



**Indiana  
Department of  
Environmental  
Management**

**Office of Water  
Quality**

**September 2009**

**FFY 2009 Annual Report to the  
U.S. Environmental Protection Agency**

**Section 319 Nonpoint Source Grant Program**

# TABLE OF CONTENTS

<b>OVERVIEW</b> .....	<b>1</b>
<b>INTRODUCTION</b> .....	<b>2</b>
WHAT'S THE PROBLEM? .....	2
THE WATERSHED APPROACH TO ADDRESSING NONPOINT SOURCE POLLUTION.....	2
PUTTING THE PIECES TOGETHER TO IMPROVE WATER QUALITY .....	3
<b>STATUS OF INDIANA'S SURFACE WATERS</b> .....	<b>5</b>
<b>IDEM'S NPS GOALS AND PROGRESS</b> .....	<b>7</b>
GOAL PROGRESS .....	8
<b>RESTORATION EFFORTS AND ACHIEVEMENTS</b> .....	<b>15</b>
SECTION 319(H) & SECTION 205(J) GRANT PROGRAMS .....	15
<i>NPS Program Focus</i> .....	16
<i>Pollutant Load Reductions</i> .....	18
<i>Project Highlights</i> .....	20
<b>- PROJECT INFORMATION PROVIDED BY SUE CRAFTON, PUTNAM COUNTY SOIL AND WATER CONSERVATION DISTRICT</b> .....	<b>21</b>
<b>WORKING TO IMPROVE THE NPS PROGRAM</b> .....	<b>25</b>
NPS MANAGEMENT PLAN .....	25
NPS MONITORING STRATEGY .....	25
PROGRAM WEBSITE UPDATE.....	26
NPS PROGRAM GRANTEE ORIENTATION WORKSHOP.....	26
ENHANCING DATABASES .....	26
<i>Assessment Information Management System (AIMS)</i> .....	26
<i>Hoosier Riverwatch</i> .....	27
DEVELOPMENT AND DEMONSTRATION OF OUTCOMES BASED EVALUATION FRAMEWORK FOR INDIANA NONPOINT SOURCE PROGRAM .....	27
ACCOUNTABILITY PILOT PROJECT.....	29
RELATIONS BETWEEN NUTRIENTS, ALGAL BIOMASS, HABITAT, AND BIOLOGICAL COMMUNITY METRICS .....	34
TOTAL MAXIMUM DAILY LOAD PROGRAM.....	36
WATERSHED SPECIALISTS.....	36
CAPACITY BUILDING TO REDUCE NPS POLLUTION .....	40
<i>Watershed Inventory Workshops</i> .....	41
<i>Watershed Specialist Networking Sessions</i> .....	41
<i>Indiana Watershed Leadership Academy</i> .....	42
LESSONS LEARNED/ADAPTIVE MANAGEMENT.....	44
<i>Lessons Learned By Section 319 Grant Projects</i> .....	44
<i>Adaptive Management by IDEM</i> .....	47
<b>PARTNERS IN WATER QUALITY</b> .....	<b>50</b>
NATURAL RESOURCES CONSERVATION SERVICE.....	50
INDIANA STATE REVOLVING FUND LOAN PROGRAM .....	51
INDIANA DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH AND WILDLIFE, LAKE AND RIVER ENHANCEMENT PROGRAM.....	51
INDIANA STATE DEPARTMENT OF AGRICULTURE, DIVISION OF SOIL CONSERVATION.....	52
INDIANA LAKE MICHIGAN COASTAL PROGRAM .....	54
INDIANA ASSOCIATION OF SOIL AND WATER CONSERVATION DISTRICTS .....	55

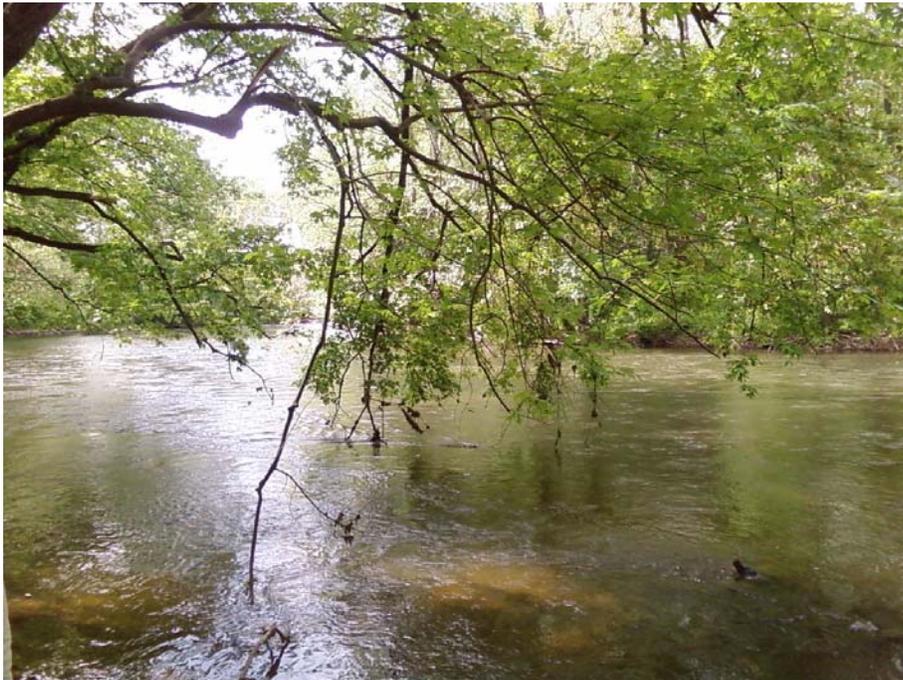
APPENDIX A – Geographic Location of Section 319 And 205(j) Projects  
APPENDIX B – Watershed Planning/TMDL Activities and 303(d) Listed Waterbodies  
APPENDIX C – List of Open 319 Projects during FFY 2007  
APPENDIX D – List of Open 205(j) Projects during FFY 2007  
APPENDIX E – Project Summaries for Closed Section 319 Projects  
APPENDIX F – List of Final Reports for Section 319 Projects

ATTACHMENT 1 – Summary Report on IDEM's 319 Program Accomplishments for 2007

# OVERVIEW

This *2008 Nonpoint Source Program Annual Report*, as required by Section 319 of the Clean Water Act, reports Indiana's progress towards reducing nonpoint source pollution. It highlights the state's efforts during the reporting period to collect data and assess water quality, implement projects that reduce or prevent nonpoint source pollution, and educate and involve the public to improve and maintain the quality of water resources for current and future generations of Hoosiers. The report provides an overview of nonpoint source pollution and the Indiana Department of Environmental Management's (IDEM) role in leading efforts to address this significant source of water pollution. Information on program goals and achievements is presented, as well as information on how IDEM's Nonpoint Source Program is evolving to become more effective. Additionally, the report presents information on how IDEM's key partners play an important role in the work to address nonpoint source pollution. Lastly, the report provides information on projects funded through Section 319 of the Clean Water Act.

IDEM and our many partners are working together on a watershed by watershed basis to improve and protect our water resources. The prevention of NPS pollution requires the cooperation of many groups and agencies at the federal, state, and local level, as well as all citizens living in the watershed. We cannot accomplish the goal of clean water without the help of many people working together.



Cover Photo: Fall Creek Gorge Nature Preserve - Warren County. (Denise Szocka, IDEM-MACS)  
Above Photo: Elkhart River – Elkhart County. (Angela Brown, IDEM-OWQ)

# INTRODUCTION

## What's the Problem?

Nonpoint source (NPS) pollution remains the largest source of water quality problems in Indiana. Information from the 2008 Indiana Integrated Water Monitoring and Assessment Report shows that NPS pollution is a significant source of impairment in Indiana waterbodies. Bacteria, nutrients, and sediments are the leading NPS pollutants of concern in Indiana. NPS pollution comes from many diffuse sources across the landscape that are difficult to specifically identify or abate in contrast to point source pollution, which is discharged from a single, identified, and regulated source, such as a pipe. While some NPS pollution is naturally occurring, most of it is a result of human activities.

## The Watershed Approach to Addressing Nonpoint Source Pollution

Environmental problems, such as NPS pollution, often cut across media and political jurisdictions. Consequently, environmental mitigation and protection require a comprehensive and collaborative approach that works with a multitude of programs and agencies. The watershed approach provides a framework for coordinating and integrating the myriad programs and resources. This approach directs the focus on water quality in a geographic area delineated by a watershed. A watershed is an area of land that drains to a particular waterway, such as a stream, lake, river, or wetland. By examining water quality issues on a watershed basis, problems can be observed in relationship to their sources so that the causes can be addressed in the most effective manner. The Watershed Approach is based on four basic principles:

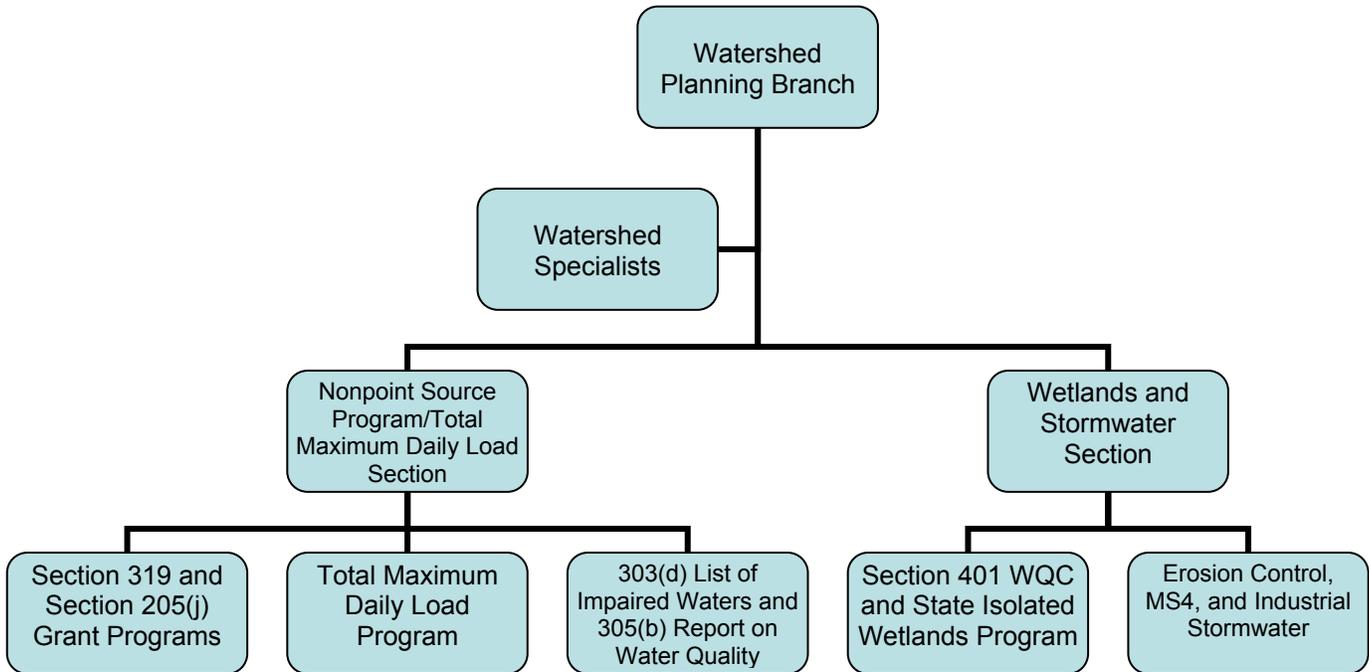
1. Geographic focus based on hydrological rather than political boundaries
2. Water quality objectives based on scientific data
3. Coordinated priorities and integrated solutions
4. Diverse, well-integrated partnerships

IDEM's ongoing effort to implement the watershed approach includes:

- Ensuring that internal resources continue to be focused on addressing the most significant water quality issues facing Indiana by conducting a semi-annual review of Office of Water Quality (OWQ) activities and making any necessary adjustments;
- Improving internal coordination between water quality assessment, watershed planning and implementation programs to facilitate an integrated watershed management approach to restoring impaired waterways; and
- Improving coordination with local watershed groups, community groups, and other state and federal agencies to better leverage efforts in ways that will achieve greater improvements in water quality.

## Putting the Pieces Together to Improve Water Quality

IDEM has aligned a number of programs to address strategically NPS pollution. This functional rethinking of several key water programs has greatly improved coordination of agency programs and increased assistance to partners outside of the agency.



Organization chart for IDEM's Watershed Planning Branch

IDEM relies on the interactions between the programs in the Watershed Planning Branch to lead statewide efforts to address NPS pollution. Each program brings a different set of resources and expertise to this issue –

1. Section 319 and 205(j) Grant programs – provide funding to a variety of groups and agencies to develop comprehensive watershed plans to address NPS pollution, implement plans to carry-out on the ground solutions, and conduct education, outreach and assessment work to inform the public about NPS pollution and measure progress towards correcting problems. In addition, these programs work internally and externally to build capacity for watershed managers and other environmental professionals through trainings, seminars, conferences, and other educational opportunities.
2. Total Maximum Daily Load (TMDL) Program – develops reports to assess sources of pollution within a watershed and establish load reductions to ensure that water quality standards will be met. This program works closely with the 319/205(j) Program to share information on water quality within a given watershed to local

watershed groups and to increase their interest in applying for grants and in implementing aspects of the TMDL report.

3. 305(b)/303(d) Program– compiles information and develops the Integrated Report, which includes the 303(d) List of Impaired waters. The report describes the status of water quality within the state of Indiana. This information is disseminated internally and externally. Impaired waters are the chief priority of the Watershed Planning Branch, with priorities in all programs set to address directly the causes of impairments through planning, implementation, and regulatory oversight.
4. Wetlands/Stormwater programs – provide regulatory oversight on both issues through the implementation of state and federal permit programs. Staff in these programs directly assist groups with education on water quality topics and works closely with other staff to provide technical expertise on a variety of issues including wetland and stream restoration, erosion control, industrial runoff and urban stormwater best management practices (BMPs).
5. Watershed Specialists – facilitate watershed planning at the local level and help build capacity and sustainability. This includes providing technical support, coordination of meetings and bringing groups together, aiding with grant applications and information transfer, reviewing watershed plans, and working with groups to find new ways to improve water quality on the local level. Staff in this program are integral to coordination of all programs within the branch.

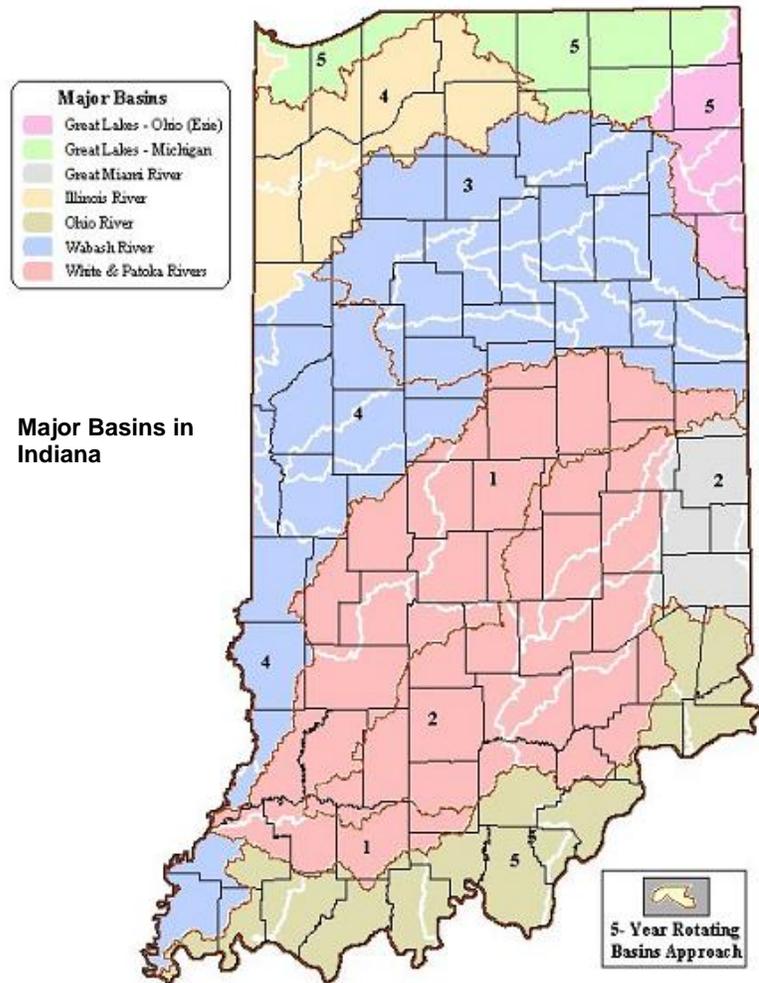
Additionally, IDEM's efforts to address NPS pollution rely heavily on the efforts of our partners. With the extent and variety of NPS issues across Indiana, the need for cooperation across political boundaries is essential. Many local, regional, state, and federal agencies play an essential part in addressing NPS pollution, especially at the watershed level. They provide information about local concerns and infrastructure and build support for the kind of pollution controls that are necessary to prevent and reduce NPS pollution. By establishing coordinated frameworks to share information and resources, Indiana can more effectively focus its water quality protection efforts.

# STATUS OF INDIANA'S SURFACE WATERS

The Office of Water Quality assesses the quality of Indiana's waters using a rotating basin approach. Approximately one-fifth of the state's waters (1-2 basins) are assessed for support of aquatic life, fishing and recreational uses each year. The monitoring program is designed to characterize the overall environmental quality of each major river basin and to identify those monitored waterbodies within each basin that are not fully supporting their designated uses. The results are reported in the Indiana Integrated Water Monitoring and Assessment Report, published every two years.

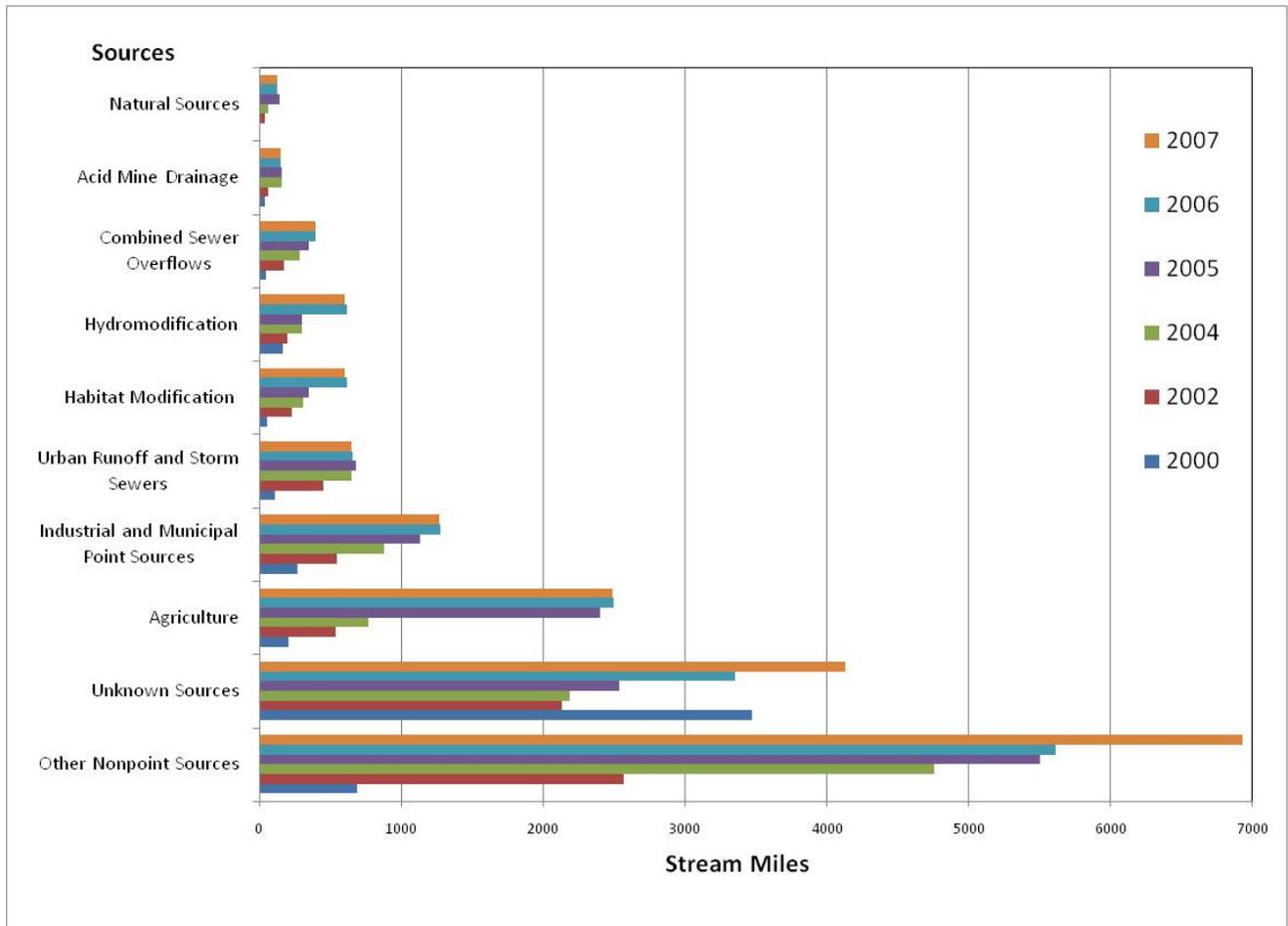
Waters that do not fully support one or more of their designated beneficial uses are placed on the Indiana's 303(d) List of Impaired Waters, which may be viewed at: <http://www.in.gov/idem/4680.htm>

According to the 2008 Integrated Water Quality Monitoring and Assessment Report, Indiana has monitored 55.7% of its streams to determine whether they are capable of supporting a well balanced warm water aquatic community. Of the streams monitored, 79.4% were supporting their designated aquatic life use. Indiana has monitored 38.1% of its streams for recreational uses. Of the streams monitored, 31.1% support full-body contact recreational uses, while 68.9% were found to be impaired. These numbers are presently being revised for the 2010 assessment and listing cycle and reflect the most current information available.



For more information on the assessment of Indiana waters, see the 2008 Integrated Water Quality Monitoring and Assessment Report at: <http://www.in.gov/idem/4679.htm>

## Sources of Stressors and Responses Impairing Indiana's Streams



Source: 2008 Integrated Water Quality Monitoring and Assessment Report

It is important to note that the data represents total stream miles assessed in each year. Since IDEM is assessing more streams each year, these numbers represent running totals and do not, per se, indicate trends.

Many of the problems caused by point source pollution have been addressed through the National Pollutant Discharge Elimination System (NPDES) permit program. The primary focus now is on reducing NPS pollution in order to restore waterbodies that are identified as impaired on Indiana's 303(d) list.

# IDEM's NPS GOALS AND PROGRESS

Section 319 of the Clean Water Act (CWA) establishes a national program to address NPS of water pollution, which are the leading causes of water quality degradation in the United States. Section 319(h) of the CWA specifically authorizes EPA to award grants to states with approved NPS Management Program Plans. As required by Section 319(h), each state's NPS Management Program Plan describes the state program for NPS management and serves as the basis for how funds are spent. IDEM completed the update of the Indiana State Nonpoint Source Management Plan (the Plan) in December of 2008. IDEM received approval from U.S. EPA for the updated Plan in January of 2009. In the process of updating the State NPS Management Plan, IDEM evaluated the State's NPS goals and made significant changes to the goals, to better align the goals with the direction the program will need to take to reach its long term goal. This report contains the new goals and progress made on the goals.

The Plan lays out a strategy to achieve the primary long-term goal for the State of Indiana's NPS program. Achieving this goal relies on the support, cooperation, and resources IDEM and its partners offer to address NPS pollution in Indiana. Some goals will be easier to achieve than others. IDEM recognizes that the plan is a living document. As progress is made towards the achievement of the goals and objectives, the Plan will be evaluated. Objectives and the approaches to reach objectives will be restructured to reflect both progress made and challenges encountered.

## The State of Indiana's Long Term Goal

Indiana's long-term goal is to:

**Make measurable improvements in water quality by addressing NPS pollution through education, planning, and implementation.**

The Plan lays out steps to achieve this goal by providing a single, unified, and coordinated approach to dealing with NPS pollution structured around program objectives. Achievement of the long-term goal will be reached through efforts made on a number of more detailed objectives. Collectively, these objectives will lead to the development of processes, programs, and skills needed to improve water quality and reduce NPS pollution. The key components of the long-term goal are:

1. identify gaps in knowledge concerning NPS pollution issues in Indiana;
2. characterize the extent and magnitude of NPS pollution in Indiana;
3. build partnerships to reduce NPS pollution and improve water quality within all impaired water bodies in Indiana;
4. focus resources within IDEM to help educate, train, and assist stakeholders and partners as they work to address NPS pollution; and,
5. Target resources to activities that will result in measurable improvements in water quality and reduce NPS pollution.

The long-term goal and corresponding program objectives will help guide efforts to realize the vision. In the Plan, short-term refers to one to five years. Medium-term refers to four to seven years. Long-term refers to seven to ten years from the adoption of the Plan. All objectives build on each other with the achievement of long-term objectives relying on the achievement of short-term and medium-term objectives. Program objectives are expressed as activities linked to the long-term goal.

## Goal Progress

IDEM set forth a series of goals to assess progress on addressing NPS pollution. The goals have been categorized by the following different areas: monitoring, partnerships, capacity building, and funding priorities & adaptive management. Following are the goals and progress made with each of the goals. IDEM is reporting on all short term goals in this report; any medium or long term goals where work has occurred have also been reported. The full set of goals can be found at:

<http://www.in.gov/idem/6006.htm>

## Monitoring

### Objective A: NPS Water Quality Monitoring Strategy

Goal	Measure
Short-term: Develop a NPS monitoring strategy in conjunction with IDEM's Assessment Branch to evaluate the magnitude and extent of NPS pollution within the state of Indiana.	Measure: Completion of the NPS monitoring strategy and its incorporation into IDEM's comprehensive water quality monitoring strategy.
<b>Progress or Accomplishments:</b> In progress	

Goal	Measure
Short-term: Develop a data quality objective (DQO) process to require performance and acceptance criteria for data collection by third party entities.	Measure: Completion of a third party DQO process to serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the study.
<b>Progress or Accomplishments:</b> In progress	

Goal	Measure
Medium-term: Use additional resources (e.g., staff, funds, and technical support) to monitor water quality in watersheds where NPS restoration activities have occurred. The monitoring data will be compared to baseline information, if available, to gauge the efficacy of the work.	Measure: Implementation of the NPS monitoring program and analysis of data collected.
<b>Progress or Accomplishments:</b> In progress	

## Objective B: Data Collection

Goal	Measure
Medium-term: Develop and implement a system to store and evaluate NPS pollution environmental monitoring data collected in the state of Indiana.	Measure: Completion of a NPS pollution database for the storage and evaluation of data collected by NPS projects.
<p><b>Progress or Accomplishments:</b> To provide a mechanism to enter 319 project data into EPA's Storage and Retrieval System (STORET), the NPS Program is using funds to build onto and improve the existing water quality database management system, AIMS, currently used by the Assessment Branch in IDEM. The existing AIMS application handles data from multiple water quality and aquatic biota programs and is being expanded to include the programs, projects, and data collected through the NPS and water quality grants. The improvements are incorporating web browser access to staff and management and enhancing STORET interface capabilities to benefit all water quality programs in meeting federal mandates for this program and the agency's other water quality monitoring programs. Additionally, the query and analysis tools available in AIMS are helping in the evaluation of the data through statistical and GIS applications and be integrated with the Assessment Branch point and nonpoint source monitoring data for further program analyses.</p> <p>The project has been underway since the second quarter of 2008 and is nearing completion in the third quarter of 2009. Efforts were made to work on NPS data entry options for manual entry and import upload into AIMS and into the existing STORET by the end of the third quarter of 2009. The data selected for inclusion into the system has been set up to be compatible with the AIMS structure. Once the enhanced system is ready, all new NPS data will be uploaded, and testing will be done using a data mapper to upload older data that is in alternate formats.</p>	

## Partnerships

### Objective A: Improve U.S. EPA/IDEM NPS Program Coordination

Goal	Measure
Short-term: Establish a formal schedule of meetings with U.S. EPA to evaluate IDEM's NPS program and obtain feedback on program improvement opportunities and successes.	Measure: Establishment of a fixed communication schedule for program coordination.
<b>Progress or Accomplishments:</b> In progress	

### Objective B: Support the Section 6217 component of the Indiana Department of Natural Resource's (IDNR's) Indiana Coastal Management Program

Goal	Measure
Short-term: Support the IDNR Coastal Nonpoint Pollution Control Program in obtaining full program approval.	Measure: Number of conditions resolved through the collaborative efforts of the two programs.
<b>Progress or Accomplishments:</b> In progress	

Goal	Measure
<p>Medium-term: Develop a collaborative approach between IDEM and the IDNR Coastal Nonpoint Management Program to work on local watershed management planning and implementation efforts in the Great Lakes drainage basin.</p>	<p>Measure: Number of projects in the coastal area where IDEM has worked collaboratively through funding, technical support, or other methods with stakeholders in the Lake Michigan and Lake Erie watersheds.</p>
<p><b>Progress or Accomplishments:</b> In progress. IDEM's NPS Program has been working with the Coastal Zone Program, the IDNR-LARE Program, and the IDEM TMDL Program to coordinate the development of a watershed management plan and a multi-parameter TMDL for Indiana's portion of the Galena River. IDEM views this project as a model for similar future projects in coastal watersheds that can focus planning efforts to move more quickly to implementation of BMPs to improve water quality.</p>	

### Objective C: IDEM Programs

Goal	Measure
<p>Short-term: Focus NPS financial and technical resources in watersheds with approved TMDLs that address NPS pollution and implementable watershed plans that are supported by a local watershed group.</p>	<p>Measure: Number of watersheds with approved TMDLs that address NPS pollution impacts and that have Section 319-funded planning or implementation activities occurring.</p>
<p><b>Progress or Accomplishments:</b> Ongoing. IDEM has focused Section 319 funds on watersheds with approved TMDLs for four funding cycles. Appendix B of this report illustrates the progress made on aligning these two programs. IDEM has begun working on incorporating the nine key elements of a WMP into the TMDL process. We have received EPA approval to fund a project through 319 to incorporate the TMDL process and the nine key elements of a WMP plan, with the goal of creating a TMDL-template that can serve as a near-complete watershed management plan.</p>	

Goal	Measure
<p>Short-term: Work collaboratively with IDEM's assessment program(s) through the establishment of a formal NPS monitoring strategy.</p>	<p>Measure: Creation of a NPS monitoring strategy and internal procedures detailing needed monetary and staffing resources.</p>
<p><b>Progress or Accomplishments:</b> In progress</p>	

Goal	Measure
<p>Medium-term: Use input obtained from NPS partners to develop and revise, as needed, a comprehensive IDEM Watershed Specialist strategy to support IDEM's internal and external partner's efforts to focus on alleviating NPS pollution issues.</p>	<p>Measure: Completion and implementation of a comprehensive Watershed Specialist strategy.</p>
<p><b>Progress or Accomplishments:</b> Complete.</p>	

### Objective D: NPS Partnerships

Goal	Measure
Short-term: Implement the creation of an advisory group of state and federal agencies, as well as interested entities and organizations, to assist with refining the state's NPS policy and procedures for all programs and agencies that work with NPS pollution.	Measure: Creation of an advisory group to the IDEM Section 319 Program on NPS issues that includes representatives from all applicable programs and partnerships, both regulatory and non-regulatory.
<b>Progress or Accomplishments:</b> In progress	

Goal	Measure
Short-term: Use current IDEM Watershed Specialists to assist partners with NPS planning and implementation activities.	Measure: Percentage of partner projects working with an IDEM Watershed Specialist for NPS-related activities.
<b>Progress or Accomplishments:</b> In progress. Watershed Specialists have been providing technical support to watershed groups for four years, assist IDNR with the review of Lake and River Enhancement grant applications, serve on the planning committee for the IASWCD Annual Conference, and work with IASWCD district specialists.	

### Capacity Building

#### Objective A: Develop Education and Training Initiatives for Use at the Watershed Level to Build Capacity of the Staff of Watershed Groups and Local Governments

Goal	Measure
Short-term: Update IDEM's NPS Web site to create a repository for information on NPS planning, implementation, and guidance on applying for and implementing Section 319 grants.	Measure: Completion of updated NPS Web site and compilation of a utilization survey.
<b>Progress or Accomplishments:</b> In progress	

Goal	Measure
Short-term: Evaluate existing NPS pollution program partners and determine resources (financial and technical) needed to improve program efficacy.	Measure: Development of partner resource needs report.
<b>Progress or Accomplishments:</b> In progress	

**Objective B: Comprehensive Training Program**

Goal	Measure
Short-term: Develop and conduct training workshops to inform 319 grant recipients about key program policies and provide training on grant implementation.	Measure: Annual Section 319 training workshop conducted by IDEM available for all grant recipients and applicants.
<b>Progress or Accomplishments:</b> Complete. The NPS program held the first 319 and 205(j) grant orientation meeting on June 12, 2009. This meeting informed grantees on all aspects of the program.	

**Objective C: Raise Public Awareness and Education through Outreach Activities**

Goal	Measure
Short-term: Enhance efforts to educate citizens on urban and agricultural NPS issues through the development of a comprehensive outreach campaign.	Measure: Number of outreach efforts conducted, categorized by training versus education.
<b>Progress or Accomplishments:</b> In progress.	
Goal	Measure
Medium-term: Develop a repository of Web-based public outreach, educational materials for use by internal and external partners and local watershed groups.	Measure: Number of IDEM NPS Web site hits.
<b>Progress or Accomplishments:</b> In progress.	

**Objective D: Build Sustainable, Locally-Led Watershed Groups**

Goal	Measure
Short-term: Work with active watershed groups to assess resource (technical, financial, and managerial) needs to enhance or ensure sustainable activities beyond Section 319 funding.	Measure: Number of watershed groups that actively seek and obtain funding, in addition to Section 319, to sustain the continual group operation.
<b>Progress or Accomplishments:</b> The Social Indicators project that Purdue is working on will help to accomplish this goal.	
Goal	Measure
Long-term: Work to create new watershed groups from ground level and provide these groups with a strong base for sustainability.	Measure: Number of new watershed groups formed subsequent to January 2009.
<b>Progress or Accomplishments:</b> Five new groups have been formed.	

## Funding Priorities and Adaptive Management

### Objective A: Focus Section 319 Planning Funds

Goal	Measure
Short-term: Target Section 319 funds in appropriate amounts, to watershed groups that will develop and implement watershed plans to address 303(d)-listed waters impaired by NPS pollution.	Measure: Number of watershed groups developing and or implementing watershed plans in 303(d) listed waters receiving Section 319 funds in appropriate amounts to accomplish their projects goals.
<b>Progress or Accomplishments:</b> The 2010 319 grant funding will be targeted to watersheds in need of NPS help.	
Goal	Measure
Medium-term: Assess water quality data to identify watersheds that should be evaluated for possible NPS water quality improvements.	Measure: Number of watersheds identified for evaluation of NPS water quality improvements.
<b>Progress or Accomplishments:</b>	
Goal	Measure
Long-term: Work with internal and external partners to solicit and utilize joint funding strategies, including Section 319 funds, in watersheds where other partner-funded projects are occurring to maximize the efficacy of funds.	Measure: Number of projects funded by Section 319 in connection with other partner funds that document improvements in water quality where NPS pollution was identified and a watershed approach was used to solve the problem.
<b>Progress or Accomplishments:</b>	

### Objective B: Target Key Pollutants and Watersheds

Goal	Measure
Short-term: Determine the extent of impacts that sediments, bacteria, nutrients, and other identified NPS pollutants have on Indiana waters.	Measure: Document the results of impact analysis.
<b>Progress or Accomplishments:</b> In progress.	
Goal	Measure
Medium-term: Target Section 319 funds to watersheds with waters that are impaired by NPS pollution and where TMDLs can be implemented.	Measure: Number of watersheds that have received Section 319 funds where implementable TMDLs have been completed.
<b>Progress or Accomplishments:</b> In progress. The creation of the TMDL/Nine Element Watershed Management Plan template is critical to the success of this measure.	

**Objective C: Adaptive Management**

<b>Goal</b>	<b>Measure</b>
Short-term: Work with U.S. EPA to establish a comprehensive adaptive management program to improve all aspects of the implementation of the IDEM Section 319 Program with clearly delineated priorities and corrective actions.	Measure: Percentage of program completion
<b>Progress or Accomplishments:</b> In progress.	

# RESTORATION EFFORTS AND ACHIEVEMENTS

A primary focus of IDEM's NPS Program is on-the-ground work to improve water quality. Funding for the implementation of watershed plans that work to restore water quality on waterways impaired for NPS pollution has resulted in measurable improvements in terms of estimated pollutant load reductions and stakeholder involvement, but much more work remains to restore fully water quality.

## Section 319(h) & Section 205(j) Grant Programs

The NPS/TMDL Section in the Office of Water Quality manages two federal pass-through grant programs aimed at improving water quality in the state: Section 319(h) and Section 205(j); each named after the portion of the Clean Water Act that authorizes the program. Additional information about the two grant programs in Indiana may be found on IDEM's website at: <http://www.in.gov/idem/4342.htm>.

The 205(j) Grant Program is dedicated to water quality management planning. Funds are used to determine the nature, extent, and causes of point and NPS pollution problems and to develop plans to resolve these problems. The continued decline in the levels of 205(j) funding available has made it challenging to expend these funds on meaningful projects. In FFY 2009, Indiana received \$244,738 in 205(j) funds. One watershed planning project was funded with these funds. Two 205(j) projects closed this fiscal year, one of which developed a watershed management plan. A list of 205(j) projects open during this fiscal year may be found in Appendix D.

Additional federal money was made available this year for projects that will improve water quality. The American Recovery and Reinvestment Act of 2009 provided significant funding for states to finance high priority infrastructure projects needed to ensure clean water and safe drinking water. The Indiana State Revolving Fund Loan Programs received a total of \$95,401,500, including \$954,015 for Water Quality Management Planning Grants. Projects have been selected and a grant application is pending approval with USEPA Region V.

The Section 319(h) Program is one of the primary resources for reducing NPS pollution in Indiana. In FFY 2009, Indiana received \$4,331,700 in Section 319(h) funds and awarded grants for eight projects. Most of the projects will begin this fall. Each year proposals are submitted, reviewed by a committee, and selected for funding based on the NPS Program's priorities and the quality of the proposal. The Program focus has changed over the years from funding many smaller projects, to funding fewer, larger, better quality projects with a greater opportunity for showing water quality improvements. This is being achieved, in part, through the IDEM Watershed Specialists working with potential project sponsors before and during development of their project proposals. Better thought-out projects and fewer, better quality proposals are now being submitted. In addition, more emphasis is being placed on project partners and documentation of their commitment to the project in the grant application. Strong partnerships are a key to project success. Also, more projects are now implementing watershed management plans and utilizing more 319 funds to implement on-the-ground BMPs in their

watersheds. There are currently forty-four open or pending 319 projects; this is a decrease of seventeen from last year.

Projects are administered through grant agreements that spell out the tasks, schedule and budget for the project. Projects are normally two to three years long and work to reduce NPS pollution and improve water quality in the watershed primarily through: education and outreach designed to bring about behavioral changes and encourage BMP implementation that leads to reduced nonpoint source pollution; development of WMPs that meet EPA's required nine elements; and implementation of WMPs involving a cost-share program to implement BMPs that address the water quality concerns outlined in the WMP.

IDEM Project Managers work closely with the project sponsors to help ensure that the project runs smoothly and the tasks of the grant agreement are fulfilled. Site visits are conducted at least quarterly to touch base with the project, provide guidance and technical assistance as needed, and to work with the grantee on any issues that arise to ensure a successful project close-out. Basic project information for all Section 319 projects is entered and maintained in EPA's Grant Reporting and Tracking System (GRTS) database. The GRTS mandated elements entered for projects include the project schedule, budget, description, BMPs implemented, location of BMPs, estimated pollutant load reductions, and progress reports.

Twenty-five Section 319 projects closed this fiscal year, including six planning projects, fourteen implementation projects, one project focusing on education, three NPS Program support projects, and one assessment project. Summaries of these projects may be found in Appendix E. Final reports and products from the projects that closed this year are included as an attachment to this report, and a list of final reports is included in Appendix E. A map showing the locations of Section 319(h) and Section 205(j) projects funded in the last seven years is shown in Appendix A. A complete list of Section 319(h) projects open during this fiscal year is located in Appendix C.

## **NPS Program Focus**

In an effort to more efficiently meet our NPS Program goals, coordinate with the TMDL Program and its efforts to identify and reduce NPS pollution, and focus more of the Section 319(h) funds on impaired waters, IDEM has identified priority projects for Section 319(h) funding for the last several funding cycles. The focus of the Program for FFY 2009 was:

1. Watershed planning and/or implementation in watersheds with one or more impaired waterbodies that have an approved Total Maximum Daily Load (TMDL) Report.
2. Watershed planning and/or implementation in watersheds that include waterbodies in Category 5A or 4A of Indiana's 2008 Integrated Water Monitoring and Assessment Report.
3. Implementation of watershed management plans that have or will soon meet IDEM's "Watershed Management Plan Checklist, 2003."

A Geographic Information System (GIS) map was created (Appendix B) to help identify areas that have been involved in the planning and implementation of watershed management plans

and the relationships with the TMDL development activities. It also shows the areas of Indiana where there are watersheds with NPS impaired waterbodies as listed in the 2008 303(d) List of Impaired Waterbodies. This assists with the continuation of the targeted approach to watershed management providing for coordination of TMDL, planning, and implementation efforts in areas of the state most in need of restoration. Targeting areas for watershed planning with developed TMDLs helps expedite the planning process since groups can use information in the TMDL regarding watershed NPS problems, sources, and needed load reductions.

The NPS Program priorities were selected because developing and implementing comprehensive watershed management plans is an effective way to focus efforts and resources on a watershed and its particular problems and develop solutions to those problems. In this process, local stakeholders join forces to develop WMPs, usually at the multiple 14-digit or 11-digit hydrologic unit code (HUC) level, that make sense for the particular conditions found in that watershed. Indiana recently transitioned to 10 and 12-digit HUCs, so watershed plans developed in FFY 2010 and beyond will be based on these HUC areas. The group identifies the problems, causes, sources, and critical or target areas in the watershed, then sets goals and chooses measures or BMPs to be implemented to achieve those goals. Indicators are chosen and monitored to evaluate the effectiveness of the implementation efforts.

Of the eight Section 319(h) projects funded in FFY 2009, all address one or more of the program priorities. All projects funded are restoration/implementation projects implementing an approved watershed management plan. Two projects have an approved TMDL for *E. coli*, and one has an approved TMDL for nutrients and pathogens.

Before a watershed management plan can be implemented using Section 319(h) funds, it must meet the required elements of IDEM's [Watershed Management Plan Checklist](#). The checklist incorporates EPA's nine required components of a watershed based plan. IDEM's WMP checklist was completely updated in 2009 to provide customers with a checklist that not only clearly outlines IDEM's NPS Program expectations, but provides examples and direction as to how those expectations can be met. This, in turn, will allow IDEM staff to more efficiently and objectively review the plans, provide effective feedback, and ensure that the plans meet the requirements and are comprehensive enough to allow for successful implementation. The IDEM 2009 Checklist was the result of extensive work with staff, customers, and coordination with the U.S. Environmental Protection Agency (US EPA). The Checklist may be viewed at: <http://www.in.gov/idem/6135.htm>

Organizing a group to develop a watershed management plan that meets the required elements can be a daunting task. A [Watershed Management Plan Guidance](#) document is provided by IDEM to help groups achieve the elements required in the checklist. To help groups develop watershed management plans, IDEM developed the [Indiana Watershed Planning Guide](#). This guide is undergoing revision to serve better our customers with new information, lessons learned from grantees, and updated links to tools and support.

In addition to the resources listed above, additional help is provided to groups by the project's IDEM Project Manager and Watershed Specialist. These key IDEM staff meet with the local Watershed Coordinator, attend stakeholder meetings, and help guide the group through the decision making process, and provide technical support on issues such as determining pollutant

loads and/or load reductions needed for the Plan. This extra guidance is invaluable as groups strive to develop a Plan that meets IDEM's Checklist and can be implemented. Once the Plan is complete, it provides a road map for how to allocate resources most effectively to address the priority water quality concerns in the watershed.

In both grant programs this fiscal year, seven watershed management plans were completed and approved, or will be approved shortly. Eight additional plans are being developed and will be completed and ready for implementation within the next two years. Of the forty-four active 319 projects, thirty-two are implementing watershed management plans. These projects are installing BMPs in critical areas of the watershed as determined by the watershed management plan.

## **Pollutant Load Reductions**

One important indicator of program (and project) success is pollutant load reductions for such pollutants as sediment, phosphorus, nitrogen, and *E. coli*, as a result of the BMPs installed. Load reductions, in most cases, are estimated using the [Region 5 Load Estimation Model](#). This is a simple Excel model that provides a general estimate of pollutant reductions (sediment, phosphorus, and nitrogen) at the source level. It estimates load reductions from structural and agricultural field practices and urban BMPs. Reductions achieved through practices related to nutrient (not tied to sediment), bacteriological, and pesticide management are not usually captured through this estimation method. Another model or method for estimating these load reductions needs to be used. In addition to the Region 5 Model, the [Spreadsheet Tool for the Estimation of Pollutant Load](#) (STEPL) model is also available and is used by some groups in Indiana. This model calculates nutrient (N, P and BOD pollutants) and sediment loads by land use type and aggregated by watershed. Alternative methods for estimating pollutant loads are also used when applicable. In a few cases, reporting pollutant load reductions may not be feasible because of the type of BMP installed. As additional models and alternative load reduction estimation methods are learned, load reductions are reported for more BMPs.

Estimated load reduction data for each BMP implemented is submitted by the project with the request for payment and entered by the IDEM Project Manager into an Access database at IDEM and the EPA GRTS database.

Reported estimated load reductions from Section 319(h) projects (from the IDEM Access database) for BMPs implemented this FFY are:

<b>NPS Pollutant</b>	<b>Reduction</b>
Sediment	14,609 tons/yr
Phosphorus	22,025 lbs/yr
Nitrogen	29,471 lbs/yr
Biological Oxygen Demand	7,983 lbs/yr
Chemical Oxygen Demand	4,082 lbs/yr
Atrazine	97 lbs/yr
Other Pesticides	189 lbs/yr
Suspended Solids	26,933 lbs/yr
Lead	5 lbs/yr
Zinc	13 lbs/yr

BMPs implemented include filter strips, conservation cover, residue management (no-till), cover crop, streambank and shoreline protection, pasture and hay planting, grassed waterways, water and sediment control basins, critical area planting, livestock fencing, heavy use area protection, prescribed grazing, rain gardens, and rain barrels.

Total estimated load reductions achieved in Indiana since 2000 by projects funded with US EPA grants are:

<b>NPS Pollutant</b>	<b>Reduction</b>
Sediment	164,197 tons/yr
Phosphorus	312,551 lbs/yr
Nitrogen	516,761 lbs/yr

## Project Highlights

Three projects that closed this fiscal year are highlighted as examples of successful NPS projects working to improve water quality through watershed planning, implementation of BMPs, and education/outreach. Where possible, IDEM has used the words of the local grant project coordinators, who are better able to speak to the impact these grants have had on locally led efforts to improve water quality.

### Big Walnut/Deer Creek Watershed Management Plan

The Big Walnut Watershed is located in the west central portion of Indiana approximately 50 miles west of Indianapolis and is comprised of five smaller 11-digit watersheds, HUC numbers 05120203010, 05120203020, 05120203030, 05120203040, and 05120203050. It encompasses 271,267 acres, or 424 square miles, of land across portions of five counties – Boone, Clay, Hendricks, Parke, and Putnam. The watershed includes two major streams - Big Walnut Creek and Deer Creek, as well as many important natural areas known for their rolling hills and steep ravines. A cluster of protected lands along Big Walnut in northeastern Putnam County provides a natural oasis for area plant and wildlife species while also serving important water quality functions in the larger watershed. IDEM's Section 303(d) List of Impaired Waters for 2006 and 2008 have 27 segments of stream within the Big Walnut Watershed listed for *E. coli* and two segments listed for impaired biotic communities.

The variety of natural beauty coupled with the diversity and pride of the local community led to the development of a strong local Steering Committee that launched the Big Walnut Creek Watershed Alliance (BWCWA). The BWCWA is focused on improving water quality in the Big Walnut and Deer Creek areas by raising public awareness, protecting natural areas, enhancing adjacent landscapes, and allowing for the public use and enjoyment of the river. The BWCWA is made up of very active participants from many local organizations. Collectively, with the help of a professional watershed coordinator, the Steering Committee developed a comprehensive watershed management plan (WMP) and has since utilized it to leverage other local funds and work with new stakeholders such as the County Highway Department and United Way on projects in the watershed.

#### Accomplishments

The Big Walnut/Deer Creek WMP has been approved by IDEM and is ready to be implemented. Without a doubt, however, the largest accomplishment has been the increase in community awareness and the leadership development of the local Steering Committee. Big Walnut and its associated resources are more frequently discussed in the local press, as well as considered by local planners and storm water and drinking water professionals in their daily operations. Connections between staff at the City of Greencastle and County Departments have grown as part of joint participation on the Committee. Local scientific leaders at the University of DePauw, the U.S. Geologic Survey (USGS), and the Health Department have engaged in the project, offering data sharing and additional data collection. The Department of Natural Resources and The Nature Conservancy (TNC) have offered the use of their properties for BMP implementation demos and/or field trips. Groups such as the Smallmouth Bass Alliance have helped conduct field work, as well as provided historic and anecdotal data throughout the

planning process. The strong sense of everyone pulling in the same direction is a noteworthy accomplishment – and it is a direct result of the WMP planning process. The Committee is also working with IDEM toward the delisting of certain sections of Big Walnut from the 303(d) list. Having more sections of Big Walnut and its tributaries delisted would be the biggest accomplishment the BWCWA could hope for as it moves ahead. Locally-led watershed work in other sections of this watershed has already led to delisting of certain segments of the stream; this work was featured in the 2008 Indiana NPS Success Story, featured on: [http://www.epa.gov/nps/Success319/state/in\\_walnut.htm](http://www.epa.gov/nps/Success319/state/in_walnut.htm)

### Funding/Partnerships

The Putnam County SWCD utilized \$108,827 in Section 319 funds for this project. A significant amount of funds have been leveraged as a direct result of having a dynamic WMP and a strong local committee. These funds, amounting to more than \$200,000, have come from a variety of sources: United Way, Lake and River Enhancement Program, Clean Water Indiana, and the Indiana State Department of Agriculture. In addition, a variety of strong partnerships have also developed as part of the WMP project. These include additional coordinated sampling with assistance from the local Health Department, storm water education in coordination with the municipal separate storm sewer systems (MS4) coordinator in Greencastle, and use of USGS long-term data to mark trends and define future successes.

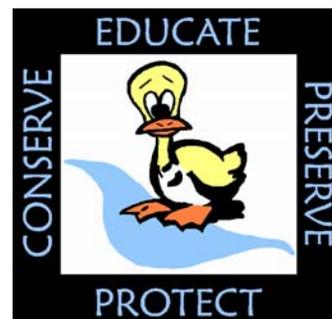
### Future Activities

The Putnam County SWCD received a Section 319 grant for \$261,900 in 2009 to begin implementing the Big Walnut/Deer Creek WMP. The Steering Committee intends to put significant effort into a well thought out education program that will target certain messages to certain groups. An upcoming public survey designed to understand the awareness, attitudes, capacity, and behaviors of residents of the watershed will guide the group's efforts. Public participation is also expected in the way of BMP implementation and changes in household actions. The Steering Committee will launch a cost share program to implement BMPs such as wetland restoration, riparian buffers, nutrient management, exclusionary fencing/alternative watering systems for livestock, and suburban/urban storm water practices above and beyond MS4 requirements that address the water quality concerns outlined in the Big Walnut/Deer Creek WMP.

*- Project information provided by Sue Crafton, Putnam County Soil and Water Conservation District*

## **Tanners Creek Watershed Implementation**

Tanners Creek watershed (HUC 05090203030) includes more than 68,000 acres of gently rolling hills and steep ravines. The headwaters begin at the south-central section of Franklin County and flow approximately 20 miles to the confluence with the Ohio River, just south of Lawrenceburg. Ninety-nine percent of the watershed's drainage area is located within Dearborn County with the other remaining one percent in Franklin County. The watershed is comprised mainly of cropland and forest land, together making up



approximately ninety-seven percent of land usage. The remaining three percent includes urban areas and water. Tanners Creek watershed is part of the much larger Middle Ohio-Laughery watershed (05090203).

Tanners Creek is listed on the 2004 Indiana Department of Environmental Management's 303(d) Impaired Waterbodies List for Impaired Biotic communities. The impaired waterbody is identified as the main stem and is located in the "Tanners Creek – Greendale, 090" subwatershed. As with all agricultural areas, the stakeholders have a concern about NPS pollution from farmland, including sediment loading, *E. coli*, and nutrient runoff. The project addressed these concerns through their cost-share program by promoting no-till, fencing livestock out of waterbodies, increasing participation in the Conservation Reserve Program (CRP) and Wildlife Habitat Incentives Program (WHIP) programs and improving pasture/hayland areas.

### Accomplishments

The Dearborn SWCD has been very successful in assisting the local landowners/ producers with multiple options for cost share to improve their farming operations in these tough economic times. In addition to Federal Farm Bill programs, the Section 319 Tanners Creek Cost-share Program paid out \$100,000 to twenty-three landowners within the watershed. Total project costs before cost-share were \$145,362. Practices included:

- 256.2 acres of hay seeding
- 90 acres of no-till
- 18 units of heavy use area protection
- 9 watering facilities
- 16,462 feet of fencing
- 3.1 acres of critical area seeding
- 427 feet of roof runoff guttering
- 2,312 feet of water pipeline

The Tanners Creek Watershed Project achieved the following pollutant load reductions:

- 3,350 tons/year of sediment
- 3,092 lbs/year of phosphorous
- 6,192 lbs/year of nitrogen

Throughout the two year project, the Tanners Creek Watershed Committee was able to educate approximately 3,560 school-youth and over 520 adults during field days and workshops. The project was also successful in reaching targeted audiences through their quarterly newsletter and news articles.

### Funding/Partnerships

The Dearborn County SWCD utilized \$220,831 in Section 319 funds and provided more than twice the match requirements needed to fulfill the grant obligations. The success of the match

provided was due to good working relations with local businesses, successful volunteer days, and additional grant funding through local foundations.

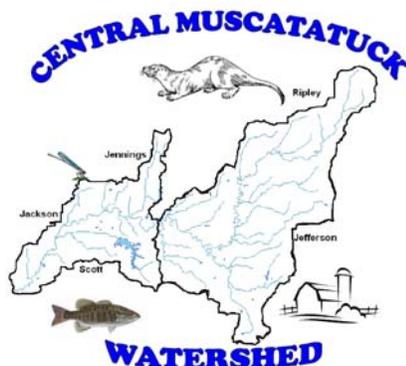
### Future Activities

The Tanners Creek Watershed Project will continue for another two and one half years on a 319 Implementation Grant. The extension of this project will be similar to this implementation grant but will also introduce new programs. Educational programs such as the Water Festival, service-learning project, river sweeps, and field days will continue for the next two years. The cost-share program will be revised to address the most important conservation needs within the watershed.

- Project information provided by Vickie Smith, Dearborn County Soil and Water Conservation District

## Central Muscatatuck Watershed Management Plan

The name Muscatatuck is a Native American word meaning “land of winding waters.” The Muscatatuck River winds its way from the hills of Jefferson County, formed by the junction of Little Creek, Big Creek, and Big Graham Creek. Along with other major tributaries it flows southwest and west through the Muscatatuck Bottoms and into the East Fork of the White River.



The Central Muscatatuck watershed (HUCs 0512020706 and 0512020701) is in the 8 digit HUC 05120207 - Muscatatuck Watershed. The two sub watersheds are located in five counties in Indiana including Jackson, Jefferson, Jennings, Ripley, and Scott, and comprise approximately 164,196 acres. Agriculture is the primary land use. The Central Muscatatuck Watershed has seven stream segments listed on the 2008 303(d) List of Impaired Waterbodies.

### Accomplishments

In 2005, a grant committee consisting of Historic Hoosier Hills RC&D, Jefferson County Soil and Water Conservation District (SWCD) and the Friends of Muscatatuck River Society (FMRS) met and proposed a project to gather data and develop a management plan for the watershed. The efforts from this project resulted in an approved comprehensive watershed management plan for the Central Muscatatuck watershed. Another accomplishment of the project was developing community interest in the importance of water quality throughout the watershed. The volunteers and partners involved in the project gained a better understanding of what NPS pollution is and the areas of concern in the Central Muscatatuck watershed. Steering Committee members gained a broader working knowledge of NPS pollution, the importance of water quality and the specific issues in the Central Muscatatuck watershed. This knowledge enables them to readily discuss the project and inform other community members, potentially leading to further community support and involvement. Steering Committee members and project volunteers developed a strong sense of ownership of the project through the development of the watershed management plan and are looking forward to working on the implementation of BMPs to address NPS pollution issues in the watershed and continued outreach and education.

### Funding/Partnerships

The Historic Hoosier Hills RC&D utilized \$141,400 in Section 319 funds for this project. The total match and in-kind service donation for the project totaled over \$60,000, exceeding the required match. The in-kind support of this project exemplifies the generous support of the Central Muscatatuck Watershed Project shown by the watershed community, volunteers, partners, general supporters and many others. A highly beneficial and strong relationship has been formed between the project staff, Steering Committee members, volunteers, and Hanover College and the Rivers Institute which provided a great amount of support through technical resources and college intern support. The interns provided windshield data surveys for 2008 and 2009 and a headwater study in 2008. These inventories, in conjunction with surveys of community concerns from public meetings, professional and volunteer water monitoring (biological, habitat, and chemical) data, watershed coordinator desktop surveys for statistical and existing data, and steering committee collaboration, provided the basis of the watershed management plan. A true team effort was put forth in successfully completing the requirements of the planning phase of the grant which instilled a strong sense of ownership and affirmed commitment to addressing the observed and proven issues impacting water quality during an implementation grant for the Central Muscatatuck Watershed.

### Future Activities

The planning phase of the Central Muscatatuck Watershed Project confirmed the necessity of further work towards improving water quality in the watershed, implementation of BMPs to reduce NPS pollution and continuing education efforts of watershed community members. Based on data collected, historical water quality data, and watershed inventories conducted during the Central Muscatatuck Watershed Project, *E. coli*, sedimentation, excess nutrients, and solid waste were identified as problems in the watershed. Resulting from the success of this project, Historic Hoosier Hills RC&D applied for and received a Section 319 grant to implement the WMP.

*- Project information provided by Deanna Robison, Historic Hoosier Hills Resource, Conservation, and Development (RC&D) Area*

# WORKING TO IMPROVE THE NPS PROGRAM

IDEM's NPS Program is actively working to expand agency resources devoted to addressing NPS pollution, develop planning and assessment tools to better gauge the effect of grant-funded projects, and fund projects to build watershed planning capacity within the state. This section of the report details efforts undertaken during this reporting period that will increase the effectiveness of the NPS Program in Indiana.

## NPS Management Plan

The NPS/TMDL Section completed the update of the State NPS Management Plan that maps out NPS pollution priorities for the next five years. IDEM contracted with Brilljent to help rewrite and update the Plan, which was approved by US EPA during this reporting period. IDEM has involved all key stakeholders in this process and has held meetings with stakeholders to gather comments on the draft and gauge interest in coordination of various programs through the formation of a State Nonpoint Source Advisory Committee.

## NPS Monitoring Strategy

The Assessment Branch and Non Point Source (NPS) Group within the IDEM Office of Water Quality are collaborating on a monitoring project to measure changes that occur in water quality as a result of 319-funded BMP installations in Indiana watersheds.

The NPS Group provided the Surveys Section of the Assessment Branch with a State map indicating the location of 319-funded BMP installations that were constructed prior to 2006. This map provided information that was used by the Source ID group within the Surveys Section to define BMP locations in areas that were scheduled to be evaluated for pollution sources during the summer of 2009. Watersheds in Whitley County, including three portions of the Blue River and several of its tributaries were selected for evaluation.

The Surveys Section collected a standard suite of water quality parameters (ammonia, nitrate+nitrite, TKN, COD, TOC, total phosphorus, dissolved oxygen, turbidity, specific conductance, temperature, pH alkalinity, CBOD5, total Solids, suspended solids, dissolved solids, sulfate, chloride, hardness, E. coli, aluminum, calcium, arsenic, cadmium, total chrome, copper, lead, magnesium, nickel, selenium, zinc), that are typically assessed by the Source ID program. The NPS monitoring objective of evaluating BMP success in improving water quality was incorporated with the Source ID objectives of locating and identifying potential sources of contamination, by adjusting the location of sampling sites to include sample collection both upstream and downstream of BMP locations and by measuring stream flow at selected sites.

The NPS/TMDL section will use the results from these surveys along with the calculated nitrogen, phosphorus, and sediment load reduction as well as historical data, to evaluate the effect of 319-funded projects and the NPS program on water quality in the Blue and Eel River watersheds. This project will be used to assist in the development of a monitoring protocol for

future NPS program evaluation as part of the Assessment Branch statewide monitoring program and for inclusion in the Office of Water Quality's Surface Water Quality Monitoring Strategy.

## **Program Website Update**

IDEM's goal is to become a leader in providing useful and up-to-date NPS and watershed-related information via its program website. Using Section 319 funds, work to redesign completely the website began in the spring of 2009. Goals for this year include an on-demand print shop for the distribution of project-specific brochures and fact sheets, interactive web space for watershed groups to share information, posting editable and downloadable Public Service Announcements, and hosting the IDEM Watershed Specialists' Watershed Toolbox. Though similar to US-EPA Watershed Wiki, the IDEM Toolbox will be focused on Indiana-specific information and highlight resources that stakeholders find most useful for watershed planning and implementation in Indiana.

## **NPS Program Grantee Orientation Workshop**

This year IDEM invited all its FFY 2009 funded grant projects sponsors to Indianapolis for a half-day workshop on the Section 319 Program. The objective of the workshop was to introduce grantees to IDEM's NPS Program policies and procedures, staff, various resources available to them as they get started on their project, and the other programs in the Watershed Planning Branch that may play a part in their efforts. Grantees learned how to be more effective with their grant funds, whether developing or implementing a watershed management plan, avoid administrative pitfalls, and understand the ins and outs of IDEM's processes. The workshop was divided into three parts: Introduction to the NPS Program and its policies, Introduction to Watershed Planning, and Introduction to Watershed Implementation. Grantees left with a CD of all applicable Section 319 policies, guidance, and forms. Initial feedback from the grantees was positive and IDEM is working to improve the workshop for next year.

## **Enhancing Databases**

### **Assessment Information Management System (AIMS)**

The NPS Program is using funds to build onto and improve the existing water quality database management system, AIMS, currently used by the Assessment Branch in IDEM, to provide a mechanism to enter 319-funded water quality data into EPA's Storage and Retrieval System (STORET). The existing AIMS application handles data from multiple water quality and aquatic biota programs and is being expanded to include the programs, projects, and data collected through the NPS and water quality grants. The improvements are incorporating web browser access to staff and management and enhancing STORET interface capabilities to benefit all water quality programs in meeting federal mandates for this program and the agency's other water quality monitoring programs. Additionally, the query and analysis tools available in AIMS are helping in the evaluation of the data through statistical and GIS applications and be

integrated with the Assessment Branch point and nonpoint source monitoring data for further program analyses.

The project has been underway since the second quarter of 2008 and is nearing completion in the third quarter of 2009. Efforts were made to work on NPS data entry options for manual entry and import upload into AIMS and into the existing STORET by the end of the third quarter of 2009. The data selected for inclusion into the system has been set up to be compatible with the AIMS structure. Once the enhanced system is ready, all new NPS data will be uploaded, and testing will be done using a data mapper to upload older data that is in alternate formats.

## Hoosier Riverwatch

IDEM is partnering with the Hoosier Riverwatch Program and the Upper White River Watershed Alliance (UWRWA) to improve access to and utility of Hoosier Riverwatch data by local leaders, volunteers and other data users. This project includes upgrading the web-enabled Hoosier Riverwatch Database to allow all current and historic Hoosier Riverwatch sampling sites and data to be consistently entered and stored for data sharing, geospatial and statistical analyses, and reporting. The UWRWA will also construct an appropriate US EPA Water Quality Exchange (WQX - formerly STORET) compliant dataflow to enable data submittal, utilizing a State-provided Node Client, from the database to the State Node. Five statewide workshops will be conducted to assist in the technical interpretation of local data and increase the participant's understanding of chemical, physical, and biological inter-relationships. These enhancements will render the existing data more useful and improve the quality of data entry by the data collectors. This project is scheduled for completion in 2011.

## Development and Demonstration of Outcomes Based Evaluation Framework for Indiana Nonpoint Source Program

In 2006 and 2008, IDEM awarded Section 319 grants to Purdue University for a two-phase project to develop indicator frameworks to assess the impacts of watershed planning and implementation projects on social outcomes, such as knowledge, attitudes, and behavior of watershed residents and stakeholders, and environmental outcomes, such as the effect of implemented management practices on water quality. Monitoring social outcomes of watershed planning and implementation is a new process to many community-based watershed groups, and although several watershed groups have attempted to design management plans to show change in environmental outcomes, few are able to complete their goal successfully.

The environmental phase of this project will measure water quality change as the effect of implemented management practices by developing a list of core and supplemental environmental indicators, selecting a list of standardized methods, and preparing a statewide monitoring inventory. Data collected using these tools will assist community-based watershed groups in showing change in water quality.

IDEM has been very pleased with the work Purdue has done to date on this project and the availability of technical staff as the project evolves.

#### Accomplishments – Social Indicators

Purdue guided the Clifty Creek Watershed Project on design, implementation, and analysis of an evaluation for a cover crop field day that was held earlier this year. They will be using this information to create another evaluation for a pasture walk field day that they will hold at the end of August. These evaluations put Clifty Creek in Step 4 of the Social Indicators Process – evaluating social indicators during project implementation.

Purdue held a focus group in the Lower Fall Creek watershed to supplement survey data that was collected in 2008. Seven members of the Mapleton-Fall Creek Neighborhood Association participated in the focus group, and provided additional information about their perceptions of the water quality in Fall Creek, how they interact with the creek, which they trust for water quality information, and in what ways they would like to receive information about water quality. This helped Purdue verify the validity of the survey data.

Contact has been made with other pilot projects who are currently reviewing the data from their first survey. Many groups are working on their own at the moment to pull information from the survey results and deciding how to use that information in their watershed implementation phase. These groups are currently in Step 3 of the Social Indicator process. These groups have been informed that personnel at Purdue University are available if they have any questions, or need assistance related to the Social Indicators Process.

At IDEM's request, Purdue held a Social Indicators workshop for IDEM employees. The workshop served as a project overview, updates on where each of the pilot projects in the state are in terms of the Social Indicators process, and allowed for questions to be answered on Social Indicators.

IDEM, in collaboration with Purdue, has added four new pilot projects during 2009 including the Greater Lafayette Reach of the Wabash; Bean Blossom; Tippecanoe Environmental Lakes and Watershed Foundation; and Big Walnut. Purdue is currently working on a timeline to determine when the existing projects will be resurveyed, and when the new projects will start the surveying process in their watersheds. At least three (3) surveys will be distributed in the Fall/Winter of 2009/2010, putting some of the pilot projects into Step 5 of the Social Indicators process, and others into Step 2.

#### Accomplishments – Environmental Indicators

Purdue worked collaboratively with IDEM staff to develop an expert panel of participants from federal, state, and local agencies, academia, watershed organizations, consulting firms, and non-governmental organizations with experience in water quality monitoring to develop the list of core and supplemental environmental indicators. This process has resulted in a successful convention of a group of people with very diverse backgrounds and years of experience. Since the initial expert panel meeting, Purdue has organized additional face-to-face meetings, web conferences and web surveys with the expert panel to capture information that will identify

environmental indicators that will successfully show improvement based on watershed management.

Purdue has also worked to identify, share, and standardize methods of measuring the indicators by watershed groups and agencies in Indiana. The expert panel clearly indicated the need to identify existing state programs that are currently monitoring using environmental indicators and their associated methodology. Based on this need, Purdue generated two products, publicly accessible at <http://monitoringprotocols.pbworks.com>, a public web space that allows the public viewing rights and designated “protocol stewards” editing abilities:

- Catalog of Monitoring Protocols Used by Indiana Agencies – a compilation of existing protocols used by statewide monitoring programs, and
- Inventory of Who is Monitoring What in Indiana – a companion tool that identifies the statewide program collecting the environmental indicator, where it is collected, general measurement information, the frequency and seasonality of sampling, and the sampling location.

In an effort to identify watersheds where improvements can most likely be demonstrated using environmental indicators. Purdue developed the Indiana Water Monitoring Inventory (<http://engineering.purdue.edu/~inwater>) and held a statewide monitoring conference, entitled “Improving Indiana’s Waters: Using Monitoring Data to Show Change” in December 2008. More than 125 participants from throughout the state came together for a full day of sharing experiences using water monitoring data to show watershed management success, discussing the barriers that exist, and developing strategies to overcome barriers.

### Future Activities

Work will be focused to finalize the list of indicators that can be used by 319 projects collecting environmental data to measure success of watershed management activities, demonstrate indicator evaluation in selected Indiana watersheds, and develop a manual to explain how to use the indicators effectively.

## **Accountability Pilot Project**

Indiana has five watersheds included in US EPA Region V’s Accountability Pilot Project. Watershed projects included in the Pilot utilize planning followed by implementation to meet water quality standards in lieu of establishing a TMDL for the impaired waterbodies within the watersheds. For each project, updates on the project’s status are submitted annually to EPA through a database. A summary of the management actions and project milestone dates submitted this year for each of the five watersheds are as follows:

**Clifty Creek** – The Bartholomew County SWCD and partners are implementing the Clifty Creek Watershed Management Plan by implementing a cost-share program and providing education and outreach. The District is developing, promoting, and implementing a cost-share program that is consistent with the sediment, nutrient, and *E. coli* load reduction goals outlined in the

Plan. The estimated load values in the WMP established through the US EPA STEPL model are: sediment 37,960 tons per year, phosphorus 527,071.9 pounds per year, and nitrogen 2,462,062 pounds per year. These values are considered baseline and were used to determine the percent reduction through BMP installations. Milestones include reduction of sedimentation by 92%, reduction of nitrogen loads by 50%, and reduction of phosphorus loads by 89% all by 2011. *E. coli* spikes will be reduced 20% by 2012 and to the state standard by 2018. Most implementation is expected to be complete by 2012 with *E. coli* delisting occurring by 2020. Approximately 74% of the plan has been implemented. Presently, Clifty Creek, through several rounds of BMP installations, has reduced sediments loads by 6,680 tons per year, phosphorous by 89,391.1 pounds per year, and nitrogen by 13,014 pounds per year.

### Annual Percent Reduction Values

Parameter	Percent reduction in 2007	Percent Reduction in 2008	Percent Reduction in 2009	% Target reduction in 2011
Nitrogen	0.02	0.52	0.53	50
Sediment	.7	17.6	17.6	92
Phosphorus	14.5	Not reported	17	89
BOD	Not reported	.006	.006	5.6

Most importantly, IDEM water quality data collected in 2007 and supported by data from the watershed group and USGS have resulted in a portion of the watershed now meeting the *E. coli* water quality standard. This significant improvement in water quality is due in large part to the implementation of NPS BMPs within the watershed and will be documented in greater detail for Indiana's 2009 NPS Success Story.

**Dunes Creek** – Save the Dunes Conservation Fund implemented the Dunes Creek Watershed Management Plan to address an *E. coli* impairment and reduce other NPS pollutants. The watershed management goal is to improve the water quality and habitat of Dunes Creek by reducing and preventing pollutant loads in the watershed such that, at a minimum, Dunes Creek meets Indiana water quality standards. Milestones include reducing nutrients (Nitrogen and Phosphorus) and sediment 15%, *E. coli* to meet the state standard, improve biotic communities to partially supporting, and reducing TDS and chloride concentrations to meet water quality standards by the end of 2012. Based on the WMP, the needed implementation efforts would be complete in 2016 and delisting was expected to take place in 2018. Progress has been made in the implementation of the Watershed Management Plan - eighteen of twenty-four action items have been implemented. Five and one-half tons (11,000 lbs/year) of sediment were reduced based on calculations, 12.2 pounds per year of phosphorus, and 69 pounds of nitrogen. Based on these estimates, targets for both 2012 & 2016 have been met for sediment.

However, ambient water quality monitoring data indicates that water quality in Dunes Creek did not change greatly between 2005 and 2008. Dissolved oxygen concentrations were within levels that meet water quality standards at all sites in 2008, a slight improvement compared to 2007 data. Dissolved oxygen percent saturation remained low in 2008, although more samples measured greater than 85% saturation in 2008 than in 2007. Conductivity and *E. coli* concentrations remained elevated in 2008. Nitrate and orthophosphate concentrations

measured in 2007 and 2008 are high compared to concentrations observed during development of the WMP. Consistent with data collected during development of the WMP, none of the 2008 samples exceeded the concentration found to be deleterious to aquatic life. While turbidity exceeded the Indiana average at four sites during a 2007 storm event, turbidity did not exceed the Indiana average at any sites during any sampling events in 2008. Overall, low dissolved oxygen and high conductivity and *E. coli* concentrations continue to be problems within the Dunes Creek watershed. Save the Dunes Conservation Fund has indicated it currently has no plan to work in this watershed or continue implementing the Watershed Management Action Items. New local partners will be needed to reach the WMP water quality improvement goals.

**Cedar Creek** - The St. Joseph River Watershed Initiative implemented the management plan for Cedar Creek by placing BMPs to reduce NPS pollution that focuses on *E. coli*, sediment and phosphorous. Critical milestones for the project include a 40% average annual reduction in *E. coli*, a 10% average annual reduction in total phosphorus and a 15% reduction in annual sediment loads by November of 2007 when the first phase of implementation ended. Approximately 20% of the plan has been implemented. As per the schedule, implementation efforts would be complete in 2015 with the ability to de-list in 2019.

The results from one 319 project for the implementation of the WMP equal twenty-four septic systems repaired, five rain gardens installed, 3,574 ft of stream bank and shoreline stabilized, 30.2 acres of trees and shrubs planted, one porous pavement treatment installed, and one nutrient management system implemented on 215 acres. The Load Reduction Summary showed a 2.7% reduction in sediment, 0.8% reduction in phosphorus, and 0.5% reduction in nitrogen from the 319 project. The percent reductions were calculated from the Region 5 model and 2004 baseline values established using a SWAT model. From BMP installations and the Region 5 model, the total amount of load reduction of sediment was determined as 1,948.40 tons, phosphorus as 2,196.5 pounds, and nitrogen as 4300.6 pounds. The percent reductions are shown below:

Sediment =	2.7 % reduction
Phosphorus =	0.84% reduction
Nitrogen =	0.52% reduction

However, using the water quality monitoring mean values instead of SWAT values, a different scenario emerged. The USGS Surface-Water Annual Statistics for Indiana at Hydrologic Unit Code 04100003, Site 100, show the discharge in cubic feet at 279.8 in 2004, at 328.0 in 2007 and 358.3 in 2008. Published graphs displayed yearly mean concentration values for nutrients, TSS, and *E. coli* for 2004, 2007, and 2008 at site 100. Based on this information, no reductions from 2004 could be seen and in all cases the SWAT calculated target values were higher than the current loads. When comparing the concentration values from the water quality data to the SWAT target values, the targets were already met for sediment, phosphorus, and nitrogen. The 2008 concentration value for sediment /TSS was 28 mg/L with the target set at 80 mg/L; for phosphorus it was 0.11 mg/L and the target is set at 0.3 mg/L; and for nitrogen it was 0.62 mg/L and target is set at 1 mg/L. Overall, the results indicate that the reduction targets derived from the SWAT model were higher than values derived from gage data and water quality data. This points to a need to reevaluate targets and rethink the goals for this project.

**Little Elkhart River** – LaGrange County has completed a WMP for headwater streams of the Little Elkhart River system. This mostly rural watershed with significant livestock production suffers impairments from *E. coli* and ammonia. Two automated samplers have been added to implementation projects, along with a paired watershed design to measure water quality changes before and after implementation. Of the two fourteen digit HUC watersheds included in this headwater management plan, one watershed is a control where no BMPs will be implemented in the early phase and the second is the treatment watershed where BMP implementation will occur. In the final phase, BMP implementation efforts in both watersheds should be complete by 2014 and delisting possible by 2016.

A 2010 or three year milestone includes a 25% reduction in nitrates and *E. coli*, a 30% reduction of total phosphorus, and a 10% reduction of suspended solids. The 2012 or five year milestone includes a 55% reduction in nitrates and sedimentation, a 71% reduction in total phosphorus, a 55% reduction in *E. coli*, and a 15% reduction of total suspended solids.

Using the baseline values calculated from the Region 5 model before and after implementing all BMPs associated with problems in the treatment watershed, Bontrager Ditch/Emma Lake, targeted reduction goals were set for nitrates at 2.7 tons, phosphorus at 0.8 tons, sediment at 24 tons, and *E. coli* at 91.8 trillion colonies. Total load reduction for three 14 digit Hydrologic Unit Code watershed: Bontrager Ditch-Emma Lake (04050001140010), Bontrager Ditch-Hostetler Ditch (04050001140020), and Little Elkhart River Ditch-Topeka (040050001140030) were set for nitrates at 34.3 tons, phosphorus at 7 tons, sediment at 25 tons, and *E. coli* at 426.3 trillion colonies.

As of August of 2009, the BMP and Region 5 calculations show a sediment load reduction of 696 tons per year, a phosphorus load reduction of 0.36 tons per year, and a nitrogen load reduction of 0.72 tons per year. The sediment load reduction was greater than 100% of 2012 expectations. For the first treatment watershed, Bontrager Ditch/Emma Lake, phosphorus reduction is 45% which is greater than the 2010 targets of 30% and less than the 2012 target of 71%. Nitrogen was reduced 27%, which is slightly greater than the 2010 goal of 25% and less than the 55% goal for 2012. Monthly sampling for *E. coli*, nitrogen, phosphorus and TSS is continuing into the implementation stages.

The project has set BMP implementation goals in the treatment watershed. The primary goals are installing fence to keep livestock out of surface waters and creation of alternative watering sources. The yearly milestones are - fifteen thousand feet of fence installed in 2008, 40,000 feet of fence installed in 2009, and 65,000 feet of fence installed 2010. Further, the project has set the goal of repairing forty-three sites that have livestock-induced ditch bank damage. Milestones for this goal include ten sites repaired in 2009, 25 sites repaired in 2010, and 43 sites repaired in 2012. As of August of 2009, 10,350 feet of fence was installed, which did not meet fence goals. The project has repaired about half of the 43 sites, which is greater than the 2009 goal. Lastly, the project has installed 25 acres of filter strips; the goal is four-hundred acres by 2012.

David Arrington, the project manager, summarizes their project and monitoring results below:

“The Little Elkhart River system is somewhat unique with 75% of residents constituting the Amish community. However, cooperation for BMP installation on target locations approaches 100%. To date, only 15% of planned BMPs have been installed with another 70% in the process or scheduled to be installed over the next 10 months. The project has initially concentrated on locations contributing the highest levels of NPS pollution. These sights also require the highest level of engineering requirements which has created a backlog in the installation process. At this point in time approximately a 5% reduction in NPS pollutants in the treatment HUC 14 (Bontrager Ditch-Emma Lake) has been documented. However, it is anticipated we could reach a statistically significant improvement as early as next fall.”

**Eagle Creek** – The Eagle Creek Watershed Alliance (ECWA) is currently implementing the management plan for the Eagle Creek watershed. The Eagle Creek Reservoir is an important drinking water source for the City of Indianapolis. Critical milestones for phase I implementation efforts are a 40% reduction in *E. coli*, 8% reduction in sediment, 3% reduction in total phosphorus, and a 2% reduction in total nitrogen by February 2008. Implementation efforts are expected to be finished by 2016 with delisting by 2019. Approximately 80% of the action items in the plan have been implemented. The ECWA has completed implementation of two BMPs. Additional BMPs to be implemented include the Earth Discovery Center project, scheduled to be completed before September, and the Canterbury Stables project. Implementation efforts to date from completed BMP projects have resulted in a reduction of 194 pounds of phosphorus and 158 pounds of nitrogen per year and a sediment reduction of 2,792 tons per year.

The summary of monitoring efforts in the Eagle Creek Watershed was provided by Lenore P. Tedesco, Ph.D. Associate Professor, Dept. of Earth Sciences and Director, Center for Earth and Environmental Science Indiana University – Purdue University Indianapolis:

“The ECWA monitoring of the Eagle Creek Watershed is largely focused on the 319 Monitoring program. Other research that they are doing in the watershed focused on documenting the timing, flow pathways and fluxes of nutrients, atrazine, and sediments from the watershed during winter and spring storms. While this work has been instrumental in the understanding of the most appropriate types of BMPs for implementation, it is not suitable for use in documenting BMP effectiveness or overall water quality improvement.

Similarly, ECWA have also been monitoring Eagle Creek Reservoir water quality especially as it relates to nuisance blue-green algal bloom formation, taste and odor compounds and microcystin toxin production. This data is providing important information to state agencies and the legislature as they consider the risk to recreational users from these harmful algal blooms and the potential for the need for statewide monitoring programs. Interannual variability makes this dataset not suitable for documentation of long-term trends in water quality in the reservoir or in fluxes from the watershed.

ECWA have been analyzing long-term data sets from CIWRP (Central Indiana Water Resources Partnership) research projects and combining them with 319 monitoring data

sets. Analysis of this data shows that they can document a decrease in annual nitrate loading from Eagle Creek Watershed to the Eagle Creek Reservoir over the past decade. But they cannot, however, determine whether that decrease is related to the implementation of watershed best practices or a shift in land use (especially around Zionsville and in the Fishback and Schoolbranch Watersheds) from agriculture to suburban. Given that we have documented that nitrate is sourced overwhelmingly from agricultural portions of the watershed, this land use shift may account for the reductions.“

## **Relations between nutrients, algal biomass, habitat, and biological community metrics**

Indiana is part of the nutrient-rich Midwest that leads the nation in corn and soybean production. Production of these crops, especially corn, requires the use of significant amounts of nutrients—primarily from fertilizer and manure additions—which has increased substantially since the 1940's. While nutrients are essential to the health and diversity of surface waters, excessive inputs of nutrients into streams have potential human-health, economic, and ecological consequences. Excess amounts of nutrients (nitrogen and phosphorus) have been shown to cause eutrophication in aquatic ecosystems, which has been linked to fish kills, shifts in species composition, taste and odor in drinking-water, and blooms of harmful algae in freshwater and estuaries.

Drinking water standards have been developed for nutrients, but current criteria do not address the effects on the biological communities resulting from increased nutrients in rivers and streams. Typically, nutrient concentrations must be extremely high to be toxic to biological communities; such concentrations are rarely found in the environment. In 1996, the US EPA National Water Quality Inventory identified excess amounts of nutrients as the second leading cause of impairment in rivers and streams across the United States (the first cause was siltation). To address the number of impaired streams and the effects on downstream water bodies, the US EPA proposed nutrient criteria in 2000.

Starting in 2001 the USGS and IDEM collaborated on several studies to provide the data necessary for IDEM to develop nutrient criteria for Indiana. To save funds, algal biomass, chlorophyll *a* (CHL*a*) for seston and periphyton, and ash-free-dry mass (AFDM), samples were collected by the USGS at the sites being sampled by IDEM as part of the probabilistic Watershed Monitoring Program (WMP). The IDEM WMP collects water chemistry (nutrients, major ions, metals, and field parameters), habitat, and fish and invertebrate community data at 38 to 50 sites per major river basin. Water chemistry and algal biomass were collected three times between May and October from 2001 to 2005 at 322 sites throughout Indiana. Starting in 2006, IDEM continued the algal biomass sampling as part of their WMP design and samples were analyzed by the USGS in the Indiana Algal Biomass Laboratory.

There were six reports from these USGS/IDEM studies that were included in the US EPA approved Indiana Nutrient Criteria Plan. The first report (Frey and Caskey, 2007) examined statistically significant relations between existing nutrient, habitat, and basin characteristics to fish and invertebrate community data collected at 58 sites. There were no algal biomass data available for this report. Canonical correspondence was used in this retrospective report to

identify which parameters most influenced biological communities. Fish and invertebrate community composition was most influenced by habitat and land use and not nutrients. The strength of relations improved when data was analyzed by basin size to integrate differences in biological community found as basin size increases.

When these studies began, there was limited information on whether nutrients and algal biomass were significantly related to biological community data. Therefore, individual reports were done for data collected in the West Fork White River in 2001 (Frey and others, 2007), East Fork White River and Whitewater River Basins in 2002 (Caskey and others, 2007), and the Upper Wabash River Basin in 2003 (Leer and others, 2007). In these three reports, statistically significant relations were found between seston and periphyton chlorophyll *a* with nutrients, habitat, basin characteristics and fish and invertebrate metrics. However, there were no significant relations between periphyton chlorophyll *a* and nutrients in any of the years. Because of the lack of algal biomass data when the US EPA proposed nutrient criteria in 2000, the fifth report was an occurrence and distribution of algal biomass and relations with nutrients and basin characteristics using the 322 sites sampled from 2001 to 2005 (Lowe and others, 2008). Throughout the 5-year study, the magnitude and frequency of stream discharge varied monthly and annually, and greatly influenced algal biomass concentrations through scour and algal drift. Algal biomass median concentrations in Indiana streams consisted of periphyton CHLa, 41.2 milligrams per square meter ( $\text{mg}/\text{m}^2$ ); AFDM, 52.1 grams per square meter ( $\text{g}/\text{m}^2$ ); seston CHLa, 2.44 micrograms per liter ( $\mu\text{g}/\text{L}$ ); and POC, 0.75 milligrams per liter ( $\text{mg}/\text{L}$ ). The highest median concentration of periphyton CHLa was in the spring, 63.2  $\text{mg}/\text{m}^2$ , while the highest median concentrations of AFDM, seston CHLa, and POC were in the summer 55.4  $\text{g}/\text{m}^2$ , 2.96  $\mu\text{g}/\text{L}$ , 0.81  $\text{mg}/\text{L}$  respectively. There were no significant differences among seasons for periphyton CHLa and AFDM; there were significant differences among seasons for seston CHLa and POC. There were no significant relations with nutrients and periphyton or seston CHLa parameters. As basin size increased, seston CHLa and POC concentrations increased while periphyton CHLa and AFDM concentrations decreased.

The final report determined the significant relations between nutrients, algal biomass, habitat, and basin characteristics with biological community metrics from the 322 sites sampled from 2001 to 2005 (Caskey and others, in press). Breakpoint analysis was used to determine nutrient and algal biomass concentrations where changes in the biological community could be assessed and used to support development of nutrient criteria for Indiana. Fish and invertebrate communities at these sites were dominated by nutrient-tolerant taxa. The mean breakpoint for total nitrogen was 4.1  $\text{mg}/\text{L}$ , for total phosphorus 0.054  $\text{mg}/\text{L}$ , for periphyton CHLa 60.1  $\text{mg}/\text{m}^2$ , for seston CHLa 6.1  $\mu\text{g}/\text{L}$ , and turbidity 17.1 NTU. The mean breakpoint concentrations in this study in addition to Dodd's trophic classification were used as multiple lines of evidence to show changes in fish and invertebrate community and attributes based on annual exposure to nutrients.

In summary, Indiana is part of the nutrient-rich agricultural Midwest that provides a source of nutrients that affects streams locally as well as downstream to the Gulf of Mexico. Streams are so nutrient rich in Indiana it is difficult to find reference streams with low levels of nutrients. There are seasonal periods when evapotranspiration and algal uptake keep relatively low nutrient levels in streams (July through October), and could lead to the misidentification of the true nutrient condition in these streams if nutrient concentrations are used alone to assess

streams. When nutrient criteria were proposed by the US EPA it was hoped that nutrients, TN and TP, as causal variables and seston and periphyton CHLa, as explanatory variables, could be used as nutrient criteria. However, the relations between nutrients and periphyton CHLa in these studies, were weak at best, and usually were not significantly related. This suggests that the biological community will be needed to assess the true nutrient condition in streams. Even though there are seasonally low periods of nutrients, the biological community tends to incorporate nutrients from the entire year and provides another line of evidence of the true nutrient condition in the streams. Based on these findings, the most appropriate assessment of nutrient conditions in streams requires collection of nutrients, seston and periphyton CHLa, and fish and invertebrate community data.

## **Total Maximum Daily Load Program**

Under the federal Clean Water Act (CWA) Section 303(d), development of TMDLs is required for all the impaired waterbodies that do not meet the water quality standards (WQS) for the designated uses to protect aquatic life, wildlife, and human health. The NPS Program and the TMDL Program continue to work together to facilitate the integration of watershed management planning and implementation with the development of TMDLs and their implementation. The Section 319(h) Program priorities are developed in cooperation with the TMDL program in order to achieve the goals of both programs in the most efficient and cost-effective manner.

TMDL staff and Section 319(h) staff attend watershed meetings together and match watershed groups to grant funding and data resources. Section 319(h)-funded project sponsors are often key stakeholders in the development of TMDLs and provide data, meeting spaces, and stakeholder lists which have greatly improved the quality of TMDL reports. The development of TMDLs has, in some cases, spurred the development of new watershed groups – thirteen new watershed groups have been formed as the result of a TMDL (and were funded with 319 grants to continue the work started by the TMDL) and several watersheds where TMDLs were completed had 319-funded watershed groups already established. TMDL staff has even worked with watershed groups to assist in the development of implementation projects designed to help meet load reductions stated in the TMDL report.

Indiana is divided into 1586 twelve digit watersheds and approximately 754 of these watersheds have TMDLs developed or scheduled to be developed by the end of 2010. This translates to 1306 TMDLs and of these, 65% are in various stages of implementation. IDEM currently produces over 100 TMDLs each year, a significant improvement over previous years. TMDLs have primarily focused on *E. coli*, but recent TMDLs have been developed that quantify the impacts of nutrients and metals on waters with impaired biotic communities.

## **Watershed Specialists**

The Watershed Specialists (WSS) continue to work according to their Strategic Plan, and key accomplishments are given below. Their work, however, is often not clearly tied to tangible, environmental results such as reduced loads of pollutants to a waterbody or a delisting of an impaired stream segment. Their progress is measured in administrative outcomes, which lead to positive social outcomes and ultimately positive environmental outcomes.

One of the major challenges in assisting local watershed planning efforts is to understand the differences in stakeholders' opinions and outlooks that can sometimes slow the watershed planning process down, and then to bring people together to work through issues that may be rooted in long-standing priorities. One issue that has in the past seemed irreconcilable in watershed planning is the need for drainage versus restoration of streams, wetlands and habitat. The years that the WSS have spent working closely with watershed steering committees, learning about the obstacles faced by drainage boards and watershed groups, and being witness to the local decision-making processes have allowed them to see subtle shifts in thinking, indeed, positive social outcomes related to drainage and restoration. Two examples are:

1. Though drainage policy differs from county to county, much of northeastern Indiana was historically the Great Black Swamp and the general policy is to ditch and drain as much land as possible for agricultural production. A subtle shift in thinking has taken place with several county surveyors. Recently, one of them expressed a belief that perhaps it is better to allow wetlands to re-emerge in areas that are difficult to drain. In addition, over 20 county surveyors and SWCDs throughout the Wabash River Basin have bought in to the two-stage ditch design that is being promoted locally by The Nature Conservancy. Though water quality is not a major responsibility of county surveyors, they are seeing the benefit in increased ditch life from the two-stage design - a design that also improves habitat, stabilizes banks and removes nitrogen.
2. Many watershed groups have started mapping hydric soils, wetlands and floodplains in their watershed management plans to identify areas critical for flood retention and wetland and headwater stream restoration. A few groups are actively promoting the wetland and stream mitigation websites (INDOT/IDEM/IDNR, Upper White River Watershed Alliance, Busseron Creek Watershed Alliance) aimed at matching mitigation needs with watershed restoration priorities, and they are seeing increased landowner interest in this approach.

## **Accomplishments of the Watershed Specialists in 2008/2009:**

### **Capacity Building for Watershed Groups**

WSS developed and conducted three Watershed Coordinator Networking Sessions in North Manchester, Madison, and Crawfordsville (November 2008) which focused on round table discussions of the following topics:

- Changing Mindsets "Lake to Watershed"
- Septic System Issues
- Working with the Amish on BMPs
- Energizing the Audience-How to do Effective Education & Outreach
- Organization Sustainability
- Effective Cost-Share Programs- Selling your Program
- Mobilizing, Motivating and Organizing Volunteers and Raising Funds
- Developing a Watershed Website- "Busseron Creek Watershed"
- Partnerships with MS4 Communities

There were fifty-five participants during this round representing SWCDs, watershed groups, RC&Ds, MS4s, environmental organizations, regional planning commissions, public water supply systems, municipalities, NRCS, ISDA, IDNR and consulting firms, and feedback on the sessions was positive

WSS developed and conducted three Watershed Coordinator Networking Sessions in Muncie, Rensselaer and Ellettsville (May 2009) focusing on “Integrating Watershed Planning and Implementation at the Local Level.” A speaker gave presentations and led discussion on city and county planning entities and jurisdictions, comprehensive plans and zoning, and when in the local planning processes a watershed group can become involved to affect natural resource decisions. There were 49 participants during this round representing SWCDs, watershed groups, RC&Ds, MS4s, environmental organizations, regional planning commissions, public water supply systems, municipalities, NRCS, ISDA, IDNR and consulting firms, and feedback on the sessions was positive

WSS assisted in developing Indiana Watershed Leadership Academy sessions and participated in reviewing the module assignments and providing feedback to the 25 participants. Additionally, WSS continued working with the IASWCD Watershed Information Specialist to develop the watershed resource toolkit, revise the “Indiana Watershed Planning Guide” and hyperlink it to the toolkit, and to finalize the watershed group tracking database format

WSS assisted over 100 active and developing watershed projects, sponsored by watershed groups, SWCDs and other entities on many levels including: meeting facilitation, reviewing draft and final watershed management plans, developing and reviewing grant proposals from several funding programs, obtaining water quality data and developing watershed maps, connecting groups with other local organizations and agencies to complement planning efforts, and assisting watershed coordinators with the overall watershed planning and implementation processes. Further, WSS reached out to areas in the state that have been absent from watershed planning and regional partnerships, or who have not participated in watershed work for several years after previous planning attempts. These entities and counties include: Michiana Watershed, Inc., Kankakee River Basin Commission, Iroquois Conservancy District, Arrowhead and Northwest Territories RC&Ds, and Blackford, Jay, LaPorte, Marshall, Newton, Jasper, Starke, Spencer, Greene, Vigo, Morgan, Martin and Orange County SWCDs)

An important accomplishment of the WSS is support given to groups to help them move beyond dependence on 319 funding and integrating their efforts with local comprehensive plans. Examples of this work include:

- The Cedar Creek Watershed group met for the first time independently of the 319 grant program and the St. Joseph River Watershed Initiative (who sponsored the grant). Since they are part of the IDEM Accountability program, it was good for them to initiate discussions on what to do next and how to function apart from (but still coordinating with) the SJRWI.
- Elkhart River Alliance worked with the City of Goshen to review and coordinate common goals of the watershed plan and comprehensive plan to protect and preserve wetlands.

- The Friends of the St. Joe shifted their thinking from depending on 319 funds to "promoting sustainability whenever possible" after they attended the Networking Session round table discussion on sustainability.
- Jasper and Newton County SWCDs began a water monitoring partnership using local resources.

WSS continued working with large watershed basin partnerships to promote integration and prioritization of local, smaller scale watershed efforts. Areas include St. Joseph-MI and St. Joseph-OH Basins, Upper Maumee Basin, St. Mary's Basin, Upper Wabash River Basin, Tippecanoe River Basin, Upper White River Basin, Wildcat River Basin, Little Calumet-Galien Basin, Lower Eel River Basin, Middle Wabash-Busseron Basin, Patoka River Basin, Whitewater River Basin. Two new efforts beginning in 2009 in which the Watershed Specialists are assisting include The Nature Conservancy's "Wabash River Assessment" which encompasses the entire Wabash and White River basins from Ohio through Indiana to Illinois, and the "Ohio River Basin Fish Habitat Partnership" which includes 150 stakeholders from six states. Both efforts aim to identify sub-watersheds that are critical for restoration of water quality and habitat in order to preserve key aquatic species, and to implement BMPs to effect improvements

### **Internal Program Coordination**

WSS work closely with numerous IDEM programs to promote watershed planning, program integrations, and new ways of reaching water quality improvement goals. This work included:

- Participated in the IDEM OWQ Watershed Initiative to coordinate programs using the watershed approach to improve water quality.
- Continued working with the IDEM NPS/TMDL Section staff to identify and improve programmatic issues affecting staff resources and local watershed activities. In particular, assisted with revision of the WMP Checklist, website content development and development of NPS monitoring and load calculation guidance for watershed groups.
- Attended TMDL public meetings to provide information on watershed planning and generate interest in forming local watershed groups.
- Worked with Stormwater staff and Integrated Report Coordinator on monitoring needs and guidance for MS4s and watershed groups as they relate to the external data framework.
- Worked with IDEM Enforcement program staff to establish coordination on Supplemental Environmental Projects (SEPs) with watershed restoration needs.
- Worked with IDEM Groundwater staff to coordinate source water protection and watershed group efforts.
- Worked with Brownfields program staff to identify opportunities to leverage funding for watershed group priorities

## **External Program Coordination:**

WSS work with numerous IDEM partner agencies and programs with the goal of increasing partner capacity, strengthening relationships, and bringing new ideas into play to address NPS pollution. This work included:

- Assisted in coordinating the Watershed Management Track at the IASWCD annual conference and moderated several sessions.
- Worked with the Upper Wabash Nutrient Management Committee (local producers and all levels of government in Indiana and Ohio for HUCs 05120101, 05120102, and 05120103). Worked with Indiana State Department of Agriculture to gather input from SWCDs in the watershed.
- Worked closely with IDNR Lake and River Enhancement (LARE) program to coordinate several LARE-funded watershed plans with IDEM requirements so groups can leverage both programs for future cost share funds. One particular LARE project involved the coordination of several other programs where the Watershed Specialist worked with the IDEM NPS/TMDL section to prepare a TMDL for the Galena Tributaries and coordinate the sampling with IDEM's Assessment Branch and IDNR's Lake Michigan Coastal Program (LMCP). The sampling done by IDEM and LMCP addressed parameters needed by the LARE program and was provided to the LaPorte County SWCD to become the foundation for their LARE Watershed Diagnostic Study and Watershed Plan. The LARE Watershed Plan will meet the nine elements of a Section 319 Watershed Plan and will be eligible for both LARE Land Treatment funding and Section 319 Implementation funding.
- Worked with IDNR Fish & Wildlife Division to identify state properties/ reservoirs that can coordinate with active watershed groups & SWCDs to address NPS upstream of state properties. This prompted IDNR to coordinate more closely within their own programs (LARE, Fisheries, State Properties) and with NRCS and IDEM on tenant farming practices and eligible BMPs on state property
- Worked with IDNR Fish & Wildlife Division and IDEM OWQ staff to discuss regulations and enforcement of deer carcass disposal into Indiana streams, and the need for public education and alternatives for disposal where there are no regulations or enforcement. The carcass disposal concern has arisen in several watershed management plans, and IDNR included information in their new hunting and trapping guide that was published and distributed in 2009 that mentions the disposition of carcasses and water quality concerns.

## **Capacity Building to Reduce NPS Pollution**

IDEM is continually seeking ways to build capacity around the state in an effort to strengthen the effectiveness of groups working to achieve water quality goals and show measurable results. The objective is to promote the organizational development and growth of local watershed partnerships and stakeholders committed to improving and maintaining the natural and economic resources of their watersheds; and to provide funding, training and technical

assistance to these groups so they can better address watershed-based problems and help develop sustainable solutions. Following are three examples of IDEM working with partners and using Section 319 funds to help build capacity statewide and at the local level to reduce NPS pollution in the state.

## **Watershed Inventory Workshops**

IDEM is partnering with the Conservation Technology Information Center (CTIC) to plan and present two workshops in October 2009, on collecting and analyzing watershed inventory data. The need for the workshops was identified during the recent revision of IDEM's Watershed Management Plan Checklist. The workshops are designed to teach watershed groups to collect data most useful for prioritizing problems and identifying critical areas in their watersheds. These Checklist elements' requirements are more comprehensive than the previous Checklist's requirements. The Watershed Inventory asks for water, habitat, biological, and land use data. The workshops are tailored to answer the following questions:

1. What are the types of monitoring and assessment data and what do they mean?
2. Which data is most important and why?
3. Who has data, why was it collected, and how do I get it?
4. How can I use data to support my watershed decisions?
5. How do I deal with uncertainties I have about data?

IDEM hopes these workshops build capacity by teaching groups how to meet watershed inventory requirements, connecting groups with data centers and other resources, and educating them about what to expect during the data collection process. With these skills, stakeholders hopefully will make wiser planning decisions, thereby increasing the odds of successful implementation projects.

## **Watershed Specialist Networking Sessions**

In 2008, the CTIC project entitled "Training Program for NPS Pollution/Seminars" was modified to give CTIC responsibility and a budget for administratively managing the Watershed Specialists' Networking Sessions. Watershed Specialists have focused on ensuring that the sessions meet the needs of Indiana's watershed groups. The Networking Sessions focus on capacity building by not only teaching stakeholders about a specific topic, but also allowing them time to interact and learn from one another. At a recent session on 'Integrating Planning at the Local Level', participants were encouraged to bring a local partner involved in area planning and decision making. The session included a presentation on integrating planning, but also included time for the participants to network and shares their experiences. Connecting local watershed groups with their area planners and decision makers increases the capacity for both groups to achieve their goals.

The lessons shared and capacity gained simply through listening and talking with other watershed managers is an aspect of the Networking Sessions continually applauded by the participants. So important is this facet of the Networking Sessions that the Specialists recently devoted a whole session to face-to-face interaction and discussion of successes and

challenges. These conversations connect local groups to other resources and help build capacity beyond what IDEM can provide.

## **Indiana Watershed Leadership Academy**

IDEM is partnering with Purdue University and using Section 319(h) funds to conduct the Indiana Watershed Leadership Program to meet the needs of watershed coordinators, agency staff, and others that want to become more effective watershed leaders. Leading the development of a scientifically-sound watershed management plan that actively involves, engages, and is supported by the community requires people who have broad skills, and know how to employ diverse tools and strategies related to watershed management.

The *Indiana Watershed Leadership Academy* was developed in 2005 by Purdue University in collaboration with numerous conservation partners throughout the State. The Academy responds to the critical need to build watershed management capacity in Indiana, documented through a survey conducted by Purdue of watershed volunteers and professionals throughout Indiana ([http://www.ces.purdue.edu/waterquality/Survey\\_Report.pdf](http://www.ces.purdue.edu/waterquality/Survey_Report.pdf)). Due to the success of the resulting Indiana Watershed Leadership Academy, the program has continued and is currently funded through January 2011.

### Accomplishments

Purdue celebrated the conclusion of the fourth class of the Indiana Watershed Leadership Academy in May 2009. Twenty-five participants from throughout Indiana with very diverse backgrounds including watershed coordinators, MS4 operators, students, consultants, resource managers, and non-profit representatives convened in January 2009 to begin face to face workshops and distance education on becoming more effective watershed leaders. Those who completed all components of the program received a Professional Certificate in Watershed Management.

In addition to the regular schedule of presentations for the Academy, Purdue added two new sessions in 2009: one on social indicators for watershed management, and another on the use of online social networking websites, including a discussion on which options were appropriate tools and their relevance in watershed management and sustaining a watershed group. Leading the development of a scientifically-sound watershed management plan that actively involves, engages, and is supported by the community requires people who have broad skills and know how to employ diverse tools and strategies related to watershed management. New modules continue to be added as new resources and tools that can enhance watershed management become available.

Outcome-based evaluations each year have been used to enhance the content, improve the overall experience, and demonstrate the impact on watershed management. The Academy has received very strong evaluations from participants, many of whom reported that the leadership and watershed science skills they gained through the Academy are already increasing their effectiveness at building effective watershed partnerships.

In the past four years, 106 people have participated in the Academy, through which they have learned skills in organization and communication, watershed technology, GIS, policy, watershed

science, and leadership. The Academy continues to receive very positive overall evaluations from its participants.

*Future Activities*

The 2010 Indiana Watershed Leadership Academy face-to-face sessions are scheduled, and applications are being accepted for the program (<http://www.purdue.edu/watersheds>). The Advisory Committee will continue to bring statewide input and support to the Academy. A new online social networking site will be developed to facilitate networking among alumni and current participants, and online and face-to-face training will continue. Due to the success and continued interest in this program, Purdue will also pursue additional funding to maintain the Academy in 2011 and beyond.

## Lessons Learned/Adaptive Management

Part of improvement and program development is taking time to evaluate existing processes and identify ways to do things better. For the NPS Program, this involves getting input and lessons learned from our grantees, our staff who manage these projects, and our partners.

### Lessons Learned By Section 319 Grant Projects

A requirement of all Section 319 grant projects is to document project successes, failures, and lessons learned in their Final Report. This information serves three purposes. First, it helps the grantee improve and use this knowledge when planning for future work in the watershed. Second, it helps IDEM improve, where applicable, its processes and policies. Third, it allows other watershed groups to learn from the successes and failures of their peers. Following are excerpts from projects' final reports on their lessons learned:

- Although water quality monitoring was conducted during this project, the practices implemented may require several years to display measurable pollutant reductions. To demonstrate water quality improvement, monitoring would need to be performed more frequently and over a longer period of time than was possible during this project.
- Resources necessary to coordinate certain aspects of this project were underestimated when developing the initial budget. More personnel time was required to identify and educate cost-share partners, select appropriate BMPs, attend meetings, give presentations, and facilitate the partnerships than was initially anticipated. Time spent educating partners and identifying potential projects does not always result in projects coming to fruition. Additional personnel funding is required to promote a cost-share program.
- It is important to engage a diverse group of stakeholders in the development and implementation of local solutions to water quality issues. By doing so, Steering Committee meetings and Work Groups were able to delve deeper into the causes and sources of water pollution, learn how their professional and personal actions can impact water quality, and take the knowledge back to local governmental offices, public and private businesses, and residences to be incorporated for positive changes in attitudes and behaviors.
- It is important to evaluate the biological and physical characteristics of the watershed. It was found that extensive chemical data was available for the Lower Fall Creek Watershed but not much in the way of biological sampling. The completion of this sampling allowed for a more comprehensive evaluation of water quality.
- The public outreach program consisting of a Steering Committee, 3 Work Groups, public meetings, and workshops was an important tool in working with a very diverse watershed. Stakeholder meetings allowed for the interactions between the public and those more closely involved in the WMP development process. By allowing the 3 Work Groups to focus on more specific issues of Education, Land Use, and Water Quality, the Steering Committee was able to guide the overall direction of the planning effort.

- It is important to begin the implementation process or BMP installation process early in the planning effort. It was difficult to secure a location for the BMP installation although many individuals and groups within the watershed had expressed an interest in such activities. Where interest was high, it seemed that the site location available was not conducive to proper BMP design, or where site locations were appropriate for proper BMPs, land owners were hesitant to participate.
- A Social Indicator Survey was completed to evaluate the attitudes of watershed residents toward water quality. While the response rate was less than Purdue University program staff hoped for, the results of this survey will be very valuable as the project is continued through implementation and education and outreach efforts. This survey and the results gathered will also be beneficial to several of the groups participating in the development of the WMP as they too have campaigns related to water quality and the views of stakeholders.
- It is very important to weigh the benefits of the 319 program against NRCS programs as often NRCS programs can prove more economically beneficial than 319. Since the 319 Grant cost-share program was designed to focus on no-till, and CREP offered a better incentive to switch to no-till, 319 grant money was a hard sell.
- Since this was one of the first WMP development and implementation combination grants offered in Indiana, a lot was learned by the SWCD as well as IDEM to help these types of grants move along more smoothly in the future; namely timing and length of the grant.
- Learned new technology such as EPA's technique for developing load duration curves. This method removes some of the guesswork in determining annual load reductions by standardizing a statistical method. We also used new GIS techniques including geodatabases and spatially explicit models to organize the immense amount of data required to analyze the very large watershed.
- The size of the study area (and limited budget) made it hard to pin-point pollution sources within the sub-watersheds.
- A targeted education program will be needed for implementation since the social background and land use of landowners is so varied (lake residents, farmers, urban communities, mobile home communities, etc.)
- The role of managed lands (conservation easements, restoration, limited use, etc.) can play a big part in water quality.
- Participation in education and outreach events is much better when we partner with other groups or where a variety of topics are presented.
- Learned that with modern farming, there are many landowners but only a handful of agricultural producers in the watershed, which makes it difficult to sell the cost-share program and spend all of the money.

- Throughout the duration of the project, there have been three separate IDEM Project Managers and three separate Watershed Coordinators. This amount of turn over inevitably caused miscommunications, changes in administration style, and limited the ability of the watershed coordinators to create a good rapport with the landowners in the watershed.
- Watershed management is mostly about people, the decisions they make, and their behavior.
- A well-organized and up-to-date stakeholder database is a necessity. The development, organization, and maintenance of this type of database are large administrative tasks that must not be overlooked for successful outreach and fundraising.
- Communication, communication, communication! Communication and coordination with staff, Board members, volunteers, partners, the media, donors, and stakeholders takes more time than you think – but must be a priority.
- Whenever possible utilize IDNR Lake and River Enhancement (LARE) state funds as match for 319 funds! The implementation of a large LARE project in the upper watershed exceeded our non-cost share match requirements.
- Training and professional development for the watershed coordinator are critical. The Indiana Watershed Leadership Academy provided enumerable tools, lessons, and contacts.
- For best results, seeding and revegetation of project sites should not be done in the late fall. Provide at least a few weeks for roots to take hold.
- Sustainability of the organization is critical for success. At our current rate of implementation, it would take 25 years to complete all of the currently-identified projects. The Board is taking a bold initiative to develop an endowment campaign to not only sustain the organization, but increase the number of staff, and to reduce the implementation time by half.
- There were few water quality samples taken which made interpreting the data more difficult. In the future, to get a more accurate measurement of the water quality, more samples will need to be taken.
- While the initial cost-share program was hard to implement due to USDA NRCS programs offering a better incentive, success was found in the end by switching the focus of the program from agricultural to urban. However, agriculture BMPs are still necessary, so will continue to be offered.

## Adaptive Management by IDEM

The following items were determined by staff within the last two years to need improvement or program/policy changes. Following is an update on progress made on these improvements.

- Working more proactively with watershed groups on the development of watershed management plans to identify possible problems or roadblocks to success.
  - Ongoing - The draft WMP submittal timeline has been revised, starting with the FFY 2008 grant agreements, to require more frequent draft submittals to better guide the development process and provide timely feedback.
- Create additional guidance on IDEM Section 319(h) program requirements, fundable activities, and policy that affects grant recipients.
  - Ongoing – Additional guidance is being developed. For more information on this guidance see the “Working to Improve the NPS Program, Program Guidance” section of this report.
- Update and rethink the existing website to better deploy information on grants and NPS pollution topics.
  - In Process – we are currently working with our Office of Media & Communication Services to scope out a comprehensive project to update the website and address other outreach and communication needs.
- Develop stronger relationships with IDEM permitting programs to ensure implementation activities detailed in grant agreements can obtain any needed permits.
  - Ongoing - NPS Program staff work very closely with Wetlands and Stormwater staff to coordinate BMPs and needed permits, advise grantees on BMPs that will work with MS4 requirements, and direct grantees to BMPs that, where possible, can be installed without the need for permits.
- Work more closely with grant applicants during the application development process to ensure that potential grant recipients have adequate human resources to manage effectively Section 319(h) grant funds.
  - Ongoing – Watershed Specialists are working closely with FFY 2009 applicants to help ensure their proposal is feasible, will fulfill NSP priorities, and will result in a successful project.
- Develop a monitoring guidance for watershed groups that includes environmental indicators that will be developed through the Environmental Indicators Project
  - In Process - Two half-day expert panel workshops on monitoring are scheduled for October of 2009. A list of water quality parameters and their associated target values and recommended testing methods have been developed for the website.

- Integrate the Section 319(h) program with other state and federal programs.
  - Ongoing - The completion of the State NPS Management Plan will set the stage for much more formal coordination between programs that impact NPS pollution in Indiana.
- Build sustainable watershed groups that can continue to work on NPS issues and not be reliant solely on Section 319(h) grant funds.
  - Ongoing – the IDEM WSS developed and conducted three Watershed Coordinator Networking Sessions which focused on watershed group funding and financial planning. For more information see the “Working to Improve the NPS Program, Watershed Specialists” section of this report.
- Actively work to bring in information and lessons learned from other state Section 319(h) programs, as well as national workshops.
  - Work needed – more coordination with sister programs in other states is needed to bring new ideas, concepts, and innovation to IDEM’s NPS Program.
- Establish a formal policy, requirements, and process for updating watershed management plans.
  - In process – draft policy is under development.
- Finalize the Urban Guidance document and associated forms. Address altered drainage areas/watershed.
  - Complete – see [http://www.in.gov/idem/files/urban\\_guidance.doc](http://www.in.gov/idem/files/urban_guidance.doc). More information is needed to help guide groups on how to work within watersheds where water flow has been altered by surface and sub-surface drainage.
- Improve/Update the current Ag Guidance.
  - In process – this document will be revisited as a part of the web project.
- Develop a comprehensive Monitoring Policy for planning and implementation projects.
  - In Process – see the “Working to Improve the NPS Program” section of this report.
- Develop standardized Policy Documents (and procedures for disseminating new policy decisions and clarifying gray areas).
  - In Process – several standardized policy documents have been developed. This will be a continuing process as issues come up and decisions are made. Procedures for disseminating new decisions need to be finalized.
- Create a NPS Program Newsletter to disseminate program information and lessons learned from projects
  - In Process – this will be a component of the web update project.

- Finalize WMP Checklist and Instructions
  - Complete - a new WMP checklist was developed. For additional information see the “Restoration Efforts and Achievements, NPS Program Focus” section of this report.
- Compliance/Enforcement - verification by PMs of installed BMPs, enforcement of GA deadlines
  - Work Needed – Work has been done to closely monitor deadlines and deliverables on grant agreements. Staff have begun to selectively field check BMPs, but a formal process is still needed.
- Clarify and refine roles of NPS and WSS staff to maximize program effectiveness
  - Complete – An internal document was created to clarify roles and responsibilities.
- Training on how to Calculate Load Reductions and use Models
  - In process – The completion of the online Load Duration Curve project, spearheaded by the TMDL Program, will provide the basis for future load calculation work. The module is being bolstered with instructions and input from NPS staff. Future modifications to the module to help it meet the needs of NPS grantees are being planned.
- Improve Proposal Development Process
  - In process – Staff have been brainstorming ideas on ways to help grantees develop good grant applications, such as holding a pre-grant application workshop and creating an online proposal development tutorial.
- Improve 319 Review Process – to help ensure success of projects, measurable results, and meeting program goals. Clarify process to potential grantees.
  - In process – new application forms are being finalized to help make the review process more focused and an internal set of procedures is in the early stages of development.

For FFY 2010, staff have identified as priorities for improvement for the next reporting cycle:

- Create a fairly comprehensive list of agricultural BMPs/revise the NRCS FOTG to be more useful for 319 recipients.
- Create monitoring protocol for using bird diversity and frequency as an indicator of water quality. This will serve as an additional tool groups can use when evaluating the state of their watershed.
- Research controlled drainage for field tiles and its feasibility to be promoted widely as a preferred BMP throughout the State.

# PARTNERS IN WATER QUALITY

The work that IDEM's many partners do to help assess and reduce NPS pollution is a vital component of how Indiana addresses this environmental challenge. Increased communication and partnership building will help assure that these efforts are complementary and that resources available in Indiana are deployed in a manner that allows for maximum returns.

## Natural Resources Conservation Service

The NRCS mission statement is "Helping People Help the Land." Through financial and technical assistance, NRCS works toward a landscape with productive agriculture and a high-quality environment. The guiding principles of NRCS work are service, partnership, and technical excellence. NRCS' primary customers are people who make decisions about natural resource use and management on non-federal land. This includes governments with a responsibility for natural resource use and management.

NRCS assists landowners in Indiana to develop conservation plans and provides technical assistance and advice about natural resource management. NRCS helps install practices and systems that meet technical standards and specifications. NRCS also provides financial assistance through incentive programs, easement programs, grants, and stewardship payments. NRCS' standards and specifications are utilized for many of the cost-share practices implemented through 319 grants. NRCS Farm Bill conservation programs are utilized as one funding source for implementing local watershed management plans.

NRCS' strategic plan is focused on NPS pollution issues in several areas. For example, one of the national goals for NRCS is "Clean & Abundant Water." The national objective is that agricultural producers will reduce potential delivery of sediment and nutrients from their operations by more than 70 million tons by 2010. Another goal is "High-Quality Productive Soils," and the national objective is that farmers will manage 70 percent of cropland under systems that maintain or improve soil condition and increase soil carbon by 2010.

Indiana NRCS has spearheaded a partnership effort to conduct a statewide natural resources assessment broken down by 8-digit watersheds, following the national Rapid Watershed Assessment (RWA) framework. The RWAs are available on-line at:

<http://www.in.gov/isda/2732.htm>

For Federal Fiscal Year 2009 (Oct. 1, 2008 through Sept. 30, 2009), NRCS programs in Indiana that support NPS pollution efforts included:

**Wildlife Habitat Incentive Program** – Approximately \$1.3 million provided to landowners to develop and improve wildlife habitat on private lands.

**Environmental Quality Incentive Program** – Approximately \$19.3 million provided to agriculture producers to implement structural and management conservation practices that optimize environmental benefits on working agricultural land.

**Wetlands Reserve Program** – Approximately \$5.88 million provided to landowners to protect restore and enhance wetlands on their property.

**Conservation Security Program** – Provided \$204,400 to landowners to promote conservation on private working lands.

## **Indiana State Revolving Fund Loan Program**

The Indiana State Revolving Fund (SRF) Loan Program finances projects that abate or prevent NPS pollution of Indiana's waters. The SRF Program has traditionally provided low interest loans to Indiana communities for projects that improve wastewater and drinking water infrastructure. The Program has been expanded to fund projects that meet the objectives in the Indiana NPS Management Plan. The money loaned to these NPS projects is also documented as match, when applicable, for the state Section 319(h) Grant Program. Eligible NPS projects must provide water quality benefits to their respective communities and may include one or more of the following:

- Wetland restoration/protection;
- Erosion control measures;
- Groundwater remediation;
- Failing septic system repair, replacement or connection to sewer;
- Storm water BMPs;
- Source water and wellhead protection;
- Conservation easements; and
- Agricultural and waste management BMPs.

This reporting period, the SRF Program loaned \$17.7 million to three communities on projects to reduce NPS pollution, primarily by extending sanitary sewers to areas with septic systems, thereby eliminating this potential source of pollution. In this fiscal year 2,364 septic systems were eliminated. Throughout the life of the SRF NPS program, \$138 million has been loaned and over 8,500 septic systems have been removed from service.

## **Indiana Department of Natural Resources, Division of Fish and Wildlife, Lake and River Enhancement Program**

The goal of the IDNR Division of Fish and Wildlife's Lake and River Enhancement Program is to protect and enhance aquatic habitat for fish and wildlife to insure the continued viability of Indiana's publicly accessible lakes and streams for multiple uses, including recreational opportunities. This is accomplished through measures that strive to reduce NPS sediment and nutrient pollution of surface waters to a level that meets or surpasses state water quality standards.

To accomplish this goal, grants are made available for technical and financial assistance for qualifying projects. In July 2009, the IDNR awarded \$926,095 in Lake and River Enhancement grants to protect the water quality of Indiana lakes and streams and to reduce soil erosion through, among other actions, the installation of grass cover, filter strips, and streambank or shoreline stabilization structures to reduce sedimentation and nutrient runoff. The twenty-six grants will benefit citizens and resources in eighteen counties throughout the state. Projects include lakescaping and strategic planning workshops in cooperation with the Midwest Glacial Lakes Fish Habitat Partnership and scientific studies to diagnose water-related problems and implement solutions, along with design and construction of engineered structures. Conservation practices will be installed with agricultural landowners in nine watershed land treatment projects. These LARE projects should result in improved water quality, boating, fishing, and other recreational opportunities as well as providing increased economic value for businesses, communities, and individuals who use these water bodies.

By state statute, a portion of LARE funds must be dedicated to the remedial control of invasive exotic aquatic species and sediment removal from publicly accessible lakes. In March 2009, over \$4.1 million was requested for these project types. Grants amounting to \$568,040 were awarded to survey and treat exotic invasive plants in forty lakes in fourteen counties. Due to budget limitations, over half of the lake associations that requested funding did not receive awards. Highest funding priorities included eradication of new exotic species introductions in Lake Manitou (hydrilla), Griffy Lake (Brazilian elodea), Meserve Lake (parrot feather milfoil), and control of other invasive species in those lakes; follow-up control for lakes previously funded for fluridone treatments; one new fluridone treatment; multi-year curly-leaf pondweed treatments; and in lakes conducting their second year of maintenance for Eurasian watermilfoil. For two years in a row, no new plans were funded in order to complete treatment cycles for lakes already in the program. Dredging projects provide immediate positive recreational and economic benefits to both users and residents of the affected waterbodies through removal of legacy sediments after sources have been controlled. A total of \$339,989 was distributed in three counties to six sediment removal projects involving seven Indiana lakes.

## **Indiana State Department of Agriculture, Division of Soil Conservation**

The Indiana State Department of Agriculture, Division of Soil Conservation (ISDA-DSC) focuses on enhancing the stewardship of natural resources on agricultural land, and strengthening the capacity of local Soil and Water Conservation Districts to ensure that constituents have a local resource for conservation assistance. In addition, ISDA-DSC provides conservation technical assistance to implement federal, state and local conservation projects.

The Division of Soil Conservation currently employs 26 Resource Specialists to directly assist landowners with the planning and implementation of conservation practices addressing specific soil and water resource concerns. Resource Specialists work in regional Conservation Implementation Teams alongside staff from the Natural Resources Conservation Service and Soil and Water Conservation Districts. The ISDA Resource Specialists assist with the planning, survey, design, and construction of thousands of practices annually. The common practices that these professionals work on include but are not limited to - filter strips, grassed waterways,

forested and grassed buffers, water and sediment control basins, wetland restorations, and livestock watering systems.

The Division also employs District Support Specialists to work directly with the local Soil and Water Conservation Districts (SWCD) to develop conservation priorities, goals, and plans for their respective territories. The District Support Specialists prepare and conduct trainings for SWCD supervisors and staff. They are also a resource for SWCDs in carrying out their legal and operational responsibilities.

#### Conservation Reserved Enhancement Program (CREP)

This program provides additional incentives to landowners who are willing to install practices directly adjacent to eligible surface waters. This program is possible through an agreement between the State of Indiana and the United States Department of Agriculture. The Pigeon-Highland, Tippecanoe, and Upper White River Watersheds are currently the targeted watersheds where landowners are eligible to participate in this program. To date, 778 practices have been contracted and 5,332 acres have been enrolled in conservation along Indiana's rivers, lakes, and streams. The State Soil Conservation Board (SSCB) and the Indiana State Department of Agriculture have worked with our conservation partners such as; NRCS, FSA, IDEM, The Nature Conservancy, USGS, Purdue CES, and IUPUI to obligate \$1.3 million from Indiana's Clean Water Indiana Fund to match the landowners share of the cost as well as the estimated \$15.5 million from USDA for installing CREP measures. Currently ISDA and FSA are working together to expand CREP in Indiana from eight watersheds to eleven watersheds, and to bring the total acreage from 7,000 to 26,250. ISDA is hosting state steering and technical committees with several conservation partners. These committees will help with the direction of CREP in the future, including training, marketing and the targeting of specific watersheds and practices.

#### Clean Water Indiana Grants:

In 2008, the SSCB, with the help of ISDA, awarded over \$1.2 million to local soil and water conservation districts (SWCD) for assistance with operating costs, training incentives, and to fund the Conservation Marketing Initiative grant (CMIG). The CMIG provided districts with funds to host a field day for local farmers to showcase various conservation practices. In addition, districts in many Wabash River watersheds participated in the Conservation Consulting Initiative (CCI). The CCI program was administered on a local level by five SWCDs. This program engaged Certified Crop Advisors (CCA) to discuss various conservation practices with their clients. The purpose of the program was to reach producers that typically may not be aware of conservation practices. This program provided a small incentive to the CCA as well as the landowner who implemented the practice. Due to the severe flooding of June 2008, the SSCB voted to award several districts funds in which to restore land, fix conservation practices, provide cost share, and various other practices. Additionally, in 2008 over \$200,000 was awarded to twenty-three districts through a competitive Sediment and Nutrient Reduction grant (SNRG). In 2009, \$284,887 was awarded to thirty-one districts through the SNRG.

## Indiana Lake Michigan Coastal Program

The purpose of the Indiana Lake Michigan Coastal Program (LMCP) is to enhance the state's role in planning for and managing natural and cultural resources in the coastal region and to support partnerships between federal, state and local agencies and organizations. The Indiana Department of Natural Resources is the lead agency implementing the LMCP.

The LMCP passes through approximately \$650,000 annually through its Coastal Grants Program for projects to protect and restore natural, cultural and historic resources in Indiana's Lake Michigan coastal region. Project categories include land acquisition (ex. riparian corridors), low cost construction (ex. natural area restoration), education and outreach, and planning/coordination/management (ex. land use planning and ordinances).

[www.in.gov/dnr/lakemich/grants/index.html](http://www.in.gov/dnr/lakemich/grants/index.html)

The LMCP recently hired a planner to its staff. The position increases the programs capacity to provide technical assistance to local communities on land use planning and incorporation of Smart Growth principles through local zoning and ordinances. The LMCP is currently funding a number of these efforts through its Coastal Grants Program.

As part of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), Congress created a stand-alone provision, Section 6217, which requires that states and territories with approved coastal management programs to develop a coastal NPS pollution control program to address water quality impairment of coastal waters. The purpose of the program is to develop and implement management measures for NPS pollution to restore and protect coastal waters.

The Indiana Clean Marina Program is a voluntary, incentive based program that encourages marinas and recreational boaters to implement environmentally sound practices to protect Indiana's inland and coastal waterways. Since the program's inception last year four marinas have signed the Indiana Clean Marina Pledge indicating their commitment to achieve full designation. Combined these marinas have 2,016 boat slips, twelve launch ramps, three fuel docks, seven fixed and three portable pumpout stations, and two fish cleaning stations servicing boaters on Lake Michigan. Additionally, Hammond Marina recently installed a boat wash station to reduce the negative impacts of storm water runoff and to the spread of aquatic invasive species as part of the program. Several hundred bilge socks that absorb fuel and oil were purchased and are currently being distributed by the Coastal Nonpoint Program to boaters.

The LMCP is partnering with the Indiana State Department of Health to develop an online septic system tracking database. The online database is being modeled upon The Wastewater Information System Tool (TWIST) developed by the EPA. It will allow the state and local health departments to effectively inventory and manage small wastewater treatment systems in their jurisdictions. It is designed to track information related to homes and facilities served, permits, site evaluations, types of systems, inspections and complaints. It will also help identify and capture important system inventory and service information to help standardize management information. Completion of the online database and training is scheduled for completion by November 2009. Funding for the project is coming from LMCP's 309 Program Enhancement funds.

The Coastal Nonpoint Grants Program awarded \$34,635 to local communities and groups to protect water quality in the coastal area. A total of six grants were awarded under the education and outreach and resource management categories. Projects that demonstrated implementation of action items listed in approved local watershed management plans were given funding priority. Funds were also internally to develop a how-to rain garden manual for homeowners. The manual is available through the Northwest Indiana Regional Plan Commission website, local rain garden workshops and the LMCP website:

[www.in.gov/dnr/lakemich/issues/cprprogram.htm](http://www.in.gov/dnr/lakemich/issues/cprprogram.htm) ,

The CNP continues to provide technical assistance to local subwatershed groups within the Little Calumet-Galien River Watershed. The CNP has assisted groups by performing macroinvertebrate and habitat assessments using approved methodologies from the EPA and IDEM. The CNP has also provided GIS support (identification of critical areas, land use change analysis, etc.). The CNP works with these groups to develop watershed plans and implementation projects consistent with 6217(g) guidance and provides volunteer water quality monitoring training.

## **Indiana Association of Soil and Water Conservation Districts**

The mission of the Indiana Association of Soil and Water Conservation Districts (IASWCD) is to represent Soil and Water Conservation Districts as one voice, and to assist the leadership of local SWCDs through coordination and education for the wise use and management of our natural resources.

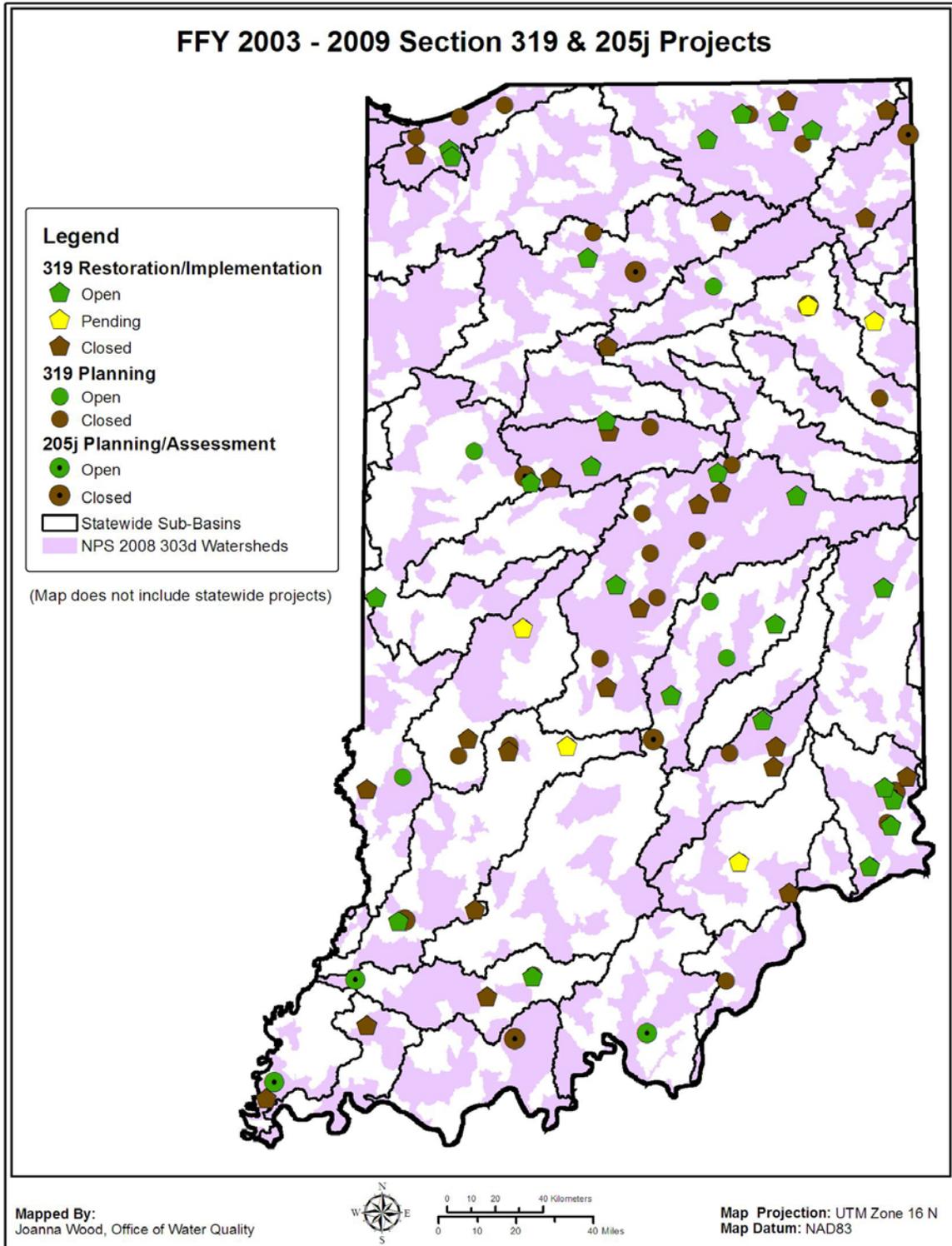
One of the many ways the IASWCD promotes the wise use of Indiana's natural resources is by providing information and outreach in support of statewide efforts to develop and enhance Indiana's watershed program and help address NPS pollution. Section 319(h) funds are used to staff a Watershed Information Specialist position at the IASWCD that serves as a liaison with IDEM Office of Water Quality staff to help promote watershed management efforts throughout the state.

Following are the accomplishments for the 2009 reporting period:

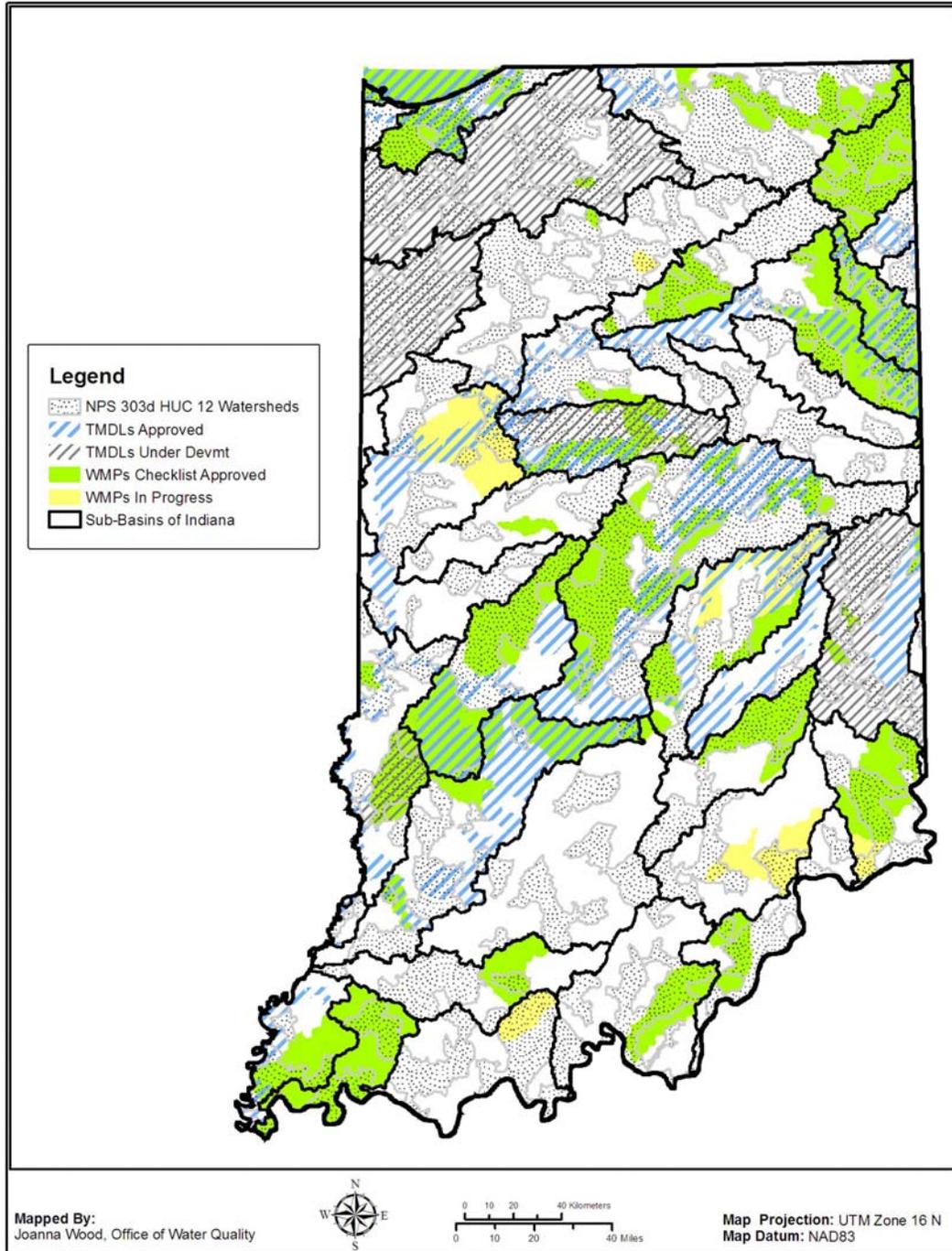
- Served as a key contact for SWCDs via the IASWCD Weekly Update, developed under this grant agreement and instrumental in regularly communicating issues, events, and resources in watershed management statewide. Update can be found at [www.iaswcd.org](http://www.iaswcd.org). This position also contributed significantly to the planning of the Watershed Networking Sessions, statewide events that were replicated regionally to maximize participation and contact between the Watershed Team and local groups.
- Met regularly with IDEM Watershed Specialists and Watershed Planning Branch Chief for communication and planning purposes.

- Launched and updated the watershed resources website within the IASWCD website. It can be found at <http://www.iaswcd.org/watershed/index.html>
- Developed an internal watershed specialist tracking database in conjunction with IDEM 319 staff and the WSS.
- Served as a team leader for the 2009 Indiana Watershed Leadership Academy.
- Worked with IDEM staff to develop an online watershed toolkit structure that will provide useful products for watershed management.
- Updated the watershed inventory project, developed with the help of Purdue University, IDEM, NRCS, CTIC, and other partners. It identifies past and current efforts in watershed management and is a comprehensive and very necessary element for increasing program delivery efficiency and maximizing partner / public dollars. It can be found at <https://engineering.purdue.edu/~iwla/finder/index.html>

# APPENDIX A: Distribution of NPS Projects



# APPENDIX B: Watershed Planning/TMDL Activities and 303(d) Listed Waterbodies by Watershed Area



Appendix B illustrates the distribution of TMDL development activities over watershed planning activities. The grayed areas are representative of the watersheds that include at least one listing of a NPS impaired water body. As evident by the areas with solid green or yellow and blue or gray stripes, these watersheds have received much attention for their level of impairments and interest from local entities to improve water quality through comprehensive planning and subsequent implementation activities.



# APPENDIX C: Open 319 Projects 9/1/08 – 8/31/09

FFY	ARN	Contractor	Project	Status	Start	End	Type	Project
2001	6-71	Save the Dunes Conservation Fund	Dunes Creek WMP Implementation Phase I	Closed	7/26/2006	9/30/2008	Restoration/Impl	Sky Schelle
2002	6-64	St. Joseph River Watershed	Cedar Creek WMP Implementation Phase I	Closed	11/14/2005	11/13/2008	Restoration/Impl	Laura
	7-172	St. Joseph River Watershed	St. Joseph River Water Quality Database	Closed	10/4/2007	3/31/2009	Education	Laura
2003	6-155	Hamilton County SWCD	Duck Creek WMP	Closed	7/26/2006	3/31/2009	Restoration/Impl	Kyle
	6-165	Wildcat Creek Watershed Alliance	Implementation of Wildcat Creek WMP	Closed	8/29/2006	3/31/2009	Restoration/Impl	Crystal
	7-161	Briljent	NPS Management Plan	Closed	5/29/2007	12/31/2008	ProgramSupport	Doug
	7-9	Steuben County Commissioners	Pigeon Creek WMP Implementation	Closed	11/17/2006	11/16/2008	Restoration/Impl	Joanna
2004	5-133	Indiana University	Assessment of Indiana Lakes	Open	8/5/2005	8/4/2009	Assessment	Laura
	5-44	Delaware Co. SWCD	White River Watershed Plan Implementation	Closed	3/11/2005	12/10/2008	Restoration/Impl	Kyle
	5-64	Wayne County SWCD	Whitewater River Implementation Plan	Closed	12/29/2004	12/28/2008	Restoration/Impl	Leanne
	6-108	St. Joseph River Watershed	Sediment, Pesticide & Nutrient Reduction Phase II	Closed	3/20/2006	3/31/2009	Restoration/Impl	Laura
	6-65	Indiana University	Integration of WQ Tools/Information to Reduce NPS	Closed	12/21/2006	3/31/2009	ProgramSupport	Joanna
	6-663	Indiana University	Eagle Creek WMP Implementation Phase I	Open	3/2/2006	10/31/2009	Restoration/Impl	Sky Schelle
	7-8	Cass County SWCD	Eel River-Tick Creek	Closed	9/15/2006	3/14/2009	Restoration/Impl	Leanne
2005	5-163	Purdue University	Develop/Demo of Evaluation Framework for NPS Prog	Closed	12/22/2005	12/31/2008	ProgramSupport	Betty
	5-165	Jennings County SWCD	Lower Sand Creek Watershed	Closed	10/12/2005	10/11/2008	Restoration/Impl	Leanne
	5-172	Pheasants Forever	Prairie Grass/Tree Planting & Wetland Restor	Open	1/5/2006	1/4/2010	Restoration/Impl	Kyle
	6-111	Clinton County SWCD	Spring Creek-Lick Run Watershed BMP Implementation	Closed	6/1/2006	5/31/2009	Restoration/Impl	Crystal
	6-128	Dearborn County SWCD	Tanners Creek Watershed Implementation	Closed	4/6/2006	10/5/2008	Restoration/Impl	Leanne
	6-156	Conservation Technology	Training Program for NPS Pollution/Seminars	Open	8/28/2006	1/31/2010	Education	Sky Schelle
	6-164	Historic Hoosier Hills	Southern Laughery Creek Watershed Implementation	Open	12/6/2006	3/31/2010	Restoration/Impl	Leanne
	6-166	Tippecanoe County Surveyor	Implementation of Lauramie Creek WMP	Open	9/15/2006	9/14/2009	Restoration/Impl	Crystal
	6-75	The Nature Conservancy	Tippecanoe River 2-Stage Ditch Demonstration	Open	5/4/2006	1/3/2010	Restoration/Impl	Kyle
	8-69	Indiana Department of	WQ Assessment Information Accessibility System	Open	3/26/2008	9/25/2009	ProgramSupport	Joanna
	9-254	Indiana University	Indiana Clean Lakes Program	Pending	8/5/2009	1/4/2012	Assessment	Laura

## 2006

10-18	Tippecanoe Environmental Lake &	Upper Tippecanoe/Grassy Creek Impl. (contract#2)	Pending			Restoration/Impl	Crystal
6-170	Indiana Association of Soil and	Indiana Watershed Promotion/TMDL Support	Open	5/12/2007	5/11/2010	ProgramSupport	Laura
6-171	Owen County SWCD	Owen County Watershed Initiative	Closed	11/22/2006	2/21/2009	Planning	Sky Schelle
6-172	Clark County SWCD	Silver Creek Watershed Improvement	Closed	1/8/2007	4/7/2009	Planning	Crystal
6-176	Putnam County SWCD	Big Walnut/Deer Creek WMP	Closed	11/3/2006	2/2/2009	Planning	Crystal
6-177	Elkhart River Restoration	Elkhart River WMP	Open	11/22/2006	2/21/2010	Restoration/Impl	Kyle
7-103	Johnson County SWCD	Youngs Creek WMP Phase III	Open	1/2/2007	9/30/2009	Restoration/Impl	Kyle
7-135	Gibson County SWCD	Pigeon Creek Headwaters - Contract#2	Closed	2/2/2007	2/1/2009	Restoration/Impl	Crystal
7-157	Patoka Lake Regional Water &	Patoka Lake Source Water Protection Plan	Open	8/20/2007	8/19/2010	Restoration/Impl	Doug
7-3	Marion County SWCD	Lower Fall Creek Watershed Improvement Project	Closed	11/22/2006	5/21/2009	Planning	Sky Schelle
7-7	Howard County SWCD	Pete's Run and Little Deer Ck. Implementation	Open	11/22/2006	5/21/2010	Restoration/Impl	Crystal
7-79	LaGrange County SWCD	LaGrange WQ Improvement	Open	3/8/2007	3/31/2011	Restoration/Impl	Kyle
7-80	Tippecanoe Environmental Lake &	Upper Tippecanoe/Grassy Ck. Implementation	Closed	3/8/2007	6/7/2009	Restoration/Impl	Crystal
7-81	Hancock County SWCD	Sugar Creek WMP	Open	1/3/2007	7/2/2009	Planning	Leanne
7-87	Historic Hoosier Hills	Central Muscatatuck WMP	Open	2/15/2007	8/14/2009	Planning	Leanne
8-134	Purdue University	Strengthening Watershed Leaders' Capacity (IWLA)	Open	7/31/2008	1/31/2011	ProgramSupport	Betty
8-75	Save the Dunes Conservation Fund	Salt Creek Implementation Demonstration	Open	3/13/2008	3/12/2011	Restoration/Impl	Sky Schelle

## 2007

7-182	LaGrange County SWCD	Little Elkhart River WMP Update	Open	11/26/2007	11/25/2011	Restoration/Impl	Kyle
7-183	Knox County SWCD	Kessinger Ditch WMP Implementation	Open	9/22/2007	12/21/2010	Restoration/Impl	Crystal
7-184	Allen County SWCD	St. Marys WMP Planning and Implementation	Open	9/7/2007	3/6/2010	Planning	Kyle
7-186	Purdue University	Development/Demo of Evaluation Framework	Open	7/14/2008	1/31/2012	ProgramSupport	Betty
7-187	Sullivan County SWCD	Busseron Watershed Planning & Implementation	Open	12/12/2007	3/11/2011	Planning	Crystal
8-131	Henry County SWCD	Big Blue River WMP	Open	7/15/2008	1/14/2011	Planning	Leanne
8-54	Clinton County SWCD	SF Wildcat Creek/Blinn Ditch/Kilmore Ck	Open	6/1/2008	11/30/2010	Restoration/Impl	Crystal
8-55	Vermillion County SWCD	Little Vermillion Watershed Project	Open	5/1/2008	10/31/2011	Restoration/Impl	Crystal
8-56	Wayne County SWCD	Whitewater River Initiative	Open	2/22/2008	8/21/2011	Restoration/Impl	Leanne
8-93	Dearborn County SWCD	Hogan Creek Watershed Project	Open	3/28/2008	9/27/2010	Restoration/Impl	Leanne
8-94	Rush County SWCD	Little Blue River Watershed Project	Open	3/28/2008	9/27/2010	Restoration/Impl	Leanne
8-97	Bartholomew County SWCD	EF White River/Clifty Creek	Open	4/25/2008	4/24/2011	Restoration/Impl	Leanne

## 2008

8-189	Save the Dunes Conservation Fund	Salt Creek Watershed Cost-Share & Outreach Program	Open	2/1/2009	1/31/2013	Restoration/Impl	Sky Schelle
8-190	Delaware Co. SWCD	White River Watershed Project	Open	12/11/2008	12/10/2011	Restoration/Impl	Kyle
9-54	Wabash River Enhancement Corp.	Wabash River:Lafayette-West Lafayette Reach WMP	Open	11/12/2008	5/11/2011	Planning	Crystal
9-56	Dearborn County SWCD	Tanners Creek Watershed Project	Open	8/26/2008	2/25/2011	Restoration/Impl	Leanne

9-57	Historic Hoosier Hills	South Laughery Creek Watershed	Open	4/1/2009	1/31/2013	Restoration/Impl	Leanne
9-89	Madison County SWCD	Little Duck & Lilly Creek Implementation Project	Open	10/27/2008	12/26/2011	Restoration/Impl	Kyle
9-90	Manchester College	Middle Eel River Watershed Initiative	Open	1/1/2009	12/31/2012	Planning	Kyle
9-91	Historic Hoosier Hills	Indian Creek Watershed Project	Open	2/26/2009	2/25/2012	Restoration/Impl	Leanne

2009

10-1	Indiana University	Eagle Creek Watershed Implementation Project	Pending			Restoration/Impl	Sky Schelle
9-272	Tippecanoe Watershed Foundation	WQ Improvement in Upper Tippi/Grassy Creek	Pending			Restoration/Impl	Crystal
9-274	Allen County SWCD	St. Marys River WMP Implementation	Pending			Restoration/Impl	Kyle
9-275	Steuben County SWCD	Pigeon Creek WMP Implementation Phase 2	Pending			Restoration/Impl	Kyle
9-276	Monroe County SWCD	Bean Blossom Watershed Implementation Project	Pending			Restoration/Impl	Kyle
9-277	Historic Hoosier Hills	Central Muscatatuck Watershed Project	Pending			Restoration/Impl	Leanne
9-278	Putnam County SWCD	Big Walnut/Deer Creek Watershed Implementation	Pending			Restoration/Impl	Crystal
9-282	Upper Wabash River Basin	Wabash River Basin WMP Implementation	Pending			Restoration/Impl	Leanne

# APPENDIX D: Open 205(j) Projects 9/1/08 - 8/31/09

FFY	ARN	Contractor	Project	Status	Start	End	Type
2006							
	7-111	U. S. Geological Survey	Algal Biomass Report on 2001-2005 Data	Closed	5/2/2007	2/1/2009	ProgramSupport
	7-6	Posey County SWCD	Big Creek WMP	Closed	11/21/2006	2/20/2009	Planning
2007							
	8-96	Upper White River Watershed Alliance	Water Quality Data Interpretation and Improvement	Open	5/18/2009	5/17/2011	ProgramSupport
	9-180	Brown County SWCD	Yellowwood Stream Restoration Demo	Open	2/17/2009	11/16/2010	Planning
2009							
	9-271	Clinton County SWCD	S. F. Wildcat Creek WMP	Pending			Planning
2009ARRA							
	10-19	Northern Indiana Regional Planning	Watershed Planning in NW IN	Pending			Planning
	N01	MACOG	Pleasant and Riddles Lake Watershed Management	Pending			Planning
	N03	Ohio River Valley Water Sanitation	Lower Wabash R. Nutrients & Continuous Monitoring	Pending			Assessment
	N04	Ohio-Kentucky-Indiana Regional	Dearborn Co. Water Quality Management Plan Update	Pending			Planning

# APPENDIX E: Project Summaries for Closed Section 319 Projects

## FFY 2001

**Dunes Creek WMP Implementation (6-71)** – Save the Dunes Conservation Fund implemented portions of the Dunes Creek WMP by implementing BMPs outlined in the Plan. BMPs included filter strips, rain gardens, wetlands, critical area plantings, vegetated swales, a grassed waterway, rain barrels and an animal waste compost facility. Water quality monitoring was conducted as well as an education and outreach program to inform stakeholders about the cost-share program and other project activities.

## FFY 2002

**Cedar Creek WMP Implementation (6-64)** - The St. Joseph River Watershed Initiative (SJRWI) implemented a cost-share program to fulfill the objectives in the Cedar Creek Watershed Management Plan. The cost-share programs included replacement of failing septic systems and demonstration of alternative septic systems, and installation of other BMPs in critical areas in the watershed. The SJRWI continued monitoring water quality at twenty-two sites in the St. Joseph River Watershed, including ten (10) locations in the Cedar Creek watershed. An education and outreach program was conducted for stakeholders in the watershed to fulfill the education goal of the watershed management plan including workshops, media releases, newsletters, stakeholder meetings, volunteer monitoring, and installation of watershed information signs. A watershed curriculum targeting 4<sup>th</sup> and 5<sup>th</sup> grade was also developed to meet Indiana state science standards that teaches students about the St. Joseph River/Maumee watershed and its regional importance. It was distributed to schools throughout the watershed.

**St. Joseph River Water Quality Database (7-172)** - The St. Joseph River Watershed Initiative (SJRWI) compiled water quality data collected weekly by staff since 1996 during the recreation season from approximately 24 sites in the St. Joseph River watershed. Water quality data supplied by the City of Ft. Wayne Utilities from the water filtration plant intake, Mayhew Road Bridge, and Tennessee Street Bridge was also added. The SJRWI constructed a web-enabled database system for the water quality data compiled which allows the public to quickly and easily access the data, view it in tabular or graphical format, print reports, export data, query the database for data of interest, and geographically select and review the data and the sampling sites with a point and click interface. The online database is accessible to the public via the SJRWI website at [www.sjrwi.org](http://www.sjrwi.org). Staff will continue to use the website and enter water quality data that is continuously collected by the SJRWI in the St. Joseph River watershed. A brochure was developed that highlights the water quality information available and the online database and how to use it.

## FFY 2003

**Duck Creek Watershed Management Plan (6-155)** - The Hamilton County SWCD produced a watershed management plan for the Duck Creek watershed, Hydrologic Unit Code (HUC) 05120201060. A steering committee met to track the project's progress and stakeholder meetings were conducted to identify and prioritize stakeholder concerns, set water quality goals, and identify and prioritize potential action items to achieve the goals. The SWCD conducted biological (macroinvertebrate) sampling and a habitat assessment at a minimum of ten (10) sites in the watershed before implementing BMPs. The SWCD developed and implemented a cost-share program for water quality BMPs in critical areas in the watershed following the Duck Creek WMP.

**Implementation of Wildcat Creek WMP (6-165)** - The Wildcat Creek Watershed Alliance began implementing the Little Wildcat Creek Watershed Management Plan (WMP) by implementing a cost-share program for streambank stabilization, riparian buffers and other BMPs identified in the WMP. An

education and outreach program was also conducted consisting of press releases, a workshop and brochure on septic system maintenance, a workshop and brochure on Low Impact Development, and a workshop and brochure on stream corridor enhancement.

**NPS Management Plan Update (7-161)** – Briljent, LLC worked with the Nonpoint Source Program staff to update Indiana's Nonpoint Source Management Plan which serves as a guide for state and local entities to manage NPS pollution in Indiana. Stakeholder meetings were conducted to gain input concerning the Plan. Public comments regarding the posted draft of the updated NPS Plan were received and written responses were drafted. Appropriate revisions to the Plan were made based on the comments received and the updated NPS Management Plan may now be found on the IDEM website at <http://www.in.gov/idem/5970.htm>.

**Pigeon Creek WMP Implementation (7-9)** - The Steuben County Commissioners implemented a cost share program to install BMPs such as filter strips, grassed waterways, and water and sediment control basins that address nonpoint source pollutants outlined in the 2005 Pigeon Creek Watershed Management Plan. A public outreach and education program was conducted tailored to meet the needs identified in the Plan to inform residents, landowners, and other stakeholders about behavior changes that would improve water quality in the watershed. The education program included topics such as lawn fertilizer BMPs, crop and livestock BMPs, septic maintenance, car washing, pet waste and urban construction site BMPs.

#### FFY 2004

**Assessment of Indiana Lakes (5-133)** – Indiana University, School of Public and Environmental Affairs continued the annual assessment of Indiana lakes to ascertain and track water quality in these lakes. Water samples from approximately two hundred Indiana lakes were collected and analyzed, primarily in July and August during the summer stratification period. A report summarizing and comparing lake water quality assessments was produced. The *Water Column* newsletter was published quarterly as a medium for education and open exchange of information regarding lake and watershed management in Indiana. The statewide network of citizen volunteer lake monitors on public and private waters was expanded and the data compiled and published in a report. The Indiana Clean Lakes Program web site (<http://www.indiana.edu/~clp/>) was updated and utilized to inform the public about lake and watershed issues in Indiana.

**White River Watershed Plan Implementation (5-44)** – The Delaware County SWCD implemented the White River Watershed Project Management Plan to reduce water quality pollutants in the Buck Creek, Killbuck-Mud Creek, and Prairie Creek subwatersheds. The District implemented an education and outreach program to encourage public behavioral changes that will result in a reduction of non-point source water pollutants, including: a conference on the combined needs of both pollution prevention and drainage; an educational brochure on proper septic system maintenance; a lawn management workshop to educate the public on suburban/residential water quality issues; an erosion control workshop for developers, contractors, and the construction community; educational materials on organic/chemical free agriculture/gardening; a constructed wetland demonstration site to educate the public on the benefits of wetlands; and a public watershed tour to highlight and demonstrate water quality improvement practices. The District also implemented a cost-share program to install BMPs in target areas as identified in the plan, focusing on buffer strips, reduced tillage and no-till farming, manure management, nutrient management, and pest management. A water quality and biological monitoring program was also conducted.

**Whitewater River Implementation Plan (5-64)** – The Wayne County SWCD implemented the Middle Fork Whitewater Watershed Management Plan by implementing a cost-share program and conducting education and outreach activities. BMPs implemented included fencing and alternative water systems, riparian buffer tree planting, and manure management. The cost-share sites were used for field day events to demonstrate the BMPs. Education and outreach activities were conducted to increase awareness about the watershed project and nonpoint source pollution and included news releases, newsletters, stakeholder meetings, workshops to educate the public about septic system maintenance

and urban nonpoint source pollution, reservoir clean-up events, brochures, and education for local school children during Wayne County's annual Agriculture Days and at Earth Day Festivities.

**Sediment, Pesticide & Nutrient Reduction in the St. Joseph River Watershed (6-108)** - The St. Joseph River Watershed Initiative implemented the St. Joseph River Watershed Management Plan. The Initiative worked to reduce sediment, nutrient and pesticide runoff in the St. Joseph River by providing cost-share assistance to farmers for modification of their planting, tillage, and/or harvesting equipment to allow them to effectively implement conservation tillage and/or nutrient and pest management. The initiative is also leased conservation tillage equipment and made it available to farmers interested in evaluating conservation tillage systems. Farmers maintained accurate records of crop inputs and crop yields on fields where the conservation tillage equipment was used in comparison to a conventional tillage system. This information was used to evaluate the agronomic and economic performance of the conservation tillage system. The Initiative also provided educational and outreach opportunities for farmers and others to learn more about conservation tillage and/or nutrient and pest management through summer field days and winter meetings.

**Integration of Water Quality Tools/Information to Reduce NPS Pollution (6-65)** – Using existing local data and statewide imagery, Indiana University (Polis Center) worked with Purdue University to integrate the Watershed Delineator and L-THIA modeling tools into the Indiana Water Quality Atlas and added high resolution data to the application for better results. Coordination with local county governments and the state to collect and integrate higher resolution data into the application benefits the user by enhancing the modeling capabilities as well as the mapping facility already a part of the Atlas. Providing these tools through the Atlas has helped watershed coordinators and state staff in the evaluation of water quality data within user defined sub-watersheds. To demonstrate to the targeted users, a TMDL was produced using the tools provided. Through the use of cooperative agreements with local government agencies and use of technical staff within the Indiana, Purdue, and IUPUI Universities, the enhancement included reviewing the current application and incorporating new interface options to accommodate the new features. A workplan style agreement was used to track progress. A demonstration was done as part of the TMDL development to test its effectiveness for further improvements during this project.

**Eel River-Tick Creek (7-8)** – The Cass County SWCD implemented the Eel River-Tick Creek WMP. The project had three primary goals: 1) address pathogen sources to control the flow of E. coli from the watershed to the Eel River-Tick Creek watershed waterbodies; 2) reduce sediment loading to the tributaries within the Eel River-Tick Creek watershed; and 3) serve as a demonstration site for future work in the watershed, throughout Logansport, and the surrounding area. The project accomplished some of these goals through creation of an education site and completion of a field day to promote BMPs and implementation of cost-share program for no-till and hayland planting within the Eel River-Tick Creek watershed.

#### FFY 2005

**Development/Demonstration of Evaluation Framework for NPS Program (5-163)** – Purdue University developed a framework to assess the impacts of 319-funded watershed planning and implementation projects on social outcomes such as knowledge, attitudes, and behavior of watershed residents and stakeholders, and environmental outcomes such as the effect of implemented management practices on water quality. This evaluation framework will enhance Indiana's ability to account for the success of watershed projects that improve water quality at both the project and statewide program level.

**Lower Sand Creek Watershed Project (5-165)** – The Jennings County SWCD implemented the Sand Creek Watershed Management Plan by implementing a cost-share program and providing education and outreach. BMPs were implemented in critical areas as described in the watershed management plan. Outreach and partnership-building activities were conducted to raise public awareness and participation in the Sand Creek Watershed Project including conservation/education field days about nonpoint source pollution or BMPs, public meetings, a "Sweep the Creek" stream clean-up event, brochures, newsletters about the project, a display about the project for use at community events, and signs to promote the watershed project and recognize landowners participating in project-sponsored conservation efforts. The

District also assisted teachers with teaching materials and established a watershed education curriculum for future use.

**Spring Creek-Lick Run Watershed BMP Implementation (6-111)** – Clinton County SWCD implemented the Spring Creek-Lick Run Watershed Management Plan (WMP). A cost-share program was developed to install BMPs in target areas as identified in the WMP. The focus of the program included filter strips, riparian buffers, fencing of livestock, alternative watering systems and Comprehensive Nutrient Management Plans. The District also conducted a public education and outreach program.

**Tanners Creek Watershed Implementation (6-128)** – Dearborn County SWCD implemented the Tanners Creek Watershed Management Plan by implementing a cost-share program and providing education and outreach. The cost-share program consisted of BMPs such as conservation tillage, pasture/hayland improvement, livestock exclusion, and others that address the natural resource concerns outlined in the watershed management plan. Dearborn County also conducted comprehensive education and outreach activities to raise public awareness and participation in the Tanners Creek Watershed Project.

#### FFY 2006

**Owen County Watershed Initiative (6-171)** – The Owen County SWCD developed a watershed management plan for the Big/Limestone Creek, Mill/Little Mill Creek, and Fall/McCormick's Creek watersheds; HUCs 051202020010, 051202020020 and 051202020030. A monitoring program was conducted in the watersheds to establish baseline water quality. The District also conducted an education and outreach program consisting of public stakeholder meetings to inform the public of data and gain as much input as possible; displays to promote the project; public presentations; a website; mailings and group email notifications; and articles to the media.

**Silver Creek Watershed Improvement (6-172)** - The Clark County SWCD developed a watershed management plan for the Silver Creek watershed. A monitoring program was conducted to establish a baseline and determine existing water quality problems. The District also conducted an education and outreach program consisting of demonstrating riparian buffer enhancement plantings and other water quality improvement activities; conducting quarterly steering committee meetings to gather input into the development of the plan; distributing an urban riparian buffer brochure; conducting annual volunteer stream sweep activities; developing a watershed awareness display for use at public events, and conducting field days or workshops to educate landowners about BMPs and water quality, including a field day at the demonstration of riparian buffer enhancement plantings.

**Big Walnut/Deer Creek Watershed Management Plan (6-176)** – The Putnam County SWCD produced a watershed management plan for Big Walnut Creek and Deer Creek watersheds, Hydrologic Unit Codes (HUCs) 05120203010, 20, 30, 40, and 50. A steering committee of local stakeholders was organized to guide the development of the watershed plan. A monitoring program was conducted to identify nonpoint source pollution and critical areas within the watershed. The SWCD also conducted an outreach and education program including press releases to local papers; public stakeholder meetings; and an outreach brochure highlighting the project and its goals.

**Pigeon Creek Headwaters Project (7-135)** - The Gibson County SWCD implemented the Highland Pigeon Watershed Management Plan by developing and implementing a cost-share program to reduce sediment and nutrient loading to the Smith Fork, Halfmoon Ditch, and Snake Run watersheds using BMPs including filter strips, waterways, grade stabilization structures, riparian buffers and equipment modifications for nutrient and crop residue control. The District also conducted an education and outreach program consisting of a field day to showcase the installed BMPs, articles to the media, and programs concerning watersheds issues and land use to schools and community groups.

**Lower Fall Creek Watershed Improvement Project (7-3)** – The Marion County SWCD produced a watershed management plan for the Lower Fall Creek watershed; Hydrologic Unit Codes (HUCs)

05120201110-010, 020, 030, 040, 050, 060. The District also constructed a comprehensive Geographic Information System (GIS) for the watershed that included land use, streams, 303(d) listed streams, and monitoring site location data. Monitoring was conducted to identify the location of water quality problems in the watershed. The District also conducted a public education and outreach program consisting of steering committee and stakeholder meetings to gain input into the development of the plan, workshops focused on issues specific to the Lower Fall Creek Watershed, an educational brochure, newsletters, and demonstrations of BMPs for addressing the water quality problems identified in the plan

**Upper Tippecanoe/Grassy Creek Implementation (7-80)** - The Tippecanoe Environmental Lake & Watershed Foundation (TELWF) is implemented the Upper Tippecanoe River Watershed Management Plan by developing a cost-share program to install BMPs to reduce sediment, nutrient and *E. coli* loading in the Upper Tippecanoe Watershed, focusing on the Grassy Creek-Robinson Lake/Ridinger Lake (HUC 05120106010060), Elder Ditch (HUC 05120106010070), and Smalley Lake (HUC 05120106010030) subwatersheds. The TELWF also conducted public education and outreach activities, including a field day highlighting completed BMPs; education days addressing watershed issues such as land use, riparian zones, erosion control, nutrient management, and septic system issues/maintenance; newsletters, and a brochure on BMPs.

**Sugar Creek Watershed Management Plan (7-81)** - The Hancock County SWCD produced a watershed management plan for the Sugar Creek watershed (Hydrologic Unit Code 05120204060). An advisory group was formed to guide the development of the watershed plan. The District conducted a monitoring program to assess water quality conditions in the Sugar Creek watershed for the plan development. Education and outreach activities were also conducted to raise public awareness and participation in the Sugar Creek Watershed Project. Activities included news releases to the local media; newsletters about the project to watershed stakeholders; workshops and/or field days to educate stakeholders about agricultural and urban BMPs; displays to promote the project; and organizing a Hoosier Riverwatch volunteer monitoring group.

**Central Muscatatuck Watershed Management Plan (7-87)** - The Historic Hoosier Hills RC&D produced a watershed management plan for the Central Muscatatuck watershed (Hydrologic Unit Codes 05120207010 and 05120207030). A monitoring program was conducted to assess water quality conditions in the Central Muscatatuck watershed. The RC&D also conducted education and outreach activities to raise public awareness and participation in the Central Muscatatuck watershed project, including public meetings; news releases to the local media; and river or lake clean-ups.

# APPENDIX F: List of Attached Final Reports for Section 319 Projects

ARN	FFY	Project Name
6-71	2001	Dunes Creek WMP Implementation
6-64	2002	Cedar Creek WMP Implementation
7-172	2002	St. Joseph River Water Quality Database
6-155	2003	Duck Creek WMP
6-165	2003	Implementation of Wildcat Creek WMP
7-161	2003	NPS Management Plan
7-9	2003	Pigeon Creek WMP Implementation
5-133	2004	Assessment of Indiana Lakes
5-44	2004	White River Watershed Plan Implementation
5-64	2004	Whitewater River Implementation Plan
6-108	2004	Sediment, Pesticide, & Nutrient Reduction in the St. Joseph River
6-65	2004	Integration of WQ Tools/Information to Reduce NPS
7-8	2004	Eel River-Tick Creek
5-163	2005	Dev/Demo of Evaluation Framework for NPS Program
5-165	2005	Lower Sand Creek Watershed
6-111	2005	Spring Creek-Lick Run Watershed BMP Implementation
6-128	2005	Tanners Creek Watershed Initiative
6-171	2006	Owen County Watershed Initiative
6-172	2006	Silver Creek Watershed Improvement
6-176	2006	Big Walnut/Deer Creek WMP
7-135	2006	Pigeon Creek Headwaters
7-3	2006	Lower Fall Creek Watershed Improvement Project
7-80	2006	Upper Tippecanoe/Grassy Creek Implementation
7-81	2006	Sugar Creek WMP
7-87	2006	Central Muscatatuck WMP



# Indiana's FFY 2009 NPS Program

## Summary of Cumulative Environmental Benefits from Project Activities

---

Section 319(h) NPS projects funded under the FFY 2009 grant cycle were highly successful in achieving important water quality benefits to Indiana's surface waters. The following is a summary of best management practices (BMPs) installed during these projects along with the associated estimated load reductions for sediment, phosphorus, and nitrogen:

### **Agricultural Management Practices**

- Implemented 9 nitrogen reduction practices on approximately 3,689 acres of farmlands within targeted watersheds and 5 additional sites developed Comprehensive Nutrient Management Plan with 14 more sites incorporating Nutrient and/or Pest Management (590) Plans/practices on 6,288 acres of production farmland. Also, established 2 Prescribed Grazing (528A) areas on 8 acres and 17 Pasture and Hay Planting (512) areas on 319 acres.
- Installed more than 40,210 linear feet of fencing (382) to exclude livestock from waterways, 370 feet of pipeline and 3 Spring Development/Watering Facilities, 1 Grade Stabilization Structure, 3 Rock Barriers, and 32 Water and Sediment Control Basins.
- Load reductions resulting from these practices: 8,619 tons/year of sediment, 15,320 lbs/year of phosphorus, and 18,965 lbs/year of nitrogen.

### **Water Quality and Riparian Zone Restoration**

- 23 Heavy Use Protection (561) areas were completed including 3 Trough and Tank structures, and 1 Wetland Creation project were completed on 64 acres for the total reduction of 1302 tons/year of sediment, 927 lbs/year of phosphorus, and 1,788 lbs/year of nitrogen in annual load reduction.
- 5 Filter Strip (393), 1 Riparian Herbaceous Cover, 2 Riparian Forest Buffers, and 3 Grassed Swale and Waterway plantings were also installed along 37 acres of riparian zone, as well as another 30,952 feet of Streambank and Shoreline Protection (580) and Stream Channel Stabilization, to provide for an additional 2,854 tons/year of sediment, 2,629 lbs/year of phosphorus, and 5,691 lbs/year of nitrogen.

### **Habitat Restoration**

- Established 3 Critical Area Plantings and 1 Wetland Restoration of 8.8 acres for habitat restoration. Load Reductions resulting from these practices: 23 tons/year of sediment, 76 lbs/year of phosphorus, and 165 lbs/year of nitrogen.

### **Waste Management**

- Successfully completed the installation of 8 Waste Management Systems and 2 Waste Utilization areas to service 658 acres and installed 5 Cover and Green Manure Crop areas on 486 acres. Also, installed 62 Rain Barrels, 12 Rain Gardens, 1 Porous Pavement practice and 2 Roof Runoff Management systems in urban areas. The total load reduction estimated from these practices: 1811 tons/year sediment, 3073 lbs/year of phosphorus and 2,862 lbs/year of nitrogen.

---



---

## ANNUAL LOAD REDUCTION SUMMARY

---



---

### ***Total FFY 2008 Pollutant Load Reductions***

Reduced Sediment loadings by 14,609 tons/year

Reduced Phosphorus loadings by 22,025 pounds/year

Reduced Nitrogen loadings by 29,471 pounds/year

Project Name	Sediment	Phosphorus	Nitrogen
Lower Sand Ck. Watershed	160	194	391
White River Watershed Implementation	125	125	251
Whitewater River Implementation Plan	197	212	424
Sediment, Pesticide & Nutrient Reduction - Phase II	589	758	1514
Tanners Ck. Watershed Implementation	948	918	1839
Southern Laughery Ck. Watershed Implementation	3683	2431	4868
Implementation of Lauramie Ck. WMP	4	3628	1382
Cedar Ck. WMP Implementation Phase 1	1912	1820	3688
Eagle Ck. WMP Implementation Phase 1	1604	2615	2185
Youngs Ck. WMP Phase 3	360	524	1156
Lagrange Water Quality Improvement Project	221	266	531
Upper Tippecanoe/Grassy Ck. Implementation	293	160	416
Pigeon Creek WMP Implementation (Steuben Co.)	870	1173	3215
SF Wildcat Ck./Blinn Ditch/Kilmore Ck. Implementation	1290	5232	3914
Hogan Creek Watershed Project	994	1107	1832

*This table shows some of the larger load reductions by project.*

### ***Total from Project BMPs installed during FFY 2000 through FFY 2007***

Sediment load reduction calculations: 164,197 tons/year

Phosphorus load reduction calculations: 312,551 pounds/year

Nitrogen load reduction calculations: 516,761 pounds/year

---



---

### **Watershed Planning through Section 319 and 205(j) Funding**

In FFY 2008, the NPS Program successfully completed eight watershed management plans. To date, there have been 37 plans implemented and eight will begin implementation in FFY 2009.