

**Water Supply Planning for Illinois**  
*October – December 2007 Progress Report*  
*January 29, 2008*

Illinois State Water Survey (ISWS) and Illinois State Geological Survey (ISGS)

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The following is a summary of activities of the Scientific Surveys from October 1, 2007 through December 31, 2007 related to the Water Supply Planning Initiative.

**PUBLIC EDUCATION/OUTREACH**

**11<sup>th</sup> Biennial Governor's Conference - Management of the Illinois River System**

On October 3, 2007, Derek Winstanley, ISWS Chief, presented Drought in Illinois: Impacts to Water Supply to the Governor's Conference in Peoria.

**ISAWWA Visitation Day**

The Illinois Section American Water Works Association membership was invited by the Cities of Charleston and Mattoon to tour their water system facilities on October 4<sup>th</sup> (Visitation Day). Ed Glatfelter updated the group on the regional water supply planning initiative, encouraged affected individuals to contact planning committee representatives, and provided contact information.

**Ohio River Basin Commission**

On October 11, 2007, Derek Winstanley, ISWS Chief, presented Climate Variability and Change to the Ohio River Basin Commission in Columbus, Ohio.

**Champaign Rotary Club**

On October 17, 2007, Derek Winstanley, ISWS Chief, presented Climate Change in Illinois and Water For Ethanol Plants to the Champaign Rotary Club in Champaign.

**East-Central Illinois Local Legislators Meeting**

On October 18, Mahomet Aquifer Consortium Board members met with legislators regarding current activities and the potential to fund additional studies related to water supply planning in the Mahomet aquifer. Also attending the meeting to provide program and technical support were Gary Clark (IDNR-OWR); Derek Winstanley and Al Wehrmann (ISWS); and Ed Mehnert (ISGS). The legislators were Illinois Representative Chapin Rose, Illinois Senators Dale Righter and Michael Frerichs. Jeremy Cirks of US Representative Tim Johnson's staff organized the meeting.

**Climate Symposium**

On October 20, 2007, Derek Winstanley, ISWS Chief, presented Global Warming Here At Home: How is Lake Michigan Faring? at the League of Women Voters "Climate Matters" Symposium in Glenview. The presentation included information about changing Lake Michigan water levels.

**IEHA Presentation**

Al Wehrmann made a presentation to the Illinois Environmental Health Association annual conference on *"Potential Water Impacts from Ethanol Production in Illinois."* The conference, attended by public health sanitarians, was held in Peoria on October 26, 2007. Concerns were raised regarding impacts on local water resources and domestic wells.

**Illinois Environmental Regulatory Group**

On October 29, 2007, Derek Winstanley, ISWS Chief, presented Why So Much Interest in H<sub>2</sub>O? to the Illinois Environmental Regulatory Group in Springfield. The presentation provided information about the Governor's water supply initiative.

### **Champaign YMCA**

On November 6, 2007, Derek Winstanley, ISWS Chief, presented Water Supplies in East Central Illinois to the Champaign YMCA in Champaign.

### **Exchange Club**

On November 7, 2007, Derek Winstanley, ISWS Chief, presented Climate Change to the Exchange Club in Urbana.

### **Mahomet Aquifer Consortium Membership Meeting**

On December 10, 2007, Derek Winstanley, ISWS Chief, presented Water Supply Planning and Management: Sustainability at a Mahomet Aquifer Consortium membership meeting in Champaign.

### **Climate Change Summit**

On December 11, 2007, Derek Winstanley, ISWS Chief, presented Policy Responses to Climate Change: Climate Change & Our Regional Water Supply at a climate change summit sponsored by the Chicago Metropolitan Agency for Planning (CMAP) at the University of Illinois, Chicago. The summit, also attended by Water Supply Planner Ed Glatfelter, was titled "Creating a Regional Agenda to Address Climate Change".

### **McHenry County**

ISWS and ISGS staff met with County officials to discuss possible groundwater resource investigations by the Surveys, including compilation of geologic information and flow modeling.

### **Will County**

ISWS supplied Will County staff with ISWS and ISGS information from Kane County's September 20<sup>th</sup> Priority Places Workshop regarding the Water Resources Investigation for Kane County.

### **WSP Web Site**

Material continued to be added to the water supply planning web site, ([www.sws.uiuc.edu/wsp](http://www.sws.uiuc.edu/wsp)). Added were two ISWS presentations to the Northeastern Illinois Regional Water Supply Planning Group (RWSPG) and a presentation to the East Central Illinois (RWSPC). Summaries of four East Central Illinois public outreach meetings were added. ISWS data on rainfall and deep-bedrock aquifer pumping in NE Illinois, and Kane County aquifer information were added. Seven other Water Survey presentations were also added. And links to seven water supply planning related publications by others were added to the site.

### **East Central Illinois Web Site**

ISGS staff continues to support and update the East-Central Illinois Regional Water Supply Planning Committee web site at [www.rwspc.org](http://www.rwspc.org).

### **Illinois Water 2008 Conference Planning**

ISWS, ISGS, and OWR staff are participating in planning for the Water 2008 Conference to be held October 7-9 at the Champaign Hilton Garden Inn. Staff include Allen Wehrmann (ISWS), Dave Larson and Bev Herzog (ISGS), and Frank Pisani (IDNR-OWR). Four themed sessions will be: Water Supply, Nutrients, Water and Energy/Biofuels, and Climate Change.

### **REGIONAL WATER SUPPLY PLANNING COMMITTEE SUPPORT Meetings**

Staff participated in two meetings of the NE Illinois RWSPG (October 23, Geneva; November 27, Chicago) and in two meetings of the East Central Illinois RWSPC (October 26, Havana; November 30, Bloomington). Allen Wehrmann presented Kane Co.: Highlights of ISWS Work; Application to RWSPG to the NE Illinois RWSPG at their October meeting. Derek Winstanley presented Water Supply Planning & Management: Sustainability to the NE Illinois RWSPG at their November meeting. Allen Wehrmann presented Mahomet Aquifer Modeling Update to the

EC Illinois RWSPC at their November meeting. These presentations are on the WSP Web-site, under Home Page, [Water Survey Presentations](#).

#### **Decision Making Framework Development**

ISWS staff assisted Northeastern Illinois RWSPG members and CMAP staff with the development of concepts for establishing a framework within which the RWSPG could consider decision making.

#### **Regional Planning Report Framework Development**

ISWS staff developed a draft outline for the regional water supply planning reports. The draft, with review and feedback by IDNR and CMAP staff and members of the East Central RWSPC, is being updated and revised.

#### **Water Budgets**

ISWS staff has developed a draft water budget defining the flow and consumption of water in a coal fired electric generating station, based on a tour of Dynergy's Havana Power Station on October 26<sup>th</sup>, and with assistance from Dynergy staff. Based on U.S. Army Corps of Engineering reports and IDNR-OWR data, ISWS staff has developed a draft water budget of the Lake Michigan diversion. ISWS staff has developed draft generic water budgets for the five water use sectors that have been defined in the water demand studies.

#### **Water Demand Scenario Report Review**

With the northeastern Illinois draft water demand report scheduled for release to CMAP staff in mid-December, ISWS initiated scheduling a peer review meeting for January 10, 2008. The meeting, to be held in Champaign, involves staff from Southern Illinois University (SIU), CMAP and the ISWS. The draft water demand report was released by the SIU consultant to CMAP and ISWS staff on December 21, 2007.

### **ILLINOIS WATER INVENTORY PROGRAM (IWIP)**

#### **Data Preparation**

The ISWS IWIP Coordinator provided power generation water-use data to Wittman Hydro Planning (WHPA), consultants for the East Central Illinois RWSPC, and to Dr. Ben Dziegielewski of Southern Illinois University, subconsultant to WHPA. The Coordinator also calculated per capita water use values for the northeastern and east-central Illinois planning areas. Numerous follow-up discussions with the consultants were made concerning data. Public water supply water withdrawal and population data were also supplied to the Barrington Area Council of Governments in northeastern Illinois. The Coordinator also began review of IWIP forms and data needs in preparation for possible combination of IWIP and IDNR-OWR data collection forms within the Lake Michigan allocation area.

### **CLIMATE**

#### **Climate Simulations**

Due to a staff reassignment, analysis and interpretation of climate simulations for 2050 and 2100 with a regional climate model driven by PCM and HadCM3 models were not accomplished as scheduled by 12/31/07. Alternate arrangements to accomplish this task are being investigated.

### **GROUNDWATER INVESTIGATIONS AND MODELING**

#### **Regional Deep Bedrock Groundwater Flow Model for NE Illinois**

The regional groundwater flow model for northeastern Illinois was completed during the previous quarter. The ISWS-CGS is ready to conduct model runs as soon as water demand scenarios data is available.

#### **Kane County Shallow Aquifers Model**

The local model of shallow aquifers in Kane County, completed during the previous quarter, was not operating in a stable enough fashion to release to Kane County for their use. The model is being modified to give it more stability, thus giving it a greater ability to handle changes to

pumping patterns, changes in recharge rates, the addition of new wells, etc. A more robust model is expected by mid-February.

#### **Mahomet Aquifer Groundwater Model**

New Mahomet aquifer field data continues to be collected primarily through funding by the Illinois-American Water Company. A new geologic map of the Champaign County area is being produced by the ISGS, based in part on this new information, by 6/30/08. It will be input by ISWS-CGS as new model layers to the existing 3D aquifer model.

### **SURFACE WATERS**

#### **Watershed Model – Fox River**

The SWAT hydrologic simulation model for the Fox River is complete, and a draft report and conference paper on the model development has been prepared. During calibration the SWAT Fox River model was not capable of accurately simulating flows during both extremely wet and extremely dry conditions using a single set of parameters. To evaluate potential impacts of climate change on water supply during drought conditions, it is essential that the model portray low flow conditions in the Fox River with reasonable accuracy. Thus, a comparatively greater calibration and validation emphasis was placed on accurate simulation of low flows and conditions during drought periods. The model is now ready for use in simulating impacts of climate change scenarios, and these scenario simulations will be initiated in late January 2008.

#### **Watershed Model - Sangamon River**

Preparation of GIS coverages (land use, soils) and climatic data inputs for the Sangamon River SWAT watershed model have been completed and calibration of the model has begun. With the completion of the Fox River model, significant progress on the Sangamon model is expected over the next three months and we are projecting the model preparation will be completed by June 2008, to be followed by the hydrologic simulation of climate scenarios.

#### **Surface Water Accounting Model (ILSAM)**

The surface water accounting models for Kane County and the Fox River watershed have been completed. The hydrologic databases and GIS shape files needed for the Sangamon and Mackinaw River accounting models have also been prepared, however minor programming changes must be made before these model versions are complete. These modifications should be completed by the end of January 2008.

#### **Drought Flow Frequency – East Central Illinois**

The analysis of drought flow frequency characteristics for the east-central Illinois region is continuing, with recent work focusing on determining the best mathematical procedure for estimating drought flow duration, frequency and recurrence intervals using streamflow gaging records. This analysis and subsequent estimation of drought flows for ungaged streams in east-central Illinois is scheduled for completion in May 2008.

### **GEOLOGY (ISGS)**

#### **3-D Geologic Mapping of the glacial deposits throughout the Fox River Watershed**

Staff compiled ISGS 3-D geologic map information from current Lake and Kendall County mapping projects; recently completed Kane County mapping; and published McHenry and DeKalb County maps. Following a meeting with the ISWS to determine the geologic level of detail desired for input to the groundwater flow model, ISGS staff developed a strategy for generalizing the geologic units to meet the agreed upon detail. Staff are working to generate a first draft of the geologic map, scheduled for delivery to the ISWS by December 31, 2007, by February 4, 2008. Geophysicists made progress processing data collected in the Fox River Watershed this past summer. ISGS entered into an agreement with Illinois State University for a graduate student to support geologic mapping efforts in the Fox River Watershed. The student will develop an MS thesis from work the work.

### **Characterization of Deep Bedrock Aquifer**

Staff have nearly completed compilation of geophysical logs from over 500 boreholes drilled into bedrock in the 11 county northeastern Illinois region. Some logs from Kankakee County remain to be processed. The paper records have been copied and scanned into digital images for use in this project. These logs will be used to explore the uniformity of the deep bedrock aquifer and to provide additional insight on the potential importance of partitioning of the aquifer into distinct units. These logs will be used later for analysis of the confining unit of the deep bedrock aquifer.

### **3-D Geologic Mapping of the Mahomet Aquifer System**

Staff are working to process and interpret geophysical and drilling data obtained this past summer. They are evaluating geophysical and drilling data from within the Pesotum Bedrock Valley, a major tributary valley to the Mahomet Bedrock Valley. The Pesotum Valley sediments were previously hypothesized to be primarily composed of fine grained units. Data collected this past summer documented a more complex sediment record, including two sand and gravel deposits. Groundwater monitoring wells were constructed so the screens were finished in these two sand deposits. ISGS and ISWS staffs continue to work on projects funded by the Illinois American Water Company, to characterize the portion of the Mahomet Aquifer System in the immediate vicinity of the City of Champaign. Delivery of work to the ISWS for input to the groundwater flow model, originally scheduled by December 31, 2007, has been delayed due to a funding delay. The work conducted for this project is being used to improve insight on the eastern portion of the system, in support of the larger, regional goals.

### **SUPPLEMENTAL RESEARCH PROPOSAL**

In May 2007 the ISWS and ISGS submitted a \$598,300 supplemental research proposal to conduct additional geologic and hydrologic studies in northeastern and east central Illinois in FY 08 and 09. The work involves shallow aquifer mapping, improving knowledge of surface water/groundwater interactions in the Fox River basin, preparing surface water accounting tools for the Kankakee and Vermillion/Wabash watersheds, and improving knowledge of recharge. The proposal, an amendment to the contract between IDNR and the University of Illinois, was approved by IDNR in December, 2007.

### **MEETINGS**

- 2 MAC Executive Board meetings, Champaign
- 2 MAC general membership meetings, Champaign
- 2 Pontiac Group conference calls (Coordination between OWR, MAC, CMAP, ISWS and ISGS)
- 2 Northeastern Illinois RWSPG meetings, Geneva, Chicago
- 2 East Central Illinois RWSPC meetings, Havana, Bloomington
- 1 State Water Plan Task Force, Springfield. Included 2 WSP presentations
- 1 Ohio River Basin Sanitary Commission/Ohio River Basin Commission round table
- 1 Illinois Water Resources Center planning meeting for Water 2008 Conference
- 1 West Shore Water Producers Association, Cudahy, WI
- 1 Water Efficiency Workshop, Alliance for Water Efficiency, Chicago
- 1 DuPage Water Commission, Great Lakes Water Wars talk with focus on Illinois' diversion.
- 1 AWWA Web-cast: Regional Water System Cooperation

### **PRESENTATIONS (In addition to those listed above)**

On December 13, 2007 Allen Wehrmann (ISWS) presented *Water Planning Update – Results from Kane County Groundwater* and Vern Knapp (ISWS) presented *Fox River Surface Water Accounting Tool*, at the State Water Plan Task Force meeting, Springfield

### **INTERVIEWS**

On December 7, 2007, Derek Winstanley, ISWS Chief, was interviewed live regarding water supply planning and management on WILL Radio, Urbana.