

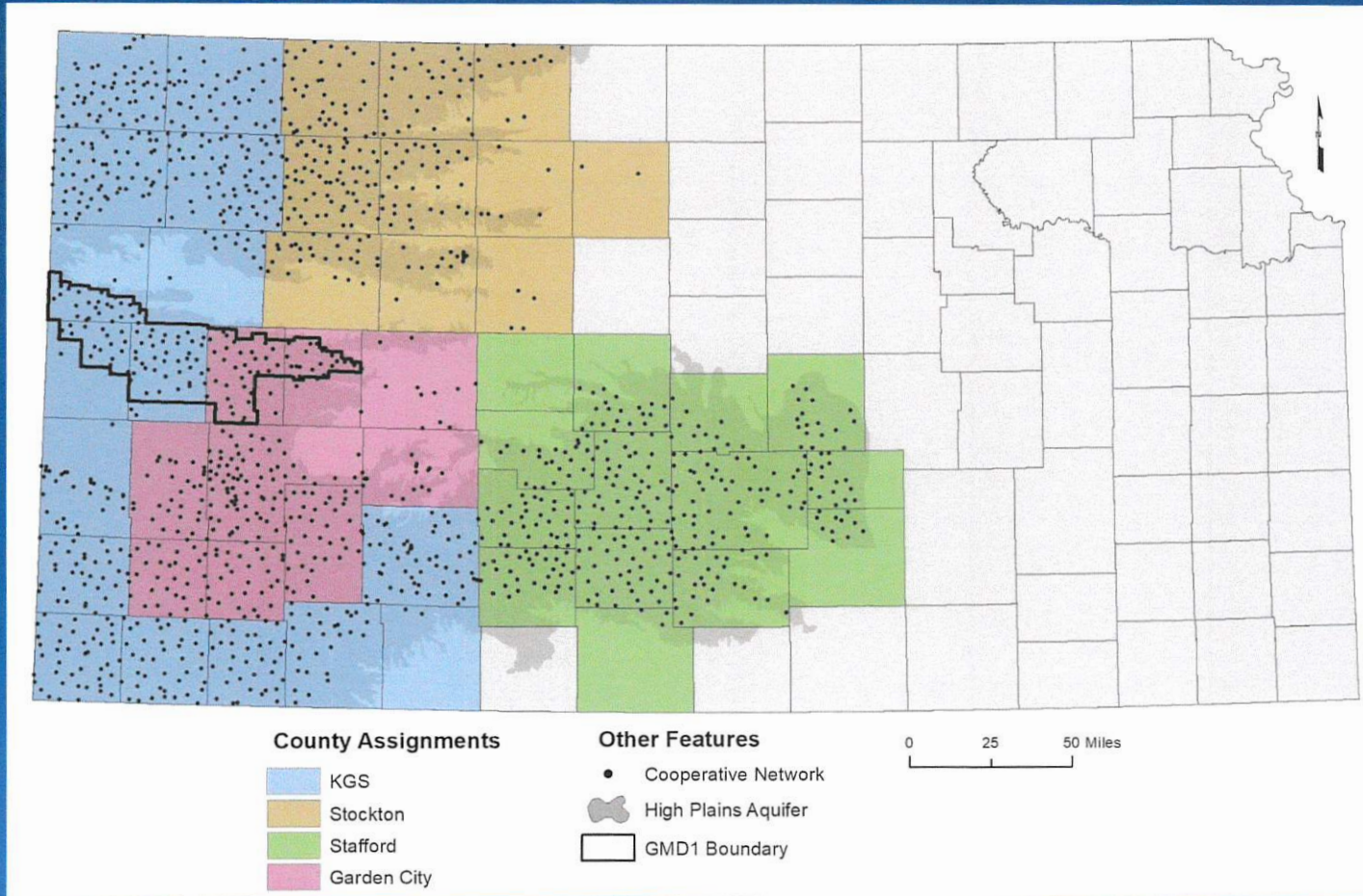
# 2023 Water Level Results and Other Goodies

Western Kansas GMD #1  
Annual Meeting  
February 28, 2023



Kansas Geological Survey  
University of Kansas

# 2023 Cooperative Water Level Program

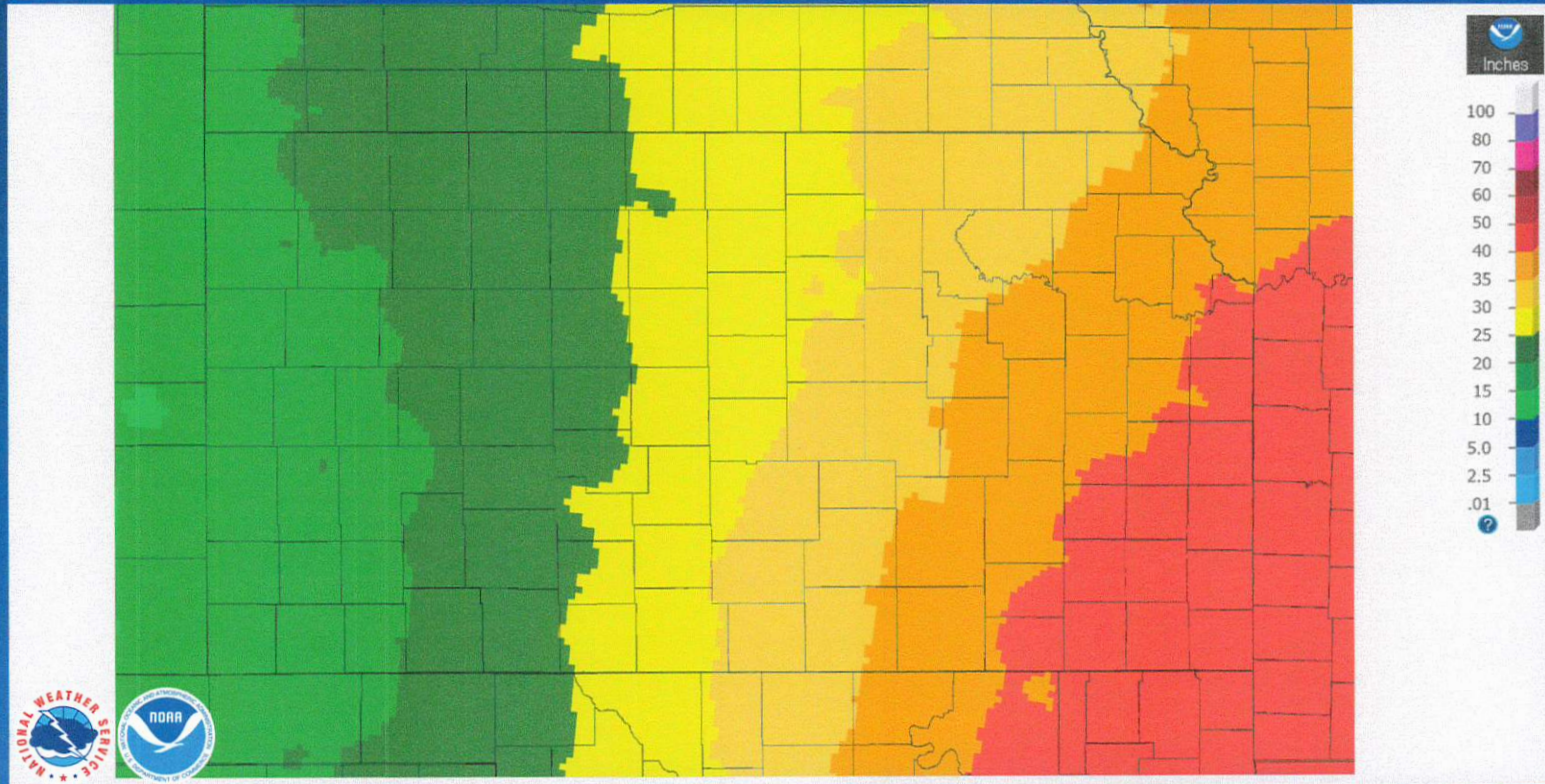


# 1991 to 2020 Normal Precipitation

January 01, 2022 Annual Normal Precipitation

Created on: January 30, 2023 - 22:45 UTC

Valid on: January 01, 2023 12:00 UTC

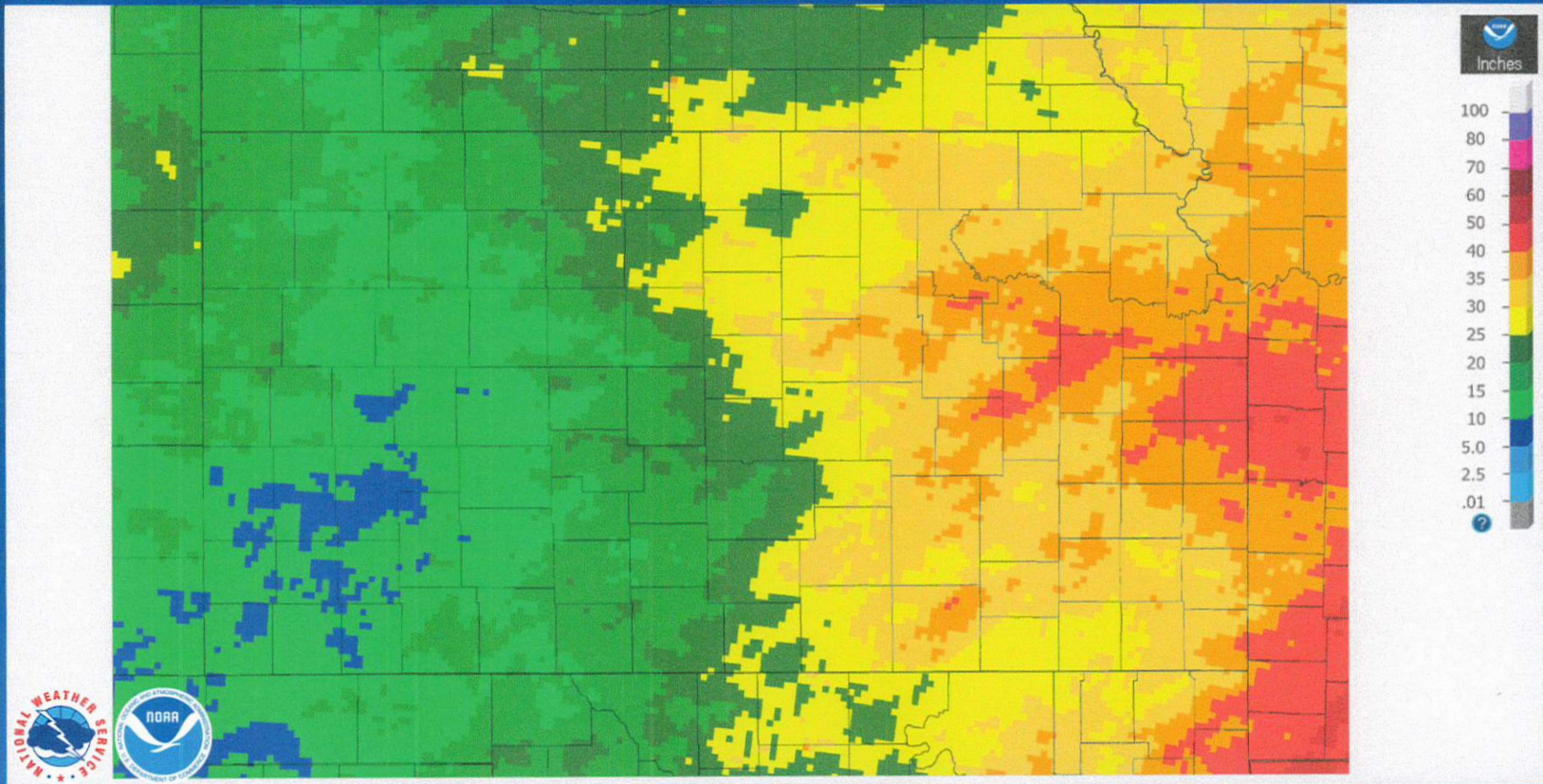


# 2022 Total Precipitation

January 01, 2022 Annual Observed Precipitation

Created on: January 30, 2023 - 22:48 UTC

Valid on: January 01, 2023 12:00 UTC

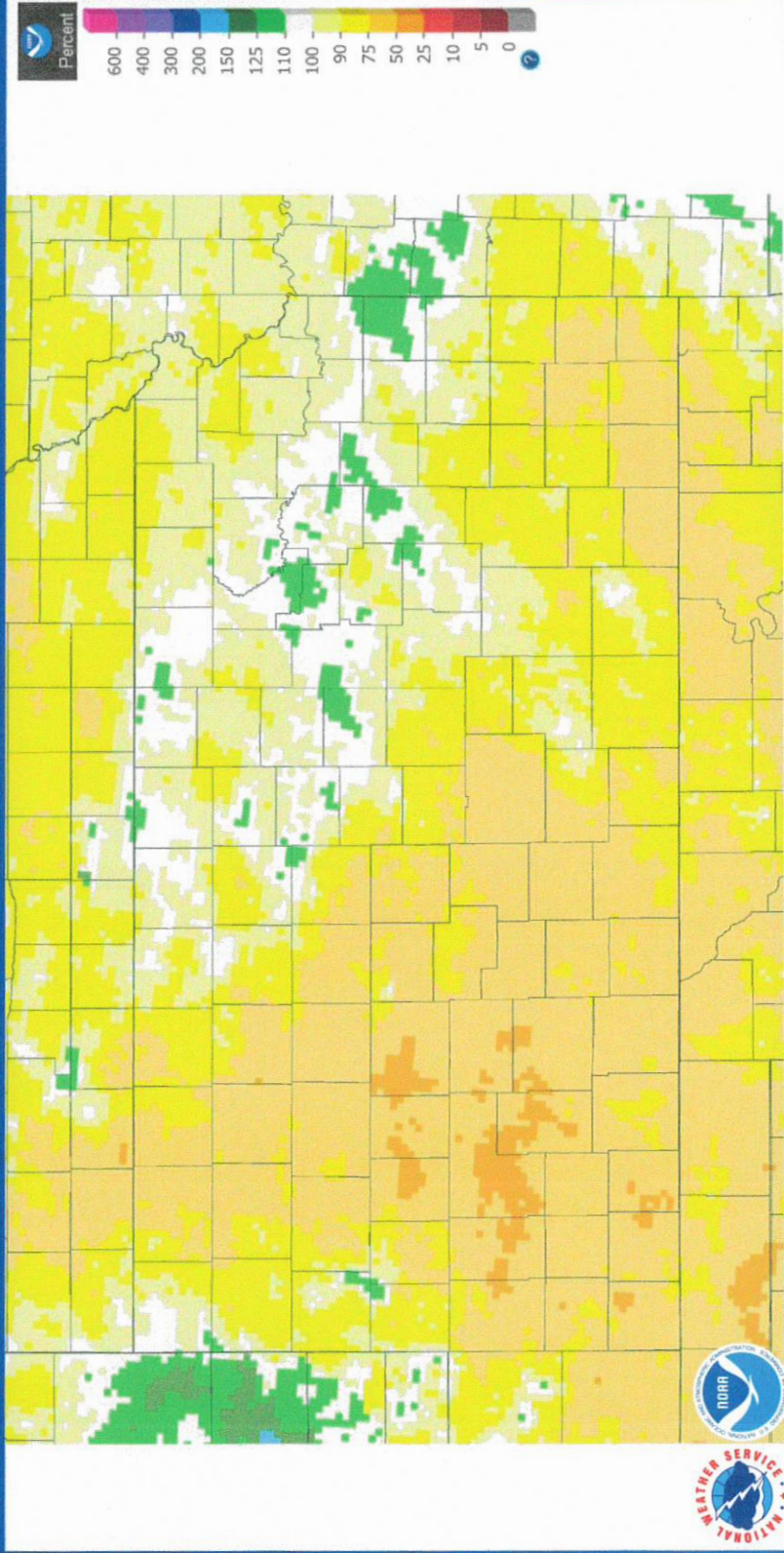


# Percent Departure from Normal Precipitation

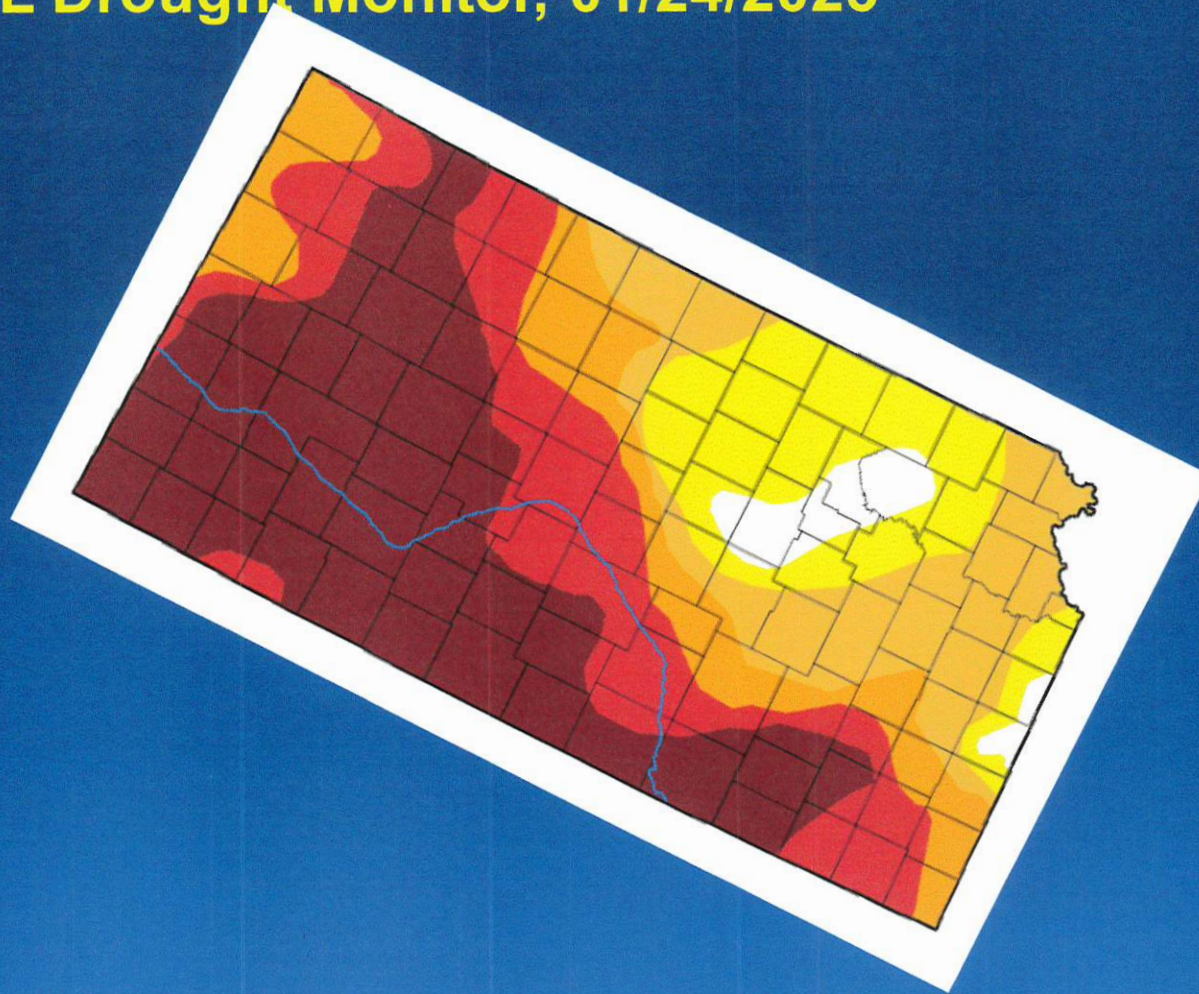
January 01, 2022 Annual Percent Precipitation

Created on: January 30, 2023 - 22:47 UTC

Valid on: January 01, 2023 12:00 UTC



# UNL Drought Monitor, 01/24/2023



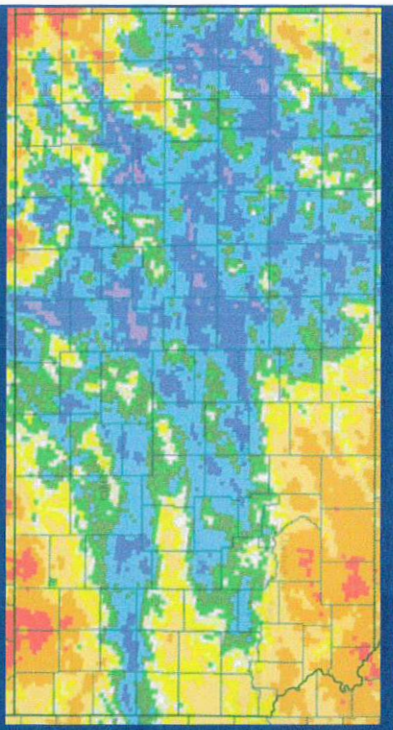
**Intensity**

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

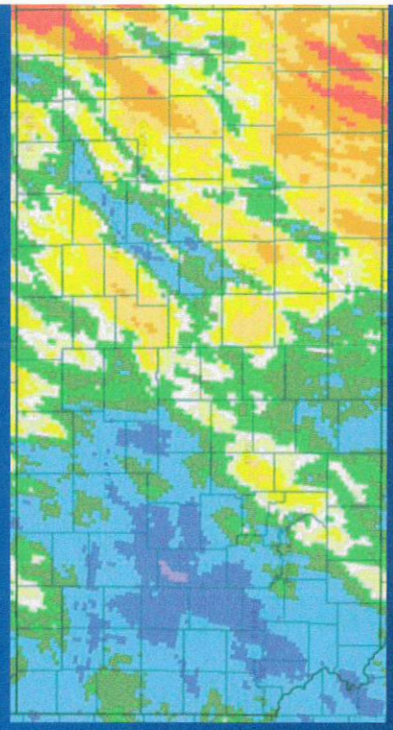
**Authors**

United States and Puerto Rico Author(s):  
**Rocky Bilotta**, NOAA/NCEI

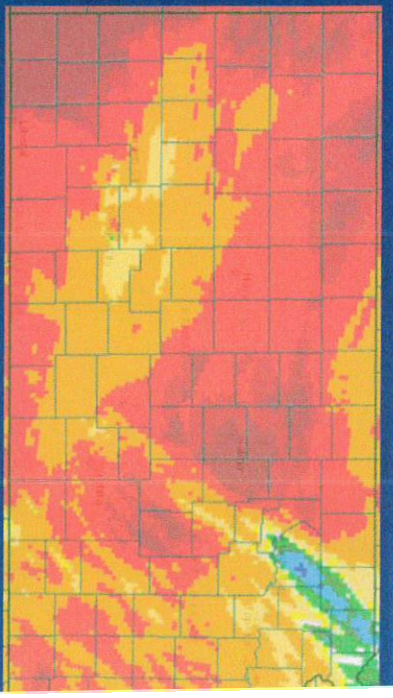
September 2021



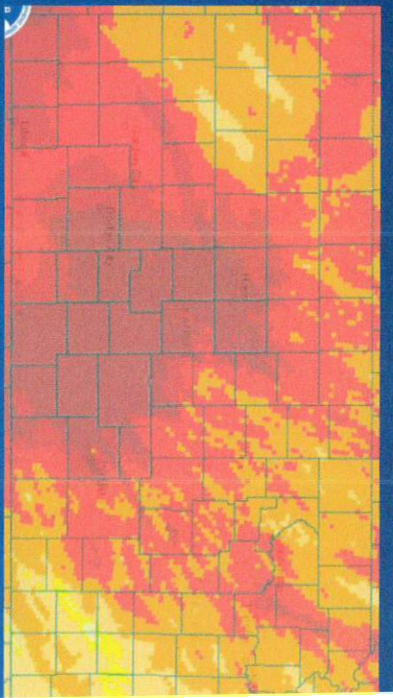
October

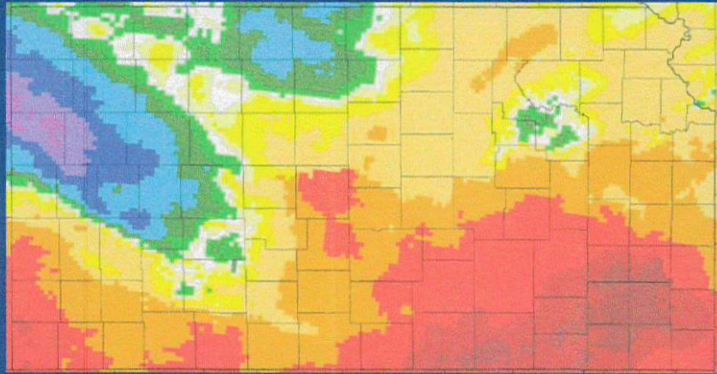


November

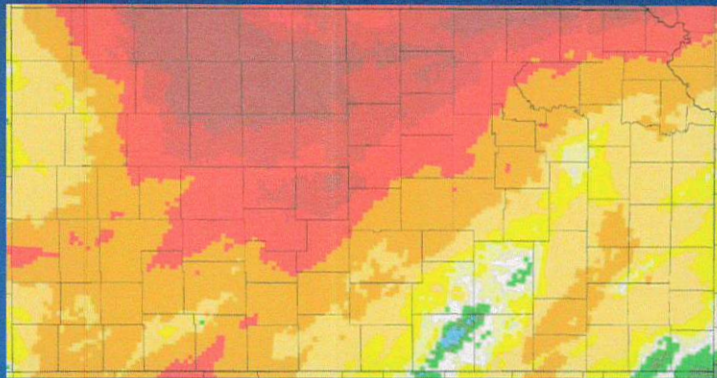


December

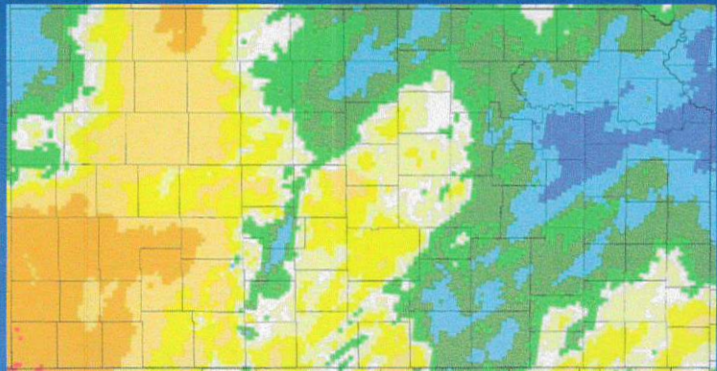




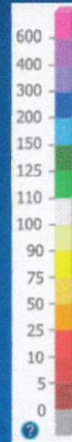
January 2022



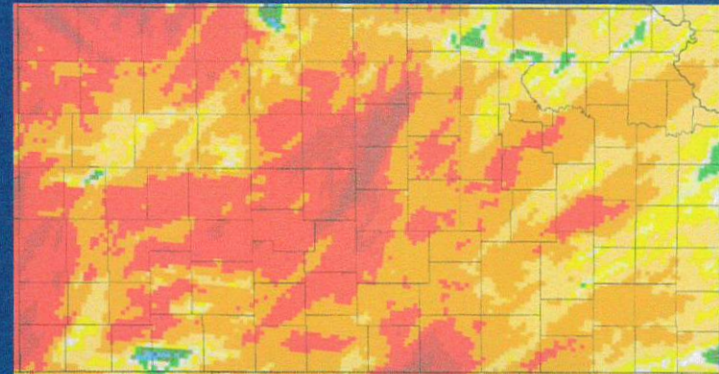
February



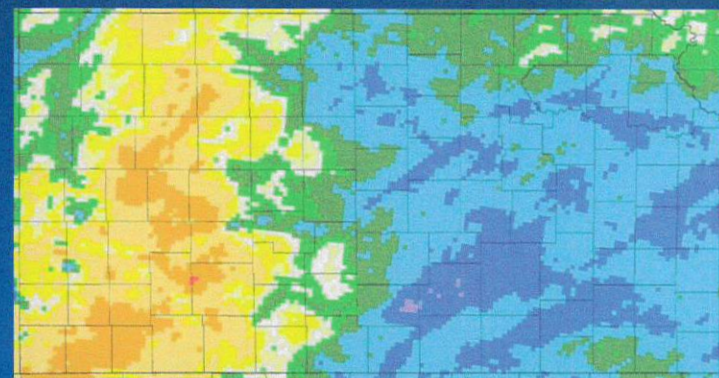
March



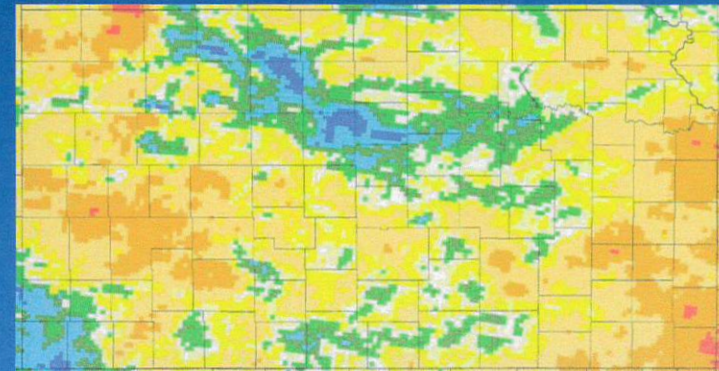
April



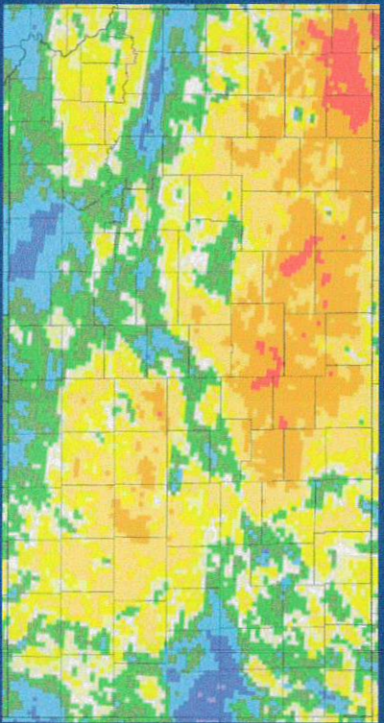
May



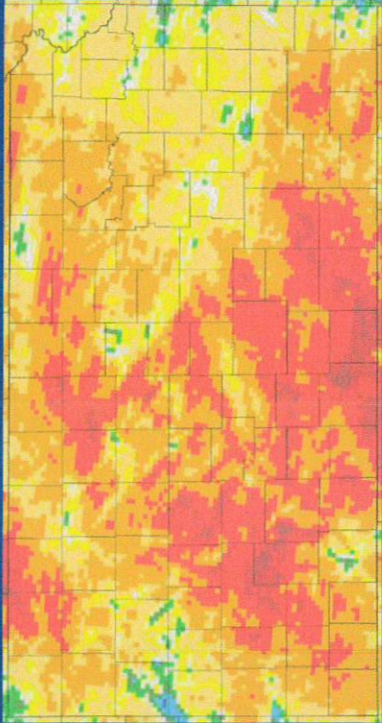
June



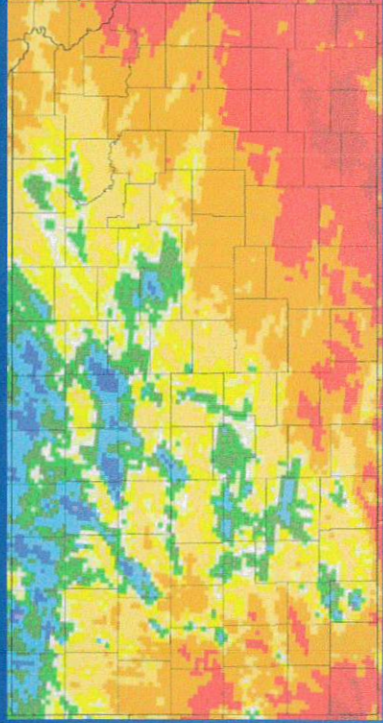




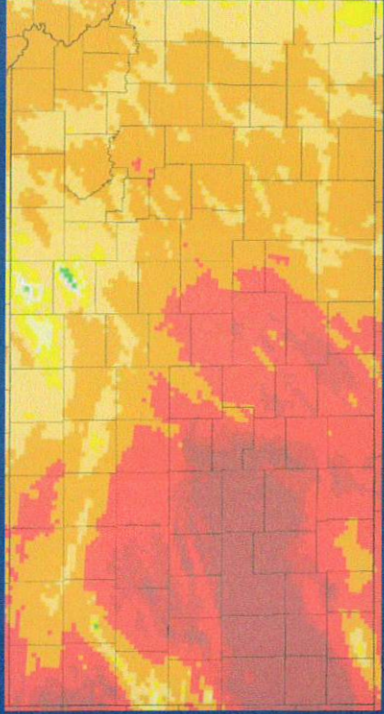
July



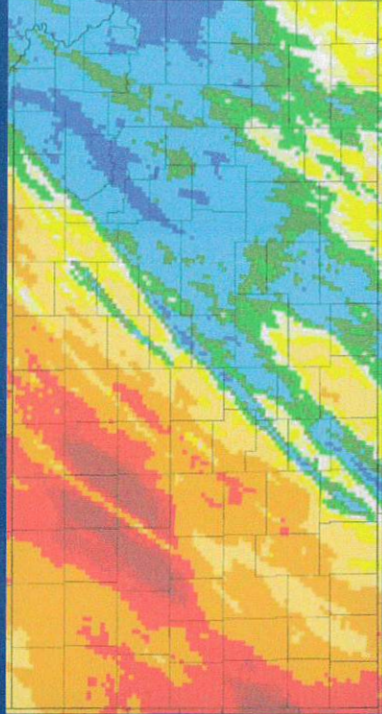
August



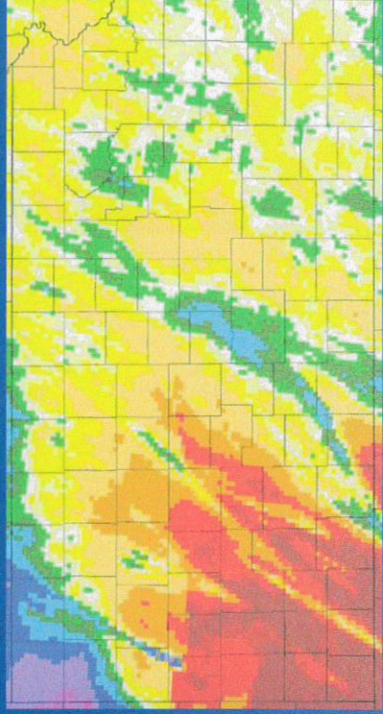
September



October



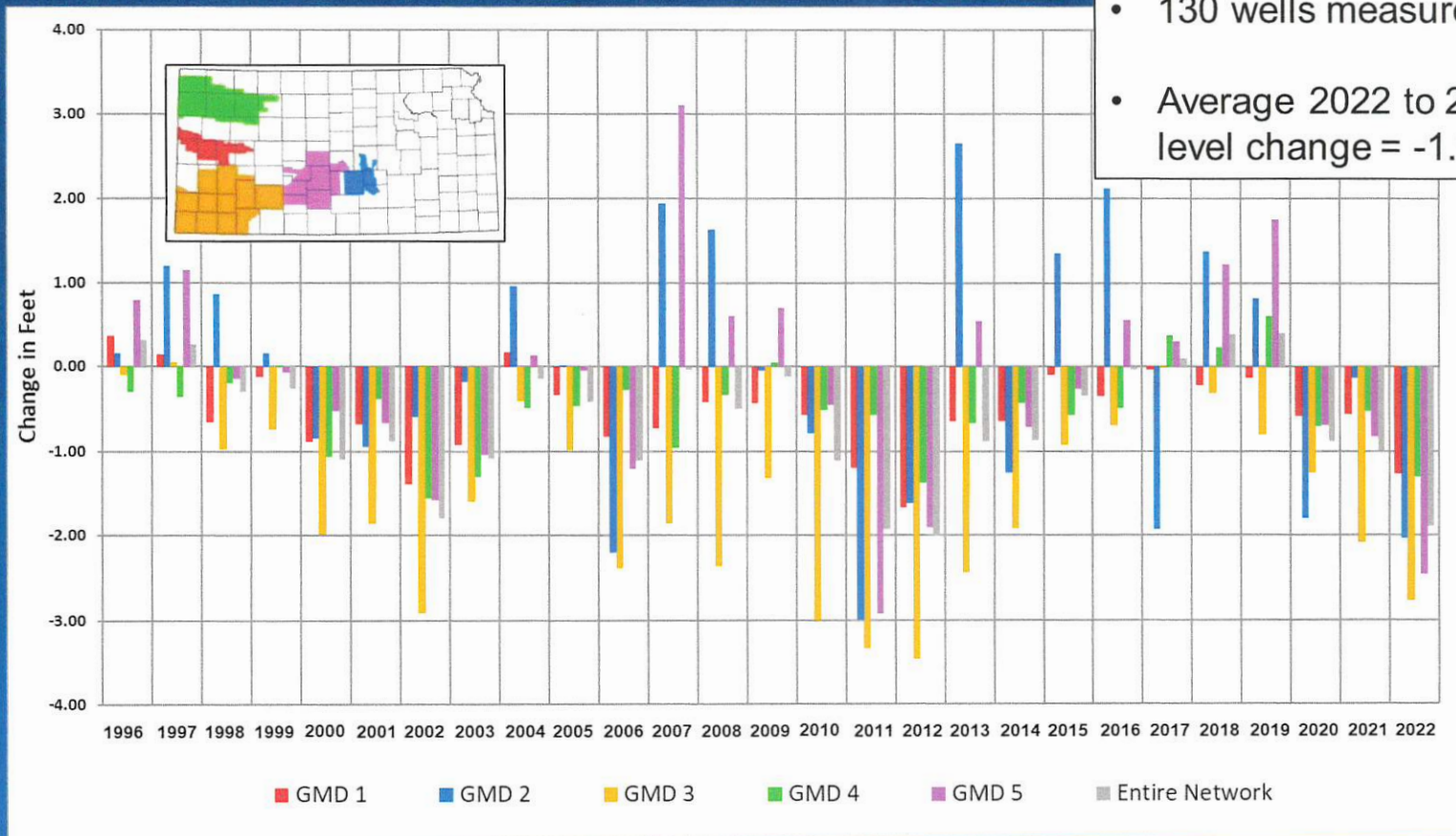
November



December



# Average Change (by Well)

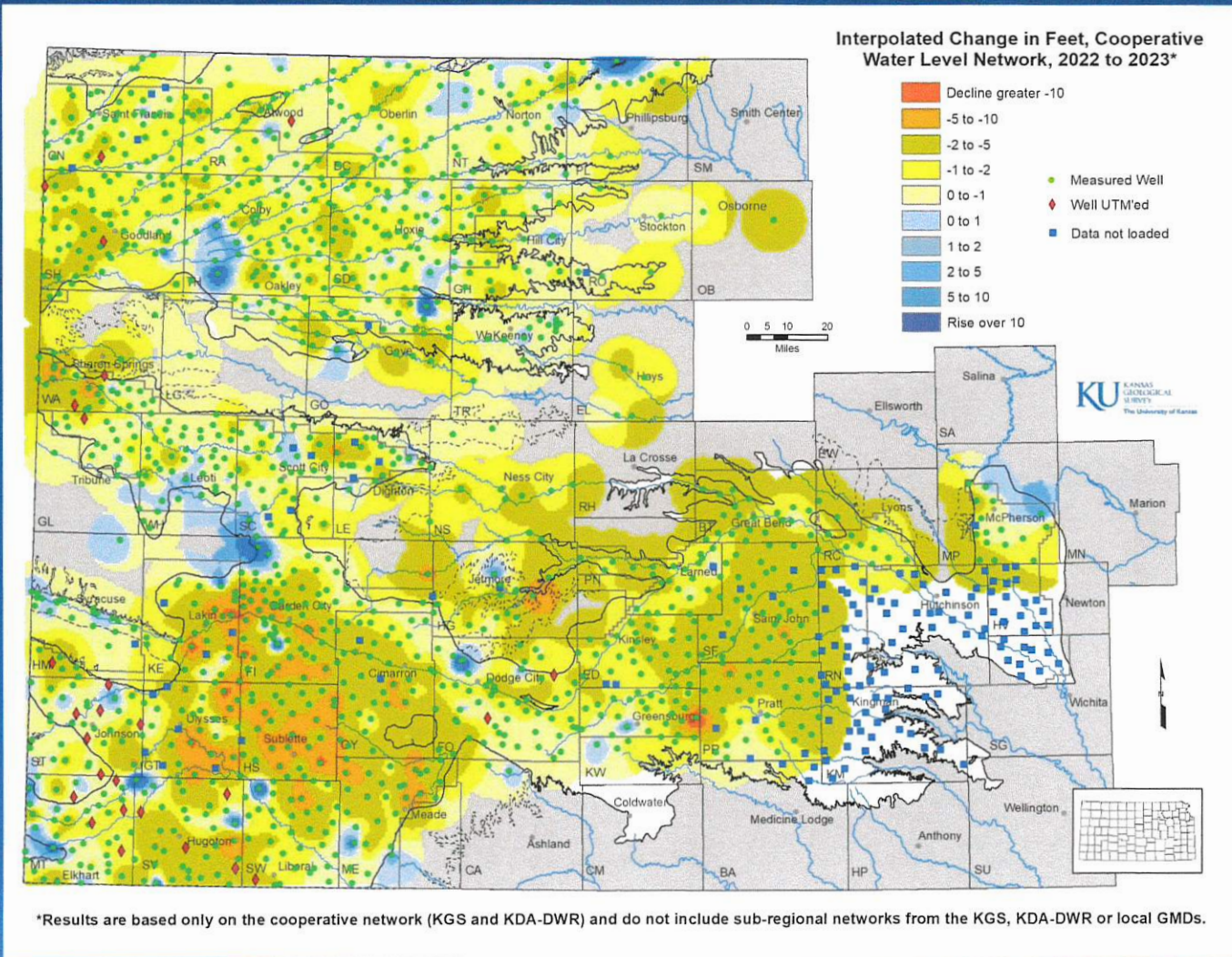


**Western Kansas GMD 1**

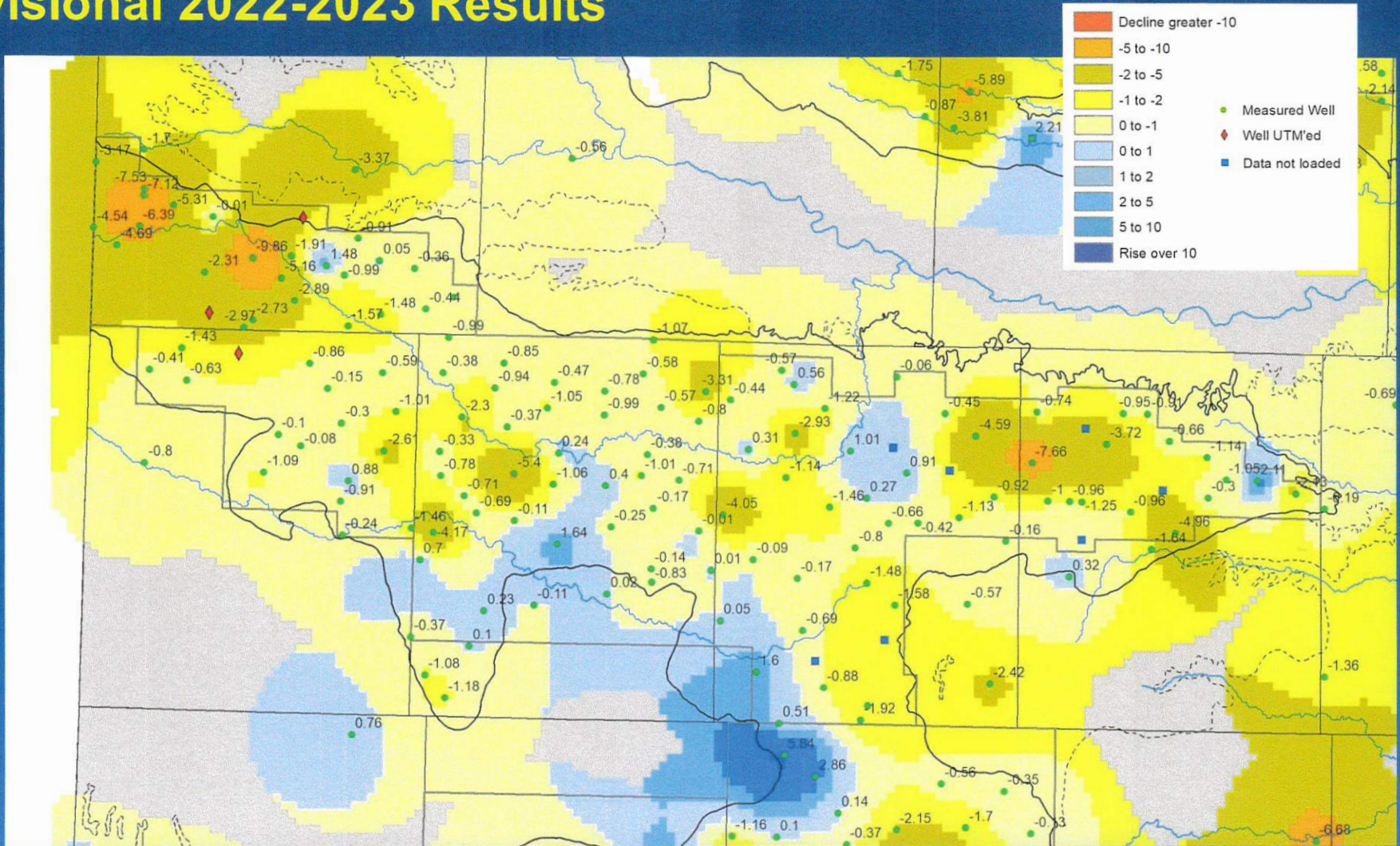
- 130 wells measured
- Average 2022 to 2023 water-level change = -1.27 ft

\*Results are based only on the cooperative network (KGS and KDA-DWR) and do not include sub-regional networks from the KDA-DWR, KGS, or local GMDs. 2023 water levels are provisional.

# Provisional 2022-2023 Results



# Provisional 2022-2023 Results

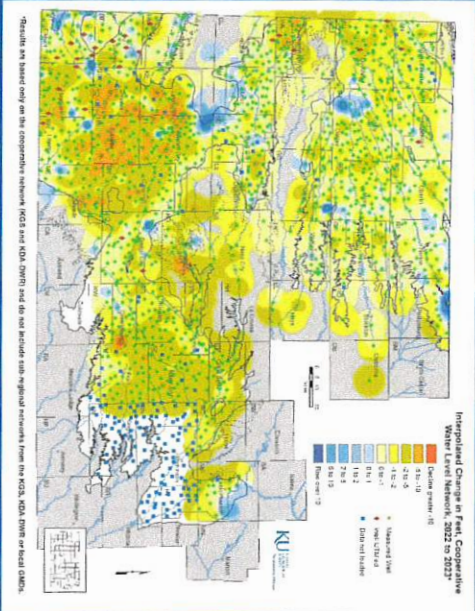


# Provisional 2022-2023 Results

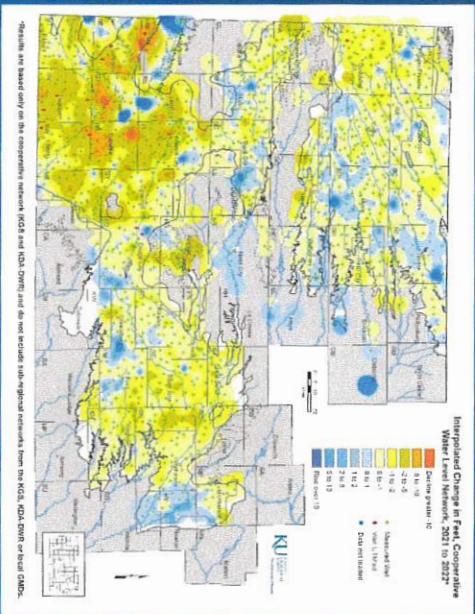
2022-2023

2021-2022

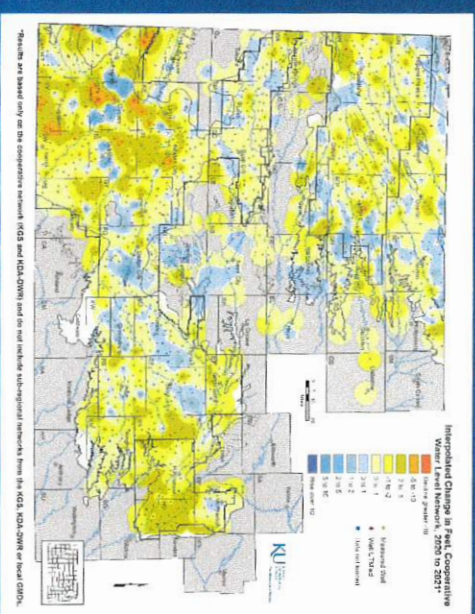
2020-2021



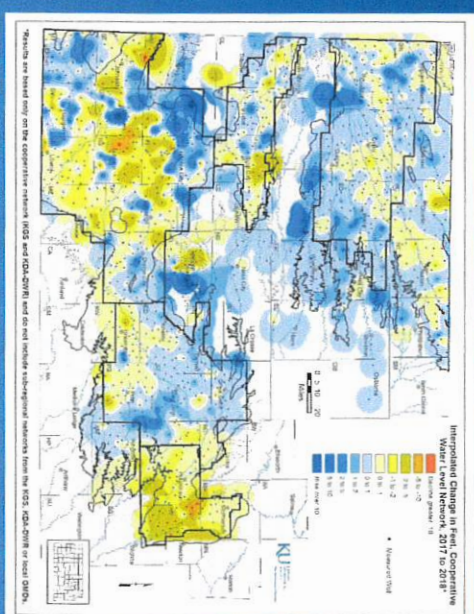
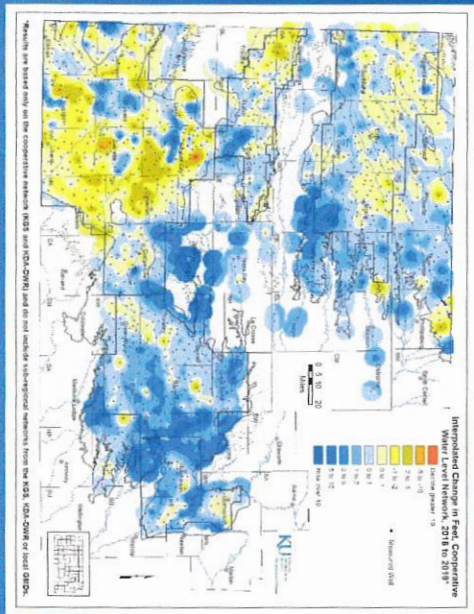
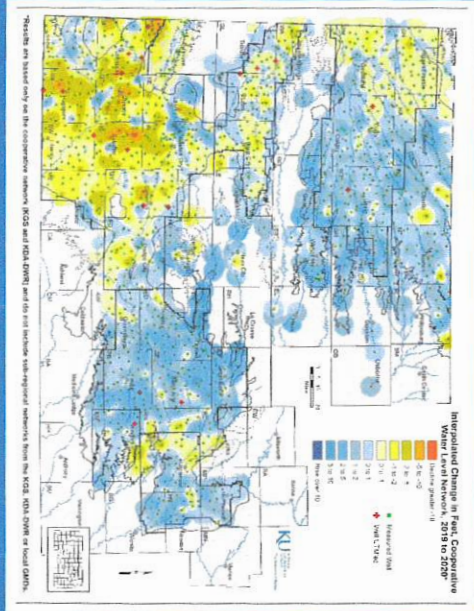
2019-2020



2018-2019

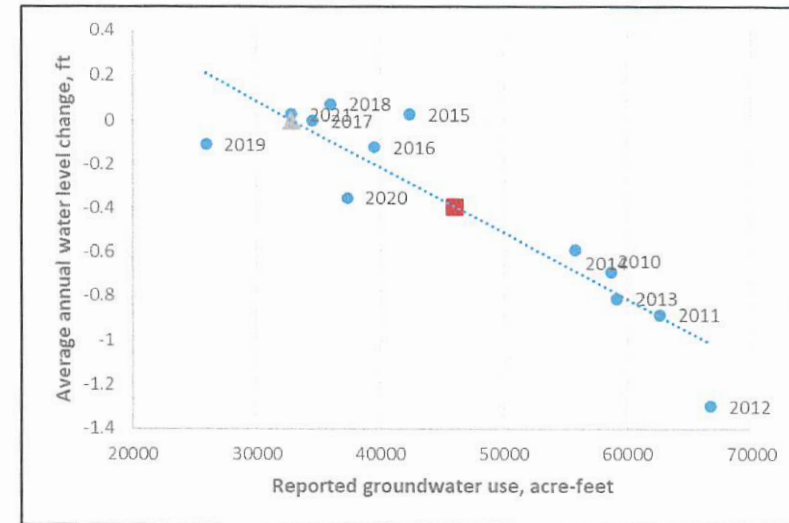
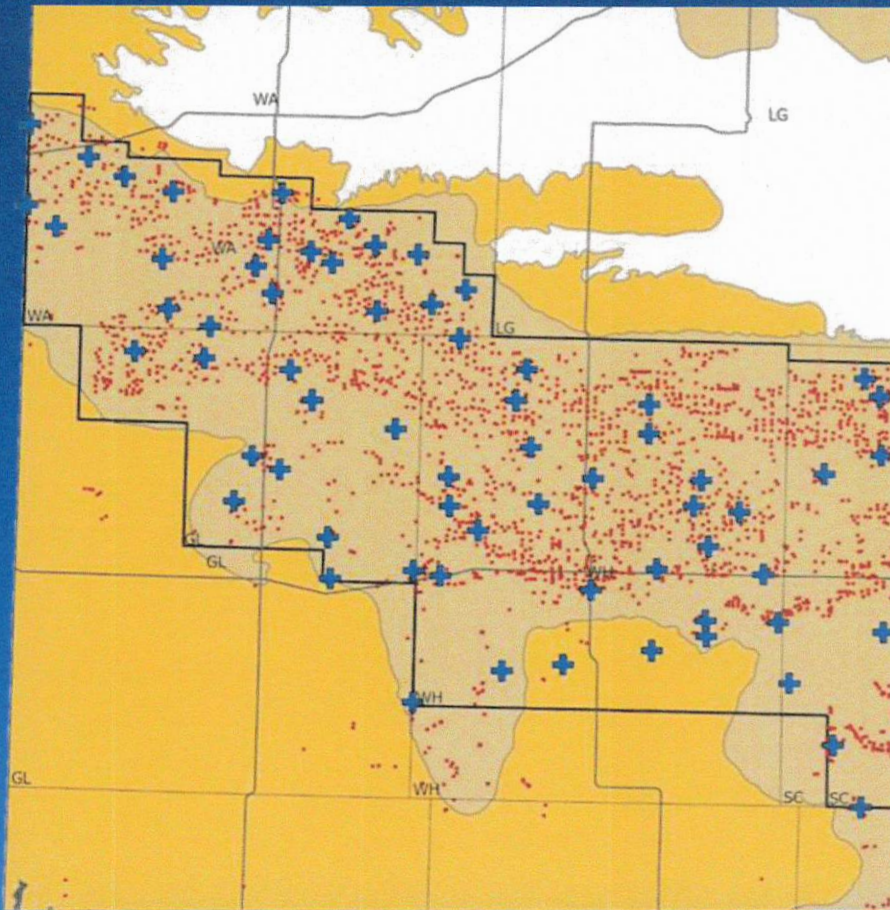


2017-2018

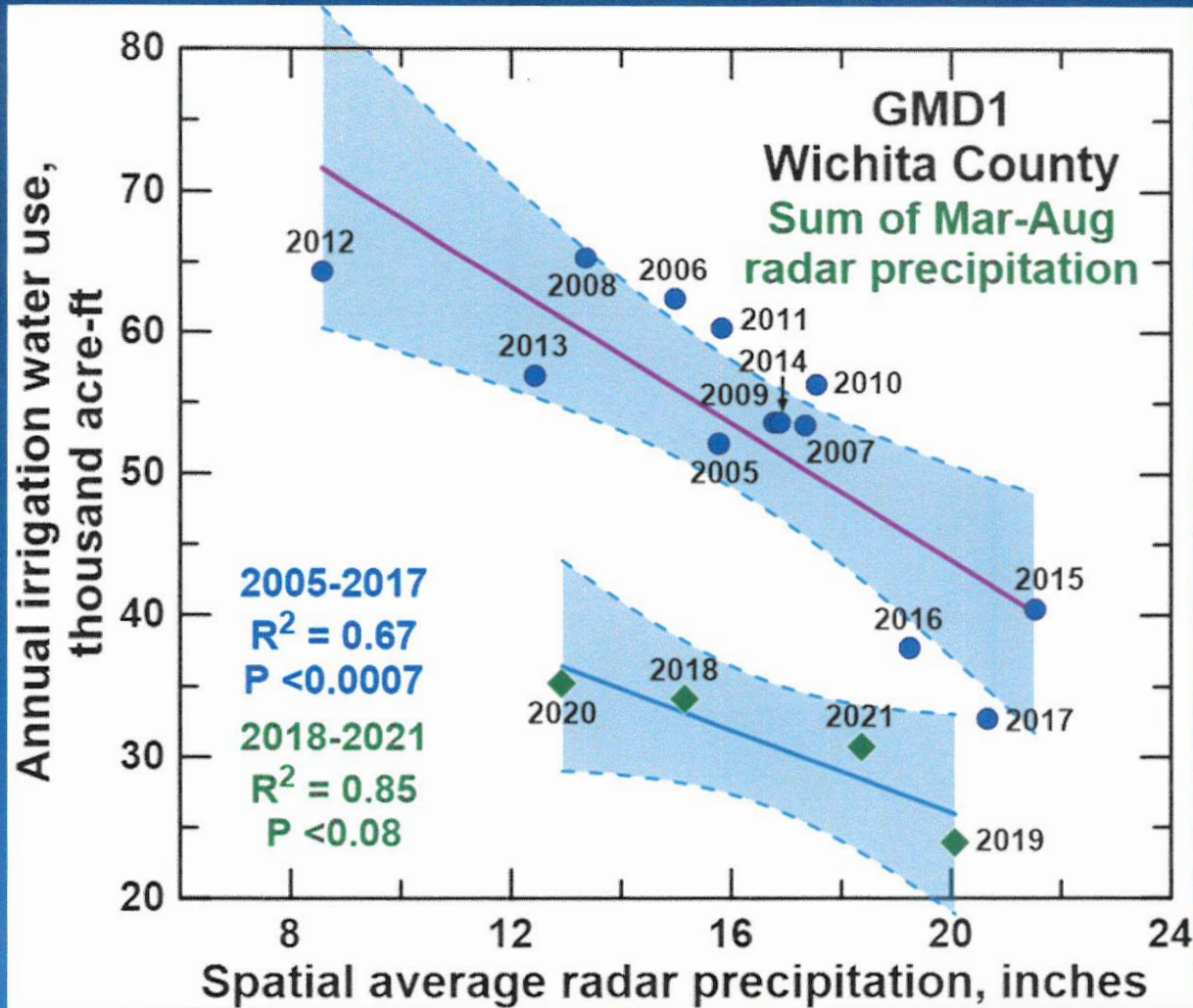


# Wichita County

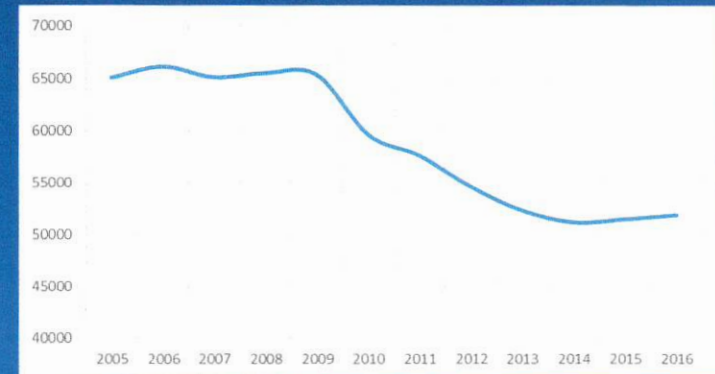
Reported water use and measured water levels, 2010 to 2021



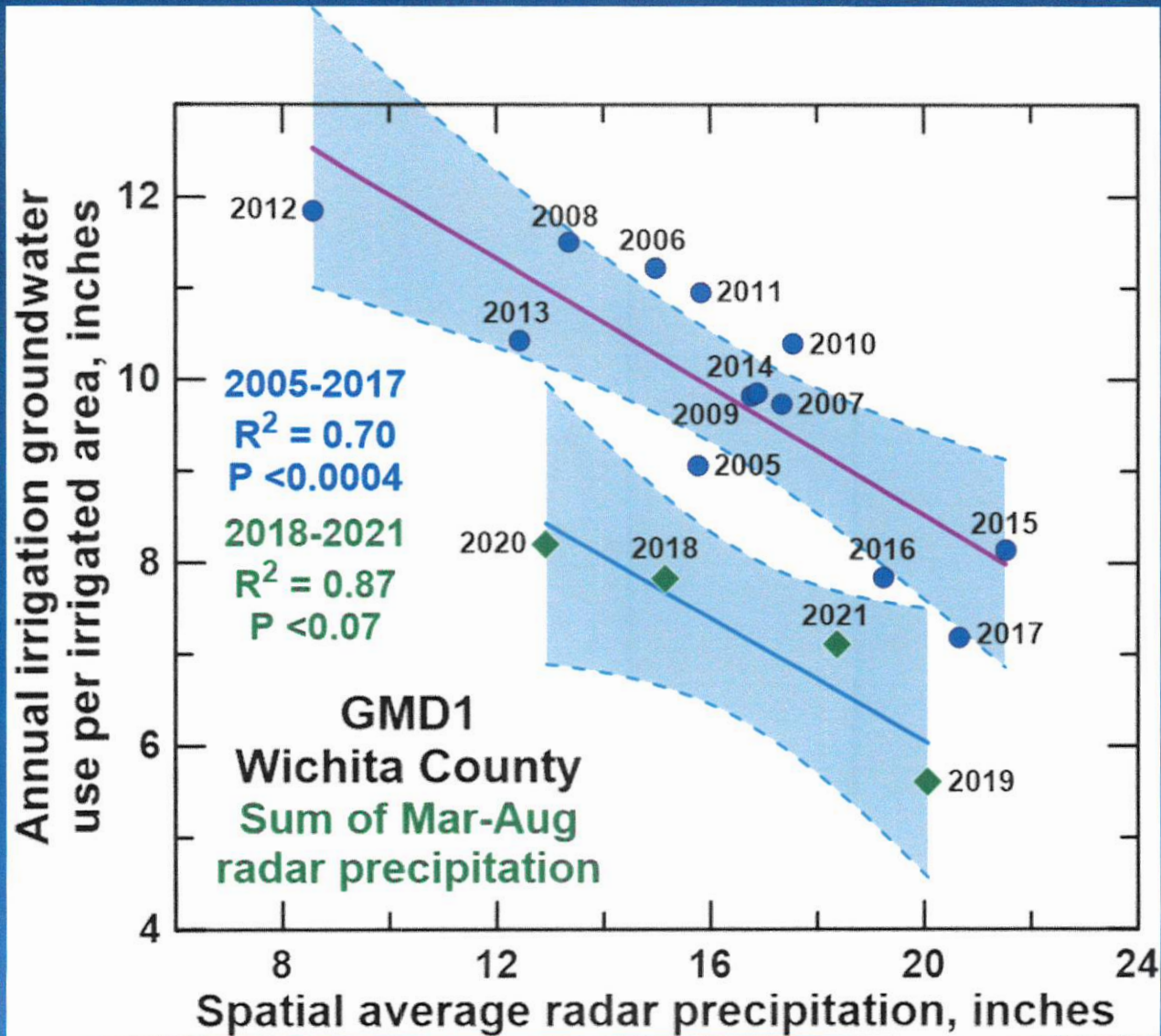
- R-squared = 0.83,  $P < 0.00004$
- Average water level change = -0.39 ft
- Average reported use = 45,962 AF
- Percent reduction for stable water levels:
  - Average conditions = 29%
  - Drought (2012) = 51%
- Notable shift after 2014



- A second notable shift in water use after 2017
- Formation of WCAs and LEMA
- Similar shift has also occurred in other areas of Kansas
- Is shift from true conservation or other factors like a reduction in irrigated acres?

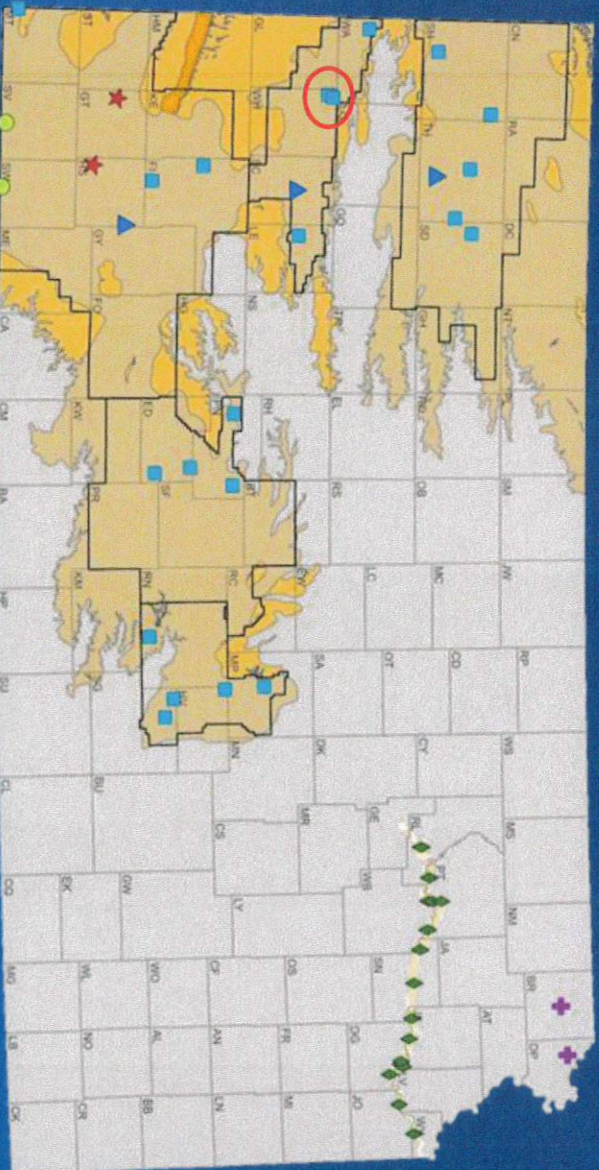


Whittemore, et. al., "Are Groundwater Conservation Management Areas in the High Plains Aquifer Truly Saving Water?"

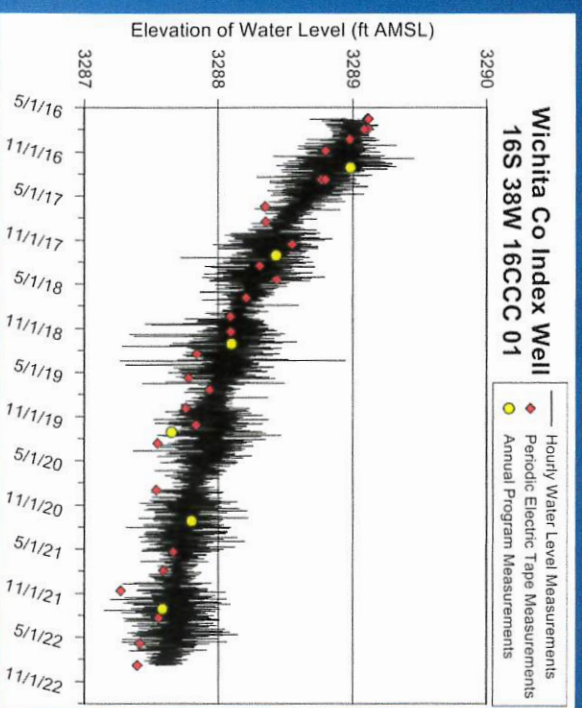




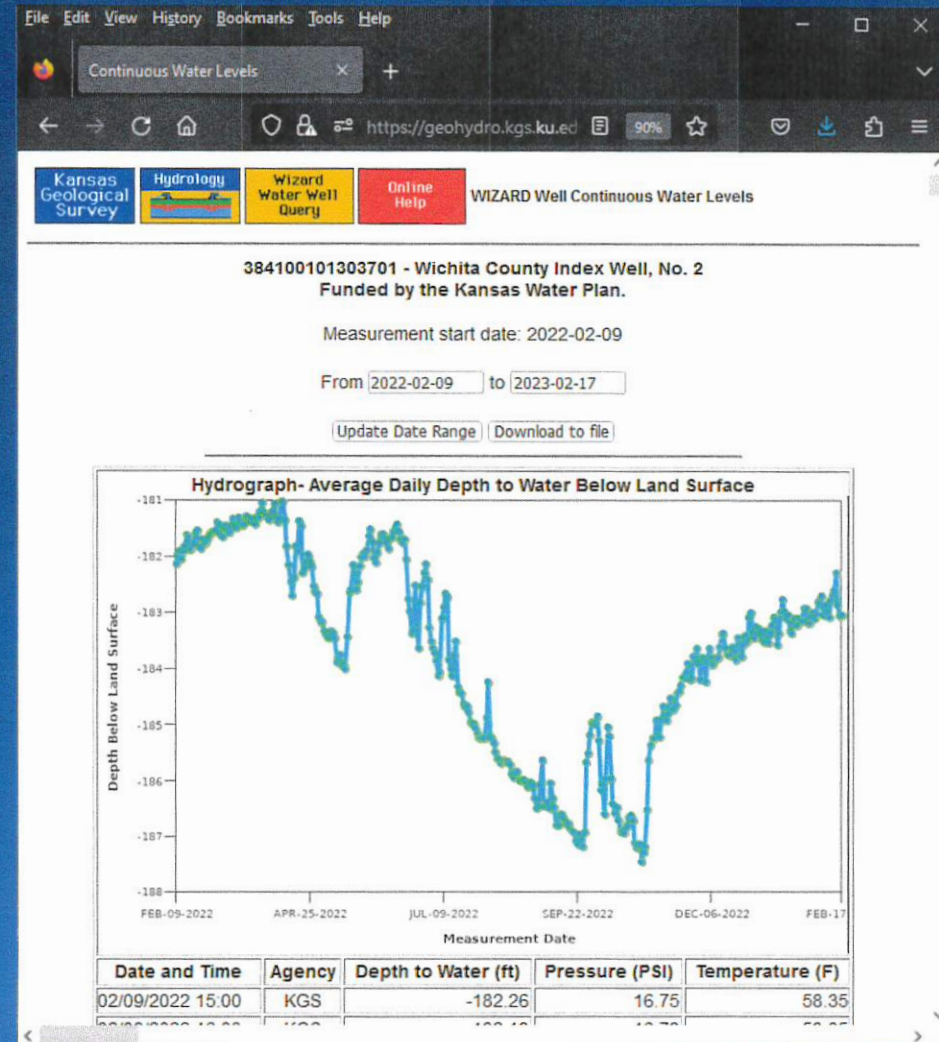
# Kansas Index Well Program



- First installed in 2007 through the Kansas Water Plan Fund
- Continuous, real-time water-level recordings
- Characterizations at the local scale



# Kansas Index Well Program



Questions????

Kansas Geological Survey  
1930 Constant Ave  
Lawrence, KS 66047  
785-864-2118



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