

Water Supply Planning for Illinois
July – September 2007 Progress Report
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Illinois State Water Survey and Illinois State Geological Survey

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The following is a summary of activities of the Scientific Surveys from July 1, 2007 through September 30, 2007 related to the Water Supply Planning Initiative.

PUBLIC EDUCATION/OUTREACH

Article Published in *Aquanotes*

An article describing the water-supply planning initiative, written by Dave Larson (ISGS) with contributions by Al Wehrmann (ISWS), was published in the Summer 2007 issue of *Aquanotes*, the newsletter for the Illinois Association of Groundwater Professionals. The article provided the links to the web sites for the Regional Water-Supply Planning Group for northeastern Illinois, the East-Central Illinois Water-Supply Planning Committee, and Illinois Water Supply Planning that is hosted by the ISWS.

ISAWWA Visitation Day

The Illinois Section American Water Works Association (ISAWWA) membership was invited by the Village of Algonquin to tour its water system facilities on July 13th (Visitation Day). Ed Glatfelter updated the group on the status of the regional water supply planning initiative, encouraged them to contact representatives on the planning committees, and provided contact information.

ISGS Field Demonstration - Bondville

On August 15, the Bondville Road Station, a research facility maintained by the University of Illinois Department of Electrical Engineering and the Illinois State Water Survey (ISWS), was the venue for a field demonstration by the Illinois State Geological Survey (ISGS) to the Board of Natural Resources and Conservation, the Mahomet Aquifer Consortium (MAC) Board, the East Central Illinois Regional Water Supply Committee (RWSPC), and other dignitaries. Forty-five guests attended.

Techniques and equipment used by ISGS scientists to collect subsurface information for geologic mapping was presented. An overview was provided of ISGS mapping and hydrogeologic programs, including the Governor's water supply initiative, and the range of research being conducted at the Station. Presentations were made on the collection and use of field-collected data including core samples, groundwater observation wells, geophysical borehole logs, ground penetrating radar, high resolution resistivity profiles and high resolution seismic profiles.

East Central Illinois Stakeholder Meetings

Wittman Hydro Planning Associates (WHPA) conducted public education/outreach meetings in four sub-regions of the 15 county East Central Illinois planning area to assist in the development of water demand scenarios. Each meeting was attended by 30 to 45 members of the general public. Staff from the Surveys assisted WHPA staff in answering questions. WHPA also held meetings with community water system officials throughout the region. Derek Winstanley participated in the Champaign area meeting.

Lake County Water Meeting

Lake County sponsored a water meeting for County and municipal officials on September 18th in Grayslake to review knowledge about Lake County's water supply and gauge interest in cooperative county-level water supply planning. Ed Glatfelter (ISWS) presented *Lake County: Groundwaters and Inland Surface Waters* and Don Keefer (ISGS) presented *Geologic Mapping in Northeastern Illinois & What Do We Know About Lake County's Geology?* .

September East Central RWSPC Meeting

Members of the general public who had shown interest in water supply planning were invited to the RWSPC's September 20th meeting in Urbana. About 70 persons attended the meeting. Bill Mullican, Deputy Executive Administrator of the Texas Water Development Board, was the guest speaker. Survey staff assisted in answering questions.

WSP Web Site

Material continued to be added to the water supply planning (WSP) web site, accessible at www.sws.uiuc.edu/wsp. Added to the site were an ISWS presentation made to the Northeastern Illinois Regional Water Supply Planning Group (RWSPG) and two presentations made to the East Central Illinois (RWSPC). The thirteen presentations made by the Surveys' staff at the Kane County workshop, titled *Priority Places, Implementing a Sustainable Water Supply for Kane County's Future*, were added to the site, and one other Water Survey presentation was also added. New pages on climate were added, as was Imperial Valley Water Authority rain gauge data. Links to five publications by others were added to the site along with links to several other organizations with water supply planning related activities.

Water Planning Issues Conference

An ISWS staff member continued to assist the Paul Simon Policy Institute at Southern Illinois University (SIU), the Chicago Metropolitan Agency for Planning (CMAP), the Illinois Department of Natural Resources (IDNR) and the Metropolitan Planning Council with planning for a water planning issues conference in Chicago. The conference is intended to increase the awareness of Illinois' elected and appointed officials.

REGIONAL WATER SUPPLY PLANNING COMMITTEE SUPPORT Meetings

Staff participated in two meetings of the NE Illinois RWSPG (July 24, Sycamore; September 25, Chicago) and in three meetings of the East Central Illinois RWSPC (July 27, Lincoln; August 31, Tremont; and September 20, Urbana). Derek Winstanley

presented *Water Supply Planning and Management: Climate Variability and Change* to the NE Illinois RWSPG at their July meeting. Allen Wehrmann presented *Groundwater Occurrence & Movement: An Introductory Discussion with Application to East-Central Illinois* to the EC Illinois RWSPC at their July meeting. Vern Knapp presented *Surface Water Availability in the East Central Illinois Planning Area* to the EC Illinois RWSPC at their August meeting. These presentations are on the WSP Web-site, under Home Page, [Water Survey Presentations](#).

Work Schedule

ISWS staff provided to staff at the Chicago Metropolitan Agency for Planning (CMAP) and members of the East Central Illinois RWSPC a schedule of the major work items being prepared by the Surveys and how they relate to major work items of the RWSPG and RWSPC. This schedule assisted CMAP staff in preparing a revised, detailed work plan for the Northeastern Illinois RWSPG.

GIS Shape Files

ISWS staff provided CMAP staff and Dr. Ben Dziegielewski (SIU) with GIS shape files and related information for several non-municipal water systems in northeastern Illinois to assist in the development of socio-economic and demographic data for development of the NE Illinois water demand scenarios.

East Central Illinois Web Site

The East-Central Illinois Regional Water Supply Planning Committee developed a web site now available at www.rwspc.org. Ed Mehnert (ISGS) helped with development and support of the site.

ILLINOIS WATER INVENTORY PROGRAM (IWIP)

Data Preparation

The ISWS IWIP Coordinator prepared numerous database summaries for the East-Central and Northeast Illinois 2050 water demand scenario consultants. Annual water withdrawal data from 1985 - 2005 for all community, industrial, and commercial wells and surface intakes in the 11-county NE Illinois and 15-county EC Illinois regions were assembled and provided to Ben Dziegielewski (SIU) and WHPA, respectively. Numerous follow-up discussions with the consultants were made concerning data gaps, outliers, uncertainties, etc. A file was also created characterizing electric generation plants in the east-central region for use by Thomas Davis, East Central RWSPC Electric Industry representative.

Conference Booth

The IWIP Coordinator staffed an IWIP booth at the Illinois Potable Water Supply Operators Association annual conference on September 12th and 13th to improve understanding about and participation in the voluntary water use reporting program.

CLIMATE

Lake Michigan Water Levels

The ISWS Center for Atmospheric Science (CAS) modified information about future water levels in Lake Michigan on the WSP web site under the “Tomorrow’s Climate–Future Scenarios” section. www.sws.uiuc.edu/wsp/climate/ClimateTom_scenarios.asp.

Previously, water levels based on future temperature and precipitation scenarios at 2050 and 2100 were shown in graphical and tabular form. Those water levels were calculated using a Great Lakes Environmental Research Laboratory (GLERL) equation from a hydrological model. It was recently learned from Dr. Croley (GLERL) that the response time of the hydrological model is longer than expected. Concerned that the prior results might be mistakenly considered as near-instantaneous responses, the tables and graphs were removed from the web site and replaced with text from the 2000 National Assessment of the Consequences of Climate Variability and Change. That text is the last comprehensive examination of the response of Great Lakes water levels to possible climate change.

The CAS now has the capability of running the GLERL hydrological model and will explore ideas for designing climate change experiments during the current fiscal year.

GROUNDWATER INVESTIGATIONS and MODELING

Regional Groundwater Flow Model

The ISWS Center for Groundwater Science (CGS) completed the regional groundwater flow model for northeastern Illinois. Numerous model runs were conducted examining regional deep aquifer conditions under different pumping scenarios and recharge conditions. This included pumping at constant 2002 pumping rates until steady-state head conditions were reached, and two future pumping scenarios with regional breakdowns of pumpage based on [Dziegielewski *et al.* \(2005\)](#).

Kane County Shallow Aquifers Model

The model of shallow aquifers in Kane County was completed. This model was used to examine shallow aquifer conditions under different pumping and recharge conditions.

Results from both models were publicly presented by ISWS and ISGS staff at a workshop entitled, “*Priority Places, Implementing a Sustainable Water Supply for Kane County’s Future*” on September 20 in St. Charles.

Mahomet Aquifer Groundwater Model

New Mahomet aquifer field data continues to be collected primarily through funding by the Illinois-American Water Company. Groundwater levels were collected from over 100 wells in Champaign and Piatt counties by the ISWS. Measurements were taken in Mahomet aquifer and Glasford aquifer wells. Drilling of new wells by the ISGS in west Champaign County is ongoing. The groundwater model will be modified after this new field data has been assessed.

Groundwater Pumpage Publication

A Summary of Pumpage from the Cambrian-Ordovician Aquifers of Northeastern Illinois, 2000-2004, (by Burch, Wehrmann) was published and is available [on-line](#).

SURFACE WATERS

Watershed Model – Fox River

The ISWS Center for Watershed Science (CWS) completed preparation and calibration of two hydrologic simulation models for the Fox River, one based on the SWAT watershed model and the other the HSPF model. Although simulated flows from both models were reasonably similar to historical Fox River flows under most conditions, neither model produced low flows similar to historical drought flows. To evaluate potential impacts of climate change during drought conditions, it is essential that improvement be made in low flow simulation. A new programming module for simulating baseflows is being developed which will be linked to the Fox River basin SWAT hydrologic model. The new baseflow module should be completed in October, and a draft report on the development of the Fox River SWAT model and its baseflow module should be completed by December. Once the baseflow module is prepared and verified, the modified SWAT model will be available for analyzing impacts related to various climate change scenarios. Modifying the baseflow algorithm in the HSPF model is more problematic and will not be attempted.

Watershed Model - Sangamon River

The Sangamon River SWAT model is in the process of being updated and recalibrated using higher-resolution GIS coverages of watershed characteristics. Greater progress will be made on the Sangamon model once the modified SWAT model for the Fox River is complete.

Surface Water Accounting Model (ILSAM)

Database programming for the new version of the Illinois Surface Water Accounting Model (ILSAM) is nearing completion. The pilot version of the accounting model prepared for Kane County will be released in early October. Expansion of the Kane County model to the entire Fox River watershed and preparation of the Sangamon River ILSAM model, to be completed by December 2007, will involve preparation of hydrologic and GIS databases and minor adjustments to the programming on the ILSAM mode. ILSAM differs from the previously-described watershed models (SWAT & HSPF) in that it is a statistically-based accounting tool that is used to more accurately predict direct impacts of water use development on streamflow quantity.

Hydrologic data and watershed characteristics are continuing to be prepared for the Vermilion River basin in east-central Illinois. These data will be used in the hydrologic analysis portion of the ILSAM model development for east-central Illinois.

Drought Flow Frequency – East Central Illinois

An analysis of drought flow frequency characteristics for the east-central Illinois region has begun, with the purpose of preparing flow estimates that will be used as data in the development of a new methodology for estimating reservoir yields.

GEOLOGY

Geologic Map - Fox River Basin

The work necessary for the development of a 3-D geologic map of the Fox River Watershed that lies within the 11-county planning region continued, including:

1. Continued compilation of information on the hydrogeology of the sand and gravel aquifers and the Silurian dolomite from existing ISGS publications and sources.
2. Development of the 3-D geologic map for large portions of western and central Lake County and portions of Cook and Kane Counties continued.
3. Initiated analyzing the 2 miles of high-resolution seismic data that were collected to help interpret the distribution and character of Quaternary sediments and the shape of the bedrock surface.
4. Completed 4 weeks of test drilling in Lake County

Geologic Map – Deep Bedrock Aquifer of Northeastern Illinois

The compilation of existing geologic samples descriptions, geophysical logs, regional and local geologic maps and reports about the Deep Bedrock Aquifer underlying northern Illinois was initiated. This work included:

1. Retrieving and compiling downhole geophysical data and data from drillers' logs for boreholes located in Boone, DeKalb, DuPage, Grundy, McHenry, Will, Kendall, and Kane Counties.
2. Creation and development of a database for the Deep Bedrock Aquifer with ongoing discussions about the database requirements and content.

Geologic Map – Mahomet Aquifer

Work on enhancing a 3-D geologic map for the Mahomet aquifer and overlying shallow aquifers continued. This work included:

1. Continued research for the 9-township Illinois-American Water Company (IAWC) project in Champaign and Piatt Counties, and for the 18-township IAWC project in portions of Champaign, Piatt, Ford, Iroquois, and Vermillion Counties.
2. Continued development and enhancement of database for the region.
3. Continued digitizing key archival geophysical surveys into database.
4. Drilled and collected samples from testholes located near Sadorus, Bondville, Dewey, and White Heath; observation wells were installed at these four sites.
5. Completed 5 miles of seismic surveys south of Paxton.
6. Continued selecting sites for additional testholes to further characterize the hydrogeology of the sediments within the Mahomet Bedrock Valley.

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, has been approved by the University and is awaiting approval by IDNR.

MEETINGS

- 2 MAC Executive Board meetings, Champaign
- 1 MAC general membership meeting, Champaign
- 2 Pontiac Group conference calls (Coordination between OWR, MAC, CMAP, ISWS and ISGS)
- 2 Northeastern Illinois RWSPG meetings, Sycamore, Chicago
- 3 East Central Illinois RWSPC meetings, Lincoln, Tremont, Urbana
- 4 East Central Illinois RWSPC stakeholder public meetings, Rantoul, Tremont, Havana, Clinton
- 1 State Water Plan Task Force, Springfield
- 1 Intergovernmental Coordinating Committee on Groundwater and Groundwater Advisory Committee, Springfield
- 1 ISWS initiated conference call coordinating use and availability of data with water demand scenario consultants for east central and northeast Illinois.
- 1 Kane County meeting, St. Charles: Presentation of Kane County study
- 1 Lake County meeting, Grayslake: Water forum for public officials.

PRESENTATIONS (In addition to those listed above)

- July 13, Illinois Society of Professional Engineers annual convention, Oak Brook, *The Governor's Executive Order 2006-01: Water Supply Planning for East Central and Northeast Illinois*, presenter Allen Wehrmann.
- July 31, Illinois Association of Soil and Water Conservation Districts Land and Water Conference, Springfield, *Water Supply Planning and Management: The Importance of Groundwater*, presenter Derek Winstanley.
- Aug 3, Agricultural Leadership Foundation, Peoria, *Global Water Issues*, presenter Derek Winstanley.
- Sep 5, Fox River Study Group (FRSG), Oswego, *Regional Water Supply Planning*, presenter Derek Winstanley. Emphasized need to coordinate WSP quantity studies and water quality study that ISWS is engaged in for the FRSG.
- Sep 12, Akzo Nobel Community Advisory Panel, Morris, *Regional Water Supply Planning*, presenter Derek Winstanley.
- Sep 12, Illinois Potable Water Supply Operators Association annual convention, Springfield, *Water and Ethanol Production in Illinois*, presenter Allen Wehrmann.
- Sep 19 Illinois Institute of Technology, Chicago, *Regional Water Supply Planning*, presenter Derek Winstanley.

INTERVIEWS

- Aug 6, Chicago Public Radio, Derek Winstanley interviewed by Sandy Hausmar on climate change and Lake Michigan water levels.
- Sep 20, Chicago Public Radio, Derek Winstanley interviewed by Sandy Hausmar about the results of ISWS water supply studies for Kane County.