

Water Supply Planning for Illinois
January – March 2008 Progress Report
March 31, 2008

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

Derek Winstanley, Chief, ISWS
Allen Wehrmann, Principal Investigator, ISWS Center for Groundwater Science
Don Keefer, Co- Principal Investigator, ISGS
Ed Glatfelter, Water Supply Planner, ISWS

The following is a summary of activities of the Scientific Surveys from January 1, 2008 through March 31, 2008 related to the Water Supply Planning Initiative.

PUBLIC EDUCATION/OUTREACH

Waste Management Research Center (WMRC) Sustainability Seminar Series

On January 16, 2008, Al Wehrmann, ISWS Center for Groundwater Science Director, presented *Water Quantity and Sustainability of the Mahomet Aquifer* at the WMRC facility in Champaign.

WILL Interview

On February 14, 2008 Derek Winstanley, ISWS Chief, was interviewed about water resources by Bill Hammack, UIUC, for upcoming WILL radio programs on water.

Mahomet Aquifer Consortium Membership Meeting

On February 19, 2008, the ISWS hosted a Mahomet Aquifer Consortium membership meeting at its facility. Guest speaker Kishore Rajagopalan, with the Waste Management Resource Center, gave a presentation on water conservation in east central Illinois industry.

Hydraulic Engineering Luncheon

On February 21, 2008 Ed Glatfelter, ISWS Office of the Chief, presented *Water Supply Planning in East Central Illinois* to the Hydraulic Engineering Luncheon at the USGS facility in Champaign.

Soil & Water Conservation Districts Land Use Council 16

On February 22, 2008 Ed Glatfelter, ISWS Office of the Chief, presented *Understanding Northeastern Illinois Water Supplies* at the Spring meeting of the Illinois Soil & Water Conservation Districts' Land Use Council 16 at the DeKalb County Farm Bureau in Sycamore.

Illinois Section-American Water Works Association

On March 13, 2008 Ed Glatfelter, ISWS Office of the Chief, presented *Water Supply Planning in Illinois* at the Illinois Section-American Water Works Association's Annual Conference and Exposition in Springfield.

WSP Web Site

Material continued to be added to the water supply planning web site at www.sws.uiuc.edu/wsp, including a methodology for climate change sensitivity analysis of water demand scenarios.

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.

REGIONAL WATER SUPPLY PLANNING COMMITTEE SUPPORT

Meetings

Staff participated in three meetings of the NE Illinois RWSPG (January 22; February 26; and March 25, at CMAP's offices in Chicago) and in three meetings of the East Central Illinois RWSPC (January 25, Decatur; February 29, Lincoln; and March 28, Savoy). Derek Winstanley

gave a presentation on a draft planning report outline to the NE IL RWSPG at their January meeting for their consideration in the preparation of their June 2009 report.

Draft Water Demand Scenario Report Reviews

The ISWS sponsored technical review meetings at the ISWS in Champaign for the Northeastern Illinois Water Demand Scenario report and the East Central Illinois Water Demand Scenario report. The Northeastern Illinois review was conducted on January 10, 2008 and involved persons from Southern Illinois University (SIU), CMAP, Wittman Hydro Planning Associates and the ISWS. A revised draft report was released to the NE IL RWSPG on February 12, 2008. The East Central Illinois review was conducted on March 6, 2008 and involved persons from SIU, Wittman Hydro Planning Associates, Patrick Engineering, the EC IL RWSPC, USGS, ISGS, and the ISWS. A revised draft report was released to the EC IL RWSPC on March 18, 2008.

Northeastern Illinois Public Water Utility Survey

Ed Glatfelter, ISWS Office of the Chief, assisted a Northeastern Illinois RWSPG Committee that helped develop a Survey of Public Water Utilities that CMAP will distribute in April, 2008.

Water Planning Issues Conference

Derek Winstanley and Ed Glatfelter, ISWS Office of the Chief, participated in a conference call with a Mahomet Aquifer Consortium Board member and staff from the Paul Simon Policy Institute at Southern Illinois University, Openlands Project, the Illinois Department of Natural Resources and the Metropolitan Planning Council regarding a water planning issues conference in Chicago, scheduled for May 16, 2008 at the Union League in Chicago. The conference is intended to increase the awareness of Illinois' elected and appointed officials to water supply issues.

ILLINOIS WATER INVENTORY PROGRAM (IWIP)

Throughout the reporting period the IWIP Coordinator worked closely with Dr. Ben Dziegielewski, SIU, and Theresa Landewe, Wittman Hydro Planning Associates, to clarify and improve the data sets provided by the ISWS for water demand scenario modeling. 2005 public water system withdrawal data in Lake County were provided to the Lake County Health Department, along with provisional USGS water use data on agricultural and golf course irrigation. UIUC economist John Braden was assisted in obtaining water rate records for public supplies in northeastern Illinois from the IEPA groundwater division for use in a study of water rate/use relationships.

CLIMATE

Lake Michigan Water Levels

A methodology was developed, and work began on modeling the impact of climate change on Great Lakes water levels with the GLERL model.

Climate Simulations

Due to 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

Kane County Shallow Aquifers Model

The previously completed local model of shallow aquifers in Kane County is being modified. It is more robust and stable, giving it a greater ability to handle changes to pumping patterns, recharge rates, the addition of new wells, etc. And model error has been reduced. Following one last model sensitivity run, the model results will be incorporated into the final Kane County report.

Kane County Report

The model results in the item above will be added to the draft report which is expected to be sent out for internal and external review by the end of April.

Fox River Basin (FRB) Shallow Aquifers Model

A 5-layer geologic model of the Quaternary deposits (unconsolidated geologic materials above bedrock) within the FRB was delivered by the ISGS to the ISWS in February 2008. The ISWS Northeast Illinois Regional Flow Model is being modified to incorporate the 5-layer FRB geologic model, allowing simulation of all major wells across NE Illinois (from shallow sand & gravel to deep bedrock). Greater model detail and model certainty will be produced for areas within the FRB. The model will have less certainty outside the FRB, but will provide results previously considered beyond the project scope to assess shallow well impacts outside the FRB. The improved Northeast Illinois Regional Flow Model is expected to be available in time to conduct model runs and provide water demand impact analysis by the end of September 2008.

Mahomet Aquifer Groundwater Model

A new geologic map of the Champaign County area is being produced by the ISGS by 4/30/08. It will be used by the ISWS as new model input layers to the existing 3D aquifer model. An improved Mahomet aquifer model is expected to be available in time to conduct model runs and provide water demand impact analysis by the end of September 2008.

SURFACE WATERS

Watershed Model – Fox River

The SWAT hydrologic simulation model for the Fox River is complete. A draft report and conference paper on the model development are to be finalized in the next few weeks. The model is now ready for use in simulating impacts of climate change scenarios, and these scenario simulations will be initiated in April.

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 good progress has been made on calibrating the model. With the completion of the Fox River model, significant progress on the Sangamon model is expected over the next three months and model preparation is projected to 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 models have also been prepared, however programming changes must be made before these model versions are complete. These modifications will take several months.

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)

Geologic Mapping of the glacial deposits throughout the Fox River Watershed

A generalized 3-D geologic map for the Fox River watershed was completed by the ISGS and delivered to staff at the ISWS. This generalized 3-D geologic map contained 5 generalized geologic units; detailed geologic maps in portions of the region included as many as 23 different units. This level of detail was determined by ISGS and ISWS staff to be a suitable level of geologic detail for input to the groundwater flow model. Geophysicists and glacial geologists have met to discuss preliminary interpretations of geophysical data collected last summer. The insights gained from this meeting are being used to revise the geophysical interpretations. ISGS project staff has begun working with a graduate student from ISU. This student will assist in the incremental revision of the 3-D geologic map.

Characterization of Deep Bedrock Aquifer

ISGS staff has completed compilation of geophysical logs from over 500 boreholes drilled into bedrock in the 11 county northeastern Illinois region. The paper records have been copied and scanned into digital images for use in this project. These logs now are being used to develop regional and sub-regional cross sections which will assist in evaluating the uniformity of the deep bedrock aquifer and in providing insight on the potential importance of partitioning of the aquifer into distinct units. These logs and cross sections also will be used for analysis of the confining unit of the deep bedrock aquifer.

3-D Geologic Mapping of the Mahomet Aquifer System

Staff continues working to integrate geophysical and drilling data obtained this past summer into the existing geologic maps and models of the regions aquifers. 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. 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. ISGS staff has also collected additional drilling data and has identified sites for new drilling which will be conducted next quarter. 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.

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.

Supplemental: 1. Deep bedrock aquifers of Northeastern Illinois

Staff collected deep bedrock aquifer water level measurements and water quality samples in the fall of 2007. Installation of two deep-well water level dataloggers in DesPlaines and Joliet are scheduled for spring.

Supplemental: 3. Enhance Knowledge of Recharge

The ISWS publishing editor has initiated work to produce a report to further advance the general understanding of recharge in Illinois by defining the existing state of knowledge about recharge, focusing on northeastern Illinois and the Mahomet aquifer. This work is being produced by interviewing existing ISWS and ISGS staff, reviewing pertinent material and producing drafts suitable for the Surveys' staff review and comment.

MEETINGS

- 3 MAC Executive Board meetings, Champaign
- 1 MAC general membership meeting, Champaign
- 2 Pontiac Group conference calls (Coordination between OWR, MAC, CMAP, ISWS and ISGS)
- 3 Northeastern Illinois RWSPG meetings, Chicago
- 3 East Central Illinois RWSPC meetings, Decatur, Lincoln and Savoy
- 1 State Water Plan Task Force, Springfield. Included 2 ISWS report reviews
- 1 Illinois Institute for Rural Affairs, Western Illinois University
- 1 Village of Algonquin and Layne-Western
- 1 New-Gazette Editorial Board

PRESENTATIONS (In addition to those listed under Public Education/Outreach)

On January 16, 2008, Al Wehrmann, ISWS Center for Groundwater Science, presented *The Mahomet Aquifer and Ethanol Production* to the Watseka Chamber of Commerce in Watseka.

On January 29, 2008, Al Wehrmann, and Vern Knapp, Center for Watershed Science, made presentations at a public forum titled "Springfield's Future Water Needs" hosted by the Citizens Club in Springfield. Al Wehrmann presented *Groundwater Resources for Springfield with emphasis on the Sangamon River alluvium*.

On February 7, 2008, Al Wehrmann presented *Groundwater Occurrence and Movement: An Introductory Discussion with Application to East-Central Illinois* at the Mason County Irrigation Clinic, Havana

On February 20, 2008, Al Wehrmann presented *Groundwater Resources of Central Illinois* to the Illinois Chapter of the American Society of Plumbing Engineers regarding Illinois water resources and issues, focusing on water reuse and "green" plumbing at HDR Consulting Engineers office in Springfield. The presentation was broadcast via the Internet to other HDR offices.

On February 21, 2008, Derek Winstanley gave a presentation on Illinois water supplies, focusing on groundwater, to the Illinois Rural Water Association at their annual conference in Effingham.

On March 20, 2008, at the State Water Plan Task Force meeting in Springfield, Vern Knapp, ISWS Center for Watershed Science, reviewed two new ISWS reports: *Uncertainties and Data Needs in Evaluating the Adequacy of Community Surface Water Supply Systems in Illinois*, and *Data for Assessing Drought Vulnerability of Illinois' Community Surface Water Systems*.