

# INDIAN CREEK SUBCOMMITTEE



July 26, 2006 9:30 AM to 11:00 AM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

# **MEETING AGENDA**

- 1. Introduction to Watershed Planning
- 2. IDEM's Expectations
- 3. Watershed Plan Approach
- 4. Quality Assurance Project Plan (QAPP)
- 5. Monitoring Site Selection
- 6. Next Steps

- □ Watershed Plan Outline
- □ Draft Quality Assurance Project Plan





# **Presentation Overview**

- Introduction to Watershed Planning
- IDEM's Expectations
- Watershed Plan Approach
- Quality Assurance Project Plan
- Monitoring Site Selection
- Next Steps



# Introduction to Watershed Planning

- Implement Feasibility Study goals in Indian Creek Watershed
- > Foster economic development
- > Preserve environmental integrity
- ➤ Enhance quality of life
- Approach to address water quality issues prior to IDEM TMDLs

# Introduction to Watershed Planning

- Indian Creek Watershed Description
  - ➢Drains 256 square miles
  - ≻Harrison and Floyd Counties
  - ≻56 miles of impaired streams
  - ➢Prone to flooding
  - $\succ$ Poised for growth
  - Numerous karst features, including Binkley Cave





## **IDEM's Expectations**

#### • \$99,930.00 Grant §205(j)

- Major Tasks
- 1. Establish Watershed Plan Committee
- 2. Conduct Quarterly Public Outreach
- 3. Develop Quality Assurance Project Plan
- 4. Conduct Monitoring and Assessment
- 5. Inventory and Map Sinkholes
- 6. Develop Watershed Management Plan

# **IDEM's Expectations**

#### TIMELINE

IDEM Awards Grant to Harrison County		3/2006
RFP to Hire Watershed Coordinator		3/2006
Establish Indian Creek Watershed Subcomr	nittee	7/2006
Conduct Quarterly Public Outreach	8/2006 to	3/2008
Develop Quality Assurance Project Plan		8/2006
Conduct Monitoring & Assessment	9/2006 to 1	0/2007
Inventory & Map Sinkholes	10/2006 to 1	0/2007
Develop Watershed Management Plan	final by 3	/1/2008

#### Watershed Plan Approach

#### Task 1. Establish Indian Creek Watershed Subcommittee

#### Roles

- Develop goals
- Provide policy direction
- Develop watershed strategies
- Eight quarterly meetings

# Watershed Plan Approach

Task 2. Conduct Quarterly Public Outreach

- Engage watershed stakeholders & citizens
- Roles
  - Recommend watershed strategies
  - Implement Watershed Plan
  - Enhanced citizen involvement

• www.indiancreekwatershed.com



Task 3. Develop Quality Assurance Project Plan

- IDEM approval required
- Establishes monitoring
- goals
- Monitoring plan
- Data analysis

# Watershed Plan Approach

Task 4. Conduct Monitoring and Assessment

- Evaluate current conditions
- Identify pollution sources
- Address Data Gaps
- Support Watershed Plan Development

Tools: GIS, statistical analysis, IDEM Pollutant Load Reduction Workbook







BMP demonstration projects



Watershed Plan Approach
Task 6. Develop Watershed Plan
Suggested Outline & Schedule

Watershed Plan Chapter	3/06	6/06	9/06	12/06	3/07	6/07	9/27	12/07	3/08
<ul> <li>Executive Summary</li> </ul>									
<ul> <li>Introduction</li> </ul>									
•Water Quality Problems									
<ul> <li>Goals and Decisions</li> </ul>									
<ul> <li>Measuring Progress</li> </ul>									
<ul> <li>Practical Matters</li> </ul>									
<ul> <li>Appendices</li> </ul>									

# **Quality Assurance** Project Plan

#### Proposed Monitoring Goals

- Evaluate current conditions · 56 miles of impaired streams - Recreation, Aquatic Life
- Identify pollution sources · Bacteria, low dissolved oxygen, poor quality habitat
- Address Data Gaps · New monitoring locations, range of hydrologic conditions
- Support Watershed Plan Development · Identify watershed implementation strategies



## **Monitoring Site Selection**

	Site #	IDEM Site #	Location	wo	AQL	Rationale
	1	OB\$080-0001	Indian Creek North between Banet Rd & Bethel Road	х	х	303(d) Segment – Aquatic Life
	2	OBS090-0002	Indian Creek above Crandall Branch near Motts Rd & Adolph Rd	х		303(d) Segment - Recreation
1	3	OBS090-0004	Indian Creek above SR355 Bridge	х		303(d) Segment - Recreation
I	4	OBS090-0005	Indian Creek at Big Indian Road & Brigetta Road	х	х	303(d) Segment - Recreation
I	5	OBS100-0001	Indian Creek above Rocky Hollow Road Bridge	х	х	303(d) Segment - Recreation, Aquatic Life
I	6	OBS100-0006	Indian Creek above Lickford Road Bridge	х	х	303(d) Segment – Recreation, Aquatic Life
I	7		Little Indian Creek above Water Street Bridge	х	х	Major tributary
	8	OB\$080-0005	Indian Creek above Georgetown Creek	х		Floyd County drainage, near County boundary, developing
	9		Indian Creek near Hottel Road	х	х	Upstream end of 303(d) Segment – Recreation, Aquatic Life
	10		Crandall Branch above SR355 Bridge	х		303(d) Segment – Recreation (may be an artifact of mapping?)
	11		Indian Creek above Little Indian Creek at Water Street	х		Downstream end of HUC, 303(d) Segment – Recreation, above WWTP, receives Corydon runoff
	12		Little Indian Creek above Turley Rd Bridge	х		Mid-point of major tributary, downstream of CAFO, classified as "unassessed" by IDEM
	13		Little Indian Creek below Georgetown Creek near Utz Road	х	x	Possible reference reach, downstream of impaired segments, upstream end of 303(d) Segment – Recreation

# **Next Steps**

- Finalize QAPP & Submit to IDEM for approval
- Initiate Monitoring
- Hold Public Outreach Event
- Populate website
- Next Subcommittee Meeting





INDIAN CREEK SUBCOMMITTEE



## July 26 2006 9:30 AM to 11:00 AM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

## MEETING SUMMARY

#### 1. Introduction to Watershed Planning

Steve Hall and Karen Schaffer provided an overview of watershed planning. Key considerations include implementing the Regional Sewer District Feasibility Study Goals of fostering economic development, preserving environmental integrity and enhancing quality of life.

There are several waterbodies that the Indiana Department of Environmental Management (IDEM) has identified as impaired. They will be developing Total Maximum Daily Loads (TMDLs) for these waterbodies. The TMDLs have an impact on the ability to obtain wasteload allocations for new or expanded wastewater discharges.

Proactively planning for the numerous wastewater decisions to be made, and addressing impairments before IDEM develops the TMDLs are important advantages of the Watershed Plan.

#### 2. IDEM's Expectations

IDEM's expectations for the 2-year grant include establishing a Watershed Plan Committee (accomplished through the RSD Indian Creek Subcommittee), conducting quarterly public outreach, developing a Quality Assurance Project Plan, conducting monitoring and assessment, inventory and map sinkholes, develop watershed management plan.

#### 3. Watershed Plan Approach

FMSM was hired as the Watershed Coordinator and will be assisting the Subcommittee with implementing the project, including drafting the watershed management plan. The Indian Creek Watershed Management Plan will address the Feasibility Study goals, integrate the karst policy and identify opportunities for BMP demonstration projects. By developing the Watershed Plan, the RSD will become eligible to apply for additional grant funds to support implementation projects that are identified in the watershed plan.



FMSM has developed a website to facilitate public outreach. A password protected link will be added to the Subcommittee page. Draft documents will be available to the Subcommittee on this page. Final documents or documents available for public comment will be moved to the public page.

### 4. Quality Assurance Project Plan (QAPP)

The QAPP is required for all water quality (WQ) monitoring conducted through this project and must be approved by IDEM. It describes monitoring design, field data collection, laboratory analysis, quality assurance review and data analysis.

The draft QAPP was handed out and discussed. The Subcommittee was encouraged to review and provide input on the QAPP.

Review of IDEM data revealed that they have sampled few times and typically under summer low flow conditions. FMSM recommended a monitoring design that includes sampling multiple times over a range of hydrologic conditions to better understand the range of water quality. Biological (benthic invertebrates), habitat, water chemistry, bacteria and flow are recommended parameters.

FMSM will collect grab samples and measure flow using a wading rod. Through the Harrison County Health Department's participation in the project, water chemistry samples will be analyzed for free by the State Health Department laboratory in Indianapolis. A local lab will be found to analyze bacteria samples because these must be analyzed within 6 hours. Thus shipping to Indianapolis is not feasible for bacteria.

### 5. Monitoring Site Selection

FMSM proposed 13 monitoring locations. Site selection considerations included locations that IDEM had monitored previously, sites that are located in reaches that IDEM characterized as impaired, near county boundaries, near reaches that IDEM characterized as "unassessed" and a possible reference reach.

FMSM will incorporate the new monitoring location, recommended on the Little Indian Creek downstream of Lanesville.

#### 6. Next Steps

- □ Floyd County should have an active role on the Subcommittee. In addition to Don Lopp (Planning), FMSM will work with Floyd County to engage a wastewater/ engineering representative.
- □ Subcommittee will provide comments on the draft QAPP



- □ FMSM will finalize QAPP based on input from the Subcommittee, including the recommended monitoring location on the Little Indian Creek downstream of Lanesville, and submit to IDEM for approval
- □ FMSM will develop a press release and schedule a public event showcasing biological monitoring

- D Presentation Slides: Indian Creek Watershed Management Plan
- □ Watershed Plan Outline
- Draft Quality Assurance Project Plan





HARRISON COUNTY REGIONAL SEWER DISTRICT INDIAN CREEK WATERSHED PLAN SUBCOMMITTEE



JULY 26, 2006 9:30 AM to 11:00 AM

Name	Organization	Telephone	Email
Anthony Combs	Harrison County Regional Sewer District & Harrison County Health Dept.	812 738 3237	anthonycombs@hotmail.com
Chris Cunningham	Harrison County Health Dept.	812 738 3237	ccunningham20@hotmail.com
Gary Davis	Harrison County Council President	812 366 3354	gldavis@epowerc.net
Steve Hall	FMSM Engineers, Inc.	812 206 0060	shall@fmsm.com
Daniel Lee	Harrison County Regional Sewer District, & Tyson Foods	812 738 5853	daniel.lee@tyson.com
Bill Sanders	Heritage Engineering	812 280 8201	bsanders@heritageeng.com
Karen Schaffer	FMSM Engineers, Inc.	812 206 0060	kschaffer@fmsm.com
Dan Schroeder	Harrison County Health Dept.	812 738 3237	ninthschroeder@hotmail.com
Ralph Schoen	Harrison County GIS	812 738 8241	rschoen@harrisoncounty.in.gov
Tom Tucker	Harrison County Regional Sewer District	812 738 4087	tomtucker@insightbb.com
Eric Wise	Harrison County Planning Commission	812 738 8927	ewise@netpointe.com



Indian Creek Watershed Plan JF2006001



INDIAN CREEK SUBCOMMITTEE



# August 9, 2006 9:30 AM to 11:00 AM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

# **MEETING AGENDA**

- 1. Introductions
- 2. Review and Approval of Meeting Summary
- 3. Quality Assurance Project Plan (QAPP)
- 4. Mission Statement
- 5. Brochure/Press Release
- 6. Next Meeting

- □ Meeting Summary
- □ Draft Quality Assurance Project Plan
- □ Brochure
- □ Press Release
- □ Mission Statement





INDIAN CREEK WATERSHED PLAN SUBCOMMITTEE



**Mission Statement** 

DRAFT August 8, 2006

# Option 1

The Indian Creek Watershed Plan Subcommittee is a partnership of concerned citizens dedicated to fostering economic development, preserving environmental integrity and enhancing the quality of life for all who live and work here.

# Option 2

The Indian Creek Watershed Plan Subcommittee is a partnership of concerned citizens dedicated to wise and sustainable use of our water resources.

# Option 3

The Indian Creek Watershed Plan Subcommittee is comprised of watershed stakeholders dedicated to the preservation, protection, and improvement of the Indian Creek watershed. Our mission is to realize a long-term vision for a healthy watershed and an educated citizenry. Our goal is to educate while building partnerships to improve water quality, reduce flooding, and preserve and restore wetlands, woodlands, and other natural resources for future generations.





INDIAN CREEK SUBCOMMITTEE



September 5, 2006 1:00 PM to 2:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

# **MEETING AGENDA**

- 1. Site Reconnaissance Results
- 2. Draft Chapter 1 of Watershed Plan
- 3. Draft Data Summaries of IDEM Data
- 4. Next Meeting

- □ Site Reconnaissance Report
- □ Draft Chapter 1 of Watershed Plan
- □ IDEM Assessment Maps and Tables





INDIAN CREEK SUBCOMMITTEE



September 5, 2006 1:00 PM to 2:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

# MEETING SUMMARY

## 1. Site Reconnaissance Results

Several members of the subcommittee expressed an interest in visiting monitoring sites. A date will be scheduled.

Dan Lee talked to Keith regarding e. coli analysis. Information regarding frequency and numbers of samples is needed.

## 2. Draft Chapter 1 of Watershed Plan

This chapter provides an introduction to the region and watershed. The Subcommittee was asked to provide comments by Sept 15, 2006.

### 3. Draft Data Summaries of IDEM Data

Draft water quality data summaries were presented. These form the basis for Watershed Plan Chapter 2. Identifying Water Quality Issues. IDEM was making impairment decisions based on very limited data in many cases. The monitoring associated with this project will greatly expand the available dataset.

Other findings include:

- e. coli levels were above criteria at all assessed stations
- Low dissolved oxygen was an issue during the summer of 2000 near the confluence with the Ohio River, where karst and low flow could influence results.
- Although not on the 303d List, elevated pH was found in the Little Indian Creek near Galena
- Un-ionized ammonia levels were well below criteria
- Comparison values were used to evaluate total phosphorus, turbidity and total Kjeldahl nitrogen.

Pollution sources will be discussed in Chapter 2 using summary statistics. The goal is to identify sources in sufficient detail to support positive action. Septic systems, agriculture and abandoned landfills will be evaluated as sources.



Wetlands and floodplains can have important roles in watershed planning. Strategies that protect water quality can provide floodplain and wetlands benefits, and vice versa. Official floodplain maps are available in paper, and unofficial digital maps are available. Because of significant karst, wetlands may not be extensive in this watershed.

Flow was also discussed as an issue. New Jersey was developing an approach to estimate flows required to support aquatic life. Indiana recognized flow as an issue in the 2004 triennial review for Surface Water Quality Standards and this topic is expected to be revisited again in the 2007 review.

There are numerous low head dams in many Indiana watersheds, including Indian Creek that influence flow. EPA has funding available to remove these dams.

### 4. Next Meeting

A stakeholder meeting will be scheduled. We will provide a presentation, maps on boards, brochure and live GIS. The stakeholder list will be forwarded to the Subcommittee for comment.

- □ Site Reconnaissance Report
- □ Draft Chapter 1 of Watershed Plan
- □ IDEM Assessment Maps and Tables





INDIAN CREEK SUBCOMMITTEE



June 21, 2007 - 2:00 PM to 3:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon, Indiana

# **MEETING AGENDA**

- 1. Watershed Plan Chapter 2 Water Quality Problems
- 2. Sinkhole Inventory
- 3. Public Meeting
- 4. Next Meeting

# Handouts

□ Chapter 2 Water Quality Issues – 80% Draft





# Presentation Overview

- Introduction
- Watershed Plan Chapter 2 Water **Quality Problems**
- Sinkhole Inventory
- · Public Meeting
- Next Steps & Closing



## Introduction

- Implement Goal of Indian Creek Watershed:
- Foster economic development, preserve environmental quality and enhance the quality of life for all who live and work in the Indian Creek Watershed.
- Approach to address water quality issues prior to IDEM TMDLs







#### Watershed Management Plan Chapter 2 Outline

- Known Water Quality Problems
- Found Water Quality Problems
- Causes and Sources
- Addressing Data Gaps: Sinkhole Inventory
- Priority Water Quality Problems



#### Known WQ Problems

- Recreational Use Support

   Impaired by E. coli 36.65 miles (TMDL 2010-2015)
- Aquatic Life Use Support
  - Low Dissolved Oxygen 17.02 miles (TMDL 2010-15)
     Impaired Biotic Communities- 3.87 miles
     (TMDL 2010 2015)
- Fish Consumption Advisory
   Mercury
   PCB's Statewide Advisory



Waterbody Segment Name	Waterbody Segment ID	Size (Miles)	Aquatic Life	Primary Contact	Fish Consumption	Category
Little Indian Creek (North)	INN0482_00	3.87	N	х	х	5A
Indian Creek-South Trib	INN0491_00	8.84	F	х	Ρ	3A
Indian Creek- Crandall Branch	INN0494_00	15.43	F	N	Ρ	5A
Indian Creek	INN0495_T1050	4.75	х	N	Р	ЗA
Indian Creek	INN0496_T1051	4.20	х	N	Р	5A
Indian Creek-North Karst Area	INN04A1_00	6.27	F	х	N	ЗA
Indian Creek-Devils Backbone	INN04A3_00	17.02	N	N	Р	5A
Indian Creek-Blue Spring	INN04A4_00	4.89	х	х	Р	3A





# WMP Chapter 2 **Known WQ Problems**

Unified Watershed Assessment (2000-01)

#### NO DATA

- Aquatic Life Use Support Recreation Use Attainment
- Lake Fishery Eurasian Milfoil Infestation
- Lake Trophic Status

#### GOOD CONDITIONS % Cropland Mineral Extraction Degree of Urbanization Aquifer Vulnerability Population Using Surface Water Supply

# WMP Chapter 2 **Known WQ Problems**

Unified Watershed Assessment (2000-01)

#### **ISSUES IDENTIFIED**

- Mussel Diversity and Occurrence degraded or rare
- Stream Fishery Degraded
- Critical Biodiversity Resource T&E Reports Filed
- Residential Septic System Density >40 / sq. mi.
- Density of Livestock high for Indiana

# WMP Chapter 2 Found WQ Problems

Chemical	Physical	Biological
Total Phosphorus (TP)	Dissolved Oxygen (DO)	E. coli
Ortho-Phosphorus (PO4)	рН	Benthic Macroinvertebrate
Total Kjeldahl Nitrogen (TKN)	Temperature (T)	Habitat
Nitrate-Nitrogen (NO3)	Specific Conductivity (SC)	
Total Ammonia (NH3+NH4)	Turbidity	
Total Solids (TS)	Stream Flow	



# WMP Chapter 2 **Causes & Sources**

- Possible causes and sources of the following are discussed in this section:
  - Recreational use impairments
  - Aquatic life use impairments
  - Fish tissue contamination

WMP Chapter 2 Causes & Sources
Causes of Recreational Use Impairments
Due to elevated bacteria which is evident in IDEM sampling, 36.65 miles of streams are considered impaired for primary contact recreational use.
Primary Contact Recreation = Swimming



- Human Sources
  - Wastewater treatment plants in non-compliance
  - Stormwater
  - Failing Septic Systems
- Animal Sources
  - Livestock
  - Wildlife, Pets

Indian Creek NPDES Facilities N Monore down N Monore down

Facility	NPDES #	Monitoring Location	Total # of Violations (03/2002 - 02/2007)	# of E. coli Violations (03/2002 - 02/2007)	Most Recent E. Coli Violation (03/2002-02/2007)	
Chimneywood Sewage Works, Inc.	IN0050181	Effluent Outfall	16	0	N/A	
Cleancar Auto Wash Corp.	IN0059803	Effluent Outfall	42	0	N/A	$\sim$
Corydon Municipal WWTP	IN0020893	Effluent Outfall	1	0	N/A	
Country View Subdivision	IN0052159	Effluent Outfall	1	0	N/A	
Dairy Dip Car Wash	IN0038385	Effluent Outfall	1	0	N/A	Number
Daramic Incorporated	INP000153	Effluent Outfall	7	0	N/A	
Woods Of Lafavette's WWTP	IN0054101	Effluent Outfall	46	12	6/30/2006	of <i>E. Coli</i>
Floyd Knobs Elementary School	IN0058572	Effluent Outfall	15	0	N/A	Effluent
Galena Elem & Floyd Central HS	IN0031178	Effluent Outfall	6	1	5/31/2006	Violation
Galena WWTP	IN0052019	Effluent Outfall	22	0	N/A	violations
Greenville Elementary School	IN0058564	Effluent Outfall	55	0	N/A	in Past 5
Highlander Point Shopping Cent	IN0050032	Effluent Outfall	0	0	N/A	Years
Huber Family Restaurant	IN0055794	Effluent Outfall	37	Ö	N/A	·····
Jacobi's Car Wash & Store	IN0059382	Effluent Outfall	32	11	10/31/2002	
Lanesville Municipal STP	IN0040215	Effluent Outfall	10	5	9/30/2006	
Lanesville Welcome Center I-64	IN0045942	Effluent Outfall	81	8	5/31/2006	
Tyson Foods, Inc.	INP000117	Effluent Outfall	2	0	N/A	
Wymberly Sanitary	IN0043923	Effluent	1	0	N/A	







#### Potential Sources of E. Coli: Livestock

- 1 Confined Animal Feeding Operation in compliance
- 6 Concentrated Feeding Operations no data
- High livestock density
- Wildlife & pets?



33,233

1,030 >1.2 M

91

on

Total

33,233

rce: ISDA DSC, 2004

1,030 5,542

WMP Chapter 2 Causes & Sources

AQUATIC LIFE USE IMPAIRMENT Causes and Sources... WMP Chapter 2 Causes & Sources

Causes of Aquatic Life Use Impairments

Aquatic life use is impaired at two locations: 1) Devils Backbone – Dissolved Oxygen 2) Little Indian Creek North – Fish Community



# WMP Chapter 2 Causes & Sources



#### Cause of AQL Impairment: Low DO

- 5 DO readings at Indian Creek at Lickford Bridge Road (Site OBS100-006) in July and August of 2000
- Four of the 5 samples did not meet DO criteria
- IDEM listed Devil's Backbone (17.2 miles) as impaired for DO in 2006
- Data collected upstream at Indian Creek at Rocky Hollow Road (OBS100-001) indicated acceptable levels of DO



#### Possible Sources of Low DO

- Organic enrichment (nutrients)
   Not supported by upstream nutrient data
- Ohio River backwater &/or losing stream
  - Flow very slow to none
    Potentially natural cause !

# WMP Chapter 2 Causes & Sources



#### Cause of AQL Impairment: Impaired Fish Community

- Little Indian Creek North
  - Chemical parameters supportive of aquatic lifeTolerant fish species present
- IBI score 24/60 = Impaired
- Habitat Score 57/100
- Instream cover, pool/glide quality, riparian zone, erosion, channel morphology - suboptimal

# WMP Chapter 2 Causes & Sources

Cause of Fish Consumption Impairment: Mercury & PCBs

- Combustion of fossil fuels
- Air deposition
- Legacy pollution
- No evidence of site specific sources in Indian Creek Watershed

#### Watershed Management Plan Chapter 2

Other WQ Concerns Nutrients - phosphorus and nitrogen

- City Park South of Corydon (Site OBS1000-0004), elevated phosphorus and nitrogen
- Phosphorus: 0.015 mg/l to 3.6 mg/l
- Nitrate: 0.06 mg/l to 11.0 mg/l
- DO: 4.6 mg/l to 17.3 mg/l

WMP Chapter 2 Other WQ Concerns Table 2.14.Estimate of 2005 Nutrient Applications in the Indian Creek Watershed **Total Nutrients** % County Nutrients in IWC (tons) (lbs) K 2,000 in ICW P2O5 P2O5 County Ν lbs/ton Ν ¢lark 2.8% 5646.28 6950.12 X 2000 158 194 Х Floyd 58.0% 190.46 108.75 X 2000 220,934 126,150 Х 32.9% Harriso Х 3588.95 2116.99 X 2000 2.361.5 1.392.9 n 29 79 Total 2,582,6 1,519,3 21 23 Source: OISC, 2005

	Na	Table 2.1	15. Conservat	tion Tillag	e in Indian Cr	reek Water	shed, Corn		
Coun tv	Acres	%	Acres	n-1111 %	Acres	ed Till %	Acres	%	Ran
Clark	9,773	63	455	3	682	4	4,546	30	8
Floyd	1,176	79	0	0	0	0	321	21	2
Harris on	20,71 6	88	0	0	600	3	2,102	9	1
Total	31,65 5	79	455	1	1,282	3	6,969	17	

WMP Chapter 2
Other WQ Concerns

Parameter	Concentration (parts per billion)
Bromacil (ug/L)	0.1
Malathion (ug/L)	0.1
Metolachlor (ug/L)	0.2
Oxadiazon (ug/L)	1.1
Simazine (ug/L)	0.08

149 other organic chemicals & pesticides – not detectable in Indian Creek Watershed !

# Sinkhole Inventory



- Geology of the Indian Creek watershed is highly prone to karst features such as sinkholes, springs and caves.
- Pollutants can be rapidly transported to groundwater systems without soil filtration.
- UIC Inventory required for modified sinkholes

# Sinkhole Inventory

- Underground Injection Control (UIC) program
- Modified sinkhole change flow of stormwater to the karst system
- Regulated under the USEPA's UIC program

   Inventory
  - Treat or cease discharge if drinking water supply affected

# Sinkhole Inventory Pilot Study

- Compiling existing data
- Advanced analysis of GIS data
- Prioritization
- Field inventory
- FINAL PRODUCT: Shapefile and FGDC standard metadata of field inventoried sinkholes



## Sinkhole Inventory **Pilot Study**



#### Advanced Analysis of GIS Data

- LIDAR and Digital Elevation Model (DEM) data
- Bowl-shaped depressions or closed contour depressions were identified
- The centroid of the closed contour depression was identified using GIS data to create point locations



- Floyd and Clark Counties –
- USGS used (DEM) data
- 10-meter (~30 feet) and 30-meter (~90 feet)
   163 possible sinkhole locations in the Floyd and Clark Co
- (this method showed 6,452 in entire watershed)



#### Sinkhole Inventory **Pilot Study** Table 2.18. Land Use and Possible Sinkhole Locations Land Use/ Land Cover Number of Possible Sinkhole Description Locations Low Intensity Residential 215 High Intensity Residential 15 Commercial, Industrial, 71 Transportation 14 Urban Recreational Grasses Total 315

# Sinkhole Inventory **Pilot Study**

Site Description	Number of Possible Sinkhole Locations	Priority
Possible Sinkhole	152	High
Drainage	117	Medium
Construction Site	2	Low
Building, Parking Lot, Street	24	Low
Pond, Quarry	7	Low
Total	315	















# Next Steps

- Public Meeting
- Field work sinkhole inventory
- Begin monitoring

# Questions







INDIAN CREEK SUBCOMMITTEE



June 21, 2007 2:00 PM to 3:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

## MEETING SUMMARY

## 1. Watershed Plan Chapter 2 – Water Quality Problems

The main problems in the watershed are **recreational use impairment** caused bacteria contamination and **aquatic life use impairment** caused by low dissolved oxygen.

Members of the subcommittee informed the group of additional monitoring data on Little Indian Creek North is available at the New Albany SWCD.

There was discussion of sources of high nutrient levels. Members discussed the possibility of analyzing nutrient application rates. Larger farms would have information on locations and amounts of applied nutrients etc. It was decided, that this may be something to look into in the future, if the group decides to, the priorities now include the sources and causes of aquatic life and recreational use impairments.

### 2. Sinkhole Inventory

The group discussed different prioritization options for the sinkhole inventory including. Locating areas or subwatersheds with water quality problems or high potential for pollution such as areas known to have a high # of failing septic systems. Kevin Russel suggested creating a shapefile that can be used in the Karst policy of the stormwater ordinance.

The group discussed sinkhole flooding as an issue. It may be more of an issue for sinkholes that can not accept the amount of surface runoff they are receiving than sinkholes that surcharge water.

### 3. Public Meeting

There are several public events coming up in July that may help raise awareness of the Watershed Management Plan, such as the Floyd County Fair (July 9-14) and the Harrison County Fair (end of July). There may be a booth set up for the Indian Creek project at one or more of these events to advertise for the public meeting and raise overall awareness.

### 4. Next Meeting



#### **Action Items**

□ The subcommittee was asked to review the 80% Draft of Chapter 2 of the watershed plan and return comments to Karen Schaffer by Friday July 20, 2007

- □ Chapter 2 Water Quality Issues 80% Draft
- □ Article as submitted to the Corydon Democrat "Help Protect Water Quality in Your Community"
- □ Agenda
- □ PowerPoint slides





# INDIAN CREEK SUBCOMMITTEE



November 15, 2007 - 2:00 PM to 3:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon, Indiana

# **MEETING AGENDA**

- 1. Introduction
- 2. Monitoring and Assessment Results
- 3. Goals & Strategies Chapters
- 4. Public Meeting
- 5. Next Steps and Closing

- Chapter 2: Water Quality Issues Draft
- Chapter 3: Goals and Decisions Draft
- Chapter 4: Measuring Progress Draft
- Newspaper Article









Public Meeting #2





	Results	: E.	Coli	nont
Site	Description	Geometric Mean	Maximum Concentration	Criteria Met
2	Georgetown Creek below Georgetown at Malinee Ott Road	194	300	No
3	Indian Creek above Georgetown Creek, IDEM Site OBS080-0005	147.2	430	No
4	Crandall Branch above SR335 Bridge	779.2	2,200	No
5	Indian Creek above SR355 Bridge, IDEM Site OBS090-0004	268.8	410	No
6	Indian Creek above Little Indian Creek at Water Street	93.3	180	Yes
7	Indian Creek at Mathis Road bridge	19.4	32	Yes
8	Indian Creek above Rocky Hollow Road Bridge, IDEM Site OBS100-0001	46.8	177	Yes
9	Indian Creek above Lickford Road Bridge, IDEM Site OBS100-0006	44.2	132	Yes
10	Little Indian Creek above Water Street Bridge	119.2	140	Yes
11	Little Indian Creek below Lanesville at State Road 62	118.8	226	Yes

















Septic System Results

- Tool indicated "direct" loadings from failing septic systems are:
  - Higher in Floyd Co
  - Lower in Harrison
  - Overall lower than cattle in streams
- Caution: does not account for potential human health impacts from failing septics!









M R	onitoring and esults: Dissolv	Asses: /ed Ox	smer (yge	nt n
Site	Description	Minimum Concentration	Criterion Met?	Maximum Concentration
2	Georgetown Creek below Georgetown at Malinee Ott Road	4.6	Yes	15.0
3	Indian Creek above Georgetown Creek, IDEM Site OBS080-0005	5.7	Yes	8.9
4	Crandall Branch above SR335 Bridge	6.4	Yes	10.4
5	Indian Creek above SR355 Bridge, IDEM Site OBS090-0004	4.5	Yes	8.7
6	Indian Creek above Little Indian Creek at Water Street	7.6	Yes	14.2
7	Indian Creek at Mathis Road bridge	5.6	Yes	9.1
8	Indian Creek above Rocky Hollow Road Bridge, IDEM Site OBS100-0001	6.3	Yes	9.1
9	Indian Creek above Lickford Road Bridge, IDEM Site OBS100-0006	3.1	No	8.9
10	Little Indian Creek above Water Street Bridge	7.7	Yes	11.1
11	Little Indian Creek below Lanesville at State Road 62	4.9	Yes	16.2



Monitorino Results: A	g and Asse quatic Life	ssment
Site	Macroinvertebrate Index of Biotic Integrity (MIBI)	Qualitative Result
Site 6 - Indian Creek above Little Indian Creek at Water Street in Corydon	40	Poor
Site 6D - Indian Creek above Little Indian Creek at Water Street in Corydon	43.9	Fair
Site 7 -Indian Creek at Mathis Road bridge	Not assessed	
Site 8 - Indian Creek above Rocky Hollow	Not assessed	
Site 10 – Little Indian Creek above the Water Street bridge	43.2	Fair

<b>R</b> (			
Sito		L Habitat Score	Qualitativo Rocul
1	Indian Creek North at Banet Road, IDEM Site OBS080-0001	46	Fair
2	Georgetown Creek below Georgetown at Malinee Ott Road	39.5	Poor
3	Indian Creek above Georgetown Creek, IDEM Site OBS080-0005	61	Good
4	Crandall Branch above SR335 Bridge	61.5	Good
5	Indian Creek above SR355 Bridge, IDEM Site OBS090-0004	40	Not Assessed
6	Indian Creek above Little Indian Creek at Water Street	42	Poor
7	Indian Creek at Mathis Road bridge	62	Good
8	Indian Creek above Rocky Hollow Road Bridge, IDEM Site OBS100-0001	55.5	Fair
9	Indian Creek above Lickford Road Bridge, IDEM Site OBS100-0006	63.5	Good
10	Little Indian Creek above Water Street Bridge	36	Poor
11	Little Indian Creek below Lanesville at State Road 62	58	Good









# Monitoring and Assessment Results: Next Steps

- 2008 Draft 303(d) Comment Letter to IDEM re: delisting DO
- Analyze water quality results from ISDH Laboratory
- Add WQ results to finalize Chapter 2
- Data submittal to IDEM

# **Chapter 3 Outline**



- 3. Goals and Decisions
- 3.1.Water Quality Improvement Goal
- 3.2.Aquatic Life and Habitat Improvement Goal
- 3.3.Flooding Protection Goal





#### Chapter 3: Goals and Decisions Water Quality Improvement Goal

- Agricultural Action Plan
  - Manure & Livestock Management Workshop
  - Financial Assistance
  - Watershed Stewardship Program







	С	hapter 4: M	easuring Progress
Re	iduce	Water C Water C e concentrations of bacteria and nutrien meeting recreatio	s and weasuring Progress Quality Improvement Goal ts in Indian Creek Watershed streams to ensure progress toward nal and aquatic life designated uses.
Prio	rity	Goal	Indicators and Progress Measures
		Reduce concentrations of bacteria and nutrients from septic systems	<ul> <li>Septic System Workshop held by X</li> <li>Operation &amp; maintenance requirements triggered by real-estate transfer, number properties inspected and maintained</li> <li>Septic management district feasibility study completed by X</li> <li>Identify and euclate X homeowners regarding septic system incentives and assistance programs by X</li> <li>Develop wastewater management strategy for homeowner stasociations by X</li> </ul>
		Reduce concentrations of bacteria and nutrients from agricultural sources	<ul> <li>Manure and Livestock Management Workshop held by X identify financial incentives and assistance to encourage manure management &amp; livestock exclusion by X;</li> <li>Conduct feasibility study and implement a watershed stewardship rogram by X.</li> </ul>
	-	Measurable targets	needed for IDEM approval of Plan!

Cha	pter 4: Me	asuring Progress
	Indicators	s and Measuring Progress
Reduce	Water Q concentrations of bacteria and nutri toward meeting recrea	tuality Improvement Goal rients in Indian Creek Watershed streams to ensure progress ational and aquatic life designated uses.
Priority	Goal	Indicators and Progress Measures
	Reduce concentrations of bacteria and nutrients from urban sources	<ul> <li>Targeted and on-going education of per-owners by X</li> <li>GlS database of stomwater outfalls and conveyance system in Harrison County by X</li> <li>Perform dry weather screening, illicit discharge detection and elimination in Harrison County by X</li> <li>Inspect and repair as needed, X feet of sewer collection system per year</li> </ul>
	Reduce concentrations of bacteria and nutrients to karst systems	Perform dye tracing at X locations per year     Sample X karst springs per year     Continue UIC program implementation     Plan and implement karst protection policy by X     Develop karst protection policy by X     Provide karst education at X events per year     Continue updating Sinkhole Inventory GIS coverage
	Monitor water quality to provide the data needed to understand status and trends	Collect water quality data at least every 5 years





INDIAN CREEK SUBCOMMITTEE



November 15, 2007 2:00 PM to 3:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon

## MEETING SUMMARY

### 1. Monitoring and Assessment Results

Monitoring events have been completed and results are being added to the watershed plan. E.Coli, dissolved oxygen, and biological monitoring results are available in the current drafts of the WMP.

The USEPA Bacteria Indicator Tool (BIT) was used in Indian Creek to compare relative contributions of bacteria in the watershed. The tool will also provide information on priority areas for bacteria management measures. Graphic representation of the results will be available on the website, and results will be summarized in the watershed plan.

#### 2. Goals and Strategies Chapters

A preliminary draft of goals and strategies has been added to the WMP. Much more input is needed from the Subcommittee in order to finalize.

Part of the goals and strategies section includes identifying adequate funding for management measures. Floyd County provided information regarding a grant administered in Paoli Pike to assist landowners in a densely populated area pay for a pump station and convert from septic to sewers. Similarly, Karen Schaffer explained that 319 grant dollars may be available to assist with the development and implementation of selected strategies in the watershed plan. IDEM has expressed interest in a project to develop a septic system management district.

A stormwater ordinance containing a karst policy has been drafted for Harrison County. RSD is planning to move forward with the ordinance early next year. The ordinance will be added to the Strategies chapter of the WMP.

### 3. Public Meeting

The next public meeting is being scheduled for the week of December 17, 2007. Topics will include monitoring and assessment results, goals and strategies, sinkhole inventory, and implementation.


#### 4. Next Steps and Closing

The next Subcommittee Meeting will be held **December 12, 2007 from 2:00 to 3:30 PM** at the Harrison County Annex Building. This meeting will focus on detailed review of Chapter 3. Goals and Strategies and Chapter 4. Measuring Progress.

#### Project Timeline

- Dec 12 Draft Final Plan
- Jan 15 Public Meeting for Draft Final Plan
- Jan 30 Draft Final Plan to IDEM
- Feb 28 Final Plan to IDEM
- Apply for Implementation Grant Funds (319(h) applications due Sept 08)

The presentation from today's meeting has been posted to <u>www.indiancreekwatershed.com</u>.

#### Action Items

- □ The subcommittee will review management strategies and provided feedback including additional strategies to consider, edits to drafted strategies, target dates for implementation, and commitments for implementation of the plan.
- □ FMSM will integrate the monitoring and assessment results in to the WMP
- □ FMSM will present a final product of the sinkhole inventory at the next Subcommittee meeting
- □ FMSM will add the stormwater ordinance development and implementation to chapter 3 and 4 of the WMP
- □ FMSM will draft a letter to IDEM requesting de-listing of the DO listing for Devil's Backbone segment of lower Indian Creek.

#### Handouts

- Chapter 2: Water Quality Issues Draft
- Chapter 3: Goals and Decisions Draft
- Chapter 4: Measuring Progress Draft
- Newspaper Article





HARRISON COUNTY REGIONAL SEWER DISTRICT

INDIAN CREEK SUBCOMMITTEE



Wednesday December 12, 2007 2:00 to 3:30 PM

Harrison County Annex Building, 124 S Mulberry Street, Corydon, Indiana

#### **MEETING AGENDA**

- 1. Introduction
- 2. Goals & Strategies Chapters
- 3. Public Meeting
- 4. Next Steps and Closing

Handouts:

- Section 2.4: Bacteria Indicator Tool Draft
- Meeting Summary November 15, 2007









#### Introduction Action Items (from last meeting)

The subcommittee will review management strategies and provided feedback including additional strategies to consider, edits to drafted strategies, target dates for implementation, and commitments for implementation of the plan Underway

FMSM will integrate the monitoring and assessment results in to the WMP

FMSM will present a final product of the sinkhole inventory at the next Subcommittee meeting Complete

FMSM will add the stormwater ordinance development and implementation to chapter 3 and 4 of the WMP  $\mbox{Drafted}$ 

FMSM will draft a letter to IDEM requesting de-listing of the DO listing for Devil's Backbone segment of lower Indian Creek Complete

### **Chapter 3 Outline** 3. Goals and Decisions

3.1.Water Quality Improvement Goal

3.2.Aquatic Life and Habitat Improvement Goal

3.3.Flooding Protection Goal















С	hapter 4: M	easuring Progress
-	indicator	
Reduce	concentrations of bacteria and nutrier meeting recreatio	nal and aquatic life designated uses.
Priority	Goal	Indicators and Progress Measures
	Reduce concentrations of bacteria and nutrients from septic systems	<ul> <li>Septic System Workshop held by X</li> <li>Operation &amp; maintenance requirements triggered by real-estate transfer, number properties inspected and maintained</li> <li>Septic management district feasibility sudy completed by X</li> <li>Identify and deucate X homeowners regarding septic system incentives and assistance programs by X</li> <li>Build septic system GIS database by X</li> <li>Develop wastewater management strategy for homeowner associations by X</li> </ul>
	Reduce concentrations of bacteria and nutrients from agricultural sources	<ul> <li>Manure and Livestock Management Workshop held by X</li> <li>Identify financial incentives and assistance to encourage manure management &amp; livestock exclusion by X;</li> <li>Conduct feasibility study and implement a watershed teargetable searces he is</li> </ul>

Cha	pter 4: Me	asuring Progress
	Indicators	s and Measuring Progress
Reduce	Water Q concentrations of bacteria and nutr toward meeting recrea	uality Improvement Goal rients in Indian Creek Watershed streams to ensure progress ational and aquatic life designated uses.
Priority	Goal	Indicators and Progress Measures
	Reduce concentrations of bacteria and nutrients from urban sources	<ul> <li>Targeted and on-spoing education of pet-owners by X</li> <li>GIS database of stomwater outfalls and conveyance system in Harrison County by X</li> <li>Perform dry weather screening, likit discharge detection and elimination in Harrison County by X</li> <li>Inspect and repair as needed, X feet of sewer collection system per year</li> </ul>
	Reduce concentrations of bacteria and nutrients to karst systems	Perform dye tracing at X locations per year     Sample X karas springs per year     Continue UIC program implementation     Plan and implement karat protection BMP pilot project by X     Develop karat protection policy by X     Provide karat education at X events per year     Continue updating Sinkhole Inventory GIS coverage
	Monitor water quality to provide the data needed to understand status and trends	Collect water quality data at least every 5 years







#### Indiana County Endangered, Threatened and Rare Species List

County: Harrison

Species Name	Common Name	FED	STATE	GRANK	SRANK
Platyhelminthes (Flatworms) Sphalloplana chandleri	Chandler's Cave Flatworm		SE	G1G2	S1
Sphalloplana weingartneri	Weingartner's Cave Flatworm		ST	G3G4	S2
Diplopoda Combola minor				<i>CE</i>	52
Eurourus leachii	A Milliped			G4	52 52
Pseudotremia conservata	The Cave Millingd			G1G2	S1
Pseudotremia indianae	Plue Piver Cave Millined		SD	G4	\$3
Scytonotus granulatus	Granulated Millined		SIC	G5	\$2 \$2
Crustacean: Malacostraca	Granuated initiped			00	55
Crangonyx packardi	Packard's Cave Amphipod		SR	G5	S2
Miktoniscus barri	Barr's Terrestrial Isopod			G2G4	S2
Orconectes inermis inermis	A Troglobitic Crayfish			G5T3T4	S3
Crustacean: Copepoda Diacyclops jeanneli	Jeannel's Cave Copepod		SE	G3G4	S1
Crustacean: Ostracoda Sagittocythere barri	Barr's Commensal Cave Ostracod		WL	G5	S3
Mollusk: Bivalvia (Mussels) Alasmidonta viridis	Slippershell Mussel			G4G5	S2
Cyprogenia stegaria	Eastern Fanshell Pearlymussel	LE	SE	G1	S1
Epioblasma triquetra	Snuffbox		SE	G3	<b>S</b> 1
Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G4	S2
Lampsilis ovata	Pocketbook			G5	S2
Lampsilis teres	Yellow Sandshell			G5	S2
Ligumia recta	Black Sandshell			G5	<b>S</b> 2
Obovaria retusa	Ring Pink	LE	SX	G1	SX
Plethobasus cooperianus	Orangefoot Pimpleback	LE	SE	G1	<b>S</b> 1
Plethobasus cyphyus	Sheepnose	С	SE	G3	S1
Pleurobema clava	Clubshell	LE	SE	G2	S1
Pleurobema coccineum	Round Pigtoe			G4	S3
Pleurobema cordatum	Ohio Pigtoe		SSC	G3	S2
Pleurobema pyramidatum	Pyramid Pigtoe		SE	G2	S1
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula metanevra	Monkeyface			G4	S3
Quadrula nodulata	Wartyback			G4	S3
Villosa lienosa	Little Spectaclecase		SSC	G5	S2
Mollusk: Gastropoda Antroselatus spiralis	Shaggy Cave Snail		ST	G3G4	S2
Carychium exile	Ice Thorn		ST	G5	S2
Fontigens cryptica	Hidden Springs Snail		SE	G1	S1
Ellipluran: Collembola Arrhopalites ater	Black Medusa Springtail		SE	G1G2	S1
Arrhopalites lewisi	Lewis' Cave Springtail		ST	GNR	S2
Dicyrtoma flammea	Flaming Springtail		SE	GNR	S1
Entomobrya socia	Social Springtail		ST	GNR	S2
Hypogastrura gibbosus	Humped Springtail		SE	GNR	S1
Hypogastrura helena	Helen's Springtail		SE	GNR	S1
Hypogastrura lucifuga	Wyandotte Cave Springtail		SE	GNR	<b>S</b> 1
Hypogastrura maheuxi	Maheux Springtail		SE	GNR	S1
Hypogastrura succinea	Girded Springtail		SE	GNR	S1
Isotoma christianseni	Christiansen's Springtail		SE	GNR	S1
Isotoma truncata	Truncated Springtail		SE	GNR	S1
Isotomiella minor	Petit Springtail		ST	GNR	S2
Onychiurus casus	Fallen Springtail		ST	GNR	S2

Indiana Natural Heritage Data Center Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State:

Indiana Department of Natural Resources This data is not the result of comprehensive county surveys.

Division of Nature Preserves

EE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern;SX = state extirpated; SG = state significant; WL = watch listGlobal Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommonGRANK: globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant SRANK:

globally;  $G^{+}$  = windespread and abundant globally out with long term concerns;  $G^{-}$  = windespread and abundant globally;  $G^{+}$  = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank State Heritage Rank: SI = critically importied in state; SZ = importied in state;  $S^{-}$  = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status;  $S^{+}$  = unranked; SNR = unranked; SNA = nonbreeding status unranked

Page 2 of 5 11/22/2005

#### Indiana County Endangered, Threatened and Rare Species List

County: Harrison

Species Name	Common Name FE	D S	STATE	GRANK	SRANK
Onychiurus reluctus	A Springtail	S	E	GNR	S1
Pseudosinella fonsa	Fountain Cave Springtail	S	т	G3G4	S2
Sensillanura caeca	Blind Springtail	S	E	GNR	S1
Sinella alata	Springtail	S	R	G5	S3
Sinella avita	Ancestral Springtail	S	E	G3G4	S1
Sinella barri	Barr's Cave Springtail	S	E	G5	S1
Sinella cavernarum	A Springtail	S	т	G5	S2
Sminthurides hypogramme		S	E	GNR	<b>S</b> 1
Sminthurides malmgreni	Malmgren's Springtail	S	Т	GNR	S2
Sminthurides weichseli	Weichsel's Springtail	S	E	GNR	S1
Tomocerus elongatus	Elongate Springtail	S	E	GNR	S1
Tomocerus lamelliferus	Layered Springtail	S	Е	GNR	S1
Tomocerus missus	Cave Springtail	S	Е	G4	S1
Insect: Coleoptera (Beetles)	4 Devile	0	Б	CNP	C 1
	A Beetle	5	E F	CICA	51
	A Beetle	5	E	G2G4	51
Catops gratiosa	A Beetle	5.	E	GIK CIC2	51
Pseudanophthalmus termita	Cave Beetle	S.	E	G1G2	51
	Cave Beetle	3	1 T	CND	52
Queulus spelaeus	Spelean Rove Beetle	3	1	GINK	32
Amblyscirtes heaon	Salt-and-pepper Skipper	S	R	G5	S2
Amblyscirtes vialis	Common Roadside-skipper	S	R	G5	S3
Artogeia virginiensis	West Virginia White	S	R	G3G4	S3
Calvcopis cecrops	Red-handed Hairstreak	S	R	G5	S2S3
Catocala flebilis	The Black-dashed Underwing	SI	R	G5	\$1\$3
	Moth				
Cyllopsis gemma	Gemmed Satyr	SI	R	G5	S2
Erynnis martialis	Mottled Duskywing	S	Т	G3G4	S2S3
Grammia figurata	The Figured Grammia	SI	R	G5	S2S3
Grammia oithona	Oithona's Grammia	SI	R	G4Q	S2S3
Grammia phyllira	The Sand Barrens Grammia	SI	R	G4	\$2\$3
Hermeuptychia sosybius	Carolina Satyr	SI	R	G5	S1S2
Hesperia leonardus	Leonard's Skipper No S	Status SI	R	G4	S2
Hesperia metea	Cobweb Skipper	S	Т	G4G5	S2S3
Lesmone detrahens	A Moth	SI	R	G5	S2
Leucania inermis	A Moth	SI	R	G4	S2S3
Paectes abrostolella	The Barrens Paectes Moth	SI	R	G4	S2S3
Pagara simplex	A Moth	SI	R	G5	S2S3
Pangrapta decoralis	The Multicolored Huckleberry Moth	S	Г	G5	S2
Tampa dimediatella	Red-striped Panic Grass Moth	S	Г	GNR.	S2S3
Thorybes pylades	Northern Cloudywing	SI	R	G5	S2S3
Insect: Mecoptera Merope tuber	Earwig Scorpionfly	SI	E	G3G5	<b>S</b> 1
Insect: Odonata (Dragonflies & Damselflies) Aeshna mutata	Spatter dock Darper	\$7	г	G4	\$1\$2
Gomphus crassus	Handsome Clubtail	0 I 19	г	G3	S2
Gomphus viridifrons	Green-faced Clubtail	<u></u>	- Г	G3	S1S2
Hagenius brevistylus	Dragonhunter	51 CI	R	G5	\$2\$3
Neurocordulia molesta	Smoky Shadowdragon	51 CT	F.	G4	S1
Neurocordulia vamaskanensis	Studian Shadowfly	ง เ	г	G5	S1S2
Stylogomphus albistylus	Least Clubtail	SE	÷ F.	G5	S1
Stylurus amnicola	Riverine Clubtail	51	- г	G4	S1S2
Stylurus notatus	Elisive Clubtail Dragonfly	SF	- F.	G3	S1
• • • • • • • • • • • • • • • • • • • •		51			

Indiana Natural Heritage Data Center Division of Nature Preserves Fcd:

 $\label{eq:LE} LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting \\ SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; \\ SX = state extirpated; SG = state significant; WL = watch list$ State:

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#### Indiana County Endangered, Threatened and Rare Species List

County: Harrison

Species Name	Common Name	FED	STATE	GRANK	SRANK
Insect: Orthoptera					
Ceuthophilus brevipes	Spotted Cave Cricket		SE	GNR	<b>S</b> 1
Melanoplus tepidus	The Fearful Barrens Locust		SR	GU	S1S3
Insect: Tricoptera (Caddisflies)					
Nectopsyche pavida	A Longhorned Casemaker		SR	G5	S2
Pycnonsyche rossi	Caddisfly A Northern Caremaker Caddisfly		SE	G3	S1
	A Normeni Casemaker Cautisny		012	0.5	ы
Arachnida Anabita nunctulata	Southanston Wondaring Spider			G4	\$1
Calymmaria cavicola	Cave Funnel-web Spider			GNR	S1
Chthonius virginicus	A Pseudoscornion		SE	GNR	S1
Cicurina arcuata	A Funnel-web Weaver		55	GNR	S1
Dolomedes scriptus	Lined Nursery Web Spider			GNR	S1?
Dolomedes vittatus	Nursery Web Spider			GNR	S1
Frebomaster flavescens	Golden Cave Harvestman		ST	G3G4	\$2 \$2
Hesperochernes mirabilis	Cave Pseudoscorpion		SE	GS	82 S1
Kleptochthonius packardi	Packard's Cave Resudescorpton		SF	G2G3	S1
Nesticus carteri	r acharu s Cave Esculuscorpion		50	GNR	SI
	Carter & Cave Spindt			- I III	51
Fish Amblyoppia apolace			ar.	GA	S1
	Northern Cavefish		ЪE	04 C4	31 61
	Bluebreast Darter			G4	SI
Etheostoma maculatum	Spotted Darter		SSC	G2	SI
Litheostoma variatum	Variegate Darter		SE	GS	SI
Notropis ariommus	Popeye Shiner		SX	G3	SX
l yphlichthys subterraneus	Southern Cavefish			G4	<b>S</b> 1
Amphibian					
Cryptobranchus alleganiensis alleganiensis	Hellbender		SE	G3G4T3T4	S1
Scaphiopus holbrookii holbrookii	Eastern Spadefoot		SSC	G5T5	S2
Reptile			ar	CETE	61
	Western Cottonmouth		SE	0313	51
Cionophis Kimandii Cestelue berridue	Kirtland's Snake		SE	GZ	82 62
Crotalus norridus	Timber Rattlesnake		SE	G4	82
Opheodrys aestivus	Rough Green Snake		88C	05	55
Bird Accipiter strictus		NI. Ctatan	880	C5	60D
	Sharp-shinned Hawk	ino Status	330	G2	SZD
	Bachman's Sparrow			G5	3AD 52
	Long-eared Owl			05	52
	Red-shouldered Hawk		SSC	65	53 53
	Black Vulture		110	C4	51N,52B
	Cerulean Warbler	100001	SSC	G4	53B
	Bald Eagle	LT,PDL	SE	65	S2
	Worm-eating Warbler		SSC	GS GV	S3B
Lanius Iudovicianus	Loggerhead Shrike	No Status	SE	G4	53B
vvilsonia citrina	Hooded Warbler		SSC	ധ	23B
Mammal Corvnorhinus rafinesquii	Rafinesque's Big-cared Bat		SSC	G3G4	SH
_utra canadensis	Northern River Otter			G5	S2
vnx rufus	Robert	No Statue		G5	51
Avotis grisescens	Grav Bat	LE	SE	G3	S1
Avotis sodalis	Unay Dat Indiana Bat or Social Mustis	LF	SF	G2	S1
Veotoma magister	Huiana Dai Or SUCIALIVIYOUS	<b>с</b> ца	SF	G3G4	\$2 \$2
Vasenlar Plant	Eastern WOOdlat		خان	5507	
Acalypha deamii	Mercury		SR	G4?	S2
Agalinis auriculata	Earleaf Foxglove		ST	G3	S1
	· · · · · · · · ·				

Division of Nature Preserves Indiana Department of Natural Resources This data is not the result of comprehensive county surveys. SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

It of comprehensive county GRANK: Global Heritage Rank: GI = critically in

RANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank
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#### Indiana County Endangered, Threatened and Rare Species List

County: Harrison

Species Name	Common Name	FED	STATE	GRANK	SRANK
Asclepias viridis	Green Milkweed		SE	G4G5	S1
Asplenium resiliens	Black-stem Spleenwort		SE	G5	S1
Asplenium ruta-muraria	Wallrue Spleenwort		SR	G5	S2
Aster oblongifolius	Aromatic Aster		SR	G5	S2
Bacopa rotundifolia	Roundleaf Water-hyssop		ST	G5	<b>S</b> 1
Baptisia australis	Wild False Indigo		SR	G5	S2
Bumelia lycioides	Buckthorn		SE	G5	S1
Calamagrostis porteri ssp. insperata	Reed Bent Grass		ST	G4T3	S1
Carex crawei	Crawe Sedge		ST	G5	S2
Carex decomposita	Cypress-knee Sedge		ST	G3	S2
Carex eburnea	Ebony Sedge		SR	G5	S2
Carex gigantea	Large Sedge		ST	G4	S1
Carex straminea	Straw Sedge		ST	G5	S2
Ceanothus herbaceus	Prairie Redroot		SE	G5	S1
Chamaelirium luteum	Devil's-bit		SE	G5	S1
Cheilanthes lanosa	Hairy Lipfern		SR	G5	S2
Cimicifuga rubifolia	Appalachian Bugbane		SE	G3	<b>S</b> 1
Clematis pitcheri	Pitcher Leather-flower		SR	G4G5	S2
Comus amomum ssp. amomum	Silky Dogwood		SE	G5T5	S1
Dicliptera brachiata	Wild Mudwort		SE	G5	S1
Diodia virginiana	Buttonweed		WL	G5	S2
Eupatorium album	White Thoroughwort		ST	G5	S1
Eupatorium incarnatum	Pink Thoroughwort		ST	G5	82
Gaura filipes	Slender-stalked Gaura		ST	G5	S2
Gentiana alba	Yellow Gentian		SR	G4	S2
	Downy Gentian		ST	G4G5	S2
	Striped Gentian		SE	G4	SI
	Sharp-scaled Manna-grass		SE	G	S1 52
	Angle Pod		SR	G4?	S2
	Slender Heliotrope		ST	GS	82
	Crested Coralroot		SR	G5	82 82
Houstonia nigricans	Narrowleaf Summer Bluets		SR	65 C5	82
Hypericum delabriforma	Coppery St. John's-wort		51 6D	GJ GA	52
	Stragging St. John's-wort		SK.	04 G4	52 S1
	Appaiachian Quinwort		SE	G4 G4	S1
	Virginia willow		wi	G3G4	\$3
	Butternut		WL ST	G5	\$2
	Smooth Venty Pea		SI SE	G5	S1
Ligusticum canadense	Nondo L ounge		GE DE	G4	S1
Ligusticum canadense	Grooved Valley, Flay		SP	G5	S1 S2
Magnolia acuminata	Cucumber Magnolia		SE	G5	S1
Melica nitens	Three-flower Melic Grass		ST	G5	S7 S2
Melothria pendula	Creeping Cucumber		SE	G5?	S1
Mublenbergia capillaris	Long-awn Hairgrass		SE	G5	S1
Najas gracillima	Thread like Naiad		ST	G5?	S1
Nothoscordum bivalve	Crow-poison		SR	G4	S2
Ophioglossum engelmannii	Limestone Adder's-tongue		SR	G5	S2
Orobanche ludoviciana	Louisiana Broomrane		SE	G5	S2
Oryzopsis racemosa	Black-fruit Mountain-ricegrass		SR	G5	S2
Oxalis illinoensis	Illinois Woodsorrel		WL	G4Q	S2
Oxydendrum arboreum	Sourwood		SR	G5	S2
Pachysandra procumbens	Allegheny Spurge		SE	G4G5	<b>S</b> 1
Panicum bicknellii	A Panic-grass		SE	G4?O	<b>S</b> 1
Passiflora incarnata	Purnle Passion-flower		SR	G5	S2
	Turple Tassion-nower				

Indiana Natural Heritage Data Center LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting Fcd:

State:

Indiana Department of Natural Resources This data is not the result of comprehensive county

Division of Nature Preserves

surveys.

GRANK:

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#### Page 5 of 5 11/22/2005

#### Indiana County Endangered, Threatened and Rare Species List

County: Harrison

Species Name	Common Name	FED	STATE	GRANK	SRANK
Penstemon deamii	Deam Beardtongue		SR	G1	S1
Phlox amplifolia	Large-leaved Phlox		SR	G3G5	S2
Phlox bifida ssp. stellaria	Cleft Phlox		SE	G5?T3	S1
Polygala incarnata	Pink Milkwort		SE	G5	S1
Polypodium polypodioides	Resurrection Fern		SR	G5	S2
Polytaenia nuttallii	Prairie Parsley		SE	G5	S1
Prenanthes aspera	Rough Rattlesnake-root		SR	G4?	S2
Ranunculus pusillus	Pursh Buttercup		SE	G5	S1
Rhynchospora corniculata var. interior	Short-bristle Horned-rush		ST	G5TNR	S2
Rubus centralis	Illinois Blackberry		SE	G2?Q	S1
Rudbeckia fulgida var. fulgida	Orange Coneflower		WL	G5T4?	S2
Rudbeckia fulgida var. umbrosa	Coneflower		SE	G5T4T5	S1
Sanicula smallii	Small's Snakeroot		SR.	G5	S2
Satureja vulgaris var. neogaea			ST	G5	S1
Saxifraga virginiensis	Virginia Saxifrage		WL	G5	<b>S</b> 3
Scutellaria parvula var. australis	Southern Skullcap		WL	G4T4?	S2
Sedum telephioides	Allegheny Stonecrop		SR	G4	\$2
Selaginella apoda	Meadow Spike-moss		WL	G5	<b>S</b> 1
Solidago shortii	Short's Goldenrod	LE	SE	G1	S1
Sparganium androcladum	Branching Bur-reed		ST	G4G5	S2
Spiranthes vernalis	Grassleaf Ladies'-tresses		WL	G5	S2
Stenanthium gramineum	Eastern Featherbells		ST	G4G5	<b>S</b> 1
Thalictrum pubescens	Tall Meadowrue		ST	G5	S2
Tragia cordata	Heart-leaved Noseburn		WL	G4	S2
Trichostema dichotomum	Forked Bluecurl		SR	G5	S2
Uvularia perfoliata	Bellwort		SE	G5	<b>S</b> 1
Valerianella chenopodiifolia	Goose-foot Corn-salad		SE	G5	<b>S</b> 1
Viola egglestonii	Eggleston's Violet		SE	G4	<b>S</b> 1
Vitis rupestris	Sand Grape		SE	G3	S1
Waldsteinia fragarioides	Barren Strawberry		SR	G5	S2
Wisteria macrostachya	Kentucky Wisteria		SR	G5	S2
Woodwardia areolata	Netted Chainfern		SR	G5	S2
Zizia aptera	Golden Alexanders		SR	G5	S2
High Quality Natural Community					
Barrens - bedrock limestone	Limestone Glade		SG	G4	S2S3
Barrens - chert	Chert Barrens		SG	G2	S1
Forest - upland dry	Dry Upland Forest		SG	G4	S4
Forest - upland dry-mesic	Dry-mesic Upland Forest		SG	G4	S4
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3
Lake - pond sinkhole	Sinkhole Pond		SG	GU	S1
Primary - cave terrestrial	Terrestrial Cave		SG	GNR	SNR
Primary - cliff limestone	Limestone Cliff		SG	GU	S1
Primary - cliff sandstone	Sandstone Cliff		SG	GU	S3
Primary - wash gravel	Gravel Wash		SG	GU	S1
Wetland - swamp sinkhole	Sinkhole Swamp		SG	G2?	S1
Other Freshwater Mussel Concentration Area	Mussel Bed		SG	GNR	SNR

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Division of Nature Preserves	State:	SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern;
Indiana Department of Natural Resources		SX = state extirpated; SG = state significant; WL = watch list
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surveys.		globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant
		globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank
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unranked

#### Page 1 of 2 11/22/2005

#### Indiana County Endangered, Threatened and Rare Species List

County: Floyd

Species Name	Common Name	FED	STATE	GRANK	SRANK
Platyhelminthes (Flatworms) Sphalloplana chandleri	Chandler's Cave Flatworm		SE	G1G2	S1
Crustacean: Malacostraca					
Caecidotea teresae	Groundwater Isopod		SE	G1G2	S1
Crangonyx torbest				GNK	83
Crustacean: Copepoda Diacyclops jeanneli	Jeannel's Cave Copepod		SE	G3G4	S1
Mollusk: Bivalvia (Mussels) Ligumia recta	Black Sandshell			G5	S2
Pleurobema cordatum	Ohio Pigtoe		SSC	G3	S2
Villosa lienosa	Little Spectaclecase		SSC	G5	S2
Insect: Lepidoptera (Butterflies & Moths)					
Artogeia virginiensis	West Virginia White		SR	G3G4	S3
Celastrina nigra	Sooty Azure		ST	G4	S2
Fish Esox masquinongy	Ohio River Muskellunge		SSC	G5	S4?
Amphibian					
Ambystoma barbouri	Streamside Salamander			G4	S3
Cryptobranchus alleganiensis alleganiensis	Hellbender		SE	G3G4T3T4	S1
Pseudotriton ruber ruber	Red Salamander		SE	G5T5	S1
Scaphiopus holbrookii holbrookii	Eastern Spadefoot		SSC	G5T5	S2
Reptile					
Cemophora coccinea copei	Northern Scarlet Snake		SE	G5T5	S1
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Fantilla coronata	Southeastern Crowned Snake		SE	G5	S1
Bird					
Dendroica cerulea	Cerulean Warbler		SSC	G4	S3B
Helmitheros vermivorus	Worm-eating Warbler		SSC	G5	S3B
l ylo alba Mileonia citrina	Barn Owl		SE	65	52 53D
	Hooded warbler		330	05	350
Mammal	Debent	No Stotus		G5	<b>C1</b>
Myotis grisescens	Boocai Grav Bat	INO Status	SF	63 63	S1
	Gray Bat	LL	51	05	51
Vascular Plant Acalypha deamii	Maroury		SP	G42	82
Armoracia aquatica	Lake Cress		SE	G4?	S1
Crataegus chrysocarpa	Fineberry Hawthorn		SE	G5T5	S1
Crataegus intricata	A Hawthorn		SR	G5	S2
Hexalectris spicata	Crested Coralroot		SR.	G5	S2
soetes engelmannii	Appalachian Quillwort		SE	G4	S1
Juglans cinerea	Butternut		WL	G3G4	S3
Passiflora incarnata	Purple Passion-flower		SR	G5	S2
Penstemon deamii	Deam Beardtongue		SR	G1	<b>S</b> 1
Plantago cordata	Heart-leaved Plantain		SE	G4	S1
Ranunculus harveyi	Harvey's Buttercup		SE	G4	S1
Rubus deamii	Deam Dewberry		SX	G4?	SX
Sagittaria australis	Longbeak Arrowhead		SR	G5	S2
Scutellaria parvula var. australis	Southern Skullcap		WL	G4T4?	S2
Jvularia perfoliata	Bellwort		SE	G5	\$1
High Quality Natural Community Barrens - bedrock siltstone	Siltstone Glade		SG	G2	S2
<sup>-</sup> orest - upland dry	Dry Upland Forest		SG	G4	S4
Other					
Freshwater Mussel Concentration Area	Mussel Bed		SG	GNR	SNR
Indiana Natural Heritage Data Center Fed: Division of Nature Preserves States	LE = Endangered; LT = Threatened; C = candid SE = state and an endangered; ST = state threatened; S	late; PDL = proposed	for delisting	of special concern:	

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Page 2 of 2 11/22/2005	Indiana County Endangered, Threatened and Rai County: Floyd	e Species I	List		
Species Name	Common Name	FED	STATE	GRANK	SRANK

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About the Indian Creek Watershed	Water Quality	Karst Features
Indian Creek is a 256-square-mile watershed located in southern Indiana. Towns include Georgetown, Greenville, Galena, Crandall, Lanesville and Corydon. The watershed is about 48 miles long and 19 miles wide. The headwaters are located in the knobs of Clark and Floyd Counties. Indian Creek then flows through Harrison County to the Ohio River. Major tributaries include Corn Creek, Crandall Branch, Raccoon Branch, Brush Heap Creek and Little Indian Creek. Land uses include agriculture (62%), forest (35%) and developed land (2.5%).	The Indiana Department of Environmental Management (IDEM) monitored water quality in the Indian Creek watershed. IDEM compared the data to the State's Water Quality Standards to identify reaches with good water quality, those affected by pollution and those that need additional monitoring.	The Indian Creek watershed includes many karst features such as caves, sinkholes and springs. Karst features are formed over centuries as rainwater dissolves limestone. Binkley Cave is an important karst feature in the watershed. At 22 miles long, it is the longest known cave in Indiana. Studies have indicated that Indian Creek feeds Binkley Cave, and the cave is connected to the Blue River. Surface pollutants can travel underground rapidly in karst systems, where they can pollute wells. Protecting karst is important for safe water supplies. Through this project, sinkholes will be mapped and evaluated for possible pollution sources.
	Designated Use Support Status 303(d) Status Full Suport Parial Suport Not Assessed Not Assessed	Watershed Goal Foster economic development, preserve environmental quality and enhance the quality of life for all who live and work in the Indian Creek Watershed.
Indian Creek Watershed Land Use LEVEL2 AGRICULTURE URBAN FOREST	IDEM found that portions of Indian Creek and Crandall Branch have elevated levels of bacteria. Habitat and biological quality were impaired in Indian Creek and Little Indian Creek.	How can you get involved? Visit our website <u>http://www.indiancreekwatershed.com/</u>
Indian Creek from the Floyd/Harrison County border to the Ohio River has been included on the Indiana Outstanding Rivers List due to its ecological importance.	Through this project new monitoring data will be collected to evaluate water quality in the watershed. Results will be used to select watershed improvement and protection strategies.	<b>Contact</b> Steve Hall, Watershed Coordinator 812-206-0100

## What is a watershed?

A watershed is defined as an area of land that drains to a common point. A watershed is very much like a bowl; it has a ridge that defines its boundary and a valley that collects each drop of water that falls within its boundary. Watersheds vary in size, and smaller watersheds exist within larger watersheds. A watershed can be a small area of land draining to a neighborhood pond or as large as the entire Mississippi River Basin. Because we all live in a watershed, our individual and collective actions directly affect the quality of our watershed.

# What is a watershed plan?

Watershed Thus, watershed planning creates a unique environment where multiple jurisdictions can work together to reduce duplication of effort and build on each other's resources and information to solve water-related problems. A multiurisdictional approach to addressing water quality issues often results in long-term neighboring entities. Watershed plans important issues currently facing the area and provide a mechanism to plan for the cooperation and coordination among identify strategies to address the most A watershed plan is a flexible framework for managing water quality and quantity political water resource needs of future generations. boundaries rarely follow watershed. the boundaries. within

## Indian Creek Watershed Plan Subcommittee

The Harrison County Regional Sewer District formed the Indian Creek Watershed Plan Subcommittee.

## **Subcommittee Members**

Daniel Lee, PE, Subcommittee Chair Harrison County Regional Sewer District, & Tyson Foods Anthony Combs Harrison County Regional Sewer District & Harrison County Health Department

Gary Davis Harrison County Council President

Ralph Schoen Harrison County GIS Tom Tucker Harrison County Regional Sewer District

Eric Wise Harrison County Planning Commission

Kevin Russell, PE Harrison County Engineer

Don Lopp Floyd County Planner







This project was funded by a Clean Water Act Section 205(j) grant from the US Environmental Protection Agency to the Indiana Department of Environmental Management to Harrison County, Indiana

#### **Indian Creek Watershed**

**Press Release** 

September 29, 2006

For immediate release

#### Contact:

Dan Lee, Harrison County Regional Sewer District (812-738-5853) daniel.lee@tyson.com

#### Harrison County receives grant to improve water quality New Two-Year Project Targets Indian Creek Watershed

Corydon IN, September 22, 2006---improving water quality in the Indian Creek watershed will be the focus of a new 2-year study undertaken by the newly formed Harrison County Regional Sewer District (RSD). Through this USEPA grant-funded project, the RSD is developing a Watershed Management Plan for Indian Creek.



The RSD will develop a watershed management plan to provide a roadmap for protecting and improving water quality in Indian Creek. The plan will identify ways to address pollution and flooding for parts of Floyd and Harrison counties. The RSD formed the Indian Creek Watershed Subcommittee to oversee development of the Watershed Management Plan.

The project will create a resource library of water quality data, maps and other

Indian Creek in Corydon.

important information relevant to the watershed. In addition, project leaders will hold a series of community meetings to actively obtain input, comments and suggestions for the final watershed-based plan.

Dan Lee, Chair of the Indian Creek Watershed Subcommittee stated: "This project will produce a plan that consolidates past efforts and guides future activities to improve water quality throughout the Indian Creek watershed. The Indian Creek Watershed Management Plan grant will be a springboard to enhance future endeavors to improve Indian Creek for future generations. We are looking forward to community meetings with the public."



The Indian Creek Watershed drains portions of Floyd County and Harrison County before emptying into the Ohio River. Towns within the watershed include Greenville and Georgetown in Floyd County and Lanesville, Crandall and Corydon in Harrison County. Major tributaries to Indian Creek include Little Indian Creek, Thompson Creek, Richland Creek and Corn Creek in Floyd County, and Crandall Branch, Raccoon Branch, Brush Heap



Creek and Little Indian Creek in Harrison County.

Over the past 20 years, developed land uses (i.e., commercial, industrial, residential) have increased and agricultural and forested land uses have decreased. This development has lead to increasing pressures on limited water resources and strained wastewater treatment facilities, as documented through water quality impairments. Based on state monitoring data, bacteria, siltation and low dissolved oxygen are affecting Indian Creek. Current indications are that septic systems, agricultural and urban runoff and loss of habitat are contributing to the impairments. The monitoring associated with the watershed plan development will help the RSD to better understand the pollution sources and how to manage them.

The southern portion of Indian Creek Watershed is characterized by sinkholes, springs and caves. In fact, the Indian Creek Watershed includes Indiana's largest cave system, Binkley Cave. The cave is home to bats, fish and insects that are uniquely adapted to cave habitats. Since pollutants can move rapidly from the surface to groundwater through sinkholes and caves, protecting karst systems will be an important component of the watershed plan. During the project, priority sinkhole locations will be mapped and the surrounding land uses will be characterized to identify potential pollution sources.

Tom Tucker, President, Harrison County Regional Sewer District, stated, "We believe that this watershed plan provides an opportunity for everyone to work together to maintain the wonderful quality of life that we have in Floyd and Harrison Counties, for ourselves and for our children and grandchildren."

The first community meeting is scheduled for Wednesday, October 18, 2-4 pm and will be held at the Harrison County Annex Building, 124 S. Mulberry St., Corydon. Additional information regarding this project and the meeting can be found at <u>www.indiancreekwatershed.com</u> or by contacting Steve Hall (<u>shall@fmsm.com</u>, 812-206-0100).

This work is funded by a grant from the U.S. Environmental Protection Agency under Section §205(j) of the Clean Water Act through the Indiana Department of Environmental Management to Harrison County.

###



HARRISON COUNTY REGIONAL SEWER DISTRICT

INDIAN CREEK WATERSHED PLAN

PUBLIC MEETING



#### October 18, 2006 2:00 PM to 4:00 PM

#### Harrison County Annex Building, 124 S Mulberry Street, Corydon

#### **MEETING SUMMARY- FINAL**

#### 1. Introduction to Watershed Planning

Steve Hall and Karen Schaffer presented an overview of watershed planning. Highlights included a discussion of the history of the watershed plan project. An interchange for Lanesville is being planned and is anticipated to spur economic growth and associated needs for wastewater and stormwater services. Over 20 public meetings were held, and issues of concern included anticipated stormwater regulatory requirements, flooding, drainage, karst, septic systems, wastewater. A key concern was not to let growth get ahead of infrastructure. A Feasibility Study was prepared and lead to the formation of the Harrison County Regional Sewer District. The goals of the Feasibility Study and the Regional District are to foster economic development, preserve environmental integrity and enhance quality of life. These goals are also the goals of the watershed plan.

The Lanesville Interchange will bisect the Indian Creek Watershed. Alignments are along Crandall Branch and Indian Creek, which are on the State's 303(d) List of Impaired Waterbodies for <u>e. coli</u> impairments. Federal and state regulations do not allow new or expanded discharges of listed pollutants into impaired waterbodies, and IDEM has the authority to deny wasteload allocation requests for these discharges. In addition, IDEM will develop Total Maximum Daily Loads (TMDLs) – water quality clean up plans - that regulate point and nonpoint discharges into the impaired streams. These requirements pose additional regulatory burden on the District, communities and citizens. In addition, other wastewater facilities are anticipated to expand as package plants are taken out of service, and sewer service areas expand. One of the key benefits of the watershed plan is to develop a locally-driven approach to address impairments before the regulatory approaches are imposed by IDEM.

#### 2. Watershed Plan Approach

The Watershed Plan provides an approach to coordinate the expansions to address key infrastructure needs and positions the District and watershed communities to receive additional grants to implement strategies identified in the watershed plan and provide tangible products for water resource managers and land use planners. Grants can be pursued prior to publication of a final Watershed Plan. Examples of funding sources and projects include:



- Nonpoint Source Management (319h) 80% of available funds are targeted toward implementation projects. An example project is a review of codes and ordinances by renowned land use planning professionals to improve subdivision regulations for stormwater management. In Northern Indian, a project is underway to use thermal and infrared photography to identify failing septic systems and form a septic management district.
- Stream Restoration/ Lake Shore Stabilization
- Agricultural Cost Shares for riparian buffers projects have resulted in reduced need for stormwater infrastructure.
- Flooding FEMA provides HMGP (Hazard Mitigation Grant Program) and PDM (Pre-Disaster Mitigation) grants to communities to study and build solutions to flooding problems.

#### Monitoring and Assessment

FMSM has reviewed IDEMs 1999-2005 water quality data. Findings thus far are highlighted below.

- The 2006 303(d) List of Impaired Waterbodies does not include impairments identified through monitoring conducted by IDEM in 2005. These data will be used to develop the 2008 303(d) List.
- Based on our review of 2005 <u>e. coli</u> data, additional listings are likely in segments currently identified as meeting designated uses.
- Elevated phosphorus has also been identified in the Indian Creek below Corydon, but since IDEM is using a guideline, rather than a water quality criterion to assess phosphorus, IDEM may not list this stream segment as being impaired for phosphorus.
- IDEM found low dissolved oxygen (DO) at the bottom of the watershed that may be caused by Ohio River backwater. Because of the way that IDEM delineates waterbody "segments", the low DO listing was applied to 17 miles of river. Through our monitoring program, we are evaluating this segment in 2 additional places. If DO is acceptable outside of the backwater area, we may work with IDEM to delist portions of this lower segment for DO.
- IDEM is developing a formal process to accept external data for the 303(d) List and initially considers our data "external". However, since we are using a QAPP that IDEM will approve and their laboratory of choice- Indiana State Department of Health (ISDH), the RSD may want to work with them to accept our data and delist segments that meet water quality standards based on our data. Otherwise, IDEM may want to do additional monitoring themselves.
- Our monitoring program will include segments that IDEM has not sampled. It is possible that new problems will be identified. While this is a concern, it is also necessary so that the problems can be addressed proactively.



#### 3. Group Discussion

#### Flooding

- Flooding impacts facilities and production. The Tyson Foods facility was affected in the recent flooding event.
- Low head dams, the ford bridge and Little Indian Creek backwater are likely contributors and the problem is anticipated to worsen as the area develops.
- The system is very flashy, with floodwaters rising and receding very quickly. This may be attributed to high velocity runoff from local impervious surfaces.
- In the Blue River, agricultural buffers and stabilization projects have been implemented to mitigate flooding. Agricultural funding sources typically require significant match (up to 50%). Grants can be sought to offset the farmers match requirement.
- Contour practices can reduce agricultural runoff and soil erosion. These practices are common where rainfall is scarcer, but could be useful locally.
- FEMA HMGP and PDM grants are available to study the problem and build solutions. Data and documentation of the nature and extent of the flooding problem is critical to a successful application. Regional solutions can incorporate recreational uses such as linear parks along rivers. Lanesville has a series of parks that provide flood storage and recreational use.
- FEMA buy-outs for repetitive loss structures are also available. This has been used on 1-2 structures in Harrison County. Buy-outs compliment regional solutions by providing land.
- Floyd County involvement is very important since drainage from the knobs and developing areas is increasing. Floyd County is developing a stormwater utility that will provide a funding source for stormwater/drainage projects that could benefit Harrison County.
- The Watershed Plan should include a recommendation to identify possible flood control structures and locations.

#### Failing / Inadequate Septic Systems

- Failing septic systems are a problem, but are difficult to quantify. The dataset is new, complaint driven and typically arises from lack of percolation. Systems that are failing into karst features don't have percolation issues and are not being detected. Repairs can be triggered by failures or changes to the system such as expansions to handle home additions.
- New Salisbury and Laconia have more repair needs than Lanesville and Corydon.



- Projects to address this issue in other communities have included using GIS to analyze repair, failure and soils data and have resulted in identification of issues such as clay lenses and perched water tables that limit infiltration. Soil testing requirements were changed as a result.
- If septic systems failures are to be highlighted, it is important to bring solutions to homeowners. Some are not likely to have the financial means to repair failing systems.
- Some communities have implemented septic system districts that require routine inspections and pump-outs and repairs for failing systems. Fees are charged for the services, but are typically much lower than tie-on fees for sewage collection and monthly sewer bills. The RSD has the authority to address septic systems and septic education is a major charge for the RSD.

#### **Other Issues**

- Drainage is not well covered in Harrison County Ordinances
- A water quality problem foaming was identified in a Corn Creek cave stream near the Floyd County boundary. There is development in the area, served by septic systems that may be contributing. Existing data did not include these northern Harrison County karst features. This area could be examined further in the Sinkhole Inventory.
- The discussion so far has focused on problems, but preservation and protection are often less expensive and less onerous than remediation. Additional discussion on protection measures is needed.

#### 4. Next Steps and Closing

• Although this was a good discussion, additional efforts to gain citizen involvement will be required in the future. Additional local advertising, non-Corydon location (e.g., Lanesville and other towns), evening time slot and refreshments were suggested as approaches to gain additional citizen involvement.





able upon your completion of the

The meetings will be held at the

#### Help Protect Water Quality in Your Community



Indian Creek Watershed Management Plan



The Indian Creek watershed drains 256 square miles and includes approximately 176 miles of streams which flow to the southwest, eventually draining to the Ohio River. Towns in the watershed include Galena, Greenville and Georgetown in Floyd County and Lanesville, Crandall and Corydon in Harrison County.

A watershed management plan is being developed for Indian Creek by a Subcommittee of the Harrison County Sewer District. The watershed plan will include a description of water quality and quantity issues and identify strategies to address important issues. А strategy for measuring progress of implementation and changes in water quality and quantity will also be developed. One of the issues that has been identified in the watershed is elevated levels of bacteria, a common problem in Indiana and throughout the U.S. Elevated bacteria may come from wildlife,

livestock, pets and/or malfunctioning septic systems as well as other sources.

The southern half of the Indian Creek Watershed is underlain with **karst** geology including Binkley Cave, the largest known cave in Indiana. Karst features include sinkholes, springs, and caves and underground channels. Contaminants near the surface can travel quickly into sinkholes, caves and groundwater without being broken down by soil. Therefore, water quality in this area is delicate and easily impacted. There are over 250 wells in the Indian Creek watershed used for drinking water and agricultural supplies, many in the karst region.

**Septic systems need proper care and maintenance.** Because of the identified problem with elevated bacteria, combined with karst geology, special attention is being paid to septic systems. Although septic systems can be a safe and effective way of treating wastewater, malfunctioning septic systems can contribute to the elevate bacteria levels in groundwater and surface water posing a threat to the environment and human health. Many households in Floyd and Harrison County use septic systems.

A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. These components are typically buried near the home. The septic tank holds the wastewater long enough to allow solids to settle out and oil and grease to float to the surface. It also allows partial decomposition of the solid materials. The wastewater exits the septic tank and is discharged into the drainfield for further treatment



by the soil. Microorganisms in the soil provide final treatment by removing bacteria, viruses, and nutrients.

#### Tips for Septic System Owners

- Don't overload your septic system Fix leaking faucets and toilets and use water efficiently, space out laundry loads, Route surface water drainage away from leach field - Keep gutters and basement sump pumps from draining into or near your septic system.
- Flush responsibly Dental floss, feminine hygiene products, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, etc. can clog and potentially damage septic system components.
- Dispose of hazardous chemicals properly Flushing household chemicals, gasoline, oil, pesticides, antifreeze, or paint can slow or stop the biological treatment. Check with your local waste department for household hazardous waste pickup.
- Regular Maintenance Have your tank pumped and inspected by a professional at least every 3 years or as recommended by the manufacturer.
- Drainfield care Avoid driving or parking vehicles on your drainfield. Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the system. Do not apply manure or fertilizers over the drainfield.
- Careful use of additives Check with your local health department before using additives since they do not eliminate the need for periodic pumping.

#### Ways to Know Your System in Not Functioning Properly

- > Sewage surfacing over the lateral field
- > Sewage backing up in the house or basement
- > Mushy ground of greener grass in the area of the lateral field
- Slowly draining toilets or drains
- Sewage odors

#### More information

For more information regarding the Indian Creek Watershed Management Plan see <u>www.indiancreekwatershed.com</u> or contact Karen Schaffer at 812-206-0100.

For more information on septic systems contact: Floyd County Health Department at 812-948-4726 or <u>http://www.floydcountyhealthdept-in.com/</u>, Harrison County Health Department at 812-738-3237 or <u>http://www.harrisoncountyhealth.com/index.htm</u> or visit EPA's Septic Systems page at <u>http://cfpub.epa.gov/owm/septic/homeowners.cfm#steps</u>.



HARRISON COUNTY REGIONAL SEWER DISTRICT

INDIAN CREEK WATERSHED PLAN

#### **PUBLIC MEETING**



July 24, 2007 6:30 to 8:00 PM

Lanesville Jaycees Building

#### MEETING SUMMARY- DRAFT

#### 1. Introduction to Watershed Planning

Steve Hall provided an explanation of the history of the project. RSD was formed to ensure poor water quality did not result from new development in Harrison County. Proximity to Louisville makes Harrison County an area posed for development. The proposed Lanesville corridor project north of I-64 near Lanesville is expected to be a center for new residential, commercial, and industrial development. Monitoring conducting under the watershed management plan will help to provide an understanding of baseline conditions prior to future development. The watershed plan is meant to focus on the most important issues and move forward to implement solutions. It will also help to address future water resource needs in Harrison County.

#### 2. Draft Watershed Plan

Karen Schaffer, Watershed Coordinator gave a presentation explaining the tasks to be completed under the watershed plan and the progress made on chapters one and two.

Two of the main issues identified in the watershed are elevated bacteria and low dissolved oxygen. Indiana Department of Environmental Management sampled several locations in the watershed and the found many miles of streams to be impaired. Due to elevated bacteria, which are evident in IDEM sampling, 36.65 miles of streams are considered impaired for primary contact recreational use. Due to low dissolved oxygen (DO) and aquatic habitat scores given by IDEM, 20.89 miles of streams are considered impaired for aquatic life support.

So far one monitoring event has taken place under the Watershed Plan. *E.Coli* and flow were tested. The *E.Coli* results are not yet available from the lab. Very low flow readings were observed in the Watershed. Four of the 10 sites were observed as having 0 feet per second flow.

The sinkhole inventory is underway to map existing sinkholes. Using GIS analysis there are 14,687 possible sinkhole locations identified in the Harrison County portion of the Watershed.



#### 3. Group Discussion

Meeting attendees discussed the following topics as they relate to Indian Creek:

#### • Uses of Indian Creek:

- o Aesthetic value
- Recreation & Wading
- Livestock crossing
- Stormwater conveyance
- Agricultural water supply
- Indian Creek Greenway Trail

#### Water Quality Issues and Concerns:

- Water/ Stormwater Quality
  - Water runs red around development areas
- Septic systems
  - State Department of Health does not approve mound septic systems although they may be a better option for a highly karst area
  - Straight pipes
  - May fail into karst systems providing little evidence from the surface
- Stormwater quantity (Flooding)
  - We can not stop development, what can we do?
  - Can we really control floods?
  - Straightening of Indian Creek for rapid stormwater conveyance, which leads to further water quality and flooding problems
  - Erosion problems in the headwaters of Floyd County portion of the watershed effect Harrison County downstream
  - Bridge near Lanesville Jaycees building seems to be causing a flooding problem in the area because of restricted flow
  - Control of mosquito and pests in future retention/detention ponds
  - Some retention ponds will open up into karst



- Lanesville drainage problem
- Critical Areas for Water Quality:
  - Upcoming meetings on stormwater ordinance with RSD and Harrison County Commissioners

#### Recommendations for Improvements or Enhancements:

- Stormwater quantity (flooding)
  - Create ponds on farms
  - RSD ordinance to control bridge placement (strategy to address flooding issues)
  - RSD has requested to view all new development plans to help insure smart development (no more water leaving site faster that than predevelopment)
  - Better controls for stormwater runoff needed
- Septic systems
  - Public education on septic systems key
  - More data on septic systems is needed
  - Septic system management district as used in Allen County to charge monthly fee for inspections, repair, and pump of septic systems
  - Research alternative septic systems
- Water/ Stormwater Quality
  - Buffers for runoff should be used
  - Stabilize creek crossing areas with grasses
  - Cows should be kept out of the creeks
- Overall
  - ID priorities to secure funding for implementation
  - Not all parcels are suitable for development in Harrison County; the Karst ordinance will help to control development in ill-suited areas

The following priorities were given for the Watershed Management Plan by the attendees using votes:

Stormwater quantity (5 votes)



- Septic systems (5 votes)
- Water/ Stormwater Quality (4 votes)
- Karst issues (1 vote)

#### 4. Next Steps and Closing

Next steps include completing water monitoring, assessing data, completing sinkhole inventory, continuing to hold Public Outreach Events, and producing Watershed Plan.





**Ross Schulz** 

Stacey Jarboe, left, and Sam Call, both of FMSM Engineers, test the waters by collecting samples of aquatic life of Indian Creek last month to determine the quality as part of the Indian Creek Watershed Management Plan. Prevalent in these waters are crayfish, clams, snails and minnows, along with many others.

#### 10 sites part of Indian Creek watershed testing

By LINDSEY CORLEY Staff Writer Icorley@corydondemocrat.com

In planning for watershed management, testing the streams and determining water quality is an early step. Several engineers and a lead aquatic insect specialist sampled 10 sites last month within the Indian Creek watershed for just that reason, as part of the on-going Indian Creek Watershed Management Plan.

Stacey Jarboe, Steve Hall and Sam Call, all of Fuller, Mossbarger, Scott and May, the engineering firm in Jeffersonville behind the water management plan, spent most of Sept. 20 testing the waters in and near Harrison County. They were looking for three different things in their tests: chemical content, biologic communities and habitat assessments.

Chemicals in the water were tested through samples sent back to the lab. Biologic communities required a more hands-on approach, that's why Call was involved. Call is the lead aquatics insect specialist on the Indian Creek Watershed team. He has 25 years experience working with water issues in Kentucky and currently teaches at Bluegrass Community College in Lexington, Ky. Call said testing biologic communities can determine water quality in ways chemical testing cannot.

"Aquatic insects spend almost all their life in the water," Call said. "We get a general idea of water quality over time (by looking at them). The communities will show if it's been bad along the way."

A habitat assessment is just looking at the physical conditions of the stream to determine if those things have an impact. One obvious one in Indian Creek is the lack of shade over the water, which during summer months can elevate the temperatures of the water. Such hot water is a habitat that can be destructive to its inhabitants.

These tests, which will have results determined in about 60 days, will then be compared with a state database of information to see how they compare. In fact, some streams that the Indiana Dept. of Environmental Management has already assessed were chosen because of the information already known. That way, a comparison is "apples to apples," Hall explained. He also said they would be testing other streams to "fill in the gaps" of information.

Of the 10 sites tested, all were for water quality, chemicals or pollutants; testing for fish or bugs was also done at five of the sites.

Once the water quality information is completed, Hall said the next part of the Indian Creek Watershed Management Plan will be to make recommendations for protecting good areas and restoring areas in need, as well as planning and developing policies for growth that would help or maintain water quality.

#### Blue River Project Office

Allen Pursell, Project Director Cassie Hauswald, Project Assistant Bonnie Wolf, Land Steward Meredith Bland, Land Protection Specialist Phone/Fax: (812) 737-2087 www.nature.org/indiana



Don't forget to check out the new Rabbit Hash Trail Some Volunteers/Contributors We'd Like to Thank

Jacob Beard Bob Beck Merle Behr Orrie Bender Joe Bina Panaena Bina Tim Brothers Lewis Brown Justin Conrad Lana Cullison Sam Cunningham Dave Elliott Margaret Fonda Rick Harvey George Herbener Jim Isbell Laura Lenkey Lewis Lenkey Mark Macomas Jeff Ray Ed Runden Steve Schaftlein Elliott Thompson Charles Willmering

Harrison County Community Foundation Boy Scout Troop#47 Elizabeth, IN

FULLER, MOSSBARGER, SCOTT & MAY ENCLER, MOSSBARGERS, INC.

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RECEIVED

Stacey larboe 350 Missouri Avenue, Ste 101 Jeffersonville IN 47131

> Blue River Project Office 5885 Wulfman Road Laconia, Indiana 47135





## Blue River News

Supporting the health and quality of Southern Indiana Ecosystems

Issue 2, 2007

### The Otter's Return to Indiana

#### By Cassie Hauswald

Fun-loving, frisky, free-spirits of freshwater ...river otters personified. The fluid movement of a river otter embodies grace and hints at the power of this diving denizen of Indiana.

As a member of the weasel family, otters are mostly nocturnal with peak activity between midnight and dawn. Fish, crayfish, invertebrates, and small mammals make up a majority of the carnivore's diet. Otter's prefer slow-moving, clean water with plenty of small fish and ample cover. Often, beaver presence is mirrored by the appearance of otters that can use the beaver dens as cover. An otter's predatory prowess is a product of several adaptive features, including: valve-like nose and ear flaps that seal out water as it dives for several minutes, sensitive whiskers that help it to find slower-moving fish in murky water, and eves situated atop its head so as to survey the water surface for danger while remaining unnoticed.

Ripples on the water's surface or a mud slide along a river bank are often the only clues to a river otter's presence. They shy away from humans and rightly so. Settlement of the Midwest coincided with the decline in otters as entire forests were converted to open farm ground and as early settlers realized the value of otters to the fur trade. Like all animals, otters are dependent upon a steady food supply and polluted water does not support healthy fish and aquatic invertebrates nor will it support a booming otter population. Occupying abandoned beaver dens, root wads of large streamside trees, and other equally messy tangles of vegetation, otters are most comfortable near water, preferring a forested corridor between rivers, lakes, and wetlands. As Indiana's stream corridors have slowly reforested and improvements in water quality have been made, the time was ripe for otter reintroductions.

After a 50 year absence, otters were reintroduced to 6 Indiana watersheds in the late 1990's with releases on Blue River occurring in February of 1999. Coincidentally, the summer of that year was one of the worst droughts on record in this area. Studies conducted on Blue River show that the many fish are still recovering from the drought of 1999 and with the follow-up drought of 2007 fish numbers can be expected to again show a decline. So while it is true that otters eat fish, the decline in some fish species over the past several years in Blue River is most likely due to the damaging 1999 drought.



Recently removed from the state's list of endangered animals, the river otter now occupies 65 Indiana counties. In southern Indiana, they have spread out to occur in all major watersheds. From 1995 to 2005, researchers with the Indiana Division of Fish and Wildlife conducted a study in which 1328 records of sightings, accidental

Continued on page 3

#### **Protect Community Water Quality** Indian Creek Watershed Management Plan



The Indian Creek watershed drains 256 square miles and includes approximately 176 miles of streams which flow to the southwest, eventually draining to the Ohio River. There is evidence that water draining into Binkley Cave travels underground and surfaces in Blue River. Towns in the Indian Creek Watershed include Galena, Greenville, and Georgetown in Floyd County and Lanesville, Crandall, and Corydon in Harrison County.

A watershed management plan in being developed for Indian Creek by a subcommittee of the Harrison County Sewer District. The watershed plan will include a description of water quality and quantity issues and identify strategies to address important issues. A strategy for measuring progress of implementation and changes in water quality and quantity will also be developed. One of the issues identified in the watershed is elevated levels of bacteria, a common problem in Indiana and throughout the US. Elevated bacteria may come from wildlife, livestock, pets, and/or malfunctioning septic systems as well as other sources.

The southern half of the Indian Creek Watershed is underlain with karst geology including Binkley Cave, the largest known cave in Indiana. Karst features include sinkholes, springs, caves, and underground channels. Contaminants near the surface can travel quickly into sinkholes, caves, and groundwater without first being broken down by soil. Therefore, water quality in this area is delicate and easily impacted. There are over 250 wells in the Indian Creek watershed used for drinking water and agricultural supplies, many in the karst region.

Septic systems need proper care and maintenance. Because of the identified problem with elevated bacteria, combined with karst geology, special attention is being paid to septic systems. Although septic systems can be a safe and effective way of treating wastewater, malfunctioning septic systems can contribute to elevated bacteria levels in groundwater and surface water, posing a threat to the environment and human health. Many households in Floyd and Harrison County use septic systems.

A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. These components are typically buried near the home. The septic tank holds the wastewater long enough to allow solids to settle out and oil and grease to float to the surface.

It also allows partial decomposition of the solid materials. The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. Microorganisms in the soil provide final treatment by removing bacteria, viruses and nutrients.

#### Tips for Septic System Owners

- Don't overload your septic system Fix leaking faucets and toilets and use water efficiently, space out laundry loads, route surface water drainage away from leach field - keep gutters and basement sump pumps from draining into or near your septic system.
- Flush responsibly Dental floss, feminine hygiene products, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, etc. can clog and potentially damage septic system components.
- Dispose of hazardous chemicals properly Flushing household chemicals, gasoline, oil, pesticides, antifreeze, or paint can slow or stop the biological treatment. Check with your local waste department for household hazardous waste facilities.
- Regular maintenance Have your tank pumped and inspected by a professional at least every 3 years or as recommended by the manufacturer.
- Drainfield care Avoid driving or parking vehicles on your drainfield. Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the system. Do not apply manure or fertilizers over the drainfield.
- Careful use of additives Check with your local health department before using additives since they do not eliminate the need for periodic pumping.

Ways to Know Your System in Not Functioning Properly

- Sewage surfacing over the lateral field
- Sewage backing up in the house or basement
- > Mushy ground of greener grass in the area of the lateral field
- Slowly draining toilets or drains
- ➢ Sewage odors

#### More information

For more information regarding the Indian Creek Watershed Management Plan see <u>www.indiancreekwatershed.com</u> or contact Karen Schaffer at 812-206-0100.

For more information on septic systems contact: Floyd County Health Dept at 812-948-4726 or <u>http://</u> <u>www.floydcountyhealthdept-in.com</u> Harrison County Health Dept at 812-738-3237 or <u>http://</u> <u>www.harrisoncountyhealth.com</u> EPA at <u>http://cfpub.epa.gov/owm/septic/</u> <u>homeowners.cfm#steps</u>.



Crowd & Crusted Risk Conventional Septic System

#### **Indian Creek Watershed**

#### **Press Release**

#### January 25, 2008

#### Questions regarding publication details should be addressed to:

Stacey Jarboe Environmental Scientist Stantec (formerly FMSM Engineers) Ph: (812) 206-0065 Fx: (812) 206-0105 stacey.jarboe@stantec.com Stantec.com

#### For immediate release

Indian Creek Watershed Management Plan Drafted Community Input Meeting: February 5, 2008

The Harrison County Regional Sewer District (RSD) Indian Creek Subcommittee has drafted a plan to address key water quality issues in the Indian Creek Watershed. Community participation will play a crucial roll in implementing the changes needed to protect and improve the Indian Creek Watershed.

The RSD Indian Creek Subcommittee would like to invite citizens of Harrison, Floyd, and Clark Counties to attend the Indian Creek Community Meeting on Tuesday, February 05, 2008 from 7:00 to 8:30 PM at the Harrison County Annex Building, 124 S. Mulberry Street in Corydon, Indiana. Refreshments will be provided.

The meeting will focus on biological and water quality monitoring results and watershed management strategies. The evening will facilitate conversation and input regarding the Indian Creek Watershed Plan which is now in draft form. Input from the meeting will be used to finalize the plan, which will be submitted to Indiana Department of Environmental Management (IDEM) in March, 2008. The Watershed Plan will be a valuable tool to coordinate efforts and provide a timeline for steps needed to address the water quality and flooding issues.

The drainage area for the Indian Creek Watershed is 256 square miles. The Watershed drains portions of Floyd County, Harrison County, and Clark Counties before emptying into the Ohio River. Towns within the watershed include Greenville and Georgetown in Floyd County and Lanesville, Crandall and Corydon in Harrison County. Major tributaries to Indian Creek include Little Indian Creek, Thompson Creek, Richland Creek and Corn Creek in Floyd County, and Crandall Branch, Raccoon Branch, Brush Heap Creek and Little Indian Creek in Harrison County. A detailed map showing roads and impaired streams within the watershed is available at www.indiancreekwatershed.com.



IDEM monitoring results indicated that portions of the Indian Creek, Crandall Branch and Devils Backbone have elevated levels of bacteria. Habitat and biological quality were considered to be impaired in Little Indian Creek and Devils Backbone.

The Watershed is located in a karst region. Karst features include sinkholes, springs, caves and underground channels. Some of the water leaves the channel of Indian Creek travels though underground channel(s) reemerging at Harrison Spring in a separate watershed system. Due to these karst features, surface contaminants can travel quickly into sinkholes, caves and groundwater or can resurface in streams without being filtered and broken down by soils. Therefore, water quality in this area is delicate and easily impacted.

#### Goal: Foster economic development, preserve environmental quality and enhance the quality of life for all who live and work in the Indian Creek Watershed.

For additional information on the project visit <u>www.indiancreekwatersed.com</u> or contact Karen Schaffer, Watershed Coordinator, 812-206-0100; <u>karen.schaffer@stantec.com</u>.

This work is funded by a grant from the U.S. Environmental Protection Agency under Section §205(j) of the Clean Water Act through the Indiana Department of Environmental Management to Harrison County.

###

#### INDIAN CREEK WATERSHED PLAN COMMUNITY MEETING

TUESDAY FEBRUARY 5, 2008 7:00PM — 8:30PM Harrison County Annex Building, 124 S Mulberry Street, Corydon, IN

#### Why a watershed plan?

To address water quality and quantity issues in the Indian Creek Watershed, including flooding and elevated bacteria.

#### Why should I get involved?

Your input is needed to help complete and implement the watershed plan.



- Watershed Plan Approach Overview
- Monitoring Approach and Results
- Strategy and Implementation
- Group Discussion
- Next Steps and Closing







"Foster economic development, preserve environmental quality and enhance the quality of life for all who live and work in the Indian Creek Watershed."



REFRESHMENTS PROVIDED

Karen Schaffer, Watershed Coordinator Stantec Consulting Services, Inc. (formerly FMSM) Phone: 812-206-0100 E-mail: karen.Schaffer@stantec.com

#### Visit us at <u>www.indiancreekwatershed.com</u>

### The Corydon Democrat

Accessed Website Thu, Feb 14, 2008 02:04 PM

#### Rews

Issue of February 13, 2008

#### Hearings conclude on watershed plan

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Lindsey Corley write the author

February 13, 2008 | 08:24 AM

In the third and final public meeting involving the Indian Creek Watershed Management Plan, Karen Schaffer, watershed coordinator, spent time with a group of citizens concerned about the future of the Indian Creek Watershed.

Schaffer first discussed results from water quality testing performed by the team from Stantec Consulting Services (formerly FMSM Engineers) last September. Ten sites were tested, and there was some overlap in areas monitored already by the Indiana Dept. of Environmental Management. Some areas, though, were completely new. Of those 10 monitored, some level of bacteria was found in four of the areas tested.

Schaffer said she and her team used a tool created by the Environmental Protection Agency called a Bacteria Indicator Tool, a spreadsheet tool used to estimate contribution of bacteria sources.

"We really honed in on bacteria problems," she said.

The results showed higher levels in western Harrison County and around lower Indian Creek. Septic system waste and potential water quality hazards due to failing systems were seen to have a greater potential for issues in Floyd County than in Harrison County. For cattle and other agricultural loadings, it was just the opposite, with the results being higher in Harrison County than in Floyd.

Dissolved oxygen content was also tested, and Schaffer said this was a good indicator of water quality as a whole.

"Actually, these looked pretty good," she said.

Only one site was designated as a problem with DO, Indian Creek above Lickford Bridge Road. IDEM had already tagged this particular site as a problem area due to the backwater from the Ohio River. Schaffer called this a "natural occurrence."
She admitted part of the testing was affected by the severe drought Harrison and Floyd counties experienced during the summer. When testing biotic integrity, or the number and kinds of insect life present in the water, two sites were unable to be tested at all.

"(There were) pretty stressed conditions out there," Schaffer said, due to the drought.

Schaffer also presented results of sinkhole testing to the audience, showing more than 14,000 possible sinkhole locations found in Harrison County and more than 150 combined found in Clark and Floyd counties.

Now, as the end of the grant for the Indian Creek Watershed Management Project is coming to a close, Schaffer also wanted to focus on goals, decisions and ways of measuring progress in the months and years to come. They want to finalize this iteration of the plan while knowing that in five or 10 years, it will be revamped, Schaffer said.

The management measures she and her team have identified are septic systems, agriculture, urban areas, karst geography, monitoring and assessment.

For septic systems, since so many local residents use them and there isn't a good database of where they are, Schaffer said she wants to find a "good pallatable, political way" to stop what could be a large problem later. That could include education workshops on how to keep the systems running cleanly and smoothly, and instating operation and maintenance requirements.

Agriculturally, since livestock waste could further impair the quality of the water, Schaffer and the audience members discussed plans like a watershed stewardship program and giving financial assistance to farmers to help create a buffer.

As for further monitoring and assessment, Schaffer said the final plan will be presented Feb. 29 to IDEM, and part of what they could begin to do is to apply for additional implementation funds for the improvements or enhancements recommended in the plan.

For more information regarding the Indian Creek Watershed Management Plan, log on to www.indiancreekwatershed.com.

PARAMETER	e. coli										
CRITERION	April 1 to Oct 31, Geomean = 125 CFU/100 ml and single sample max <576 CFU/100 ml</td										
SITE	WATERBODY	LOCATION	START	STOP	Ν	Min	GEOMEAN	MAX	> 576	STATUS	
OBS080-0001	Little Indian Cr	Banet Rd			0					Not Assessed	
OBS080-0004	Little Indian Cr	Near Galena			0					Not Assessed	
OBS080-0005	Indian Cr	@ Greenville Road, NW of Georgetow	07/10/00	08/07/00	5	64	128.3	180	No	Acceptable	
OBS080-0007	Georgetown	Parent Lake			0					Not Assessed	
OBS080-0008	Indian Cr	Navilleton Rd	06/07/05	07/06/05	5	163.1	561.1	3255	Yes	Impaired	
OBS090-0002	Indian Cr	Southern RR			0					Not Assessed	
OBS090-0004	Indian Cr	@ SR 335 near Corydon Junction	07/10/00	08/07/00	5	74	417.5	2100	Yes	Impaired	
OBS090-0005	Indian Cr	Landmark Way	06/08/05	07/07/05	5	72.3	308.5	1203.3	Yes	Impaired	
OBS090-0007	Indian Cr	Pleasant Valley Rd	06/08/05	07/07/05	5	133.3	423.5	2602	Yes	Impaired	
OBS100-0001	Indian Cr	Rocky Hollow Rd			0					Not Assessed	
OBS100-0004	Indian Cr	City Park S of Corydon, SR 135	09/13/00	03/15/01	2	69	157.6	360	No	Not Assessed	
OBS100-0005	Indian Cr	Corydon City Park, off SR 135 S			0					Not Assessed	
OBS100-0006	Indian Cr	at Lickford Bridge Rd	07/12/00	08/09/00	5	20	162.9	833	Yes	Impaired	
OBS100-0007	Indian Cr	Downstream of Little Indian Cr mouth	07/12/00	08/09/00	5	33	364.7	4500	Yes	Impaired	

PARAMETER	Dissolved Oxygen									
CRITERION	>/= 4.0 mg/L (instantaneous); >/= 5.0 mg/L (daily average									
SITE	WATERBODY	LOCATION	START	STOP	Ν	Min	AVG	MAX	% < 4.0 mg/L	STATUS
OBS080-0001	Little Indian Cr	Banet Rd	05/18/00	09/06/00	4	8.4	9.2	10.8	0	Full Support
OBS080-0004	Little Indian Cr	Near Galena	03/28/00	08/01/00	19	8.4	10.4	12.2	0	Full Support
OBS080-0005	Indian Cr	@ Greenville Road, NW of Georgetow	07/10/00	08/07/00	5	6.5	7.6	8.9	0	Full Support
OBS080-0007	Georgetown	Parent Lake			0					Not Assessed
OBS080-0008	Indian Cr	Navilleton Rd	05/26/05	09/13/05	10	8.4	10.5	12.0	0	Full Support
OBS090-0002	Indian Cr	Southern RR	05/18/00	09/05/00	3	7.5	7.6	7.9	0	Full Support
OBS090-0004	Indian Cr	@ SR 335 near Corydon Junction	07/10/00	08/07/00	5	6.1	7.6	8.9	0	Full Support
OBS090-0005	Indian Cr	Landmark Way	05/24/05	09/13/05	10	5.2	7.9	11.5	0	Full Support
OBS090-0007	Indian Cr	Pleasant Valley Rd	06/08/05	10/12/05	9	5.5	6.7	8.3	0	Full Support
OBS100-0001	Indian Cr	Rocky Hollow Rd	05/16/00	09/06/00	3	9.9	10.3	10.7	0	Full Support
OBS100-0004	Indian Cr	City Park S of Corydon, SR 135	04/07/99	03/07/06	84	4.6	11.8	17.3	0	Full Support
OBS100-0005	Indian Cr	Corydon City Park, off SR 135 S			0					Not Assessed
OBS100-0006	Indian Cr	at Lickford Bridge Rd	07/12/00	08/09/00	5	2.5	4.3	7.8	80	Impaired
OBS100-0007	Indian Cr	Downstream of Little Indian Cr mouth	07/12/00	08/09/00	5	7.6	9.2	11.2	0	Full Support

PARAMETER	рН									
CRITERION	pH between 6.0 and 9.0									
SITE	WATERBODY	LOCATION	START	STOP	Ν	Min	Avg	MAX	% >9.0	STATIS
OBS080-0001	Little Indian Cr	Banet Rd	05/18/00	09/06/00	4	7.57	7.92	8.42	0	Full Support
OBS080-0004	Little Indian Cr	Near Galena	03/28/00	08/01/00	19	7.9	8.74	9.26	10.0	Impaired
OBS080-0005	Indian Cr	@ Greenville Road, NW of Georgetow	07/10/00	08/07/00	5	7.34	7.53	7.59	0	Full Support
OBS080-0007	Georgetown	Parent Lake	07/22/96	07/22/96	0					Not Assessed
OBS080-0008	Indian Cr	Navilleton Rd	05/26/05	09/13/05	10	7.38	8.03	8.76	0	Full Support
OBS090-0002	Indian Cr	Southern RR	05/18/00	09/05/00	3	7.88	7.95	8.06	0	Full Support
OBS090-0004	Indian Cr	@ SR 335 near Corydon Junction	07/10/00	08/07/00	5	7.36	7.65	7.84	0	Full Support
OBS090-0005	Indian Cr	Landmark Way	05/24/05	09/13/05	10	7.11	7.66	8.21	0	Full Support
OBS090-0007	Indian Cr	Pleasant Valley Rd	06/08/05	10/12/05	9	7.3	7.49	7.66	0	Full Support
OBS100-0001	Indian Cr	Rocky Hollow Rd	05/16/00	09/06/00	3	8.25	8.48	8.77	0	Full Support
OBS100-0004	Indian Cr	City Park S of Corydon, SR 135	04/07/99	03/07/06	84	7.69	8.36	9.19	1.2	Full Support
OBS100-0005	Indian Cr	Corydon City Park, off SR 135 S			0					Not Assessed
OBS100-0006	Indian Cr	at Lickford Bridge Rd	07/12/00	08/09/00	5	7.34	7.46	7.76	0	Full Support
OBS100-0007	Indian Cr	Downstream of Little Indian Cr mouth	07/12/00	08/09/00	5	7.82	8.04	8.18	0	Full Support

PARAMETER	Total Phosphore	us								
COMPARISON	0.3 mg/L									
	-									
SITE	WATERBODY	LOCATION	START	STOP	Ν	Min	AVG	MAX	% > 0.3	STATUS
OBS080-0001	Little Indian Cr	Banet Rd	05/20/00	09/06/00	3	0.015	0.036	0.079	0	Acceptable
OBS080-0004	Little Indian Cr	Near Galena			0					Not Assessed
OBS080-0005	Indian Cr	@ Greenville Road, NW of Georgetov	vn		0					Not Assessed
OBS080-0007	Georgetown	Parent Lake	07/26/96	07/22/96	2	0.055	0.067	0.079	0	Not Assessed
OBS080-0008	Indian Cr	Navilleton Rd	05/28/05	09/13/05	3	0.025	0.025	0.025	0	Acceptable
OBS090-0002	Indian Cr	Southern RR	07/11/00	09/05/00	2	0.03	0.033	0.035	0	Not Assessed
OBS090-0004	Indian Cr	@ SR 335 near Corydon Junction			0					Not Assessed
OBS090-0005	Indian Cr	Landmark Way	05/24/05	09/13/05	3	0.025	0.025	0.025	0	Acceptable
OBS090-0007	Indian Cr	Pleasant Valley Rd	06/22/05	10/12/05	3	0.025	0.025	0.025	0	Acceptable
OBS100-0001	Indian Cr	Rocky Hollow Rd	07/18/00	09/06/00	2	0.046	0.055	0.063	0	Not Assessed
OBS100-0004	Indian Cr	City Park S of Corydon, SR 135	04/07/99	02/08/06	83	0.015	0.459	3.62	34	Elevated
OBS100-0005	Indian Cr	Corydon City Park, off SR 135 S			0					Not Assessed
OBS100-0006	Indian Cr	at Lickford Bridge Rd			0					Not Assessed
OBS100-0007	Indian Cr	Downstream of Little Indian Cr mouth	at Corydon		0					Not Assessed

PARAMETER	Nitrate-Nitrite Nitrogen									
COMPARISON	10 mg/L									
SITE	WATERBODY	LOCATION	START	STOP	Ν	Min	AVG	MAX	% > 10 mg/L	STATUS
OBS080-0001	Little Indian Cr	Banet Rd	05/19/00	09/06/00	3	0.13	2	0.827	0	Acceptable
OBS080-0004	Little Indian Cr	Near Galena			0					Not Assessed
OBS080-0005	Indian Cr	@ Greenville Road, NW of Georgetow	'n		0					Not Assessed
OBS080-0007	Georgetown	Parent Lake	07/24/96	07/22/96	2	0.022	0.024	0.023	0	Acceptable
OBS080-0008	Indian Cr	Navilleton Rd	05/27/05	09/13/05	3	0.02	0.26	0.113	0	Acceptable
OBS090-0002	Indian Cr	Southern RR	07/11/00	09/05/00	2	0.22	0.83	0.525	0	Acceptable
OBS090-0004	Indian Cr	@ SR 335 near Corydon Junction			0					Not Assessed
OBS090-0005	Indian Cr	Landmark Way	05/24/05	09/13/05	3	0.45	1.3	0.757	0	Acceptable
OBS090-0007	Indian Cr	Pleasant Valley Rd	06/22/05	10/12/05	2	0.02	0.08	0.050	0	Acceptable
OBS100-0001	Indian Cr	Rocky Hollow Rd	07/18/00	09/06/00	2	0.005	0.005	0.005	0	Acceptable
OBS100-0004	Indian Cr	City Park S of Corydon, SR 135	04/07/99	02/08/06	83	0.6	1.806	11	0	Acceptable
OBS100-0005	Indian Cr	Corydon City Park, off SR 135 S			0					Not Assessed
OBS100-0006	Indian Cr	at Lickford Bridge Rd			0					Not Assessed
OBS100-0007	Indian Cr	Downstream of Little Indian Cr mouth	at Corydon		0					Not Assessed



Indian Creek 303(d) Stream Status

