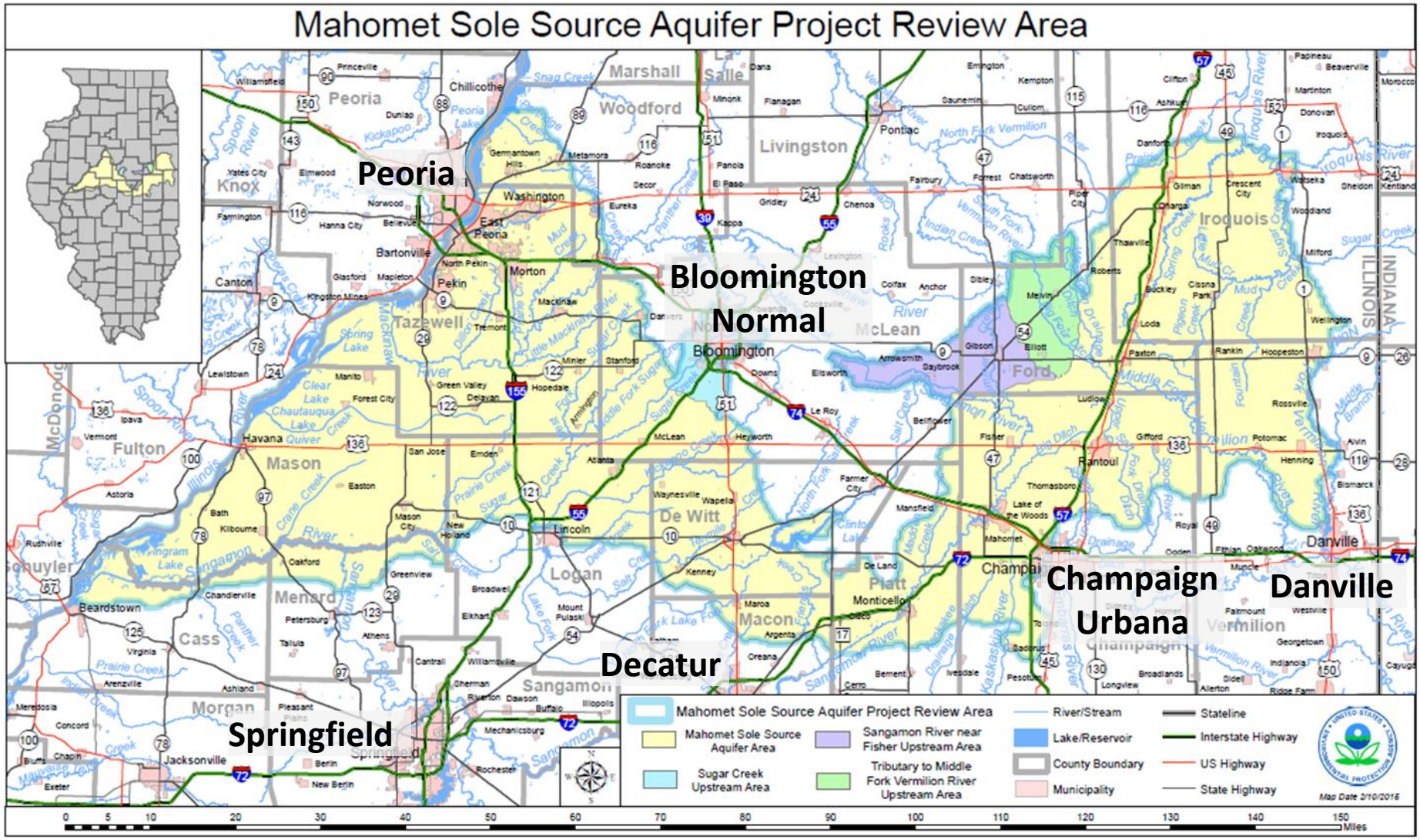
Protection of the Mahomet Aquifer

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

ILLINOIS

Henry Allan Gleason Nature Preserve
Andrew Bradshaw - http://lincolnlandnature.blogspot.com/

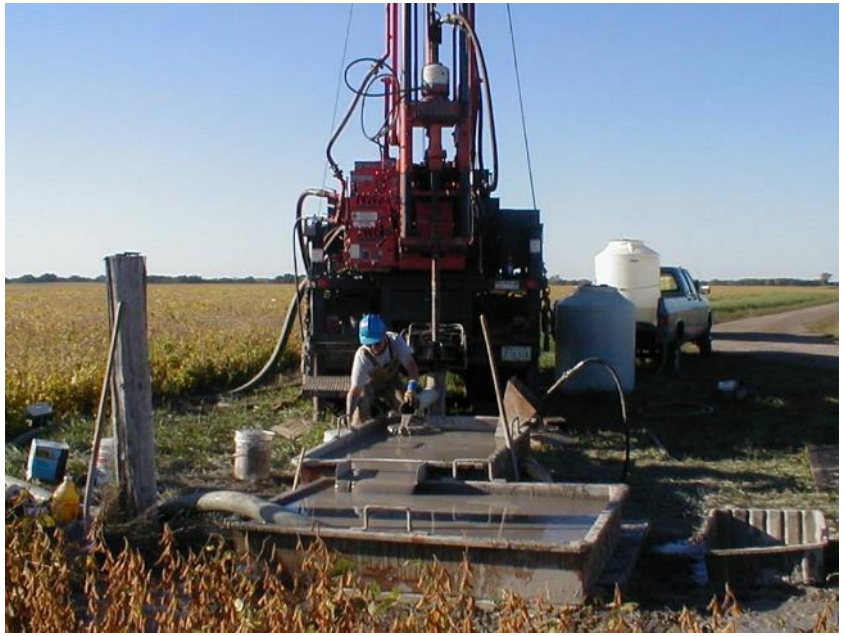
The Mahomet Aquifer

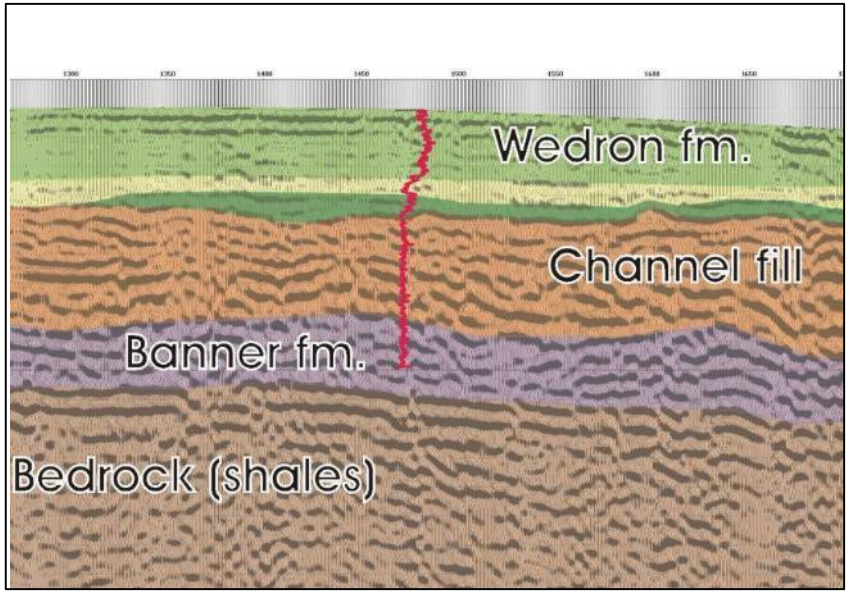


Why Does PRI Study the Aquifer?

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

How Does PRI Study the Aquifer?





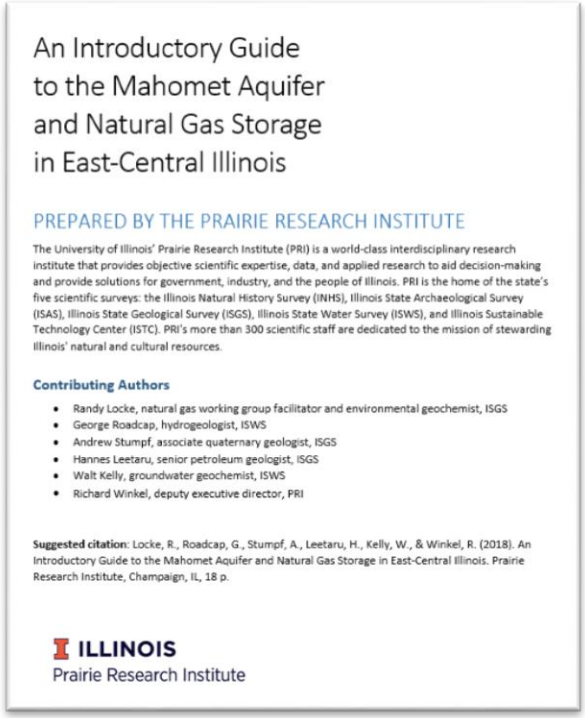
Resources for the Task Force

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

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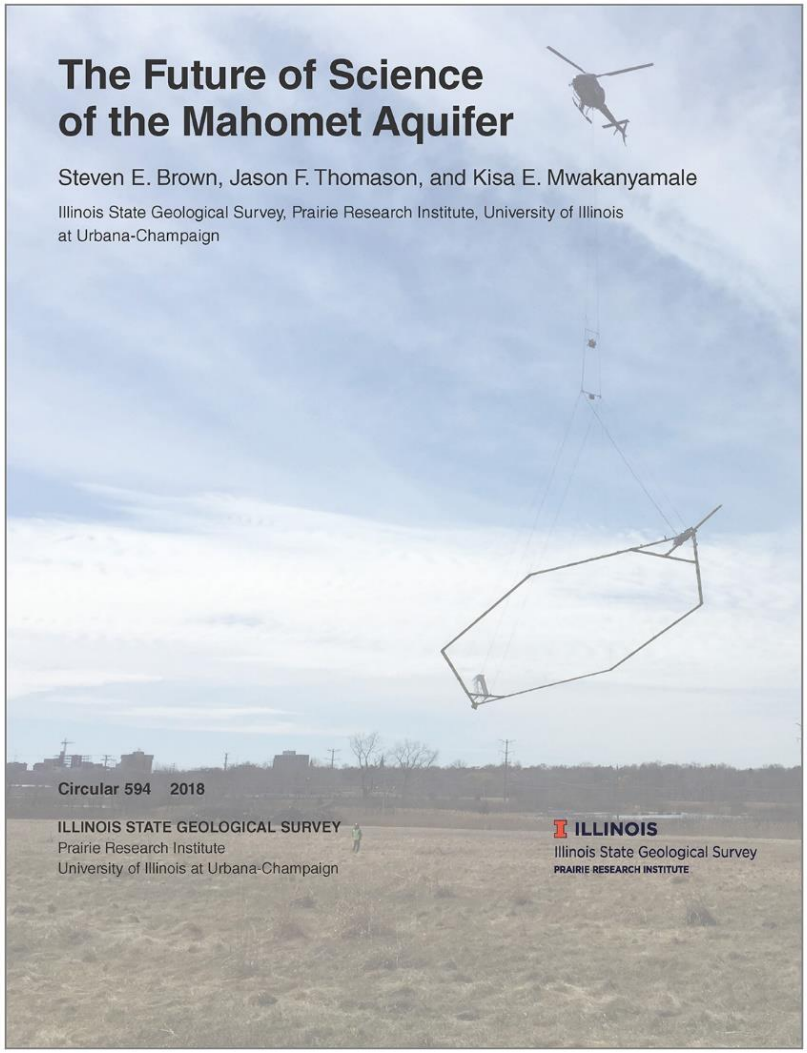
Prairie Research Institute

Point of Contact:
Trish Barker, tlbarker@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

Illinois State Geological Survey Circular 594

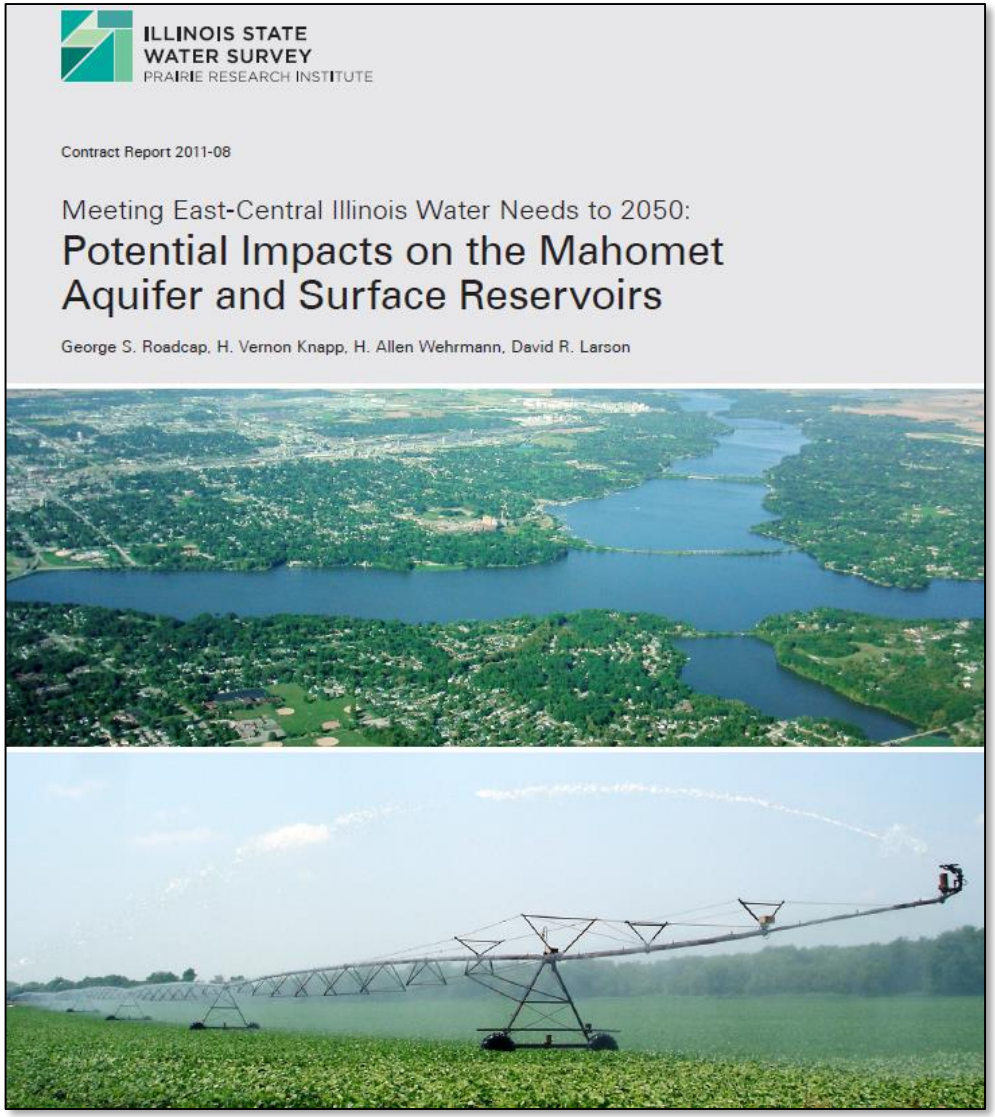
1. Reviews different concepts, interpretations, and identities of the Mahomet aquifer

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


ILLINOIS STATE WATER SURVEY
PRAIRIE RESEARCH INSTITUTE

Contract Report 2011-08

Meeting East-Central Illinois Water Needs to 2050:
Potential Impacts on the Mahomet Aquifer and Surface Reservoirs

George S. Roadcap, H. Vernon Knapp, H. Allen Wehrmann, David R. Larson

Resources for the Task Force

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

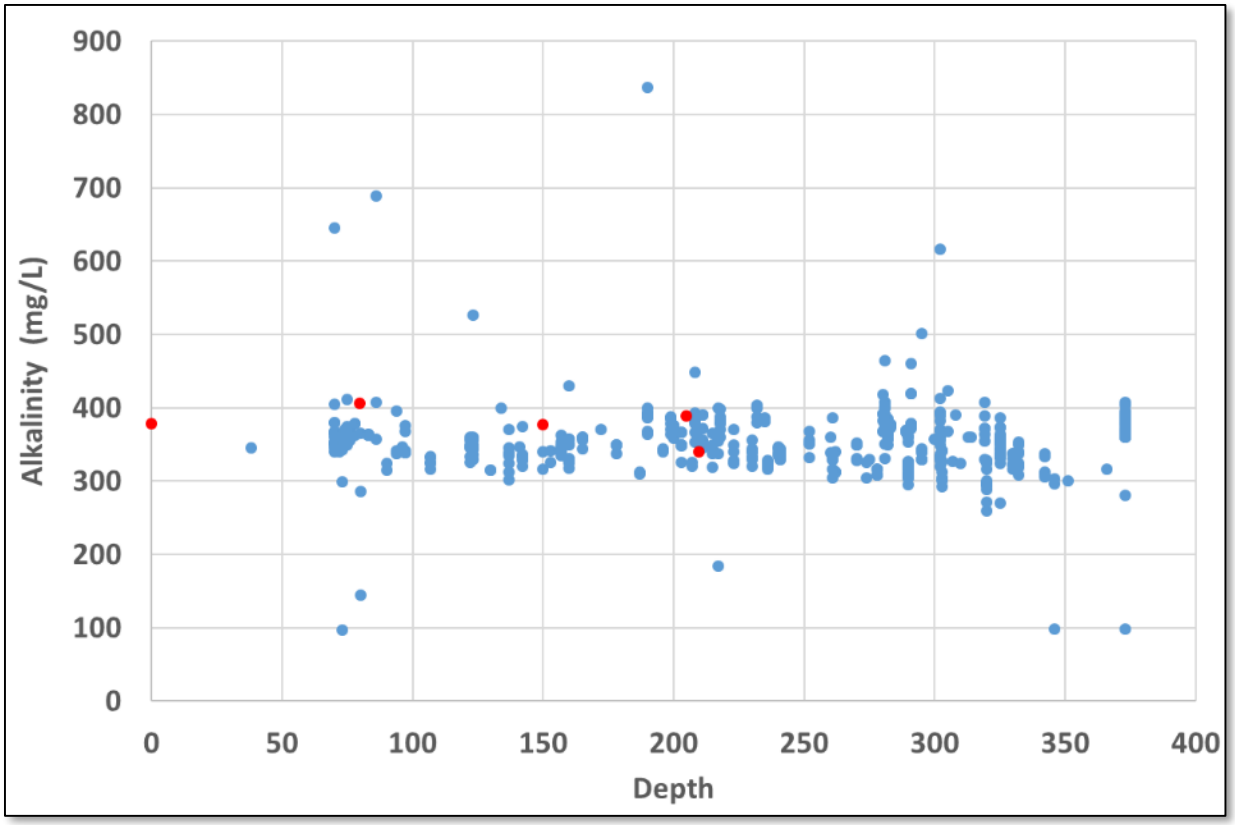
A Plan to Improve the Planning and Management of Water Supplies in East-Central Illinois

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



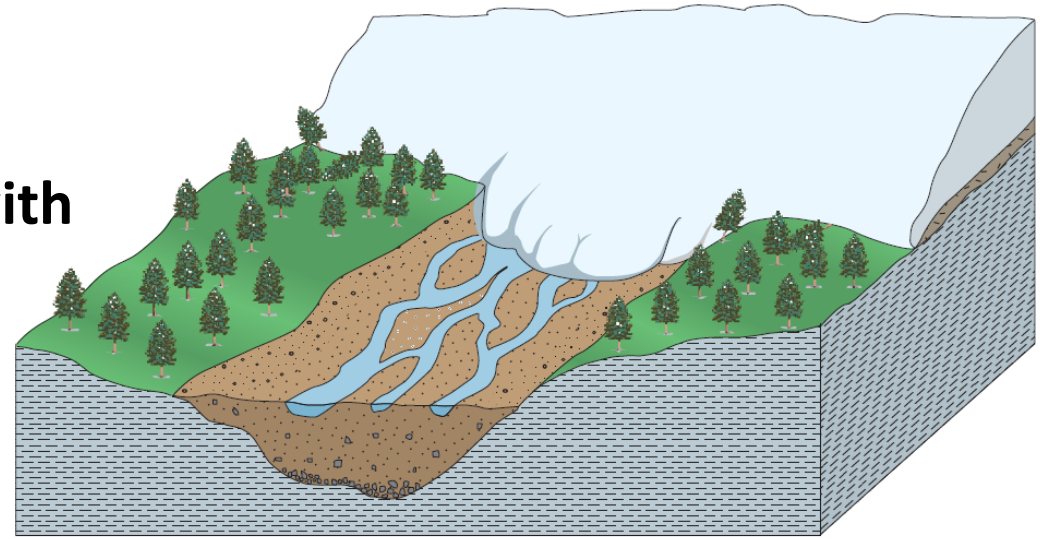
Formed by Glaciers

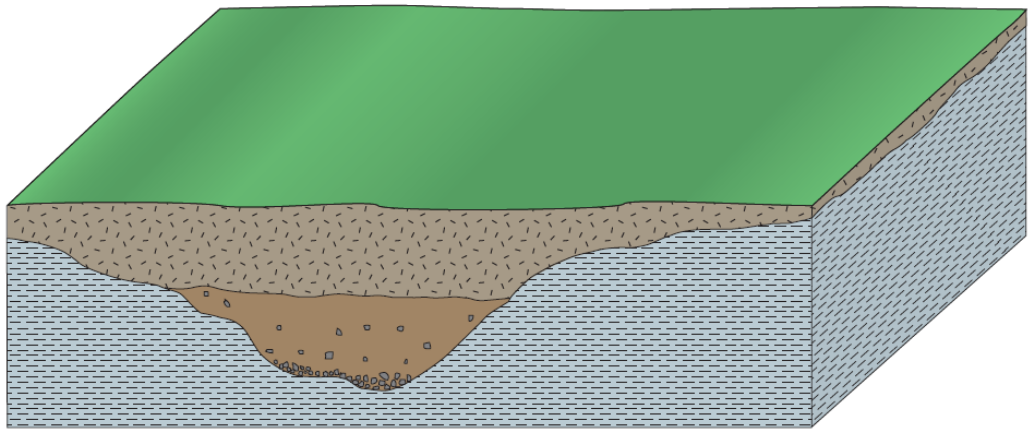
Thwaites Glacier
Antarctica

The New River
in West Virginia

Deposition in Bedrock Valleys

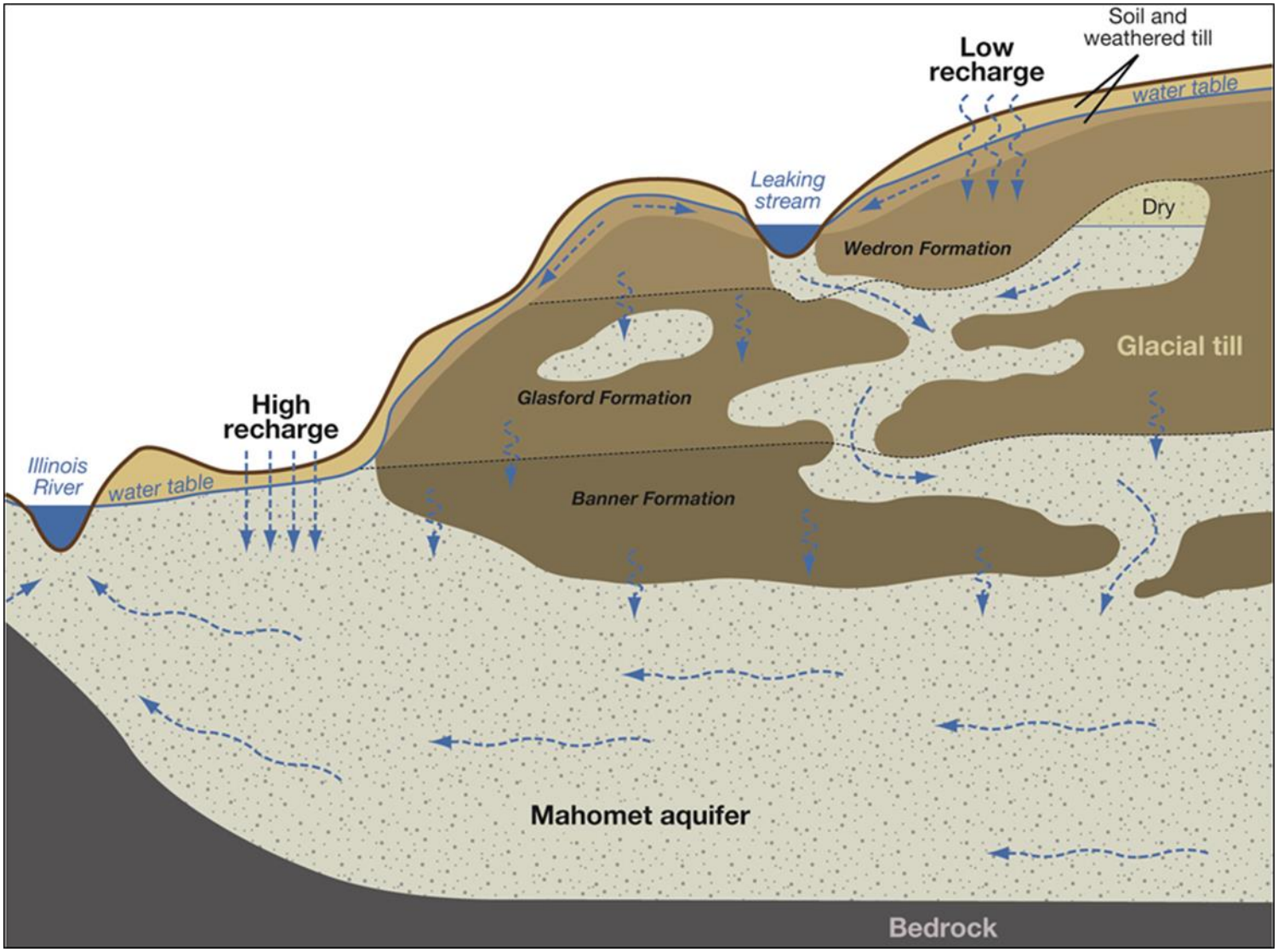
- Three major advances
- Interglacial erosion
- Layered sands and clays with some interconnections between aquifers





Panno et al., 2005

Conceptual Flow Model



Who Uses the Aquifer?

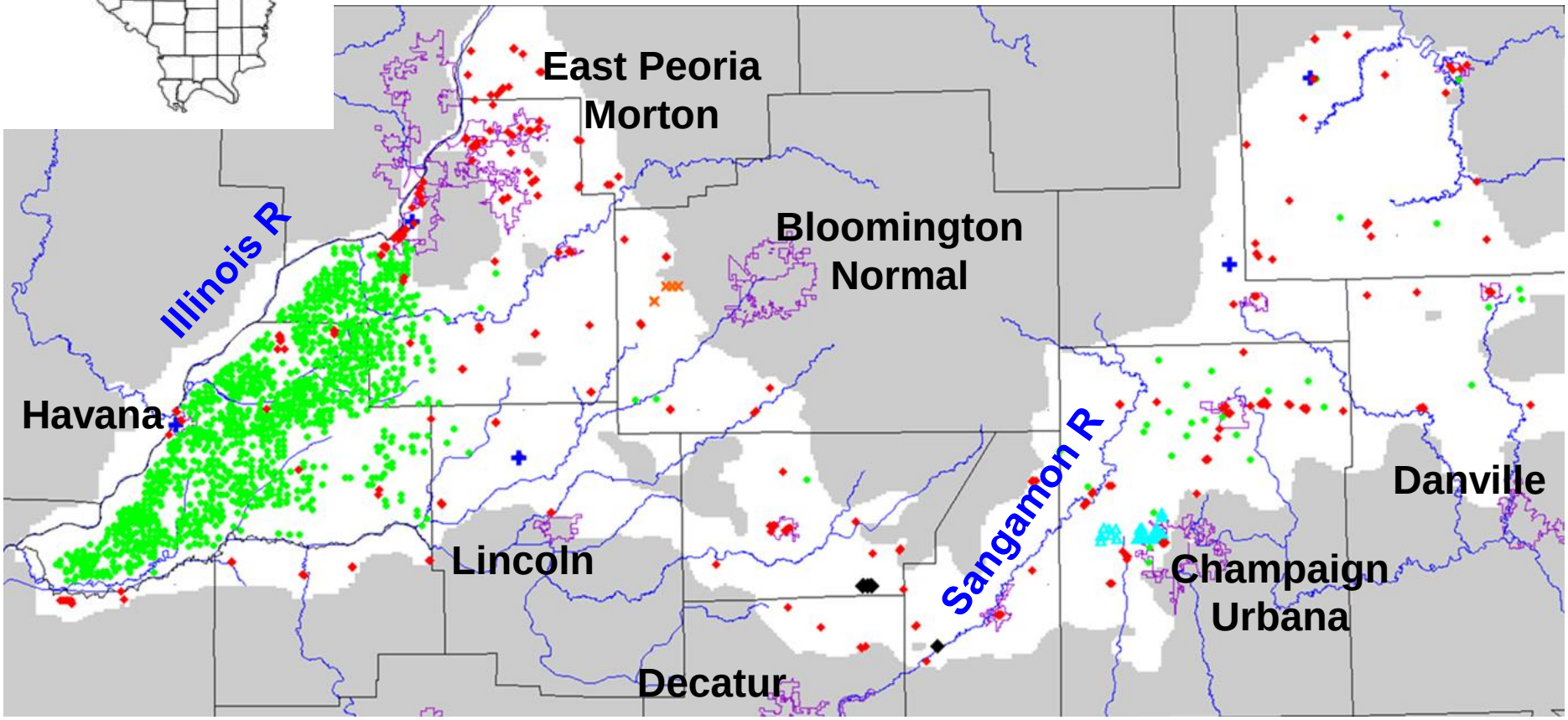
Agriculture

Public Water Supplies (IAWC Well 57)

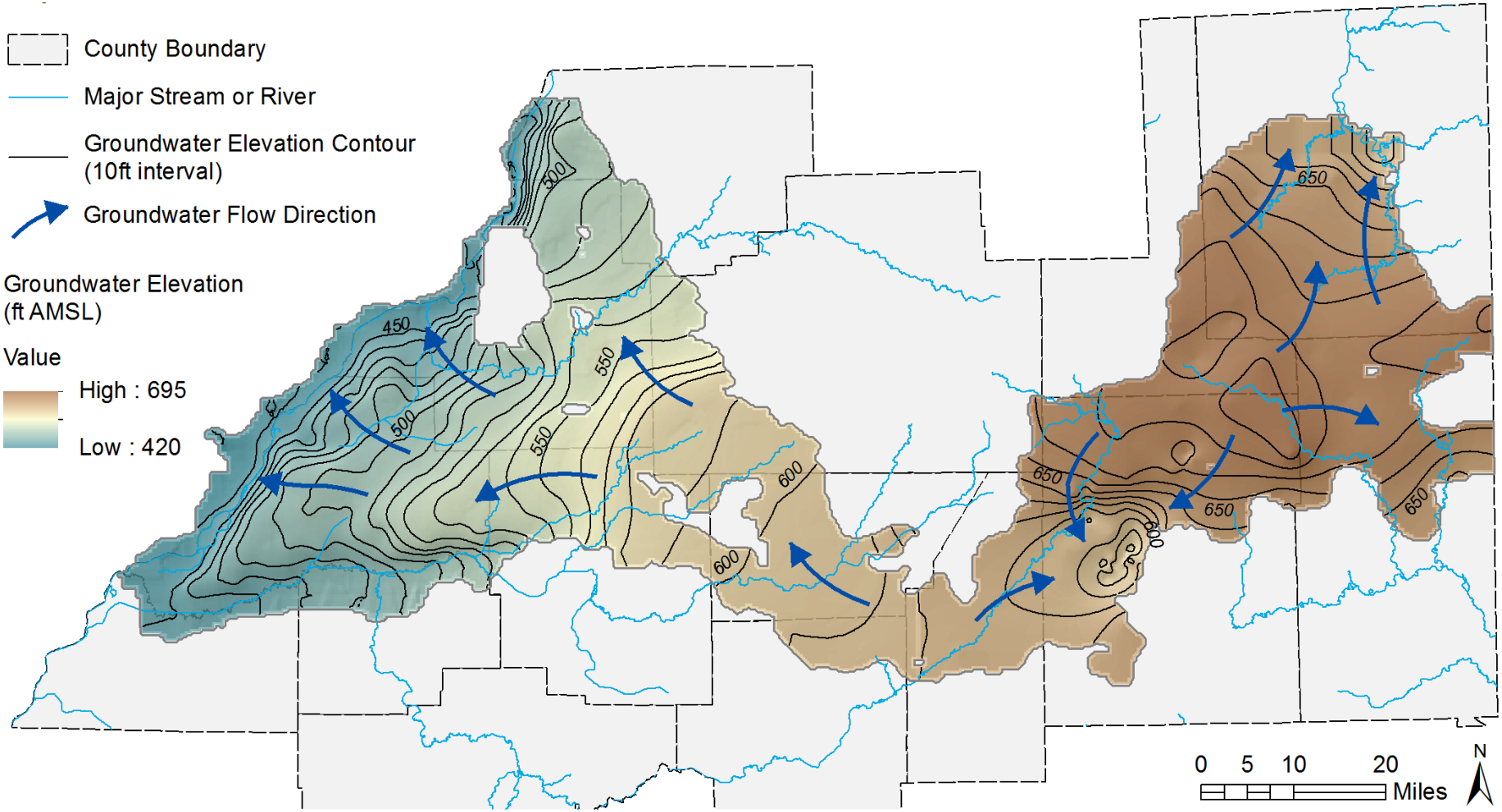
Mahomet Aquifer Demand

210 million gallons per day (MGD)

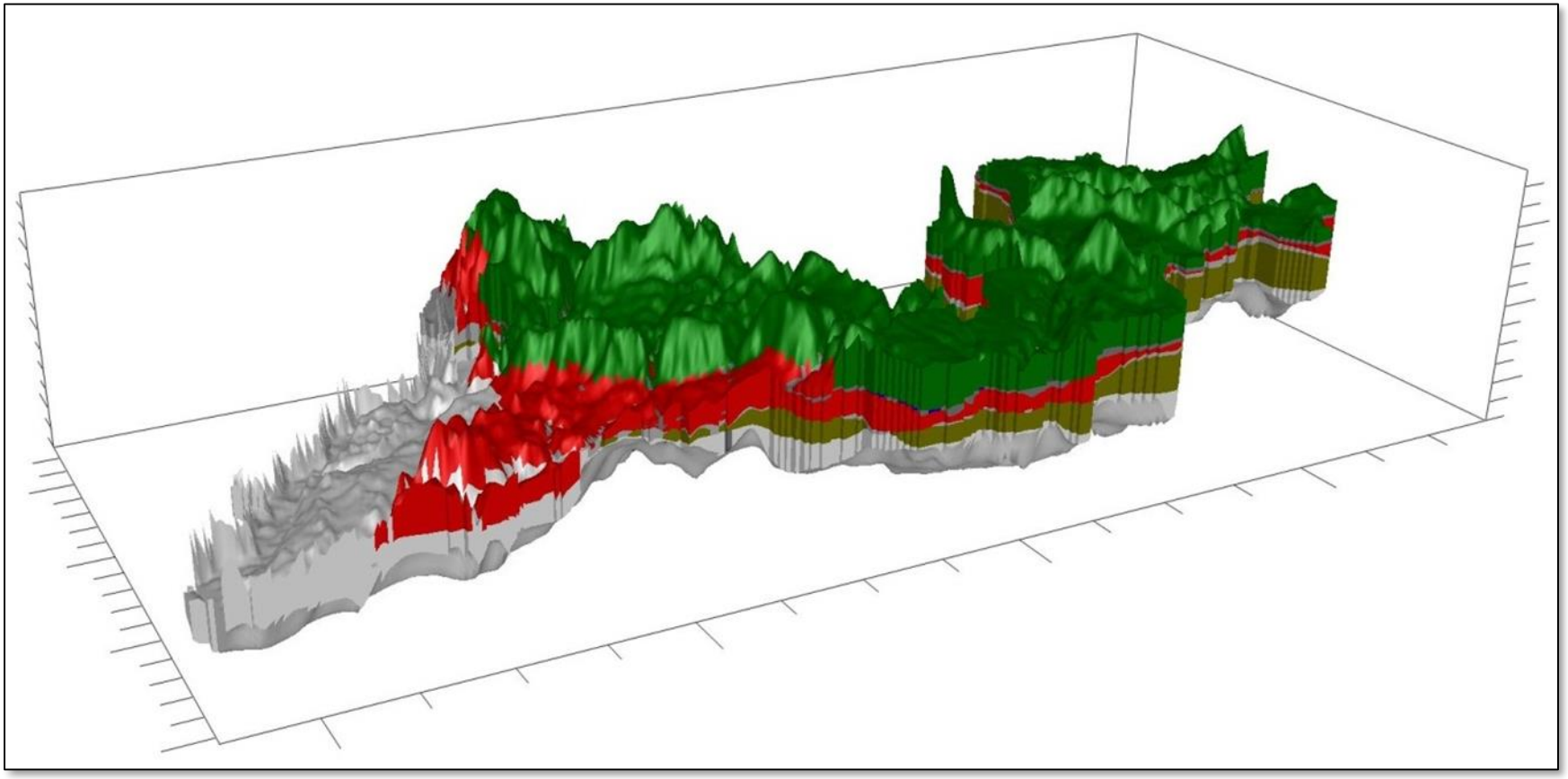
> 1600 large-capacity wells



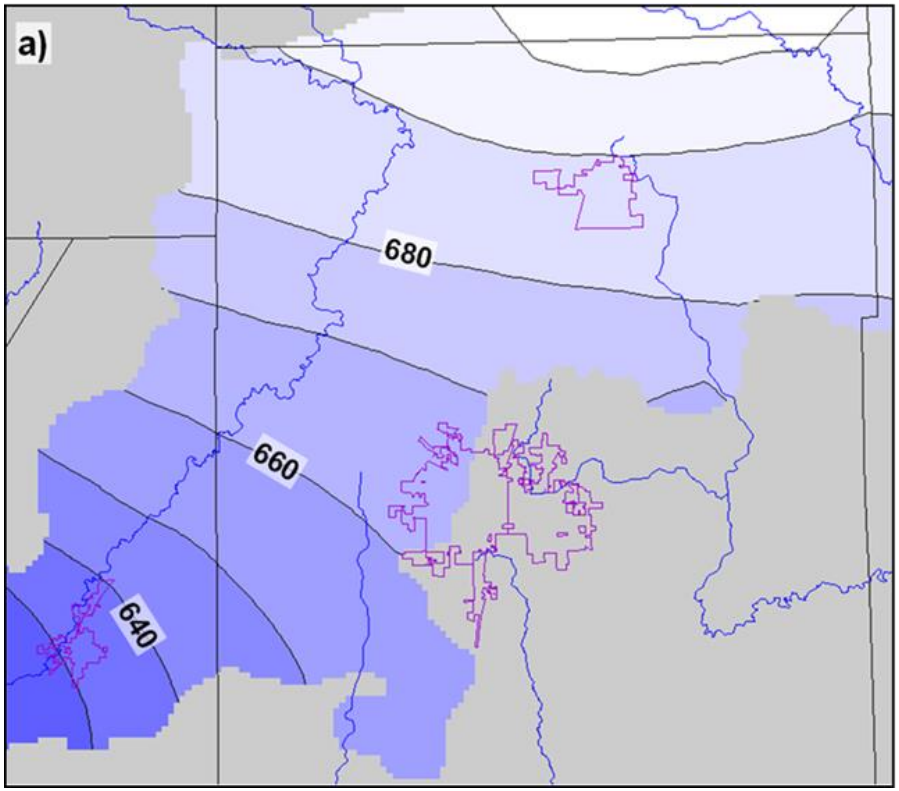
Groundwater Flow Patterns

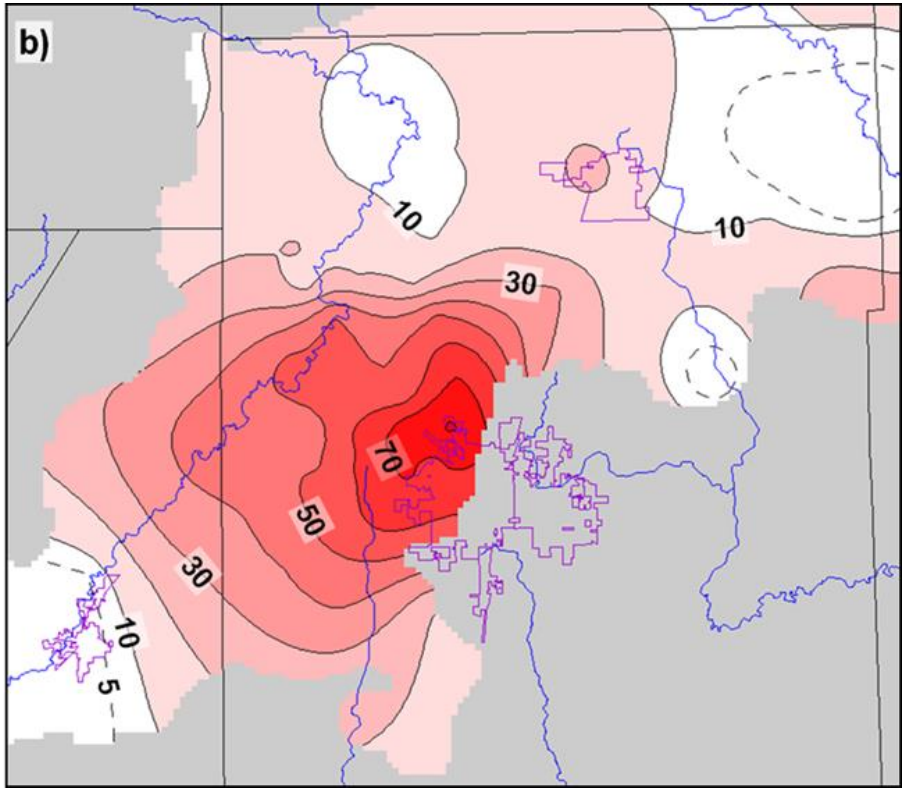


Groundwater Flow Model



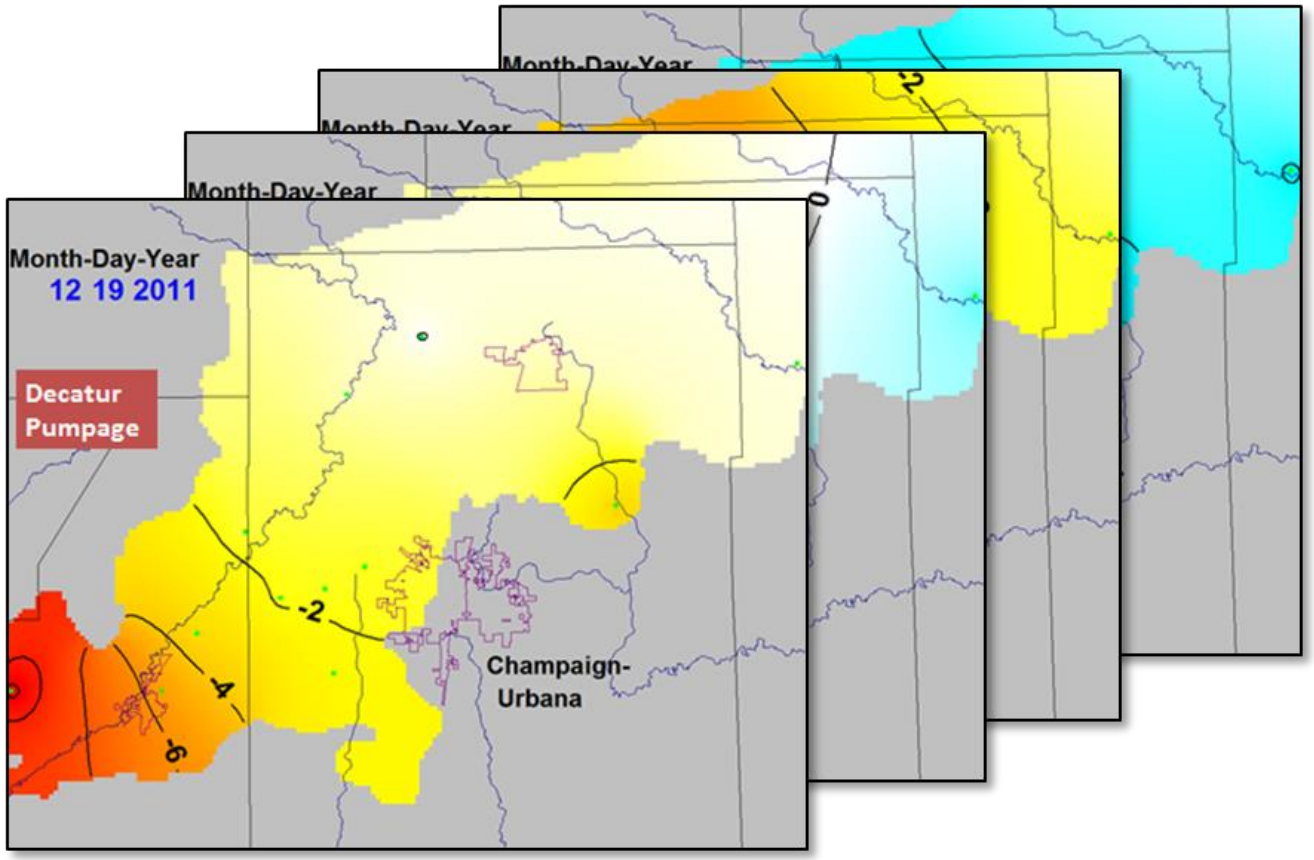
Water Level Drawdown near Champaign



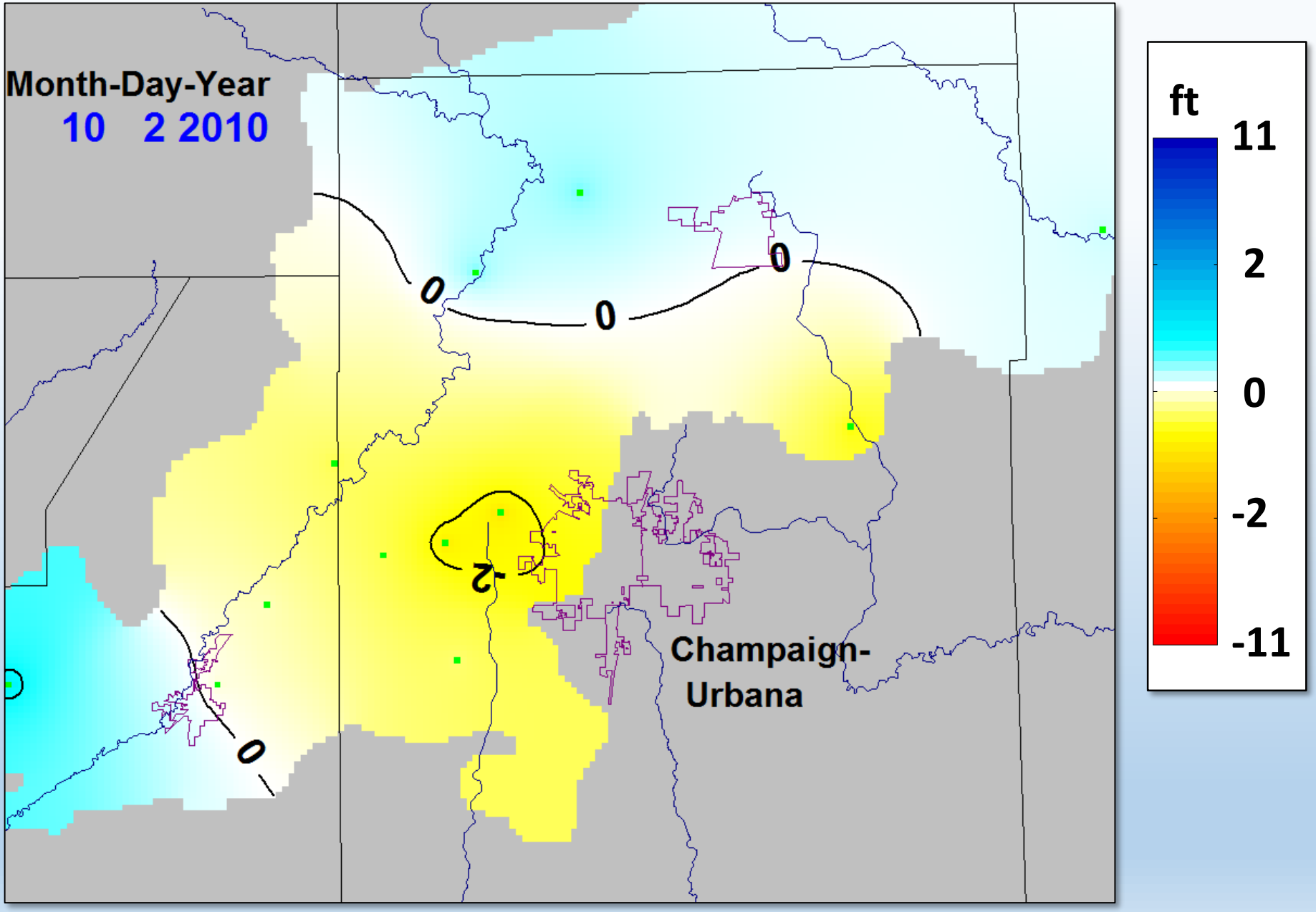


Sangamon River at Old Route 48 in Monticello, August 2012

Response to Recharge and Drought



Head Change From Mean



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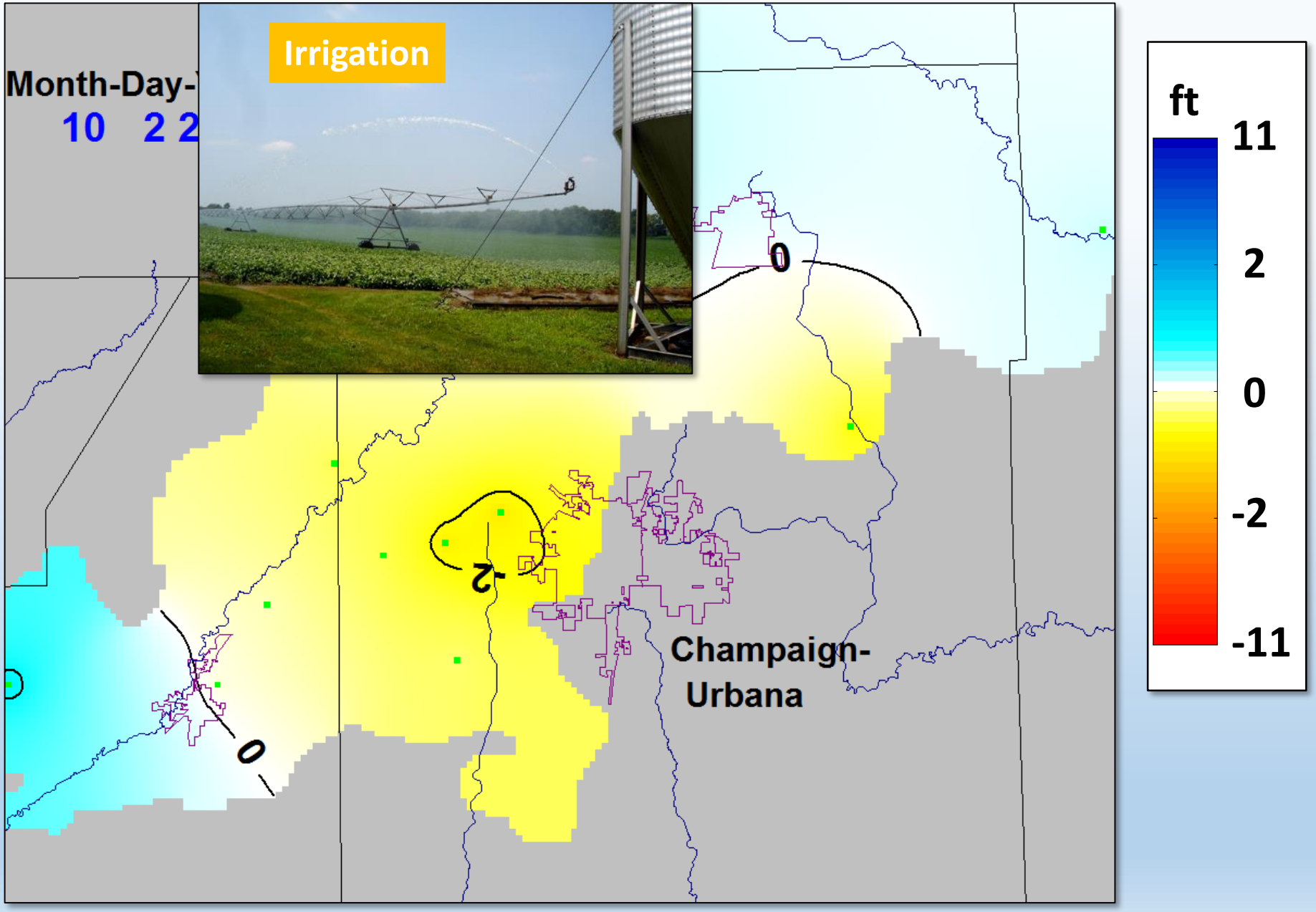

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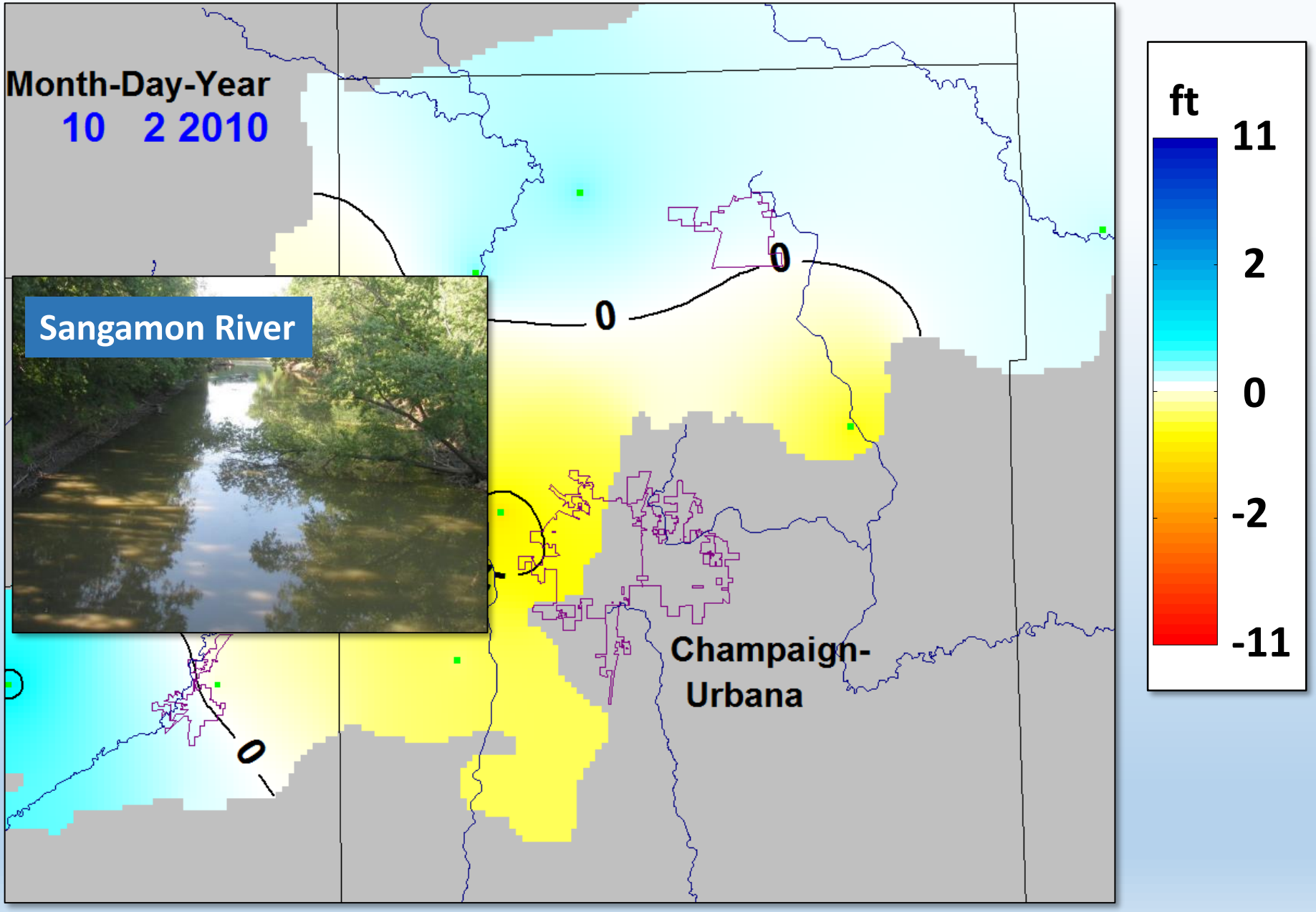

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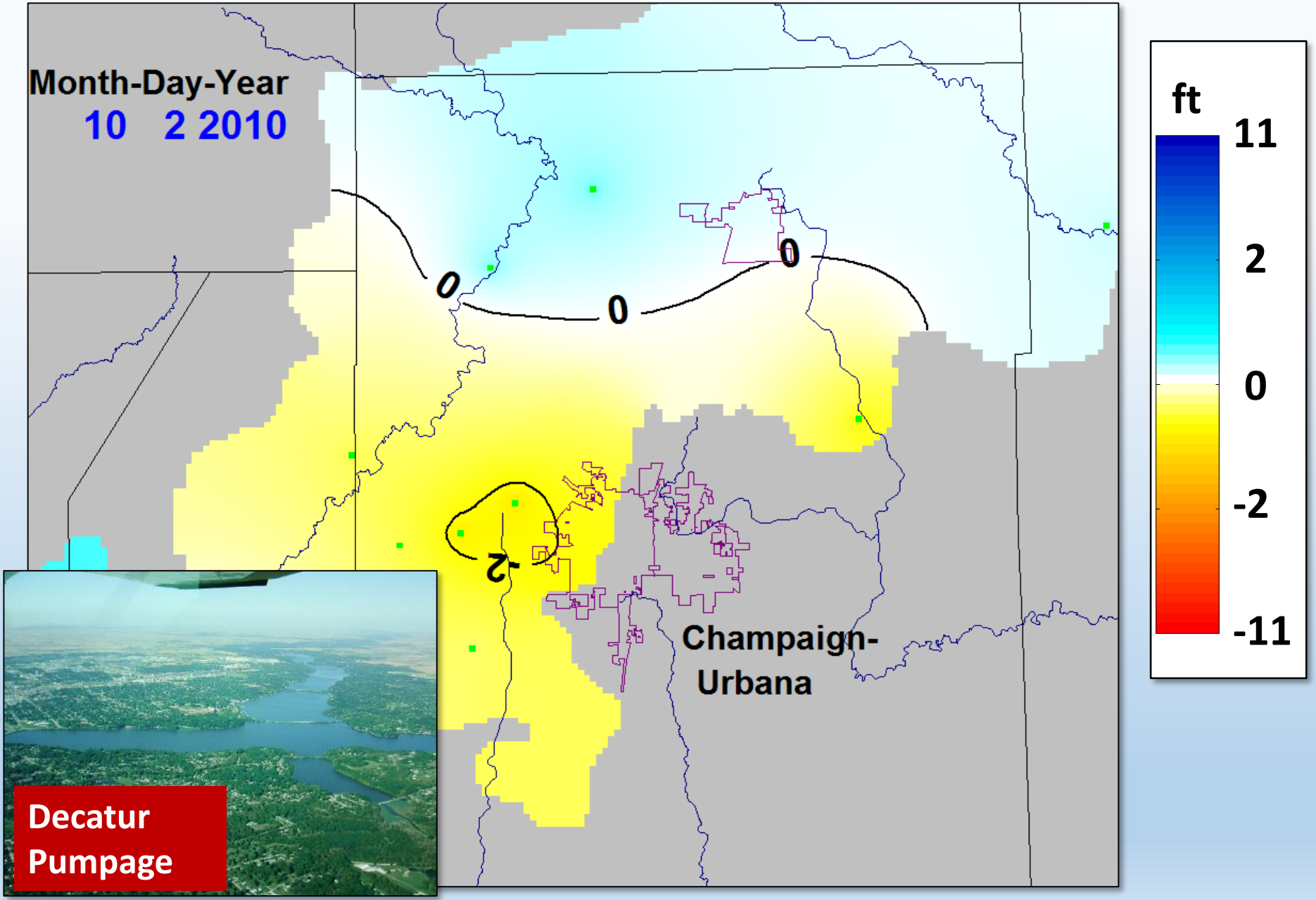

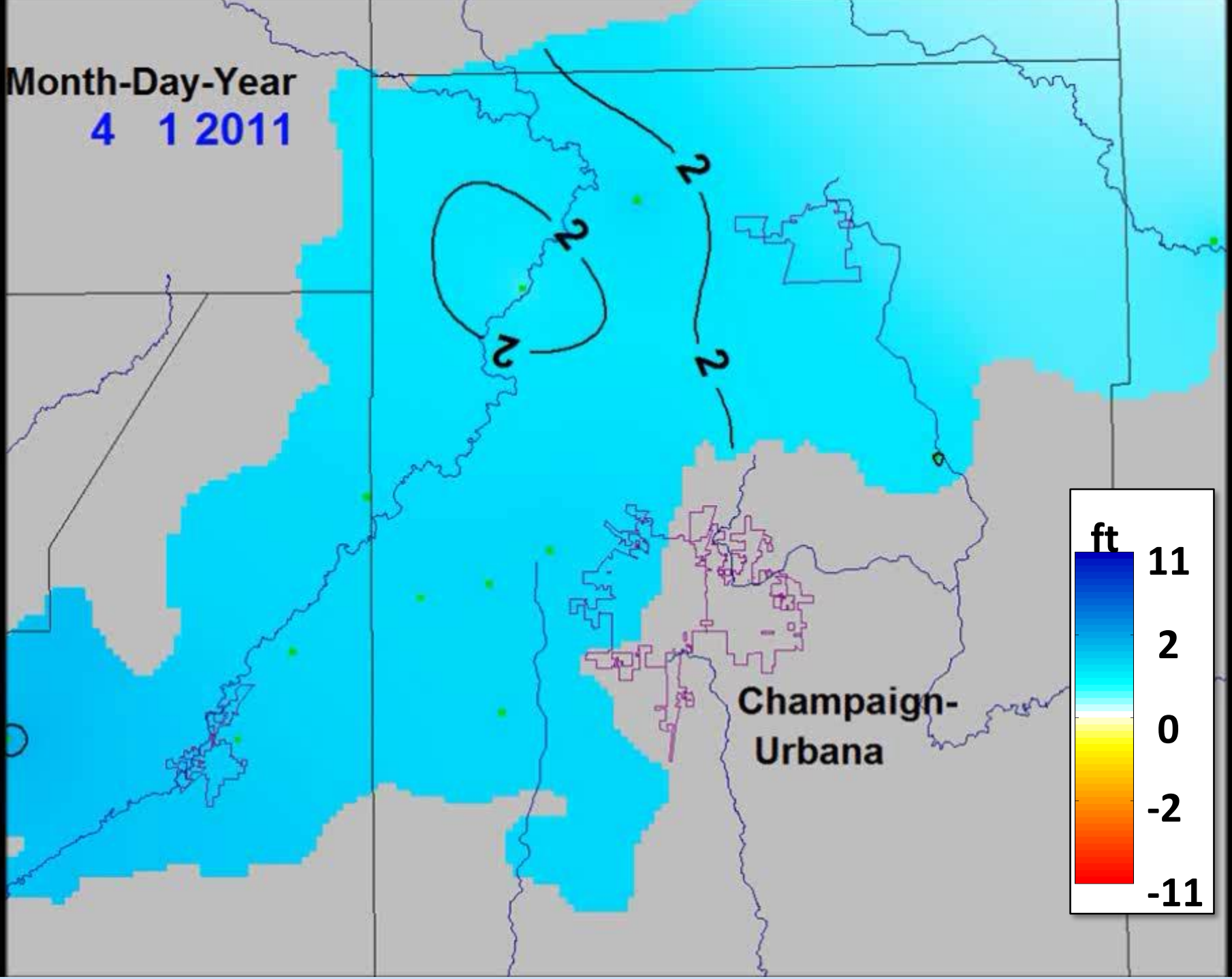
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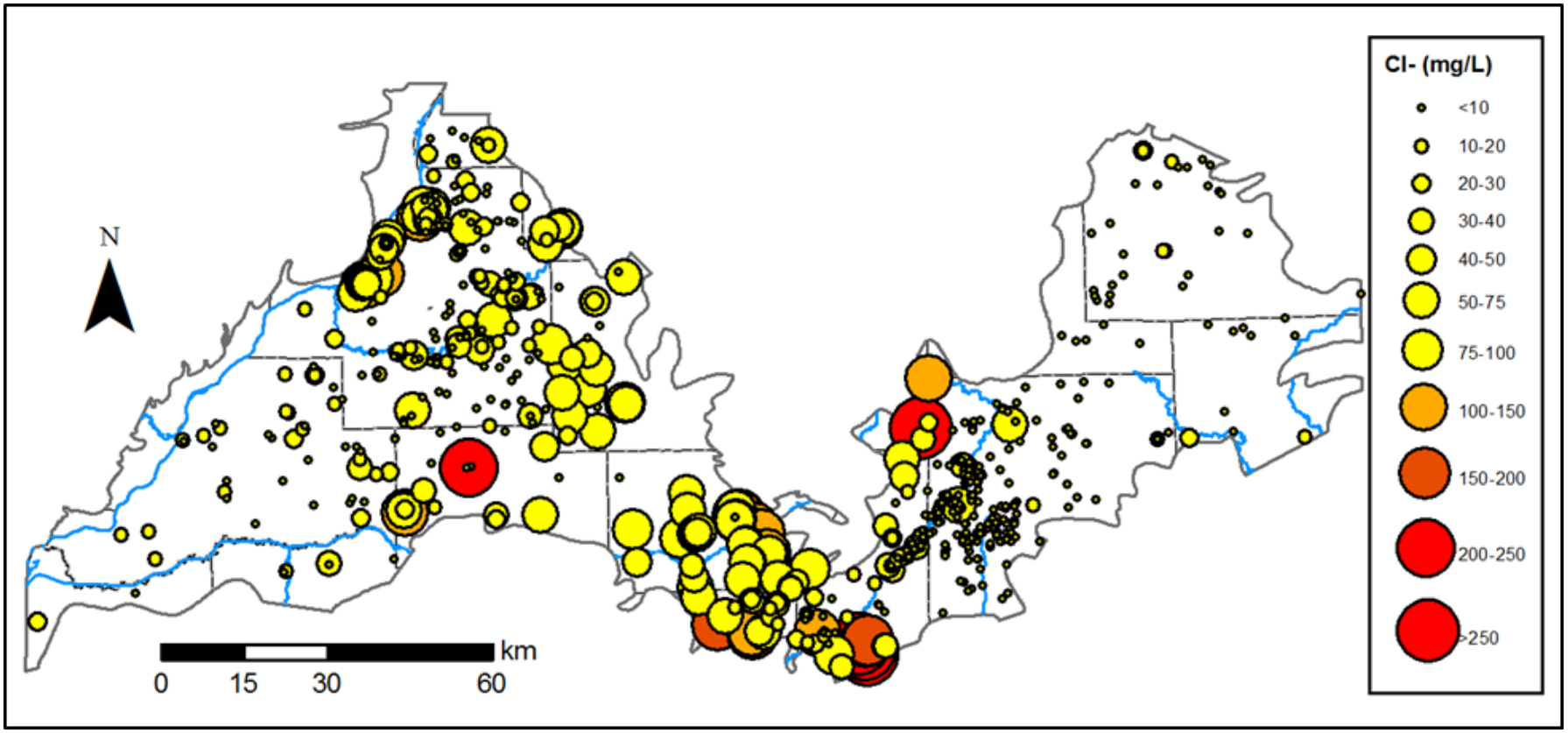
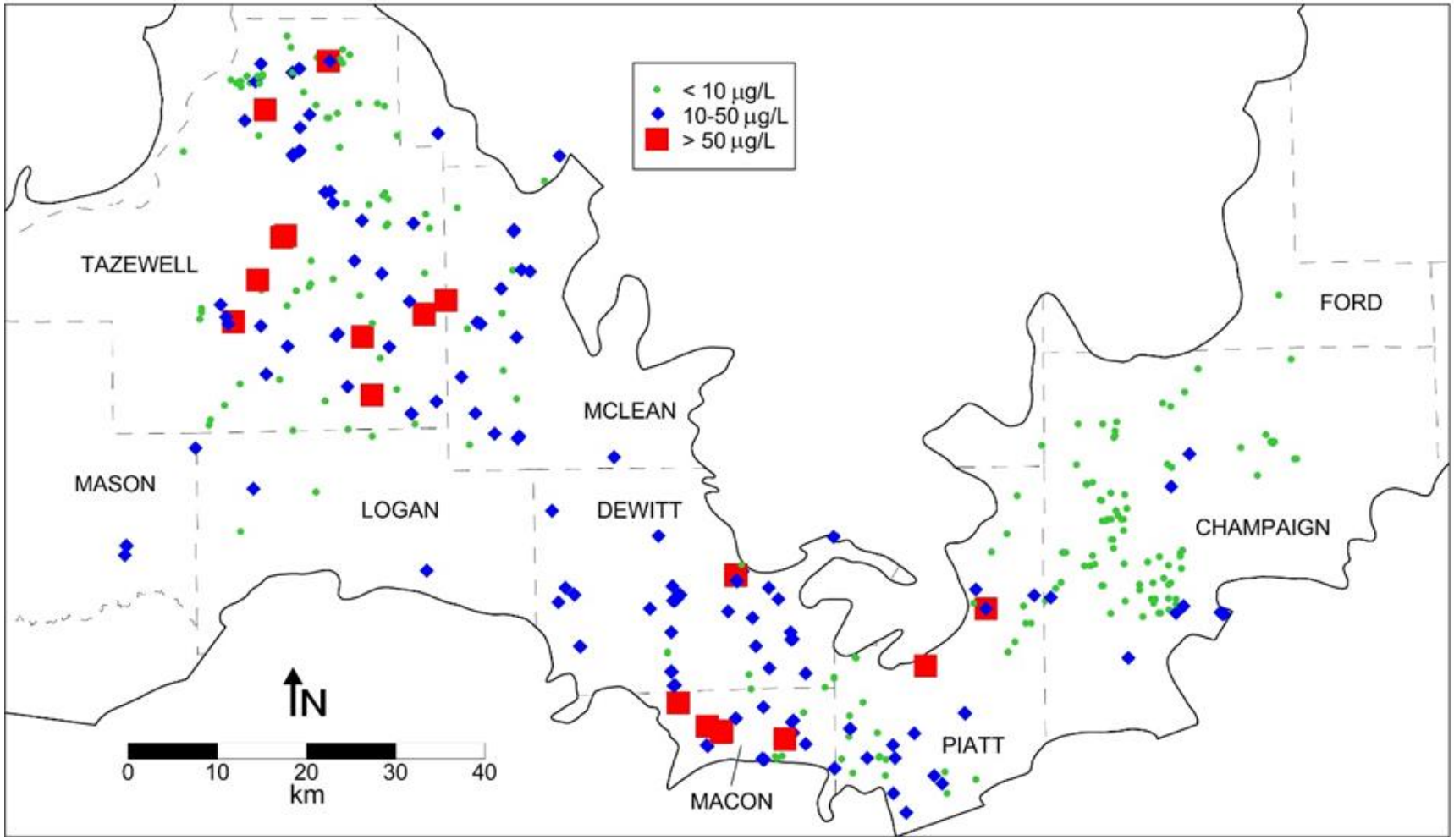
Groundwater Chemistry - Chloride



Natural Contaminants - Arsenic



Thank you

#10

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