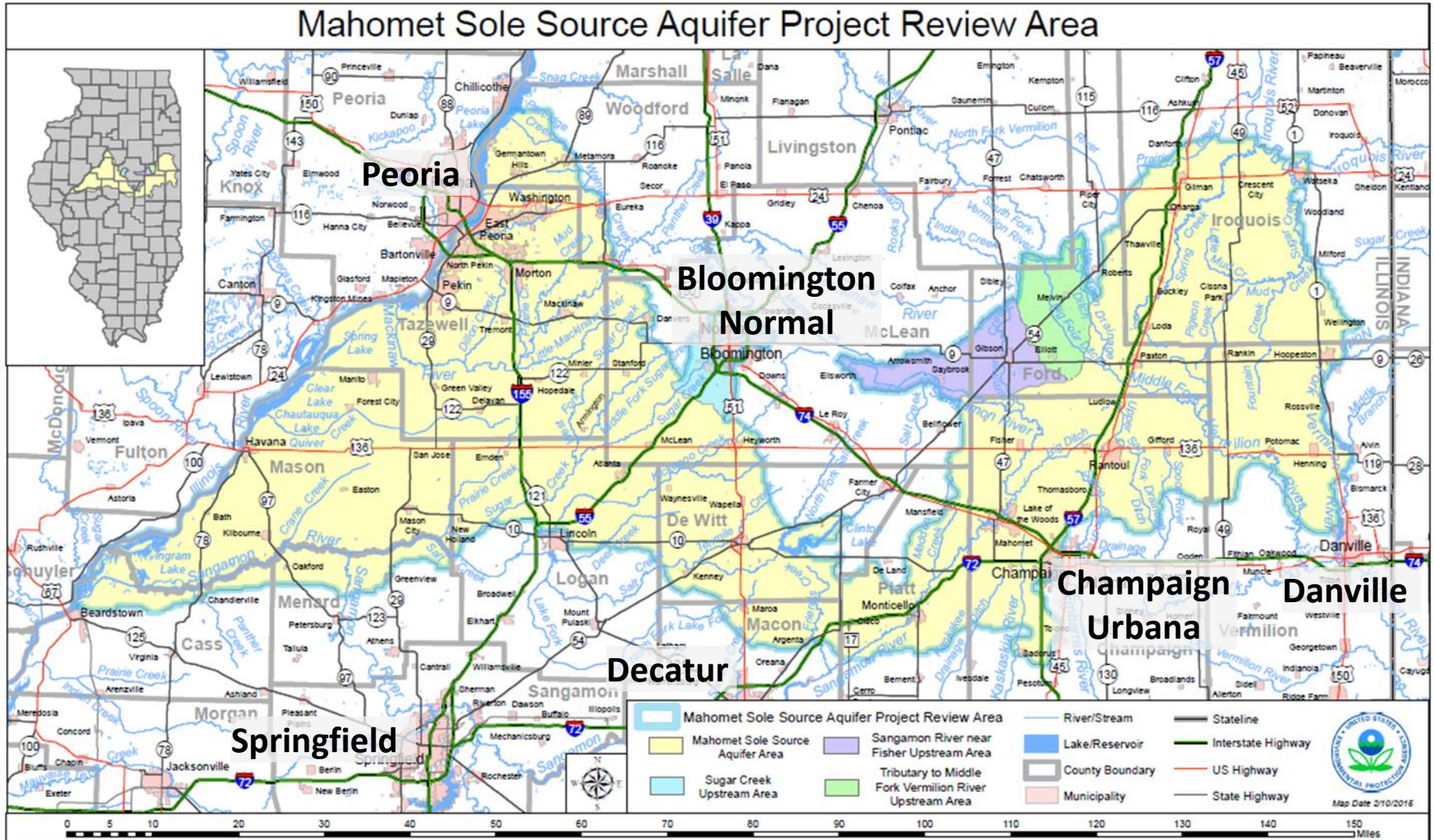


Protection of the Mahomet Aquifer

George Roadcap, PhD, P G
Hydrogeologist - Illinois State Water Survey
Prairie Research Institute
Adjunct Professor - Dept. of Geology
roadcap@Illinois.edu 217-333-7951



The Mahomet Aquifer

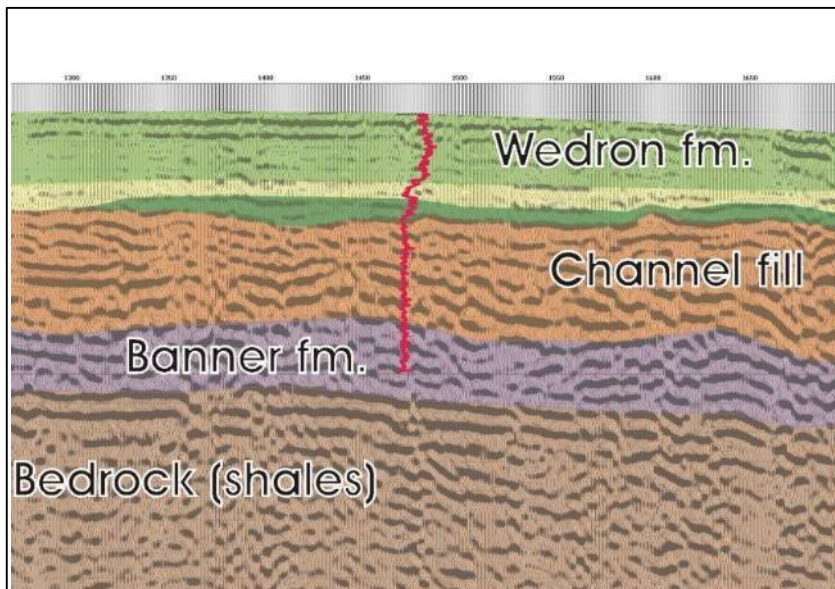
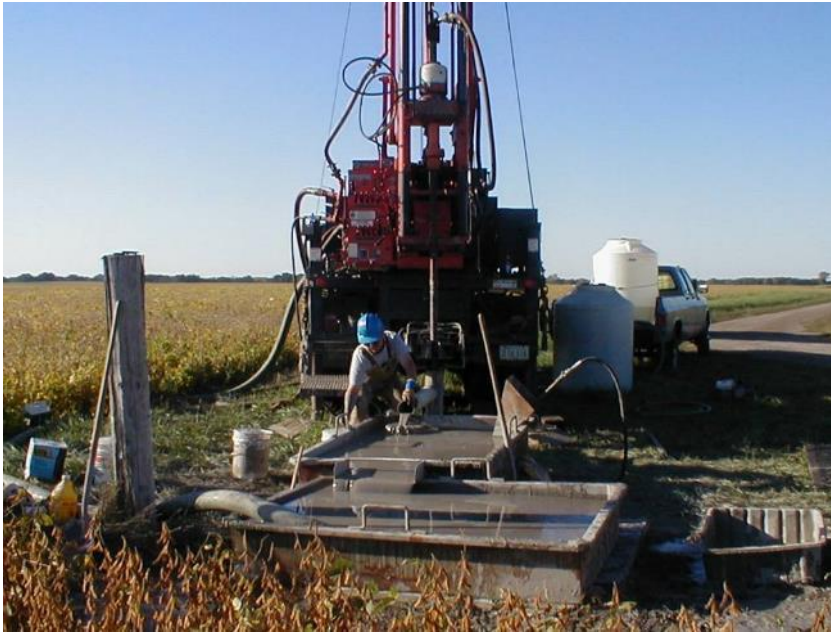


Why Does PRI Study the Aquifer?

- **Understanding the resource**
 - Geology
 - Hydrology
 - Chemistry
- **Water Supply**
 - Sustainability of current and future use
 - Protection of water quality



How Does PRI Study the Aquifer?



Resources for the Task Force

PRI Natural Gas Working Group (NGWG) goals are to:

1. Assist stakeholders in their responses to address natural gas leakage...
2. Consider natural gas storage activities in Illinois ...as they relate to natural resource ... protection issues

“Introductory Guide”, includes:

- Basic information about the Mahomet aquifer and natural gas storage, and
- A list of potential aquifer protection issues for task force consideration

An Introductory Guide
to the Mahomet Aquifer
and Natural Gas Storage
in East-Central Illinois

PREPARED BY THE PRAIRIE RESEARCH INSTITUTE

The University of Illinois' Prairie Research Institute (PRI) is a world-class interdisciplinary research institute that provides objective scientific expertise, data, and applied research to aid decision-making and provide solutions for government, industry, and the people of Illinois. PRI is the home of the state's five scientific surveys: the Illinois Natural History Survey (INHS), Illinois State Archaeological Survey (ISAS), Illinois State Geological Survey (ISGS), Illinois State Water Survey (ISWS), and Illinois Sustainable Technology Center (ISTC). PRI's more than 300 scientific staff are dedicated to the mission of stewarding Illinois' natural and cultural resources.

Contributing Authors

- Randy Locke, natural gas working group facilitator and environmental geochemist, ISGS
- George Roadcap, hydrogeologist, ISWS
- Andrew Stumpf, associate quaternary geologist, ISGS
- Hannes Leetaru, senior petroleum geologist, ISGS
- Walt Kelly, groundwater geochemist, ISWS
- Richard Winkel, deputy executive director, PRI

Suggested citation: Locke, R., Roadcap, G., Stumpf, A., Leetaru, H., Kelly, W., & Winkel, R. (2018). An Introductory Guide to the Mahomet Aquifer and Natural Gas Storage in East-Central Illinois. Prairie Research Institute, Champaign, IL, 18 p.

 **ILLINOIS**
Prairie Research Institute

Point of Contact:

Trish Barker, tbarker@illinois.edu;
217-300-2327

For more information, see:

<https://prairie.illinois.edu/content/natural-gas-working-group>

Resources for the Task Force

The Future of Science of the Mahomet Aquifer

Steven E. Brown, Jason F. Thomason, and Kisa E. Mwakanyamale

Illinois State Geological Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign



Circular 594 2018

ILLINOIS STATE GEOLOGICAL SURVEY
Prairie Research Institute
University of Illinois at Urbana-Champaign

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

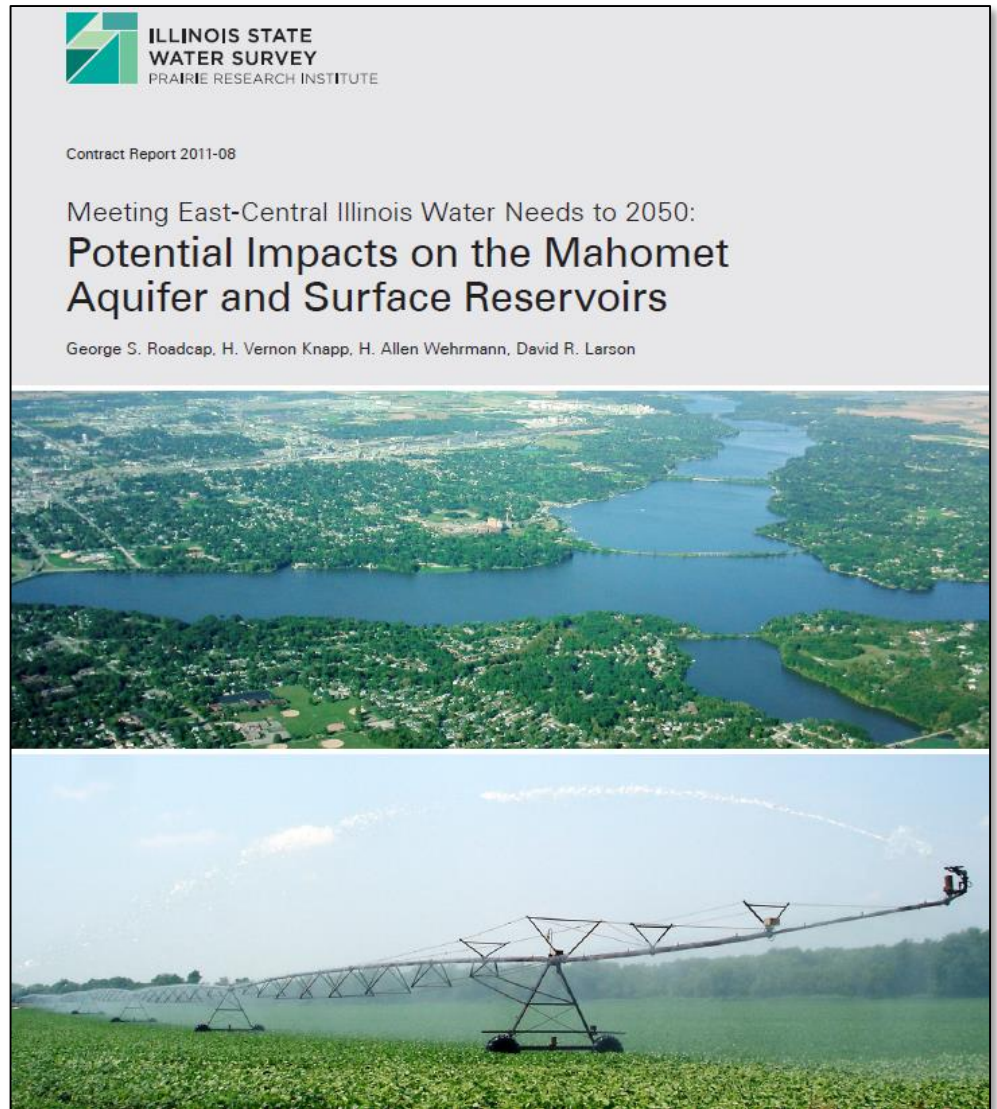
The Future of Science of the Mahomet Aquifer

Illinois State Geological Survey Circular 594

1. Reviews different concepts, interpretations, and identities of the Mahomet aquifer
2. Provides a summary of the June 28, 2017 “Future of Science of the Mahomet Aquifer” stakeholder workshop
3. Makes the case for the need to map the aquifer in 3D, and in high resolution with airborne technology

Resources for the Task Force

- **Water supply and demand**
- **Geology**
- **Hydrogeology**
 - Flow
 - Recharge
- **Groundwater Flow Model**
- **Yield estimates for:**
 - Lake Decatur
 - Lake Springfield
 - Lake Bloomington
 - Lake Vermilion



Resources for the Task Force

- Mahomet Aquifer Consortium
- Regional Water Supply Planning Committee
- PRI scientists serve as technical advisors

A Plan to Improve the Planning and Management of Water Supplies in East-Central Illinois

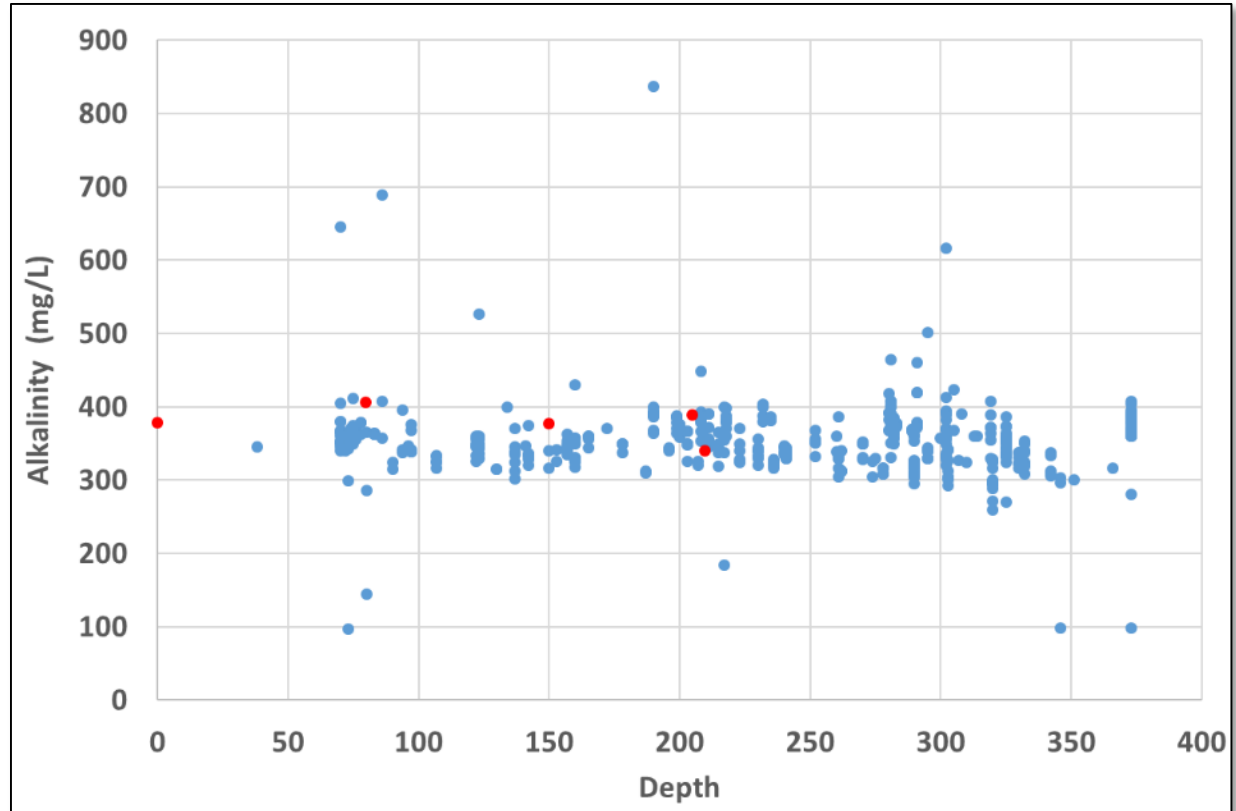
This report has been a collaborative, joint effort organized by the Mahomet Aquifer Consortium and numerous other individuals including the following stakeholders:

Bradley Uken (Chair): Public Jeff Smith (Vice Chair): Agriculture Shannon Allen: Soil and water conservation
Morris Bell: Water authorities Dwain Berggren: Environment Robert Betzelberger: Small business
Frank Dunmire: Rural water districts Jay Henry: Electric generating utilities Evelyn Neavear: Counties
Mark Sheppard: Industries William Smith: Municipalities Steve Wegman: Water utilities



Resources for the Task Force

- Water quality reports
- Arsenic studies
- Isotope studies
- Microbial studies
- Water quality database



Formed by Glaciers



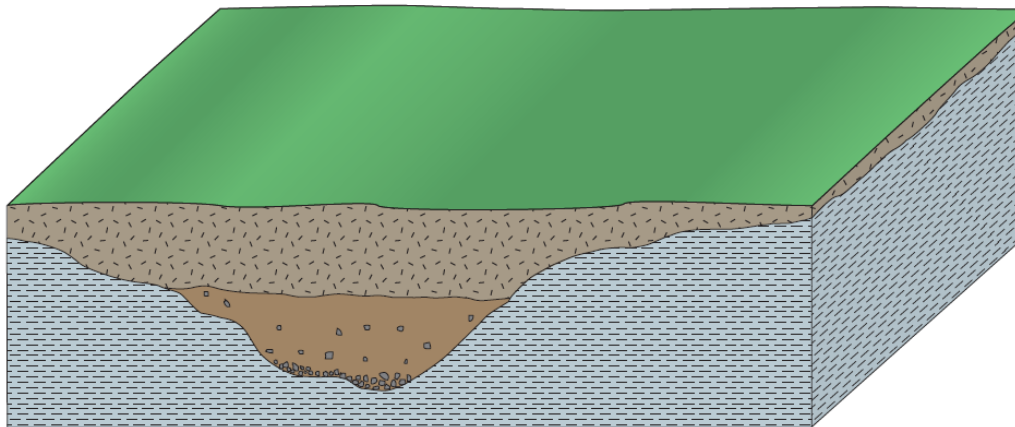
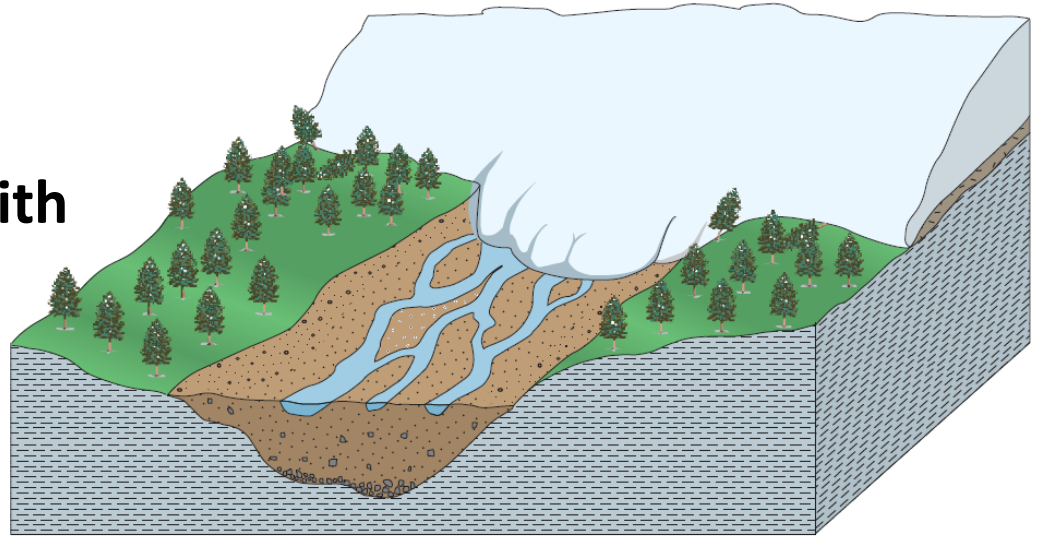
Thwaites Glacier
Antarctica

The New River
in West Virginia



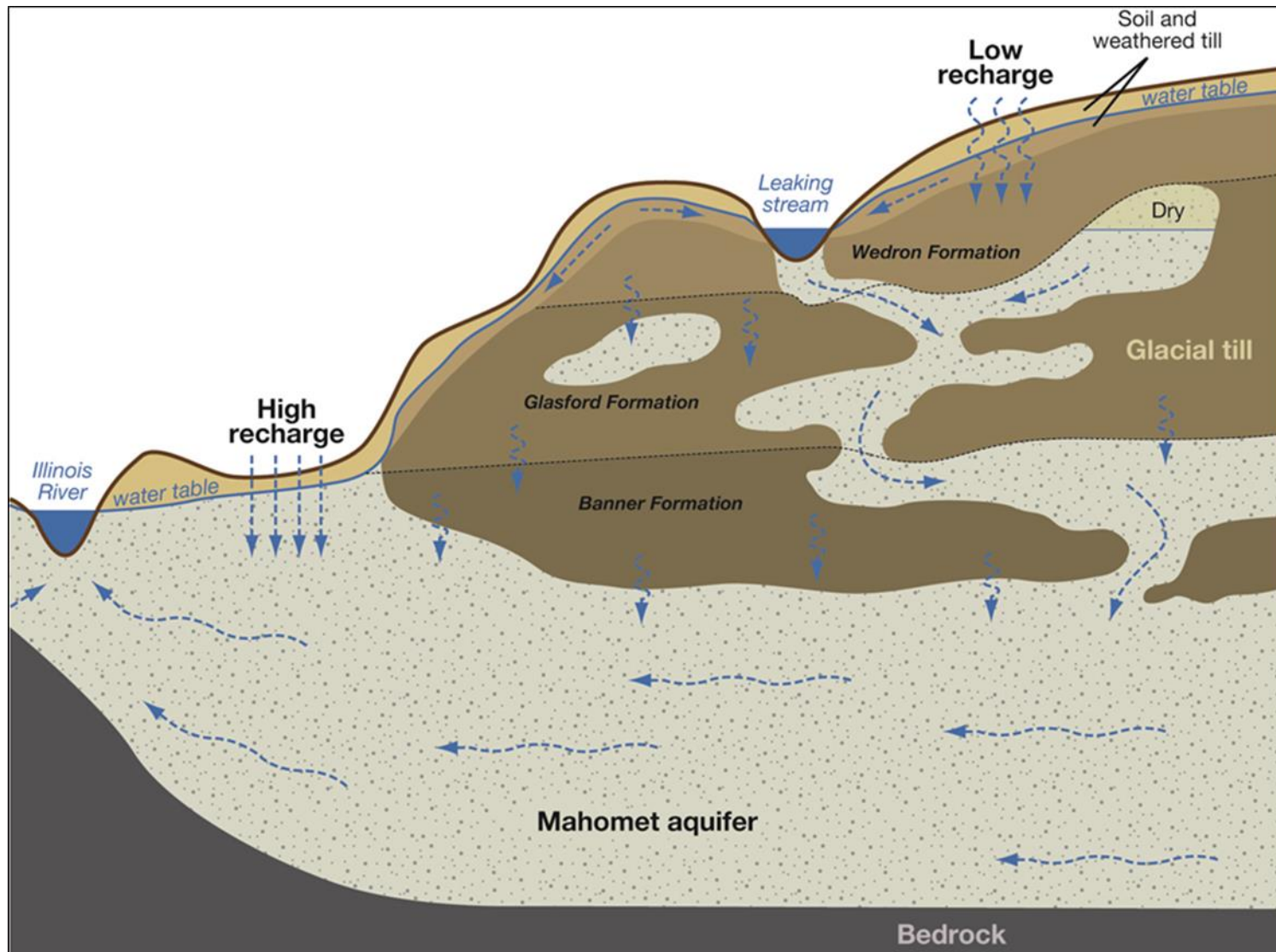
Deposition in Bedrock Valleys

- Three major advances
- Interglacial erosion
- Layered sands and clays with some interconnections between aquifers



Panno et al., 2005

Conceptual Flow Model



Who Uses the Aquifer?



Photo: Mason County Democrat

Agriculture

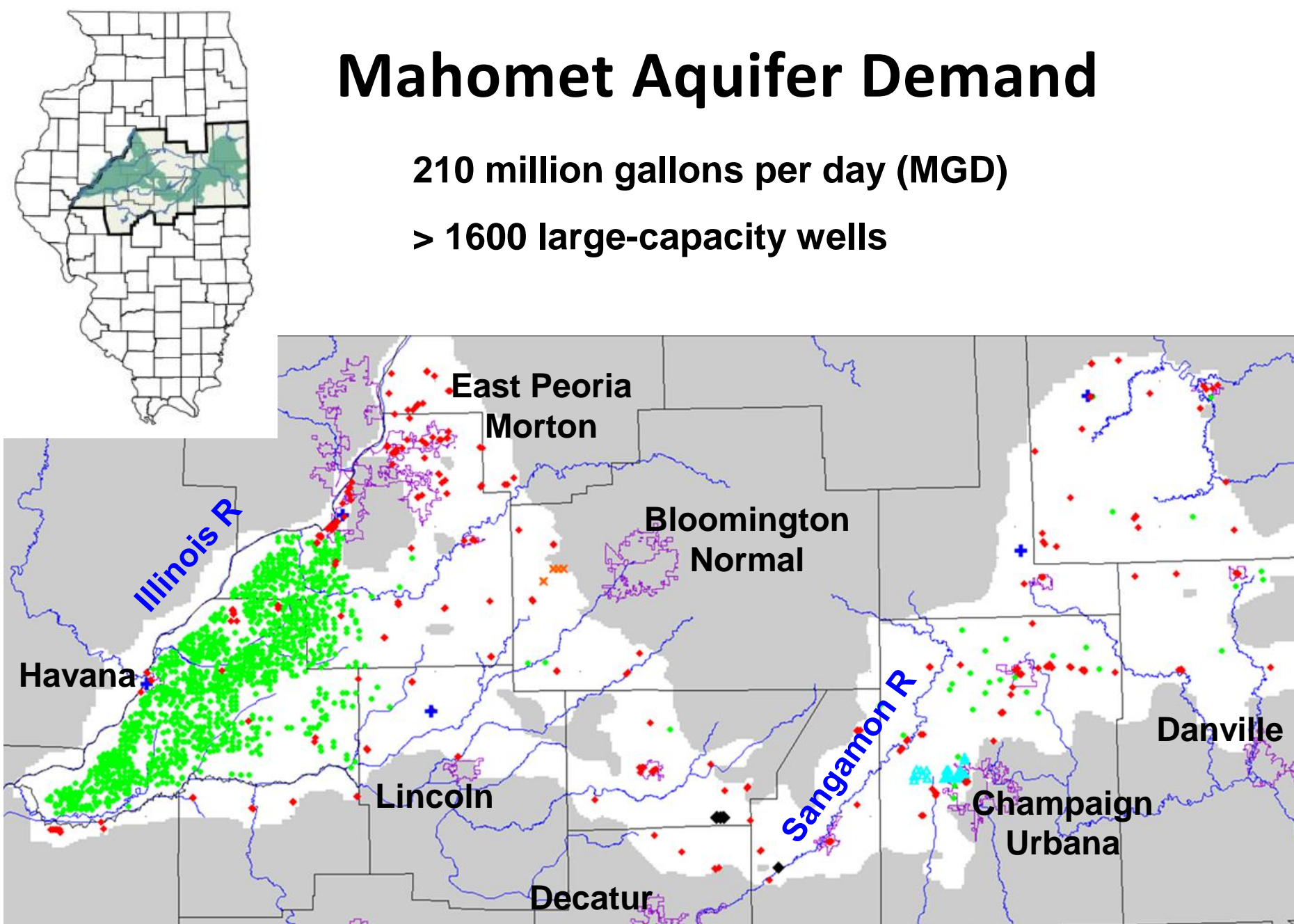
**Public Water Supplies
(IAWC Well 57)**



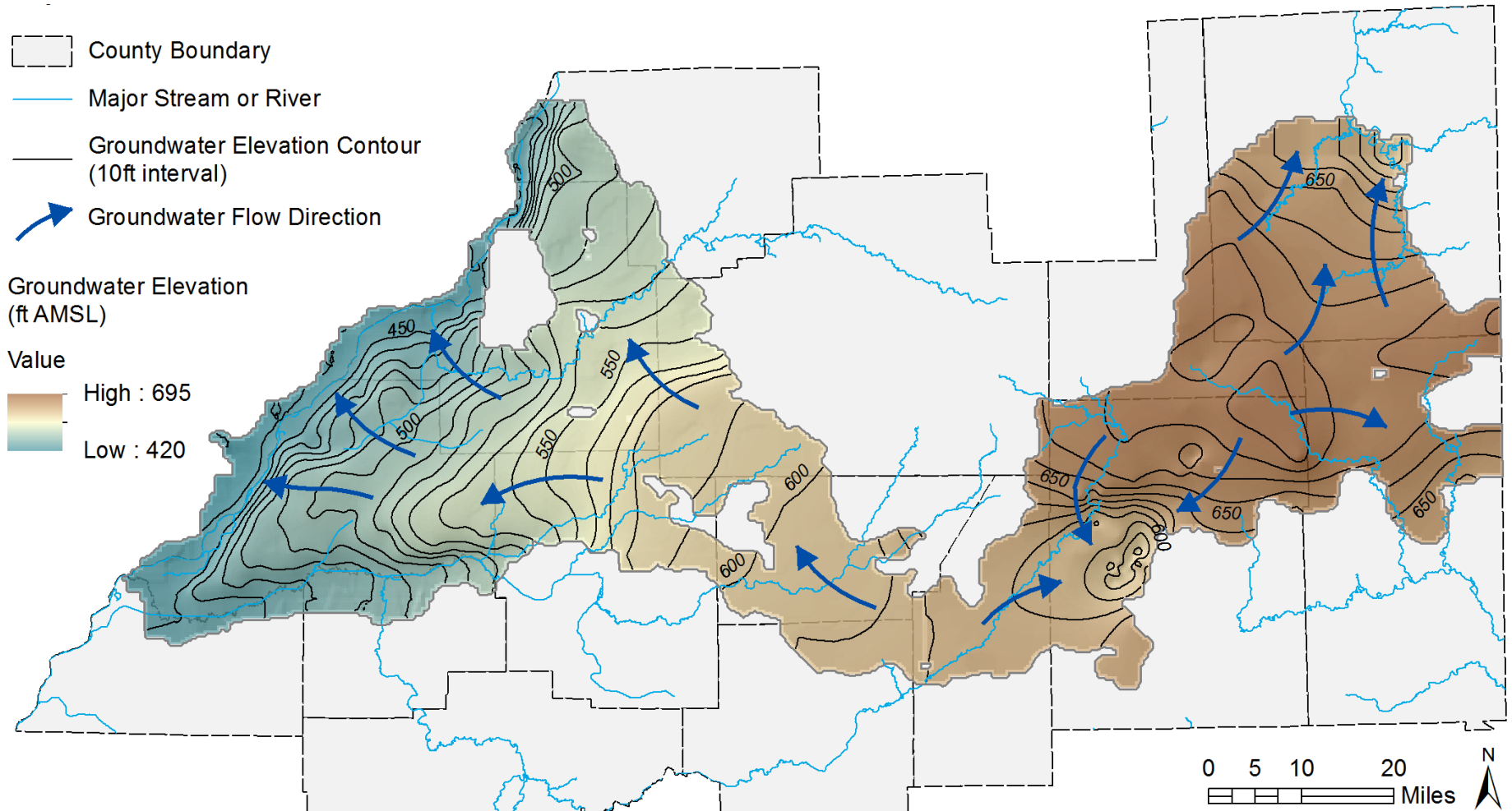
Mahomet Aquifer Demand

210 million gallons per day (MGD)

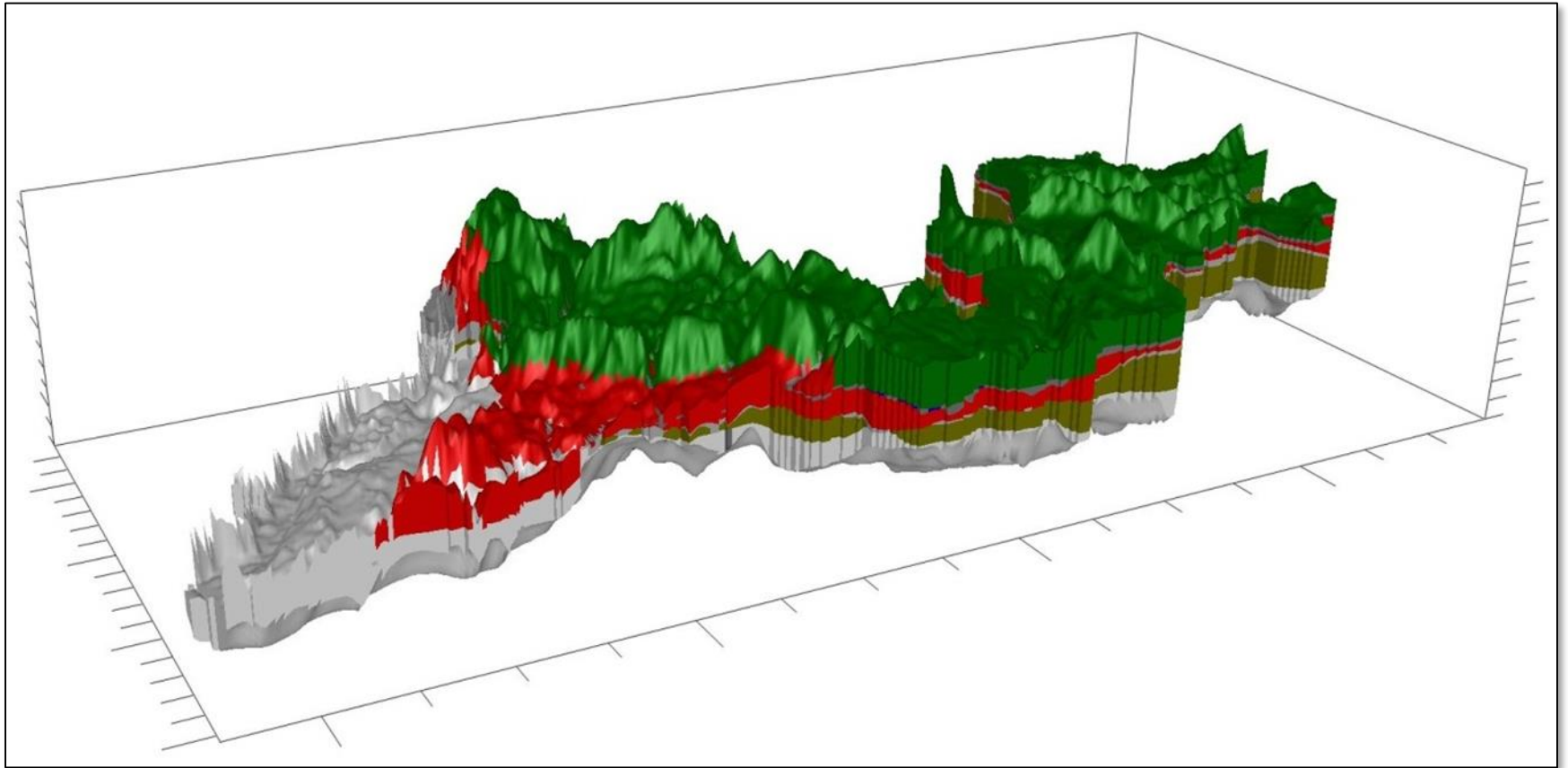
> 1600 large-capacity wells



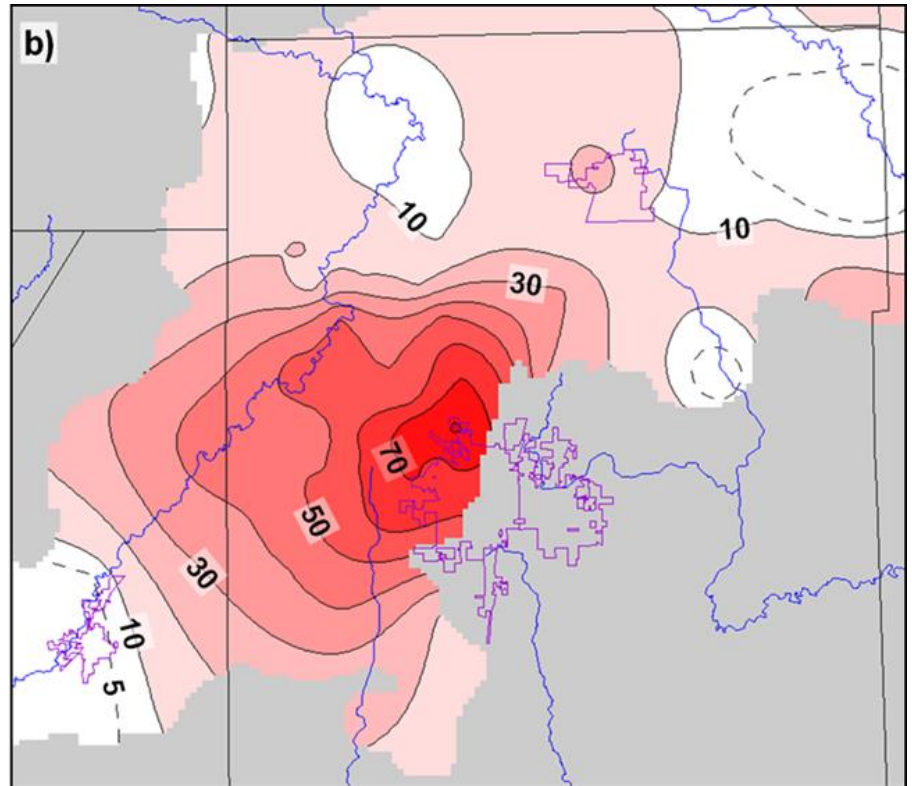
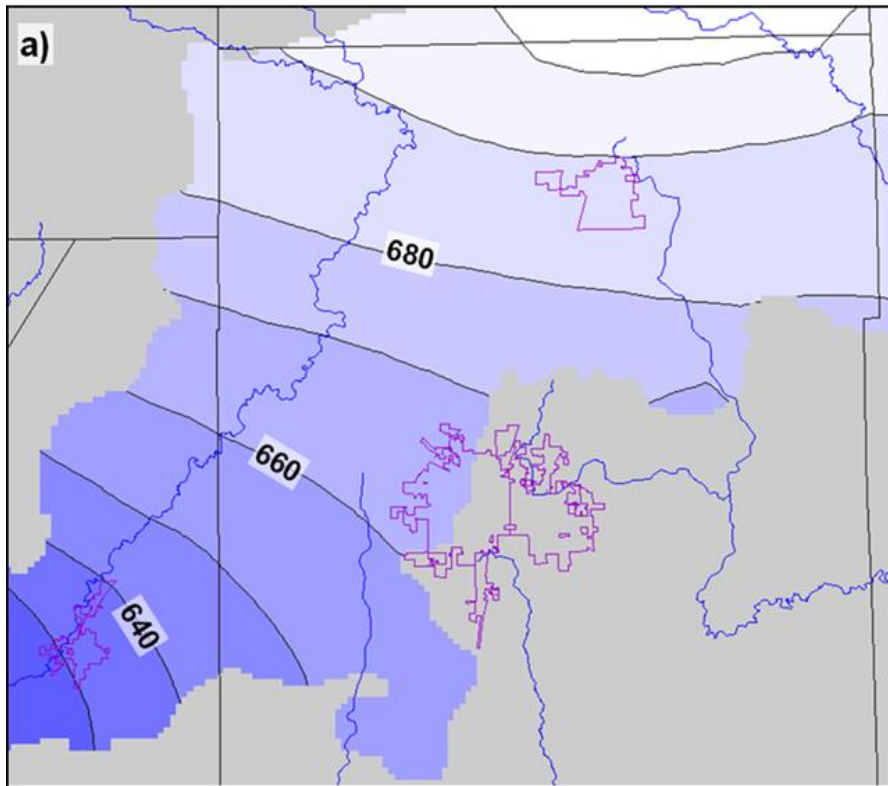
Groundwater Flow Patterns



Groundwater Flow Model



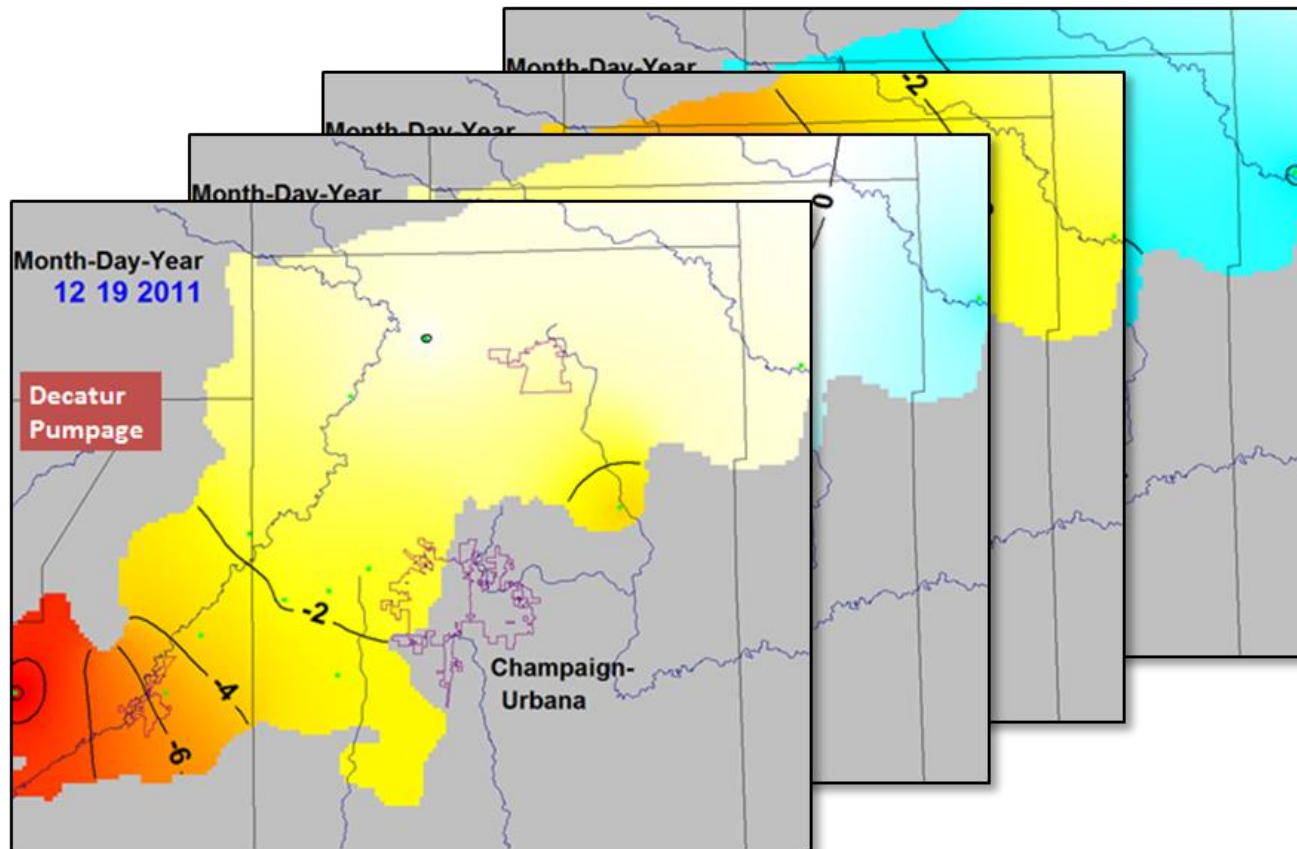
Water Level Drawdown near Champaign



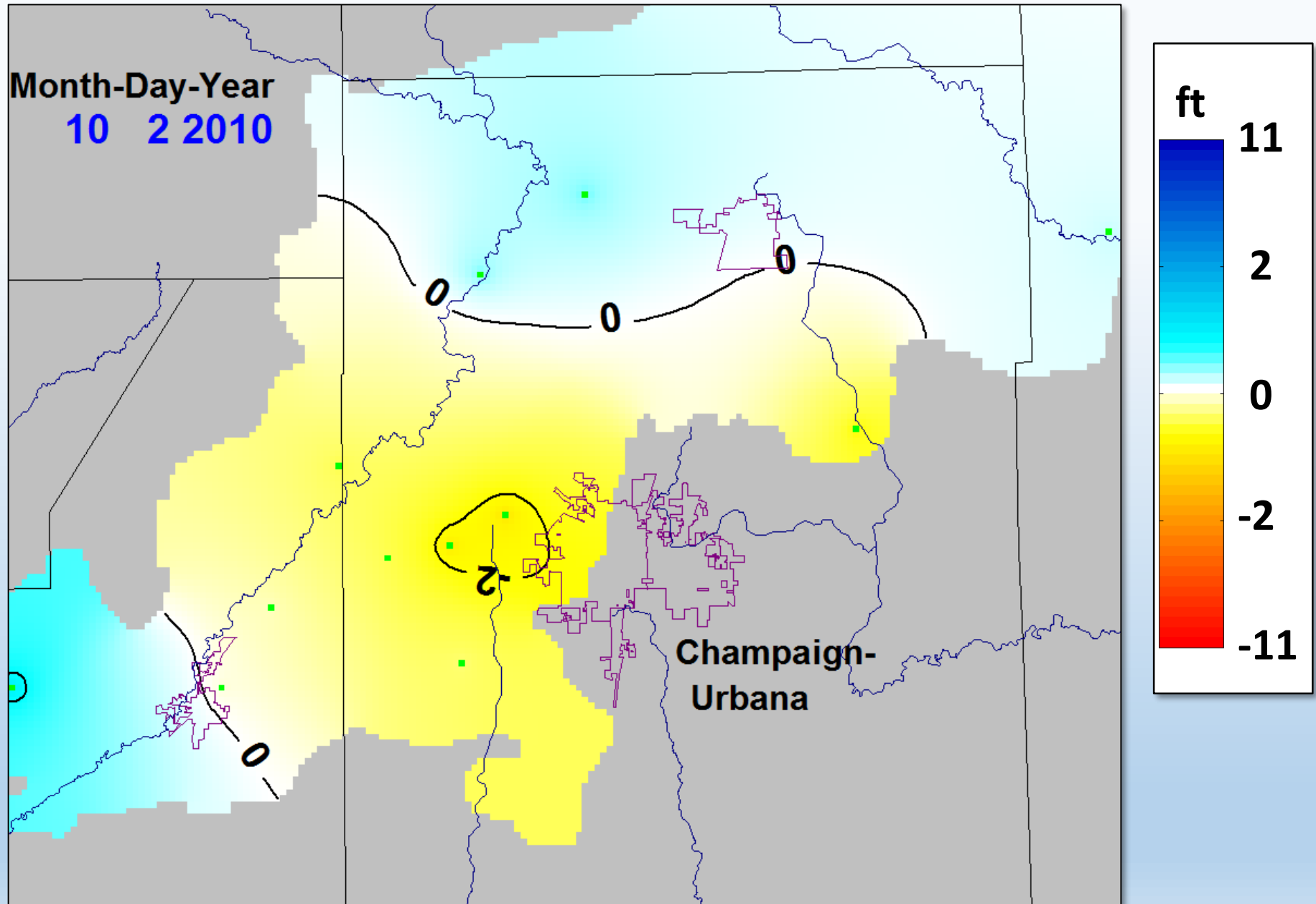
Sangamon River at Old Route 48 in Monticello, August 2012



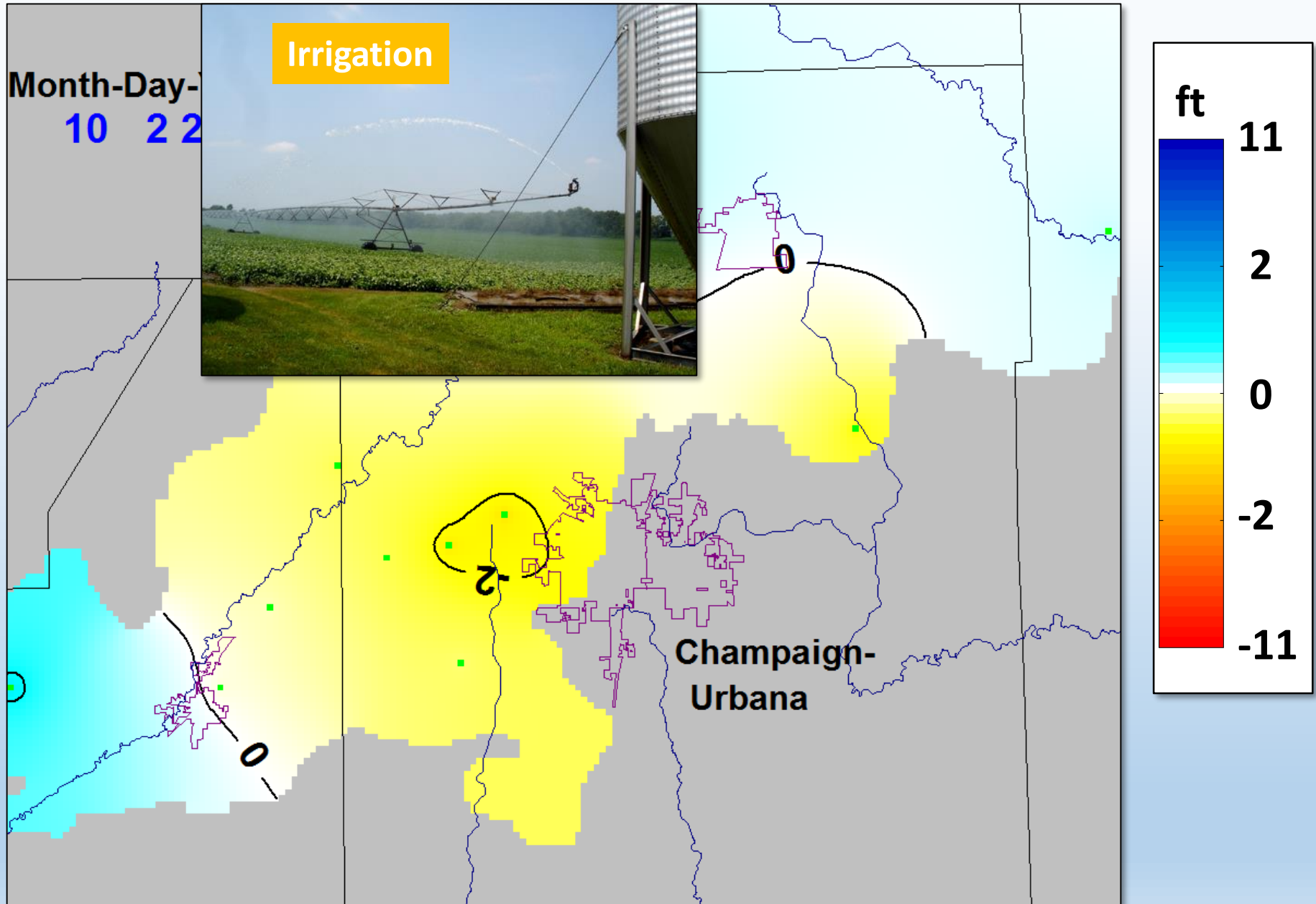
Response to Recharge and Drought



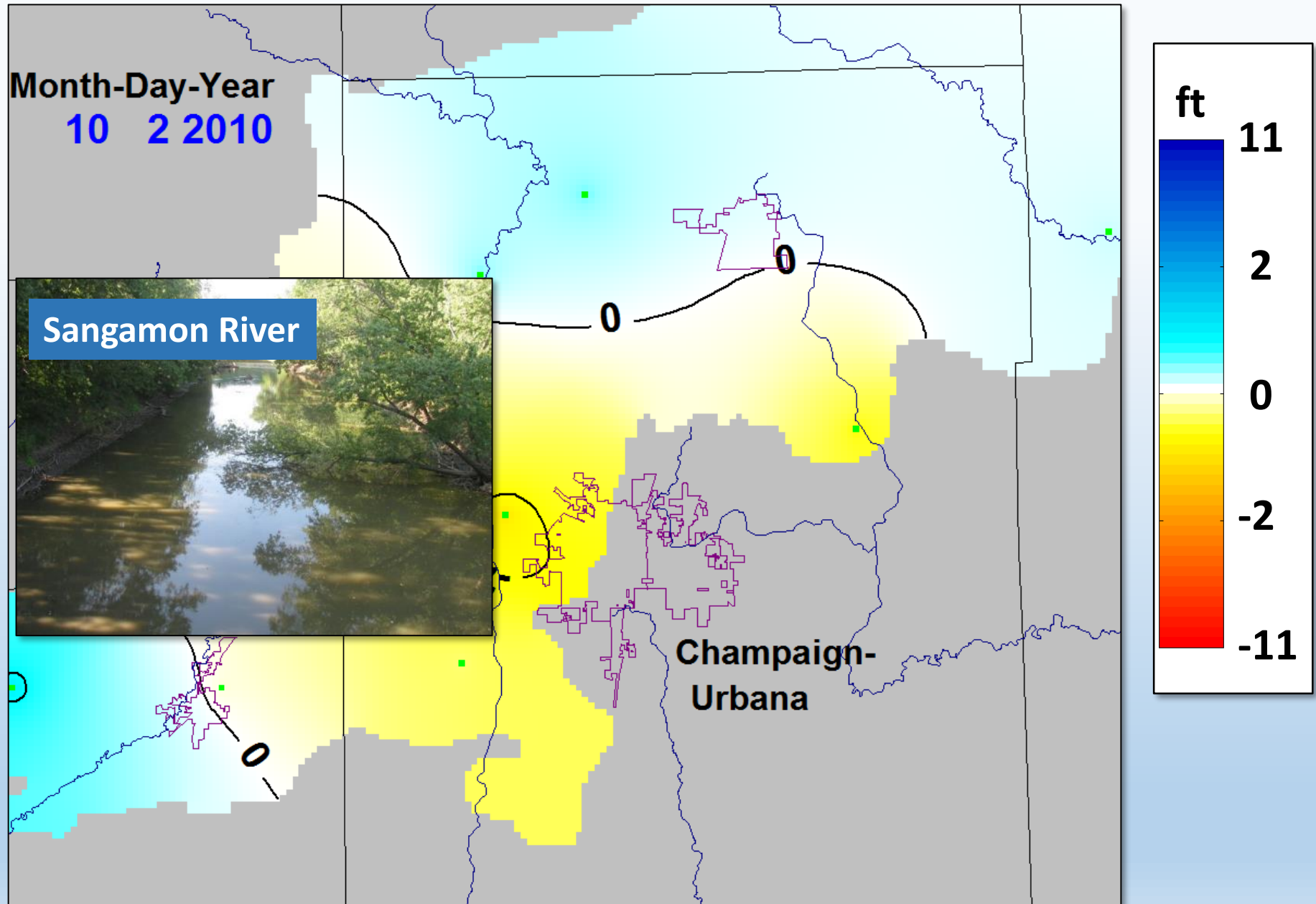
Head Change From Mean



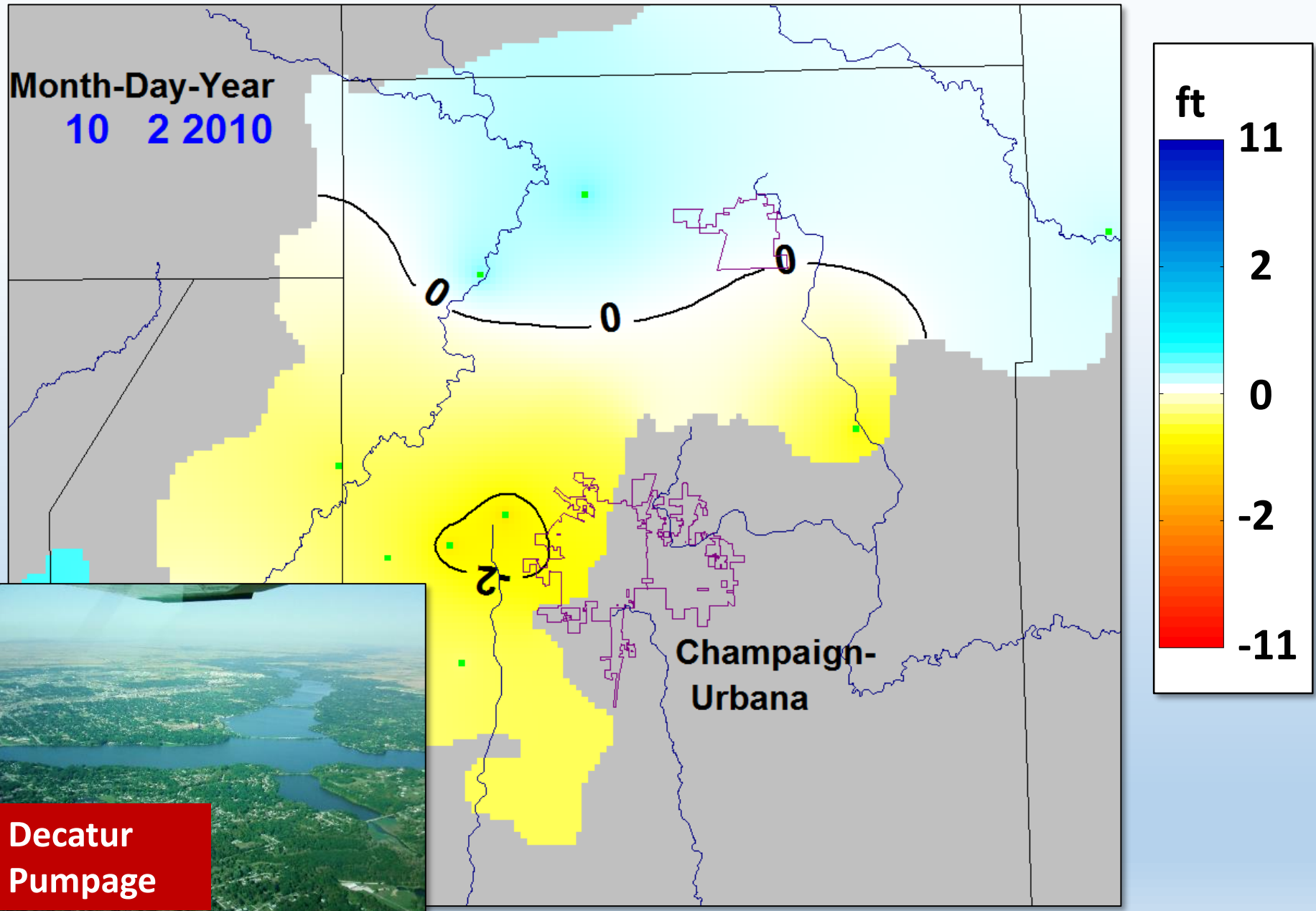
Head Change From Mean



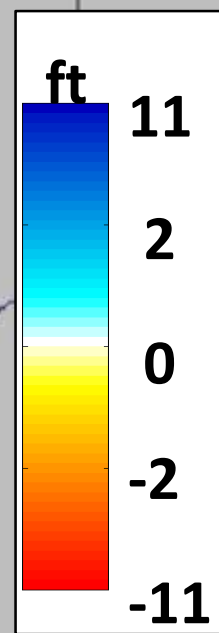
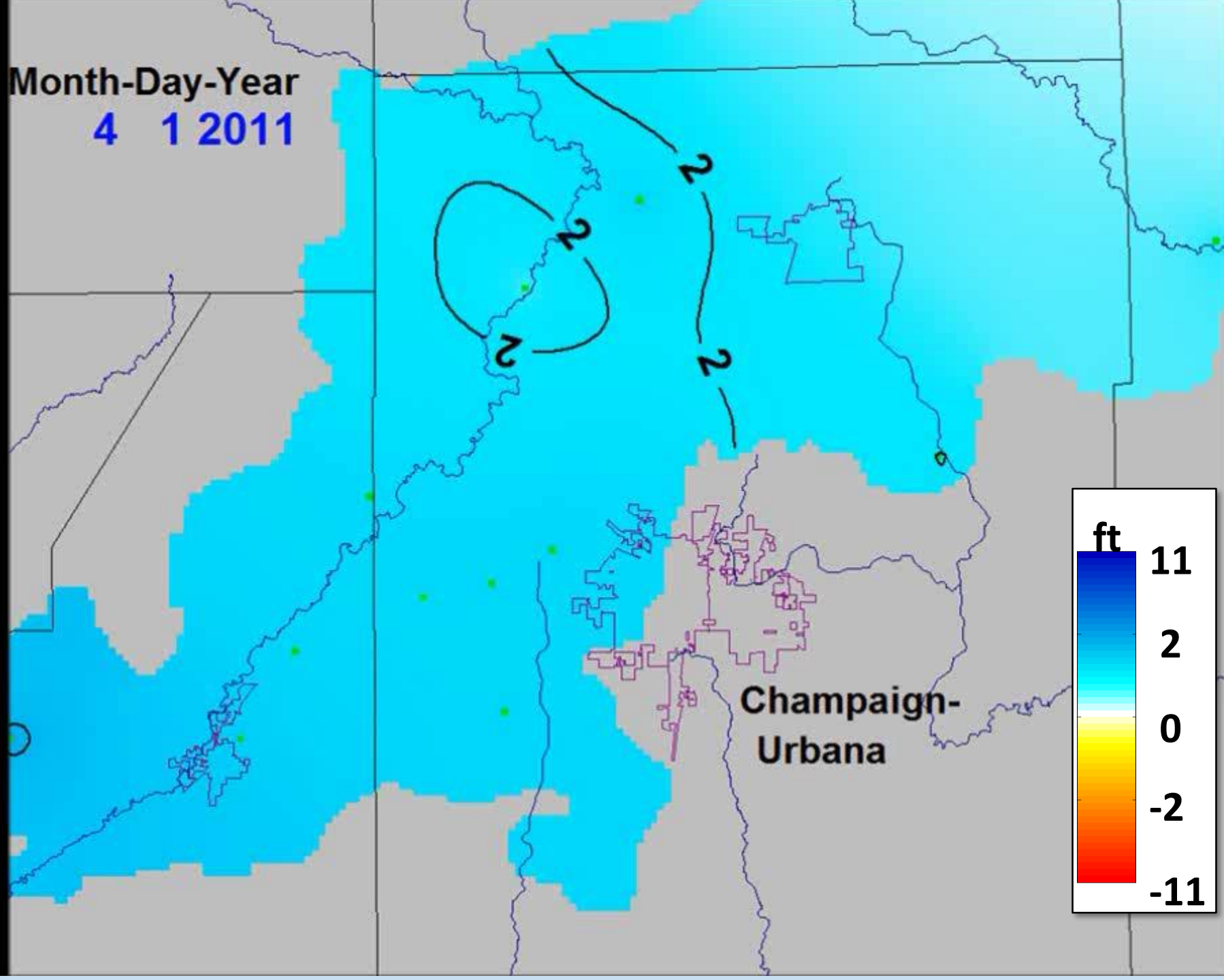
Head Change From Mean



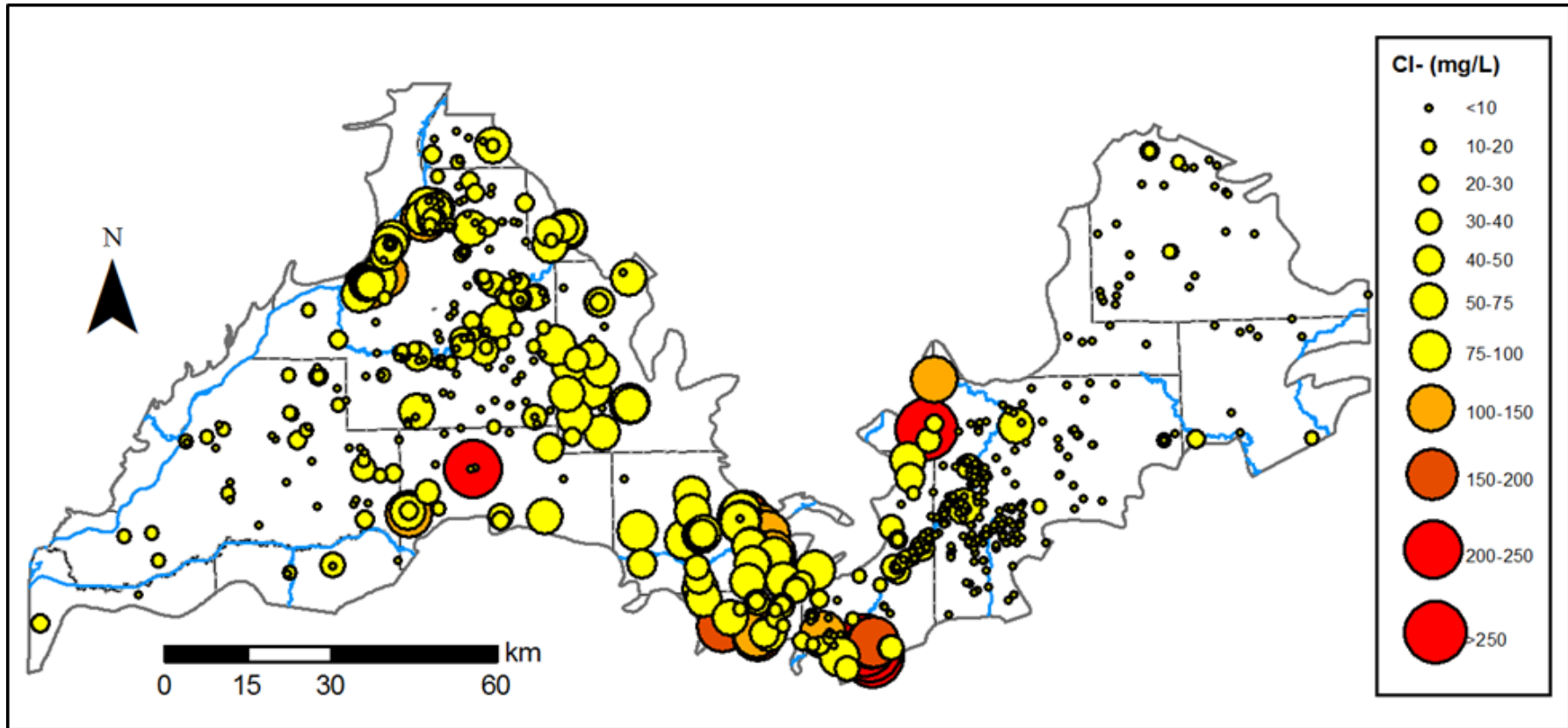
Head Change From Mean



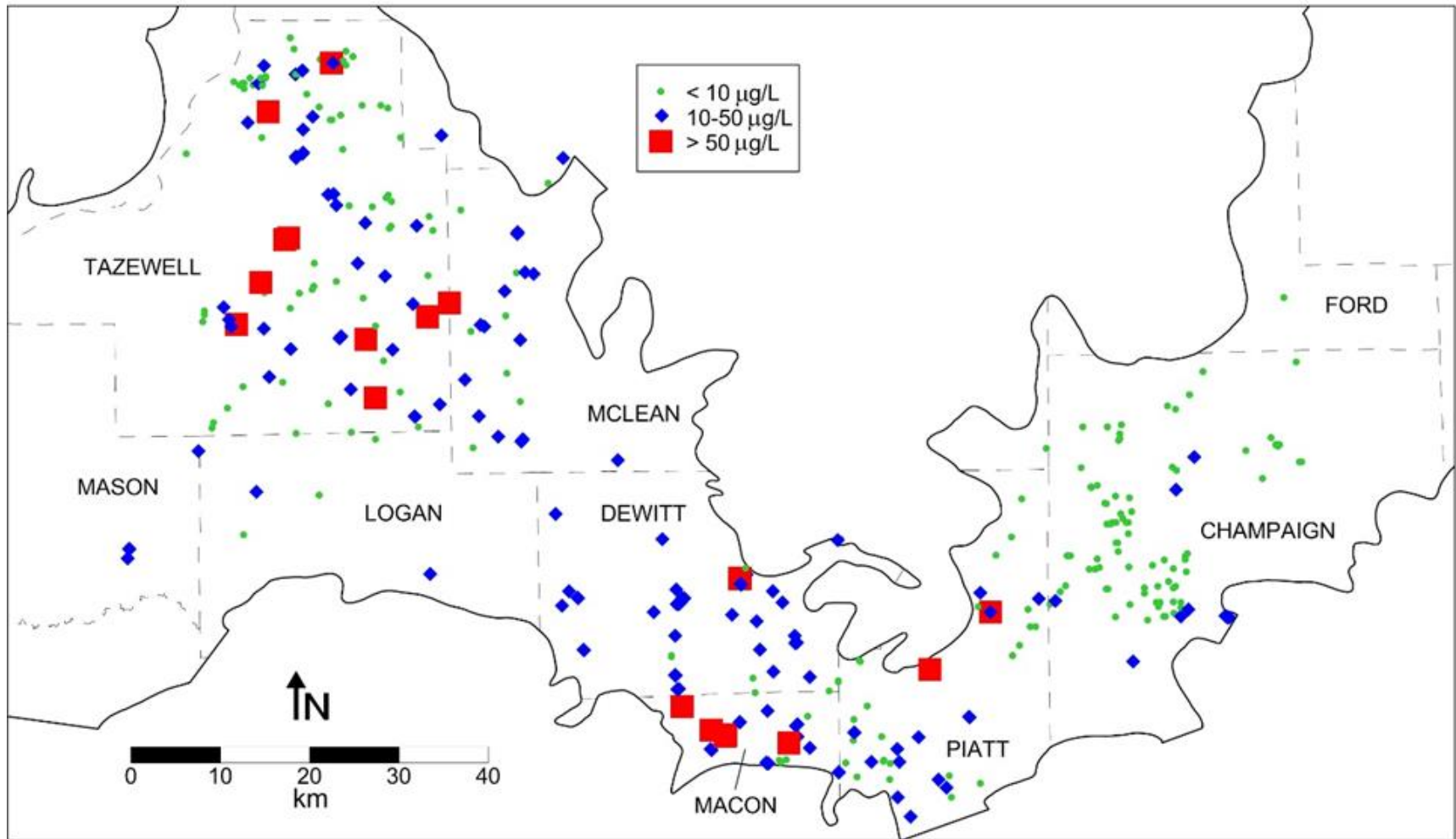
Month-Day-Year
4 1 2011



Groundwater Chemistry - Chloride



Natural Contaminants - Arsenic



Thank
you



#10

New wells north of Lincoln Ave. pumping station, 1915.