

States Panel on Extreme Event Preparedness and the Need for Solid Data in Decision Making



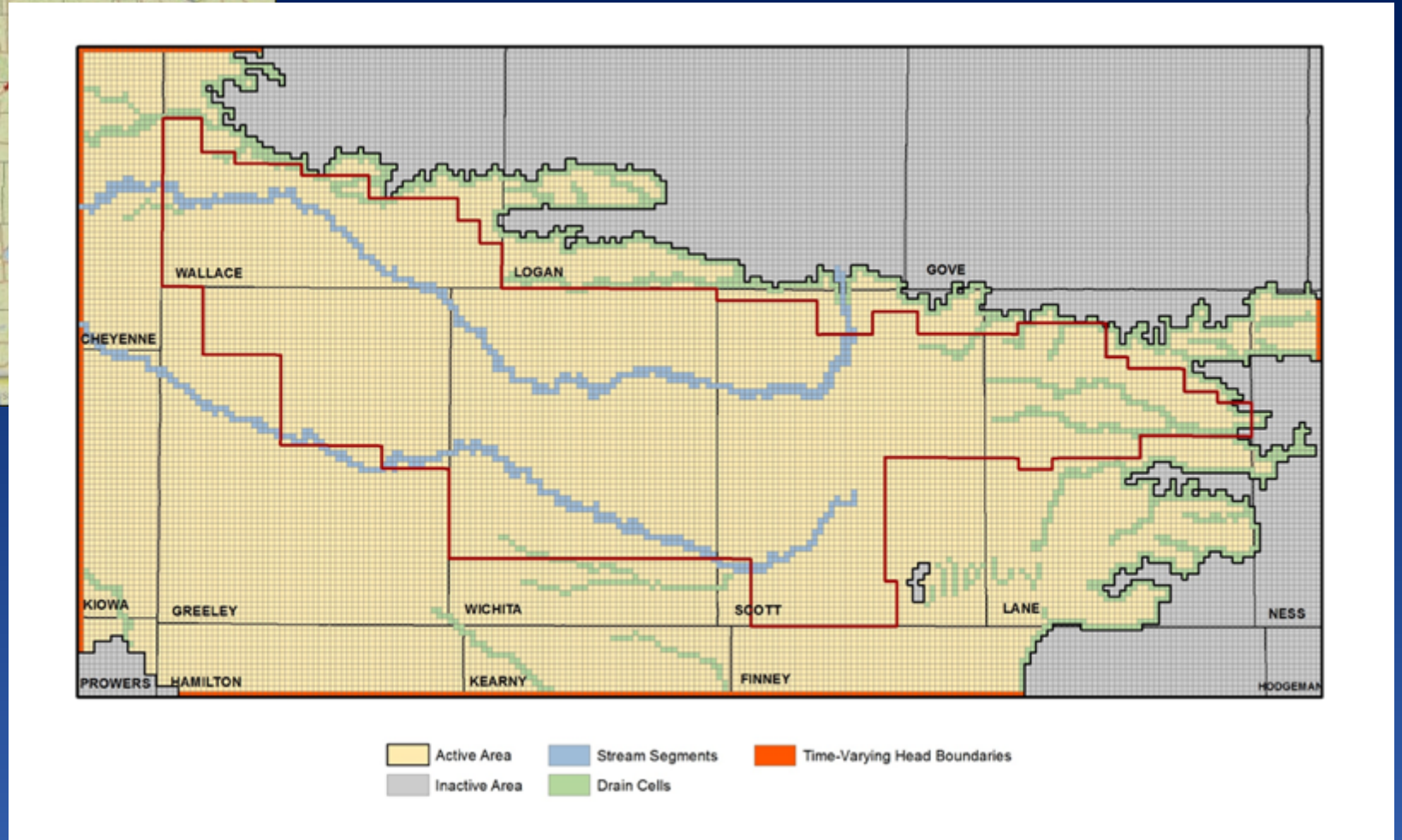
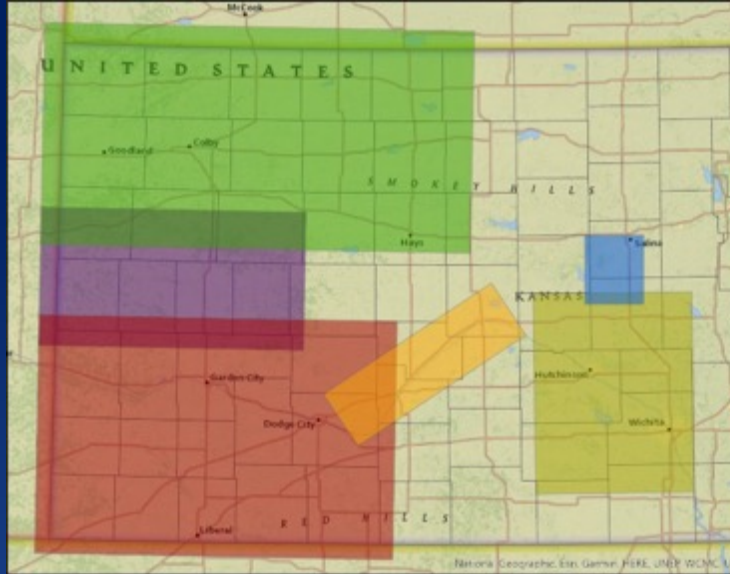
Brownie Wilson
Kansas Geological Survey
University of Kansas

A Kansas Groundwater View on Extreme Event Preparedness and the Need for Solid Data in Decision Making



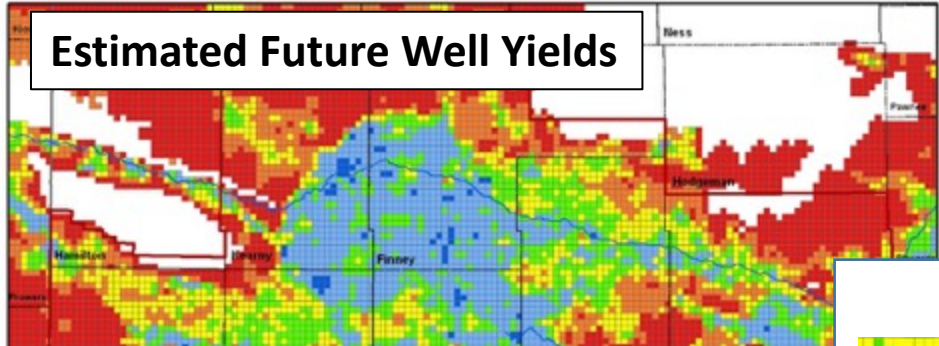
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A Key Tool for Water Decision in Kansas- Groundwater Models

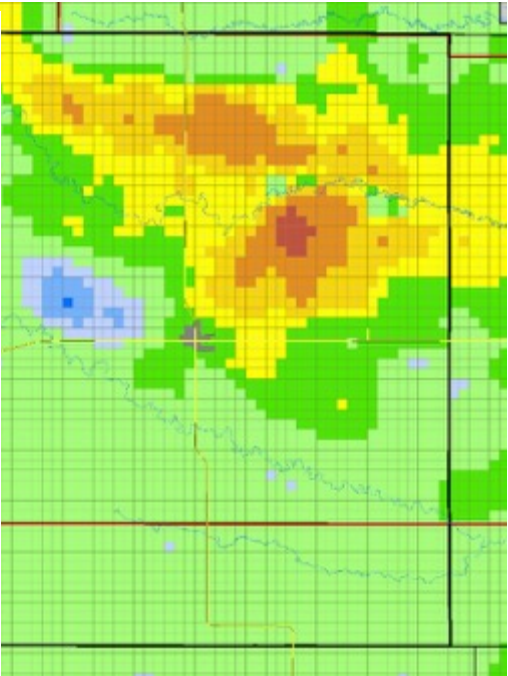


Groundwater Models

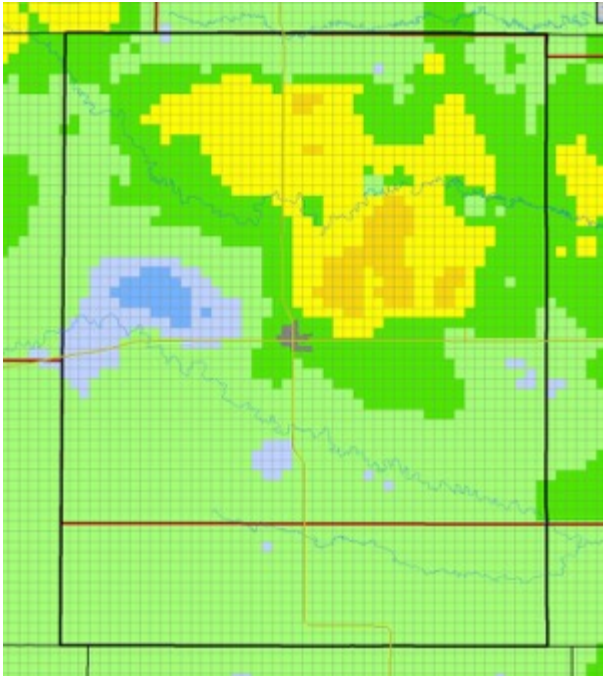
Estimated Future Well Yields



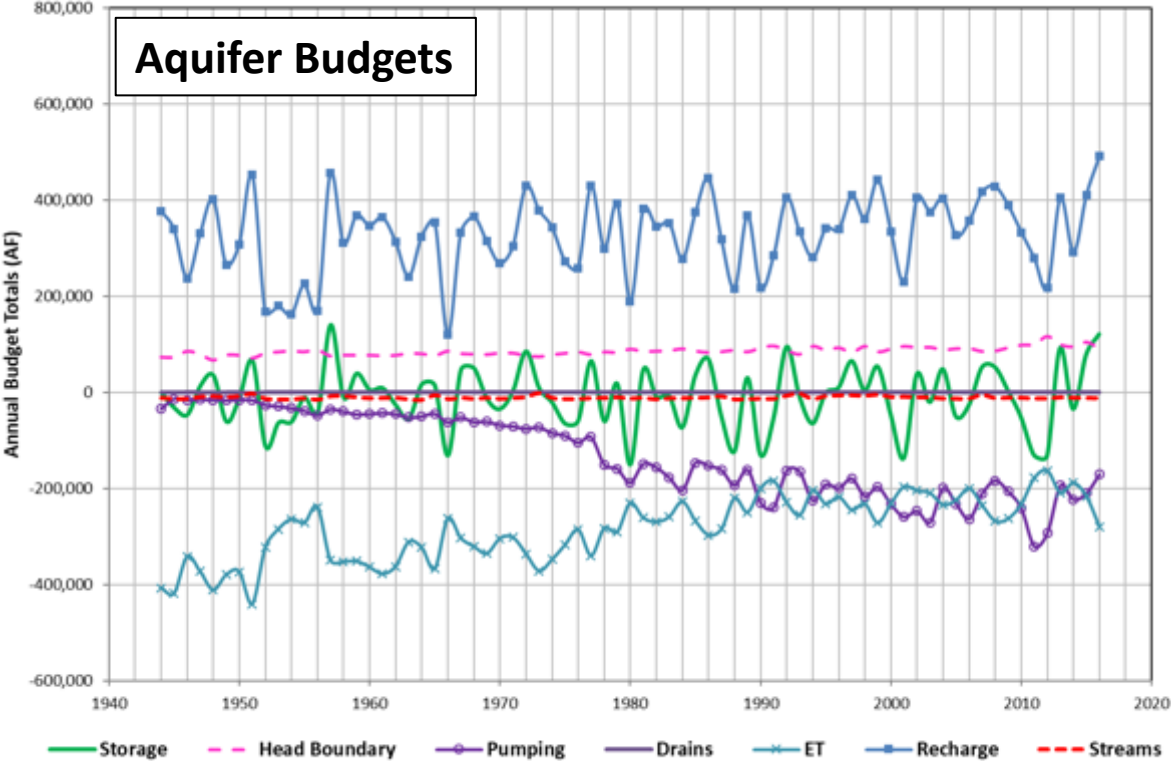
No Change Scenario



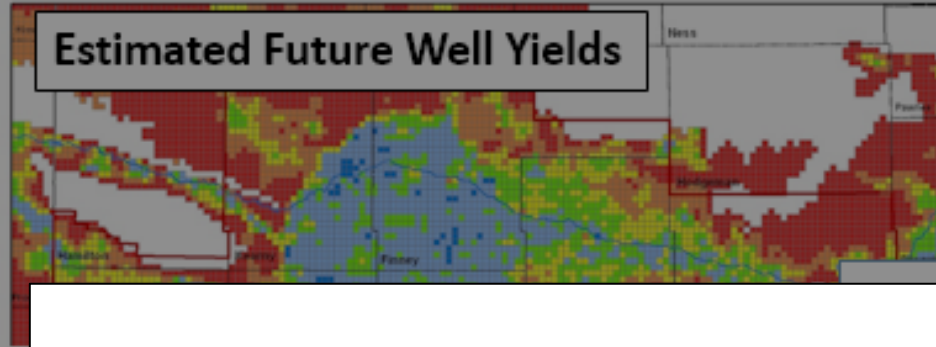
90% Participation



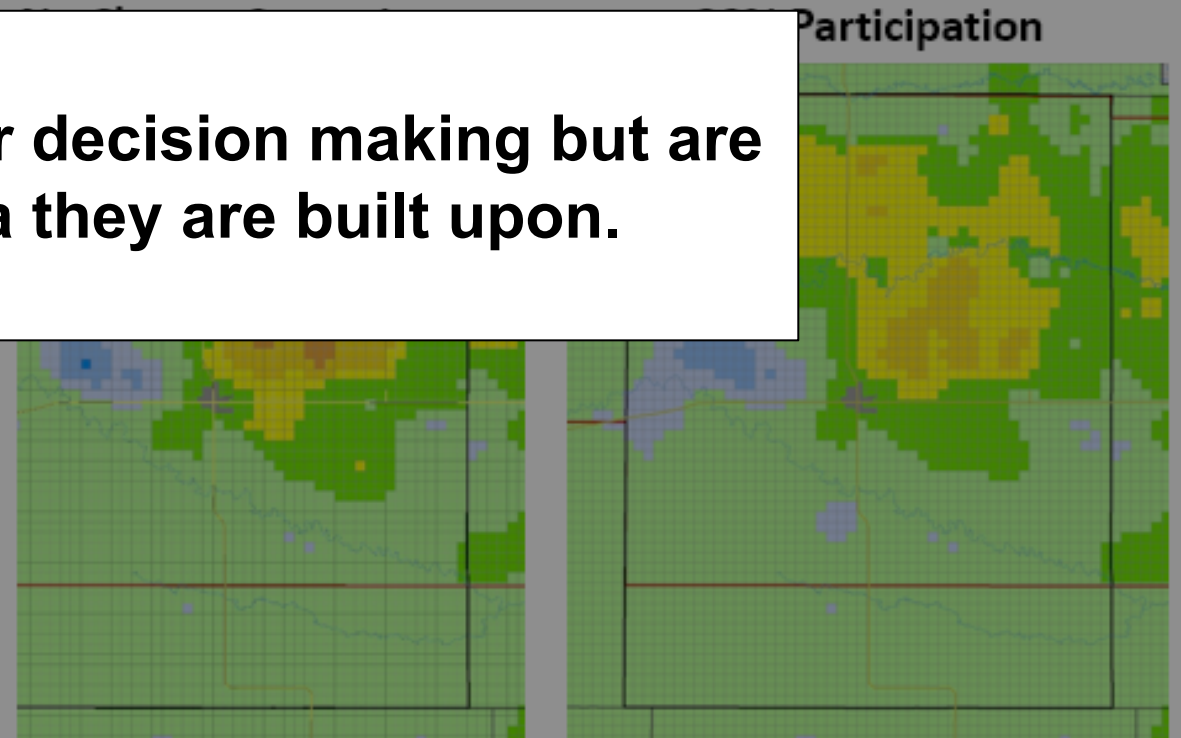
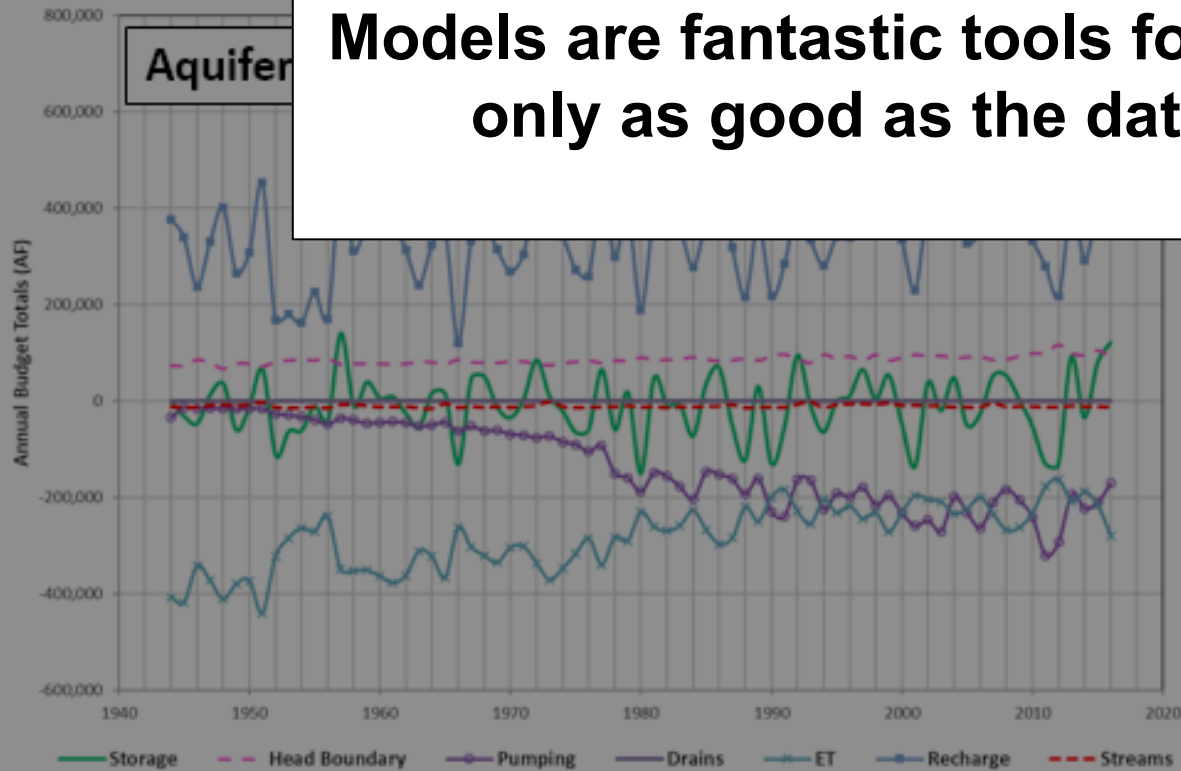
Aquifer Budgets



Groundwater Models

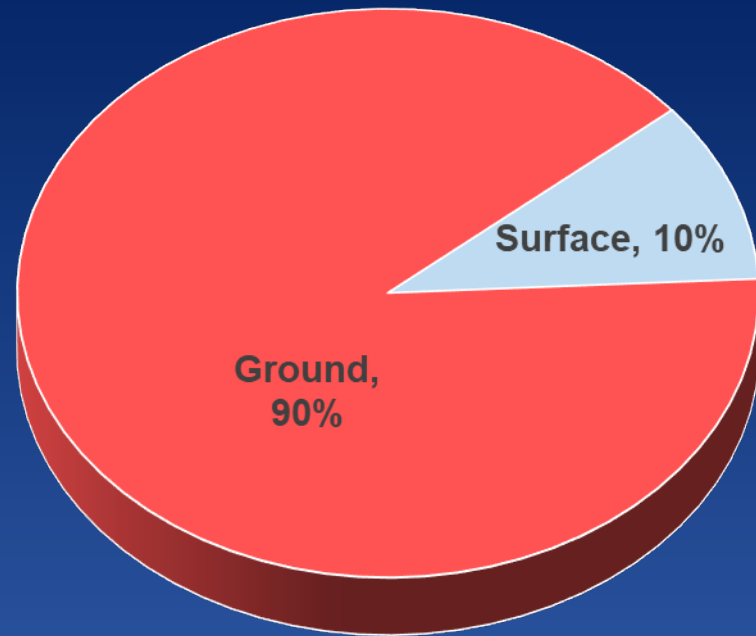


Models are fantastic tools for decision making but are only as good as the data they are built upon.



Kansas is very data-rich in terms of groundwater databases

Average Reported Source of Supply, Kansas, 2009 to 2018



- Kansas does not have a single water agency
- Multiple agencies, each with their own database
- Kansas well repositories:
 - Well construction and lithology
 - Measured depth to water
 - Water rights
- Publicly available via the KGS website (<http://www.kgs.ku.edu/>)

WWC5- Well Construction and Lithology

- Water Well Completion Records
- Kansas Department of Health and Environment
- KGS directed, by statute, to serve and maintain the data
- WWC5 forms are required for any constructed, reconstructed, or plugged well in Kansas since 1975



WWC5- Data Applications

KOLAR Document ID: 1524050

WATER WELL RECORD Form WWC-5

☒ Original Record ☐ Correction ☐ Change in Well Use

Division of Water Resources App. No. _____ Well ID _____

1 LOCATION OF WATER WELL:

County: Sherman Fraction NE ¼ SE ¼ NE ¼ NE ¼ Section Number 5 Township Number T 8 S Range Number R 38 E 4 W

2 WELL OWNER: Last Name: Bedore First: Dustin & Bailey Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here: ☐
 Address: 8794 Road 27 Road 27 and Road 68
 City: Goodland State: KS ZIP: 67735

3 LOCATE WELL WITH "X" IN SECTION BOX:

N
 -- NW -- NE --
 W -- SW -- SE --
 S
 1 mile

4 DEPTH OF COMPLETED WELL: 255 ft.
 Depth(s) Groundwater Encountered: 1) 185 ft.
 2) 185 ft. 3) 185 ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: 185 ft.
☒ below land surface, measured on (mo-day-yr) 7/16/2020
☐ above land surface, measured on (mo-day-yr) _____
 Pump test data: Well water was _____ ft. _____ gpm
 after _____ hours pumping
 Well water was _____ ft. _____ gpm
 after _____ hours pumping
 Estimated Yield: 35 gpm
 Bore Hole Diameter: 8 in. to 255 ft. and _____ in. to _____ ft.

5 Latitude: 39.39233 (decimal degrees)
Longitude: 101.577966 (decimal degrees)
 Datum: ☒ WGS 84 ☐ NAD 83 ☐ NAD 27
 Source for Latitude/Longitude:
☐ GPS (unit make model: _____)
 (WAAS enabled? ☐ Yes ☐ No)
☐ Land Survey ☐ Topographic Map
☐ Online Mapper

6 Elevation: 3551 ft. ☒ Ground Level ☐ TOC
 Source: ☐ Land Survey ☐ GPS ☐ Topographic Map
☒ Other KOLAR

7 WELL WATER TO BE USED AS:

1. Domestic: ☒ Household ☐ Lawn & Garden ☐ Livestock ☐ Irrigation ☐ Feedlot ☐ Industrial
 5. ☐ Public Water Supply: well ID _____
 6. ☐ Dewatering: how many wells? _____
 7. ☐ Aquifer Recharge: well ID _____
 8. ☐ Monitoring: well ID _____
 9. Environmental Remediation: well ID _____
☐ Air Sparge ☐ Soil Vapor Extraction ☐ Recovery ☐ Injection
 10. ☐ Oil Field Water Supply: lease _____
 11. Test Hole: well ID _____
☐ Cased ☐ Uncased ☐ Geotechnical
 12. Geothermal: how many bores? _____
 a) Closed Loop ☐ Horizontal ☐ Vertical
 b) Open Loop ☐ Surface Discharge ☐ Inj. of Water
 13. ☐ Other (specify): _____

Was a chemical/bacteriological sample submitted to KDHE? ☐ Yes ☒ No If yes, date sample was submitted: _____
 Water well disinfected? ☒ Yes ☐ No

8 TYPE OF CASING USED: ☐ Steel ☒ PVC ☐ Other _____ CASING JOINTS: ☒ Glued ☐ Clamped ☐ Welded ☐ Threaded
 Casing diameter 4.5 in. to 255 ft. Diameter _____ in. to _____ ft. Diameter _____ in. to _____ ft.
 Casing height above land surface 18 in. Weight 2.38 lbs./ft. Wall thickness or gauge No. .237

TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☒ PVC ☐ Other (Specify) _____
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous Slot ☐ Mill Slot ☐ Gauze Wrapped ☐ Torch Cut ☐ Drilled Holes ☐ Other (Specify) _____
☐ Louvered Shutter ☐ Key Punched ☐ Wire Wrapped ☒ Saw Cut ☐ None (Open Hole)

SCREEN-PERFORATED INTERVALS: From 215 ft. to 255 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.
GRAVEL PACK INTERVALS: From 25 ft. to 255 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.

9 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☒ Bentonite ☐ Other _____
 Grout Intervals: From 0 ft. to 25 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.

Nearest source of possible contamination: ☒ No potential source of contamination within 200 ft.
☐ Septic Tank ☐ Lateral Lines ☐ Pit Privy ☐ Livestock Pens ☐ Insecticide Storage
☐ Sewer Lines ☐ Cess Pool ☐ Sewage Pileup ☐ Fuel Storage ☐ Abandoned Water Well
☐ Watertight Sewer Lines ☐ Leaky Pit ☐ Feedyard ☐ Fertilizer Storage ☐ On Well Gas Well
☐ Other (Specify) _____

Direction from well: _____ Distance from well: _____ ft.

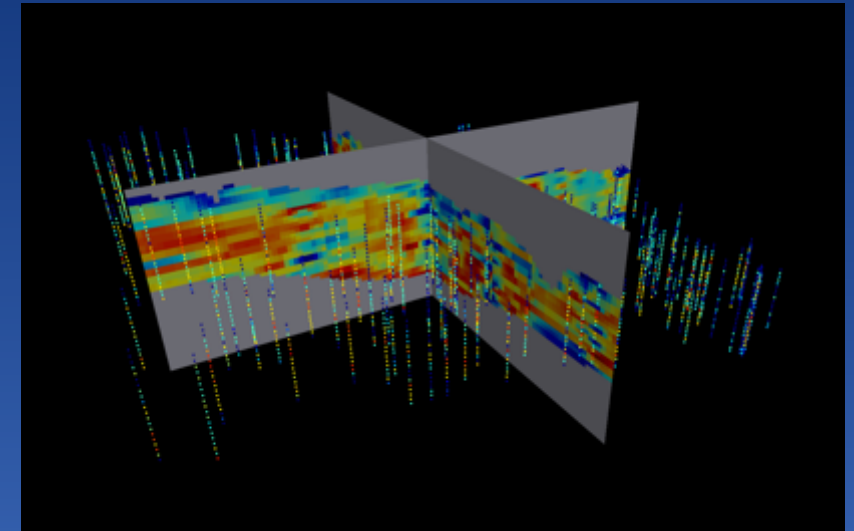
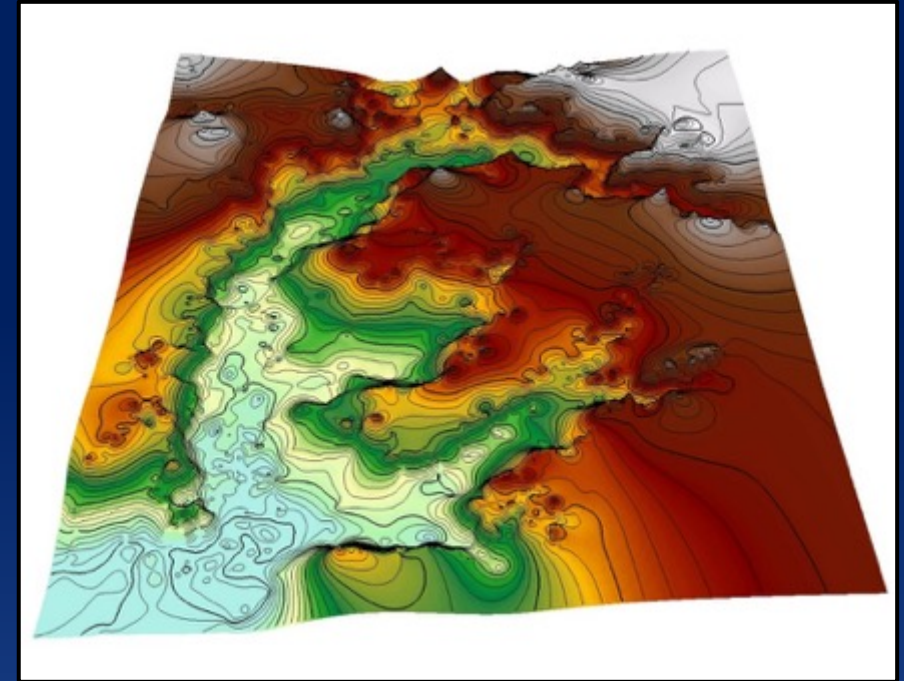
10 FROM TO LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) or PLUGGING INTERVALS

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	2	Surface	209	236	Fine to some medium sand with cemented
2	12	Loess	236	245	Fine and medium sand
12	36	Clay	245	255	Yellow Ochre/Black Shale
36	70	Clay with caliche lenses			
70	78	Fine and medium sand with clay and caliche			
78	161	Clay and caliche with sand streaks			
161	182	Fine to some medium sand			
182	196	Cemented sand with sand lenses			
196	209	Fine to some medium sand			

Notes:

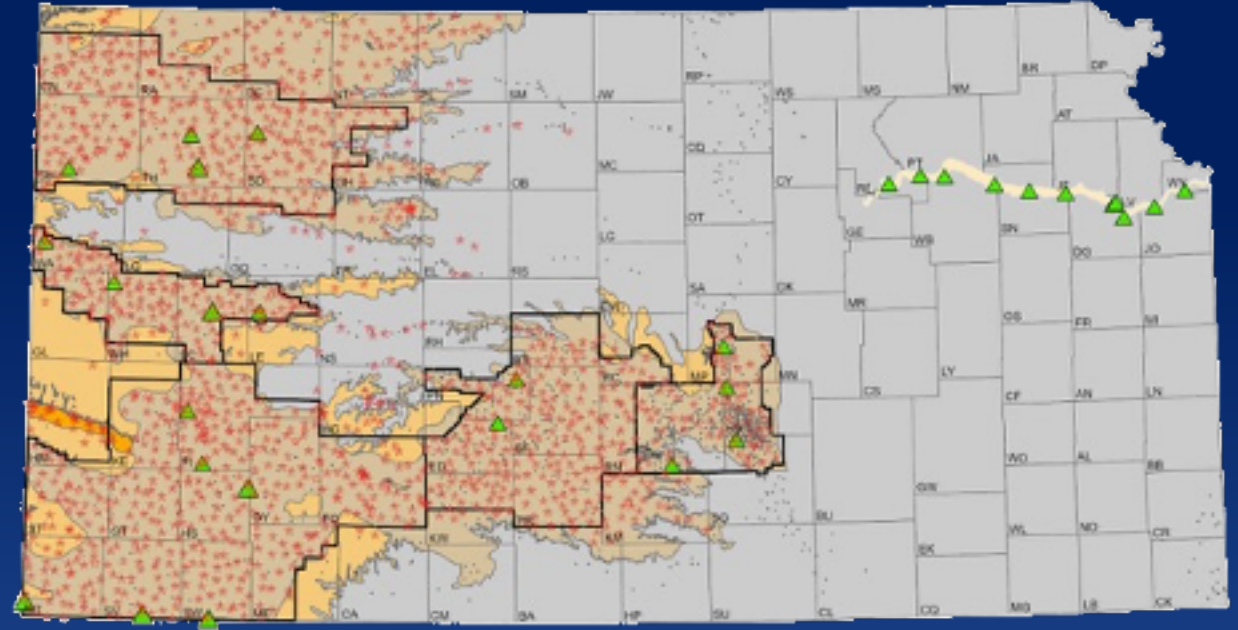
11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☒ constructed, ☐ reconstructed, or ☐ plugged under _____ jurisdiction and was completed on (mo-day-yr) 07/16/2020 and this record is true to the best of my knowledge and belief.
 Kansas Water Well Contractor's License No. 881 This Water Well Record was completed on (mo-day-yr) 07/16/2020
 under the business name of: Wooster Pump & Well, Inc. #881

Send one copy of this WATER WELL OWNER and retain one for your records. Fee of \$5.00 for each completed well.
 KS Department of Health and Environment, Bureau of Water, 1000 SW Jackson St., 6th Floor, Topeka, Kansas 66612-1367. Telephone 785-296-3565.
 Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212

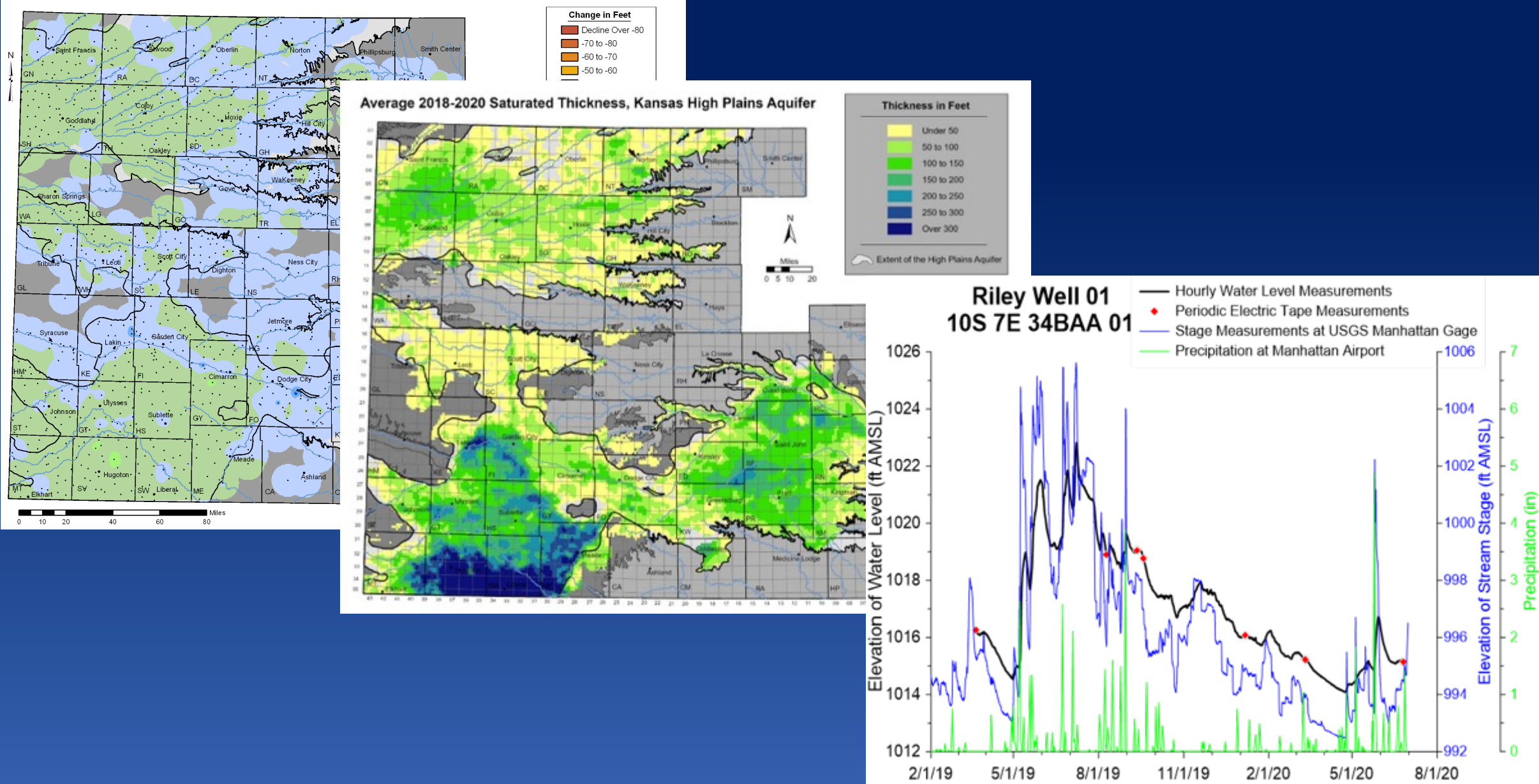


WIZARD- Depth to water measurements

- Water Information Storage and Retrieval Database
- Kansas Geological Survey
- State's largest repository of depth-to-water measurements
- Data collected from local, state, and federal sources

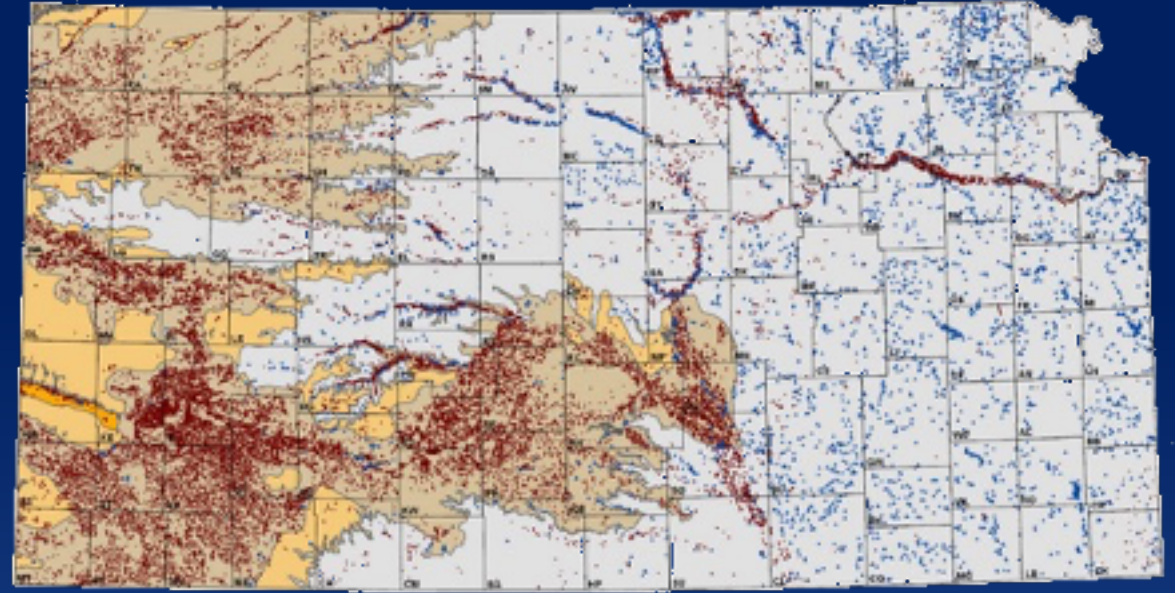


WIZARD- Data Applications

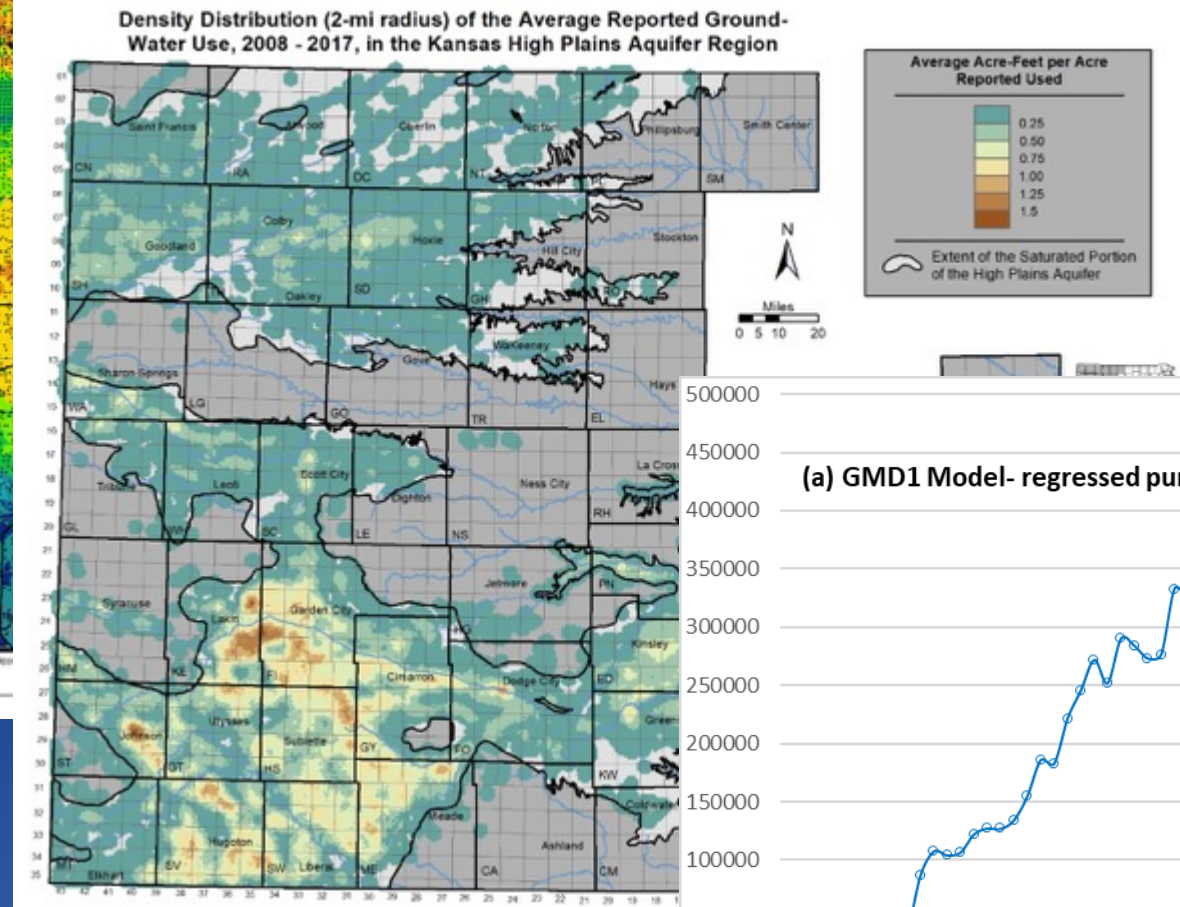
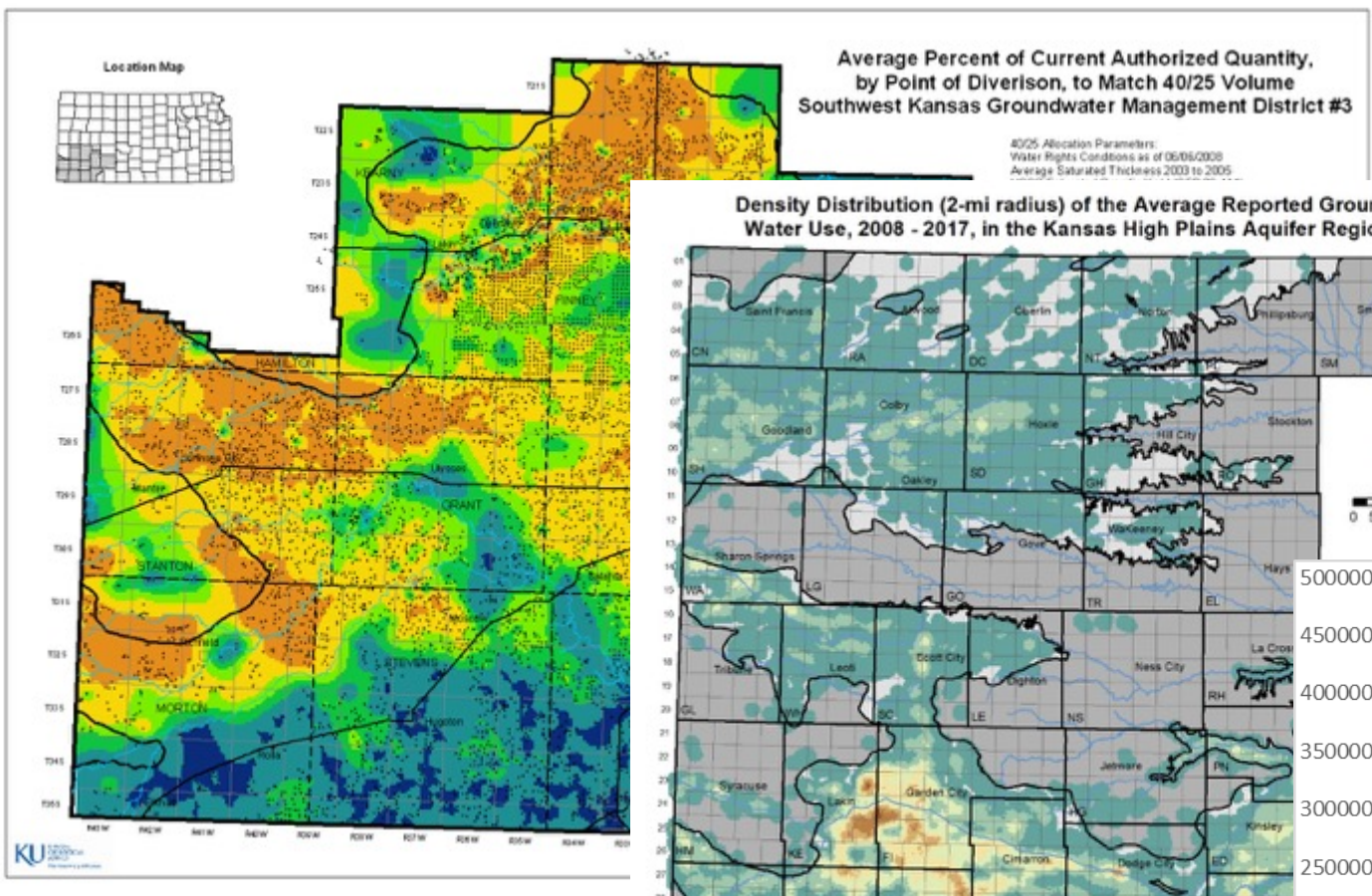


WIMAS - Water Rights

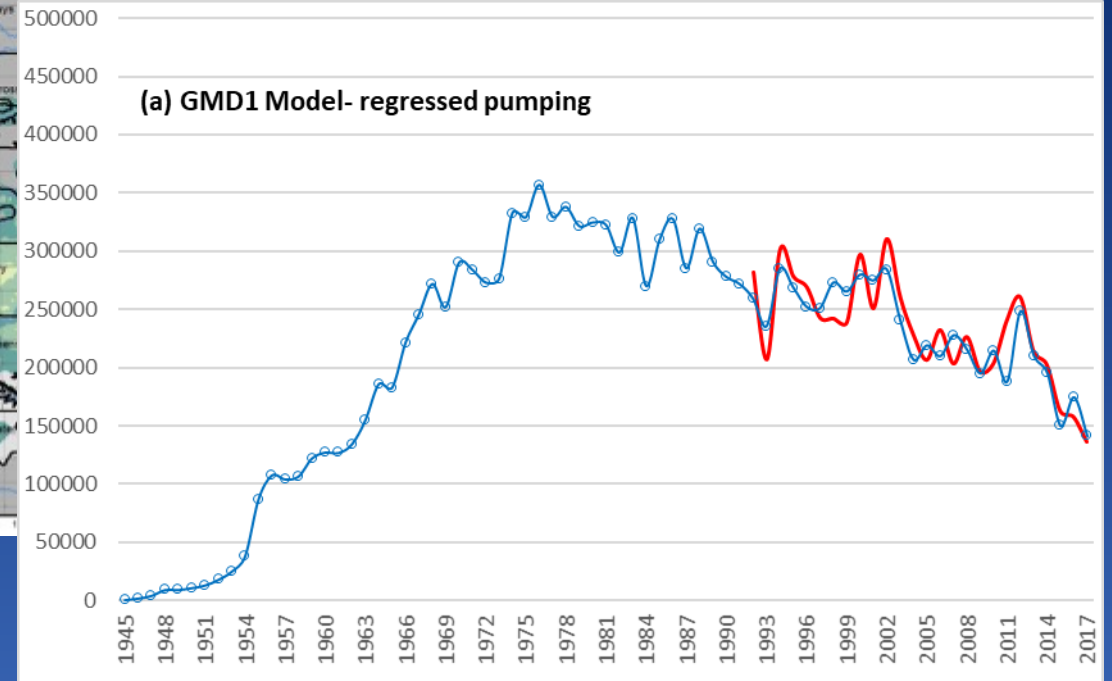
- Water Information Management and Analysis System
- Kansas Department of Agriculture, Division of Water Resources
- Permits/Certificates to use water
- Water rights can be exceptionally complex
 - Typically large uses (domestic excluded)
 - Diversions include both ground and surface water
 - Authorized annual quantities and rates
 - Reported water usage



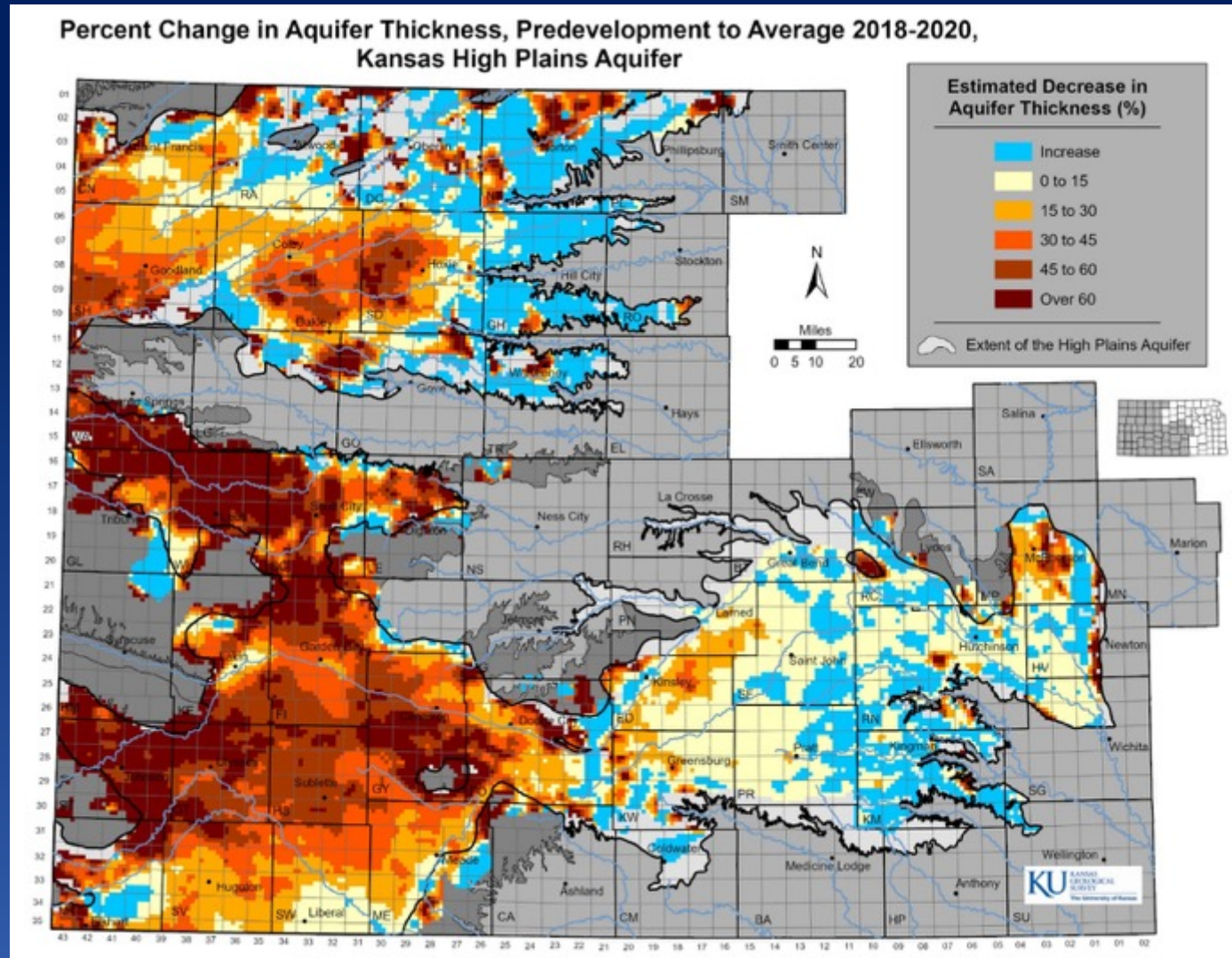
WIMAS- Data Uses



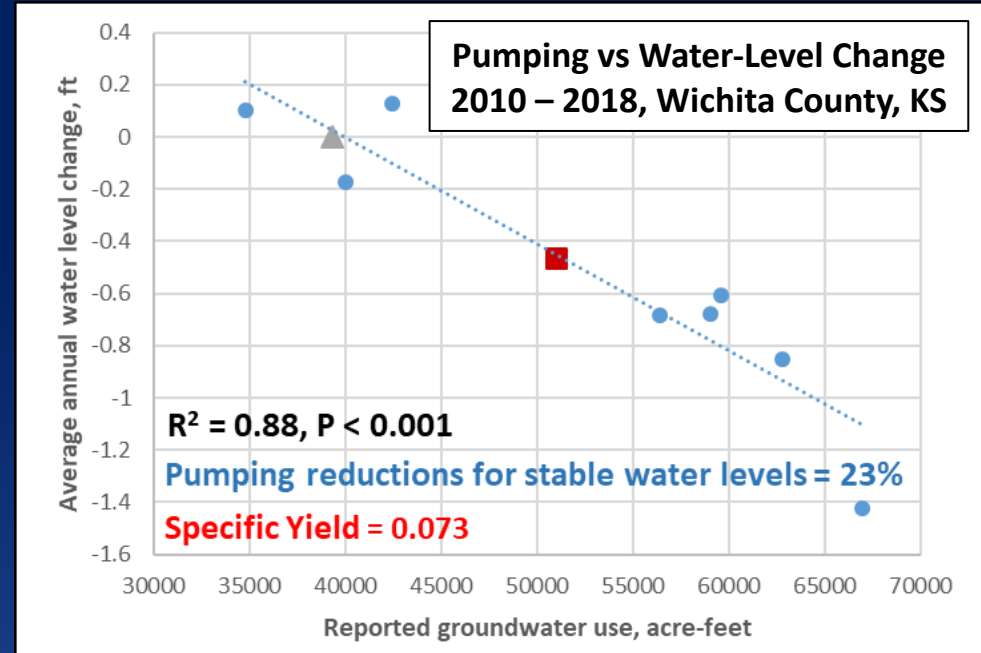
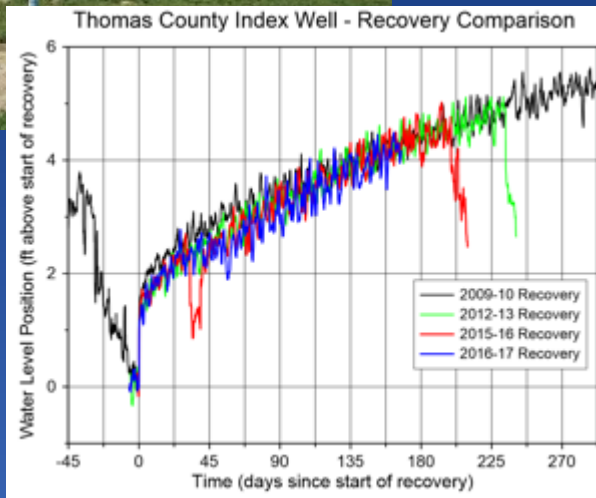
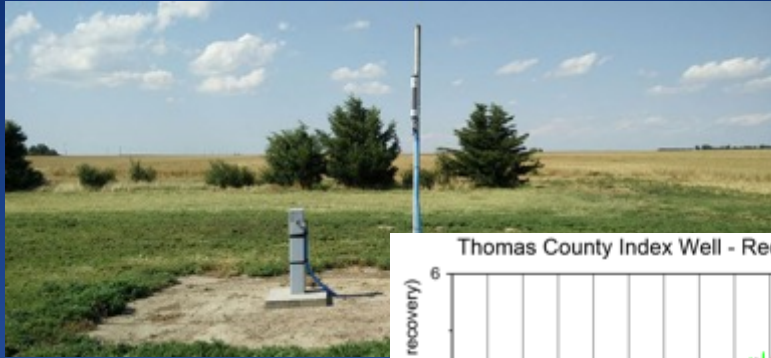
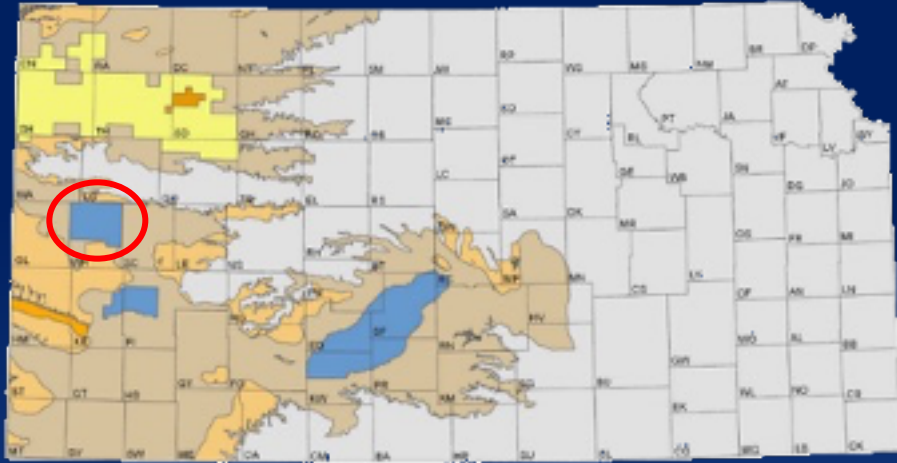
(a) GMD1 Model- regressed pumping



....Extreme Event Preparedness....



Using Data to Help Answer Complex Questions



- Relationships using average annual water level measurements and reported pumping amounts.
- Data-driven approach with no conceptualizations.
- Not meant to be a replacement for numerical flow models, rather help constrain and form modeled aquifer parameters.
- Requires dedication to quality data collection efforts.

Thank You!

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