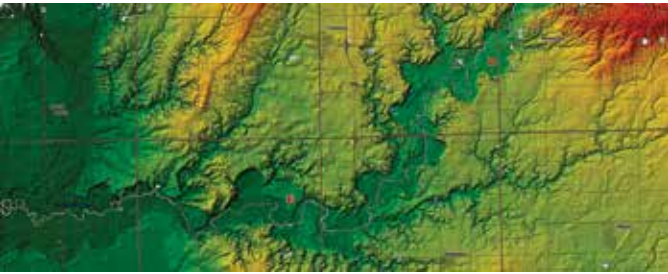




**PRAIRIE**  
RESEARCH INSTITUTE



2012 REPORT



ILLINOIS NATURAL HISTORY SURVEY  
ILLINOIS STATE ARCHAEOLOGICAL SURVEY  
ILLINOIS STATE GEOLOGICAL SURVEY  
ILLINOIS STATE WATER SURVEY  
ILLINOIS SUSTAINABLE TECHNOLOGY CENTER



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### **Mission**

To provide objective, integrated scientific research and service, in cooperation with other academic and research units of the University of Illinois and elsewhere, that allow citizens and decision-makers to make choices that ensure sustainable economic development, enduring environmental quality, and cultural resource preservation for the people, businesses, and governments of Illinois.

### **Vision**

The Prairie Research Institute will serve as a model of proactive, multidisciplinary research and service as a key to economic development, environmental quality, and cultural resource preservation. The incorporation of the Institute into a major research university is a unique opportunity to integrate the University's intellectual capital with the Institute's ability to apply science to societal challenges as an example for the nation and the world.



## From the Executive Director

The Prairie Research Institute continues to thrive as we carry out Illinois-focused natural and cultural resource research and service in support of the state. Our work encompasses a broad range of resource sciences, which we apply to address societal challenges faced both by our citizens and by other societies around the world. Among a myriad of other research and service projects, we provide data and expertise for drought and flood response efforts, monitor mosquito populations for West Nile virus, evaluate water supplies for growing communities, discover and catalogue archaeological sites in the path of construction, and lead one of the world's most advanced demonstrations of geologic carbon sequestration.

Last year, our \$15.8 million core state funding leveraged nearly \$65 million in other funding, about half of which came from federal sources (U.S. Department of Energy [DOE], U.S. Department of the Interior, National Science Foundation, etc.) A significant amount of our funding originates in State of Illinois agencies, for which we are an increasingly important source of the research they require to fulfill their mandates, especially as their funding shrinks in response to shortfalls in state revenues.

The state legislature has provided core funding to the State Scientific Surveys since they were founded in the mid-1800s, including each year since 2008 when the Institute was established and we moved administratively from state government to the University. The Institute receives those funds as a separate line in the University's budget. The Institute receives essentially no direct funding from the University and, like other campus units, we deliver a significant percentage of the overhead we generate from external funding to the University each year.

This year, in the midst of the severe drought, Institute scientists clearly demonstrated the value of their data and expertise to the citizens of Illinois. As members of the Governor's Drought Task Force, our scientists provided weekly updates on drought conditions and the future outlook. The State Climatologist and colleagues gave hundreds of presentations and talks to keep farmers and residents updated. They also gave numerous interviews to state and national media, and they kept websites posted with the latest data on the drought.

Last summer the Institute released a new geophysical survey for central Illinois, which stimulated new land leases for oil and gas production. Those new seismic reflection data, acquired to help evaluate the suitability of rocks in central Illinois for large-scale storage of carbon dioxide, are part of a U.S. DOE-sponsored research project. Since seismic reflection information is commonly used in exploration for oil and gas, several companies are pursuing opportunities in a part of the state where these expensive data didn't exist, an area not previously known for its hydrocarbon potential.

Responding to requests from the Illinois Attorney General's office and legislative committees, Don McKay, Rob Finley, and Bob Bauer provided scientific briefings to staff and elected officials on the use of horizontal drilling and hydraulic fracturing technology for production of oil and natural gas, as they considered potential impacts on Illinois' natural resources and related legislation. This exemplifies the role the Surveys have played in Illinois since their founding, providing decision-makers with objective research, expertise, and data.

On July 1, 2013, the Institute will celebrate its fifth anniversary as part of the University of Illinois. Over the past two years, the upper management of this campus has changed greatly. We report to a new U of I Chancellor and new President through the Office of the Vice Chancellor for Research, which is now led by Dr. Peter Schiffer, who came to us in August 2012 from Pennsylvania State University; Dr. Schiffer has taken a great interest in the Institute's program. As part of University-wide efforts to develop plans for each of its campuses, he has asked us to carry out a significant strategic planning process aimed primarily at assuring our future funding and our ability to continue to hire quality scientists to replace or retain scientific staff as they leave through retirement or are attracted by other employment opportunities.



**Responding to requests from the Illinois Attorney General's office and legislative committees, Institute scientists provided scientific briefings to staff and elected officials...**

Our plan, which will be completed by July 1, is designed to position us to address the ever-shifting natural and cultural resource landscape within which the state, nation, and global communities must work.

Over the past year, every Survey has been engaged in transmitting their research expertise to other states and countries who regard our applied research programs as models that can be translated to solve natural and cultural resource problems faced by their own citizens. In 2012, our annual Midwest Carbon Sequestration Science Conference attracted one-fourth of its 120 participants from countries outside the U.S., including Canada, China, Germany, Japan, Norway, Republic of Korea, South Africa, and the United Kingdom. Institute water scientists collaborated with Zhejiang University and the University of Leeds to organize a major conference in Hangzhou, China with the goal of developing an international research community focused on identifying and delivering the best solutions to water quality problems.

In January, Gary Miller, Brian Anderson, and I spent a week at the Desert Research Institute (DRI) on its Reno and Las Vegas campuses to exchange research and funding strategies between our broadly similar Institutes. While our relationships with our respective state university systems differ in some fundamental ways, there are many administrative and research strategies that both Institutes share. Later in 2013, we will host DRI scientists and leaders to continue the constructive dialogue initiated in Nevada. Gary Miller and Mike Demissie also visited colleagues at the University of Oklahoma who are looking to establish a state-focused research institute similar to the Prairie Research Institute.

Finally, as I write this brief message, we are working on strategies to preserve our state and federal funding to the extent that we can, given announced and expected cuts to federal and state research funding that are projected for the next fiscal year. We are addressing these contingencies by maintaining close contact with our political and research partners at both the state and federal levels.



William W. Shilts, PhD  
Executive Director

...every Survey has been engaged in transmitting their research expertise to other states and countries who regard our applied research programs as models that can be translated to solve natural and cultural resource problems faced by their own citizens.

# Financial Overview

Total expenditures for the Prairie Research Institute increased 57 percent from FY2008 to FY2012 to over \$80 million. Expenditures other than state-appropriated accounts grew from just over \$33.5 million in FY2008 to over \$64.5 million, an increase of almost \$31 million or 92 percent.

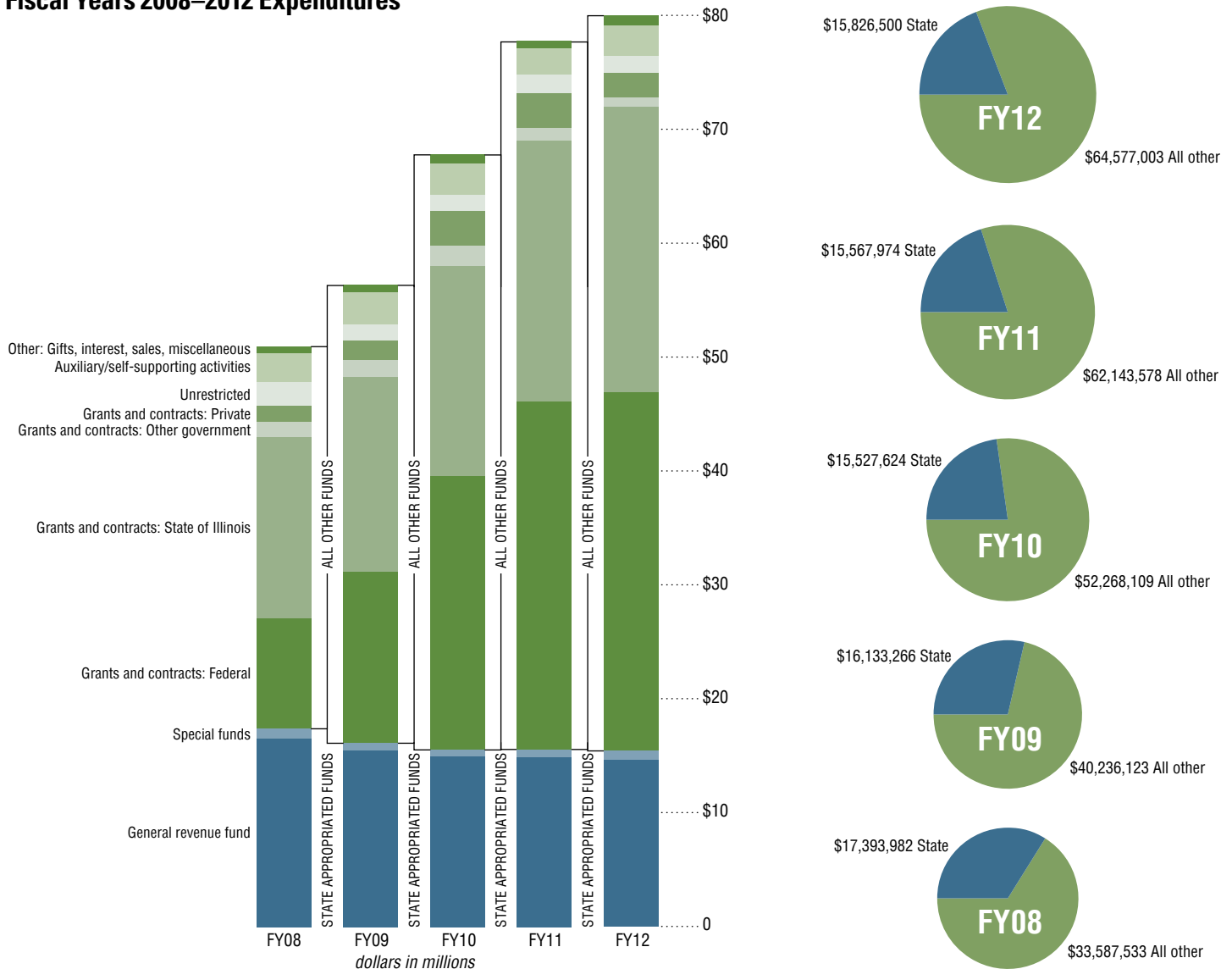
During the past five years, grant and contract expenditures from state agencies increased over \$9 million or 60 percent, while annual expenditures from federal sources grew over \$29 million, an increase of over 200 percent.

The Illinois State Archaeological Survey (ISAS) joined the Institute in February 2010. ISAS had 4 percent of the Institute's total grant and contract expenditures in FY2010 (five months) and about 12 percent in FY2012, which constituted 9 percent of the Institute's total expenditures.

In FY2012, \$15.8 million in state-appropriated expenditures leveraged over \$64.5 million in external funding (federal, state, local, and private grants), which was a 4:1 multiplier on the state's investment.

The Prairie Research Institute has a total FY2012 payroll of \$44.4 million, supporting about 1,000 staff. About 230 of these staff are supported directly by General Revenue Funds. External funding (79%) and three special state funds (1%) support an additional 620 staff, plus 168 students, who are either supervised or led by the GRF staff on hundreds of active Institute projects across the state. Included in these expenditures are donations and income derived from services such as laboratory analysis and publication sales.

## Fiscal Years 2008–2012 Expenditures



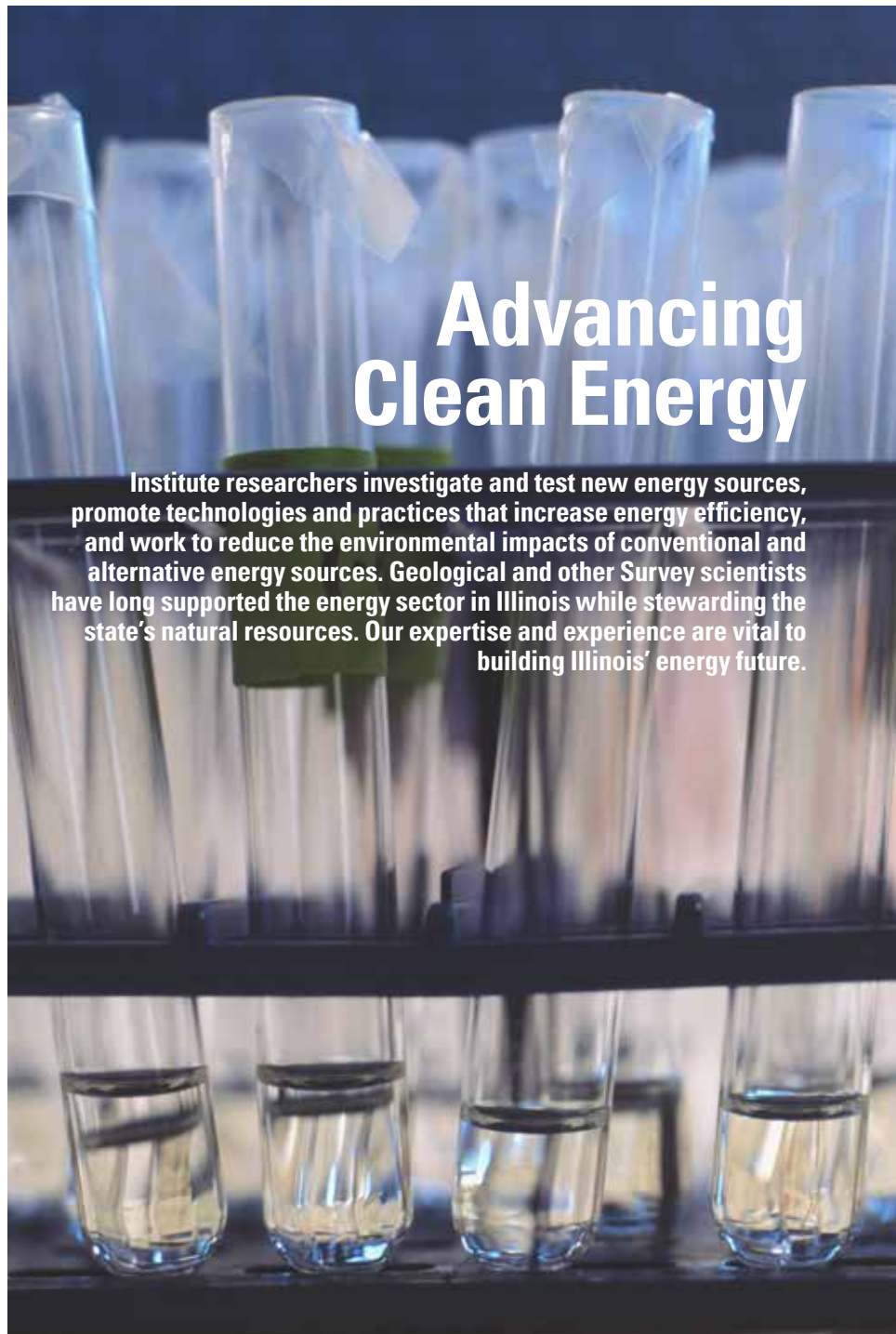
*I want to congratulate the Midwest Geological Sequestration Consortium, the Prairie Research Institute, ADM, and the other partners on this leading-edge demonstration project that has brought the future of clean energy research and technology to the state of Illinois today.*

Pat Quinn  
Governor, Illinois



### Injecting CO<sub>2</sub>

The ISGS-AETI-led Midwest Geological Sequestration Consortium (MGSC) continues to inject carbon dioxide (CO<sub>2</sub>) into the Mt. Simon Sandstone more than a mile (2.25 km) beneath the surface—the first million metric-ton demonstration of carbon sequestration from an industrial source in the U.S. The \$96 million Illinois Basin – Decatur Project is located at the Archer Daniels Midland company's ethanol production facility. Injection began in November 2011 and will occur over three years, followed by three years of environmental monitoring. The project incorporates a first-in-the-world subsurface CO<sub>2</sub> monitoring system deployed by Schlumberger Carbon Services, attracting intense interest from the international sequestration research community. Scientists from Australia, China, Norway, Spain, and Japan have visited the site. MGSC is the first of seven regional partnerships funded by the U.S. Department of Energy to commence large-scale injection of CO<sub>2</sub> from an industrial source.



## Advancing Clean Energy

**Institute researchers investigate and test new energy sources, promote technologies and practices that increase energy efficiency, and work to reduce the environmental impacts of conventional and alternative energy sources. Geological and other Survey scientists have long supported the energy sector in Illinois while stewarding the state's natural resources. Our expertise and experience are vital to building Illinois' energy future.**

### Second injection well

A second carbon capture and storage project at Decatur will provide the first opportunity to study the interaction of two industrial-scale CO<sub>2</sub> plumes from injection wells about three-quarters of a mile (1.1 km) apart. The Illinois Industrial Carbon Capture and Storage project will inject about 2.5 million metric tons of CO<sub>2</sub> from the Archer Daniels Midland biofuel facility into the Mt. Simon Sandstone beginning in 2013. ISGS provides technical expertise on this ADM-led project, funded by the U.S. Department of Energy.

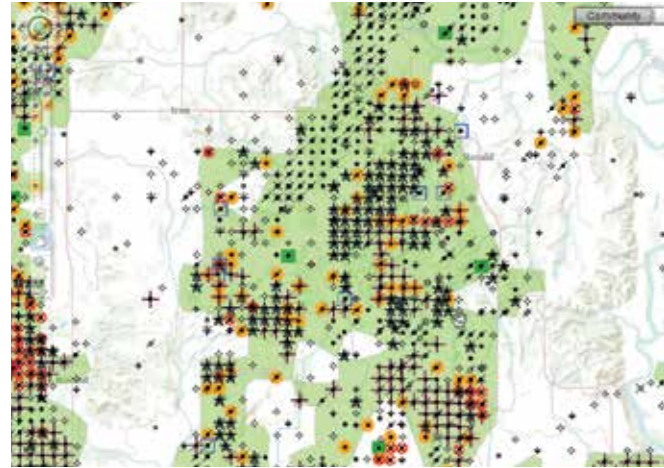


## Developing clean energy technologies

ISGS staff develop innovative materials, processes, and systems for emerging energy and environmental applications. Technologies for on-site production of activated carbon and calcium-based sorbents to remove mercury and acid gases in coal combustion flue gases have been developed and patented with support from the Electric Power Research Institute. Full-scale demonstrations of these technologies at coal-fired power plants are underway. ISGS is also working with several industrial partners and the U.S. Department of Energy and Illinois Clean Coal Institute to develop pre- and post-combustion CO<sub>2</sub> capture technologies for coal plants.

## Wind turbines and wildlife

An INHS ecologist has pioneered the use of high resolution radiometry to study the effect of wind turbines on birds and bats. The U.S. Department of Energy has funded this research to help develop siting, design, and operational guidelines designed to reduce wind energy impacts on native species.



## Converting used plastics to fuel

ISTC scientists are investigating a new process to convert carbon-rich non-recyclable plastics into oil, thereby scaling back on the amount of plastic that ends up in landfills, oceans, and other waterways, and decreasing the nation's dependence on foreign oil. Containers such as plastic grocery bags, medicine bottles, yogurt containers, and CD cases can be converted to oil by heating to high temperatures in the absence of oxygen, a process called pyrolysis. Two pounds of plastic produce one quart of oil. The resulting crude oil can be refined into energy products such as diesel, gasoline, and jet fuel.

## New seismic data released

ISGS released new seismic reflection data in October 2012 for an east-west line from Meredosia to southwestern Champaign County. It is the only seismic line known to have been collected in that region and the data can be used in the exploration for oil and gas. Seismic reflection uses sound waves to produce images of rocks and sediments in the Earth's subsurface. The seismic reflection survey is part of a U.S. Department of Energy-sponsored research project and was originally acquired to help evaluate the suitability of rocks in central Illinois for large-scale storage of carbon dioxide produced by electric generating plants and industrial processes such as biofuel production.

*There is no way that small, growing communities such as Antioch could commission the type of exploration and analysis that the ISGS has undertaken.*

Jim Keim, Director,  
Antioch Physical Services (Lake County)



# Managing Water Resources

*The Illinois State Water Survey is one of our most valued technical advisors. Their advice and technical assistance is proving invaluable to our efforts to ensure sustainable water supplies in northeastern Illinois.*

**Tom Weisner, Mayor, City of Aurora; Chairman, Northwest Water Planning Alliance**  
**Karen McConaughay, Kane County Board Chairman; Vice-Chairman, NWPA**

## Providing the foundation for water planning

Northeastern Illinois communities not served by Lake Michigan water rely on groundwater or surface water reservoirs. A computer model developed by the ISWS shows that groundwater will decline to critical levels in the next 10 to 20 years. Institute scientists are assisting regional planning agencies to develop water supply plans that support sustainable economic development at a reasonable cost to Illinois citizens.

## Reducing water treatment costs

Scientists with the ISWS Institutional Water Treatment Program act as technical advisors to more than 100 public water treatment facilities, including several universities, the State of Illinois Departments of Transportation, Natural Resources, and Corrections; the Secretary of State; and Central Management Services. The program has helped save Illinois taxpayers substantial costs in chemicals, fuel, water, and maintenance associated with ineffective industrial and potable water treatment systems. During FY2012, staff responded to more than 500 phone requests and hundreds of e-mails, and made 355 site visits. Approximately 2,890 water samples were analyzed in the field, and an additional 425 samples received a complete analysis in the laboratory.

## Finding new methods to clean up water supplies

Removing salt from groundwater and seawater is one way to supplement fresh water supplies. However, the most common desalination process, reverse osmosis, requires substantial electrical energy. ISTC researchers are studying forward osmosis, coupled with low-grade thermal energy, as an alternative. If successful, this technique will provide an additional pathway to desalination that is potentially safer, easier to scale-up, and more energy-efficient than current forward osmosis processes.







### Helping communities manage water efficiently

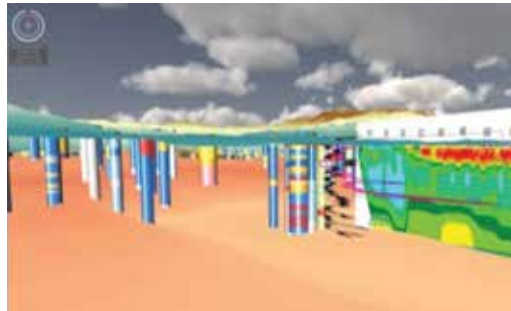
Safe, clean, abundant water is a vital precursor to sustainable economic development. The Midwest Technology Assistance Center at ISWS supports small communities across the Midwest with answers to their most critical water-related problems. The Center has funded studies addressing drought vulnerability and planning, financial benchmarking and rate-setting, water capacity and demand issues, low-cost arsenic treatment, and the website, [smallwatersupply.org](http://smallwatersupply.org), a clearinghouse for free resources for operators of small public water systems.

### Partnering to manage the Fox River watershed

Fox River was designated as impaired by the Illinois Environmental Protection Agency in 2001. The Fox River Study Group was formed to address the issues, and the ISWS serves the group as technical partner. Although the Fox River watershed represents only 3 percent of the total area of Illinois, it is home to 450,000 people, and is projected to grow by 30 percent over the next 20 years. ISWS provides the Study Group with the latest monitoring and modeling information to effectively manage the watershed. Water Survey models are used to assess the effects of various development options, evaluate management priorities, and identify sensitive areas. Residents, as well as thousands of visitors who enjoy recreation on the Fox River, benefit from improved water quality along the Fox River.

*The information and advice provided by the Surveys allows us to make accurate decisions regarding the availability and location of ground-water supplies. Few municipalities realize how much time and money they save because of the private-public partnership provided by the Surveys.*

Lawrence E. Thomas, P.E., Chief Operating Officer, Baxter & Woodman, Inc. Consulting



### Modeling the Cache River basin

In 2011, several communities in the Cache River Valley were inundated by historic floods. In 2012, the region suffered such an extreme drought that the U.S. Department of Agriculture declared it a disaster area. ISWS scientists continue to update hydrologic and hydraulic models for the Cache River basin, providing scientific information essential to restoration efforts and flood mapping, as well as contributing institutional knowledge and experience needed to monitor droughts and the subsequent outcomes of crop losses and water shortages.

### Addressing water quality at the international level

ISWS scientists collaborated with Zhejiang University and the University of Leeds to organize an international water quality conference in Hangzhou, China in September 2012. It provided a forum for researchers, industry, policymakers, and other stakeholders to prioritize key water quality concerns. The goal of this collaboration is to develop an international research community focused on identifying and delivering the best solutions to international water quality problems. A summary of global water quality challenges is currently being developed based on surveys and participant comments. Conference proceedings are available at [accwa.net](http://accwa.net).

Institute researchers provide vital technology, data, and expertise to an industry that generates \$17 billion annually in crop value in Illinois.



# Supporting Agriculture

Every day, farmers and the food and agriculture industry turn to the Institute for help. From pest control to weather and soil data, our researchers inform and work with growers to improve productivity and expand opportunities. To be successful now and in the future, Illinois farmers need innovative technologies, synthesized real-time data at their fingertips, and access to experts to solve problems. The Institute provides these resources.

Our researchers provide objective, integrated research and service to farmers while stewarding Illinois' abundant natural resources. They work in the laboratory and in the field collecting and analyzing data and turning it into usable forms designed to provide timely, critical expertise to agriculture.

*For years, Illinois Farm Bureau has valued the objective, professional research done by the State Scientific Surveys. Research projects done by the Surveys interface with so many agricultural-related issues such as weather, soils and climate, corn rootworm, geologic mapping, and on programs like the Conservation Reserve Enhancement Program.*

Nancy Erickson  
Director, Natural and Environmental Resources, Illinois Farm Bureau

## Guarding against exotic pests

The Cooperative Agriculture Pest Survey program is vital for safeguarding the nation's food and ecosystems from exotic pests. INHS administers this program in Illinois in collaboration with the Illinois and U.S. Departments of Agriculture. This year, INHS focused on emerging invasive threats to oak and black walnut in natural areas and residential neighborhoods. Many introduced pests, if established in Illinois, would not only threaten the diversity of our natural areas, but also dramatically impact our forest product industry and nursery trade. Early pest detection helps practitioners and policymakers take action to control infestations and prevent further spread.

## Tracking key weather, water, and soil data

The historic 2012 agricultural drought posed a severe challenge to Illinois farmers. ISWS has collected water and atmospheric resource observations in Illinois for more than 100 years. Data from the ISWS Water and Atmospheric Resources Monitoring program, including growing and pest degree days, soil temperature and moisture, water table levels, and in-stream sediment, are key to farming operations. The program unites weather, surface water, and groundwater monitoring networks to provide comprehensive information to farmers and other users across the state. Maps and data are provided free online. Research at the Midwest Regional Climate Center, also at the ISWS, helps explain the climate of the nine-state region and its impacts on agriculture.

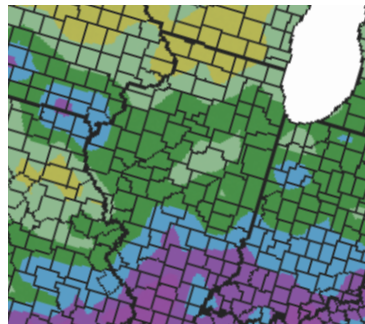
## Planning for rural water supply

ISWS and ISGS scientists conduct work on groundwater and surface water supplies and provide 3-D visualization, geological maps, and analysis tools to northeast Illinois, including Kane, Kendall, Lake, and McHenry Counties; east-central Illinois; and the Kaskaskia River Basin. Water supply planning helps identify sustainable water resources to meet irrigation demands. The ISWS Water Resources and Data Information Unit provides rural homeowners and farmers with information on groundwater resources and wells in their region.



## Developing sustainable soil amendments

ISTC scientists are continuing to study biochar as an amendment to boost soil fertility, improve soil quality, and retain nutrients. Biochar is a carbon-rich material that is created by heating biomass in a low oxygen environment. This process also creates syngas and bio-oils. ISTC is examining the use of biochar in riparian buffer zones to reduce nutrient losses to streams, which may help reduce algae blooms in aquatic systems. ISTC hosts the Illinois Biochar Group, which encourages research in the production and use of biochar.



## Stemming the decline in bee populations

INHS insect pathologists have shown that the development of *Nosema* disease in honey bees occurs only in the midgut tissues, a finding that has implications for how the disease is transmitted. They also showed in laboratory tests that the antibiotic fumagillin, used for treatment of *Nosema* disease throughout the U.S., may allow the pathogen to reproduce at even higher rates than in untreated bees when the drug degrades in honey bee hives during the summer months. These studies contribute to knowledge about causes of global honey bee decline. The INHS insect pathology team also works with the U.S. Forest Service to solve disease problems in predatory beetles that are being reared to help control the hemlock woolly adelgid, an exotic insect that is killing hemlock trees in eastern North America.

## Enhanced data for precision agriculture

Accurate and reliable elevation data are critical to precision agriculture, which decreases costs and increases productivity while protecting the environment. ISGS is a lead agency in Illinois for processing and distributing Light Detection and Ranging (LiDAR) enhanced elevation data, which are 100 times more detailed than the best prior elevation data. LiDAR data are being collected on a county basis statewide in collaboration with Illinois Department of Transportation and as part of the National Oceanic and Atmospheric Administration-funded ISGS Height Modernization Program.

## Controlling corn rootworm


Studies by an INHS insect behaviorist are critical to maintaining the effectiveness of genetically modified corn with resistance to western corn rootworm, the most significant pest of the nation's most valuable crop. Corn is worth more than \$10 billion annually in Illinois alone and more than \$66 billion nationally. Scientists develop, test, and share strategies to address the pest's ability to adapt to control measures, an ongoing challenge to corn production and to our state's economy. This agricultural biotechnology research has been supported by the U.S. Department of Agriculture, Pioneer Hi-Bred International, and Monsanto.



*The geologic information that the Illinois State Geological Survey continues to provide to McHenry County Government is invaluable! The maps have assisted the County... to develop a Sensitive Aquifer Recharge Areas map that is used regularly in zoning decisions to prevent aquifer contamination and to maximize quality groundwater recharge.*

Cassandra McKinney,  
Water Resources Manager,  
McHenry County

# Protecting the Public



Institute scientists monitor our natural and built environment, from the upper reaches of the atmosphere to the deepest bedrock, to understand and manage risks to human health and natural resources. Some threats are natural; others, the result of human activity. Our scientists help communities and decision makers develop and implement policies and practices to deal with these risks.



## Preparing for drought

Prior to 2012's historic drought, ISWS completed a two-year pilot project, Drought-Ready Communities and the *Guide to Community Drought Preparedness*, a publication that communities nationwide use to understand and reduce their drought risk. The Guide includes case studies and an extensive resource collection on how municipalities have planned for drought. Planning reduces losses, increases community resilience, reduces stress, and protects animal habitats.

## Will carbon sequestration affect water supplies?

The U.S. Environmental Protection Agency is funding a three-year Institute study to address groundwater concerns associated with geologic carbon sequestration. ISGS and ISWS scientists are working to integrate two groundwater models, developed for different purposes, to assess whether groundwater pumping in the Mt. Simon sandstone and overlying aquifers will be impacted by geologic carbon sequestration in the future.

## Monitoring groundwater quality

Studies show that urbanization is degrading shallow groundwater quality in the Chicago region. A primary cause is the use of salt for highway de-icing. Historical water quality data archived at ISWS show salt has been increasing in shallow groundwater in Northeastern Illinois since the 1960s, when road salting first became popular. In downstate Illinois, ISWS recently found high levels of naturally occurring arsenic in many public and private wells. ISWS chemists conducted testing to determine causes for the high levels and recommended low-cost methods for arsenic removal.

## Elevation data for flood mapping

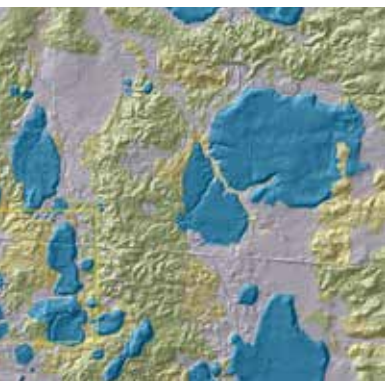
ISGS is a lead agency for processing and distributing Light Detection and Ranging (LiDAR) enhanced elevation data in Illinois. LiDAR data, which are 100 times more detailed than the best prior elevation data, have been collected for roughly 70 percent of the state. ISGS is working to critically review and provide the new data. Benefits include reduced flood damage from more accurate measurement of levees and better flood prediction, modeling, and control; reduced cost of surveying for highway design and mapping projects; and increased yields attributable to precision agriculture enabled by LiDAR.

## Monitoring and predicting West Nile virus

The 2012 drought prompted an early amplification of the West Nile virus (WNV) and the year ended with 282 cases in Illinois, the fourth highest in the U.S. The INHS Medical Entomology Program has demonstrated that WNV is able to overwinter in Illinois, and the primary vectors are common urban *Culex* mosquitoes. The program confirms infection rates of mosquitoes from several mosquito abatement districts (primarily in the Chicago suburbs) to assist the Illinois Department of Public Health's statewide surveillance program. INHS researchers have collaborated with ornithologists regarding avian exposure to WNV and ISWS scientists in order to determine how climatic and meteorological factors influence mosquito populations. In addition, the group has looked at the role of blood-feeding behavior and the larval environment on the ability of mosquitoes to transmit arboviruses to understand the conditions that promote WNV transmission.

*We appreciate the Illinois Natural History Survey's advice on issues like the ecology and epidemiology of West Nile virus, tick-borne Lyme disease, and other diseases that pose significant health risks to the people of Illinois.*

Linn D. Haramis, Ph.D.,  
Program Manager, Vector Control, Illinois Department of Public Health



## Earthquake monitoring and preparedness

Geophysicists at the ISGS are partners in the \$1.3 million National Science Foundation EarthScope program to improve the understanding of the geologic processes that create earthquakes in and near continental-scale geologic structures. Regionally, the program involves the installation and operation of a large array of seismometers centered over the Illinois Basin in coordination with a nationwide array. ISGS scientists continue to work on earthquake response plans with seven state geological surveys surrounding the New Madrid seismic zone. These plans will be tested in the next eight-state regional exercise in 2014. Federal scientists estimate a 20 to 40 percent probability of a damaging earthquake in this zone within the next 50 years.

# Stewarding Natural Resources

Science-based management of natural resources is at the core of the Prairie Research Institute's work. Institute scientists collect baseline data, research natural and man-made changes in the environment, propose and test management alternatives, and share that information with the people of Illinois and the world—all to support stewardship of Illinois' abundant natural resources.



## Battling the Asian carp

INHS scientists and colleagues from other institutions are at the forefront of efforts to manage the invasive Asian carp in Illinois waterways. INHS data indicate that two Asian carp species and their hybrids are inter-fertile and are progressing toward a fully integrated hybrid swarm, which is not common within their home range in China. Ongoing research examines the extent and causes of potential impacts to the food web of Asian carp and better sampling methods to monitor the progression of the invasion.

## Framework for habitat preservation in Illinois

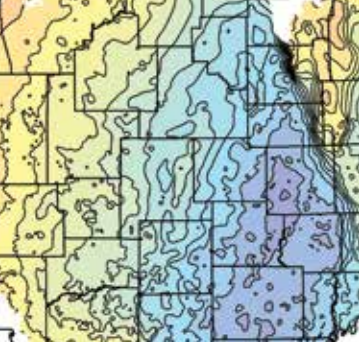
The Critical Trends Assessment Program is the nation's only statewide assessment of ecosystem health across all community types. The Illinois Natural Areas Inventory, which provides the framework for all habitat preservation in Illinois, is being updated under INHS leadership. Nearing completion, researchers have located more than 200 previously undocumented high-quality natural areas.

## Identifying pharmaceutical contaminants

Scientists at ISTC are striving to identify and quantify the environmental fate and transport of steroid hormones and veterinary antibiotics from irrigation water on crop fields and in rural sewage treatment lagoons to reduce contamination in soil and water and protect water supplies. Wastewater from sewage treatment plants and concentrated animal feeding operations are increasingly reused to supplement scarce fresh water sources for crop irrigation. However, irrigation may introduce pharmaceutical and hormone contaminants into food plants, which raises food safety concerns.

## Supporting data-driven wildlife management

INHS provides data and research to support the Illinois Department of Natural Resources' management decisions, which are critical to the \$3.2 billion outdoor recreation industry in Illinois, including fishing, hunting, and wildlife observation.



*DNR and the State Scientific Surveys have a long-standing and productive relationship. The Prairie Research Institute provides the basic science that underlies the Department's science-driven management programs and policies.*

Marc Miller, Director  
Illinois Department of Natural Resources



## Restoring habitat

INHS scientists are conducting research to determine the best methods for controlling crown vetch, an exotic flowering vine, and promoting the subsequent recovery of native species. They are investigating management tools including herbicide application, burning, and seeding, all within the context of varying landscape conditions. Crown vetch was widely planted to control erosion and has become invasive in Illinois and elsewhere.



## Investigating the spread of a new disease

A multi-disciplinary team of University of Illinois researchers, led by INHS, is working with the Illinois Department of Natural Resources to study Bat White Nose Syndrome, a disease that threatens to decimate Illinois' cave-inhabiting bat populations. The INHS team first detected this disease in Illinois in February 2013. The researchers are culturing thousands of samples from Illinois bats and cave substrates, using molecular approaches to examine whole-community microbial ecology, and conducting histopathological examinations. Declining bat populations have implications for insect control, and it is estimated that loss of bats in North America could lead to agricultural losses of more than \$3.7 billion per year.

## Mapping mineral resources

Illinois produces \$3 billion in industrial minerals, coal, oil, and gas annually. ISGS geologic maps convey the nature, extent, and availability of mineral and fossil fuel resources and delineate land and habitats vulnerable to natural and man-made changes. Through maps and other data, Institute scientists provide objective information to Illinois' citizens, governmental agencies, and industries to support environmentally responsible exploration and utilization of these vital resources. Coal production in Illinois is up 41 percent over the past two years, and exports to international markets are up almost fivefold over the same period. Increases are largely attributed to advanced scrubbing technologies in modern power plants and the relatively low cost of Illinois coal.



## Inspiring students

*"My students loved it. It was a 'hands-on' experience that they'll never forget. They would have stayed all day. We need these kinds of activities."*

This year, the INHS Traveling Science Center participated in 5 public events and visited students from 40 schools, reaching 4,000 children and adults with the wonders of biodiversity.

*Scientists at the Surveys provide us with the highest quality evaluations of aquatic and terrestrial biotic resources, delineations, and hydrological monitoring of wetlands, habitat mapping, and environmental site assessments that enable IDOT staff to determine potential environmental impacts of transportation projects.*

Scott E. Stitt, P.E.  
Chief, Bureau of Design and Environment,  
Illinois Department of Transportation



### Assessing environmental and safety hazards

In FY2012, Institute scientists assessed over 330 miles of roadway for potential environmental and safety issues. Assessments provide the data needed to comply with state and federal regulations. The timely gathering of data and identification of issues helps IDOT keep projects on time and on budget.

### Investigating, assessing, and monitoring wetlands

ISGS hydrogeologists and INHS biologists examine IDOT sites throughout the state for potential wetland compensation areas where wetlands can be created or restored, as required by state and federal regulations when wetlands are damaged or destroyed. Institute researchers are studying sites in the Chicago Metro area, St. Louis Metro East area, Fayette County, and Illinois River floodplain sites in Grundy and Brown Counties. Additionally, INHS ecologists partner with U.S. Environmental Protection Agency on two projects that will develop rapid assessment methods to estimate wetland conditions using a multiple species approach.

## Guiding Transportation Development



The Institute's transportation projects exemplify our multi-disciplinary approach to applied research. The Institute provides more than \$11 million annually in biological, geological, and archaeological research to the Illinois Department of Transportation (IDOT). With over \$11.5 billion in construction projects through 2017, IDOT depends on timely environmental and cultural resource information from Institute scientists.

### Preparing for new \$670 million bridge

ISAS archaeologists have completed cultural survey work and met construction deadlines for the new Mississippi River Bridge between Illinois and Missouri. The bridge is a major step in promoting the economic recovery of the St. Louis metropolitan area, including East St. Louis. ISAS employed up to 90 staff to meet demanding deadlines that enabled the state to receive millions of federal transportation dollars.

### Promoting the health of the Illinois River

Institute scientific research supports the Illinois River, which provides commerce, recreation, and natural habitat for a major portion of the state. The ISTC Mud to Parks project characterizes Illinois River sediment and seeks ways to use it beneficially. Reclaimed topsoil from the river has been used on a landfill, on a former strip mine at a fish and wildlife area, and as topsoil on a steel mill slag field being converted to a park along Lake Michigan. The removal of sediment restores depth to select locations, improving aquatic habitat and recreational opportunities. ISGS three-dimensional maps characterize geological deposits along the banks of the river and tributaries to better understand sedimentation, landslides, and erosion that contribute to water-quality and navigation problems in the river. INHS researchers helped design and implement fish barriers to keep Asian carp out of the Great Lakes and on-going research assesses the effectiveness of those barriers. The Illinois River connection to Lake Michigan supports the \$500 million per year river-based transportation industry as well as the international export of Illinois natural and agricultural resources.

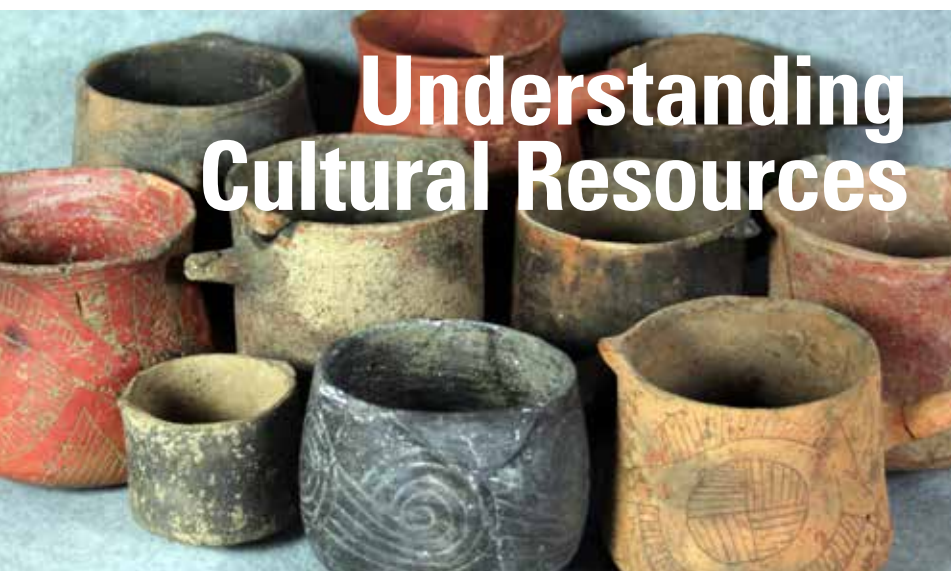


### Finding earlier evidence of the Black Drink

People living 700 to 900 years ago in Cahokia ritually used a caffeinated tea made from the leaves of a holly tree that grew hundreds of miles away, according to ISAS scientists. In a collaborative effort among researchers from ISAS, University of New Mexico, Hershey Technical Center, and Millsaps College, plant residues from ceramic beakers confirmed the consumption of the Black Drink—a beverage having ritual significance among southeastern Native Americans in the historic period. The presence of this beverage at Cahokia pushes back the use of the Black Drink by at least 500 years, and adds to the evidence that a broad cultural and trade network thrived in the Midwest and southeastern U.S. as early as 1050 A.D.

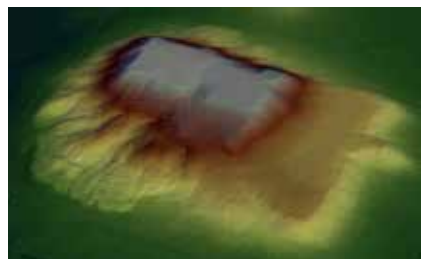


## Understanding Cultural Resources



### Uncovering “America’s first city”

ISAS has unearthed the remains of a spectacular prehistoric ceremonial and residential complex in East St. Louis—over 1,400 structures. It is the largest archaeological excavation project in the country, and together with nearby Cahokia, it is the most significant Native American urban center in North America. These excavations are part of a new federally-funded \$670 million Mississippi River Bridge connecting Missouri and Illinois. ISAS’s historic discovery of an ancient city continues to draw international attention, and was featured on National Public Radio, *Science*, and on the cover of *National Geographic*.



### The Fort de Chartres rediscovered

ISAS researchers and volunteers have uncovered portions of the Fort de Chartres about 50 miles south of St. Louis. The fort was a government and military facility originally constructed in 1719, then rebuilt several times. Archaeologists retrieved hundreds of artifacts associated with the French colony, including rare medicinal-related artifacts that may have belonged to the fort’s surgeon.



### Revealing Illinois pipestones in an Ohio mound

ISAS researchers discovered that carved pipes found in the Tremper Mound in southern Ohio were actually made in Illinois about 100 BC. This study reminds archaeologists that the people who produced these artifacts were more diverse and varied in their cultural practices than scientists may have assumed.



## MISSION

To investigate and document the biological resources of Illinois and other areas, and to acquire and provide natural history information that can be used to promote the common understanding, conservation, and management of these resources.

## FROM THE DIRECTOR



The Illinois Natural History Survey has been studying the plants and animals of Illinois for 155 years. After so long, why don't we know everything there is to know? We have tremendous biodiversity in Illinois. When visiting the cypress tupelo swamps of the Cache River in southern Illinois, you might think you were in Louisiana. Or, if you are visiting White Pines Forest State Park in northern Illinois, you might swear you were in Wisconsin. The result is a tremendous number of plant and animal species native to Illinois.

Further, the actual number of species in Illinois is constantly changing. Occasionally a species new to Illinois is found, but often it is a non-native invasive species. Once in a while it is a native species that has gone unnoticed or, in rare cases, is actually new to science. And, despite the best efforts of scientists and resource managers, some species are occasionally lost from Illinois.

One of the great strengths we have at the Illinois Natural History Survey is our long-term data sets. We recently published *Illinois Birds: A Century of Change*, which details the changes in bird communities as Illinois changed from a pioneer to an agricultural economy, and as suburbs and metropolises arose. We have begun to update the landmark study: "Fishes of Champaign County, Illinois: During a Century of Alterations of a Prairie Ecosystem," a survey of fish populations that has been repeated several times over the past 100 years during the shift from family farming to industrial agriculture and the implementation of conservation practices introduced by farm bill programs. We are also looking for "climate signals" in data collected over the past 15 years as part of the "Critical Trends Assessment," a survey of plants, birds, and insects, in samples from the grasslands, wetlands, and forests of Illinois. No other state has the capacity that we do to answer some of the long-term questions related to landscape change.

Our work will never truly be done as long as exotic invaders like Asian carp or Bat White Nose Syndrome abound, or new technologies like wind turbines arise, or new chemicals are developed and released, or new land uses are implemented. The Illinois Natural History Survey will be prepared to help policymakers and land managers understand the impacts of such changes on our state's biological resources and, where necessary, assist them in lessening the impact of those changes on our state's natural heritage.

Brian D. Anderson, PhD  
Director

## EXPERTISE

Agricultural Pests  
Aquatic and Terrestrial Ecology  
Biological Collections and Databases  
Cave Biology  
Ecosystem Assessment and Monitoring  
Environmental Contaminants  
Fisheries Biology

Human Attitudes About the Environment  
Invasive Species  
Medical Entomology  
Taxonomy of Plants, Animals, and Fungi  
Threatened and Endangered Species  
Wildlife Biology and Diseases  
Public Outreach and Education





**ILLINOIS STATE  
ARCHAEOLOGICAL SURVEY**  
PRAIRIE RESEARCH INSTITUTE

## MISSION

To investigate, preserve, and interpret the archaeological heritage of Illinois within the contexts of long-term public needs and economic development through its scientific research, public service, education, and outreach activities.

## FROM THE DIRECTOR



ISAS has maintained a very busy pace to coordinate with the cultural resource assessment needs of the Illinois Department of Transportation (IDOT). ISAS's Mississippi River Bridge archaeological excavations, the largest in the country, continued to reveal the remains of a spectacular prehistoric ceremonial and residence city buried under modern East St. Louis. These excavations are being undertaken as part of a new bridge project connecting Missouri and Illinois. The new bridge will be a critical step in promoting the economic recovery of the St. Louis metropolitan area.

ISAS continues to work on several large multi-year projects across the state, such as U.S. 34 in western Illinois, the Chicago South Suburban Airport, and the Illiana Corridor in northern Illinois. Staff completed more than 200 surveys for IDOT projects last year. Our partnership role with IDOT contributes to the design, siting, and timely completion of transportation networks across the state—a key factor in Illinois' economic prosperity. Since its inception, the Survey has expanded its efforts to engage with both the public and the business communities to better serve them.

Thomas E. Emerson, PhD  
Director

## EXPERTISE

Ancient Technologies  
Archaeobotany  
Archaeological Collections  
Archaeological Materials  
Bioarchaeology  
Cartography/GIS  
Curation  
Physical Anthropology  
Site Preservation  
Transportation Archaeology  
Tribal Consultation





**ILLINOIS STATE  
GEOLOGICAL SURVEY**  
PRAIRIE RESEARCH INSTITUTE

## MISSION

To provide the citizens and institutions of Illinois with earth science research and information that are accurate, objective, and relevant to our state's environmental quality, economic prosperity, and public safety.

## FROM THE DIRECTOR



ISGS is Illinois' geoscience knowledge engine for timely access to information about the state's geologic resources, hazards, and heritage. For over a century, ISGS has been deploying scientists across Illinois to study, sample, analyze, and map geologic units, thereby generating new knowledge in support of the state's economic development and environmental quality. This heritage of state-based science provides facts needed for informed decision making so that Illinois industries, governments, institutions, and citizens are prepared when they need to address issues such as the use of horizontal drilling and hydraulic fracturing technology for production of natural gas and the siting of industrial livestock operations on karst terrain.

The Survey makes its huge holdings of data and information available to the public through its website and facilities in Champaign. These ISGS services help boost the state's competitive advantage by supporting responsible development of Illinois' coal, oil, and natural gas resources (\$1.6 billion per year); stone and gravel mining for building and infrastructure (\$1.2 billion per year); and geologic CO<sub>2</sub> sequestration as a potential growth industry in the state (\$140.9 million in ongoing projects at Decatur and \$1.2 billion for FutureGen 2.0). Geologic mapping of aquifers helps identify and protect potable groundwater resources. Publication of geologic maps and reports, such as the recent *Geology of Illinois*, conveys the latest knowledge of the nature, extent, and supply of earth's resources and an understanding of the hazards and vulnerability of our lands and habitats—the evidence base necessary for responsible stewardship.

E. Donald McKay III, PhD  
Director

## EXPERTISE

Advanced Energy Technology Initiative  
Bedrock Geology (Paleozoic)  
Carbon Capture and Geologic Sequestration  
Coal Geology  
Earthquakes  
Engineering Geology  
Environmental Site Assessments  
Geochemistry  
Geographic Information Systems  
Geologic Hazards  
Geologic Images, Samples, and Collections

Geologic Mapping and Modeling  
Geophysics  
Geospatial Analysis, Modeling,  
and 3-D Visualization  
Glacial and Quaternary Geology  
Groundwater Resources and Protection  
Industrial Mineral Resources  
Petroleum Geology  
Topographic Maps and LiDAR  
Well and Borehole Records  
Wetlands Geology





**ILLINOIS STATE  
WATER SURVEY**  
PRAIRIE RESEARCH INSTITUTE

## MISSION

**To characterize and evaluate the quantity, quality, and use of surface water, groundwater, and atmospheric resources of Illinois through basic and applied research; collecting, analyzing, archiving, and disseminating objective scientific and engineering data and information; and providing service, education, and outreach programs.**

## FROM THE DIRECTOR



ISWS researchers continue to investigate and monitor the water and atmospheric resources that are vital to the well-being of Illinois' citizens. Scientists at the Water Survey are continuously collecting data and performing analyses to assist policymakers and resource managers in making wise decisions based on sound science and engineering. Our scientists have completed surface and groundwater analyses for northeastern and east-central Illinois, which are being used in regional water supply planning, and are currently working on water resource management for the Kaskaskia River basin in southern Illinois.

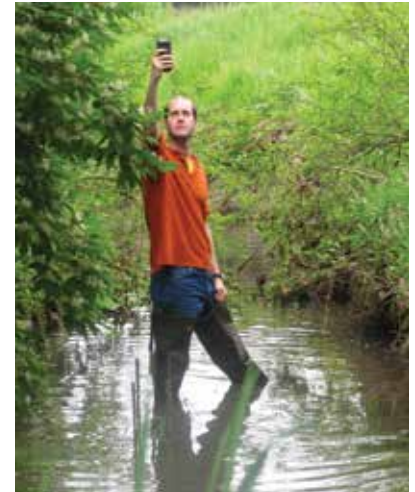
In 2012, most regions in the United States experienced one of the worst drought conditions on record. Water Survey scientists have been closely following and monitoring the drought and its impacts on Illinois. We actively participate in the Governor's Drought Task Force meetings by updating the Task Force on drought conditions and the future outlook. Our drought update is posted on our website and accessed by thousands of people.

The Coordinated Hazard Assessment and Mapping Program staff continue to work with the Illinois Department of Natural Resources and the Federal Emergency Management Agency to prepare up-to-date floodplain maps so that communities can prepare flood mitigation plans to reduce flood losses. Our Office of the State Climatologist and the Midwestern Regional Climate Center continue to provide timely and valuable critical weather and climatic information to the state and the region.

Misganaw Demissie, PhD  
Director

## EXPERTISE

- Air Quality
- Atmospheric Science
- Domestic Well and Groundwater Data
- Floodplain Map Modernization
- Groundwater Science
- Illinois Rivers Decision Support System
- Public Service/Water Quality Testing
- Surface Water and Floodplain Information
- Water Supply Planning
- Watershed Science





**ILLINOIS SUSTAINABLE  
TECHNOLOGY CENTER**  
PRAIRIE RESEARCH INSTITUTE

## MISSION

**To encourage and assist citizens and businesses to prevent pollution and reduce waste to protect human health and the environment.**

## FROM THE INTERIM DIRECTOR



ISTC's role and structure are unique within the Institute, reflecting our focus on sustainable technologies and practices to strengthen our economy and protect human health and the environment. ISTC meets client needs today, but also conducts applied research to develop solutions for tomorrow's challenges. ISTC serves a vital role in providing sophisticated analytical laboratory analyses in support of research, technical assistance for improved manufacturing processes, and information on best practices and environmental compliance issues. ISTC-coordinated websites and programs provide accurate, up-to-date waste reduction and sustainability information

for industry, government, and the public.

The Center is using a variety of approaches to address a significant environmental issue in the Sustainable Electronics Initiative. We conduct and sponsor research on electronic waste and provide information to businesses, educators, and the public about sustainable electronics. We organized a seminar series on the topic and are working on curriculum for an on-line class on sustainable electronics practices. We also oversee the International Sustainable Electronics Competition, which had entries from college students from eight countries this year.

David L. Thomas, PhD  
Interim Director

## EXPERTISE

Advanced Analytical Chemistry  
Biochar Development and Use  
Biofuels from Biomass  
Biolubricants  
Indoor Climate Research  
and Weatherization Training  
Manufacturing Process Improvement for  
Waste Reduction  
Pharmaceuticals and Personal Care Products  
in the Environment  
Pollution Prevention  
Public Outreach and Education  
Sediment Reuse  
Water and Energy Use



# A Storehouse of Knowledge

*The first indispensable requisite is a thorough knowledge of the natural order—an intelligently conducted . . . survey. Without the general knowledge which such a survey would give us, all our measures must be empirical, temporary, uncertain, and often dangerous.*

Stephen Alfred Forbes, 1880  
First Director, Illinois Natural History Survey

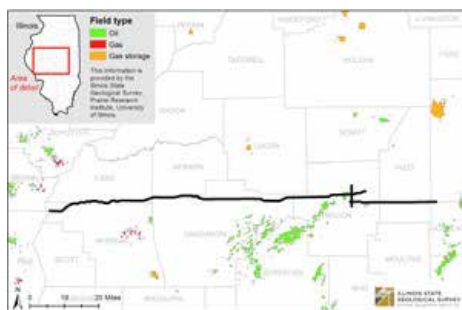
Since our founding in the mid-19th century, the core of the Illinois State Scientific Surveys' mission has been to collect, organize, and interpret environmental data and samples to provide a foundation for basic and applied research as well as economic development in Illinois. This storehouse of knowledge is one of the Institute's most important assets, a priceless resource for researchers, the private sector, and the public.

Overall, more than 500 researchers directly accessed the Institute's physical collections in FY2012, and thousands more accessed the collections through online catalogs, public exhibits, tours, or loans. Online resources were accessed hundreds of thousands of times, including clearinghouses managed by the Surveys and informational pages, databases, maps, records, and digital documents on Survey websites and in the University of Illinois Institutional Repository. INHS's biological collections are among the 10 largest in North America, including the most complete record anywhere of Illinois species. ISAS curates a collection of 1.5 million specimens and artifacts, one of the finest regional datasets in North America. ISGS has one of the nation's largest collections of geologic core samples, which, together with well cuttings, document over 3.5 million vertical feet of the Illinois subsurface.

## ISGS public release of seismic reflection data for central Illinois

ISGS publically released a recently acquired new 120-mile long seismic reflection survey across central Illinois. These data were collected as part of a U.S. Department of Energy-sponsored research project to characterize reservoir rocks deep underground for possible geologic storage of carbon dioxide, a greenhouse gas. The continuous east-west seismic line extends from near Meredosia, Illinois, to southwestern Champaign County. This is the only seismic reflection line known to have been collected in this region of Illinois.

The data were collected and processed for ISGS by WesternGeco, a division of Schlumberger, Inc. The primary purpose of the U.S. DOE project was to evaluate the suitability of the



subsurface for large-scale sequestration (disposal) of carbon dioxide. The seismic reflection data are also suitable for exploration for oil and gas drilling targets.

The data were released to all interested parties on October 10, 2012, at the headquarters of the Illinois Oil and Gas Association, where ISGS scientists presented, discussed, and distributed the data, and online. Over 90 companies and individuals have acquired the data, and initial feedback indicates the information has been used to lease land for potential oil drilling.

## Prairie Research Institute Library

The Prairie Research Institute Library offers on-site and virtual reference services to our researchers, the University, and the public. Our librarians collect, preserve, promote, document, and collaborate in the scientific research and educational activities of the Institute. In FY2012, the library had ~6,000 visitors, answered 1,300 patron inquiries, loaned more than 1,800 items, and logged more than 400,000 visits to our web pages, online research guides, and bibliographies created by our librarians. Institute librarians provided instruction to nearly 400 individuals, including Institute staff, University of Illinois students, and students in public schools. Our collection and subject expertise strengths include natural resources, natural history, ecology, earth and atmospheric sciences, environmental science, environmental sustainability, and environmental education with emphasis on Illinois and the region. The circulating collection currently holds more than 52,000 titles, with more than 10,000 titles added in FY2012.

We are making a concerted effort to expose holdings of the Survey libraries through the University Library's online catalog, transfer materials to the Institute Library location where they can be readily accessed by users, and digitize our holdings where appropriate. Library holdings also include specialized collections of images, maps, and field notes. The Institute Library works in close collaboration with the University Library, and enjoys considerable funding and support for collections, cataloging, preservation, digitization, advancement, and staff development. Institute librarians work closely with the University Library on campus-wide issues including preservation, assessment, and eResearch and research data services.

## Digitizing biological collections

INHS secured grants totaling \$2.6 million over four years from the National Science Foundation for projects to digitize biological collections. INHS entomologists are leading a consortium of 22 Midwestern

institutions on the InvertNet project, which will digitize 56 million arthropods and create an online virtual museum. INHS botanists, mycologists, and entomologists are collaborating on two other large collection digitization projects. This work will transform the way researchers and the public gain access to information on specimens, species, and biodiversity.

### Expanded oil and gas well records

The Geological Records Unit at ISGS received a donation of over 70 file cabinets of oil and gas well records from the Illinois Petroleum Resources Board and Illinois Oil and Gas Association. These donations expand upon on the extensive oil and water well data already on file at ISGS.

### Ultra high-definition mapping

ISGS has received \$5.3 million in federal and state funding to acquire, process, and distribute Light Detecting and Ranging (LiDAR) enhanced data. LiDAR data enable precision elevation maps with data that are 100 times more detailed than the best prior elevation data. The increased data precision has numerous public and private sector applications, estimated to avoid hundreds of millions of dollars in costs and flood damages annually.

### Data

Databases and data clearinghouse programs administered by the Institute include:

Cahokia Archaeological Artifacts database, ISAS  
 Cooperative Agricultural Pest Survey, INHS  
 Critical Trends Assessment Program, INHS  
 Cultural Resource Management Report Archives, ISAS  
 Domestic Wells Database, ISWS  
 Earth Systems Visualization Laboratory, ISGS  
 Geologic Quadrangle Maps, ISGS  
 Great Lakes Pollution Prevention Roundtable, ISTC  
 Historical Aerial Photographs, ISGS  
 Illinois Climate Network, ISWS  
 Illinois Historic Bridges database, ISAS  
 Illinois Inventory of Burial Sites, ISAS  
 Illinois Mines: Coal Mines Viewer, ISGS  
 Illinois Natural Areas Inventory, INHS  
 Illinois Natural Resources Geospatial Data Clearinghouse, ISGS  
 Illinois Water Inventory Program, ISWS  
 LiDAR Elevation Data and Maps, ISGS  
 Long-Term Fish Population Monitoring Program, INHS  
 Long-Term Resource Monitoring Program, INHS  
 Midwest Regional Climate Center, ISWS  
 National Atmospheric Deposition Program, ISWS  
   Ammonia Monitoring Network  
   Atmospheric Integrated Research Monitoring Network  
   Atmospheric Mercury Network  
   Mercury Deposition Network  
   National Trends Network  
 Nitrogen Cycles Project, ISWS  
 Printers' National Environmental Assistance Center, ISTC  
 Project Notification System for tribes, ISAS  
 Water and Atmospheric Resources Monitoring, ISWS  
 Watershed Monitoring Data, ISWS  
 Wells (oil and water) and Related Boreholes, ISGS

### Publications

Institute researchers advance their respective disciplines through formal publication in outside venues and presentations at professional meetings. In FY2012, Institute staff authored 258 journal articles, 3 books, 16 book chapters, 10 articles in popular magazines, and delivered 89 presentations at regional, national, and international conferences. Graduate students advised by Institute staff deposited 10 masters theses and 1 doctoral dissertation.

This year, Institute units published 1 book, 5 maps, and 35 other formal in-house publications. In addition, research conducted for public and private-sector clients was documented in more than 550 reports delivered this year. Many formal publications as well as reports are freely available via the Institute website.

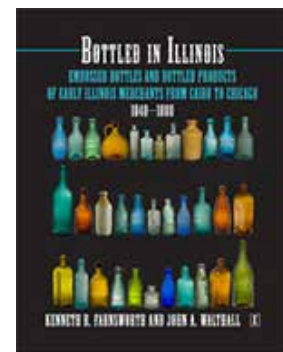
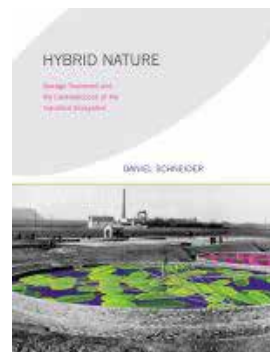
Books published in-house or authored/edited by Institute staff in FY2012 were:

**Farnsworth, K.B.**, and J.A. Walthall. *Bottled in Illinois: embossed bottles and bottled products of early Illinois merchants from Chicago to Cairo, 1840-1880*. Studies in Archaeology. Vol. 6. Champaign, IL: Illinois State Archaeological Survey, 2011. 792 pp.

Norrgrén, L., and **J.M. Levengood**, eds. 2012. *Ecology and Animal Health*. Ecosystem Health and Sustainable Agriculture. v. 2. Uppsala, Sweden: The Baltic University Programme, Uppsala University, 2012. 380 pp.

**Schneider, D.** Hybrid Nature: Sewage Treatment and the Contradictions of the Industrial Ecosystem. Urban and Industrial Environments. Cambridge, Mass.: MIT Press, 2011. 338 pp.

Schummer, M.L., **H.M. Hagy**, K.S. Fleming, J.T. Callicutt, and J.M. Cheshier. *A Guide to Moist-Soil Wetland Plants of the Mississippi Alluvial Valley*. Jackson: University Press of Mississippi, 2012. 260 pp.



A complete list of Institute publications, both in-house and external, for the year may be found at [www.prairie.illinois.edu/publications/FY12.shtml](http://www.prairie.illinois.edu/publications/FY12.shtml).

Institute scientists also hold editorial positions on core titles for their disciplines including *Annals of the Entomological Society of America*, *Environmental Entomology*, *Geochemical Transactions*, *Geochemistry: Exploration, Environment, Analysis*, *Ground Water*, *International Journal of Environmental Monitoring and Analysis*, *Journal of Applied Meteorology and Climatology*, *Journal of Hydraulic Engineering*, *Journal of Invertebrate Pathology*, *Journal of Maps*, *Midcontinental Journal of Archaeology*, and *Natural Areas Journal*.



# Awards and Honors, FY2012

## **Brian Anderson, INHS**

Wildlife Professional of the Year  
Pheasants Forever and Quail Forever

2011 Writing Award for Best Environmental Article  
Illinois Association of Park Districts

## **Kendall Annetti, INHS**

2012 Robert H. Davis Undergraduate  
Research Prize  
University of Illinois at Urbana-Champaign

## **Lorraine Chow, INHS**

Undergraduate Research Scholarship  
Program Award  
College of Agricultural, Consumer and  
Environmental Sciences, University of Illinois at  
Urbana-Champaign

## **George Czapar, ISWS**

Fulbright Specialist Award  
University of Buenos Aires, Argentina

## **David Eades, INHS**

Acting Chairman  
Global Team of the Catalogue of Life

## **Robert J. Finley, ISGS**

Chancellor's Academic Professional  
Excellence Award  
University of Illinois at Urbana-Champaign

## **John Grube, ISGS**

Vincent E. Nelson Memorial Award  
American Association of Petroleum Geologists

## **Sam Heads, INHS**

New species of mole cricket named for Dr. Heads:  
*Scapteriscus headsi*

## **Beverly Herzog, ISGS (retired)**

Robert Storm Interdivisional Cooperation Award  
National Ground Water Association

2012 Illinois Groundwater Education Award  
Illinois Groundwater Association

## **Ed Heske, INHS**

President  
American Society of Mammalogists

## **Vince Hustad, INHS**

Alexander H. and Helen V. Smith Research  
Fund Award  
Mycological Society of America

## **David Kristovich, ISWS**

Chief Editor  
American Meteorological Society *Journal of  
Applied Meteorology and Climatology*

## **Richard Lampman, INHS**

President  
Illinois Mosquito and Vector Control Association

## **Kaley Major, INHS, Dave Soucek, and Rosanna Giordano**

First place, Student Presentation Award  
Best Student Poster in the Master's  
Degree Category  
Society of Environmental Toxicology and  
Chemistry 32nd Annual International Meeting

## **Momcilo Markus, ISWS**

Faculty Fellow  
National Center for Supercomputing Applications,  
Institute for Advanced Computing Applications  
and Technologies

## **Trisha Rentschler, ISGS**

2012 Outstanding Student Award  
Illinois GIS Association

## **James Ricci, INHS**

Student competition winner  
Illinois Mosquito and Vector Control Association

## **Amy Russell, ISWS**

President  
American Society of Civil Engineers, Central  
Illinois Section

## **Manoranjan Sahu, ISGS**

Best Doctoral Dissertation Award  
Air and Waste Management Association

## **Al Wehrmann, ISWS (retired)**

2012 Illinois Groundwater Science  
Achievement Award  
Illinois Groundwater Association

## **Max Wolter, INHS**

Hugh C. Becker Award  
Muskie's Inc.

## **Wei Zheng, ISTC, Xiaolin Li, ISTC, Yonghong Zhou, ISTC, and Michael L. Machesky, ISWS**

First Place Poster Award  
6th International Conference on Environmental  
Science and Technology

## **2012 GOVERNOR'S SUSTAINABILITY AWARDS**

### **Presented by Illinois Sustainable Technology Center**

Advocate Health Care, Oak Brook  
Christopher B. Burke Engineering, Ltd., Rosemont  
CCH, a Wolters Kluwer business, Chicago  
City of Moline  
Clarke, Roselle  
County of Will, Joliet  
Flex-N-Gate Urbana  
Fluorecycle, Inc., Ingleside  
Knauz Automotive Group, Lake Bluff  
The Label Printers LP, Aurora  
Lawrence Foods, Inc., Elk Grove Village  
Naperville Park District  
Naval Station Great Lakes  
The Peterson Garden Project, Chicago  
Quaker Foods & Snacks, Bridgeview  
Testa Produce, Inc., Chicago  
Wight & Company, Darien

### **Continuous Improvement Awards**

Caterpillar Technical Center, Mossville  
Farmland Foods, Inc., Monmouth  
Vaughan & Bushnell Mfg. Co., Bushnell  
Village of Schaumburg

# Major Project Sponsors, FY2012

Agricultural Watershed Institute  
 Alaska Department of Environmental Conservation  
 Alaska Native Tribal Health Consortium  
 Archer Daniels Midland Company  
 Arizona Geological Survey  
 ATCO Power Ltd.  
 Atmospheric Research & Analysis, Inc.  
 Cherokee Nation  
 Cheyenne River Sioux Tribe  
 City of Bloomington, Illinois  
 City of Taylorville, Illinois  
 Colorado State University  
 Compressed Energy Systems  
 Earth Networks, Inc.  
 Electric Power Research Institute  
 Environment Canada  
 Federal Emergency Management Agency  
 Forest County Potawatomi Community  
 Fox River Study Group, Inc.  
 Frontier Geosciences  
 FutureGen Industrial Alliance  
 Gas Technology Institute  
 Georgia Department of Natural Resources  
 Grundy County, Illinois  
 Howard University  
 Illinois-Indiana Sea Grant  
 Illinois American Water  
 Illinois Capitol Complex  
 Illinois Clean Coal Institute  
 Illinois Department of Central Management Services  
 Illinois Department of Commerce & Economic Opportunity  
 Illinois Department of Corrections  
 Illinois Department of Military Affairs  
 Illinois Department of Natural Resources  
 Illinois Department of Public Health  
 Illinois Department of Transportation  
 Illinois Environmental Protection Agency  
 Illinois Manufacturing Extension Center  
 Illinois Mines Subsidence Insurance Fund  
 Illinois State Library  
 Illinois State Toll Highway Authority  
 Imperial Valley Water Authority  
 Innovative Health Applications LLC  
 Integrys/Peoples Gas Light & Coke Company  
 Jacques Whitford AXYS Ltd.  
 John Jay College  
 Kansas Department of Health and Environment  
 Kansas State University  
 Lake County Forest Preserves Lake Michigan Air Directors Consortium  
 Livingston County Environmental Association  
 Louisiana Department of Environmental Quality  
 MACTEC  
 Maryland Department of Natural Resources  
 McHenry County, Illinois  
 Michigan State University

Minnesota Pollution Control Agency  
 Mississippi Department of Environmental Quality  
 Murray State University  
 National Oceanic and Atmospheric Administration  
 National Park Service  
 National Science Foundation  
 Nebraska Department of Environmental Quality  
 New England Interstate Water Pollution Control Commission  
 New Mexico Air Quality Bureau  
 New York State Department of Environmental Conservation  
 New York State Energy Research and Development Authority  
 North Carolina Department of Environment and Natural Resources  
 Northeast States for Coordinated Air Use Management, Inc.  
 Northern Cheyenne Tribe  
 Northern Illinois University  
 Oklahoma Department of Environmental Quality  
 Pegasus Technical Services, Inc.  
 Pennsylvania State University  
 Penobscot Indian Reservation  
 Purdue University  
 Savannah River Nuclear Solutions, LLC  
 Seminole County, Florida  
 South Carolina Department of Health and Environmental Control  
 South Florida Water Management  
 Southern Illinois University  
 State of Maine  
 State of Utah  
 Suffolk County, New York  
 Syracuse University  
 Texas Commission on Environmental Quality  
 Texas Tech University  
 Town of Normal, Illinois  
 United States Army Corps of Engineers  
 United States Department of Agriculture  
 United States Department of Energy  
 United States Department of Housing and Urban Development  
 United States Environmental Protection Agency  
 United States Fish and Wildlife Service  
 United States Geological Survey  
 University of Illinois at Urbana-Champaign Campus Research Board  
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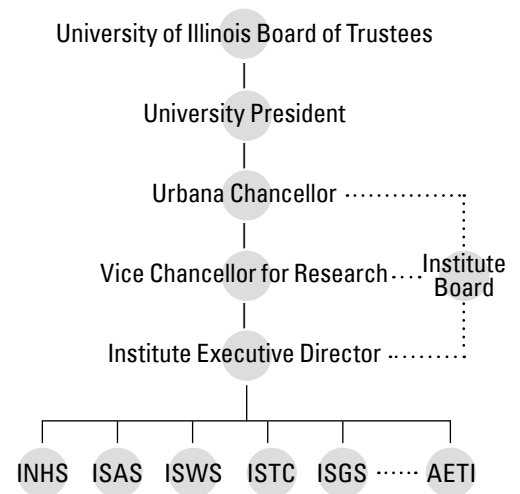
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