



Illinois Groundwater Monitoring Network

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Illinois Monitoring Networks

Currently 111 water level sites in NGWMN

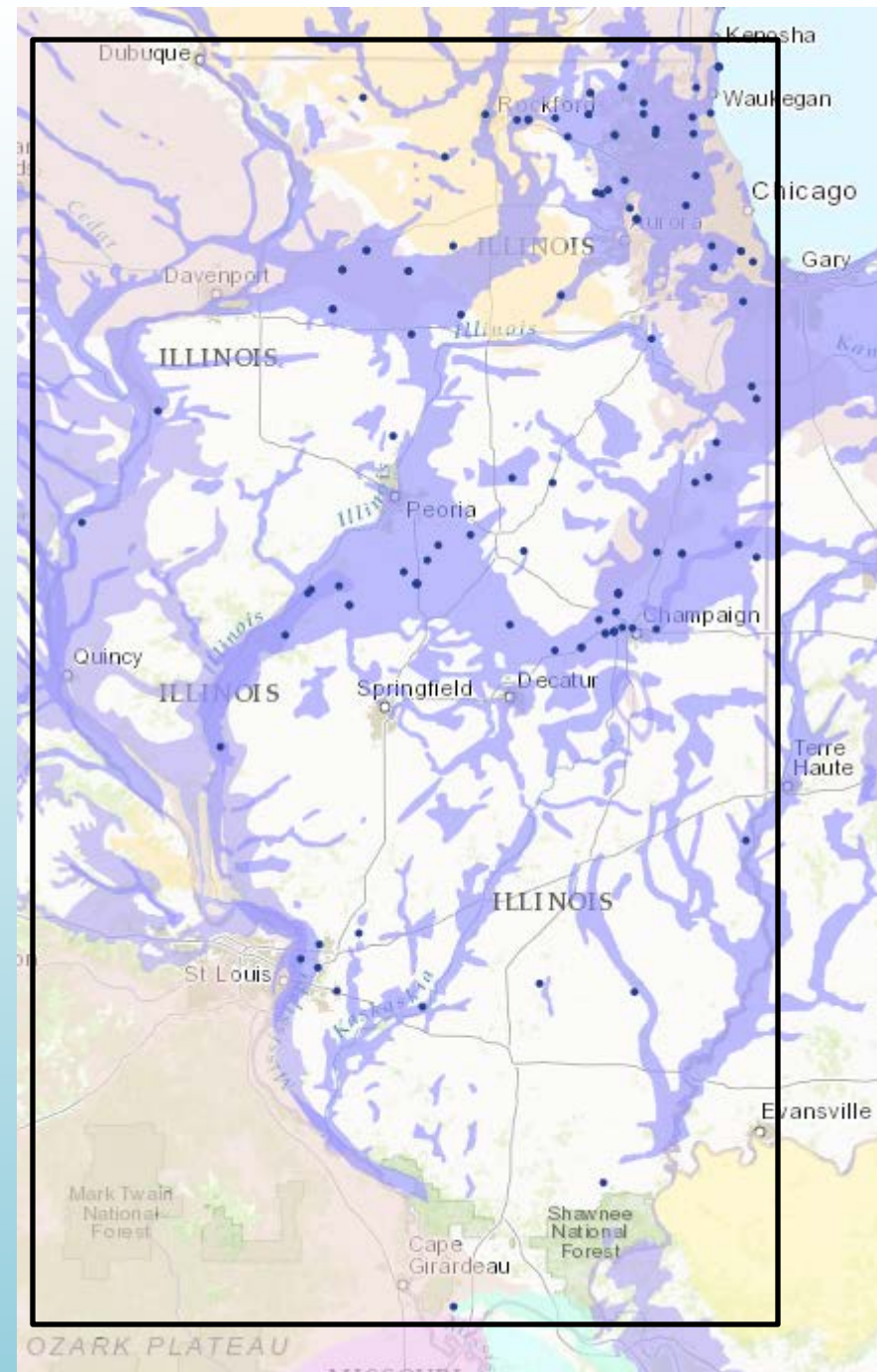
- 63 USGS measured sites
 - Includes ISWS wells
- 48 ISWS measured sites
 - Additional 6 sites pending, will be added as data goes live



Illinois Monitoring Networks (cont'd)

Water table aquifers

- WARM network





<http://www.sws.uiuc.edu/warm/>



About ISWS

Research

Data

Publications

Library

News

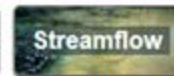
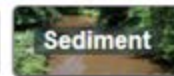
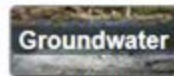
Staff



Google™ Custom Search

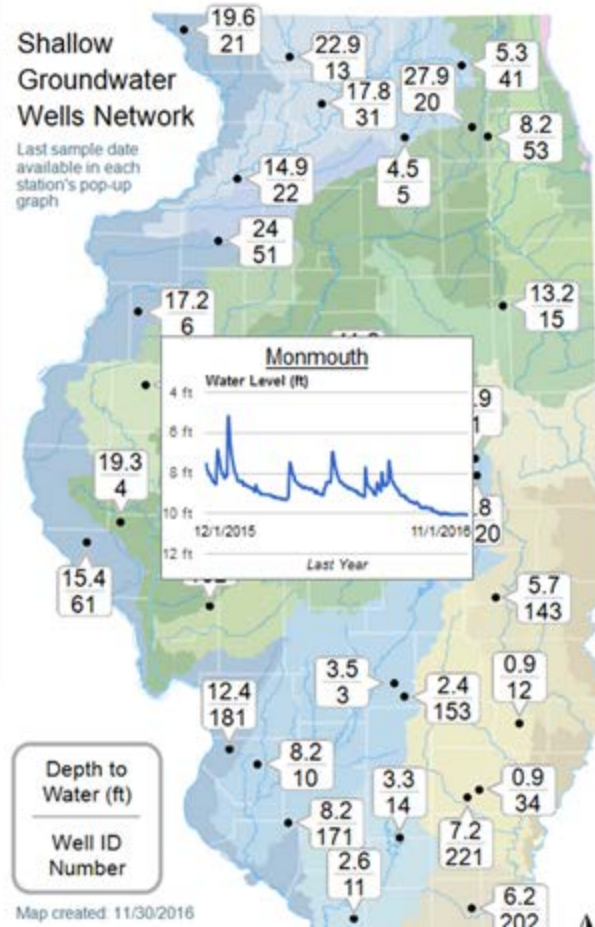
Go

Water and Atmospheric Resources Monitoring Program (WARM)



| |
|------------------|
| Groundwater Data |
| Background |
| Stations Map |
| Publications |
| Data Use |
| Support WARM |
| Contact Us |

Shallow Groundwater Wells Network



- [Barry \(1956-Present\) 61](#)
- [Belleville \(1996-Present\) 10](#)
- [Big Bend \(2005-Present\) 22](#)
- [Bondville \(1982-Present\) 1120](#)
- [Bondville \(1996-Present\) 1](#)
- [Boyleston \(1984-Present\) 221](#)
- [Brownstown \(1996-Present\) 3](#)
- [Cambridge \(1961-2004\) 51](#)
- [Carbondale \(1997-Present\) 11](#)
- [Crystal Lake \(1950-Present\) 41](#)
- [Dekalb \(1996-Present\) 5](#)
- [Dixon Springs #1 \(1955-Present\) 191](#)
- [Dixon Springs #2 \(1956-Present\) 2](#)
- [Fairfield \(1997-Present\) 34](#)
- [Fermi \(1988-Present\) 53](#)
- [Freeport \(1996-Present\) 13](#)
- [Galena \(1963-Present\) 21](#)
- [Good Hope \(1980-Present\) 72](#)
- [Greenfield \(1965-Present\) 132](#)
- [Janesville \(1969-Present\) 143](#)
- [Kilbourne \(1996-Present\) 7](#)
- [Monmouth \(1996-Present\) 6](#)
- [Mt. Morris \(1960-Present\) 31](#)
- [Olney \(1997-Present\) 12](#)
- [Peoria #2 \(2005-Present\) 8](#)
- [Perry \(1996-Present\) 4](#)
- [Rend Lake \(1997-Present\) 14](#)
- [S.E. Illinois College \(1984-Present\) 202](#)
- [Snicarte \(1958-Present\) 91](#)
- [Sparta / Eden \(1960-Present\) 171](#)
- [Springfield #2 \(2006-Present\) 9](#)

Illinois Monitoring Networks (cont'd)

Water table aquifers

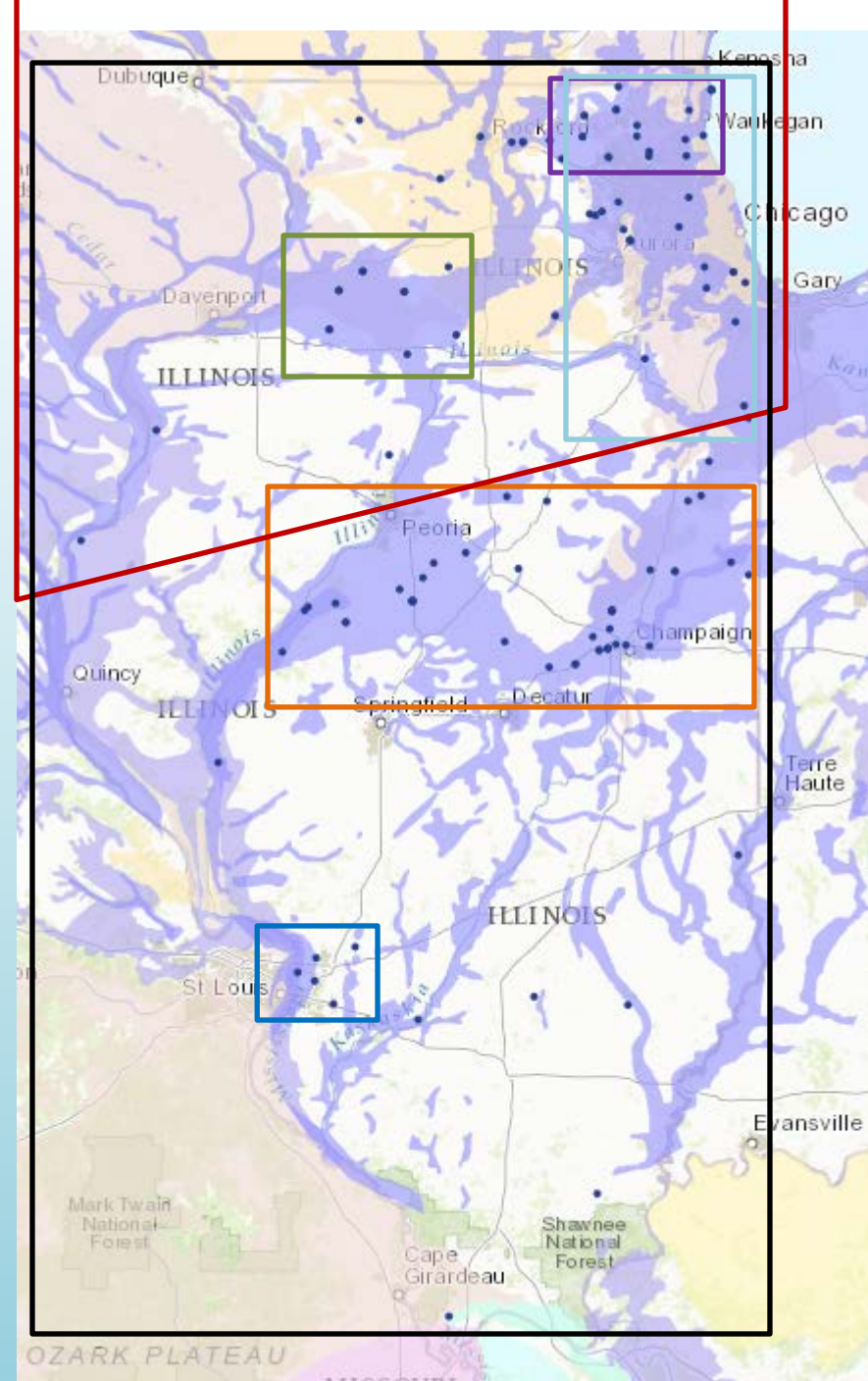
- WARM network

Glacial aquifers

- Sankoty Aquifer
- Mahomet Aquifer
- Metro East
- McHenry/Lake County

Bedrock

- Dolomites (Silurian, Galena-Platteville)
- Cambrian-Ordovician Sandstones



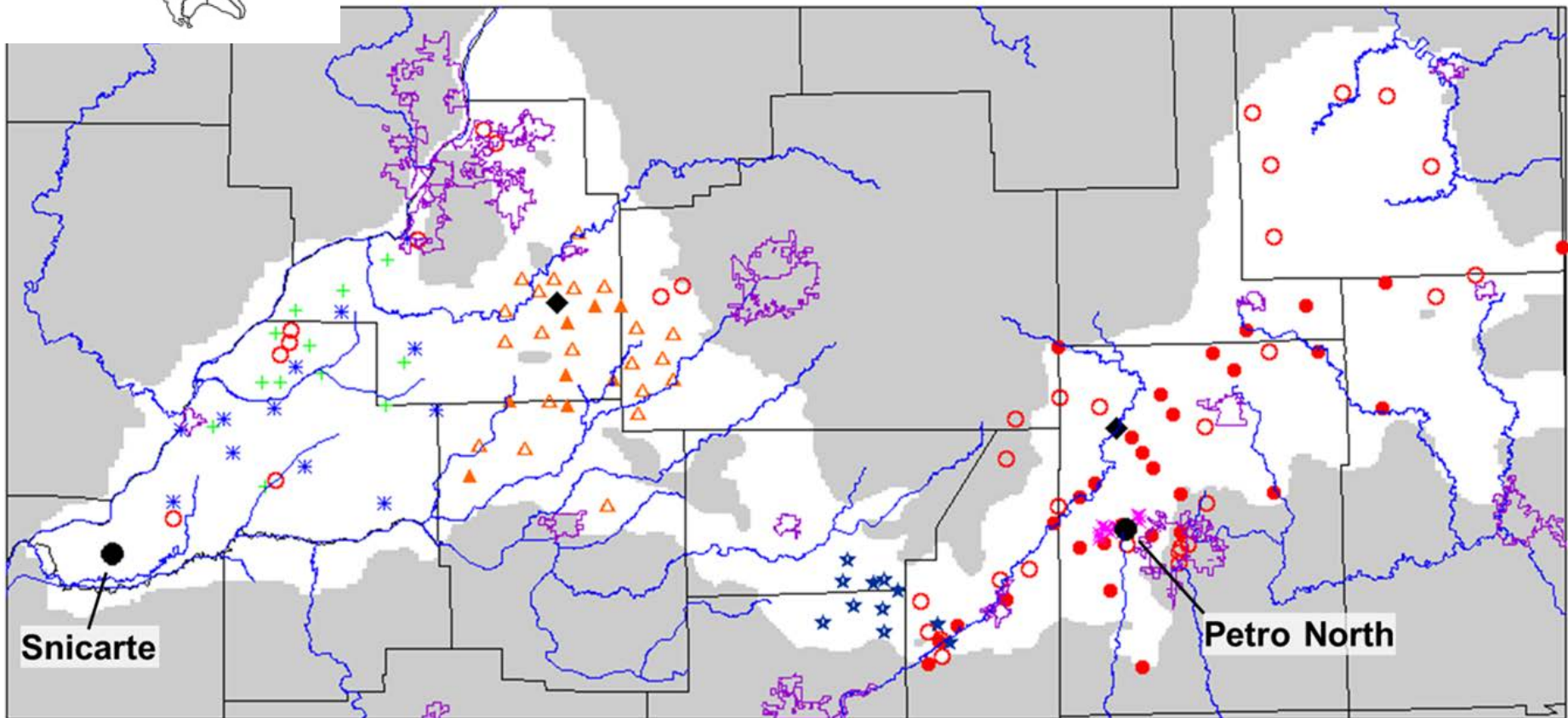
Monitoring network goals

- Assess aquifer recharge (natural and anthropogenic) and reductions in natural groundwater discharge to streams
- Provide data for calibration of groundwater flow models
- Monitor impacts of irrigation (Mahomet Aquifer) and industrial/public supply withdrawals (Cambrian-Ordovician Sandstone) on water availability and domestic wells

Mahomet Observation Well Network

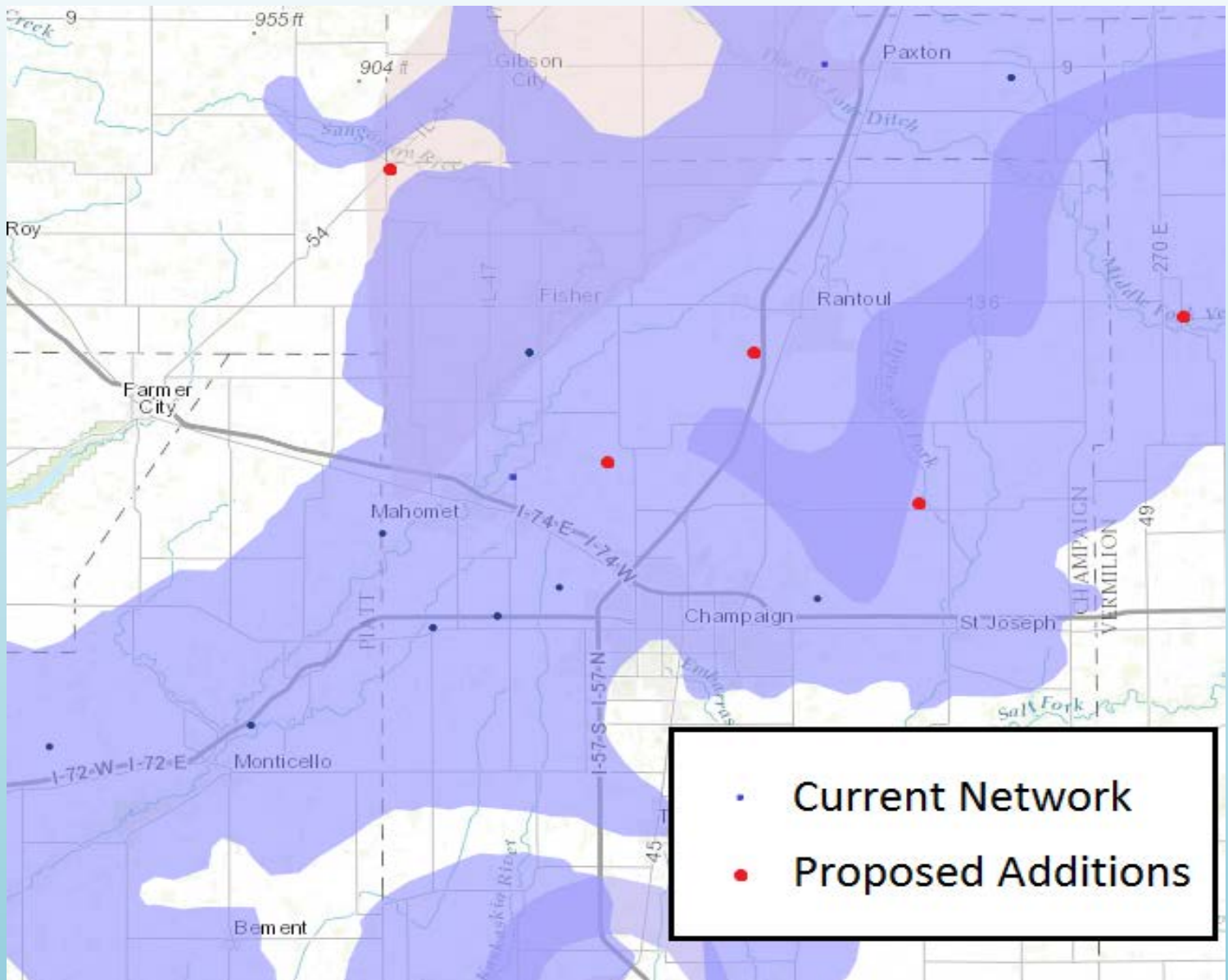
Glacial aquifer, includes original NGWMN pilot of 15 wells selected from about 170 ISWS measures

Currently over 30 wells in the NGWMN



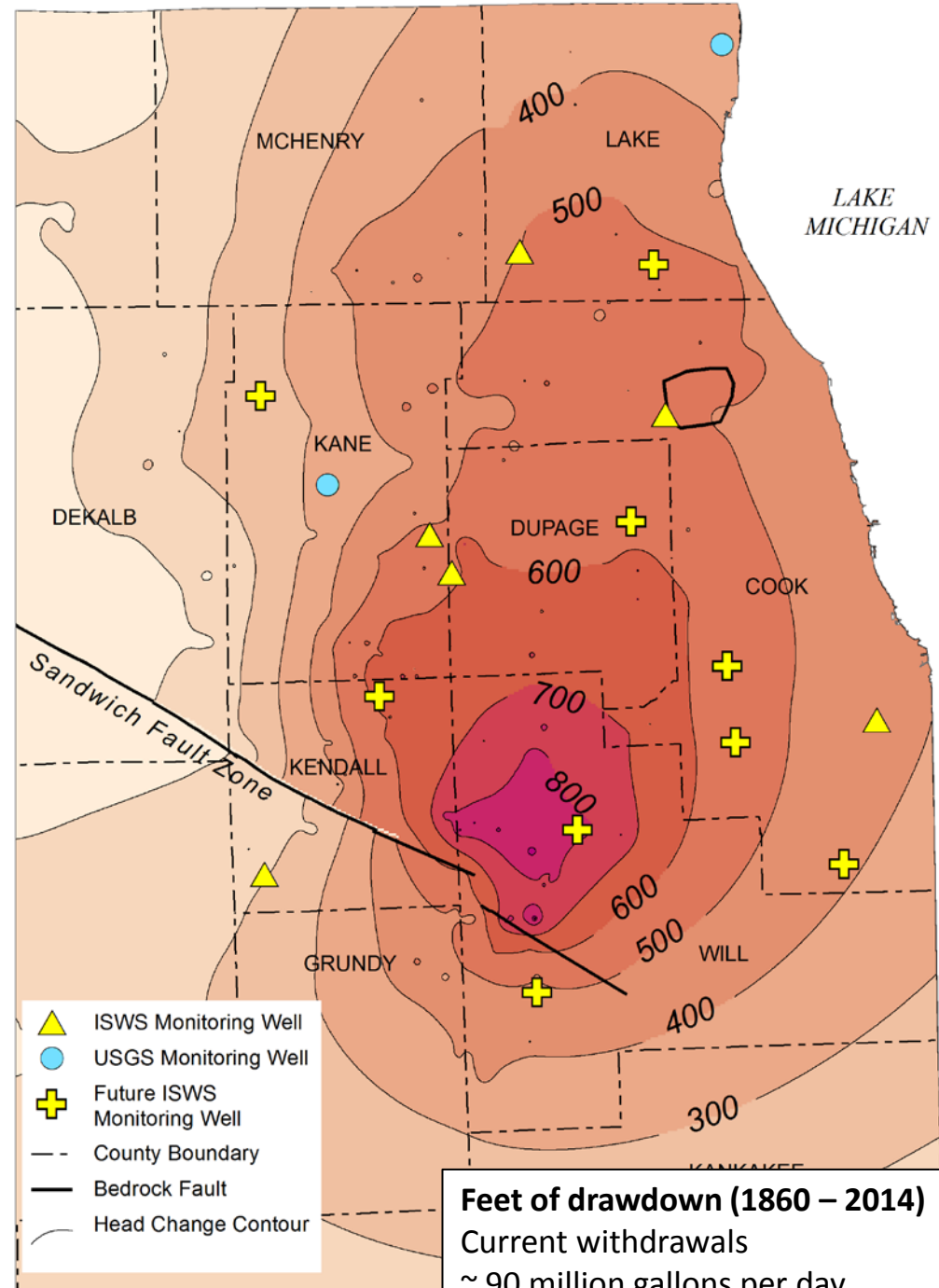
With telemetry in place for 5 years, we have a better idea which wells behave as background and which are influenced by pumping

- Looking to outfit additional wells with telemetry to constrain changes



Sandstone Monitoring Network

- Currently 6 sites (7 wells) plus 2 USGS wells
 - Real time hourly data
- Plan to add 8+ wells
 - Emphasis on Joliet area (center of cone)
- Planning to supplement with transducer data from active wells
- Network supported by synoptic measurements



Sandstone synoptic measurements

- Synoptic measurements every year 1957-1980, every 5 years since 1980
- In part uses production wells that have been off for several hours (ideally) or inactive (emergency) wells
- Not every well is measured each time (average 200-300), but some may be appropriate to add as NGWMN Surveillance wells
- Data not available online (yet)

Monitoring Site Selection

- New sites ideally provide spatial coverage to fill data gaps or monitor areas of known/expected change
- Luck involved with respect to taking ownership of abandoned wells, or wells actively being sealed
 - Cambrian-Ordovician Sandstone monitoring wells are expensive to drill (600-1400 feet, \$110k + each, vs. ~\$3500 for telemetry and transducer)
- Ease of access/security



Data Collection Protocols


- With wells changing hands, there are often inherent location and elevation uncertainties
 - Historically locations were based off centers of 10 acre plot (PLSS), elevations from topo maps
 - Casing stickup often poorly documented
 - Currently working to field verify observation wells
- Airline lengths on sandstone synoptic measurement wells historically prone to error
 - Airline length can exceed 1000 feet, changes as wells are serviced

Water Quality Data

- Many ISWS monitoring wells have little if any water quality data associated with them aside from samples taken as part of larger studies
- Illinois Environmental Protection Agency (IEPA) provides water quality data for community and non-community wells at Drinking Water Watch, exploring adding ambient sites to NGWMN
- <http://water.epa.state.il.us/dww/index.jsp>

ILWATER – Illinois State Geological Survey

Geologic logs, well construction data



ILLINOIS STATE GEOLOGICAL SURVEY
PRAIRIE RESEARCH INSTITUTE

Illinois Water & Related Wells

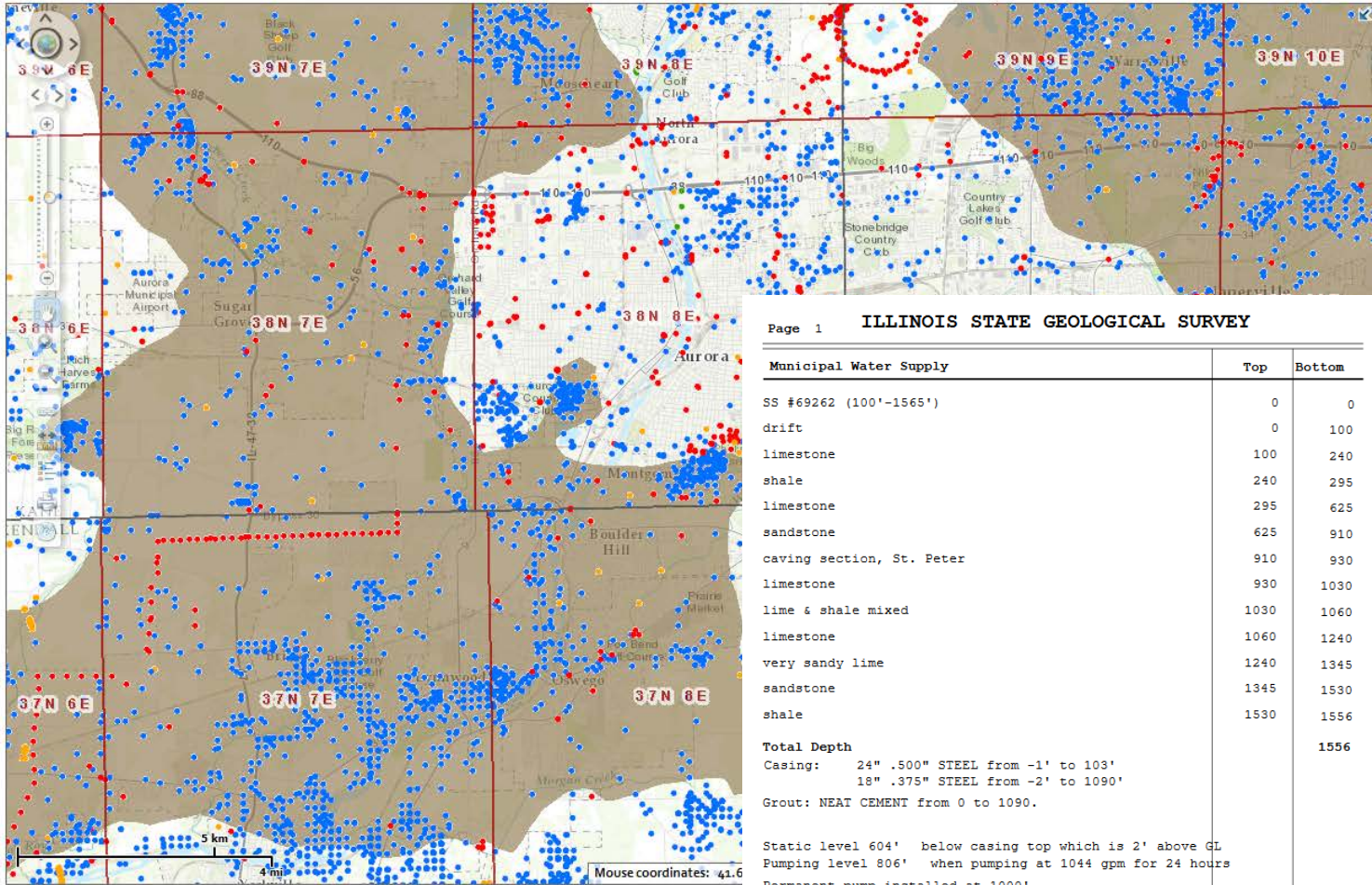
Map Layers Select Find

Map Layers

- Reference Layers
- Water and Related Wells
- Karst Areas
- Bedrock Topography
- Aquifers
- Drift Thickness

Basemaps

World Topo Map

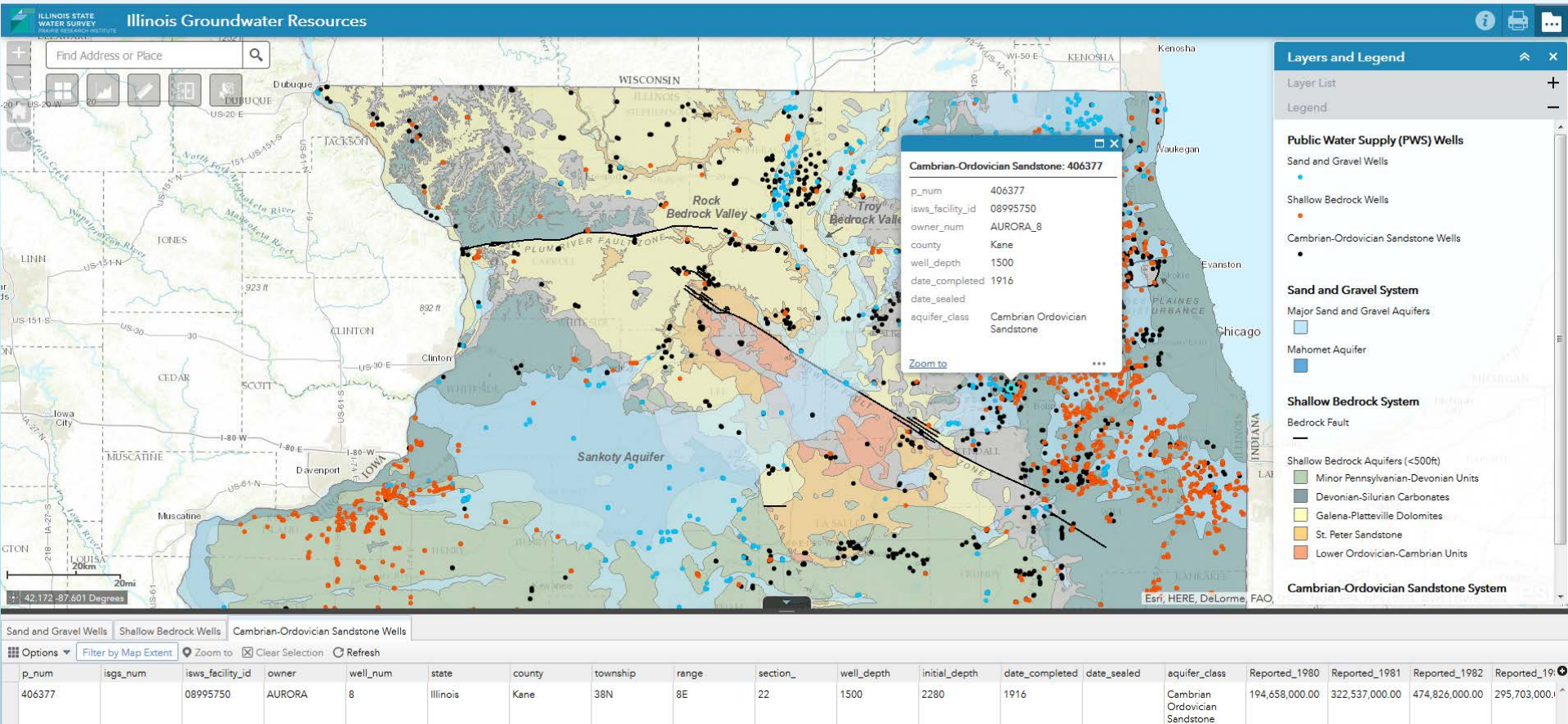


Page 1 **ILLINOIS STATE GEOLOGICAL SURVEY**

| Municipal Water Supply | Top | Bottom |
|--|------|-------------|
| SS #69262 (100'-1565') | 0 | 0 |
| drift | 0 | 100 |
| limestone | 100 | 240 |
| shale | 240 | 295 |
| limestone | 295 | 625 |
| sandstone | 625 | 910 |
| caving section, St. Peter | 910 | 930 |
| limestone | 930 | 1030 |
| lime & shale mixed | 1030 | 1060 |
| limestone | 1060 | 1240 |
| very sandy lime | 1240 | 1345 |
| sandstone | 1345 | 1530 |
| shale | 1530 | 1556 |
| Total Depth | | 1556 |
| Casing: 24" .500" STEEL from -1' to 103' | | |
| 18" .375" STEEL from -2' to 1090' | | |
| Grout: NEAT CEMENT from 0 to 1090. | | |
| Static level 604' below casing top which is 2' above GL | | |
| Pumping level 806' when pumping at 1044 gpm for 24 hours | | |
| Permanent pump installed at 1000' | | |
| on May 3, 2004, with a capacity of 1200 gpm | | |
| Remarks: PICS 19790450 #20/well yield 1044 gpm | | |
| Sample set # 69262 (100' - 1565') Received: May 1, 2004 | | |
| Owner Address: | | |

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

Reported Annual Withdrawals (Public Supplies) Illinois Water Inventory Program



<http://www.sws.uiuc.edu/gws/maps/gwresintmap.asp>

Reported water levels are unfortunately not available electronically at this time, however we envision a similar portal will be used to deliver water level data

ISWS Well Records main file room





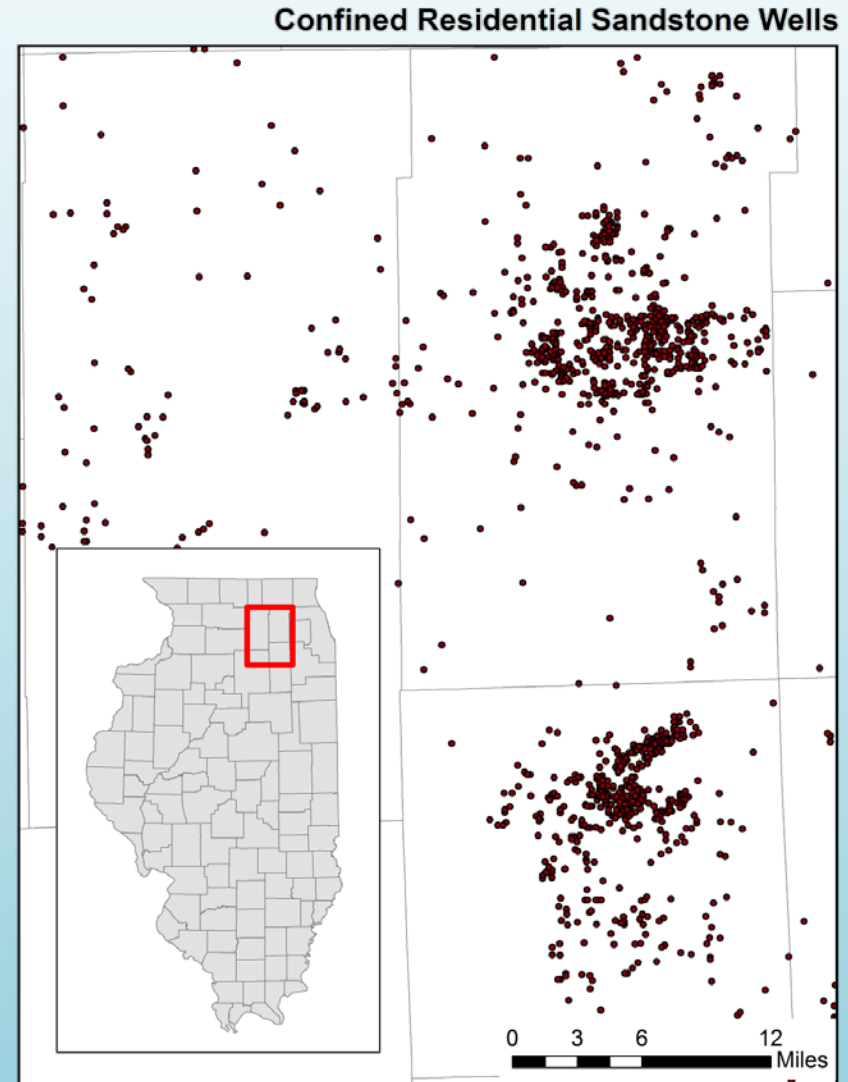
- Records for 420,000+ water wells in Illinois (1895 – present)
 - Well construction, sealing forms
 - Water quality samples
 - Water levels, historical withdrawals, pump tests, service reports
 - Survey reports, studies, communications
- Some documents have been scanned, but majority are not available electronically, most data <1980 not in database

Current Work

- ISWS observation well network is slowly moving into the 21st century, but there are certainly growing pains
 - Linking/merging ISWS and ISGS wells database
 - Data sharing with the IEPA, eventually adding water quality sites to NGWMN
- Rehabilitating several existing monitoring wells to outfit with telemetry in the coming years

Current Work

- Several communities have come forward interested in drilling new monitoring wells or outfitting wells with telemetry
- Looking to establish nested glacial / shallow bedrock / sandstone sites to assess sandstone withdrawals' impact on shallower aquifers

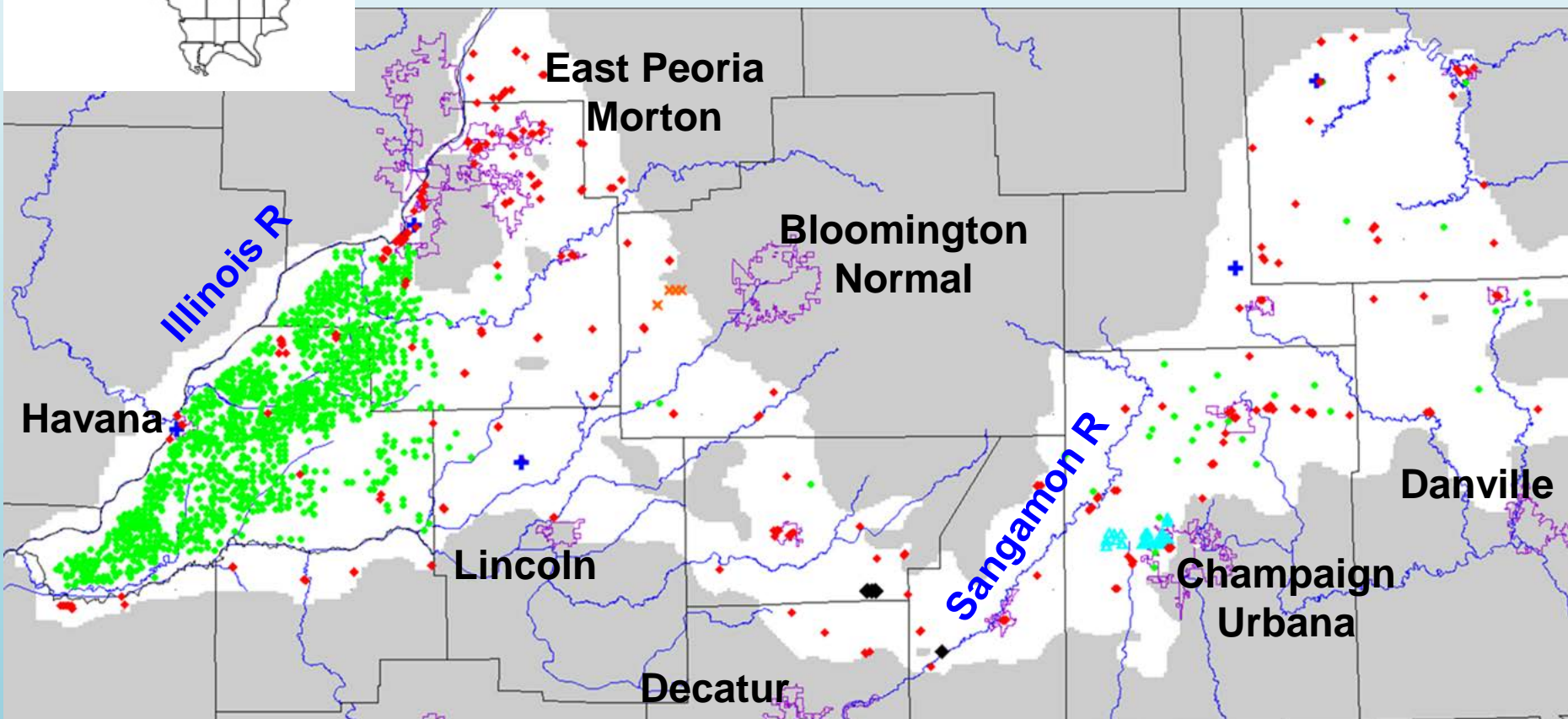


Applications: Impacts of Mahomet Aquifer Groundwater Demand

Total Pumpage in 2005:

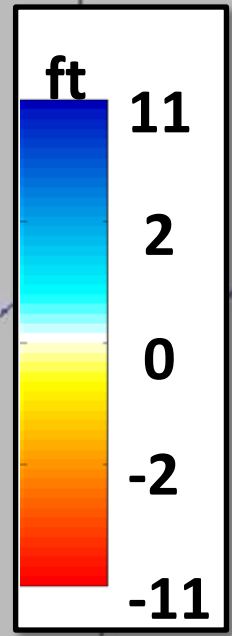
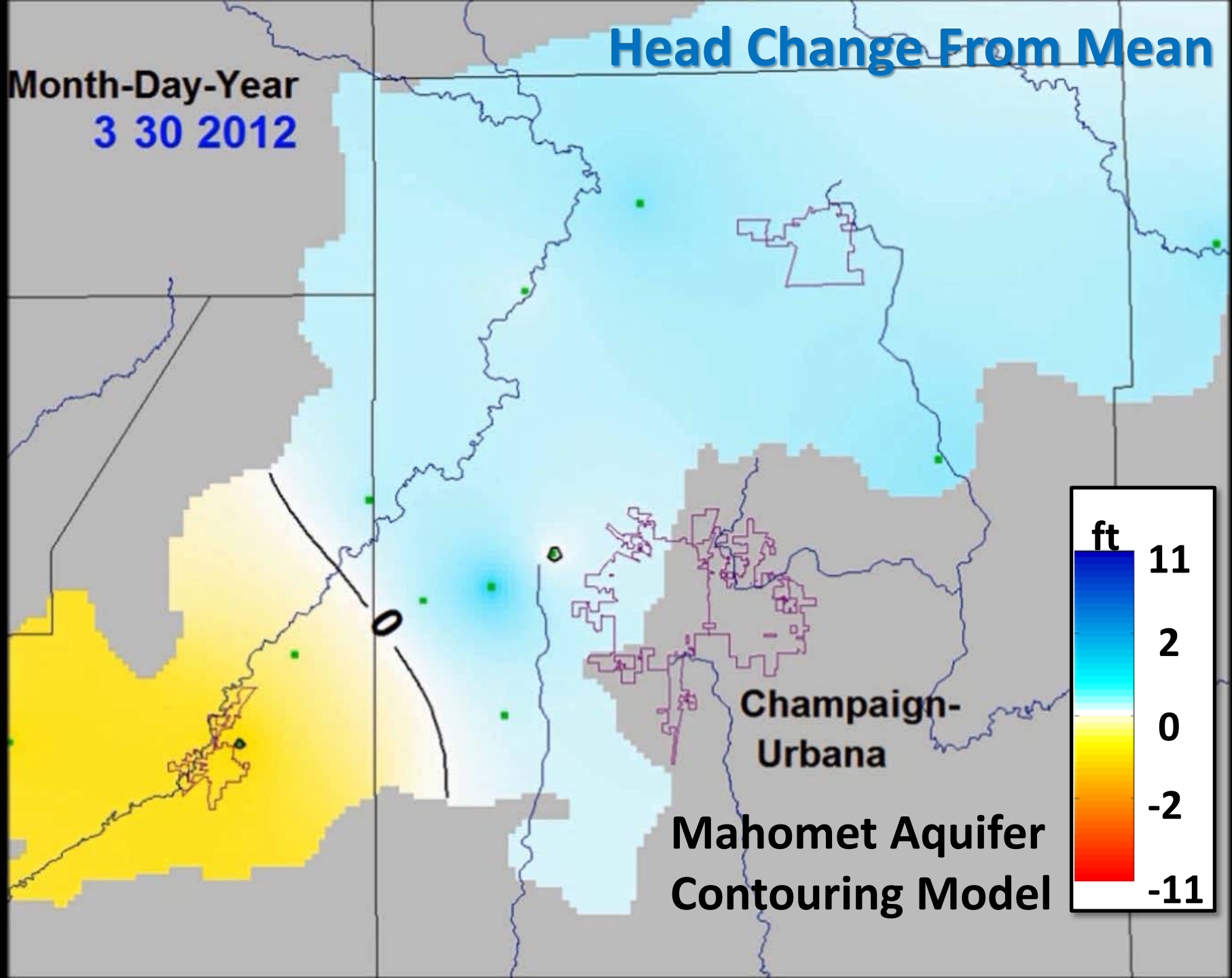
210 million gallons per day (MGD)

1544 large-capacity wells



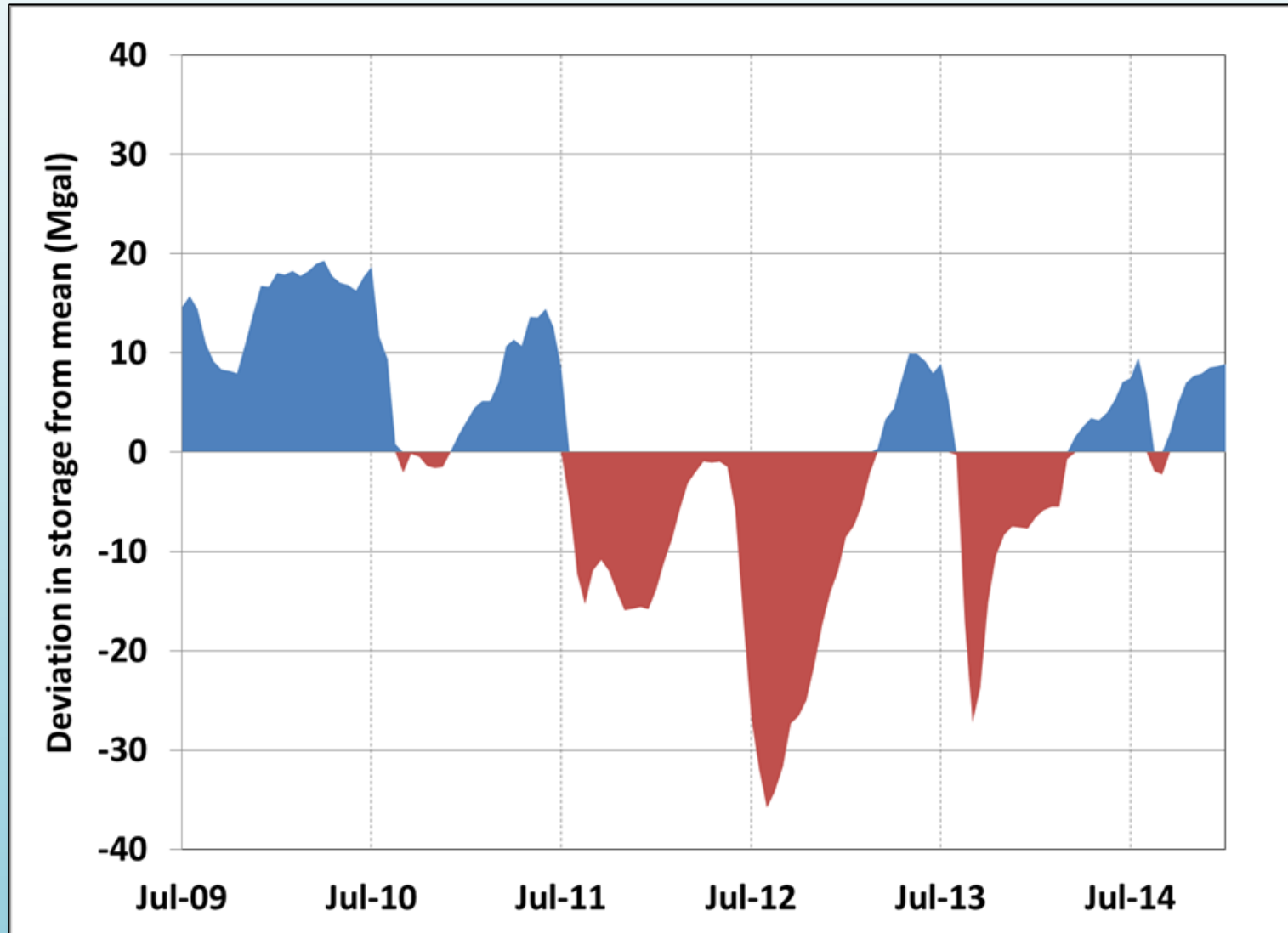
Head Change From Mean

Month-Day-Year
3 30 2012

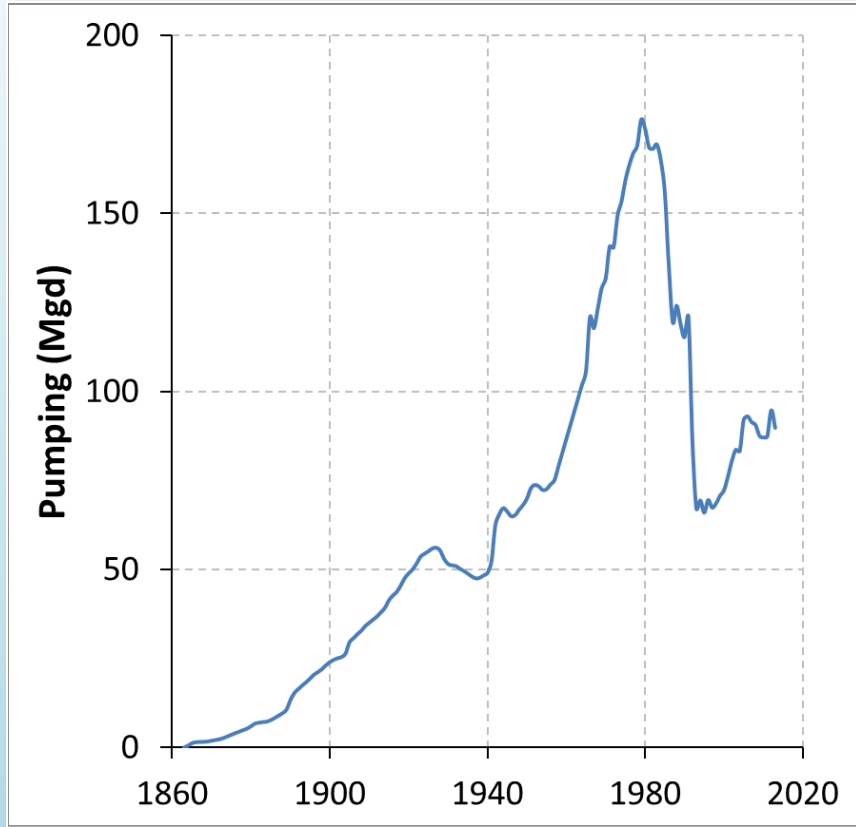


Champaign-Urbana
Mahomet Aquifer
Contouring Model

Volumetric Calculations From the Contouring Model



Comments/Questions?



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Sandstone Aquifer Head (ft)

Observations interpolated between
non-measurement years

1863

