

green  
town

# GreenTown Rockford

November 12 | Embassy Suites Rockford Riverfront

# IMPORTANCE OF GROUNDWATER IN NORTHWESTERN ILLINOIS

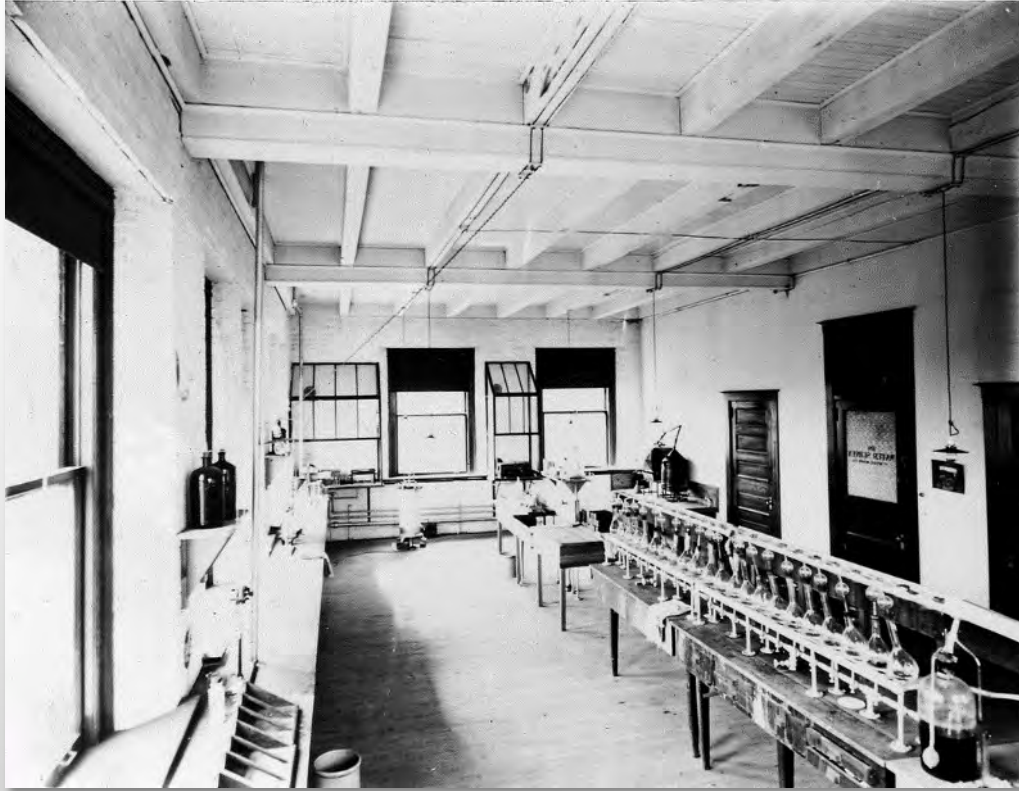
WATER SUPPLY PLANNING: DANIEL ABRAMS

GROUNDWATER FLOW MODELER, ILLINOIS STATE WATER SURVEY

GREENTOWN 2021

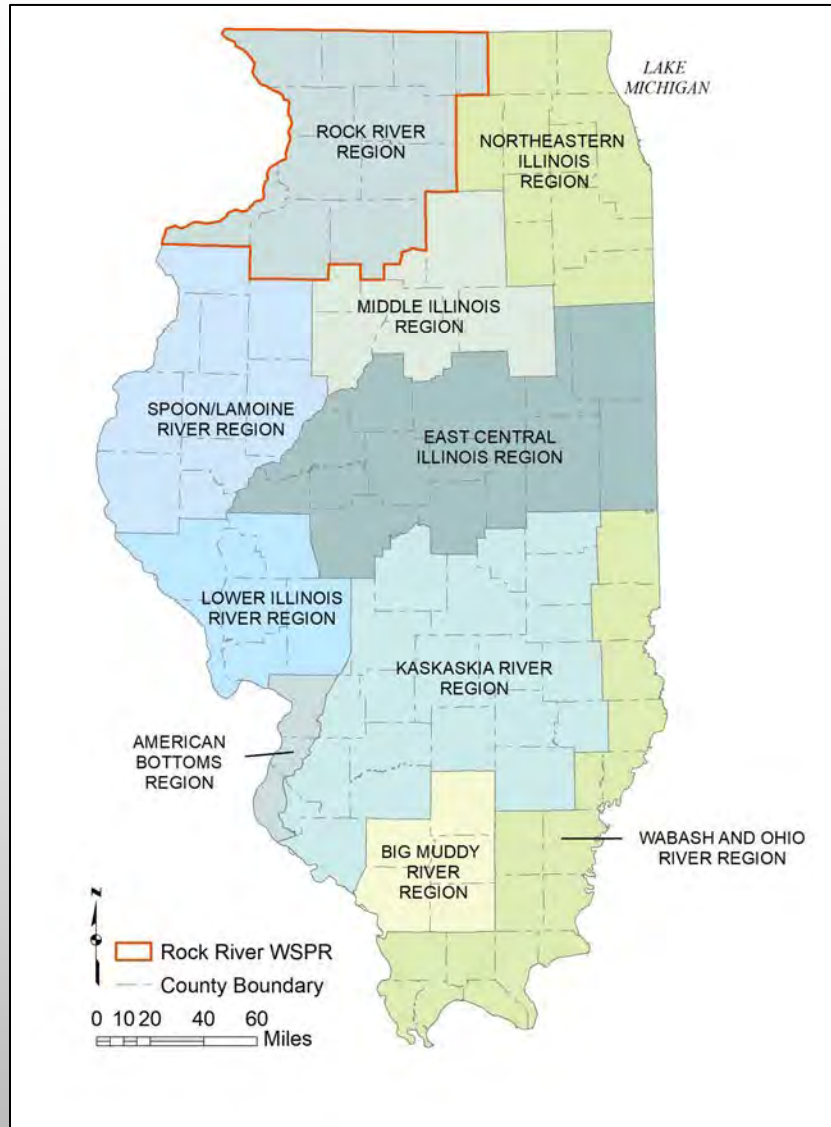


# ILLINOIS STATE WATER SURVEY



- Formed in 1895, originally a unit of the University of Illinois Department of Chemistry
- Original mission to survey the waters of Illinois to trace the spread of waterborne disease, particularly typhoid

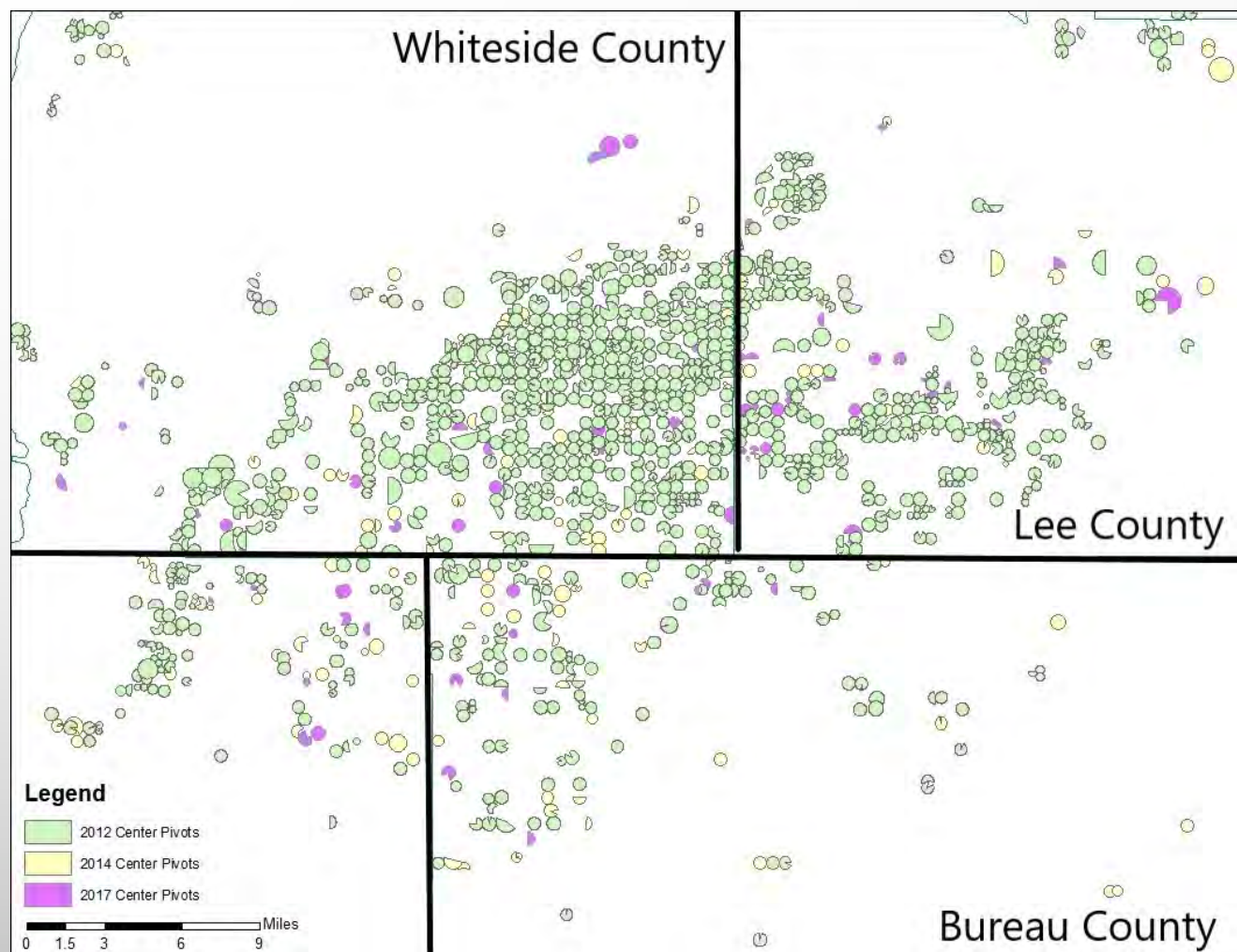
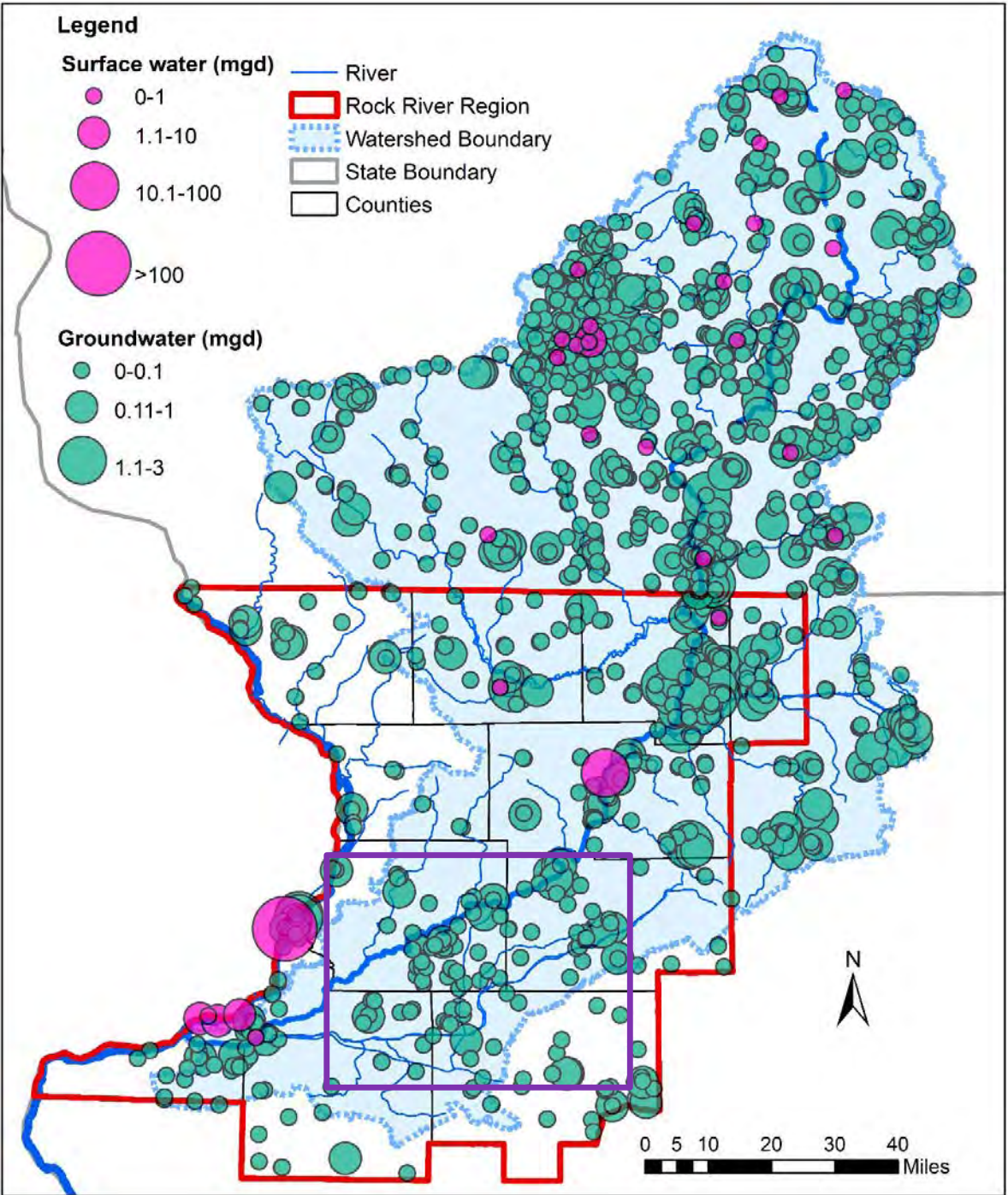
# ROCK RIVER REGION WATER SUPPLY PLANNING



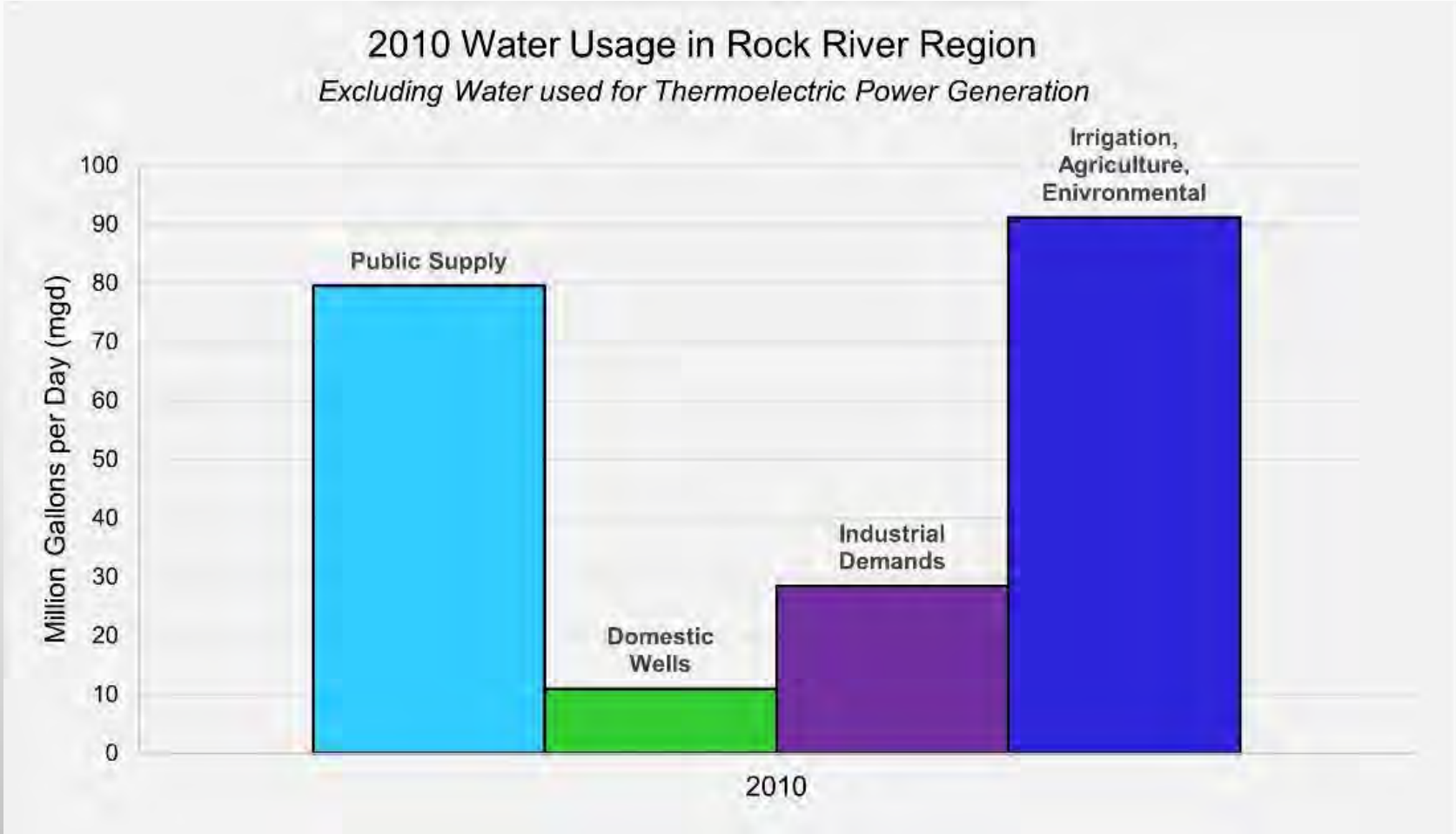
- Project funded by IDNR-OWR
- Public feedback received by the Rock River Water Supply Planning Region, with support from Blackhawk Hills



# PREDOMINANTLY GROUNDWATER USERS

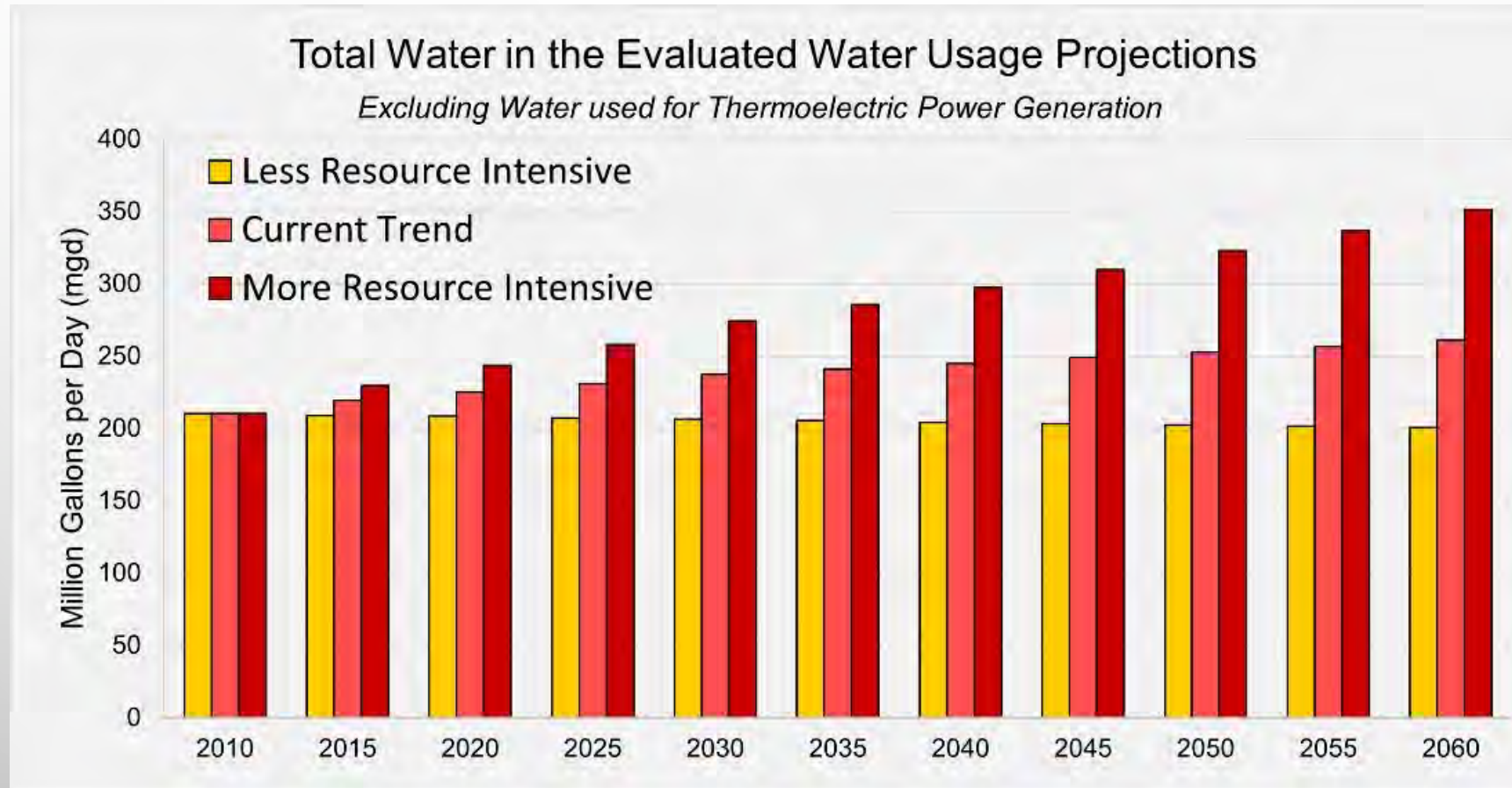


# CURRENT DEMAND BREAKDOWN



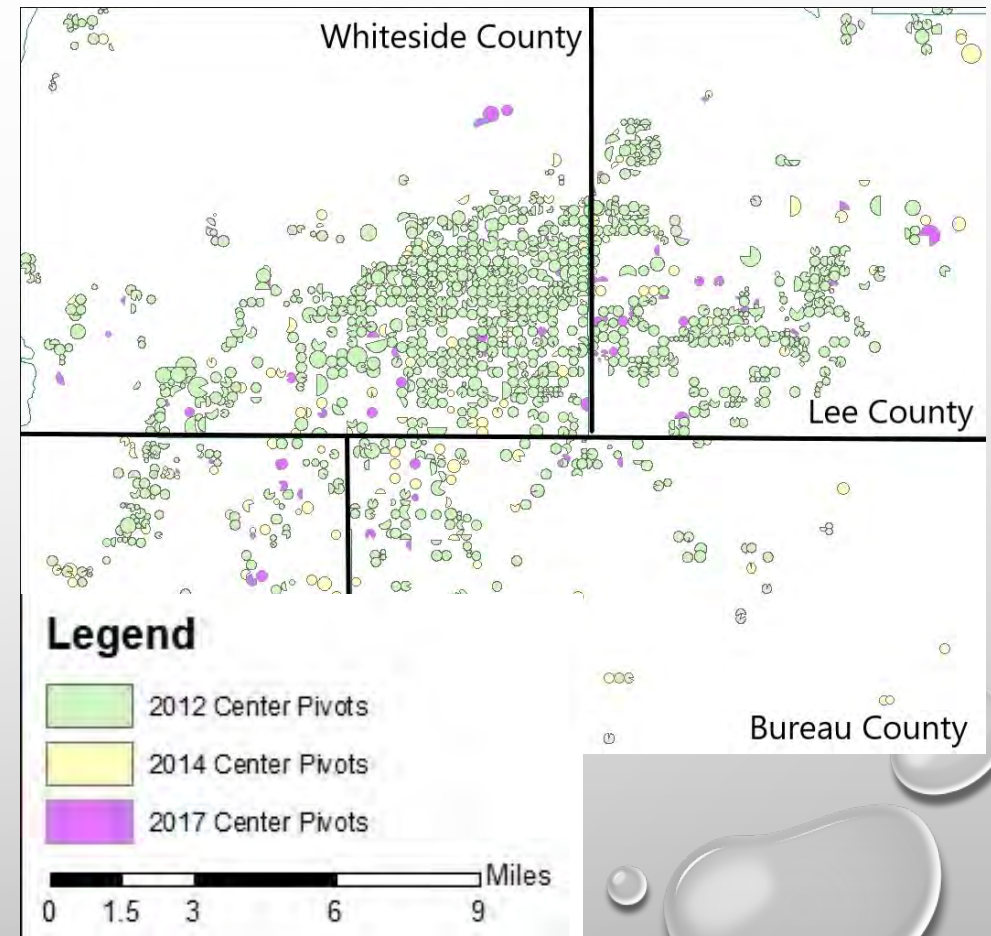
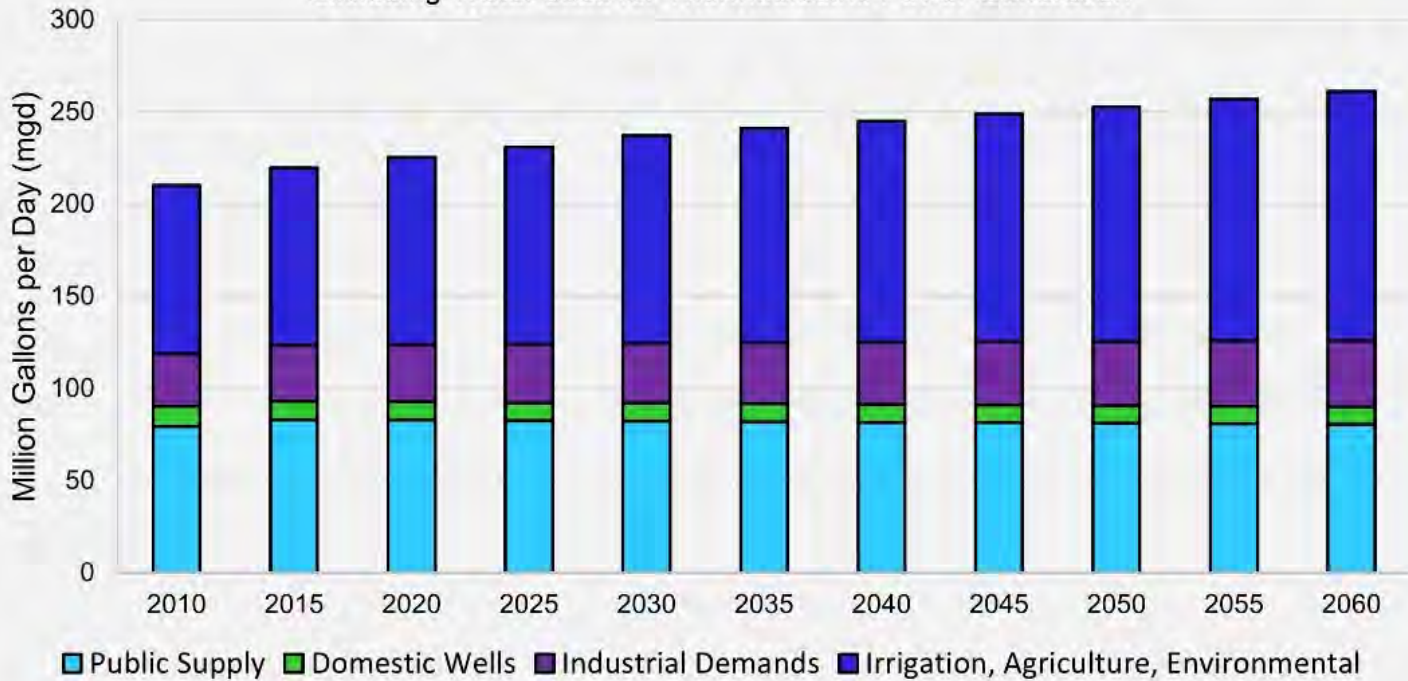


# FUTURE DEMANDS (MULTIPLE SCENARIOS)



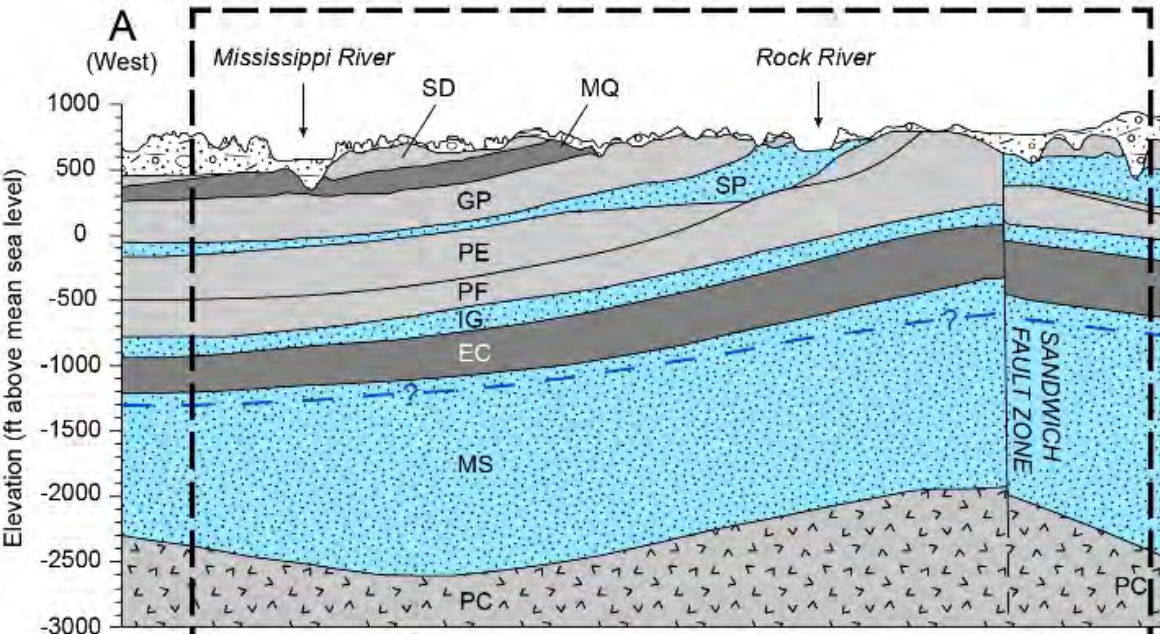
# FUTURE GROWTH IS MOSTLY IN THE AGRICULTURAL SECTOR

Current Trend Water Usage in Rock River Region  
*Excluding Water used for Thermoelectric Power Generation*





# GEOLOGY OF THE ROCK RIVER REGION



## Geologic Material

- |  |                   |  |                     |
|--|-------------------|--|---------------------|
|  | Weathered Bedrock |  | Shale               |
|  | Glacial Deposits  |  | Carbonate           |
|  | Till/Diamicton    |  | Sandstone           |
|  | Sand and Gravel   |  | Crystalline Bedrock |

## Hydrostratigraphic Units

- |    |                           |    |                    |
|----|---------------------------|----|--------------------|
| SD | Silurian-Devonian         | PF | Potosi-Franconia   |
| MQ | Maquoketa                 | IG | Ironton-Galesville |
| GP | Galena-Platteville        | EC | Eau Claire         |
| SP | St. Peter                 | MS | Mt. Simon          |
| PE | Prairie du Chien-Eminence | PC | Precambrian        |

— — — — — fresh/saline groundwater contact

## Sand and Gravel

- Major Roads
- Major Rivers
- Counties

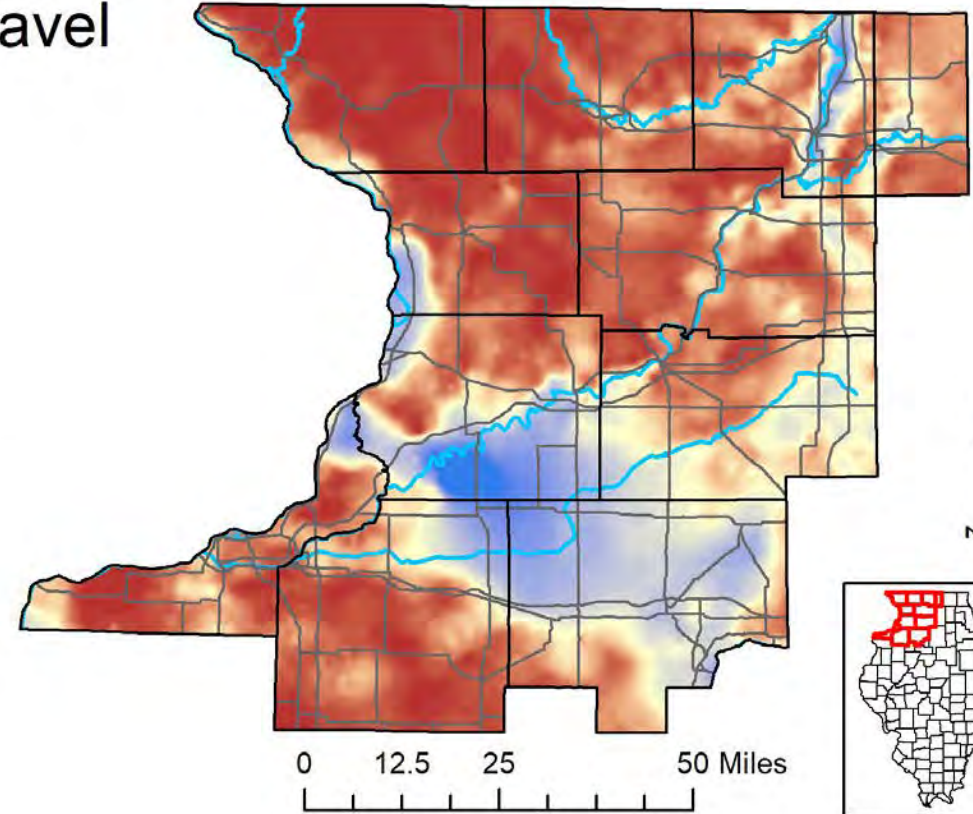
## Transmissivity

ft<sup>2</sup>/d

High : 100000

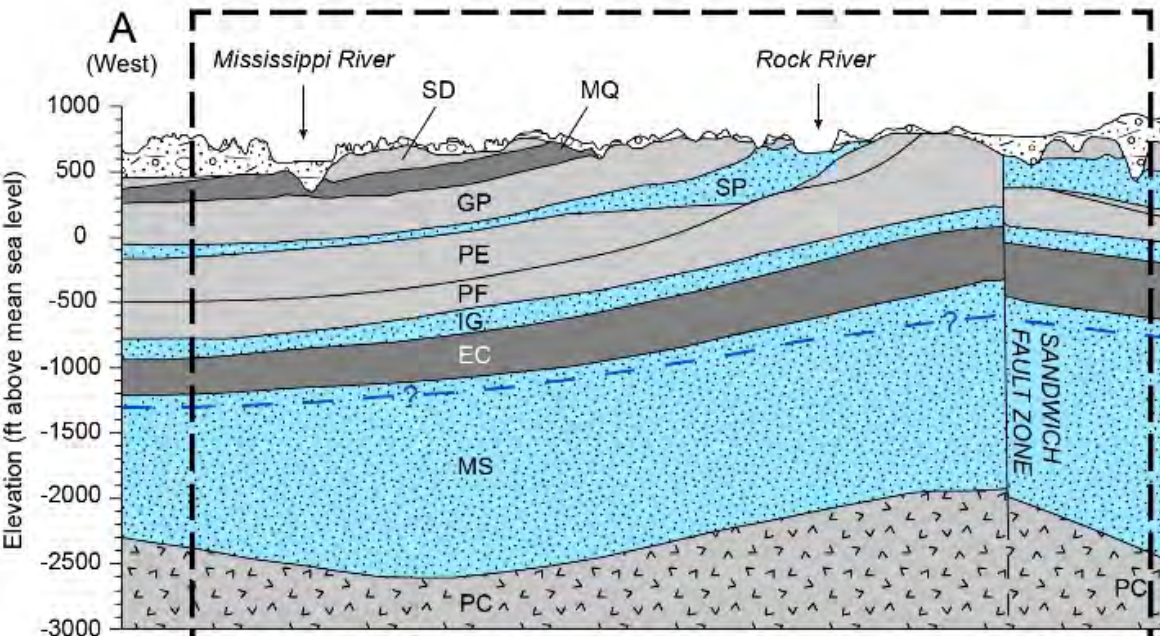


Low : 0





# GEOLOGY OF THE ROCK RIVER REGION



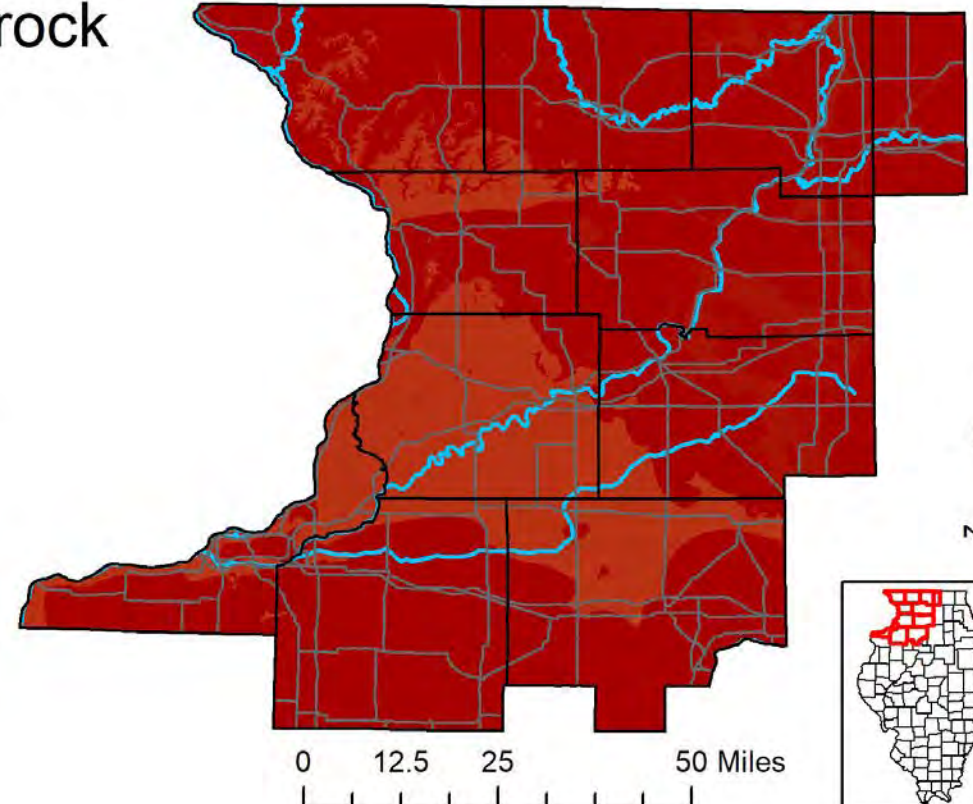
## Shallow Bedrock

- Major Roads
- Major Rivers
- Counties

## Transmissivity

ft<sup>2</sup>/d

High : 100000



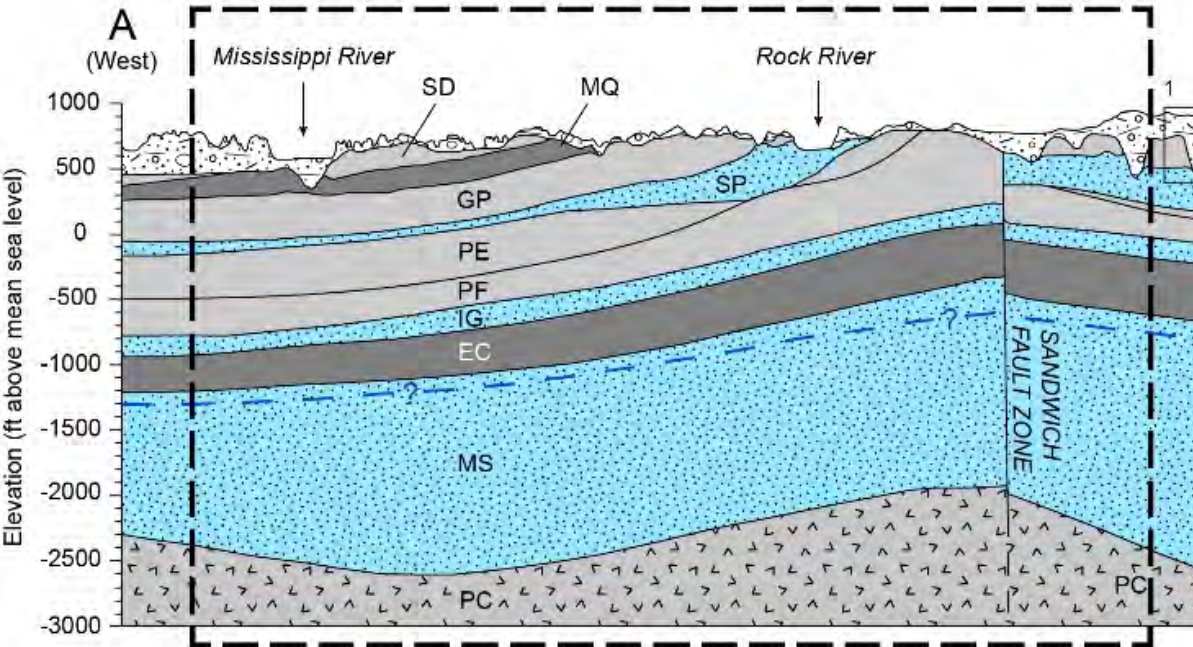
### Hydrostratigraphic Units

- SD Silurian-Devonian
- MQ Maquoketa
- GP Galena-Platteville
- SP St. Peter
- PE Prairie du Chien-Eminence
- PF Potosi-Franconia
- IG Ironton-Galesville
- EC Eau Claire
- MS Mt. Simon
- PC Precambrian

— — — — — fresh/saline groundwater contact



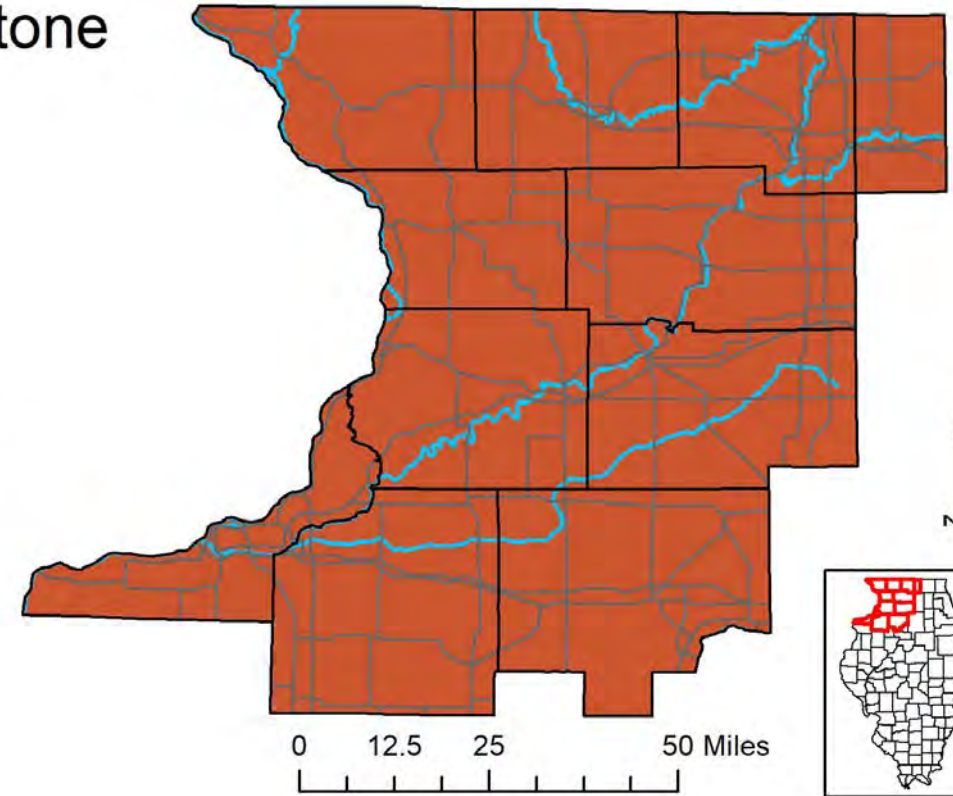
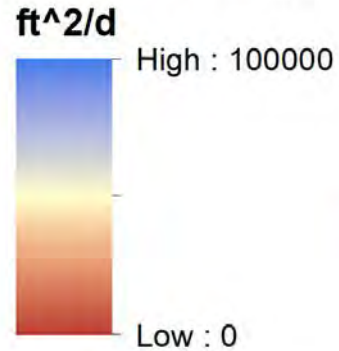
# GEOLOGY OF THE ROCK RIVER REGION



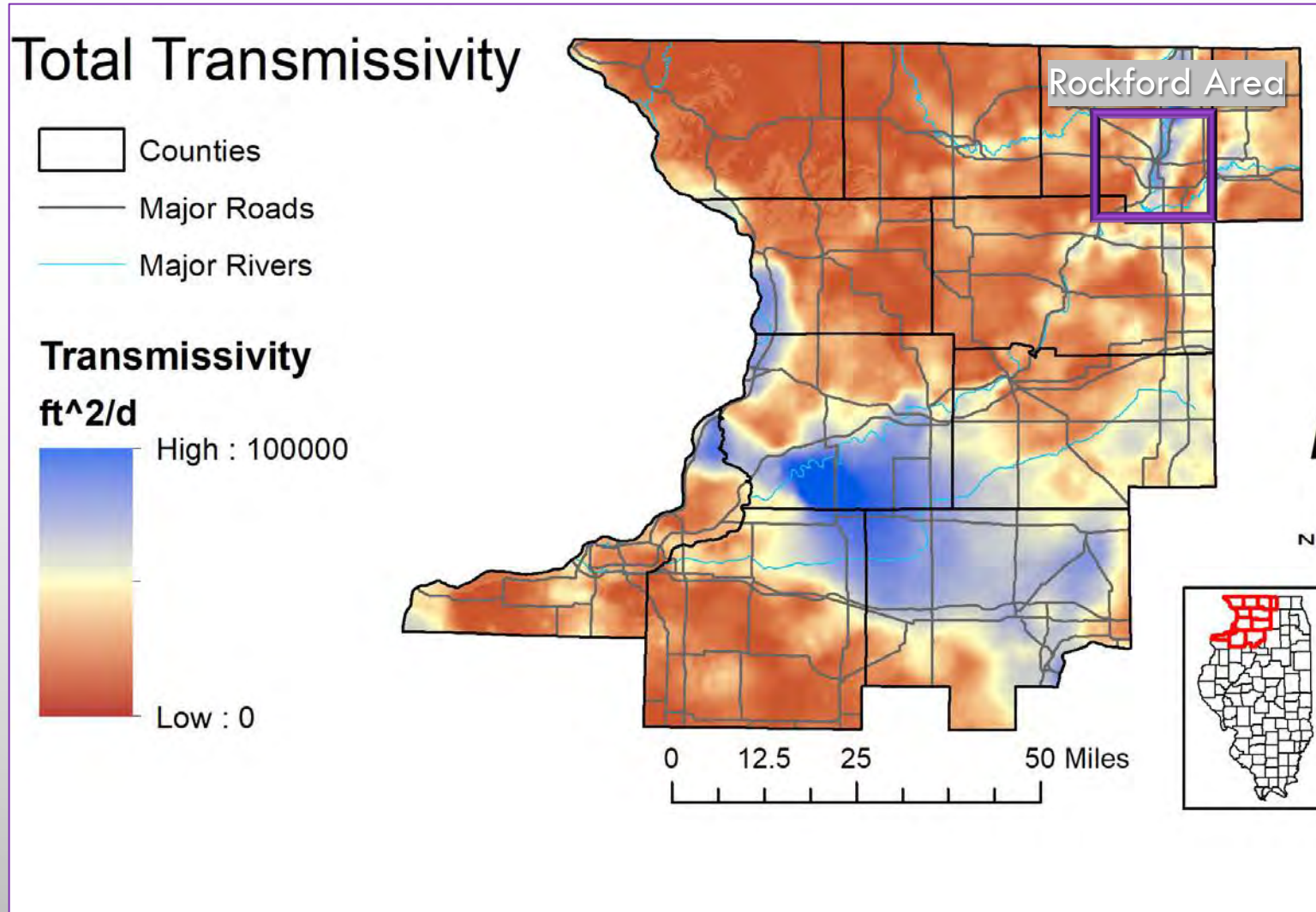
## Deep Sandstone

- Major Roads
- Major Rivers
- Counties

## Transmissivity



# DISCUSSION 1: ROCKFORD

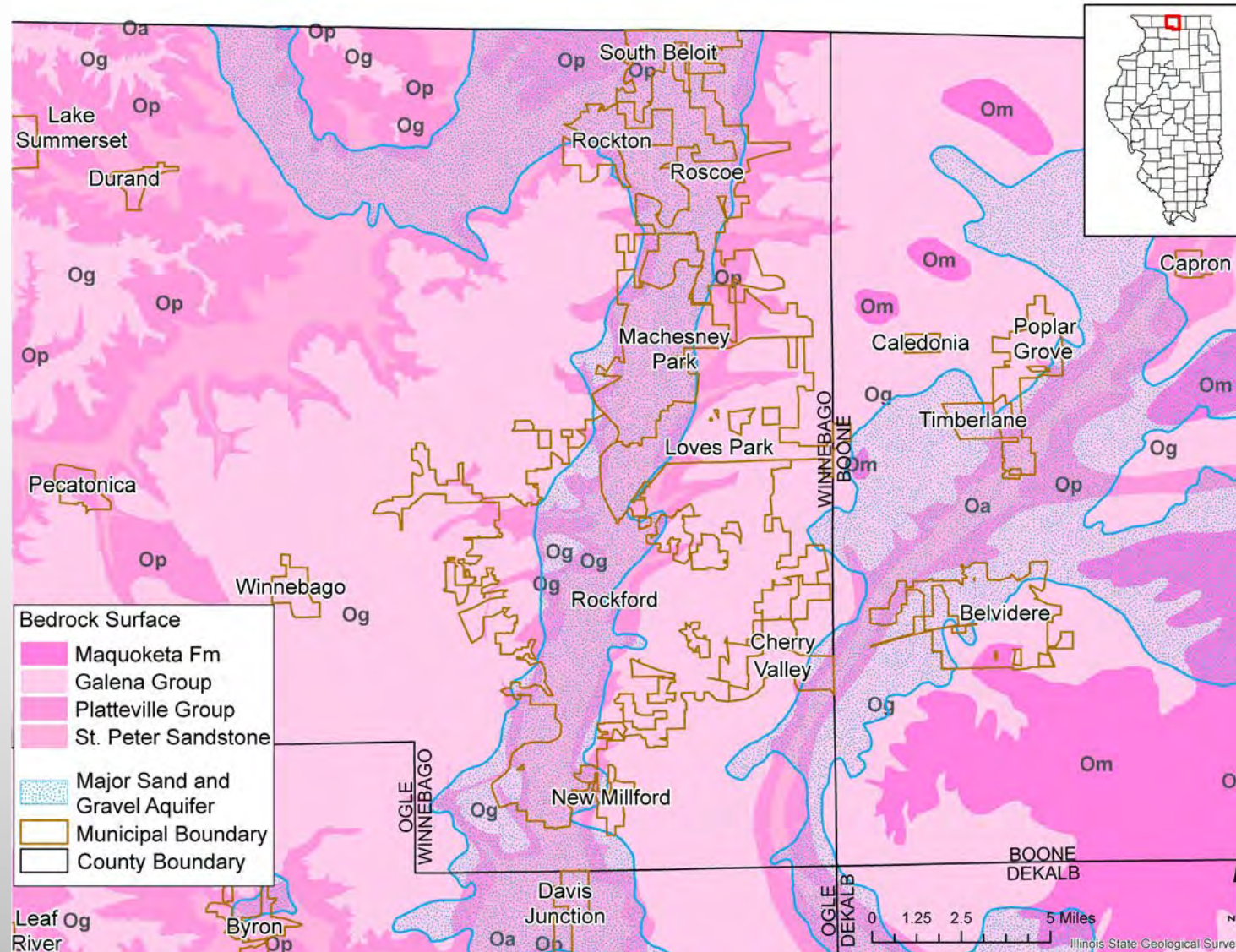




# BEDROCK GEOLOGY OF THE ROCKFORD AREA

Bedrock surface and the major sand and gravel alluvial aquifer in the Rockford area.

Note that the sandstone is at bedrock surface in both Rockford and Belvidere (here designated as Oa)

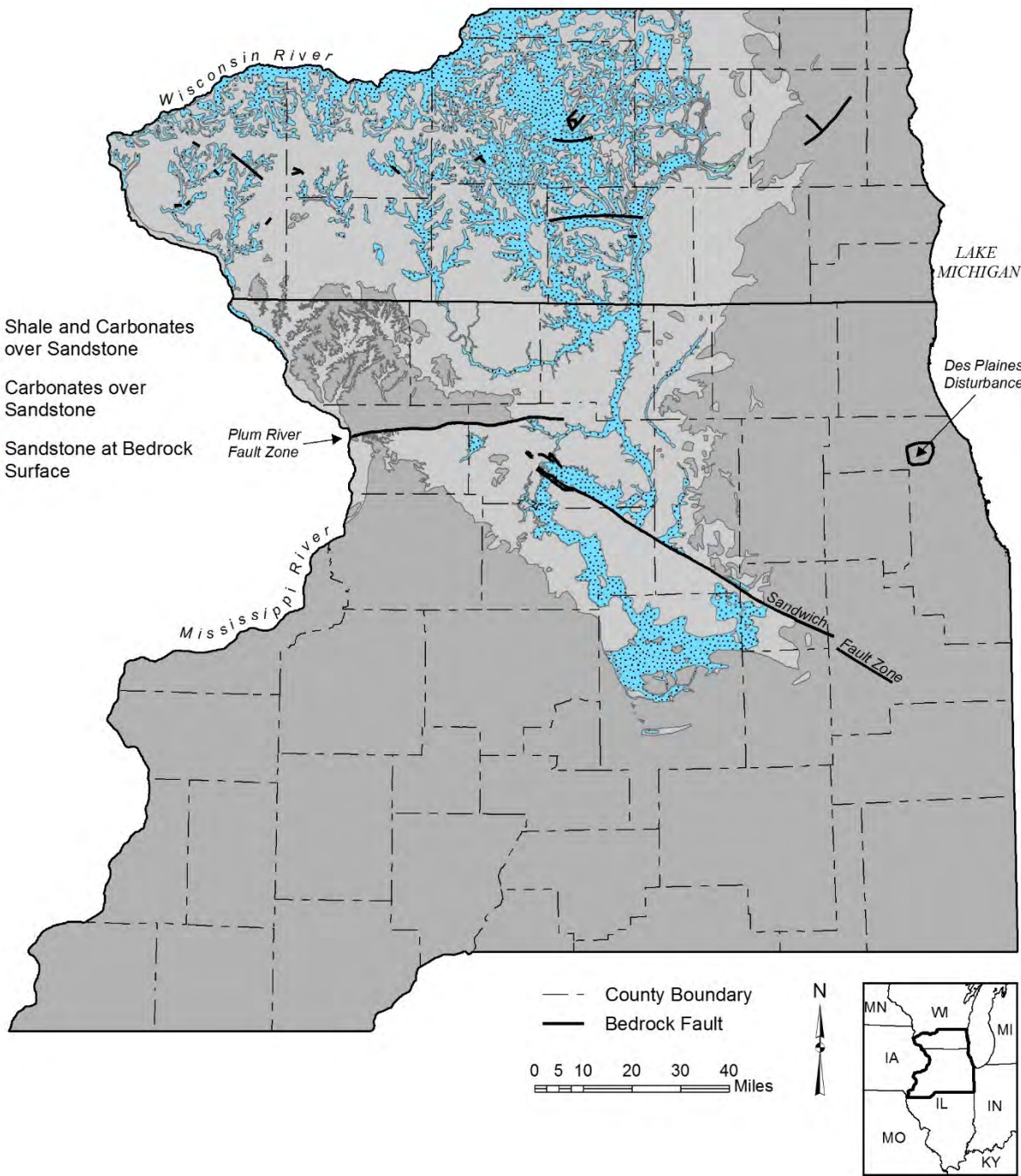




# STEP BACK TO THE STATE: WHY IS THIS IMPORTANT?

The sandstone aquifer is overlain by shale throughout a lot of northeastern Illinois, but not in much of the Rock River Region

This allows precipitation events to recharge the sandstone. While it takes hundreds or even thousands of years for groundwater to move from these recharge areas to meet some demands in northeastern Illinois, this is still a critical source of water without which the sandstone would have been depleted long ago

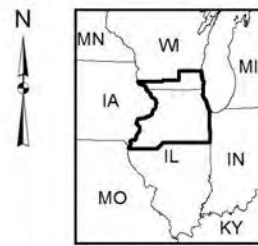
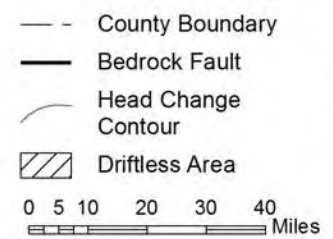
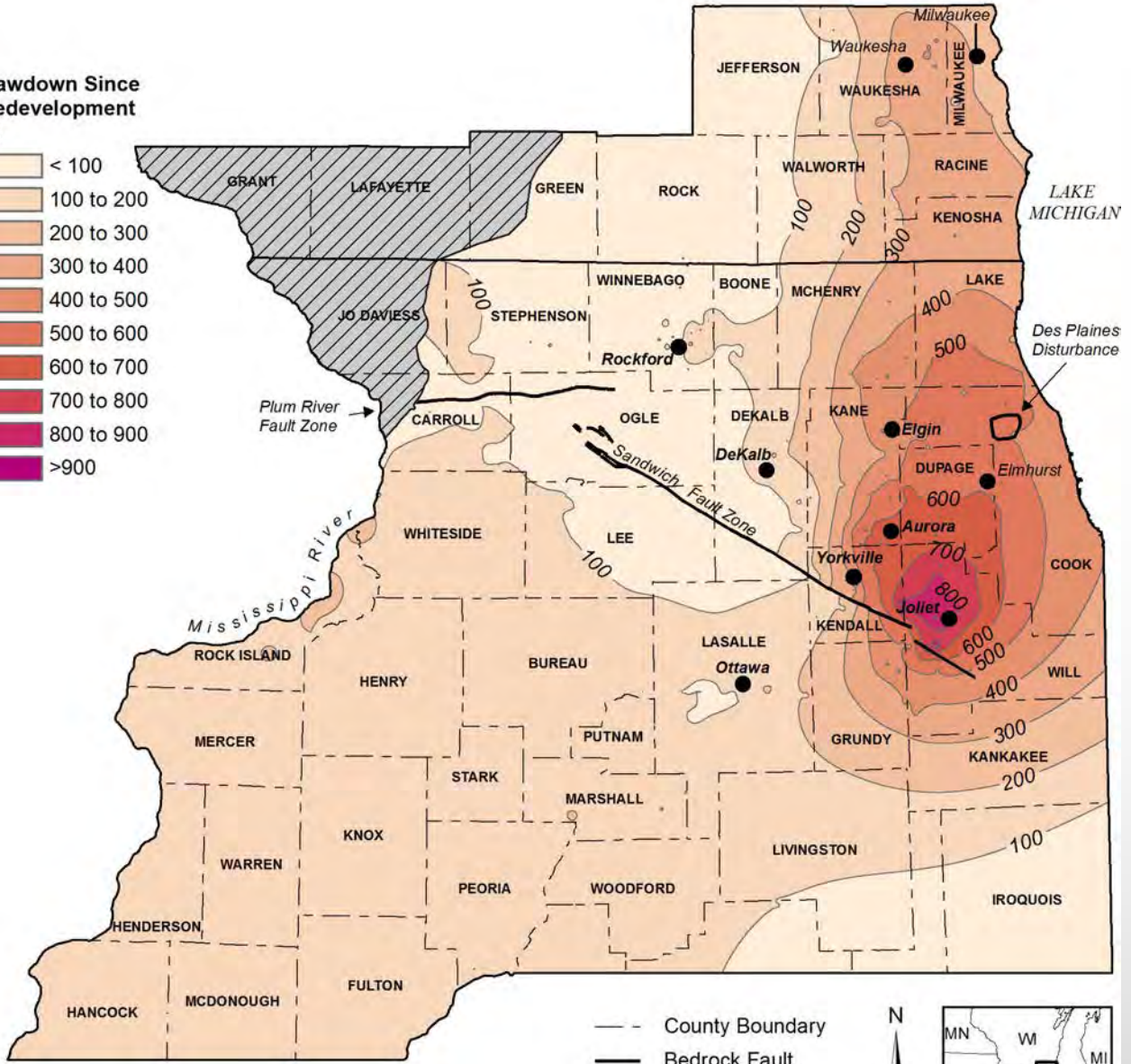
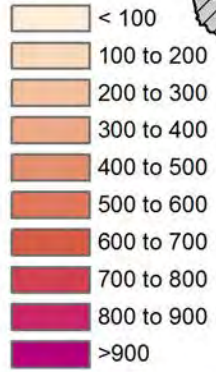


# STEP BACK TO THE STATE: WHY IS THIS IMPORTANT?

Sandstone water levels in northeastern Illinois have experienced significant drawdown. Many communities in Will and Kendall Counties (at the center of the cone of depression) are evaluating their options right now.

Water levels in the Rockford area have declined, too, but not nearly to the same degree. Let's look closer at this change.

Drawdown Since  
Predevelopment  
(ft)

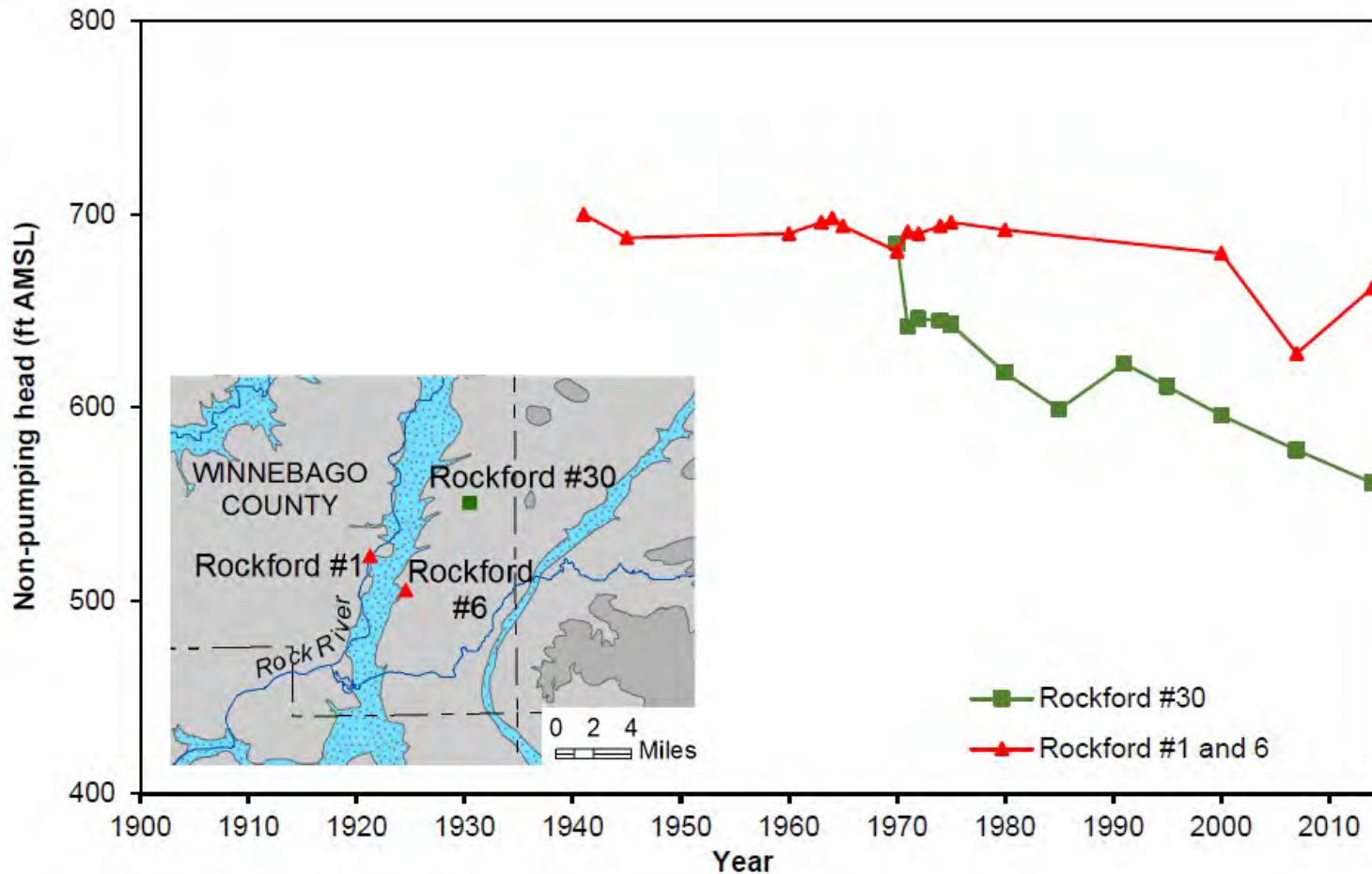




# C-O WELL WITH ROCK RIVER VALLEY ALLUVIAL AQUIFER OVERLYING VERSUS GALENA-PLATTEVILLE OVERLYING.

Water levels in Rockford Cambrian-Ordovician wells 1, 6, and 30. Adapted from (Abrams et al., 2015)

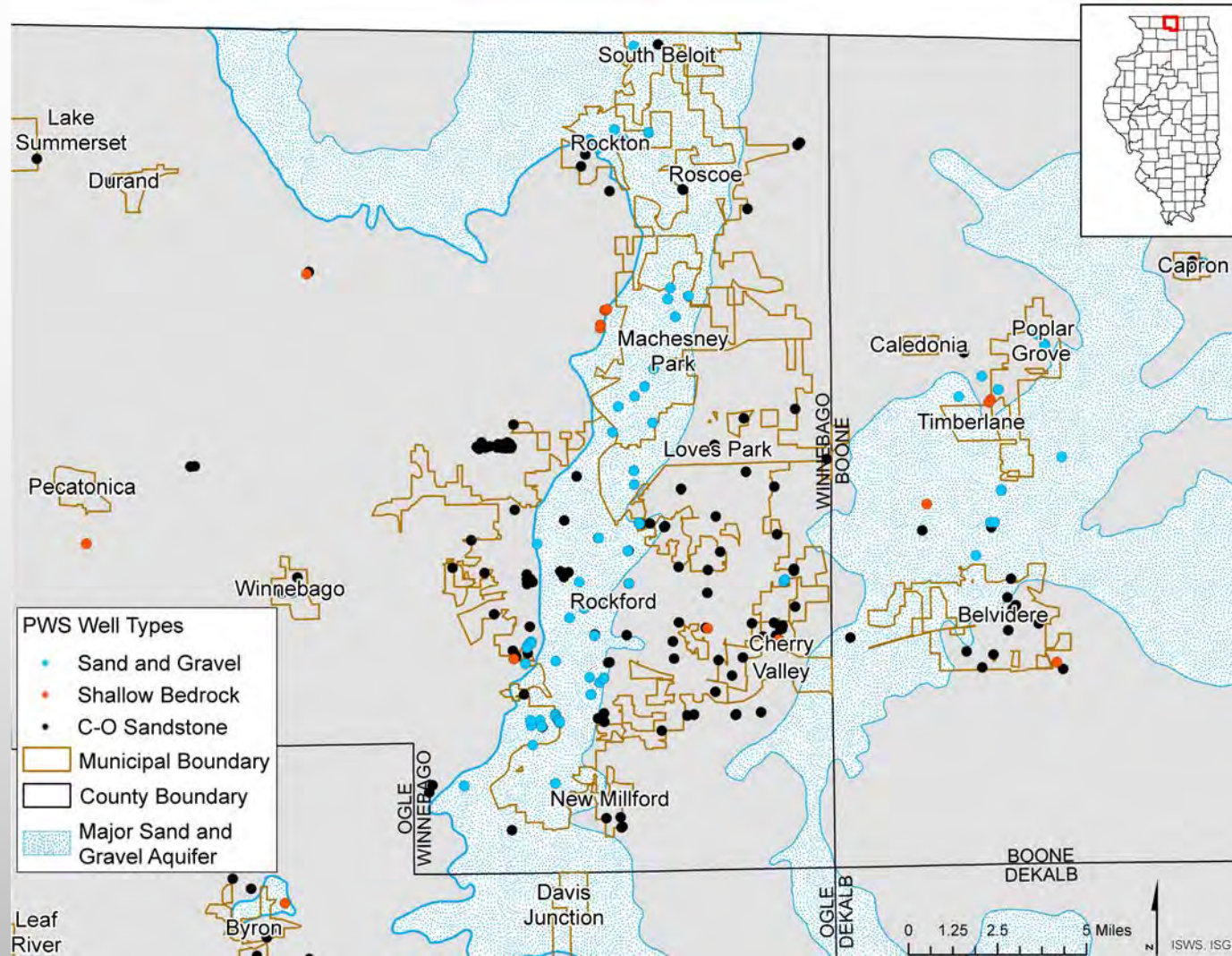
Drawdown is more apparent in wells where Galena-Platteville is present



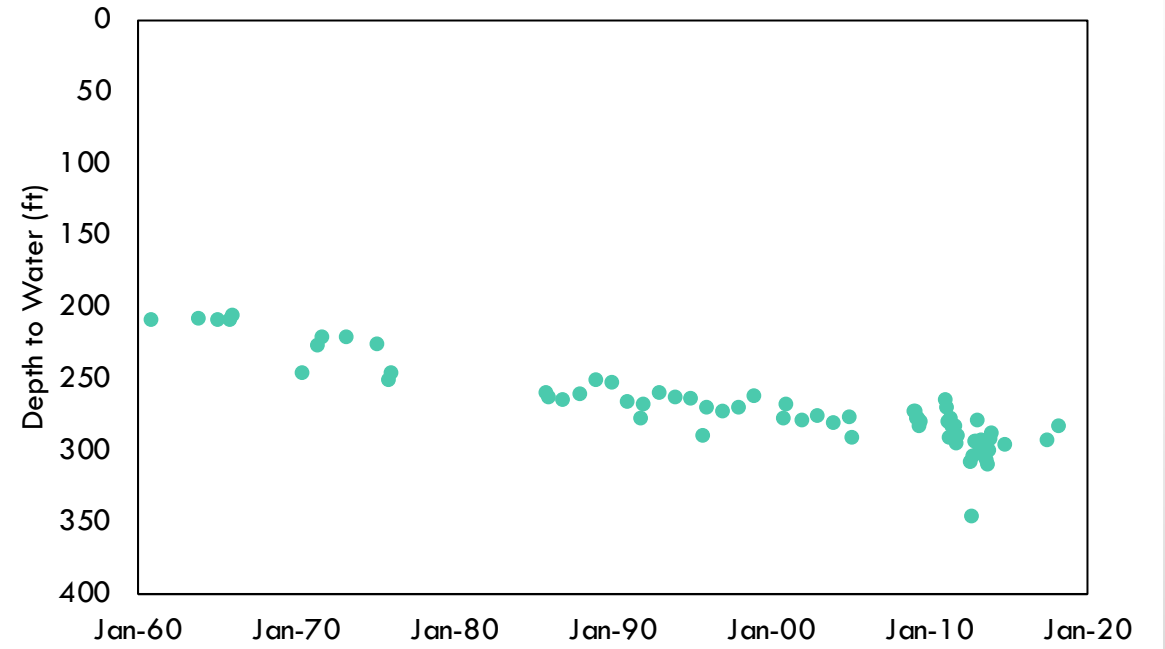
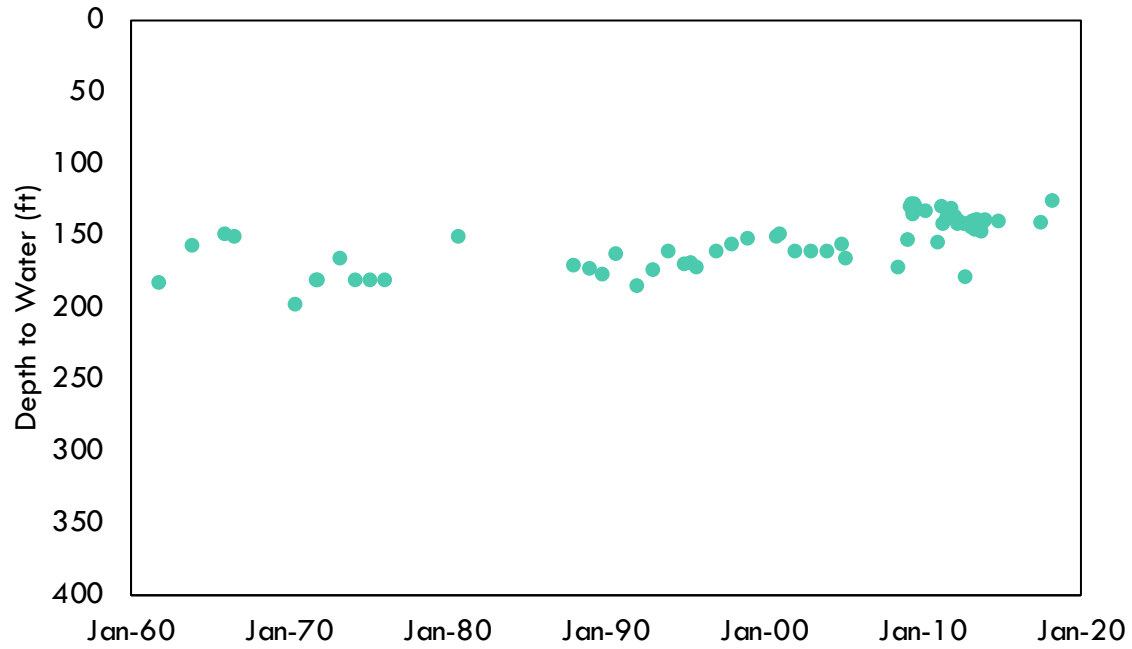


# MAP OF THE GROUND WATER WELLS IN THE AREA COLORED BY AQUIFER.

Different types of public water supply wells in the Rockford area.

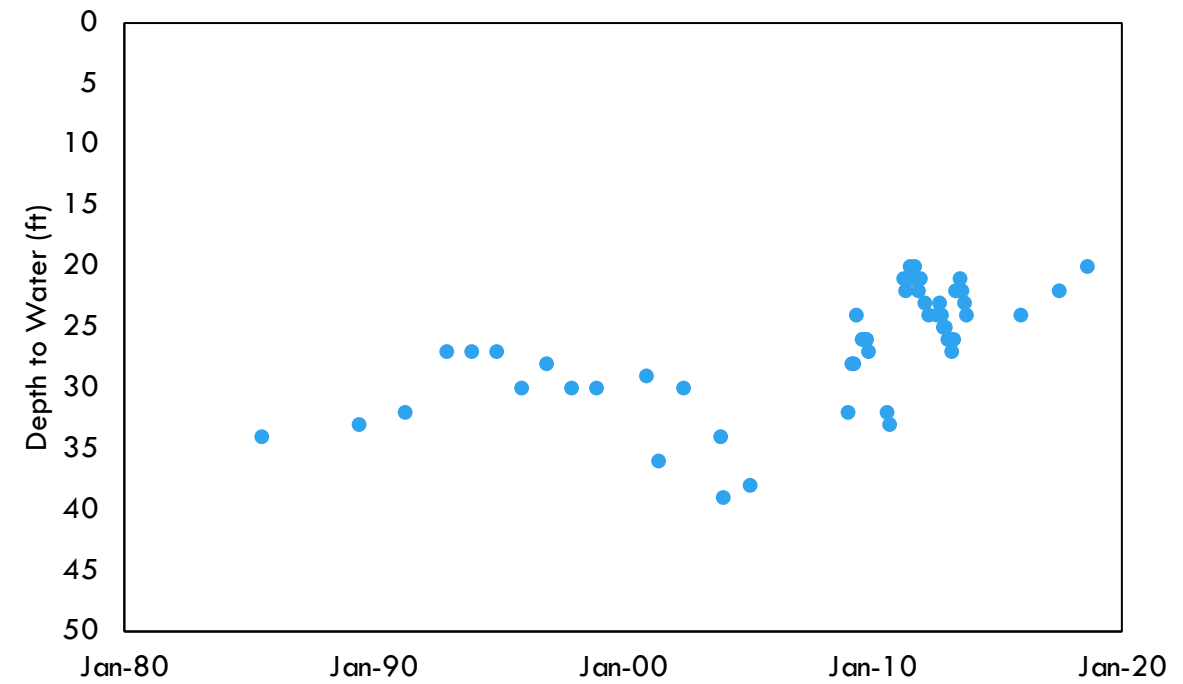
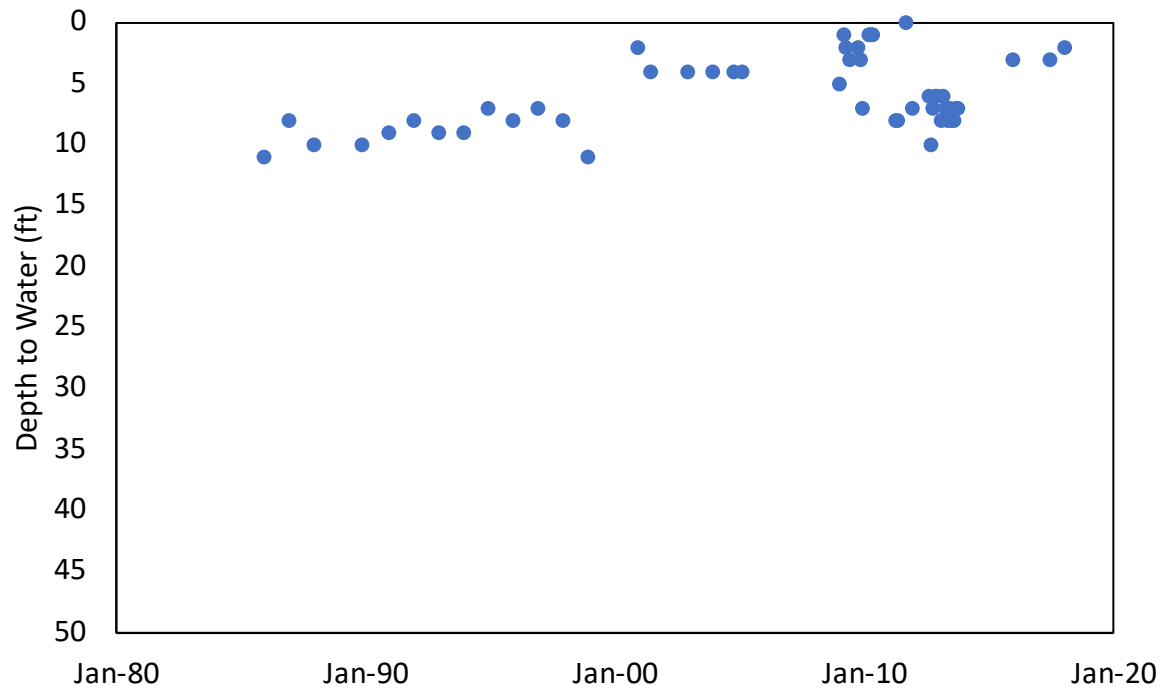


# TWO LONG TERM C-O WELLS, ONE WEST AND ONE EAST OF THE ROCK RIVER VALLEY



Water levels in the Cambrian-Ordovician system at Rockford (left) Rockford Well #18 west of the Rock River and (right) Well #10 east of the Rock River

# TWO TYPICAL WELLS FROM THE ROCK RIVER ALLUVIAL AQUIFER



*Water levels in the alluvial aquifer at (left) Rockford Well #23 and (right) Rockford Well #35.*

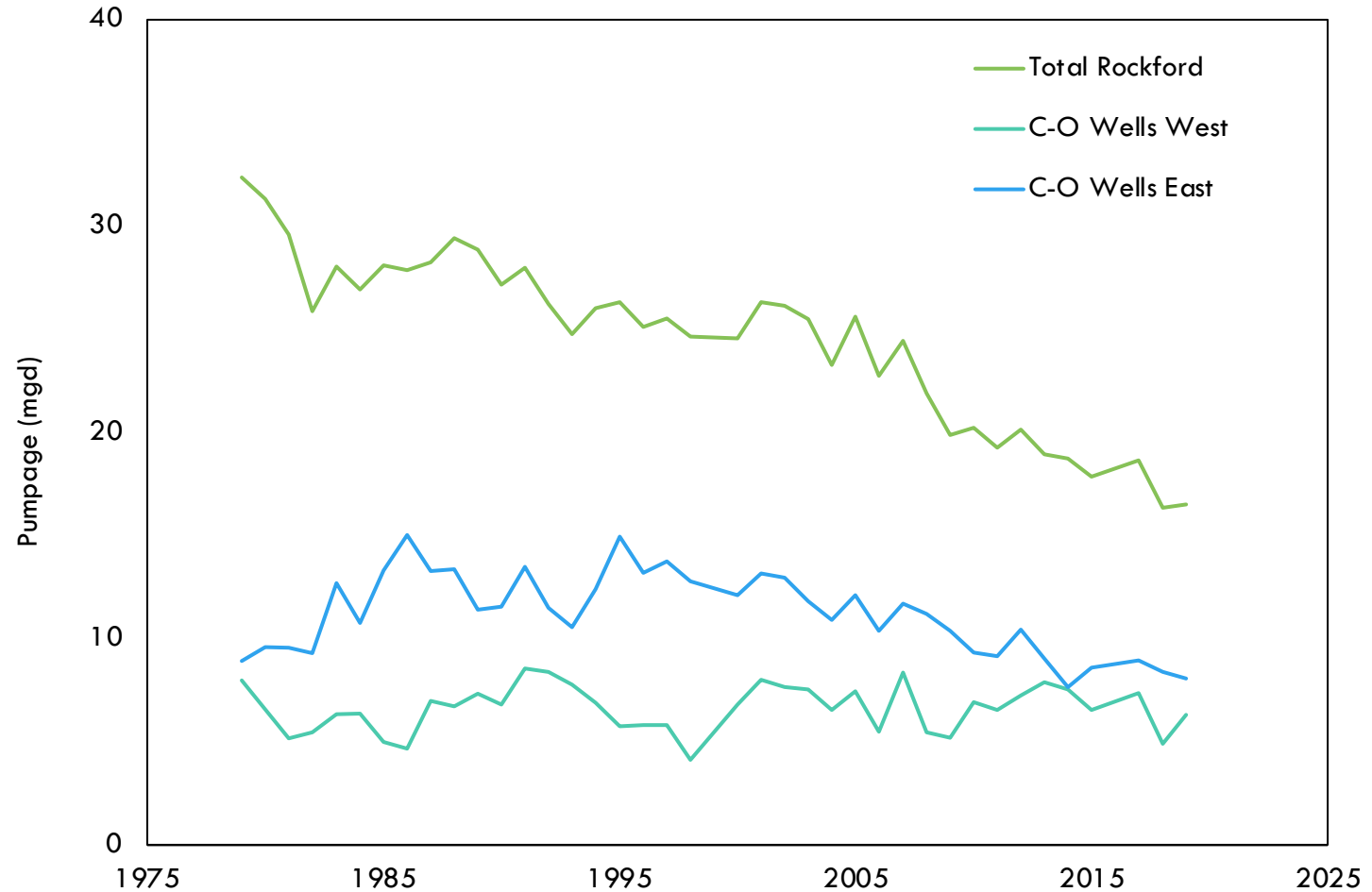
# CHART OF TRENDS FOR 23 SELECT ROCKFORD WELLS

Well	Increasing	Decreasing	Stable	No Trend
3			X	
18	X			
21	X*			
22		X*		
34	X*			
37			X	
44				X
23	X			
24				X*
35	X			
5		X		
6			X	
10		X		
13			X	
26			X	
29		X		
30		X		
31		X		
36			X	
39				X
40			X	
42			X*	
43		X		

*Water level trends of 23 selected City of Rockford wells. Orange indicates a Cambrian-Ordovician well to the west of the Rock River, blue indicates a Cambrian-Ordovician well to the east, and white indicates an alluvial aquifer well within the Rock River valley. Asterisks denote wells that need further investigation to confirm records.*

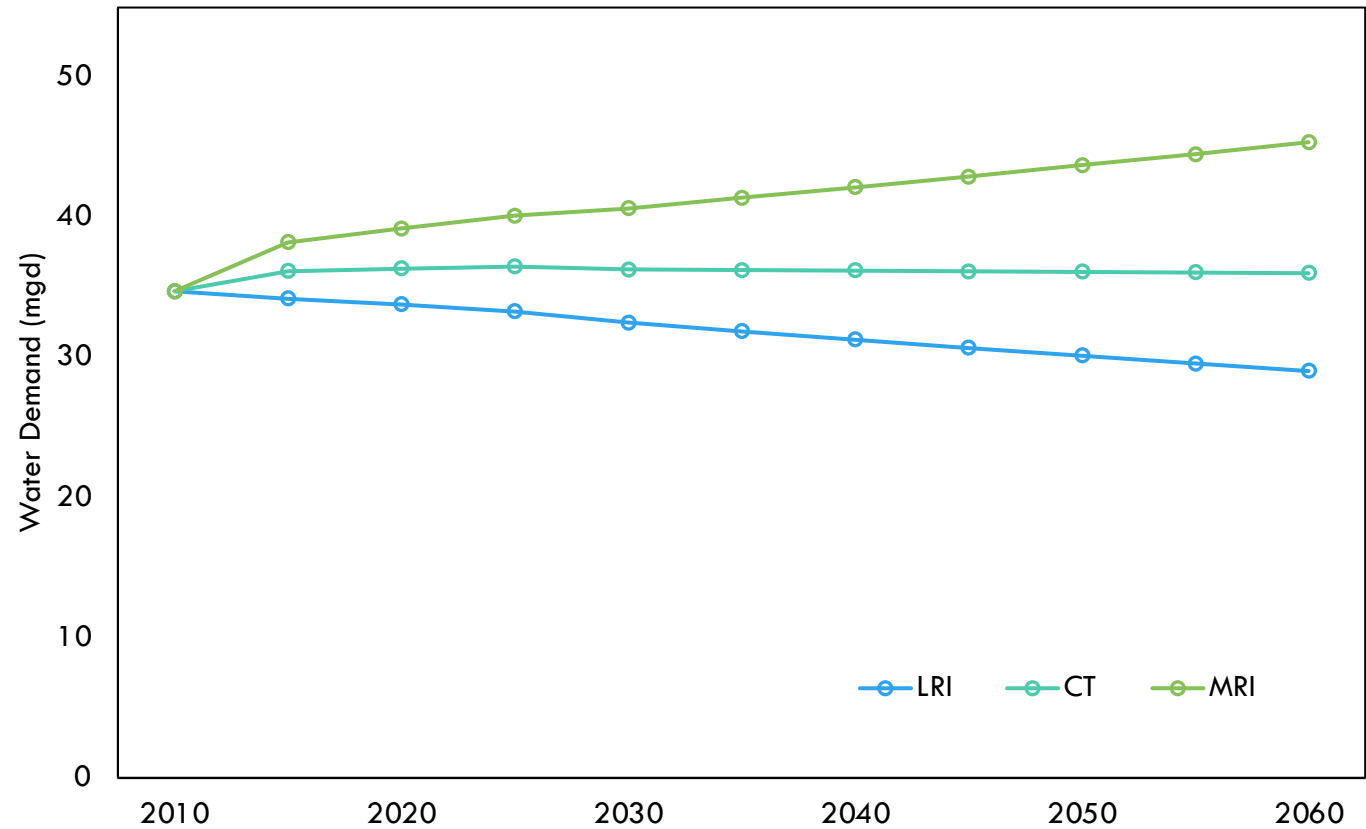
# CITY OF ROCKFORD PUMPING DISTRIBUTIONS; TOTAL, C-O WEST AND C-O EAST

*Total pumping (including alluvial aquifer pumping), Cambrian-Ordovician pumping west of the Rock River valley (orange), and Cambrian-Ordovician pumping east of the Rock River valley (blue) reported by the City of Rockford through IWIP from 1979 to 2019.*



# PUMPAGE SCENARIOS FROM MEYER ET AL., 2019

*Water Demand for Winnebago County from (Meyer et al., 2019).*



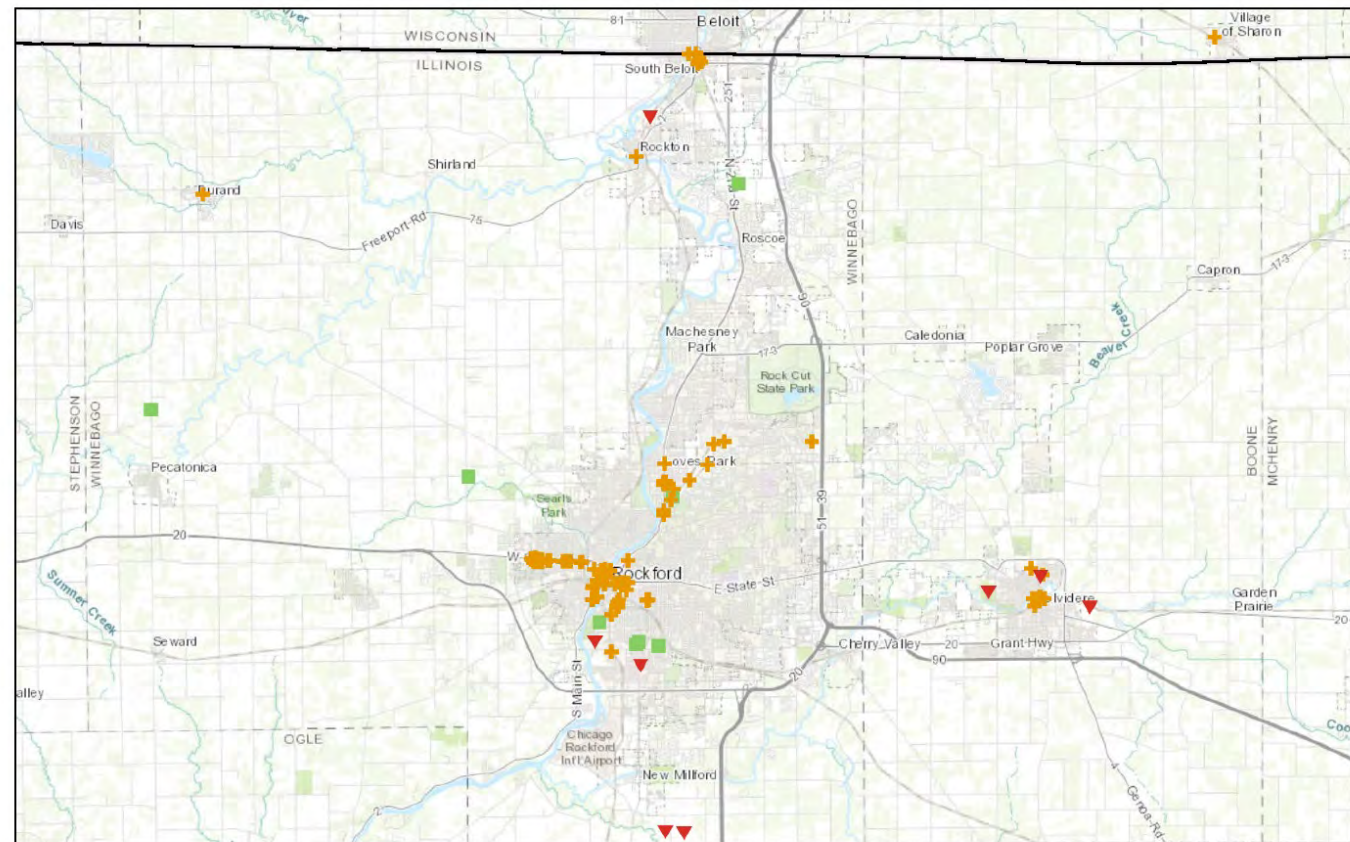


# MINIMIZED DRAWDOWN OFTEN MEANS MORE RECHARGE, AND INCREASED VULNERABILITY TO CONTAMINATION

## BROWNFIELD, RCRA, AND CERCLA SITES

Figure 25. Brownfield; Resource Conservation and Recovery Act (RCRA); and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, Superfund) sites in the Rockford Area. (This figure was made with the USEPA's Cleanups in My Community tool available at <https://www.epa.gov/cleanups/cleanups-my-community>.)

Rockford Area Brownfield, RCRA, and CERCLA sites



February 3, 2020

State Outlines

Sites

+ Brownfields

■ RCRA Corrective Action

▼ Superfund NPL

1:344,749

0 2.25 4.5 9 mi  
0 3.5 7 14 km

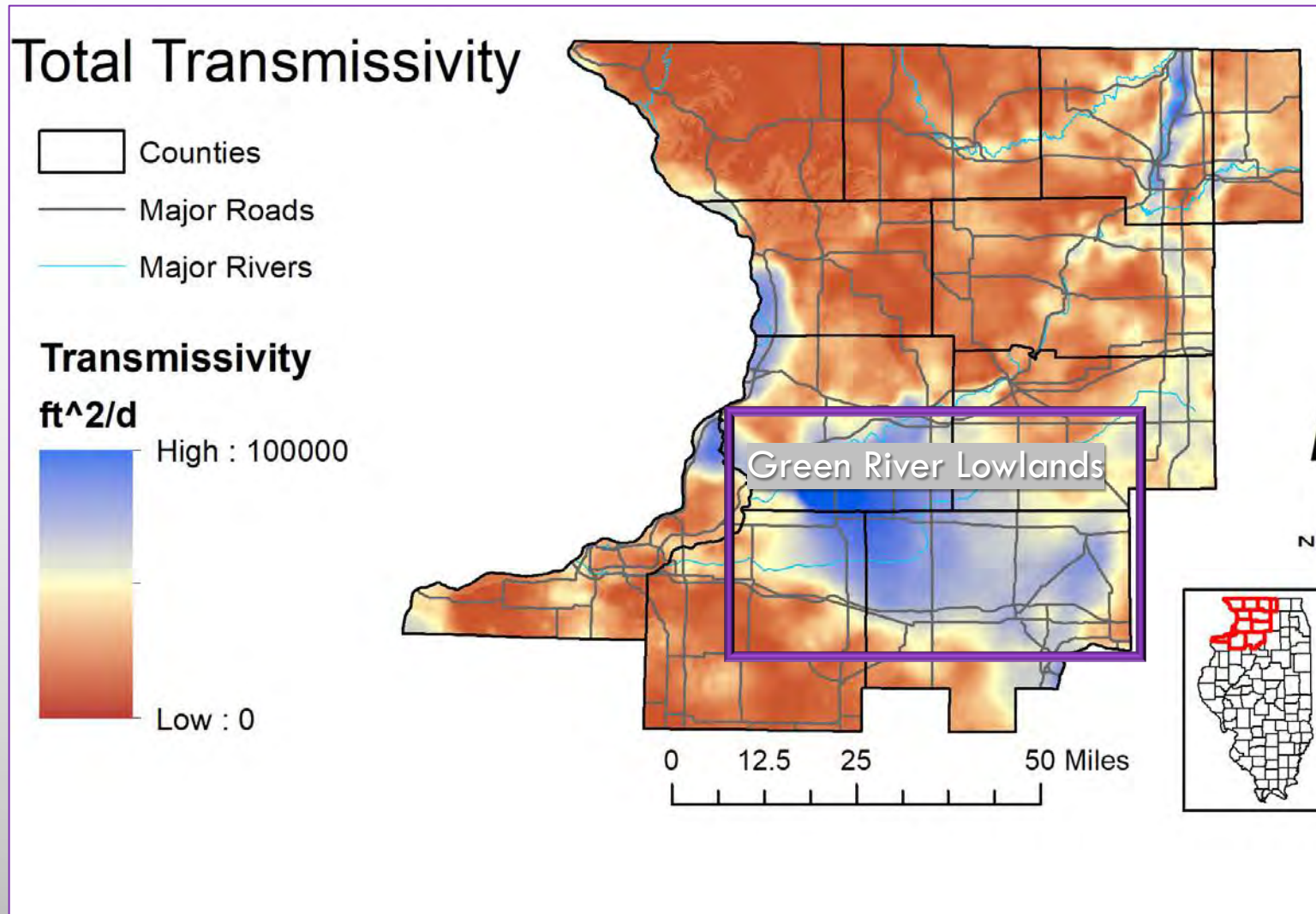
US EPA, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL,

Generated from: Cleanups in My Community; Date above is the date map





# DISCUSSION 2: GREEN RIVER LOWLANDS

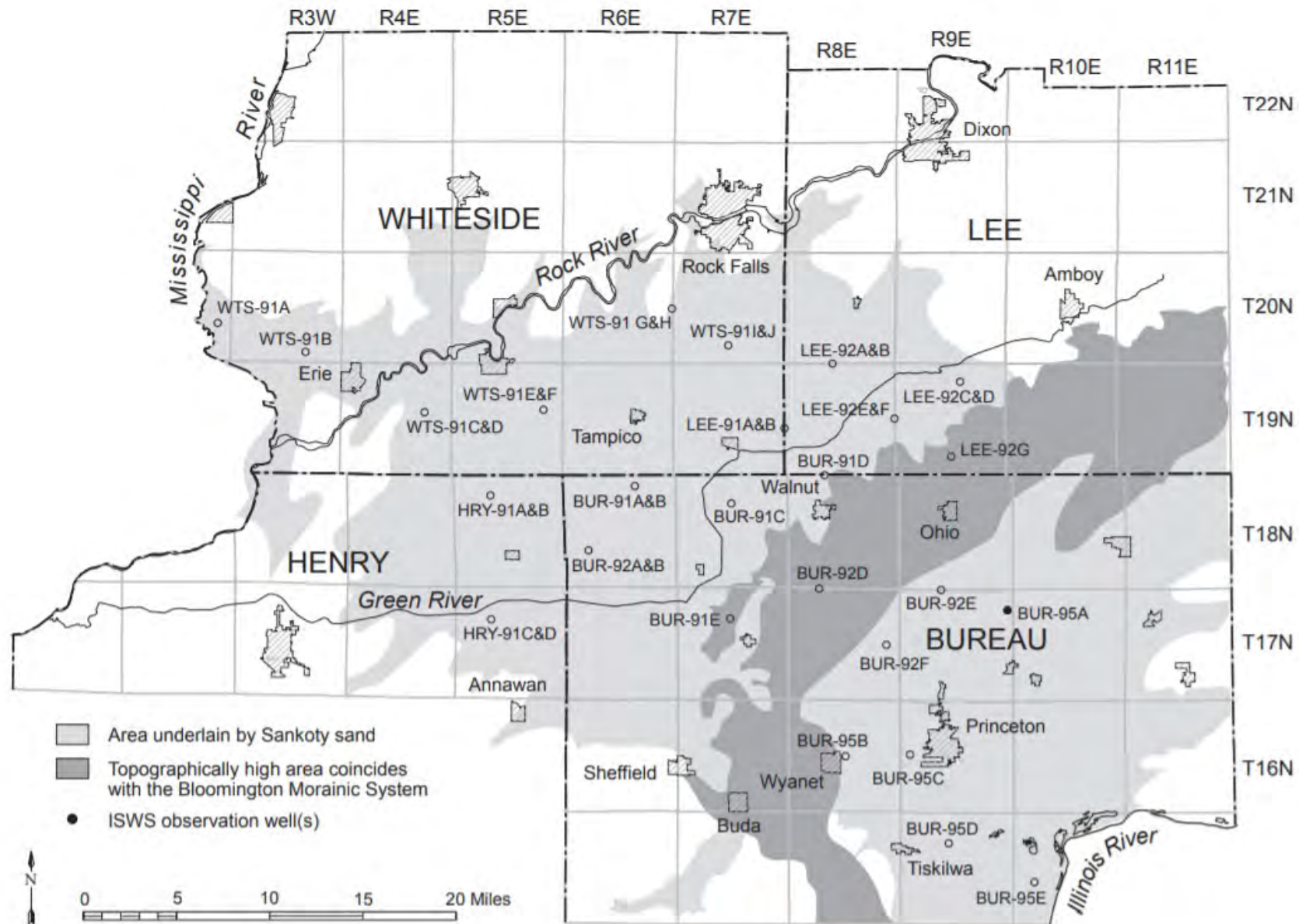


# CENTER PIVOT IRRIGATION





# LONG HISTORY OF MONITORING





# MONITORING WELLS



By Hand



Real-Time



# ISWS REAL-TIME MONITORING

<https://www.isws.illinois.edu/groundwater-science/groundwater-monitoring-well-networks/green-river-lowlands-monitoring>

**ILLINOIS**  
Illinois State Water Survey  
PRAIRIE RESEARCH INSTITUTE

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## Groundwater Science

Home / Groundwater Science / Illinois Water Level Conditions

### Illinois Water Level Conditions - Green River Lowlands

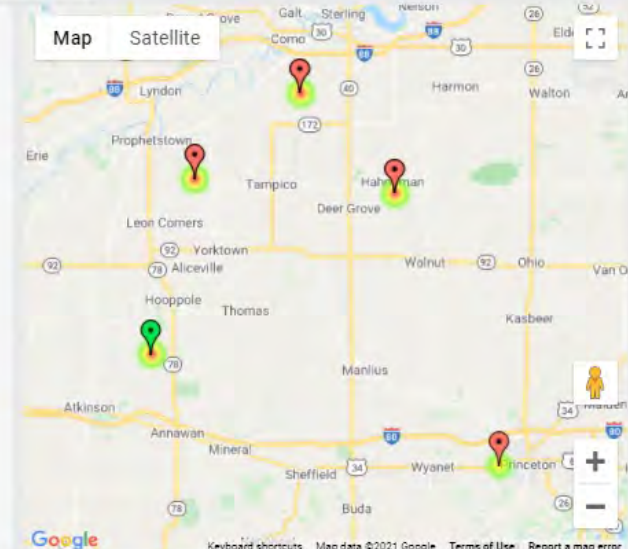
Telemetry Station:

Name : HRY-91C  
ISWS P# : 381651

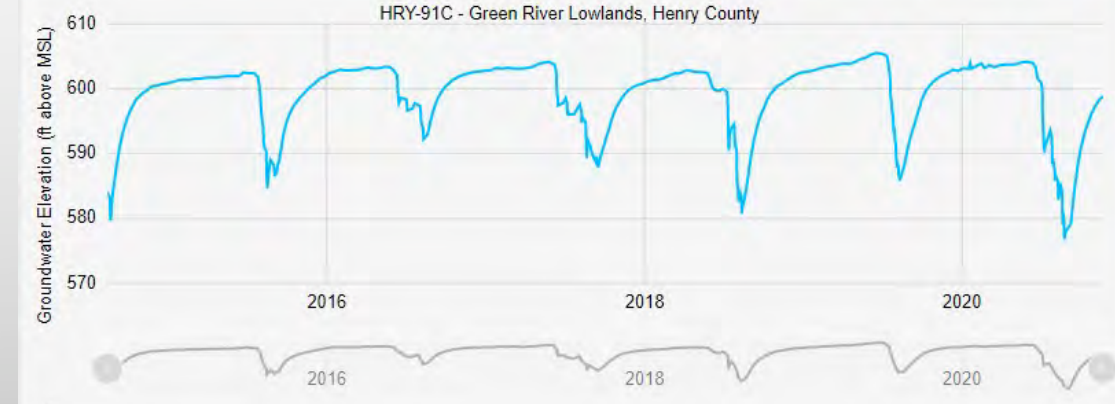
Network : GREEN RIVER LOWLANDS  
Local Aquifer Name : SANKOTY  
Aquifer Type : CONFINED  
Aquifer Class : QUATERNARY SAND AND GRAVEL

Location [ Lat, Long ] : [ 41.470948, -89.936731 ]  
Land Surface Elevation : 612.15 feet above MSL  
Depth : 103 feet below LS  
Measurement Frequency : CONTINUOUS  
Period of Record : [ 1991-07-03 00:00 ] - [ 2021-11-10 10:00 ]  
Last water level : 599.21 feet above MSL

Download Data :  
[ JSON ] [ CSV ]



#### HRY-91C - Green River Lowlands, Henry County

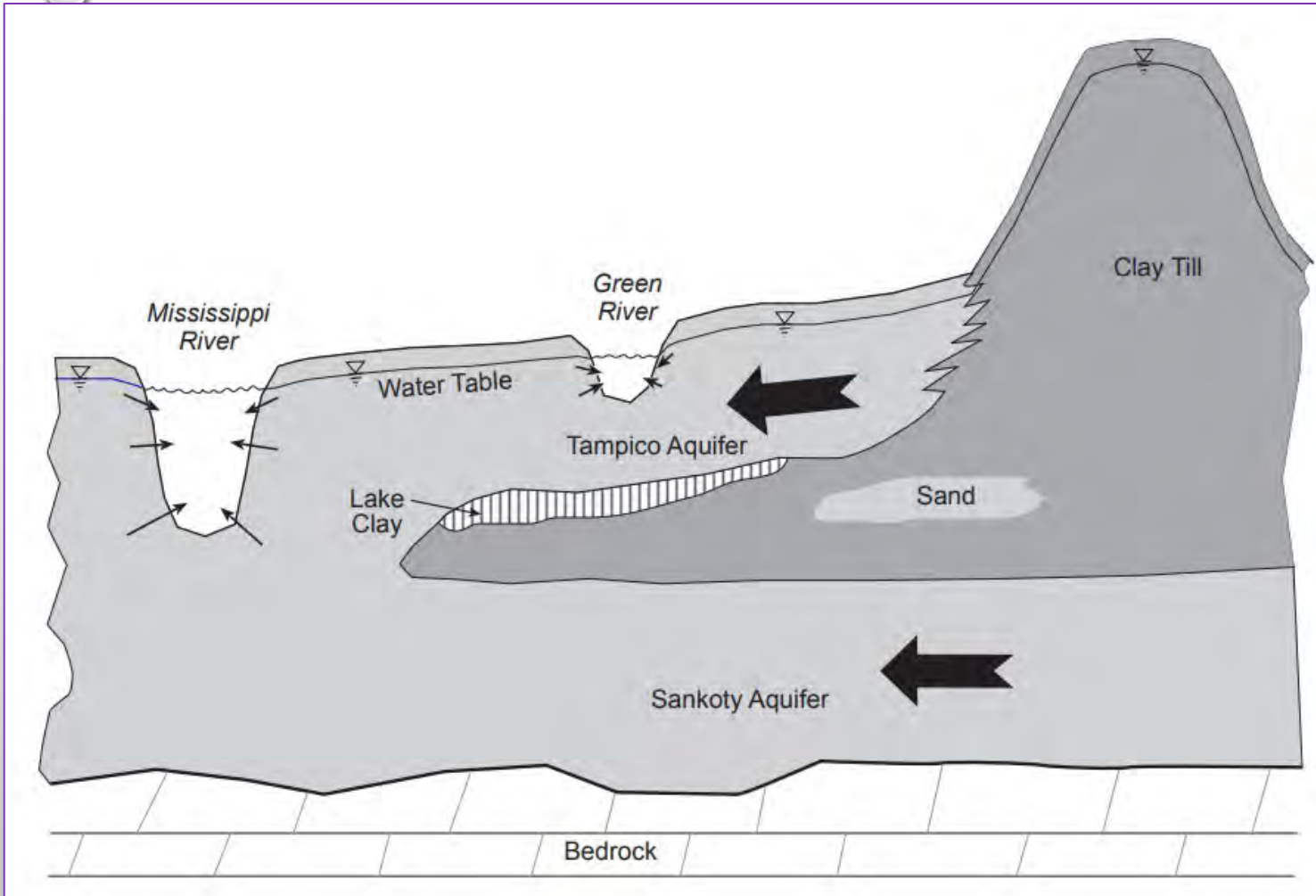


Groundwater Elevation (ft above MSL)

Plot Depth to Water

Download Data

# TWO AQUIFERS

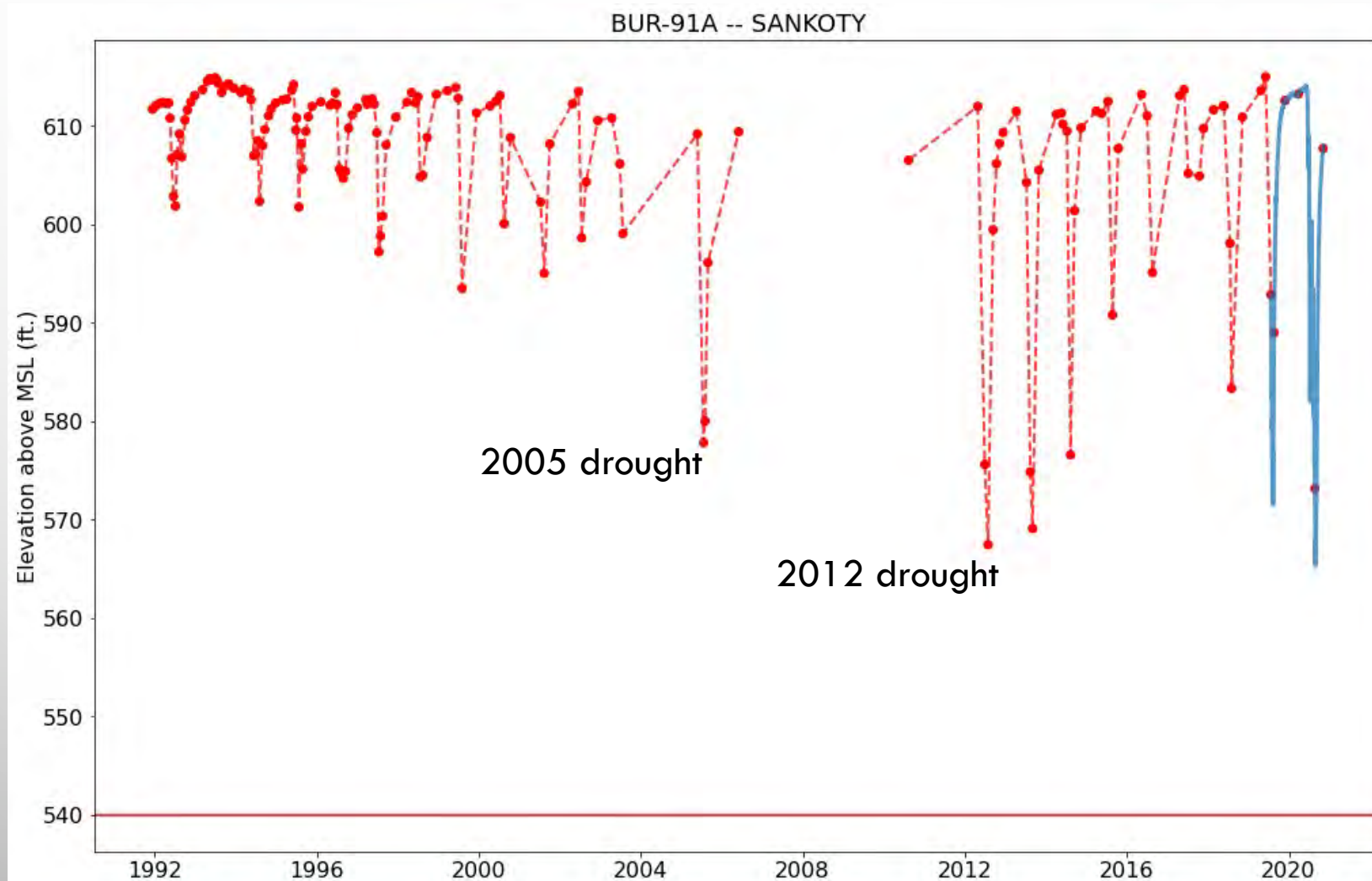


Uppermost Tampico Aquifer (readily recharged by precipitation events)

Lowermost Sankoty Aquifer (most irrigation occurs from this deeper aquifer)

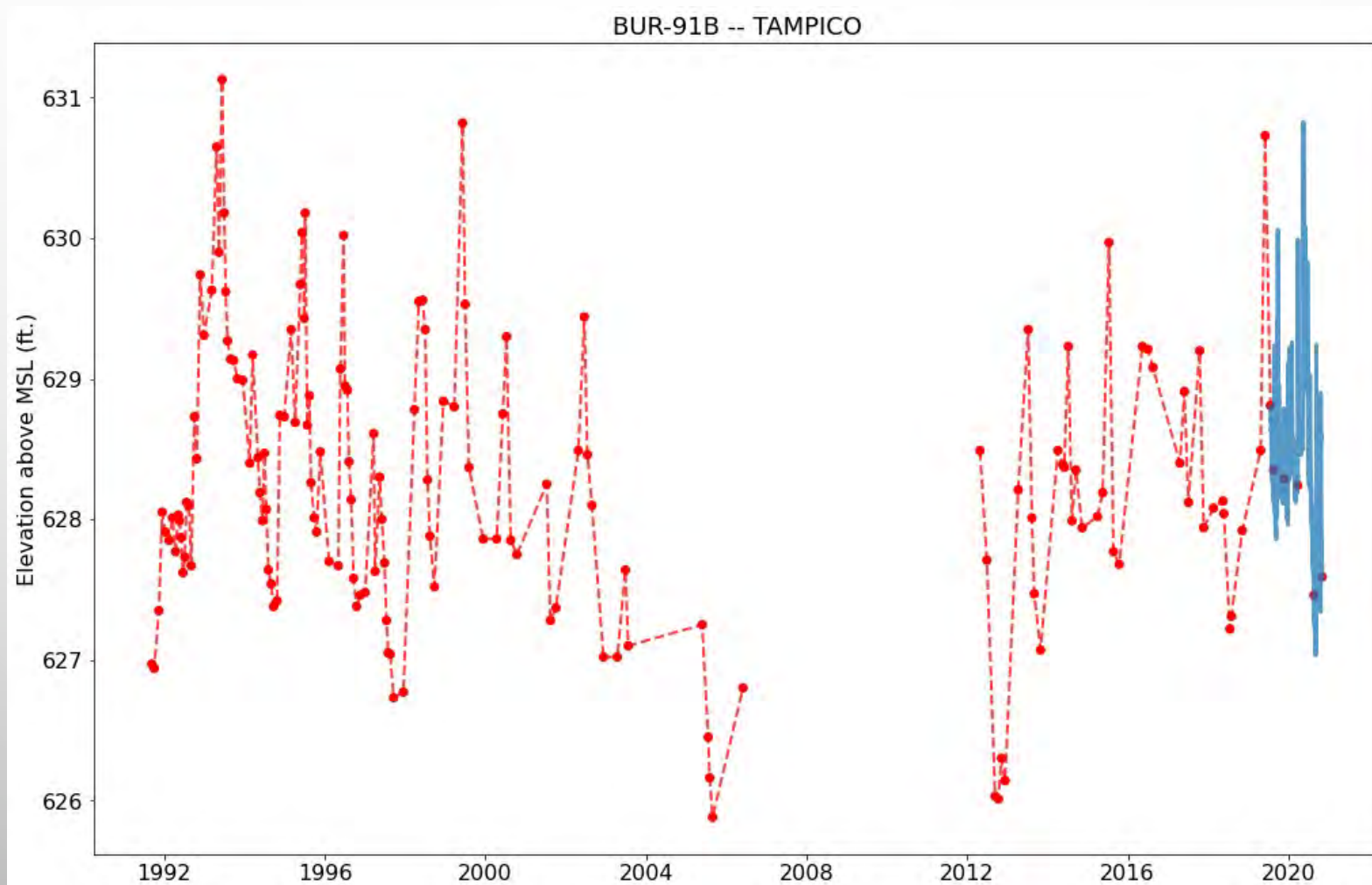
The two aquifers are separated by a clay layer

# MANY SANKOTY WELLS HAVE A DECREASE IN SUMMERTIME IRRIGATION, PARTICULARLY AFTER 2004

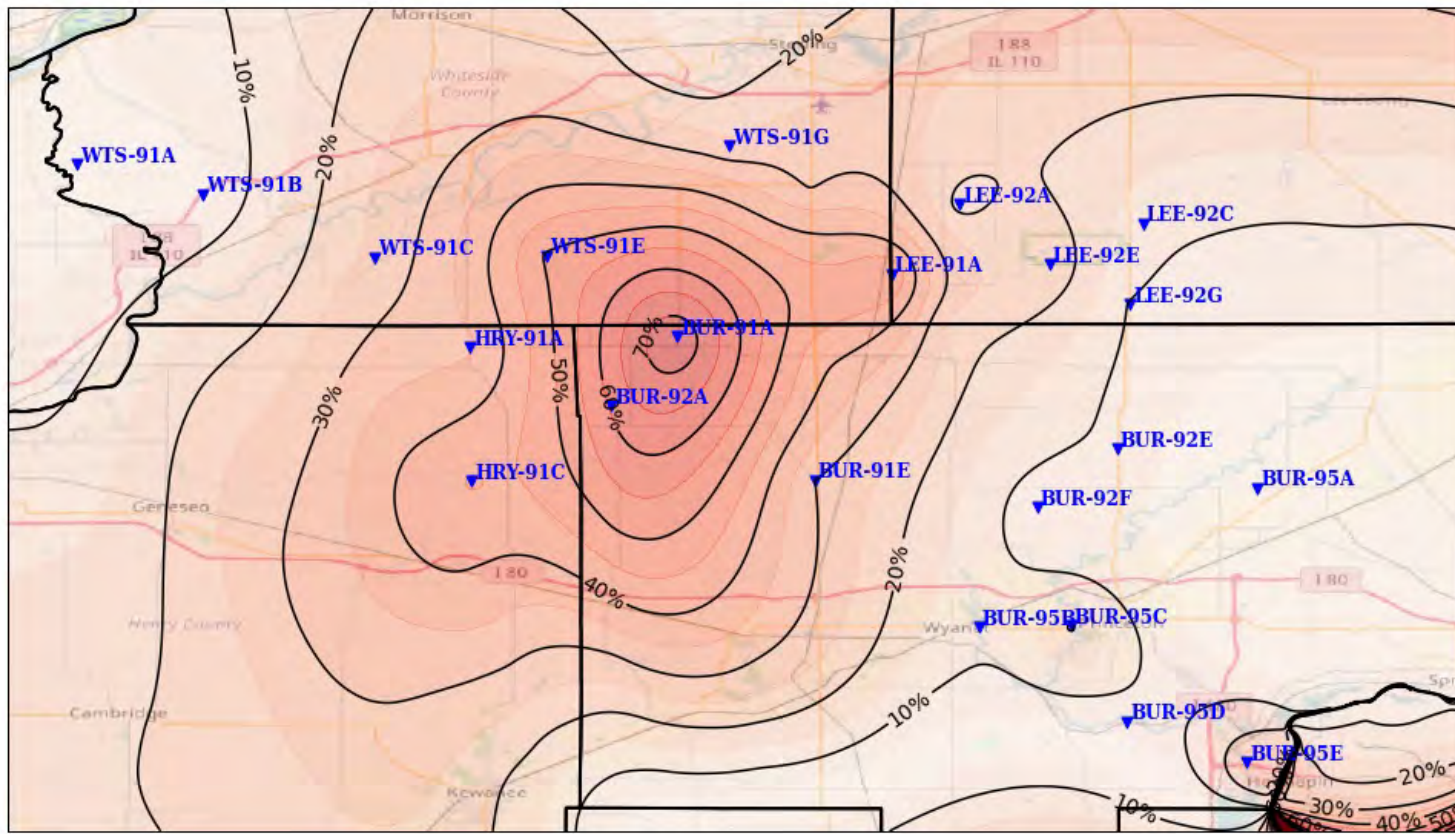




# TAMPICO HAS NOT FOLLOWED SUIT, MANY WET SPRINGS RECENTLY HAVE LED TO HIGHER WATER LEVELS



# MOST PROMINENT HEAD CHANGE IN NW BUREAU COUNTY



>70% of available head above the top of the Sankoty is removed during the summer

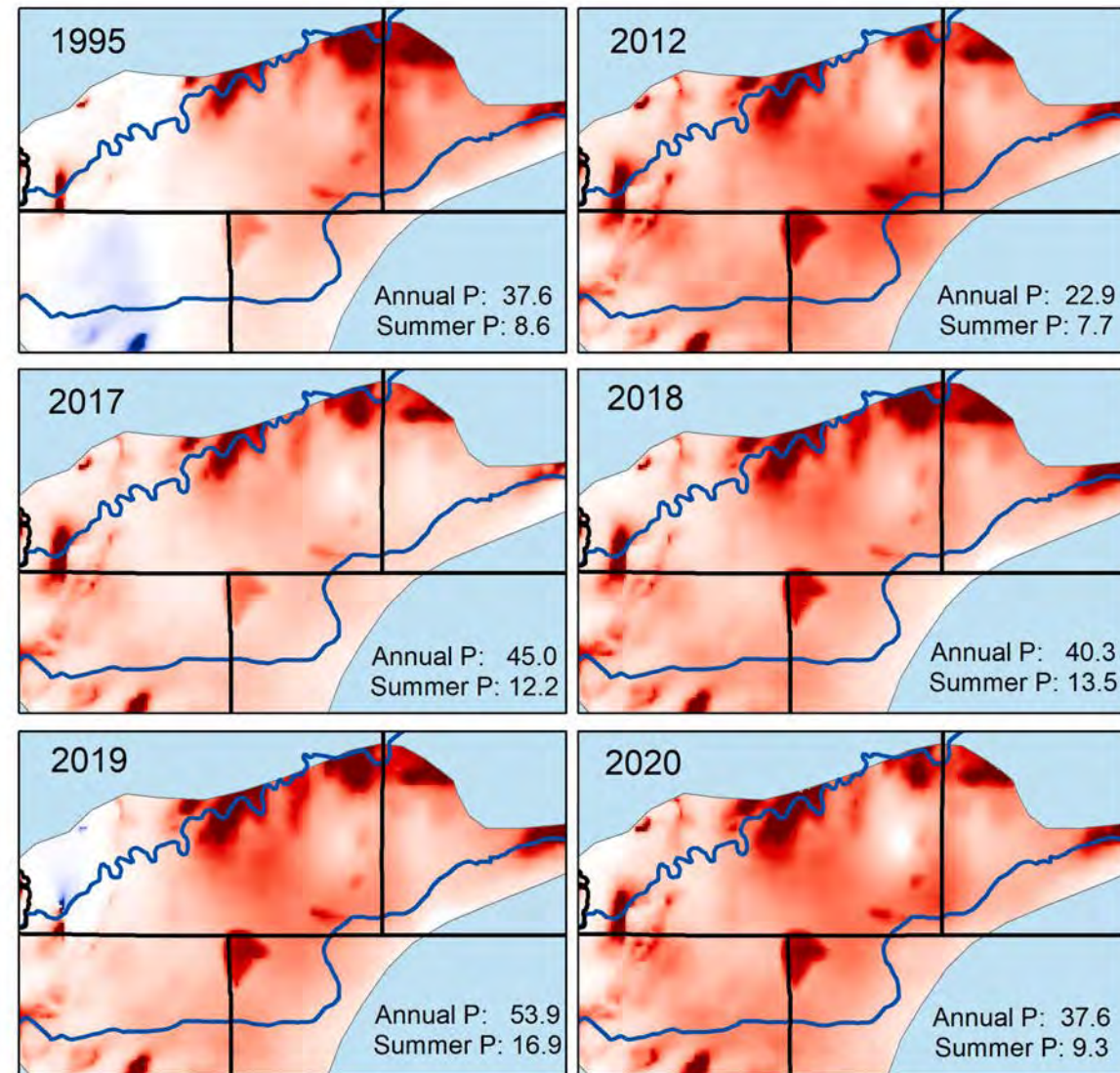
This is a pressure response in a deep aquifer



# QUESTION?

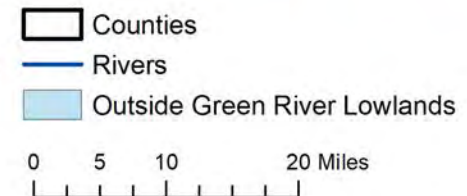
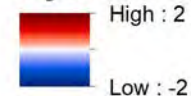
Why do the water levels in the Sankoty always seem to bounce back in the spring?

Likely explanation: water drains from the upper Tampico to lower Sankoty through heterogeneities in the aquitard (it is not continuous)



## Legend

### Hydraulic gradient






## IS THIS AN ISSUE?

The impacts are seasonal, and monitoring wells have been installed to evaluate whether water levels continue to decline during the summer months when irrigation is at its peak

Potential impacts include local dewatering of very shallow wells where the Sankoty is locally dewatered

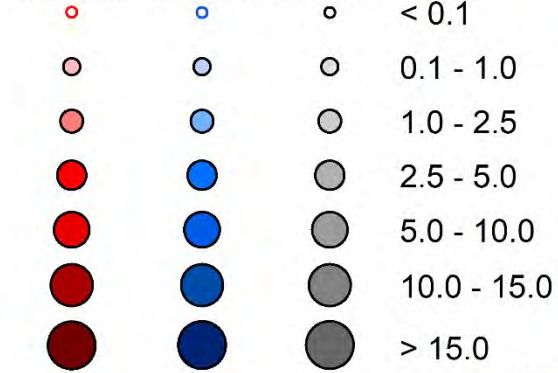




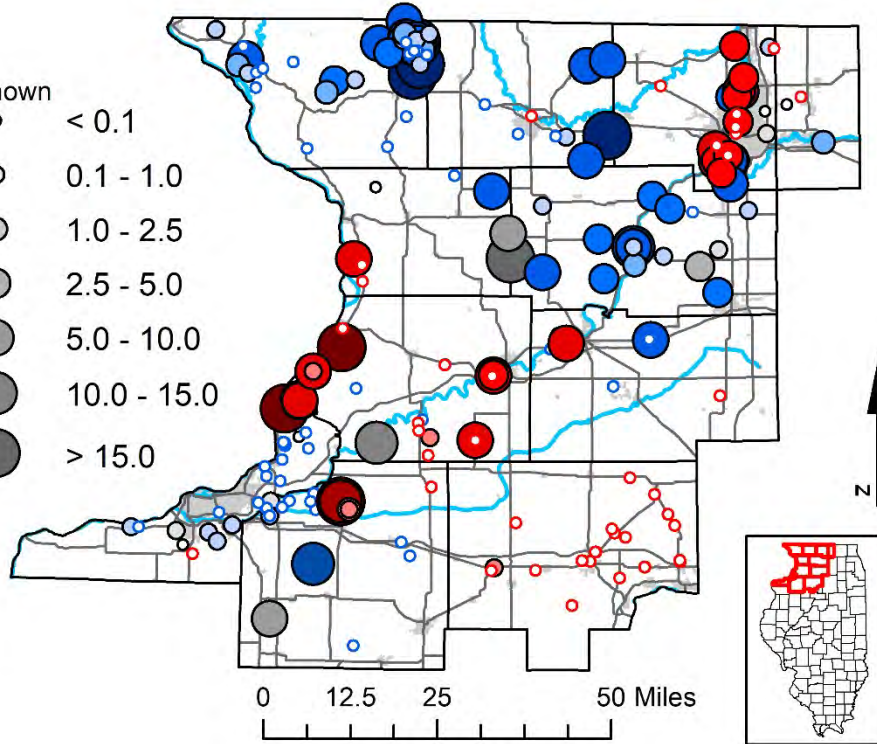
# REGIONAL WATER QUALITY

## NO<sub>3</sub>-N (mg/L)

Unconsol. Bedrock Unknown

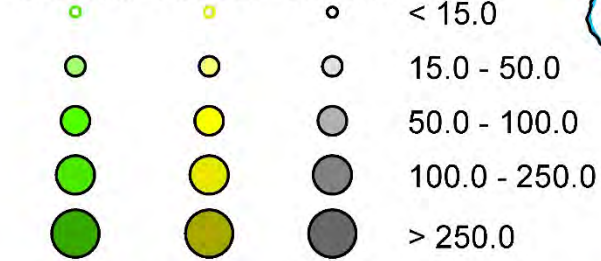


— Major Roads  
 — Major Rivers  
 ■ Municipalities  
 □ Counties

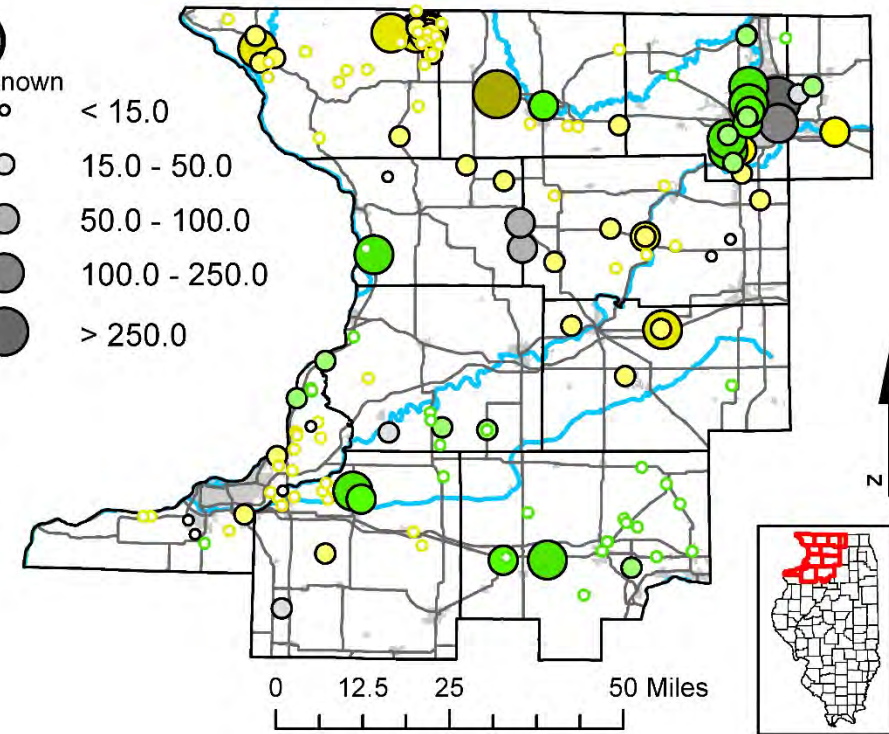


## Chloride (mg/L)

Unconsol. Bedrock Unknown



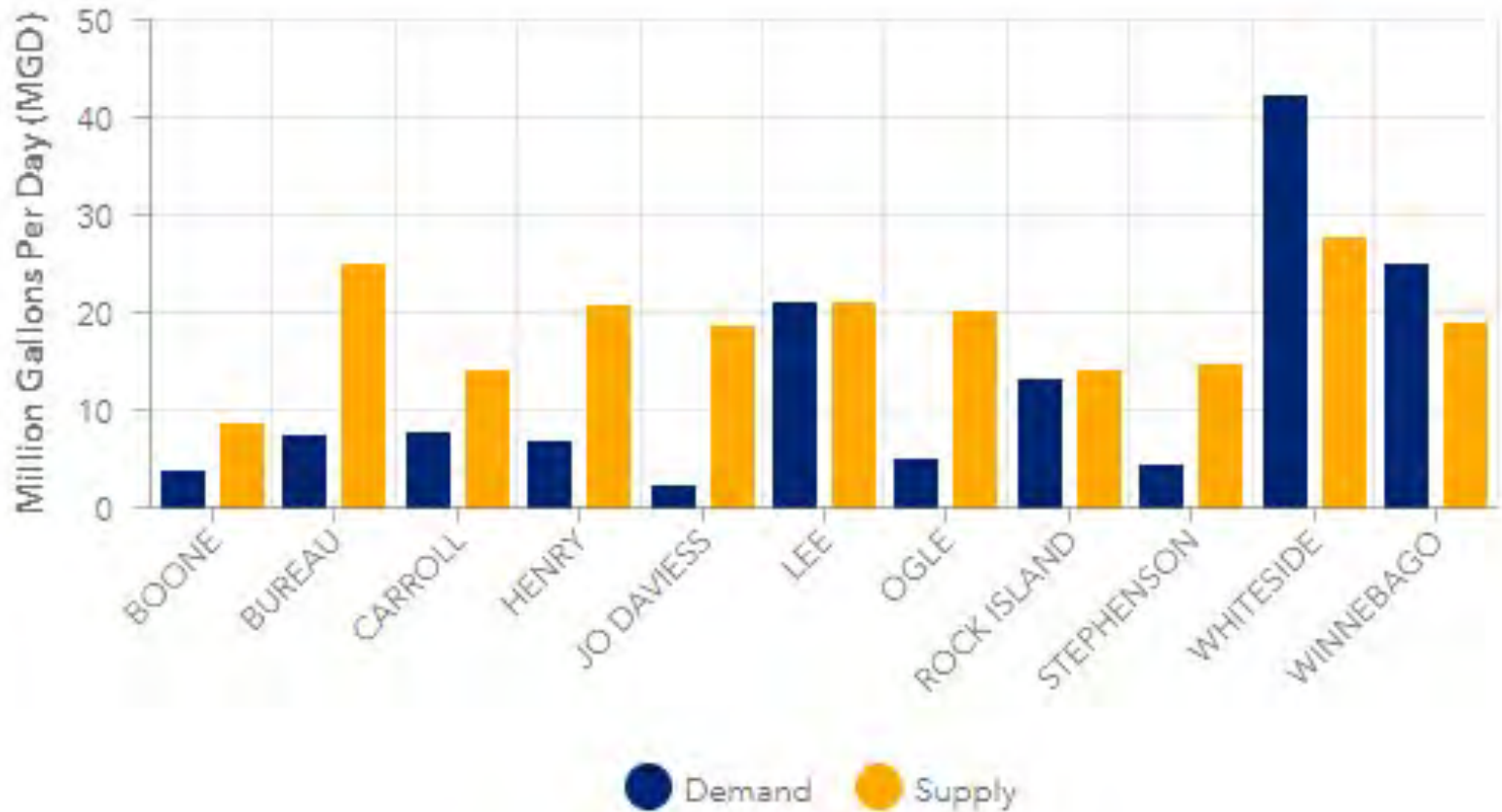
— Major Roads  
 — Major Rivers  
 ■ Municipalities  
 □ Counties



Nitrate: fertilizer, waste from animal farms

Chloride: deicing applications

# SUPPLY AND DEMAND (GROUNDWATER)



Tier 1 Assessments of available supply in the groundwater compared to current demands

Seeking stakeholder feedback





# WATER SUPPLY PLANNING REPORT

All material presented are compiled in a draft water supply planning report for the Rock River Region. We are always looking for reviewers to provide feedback.

Please contact me if interested in being a reviewer:

[dbabrams@Illinois.edu](mailto:dbabrams@Illinois.edu)

217-244-1520





# 3D Geologic Mapping for Groundwater Studies

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



**Prairie Research  
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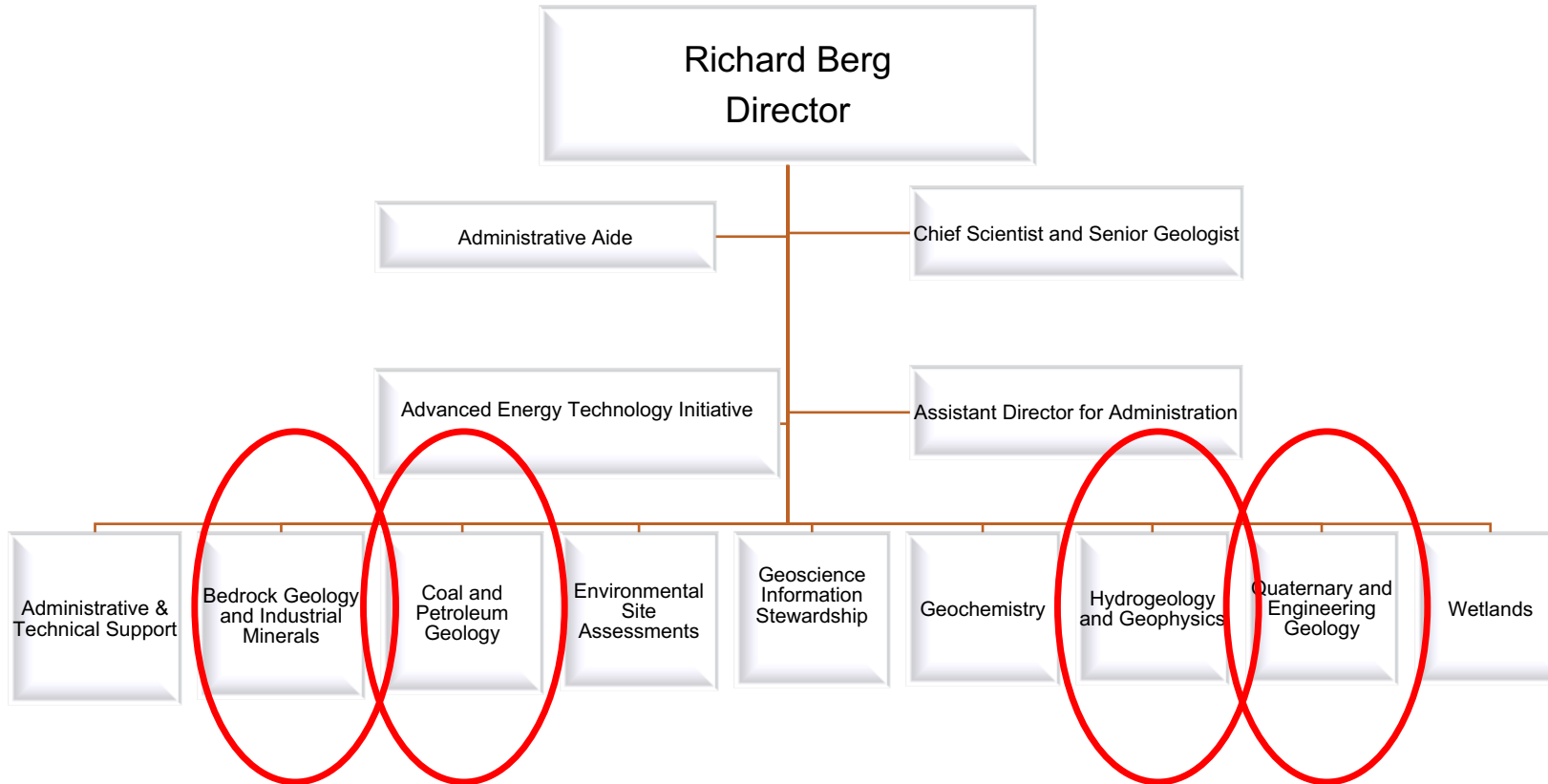


GreenTown Rockford

November 12, 2021



# Illinois State Geological Survey



## Geologic Mapping



**Prairie Research  
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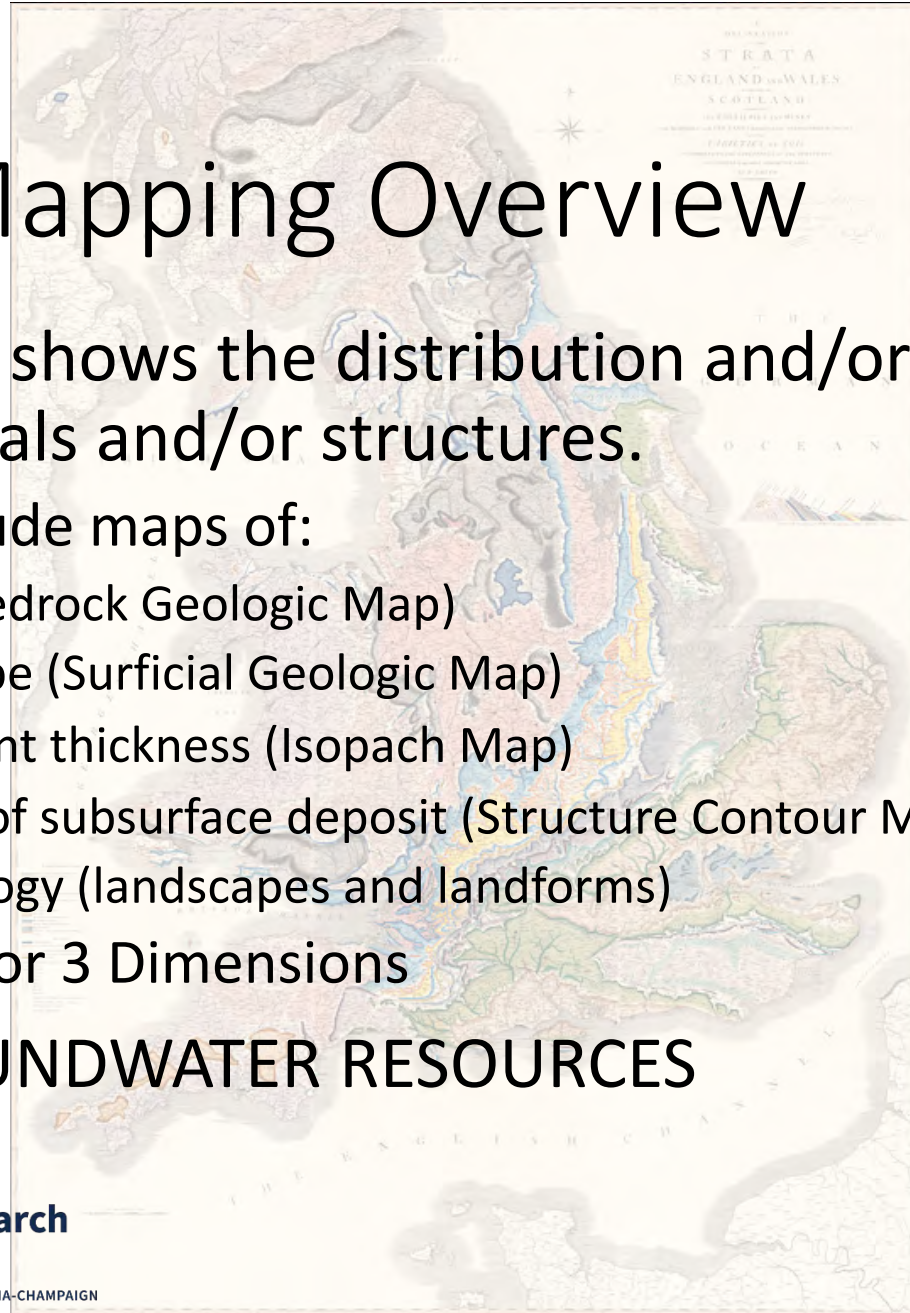
# Geologic Mapping Overview

- A geologic map shows the distribution and/or characteristics of geologic materials and/or structures.
  - Examples include maps of:
    - rock type (Bedrock Geologic Map)
    - sediment type (Surficial Geologic Map)
    - rock/sediment thickness (Isopach Map)
    - topography of subsurface deposit (Structure Contour Map)
    - geomorphology (landscapes and landforms)
  - 2 Dimensions or 3 Dimensions
- **AQUIFER/GROUNDWATER RESOURCES**



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# Geology Overview: Aquifer

Rock or sediment that is saturated with water, and permeable enough and thick enough to allow economically-valuable quantities of water to flow to wells or springs.

Some deposits meet this definition for low-capacity wells (i.e., domestic well), but not for high-capacity wells (i.e., irrigation well, industrial well, municipal well).



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# Geology of an aquifer—glacial deposits

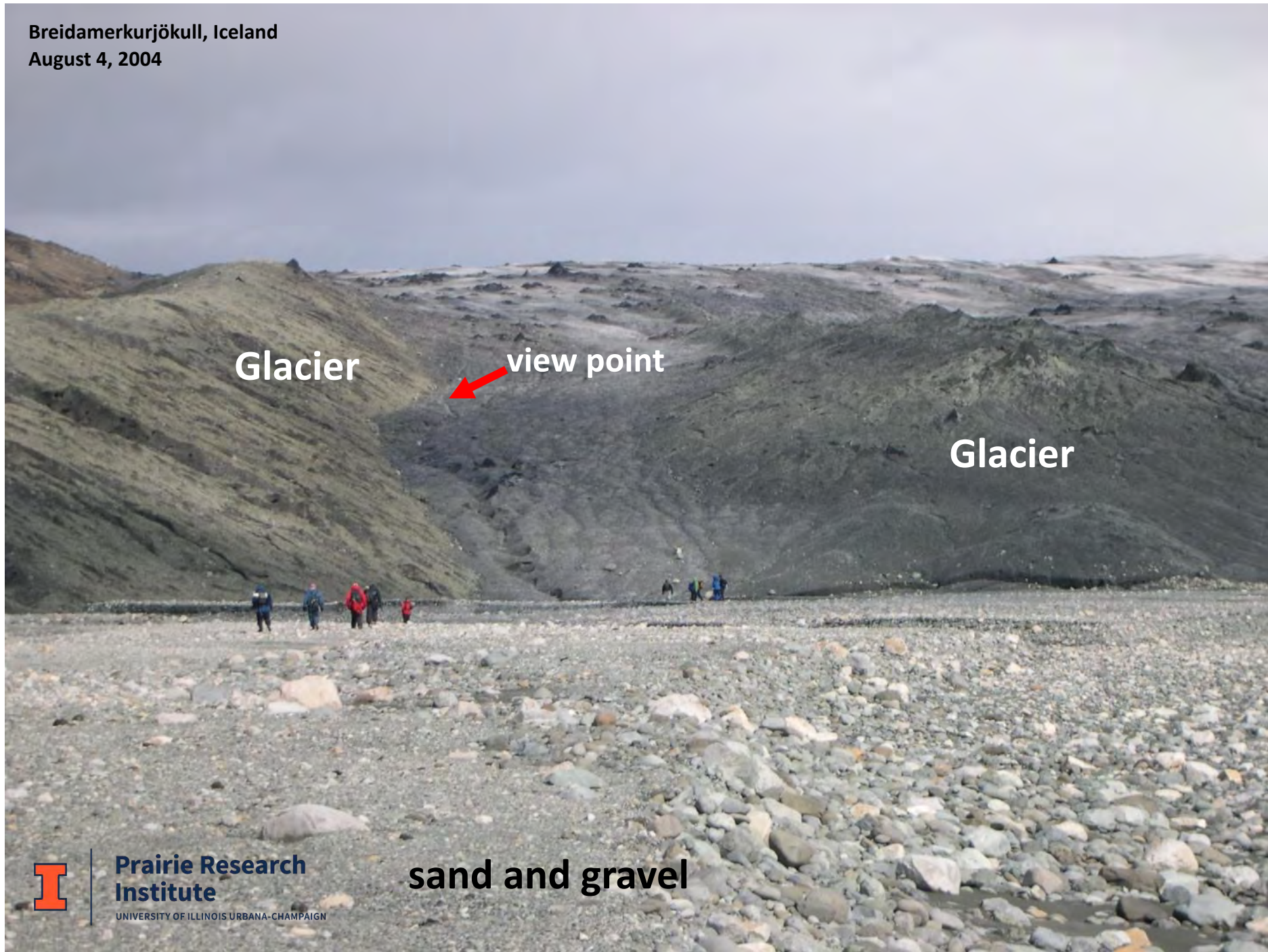
sand and gravel

made by  
meltwater rivers





Breidamerkurjökull, Iceland  
August 4, 2004



Glacier

view point

Glacier

sand and gravel



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Breidamerkurjökull, Iceland  
August 4, 2004



view point

sand and gravel

Glacier

Glacier



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# Geology of an aquifer—bedrock



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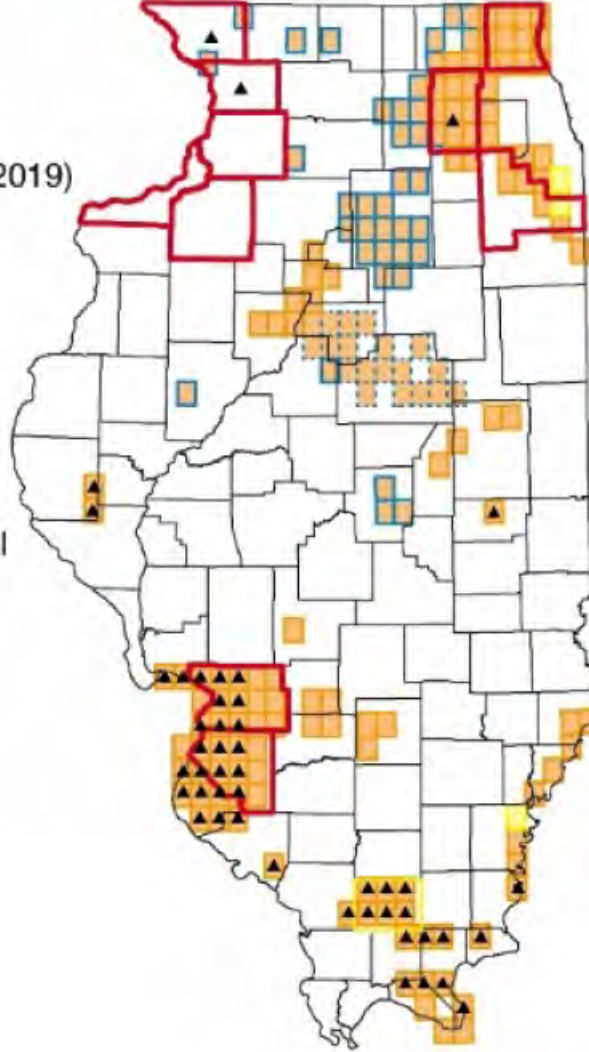


# CURRENT/COMPLETED 2D GEOLOGIC MAPPING IN ILLINOIS

### Bedrock Completed & Current



### Surficial Completed & Current



7.5-minute quadrangle and county status

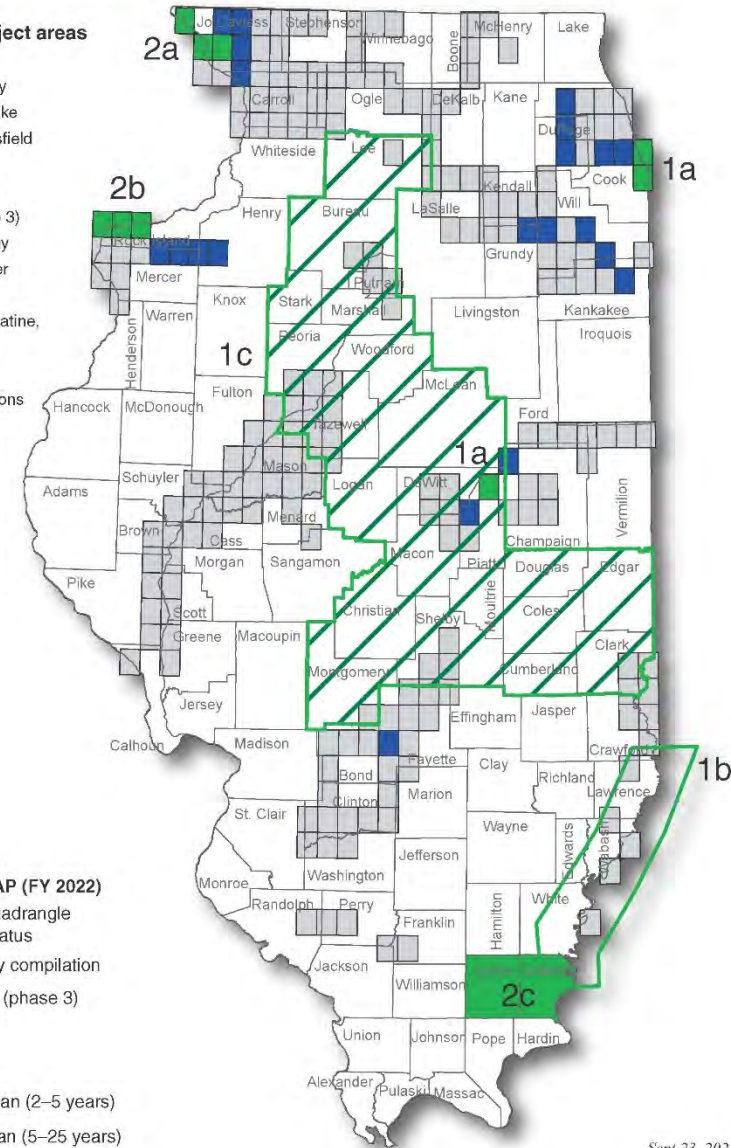
- Current STATEMAP (FY 2019)
- Completed quadrangle
- Completed county compilation
- Completed EDMAP
- Completed student map
- Both bedrock and surficial mapping completed

## STATEMAP FY22 Proposed and Planned Mapping

# PLANNED GEOLOGIC MAPPING IN ILLINOIS

### Proposed FY22 project areas (numbered on map)

1. Illinois surficial geology
  - 1a. Jackson Park, Lake Calumet, & Mansfield
  - 1b. Wabash Valley compilations
  - 1c. Statewide (phase 3)
2. Illinois bedrock geology
  - 2a. Bellevue, Hanover & Menominee
  - 2b. Illinois City, Muscatine, & Montpelier
  - 2c. Gallatin & Saline County compilations



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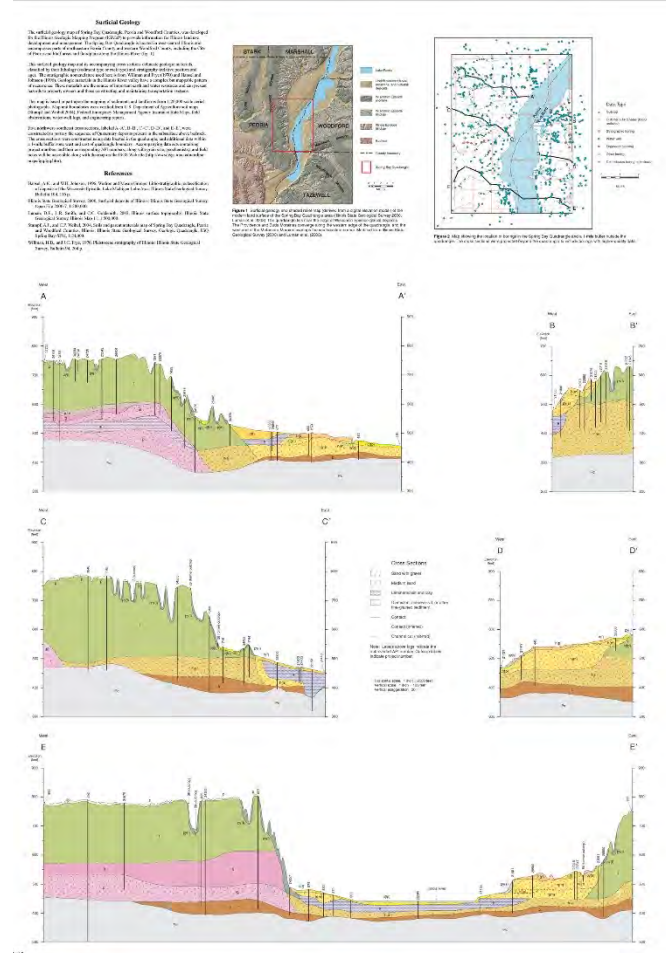
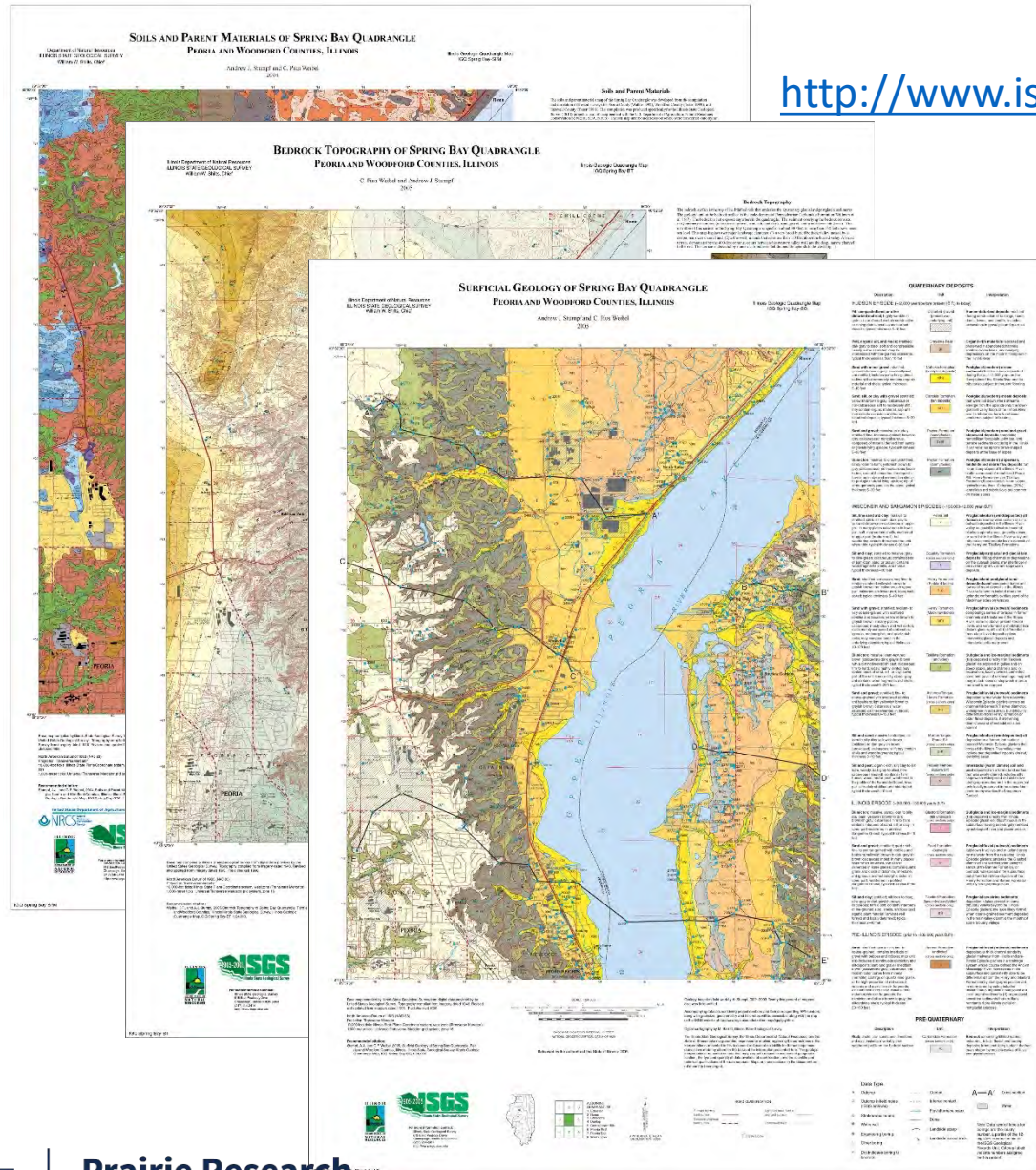
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Sept 23, 2021  
IGMAC Meeting



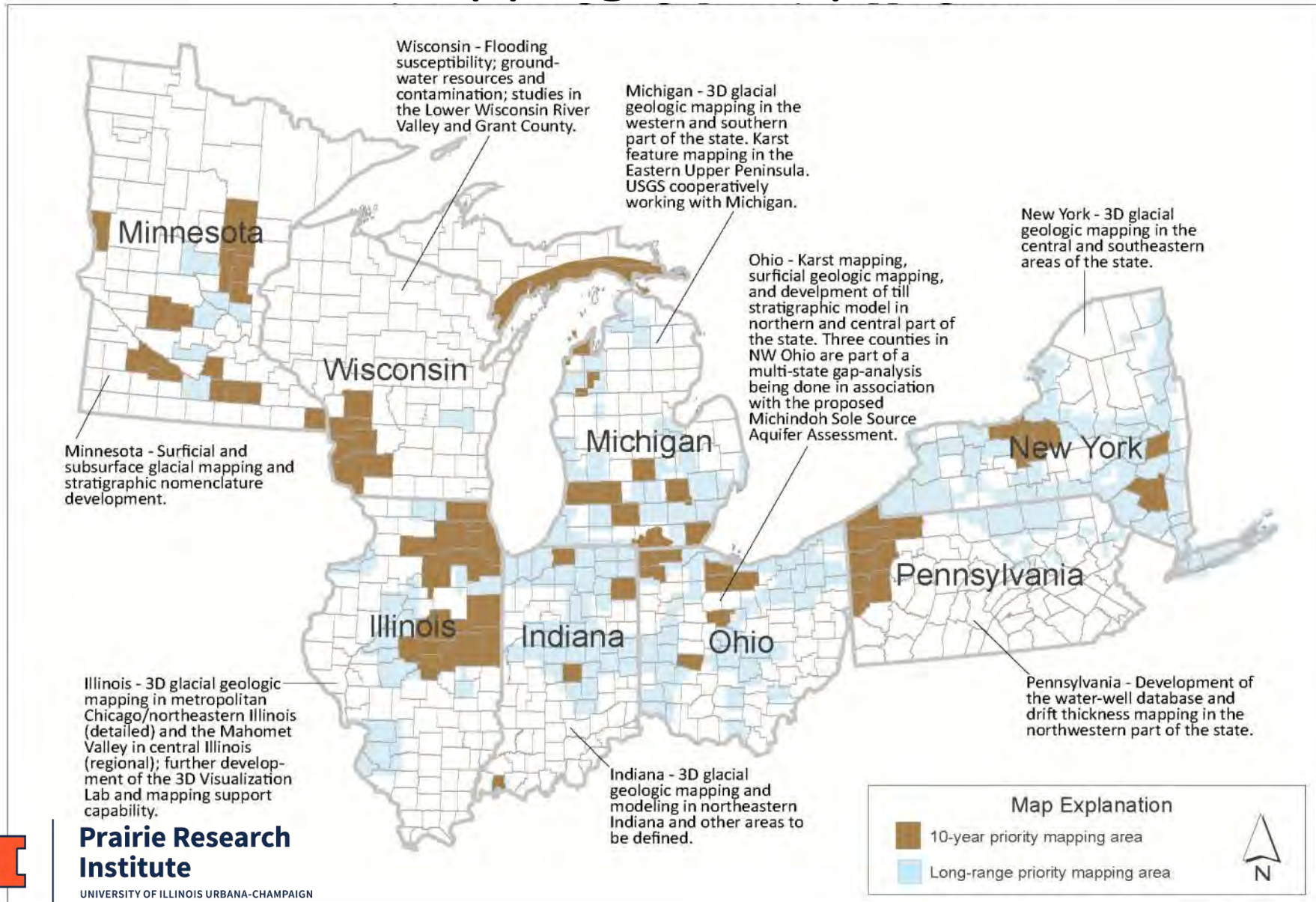
# Geologic maps

<http://www.isgs.illinois.edu/maps/isgs-quads>

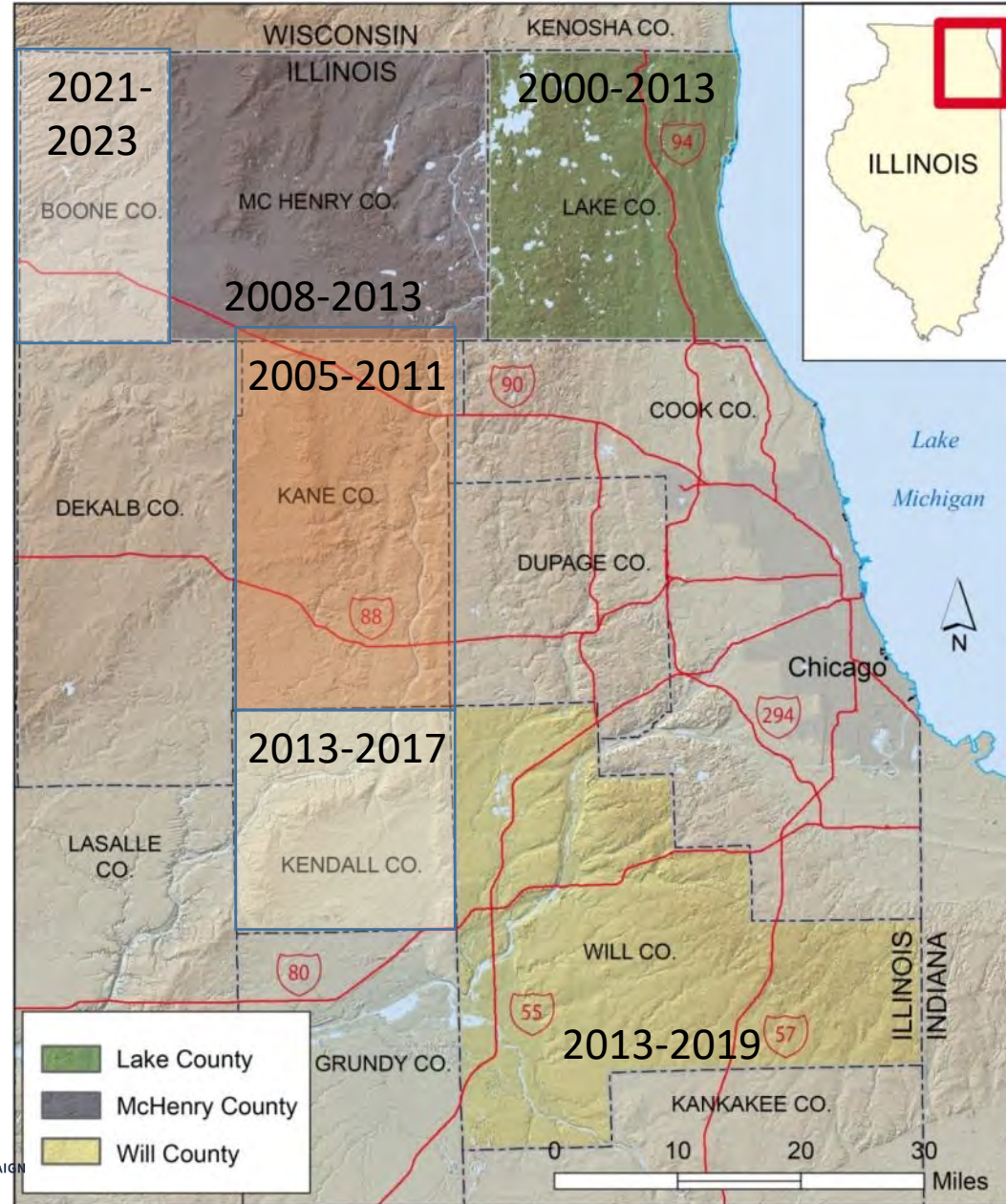




# 3D Mapping Priority Areas



# 3D Mapping Projects in Illinois



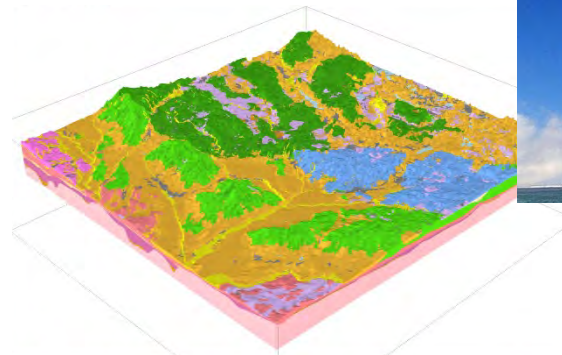
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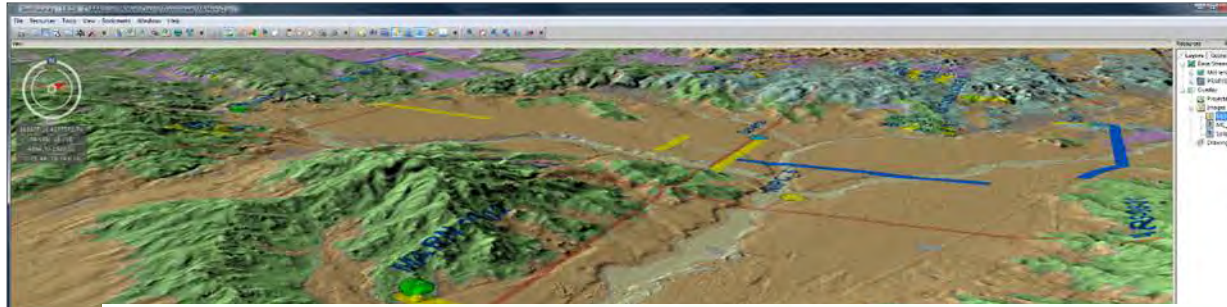


# 3D Geologic Mapping/Modeling

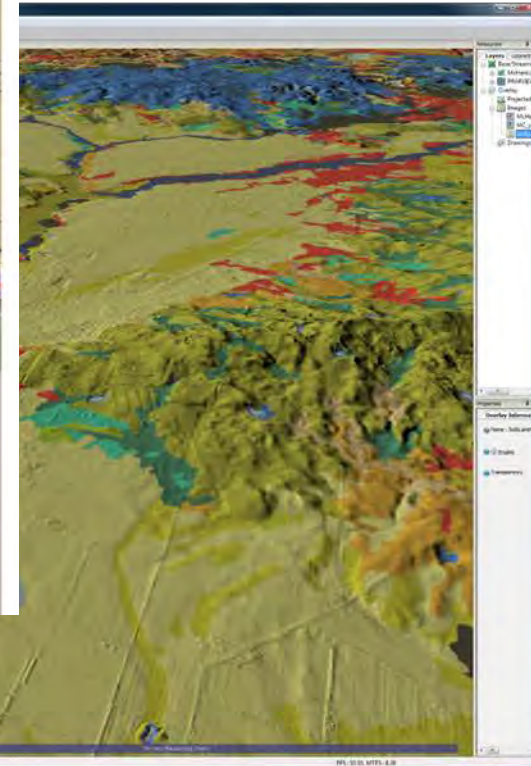
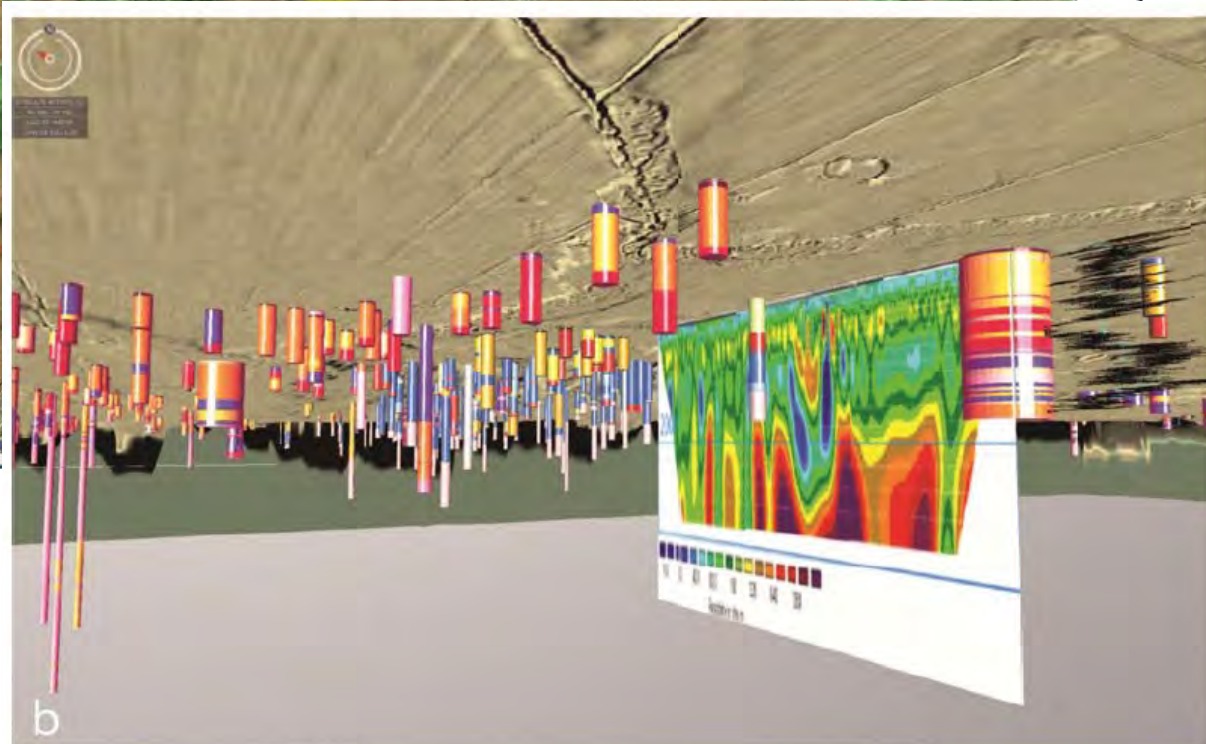
- Traditional
  - Ground-based observations
  - Field Samples
  - Drilling data/samples
- Tools
  - New coring techniques
  - Geophysics (seismic and electrical)
  - Laboratory analyses of rock and sediment
- Innovations
  - Coupled geophysics techniques (1D, 2D, 3D)
  - Airborne methods (airborne electromagnetics)
  - 3D Visualization and Geostatistics
- Derivative products
  - Digital data
  - Online interactive products
    - [Regional](#)
    - [County](#)
- Objectives
  - Natural Resources
  - Aquifer Delineation
  - Groundwater Modeling Frameworks



# GeoVisionary by Virtualis 3D Visualization



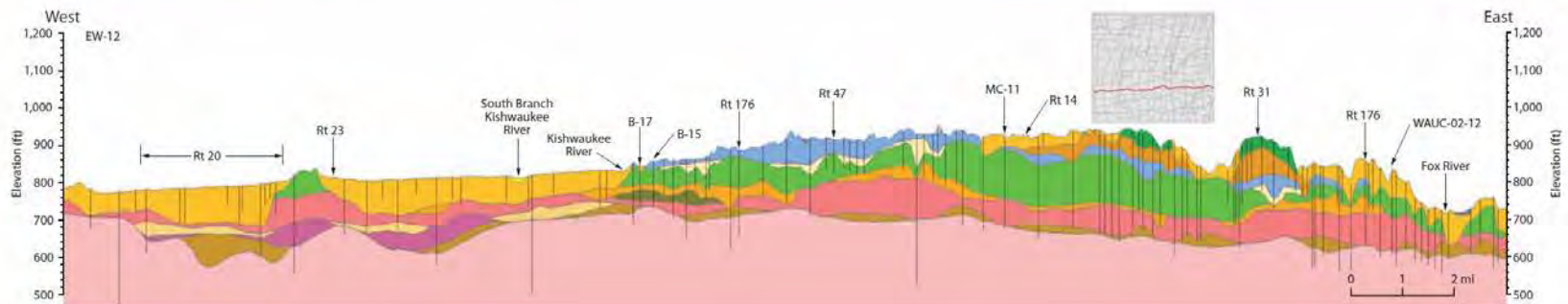
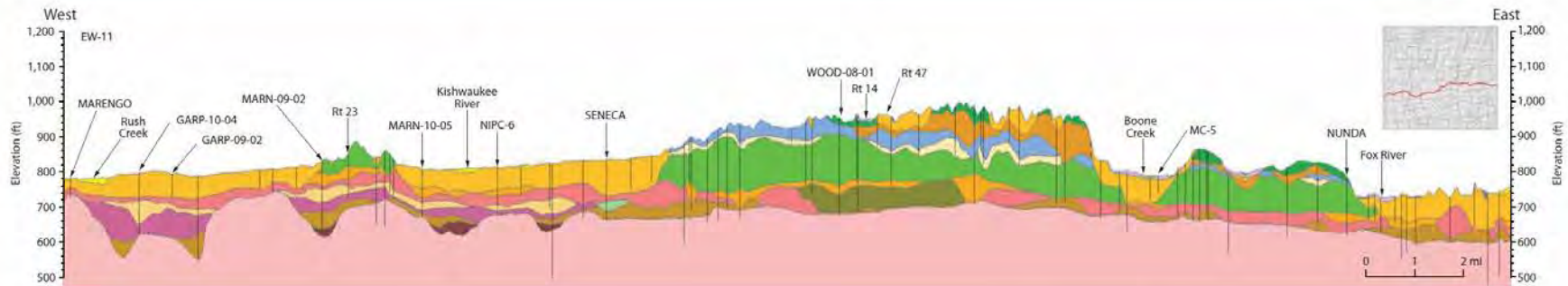
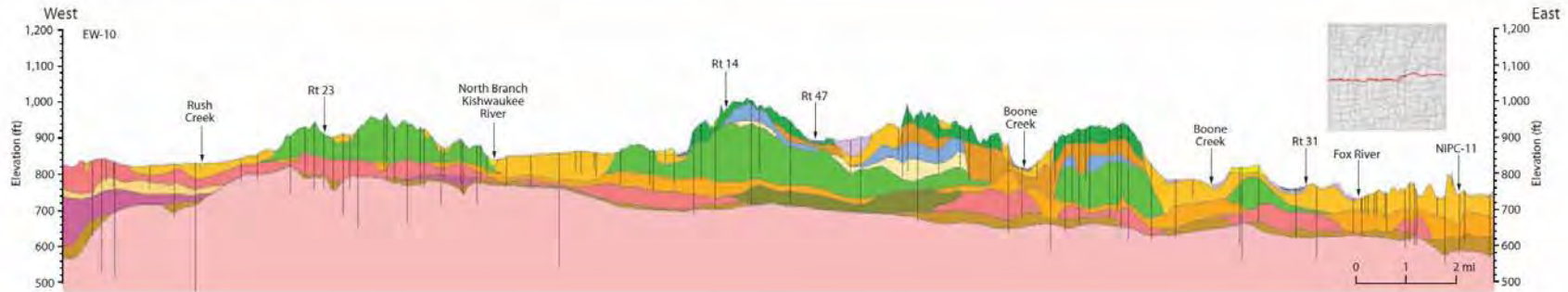
Surficial geology and field sites-test holes, geophysical surveys, etc.



NRCS soil lowest  
Prairie Research Institute texture  
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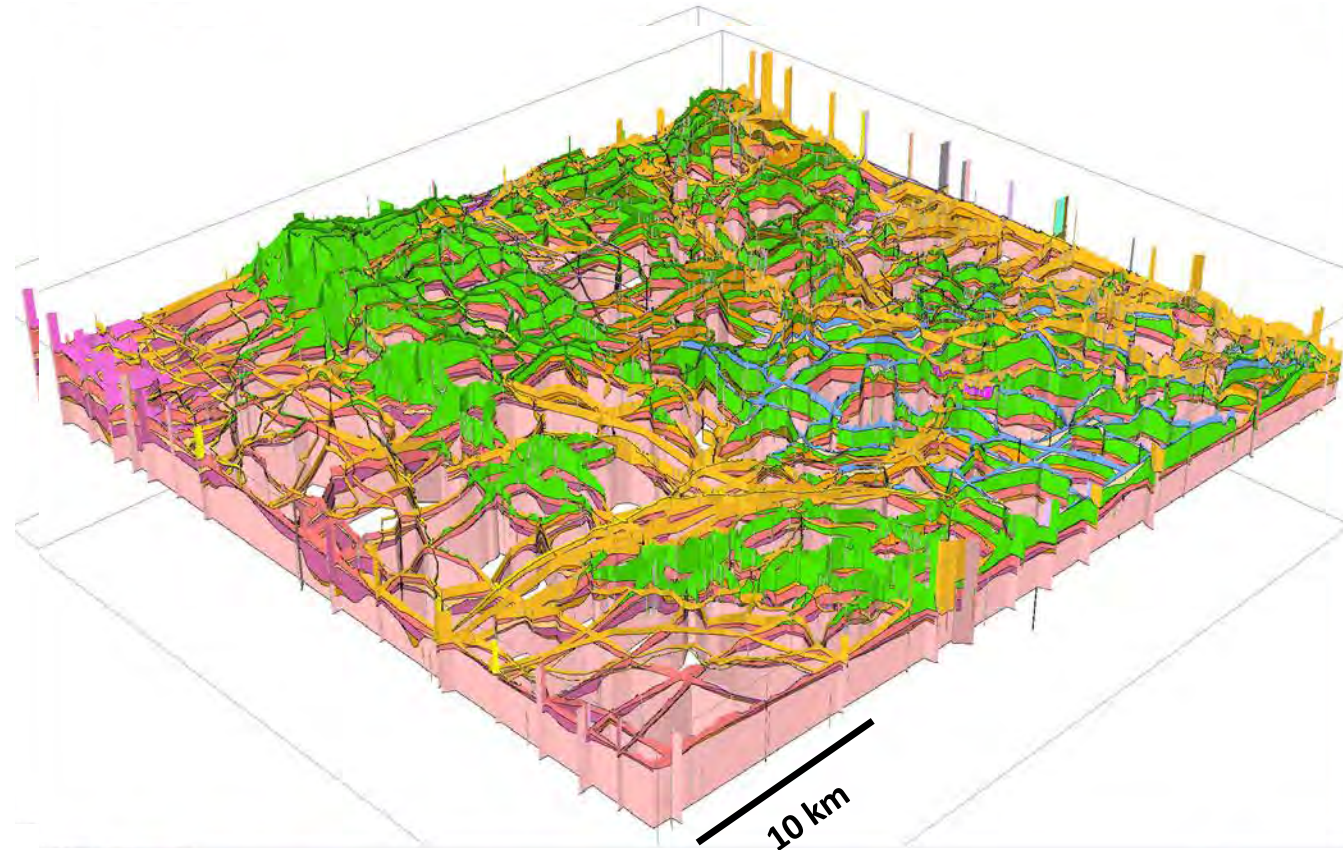
# Section-based 3-D mapping- Regional



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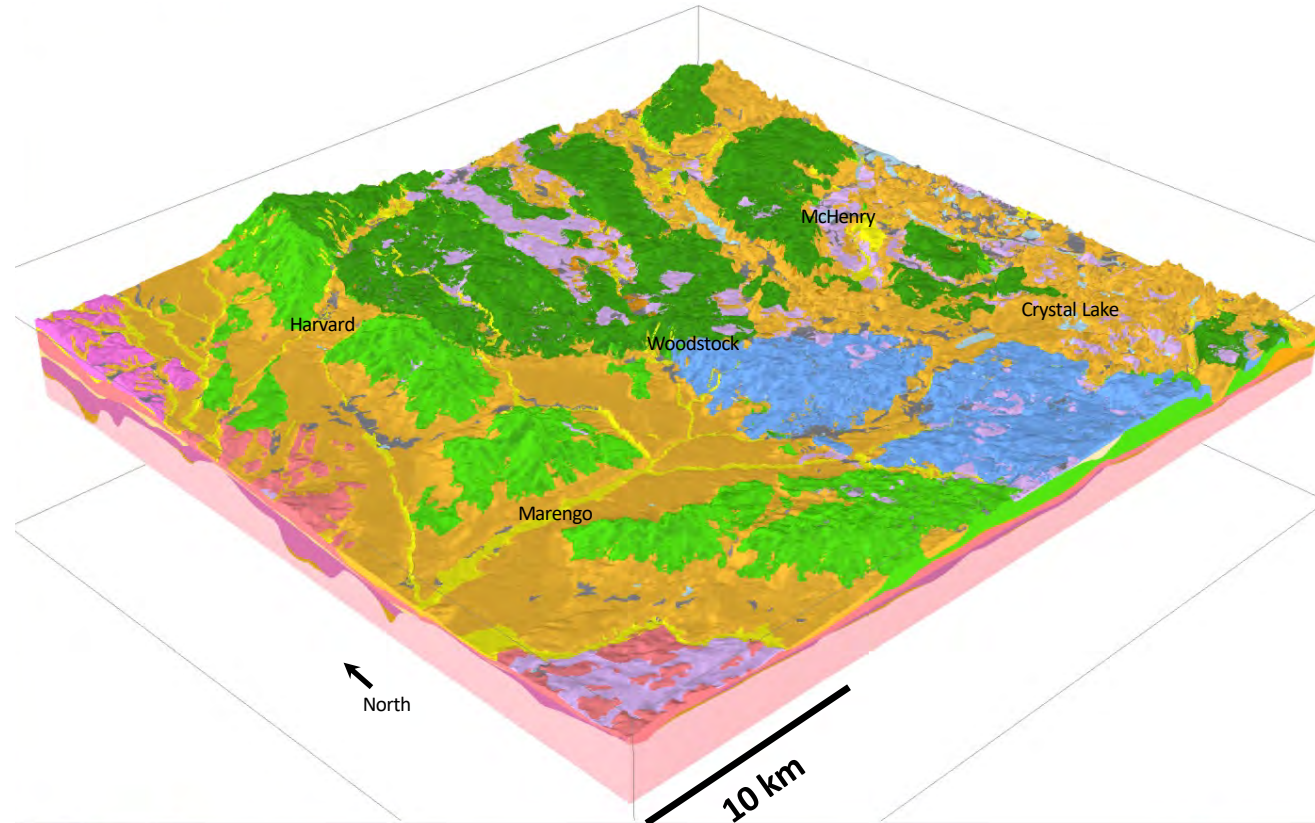
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# 3D Geologic Map-Cross Section Network



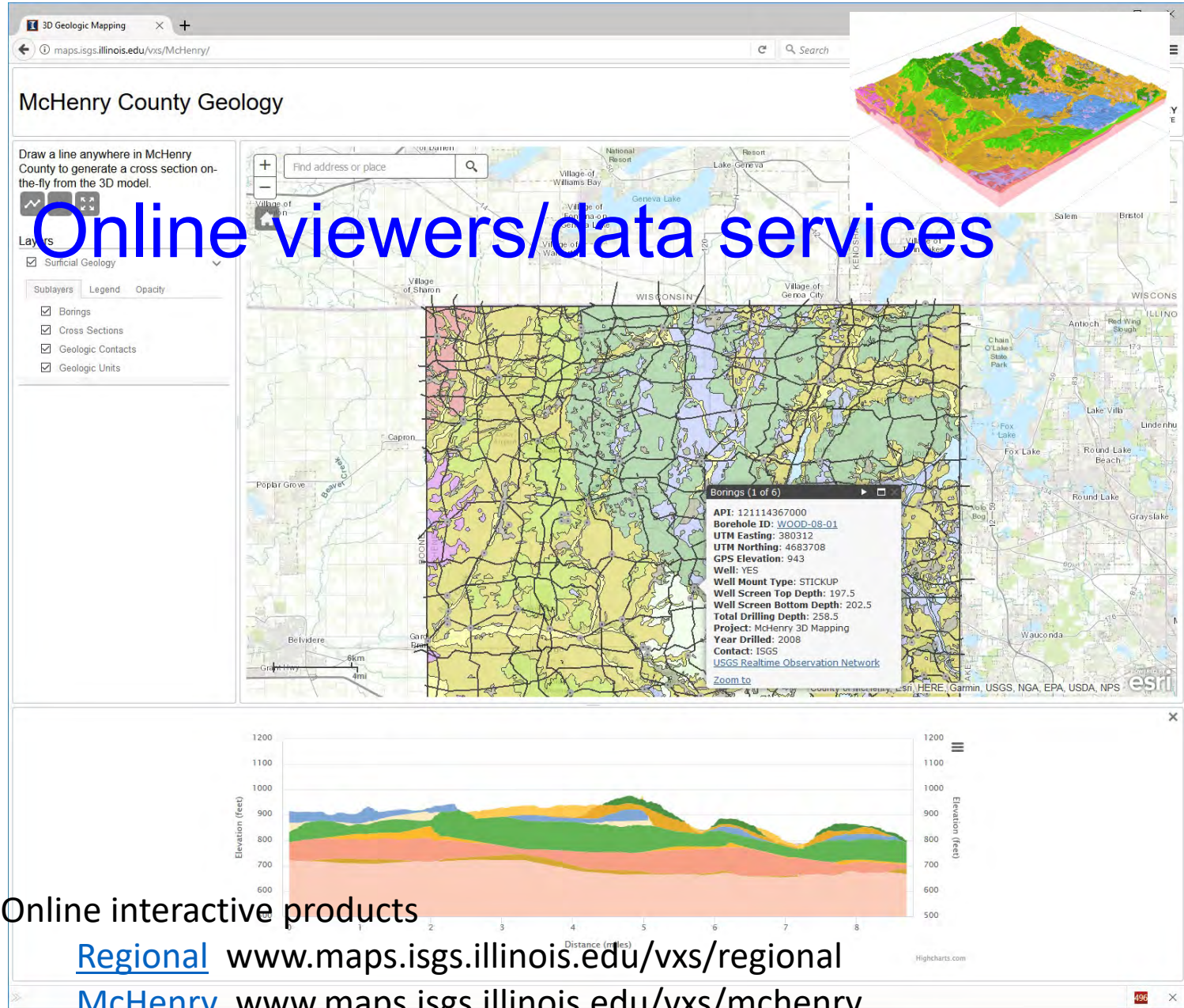


# 3D Geologic Map Products



## Interactive Models





# Online viewers/data services

Online interactive products

[Regional](http://www.maps.isgs.illinois.edu/vxs/regional) [www.maps.isgs.illinois.edu/vxs/regional](http://www.maps.isgs.illinois.edu/vxs/regional)

[McHenry](http://www.maps.isgs.illinois.edu/vxs/mchenry) [www.maps.isgs.illinois.edu/vxs/mchenry](http://www.maps.isgs.illinois.edu/vxs/mchenry)

[Kane](http://www.maps.isgs.illinois.edu/vxs/kane) [www.maps.isgs.illinois.edu/vxs/kane](http://www.maps.isgs.illinois.edu/vxs/kane)

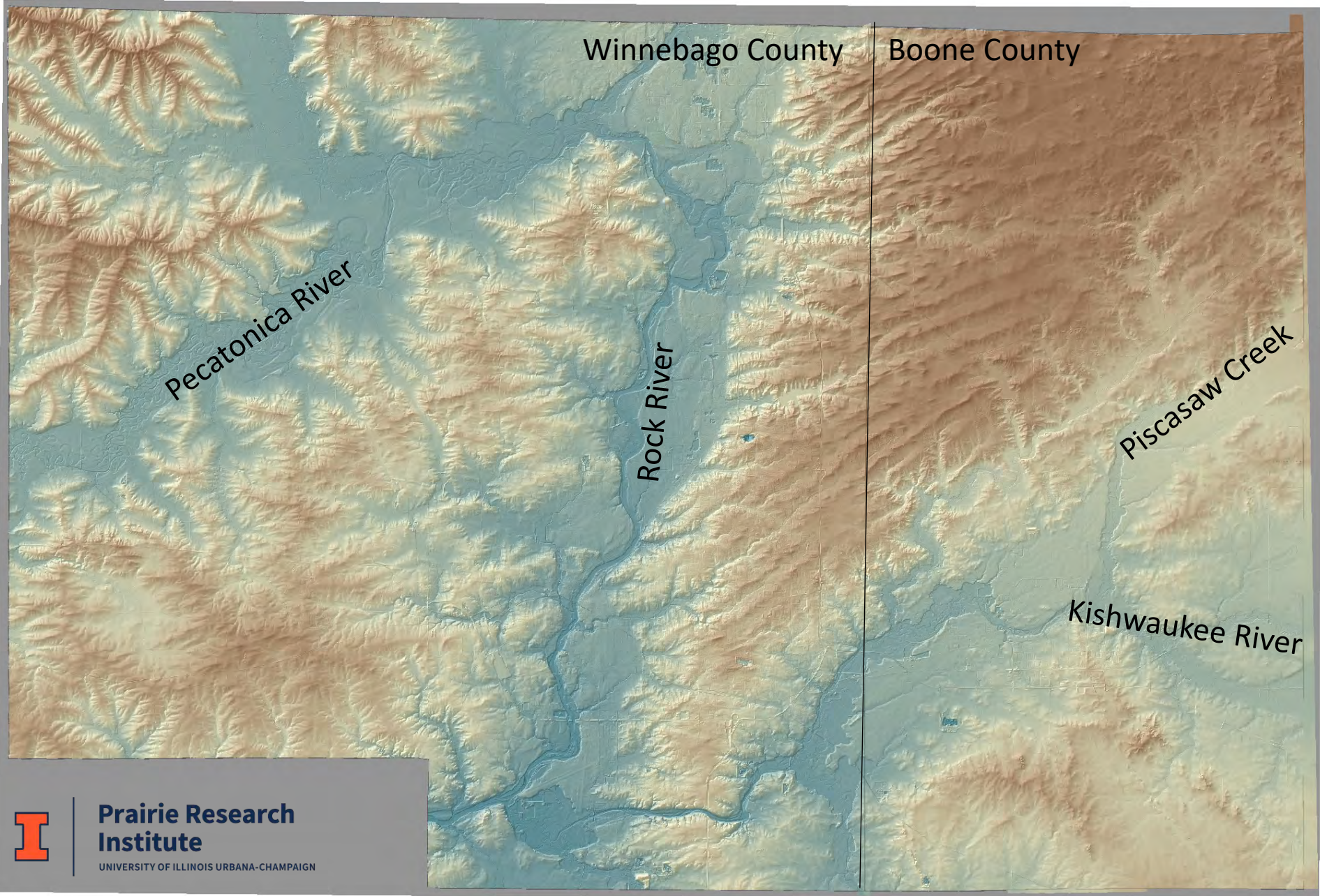
[Lake](http://www.maps.isgs.illinois.edu/vxs/lake) [www.maps.isgs.illinois.edu/vxs/lake](http://www.maps.isgs.illinois.edu/vxs/lake)



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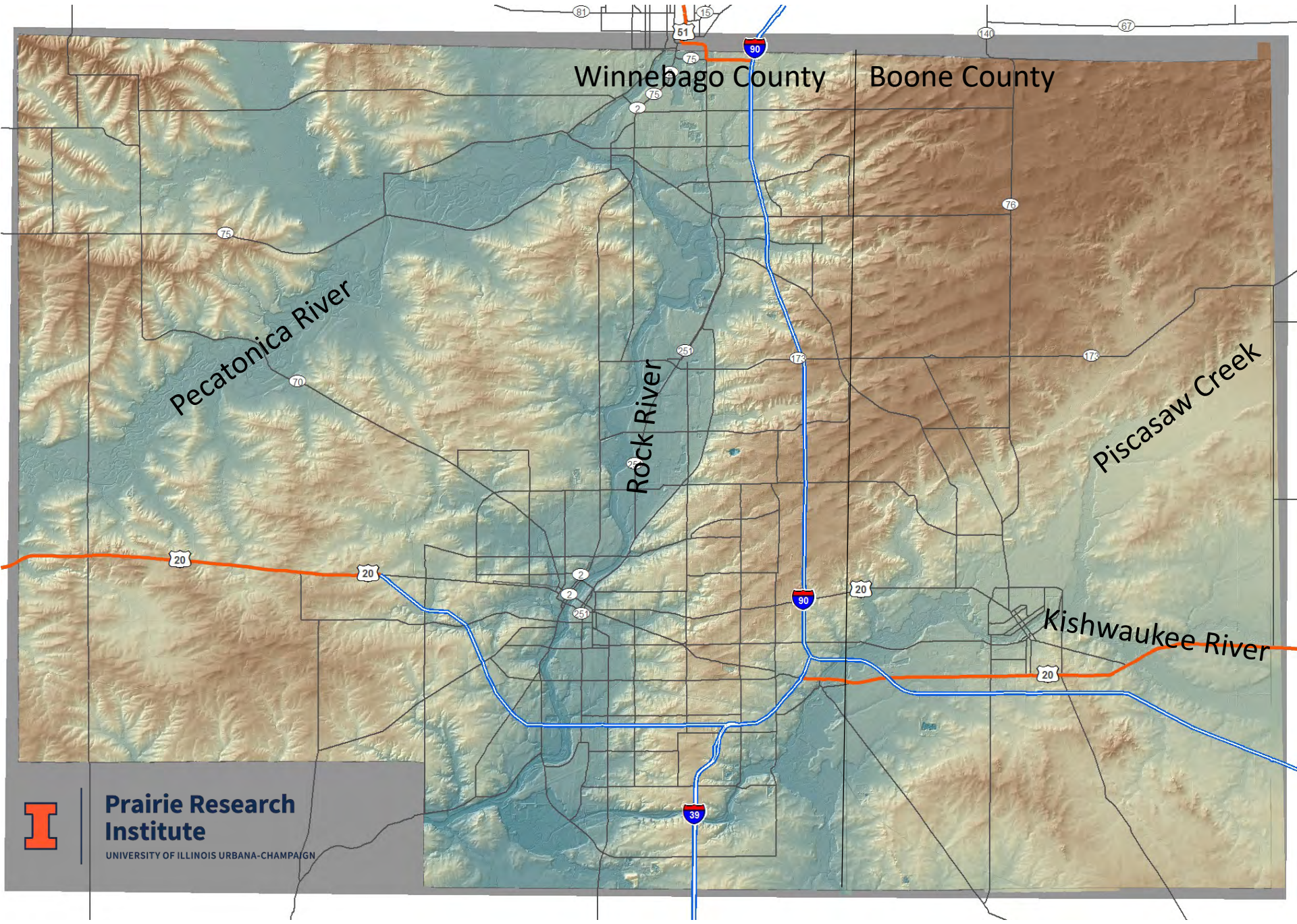




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Winnebago County

Boone County

Pecatonica River

Rock River

Piskasaw Creek

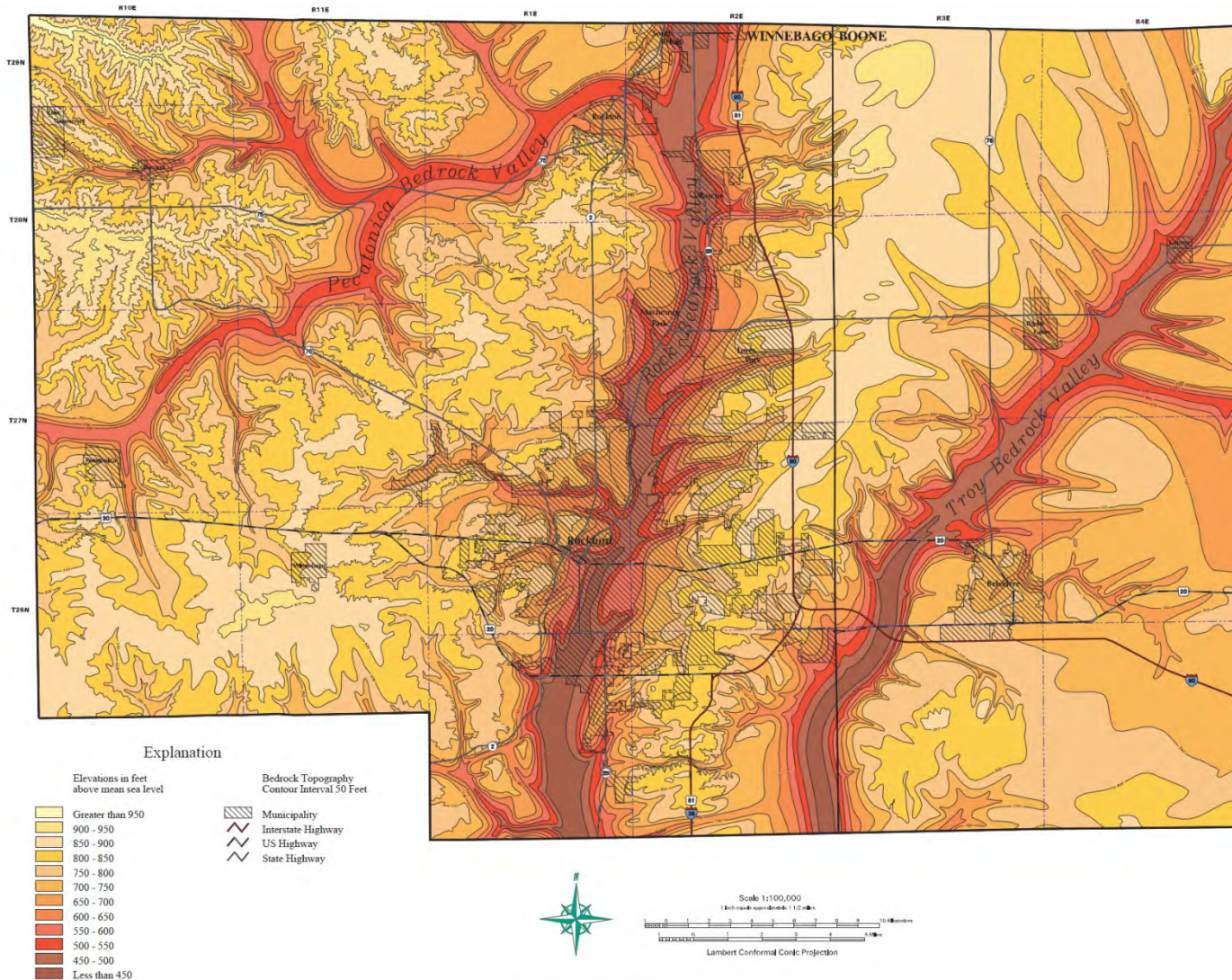
Kishwaukee River



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# McGarry, 2000, Bedrock Topography of Boone and Winnebago Counties



**Explanation**

<p>Elevations in feet above mean sea level</p> <ul style="list-style-type: none"> <li>Greater than 950</li> <li>900 - 950</li> <li>850 - 900</li> <li>800 - 850</li> <li>750 - 800</li> <li>700 - 750</li> <li>650 - 700</li> <li>600 - 650</li> <li>550 - 600</li> <li>500 - 550</li> <li>450 - 500</li> <li>Less than 450</li> </ul>	<p>Bedrock Topography Contour Interval 50 Feet</p> <ul style="list-style-type: none"> <li>Municipality</li> <li>Interstate Highway</li> <li>US Highway</li> <li>State Highway</li> </ul>
--	--

The map of bedrock topography shows the elevation of the top surface of the consolidated rocks that lie at or beneath the land surface. Bedrock topography illustrates pre-glacial topographic features of the two-county study area. In northwest Winnebago County, there is little difference between the land surface and bedrock surface in the uplands; a 0 to 5 m (16 ft.) thick veneer of glacial till and/or loess overlying near-surface bedrock generally characterizes these areas. In contrast, the bedrock surface is more than 100 m (328 ft.) below the land surface in deep bedrock valleys. The Rock, Troy, and Pecatonica bedrock valleys are clearly discernible on the bedrock topography map. These valleys were incised prior to glaciation in the region and are now filled with glaciofluvial sediments, primarily sand and gravel. Although the Rock and Pecatonica bedrock valleys presently contain rivers bearing the same names, the Troy bedrock valley has no expression at the land surface today. Unconsolidated Quaternary deposits are generally thicker toward the east, resulting in very few bedrock exposures in Boone County.

This map was created to assist in determining the subcropping pattern of bedrock units (McGarry, 2000). Stecyk's (1983) map of the bedrock topography was edited to more accurately reflect the variations in topography in the northwest portion of Winnebago County, based on field mapping, and to account for well data that were not available in 1983. Bedrock is very near the land surface in the northwest portion of the study area, but Stecyk's (1983) map showed areas where the bedrock surface was more than 15 m (50 ft.) below the land surface. Land surface elevations from USGS topographic quadrangles were used to modify the bedrock topography map to reflect shallow bedrock. In areas where new well data indicated a difference in bedrock elevation from that mapped by Stecyk, the map was altered to reflect the new data. Overall, about 60% of the original map was altered.

Data used to create this map were compiled from ISGS well logs, Illinois Department of Transportation borings, United States Department of Agriculture soil survey maps, United States Geological Survey 7.5-minute topographic quadrangle maps, and field observations.

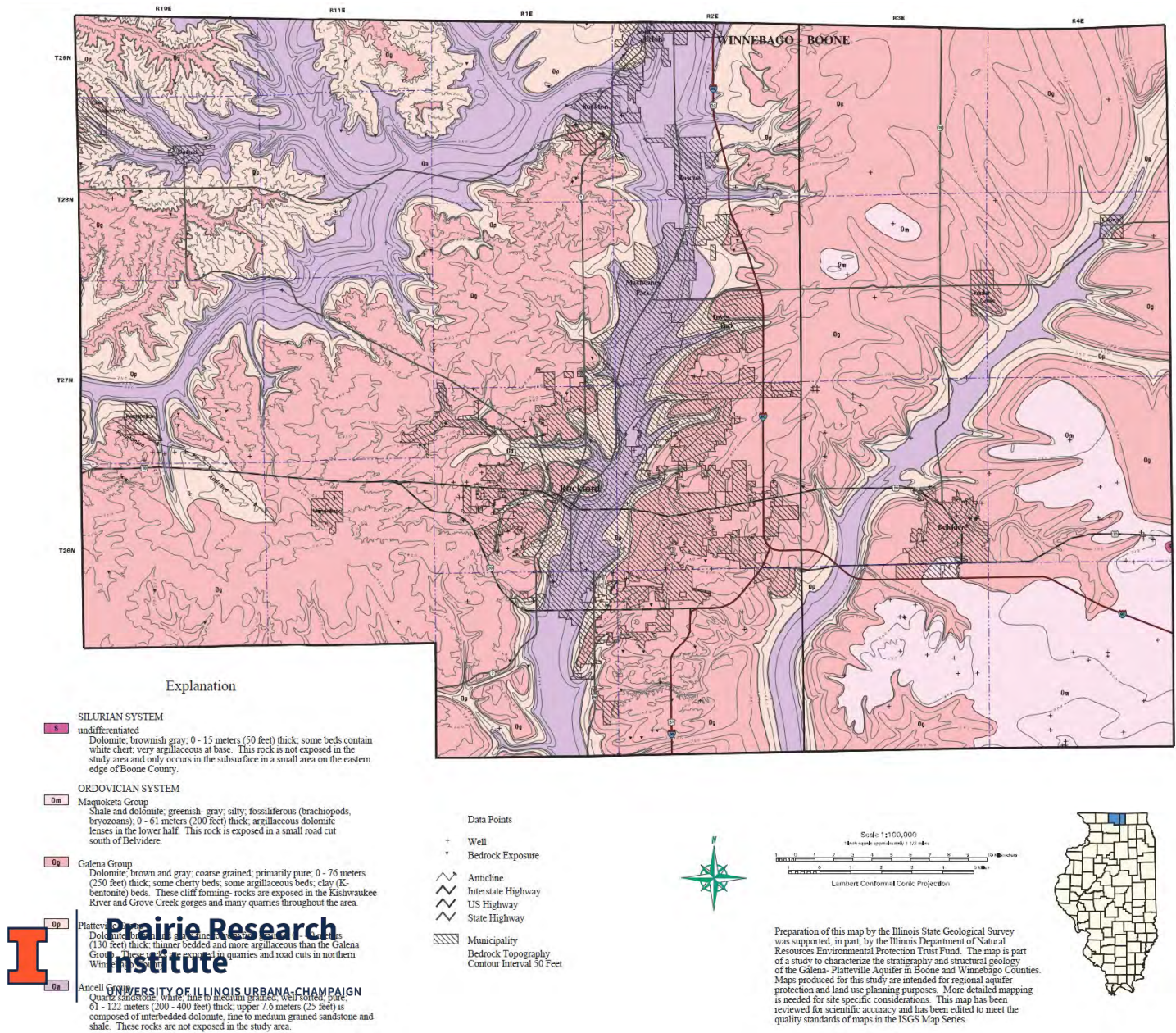
**References:**  
 McGarry, C.S. (2000) Bedrock Geology of Boone and Winnebago Counties, Illinois: Illinois State Geological Survey, Open File Series 2000-3, scale 1:100,000.  
 Stecyk, A.N. (1983) Topography of the Bedrock Surface of Boone and Winnebago Counties, Illinois State Geological Survey, 1:62,500.



Preparation of this map by the Illinois State Geological Survey was supported, in part, by the Illinois Department of Natural Resources Environmental Protection Trust Fund. The map is part of a study to characterize the stratigraphy and structural geology of the Galena-Platteville Aquifer in Boone and Winnebago Counties. Maps produced for this study are intended for regional aquifer protection and land use planning purposes. More detailed mapping is needed for site specific considerations. This map has been reviewed for scientific accuracy and has been edited to meet the quality standards of maps in the ISGS Map Series.



# McGarry, 2000, Bedrock Geology of Boone and Winnebago Counties



Data used to map the bedrock geology of Boone and Winnebago Counties included United States Geological Survey 7.5-minute topographic quadrangles, ISGS well logs, Illinois Department of Transportation borings, United States Department of Agriculture soil survey maps, previous studies conducted by Wilman and Kolata (1978) and Kolata and Graese (1983), and project field observations. Well data used included 122 core and drill cuttings analyses, 14 geophysical log studies, and 58 water well driller records. Due to the suspect accuracy of well driller records, only carefully selected driller records in areas lacking core cuttings analyses or geophysical logs were used. Of the 194 well data points, 24 were found to be inconsistent with surrounding well descriptions. These anomalous well records, primarily water well records, either had incorrect descriptions of the strata encountered or incorrect location information and were ignored. Only the remaining 170 well data points were used in the mapping.

The geologic units commonly penetrated by water wells and other shallow boreholes in Boone and Winnebago Counties include un lithified Quaternary sediments, predominantly glacial deposits, underlain by Paleozoic bedrock deposited as marine sediments. These sediments and rocks, roughly 760 m (2494 ft) thick in northern Illinois, comprise a thin veneer of rock over the Precambrian crystalline basement.

Bedrock geology is a significant consideration for land use planning in this region. The dolomite and sandstone bedrock formations are important groundwater resources throughout northern Illinois. Land use decisions should be made with consideration for the protection of groundwater resources from potential contamination. In addition to groundwater resources, dolomite formations near the land surface are current or potential rock product resources.

The outcropping (or subcropping in the subsurface) pattern of the bedrock geology is largely controlled by deep bedrock valleys. These valleys incise into the Ancell Group, although these strata are not exposed anywhere in the two-county region. Outcropping of younger strata to the southeast reflects the gentle regional dip, a result of the uplift of the Wisconsin Arch. It is interesting to note the presence of the Pecatonica Anticline, southeast of the town of Pecatonica. This structure is a small anticline about 10 km (6.2 mi.) long and 3 km (1.9 mi.) wide with about 9 m (29.5 ft.) of vertical uplift. An inactive quarry east of Pecatonica reveals very gently northeast-dipping beds, a subtle exposure of this structure.

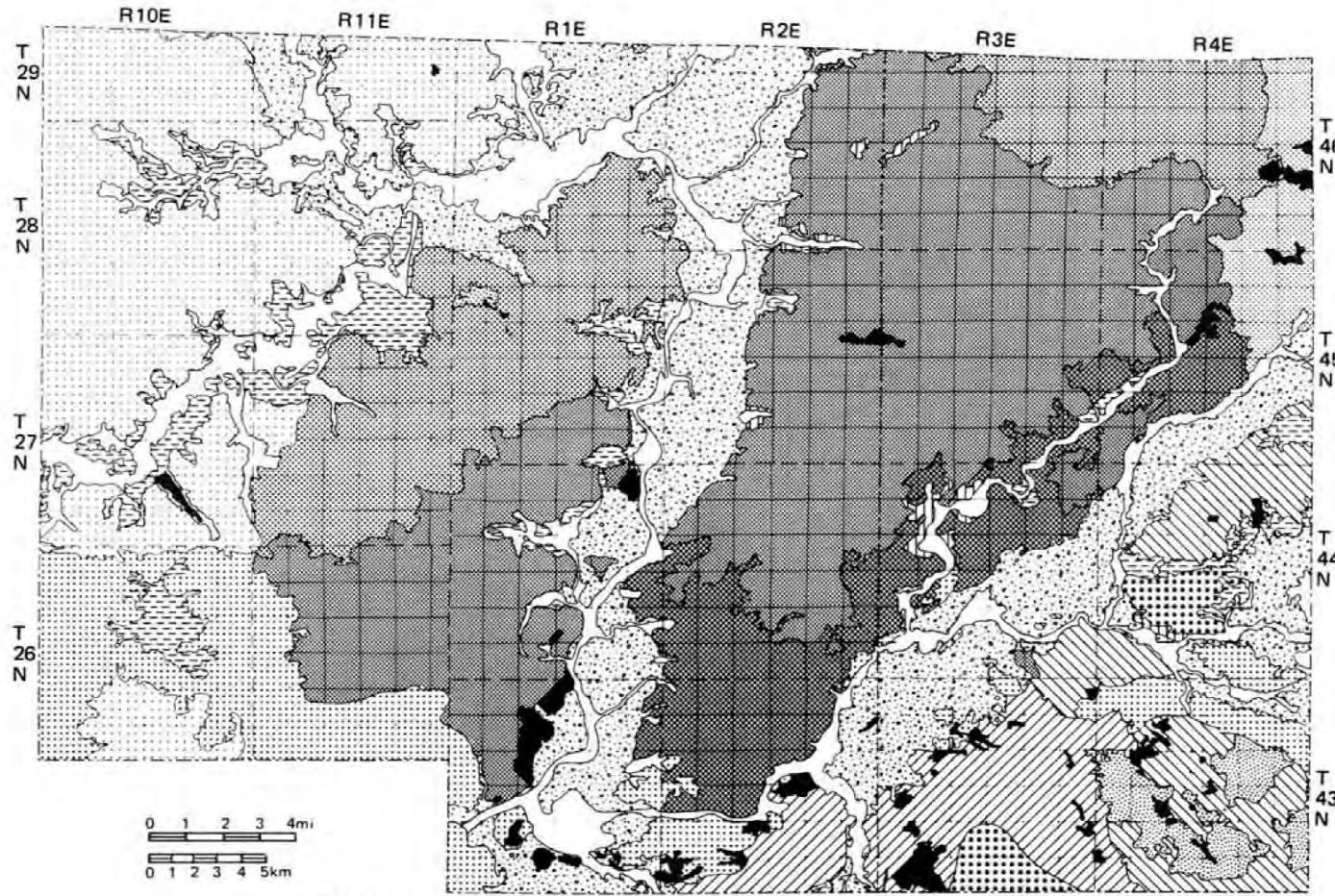
References:  
Kolata, D.R. and A.M. Graese (1983) Lithostratigraphy and Depositional Environments of the Maquoketa Group (Ordovician) in Northern Illinois: Illinois State Geological Survey Circular 528, 49 p.  
Wilman, H.B. and D.R. Kolata (1978) The Platteville and Galena Groups in Northern Illinois: Illinois State Geological Survey Circular 502, 75 p.

SEQ.	SYSTEM	GROUP	FORMATION & THICKNESS	GRAPHIC COLUMN		
TIPPECANOE	ORDOVICIAN	MAQUOKETA GROUP	QUATERNARY 0 - 137 m (0 - 450 ft.)			
			SILURIAN 15 m (50 ft.)			
			Maquoketa 46 - 61 m (150 - 200 ft.)			
			Galena 76 m (250 ft.)			
			Platteville 30 m (100 ft.)			
			Ancell Glenwood 2-18 m (5-60 ft.) St. Peter 61-122 m (200-400 ft.) Potomac 15-30 m (50-100 ft.) Franconia 15-30 m (50-100 ft.)			
			SAUK		CAMBRIAN	Fronton - Galena 23-52 m (75-170 ft.) Eau Claire 107-137 m (350-450 ft.)
						Mt. Simon 305-488 m (1000-1600 ft.)
						PRECAMBRIAN GRANITE

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# Berg, et al., 1984, Geology for Planning in Boone and Winnebago Counties



edge of Boone County.

**ORDOVICIAN SYSTEM**

**Maquoketa Group**  
 Shale and dolomite, greenish-gray, silty, fossiliferous (brachiopods, bryozoans), 0 - 61 meters (200 feet) thick; argillaceous dolomite lenses in the lower half. This rock is exposed in a small road cut south of Belvidere.

**Galena Group**  
 Dolomite, brown and gray, coarse grained; primarily pure, 0 - 76 meters (250 feet) thick; some cherty beds; some argillaceous beds; clay (K-bentonite) beds. These cliff-forming rocks are exposed in the Kishwaukee River and Grove Creek gorges and many quarries throughout the area.

**Platteville Group**  
 Dolomite, brown and gray, coarse grained; primarily pure, 0 - 76 meters (250 feet) thick; some cherty beds; some argillaceous beds; clay (K-bentonite) beds. These cliff-forming rocks are exposed in quarries and road cuts in northern Winnebago County.

**Ancell Group**  
 Quartz sandstone, white, fine to medium grained, well sorted, pure, 61 - 122 meters (200 - 400 feet) thick; upper 7.6 meters (25 feet) is composed of interbedded dolomite, fine to medium grained sandstone and shale. These rocks are not exposed in the study area.

**Data Points**

- Well
- Bedrock Exposure
- Anticline
- Interstate Highway
- US Highway
- State Highway
- Municipality
- Bedrock Topography Contour Interval 50 Feet



Scale 1:100,000  
 Lambert Conformal Conic Projection



Preparation of this map by the Illinois State Geological Survey was supported, in part, by the Illinois Department of Natural Resources Environmental Protection Trust Fund. The map is part of a study to characterize the stratigraphy and structural geology of the Galena-Platteville Aquifer in Boone and Winnebago Counties. Maps produced for this study are intended for regional aquifer protection and land use planning purposes. More detailed mapping is needed for site specific considerations. This map has been reviewed for scientific accuracy and has been edited to meet the quality standards of maps in the ISGS Map Series.

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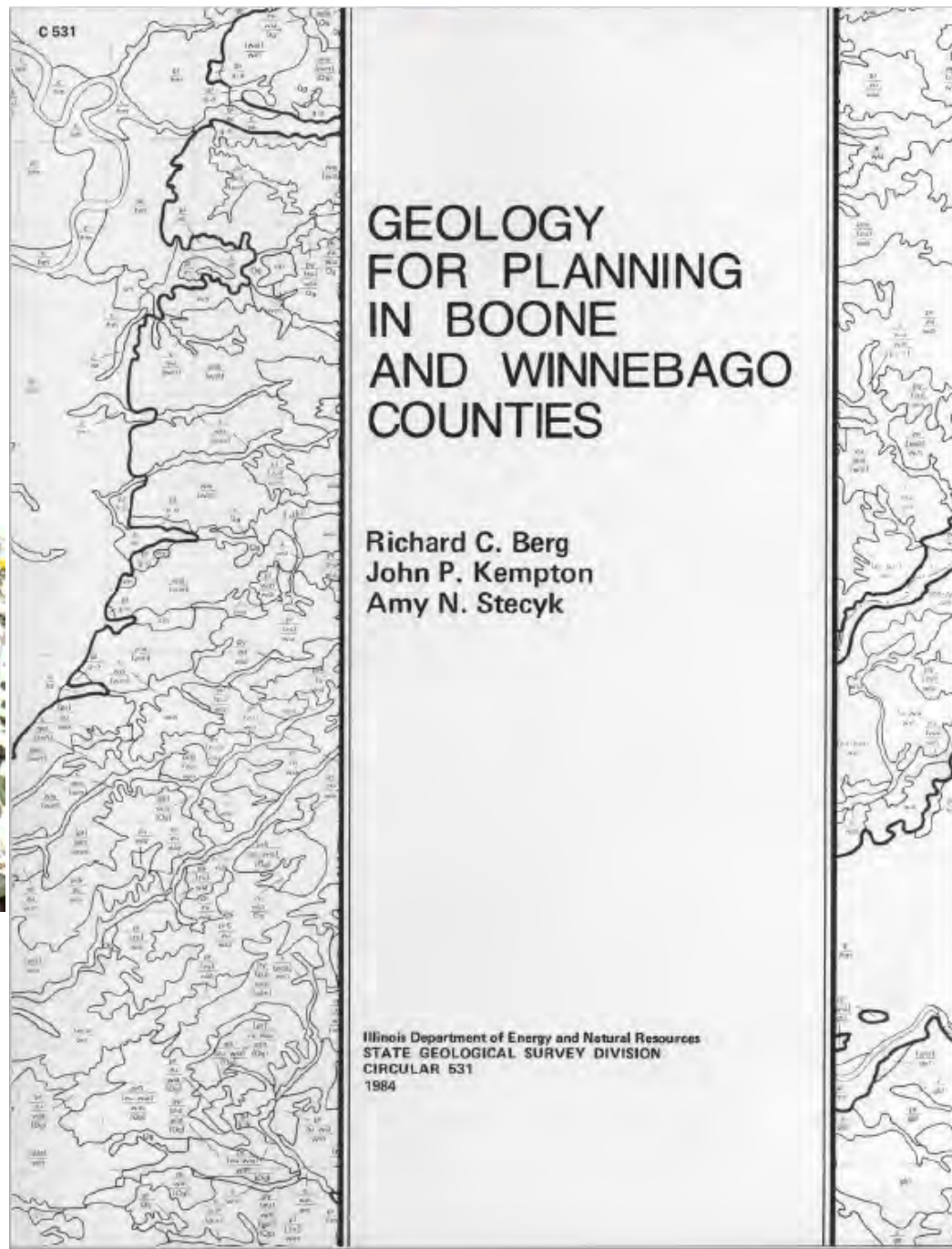
SEQ.	SYSTEM	GROUP	FORMATION & THICKNESS	GRAPHIC COLUMN
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		SILUR.	15 m (50 ft.)	
TIPPECANOE	ORDOVICIAN	Maquoketa	46 - 61 m (150 - 200 ft.)	
		Galena	79 m (260 ft.)	
		Platteville	30 m (100 ft.)	
		Ancell	Glenwood 2-18 m (5-60 ft.) St. Peter 61-122 m (200-400 ft.) Potomac 15-30 m (50-100 ft.) Franconia 15-30 m (50-100 ft.)	
			Fronton - Galena 23-52 m (75-170 ft.) Eau Claire 107-137 m (350-450 ft.)	
SAUK	CAMBRIAN		Mt. Simon 305-468 m (1000-1600 ft.)	
		PRECAMBRIAN		GRANITE



Berg et al., 1984



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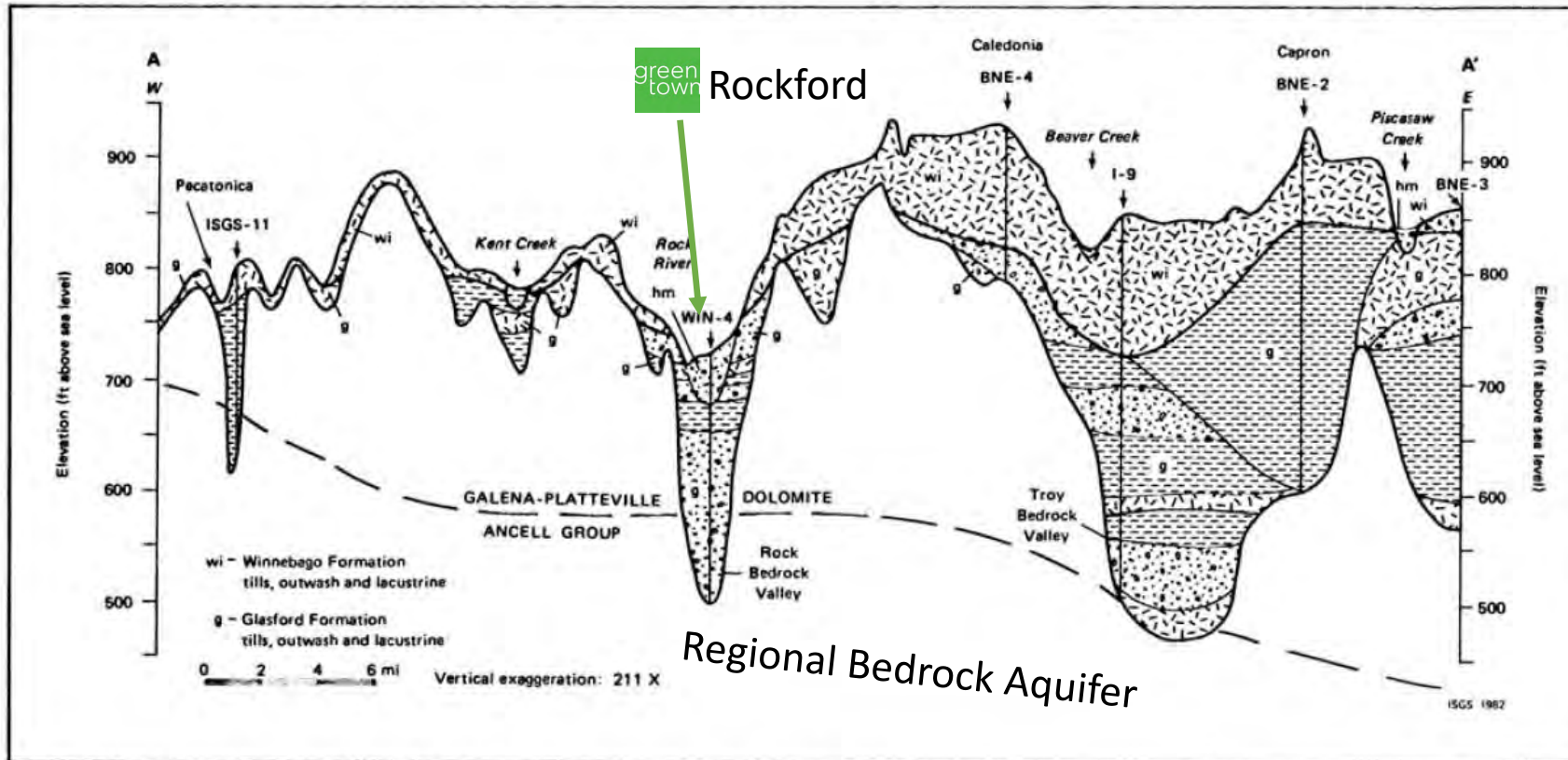


Figure 13a. Generalized W-E cross section across Boone and Winnebago Counties.



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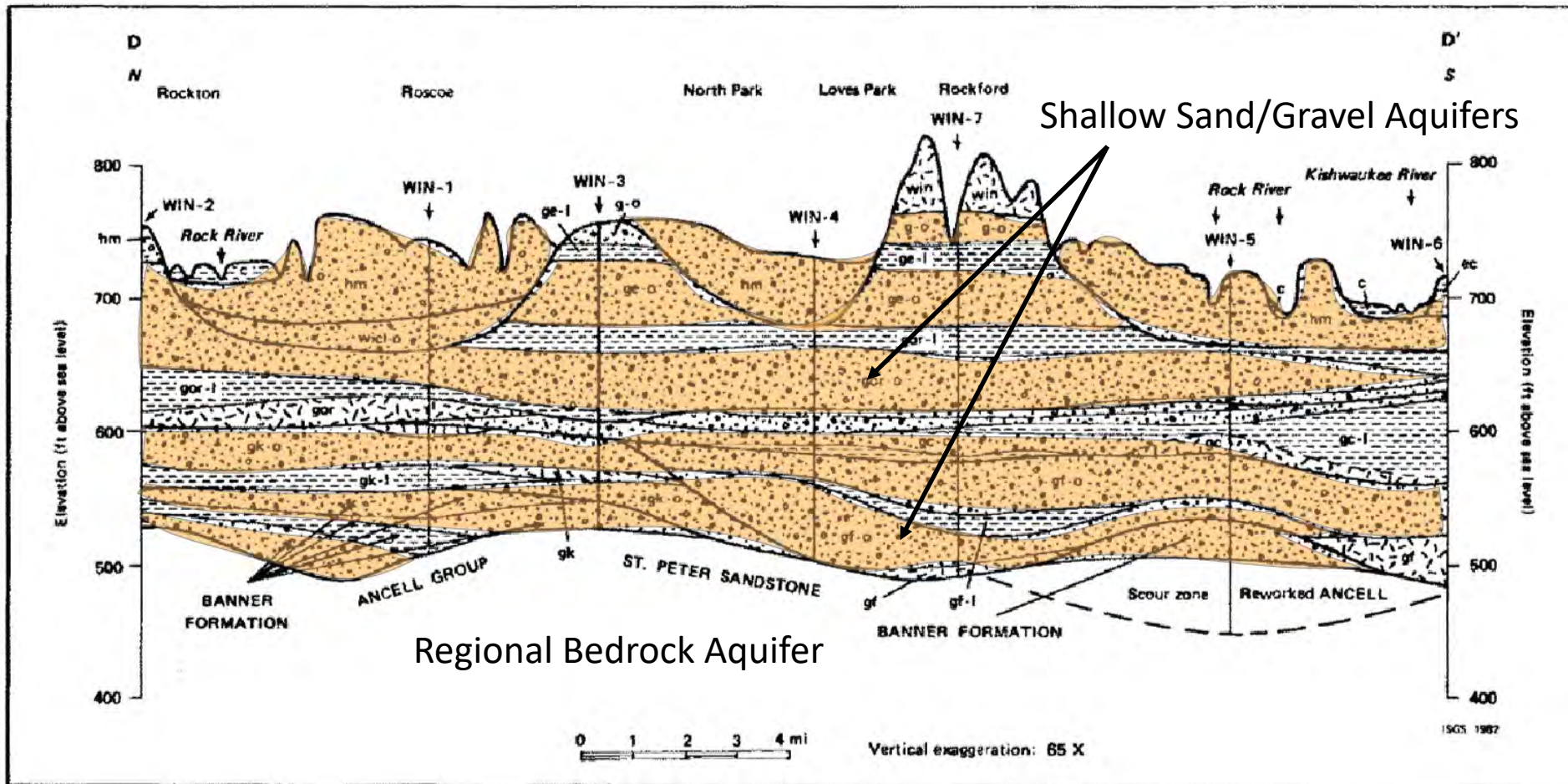


Figure 13d. N-S cross section along Rock River valley.



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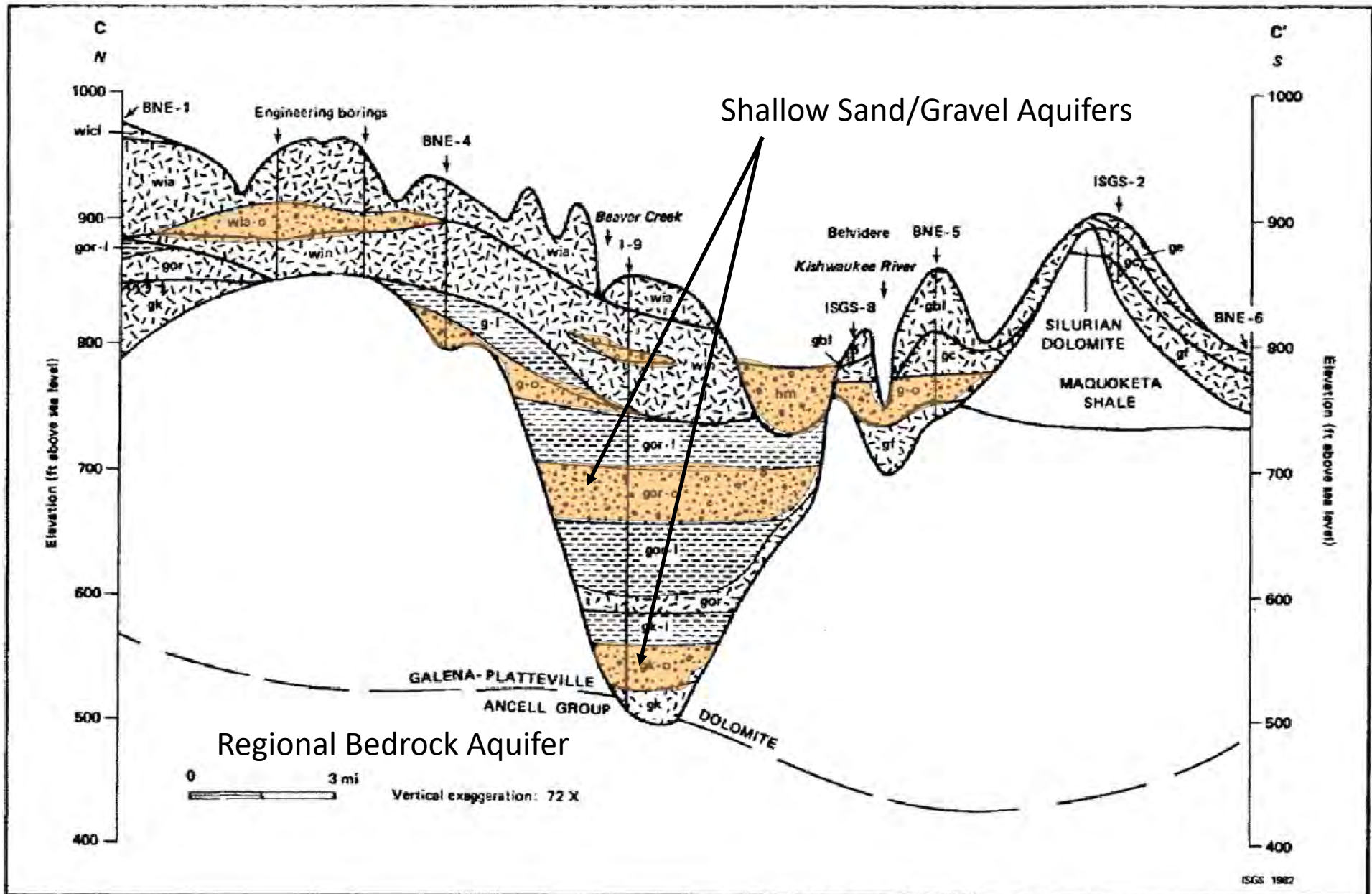


Figure 13c. N-S cross section through Boone County.



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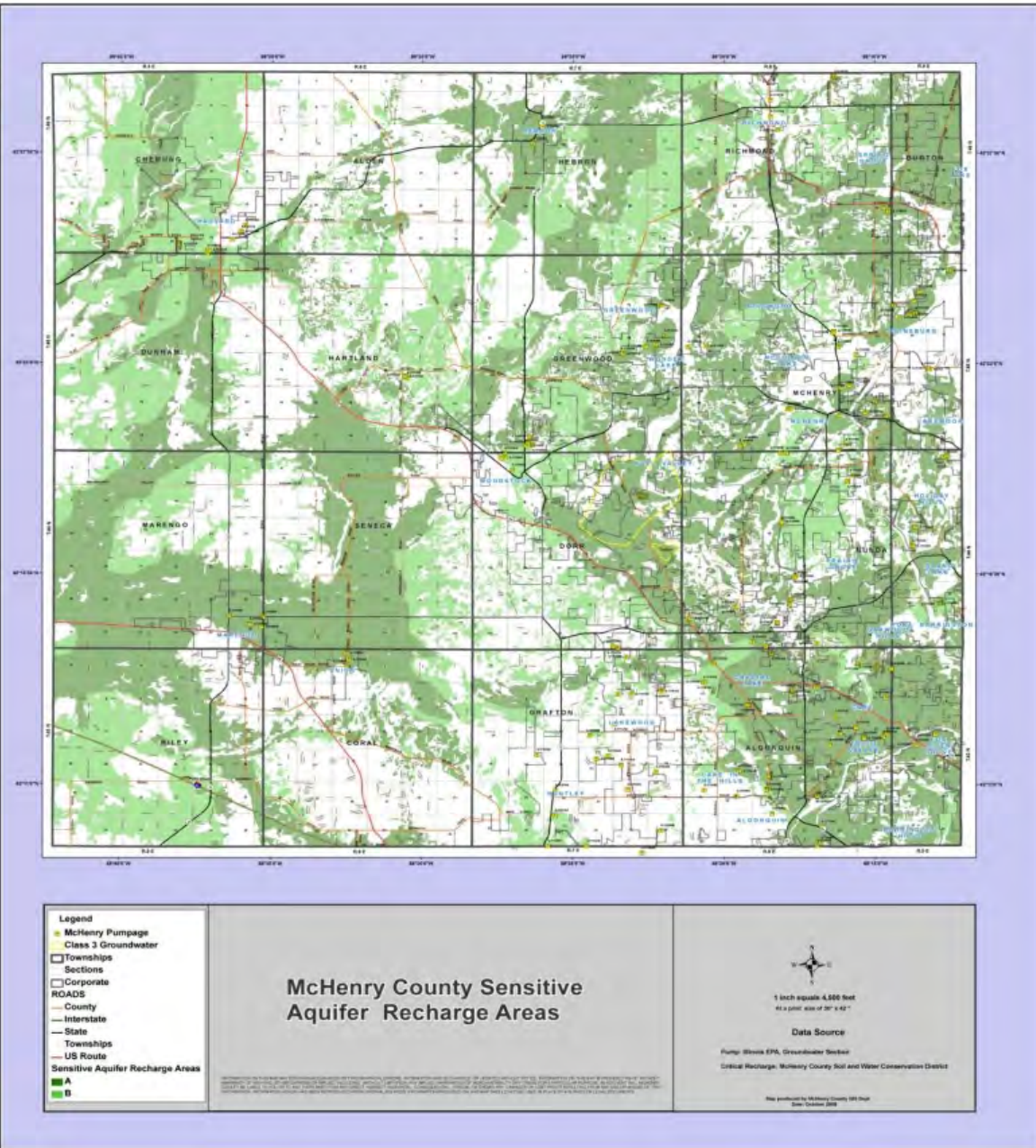




# McHenry County Sensitive Aquifer Recharge Areas

Final Map

10/14/2008



- Legend**
- McHenry Pumpage
  - Class 3 Groundwater
  - Townships
  - Sections
  - Corporate
  - ROADS
  - County
  - Interstate
  - State
  - Townships
  - US Route
  - Sensitive Aquifer Recharge Areas
  - A
  - B

McHenry County Sensitive Aquifer Recharge Areas



1 inch equals 4,860 feet  
at a point east of 90° 30' W

**Data Source**

Pump: Illinois EPA, Groundwater Section  
Critical Recharge: McHenry County Soil and Water Conservation District

Map produced by McHenry County GIS Dept.  
Date: November 2008



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McHenry Planning & Development

PlanDev Viewer  
McHenry County, Illinois

SEARCH BY: Parcel Address Subdivision Petition Number

Enter parcel (ex. 08-32-201-004) Search

Layers Basemaps Print

MAP LAYERS

Layers Legend City Zoom

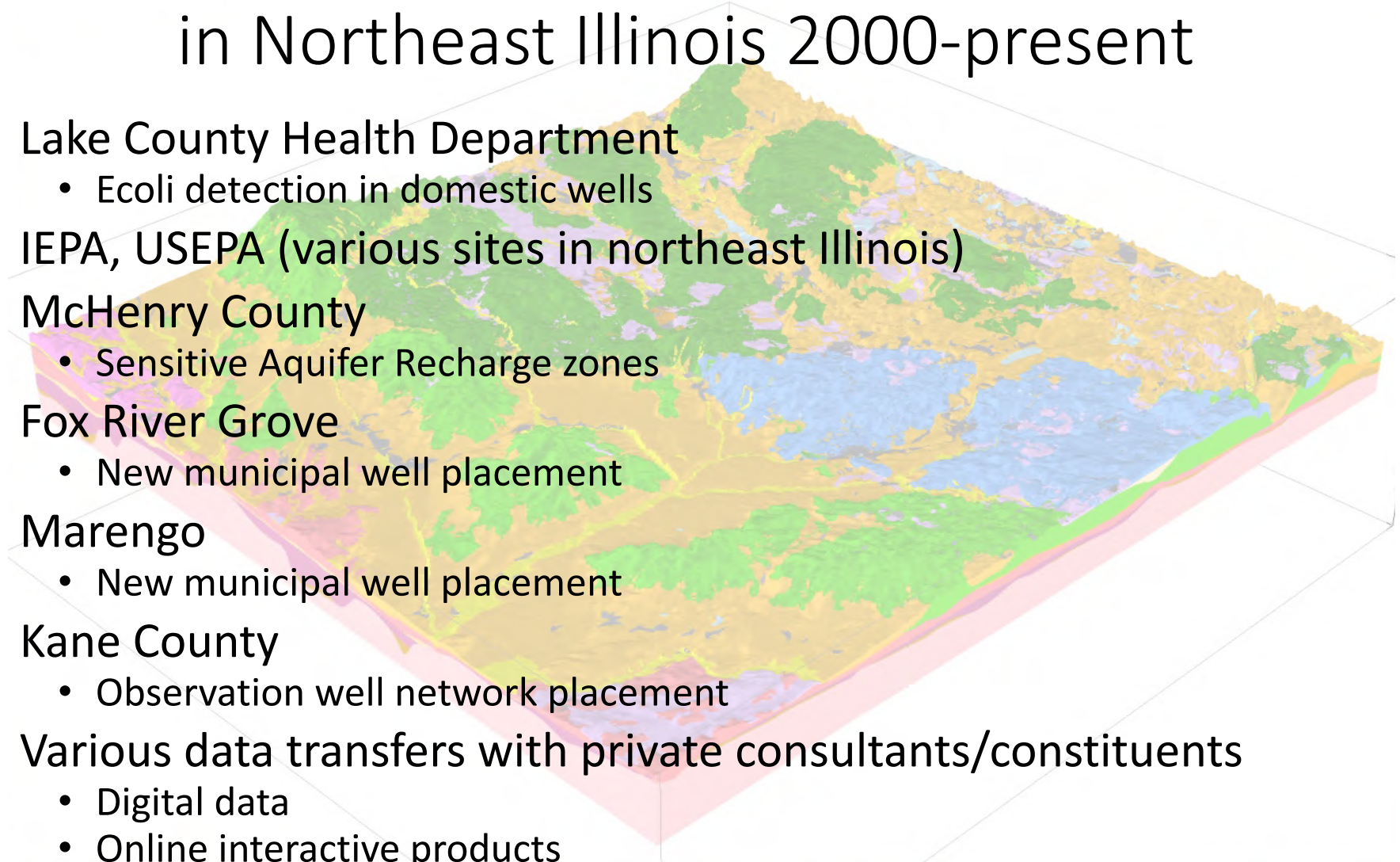
- Proposed Subdivisions
- FEMA Flood Zones
- Historical Flood Zone
- Wetlands
- Watershed Plans
- Topography 2008
- Topography 2017
- Soils
- Agricultural Areas
- Green Infrastructure Network
- SARA Overlay District**
- Class III Groundwater Overlay District
- LN Overlay District
- UDO Road Classifications**

Transparency 0%



# Examples: Impacts of Geologic Maps/3D Models in Northeast Illinois 2000-present

- Lake County Health Department
  - Ecoli detection in domestic wells
- IEPA, USEPA (various sites in northeast Illinois)
- McHenry County
  - Sensitive Aquifer Recharge zones
- Fox River Grove
  - New municipal well placement
- Marengo
  - New municipal well placement
- Kane County
  - Observation well network placement
- Various data transfers with private consultants/constituents
  - Digital data
  - Online interactive products
    - [Regional](#)
    - [County](#)



# Current/ongoing geology and mapping projects in the Rockford area

- 3D geology of Boone County (USGS funded)
- National Groundwater Monitoring Network (USGS funded)
- Engineering/hydraulic properties of geologic soils (IDOT funded)
- Wetland mitigation and hydraulic monitoring (IDOT funded)
- Regional water-supply planning and groundwater modeling (IDNR funded- ISWS colleagues)







**THANK YOU**

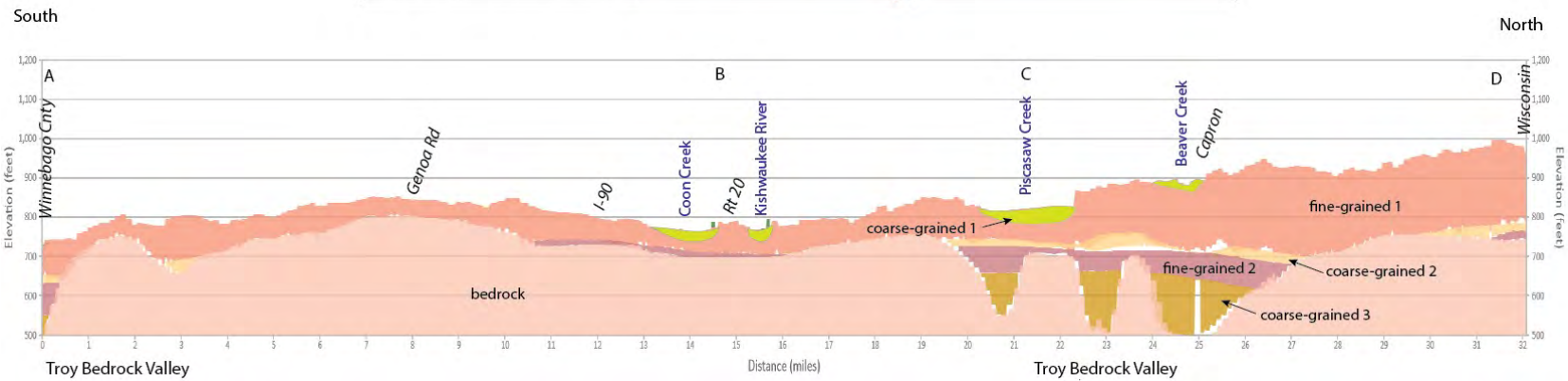
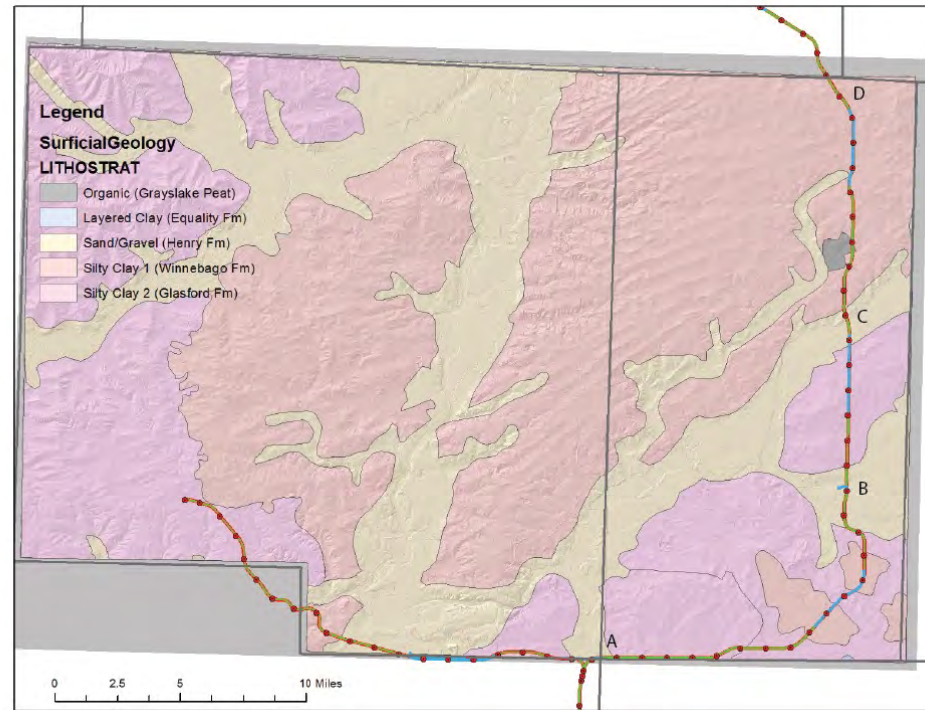
**Pecatonica River, Winnebago County IL**

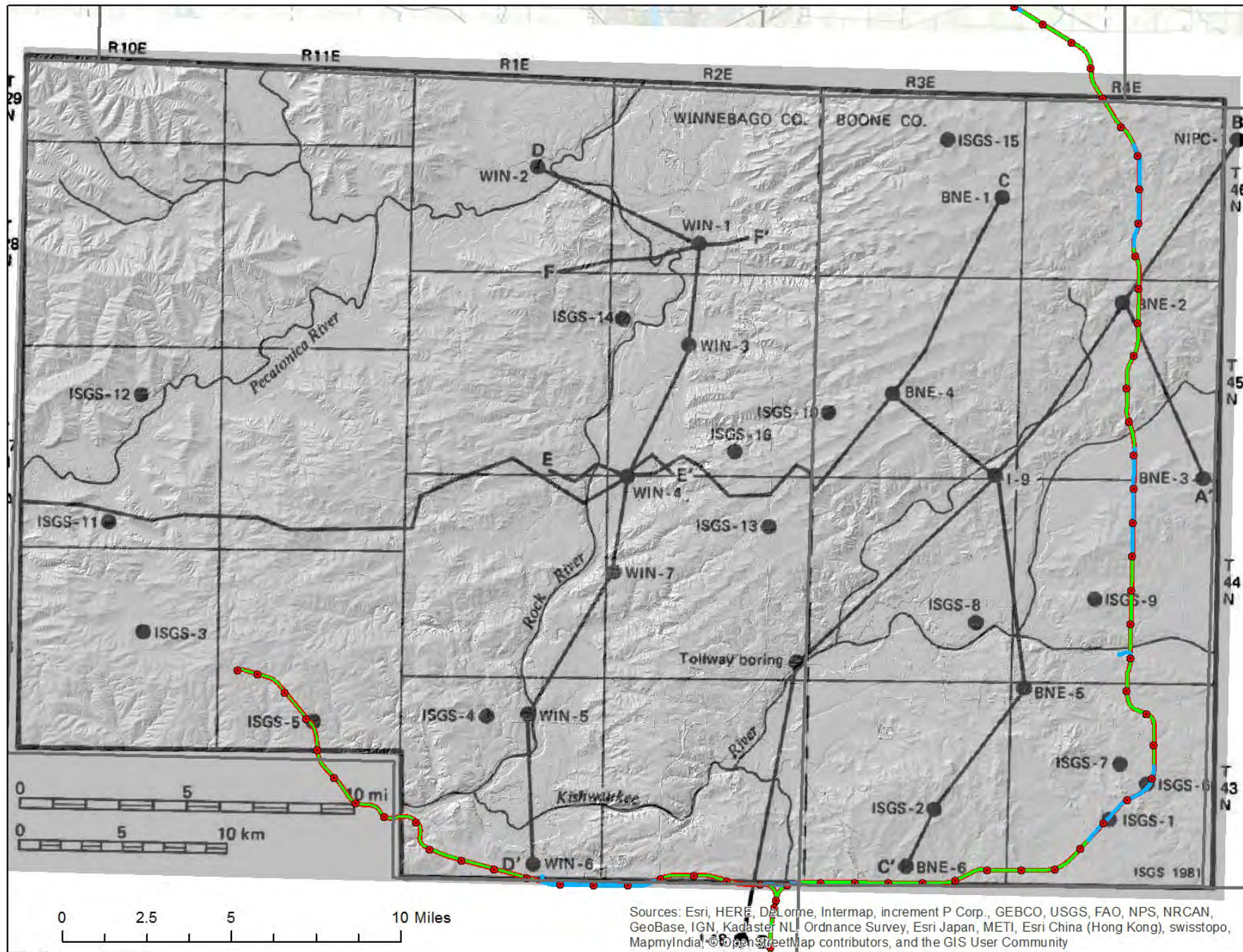




<http://maps.isgs.illinois.edu/vxs/regional/>

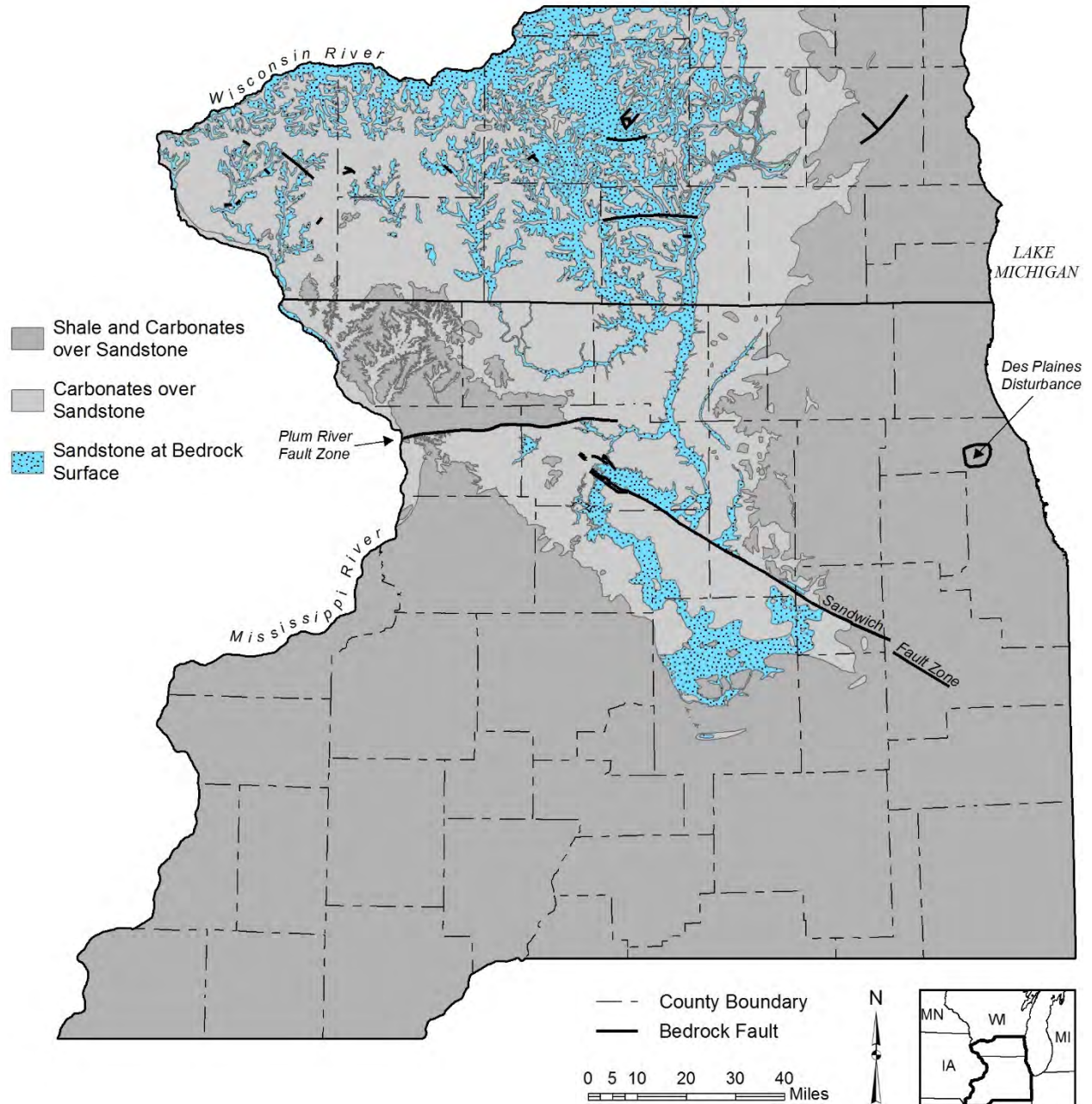
<http://maps.isgs.illinois.edu/vxs/>





Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community





green  
town

# GreenTown Rockford

November 12 | Embassy Suites Rockford Riverfront