



2008 SUMMARY REPORT

ILLINOIS STATE WATER SURVEY

Illinois State Water Survey Mission

To characterize and evaluate the quality, quantity, and use of the atmospheric, surface water, and groundwater resources of Illinois.

The Illinois State Water Survey (ISWS) has flourished for more than a century by anticipating and responding to new challenges and opportunities to serve the citizens of Illinois. Today, the ISWS continues to demonstrate flexibility and adaptability by developing new programs, while continuing to provide long-standing services upon which Illinoisans have come to rely.

In July 2008, the ISWS and the other Illinois State Scientific Surveys were transferred to the University of Illinois at Urbana-Champaign (U of I) as units within the newly created Institute of Natural Resource Sustainability. With this new opportunity, we are positioning ourselves to more effectively achieve our mission through a broader collaboration with U of I faculty and organizations.

ISWS is dedicated to supporting and advancing science and helping to solve societal problems through basic and applied research; climate, air quality, and water monitoring activities; information dissemination; and collaboration. The following are a few key research projects and programs that serve to advance our mission in 2008 and beyond.

Center for Atmospheric Science (CAS)

CAS pursues a program of basic and applied research, monitoring, services, and outreach to address key atmospheric issues of importance to Illinois, the Midwest, and the nation. Areas of study include climate variability and change, air chemistry and quality regarding particulates and toxic chemicals, agricultural meteorology, weather and climate impacts, precipitation variability, and local storms and atmospheric circulations. Continuing research helps scientists better understand basic atmospheric processes and investigate the effects of possible future climate change. Current projects include:

Climate modeling

While global models have been used to predict large-scale climate change, regional climate models are being developed to quantify local impacts. CAS modeling projects focus on 1) air quality and its future projection to give guidance for future emission-control strategies, 2) seasonal climate prediction to optimize crop production and assist drought mitigation, 3) climate change influences on invasive species in the U.S., and 4) quantitative forecasts of precipitation and terrestrial hydrology to improve water management.

Lake breeze studies

Lake breeze circulations have important influences near the coasts of the Great Lakes by providing cooler temperatures, affecting the development of severe thunderstorms, influencing precipitation amounts, and altering air pollution concentrations. Previous studies have shown that lake breezes in urban areas tend to move inland shorter distances; however, ISWS studies show that Chicago often has the opposite effect for reasons we don't yet understand. Increasing this understanding will improve our ability to predict and perhaps mitigate negative impacts throughout the Great Lakes region.

Impacts of climate extremes

CAS scientists have assessed the economic, societal, and environmental impacts incurred from major climate anomalies, such as the 1988 drought, the 1995 heat wave, and the unusually productive 2004 growing season. From 1983 to 2006, 10 climate anomalies occurred in the Midwest, causing \$265.5 billion in losses and \$125 billion in gains. These economic measures are useful for estimating impacts of possible future climate changes due to global warming.

Midwest Regional Climate Center and State Climatologist

These long-running programs provide high-quality climate data, derived information, and data summaries for the Midwest by monitoring and assessing regional climate conditions and their impacts and preparing specialized historical climate data sets. CAS scientists coordinate and conduct applied research on climate-related issues and problems such as heat waves, drought, flooding events, precipitation estimate methods, agricultural impacts, and fog.

Agricultural meteorology

Contributors to this growing effort conduct research on the interactions between agricultural systems, including traditional and biofuel crops, and atmospheric and climatic changes. Recent efforts seek to understand the impacts of these changes on energy exchanges as well as on carbon and hydrologic cycling between crops and the atmosphere. Crop canopy responses to stressors, such as drought or insect infestation, and changes in atmospheric gaseous composition are also investigated.

Center for Chemistry and Technology (CCT)

CCT programs provide analyses for research projects and help private citizens, state facilities, and small public drinking-water systems solve water-related problems in Illinois and the Midwest. The principal programs include:

Institutional Water Treatment Program

The program provides professional water treatment advice to more than 100 state facilities in Illinois, resulting in substantial annual savings in costs of chemicals, fuel, water, and maintenance in industrial and potable water systems.

Midwest Technology Assistance Center (MTAC)

MTAC serves small public water systems by addressing water treatment and quality issues, ultimately providing safe water at reasonable cost. The MTAC is now involved in helping small water systems that use groundwater plan to secure their future water supply, and in providing small surface water systems with recommendations for producing an effective drought response plan.

Public Service Laboratory

The laboratory tests water samples for mineralogical content and suggests solutions for water problems. Arsenic testing in public and private well supplies has become a high priority following EPA's action to make maximum contaminant levels of arsenic more stringent for public water suppliers.

Center for Groundwater Science (CGS)

The mission of the CGS is to conduct research, collect and analyze data, provide public service on groundwater issues important to Illinois citizens, and to serve as the State's primary repository of groundwater records and data. Among its current projects are:

Water supply planning

ISWS has been intimately involved in developing a planning framework for northeast and east-central Illinois that promotes coordination and collaboration among communities, counties, and other stakeholders for groundwater and surface water supplies that extend beyond community and county boundaries. Scientists from the ISWS Center for Watershed Science and the Illinois State Geological Survey are assisting in developing computer models to assess impacts on Illinois' water resources to meet growing demand to 2050 and providing input on planning options to meet those demands.

Illinois water inventory

The Illinois Water Inventory Program collects data on water withdrawal, use, and returns. Data can be summarized geographically by county, township, or drainage basin, as well as by various water use and water source categories.

Arsenic occurrence and removal in drinking water

In two related studies, scientists are evaluating the current treatment measures for removing arsenic in public water systems and developing new equipment used in municipal water treatment plants and the home for removing arsenic in drinking water. This work builds on experience gained in examining the occurrence, causes, and fate of arsenic in Illinois groundwater.

Center for Watershed Science (CWS)

CWS generates historical and spatial scientific data, investigates and understands watershed processes, and provides state-of-the-art scientific and engineering analyses to policymakers, planners, and resource managers in the State of Illinois and beyond so that they can develop and implement sustainable watershed programs based on the best scientific and engineering analyses possible. Current projects include:

Floodplain mapping

The Map Modernization Project entails updating paper floodplain maps using the latest digital equipment to produce Flood Insurance Rate Maps for regulatory and flood insurance purposes. This project has completed maps for 58 Illinois counties, and is assisting communities with mitigation planning for floods and other natural disasters.

Fox River Watershed investigation

In a multi-phase water quality study of the Fox River in northeastern Illinois, researchers are addressing significant watershed issues and implementing a watershed scale investigation including data collection, model development, and water quality monitoring.

Ecosystem restoration of the Illinois River basin

Erosion and sedimentation are major problems in Illinois. ISWS scientists are conducting watershed assessments in the Illinois River basin and making recommendations for restoration of high-priority areas. In addition, ongoing sampling and monitoring in the Spoon and Sangamon Rivers, major tributaries to the Illinois River, increase available information on excessive sediment transport and increased algal biomass, which reduce water quality.

Restoration of the Cache River

The ISWS continues to work with the Cache River Joint Venture Partnership (JVP), which includes the Illinois Department of Natural Resources, the Nature Conservancy, U.S. Fish and Wildlife Service, Ducks Unlimited, and the Natural Resources Conservation Service by developing hydrologic and hydraulic models for the Cache River to guide the long-term restoration effort of the JVP.

National Atmospheric Deposition Program (NADP)

NADP is a long-term monitoring program in support of research on the effects of atmospheric chemical deposition. The NADP operates three networks that monitor precipitation chemistry at more than 300 sites.

National Trends Network (NTN)

NTN is the only network providing a long-term record of precipitation chemistry across the United States. Its purpose is to provide data on the amounts, trends, and geographic distributions of the atmospheric deposition of acids, nutrients, and base cations. NTN collects about 13,000 samples each year.

Atmospheric Integrated Research Monitoring Network (AIRMoN)

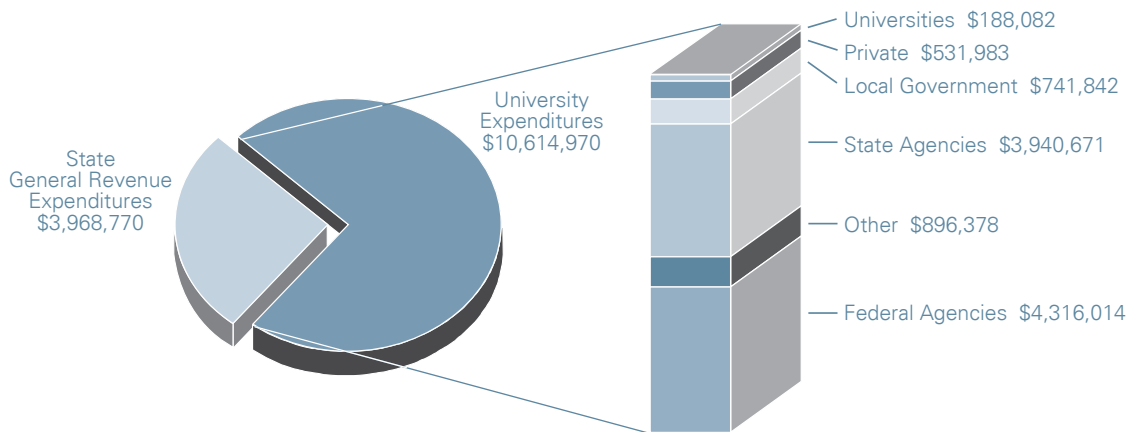
AIRMoN sites collect precipitation samples daily (1,100 annually) to provide data for studying atmospheric processes and for developing and testing models that simulate these processes.

Mercury Deposition Network (MDN)

MDN sites collect precipitation samples for total mercury analysis and offer methyl mercury measurements as an option. The objective of the MDN is to provide data on the geographic distributions and trends of mercury deposition, information that may help scientists better understand the link between mercury deposition and mercury-contaminated fish. The network collects 6,000 samples each year.

ISWS FINANCIAL STATEMENT FISCAL YEAR 2008

TOTAL EXPENDITURES: \$14,583,740



In addition to the above, the ISWS receives NOAA computer time at an estimated value in excess of \$2,500,000 annually.