



## AT THE CENTER

News and Notes from the  
Center for Earth and Environmental Science

Spring 2005

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Spring is here, marking both the end of another semester at IUPUI and the beginning of new research initiatives and warm weather activities. We have been quite busy over the winter months and have stewarded several new projects and fostered new collaborations with community partners. Our efforts continue to focus on implementing and improving remote monitoring technologies for water quality and understanding and testing new methodologies and tools for watershed and water quality improvement. We are continuing to engage K-12 students in environmental programs at our research sites and have just completed a successful semester of service learning. We have booths at two community events this month, Earth Day Indiana at the American Legion Mall & Veteran's Memorial Plaza on Saturday, April 23 and at the Indiana State Museum for Arbor Day celebrations on Thursday, April 28 and Friday, April 29.

I hope you enjoy hearing about CEES projects and programs and in this newsletter we will highlight some of our efforts. Thank you for your interest in CEES' work. Please contact me to learn more about CEES or to become engaged in environmental stewardship programs in central Indiana.

Regards,

Lenore P. Tedesco, Director

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### *Friends of CEES*

Thank you to all who have joined our new membership program, *Friends of CEES*. We will hold our first members only *Friends of CEES* event on Saturday, May 21 from 9:30 - 2:30 at Scott Starling Nature Sanctuary, located within Eagle Creek Park. Rain date will be Sunday, May 22, starting at 1:00 pm. Join us for a wildflower walk and environmental stewardship activities, including planting native wetland plants. We will provide lunch and tools. Save the date and look for more details on this event to follow.

There's 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 [http://www.cees.iupui.edu/Community\\_Info/friends.htm](http://www.cees.iupui.edu/Community_Info/friends.htm) or email [cees@iupui.edu](mailto: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.

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### *Remote Monitoring Network at the Lilly ARBOR Project*

The Lilly ARBOR Project, the floodplain forest restoration experiment along the White River in downtown Indianapolis, Indiana, has produced effective methods to restore riverfronts and improve water quality in central Indiana. Over the past five years, environmental research scientists from CEES have worked with community partners, university students, and K-12 students and teachers to transform the Lilly ARBOR Project site from mown turf grass into a thriving wildflower, shrub, and sapling forest that is teeming with life.

Water quality and ecosystem monitoring have been at the heart of the restoration project. With an emphasis on community-based research, the ARBOR project has been a test bed for the utilization of new sensor technologies for monitoring environmental systems remotely.

A new collaborative partnership between CEES and the Pervasive Technology Labs at Indiana University has resulted in a series of applied research projects by students at Indiana University Bloomington (IUB). Lenore Tedesco, working with Yvonne Rogers and students in her courses at IUB, have created wireless, hand-held, data acquisition tools for use at the Lilly ARBOR project. The field tools are designed to enhance learning by closing the gap between field data collecting and laboratory analysis. The tools were implemented for the first time on April 1, 2005 as part of the service learning program at ARBOR that measures the survival and growth of the trees. Lenore, Yvonne, Polly Baker from the Pervasive Technologies Lab, and colleagues at IUB recently submitted a major grant to the National Science Foundation to continue to develop unique educational tools for environmental science and water quality education.

Lilly ARBOR Project:  
<http://www.cees.iupui.edu/Research/Restoration/ARBOR/>

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### *Central Indiana Water Resources Partnership*

We are now beginning the third year of the Water Resources Partnership with Veolia Water Indianapolis that is focusing on studying and implementing ways to improve water quality in central Indiana. We began the program in late 2002 with a comprehensive survey of the data and characteristics of Eagle Creek, Geist and Morse reservoirs and their watersheds and created a preliminary report of analyses of water quality and nutrient cycling. This work helped us to understand the range of challenges facing drinking water sources and set the stage for program research last year.

The research program in 2004 focused on understanding nutrient delivery, cycling and algal community response in Eagle Creek Reservoir. We used a systems approach and have been working to develop a mass balance of the source of nutrients coming into the reservoir from watershed sources, the effect of different land use on the magnitude and timing of that delivery, the fate of nutrients once in the reservoir (including burial in the sediments vs. release back to the water column for reuse), and the utilization of nutrients in the reservoir by blue-green algae to understand the causes and triggers for nuisance algal blooms that affect drinking water quality.

CEES research results are now being incorporated into management decisions by Veolia Water. As we move into the 2005 research year, efforts are now beginning to focus on reducing source water quality degradation by implementation and analysis of strategies for watershed best management practices and the development of rapid assessment tools to aid in determining



conditions in source waters. This year's projects include finalizing the nutrient mass balance study on Eagle Creek, documenting nutrient utilization by blue-green algae to refine efforts to predict nuisance algal blooms in the reservoir, refining nutrient and sediment stream budgets in areas of land use change in watersheds undergoing development, and developing new tools to map blue-green algae with remote sensing.

CIWRP has been a major effort for CEES program development. Three graduate students have been conducting research as part of this program. The partnership funding has also enabled CEES to build staff resources. Additionally, watershed studies and water quality programs have been a focus for proposal development. CEES and its affiliated faculty currently have four major proposals under consideration by the Environmental Protection Agency, Indiana Department of Environmental Management, and Indiana Department of Natural Resources.

CIWRP:

[http://www.cees.iupui.edu/Research/Water\\_Resources/CIWRP](http://www.cees.iupui.edu/Research/Water_Resources/CIWRP)

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*Central Indiana Watershed Enhancement Partnership – Expanding Environmental Service Learning and Water Quality Awareness*

The Central Indiana Watershed Enhancement Partnership (CIWEP) is a CEES program funded by a Commitment to Excellence grant award from the IUPUI Center for Service and Learning. CIWEP is focused around raising awareness of ecological health issues as they relate to water quality. The program engages IUPUI students in service learning and internship experiences with campus and community partners to improve water quality and environmental sustainability. CIWEP builds on existing CEES partnerships with corporate, governmental and campus stakeholders (Veolia Water Indianapolis, Indy Parks, IUPUI Campus Facility Services) and builds new partnerships (Fishers Parks and Recreation, Central Indiana Land Trust (CILTI), Hamilton County Parks and Recreation, the Indiana School for the Blind, and Marion County Soil and Water Conservation District) to engage students in environmental stewardship activities while providing service to the community. The goal of this program is to provide education and awareness programs founded in sound and rational science that result in changing behavior to improve the environment – especially water quality.



Over the past school year, CIWEP funding has allowed for the expansion of the CEES Environmental Service Learning Program. Each semester, we now offer 12 community-based environmental stewardship projects for up to 500 students. Some of our most recent projects have centered at IUPUI to promote environmental awareness on campus. CEES has partnered with Campus Facility Services (CFS) to locate and mark storm drains on the IUPUI campus which feed directly into White River and Fall Creek. The goal of the markers is to promote awareness of the linkage between storm drains and waterbodies to prevent pollution and improve water quality of Indianapolis waterbodies. We have also worked with our campus partners, Campus Facility Services and Environmental Health and Safety, to expand recycling efforts on campus through a grant award from the Indiana Department of Environmental Management. On April 14<sup>th</sup> and 15<sup>th</sup> CEES helped to host the campus' first annual recycling and Tox Away collection day in conjunction with the Environmental Service Learning Program. The event was a success with over 100 participants.

Environmental Service Learning:

[http://www.cees.iupui.edu/service\\_learning](http://www.cees.iupui.edu/service_learning)

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### *CEES Wetland Restoration Research Programs*

CEES is pleased to now have two graduate student research projects that focus on understanding the effectiveness of wetland restoration programs in central Indiana systems.

Andrew Smith has begun studying the Starling wetland restoration site. His work is 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? Andrew's work will help answer these questions, in addition to providing a wealth on information about water sources, water quality, and the effect of the wetland on improving the quality of water flowing to Fishback Creek.

Dustin Graves has just begun a study comparing five central Indiana fen systems. 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 Ritchie 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. Both projects have just begun. We are excited to see how their work can help us continue to steward wetland restoration efforts in central Indiana.

Wetland Restoration Research Projects:

<http://www.cees.iupui.edu/Research/Restoration>

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### *CEES Scholarship Awards*

CEES is pleased to now have two annual scholarships available for undergraduate students working with CEES. The students receiving the awards promote exemplary work in environmental science by supporting CEES environmental research and education outreach programs in the community. Emerson Palmer, a senior majoring in Geology, received the 2005 CEES Engaged Scholar Award for his work supporting the development of the remote monitoring network and supporting the CEES technology infrastructure for community outreach and education. J. Jeremy Webber, a junior majoring in Geography, is the recipient of the 2005 Carl H. Johnson Achievement Scholarship. The Carl H. Johnson Achievement Scholarship is an award created by Matthew and Susan Cornacchione in honor of Susan's father. The two students will be recognized at the School of Science Honors Convocation event held on Friday, April 22 at the University Place Conference Center Auditorium. Congratulations to both!

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### *Contact Us*

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