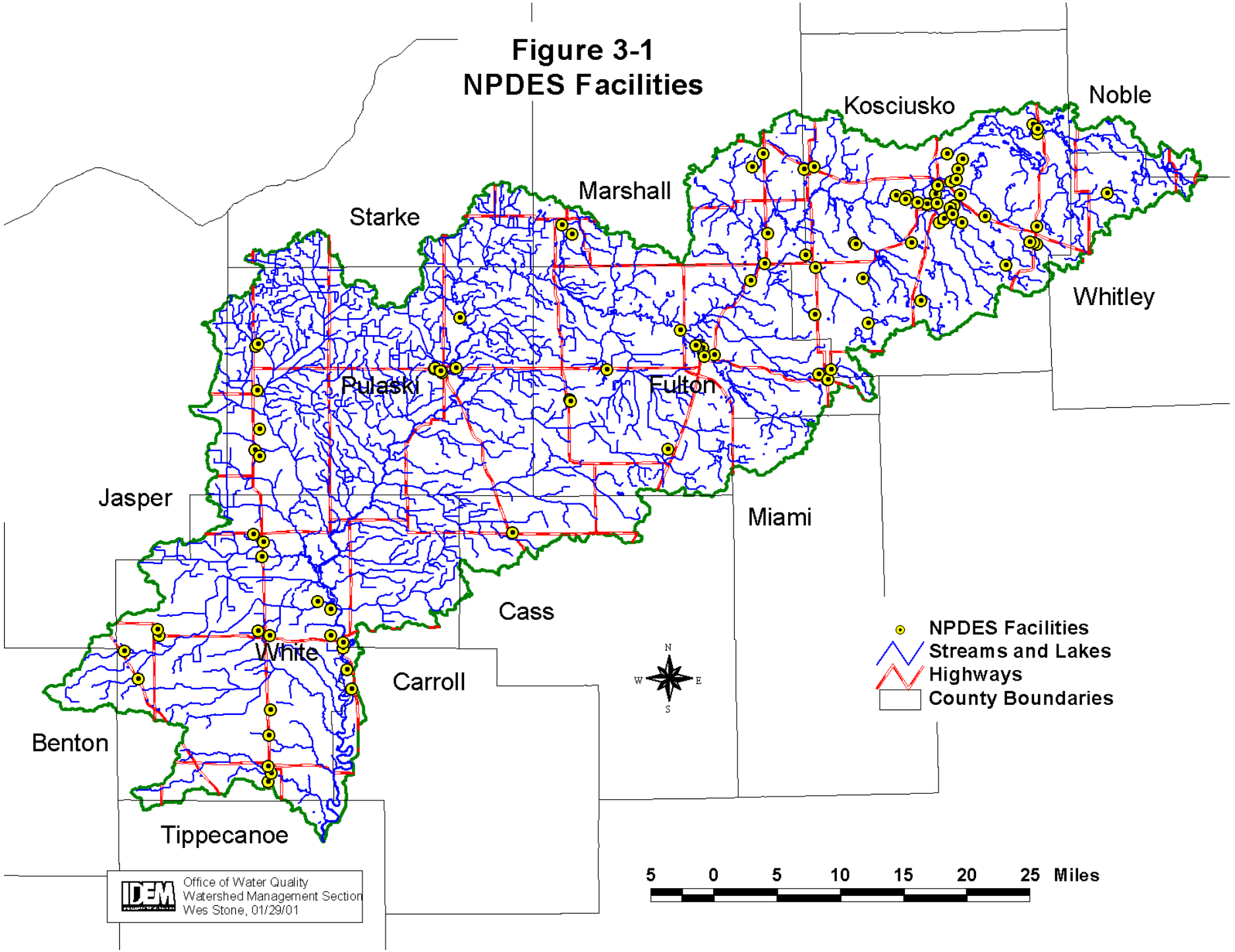


Figure 3-1
NPDES Facilities
Kosciusko
Noble
Marshall
Starke
Whitley
Pulaski
Fulton
Jasper
Miami
Cass
White
Carroll
Benton
Tippecanoe
N
W
E
S
NPDES Facilities
Streams and Lakes
Highways
County Boundaries
5 0 5 10 15 20 25 Miles
IDEM
Office of Water Quality
Watershed Management Section
Wes Stone, 01/29/01