

# Groundwater Monitoring in Sugar Grove and Campton Townships

Update to NWPA, 11/27/2018

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# Aquifers in Sugar Grove TWP

## Two Major Bedrock Valleys

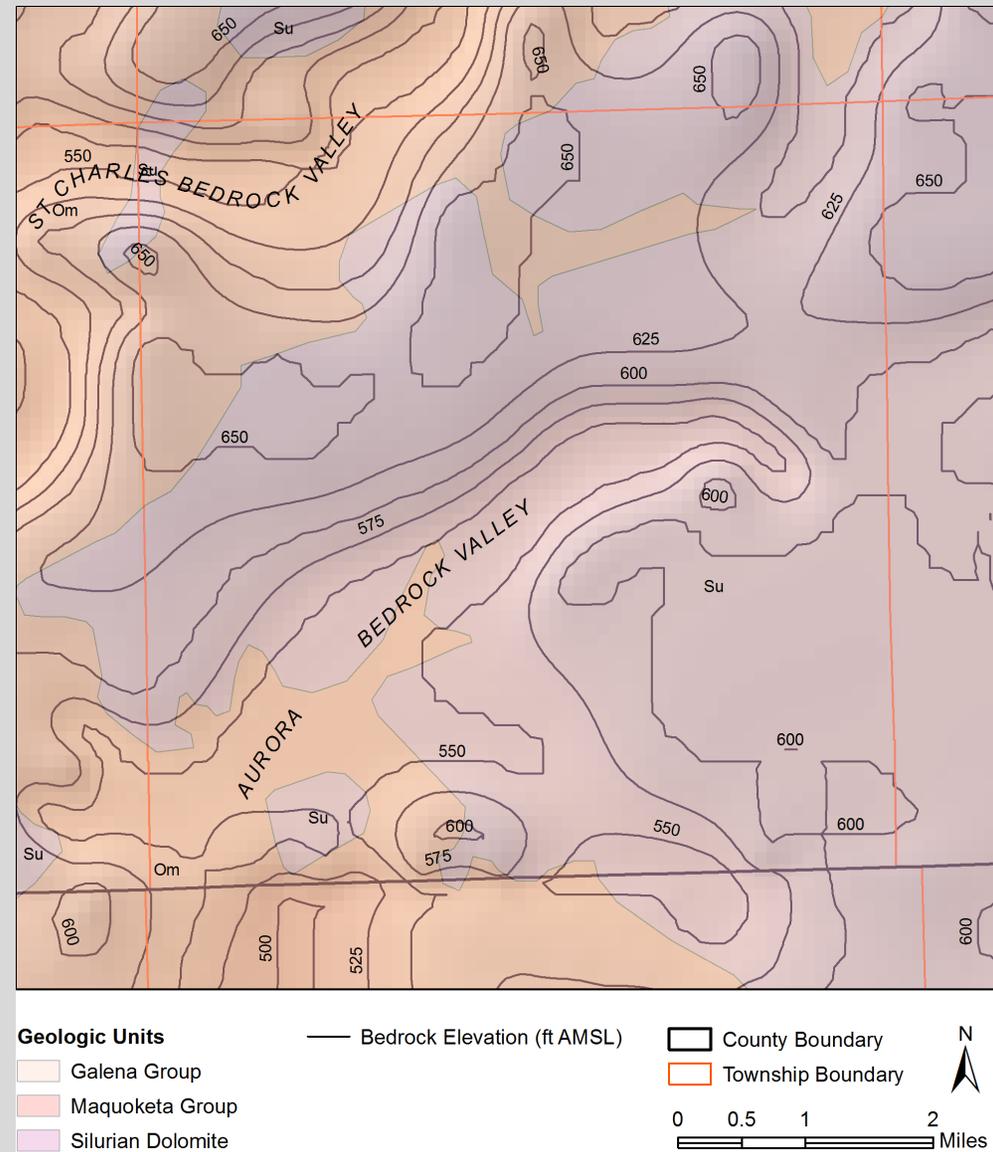
- St. Charles Bedrock Valley
- Aurora Bedrock Valley

-Filled in with glacial sands, gravels, and clays

## Shallow Bedrock Aquifers

- Silurian Dolomite
- Maquoketa Shale
- Galena-Platteville Dolomite

## Deep St. Peter Sandstone



# Sugar Grove Township Monitoring Sites

## Established Monitoring Wells

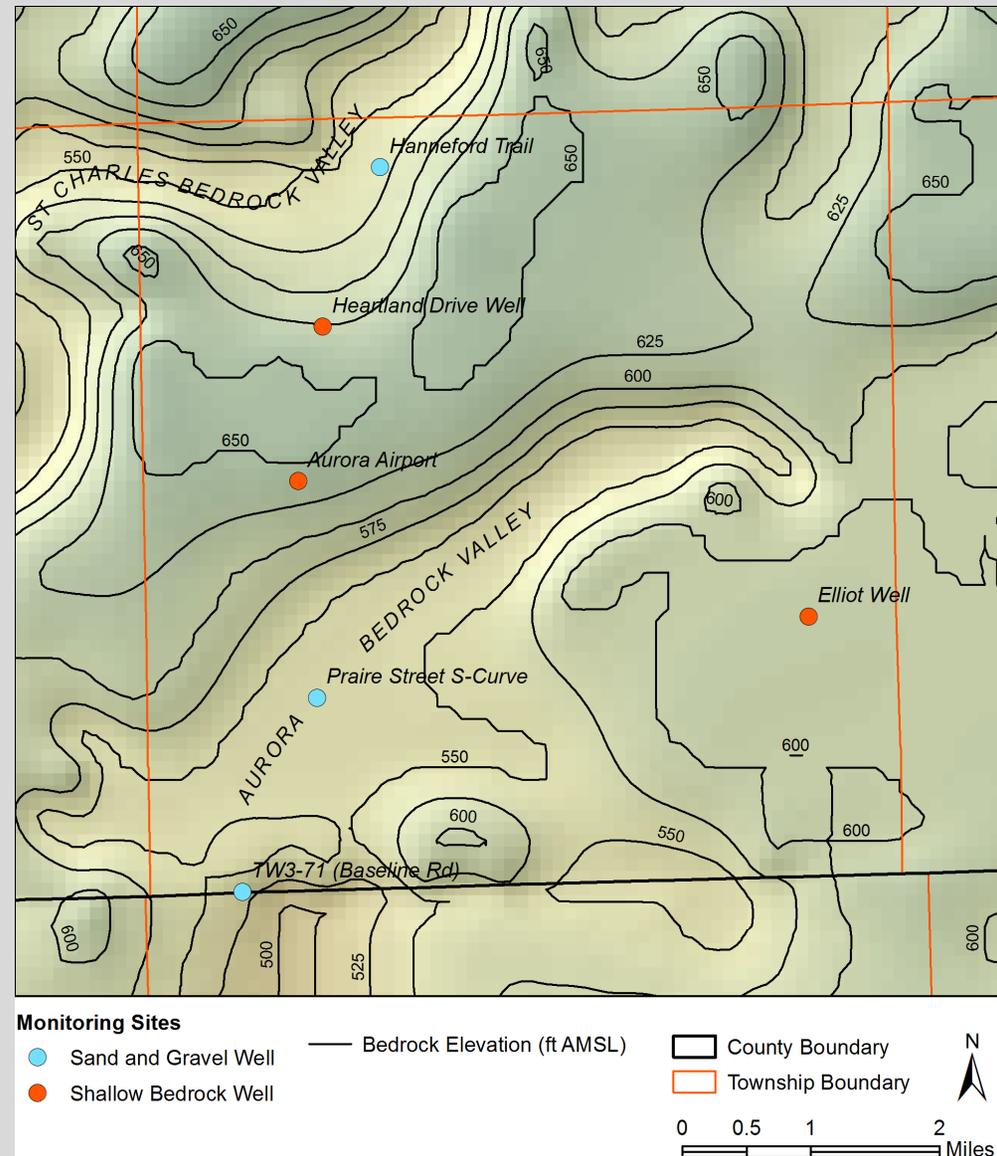
- Elliott Well (WellIntel Sensor)
- Aurora Airport (Campbell Scientific Sensor)
- Heartland Drive Well (Campbell Scientific Sensor)

## Monitoring Wells in the works

- Prairie Street S-Curve Site
- Hanneford Trail

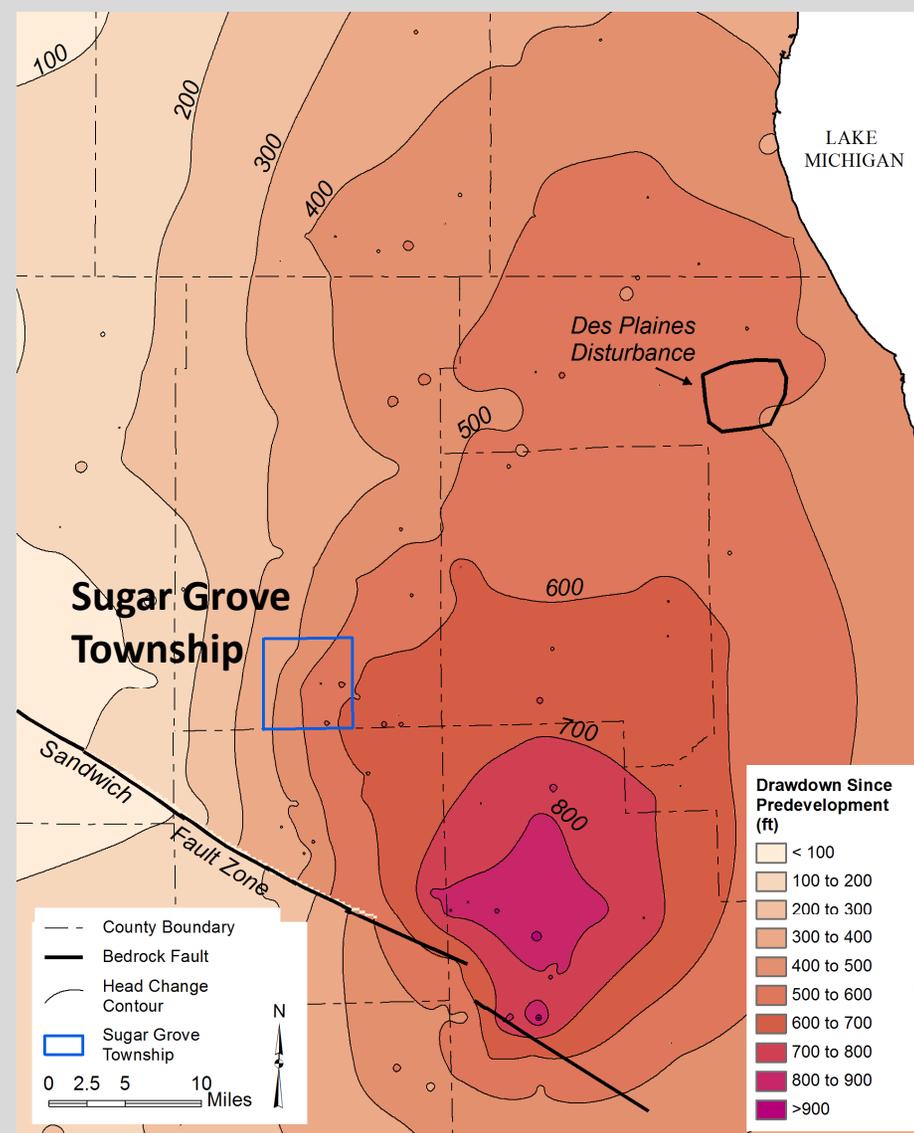
## Potential Monitoring Well

- Baseline Road (Aurora Test Well), pending permission from landowner



# Deep Sandstone Aquifer in Sugar Grove Township

- St. Peter aquifer drawdown is 300-600' in Sugar Grove Township
- Regional drawdown from overuse in Will and Kendall counties
- Cone of depression centered around Joliet, but Joliet not entirely to blame
- Heavy use by industry and other municipalities
- Sandwich Fault acts as flow barrier, prevents groundwater from readily flowing from the south
- Current trends (population growth) are projected to continue with accompanying rates of decline groundwater decline.
- Establishing a St. Peter monitoring well would be great....



## Campbell Scientific, Inc. (Logan, UT)

- Build-it-yourself transducer, weather station, and telemetry systems
- Ideal for long-term monitoring and remote reporting of data
- Typically around \$3000-3500 per site with cellular communication
- Data retrieval is hourly
- Typical setup by the ISWS

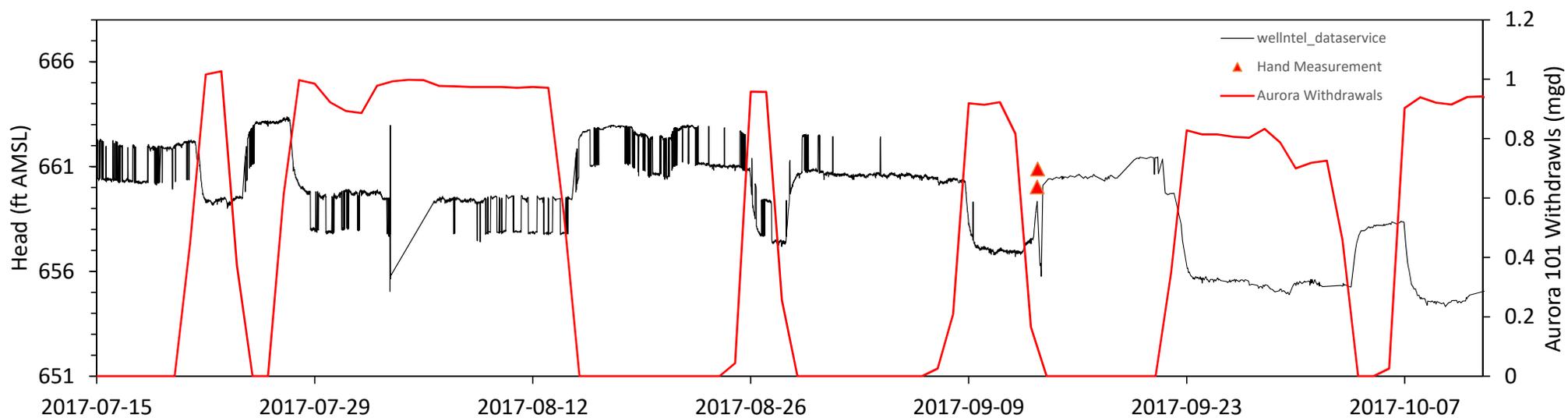
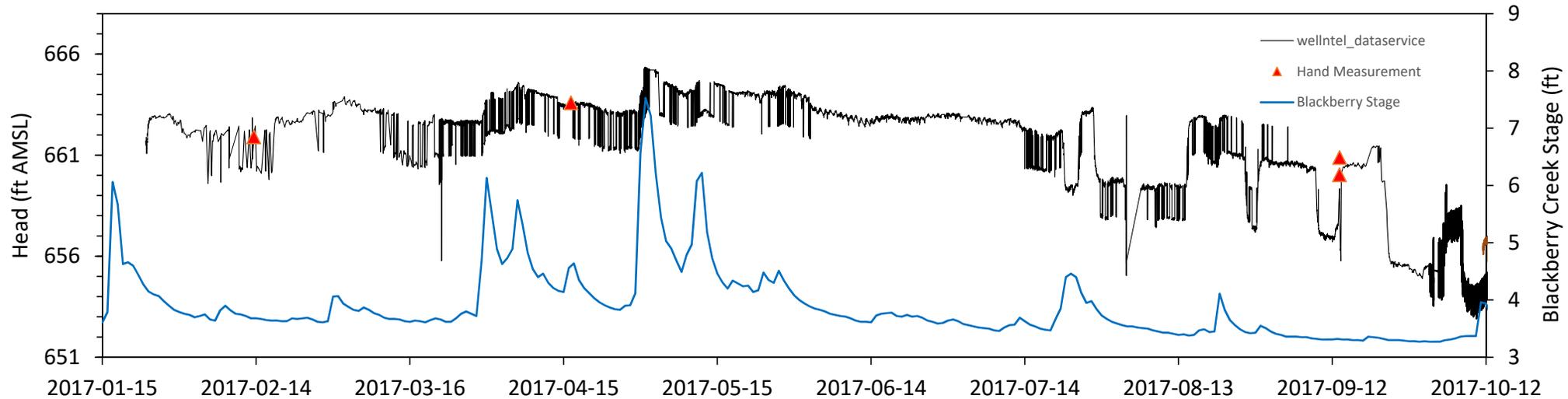


## WellIntel Systems (Milwaukee, WI).

- Sonar sound pulse sensors
- Designed to connect WellIntel Sensors to the Internet using nearby wired Internet access.
- Cost around \$700
- Cases of sensor deterioration due to high humidity contamination in shallow head level application.
- Much cheaper cost, but harder to access data
- Good for domestic well use where transducers are not an option

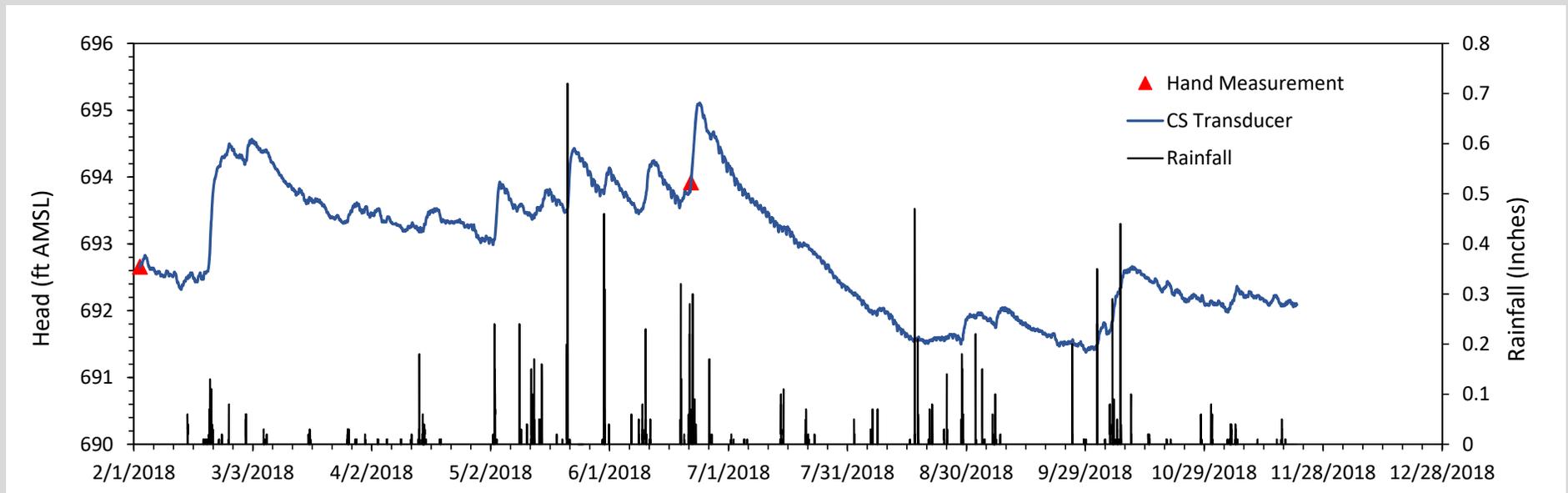


# Prairie Street Well Hydrograph



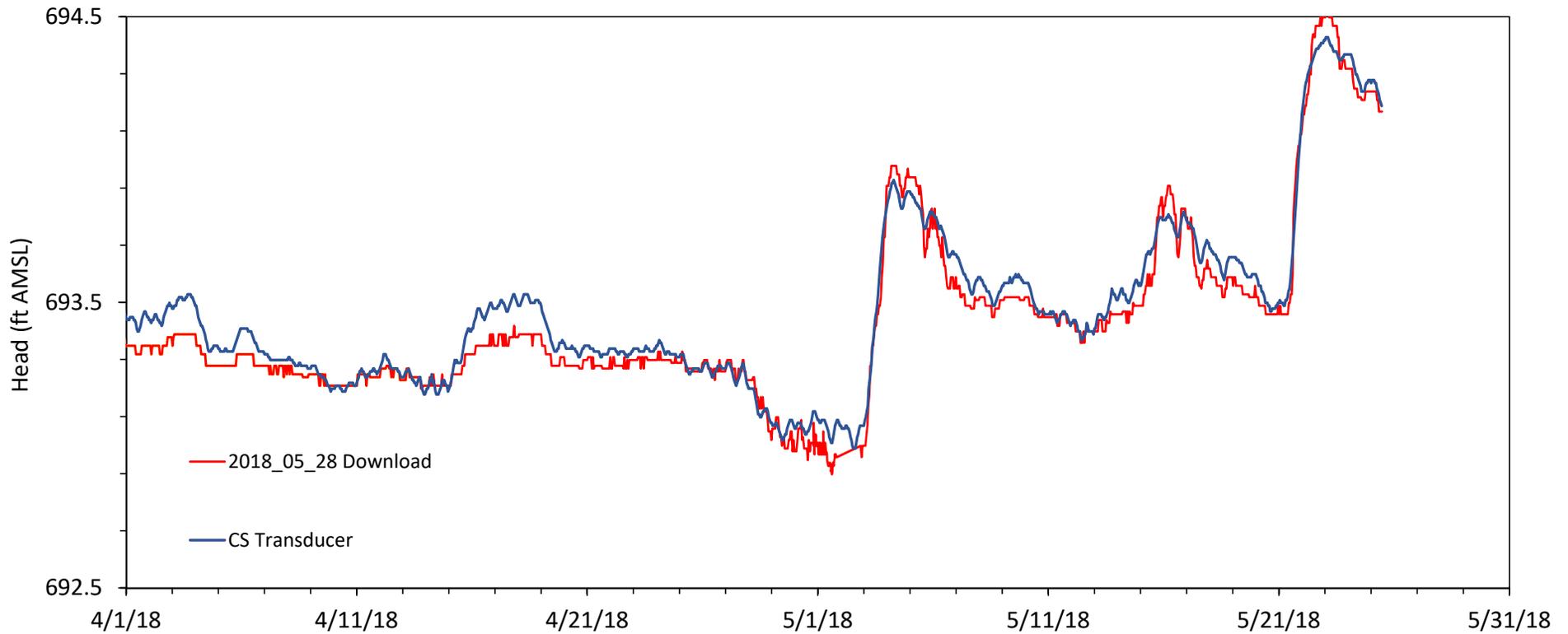
# Aurora Airport Well

- Monitoring since September 2017, installed telemetry February, 2018
- Hourly water levels
- 204' deep
- Open to Silurian and Maquoketa
- Fairly responsive to rainfall events (most of the time), recession in summer months





## Aurora Airport Well Hydrograph Comparison

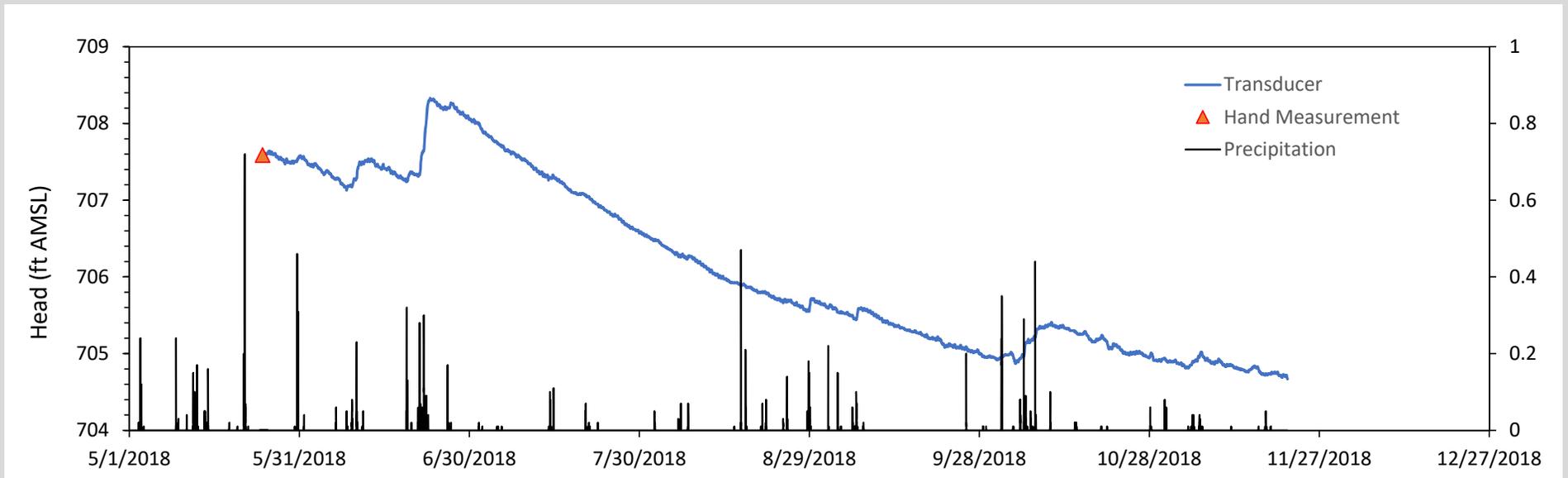


WellIntell unit pretty close to transducer, but difficult for sensor at such shallow water levels

# Heartland Drive

- Installation on 5/24/2018
- Hourly water levels
- 165' deep
- Open to Maquoketa and Galena-Platteville

Slow recession of several feet throughout the summer and fall, peaks from rainfall events (most of the time)





Drilling the S-Curve site



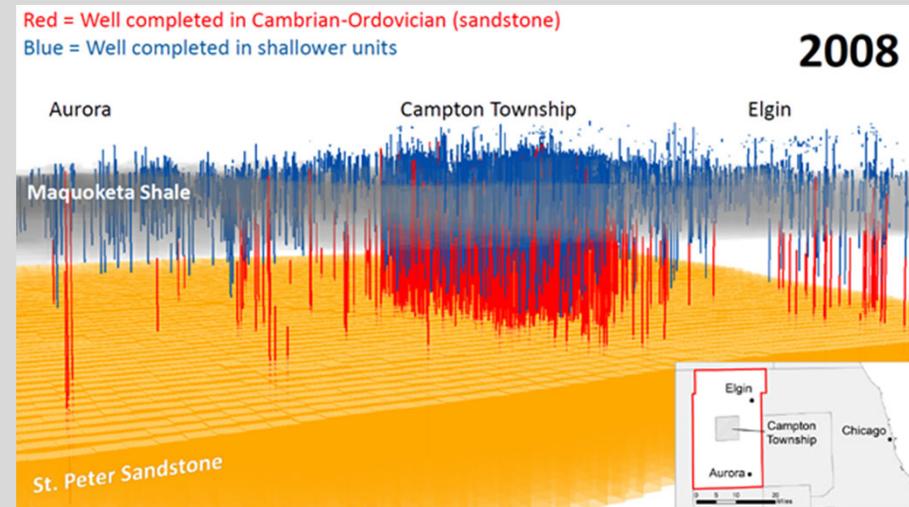
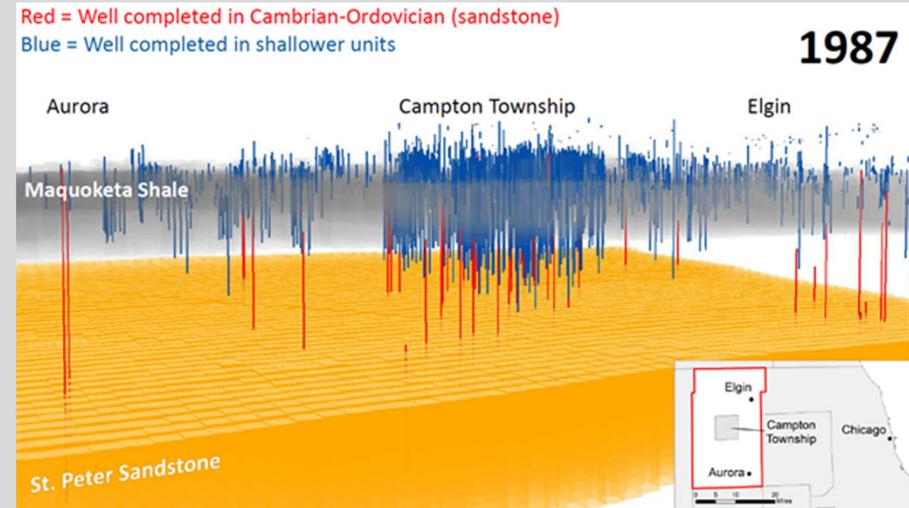
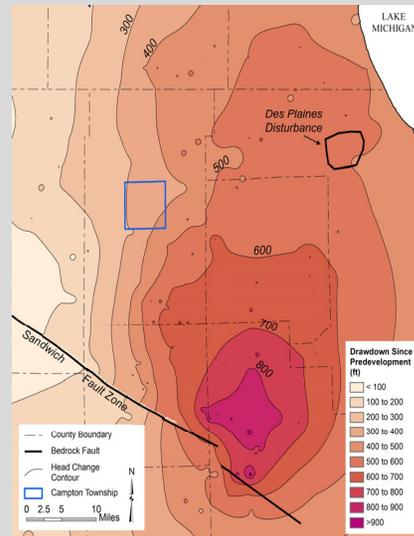
Hannaford Trail site

## Future Work

- Install equipment at Prairie Street S-curve site and Hannaford Trail site
- Acquisition of Baseline Rd sand and gravel well in the Aurora Bedrock Valley?
- On the lookout for any unused St. Peter wells
- Additional WellIntel unit deployment for homeowners interested in the project
- Water quality sampling to supplement Kane County 2015 Water Quality Report

# Campton Township Monitoring

- 300-400 feet of drawdown in St. Peter
- High density of private wells
- Increase in number of wells that bypass the confining Maquoketa shale
- Increase in number of St. Peter wells
- Instances of multi-aquifer St. Peter wells dewatering shallower aquifers

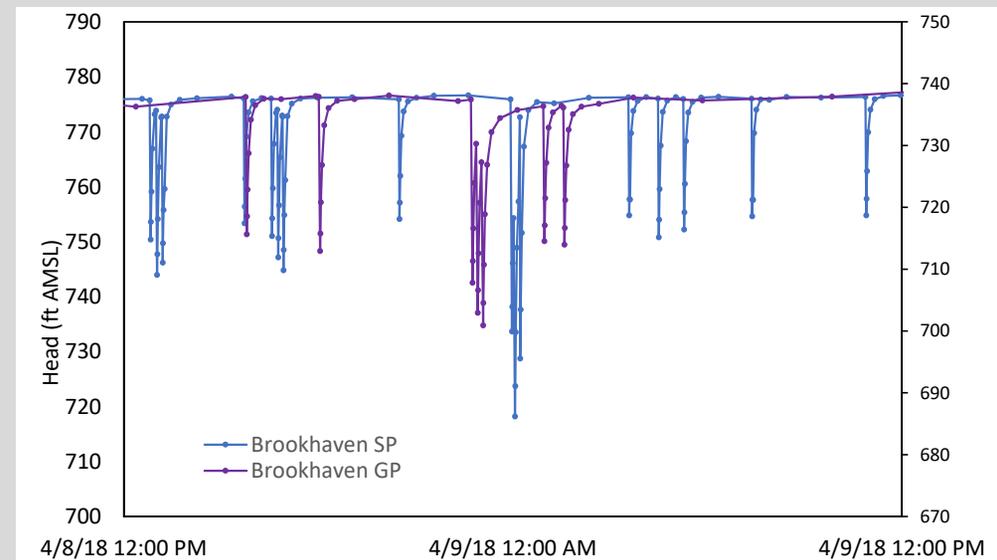
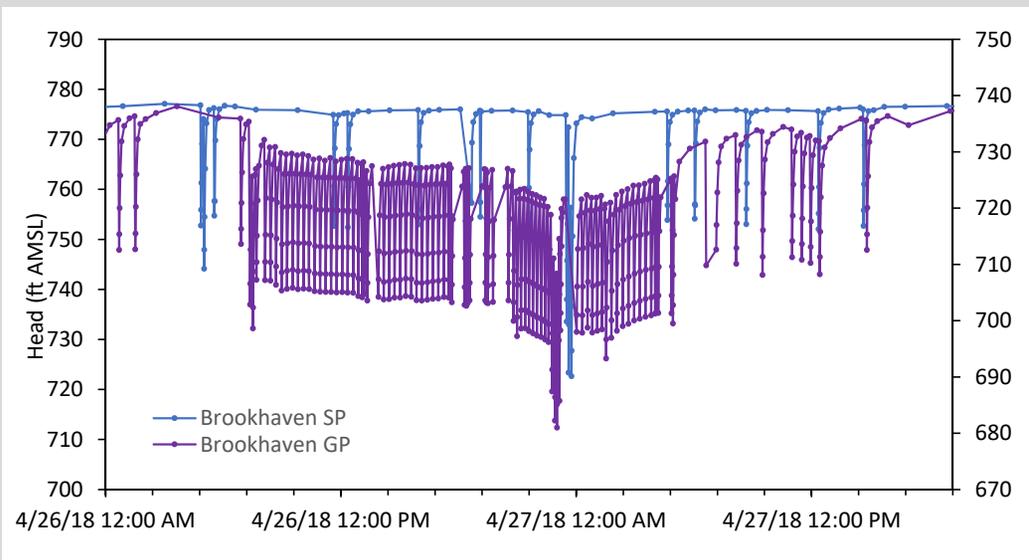
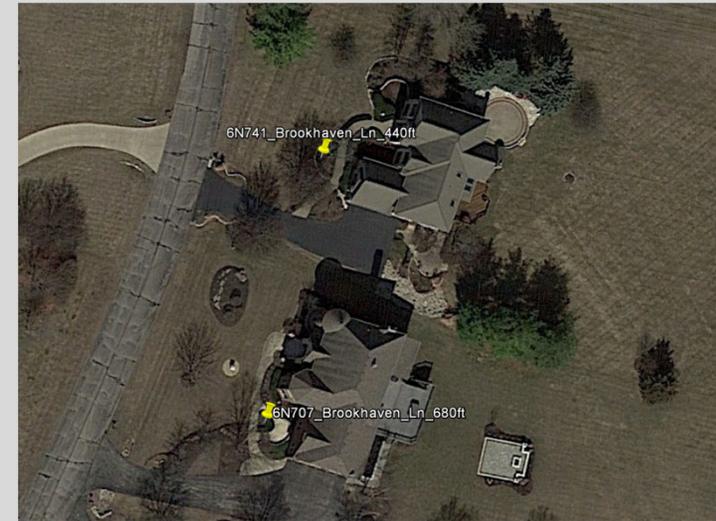


## Goals:

1. monitor domestic wells, determine extent and magnitude of groundwater flow between aquifers at multi-aquifer wells
2. Map density of domestic wells (by specific aquifers), infer risk to regions in the township

# Brookhaven Subdivision Well Pair

- WellIntell Units installed March 2018, monitor static and pumping levels
- One well open to Galena-Platteville, another open to Galena-Platteville and St. Peter
- Only 150 feet away from each other
- Do withdrawals from one affect the other?
  - Not really
  - Many pumping events from one well coincide timed readings from the other well, no measured drawdown
- The issue of static water levels:
  - Galena-Platteville well: 180' dtw in 1995, 88' dtw in 2018
  - St. Peter well: 220' dtw in 2001, 58' dtw in 2018

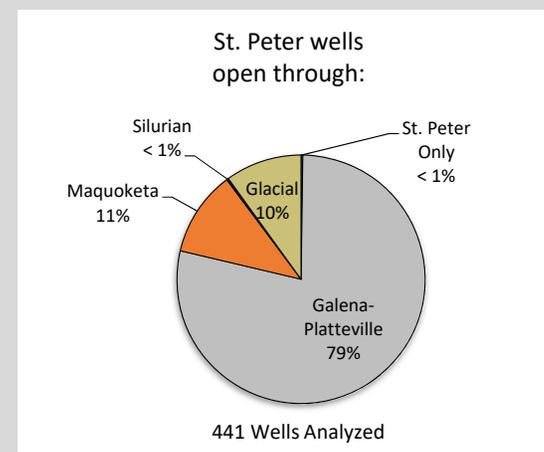
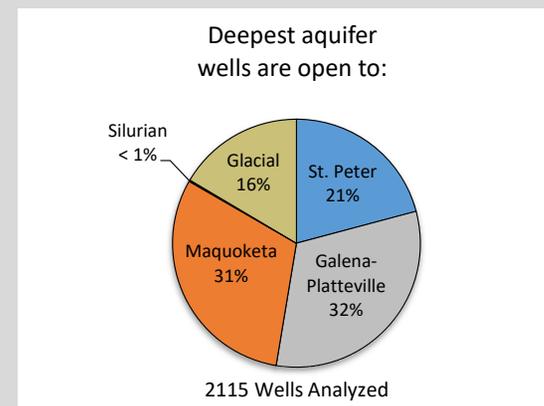


# Well Type Analysis

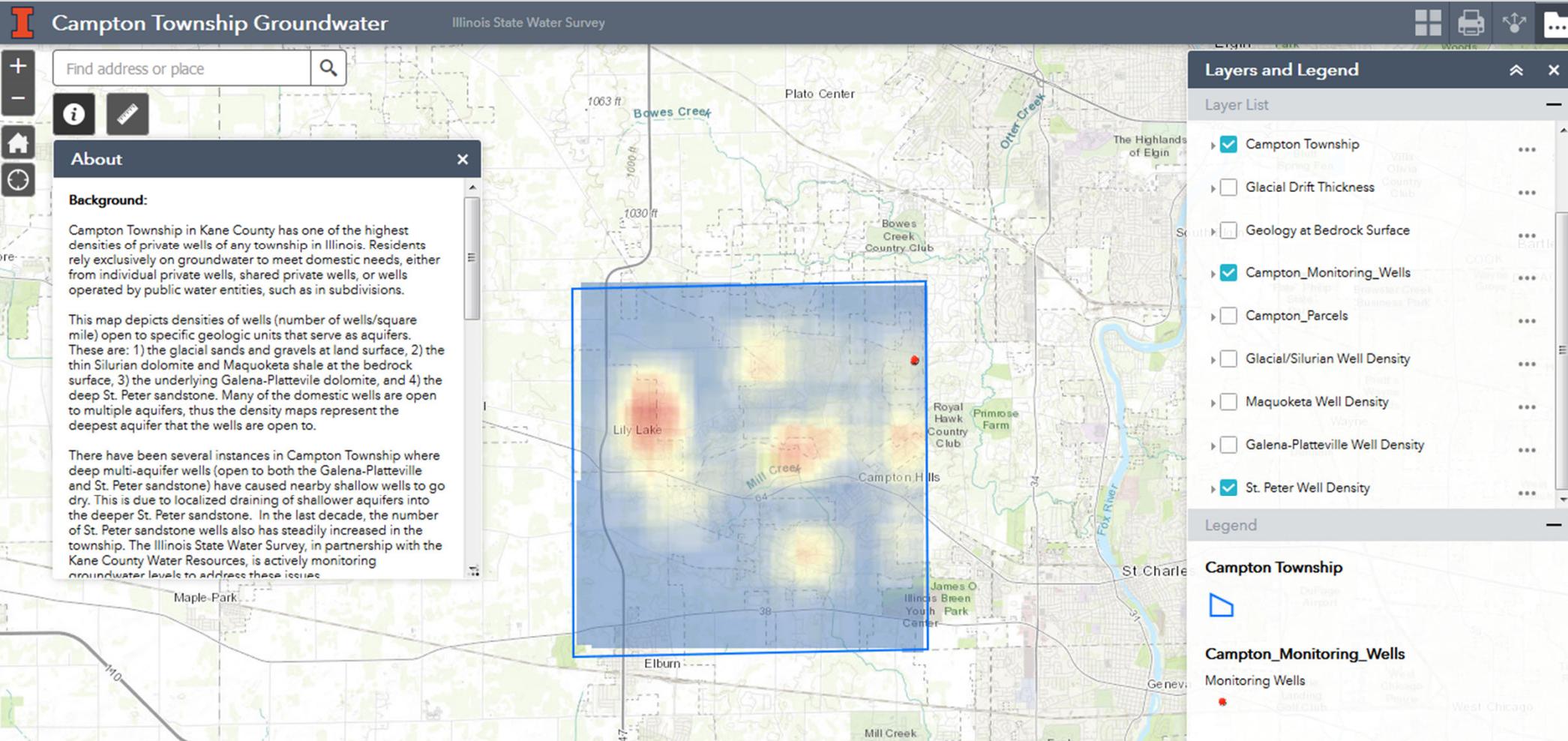
Total Number of Wells	2638
Number of wells with depths and casings that make sense	2115
Number of township parcels (ag, residential)	6147
Number of Wasco parcels	1195
Number of Windings Parcels	435
Number of Public Water Supply Parcels	1630
Number of Self Supplied Parcels	4517
Percentage of self-supplied parcels we have good records for	46.8%

Deepest aquifer wells are open to:	Number	Percent
St. Peter	441	20.9%
Galena-Platteville	672	31.8%
Maquoketa	649	30.7%
Silurian	4	0.2%
Glacial	349	16.5%
Total	2115	

St. Peter wells open through:	Number	Percent
St. Peter only	1	0.2%
Galena-Platteville	346	78.5%
Maquoketa	49	11.1%
Silurian	1	0.2%
Glacial	44	10.0%
Total	441	

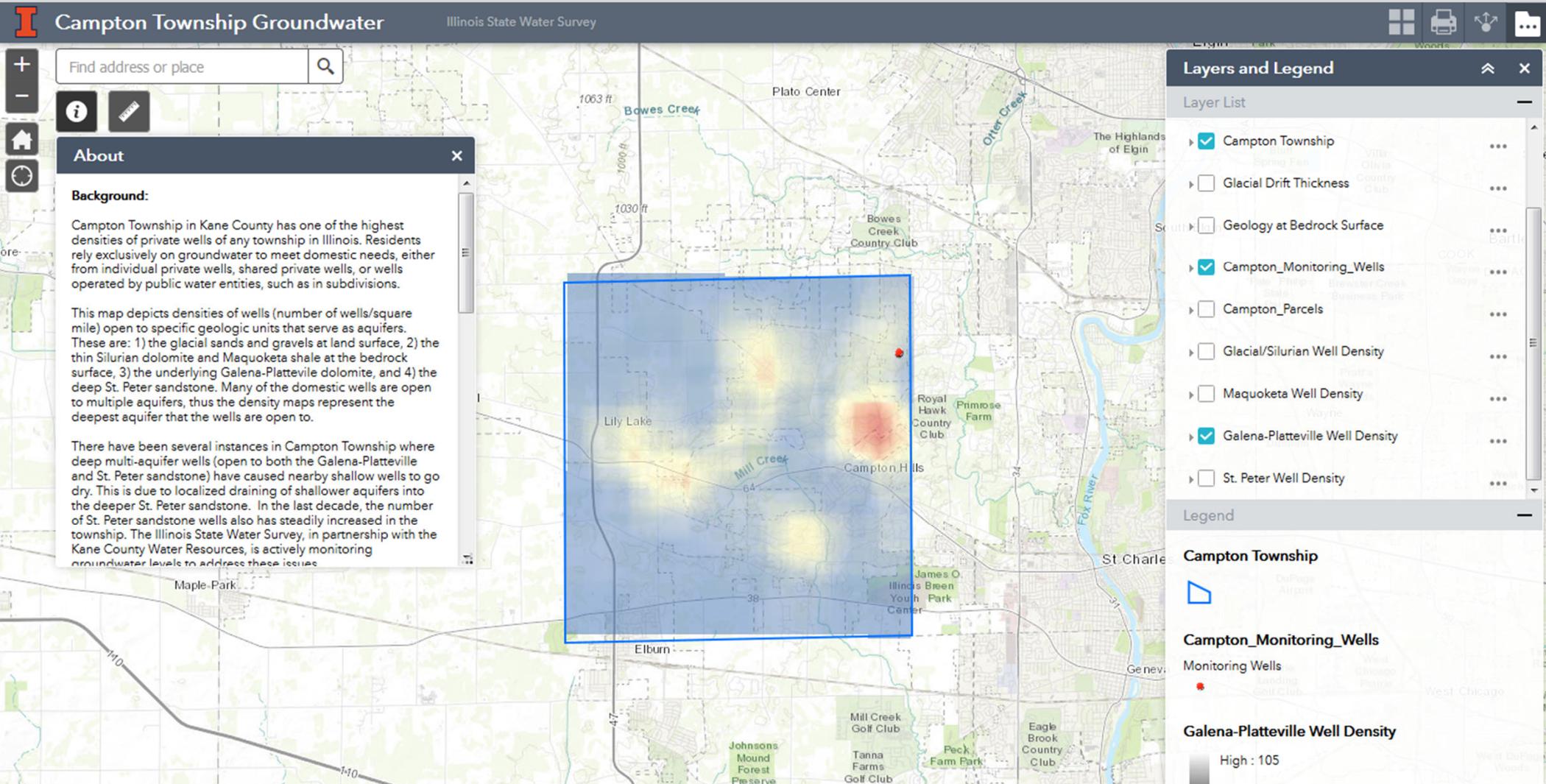


# Well Density Analysis



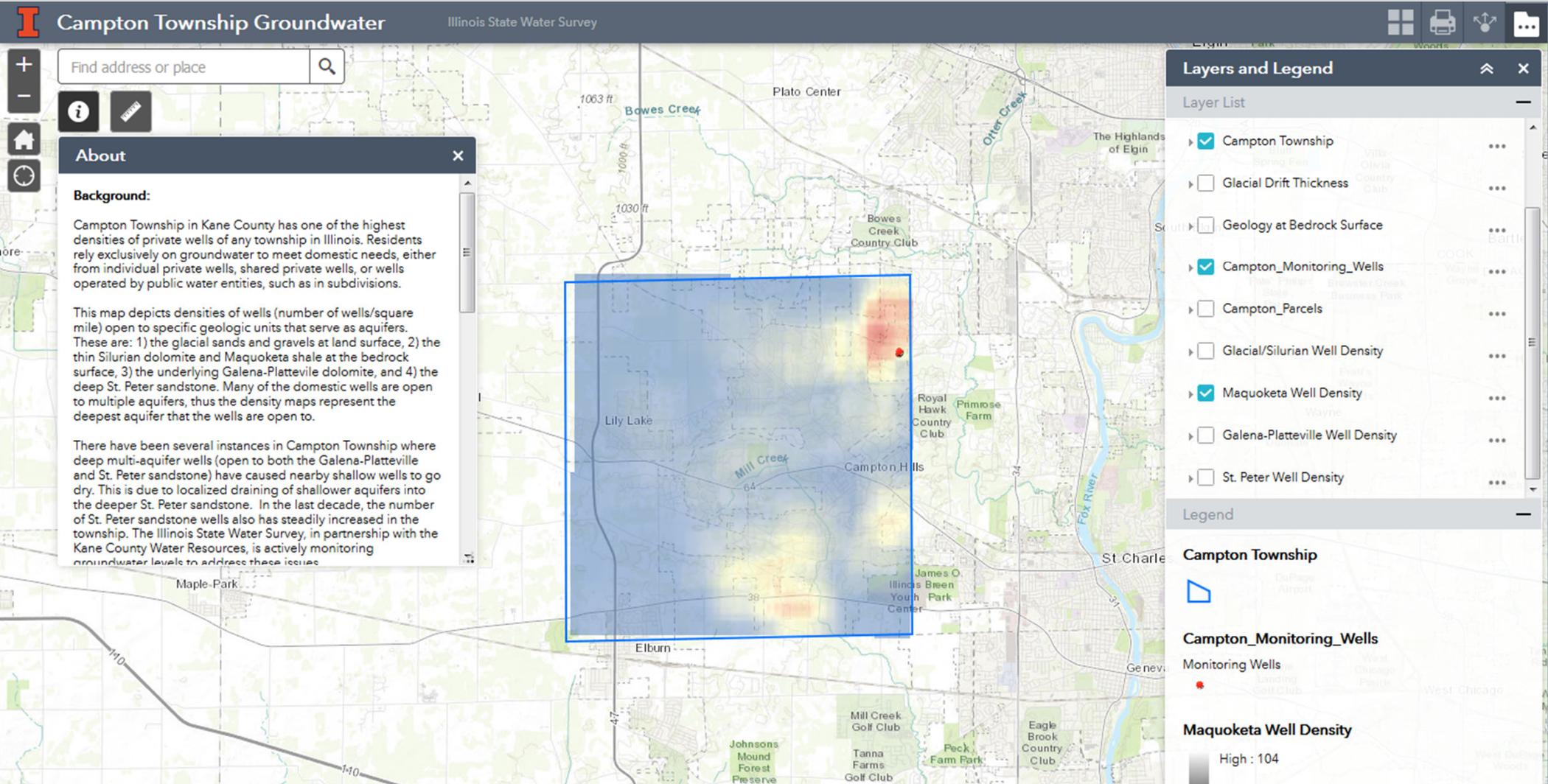
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# Well Density Analysis





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