



AT THE CENTER

News and Notes from the
Center for Earth and Environmental Science

Spring 2006

Director's Note

CEES has a lot of exciting programs to report for the upcoming spring and summer months. This newsletter highlights our most recent activities and accomplishments. I am pleased to announce that the comprehensive environmental science education program, *Discovering the Science of the Environment*, is now under development and will be implemented within the next year. Check back with us to see new program offerings and professional development opportunities for middle and high school teachers. The Eagle Creek Watershed Alliance is also working on many aspects of the Section 319 Implementation Grant for Eagle Creek Watershed. A watershed coordinator has been named and subcommittees are forming and meeting to determine priorities.



CEES continues its involvement in Central Indiana science education initiatives. We worked with the Intel International Science and Engineering Fair (IISEF) coordinators to offer tours of our research sites for fair participants and coordinated the Indiana Statewide Water Quality Investigation for students and teachers in grades 4-12. The data collected was displayed at the IISEF interactive exhibit and public visitation on May 11 and 12 at the Indiana Convention Center and on our web site.

Enjoy the spring weather!

Regards,

Lenore P. Tedesco, Director

Friends of CEES

Thank you to all who have renewed or joined Friends of CEES this year! We will hold the Friends of CEES spring event on Saturday, June 3 at Southwestway Park. Participants will have the opportunity to learn about the ongoing research and collaboration at this site with Indy Parks and Recreation. We will have lunch and tour the park, with opportunities to explore the diverse ecosystems which include wetlands, floodplain forest along the White River, and upland forest. Friends, please save this date and look for additional information in the mail soon.



There is still time to join and participate in this event! By joining Friends of CEES you will receive membership benefits, including updates on CEES environmental research activities, environmental stewardship events, and research site tours.

Visit www.cees.iupui.edu or email cees@iupui.edu to learn more about the program. Sign up to become a Friend and help ensure CEES programs remain an important part of environmental stewardship for Central Indiana.

Discovering the Science of the Environment

The Center for Earth and Environmental Science and the Visualization and Interactive Spaces Lab, part of Pervasive Technology Labs at Indiana University have developed a new environmental education program entitled “**Discovering the Science of the Environment.**” This environmental science education program has been formulated to fundamentally change the way our community views the environment and their role in improving environmental quality. It also works to develop scientifically and technologically skilled students that are engaged in scientific inquiry and interested in career pathways in science, engineering, and technology. Based in water resource and ecological restoration research and education programs at CEES funded by federal, state and local programs, this program effectively bridges applied environmental research and technology to community education and outreach.



We will use the environment as an integrating concept and provide a comprehensive science education program that utilizes a multi-tiered spectrum of audience engagements and innovative experiences. Water and water-based ecosystems will be the unifying thread of this program. Our programs are based around the need for hands-on science education and focused on experimentation and evaluation of restored ecosystems, schoolyard natural areas, and natural areas at nature centers and parks. This approach recognizes the widespread availability of these sites as educational resources for large numbers of people while also recognizing limitations associated with transportation and scheduling for classroom programs. Our approach is to design and create programs, training, materials, and support for program adoption and delivery by the broad spectrum of education and outreach program providers. The program is designed to empower teachers and other environmental education program providers to elevate their levels of programming to truly enhance science literacy in Indiana. Target audiences include 8-14 year old children, families, the general public, and educators.

The program is comprised of five components with a phased implementation approach that includes:

- Field Science Experiences and Mobile Environmental Science Education Trailer
- Interactive Web Portal and Distance Education Programs
- Museum and Nature Center Interactives and Displays
- Professional Development Workshops for Middle and High School Teachers
- Equipment Loan Program for Schools, Parks, Nature Centers, and Museums



We are pleased to announce that **Veolia Water Indianapolis** has made the lead philanthropic gift to this program. We have also received funding support from the **Eli Lilly and Company Foundation** and have proposals currently in review by additional foundations and corporations. Program development will begin this summer with full program implementation during the summer of 2007. For more information about the program and opportunities for program sponsorship, please contact us.





Eagle Creek Watershed Alliance Update

CEES and our partners in the Eagle Creek Watershed Alliance (ECWA) have been awarded funds for a 3-year Section 319 Implementation Grant from the U.S. Environmental Protection Agency under an assistance agreement with the Indiana Department of Environmental Management. The contract was signed in March and working groups are currently being formed to begin efforts to alleviate nonpoint source pollution in Eagle Creek Watershed. Efforts will include implementing Best Management Practices (BMPs), monitoring water quality, installing watershed identification signs, conducting educational outreach programs, and distributing educational materials to the watershed community.

The implementation grant will fund a watershed coordinator and farm promoter to ensure coordination, progress and success of the project. Lora Shrake has transitioned positions within CEES and will serve as the Watershed Coordinator. Lora has been with CEES since 2002 and has been the Project Coordinator for the Central Indiana Water Resources Partnership, a research and development partnership between CEES and Veolia Water Indianapolis, LLC. A Farm Promoter is expected to be in place by summer. The farm promoter will be housed with the Boone County Soil and Water Conservation District and will work with Lora and the ECWA committees to target BMP locations and provide technical assistance to farmers.

If you are interested in joining the Eagle Creek Watershed Alliance and making a positive impact that will improve water quality in a watershed that affects our drinking water, please attend our next ECWA meeting or contact Lora Shrake at 317-278-8585 or lshrake@iupui.edu. The next quarterly ECWA meeting is scheduled for Monday, May 22 at Zionsville Public Library from 6:30-8pm. We welcome your participation and encourage your involvement!

CEES Participation in the Indiana Watershed Leadership Academy

The First Indiana Watershed Leadership Academy (IWLA), an in-depth training program out of Purdue, began on January 9th, 2006 and will conclude in June with 24 watershed professionals from across the State. The program provides educational tools to local leaders to engage their organizations and communities in successful watershed management. Lora Shrake, a CEES employee and the Watershed Coordinator for the Eagle Creek Watershed Alliance Implementation Grant, was accepted to participate in the first IWLA. She will use the information and resources obtained from the IWLA and apply them to the management of Eagle Creek Watershed and other CEES projects. Successful completion of the IWLA will also lead to a professional certificate in watershed management.



Graduate Student Updates

Dustin Graves

Assessing the Role of Geologic Setting on the Water Quality of Temperate Zone Fens in the Glaciated Midwest

Dustin Graves is completing his master's study which compared five Central Indiana fen wetland systems for a hydrogeochemical study in order to test the hypothesis that geologic setting has a significant influence on the water chemistry of these unique wetlands. Fens are relatively rare groundwater fed wetland systems. This wetland type is more common in areas north of Indiana. The fens in central Indiana occur very close to their southern limit making documentation of their water chemistry and setting an important contribution to fen protection and restoration. Dustin is studying two Indy Parks fens (Southwestway Park and Holliday Park), a fen at Ritchey Woods in the Town of Fishers, and two fens on DNR park properties (Mounds and Prophetstown State Park). These fens all share a similar geologic setting and similar water source, but differ in their size and location relative to human disturbance and surrounding land use. Shallow ground water has been sampled and analyzed from these five study sites over the course of the last year. Values attained from the analyses have been statistically evaluated and compared to values attained from similar studies. Preliminary results suggest that the geologic setting has a significant influence on fen hydrogeochemistry. Furthermore, fens located throughout Central Indiana have similar water chemistry, likely due to a strong similarity in the geologic setting of these sites, while northern Indiana fens are found to have different water chemistry, likely due to the geologic heterogeneity of these sites.

Graduate Student Updates (Continued)

Andrew Smith

Spatial and Temporal Changes in the Sources of Water to a Restored Slope-Wetland and Riparian Zone in Eagle Creek Park

Andrew Smith is also completing his master's study, which focused on the Scott Starling Nature Sanctuary wetland restoration site of Eagle Creek Park. His work focused on documenting the water flow systems in the valley and determining the effect of field tile removal on wetland restoration. Given that restoring wetland water conditions remains the most critical factor in successful wetland restoration projects, a detailed study on the hydrology of the Starling site represents an important effort. An important question facing restoration managers is the effect of removing drainage tiles. Does tile removal return the hydrology to pre-disturbance conditions? Or is the effect of the tile drainage always a part of the wetland hydrology?

Examination of water table data indicate that two main ground water flow-regimes exist, representing high water table conditions (flow perpendicular to the stream) and low water table conditions (flow parallel to the stream). A transitional period between high and low water table seasons has also been identified. A strong down-valley gradient persists throughout the year and is easily observed during the summer and fall months. This down-valley gradient appears to be "overridden" by increased flow from the seeps in surrounding hillslopes during wetter months of the year. Ground water flow nets show that the flow of water is parallel to the ground surface, apparently as a result of the confining layer underlying wetland and riparian zone soils.

Water chemistry data was used in conjunction with a number of statistical analyses to confirm conclusions made based on water table observations. Principle components analysis and discriminant analysis both confirm that ground water seeps adjacent to the wetland and riparian zone are significant sources of water to the study site during the entire hydrologic cycle. It appears that water is discharging from the glacial till layer adjacent to and underlying the study site, via slow seepage, which represents the down-valley gradient observed in the water table during drier months. However, water carrying the seep ground water signature dominates the majority of chemical analyses performed on water from soils at the study site.



CEES Scholarship Awards and Award Winners

CEES awards two annual scholarships for undergraduate students working with CEES. Christin Cruz, Geology major, and Bradley Woolems, Environmental Science and Health major, both received the 2006 CEES Engaged Scholar Award. The CEES Engaged Scholar Award recognizes their exemplary work in environmental science by supporting CEES environmental research and education outreach programs in the community, particularly through their participation as interns with the CEES Environmental Service Learning Program. Alice Enochs, Biology major, is the recipient of the 2006 Carl H. Johnson Achievement Scholarship. The Carl H. Johnson Achievement Scholarship is an

award created by Matthew and Susan Cornacchione named in honor of Susan's father and inspired by their daughter. This award supports students working in interdisciplinary fields on applied environmental science. Alice has been recognized for her work in Dr. Pierre Jacinthe's lab studying soil samples from depressional wetlands and riparian zones. The students were recognized at the School of Science Honors Convocation event held on Friday, March 24 at the University Place Conference Center Auditorium.

John Jeremy Webber, Physical Geography major, was one of ten recipients university-wide of the newly-established William M. Plater Civic Engagement Medallion. The Plater Civic Engagement Medallion honors students who have demonstrated exemplary commitment to their communities during their undergraduate years at IUPUI. Jeremy was recognized for his work with the Center for Earth and Environmental Science (CEES) as both a service learning assistant and student research employee supporting programs for ecosystem restoration and educating others about the importance of such efforts, including teaching K-12 environmental science outreach programs. The Plater Medallion was awarded at the IUPUI Civic Engagement Showcase on Friday, April 28 at the Herron School of Art and Design.

Congratulations to all!



CEES Spring Events

Spring 2006 Conference

The Central Indiana Water Resources Partnership hosted the first international workshop, Emerging Issues in Source Water Management and Strategies for Addressing New Drinking Water Regulations, at University Place Conference, IUPUI April 12 and 13, 2006.

The goal of this meeting was to bring together a group of experts and interested parties to link the issues of source water management, health effects and treatment strategies as they relate to current and emerging water quality concerns. Over 100 attendees and 18 speakers gathered for the meeting which included a short regulatory update followed by three half-day topical sessions on the following topics: 1) Disinfection By-Products; 2) Microbial Contaminants with a focus on *Cryptosporidium* and *Giardia*; and 3) Taste and Odor and Algal Toxins. Speakers came from Paris and Berlin and included EPA scientists, industry experts, and faculty from across the United States. Each session consisted of presentations to link source water, health effects and treatment issues related to the topic. The attendees gained an increased understanding of the linkages between source water, treatment, and drinking water quality to facilitate an integrated and more sustainable approach to addressing long-term water quality concerns.

Visit www.cees.iupui.edu for full conference details and PowerPoint presentations.

Intel International Science and Engineering Fair

The Intel International Science and Engineering Fair (IISEF) was held in Indianapolis from May 7 – 13 at the Indiana Convention Center. This is the world's largest science fair competition for high school students. CEES participated in the fair through coordinating the Indiana Water Quality Statewide Investigation along with the IISEF education outreach committee, Veolia Water Indianapolis, the Visualization and Interactive Spaces Lab, part of Pervasive Technology Labs at Indiana University, and Hoosier Riverwatch. One hundred participating teachers in grades 4-12 were provided with a free LaMotte testing kit that tests temperature, pH, dissolved oxygen, and turbidity. The teachers and their students completed all water quality testing during the week of April 24 – 28 and entered the data in a CEES database for display at the Indiana Water Quality Statewide Investigation display at the IISEF on May 11 and 12 and on the CEES website.

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