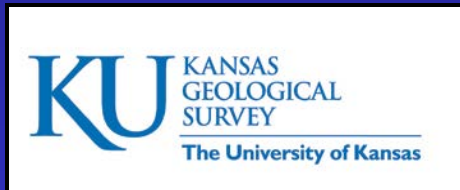


Establishing Kansas as a Data Provider to the NGWMN

National Ground-Water Monitoring Network
Data Providers Meeting
December 6, 2016



Brownie Wilson
Geohydrology Section
Kansas Geological Survey
University of Kansas

A Confession

A little apprehension at the start.

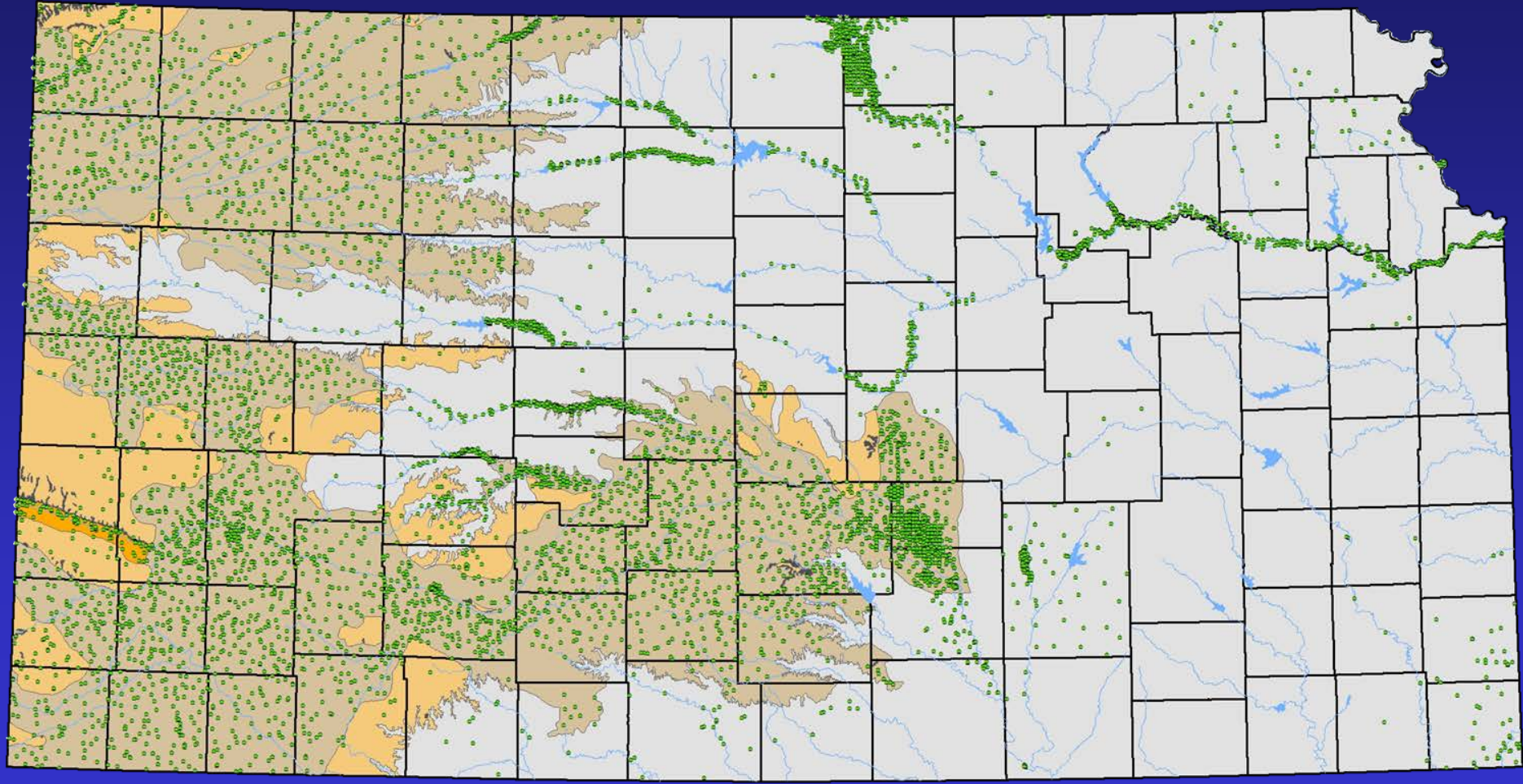
- **Project coming from a federal agency**
- **Forms, acronyms, standards, etc....**



Fears were completely unfounded.

- **Fantastic support**
- **Clearly defined objectives**
- **Tips sheets and examples from other states**

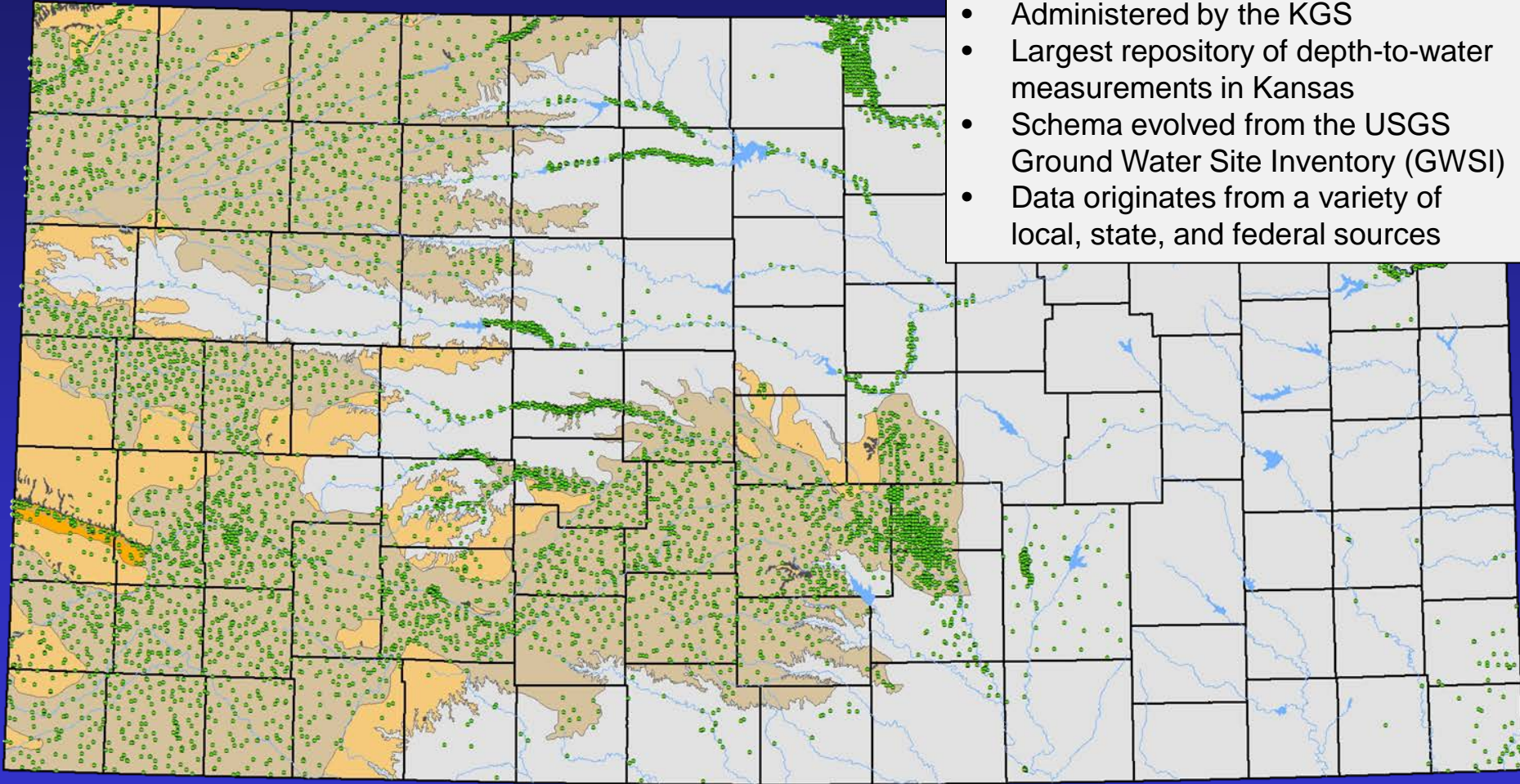
Water Levels



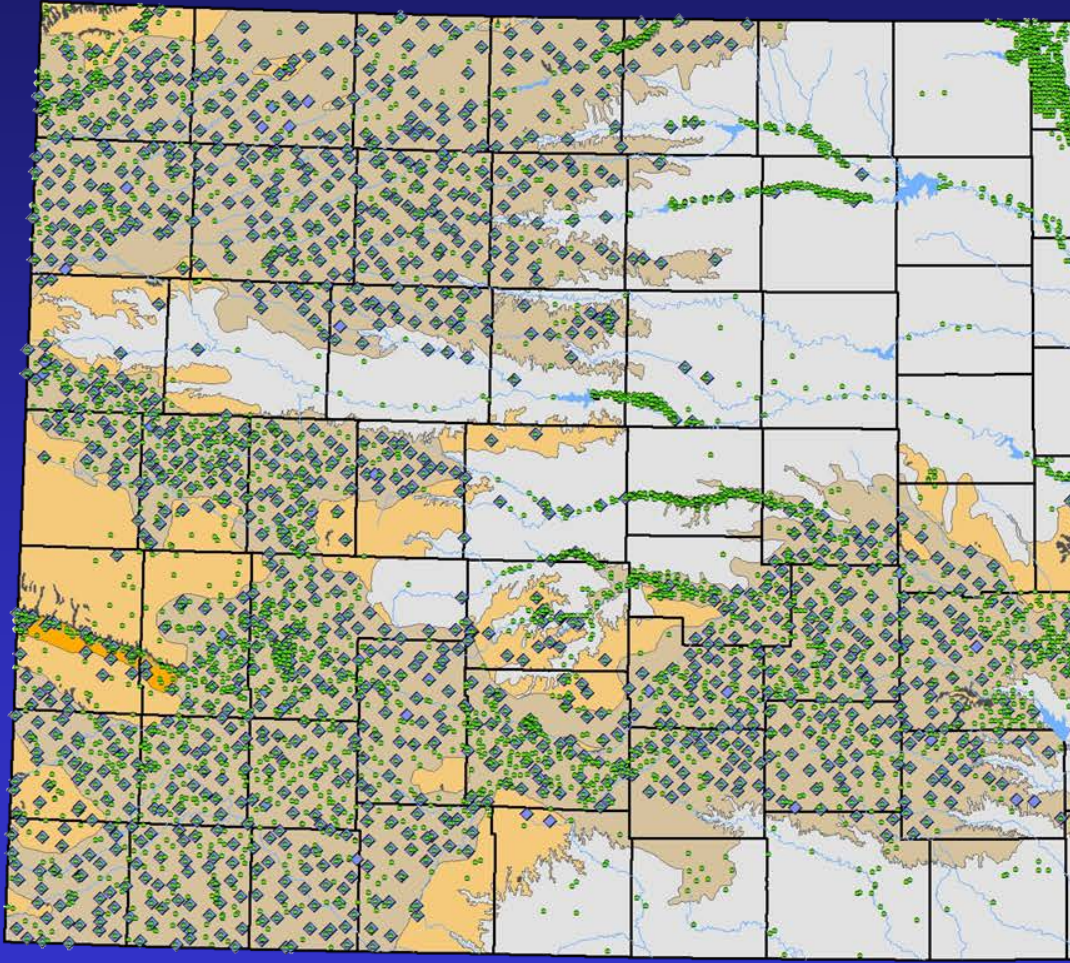
Water Levels- WIZARD

Water Information Storage and Retrieval Database- WIZARD

- Administered by the KGS
- Largest repository of depth-to-water measurements in Kansas
- Schema evolved from the USGS Ground Water Site Inventory (GWSI)
- Data originates from a variety of local, state, and federal sources



Water Levels- Cooperative Water Level Program



Cooperative Water-Level Network

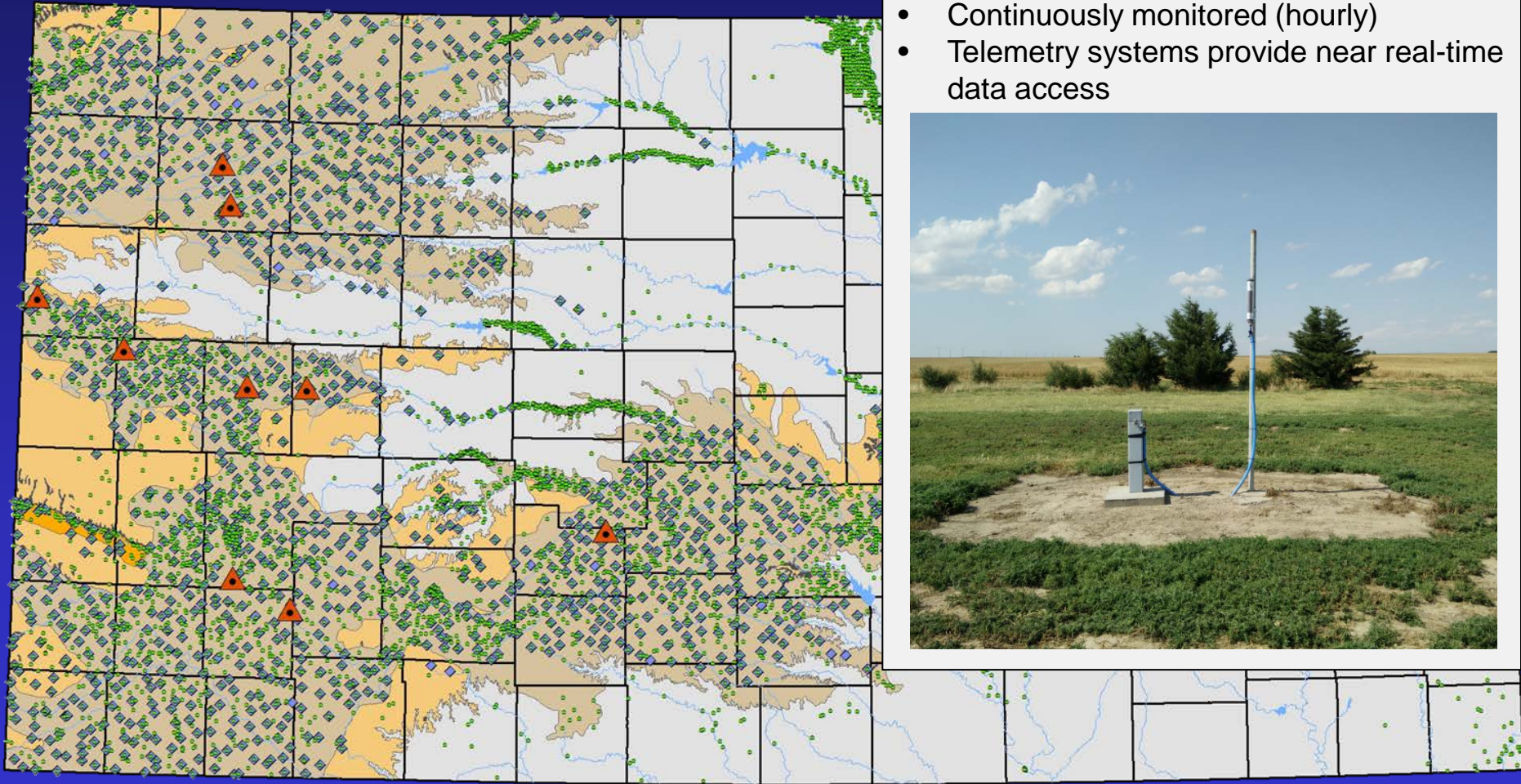
- KGS (administrator) and KS Department of Agriculture, Division of Water Resources
- Network of ~1,400 wells
- Focused on the High Plains Aquifer
- Most are production (irrigation) wells
- Measured annually in the winter
- Lots of control and oversight



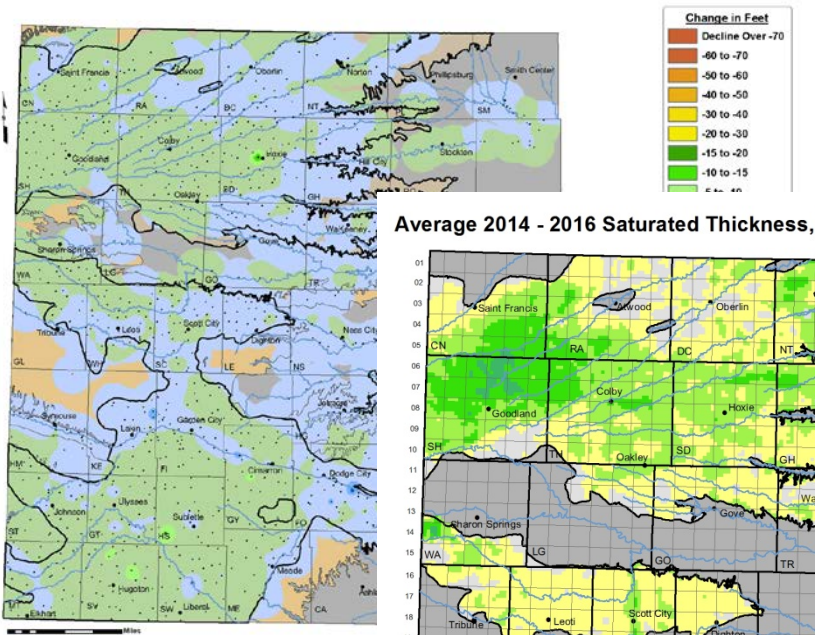
Water Levels- Kansas Index Wells

Kansas Index Well Program

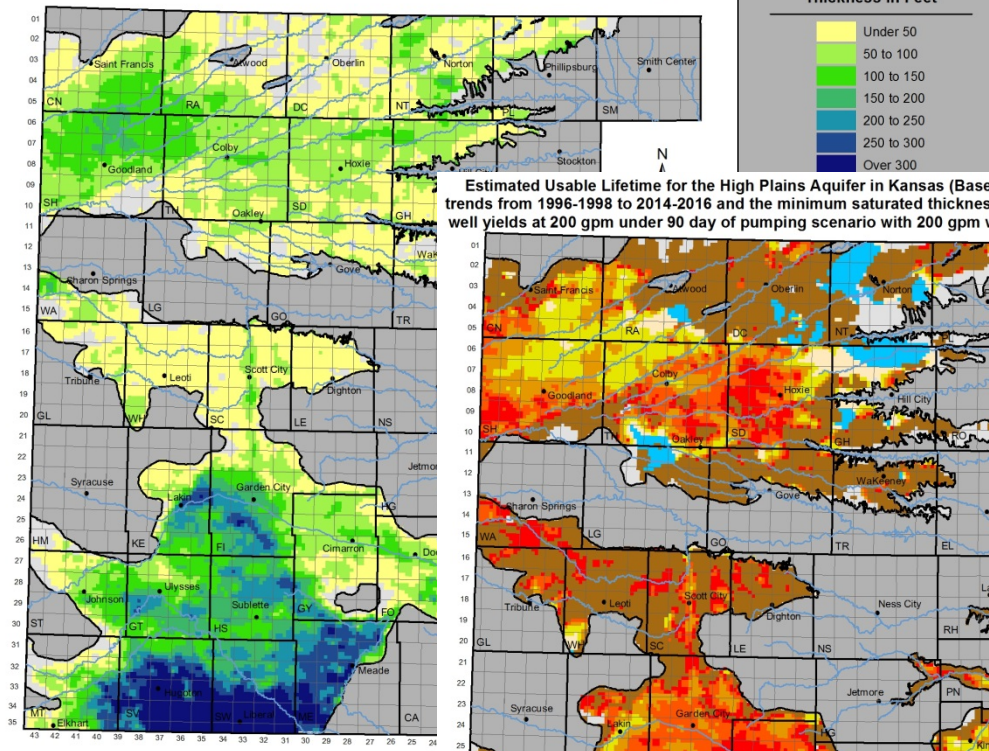
- True observation wells
- Continuously monitored (hourly)
- Telemetry systems provide near real-time data access



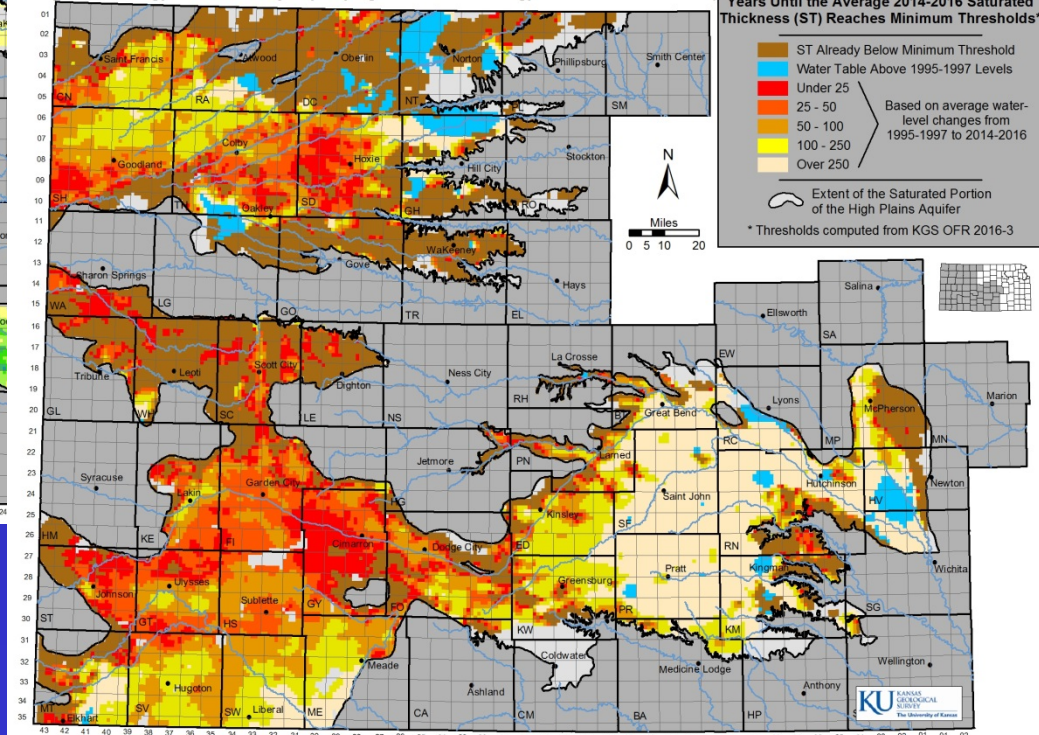
Water Levels- Applications



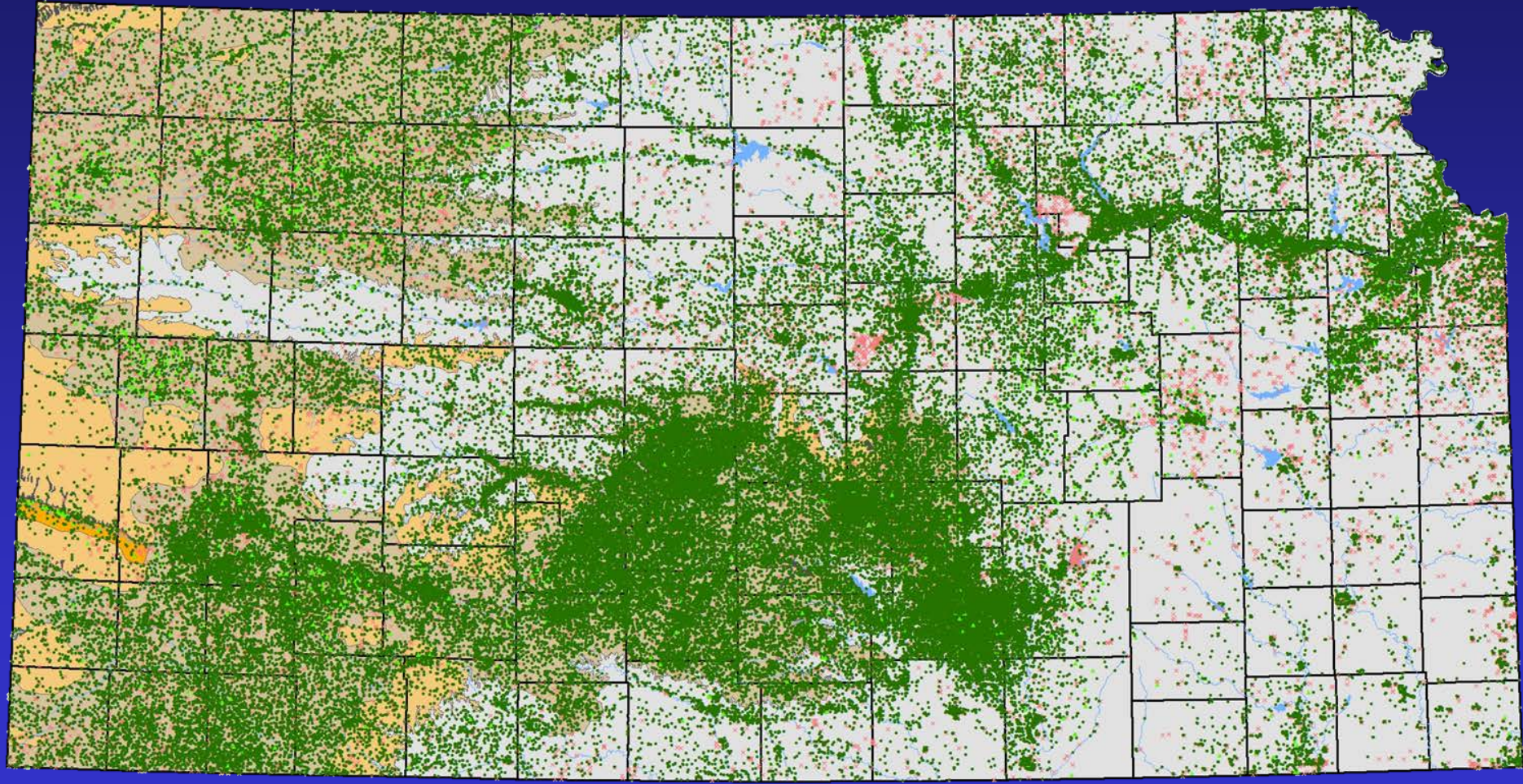
Average 2014 - 2016 Saturated Thickness, Kansas High Plains Aquifer



Estimated Usable Lifetime for the High Plains Aquifer in Kansas (Based on ground-water trends from 1996-1998 to 2014-2016 and the minimum saturated thickness required to support well yields at 200 gpm under 90 day of pumping scenario with 200 gpm wells on 1/4 sections)



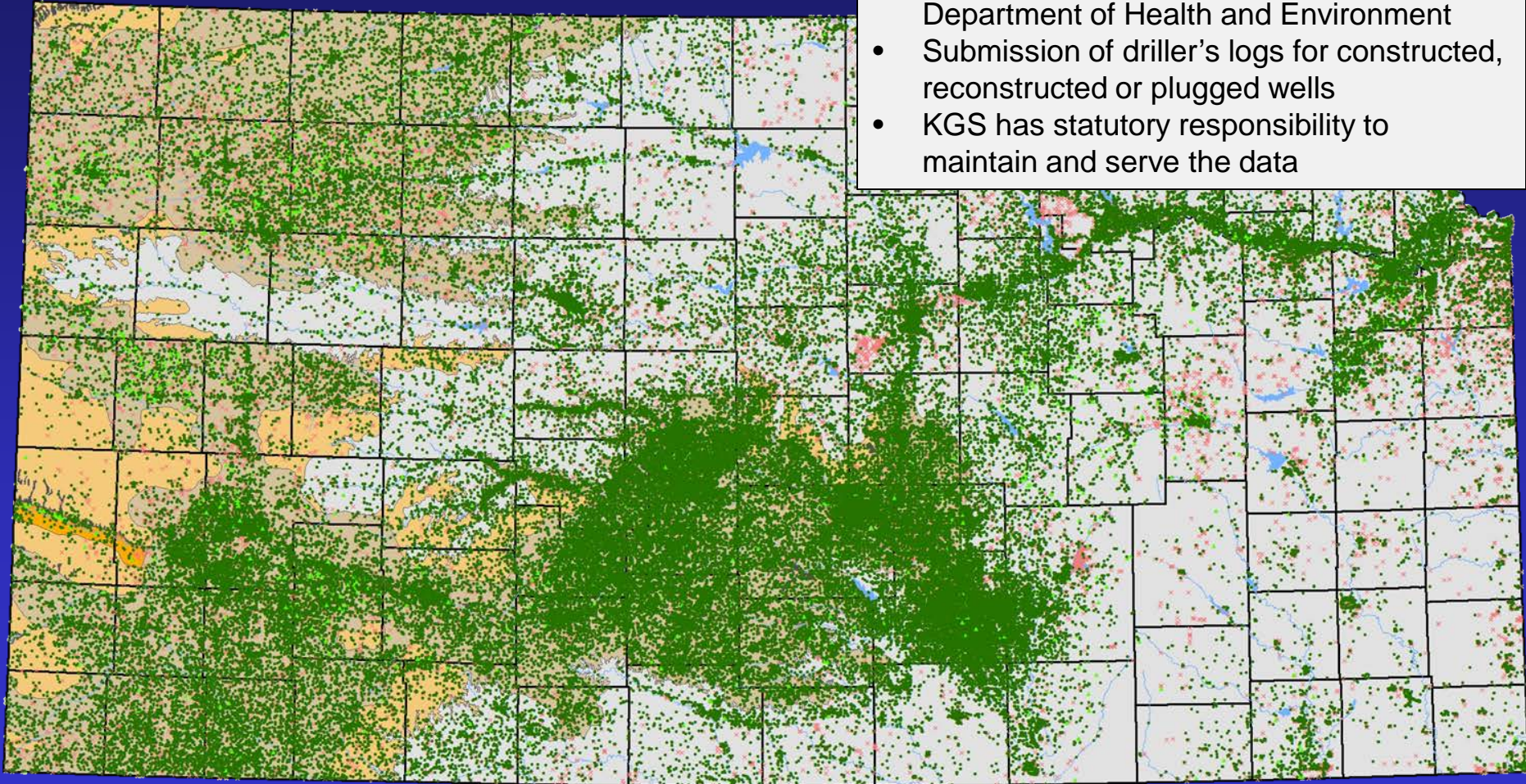
Lithology



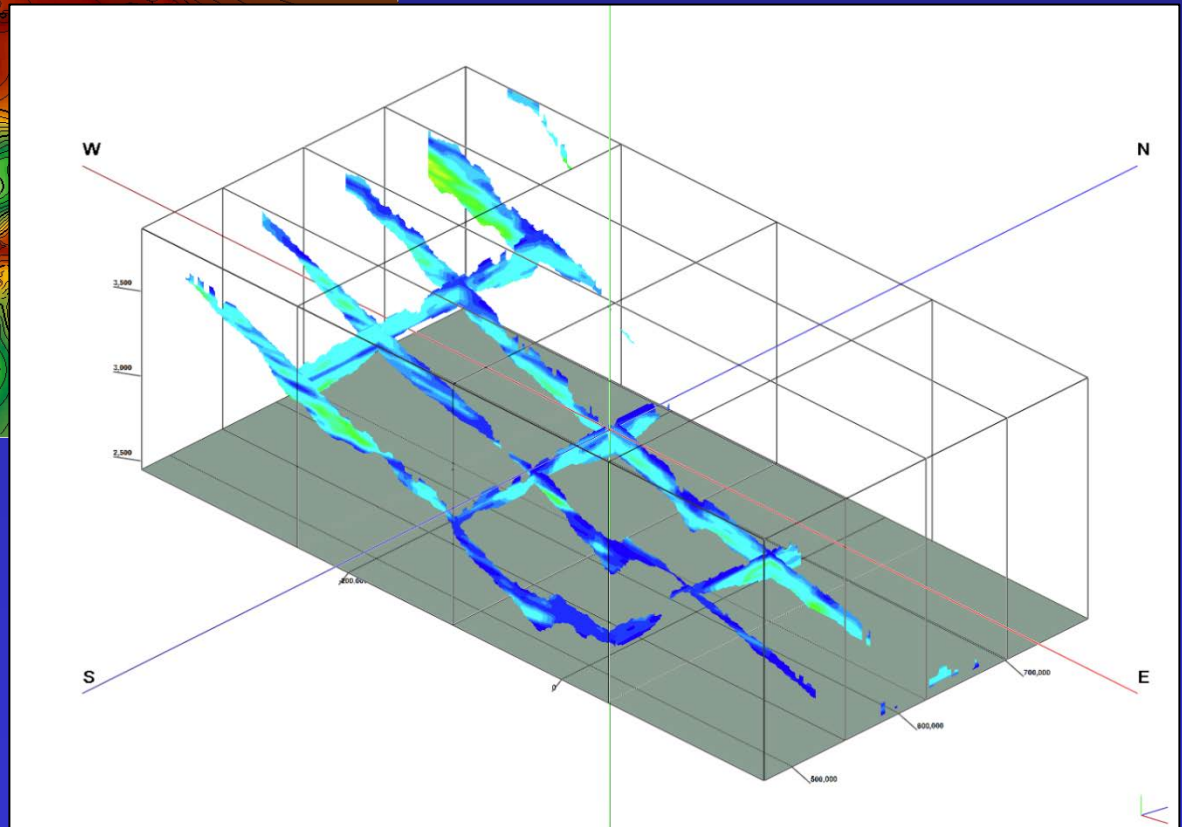
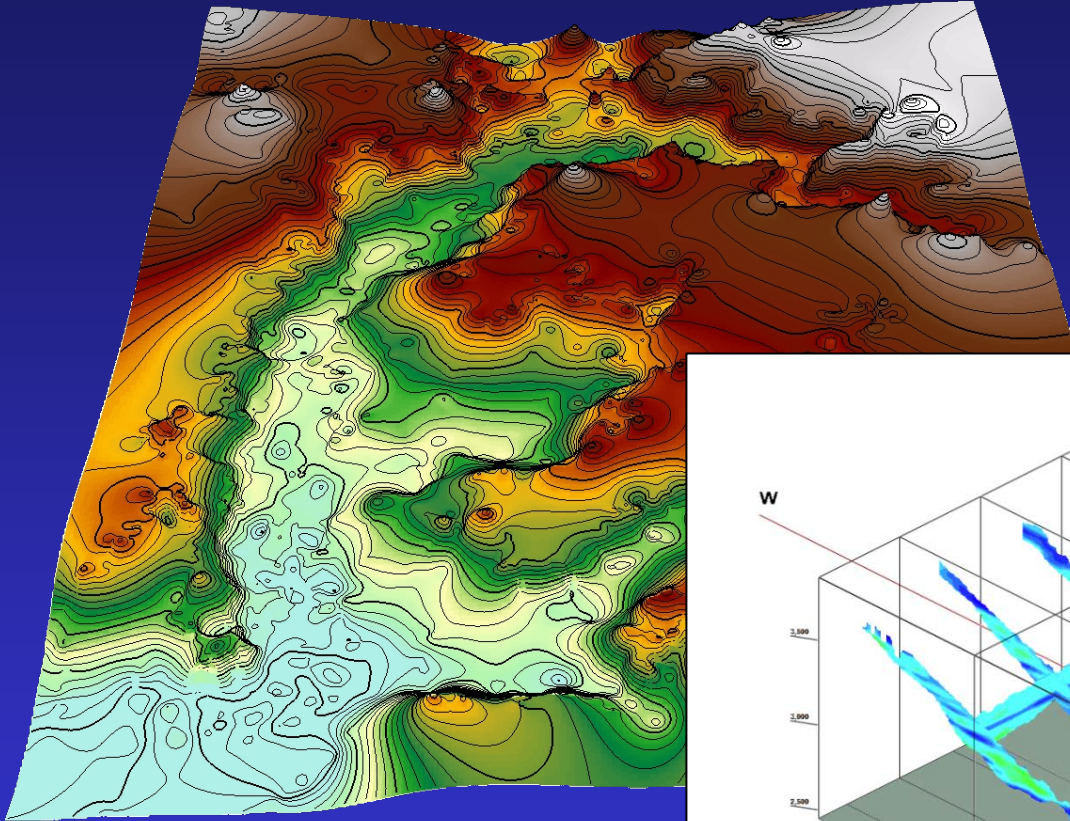
Lithology- Water Well Completion Records

Water Well Completion Records (WWC5)

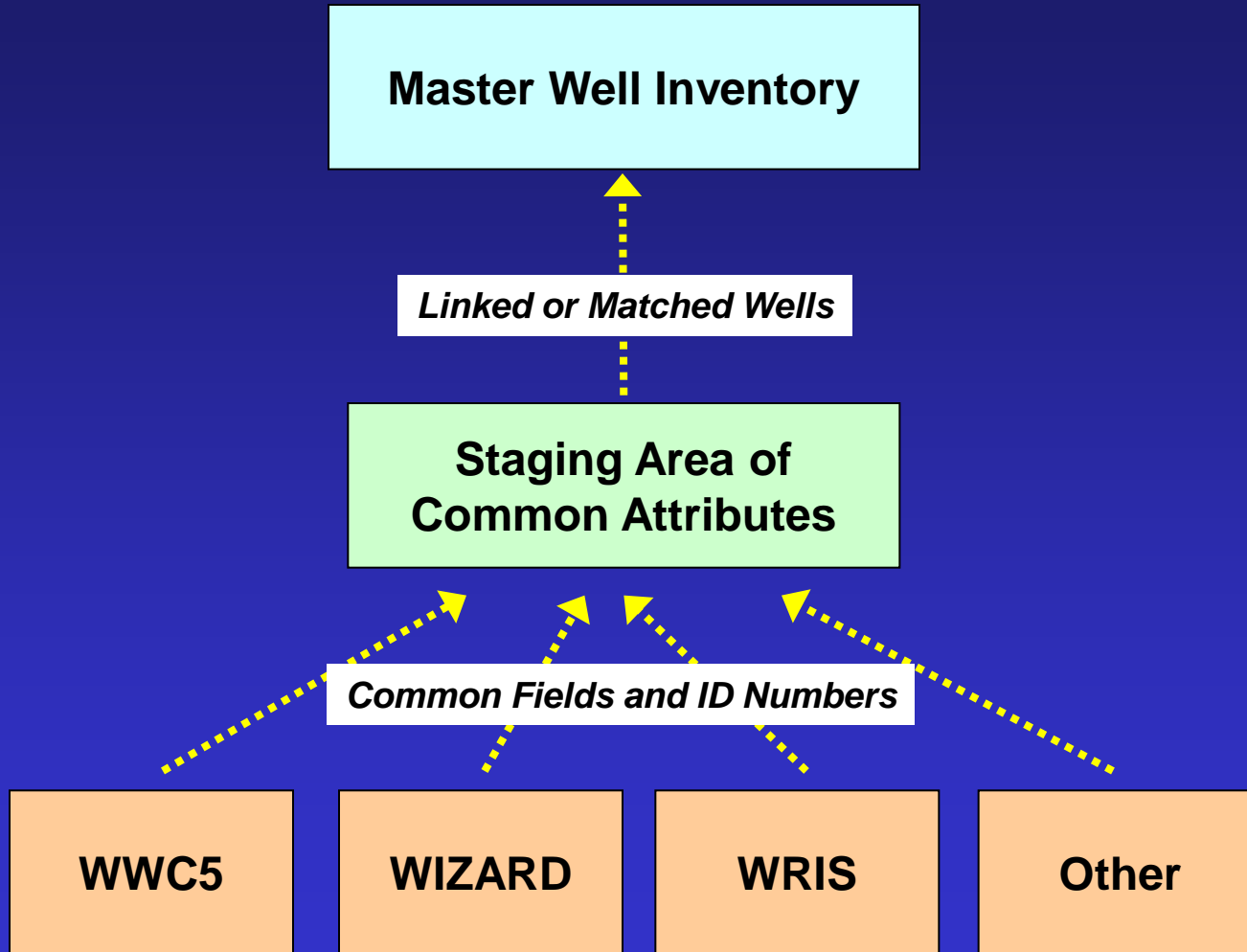
- Required since 1975 by the Kansas Department of Health and Environment
- Submission of driller's logs for constructed, reconstructed or plugged wells
- KGS has statutory responsibility to maintain and serve the data



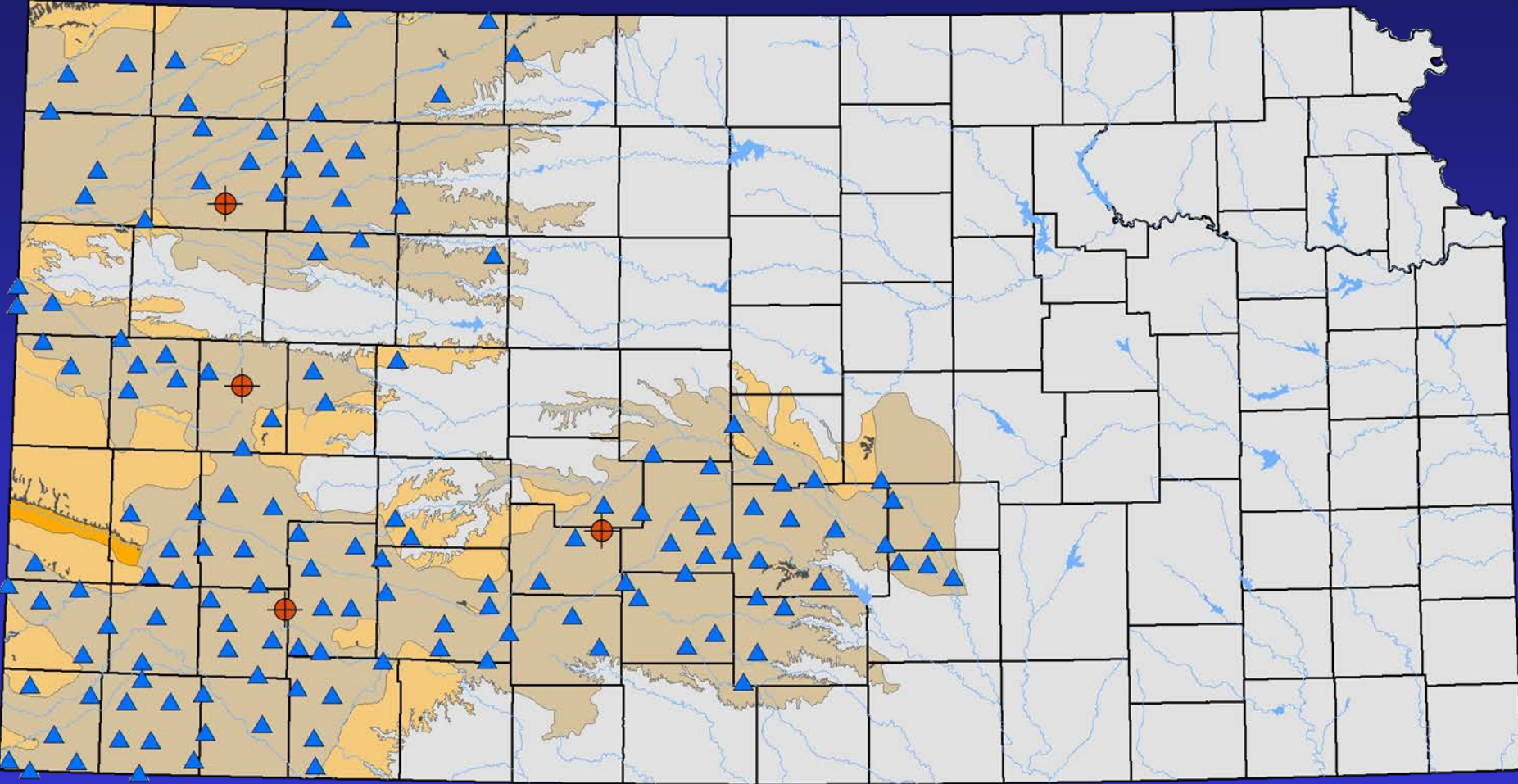
Lithology- Applications



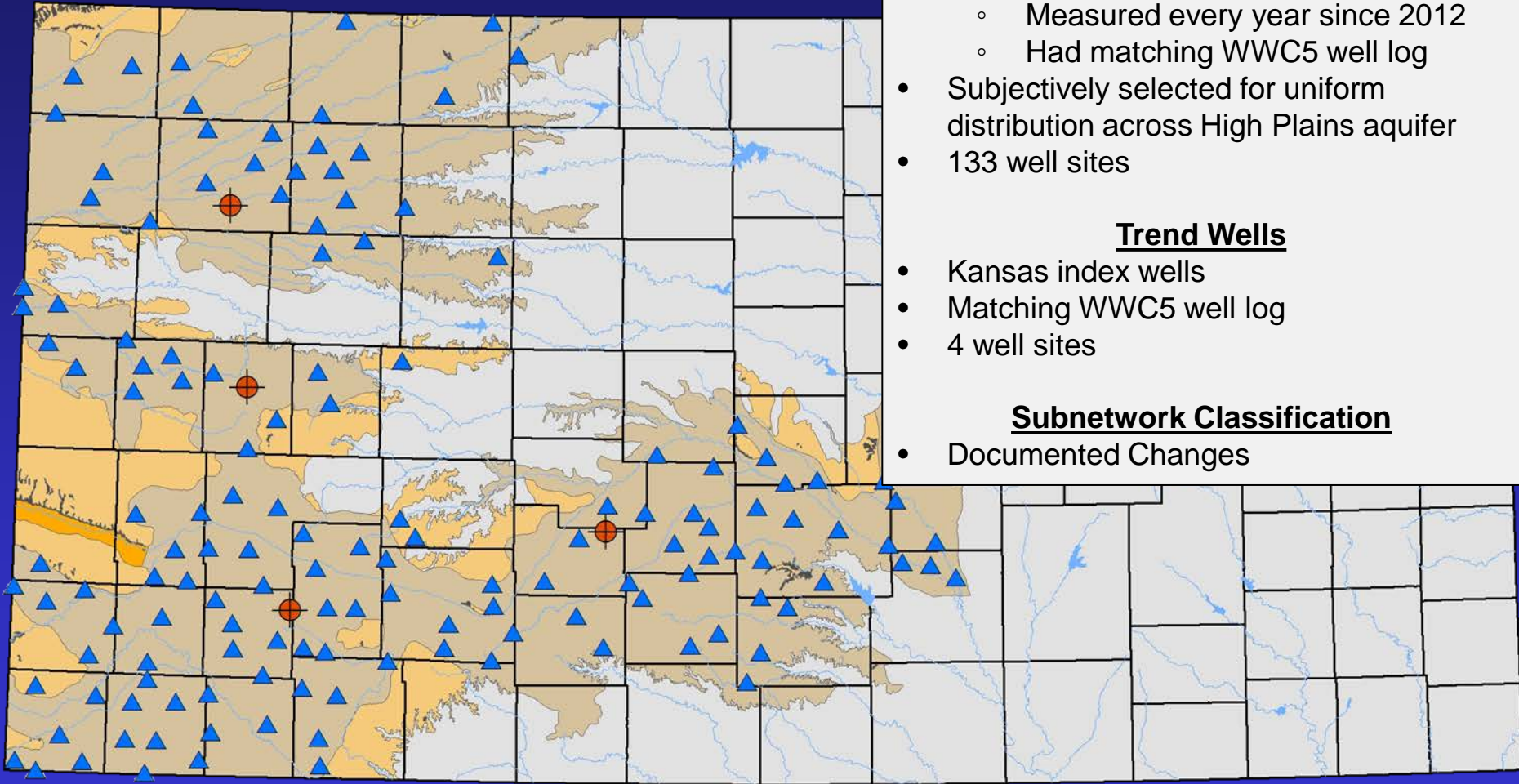
Kansas Master Well Inventory



NGWMN Site Selection



NGWMN Site Selection



Surveillance Wells

- Kansas Cooperative Network
 - Measured every year since 2012
 - Had matching WWC5 well log
- Subjectively selected for uniform distribution across High Plains aquifer
- 133 well sites

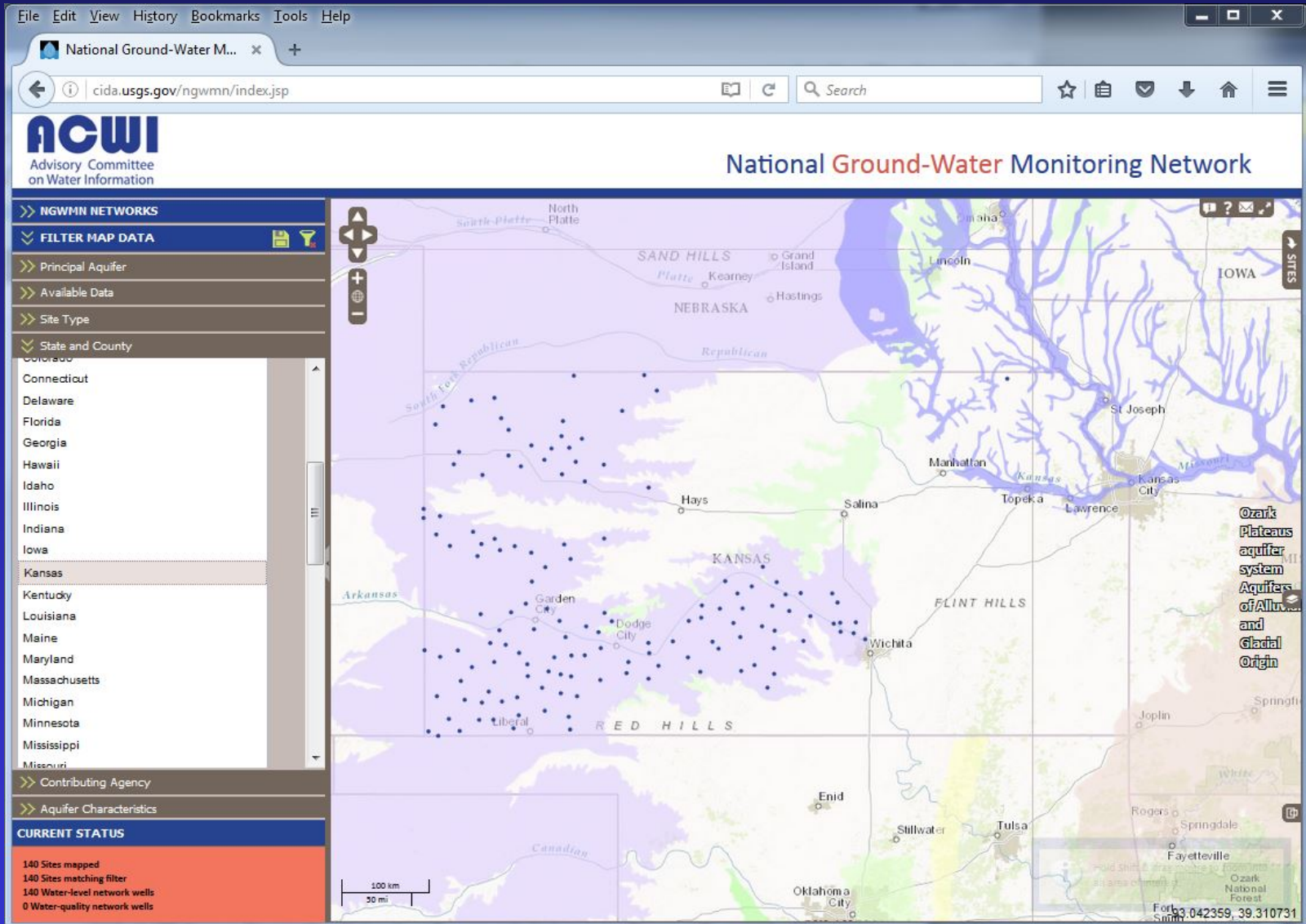
Trend Wells

- Kansas index wells
- Matching WWC5 well log
- 4 well sites

Subnetwork Classification

- Documented Changes

Snapshot of Kansas NGWMN Sites



Kansas Web Services to the NGWMN

- **Developed as an Adobe Coldfusion component**
 - **Seamless integration of existing SQL queries**
 - **Real-time data access to Oracle-based tables**
- **Stored on replicated Apache web servers**
- **One file with URL-based variables to specify the web service/method and well(s) to be selected**

<http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=WaterLevels&sites=371237100455301>

<http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Lithology&sites=371237100455301>

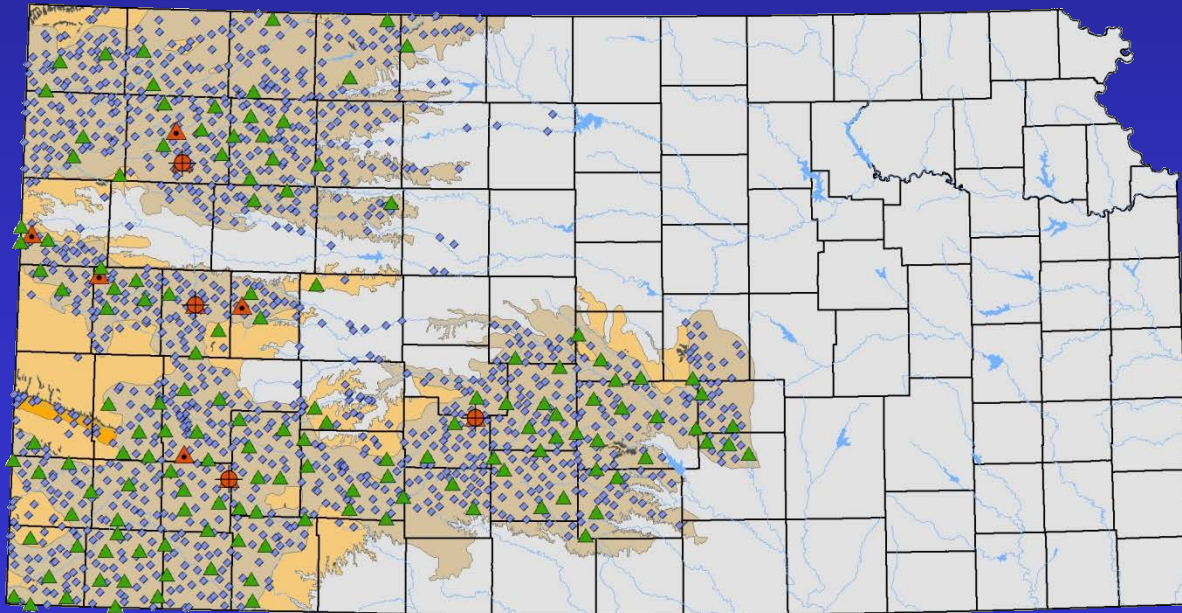
<http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Casing&sites=371237100455301>

<http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Screens&sites=371237100455301>

- **Returns a XML formatted document**

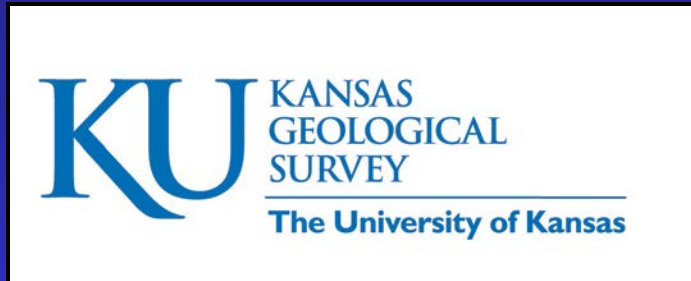
Future Plans

- Update the NGWMN well registry with changes from the 2017 Cooperative Water Level run
- Populate NGWMN well registry with new Index/Trend wells
- Review additional possible site locations based on minimum data standards and spatial distribution



Questions????

**Kansas Geological Survey
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Lawrence, KS 66047
785-864-2118**



Visit our site at
<http://www.kgs.ku.edu>