

## The Role of the Pilot Watersheds in Advancing IDNR Resource Management Efforts

The following section is a synopsis of achievements attributable to the Pilot Watersheds, and their role in developing and supporting technical solutions applicable to many programs of the IDNR. These items are arranged in four major categories of:

- ◆ Resource Management and Coordination,
- ◆ Research Data and Analytical Tools,
- ◆ Financial & Technical Support, and
- ◆ Stakeholder Attitudes and Outreach.

Cumulatively they provide an overview of contributions of the Pilot Watersheds.

### RESOURCE MANAGEMENT AND COORDINATION

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- ➔ **The Pilot Watersheds serve as models for other large restoration efforts.**
- The Pilot Watersheds serve to evaluate the complex issues involved in watershed science and resource management. The selection of these watersheds was based upon the transferral of information to similar-sized watersheds. However, these watersheds can advance our knowledge about larger systems. For example, how we work in a watershed with larger programs such as Illinois Rivers 2020 can be based on the relationships, processes, and

science that are developed in the Pilot Watersheds. These watersheds provide an opportunity to learn in a smaller setting before advancing the benefits to other watersheds.

- ❑ The interaction with other agency efforts, as well as the relationship between research and project implementation, are appropriate at the scale of the Pilot Watersheds. Although the scale of the Ecosystem Partnerships does provide some value in terms of large-scale planning, the detailed planning and implementation actually occurs at the scale of the Pilot Watersheds.
- ❑ The IDNR supports or delivers many state and federal conservation programs (e.g., Illinois Rivers 2020, Conservation Reserve Enhancement Program-CREP, Conservation 2000) yet understanding of the interaction among these programs is not evaluated. Monitoring at the scale of the Pilot Watersheds provides an opportunity to assess the cumulative effects of the projects.
- ❑ Interagency partnerships are enhanced by the Pilot Watershed approach. One priority of the Natural Resources Coordinating Council was to improve the interaction between agencies. The Pilot Watersheds provide a common goal for many agencies (e.g., IDA, IEPA, NRCS, IASWCD, and IDNR).

**→ Refinement of administrative procedures for watershed project implementation.**

- ❑ A direct result of the Pilot Watersheds is the development of new procedures and project evaluation forms to be completed by resource managers in the Office of Resource Conservation. These provide for a multi-disciplinary review of, and sign-off on, potential projects to ensure they received a

comprehensive evaluation, thus reducing potential delays in the cultural and environmental review process (CERP).

- ❑ Project reviews and assessments, both in the office and site visits, are made as a multi-agency effort providing greater coordination and communication among collaborating agencies. This enhances understanding among the resource managers and improves relationships with landowners.
- ❑ With the large number of watershed committees in Illinois, and the potential demand on staff to attend meetings, the ORC leadership developed a list of resource managers as primary watershed contacts. The primary contact provides support for the watershed committee by ensuring that appropriate IDNR staff are present when needed. This list was first developed in the early stages of the Pilot Watersheds.

These primary contacts also help to develop a relationship of trust between stakeholders and agencies. Because of the significant role of agency personnel in watershed planning and implementation this relationship is important. As noted by Griffin (1999), developing this trust can be difficult if agency personnel change.

**→ The Pilots have helped develop a strong recognition of the need for local staffing support, leadership development, and support by the agencies.**

- ❑ A recent US EPA document (U.S. EPA 2002) noted at least two models highlighting the interaction between agencies and local watershed committees. One model uses a state-sponsored planning and management approach to assist local partnerships, whereas the other is

based on local watershed or basin councils that are given legal authority as a result of legislation. Both models can share various components and may require substantial agency support, but the trend is towards locally-driven, multi-stakeholder, watershed efforts. Understanding the needs of the local committees improves the IDNR's capacity to adequately support these efforts and serves to guide potential staffing needs.

- ❑ Through the Peace Corps Fellowship Program, Department of Geography at Western Illinois University, watershed coordinators were provided to the Court Creek Watershed Committee. These graduate students, with experience abroad, developed a research topic around the Court Creek Watershed for a Master's thesis and provided coordination for the watershed planning process.

**→ Watershed Planning as a tool to guide watershed restoration.**

- ❑ Each Pilot Watershed was required to develop a comprehensive watershed plan. Two watersheds, Court Creek and Sugar Creek/Lake Branch contained IEPA 303d listed streams, thus qualifying them for planning funds from IEPA. IDNR matched these funds. IDNR also funded the Hurricane Creek planning process, along with considerable in-kind matching services and support from Eastern Illinois University and the Embarras River Management Association (ERMA). The Big Creek Committee did not require external support for planning, but was a collaborative interagency and stakeholder effort.

**→ Stream restoration requires sufficient staffing to implement projects.**



**Figure 31.** Stream geomorphology survey crews are vital for acquiring data to design instream projects. Here, John Beardsley uses sophisticated electronic surveying equipment to obtain data for a stream project. Source: John Beardsley, ISWS.

- ❑ A critical component of any stream restoration strategy is the availability of staff to gather appropriate data for designing and implementing projects (Figure 31). For the Pilot Watersheds, because of the experimental aspects of the practices, the Illinois State Water Survey has been instrumental in successfully collecting stream geometry data and overseeing construction of the pool and riffle stream stabilization practices. The Pilot Watershed effort has highlighted the great importance of these survey crews and the need for more personnel with these skills.

In the Pilot Watersheds, the ISWS stream restoration crew has surveyed over 47,000 feet of streams to obtain data necessary for identifying locations for construction of instream practices (J. Beardsley, ISWS).

## RESEARCH, DATA COLLECTION AND ANALYTICAL TOOLS

To understand the relationship between physical and biological components at the watershed scale requires a long-term commitment by the supporting agencies. Systemic responses due to best management practices in natural resources may take several years.

Droughts, floods and natural variability all confound the ability of researchers to adequately interpret cause-and-effect relationships. Yet, the collection of high-quality data over a sufficient period and a preponderance of evidence from collaborative research can effectively guide our approach to resource management.

Through both direct and indirect research initiatives associated with the Pilot Watersheds, and with a long-term commitment by participating agencies, significant advances in the knowledge of watershed science can be achieved.

Due to the rigorous science-based assessments, the Pilot Watersheds have been nominated for designation as USEPA National Non-point Source Monitoring Program. In their report, Lombardo *et al.* (2000) support and recommend a study design similar to

**Figure 32.** Fish (top), macroinvertebrates (middle) and habitat (bottom) are collected in each Pilot and Reference Watershed to assess the response of best management practices.



that used for the Pilot Watersheds. By building upon the Pilot Watershed approach, the IDNR, other agencies, and stakeholders will be better-positioned to take advantage of potential future Clean Water Act 319 funding opportunities. Actual designation will be contingent upon continued IDNR support for this effort. Provided below are some highlights of these efforts.

- Hydrology and Sediment: Often some of the highest priority issues in these watersheds originate from problems associated with flooding or erosion. Thus, a network of stream gaging stations was established in the Pilot Watersheds to enhance the data from these smaller systems. Few permanent USGS gaging stations are currently operated on watersheds similar to the size of the Pilot Watersheds. Understanding the hydrology and sediment transport of a system is critical to instream restoration efforts.

To help disseminate these data to other researchers and stakeholders, the ISWS established a Watershed Monitoring Data web site for ISWS-operated Pilot Watershed and CREP area (i.e. on Panther and Cox Creeks in the Jim Edgar Panther Creek State Fish & Wildlife Area) stream gaging stations. In addition to general station information, the web site has stage, discharge, nutrient, and sediment data beginning with Water Year 1999 (partial record) Note: Water years are from 1 October through 30 September). The site is located at: <http://www.sws.uiuc.edu/wss/wmd/>

- ❑ Modeling: Since the early 1980's, the Illinois State Water Survey has collected flow data from Big Creek (Cache River Basin). Because of these data, the ISWS was able to develop a hydrologic model that has been used by the Big Creek Technical Committee to help establish a prioritization for projects in this watershed (Demissie *et al.* 2001).

Similarly, data collected in the 1980's by the ISWS (Roseboom *et al.* 1982a, 1982b, 1986, 1990) has been critical for developing a dynamic watershed simulation model of the Court Creek Watershed (Bora and Bera 2000). As in Big Creek, this model has been used to establish criteria for prioritization of projects in this watershed. Contacts: Dr. Mike Demissie and Dr. Deva Borah, Illinois State Water Survey.

- ❑ Fish and macroinvertebrates: Understanding the biological response of best management practices is critical for guiding the IDNR's approach to resource management. Because streams tend to integrate and reflect the physical and biological conditions of a watershed, the Illinois Natural History Survey (INHS), Center for Aquatic Ecology is collecting fish and benthic macroinvertebrates at sites in each of the

Pilot and Reference Watersheds (Figure 32). The status of fish and macroinvertebrates are useful measures for biologists and can be used in various analyses such as the Index of Biotic Integrity (IBI), to assess the quality of these streams. Contact: Hope Dodd and Dr. Dave Wahl, Illinois Natural History Survey.

- ❑ Instream habitat: Biological responses to the environment are often associated with habitat conditions. As a companion effort with fish and macroinvertebrate sampling, several habitat variables are collected to document changes in stream conditions. Contact: Hope Dodd and Dr. Dave Wahl, INHS.

In addition to research specifically directed at the Pilot Watersheds, several significant projects have been indirectly linked to assessments. The following projects provide an overview of the diversity and scope of watershed needs.

- ❑ Geomorphic Characterization-meander bends and bendway weirs: Originating as a proposal from the Embarras River Ecosystem partnership, researchers at the University of Illinois are developing protocols for evaluating the geomorphological condition of meandering streams. This is critical for the appropriate application of stream enhancement projects. Contact: Dr. Bruce Rhoads (University of Illinois), Bill White and Dave Day (IDNR).

- ❑ Conservation Practices mapping: To more fully understand the relationship among conservation practices within a watershed, it is essential to know how these projects are spatially related. Developed initially for USDA Programs (e.g., CREP, CRP, WHIP, EQIP, etc.), the Conservation Practices Tracking System can be used to track the location of all

Pilot Watershed Practices, and when available, the projects of other agencies. Contact: Lisa Scott (USDA-FSA), Steve Sobaski (IDNR).

☐ Resource Management Mapping Service

(RMMS): This web-based tool provides local agencies, stakeholders and researchers with basic coverages and tools to map and identify areas of interest. It can be found at: <http://space1.itcs.uiuc.edu/Website/rmms/>

☐ GIS expansion in the IDNR-Office of

Resource Conservation (ORC): For resource managers and administrators to more directly understand the relationships among resource issues, it is essential for them to have immediate access to GIS tools. As a result of these field-based needs, and with significant support from ORC administration, the ORC-Technical Support Section developed a plan to upgrade and expand current GIS capabilities for field staff, and established regional GIS work stations and contact persons to support the basic needs within each region. While progress has been made, more work is needed to provide the most current technology to field staff.

☐ Pool and Riffle Assessment: Critical to understanding the biological response to practices, Southern Illinois University researchers have collected macroinvertebrate and habitat data to assess a key stream enhancement technique (pool and riffle structures). This research initiative provides for collection of pre-implementation data with anticipation for construction of a project. Following construction, assuming available funding, post-implementation studies would be conducted to understand the response of biota

to this practice. Contact: Dr. Matthew Whiles, Department of Zoology, Southern Illinois University-Carbondale.

Pre- and Post-implementation fish and macroinvertebrate sampling has been conducted by Illinois Natural History Survey researchers on North Creek (Court Creek Pilot Watershed). These data are under evaluation with results to be presented in annual reports. Contacts: Hope Dodd and Dr. Dave Wahl, INHS.

☐ Fish sampling equipment (electric seine

refinements): To ensure that reliable and appropriate equipment was available for fish sampling, the INHS, Eastern Illinois University, IEPA and IDNR staff, collaborated to refine the electric seine, a standard fish sampling gear used by the IDNR. Due to changes in availability of new materials, this device was in need of modification. As a result of these changes, researchers and resource managers in Illinois and other states (e.g., Iowa, Mississippi) are requesting information on this equipment. A manual on construction of the device is in preparation (Day, *et al.* )

## PILOT WATERSHED FINANCIAL & TECHNICAL SUPPORT

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Funding for a substantial portion of the IDNR component of the Pilot Watersheds has focused on monitoring, research, and more recently, implementation. The source of these IDNR funds have been the Conservation 2000 Ecosystems Program. Other agencies and institutions have also made significant financial and technical resource commitments to the Pilot Watersheds.

The USDA-NRCS has provided technical support for design and implementation of several water retention structures, wetlands and instream projects. The IEPA provided technical assistance for watershed planning.

The Pilot Watersheds serve as focal points for the agencies, institutions and the local watershed groups to focus attention and garner additional financial support for research and implementation. These funds come from many sources including:

- ❑ \$1 million from the Illinois Department of Agriculture (IDA) during the 5 years of the Pilot Watershed Program, for Implementing Conservation Practices Program (CPP) (e.g., grass waterways, dry dams, and other soil conservation practices). Contacts: Terry Donohue and Alan Gulso.
- ❑ \$40,000 from IEPA for watershed planning and strategy development for Lake Branch and Court Creek. Contacts: Gary Eicken and Margaret Fertaly (IEPA).

- ❑ \$20,000 over two years from CFAR (Council on Food and Agricultural Research) to the ISWS for nutrient (nitrogen and phosphorous) sampling in Big Creek (Cache River watershed). Contact: Laura Keefer (ISWS).
- ❑ \$103,784 from IDNR Conservation 2000 Ecosystem Partnership Program to the ISWS for the first two years of hydrologic, sediment, and nitrate monitoring in the Hurricane Creek watershed. Contact: Laura Keefer (ISWS).
- ❑ \$50,000 from the U.S. Fish & Wildlife Service for projects in Big Creek. Further, the USDA EQIP funding for this watershed was associated with the Pilot Watershed Funding.
- ❑ \$20,000 from Southern Illinois University (Office of Research Development Administration) for research on Sugar Creek/Lake Branch habitat and water quality relationships. Entitled “Influence of riparian forests on water quality, in-stream habitat, and biotic integrity in agriculturally impacted southern Illinois streams.”, the principal investigators were Dr. Matthew R. Whiles and Dr. Karl Williard.
- ❑ \$990,00 over five years, from the Conservation Reserve Enhancement Program (CREP) to install and maintain stream gages and water sample devices, and to collect and analyze hydrology and sediment data in the Court Creek Watershed, its reference watershed, Haw Creek and two gaging stations in the Jim Edgar Panther Creek State Fish & Wildlife Area. Contact: Lisa Scott (USDA-FSA), Debbie Bruce and Rick Mollahan, (IDNR).
- ❑ \$20,000 from the University of Illinois, Department of Natural Resources and Environmental Studies has been provided in support of personnel for the development of the publication by McDermaid and Barnstable (2001). Contact: Karyn McDermaid.

- ❑ \$3,100 in support services from Eastern Illinois University and the Embarras River Management Association (ERMA) for development of the Hurricane Creek Watershed Implementation Plan. Contact: Dr. Vince Gutowski, Department of Geography, Eastern Illinois University.
- ❑ \$375,000 through U.S. Fish & Wildlife Service-Dingell-Johnson Sport Fish restoration funds have been used for fish sampling.

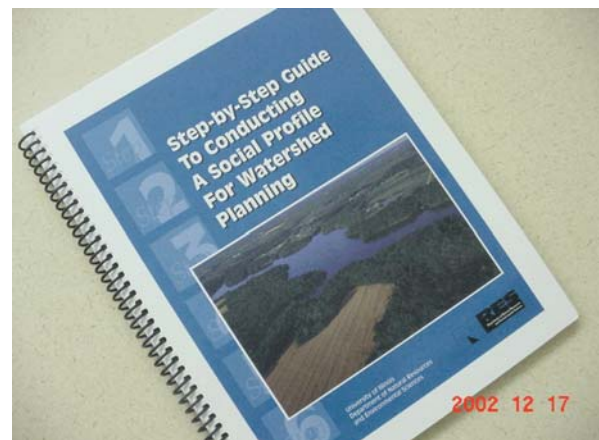
## STAKEHOLDER ATTITUDES and OUTREACH

→The Pilot Watersheds were instrumental in developing IDNR’s understanding of stakeholder needs.

The role of stakeholders is essential for successfully implementing watershed best management practices, and it is important that watershed committees, agencies and other relevant groups, understand the issues from the perspective of the landowners. Great advances in this aspect of watershed management have been made through the Pilot Watersheds. It is also necessary to convey this information through a variety of outreach mechanisms. Both developing this understanding of stakeholder needs and transferring it to stakeholders are important for gaining local support. The following items summarize some relevant products from the Pilot Watersheds.

- ❑ Landowner surveys: Surveys stakeholders in Court Creek and Hurricane Creek Watersheds were completed and summary reports produced and distributed.

- ❑ Social Dimensions of Watershed Planning: A significant product from the Pilot Watersheds is the document developed by Karyn McDermaid entitled "Step-by-Step Guide to Conducting a Social Profile for Watershed Planning" (Figure 33). The manual includes numerous sources for information, step-by-step instructions on how to collect social data for a watershed and guidelines for conducting a landowner survey. Use of this manual extends beyond the Pilot Watersheds and is being applied in the Ecosystem Partnerships. Copies have also been requested by the USDA Natural Resources Conservation Service, US EPA, Illinois EPA, The Nature Conservancy and universities throughout the states. To date over 500 copies have been distributed with some translated and shipped for use in the Balkans.



**Figure 33.** An important document developed from the Pilot Watersheds is the “Step-by-Step Guide to Conducting a Social Profile for Watershed Planning”.

A web site was created and complements this workbook. This site allows users to select survey questions, create their own unique survey, enter their survey data into a database, and perform simple statistical analyses on their survey results. This can be found at:

<http://www.watershedplanning.uiuc.edu/>

- ❑ Court Creek Watershed Web Site: Under direction of the University of Illinois Extension in Knox County, the Court Creek Watershed Committee developed a web site to provide: basic watershed information; details on best management practices; and responses to frequently asked questions. The site can be found at: [http://web.extension.uiuc.edu/knox/sarah/watershed\\_infotext.htm](http://web.extension.uiuc.edu/knox/sarah/watershed_infotext.htm)

Contact Kyle Cecil, Knox County, University of Illinois-Extension.

- ❑ In the Fall 2001, the University of Illinois Extension and Knox County Soil & Water Conservation District coordinated a Conservation Field Day. The emphasis of this public event was to highlight the North Creek, stream stabilization (pool and riffle) demonstration project.
- ❑ Pilot Watershed Signs: To highlight the importance of watersheds and streams, the Court Creek, Hurricane Creek and Lake Branch watersheds, with assistance from the IDNR-Technical Support Section, designed watershed signs that were placed at the watershed



**Figure 34.** Watershed signs were placed at high visibility areas. Here, a Court Creek Watershed sign is installed.

boundaries. These signs were designed to raise public awareness of the watershed concept. Signs denoting significant streams were placed at bridges in each watershed (Figure 34).

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## ILLINOIS WATERSHED ACADEMY



- ❑ Watershed Academy: Early in the Pilot

Watershed effort, it was apparent that watershed planning committee leaders were often unaware or unable to sufficiently address the diverse needs of leading volunteer groups. Often these committee members and leaders are themselves volunteers, with little or no background in watershed or natural resource sciences. Thus, the Watershed Academy was developed to help provide this educational need. A co-funded and collaborative effort between the University of Illinois, Department of Agriculture, Consumer and Environmental Studies, Department of Natural Resources and Environmental Studies, the Water Resources Center, Partnership Illinois, the IDNR, and the IEPA, three Watershed Academy workshops have been conducted. As with the Pilot Watersheds, these workshops were designed to serve as models of information to be transferred to other watershed committees. Information on the Watershed Academy can be found at: <http://www.enviro.uiuc.edu/iwrc/WatershedAcademy/> A synopsis of each Watershed Academy conducted thus far, is provided below.

## **Watershed Academy 1**

February 24-26, 2000

### ***Watershed Science for Effective Partnerships***

This workshop provided an overview of basic watershed science topics including stream hydrology, climate, stream geomorphology, biological components (fish and macroinvertebrates), wetland functions and related topics.

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## **Watershed Academy 2**

January 31-February 2, 2001

### ***Organizing for Success***

The tenet of this workshop was to develop the administrative skills of watershed leaders by providing information assessing stakeholder interests, watershed planning, dealing with conflict, writing successful grants and conducting effective meetings.

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## **Watershed Academy 3**

March 13-15, 2002

### ***Watersheds in Transition***

Residents of many Illinois watersheds are facing diverse issues of urban development and other land use changes, storm water management and associated problems. This workshop provided case histories of watershed planning, GIS tools to assist watershed leaders and their communities in understanding these changes, and practical, on-the-ground reviews of various storm water management strategies in the Champaign-Urbana area.

## **WORKSHOPS**

**1998**

### ***1<sup>st</sup> Pilot Watershed Program Workshop,***

**3 March, Northfield Center, Springfield, IL**

This workshop brought together stakeholders, agencies and researchers to inform all participants in the Pilot Watersheds about the status of this effort and its goals. Facilitated by Dr. John Braden, University of Illinois-Water Resources Center, the main focus of this workshop was an overview of watershed planning from perspective of the agencies, and included several case studies. Representatives from the selected Pilot Watersheds also provided highlights of their watershed.

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**1999**

### ***Pilot Watershed Program Researchers Retreat***

**7 January, Holiday Inn, Urbana, IL**

For this meeting over 60 researchers, resource managers and administrators gathered to discuss data management issues and needs within the Pilot Watersheds, and how these needs could be addressed for other watershed efforts. Some action items included: developing a list of basic information needs for watershed planning groups, adding a social component to the Pilot Watersheds, developing a historical perspective of the watersheds using aerial photography, developing a terrestrial and wildlife habitat quality index, developing metadata standards for essential data sets, developing or enhancing various models and associated data.

### ***2<sup>nd</sup> Pilot Watershed Program Workshop***

**5 March, Northfield Center, Springfield, IL**

Building upon the topics in the first Pilot Watershed Workshop and the researchers retreat, the goal of this workshop was to obtain updates from the Pilot Watershed representative stakeholders, review the science involved in evaluating the Pilot Watershed (e.g., geology, hydrology, aquatic biology) and provide some tips and tools to assist agencies and stakeholders with evaluating and advancing their watershed efforts.

### ***Pilot Watershed and CREP Modeling and Assessment Meeting***

**30 June, Waste Management and Research Center, Champaign, IL.**

Monitoring in the Pilot Watersheds and CREP area contain two main components: collection of data and use of models for predicting effects of practices. This meeting provided researchers with an overview of four models and exchange of information on data availability and needs.

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**2000**

### ***3<sup>rd</sup> Pilot Watershed Program Workshop***

**24 March, Holiday Inn Select, Decatur, IL.**

Further advancing the issues of data needs, interagency cooperation, and the role of stakeholders, discussed in previous workshops, this meeting provided case histories of whole farm planning, watershed planning in the Mackinaw River Basin, and the importance of understanding data needs.

### ***Pilot Watershed Researchers Chatauqua***

**9 November, Illinois State Water Survey, Champaign, IL.**

This meeting was a continuation of the effort to enhance the understanding of the complicated aspects of watershed science and their relevance to efforts such as the Pilot Watersheds. The goals of this meeting were to: foster interaction and data sharing, identify potential research gaps and data needs, discuss new funding sources and develop collaborative efforts and discuss the status of the watershed plans and practice implementation.

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## REFERENCES

- Born, S. M. And K. D. Genskow. 2001. Toward Understanding New Watershed Initiatives. A report from the Madison Watershed Workshop. Madison, Wisconsin. 23 pp. See also at [www.tu.org](http://www.tu.org) [http://www.tu.org/newsstand/library\\_pdfs/watershed.pdf](http://www.tu.org/newsstand/library_pdfs/watershed.pdf)
- Demissie, M. H. V. Knapp, P. Parmar, D. J. Kriesant. 2001. Hydrology of the Big Creek Watershed and Its Influence on the Lower Cache River. Illinois State Water Survey Contract Report 2001-06 114 pp.
- Griffin, C.B. 1999. Watershed Councils: An emerging form of public participation in natural resource management. Journal of the American Water Resources Association. 35: 505-518.
- Lombardo, L.A., G.L. Grabow, J. Spooner, D.E. Line, D.L. Osmond, and G.D. Jennings. 2000. Section 319 Nonpoint Source National Monitoring Program Successes and Recommendations. NCSU Water Quality Group, Biological and Agricultural Engineering Department, NC State University, Raleigh, North Carolina.
- Roseboom, D., R. L. Evans, J. Erickson, and L.G. Brooks, 1982a. An Inventory of Court Creek Watershed Characteristics that May Relate to Water Quality in the Watershed. Illinois State Water Survey Contract Report 322.
- Roseboom, D., R. L. Evans, J. Erickson, and L.G. Brooks. 1982b. Appendices for an Inventory of Court Creek Watershed Characteristics that May Relate To Water Quality in the Watershed. Illinois State Water Survey Contract Report 322A.
- Roseboom, D., R. L. Evans, J. Erickson, L. G. Brooks, D. Schackleford. 1986. The Influences of Land Uses and Stream Modification on Water Quality in the Streams of the Court Creek Watershed. ILENR/RE-WR-86/16, Illinois Department of Energy and Natural Resources, Springfield, IL.
- Roseboom, D., T. Hill, J. Rodsater and A. Felsot. 1990. Stream Yields from Agricultural Chemicals and Feedlot Runoff from an Illinois Watershed. ILENR/RE-WR-90/11, Illinois Department of Energy and Natural Resources, Springfield, IL.
- Steward-Oaten, A., W. W. Murdoch, and K.R. Parker. 1986. Environmental impact assessment: "pseudoreplication" in time? Ecology 67:929-940.
- U.S. EPA. 2002. A review of Statewide Watershed Management Approaches. Final Report. Office of Water. 65 pp.

## PRESENTATIONS AT PROFESSIONAL MEETINGS

- Austen, D. J. and D. M. Day. 2001. Evaluating the effectiveness of Watershed Management: How much and can we measure the impact? *63<sup>rd</sup> Midwest Fish and Wildlife Conference*. December 9-12, 2001. Des Moines, IA.
- Austen, D.J. and D. M. Day. 2002. Addressing Watersheds through the Illinois Pilot Watershed Project: Assessment of effect in a dynamic environment. *10<sup>th</sup> National Non-point Source Monitoring Workshop*, September 8-12, 2002, Breckenridge, CO.
- Borah, D.K., R. Xia, and M.Bera. 2001. Hydrologic and Sediment Transport Modeling in the Court Creek Watershed. *2001 Governor's Conference on the Management of the Illinois River System*, October 2-4, 2001, Peoria, IL. Special Report No. 27, Illinois Water Resources Center, Urbana, IL: 178-188.
- Borah, D.K., M. Bera, and R. Xia. 2002. Hydrologic and Sediment Transport Modeling in an Illinois Watershed for Planning Restoration. *Proceedings of the 2002 Conference on Water Resources Planning and Management*, May 19-22, 2002, Roanoke, VA. ASCE-EWRI, Washington, DC: CD-ROM.
- Borah, D.K. and M. Bera. 2000. Watershed modeling with state and local partners in Illinois. *2000 Joint Conference on Water Resources Engineering and Water Resources Planning & Management*, July 30-August 2, 2000, Minneapolis, MN. Proceedings on CD Rom, ED. R.H. Hotchkiss and M. Glade, ASCE-EWRI, Washington, DC.
- Borah, D. 2001. Modeling to support watershed flood and soil loss management. *C-FAR WQ-SRI Water Quality Forum*, March 1, 2001, Springfield, IL. Illinois Council on Food and Agricultural Research (C-FAR), University of Illinois at Urbana-Champaign, Urbana, IL.
- Borah, D.K., M. Bera, and R. Xia. 2002. Hydrologic and Sediment Transport Modeling of a Watershed in Illinois for Planning Restoration. Poster presented at the *International Conference on Water Resources Management in Arid Regions*, March 23-27, 2002, Kuwait.
- Borah, D.K., M. Bera, and R. Xia. 2001. Hydrologic and Sediment Transport Modeling in the Court Creek Watershed in Illinois for Planning Restoration. Poster presented at the *2001 Governor's Conference on the Management of the Illinois River System*, October 2-4, 2001, Peoria, IL.
- Borah, D., M. Bera, and R. Xia. 2000. Dynamic Watershed Simulation Model Helping Citizen Group Restoring the Court Creek Pilot Watershed. *Illinois Water 2000 Conference*, November 13-14, 2000, Urbana, IL. Poster Abstract in *Special Report 26*, Illinois Water Resources Center, Urbana, IL: 54.

- Borah D., M. Bera, and R. Xia. 2002. Hydrologic and Sediment Transport Modeling of the Court Creek Watershed in Illinois for Planning Restoration. *Proceedings of Environmental Horizons 2002*, April 1-2, 2002, Urbana, IL. Environmental Council, University of Illinois at Urbana-Champaign, Urbana, IL: 78 (Poster Abstract).
- Demissie, M., L. Keefer, J. Slowikowski, A. Russell, T. Snider, and K. Stevenson, 2001. Sediment and Nutrient Monitoring at Selected Watersheds within the Illinois River Watershed for Evaluating the Effectiveness of the Illinois River Conservation Reserve Enhancement Program (CREP). ISWS CR 2001-12, Illinois State Water Survey, Champaign, IL, 141 p.
- Dodd, H.R., A.M. Holtrop, D.H.Wahl, and D. Day. 2001. Evaluation of Transect-Scale Habitat Methods for Detecting Changes in Illinois Stream Conditions. 63rd Midwest Fish and Wildlife Conference, Des Moines, Iowa, Dec. 11, 2001.
- Dodd, H. and D. Wahl. 2000. Evaluation of Watershed Management Practices for Improving Illinois Streams. 62<sup>nd</sup> Midwest Fish and Wildlife Conference, Minneapolis, MN, Dec. 5, 2000.
- Dodd, H., D. Wahl, and S. Kohler. 2000. Evaluation of Watershed Management Practices for Improving Illinois Streams. Illinois Chapter American Fisheries Society Annual Meeting, Mt. Vernon, IL, Feb. 28, 2000.
- Keefer, L. 2002. Hydrologic, Sediment and Nutrient Monitoring in the Illinois CREP National CREP Forum, June 2002, Peoria, IL.
- Keefer, L. 2001. Hydrologic, Sediment & Nutrient Monitoring for the Pilot Program Watersheds Governor's Conference on the Management of the Illinois River, October 2001, Peoria, IL.
- Keefer, L. 2000. CREP/Pilot Monitoring Program, Environmental Horizons 2000 Conference, March 2000, Champaign, IL.
- Stone, M. L., M. R. Whiles, J. A. Webber, and K. Williard. 2002. Relationships between riparian vegetation, water chemistry, and stream invertebrates in a southern Illinois agricultural landscape. Annual meeting of the North American Benthological Society, Pittsburgh.
- Webber, J. A., K. W. J. Williard, M. R. Whiles, M. L. Stone, J. J. Zaczek, and K. D. Davie. 2002. Watershed scale assessment of the impact of forested riparian zones on stream water quality. 13th Central Hardwood Forest Conference, Champaign, Illinois.

Webber, J. A., K. W. Williard, M. R. Whiles, and M. L. Stone. 2001. Watershed-scale assessment of the impact of forested riparian buffer strips on stream water quality and biotic integrity. Ecological Society of America 2nd International Nitrogen Conference, Potomac, MD.

Whiles, M. R., M. L. Stone, J. Webber, and K. Williard. 2001. The influence of forested riparian buffers on water quality and stream invertebrates in Sugar Creek drainage, Illinois. Governor's Conference on Management of the Illinois River system, Peoria, Illinois

Whiles, M. R. and M. L. Stone. 2001. Relationships between riparian zone vegetation, water quality, and stream invertebrate communities. Illinois Renewable Natural Resources Conference, Peoria, Illinois

Williard, K. W. J., J. A. Webber, M. R. Whiles, M. L. Stone, and J. J. Zaczek. 2002. The relationship of stream nutrients with riparian forest cover in headwater agricultural watersheds. Annual Meeting of the American Water Resources Association. Philadelphia.

Williard, K. W. J. and J. J. Zaczek. 2002. Quantifying the water quality benefits of riparian buffer zones. Upper Mississippi River/Tallgrass Prairie Ecosystem Team Meeting, Herrin, Illinois.

Williard, K. W. J., J. A. Webber, J. E. Schoonover, J. M. O'Brien. 2001. Water quality benefits of native riparian vegetation in the Cache River watershed. Illinois Renewable Natural Resources Conference, Peoria, Illinois.

## PUBLICATIONS AND REPORTS

Borah, D. K. and M. Bera. 2000. Hydrologic Modeling of the Court Creek Watershed. Illinois State Water Survey. Champaign. 63 pp

Borah, D.K. and M. Bera. 2002. Hydrologic and sediment transport modeling in an Illinois watershed for planning restoration. *Transactions of the ASAE*. Under review.

Cain, S. (editor). 2001. Lake Branch Watershed Implementation Plan. Lake Branch Watershed Planning Committee. 77 pp.  
<http://web.aces.uiuc.edu/watershed/lakebranch/LAKEBR%7E1.pdf>

Cache River Watershed Resource Planning Committee. 2002. Big Creek Watershed Restoration Plan: A component of the Cache River Watershed Resource Plan. M. Guetersloh, editor, 52 pp.  
<http://web.aces.uiuc.edu/watershed/Big%20Creek%20PW%20Plan.pdf>

- Day, D.M., A.M. Holtrop, H.R. Dodd, R.Smogor, R. Fischer, and M. Short. (In prep.) A guide to Assembly and Operation of an Electric Seine. IDNR publication
- Dodd, H.R., S. L. Kohler, D. H. Wahl, G. F. McIssac, J. H. Hoxmeier, and D. Roseboom. 1999. Evaluation of Watershed Management Practices for Improving Stream Quality in the Illinois Watershed Program. Annual Progress Report. Illinois Natural History Survey, Aquatic Ecology Technical Report 99/11. 19 pp. + tables and figures.
- Dodd, H.R., D. H. Wahl, G. F. McIssac, J. H. Hoxmeier, and D. Roseboom. 2000. Evaluation of Watershed Management Practices for Improving Stream Quality in the Illinois Watershed Program. Annual Progress Report. Illinois Natural History Survey, Aquatic Ecology Technical Report 00/7. 28 pp. + tables and figures.
- Dodd, H.R., J. W. Neisler, A. M. Holtrop, and D. H. Wahl, 2001. Evaluation of Watershed Management Practices for Improving Stream Quality in the Illinois Watershed Program. Annual Progress Report. Illinois Natural History Survey, Aquatic Ecology Technical Report 01/08. 38 pp. + tables and figures.
- Gutowski, V. and D. Osterman (editors) 2002. Hurricane Creek Watershed Implementation Plan. 69 pp. + maps.  
<http://web.aces.uiuc.edu/watershed/hurricaneCreek/WIP.pdf>
- Hogan, A. M. 2001. Agency collaboration launches Illinois Pilot Watershed Program. *Agro-Ecology* Vol. 8 (1):8-10.
- Keefer, L. Geomorphic Assessment of the Big Creek Watershed in the Cache River Basin, Master's Thesis: in progress (anticipated completion August 2003).
- McDermaid, K.K. and D. C. Barnstable. 2001. Step-by-Step Guide to Conducting a Social Profile for Watershed Planning. University of Illinois, Department of Natural Resources and Environmental Sciences, Urbana. 92 pp.
- Ortlieb, J. T. and T. A. Hall, (editors) 2000. The Court Creek Watershed Protection Plan. Court Creek Watershed Planning Committee. 64 pp. + Figures, Tables and Appendices. The watershed plan can be viewed on-line at: <http://web.aces.uiuc.edu/watershed/courtcreek/TOC.htm>
- Rhoads, B. and R. Wade. (In prep. anticipated availability January 2003.) Geomorphic Characterization of Meander Bends and Bendway Weirs, University of Illinois, Department of Geography, Urbana.
- Roseboom, D., T. Hill, J. Beardsley, J. Rodsater, and L. Duong. 1999. Stream Habitat Restoration: Design, Implementation and Training for the Illinois Department of Natural Resources (Phase 2). IDNR Contract No. G9920201.

Stone, M. – M.S.. thesis in progress; expected completion in spring 2003.

Webber, J. A. 2002. Effect of riparian forest cover on stream water quality in headwater agricultural watersheds in southern Illinois. Dept. of Forestry, Southern Illinois University.

Webber, J. A., K. W. J. Williard, M. R. Whiles, M. L. Stone, J. J. Zaczek, and K. D. Davie. *In press*. Watershed scale assessment of the impact of forested riparian zones on stream water quality. Proceedings 13th Central Hardwood Forest Conference, Champaign, IL.

Weidner, J. 2002. Evaluation of Woody Debris as a Habitat Restoration Tool for Stream Biota: Assessment of Macroinvertebrates. Undergraduate Senior Thesis. University of Illinois. May 2002.

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**Illinois Department of Natural Resources**

**Illinois Department of Agriculture**

**Illinois Environmental Protection Agency**

**USDA-Natural Resources Conservation  
Service**

**USDA-Farm Service Agency**

**Association of Illinois Soil and Water  
Conservation Districts**

Clark County

Clinton County

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Cumberland County

Knox County

Union County

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**Illinois Farm Bureau**

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**Friends of the Cache River**

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## RESEARCH INSTITUTIONS

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Watershed Science Section

### **Illinois Natural History Survey**

Center for Aquatic Ecology

Center for Wildlife Ecology

### **Illinois State Geological Survey**

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Department of Forestry

Department of Agribusiness Economics

### **University of Illinois**

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