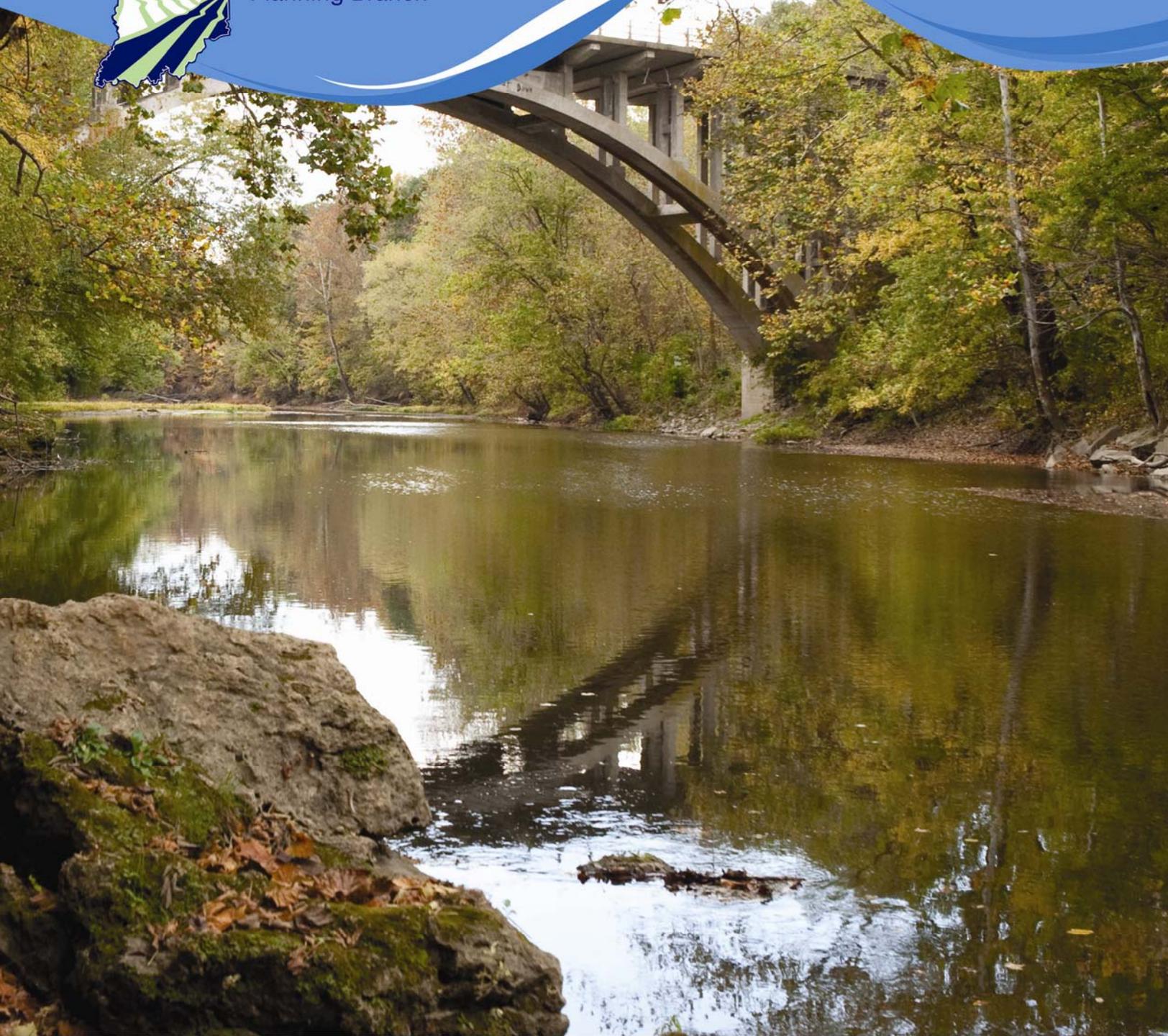




Indiana Department of
Environmental Management
Office of Water Quality
Watershed Assessment and
Planning Branch



**FFY 2010 Annual Report to the
U.S. Environmental Protection Agency**
Section 319(H) Nonpoint Source Grant Program
September 1, 2010

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OVERVIEW

This *2010 Nonpoint Source Program Annual Report*, as required by Section 319(h) 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(h) 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.

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.

IDEM relies on the interactions between the programs in the Watershed Assessment and 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(h)(h) 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(h)/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. 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 is integral to coordination of all programs within the branch.

In 2010, IDEM undertook a number of efforts to reorganize and restructure programs to increase efficiency, realize cost savings, and improve the utilization of key resources. Examining different structural arrangements of staff allows the agency as a whole to work creatively together to protect our water quality. A part of this initiative, the Office of Water Quality merged the Assessment Branch with the non-regulatory section of the Watershed Planning Branch. Bringing these two groups together will create synergies that are less likely to result when working apart. The objectives of each of the branches align and staff already work together on evaluating data for listing purposes, TMDL sampling and development, and more recently on non-point source monitoring in areas where restoration activities have been implemented through §319(h) (h) grants. This merger will further integrate watershed monitoring and planning activities, internal and external decision making for restoration activities, and strengthen IDEM's ability to de-list water bodies and demonstrate water quality improvements through the watershed approach. The new Watershed Assessment and Planning Branch will work closely with the rest of the OWQ to address the sampling and quality data needs of drinking water and waste water permitting and compliance activities. A revised organization showing the programs in the new branch is included as Appendix G to this report.

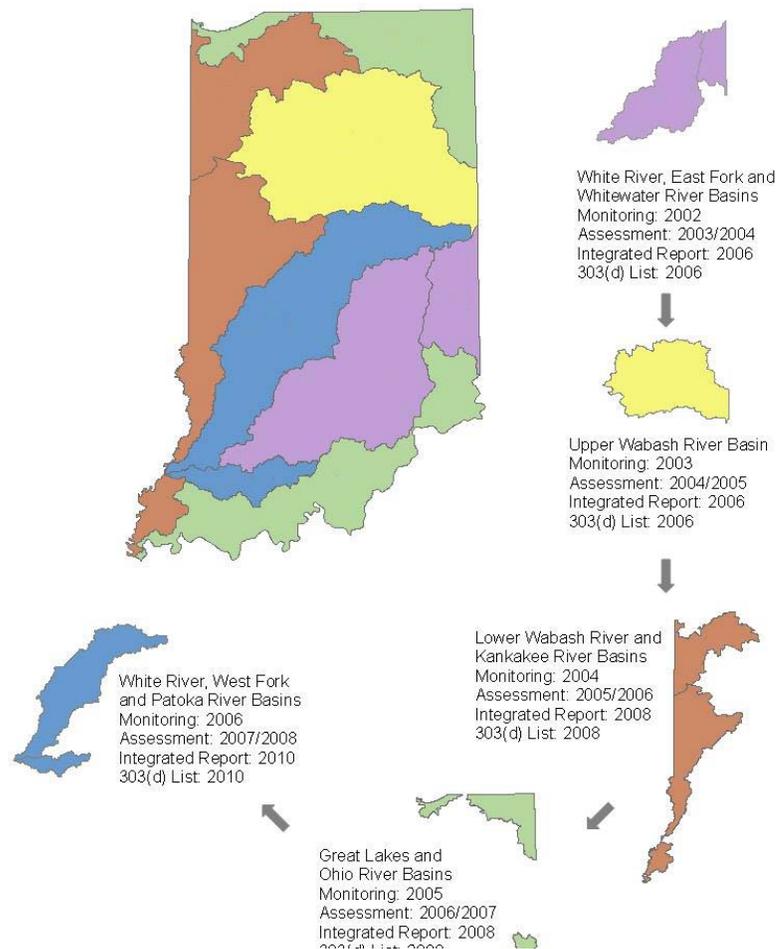
Lastly, IDEM's efforts to address NPS pollution rely heavily on the efforts of our partners. With the extent and variety of NPS issues across Indiana, the need for cooperation across political boundaries is essential. Many local, regional, state, and federal agencies play an essential part in addressing 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.

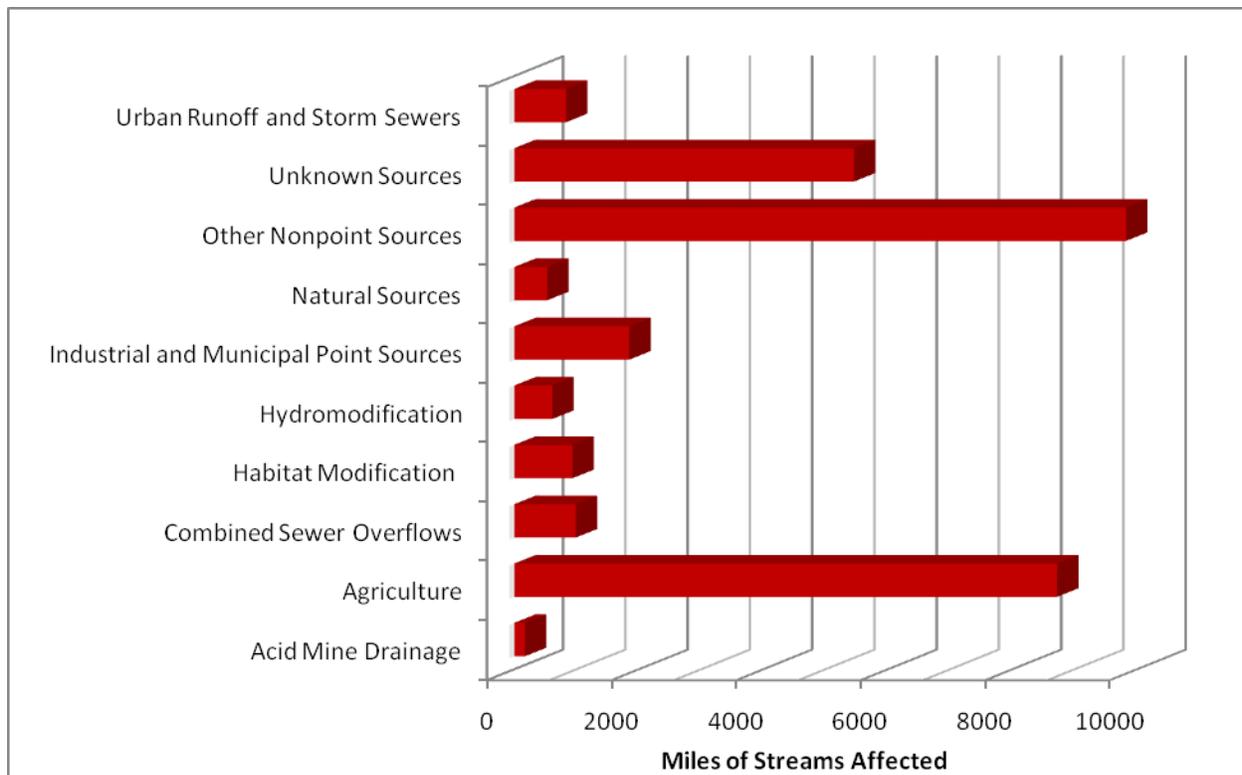
Waters that do not fully support one or more of their designated beneficial uses are placed on the Indiana's 303(d) List of Impaired Waters, which may be viewed at: <http://www.in.gov/idem/4680.htm>

According to the draft 2010 Integrated Water Quality Monitoring and Assessment Report, which will be published in 2010, Indiana has monitored 48.9% of its streams to determine whether they are capable of supporting a well balanced warm water aquatic community. Of the streams monitored, 71.0% were supporting their designated aquatic life use, and 29.0% were found to be impaired. Indiana has monitored 48.1% of its streams for recreational uses. Of the streams monitored, 24.4% support full-body contact recreational uses, while 75.6% were found to be impaired. These numbers are draft values obtained for the purposes of CWA 305(b) reporting for the 2010 assessment and listing cycle and reflect the most current information available.



IDEM's Rotating Basin Monitoring, Assessment, Reporting and Listing Schedule

Sources of Impairments of Indiana's Streams (2010)



As shown in the chart above, nonpoint sources of water pollution continue to be a primary concern for Indiana's water quality programs and drive the many partner agencies' conservation programs geared towards improving water quality. Data for this chart comes from IDEM's analysis of water monitoring data collected in support of the development of the 303(d) list of impaired waters.

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 impairments to waterbodies identified on Indiana's 303(d) list that are driven by this type of pollution.

IDEM's NPS Goals and Progress

Section 319(h) of the Clean Water Act (CWA) establishes a national program to address nonpoint sources of water pollution, which are the leading causes of water quality degradation in the United States. Section 319(h)(h) of the CWA specifically authorizes EPA to award grants to states with approved NPS Management Program Plans. As required by Section 319(h)(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 and 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.
Progress or Accomplishments: The NPS monitoring strategy was completed and submitted to USEPA on December 31, 2009. Incorporation of this document into the comprehensive water quality monitoring strategy should occur in late 2010 or early 2011.	

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.

Progress or Accomplishments: The table below describes the overall structure of IDEM's DQO project.

	<i>Data Quality Level</i>	<i>Potential Uses of the Data by OWQ Programs</i>
Increasing Data Quality Requirements 	3	Any Level 1 or Level 2 use TMDL Modeling CWA Section 305(b) Water Quality Assessments CWA Section 303(d) Listing Decisions Demonstrating the effectiveness of any implementation effort such that one/more impairments may be removed from the State's 303(d) List of Impaired Waters Determining representative background conditions for the purposes of developing National Pollutant Discharge Elimination System (NPDES) permits
	2	Any Level 1 use Supplementary information for use in planning and prioritization of IDEM monitoring efforts or TMDL development Demonstrating the effectiveness of TMDL implementation efforts Demonstrating the effectiveness of WMP implementation efforts Baseline data collection for analysis of trends over time Watershed management planning Demonstrating compliance with minimum control measures specified in Municipal Separate Storm Sewer Systems (MS4) permits Establishing need for low interest loans to assist with Regional Water and Sewer District (RSD) formation
	1	Education and raising awareness of water quality issues Supplementary information for Total Maximum Daily Load (TMDL) development Supplementary information for development of Indiana's Integrated Water Monitoring and Assessment Report (IR)

Data quality objectives for Level 3 Data (data meeting the highest quality measures) have been completed. Level 2 data quality objectives will be finalized as a of the Environmental Indicators project, funded by a Section 319(h) grant and spearheaded by Purdue University. The target for completion of this section, as well as Level 1 data quality objectives, is the end of the first half of 2011.

Goal	Measure
<p>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.</p>	<p>Measure: Implementation of the NPS monitoring program and analysis of data collected.</p>
<p>Progress or Accomplishments: In 2009, IDEM conducted a pilot sampling project geared towards assessing NPS grant funded implementation projects and their potential impact on water quality. Sampling of 319(h)(h) funded BMP filter strip reaches was conducted as a component of the Surveys Section 2009 Source ID studies in the Upper Eel River watershed. This sampling was conducted to evaluate the effect of the filter strips on water quality.</p> <p>Seven BMP reaches were selected, six of which were situated in the Blue River watershed northeast of Columbia City, and one was located in the Gangwer Ditch watershed southeast of Columbia City. Both the Blue River and Gangwer Ditch lie within the Upper Eel River watershed and all sampled BMPs are situated within Whitley County. All of the BMPs were designated as filter strips and were situated in areas where agricultural row crops were the primary surrounding landuse. Sampling was conducted during late summer warm weather conditions between August 4th and September 2nd of 2009. A detailed discussion of this project is located in “Working to Improve the NPS Program” section of this report.</p>	

Objective B: Data Collection

Goal	Measure
<p>Medium-term: Develop and implement a system to store and evaluate NPS pollution environmental monitoring data collected in the state of Indiana.</p>	<p>Measure: Completion of a NPS pollution database for the storage and evaluation of data collected by NPS projects.</p>
<p>Progress or Accomplishments: To provide a mechanism to enter 319(h)(h) project data into EPA’s Storage and Retrieval System (STORET), the NPS Program is used 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. The project has been completed. To enter accurately data into the database, IDEM is distributing templates to grantees and contractors for electronic submittal. Once these sheets are loaded into AIMS, IDEM will work to have the data uploaded to US EPA via WQX. This should be complete in the next fiscal year.</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.
<p>Progress or Accomplishments: No formal schedule of meetings with US EPA has been set. However, IDEM and US EPA have coordinated on a number of projects, such as the NPS/TMDL template, the Salt Creek Stormwater/NPS/TMDL project, the development of Social and Environmental Indicators, and various partnership discussions. Communication is regular with US EPA staff on policy and program issues.</p>	

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.
<p>Progress or Accomplishments: IDEM has provided support to the IDNR Coastal Nonpoint Source Program in a number of keys areas that will assist with full program approval.</p> <ul style="list-style-type: none"> • IDEM published the Indiana Storm Water Quality Manual in October 2007. The manual provides guidelines and specific BMPs for controlling post construction stormwater runoff and site clearing that are consistent with the guidance for new and site development. • IDEM developed watershed planning guidance that lays out the requirements for a watershed plan. In 2009, IDEM updated the watershed checklist to further emphasize that watershed management plans developed within the 6217 management area should not only be consistent with EPA's "9 Key Elements" for watershed planning but also the 6217 guidance. Tentatively, by 2018, the state plans to have approved watershed plans in place for each subwatershed within the Little Calumet-Galien watershed. With nearly 70% of the subwatersheds already covered by watershed plans, the state is well on its way to meeting its goal. • IDEM revised its watershed checklist in 2009 to ensure that all watershed plans developed within the 6217 area are consistent with guidance on hydromodification measures. To help ensure the checklist is followed, only watershed planning activities that adhere to the checklist are eligible for Section 319(h) funding. IDEM provides directed assistance to watershed planning groups to reinforce that watershed plans within the 6217 area are appropriate when concerning hydromodification. • IDEM has worked continuously with the CZM Program to identify possible opportunities to help achieve full program approval via the use of Section 319(h) funds. Reductions to overall staffing across all state agencies have delayed this process. 	

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>Progress or Accomplishments: 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. The Galena River TMDL has been completed and is in the final stages of review by IDEM management.</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(h)-funded planning or implementation activities occurring.</p>
<p>Progress or Accomplishments: Ongoing. IDEM has focused Section 319(h)(h) 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(h) 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. This project has hired Tetra Tech, who began in March 2010 to accomplish this task. The project is ongoing and on schedule for completion in 2011.</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>Progress or Accomplishments: In 2010, the Office of Water Quality reorganized the Assessment and Watershed Planning Branches by merging both programs and beginning a complete evaluation of monitoring needs, existing programs, and opportunities for integration of NPS monitoring into the larger monitoring strategy. In 2011, IDEM will report on changes made to all programs in the new Watershed Assessment and Planning Branch that will affect NPS monitoring.</p>	

Goal	Measure
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.	Measure: Completion and implementation of a comprehensive Watershed Specialist strategy.
Progress or Accomplishments: Complete. A strategy for the focus and use of these positions has been developed, taking into consideration input from partners such as the Department of Natural Resources, the State Department of Agriculture, the Indiana Association of Solid and Water Conservation Districts and the Natural Resources Conservation Service. An updated version of the current strategy will be posted to the revised IDEM NPS website by the end of 2010.	

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(h) Program on NPS issues that includes representatives from all applicable programs and partnerships, both regulatory and non-regulatory.
Progress or Accomplishments: Initial work to scope the potential membership and scope of this group has occurred, but no formal meetings have taken place.	

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.
Progress or Accomplishments: 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. The measurement of this metric needs to be reexamined in future updates.	

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(h) grants.	Measure: Completion of updated NPS Web site and compilation of a utilization survey.
Progress or Accomplishments: Nearly complete. Deployment of a newly designed and reorganized website will occur by the end of 2010. Final revisions to content and structure are being made by NPS staff and staff from the office of Media and Communication Services. A detailed discussion of this project is located in "Working to Improve the NPS Program" section of this report.	

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.
Progress or Accomplishments: No progress has been made on this goal at this time.	

Objective B: Comprehensive Training Program

Goal	Measure
Short-term: Develop and conduct training workshops to inform 319(h)(h) grant recipients about key program policies and provide training on grant implementation.	Measure: Annual Section 319(h) training workshop conducted by IDEM available for all grant recipients and applicants.
Progress or Accomplishments: Complete. The NPS program held the first 319(h)(h) and 205(j) grant orientation meeting on June 12, 2009. This meeting informed grantees on all aspects of the program. A web-based version of this training will be placed on the IDEM website in the next month.	

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.
Progress or Accomplishments: In progress. Education materials including six new brochures, seven bill stuffers, and several large scale displays are under final development. These will be used by IDEM staff and NPS partners to educate the public on NPS issues and concerns. A detailed discussion of this project is located in "Working to Improve the NPS Program" section of this report.	

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.
Progress or Accomplishments: Nearly complete. Deployment of a newly designed and reorganized website will occur by the end of 2010. Final revisions to content and structure are being made by NPS staff and staff from the office of Media and Communication Services. A detailed discussion of this project is located in "Working to Improve the NPS Program" section of this report.	

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(h) funding.	Measure: Number of watershed groups that actively seek and obtain funding, in addition to Section 319(h)(h), to sustain the continual group operation.
Progress or Accomplishments: Ongoing. IDEM's Watershed Specialists work closely with Indiana's watershed groups to increase group sustainability, effectiveness, and gauge future resource needs. Since this work is continual, a detailed description of IDEM's work on this goal is found at the "Working to Improve the NPS Program" section of this report under Watershed Specialists and Networking Sessions.	

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.
<p>Progress or Accomplishments: IDEM's Watershed Specialists have 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. Much of this work has insured that existing groups have remained functional and active; however, at least five new groups have been formed during this reporting period in northeast and southern Indiana.</p>	

Funding Priorities and Adaptive Management

Objective A: Focus Section 319(h) Planning Funds

Goal	Measure
Short-term: Target Section 319(h)(h) 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(h) funds in appropriate amounts to accomplish their projects goals.
<p>Progress or Accomplishments: Since 2008, IDEM has funded 22 projects that are either developing or implementing watershed management plans on 303(d) listed waters, which represents virtually all projects funded by IDEM during this time period.</p>	

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.
<p>Progress or Accomplishments: In progress. IDEM has developed a draft list of watersheds where Section 319(h)(h)/205J funds have been allocated to local watershed groups that have implemented significant on-the-ground NPS best management practices. Once this list is reviewed and finalized, it will become the basis for future NPS water quality monitoring to show results.</p>	

Goal	Measure
<p>Long-term: Work with internal and external partners to solicit and utilize joint funding strategies, including Section 319(h) funds, in watersheds where other partner-funded projects are occurring to maximize the efficacy of funds.</p>	<p>Measure: Number of projects funded by Section 319(h) 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.</p>
<p>Progress or Accomplishments: One partnership project has been completed that meets the intent of this goal.</p> <p>In the Galena River watershed, the LaPorte County SWCD was approached and funded to apply for a DNR Lake and River Enhancement (LARE) grant to do a watershed diagnostic study. As part of discussions with the SWCD, the IDEM Watershed Specialist and the DNR Coastal Nonpoint Source Coordinator worked closely together to align resources to produce not only a watershed diagnostic study, but a complete watershed plan meeting the §319(h) 2003 checklist.</p> <p>This was done by completion of several cross-program tasks. First, a TMDL for the Galena watershed was initiated. Sampling for the TMDL was done by Assessment Branch staff within the Office of Water Quality. Additional benthic macroinvertebrate sampling was done by the DNR Lake Michigan Coastal Program as well as the LaPorte County SWCD.</p> <p>Completion of the TMDL meant that monitoring resources were saved in the LARE grant. The additional parameters collected to meet the LARE requirements were assessed along with the TMDL data. This cost savings allowed the LARE contractor to go above and beyond the traditional watershed plan. Additionally, LARE and §319(h) staff were instrumental in reviewing and providing input along the way such that the LARE watershed plan met both the requirements of the LARE program and the 2003 checklist. The Galena watershed plan is now eligible for future implementation funding through both the LARE program and the IDEM §319(h) program.</p>	

Objective B: Target Key Pollutants and Watersheds

Goal	Measure
<p>Short-term: Determine the extent of impacts that sediments, bacteria, nutrients, and other identified NPS pollutants have on Indiana waters.</p>	<p>Measure: Document the results of impact analysis.</p>
<p>Progress or Accomplishments: Ongoing. The completion of the External Data Framework (the standards IDEM will use to evaluate and use third-party data in the 303(d) development process), in 2011 will help move progress on this goal ahead. Additional data is needed to provide a larger spatial analysis of water quality concerns in Indiana. This goal may need to be adjusted to a medium term goal to reflect the time needed to collect and analyze data.</p>	

Goal	Measure
Medium-term: Target Section 319(h) 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(h) funds where implementable TMDLs have been completed.
Progress or Accomplishments: Currently, there are 111 out of 1,589 HUC 12s in Indiana that have both a TMDL and an approved watershed management plan. There are at least 14 HUC 12s where TMDLs are being implemented, in part, by projects funded by Section 319(h) grants.	

Objective C: Adaptive Management

Goal	Measure
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(h) Program with clearly delineated priorities and corrective actions.	Measure: Percentage of program completion
Progress or Accomplishments: No progress has been made on this goal at this time.	

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)(h) and Section 205(j); each named after the section of the Clean Water Act that authorizes them. More information about the two grant programs in Indiana may be found on IDEM's website at:

<http://www.in.gov/idem/4342.htm>.

The Section 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. In FFY 2010, Indiana received \$547,376 in 205(j) funds. Two watershed planning projects have been funded to date with these funds. A list of all 205(j) projects open during this fiscal year may be found in Appendix D.

The Section 319(h) Program is one of the primary resources for reducing NPS pollution in Indiana. In FFY 2010, Indiana received \$4,331,700 in Section 319(h) funds and has awarded grants for nine projects to date. 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(h) funds to implement on-the-ground BMPs in their watersheds. There are currently forty-four open (or pending) 319(h) projects of which thirty-one are implementing watershed management plans and installing BMPs in critical areas of the watershed as determined by the watershed management plan. A list of all 319(h) projects open during this fiscal year is located in Appendix C.

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 NPS 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. Locations of both Section 319(h) and Section 205(j) projects funded in the last seven years are shown in Appendix A.

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(h) 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, type of BMPs implemented, location of BMPs, estimated pollutant load reductions, and progress reports.

Thirteen Section 319(h) projects closed this fiscal year, including one planning project, eight implementation projects, one project focusing on education, and three NPS Program support projects. 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.

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. A statewide priority was added this year in an effort to help encourage projects that support the mission of the sponsor, build capacity and/or improve water quality at the local level, and have a statewide applicability. The focus of the Program for FFY 2010 was:

- Watershed management planning in areas with waterbodies on the State 303(d) List of Impaired Waterbodies. See the [2008 303\(d\) List Categories 4A and 5A](#) for the list of nonpoint source impaired waterbodies.
- Implementing watershed management plans that meet [IDEM's 2003](#) or [2009 Watershed Management Plan Checklist](#).
- Watershed management planning and implementation in areas with approved Total Maximum Daily Loads (TMDLs). See the [Total Maximum Daily Load Program](#) for more information.
- Projects that support the mission of the sponsor and have a statewide applicability for water quality improvements or capacity building at the local level.

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.

Of the nine Section 319(h) projects funded in FFY 2010, all address one or more of the NPS Program priorities. Three projects have statewide applicability for improving water quality or building capacity of watershed groups, five projects are restoration/implementation projects implementing an approved watershed management plan (TMDLs are currently being drafted for two of the watersheds), and one project is planning in a watershed with impaired waterbodies.

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 at the hydrologic unit code (HUC) level that make sense for the particular conditions found in that watershed. 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.

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 on 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.

Organizing a group to develop a watershed management plan that meets the required elements can be a daunting task. To help groups develop watershed management plans, IDEM developed the [Indiana Watershed Planning Guide](#). This guide was revised in late 2010 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, 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.

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 must 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. In a few cases, reporting pollutant load reductions may not be feasible because of the type of BMP installed.

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 for BMPs implemented this FFY (through 8/13/10) are listed below. All data was obtained from IDEM's Access database with the exception of sediment, phosphorus, and nitrogen data, which was taken from GRTS.

NPS Pollutant	Reduction
Sediment	18,166 tons/yr
Phosphorus	13,206 lbs/yr
Nitrogen	27,702 lbs/yr
Biological Oxygen Demand	1,612 lbs/yr
Chemical Oxygen Demand	14,180 lbs/yr
Atrazine	1,272 lbs/yr
Other Pesticides	456 lbs/yr
Suspended Solids	43,931 lbs/yr
Lead	27 lbs/yr
Zinc	49 lbs/yr
Copper	1 lb/yr

BMPs implemented include filter strips, conservation tillage, 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, wetland restoration, nutrient management, pest management, rain gardens, porous pavement, and rain barrels.

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

NPS Pollutant	Reduction
Sediment	187,333 tons/yr
Phosphorus	330,581 lbs/yr
Nitrogen	558,505 lbs/yr

Project Highlights

Two grants that closed this fiscal year are highlighted here as examples of successful NPS projects working to improve water quality through watershed planning, implementation of BMPs, and education/outreach. The information below was taken from each project's final report.

Southern Laughery Creek Watershed Implementation Phase 1

The South Laughery Creek Watershed (SLCW), Hydrologic Unit Codes (HUCs) 05090203070 and 05090203080, is made up of 112,000 acres in four counties in Indiana: Ripley, Dearborn, Ohio, and Switzerland. The watershed is part of the much larger Middle Ohio-Laughery watershed (HUC 05090203). South Laughery Creek is approximately 22 miles long stretching from Versailles Lake in Ripley County to the Ohio River just west of Aurora in Dearborn County. Most of the SLCW is rural consisting of small towns with a few larger towns including Versailles, Dillsboro, and East Enterprise. Small to large farms (mostly soybeans and corn) are distributed across the flat to gently rolling land with forests and pastures residing on steeper valley slopes. Several small beef cattle and dairy farms are in the watershed, with goat production increasing as a new farming opportunity. Light industry also dots the area, which is located on the far western edge of the Cincinnati metro area.



In 1999, the Dearborn County Soil and Water Conservation District (SWCD) came together with concerned landowners to begin water testing on South Laughery Creek. After reviewing the test results, and the fact that the South Fork Laughery Creek-Lower in Ohio County was listed as an impaired waterbody for *E. coli*, the group decided to submit an application for a Section 319(h) grant to develop a watershed management plan (WMP). The SWCD was awarded a grant in 2003 to develop a comprehensive WMP for the South Laughery Creek watershed. Based on water quality and watershed inventory data collected during the watershed planning process, the Steering Committee identified *E. coli*, sedimentation/erosion and lack of public awareness as problems for the watershed. The WMP was finalized and approved by IDEM in 2006. Later that year Historic Hoosier Hills RC&D (HHH) took over the project was awarded a 319(h) grant in 2008 to implement best management practices (BMPs) on the land. The steering committee is made up of key stakeholders from a variety of backgrounds including landowners, educators, technical experts, and concerned citizens, and is responsible for setting policies, supervising, and giving program direction to members and staff.

More information on the South Laughery Creek Watershed Project may be found on the HHH web site at: <http://www.hhhwatershed.org/South-Laughery.html>.

Accomplishments

The South Laughery Creek Implementation Phase I Cost Share program was a success. Twenty-three landowners utilized \$193,000 in Section 319(h) funds and implemented a total of 98 BMPs including the following:

- **26 Fencing Projects** (53,251 ft) to exclude livestock from woodlands and/or streams/bodies of water.
- **18 Water tanks or fountains** for more efficient pasture land grazing management systems.
- **17 Heavy Use Area Protection** practices as part of watering systems or outside winter leading sites.
- **13 Pipelines** (3,630 ft) practices as part of livestock watering systems for more efficient pasture land grazing systems.
- **9 Pasture/Hayland Planting** practices totaled 153.7 acres with 7 of these practices converting cropland acreage to permanent grassland/legume mixture.
- **2 Erosion control structures** to lower safely concentrated surface water runoff from grassed waterways into perennial or intermittent streams.
- **1 Grassed Waterway** totaling .5 acres to safely transport concentrated surface water to a safe outlet flowing into South Laughery Creek.
- **2 Roof Runoff Management systems** consisting of guttering and 595 feet of underground outlets to divert surface water from flowing across livestock wintering feeding areas and flowing to streams.
- **2 Wells** with pumping plants to provide a safe and adequate water supply to livestock grazing management systems.
- **3 Spring Developments** with one pumping plant practice to provide a safe and adequate water supply to livestock grazing management systems.

Estimated pollutant load reductions from the South Laughery Creek Watershed Project are:

7,904 tons/yr of sediment
10,414 lbs/yr of Phosphorous
5,191 lbs/yr of Nitrogen

In addition, seven landowners are also participating in the NRCS EQIP cost share program as a result of conservation planning within the watershed. These landowners have either completed, are currently participating in, or will have future projects completed through EQIP. To date, practices implemented through the EQIP program total \$15,156.43.

Education is an important aspect of any project. Conducting educational programs provides both children and adults with knowledge about water quality and helps them become involved with the watershed project. They can also teach and encourage educators to incorporate these lessons into their curriculum. Visiting classrooms to give presentations to students is perhaps one of the most important activities done by the SLC Watershed Project. Presentations to local students K-12 were administered about topics such as nonpoint source pollution and water quality monitoring. If an educator was unable to book a presentation in their classroom, curriculum was provided on these topics to promote future natural resource education. Eight presentations were given to area students. Between all of the education events, over 1700 children learned about water quality and were encouraged to take this message home.

Adult education by way of field days and workshops is very important in emphasizing the importance of implementing conservation on the land. People are more likely to accept a new idea if they learn about it through a hands-on approach. Many events were held where “hands-on experience” was taught as well as discussion from individuals that have already incorporated these new techniques on their land. Over the course of this three year project the South Laughery Creek Watershed Project conducted 6 adult workshops about conservation tillage, one field day on cover crops, one Streambank Stabilization Field Day, and a Pond Clinic. Additionally, two septic system meetings, two stream clean-ups, and several educator workshops were held. These events varied in attendance from 6 people to over 150. Regardless of the turnout all participants were educated on environmental issues concerning the watershed and were encouraged to help protect South Laughery Creek.

Community service projects are a great way to get people involved in helping the watershed. By doing events such as stream clean-ups individuals are able to see what difference they can make with a little effort. In 2008 and 2009, the South Laughery Creek Watershed Project partnered with ORSANCO and Best Way Disposal to conduct two River Sweep events in Dearborn and Ripley Counties. More and more students turn out for these clean-up events and take pride in their accomplishments. Many students involved in events such as these decide to go into the environmental field and/or continue to be environmental advocates throughout their lives.

Funding/Partnerships

The Historic Hoosier Hills RC&D utilized \$388,520 of Section 319(h) grant funds and documented \$129,507 in match to complete this project. Many organizations partnered and worked alongside the HHH watershed group to ensure the educational events and cost share programs were successful.

- Purdue Cooperative Extension
- Ripley County Health Department
- Switzerland County Health Department
- Dearborn County Health Department
- Best Way Disposal
- ORSANCO
- Denver Siekman Environmental Park
- USDA - Farm Service Agency
- USDA - NRCS
- Indiana State Department of Ag
- Laughery Valley Fish and Game Club
- HHH RC&D Council
- HHH RC&D Woodland Committee
- HHH RC&D Regional No-Till Committee
- Ripley County Highway Department
- Ohio County Highway Department
- Switzerland County Highway Department
- Dearborn County Highway Department
- Local Soil and Water Conservation Districts
- Indiana Department of Natural Resources

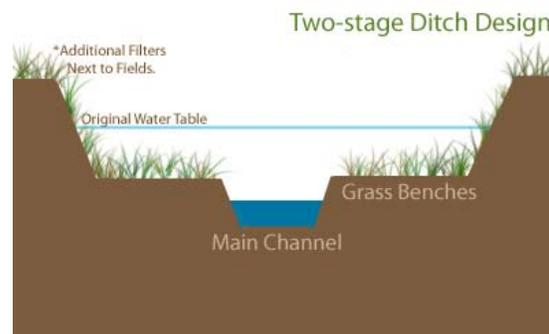
Future Activities

The South Laughery Creek Watershed is continuing the project using a 319(h) grant awarded in 2008. The new phase will be similar to the Phase I implementation grant. Educational programs will be offered and cost-share monies will once again be available for landowners that are in the priority watersheds. HHH will develop a cost-share program to implement BMPs such as conservation tillage, livestock exclusion, filter strips, riparian buffers, and others that address the water quality concerns outlined in the South Laughery Creek WMP.

Tippecanoe River Two-Stage Ditch Demonstration

Drainage has been a significant factor in Indiana agriculture and land management for many years. What has been done to achieve proper drainage, however, has dramatically influenced the landscape. Draining of wetlands, poor tillage practices, and dredging or deepening streams and ditches has changed the land and allowed water to become an unintentional threat. When too much water moves through an undersized area of land it leads to bank erosion, scouring, and eventually flooding. Researchers have been working on a type of in-stream restoration called the two-stage ditch that may help alleviate these problems.

The Nature Conservancy, Indiana Chapter was awarded a Section 319(h) grant in 2003 to introduce two-stage ditch technology to key stakeholders in Indiana to help generate greater acceptance of the practice at the scale required to address water quality issues in the Wabash River watershed and beyond. As part of the project, a two-stage ditch was designed (by Dr. Andy Ward of Ohio State University) and constructed, and comprehensive monitoring of the ditch was conducted.



The concept of the two-stage ditch was developed by observing natural processes that form stable streams and rivers. The design incorporates a floodplain zone, called benches, into the ditch by removing the ditch banks, 2-3 feet above the bottom, for a width of about 10 feet on each side. This allows the water to have more area to spread out on and decreases the velocity of the water. The design increases the amount of water the ditch can process. This not only improves the water quality, but also improves the biological conditions of the ditch.

The benefits of a two-stage ditch over the typical agricultural ditch include both improved drainage and ecological function. The design improves ditch stability by reducing water velocity and the need for maintenance, saving both labor and money. Because the design allows more settling of sediment and increased nutrient assimilation it also has the potential to create and maintain better habitat conditions for terrestrial and marine species by minimizing the amount of sediment and nutrients transported from ditch to stream to river to sea.

Accomplishments

During this 3-year project, 0.4 miles of two-stage ditch was installed in western Kosciusko County, Indiana, on Shatto Ditch; a county-maintained drainage system that outlets directly to the Tippecanoe River. The ditch was monitored both before and following construction of the

two-stage ditch to assess the performance of the practice relative to water quality, biota, and habitat. An upstream / downstream study design was used, with a control section upstream and a treatment section downstream to evaluate the effects of the installation of the two-stage system. One year of baseline data was collected in both control and treatment sections before the two-stage ditch was constructed, and was followed up with two years of post construction evaluation in both stream reaches. The Shatto Ditch is one of the first two-stage ditches implemented in Indiana, and the only one to be monitored in an upstream / downstream configuration with a control section and a treatment section to assess the benefits of the two-stage ditch.

Improvements in water quality and biota are slow to manifest themselves in significant and measurable ways. Construction took place in the fall of 2007, and there were no solid trends in the indices of community integrity in the years following construction. However, there are hints that conditions are improving in the system. Prior to construction, the majority of the invertebrates found were isopods (aquatic crustaceans tolerant to poor habitat and water quality). The percentage found at each site decreased after construction in both control and treatment areas, but more so in the latter. This decrease allowed for an increase in pollution intolerant invertebrate taxa as the conditions and habitats improved. Further evidence of biological improvement was seen in the fish community composition. Prior to construction, only one variety of sunfish species was present in either section (control and treatment). Following construction, four species were present in the two-stage section, including two sensitive species. In the control section, the numbers did not change, hinting that the improvements are a result of the two-stage construction.

Differences in water quality are difficult to interpret because there are a variety of factors that dictate the levels of contaminants, and these factors are highly variable in dynamic freshwater systems. Rainfall and weather patterns, additional inputs of pollutants between sampling sites, and runoff from adjacent fields all can have an effect on water quality as it is collected during low flow and storm events. However, when the data is analyzed, there are greater reductions in the treatment section compared to the control section (post construction) for nitrate-nitrogen, total phosphorous, ortho-phosphorus, and total suspended solids. These reductions can be attributed to the construction of the two-stage ditch channel. The significant reduction in TSS indicates that the two-stage benches work very well as settling basin for suspended solids. Also, as expected, the two-stage ditch design has enhanced sediment removal capacity during high water flow events.

Two-stage ditch management increased reach-scale N removal, via denitrification, by more than 350% through the addition of bench surface area. Bench soils have higher denitrification rates than do soils in grass buffer strips or hillslopes. However, because of the high N load in Shatto Ditch, N removal efficiency averaged just 3%, meaning that a change in N export in the water column was undetectable. The two-stage ditch exhibited the highest N removal efficiency when N loads were lowest, indicating that two-stage management will be most effective when paired with landscape practices that reduce nitrate loading to streams. This shows the limitation of single practice installation and its ability to impact water quality in a significant way.

There needs to be land-based BMPs like nutrient management, buffer strips, and other practices to reduce nutrients applied to the land as companion practices. There could also be additional sections of two-stage ditch implemented at strategic locations throughout the watershed to begin to make a difference in overall pollutant loads.

Multiple field days were held at the site highlighting the technology to a variety of groups including county surveyors and local drainage officials, contractors, the Hoosier Chapter of the Soil and Water Conservation Society, the Indiana State Soil Conservation Board, local Soil and Water Conservation Districts, and local landowners. There are now several units of government and a variety of smaller watershed groups who have included the two-stage ditch into their watershed plans. As a result of this marketing and the positive performance of the practice, the Natural Resources Conservation Service (NRCS) added the two-stage ditch to their Indiana Field Office Technical Guide (FOTG), making it a practice that is eligible for cost-share assistance if applied through one of the Farm Bill conservation programs.

Funding/Partnerships

TNC utilized \$119,774 in Section 319(h) grant funds and documented \$39,925 in match for this project. Partnerships and relationships played a large role in the success of the project. Partnerships with the Kosciusko County NRCS representative and the local SWCD led to a greater relationship with the Kosciusko County Surveyor, which increased the ability to work within the legal drainage framework to implement the project. The County Surveyor, in conjunction with TNC, the SWCD and the local NRCS representatives all worked together to select the site and implement the project. A relationship was developed with Dr. Andy Ward (with Ohio State University), who is one of the lead researchers and developers of the two-stage ditch technology. Dr. Ward and his students provided technical expertise on the two-stage ditch's applicability to Indiana drainage systems. A partnership with Notre Dame University and Dr. Jennifer Tank also helped the project meet its objectives. Dr. Tank monitored the two-stage ditch to assess the nutrient and sediment processing performance and has taken an interest in the project. Dr. Tank also sought out additional funding opportunities and is currently working with Dr. Ward to do a regional study of the performance of the two-stage ditches that have been installed in the Midwest over the past several years.

Future Activities

The next important step is to conduct an education campaign in those areas of Indiana where two-stage ditch technology is applicable. TNC applied for and received a 319(h) grant in 2010 to conduct an education and outreach program to promote two-stage ditches as a BMP for nonpoint source pollution reduction. Target audiences will include county surveyors, landowners, and groups active in watershed management. TNC will also develop a webpage as an online outreach tool and do press releases and articles to educate farmers, landowners, community members, and local officials.

For more information on TNC's work on the two-stage ditch project:

<http://www.nature.org/wherewework/northamerica/states/indiana/misc/art25464.html>

Project Recognitions

Individuals and watershed groups in Indiana work long and hard to improve water quality in their watersheds and educate others about nonpoint source pollution. It takes the efforts of many people (many of them volunteers) to achieve the goals of the group and their watershed management plan. Most of the time, these efforts go unrecognized. Sometimes, however, an individual or a group will receive recognition for their efforts and achievements. This report highlights three projects in Indiana that were recognized this year for their work and achievements.

EPA Region 5 Volunteer Water Monitoring Success Story

(Story taken from the EPA web site: <http://www.epa.gov/region5/news/features/monitoring201004.html>.)

Last year EPA Region 5 decided to start showcasing examples of highly effective volunteer monitoring (or other local monitoring) initiatives in the Region, which includes Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin. Their goal is to encourage volunteer and other stakeholder monitoring efforts by offering examples of the important role volunteers play in protecting the surface waters of the Region. In April 2010, a humble Hoosier volunteer - **Mike Meyer** from the **Clifty and Flatrock-Haw Creek Watersheds** was recognized as the first "Volunteer Monitoring Success Story." The Clifty Creek Watershed group is a multi-grant recipient of Indiana's NPS Program and is currently implementing their watershed management plan. Phase I of the implementation project was highlighted in IDEM's FFY 2008 Annual Report. The Flatrock-Haw Creek watershed group is currently developing a WMP.

Mike is a volunteer stream monitor with an agenda. "I wanted to make sure that the data that was collected was valid. I didn't want this to be a 'feel good project'," Mike explained. Driven by a strong science background that began with a degree in chemistry from Purdue, a stint as a high school chemistry teacher, and 26 years designing waste water collection, distribution and treatment facilities, Mike's stream monitoring accomplishments in Indiana make him an outstanding example of an. Since 2003, Mike has conducted continuous, year-round monitoring of the Clifty/Flatrock-Haw Creek Watershed of Indiana in conjunction with a Section 319(h) project designed to reduce nutrients, sediment and *Escherichia coli*, a bacterium used as an indicator of fecal contamination. Mike collects flow, pH, dissolved oxygen (DO), turbidity, and temperature data, and he collects water samples for *E. coli*, biochemical oxygen demand (the rate of dissolved oxygen uptake by organisms), total phosphorus, ammonia, and nitrate nitrogen.

Mike also collected chlorides (an indicator of the presence of road salt in the water) for awhile. "That was interesting when it was factored with flow and the season," he said. His consistent and reliable data, collected monthly, have helped to establish a baseline for monitoring changes in the water quality in the watershed. His data have helped identify locations for prioritizing best management practice (BMP) implementation, and then documenting reductions in phosphorus and sediment loading as a result of BMPs implemented as part of the project.

Mike's data have also been used to provide educational information to landowners, including press releases on how to reduce water quality impacts by keeping livestock out of streams and limiting application of yard fertilizers. Mike uses his technical background to serve as a mentor for other volunteers to help them understand water monitoring.

He acquired new equipment for more precise DO measurements, and he obtained an incubator so project staff could count *E. coli* bacteria. Mike found this equipment at auctions. According to Mike, "Many cities put surplus equipment up for auction. I pick up old lab stuff at ridiculously low prices... I think I paid about \$1 for the DO meter and \$10 for the incubator." Purchased new, a DO meter can cost as much as \$2,000 and an incubator as high as \$5,000.

While Mike's professional science background sets him apart from other volunteers, his enthusiasm, and dedication to protecting surface waters is a characteristic shared by all in the volunteer monitoring community. As Mike explains, "Because of my many years in the lab, I thought I could make a difference in the quality of the data so that good interpretations could be made." This combination of professional discipline and a desire to contribute make his a true success story. Mike's leadership has encouraged other volunteers to contribute by collecting quality data to support the Clifty Creek 319(h) project.

Mike insists that he has done nothing special. What he has done is to provide a perfect example of how one dedicated individual can make a difference.

2010 Indiana Governor's Nomination for Excellence in Environmental Education, Switzerland County, Indiana, Indian Creek Watershed Project

(Write-up provided by Bonnie Fancher, Project Coordinator)

The Indian Creek Watershed Project was nominated by citizens in the watershed for a Governor's award for education and outreach associated with the project. These awards recognize Indiana's leaders who have implemented outstanding environmental strategies into their operations and decision-making processes. The following write-up provides detail on the group and their work:

The Indian Creek Watershed Project had its beginning on a pretty April Day in 2001 in Switzerland County, Indiana, with a school van filled with students and their teacher from Switzerland County High School, making a visit to twenty sites in the Indian Creek watershed. Most students had lived their entire lives in Switzerland County but had never really investigated their surroundings. The bluebells and the local Miami Mist wildflowers were in bloom. The students were ecstatic to be outdoors on a spring day. They were taking samples for *E.coli* bacteria. They were investigating the bacterial quality of their watershed. Back in the classroom, several days later, they were stunned by the results. They found a USEPA recommended value for swimming and wading—"body contact recreation"—was 235 bacterial colonies in a 100 mL sample. Many of the twenty sites tested by the students had test results as high as 3000 *E.coli* colonies in a 100 mL sample. Students recalled with concern the mother and toddler swimming and wading at one of the test sites. Resource persons came immediately to the classroom to view the results when invited by students. A community task force, fully involving students, led to a USEPA/IDEM Section 319(h) research grant, for Indian Creek, then to an implementation grant for best management practices, and also to a Switzerland County Council funded preliminary research project for five additional Switzerland County Watersheds—Plum Creek, Log Lick Creek, Bryant's Creek, Goose Creek, Grant's Creek—names that define the past history of Switzerland County citizens and their original water supplies.

In the fall of 2009, for twelve days during after school hours, students of the AP Environmental Science Class, of Switzerland County High School, and their teacher were the responsible volunteer monitors for twelve sample sites in the Indian Creek Watershed and its tributaries. The students had a document to guide them, a Quality Assurance Project Plan, written by their teacher and approved by IDEM. They had been trained in the classroom to conduct field monitoring. They were now in the field, fully responsible for the chemical, physical, and biologic assessment of twelve sample sites. They took the responsibility very seriously, working in the field, in the lab, and in the classroom. They gathered data. They calculated results. They assessed and discussed the data—students working as “Environmental Scientists!” They repeated the field work and assessment in December of 2009 –twelve sample sites, now with very cold hands and noses, and again in a spring assessment of the twelve sites—this time surrounded by spring wildflowers and warblers. They also assessed the macro invertebrates of their watershed. Now they are part of an IDEM/USEPA Section 319(h) Watershed Implementation Grant. They have learned “best management practices” from Mr. Cary Louderback, the ICWP Coordinator, who is working with local landowners to plan and apply conservation practices to the land to benefit water quality. Students, their teacher, the project staff, and community partners are all working together for environmental education and stewardship of the local environment. The students, supported by community partners, have developed a very positive “ownership” of their local watershed. The Indian Creek Watershed Project involves a collaboration of an unusual number of community partners. Awareness of the meaning and value of “watershed” is being developed in Southeastern Indiana. The Spanish philosopher, Ortega Y Gasset said, “Tell me your landscape, and I will tell you who you are!” Students and community partners now have a better understanding and appreciation of their local landscape, a better understanding of who they are!

The challenges of such a large scale project began in a classroom setting with a community task force, involving students, working to develop a vision and mission for the Indian Creek Watershed Project. Dow Corning became an important partner, funding the necessary equipment and supplies, for student volunteer monitoring. Their teacher invested the necessary hours in writing the grants, and a very positive working relationship developed with Dow Corning of Carrollton, an excellent community partner on the Kentucky side of the Ohio River. ORSANCO, the Ohio River Water Sanitation Commission, their educational foundation, and staff have also helped fulfill the need for supplies and equipment and training. The Switzerland County Council supplied generous funding for the Switzerland County Soil and Water Conservation District Office to begin a preliminary investigation of additional local watersheds. The barriers for such a project –equipment needs, volunteer time for the work, funding, collaboration, management—are all being addressed by the students; the teacher; the project staff; by community partners; through USEPA/IDEM project funding; by the Historic Hoosier Hills project sponsor and its coordinator, Mr. Terry Stephenson; by those local to the Switzerland County landscape; by citizens of the local watershed. The Indiana Association of Soil and Water Conservation Districts defines watershed management as “The place where soil and water meet.” The Indian Creek Watershed Project is also a place where environmental stewardship and education meet, a place where youth collaborate with community partners, and are able to contribute as valuable community citizens.

The effectiveness of the Indian Creek Watershed Project can be measured in part by the enthusiasm, knowledge, and concern of young adults for their local environment. Long term awareness and involvement of students, now for ten years, is also a measure of the value of the

project. Many students are making environmental career choices; some are environmental career professionals in the local community. Students will continue to be involved as trained volunteer monitors into the future. Implementation of best management practices in the watershed will in the long- term result in improved water quality. Improved water quality will provide safe conditions for family enjoyment of fishing, swimming and hiking near streams. Environmental stewardship and environmental education are essential components of this model project that can be observed, valued, and considered in other communities.

Local Group Seeks Innovative Ways to Protect Indiana Watersheds

(By Arianna Prothero <http://indianapublicmedia.org/news/managing-indianas-watersheds/#>)

Local watershed management coalitions are springing up across the state. One such organization new to the game is the West-Central Indiana Watershed Alliance. “A watershed is an area of land that drains into a body of water. And you can actually think of them kind of like those Russian nesting dolls where one stacks inside another and stacks inside another,” said Coordinator Lisa Holscher.

In her scenario the smallest nesting doll is a mud puddle. Everything that flows into the mud puddle is that puddle’s watershed. Water from the puddle then flows into the next larger nesting doll, say, a ditch, which in turn drains into another doll such as the Busseron Creek in the Busseron Watershed. That watershed then feeds into the Wabash, which nests in an even larger watershed, the Ohio River basin, and finally, all of that feeds into the Mississippi. “By all these connections, anything that happens here in our little watershed—in that mud puddle’s watershed—has the potential, through this whole nesting effect, to actually flow through down to the Gulf of Mexico. That’s what a watershed is,” Holscher said.

The WCIWA began as a coalition working to improve the water quality in the Busseron Creek Watershed through best management practices and educational outreach. Holscher said since watersheds do not adhere to county borders, the Alliance has since grown to include more political districts and more watersheds.

“The other watersheds, Turman, Turtle, Kelly Bayou, are all almost all in Sullivan County,” Holscher said. Turman Creek actually extends down from Vigo County through Sullivan flowing southwest into the Wabash River.”

Holscher’s job encompasses a lot of different duties, but one important aspect is developing conservation packages, or plans, for farmers whose fields drain into her watersheds. Because the WCIWA is not a regulatory entity, all farmers who agree to work with Holscher are doing so voluntarily. To get farmers to sign on, she helps them identify issues affecting the water quality of streams on their property and then connects them with a corresponding government program. Holscher said success lies in appealing to a farmer’s economic sensibilities.

“I call it selling conservation. Because you’ve got to make it something these folks want to buy into, something all these farmers want to buy into that’s going to make sense to their bottom line because their businessmen. You also have to address the objections they’re going to have. It’s sales 101: identify the objections, overcome them, close the sale.”

According to Holscher the two major objections farmers have are cost and the amount of paper work. She said conservation is not cheap and the paper work to sign up for various government programs is not easy to wade through. Owner and Operator of Ready Farms Gary Ready is a fifth generation farmer and has, with Holscher's help, recently signed onto a conservation program offered through the United States Department of Agriculture's National Resources Conservation Service. He already practices some environmentally-friendly farming techniques such as no-till, which reduces soil erosion. However, Ready's interest was piqued by something called precision farming."

"When the fertilizer company comes out and puts on fertilizer, they put it on with satellite maps," Ready explained. "If one area of a field needs, say, potash it puts on more potash there. Then if you get into an area where you don't need it, the machines automatically adjust as they go and spread what you need where you need it rather than just a blanket of fertilizer."

Using precision farming techniques not only saves Ready money, but also keeps excess chemicals out of the water. Farmers are also encouraged to create buffers of grass between their crops and streams to protect the soil and create habitat for wildlife. Although, that tactic takes land out of production and can cost the farmer money. These are only a few alternatives available to Indiana Farmers in the Busseron watershed but Ready says it's hard to change a farmer who is set in their ways. School of Public and Environmental Affairs Clinical Professor Bill Jones said that changing generation old habits is the next challenge for groups like the WCIWA.

"Many behaviors we learn from our parents and from our grandparents," Jones said. "Many times I've talked to many farmers, for example, and they've said well, my dad always did it this way and his dad before him and so we're just carrying on the family tradition. Well, those family traditions might have been fine with 100 acre fields but now that we've gone to bigger agriculture there are bigger issues."

Furthermore, Jones pointed out farmers are not the only ones who have chemicals running into the waterways. He said homes in urban areas contribute to the problem too. "Interestingly enough in residential areas, residential levels of lawn fertilizers and lawn pesticides are often much higher than those found in agricultural areas."

And that's not all, there is still acid mine drainage—or highly acidic, metal rich water—seeping into waterways from abandoned mines all of which eventually ends up in the Gulf of Mexico. The result of all this is something called the dead zone in the Gulf a phenomenon currently being overshadowed by the BP oil spill. The dead zone is an area of low-oxygen water surrounding the outfall of the Mississippi that cannot support marine life. Increased use of chemical fertilizers is cited as causing the depletion of oxygen in the Gulf's dead zone. Holscher admitted the task of addressing so many issues with such large consequences may seem daunting, but, she said, "if you look at the situation in increments—look at the puddle instead of the Mississippi—the solution is not that far off."

"And if you take a lot of these little projects, and if you take all of these watersheds doing the same kind of work we can really make a huge impact nationally and globally environmentally." And as Holscher pointed out, everyone lives downstream from someone.

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. Each project is working toward achieving the goals set out in their watershed management plan. 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 89% of the plan has begun 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. This has not changed from 2009. The current contract is ending this year and a new contract has not been awarded. The analysis of the volunteer water quality data collected for this project has not been completed. Hoosier Riverwatch Methods were used for data collection and analysis for this project. In addition, a volunteer stream monitor, Mike Meyer, was recognized as the "Volunteer Monitoring Success Story" in EPA Region 5 in April 2010. For more information on this award see the "Project Recognitions" section of this report.

Parameter	Percent reduction in 2007	Percent Reduction in 2008	Percent Reduction in 2009/2010	% 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. In 2007, IDEM assessed the water quality in the larger Clifty Creek watershed and results from that survey indicated the *E. coli* levels have dropped in

lower Clifty Creek. Based on the 2007 geometric mean of 67.58 MPN, stream segment INW0616-00, Clifty Creek-Columbus, was removed from the 2002 303(d) listed segment of Clifty Creek watershed from the 303(d) list. The table below summarizes the changes in the Lower Clifty Creek watershed.

E. coli changes Summary

Stream Name	Hydrologic Unit Code	WQS geometric mean	2002 Geometric mean	2007 geometric mean	Percent Reduction
Clifty Creek	051202060107	125 MPN	205.02 MPN	67.58 MPN	67.03%

Dunes Creek – Save the Dunes Conservation Fund completed the Dunes Creek watershed Management Plan (WMP) to address *E. coli* impairment and reduce other NPS pollutants. The watershed management goal was to improve the water quality and habitat of Dunes Creek by reducing and preventing pollutant loads in the watershed such that at a minimum, the creek meets Indiana water quality standards.

Critical Milestones included 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. The needed implementation efforts were estimated to be complete in 2016 and delisting was expected to take place during 2018.

Implementation of the WMP remains at 18 of the 24 (75%) action items. Results are summarized as follows: five and one-half tons (11,000 lbs/year) were reduced through BMP calculations of sediment, 12.2 pounds per year of phosphorus, and 69 pounds of nitrogen.

Also an *E. coli* data gathering project by USGS was funded by 205(j) funds for a wetland restoration project that was completed in 2004. In this pilot study to determine if it was a reasonable approach for decreasing *E. coli* concentration in dunes Creek, in 2003, a pond was constructed on a major ditch that flows into the eastern branch of Dunes Creek. Results two months after construction suggested that the pond was having a limited impact on decreasing *E. coli* concentrations. The lack of a more favorable response was not unexpected since plants were not present to stabilize the banks, resulting in erosion and runoff; also, water within the pond was turbid, which prevented sunlight from penetrating the surface to decrease the *E. coli* population. Once the pond area became more stabilized, *E. coli* concentrations between the inflow and outflow should decrease.

Targets for both 2012 and 2016 have been met for sediment. Dissolved oxygen concentrations in 2008 slightly improved compared to 2007 data and were within levels required by the IAC at all sites. Overall, water quality appears to have changed little from 2005 to 2008. Low dissolved oxygen and high conductivity and *E. coli* concentrations continue to be problems within the Dunes Creek watershed.

Save the Dunes Conservation Fund will no longer be working in this watershed or implementing the watershed management action items. Other entities such as USGS will be contacted periodically for future data results and improvements to *E. coli* concentrations in this watershed.

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. The schedule for completion of implementation efforts is 2015 with the ability to de-list in 2019. A creek clean up on September 11, 2010 and a new \$30,000 grant to demonstrate stream bank stabilization at the end of September are the only activities planned for the Cedar Creek Group this year.

The results from one 319(h) project for the implementation of the WMP include twenty-four septic systems repaired, five rain gardens installed, 13,751 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(h) 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 2,2002.5 pounds, and nitrogen as 4142.6 pounds. The percent reductions are shown below:

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

Using the water quality monitoring mean values with USGS Surface-Water Annual Statistics for Indiana at Hydrologic Unit Code 04100003 on Site 100 shows the discharge in cubic feet at 279.8 in 2004, at 328.0 in 2007, 326.3 in 2008, and 432 in 2009 until October. Published graphs displayed yearly mean concentration values for nutrients, TSS, and *E. coli* for 2004, 2007, 2008, and 2009 at site 100. The 2009 concentration value for sediment /turbidity was 28 mg/L, for phosphorus it was 0.18 mg/L, and for nitrogen it was 0.14 mg/L. It is still too early to establish water quality improvements using trend lines.

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 (Bontrager Ditch-Emma Lake (04050001140010)). 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 and the 2012 or five year milestone are displayed in the table below. 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.

The project has set BMP implementation goals in the treatment watershed and is currently on track for their 2010 goals of 65,000 feet of fence installed, repairing 25 sites that have livestock-induced ditch bank damage, and 400 acres of installed filter strips.

For their Watershed Management Plan Action Goals in the 3rd year of implementation, 57% of their goals have been completed, 28 % are on schedule, and 14% has not been accomplished but will be in place next year. Eighty-five percent of WMP has been started.

Parameter	Targeted Reductions set for Bontrager Ditch/Emma Lake	Percent reduction in 2010 For Bontrager Ditch/Emma Lake
Nitrogen	2.7 tons	21
Sediment	24 tons	>100
Phosphorus	0.8 tons	26
<i>E. coli</i>	91.8 trillion	54

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 85% of planned BMPs have been installed with another 10% in the process or scheduled to be installed over the next 5 months. The project has initially concentrated on locations contributing the highest levels of NPS pollution. All but one of these sights has had BMPs installed. At this point in time approximately a 21% reduction in nitrates, 26% reduction in total phosphorus, 54% reduction in *E. coli*, and a 355 ton reduction in sedimentation pollutants in the treatment HUC 14 (Bontrager Ditch-Emma Lake) has been documented.”

Eagle Creek – The Eagle Creek Watershed Alliance (ECWA) is currently implementing the 2005 Eagle Creek Watershed Management Plan and the upgraded 2008 plan. Implementation of the watershed management plan is scheduled to be completed by 2016 with 303(d) delisting by 2019. The Phase 1 implementation project closed October 31st of 2009 and a second implementation project began this year.

ECWA established a critical milestone of expected reductions from the Phase 1 Implementation project as follows: 40% reduction in *E. coli*, 8% reduction in sediment, 3% reduction in total phosphorus, and a 2% reduction in total nitrogen.

The Phase 1 Implementation project ended with nine BMP installations funded by the 319(h) grant. Region 5 model load reductions totaled 5,524.2 tons of sediment, 4,279.2 lbs of phosphorus, and 5,860.4 lbs of nitrogen. Using water quality load data from the 2005 WMP to the calculated BMP reduction values, a 21% sediment reduction, 4% phosphorus reduction, and 3 % nitrogen reduction, the critical milestone was met except for *E. coli*, which could not be calculated using this model.

As documented in the “Eagle Creek Watershed Management Plan Final Report,” fifteen BMP installations were completed. The updated WMP and ECWA calculated values are shown in the table below.

Updated Watershed Management Plan Implementation and Goals.

Parameter Units	WMP Mean	Target Mean	Reduced Mean by	Current Mean	Percent Reduction	Target Percent Reduction	Remaining Percent Reduction
Sediment tons/yr	26,000	18.628	5,266	20,734	19.3	28.4	9.1
Phosphorus lbs/yr	120,000	50,000	6,974	113,026	5.8	58	52.2
Nitrogen Lbs/yr	1,780,000	1,136,000	14,830	1,765,170	0.8	35.2%	36
<i>E. coli</i>	<i>Not calculated</i>	<i>Not calculated</i>					

Because of the water quality monitoring collected throughout this project’s term, ECWA was able to demonstrate in the year end data summary, major sources of contaminants and why the different reaches of streams have different pollutant loadings. Their analysis demonstrated the importance separation of analysis on base and event sampling. From separating the data into these two categories instead of averaging all the analysis together they determined that the base loading was greatly exaggerated.

ECWA was unable to show change in water quality based on BMP implementation. Monthly sampling does not provide a sufficient number of samples to show change in water quality. ECWA depended on comparison of median values to provide some information about the distribution of hotspots and to help focus best management practices.

Approximately 80% of the action items in the watershed management plan have been implemented. ECWA reported that the results suggest a lack of understanding of water quality impairments threatening water resources.

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 Monitoring Strategy

In 2009, IDEM submitted to US EPA a NPS monitoring strategy. This strategy is aimed at collecting and analyzing data in a manner that enables IDEM to target limited resources for watershed planning purposes and to ascertain changes in water quality resulting from different OWQ program activities such as watershed planning and restoration activities funded through NPS Section 319(h) and 205(j) grants, and TMDL development and implementation. Other OWQ efforts as well as efforts by conservation partners and various organizations including activities aimed at minimizing storm water impacts, eliminating combined sewer overflows, improving permit compliance, installing agricultural best management practices and ameliorating the effects of hydro-modification will be captured through this strategy.

The first project initiated under this strategy was a BMP Sampling of the Upper Eel River Watershed in Whitley County. The following provides a summary of the project and the results.

Background

Sampling of 319(h) funded BMP filter strip reaches was conducted as a component of the Surveys Section 2009 Source ID studies in the Upper Eel River watershed. This sampling was conducted to evaluate the effects of the filter strips on water quality. The USDA defines a filter strip as an area of grass or other permanent vegetation used to reduce sediment, organics, nutrients, and other contaminants from runoff and to maintain and improve water quality by providing a buffer between the contaminant source such as row crop activity and the waterbody.

Seven BMP reaches were selected, six of which were situated in the Blue River watershed northeast of Columbia City, and one was located in the Gangwer Ditch watershed southeast of Columbia City. Both the Blue River and Gangwer Ditch lie within the Upper Eel River watershed and all sampled BMPs are situated within Whitley County. All of the BMPs were designated as filter strips and were situated in areas where agricultural row crops were the primary surrounding landuse. Sampling was conducted during late summer warm weather conditions between August 4th and September 2nd of 2009.

Sample Design and Methods

All of the BMP stream reaches were embedded within the Upper Eel River Source ID study areas so that sampling of each was a matter of adjusting sampling routes to incorporate BMP site locations. Each of the BMPs was assigned an upstream edge and downstream edge sampling site location. The rationale was to observe the upstream water quality entering the BMP stream reach and the discharge water quality at the downstream edge to evaluate

potential improvement through the BMP zone of influence. If feasible, all sites were intended to be sampled as three part composites within a 24-hour period for water chemistry with three discreet sampling events for field data collection, providing accessibility was not a deterrent. Collection of the third sampling event before dawn was of particular concern for those sites located a long distance off road. Data collection mirrored those parameters collected for the Source ID study and included field data, *E.coli*, general chemistry, nutrients, and metals data. See specific parameters as listed in Tables 1, 2, and 3 as shown below. In addition to sample collection for laboratory analysis and in situ field data collection, flow measurements, physical descriptions, and pictures were taken at all sampling locations.

Table 1: Field Parameters

Parameter	Method	Limits of Quantitation
Dissolved Oxygen	SM 4500-OG	0.03 mg/L
Turbidity	SM 2130B Mod	0.02 NTU
Specific Conductance	SM 2510B	1 umhos/cm
Temperature	SM 2550B (2)	0.1° C
pH	EPA 150.1	0.1 SU*

* NTU = Nephelometric Turbidity Unit(s)

Table 2 : Chemical Parameters for Laboratory Analysis

Anions/Physical			Nutrient/Organic		
Parameter	Method	CRQL	Parameter	Method	CRQL
Alkalinity	310.1	3.0 mg/L	TKN	351.4	0.03 mg/L
CBOD ₅	405.1	2.0 mg/L	Ammonia-N	350.3	0.03 mg/L
Total Solids	160.3	1.0 mg/L	Nitrate+Nitrite-N	353.2	0.05 mg/L
Suspended Solids	160.2	4.0 mg/L	Total Phosphorus	365.1	0.01 mg/L
Dissolved Solids	160.1	10.0 mg/L	TOC	415.1	0.05 mg/L
Sulfate	375.2	0.5 mg/L	COD	410.4	3.0 mg/L
Chloride	325.2	1.0 mg/L			
Hardness	SM2340B	0.4 mg/L			
Priority Metals (Total Recoverable)					
Aluminum	200.8 or 200.7	4.0 µg/L	Lead	200.8	2.0 µg/L
Arsenic	200.8	4.0 µg/L	Magnesium	200.7	40 µg/L
Calcium	200.7	200 µg/L	Nickel	200.8	2.0 µg/L
Cadmium	200.8	1.0 µg/L	Selenium	200.8	1.0 µg/L
Chromium	200.8	3.0 µg/L	Zinc	200.8	10.0 µg/L
Copper	200.8	3.0 µg/L			

Table 3: Bacteriological Parameter Showing Method and Quantification Limits

Parameter	Method	Quantification Limits
<i>E. coli</i>	SM 9223 Enzyme Substrate Coliform Test	1 MPN* / 100 mL

* 1 MPN (Most Probable Number) = 1 CFU (Colony Forming Unit)

Findings

Field observations showed that most of the BMP stream reaches were installed in a similar fashion and had many of the same physical characteristics. Each stream was typically channelized and very deeply incised into the local topography. Stream geomorphology was consistently smooth resulting in laminar surface flow during low flow stream stages. Low gradient was evident on the tributaries to the Blue River resulting in pooled conditions with accompanying mucky streambeds prevalent. Blue River and Gangwer Ditch both had slightly steeper gradients as evidenced by glide and some slight substrate scour conditions documented at each sampling location. Stream banks were very steep, covered with tall grasses and devoid of tree cover. In many cases either tall grasses or a mowed grassy strip typically extended 20 to 30 feet away from the edge of the bank which effectively created a grassy buffer strip on both sides of the stream. Some reaches did have some scrub growth including small trees and weeds starting to encroach upon the grasses. There was evidence that the scrub growth had been sprayed with herbicides in many locations which was apparent by ubiquitous die-off of the non-grass vegetative species.

A chance meeting at one of the BMP sampling sites with Devon Schuman who is the Whitley County Engineer and on the Whitley County Drainage Board revealed some additional information about the drainage maintenance in the county. Mr. Schuman indicated that all the maintained ditch stream banks are sprayed for weeds once a year and roughly 50% of the county stream reaches have filter strips that are either government funded or by the farmers own initiative. The seven BMP filter strips that were the subject of this study were installed in 1993 and 1994 and were government funded as part of the ARN 92-22 project. These original installations appear to coincide and be adjacent to certain bordering row crop fields. Due to the prevalence of filter strips throughout Whitley County, there were no demarcations evident between the original government funded filter strips and extended reaches that were not included as a part of this initial installation. Onsite observations revealed the filter strips extended in a continuous fashion for much of the watershed. The uniformity of all these reaches appeared to indicate the ditches are cleaned out and maintained on a regular basis. In this regard, a land owner living downstream of the Growcock Branch BMP related that Growcock Branch had been dredged three years prior in 2006. There was no evidence of very recent dredging at any of the BMP sampling sites that would have some impact on the data analysis for this study.

Data evaluation for this study indicated very few issues in terms of stream standard exceedances. (See Tables 4, 5, 6, 7A, 7B, and 8). Dissolved oxygen (DO) was observed below 4.0 mg/L on two of the BMPs both of which were on tributaries of Blue River. Growcock Branch showed a late afternoon DO of 3.7 mg/L and an average of 4.37 mg/L for the two sampling events at the downstream edge (WAW020-0077) of this BMP. An upstream edge for the Growcock Branch BMP was not sampled due to difficult access. The sediment at the downstream edge of this BMP was extremely mucky to the point of not being wadeable. This site was an elongated pool with very little velocity and a high reading of only 0.05 ft/sec indicating low gradient. There was 100% duckweed cover in addition to tall grasses encroaching upon the stream surface. All of these factors would combine to create conditions which would suppress DO levels. The duckweed proliferation and grasses covering the stream would cause sunlight blockage and promote vegetative die off and decay of any previous algal or macrophyte growth and cause oxygen demand. The water indeed appeared very dark,

turbid, and full of visible large solids which translated to higher than normal suspended solids for this site compared to other BMP sites in the watershed. The suspended solids level of 33 mg/L

was considerable above the average of 10.8 mg/L for all BMP sampling sites combined. Further, the dredging process could have decreased stream reach gradient by creating a site specific pooled reach where attention to slope was not a foremost consideration. These conditions would inhibit reaeration and create a scenario for sediment oxygen demand in the mucky sediment which would exacerbate the affects of the duckweed cover.

The other BMP where DO was an impairing issue was on Rouch Ditch at both the upstream edge (WAW020-0076) and the downstream edge (WAW020-0073) of the filter strip. Duckweed cover was not an issue at either of these locations. The upstream site was pooled and very mucky, which again is indicative of a gradient issue. The early morning DO was 2.82 mg/L and the late afternoon level was 9.65mg/l. which would indicate algal activity and a resultant diurnal fluctuation. The downstream edge also had a low morning DO of 1.92 mg/L and a mean DO of 4.67 mg/L. The algal activity was very evident at the downstream site during the late afternoon data collection on August 25th at 7:10 PM. The DO was 7.42 mg/L but falling steadily at the sampling site which was shaded by a tractor crossing culvert bridge and the low angle of the sun. Just downstream of the culvert where the stream was still exposed to direct sunlight the DO was 10.18 mg/L.

E.coli data results showed many of the BMP sites to have counts in exceedance of the 235 MPN/100 mL for a single sample event. This is not uncommon since most watersheds in Indiana show counts in exceedance of the standard which can many times be due to wildlife activity. The important point to note for the *E.coli* data is that no single count is inordinately high which would give rise to concern of a contamination source or the filter strips not doing their job. There are no counts in excess of 1,000 MPN/100mL with the highest count observed being 770 MPN/100mL. Four of the values were below the standard with the lowest value of 10 MPN/100mL on Rouch Ditch being an extremely low count that is a rarely observed level as compared to statewide *E.coli* monitoring.

Six of the thirteen sampling sites were also found to have aluminum above the stream standard. This is also a parameter that is commonly found above the stream standard but none of the values were inordinately high and would cause concern of a contaminate source other than what is naturally occurring.

Since there was no historical water quality data before the BMP installations occurred, there was not a way to evaluate before and after affects of the BMPs. This study attempted to evaluate upstream and downstream edges of the BMPs as they were digitized according to the original installations in 1993 and 1994 and show improvement through the BMPs. Although the extension of these filter strips beyond the original installations is positive for Whitley County water quality, the extended reaches hampered the purely discrete assessment of the original reaches. As expected, evaluation of key parameters through the buffer strips showed no significant change from upstream to downstream in water quality. DO, suspended solids, turbidity, and nutrients in particular showed no significant worsening or improving affects through the digitized reaches. This was most likely due to improvement already occurring

through the upstream extended filter strip leading to the original BMP installation. Most importantly, other than the two site-specific depressed DO levels there were no deleterious water chemistry issues

Conclusions

Based strictly upon the intention of the filter strips for removing sediment, organic matter and other pollutants from runoff and wastewater to improve water quality, the filter strips sampled for this study appear to be achieving that purpose. The data showed no substantive water quality impairments other than two tributaries that had low DO issues that were the result of low gradient, pooled conditions, and slow velocity. One tributary was being affected by extreme duckweed cover and vegetative decay and the other tributary was affected by a diurnal fluctuation from algal activity. There were no dredging activities at the time of the study which would have influenced the data results. Making a discrete evaluation of the original BMP installations became almost a moot task due to the extended filter strip reaches that are prevalent throughout Whitley County. The original reaches were benefiting from the subsequent upstream installations so that water quality at the upstream edge of the digitized reaches had already been improved. This improvement was reflected in the data which showed fairly good water quality at the upstream edge of the BMP which remained relatively stable through the filter strip reach.

Although these seven BMPs were shown to be achieving their intended purpose according to the letter of their definition of removing deleterious runoff components from reaching the stream, the aquatic life use support won't be fully protected until the bank and buffer strip riparian zones are allowed to develop naturally with vegetation and tree cover shading the stream. Total stream recovery would also include the natural reverting to some degree of sinuosity and a pool-riffle-pool effect to restore the natural aquatic habitat.

As an initial effort to monitor BMP effectiveness, this survey will serve to help improve upon future study designs. Most importantly, in those cases where there has been extended filter strip installations, an effort should be made to sample the total filter strip reach beginning with the furthest upstream edge and perhaps include sites within the reach if dealing with many miles of installation, and the downstream edge. This will render a before and after analysis of the BMP effectiveness which is probably the only approach available since a temporal before and after approach is not feasible at this point. Although Whitley County has done a very good job of filter strip installation, not all Indiana counties have been as proficient and it will be interesting to see results of BMP monitoring in various counties to obtain a comparative effectiveness. Although no mention was made of protecting aquatic life as one of the beneficial purposes for filter strips in the USDA 393 publication, the collection of biological data probably would show that an additional step of letting the riparian zone totally recover to a natural tree lined corridor would enhance these agricultural streams even more.

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(h) funds, work to redesign

completely the website began in the spring of 2009. The project, funded by Section 319(h), is described below:

Project Goals: Create a non-point source pollution Web site that allows stakeholder to increase their knowledge and access to information. Some of the key elements to provide:

- Basic information on nonpoint source pollution and how it impacts the citizens of Indiana;
- Information on how to run a successful 319(h) grant and guidance on all aspects of grant work, from how to write an effective watershed management plan, IDEM policy and procedures, how to form effective partners, monitoring information, and assistance with education and outreach;
- Information on the soon to be finalized social Indicator tools, such as SIDMA;
- How to network and learn from other 319(h) projects successes and failures;
- Information on urban BMPs and programs that drive the need to address urban storm water; and,
- Tools, guides, and information that would help groups make measureable improvements in water quality.

Narrative: The OWQ has identified a need to improve stakeholder capacity via the Internet. This will be accomplished by completing a large scale revision and improvement to the non-point source Internet site. The current site provides stakeholder with basic information, but fails to educate visitors on the impacts of non-point source pollution affect citizens or provide tools and resources necessary for stakeholders to participate in local grassroots efforts to eliminate non-point source pollution.

The funds requested will be used to complete a comprehensive redesign of the current IDEM web site devoted to nonpoint source. New tools such as template brochures with on-demand digital printing catalogs, guides, electronic mapping, and a page dedicated to allowing groups to post their own content will be created. Existing informational materials will be rewritten to more effectively communicate policy and guidance, such as the role of the watershed specialists. The State Nonpoint Source Plan and links to partner non-point source programs will be incorporated into the new design. New tools that allow push-based information feeds will be provided to help local organization or partners stay current on agency activities.

Lastly, this project will work closely with IDEM's MS4 program to help create outreach resources that will help all stakeholders understand the importance of storm water programs and actions that can be taken to help address this on the local level.

The project will be completed in a three phased approach:

Phase 1 – Re-design the existing Web site, including the development of new content for Web pages and incorporation of existing outreach and educational materials available from the

National Nonpoint Source Toolbox, other states, and previously funded 319(h)-projects, as appropriate.

Phase 2 – Develop new outreach materials and delivery mechanisms that convey information on various nonpoint source topics, including but not limited to: urban storm water, septic maintenance, watershed planning, BMP selection, and other topics that provide education to 319(h)-funded groups that will improve their planning and implementation projects to achieve measureable improvement in water quality. Materials would be web-based brochures, guides, and short videos.

Phase 3 – Develop non-web outreach materials to heighten awareness of nonpoint source pollution and the role citizens can play in helping clean up Indiana’s waterways. These materials may include – radio ads, informational PSAs, and other mass-media advertising.

Final products associated with this project, which will be available via IDEM’s website later in 2010 include:

- Over 200 new webpages devoted to watershed planning, nonpoint source education, resources, and reimaged websites for key agency NPS programs.
- A web-based GIS powered 303(d) list with access to TMDLs and WMPs for view by the public.
- A redesigned and easier-to-use Indiana Water Quality Atlas.
- Seven new brochures and biller stuffers designed for use by watershed groups and other interested parties, available thru an e-print web portal.
- A revised and reimaged Indiana Watershed Planning Guide.
- A revised and reimaged Integrated Water Quality Report, encompassing the 305(b) and 303(d) reports.
- Four informational videos, with four more planned, on watershed and NPS pollution topics.
- Three large scale water quality education displays, available to the public for rental at no-cost thru IDEM’s regional offices.

A final report, prepared by the Office of Media and Communication Services, describes work accomplished in greater detail.

Enhancing Databases

Assessment Information Management System (AIMS)

The NPS Program used 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(h)-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 was expanded to include the programs, projects, and data collected through the NPS and water quality grants. The improvements incorporated web browser access to staff

and management and enhanced 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 is complete and is currently under a one-year maintenance period which will include further enhancements. 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(h) 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 present a monitoring strategy for 319(h) projects that will assist watershed groups in their planning and implementation goals. Purdue will 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. Purdue will provide guidance and tools that can be used in collecting environmental data.

Purdue has established a list of core and supplemental environmental indicators, provided a list of standardized methods, prepared a statewide inventory of monitoring groups, data sources, monitoring methods, and will assist in technical training. Training will consist of providing

technical assistance for watershed groups and NPS staff through workshops, webinars, models, and a comprehensive training manual.

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

At IDEM's request, Purdue held another 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.

A post-survey report and some preliminary pre-post survey data analysis has been conducted for the Clifty Creek Watershed Project. The Tippecanoe Watershed Foundation (TWF) sent out a survey to a sample of their lakes residents. Many of these surveys have been returned, and data entry is taking place as the surveys come in. The TWF has also created a survey to gather information from their agricultural residents, and this is set to be sent out in July of 2010. Bean Blossom is also working on creating their first survey to be sent to a combined urban and agricultural population. These surveys are also set to be sent out in the summer of 2010. Continued support has been provided to pilot projects that have questions about their social data or the social indicators process.

The entire Region 5 Social Indicators team met at the end of June to discuss results of a few of the first pilots that have pre-post survey results. There will be some changes made to the survey instrument and analysis process as a result of the discussions that took place at that meeting.

Status updates for all pilot projects:

Purdue currently has 9 pilot projects using social information surveys: Eagle Creek, Clifty Creek, South Fork Wildcat-Kilmore Creek, West Fork Whitewater, Lower Fall Creek, St. Mary's, Greater Lafayette Reach of the Wabash, Bean Blossom, and the Tippecanoe Environmental Lakes and Watershed Foundation. Big Walnut has created their own survey based on the SIPES process; however, they are not considered a pilot project because they did not following a critical step in survey development.

South Fork Wildcat-Kilmore Creek was the first pilot to complete both rounds of survey testing, and this took place in the fall of 2009. Some analysis on pre- and post- survey data has been conducted and shared with the group.

Clifty Creek recently completed their second round of survey testing and some additional analysis has been conducted for them. They are ready to share results with stakeholders and the steering committee in their watershed.

Purdue decided not to conduct a follow-up survey with Eagle Creek because they did not use data gathered from their first survey to guide any of their planning or implementation processes; thus any changes they would see in the second round of the survey testing would not be based on information from the social indicators process.

West Fork Whitewater, Lower Fall Creek, and St. Mary's watersheds are currently working at steps 3 and 4 of the SIPES process. They are reviewing data and refining social outcomes and

implementing some of what they have learned from their survey data into their watershed related activities. Purdue will resurvey West Fork Whitewater and St. Mary's in 2011.

The Tippecanoe Environmental Lakes and Watershed Foundation has just completed a survey of lake residents within their watersheds, and has started on a survey to agricultural producers in the watershed.

Bean Blossom is creating their first survey that should be sent to a combination of urban and agriculture residents within the month.

Finally, the Greater Lafayette Reach of the Wabash has held meetings with stakeholders to discuss which questions should be included in their urban and agricultural surveys that are scheduled to be sent this fall.

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. Also, the expert panel clearly indicated the need to identify existing state programs that are currently monitoring using environmental indicators and their associated methodology. The expert panel also gave their opinions on parameters that were likely to change and many panel members replied that this was a statistical question.

Based on the two examples (QHEI and Fish IBI) presented in March 2010, Purdue drafted rough information for all 25 core and supplemental indicators for the Environmental Indicator Manual. Currently the indicator list is at 27. The separation of indicators into core and supplemental categories will be accomplished through meetings between Purdue and NPS staff.

Purdue has also worked to identify, share, and standardize methods of measuring the indicators by watershed groups and agencies in Indiana. 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.

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.

As a result of the expert panel, Purdue realized the importance to provide examples of minimum detectable change analyses to help inform indicator selection. Using the standard statistical method available for calculating minimum detectable change, based on the paper by Spooner, 1987, Purdue is conducting example evaluations of the minimum detectable change for watershed projects where monitoring has taken place.

Purdue is using monitored data and target concentrations from watershed group to calculate target load reductions. They will compare these to load reductions from BMPs actually implemented (using the Region 5 model, STEPL, and an LTHIA-based estimate to calculate load reductions). Purdue will estimate the number and types of BMPs that would be needed to meet load reduction targets.

Purdue worked with Barry Tanning of TetraTech to schedule a webinars series based on 4 PowerPoint presentations: “Types of Monitoring & Assessment Data and What They Mean,” “Which Data are Important and Why,” “Using Data to Support Watershed Protection & Restoration Decisions,” “Dealing with Uncertainty in Watershed Assessments.” These webinars will be used as training for 319(h) projects that are monitoring. The content for these presentations came from content developed for a separately funded Section 319(h) project.

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)(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)(h) staff attend watershed meetings together and match watershed groups to grant funding and data resources. Section 319(h)(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(h) grants to continue the work started by the TMDL) and several watersheds where TMDLs were completed had 319(h)-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. 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.

Capacity Building for Watershed Groups:

The WSS developed and conducted three Watershed Networking Sessions in Albion, Seymour, and Terre Haute (December 2009) focusing on “Managing Runoff in Indiana: Modified vs. Natural Systems”. Speakers from Stantec Consulting, Wetland Services, Inc., Wells County Surveyors Office, Little River Wetlands Project, IDEM Wetlands Program, IDNR Division of Forestry and The Nature Conservancy presented information on topics including 1) hydromodification in Indiana and how to move toward natural stream and wetland restoration; 2) importance of forested riparian buffers; 3) two-stage ditch principles; and 4) local drainage issues and overcoming barriers to restoration. There were 72 participants during this round of sessions representing SWCDs, watershed groups, RC&Ds, MS4s, environmental organizations, lake associations, conservancy districts, regional planning commissions, public water supply systems, county surveyors, municipalities, colleges, universities, NRCS, ISDA, IDNR and consulting firms, and feedback on the sessions was positive – local watershed group reported that because of this session, contacts were made and measures have been taken to prevent Asian carp migration between the Mississippi and Great Lakes drainages via floodwaters in the Ft Wayne area.

The WSS developed and conducted four Watershed Networking Sessions in Winslow, Seymour, Andrews and North Judson (May 2010) focusing on “Septic System Maintenance and Onsite Wastewater Alternatives.” Speakers from the Indiana State Department of Health (ISDH) and Rural Community Assistance Program (RCAP) presented information on decentralized wastewater systems and how to move communities forward to address rural wastewater issues. There were 77 participants during this round of sessions representing SWCDs, watershed groups, local health departments, septic system installers, RC&Ds, MS4s, TNC, lake associations, conservancy districts, conservation clubs, county planning commissions, county engineers, river basin commissions, regional planning commissions, public water supply systems, county surveyors, municipalities, realtors, Indiana Alliance for Rural Water, IASWCD, NRCS, ISDA, IDNR and consulting firms, and feedback on the sessions was positive.

To support the Section 319(h) program and other partners, WSS completed the Watershed Resource Toolkit and revisions to the “Indiana Watershed Planning Guide” and worked with NPS/TMDL Section Chief and MACS to put them on the IDEM website. These will be deployed later this year.

The WSS assisted Purdue University in developing the Indiana Watershed Leadership Academy sessions, participated in a face-to-face session with an expanded class of 35

participants this year, reviewed the module assignments and provided feedback to participants, and attended their graduation and evaluated their class projects presented that day.

The WSS worked with the new IASWCD Conservation Development Specialist to assist watershed groups and SWCDs in marketing and fundraising for their conservation needs.

As a primary part of their jobs, 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. This work includes helping groups move beyond dependence on 319(h) funding and integrating with local comprehensive plans. In addition, they have worked with large watershed basin partnerships to promote integration and prioritization of local, smaller scale watershed efforts.

Internal Program Coordination:

The WSS worked extensively with other IDEM staff to improve internal processes and foster information exchange, which included:

- Continued working with the IDEM NPS/TMDL Section staff on WMP revision guidance, website content development and development of NPS monitoring and load calculation guidance for watershed groups
- Met with IDEM CSO program staff to learn about their program and how we can tie their efforts to watershed group/WMP needs
- Worked with IDEM Groundwater staff to continue coordinating source water protection and watershed group efforts
- Met with Stormwater and Groundwater Section Chiefs to discuss issues with urban infiltration BMPs in Wellhead/Sourcewater Protection Areas
- Continued to work with Watershed Assessment and Planning Branch staff on the External Data Framework

External Program Coordination:

The WSS work directly with partner agencies to help strengthen efforts to address NPS pollution through a variety of other programs. This included:

- Assisted in coordinating watershed-related topics at the IASWCD annual conference and moderated several sessions
- Met with ISDH staff to continue coordination on education & outreach on decentralized systems
- Continued to coordinate with IDNR LARE staff on watershed planning and diagnostic study projects to meet 319(h) requirements in order to leverage funding and resources
- Coordinated a meeting with Office of the Indiana State Chemist (OISC) staff and director and several IDEM program staff (Planning Branch, Assessment Branch, Drinking Water Branch) to discuss programs, share information and concerns about water quality, and

- seek ways to continue to work together on education and outreach on herbicides/pesticides to watershed groups, other partners
- Attended the Indiana MS4 Annual Meeting to network with MS4 coordinators interested in watershed planning
- Continued promoting the Mitigation Matchmaker website developed by INDOT, IDNR, and IDEM. Several watershed groups have started using this tool and are getting some mitigation projects in their watersheds
- Coordinated and facilitated a meeting with consultants, IUPUI Center for Earth and Environmental Science, TNC, IDEM 401 program staff and IDEM Watershed Planning Branch Chief to discuss opportunities and obstacles for natural stream and wetland restoration in Indiana. Also coordinated with the President of the County Surveyors Association to have the same consultants, IUPUI and TNC speak at the annual Purdue Road School (March 2010) to educate surveyors on watershed hydrology and hydromodification, two-stage ditch principles and natural stream design. The response from the surveyors (over 50 in attendance) was overwhelmingly positive
- Worked with the Indiana Water Monitoring Council to develop and conduct a water monitoring field day with USGS, IDEM, IDNR and a local watershed group (Big Walnut Creek Watershed Alliance)
- Worked with other agencies in the Indiana Conservation Partnership to begin developing a Training and Certification program for partner employees, including training in the design and implementation of best management practices for water quality improvement

Public Presentations/Outreach:

The WSS gave formal public presentations on watersheds and water quality at the following:

- Ball State University
- Kendallville Public Library
- Watershed Specialists wrote articles for the Indiana Lakes Management Society newsletter on the following topics:
 - “IDEM works to match groups with potential wetland restoration sites”, Fall 2009
 - “Don’t Feed the Algae”- article about using phosphorus-free lawn fertilizer, Spring 2010
- Watershed Specialists helped to staff the “Pathway to Water Quality” exhibit at the Indiana State Fair

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 examples of IDEM working with partners and using Section 319(h) funds to help build capacity statewide and at the local level to reduce NPS pollution in the state.

Watershed Networking Sessions

Networking Sessions conducted by IDEM's WSS 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. 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. More information on the Networking Sessions held this year may be found under the "Watershed Specialists, Capacity Building for Watershed Groups" section of this report.

Indiana Watershed Leadership Academy

IDEM is partnering with Purdue University and using Section 319(h)(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 (IWLA) 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). 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 fifth class of the Indiana Watershed Leadership Academy in May 2010, which was the largest class ever. Thirty-five participants from throughout Indiana with very diverse backgrounds including watershed coordinators, MS4 operators, students, private citizens, consultants, resource managers, and non-profit representatives convened in January 2010 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. 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. When asked to provide specific comments regarding the overall Academy, participants indicated:

- “It is comforting to know the number of individuals and organizations devoted to the improvement of Indiana’s aquatic systems. Networking with these individuals was especially important.”
- “The networking and diversity of the group was great. I know many people initially felt out of their league due to complete lack of experience or knowledge in watershed management. It was instantly comforting to see the broad range of skills that people brought to the table.”
- “This is a great learning experience. I have literally gone from knowing very little about watersheds to now feeling comfortable in carrying out complex watershed management activities.”
- “The IWLA is an excellent opportunity to learn about how to improve water quality in your area. You will meet many people that are facing the same challenges as you and you may even find people with answers to questions you have. The actual course will teach you about water quality and how it can be improved, but the networking will allow you to visit with like minded individuals and learn about what others are doing to help. This course is a terrific asset to anyone interested in improving water quality in Indiana.”
- “This class does its best to find out where you are in the process of water quality issues and then takes you to the next level. It helps you to identify issues in the county that must be addressed as well as clearly understanding how to address those issues. This Academy is an important piece of the puzzle to ensuring good water quality for Indiana, for our homes, our health, and our heritage.”

Many participants reported that the leadership and watershed science skills they gained through the Academy are already increasing their effectiveness at building watershed partnerships.

- “The Academy helped me build and strengthen partnerships with other people, organizations, and agencies involved in natural resources protection. I have called on several people I met through the Academy for formal support of grant projects as well as personal insight on watershed related decisions I had to make.”

- “The Academy taught me that there are many different people with many different skills involved in watershed leadership. It taught me how important it is to include people from varied disciplines, and to take the time to understand where they are coming from. Often people who think they disagree just haven't reached the point where they understand where the other person is coming from. The Academy helped me cultivate relationships with people with a different skill set and viewpoint to work with me in “our” watershed.”

Overall, when Academy participants are asked about their continued participation in future Academy activities and watershed management, and how the Academy influenced them, their responses are overwhelmingly positive. When surveying alumni from 2006 through 2009, more than 95% of the respondents were interested in participating in an alumni network, 90% have remained active in watershed management, and 90% believe that participation in the Academy

has influenced their continued involvement in watershed management. The remaining 10% indicated they were already fully vested in watershed management prior to the Academy.

In the past four years, 141 people have participated in the Academy, through which they have learned skills in organization and communication, watershed technology, GIS, policy, watershed science, and leadership.

Future Activities

The 2011 Indiana Watershed Leadership Academy face-to-face sessions are scheduled, and the application period will open in August 2010 (<http://www.purdue.edu/watersheds>). The Advisory Committee will continue to bring statewide input and support to the Academy. Due to the success and continued interest in this program, Purdue pursued additional funding to maintain the Academy in 2011 and beyond and was recently notified that additional funding will be granted.

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. Key lessons learned by our grant projects are passed along to other watershed groups by IDEM's Watershed Specialists and NPS staff throughout the grant process.

Lessons Learned By Section 319(h) Grant Projects

A requirement of all Section 319(h) 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:

- It is very difficult to keep interest and information on a high profile level for a project or program over an extended period of time. It is imperative to find innovative ways and fresh ideas to keep the project moving along at a high level for both the Steering Committee members and local land user participation. In the future the project will try to get more buy into the programs going on. If this could have been predicted the project would have progressed in a different manor to maintain interest.
- Another lesson learned is that with a watershed project covering multiple counties, publicity and getting timely information out to landowners has not been easy and can be a somewhat difficult challenge. We found that there is no local singular media outlet, such as a daily or weekly newspaper, radio, or television station that includes all of our four counties. We have attempted to send a bi-monthly newsletter to the local landowners in the mail by utilizing the local SWCD's mailing lists and are now trying to add an electronic version for the newsletter.
- One important lesson learned is how long it takes to bring a cost-share project through landowner cultivation, design, estimates, permits, construction, contracting, and invoicing. The second round of implementation projects will need to begin in the early part of the next grant and stay on an aggressive schedule. Additional oversight and coordination from the Technical Committee, the coordinator, and the agricultural liaison is needed to reduce the steps outlined above.
- Another important lesson learned is related to the actual oversight and administrative safe guards associated with the cost-share program. The Technical Committee sees the need to update the cost-share program document to include caps on each practice and a formal estimate and contract process for all types of projects.
- Cost share:
 - Be explicit about all aspects of the practices selected for cost share and make certain that IDEM approves each component.
 - Seek the help of private crop consultants/chemical applicators in project implementation as early as possible especially when the cost share program includes nutrient and pest management.
- Administration:
 - Do not change contract forms during the time of the grant. Whatever forms are valid on the date the contract is signed should remain valid during the entire grant period.

- Keep communication open between project manager and grant coordinator. There were five different project managers assigned to this 319(h) project during the grant period.
- Local Objectives:
 - Within reason the grant recipient should be given greater leeway to implement the project in the way that best meets the needs of the target audiences. (IDEM should develop a closer relationship with SWCDs to understand the variety of programs being used to address resource concerns. Adjusting the 319(h) program to complement the USDA, FSA, and ISDA is in the best interest of the SWCD).
- Although our electronic communication vehicles are priceless, meeting face-to-face with individuals and groups has been of extreme value in designing tools, trainings and support. The lesson learned is that “one size does not fit all.” By learning the unique features of each group, we are better able to design a plan of support that fits their needs.
- Many producers initially were interested in participating, but were delayed with fall harvest and were not able to implement projects. As a lesson learned, in the future we will try to secure a larger number of producers so that if someone backs out of a contract, we can move the funds to another producer.

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 and will soon be available on the revised and improved NPS web site.
- Update and rethink the existing website to better deploy information on grants and NPS pollution topics.
 - Nearly Complete – The revised and improved website will be fully online by the end of 2010.
- 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 have been working more closely with 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 developed through the Environmental Indicators Project
 - In Process - A list of water quality parameters and their associated target values and recommended testing methods have been developed for the website. Additional guidance will be available upon the completion of the Environmental Indicators Project.
- 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.
- Improve/Update the current Ag Guidance.
 - Complete – this document will be posted 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.
- Compliance/Enforcement - verification by PMs of installed BMPs, enforcement of GA deadlines
 - Work Needed – Work has been done to monitor closely deadlines and deliverables on grant agreements. Staff has begun to selectively field check BMPs, but a formal process is still needed.
- 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(h) 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.
- Create a fairly comprehensive list of agricultural BMPs/revise the NRCS FOTG to be more useful for 319(h) recipients.
 - In process – a comprehensive list of 319(h) fundable Ag BMPs has been developed and is in the final stages of completion. We are coordinating with NRCS on the development of this list.
- 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.
 - In process - background information and training has been partially completed which included IDEM QHEI training and one workshop for wildlife and native plants. Phase 1 of the project will begin by describing quality riparian levels based on variability and abundance of native plant species vs. invasive species and width and depth of riparian area. We anticipate that the levels will be broken into 4 or 5 classes and will be added to either the cQHEI or QHEI sheets as an added metric. Phase 2 will include adding native bird species that are commonly found among health riparian areas. Phase 1 has been delayed due to priority assignments.
- Research controlled drainage for field tiles and its feasibility to be promoted widely as a preferred BMP throughout the State.
 - Work needed – training on this topic needs to be identified.

For FFY 2011, staff have identified as priorities for improvement for the next reporting cycle:

1. Standard monitoring regimen made available to all 319(h) applicants.
2. Load reduction tool for Precision Ag technology.
3. Cost-benefit analysis tool for potential BMPs.
4. Training for project managers in Conservation Planning.
5. Project accountability, once the environmental indicators framework is finished and in play. This includes improving coordination efforts to produce NPS Success Stories with WQ Assessments Success Stories and Measure W (SP-12) submissions.

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(h) 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 \$1.08 million provided to landowners to develop and improve wildlife habitat on private lands.

Environmental Quality Incentive Program – Approximately \$11.5 million provided to agriculture producers to implement structural and management conservation practices that optimize environmental benefits on working agricultural land.

Wetlands Reserve Program – Approximately \$6.62 million provided to landowners to protect, restore, and enhance wetlands on their property.

Conservation Security Program – Provided \$7.66 million to landowners to promote conservation on private working lands.

*Final program numbers for FFY 2010 are not available until October.

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 \$44.3 million to eleven communities on projects to reduce NPS pollution, primarily by extending sanitary sewers to areas with septic systems, thereby eliminating this potential source of pollution and through the remediation of brownfield sites. In this fiscal year 3,214 septic systems were eliminated and four brownfields sites were remediated. Throughout the life of the SRF NPS program, \$168 million has been loaned and over 9,700 septic systems have been removed from service.

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

The legislation that established the Lake and River Enhancement (LARE) program in IDNR's Division of Fish and Wildlife charges the Department with the responsibility to "Administer a lake and river enhancement program to do the following: (A) Control sediment and associated nutrient inflow into lakes and rivers, and (B) Accomplish actions that will forestall or reverse the impact of that inflow and enhance the continued use of Indiana's lakes and rivers."

The legislation additionally notes the importance of conserving the natural resources, including wildlife, protecting the water quality of lakes and streams, and protecting high water quality resources. One method of addressing these goals is through projects designed to protect and enhance aquatic habitat for fish and wildlife. The effort to insure the continued viability of Indiana's publicly accessible lakes and streams for multiple uses, including recreational opportunities, is also crucial since funding for this program comes directly from boat-owners in Indiana. A lake and river enhancement fee annually assessed by the Indiana Bureau of Motor Vehicles (BMV) is collected when boats are registered. These funds are used for the LARE program as well as IDNR Division of Law Enforcement for aquatic safety programs.

To accomplish the goals of the LARE program, grants have been made available for technical and financial assistance to various agencies and non-governmental entities (such as a lake or homeowner association) for qualifying projects for over 20 years. In July of 2009, IDNR awarded \$926,095 in grants to protect the water quality of Indiana lakes and streams. Projects to reduce the impact of soil erosion included the installation of grass cover, filter strips, and streambank or shoreline stabilization structures to reduce sedimentation and nutrient runoff. In March of 2010, as the nationwide economic recession made its impact more fully felt in Indiana, LARE grants were restricted to addressing four projects. The projects were dedicated to eradication efforts on hydrilla in Lake Manitou; Starry Stonewort in Lakes Wawasee and George; and Parrot Feather in Meserve Lake. In July of 2010, new LARE grants were suspended indefinitely due to the state's continuing economic challenges, however, progress in ongoing projects amounting to over \$1.6 million continued throughout the state. These projects address issues of sediment removal, or consisted of biological, diagnostic, design and construction projects on lakes and in lake watersheds throughout the state. Watershed Land Treatment projects involving landusers in 16 Soil and Water Conservation Districts were completed in 2010 or are continuing. These projects promote improved water quality and aquatic habitat, enhanced opportunities for boating, fishing, and other recreational pursuits, as well as providing increased economic value for businesses, communities, and individuals who live on or use these water bodies.

By state statute, a portion of LARE funds is to be used to control of invasive exotic aquatic species and sediment removal from publicly accessible lakes. Due to budget limitations, the amount granted was \$485,454 for the four projects already noted: Lake Manitou (Hydrilla), Meserve Lake (Parrot Feather), and Lake Wawasee and Lake George (Starry Stonewort). Dredging projects provide immediate positive recreational and economic benefits to both users and residents of the affected water bodies through removal of legacy sediments after sources have been controlled, however no new projects were approved in March of 2010. Projects that were approved in 2009 are continuing and nearing completion as of July 2010.

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 employs Resource Specialists to assist directly landowners with the planning and implementation of conservation practices addressing specific soil and water resource concerns. Resource Specialists work in regional Conservation Implementation Teams (CIT) alongside staff from the Natural Resources Conservation Service (NRCS) and Soil and Water Conservation Districts (SWCD). 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 both state and federal 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, 927 conservation practices have been obligated or installed totaling 6256.16 acres along Indiana's rivers, lakes, and streams. 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. This expansion is expected to be ready for sign-up in August of 2010.

Clean Water Indiana

In 2009, over \$1.02 million was awarded to Soil and Water Conservation Districts for local match for operational support, training incentives, and the restoration of flood damaged areas. Additionally, \$284,887 was awarded to thirty-one districts through Sediment and Nutrient Reduction Grants (SNRG). Projects funded through these grants included wetland restoration, conservation education, riparian buffers, and many others. In 2010, \$584,409 has been awarded to 88 districts with projects related to education, marketing, cost share incentives for practices, and capacity building.

In both 2009 and 2010, the State Soil Conservation Board (SSCB) allotted CWI funds for the Conservation Cropping Systems Initiative (CCSI), along with NRCS. The intent of CCSI is to promote a systematic approach to production agriculture focusing on continuous no-till/strip-till, cover crops, precision farming, nutrient and pest management, and conservation buffers

resulting in improved soil quality, water quality, and profitability on Indiana cropland. Through this program, agronomy professionals provide very specific education and technical assistance to agricultural producers and our partners directed at production efficiency and nutrient/sediment runoff reduction.

On-Farm Network

A new 2010 initiative for ISDA is the On-Farm Network. This is a program which engages groups of 10-20 producers to conduct on-farm research trials using existing equipment and technologies. This concept is considered adaptive management and generally results in changes that increase profitability of the producer and ultimately has a positive impact on water quality. Initially, this program was developed by the Iowa Soybean Association in 2000 to address key challenges in advancing water quality goals in the state related to production agriculture. In Iowa, the adaptive management process has shown most growers can reduce their N rates by one-third while maintaining or increasing profitability. While this program is still in its infancy in Indiana, ISDA is optimistic that in time it will become a success.

SharePoint

SharePoint is web-based technology that allows conservation partners to collaborate on a private computer network to share securely information. ISDA's Division of Soil Conservation is excited about the release of the SharePoint site and believes this new tool will help us better serve constituents through increased communication, collaboration, and accountability as we continue our partnership to improve soil and water conservation efforts throughout Indiana.

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 the 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). The LMCP set the priorities for 2011 Coastal Grants at the June 16, 2010 meeting. Priorities for funding are:

- **Low Cost Construction:** Restoration of Critical Riparian Habitat
- **Acquisition:** Contiguous Riparian Corridors
- **Planning/Coordination/Management:** Watershed Management Planning
- **Education / Outreach:** Interpretive Signage
- **Applied Research:** Nonpoint Source Pollution Impacts
- **Emerging Issues:** Sustainable Economic Development

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.

With direction from the Lake Michigan Coastal Program Coastal Advisory Board Planning Committee and local municipal discussions, the state developed three hazard mitigation model ordinances that will be used to protect natural and manmade features of Indiana's coastal features. The three model ordinances created cover the six reaches of the Indiana Lake Michigan Shoreline. They include industrialized shoreline, private riparian shoreline, and natural public shoreline that stretch along the three counties within the coastal program area. The Planning Committee, which was established early in 2009 is a 9 member board comprised of three divisions which include:

- 3 Coastal Advisory Board Members
- 3 Partner Members that include: Metropolitan Planning Organization, Regional Development Authority, and Indiana/Illinois Sea Grant.
- 3 Planners, one from each of the three counties in which the program operates

The shoreline hazard model ordinance is designed so that a specific ordinance(s) can be incorporated into existing municipal policies or adopted in its entirety as an overlay zone sometimes identified as a Beach Overlay Zone or Shoreline Protection Overlay Zone. One community along the Indiana Lake Shore has such an ordinance established. The Town of Porter adopted a Beach Overlay Zone in December of 2009. In working with the individual shoreline communities many have some shoreline hazards protection ordinances with respect to setback, encroachment, impacts of fill and vegetation removal. However, to truly incorporate model hazards ordinance into the three forms of shorelines existing along the six reaches of Indiana, one must first recognize the seven hazards that have a significant impact on the Indiana coastal zone and the type of ordinances that mitigate coastal hazards. The 7 types of Coastal Hazards in Indiana are:

- Flooding - Wet land protection
- Subsidence - Best management practices
- Sea level rise - Structure regulations
- Coastal erosion - Native vegetation planting,
- Tornadoes - Vegetation removal
- Windstorms - Vegetation secession
- Storm surges - Setback requirements

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 DNR LMCP and IDEM Section 319(h) program work together in meeting the requirements of this program.

The LMCP submitted supporting documentation to NOAA and EPA for the following Management Measures on March 26, 2010:

- New Development and Site Development;
- Watershed Protection and Existing Development;
- New and Operating Onsite Disposal Systems (OSDS);
- Planning, Siting, and Developing Roads and Highways;
- Siting, Designing, and Maintaining Bridges;
- Road, Highway, and Bridge Operation and Maintenance;
- Road, Highway, and Bridge Runoff Systems; and Hydromodification.

The NOAA and EPA reviewed the supporting materials and on June 24, 2010, and submitted findings to the state regarding these measures. The findings held that Indiana fully meets requirements for 9 of the 13 measures submitted and 2 others require minor additional supporting documentation.

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 – Hammond Marina is a designated Clean Marina. Two marinas in Michigan City – Washington Park and Sprague Point marinas meet the checklist requirements and will be designated Clean Marinas this summer. All marinas in the Coastal area Combined 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. This new database – iTOSS - Indiana's network for Tracking of Onsite Sewage Systems is complete and ready for deployment.

iTOSS has the following capabilities:

- Centralized database and user interface containing parcel, facility, soil evaluation, onsite system, permit, and permit violation information.
- Complaint data that can be associated with a specific parcel.
- Custom interfaces for consistent data entry of all types of data.
- Attachments of images and documents allow supportive data.
- Administrator interfaces that allow management of users and security.
- Reports available in PDF format, with county specific headers.

- The infrastructure was designed to support additional functionality and modules to be incorporated—such as GIS capabilities.
- Assists the Agency with internal and external data requests.
- Time and money saved due to centralized data and easy web access.

The LMCP and ISDH are working together to deploy the iTOSS Database in the Coastal Region. The LMCP is working to provide grant funds to the local entities for data entry/conversion. The local entities have committed to either using the iTOSS database or providing data that can be entered into iTOSS for septic tracking purposes. The LMCP and ISDH continue to discuss updates and enhancements to the iTOSS system to increase usefulness and ease of use.

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. Many of these projects continued into this reporting period. 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 ,

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.

The LMCP Nonpoint Assistant worked with the Coastal Nonpoint Coordinator to develop Watershed Fact Sheets at the 10 digit Hydrologic Unit Code (HUC) level. These fact sheets provide an overview of each of the 4 – 10 digit HUCs for the Coastal Region. The fact sheets are in the edit process currently and will be posted to the LMCP website upon completion.

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 Conservation Development 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 2010 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. 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.
- The Conservation Development Specialist (CDS) role was implemented July 2009 to assist local organizations (primarily Indiana Watershed Initiatives and Soil and Water Conservation Districts) with growth and organizational development.
- Created and disseminated(s) resource and fund development and [Marketing Tools](#) to SWCDs and Watershed Groups
- Created and disseminated(s) a monthly Development E-letter that highlights applicable funding/grant opportunities and other resource development information.
- Meetings held with individual SWCDs, Watershed Groups, IDEM WSS team and ISDA Division of Soil Conservation staff to assess development needs and design and/or offer programming and materials relative to fund development, marketing and other general features that build capacity within the various conservation and watershed entities.

Indiana University School of Public and Environmental Affairs, Indiana Clean Lakes Program

The School of Public and Environmental Affairs (SPEA) at Indiana University has been working with IDEM through a Section 319(h) grant to administer the Indiana Clean Lakes Program (CLP) since 1989. The Indiana CLP is a comprehensive, statewide public lake management program that includes public information and education, technical assistance, volunteer lake monitoring, and lake water quality assessment.

Indiana has over 1,400 lakes, reservoirs, and ponds. These waterbodies are one of the State's most precious natural resources. They provide drinking water, flood control, and a myriad of recreational opportunities including boating, swimming, fishing, hunting, and wildlife viewing. However, Indiana's lakes are under pressure. Human activities such as poorly managed agriculture, suburbanization of lakeshores, boating impacts, and septic system discharges can result in excessive nutrient concentrations reaching lakes. This can lead to accelerated eutrophication and related undesirable effects including nuisance algae, excessive plant growth, murky water, odor, and fish kills.

Section 314 of the Clean Water Act charges IDEM with responsibility for monitoring, assessing, and reporting the trophic state and trends in trophic conditions of Indiana's lakes. Continued assessment of lake nutrient levels and effects, as begun by the State in the early 1970s, is needed in order to do the following: 1) report the status of lake eutrophication levels to the U.S. EPA (EPA) in the State's 305(b) water quality reports and 303(d) listing of impaired waterbodies; 2) ascertain and track any trends in lake eutrophication levels for State and EPA use; 3) collect any data needed to continue to develop State nutrient criteria, as mandated by EPA; and 4) collect data needed to determine if lakes and reservoirs are meeting state water quality standards.

Indiana's CLP, coordinated by IU-SPEA staff and students, includes the following components:

- Annual sampling of lakes and reservoirs to meet numbers 1 and 2 above;
- Training and support of a corps of volunteer lake monitors;
- Education and outreach through the production and distribution of the quarterly newsletter, *Water Column*; maintenance of a website (<http://www.indiana.edu/~clp/index.html>); preparation of brochures and fact sheets; and participation in the annual Indiana Lake Management Conference; and
- Providing technical assistance and expertise on lake-related issues within the State and elsewhere.

In 2008, IDEM developed a CWA Section 305(b) assessment methodology in an effort to more accurately characterize water quality in Indiana lakes. In order to develop the methodology, water quality data from more than 13,000 individual samples were reviewed. The majority of these data (70%) were collected under the Clean Lakes Volunteer Monitoring Program. In order to have sufficient data for development of the methodology, it was important to use the volunteer data, if its reliability could be verified. To do this, Limnotech, Inc., under contract to IDEM, compared the volunteer data with agency-collected data for several parameters to determine if a significance difference existed between the two data sets. These analyses showed that the data collected by the Clean Lakes Program volunteers are indistinguishable from agency data, and, therefore, no bias should exist if all datasets are combined. Data from the Clean Lakes Volunteer Monitoring Program was a critical component of the analysis from which IDEM developed its 305(b) assessment methodology. And, once the methodology was developed, IDEM was able to use volunteer data to make CWA 305(b) assessments of lake water quality for the first time in 2008.

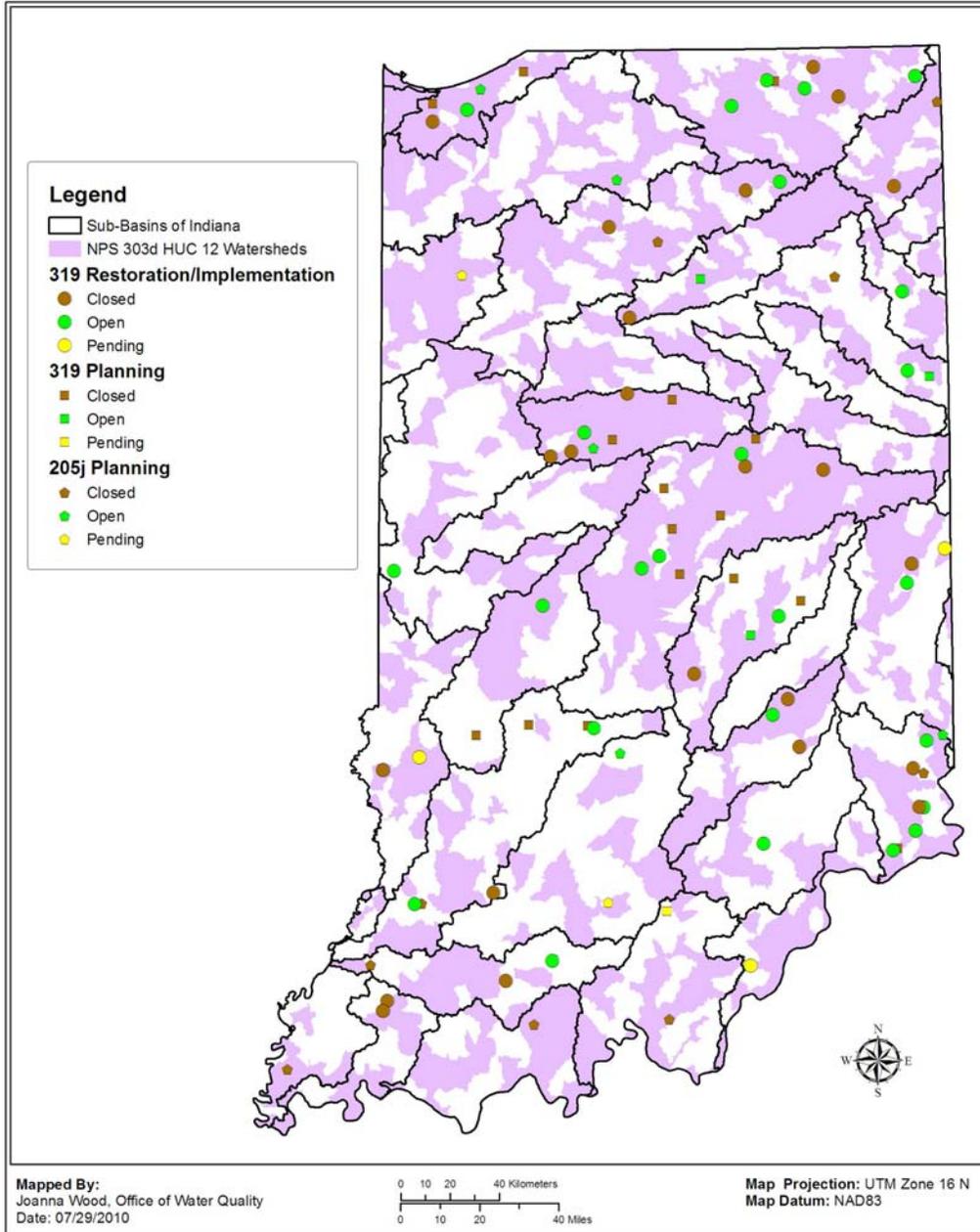
IU-SPEA continues to collect lake data under a 319(h) grant that runs through 2011. In 2010 and 2011 data will be collected using a random sampling design (from a set of Indiana public lakes and reservoirs with boat access and a surface area greater than five (5) acres) as opposed to a targeted design which was used in the past. This change was made to provide a more statistically valid assessment of Indiana lakes and reservoirs. By doing this, the biannual 305(b) report to EPA will more accurately reflect the status of Indiana's publicly-accessible lakes and reservoirs, without geographical bias.

The Indiana Clean Lakes Program plays an important role in the effort to reduce nonpoint source pollution in lakes and their tributaries. Educating watershed stakeholders and lake residents is the first step in changing behaviors that will reduce NPS pollution. Through the CLP's education and outreach efforts, word is getting out about nonpoint source pollution and its

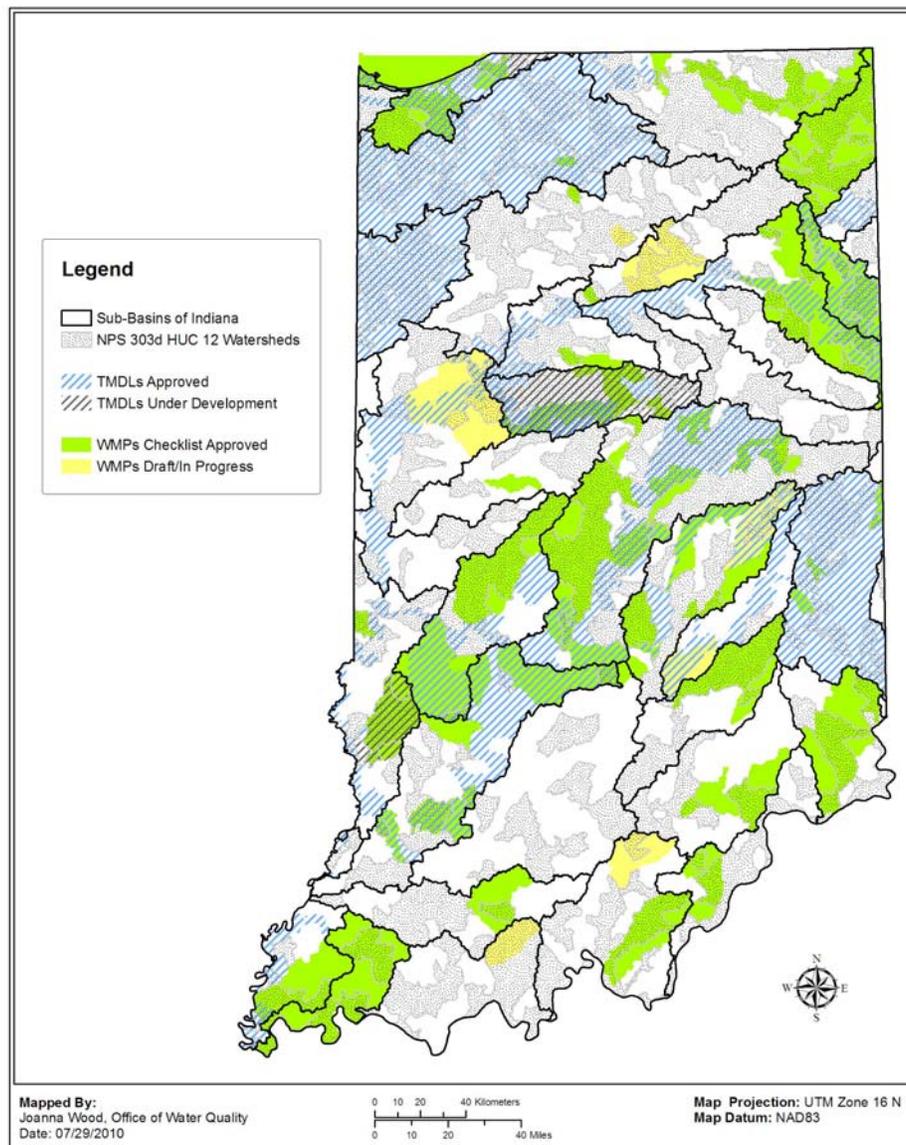


effects on lakes. Lake assessment data are important because they can support lake management efforts by establishing the need for action. Temporal data may show important trends that can help identify problems as well as sources. Randomized lake water quality assessment data will better identify regional differences in geography, geology, topography, and land use throughout Indiana, which might affect the nature and magnitude of NPS pollutants affecting the state's lakes and reservoirs. More lake associations and residents understand the importance of watershed management to protect and improve their lakes (reflected, in part, by the increased number of lake associations interested in watershed planning and 319(h) funding), and the Clean Lakes Program at IU-SPEA and the NPS Program at IDEM are available to help them achieve their goals.

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(h) Projects 9/1/09 – 8/31/10

FFY	ARN	Contractor	Project	Status	Start	End	Type	Project Manager
2002								
	N02-01	Indiana Department of	NPS Communications Capacity Building - Phase 1	Open	4/1/2009	3/31/2010	ProgramSupport	Andrew
2003								
	N03-01	Indiana Department of	NPS Communications Capacity Building - Phase 2	Open	4/1/2009	3/31/2010	ProgramSupport	Andrew
2004								
	6-63	Indiana University	Eagle Creek WMP Implementation Phase I	Closed	3/2/2006	10/31/2009	Restoration/Impl	Sky Schelle
	N04-01	Indiana Department of	NPS Communications Capacity Building - Phase 3	Open	4/1/2009	3/31/2010	ProgramSupport	Andrew
2005								
	10-61	enfoTech and Consulting, Inc.	IDEM AIMS Upgrade	Open	6/14/2010	6/13/2011	ProgramSupport	Joanna
	5-172	Pheasants Forever	Prairie Grass/Tree Planting & Wetland Restor	Closed	1/5/2006	1/4/2010	Restoration/Impl	Kyle
	6-156	Conservation Technology	Training Program for NPS Pollution/Seminars	Closed	8/28/2006	1/31/2010	Education	Laura
	6-164	Historic Hoosier Hills	Southern Laughery Creek Watershed Implementation	Closed	12/6/2006	3/31/2010	Restoration/Impl	Leanne
	6-166	Tippecanoe County Surveyor	Implementation of Lauramie Creek WMP	Closed	9/15/2006	9/14/2009	Restoration/Impl	Crystal
	6-75	The Nature Conservancy	Tippecanoe River 2-Stage Ditch Demonstration	Closed	5/4/2006	1/3/2010	Restoration/Impl	Kyle
	8-69	Indiana Department of	WQ Assessment Information Accessibility System	Closed	3/26/2008	9/25/2009	ProgramSupport	Joanna
	9-254	Indiana University	Indiana Clean Lakes Program	Open	8/5/2009	1/4/2012	Assessment	Laura
2006								
	10-18	Tippecanoe Environmental Lake &	Upper Tippecanoe/Grassy Creek Impl. (contract#2)	Open	11/6/2009	10/5/2010	Restoration/Impl	Crystal
	6-170	Indiana Association of Soil and	Indiana Watershed Promotion/TMDL Support	Closed	5/12/2007	5/11/2010	ProgramSupport	Laura
	6-177	Elkhart River Restoration	Elkhart River WMP	Open	11/22/2006	11/21/2010	Restoration/Impl	Laura
	7-103	Johnson County SWCD	Youngs Creek WMP Phase III	Closed	1/2/2007	9/30/2009	Restoration/Impl	Kyle
	7-157	Patoka Lake Regional Water &	Patoka Lake Source Water Protection Plan	Open	8/20/2007	8/19/2010	Restoration/Impl	Doug
	7-7	Howard County SWCD	Pete's Run and Little Deer Ck. Implementation	Closed	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	Crystal
	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	Joanna
2007								
	7-182	LaGrange County SWCD	Little Elkhart River WMP Update	Open	11/26/2007	11/25/2011	Restoration/Impl	Crystal
	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	Closed	9/7/2007	3/6/2010	Planning	Laura
	7-186	Purdue University	Development/Demo of Evaluation Framework	Open	7/14/2008	1/31/2012	ProgramSupport	Betty

APPENDIX C: Open 319(h) Projects 9/1/09 – 8/31/10

FFY	ARN	Contractor	Project	Status	Start	End	Type	Project Manager
	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	Joanna					
	8-190	Delaware Co. SWCD	White River Watershed Project	Open	12/11/2008	12/10/2011	Restoration/Impl	Betty
	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	Doug
	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	10/26/2011	Restoration/Impl	Laura
	9-90	Manchester College	Middle Eel River Watershed Initiative	Open	1/1/2009	12/31/2012	Planning	Leanne
	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	Open	12/3/2009	12/2/2012	Restoration/Impl	Leanne
	10-26	Tetra Tech Environmental, Inc.	TMDL and 9 Key Elements of a WMP Template	Open	3/4/2010	9/3/2011	ProgramSupport	Leanne
	9-272	Tippecanoe Watershed Foundation	WQ Improvement in Upper Tippi/Grassy Creek	Open	8/27/2009	8/26/2012	Restoration/Impl	Crystal
	9-274	Allen County SWCD	St. Marys River WMP Implementation	Open	1/15/2010	1/14/2013	Restoration/Impl	Laura
	9-275	Steuben County SWCD	Pigeon Creek WMP Implementation Phase 2	Open	9/23/2009	9/22/2012	Restoration/Impl	Crystal
	9-276	Monroe County SWCD	Bean Blossom Watershed Implementation Project	Open	11/3/2009	11/2/2012	Restoration/Impl	Doug
	9-277	Historic Hoosier Hills	Central Muscatatuck Watershed Project	Open	8/27/2009	8/26/2012	Restoration/Impl	Leanne
	9-278	Putnam County SWCD	Big Walnut/Deer Creek Watershed Implementation	Open	8/27/2009	8/26/2012	Restoration/Impl	Crystal
	9-282	Upper Wabash River Basin	Wabash River Basin WMP Implementation	Open	8/28/2009	2/27/2013	Restoration/Impl	Betty
2010	10-64	Indiana Association of Soil and	Capacity Building & Public Support for Wtrshd Grps	Pending			ProgramSupport	Laura
	10-65	St. Joseph River Watershed	Middle St. Joseph River WMP Development & Impl.	Pending			Restoration/Impl	Laura
	10-66	Purdue University	Watershed Leadership Academy	Pending			ProgramSupport	Betty

APPENDIX C: Open 319(h) Projects 9/1/09 – 8/31/10

FFY	ARN	Contractor	Project	Status	Start	End	Type	Project Manager
10-80		Clark County SWCD	Silver Creek Watershed Improvement Project	Pending			Restoration/Impl	Leanne
10-84		The Nature Conservancy	Two-Stage Ditch Outreach and Technology Transfer	Pending			Education	Doug
10-85		Dearborn County SWCD	Hogan Creek Watershed Project	Pending			Restoration/Impl	Doug
10-86		LaGrange County SWCD	Pigeon River WMP Development & Implementation	Pending			Restoration/Impl	Crystal
10-87		White River RC&D, Inc.	Mill Creek - Blue River Watershed Project	Pending			Planning	Crystal
1-2		Sullivan County SWCD	Busseron Creek Watershed Implementation	Pending			Restoration/Impl	Crystal

APPENDIX D: Open 205(j) Projects 9/1/09 - 8/31/10

FFY	ARN	Contractor	Project	Status	Start	End	Type	Project Manager
2007								
	8-96	Upper White River Watershed Alliance	Water Quality Data Interpretation and	Open	5/18/2009	5/17/2011	ProgramSupport	Joanna Wood
	9-180	Brown County SWCD	Yellowwood Stream Restoration Demo	Open	2/17/2009	11/16/2010	Planning	Laura
2009								
	10-27	Save the Dunes Conservation Fund	Salt Creek Integrated Pilot	Open	6/1/2010	2/28/2014	Planning	Joanna Wood
	9-271	Clinton County SWCD	S. F. Wildcat Creek WMP	Open	10/29/2009	10/28/2012	Planning	Crystal
Rehder								
2009ARRA								
	10-19	Northern Indiana Regional Planning	Watershed Planning in NW IN	Open	2/3/2010	2/2/2012	Planning	Crystal
Rehder								
	10-20	MACOG	Pleasant and Riddles Lake Watershed	Open	2/3/2010	2/2/2012	Planning	Crystal
Rehder								
	10-21	Ohio River Valley Water Sanitation	Lower Wabash R. Nutrients & Continuous	Open	2/3/2010	8/2/2011	Assessment	Betty Ratcliff
	10-23	Ohio-Kentucky-Indiana Regional	Dearborn Co. Water Quality Management Plan	Open	2/3/2010	8/2/2011	Planning	Doug
2010								
	10-81	Jasper County SWCD	Upper Iroquois Watershed Initiative	Pending			Planning	Crystal
Rehder								
	10-83	Orange County SWCD	Lost River Watershed	Pending			Planning	Leanne

APPENDIX E: Project Summaries for Closed Section 319(h) Projects

FFY 2002, FFY 2003, and FFY 2004

NPS Communications Capacity Building Project – Phases 1, 2, & 3 - The Office of Water Quality identified a need to improve stakeholder capacity via the Internet. This was accomplished by completing a large scale revision and improvement to the nonpoint source Internet site. The previous site provided stakeholders with basic information, but failed to educate visitors on the impacts of nonpoint source pollution or provide tools and resources necessary for stakeholders to participate in local grassroots efforts to eliminate nonpoint source pollution. The goal of the project was to create a nonpoint source pollution Web site that allows stakeholders to increase their knowledge and access to information. Some of the key elements provided: basic information on nonpoint source pollution and how it impacts the citizens of Indiana; information on how to run a successful 319(h) grant and guidance on all aspects of grant work, including how to write an effective watershed management plan, IDEM policy and procedures, how to form effective partners, monitoring information, and assistance with education and outreach; information on the soon to be finalized social indicator tools, such as SIDMA; how to network and learn from other 319(h) projects successes and failures; information on urban BMPs and programs that drive the need to address urban storm water; and, tools, guides, and information that will help groups make measurable improvements in water quality.

FFY 2004

Eagle Creek WMP Implementation Phase I – Indiana University began implementing the Eagle Creek Watershed Management Plan with goals of improving water quality, increasing public awareness of watershed water quality, and encouraging stewardship of the watershed resources (HUC 05120201120). Specific water quality concerns identified within the watershed include nutrient loading and resultant algal blooms; harmful levels of herbicides and other chemicals (including atrazine); high levels of *E. coli* and other pathogens; and sedimentation resulting in degradation of aquatic habitats. Activities identified and implemented to address these concerns included: implementation of a cost-share program for agricultural and urban storm water BMPs, development of educational materials, activities, and displays for watershed citizens, parks, nature centers, schools, and events; design and maintenance of a technical and educational website; creation of a Watershed Water Quality Awareness Day (WQAD) Program; design, purchase and installation of watershed identification signs for watershed stream/road crossings; and implementation of a water quality monitoring program.

FFY 2005

Prairie Creek/Tree Planting & Wetland Restoration Project (5-172) – Pheasants Forever is improving water quality in the St. Joseph River Watershed (HUC 04050001) by establishing prairie grass, woodland plots, and restoring wetlands in priority areas outlined in the St. Joseph River Watershed Management Plan. During this project Pheasants Forever implemented a cost-share program to plant a total of 234.3 acres of warm season grasses, 48.8 acres of trees, and construct 2 wetlands. They also conducted public outreach to promote the project and educate the public on methods to improve water quality through newspaper and newsletter articles, brochures, demonstration sites at the LaGrange County Fairgrounds and Par Gil Natural Resource Learning Center, a display at the LaGrange County 4-H fair, public



presentations, a Leopold Education Workshop geared to educate youth in natural resource stewardship, and a public field day to promote and display the project's efforts.

Tippecanoe River 2-Stage Ditch Demonstration (6-75) – The Nature Conservancy installed a two-stage ditch in Kosciusko County, monitored its water quality and economic performance, and advertised its effectiveness to other water quality decision makers. Field days were held at the project site in years two and three of the project to demonstrate the two-stage ditch. The Conservancy conducted a stream monitoring program that consisted of chemical and habitat monitoring at stations upstream, downstream, and within the two-stage ditch installation and in an adjacent control stream. TNC also monitored macroinvertebrate and fish communities on an annual basis at the same locations. For more information on this project see the **Project Highlights** Section of this report.

Southern Laughery Creek Watershed Implementation (6-164) – Historic Hoosier Hills implemented the Southern Laughery Creek Watershed Management Plan. The project used a focused education program, development of sustainable partnerships and BMPs to reduce sediment, nutrient and pathogen loading to South Laughery Creek and its tributaries and improve aquatic habitats. BMPs included fencing and alternative watering systems, pasture/hayland planting, and heavy use area protection. For more information on this project see the **Project Highlights** Section of this report.

Lauramie Creek Watershed Management Plan Implementation (6-166) – Tippecanoe County Surveyor's Office implemented the Lauramie Creek Watershed Management Plan by promoting and implementing a cost share program designed to assist landowners with implementing rural and agricultural BMPs including riparian buffers, filter strips, agricultural field practices, exclusionary fencing and alternative watering systems for livestock and conducting stream bank restoration. In conjunction with the cost share program, an outreach and educational campaign was undertaken that included developing educational brochures, each detailing the specific benefits and cost savings associated with one of the BMPs listed above.

Indiana Training Program for Nonpoint Source Pollution Control and Water Resource Management (6-156) – The Conservation Technology Information Center (CTIC) surveyed water resource professionals on training needs and developed and delivered two workshops during the project. The workshops titled "Stream bank Stabilization and Restoration Workshop" and "Monitoring and Assessment for Watershed Plans: Methods for Identifying and Characterizing Nonpoint Sources of Pollution" were held in 2007. CTIC staff also coordinated meeting spaces, snacks and lunch, online registration and advertising for three Watershed Networking Sessions hosted by the IDEM Watershed Specialists in November 2008, May 2009 and December 2009.

Water Quality Assessment Information Accessibility System (8-69) – The Office of Water Quality sponsored this project which provided for improvements in the collection, storage, retrieval, and reporting of nonpoint source data by providing a data management system that is tailored to the nonpoint source program need for analyses and decision-making tools. This included integration of water quality data into the WQX (STORET) and improvements to the current system in which the agency-generated data is stored for data management and reporting.

FFY 2006

Indiana Watershed Promotion/TMDL Support (6-170) – The Indiana Association of Soil and Water Conservation Districts provided a Watershed Information Specialist (Specialist) position that served as a liaison with IDEM Office of Water Quality staff to help promote watershed management efforts throughout the State. The Specialist met regularly with the IDEM Watershed Specialists and the Indiana watershed workgroup. The Specialist' tasks included: developing presentations on the watershed planning, implementation and TMDL process; identifying groups with potential interest in developing watershed projects in 303(d) listed watersheds and contacting them to provide information; providing media relations for the IDEM Watershed Specialists including publishing quarterly Watershed Update newsletters and weekly SWCD Update newsletters in electronic format that promote watershed activity success stories and provide general watershed management information; and providing needed tools for use by the Watershed Specialists and others.

Patoka Lake Source Water Protection Plan (7-157) – The Patoka Lake Regional Water and Sewer District implemented the Source Water Protection Plan for the Patoka Lake Watershed. A cost-share program was implemented for management measures to improve water quality in this important drinking-source water basin. Public meetings, field days to demonstrate BMPs, clean-up events, volunteer water quality monitoring training, and septic system maintenance education were all part of the project.

Youngs Creek Watershed Management Plan (WMP) Implementation Phase III and Indian Creek WMP Development (7-103) - The Johnson County SWCD continued to implement the Youngs Creek Watershed Management Plan, and is also developing a watershed management plan for the Indian Creek watershed (HUC 05120201170). A cost-share program was implemented in the Youngs Creek watershed to install best management practices such as livestock exclusion, riparian buffers, conservation tillage, and others that address the natural resource concerns outlined in the Youngs Creek Watershed Management Plan. The District conducted outreach activities to increase public awareness and participation in the Youngs Creek and Indian Creek watershed projects.

Pete's Run and Little Deer Creek Implementation (7-7) - The Howard County SWCD implemented the Pete's Run and Little Deer Watershed Management Plans by implementing a cost-share program to implement best management practices including pest and nutrient management, manure management, stream bank protection, tree planting, livestock watering facility, wetland restoration, and animal mortality facilities. An education and outreach program was also be conducted consisting of information about the project submitted to the media or a local SWCD newsletter, workshops on septic systems and proper maintenance, distributing a Tile and Drainage Handbook, promoting the project by setting up a booth at community events, and organizing a water quality volunteer monitoring group.

FFY 2007

St. Marys WMP and Implementation (7-184) - The Allen County SWCD produced a watershed management plan (WMP) for the Indiana portion of the St. Marys watershed, HUC 04100004. A monitoring program was conducted to supplement data collected for the TMDL to aid in the development of the WMP. The district then began implementing the Plan by implementing a cost-share program for BMPs outlined in the St. Marys Watershed Management Plan. An education and outreach program was also implemented and included quarterly public steering committee meetings, press releases to the media, newsletters, a brochure on proper operation and maintenance of septic systems, and field days.

APPENDIX F: List of Attached Final Reports for Section 319(h) Projects

ARN	FFY	Project Name
6-663	2004	Eagle Creek WMP Implementation Phase I
5-172	2005	Prairie Grass/Tree Planting & Wetland Restoration
6-156	2005	Training Program for NPS Pollution
6-164	2005	Southern Laughery Creek Watershed Implementation
6-166	2005	Implementation of Lauramie Creek WMP
6-75	2005	Tippecanoe River 2-Stage Ditch Demonstration
8-69	2005	Water Quality Assessment Information Accessibility System
6-170	2006	Indiana Watershed Promotion/TMDL Support
7-103	2006	Youngs Creek WMP Phase III
7-7	2006	Pete's Run and Little Deer Creek Implementation
7-184	2007	St. Marys WMP Planning and Implementation
	2002, '03, '04	NPS Communications Capacity Building Phases 1-3

The following final reports will be submitted when they are received:

7-157	2006	Patoka Lake Source Water Protection
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Indiana's FFY 2010 Nonpoint Source Program

Summary of Cumulative Environmental Benefits from Project Activities

Section 319(h) NPS projects funded under the FFY 2010 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 31 nitrogen reduction practices on approximately 2,501 acres of farmlands within targeted watersheds and 3 additional sites developed Comprehensive Nutrient Management Plan with 21 more sites incorporating Nutrient and/or Pest Management (590) Plans/practices on 7,058 acres of production farmland. Also, established 1 Prescribed Grazing (528A) area on 1 acre and 22 Pasture and Hay Planting (512) areas on 299 acres. Installed more than 39,490 linear feet of fencing (382) to exclude livestock from waterways, 3,430 feet of pipeline, 1 Grade Stabilization Structure, 1 Field Border, 6 Grassed Waterways, and 1 Water and Sediment Control Basin. Load reductions resulting from these practices: 15,446 tons/year of sediment, 10,856 lbs/year of phosphorus, and 26,325 lbs/year of nitrogen.

Water Quality and Riparian Zone Restoration

- 35 Heavy Use Protection (561) areas were completed including 10 Trough and Tank structures, and 1 Wetland Creation and 1 Wetland Detention project were completed on 226 acres for the total reduction of 1,617 tons/year of sediment, 1,386 lbs/year of phosphorus, and 2,964 lbs/year of nitrogen in annual load reduction.
- 2 Filter Strip (393), 1 Buffer Strip, 1 Riparian Herbaceous Cover, and 3 Grassed Swale plantings were also installed along 39 acres of riparian zone, as well as another 250 feet of Streambank and Shoreline Protection (580), to provide for an additional 5 tons/year of sediment, 14 lbs/year of phosphorus, and 46 lbs/year of nitrogen.

Habitat Restoration

- Established 3 Critical Area Plantings, 1 Wetland Restoration, and 1 Tree and Shrub Establishment planting of 14 acres for water quality and habitat restoration. Load Reductions resulting from these practices: 2 tons/year of sediment, 10 lbs/year of phosphorus, and 80 lbs/year of nitrogen.

Waste Management

- Successfully completed the installation of 1 Waste Utilization and 1 Manure Transfer areas and installed 10 Cover and Green Manure Crop areas on 824 acres. Also, installed 28 Rain Barrels, 7 Rain Gardens, 7 Porous Pavement practice and 8 Roof Runoff Management system (1 with subsurface drain), and 1 Animal Walkway in urban areas. The total load reduction estimated from these practices: 898 tons/years sediment, 1,090 lbs/year of phosphorus and 2,083 lbs/year of nitrogen.

ANNUAL LOAD REDUCTION SUMMARY

Total FFY 2010 Pollutant Load Reductions

Reduced Sediment loadings by 17,968 tons/year

Reduced Phosphorus loadings by 13,356 pounds/year

Reduced Nitrogen loadings by 31,498 pounds/year

Project Name	Sediment	Phosphorus	Nitrogen
East Fork White River/Clifty Creek Implementation	446	504	1013
Elkhart River Watershed Management Plan	134	55	441
Hogan Creek Watershed Project	1528	1328	2526
Lagrange Water Quality Improvement Project	291	447	843
Little Blue River Watershed Project	950	1308	2590
St Marys WMP & Implementation	605	986	1752
SF Wildcat Ck./Blinn Ditch/Kilmore Ck. Implementation	1281	1534	4241
South Laughery Creek Watershed Implementation	6567	3605	7119
Tanners Creek Watershed Implementation	574	669	1336
Whitewater River Implementation Plan	97	99	198

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

Total from Project BMPs installed during FFY 2001 through FFY 2008

Sediment load reduction calculations: 162,258 tons/year

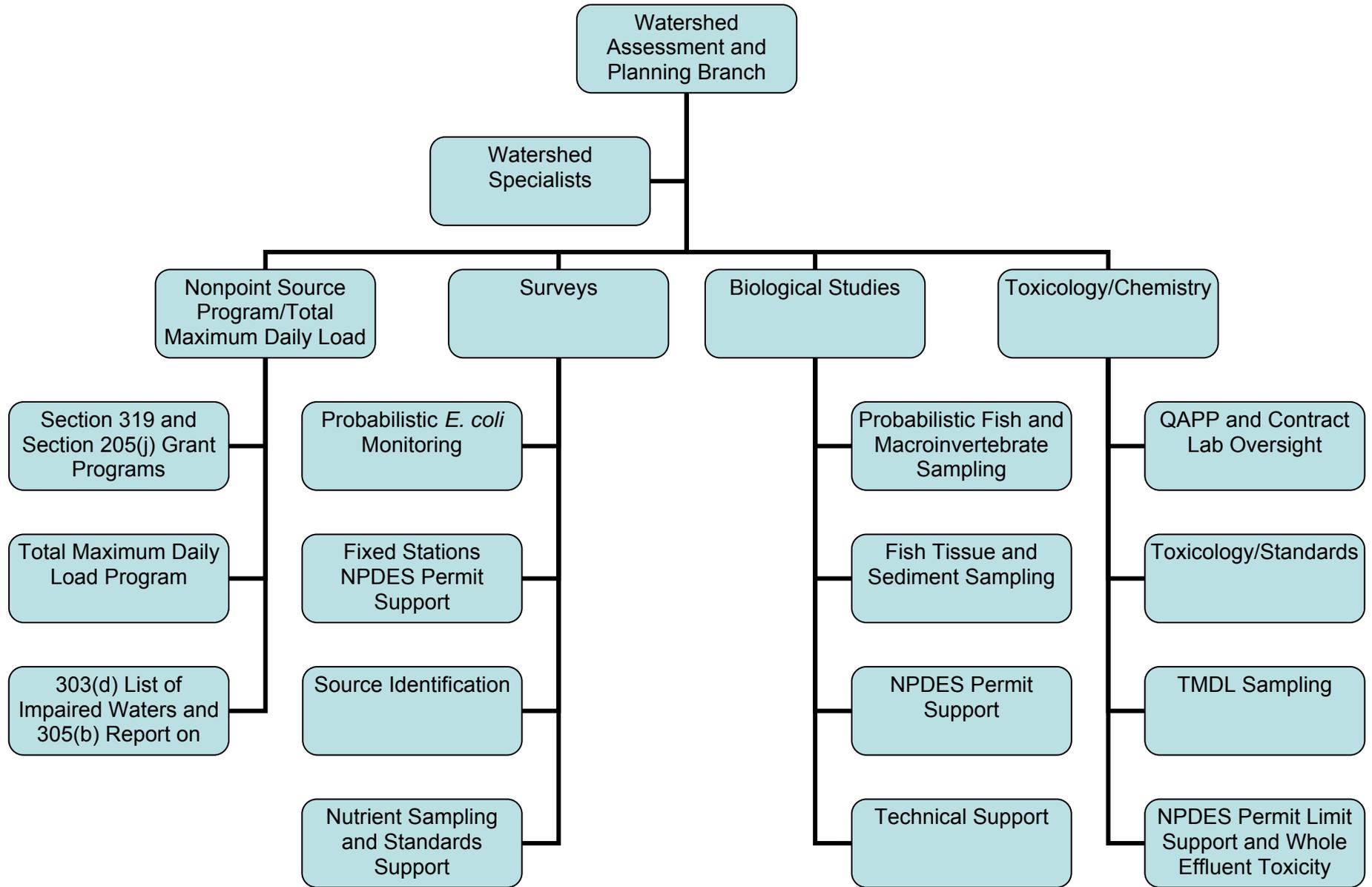
Phosphorus load reduction calculations: 309,946 pounds/year

Nitrogen load reduction calculations: 511,540 pounds/year

Watershed Planning through Section 319(h) and 205(j) Funding

In FFY 2009, the NPS Program successfully completed one watershed management plan. To date, there have been 37 plans implemented and one is anticipated to begin implementation in FFY 2010

Appendix G: Organization Chart of the Watershed Assessment and Planning Branch Showing Major Program Activities



Appendix H: Nonpoint Source Monitoring Strategy

Indiana Department of Environmental Management's Non-point Source Monitoring Strategy

Summary

This non-point source (NPS) water quality monitoring strategy is aimed at collecting and analyzing data in a manner that enables the Indiana Department of Environmental Management (IDEM) to target limited resources for watershed planning purposes and to ascertain changes in water quality resulting from different Office of Water Quality (OWQ) program activities such as watershed planning and restoration activities funded through NPS Section 319(h) and 205(j) grants, and Total Maximum Daily Load (TMDL) development and implementation. Other OWQ efforts as well as efforts by conservation partners and various organizations including activities aimed at minimizing storm water impacts, eliminating combined sewer overflows, improving permit compliance, installing agricultural best management practices and ameliorating the effects of hydro-modification will be captured through this strategy.

This monitoring strategy incorporates targeted baseline data collection at the 10-digit Hydrologic Unit Code (HUC) scale by IDEM's Assessment Branch (AB) for watershed planning and TMDL purposes¹, as well as follow-up monitoring to determine if there have been water quality improvements in areas where a review of the data indicate that the United States Environmental Protection Agency's (USEPA) Specific Targets SP-10, SP-11, or SP-12² may be achieved or where best management practices (BMPs) have been implemented for a period of not less than three years.

Additionally, IDEM has developed a formal External Data Framework, which describes the OWQ policy regarding the use of external data by its programs, guidelines for submitting data, and the technical assistance necessary to facilitate greater collaboration between the OWQ and external parties to help meet shared goals of improving and protecting Indiana's water resources. By providing additional water quality data for use in OWQ programs, the Framework promises potentially significant cost savings to the IDEM.

¹ Historically, TMDLs have been done on a 12-digit scale.

² These specific targets are found in USEPA's 2006-2010 Strategic Plan, which includes a number of performance measures that rely heavily on water quality data and analysis.

The NPS Monitoring Components

Baseline monitoring for TMDL purposes has been on-going with sampling having been done through contractors and OWQ staff in accordance with the USEPA approved Quality Assurance Plan.

Indiana is divided into 1,586 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 1,306 TMDLs and of these, 65% are in various stages of implementation. IDEM currently produces over 100 TMDLs each year and while TMDLs have primarily focused on *E. coli*, more recently they have quantified the impacts of nutrients and metals on waters with impaired biotic communities. This approach will continue.

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.³ 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. Additionally, the OWQ has 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. In developing the TMDL for the Galena Tributaries, sampling was coordinated between the AB and the IDNR's Lake Michigan coastal Program (LMPC).

Baseline monitoring for watershed planning purposes will commence in 2011⁴. The solicitation for 319(h) and 205(j) projects will be amended in 2010 to reflect that the AB will conduct the baseline monitoring for watershed planning projects that rank high enough to be funded. This baseline monitoring will supplement all of the existent data for the watershed, with the parameters determined in part by the age and rigor of the data. Sampling will be conducted in accordance with the USEPA approved Quality Assurance Plan and provided to the local watershed group.

Follow-up monitoring by the AB to determine water quality changes commenced in 2009. The NPS Group has developed a map showing the locations of 319(h)-funded BMP installations that were constructed prior to 2006 (See Attachment A). This was provided to the AB Surveys Section, who following the 5-year rotating basin schedule for

³ In 2010, a TMDL template will be developed that will meet the requirements for an approvable TMDL to USEPA and, as closely as possible, meet the required 9 key elements of a Watershed Management Plan (WMP). With the TMDL and WMP aligned, watershed groups will know better what is needed in the watershed to improve water quality, which will allow for earlier implementation.

⁴ Baseline monitoring was conducted by the AB in the South Fork Wildcat Creek watershed as part of the OWQ initiative, but that was independent of the OWQ decision to assume baseline monitoring for 319(h) and/or 205(j) watershed planning projects.

probabilistic sampling, will define areas for follow-up monitoring and develop annual workplans. (See Attachment B, 5-Year Rotating Basin Map).

The standard suite of water quality parameters that is being collected include: 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, and zinc. The NPS monitoring objective of evaluating BMP success in improving water quality has been 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.⁵

Follow-up monitoring by the AB for USEPA's Specific Targets will commence in 2010 based on the data review for the Draft 2010 303(d) List of Impaired Waters. Workplans will be developed in the first quarter of 2010.

The External Data Framework will be further refined, particularly with regards to Tier 2 Data, during 2010, with full implementation by 2011 (See Appendix A). The External Data Framework is a tiered system based on the potential use of external data by OWQ programs and the corresponding data quality requirements (Attachment C). The three levels within the External Data Framework are based on USEPA's graded approach to data quality, which recognizes that the quality of a project's data should be commensurate with the intended use of those data. For example, regulatory decisions (Level 3) required the highest quality data- equivalent to that collected by OWQ- while the data quality requirements for non-regulatory uses (Levels 1 and 2) are not as stringent.

Submission of water quality data through OWQ's external data process will be voluntary except for those projects whose monitoring is funded with a NPS Program Grant. The Framework is a systematic process for the solicitation of data from external parties and the internal data quality review and ranking of the data sets received for potential use in OWQ programs. The Framework document provides a roadmap for the process and includes general information regarding data submission and which OWQ programs might use data submitted, and specific information for each of the three levels including:

- Minimum documentation required for data submission;
- Sampling and analytical methods required for different data types; and
- Data quality requirements.

⁵ In the first year, watersheds in Whitley County, including three portions of the Blue River and several of its tributaries were evaluated.