

## To Build or Not to Build: New Online Resource Aids Local Planners

Planning for the future is easier and more efficient if you have a clear sense of where you are in the present. A new Illinois-Indiana Sea Grant web site titled *Local Community Decision Maker* ([www.planningwithpower.org/dm](http://www.planningwithpower.org/dm)) provides that clear sense for Indiana communities as they set out to do comprehensive land use planning.

This new GIS-based web site is rich with research data on environmentally sensitive areas, open space, streams and rivers, and potential sources of contamination. Plus, the site goes beyond natural resources to include critical information on economic development, labor markets, and schools. "Now when local planners strive to balance growth with natural resources, they have tools necessary to make informed choices," said Rick Farnsworth, IISG associate director of extension.



*Planning with POWER*

Within a few clicks, land use planners can find up-to-date information specific to their community. They can view multiple maps of information at the same time to see where potential problems or opportunities exist. And they can compare their community with neighboring communities or the larger county or state. The maps are also available to print or email for further discussion or to include in a comprehensive plan.

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## IISG Funding New Research Projects

Illinois-Indiana Sea Grant is funding four research projects in 2008 and 2009.

### ✓ **How Do Plant Species Invasions Affect Water Quality Services Performed by Great Lakes Coastal Wetlands?**

*Nancy Tuchman, Daniel Larkin, Pamela Geddes, and David Goldblatt, Loyola University Chicago*

### ✓ **Integrated Modeling for the Ecosystem Restoration of Marshes in the Lake Calumet Area**

*Yanqing Lian, George Roadcap, Illinois State Water Survey; Ximing Cai, University of Illinois*

### ✓ **Real-time Fluorometric Assay for Sewage Presence: A Cost-effective Method to Determine Potential Water Quality Threats to Swimmers and Ecosystem Health**

*Kizhanipuram Vinodgopal and Julie Peller, Indiana University Northwest; Muruleedhara Byappanahalli and Richard Whitman, U.S. Geological Survey at Porter Indiana*

### ✓ **Development of Virtual Coastal Cities for Indiana**

*Jie Shan, Purdue University*

For more information on these projects, visit  
[www.iisgcp.org/research](http://www.iisgcp.org/research).

## The **HELM**

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**Sea Grant**  
ILLINOIS - INDIANA



# Disinfecting Drinking Water Can Create Toxic By-Products

Safe drinking water is something we take for granted in this country and in much of the developed world. By eliminating infectious diseases from drinking water, we have made much of the world a dramatically safer place. However, the process of disinfecting drinking water has led to its own set of concerns.

Some disinfectant by-products, or DBPs, which result from the reaction of organic matter with disinfectants, can have long-term health impacts, including several types of cancer. Some DBPs have been linked to fetal development problems.

"Approximately 600 DBPs have been identified, which represents only a fraction of the total number," said Michael Plewa, a University of Illinois genetic toxicologist. The U.S. EPA regulates a small number of known DBPs, and the agency is in a multi-year period of evaluation of the new Stage 2 Drinking Water Disinfection Rule.

In a project partially funded by IISG, Plewa has developed a comprehensive in vitro database of toxicity levels of DBPs considered a priority by the U.S. EPA. Plewa's team, which included scientists at EPA, tested DBPs to assess their impacts on mammal cells and their genetic material.

Plewa's database will provide information to aid in the EPA's assessment of present regulations. The database can also serve as a much-needed practical resource for the water treatment community as they make decisions regarding local disinfection practices.

For example, to reduce the occurrence of regulated by-products, some communities have switched from chlorine to chloramine in their disinfection process. In water that is high in organic matter, typically surface water, this can lead to an increase in emerging classes of nitrogen-containing DBPs, some of which Plewa has found to be considerably more toxic

than those that are regulated. In water that contains iodine, such as water that has been infiltrated with sea water or sea water that has been locked away underground, the use of chloramine can produce highly toxic iodinated DBPs.

"Some iodinated DBPs are the most genotoxic to mammalian cells of any known DBPs," said Plewa. "Water managers should know that the spectrum of DBPs shifts when chlorine is replaced with chloramine."



Plewa doesn't recommend that people steer clear of tap water—it's been serving us well for 100 years. In fact, he describes the disinfection of drinking water as the most important public health event of the 20th Century. "And tap water, unlike bottled water, is regulated," said Plewa. "But, for those concerned about DBPs, it's a good idea to use a point-of-use filter in their home."

He hopes that one day, through genetic testing, we will be able to pinpoint people who are most vulnerable to health problems related to DBPs and make appropriate recommendations.

# SOLEC Provides the Latest Great Lakes Health Report



The rosette is an instrument used to collect water samples on board the *R/V Peter Wise Lake Guardian*. U.S. EPA GLNPO

The *State of the Great Lakes 2007 Highlights* report features good news and bad news. In some ways, the health of the Great Lakes is improving, in others, not so much, due to more invasive species and new sources of contamination.

The State of the Lakes Ecosystem Conference, or SOLEC, is a combined effort of the U.S. EPA and Environment Canada as part of the bi-national Great Lakes Water Quality Agreement. Every two years since 1994 the current conditions of the lakes are assessed using a consistent set of indicators.

"These indicators, such as contaminant concentrations, status of fish and wildlife populations, and the health of coastal wetlands, are tools to monitor change over time," said Jackie Adams, IISG water quality extension associate.

The most recent SOLEC was held in November, 2006 in Milwaukee, Wisconsin. The 2007 report is based on assessments

presented at that meeting. IISG, in partnership with U.S. EPA Great Lakes National Program Office, distributes this report to resource managers, policy makers, and other interested organizations and individuals.

Some good news from the SOLEC report is that for the past 30 years, levels of toxic chemicals in Great Lakes air, water, flora, fauna, and sediment have gone down; in fact, air quality is generally improving.

"Despite these improvements, however, many biological components of the Great Lakes ecosystem are severely stressed," said Adams. Invasive species continue to wreak havoc and native species struggle in many of the lakes. For example, *Diporeia*, the dominant native bottom-dwelling invertebrate in offshore waters and an important component of the food web, continues to decline in Lake Huron, Lake Michigan, and Lake Ontario, and they may be extinct in Lake Erie.

With its focus on "Chemical Integrity of the Great Lakes," the report also discusses the threat of emerging contaminants, including flame retardants, pharmaceuticals, and personal care products, which are being detected more frequently in the environment.

Adams is now helping to plan SOLEC 2008, which will be held October 22–24, in Niagara Falls, Ontario. The focus for this conference will be nearshore monitoring. "This is a difficult subject to tackle because there are over 10,000 miles of coastline and a limited number of research vessels with which to conduct monitoring programs," said Adams. "We

are interested in hearing from scientists who are involved in Great Lakes nearshore research and monitoring."

To help address this need, the U.S. EPA Great Lakes National Program Office recently purchased a Triaxus towed sensor platform, which will be used to monitor the nearshore. "This instrument will be towed behind the *R/V Peter Wise Lake Guardian* and provide live-streaming data. With this equipment, any depth that is needed can be sampled," said Adams.



Scientists sieve through sediment for bottom-dwelling organisms aboard the *R/V Peter Wise Lake Guardian*.

U.S. EPA GLNPO

To download a copy of the *State of the Great Lakes 2007 Highlights*, visit [www.epa.com/glnpo/solec](http://www.epa.com/glnpo/solec).

Jackie Adams can be reached at 312-353-7203 or [Adams.Jacqueline@epa.gov](mailto:Adams.Jacqueline@epa.gov).

# Reconnecting Fish Habitat Key to River Restoration

Dams, culverts, and levees have left many rivers and stream habitats fragmented and degraded. Reconnecting streams and rivers has increasingly become a cornerstone of efforts to restore aquatic ecosystems.



Workshop participants visited Brewster Creek near South Elgin where the dam has been partially removed and a rock ramp added to enhance fish passage.

*Photo by Steve Pescitelli*

The most obvious way to restore a fragmented river ecosystem, especially its fish and mussel populations, is to remove dams or other obstructions. However, this is not always an option. So at a recent IISG-sponsored workshop, experts gathered to discuss the effectiveness of fish passages, which provide the means for fish to swim over or around a dam or through a culvert.

Some fish passages are more natural, using rocks to create pools and riffles that provide a path over dams; others are more structural, with ladders, bypasses, or baffles to enable the fish to pass. “Many different types of fish passage structures work, but some are better than others--site constraints will often dictate the choice of passage structure,” said Steve Pescitelli of the Illinois Department of Natural Resources.

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## *Restoring Streams from a Watershed Perspective*

Edwin Herricks, a University of Illinois ecological engineer, looks at reconnecting and restoring streams from a watershed perspective. Using the North Branch of the Chicago River as a study site for his Sea Grant funded project, he developed a methodology that resource managers can use to decide the best site to take action to improve a river ecosystem.

The North Branch of the Chicago River is part of an urban watershed, with streams isolated by dams and with highly modified channels. The result is degraded habitat and reduced species diversity. So how do resource managers decide where to invest their efforts to have the most impact?

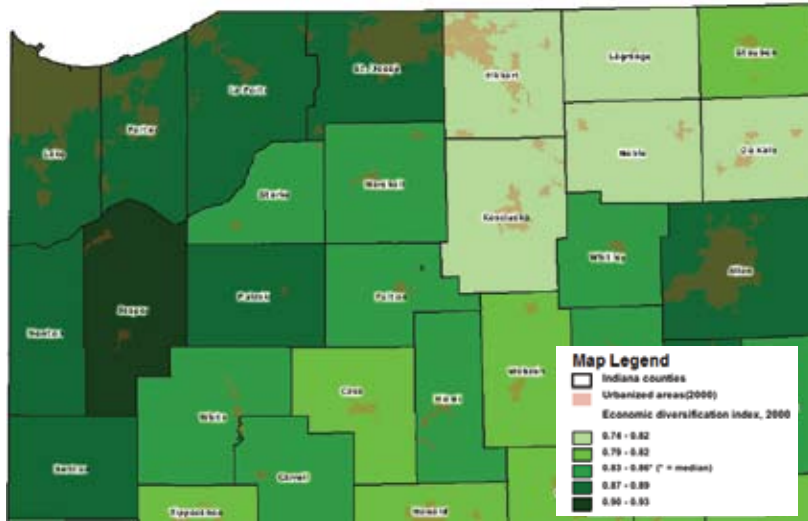
Herrick’s team used GIS to map the hydraulic conditions of the watershed. “Diversity of water flow is key to providing necessary habitat diversity in a stream,” he said. “For example, where there are bends or slope changes in the river, there is likely to be hydraulic diversity and better habitat.”

This approach enables site selection and design that improves connectivity from a systems perspective. And it can be applied to other degraded rivers and streams. “Remote sensing data and digital maps are easily accessible, and hydraulic models are widely used by local governments,” said Herricks.

# New Online Resource Aids Local Planners Continued from page 1

Decision Maker helps planners assess existing conditions and determine the type of growth—urban, recreational, or agricultural—that complements their natural, human, and economic resources. “There are a number of factors that need to be considered. For example, how will new development impact the

quickly,” said Sam Cordes, co-director of the Purdue Center for Regional Development. “Decision Maker provides planners an economic diversification index, employment data, commuting patterns, and demographic data to assess existing economic conditions.”



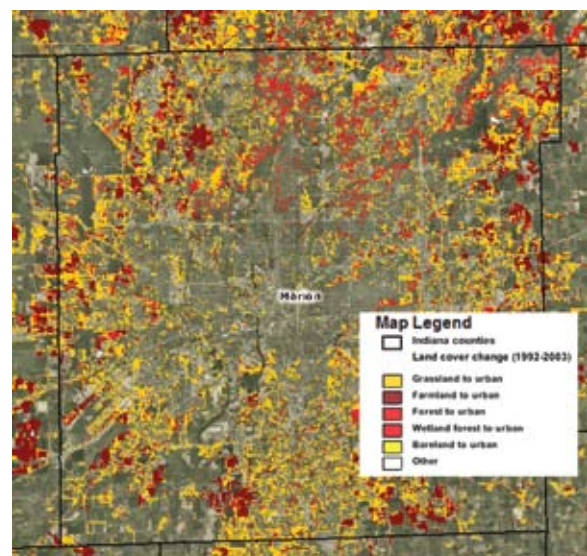
Decision Maker is now being piloted-tested in three Indiana counties that are developing or updating comprehensive plans. “These three counties have very different challenges,” said Farnsworth. Porter County is facing rapid urbanization; Jasper County is focusing on agricultural-based businesses as part of their economic development; and Dearborn County is looking to recreation as a component of their economy. “As these counties create their development strategy using Decision Maker, they will also help us fine tune the site.” Decision Maker is also being introduced to Purdue Extension staff in throughout Indiana.

existing sewer, water, and transportation infrastructure? How will new development impact the flow of services coming from the community’s natural resources?” said Farnsworth, who in his role as a Purdue University natural resource economist, was a leader in creating the site.

“Almost half of a county’s tax revenues go to school corporations,” said Larry DeBoer, who specializes in the fiscal impacts of economic development at Purdue University. The decision maker site provides 12 questions for communities regarding local schools, such as “How much property tax wealth does my school corporation have? and How big or crowded are my school corporation’s buildings? “In working through these questions, planners will get a good idea about whether schools may need to be added or closed and the implications on school budgets, based on actual and projected growth in the region,” said DeBoer.

Some communities have the ability to recover from economic shocks, such as a prolonged recession, and some have a more difficult time. “More diversified counties can weather downturns and recover more

Local Community Decision Maker was developed with funding and contributions from the Purdue Center for the Environment, the Purdue Center for Regional Development, and IISG. Faculty and staff from Purdue’s Departments of Forestry and Natural Resources and Agricultural Economics were instrumental in collecting data and developing maps for the project.



Maps found on the Decision Maker web site are rich with information and can provide a statewide, regional, or local perspective.

# Sea Grant Staff Update



## Jackie Adams

Jackie Adams is the program's new water quality extension associate, located in the U.S. EPA's Great Lakes National Program Office (GLNPO). She collects monitoring data through sampling aboard the *R/V Peter Wise Lake Guardian*, provides information to Great Lakes managers, and assists with all areas of the biennial State of the Lakes Ecosystem Conference. Before joining Sea Grant, Adams was employed by U.S. EPA GLNPO since 2004.



## Rick Farnsworth

Rick Farnsworth is Illinois-Indiana Sea Grant's new associate director for extension. An agricultural economist and associate professor at Purdue University Department of Forestry and Natural Resources, Farnsworth has been instrumental in the development of Sea Grant's new GIS-based Decision Maker web site. In his Sea Grant role, Farnsworth will oversee the program's team of specialists, providing leadership and support.



## Kimberly Lomax

Kimberly Lomax is the new IISG program secretary. She came to Sea Grant from the University of Illinois, College of Education. Lomax manages the University of Illinois Sea Grant office, including maintaining the program director's calendar, scheduling meetings, and preparing and processing documents.

## IISG Knauss Fellows Go to D.C.

The Knauss Fellowship program sends highly-qualified graduate students to Washington, D.C. to fill a one-year position in the legislative or executive branch of government. In 2008, Mark Carter, who has a Master's degree from the Department of Natural Resources and Environmental Sciences at the University of Illinois, will work in the NOAA

National Marine Fisheries Service Aquaculture Program Office. Angela Bobeldyk, who is completing a doctorate in biological sciences from Notre Dame University, is spending the year in the Congressional Analysis and Relations Division of NOAA's Office of Ocean and Atmospheric Research.

## Reconnecting Fish Habitat Continued from page 5

According to Christopher Bunt of Biotactic Fish and Wildlife, Inc., who compiled data on the effectiveness of different types of fish passages in variety of locations, on average, 30 percent of fish actually make it through. This percentage becomes more complicated when broken down by species. For example, walleye are much less likely to go through fish passages than many other fish species.

"For a fish passage to be successful, it must be easy for fish to find, they must be able to make it all the way through, and the structure must stay in place against high flows and ice," said Pescitelli. "In some ways, passing the fish is the easy part, keeping the structure in place under wide ranging flows and ice damage is more difficult."

This workshop was the sixth in a series on stream restoration attended by resource managers, consultants, designers, scientists, and engineers. "We survey our audience and plan these workshops to address on-the-ground needs of those in the field," said Leslie Dorworth, IISG aquatic ecology specialist.

# Explore Lake Michigan at Educator Workshop

The Center for Ocean Sciences Education Excellence (COSEE) Great Lakes, in partnership with the Great Lakes Sea Grant Network, invites 4-10th grade teachers and non-formal educators to participate in the Lake Michigan Exploration Workshop, August 2-8 in Chicago. This workshop is designed to promote Great Lakes and ocean sciences in education and to build lasting relationships between scientists and educators.

This seven-day summer workshop will offer educators an excursion into Great Lakes and marine science education through classroom and field experiences. Educators will enhance inquiry, questioning, and experimentation skills, build on their experiences with students, and connect their work to specific standards for student performance. To learn more, visit [coseegreatlakes.net/events/lakemichigan](http://coseegreatlakes.net/events/lakemichigan).



Educators at last year's Lake Huron Exploration Workshop used a fyke net to capture sunfish and largemouth bass to learn about wetland ecology.

*COSEE Great Lakes*

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