



Western Kansas Groundwater Management District #1

Wichita County LEMA Outreach Meeting August 28th, 2024

10:30am

1. **Introductions and Overview of GMD1 Updates for Wichita County**
2. **Kansas Geological Survey Activities in Support of Groundwater Conservation Efforts in Wichita County**
 - Jim Butler, Kansas Geological Survey
3. **Update on Wichita County LEMA in Review**
 - David Barfield, GMD1 Consultant
4. **General Discussion**
 - Introduction of survey
 - Timeline moving forward and additional outreach meetings (*November?*)
 - Directions for the Board of Directors

12:00pm Lunch

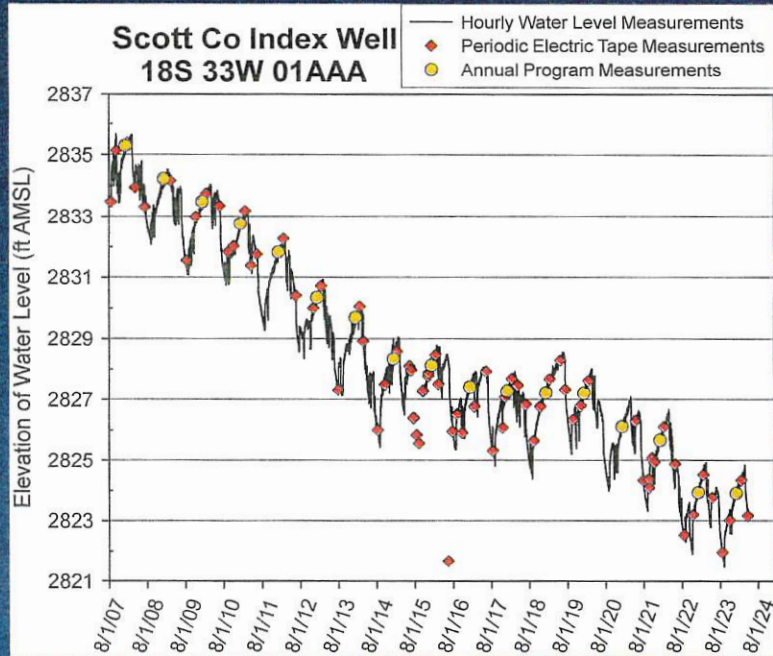
Kansas Geological Survey Activities in Support of Groundwater Conservation Efforts in Wichita County

Wichita County Public Meeting
August 28, 2024

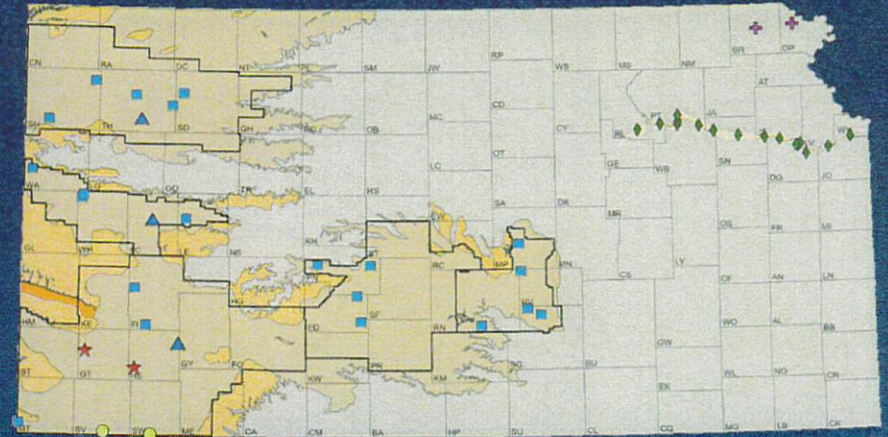


Kansas Geological Survey
University of Kansas

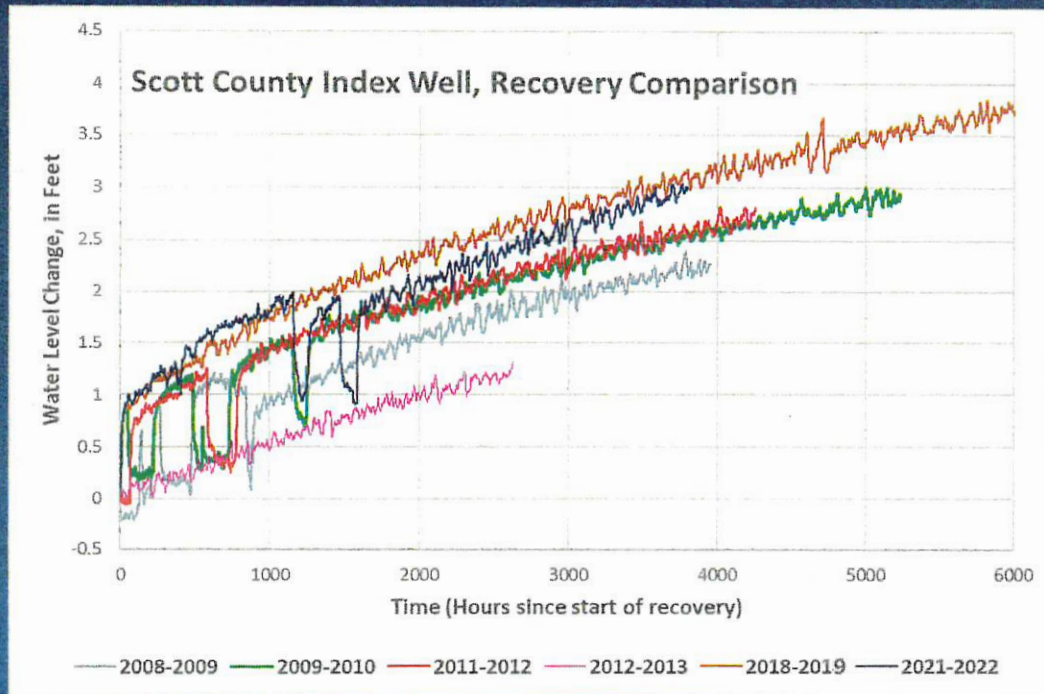
Kansas Index Well Program



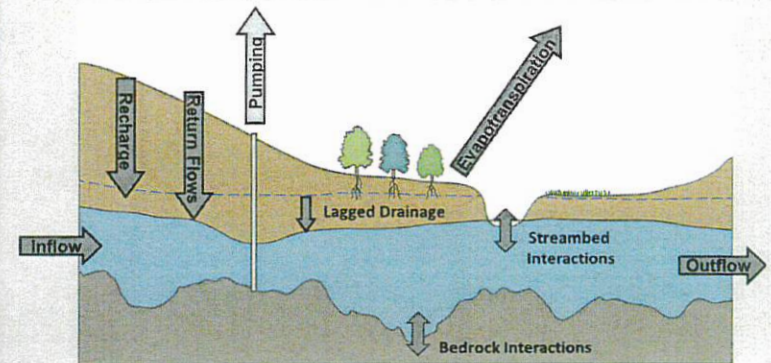
Since monitoring began, end-of-season recovery is similar regardless of past pumping or climatic conditions



Index Wells Recovery Curves, Scott County



- Water level change starting at the end-of-season pumping (September to April~June)
- Recovery is similar each year
- “Net Inflow”
Everything flowing in and out of the aquifer except pumping

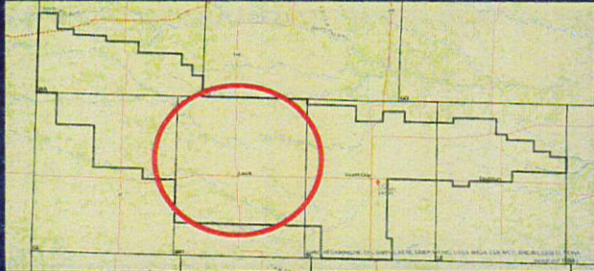


KGS Water Balance / Q-Stable Analysis

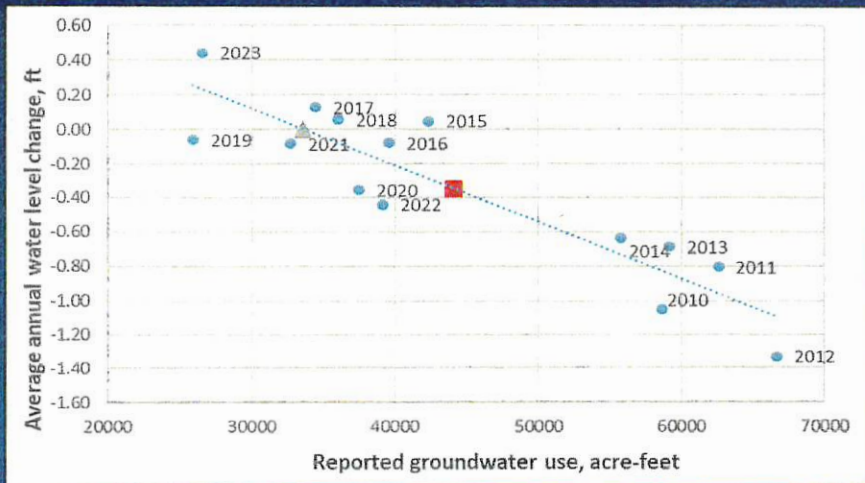
- A simple approach to assess the relationship between average groundwater usage and water-level change
- Well suited for Ogallala/High Plains aquifer
 - Seasonally pumped
 - Water is at depth
 - Semi-arid region
- Data driven with no conceptualizations
 - Water use
 - Water levels
- Relationships should hold for the next one to three decades



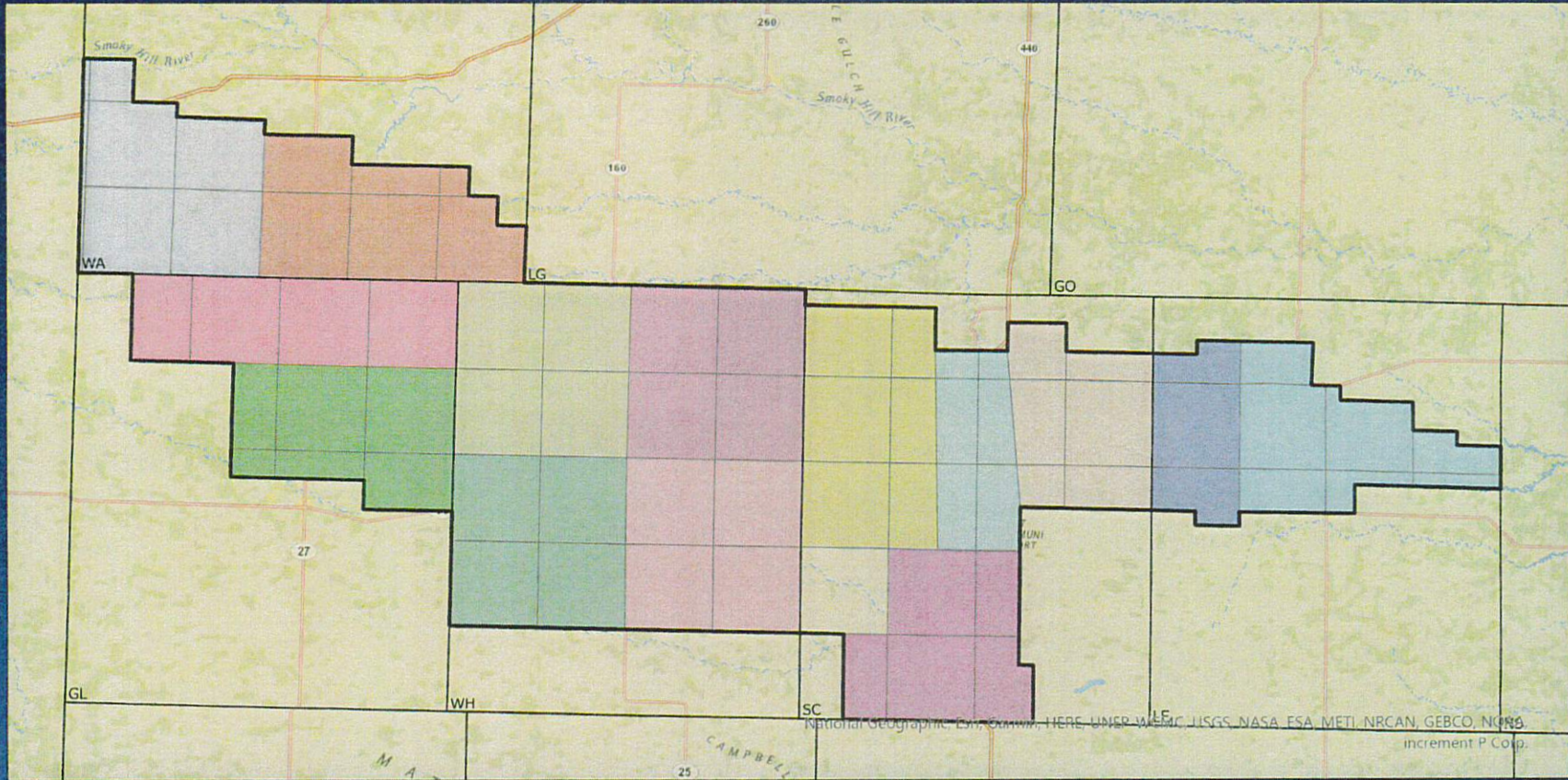
Wichita County



- R-squared = 0.81, $P < 0.00002$
- Average 2010-2023:
 - Water-level change = -0.35 ft
 - Total reported use = 44,066 AF
- Average 2019-2023:
 - Water-level change = -0.098 ft
 - Total reported use = 32,351 AF
- Net Inflows = 33,602 AF
- Percent reduction for stable water levels:
 - Average conditions = 24%
 - Drought (2011) = 46%
 - Last 5 years = 0%

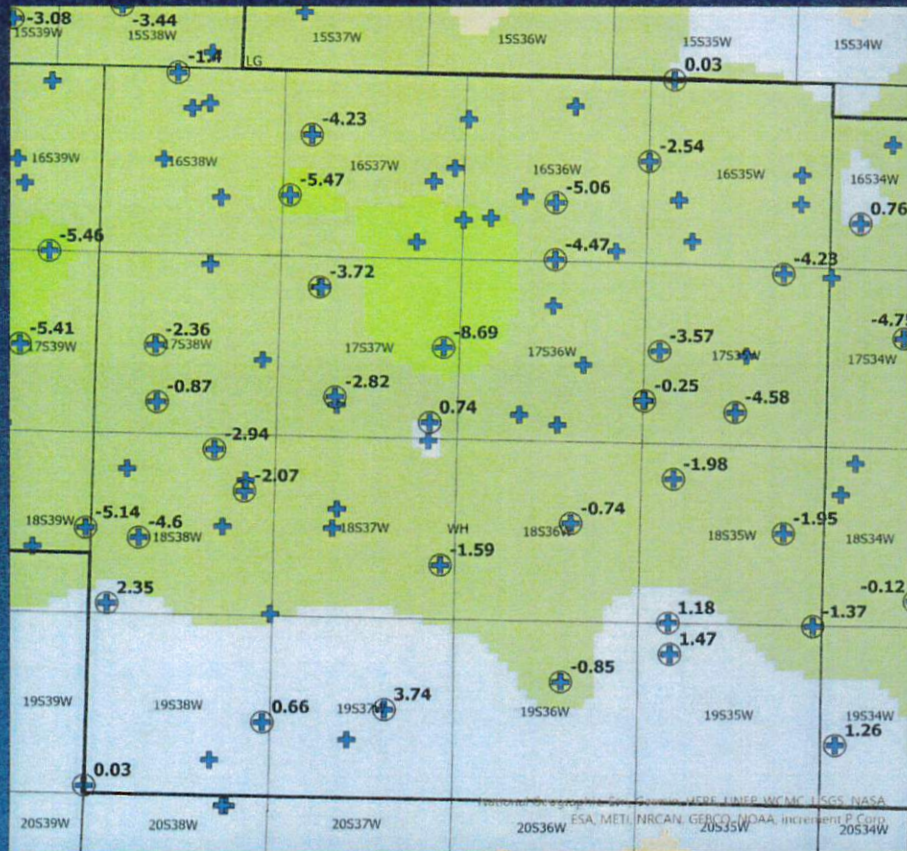


Township Scale Groups

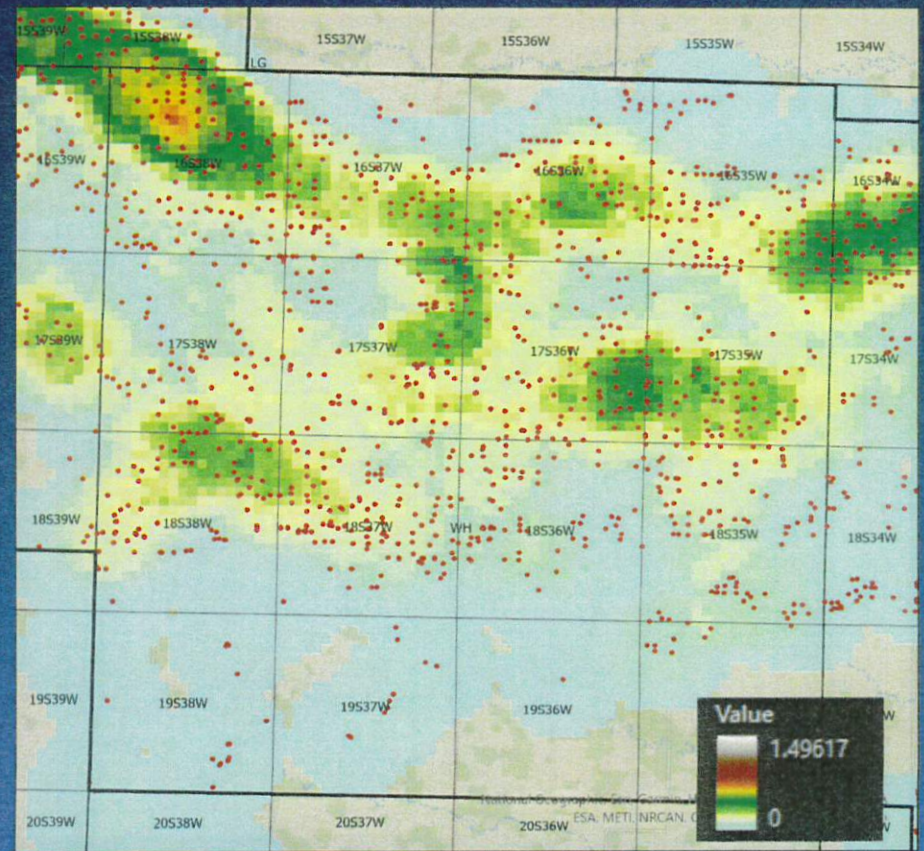


10-year water level change and water use density- Wichita County

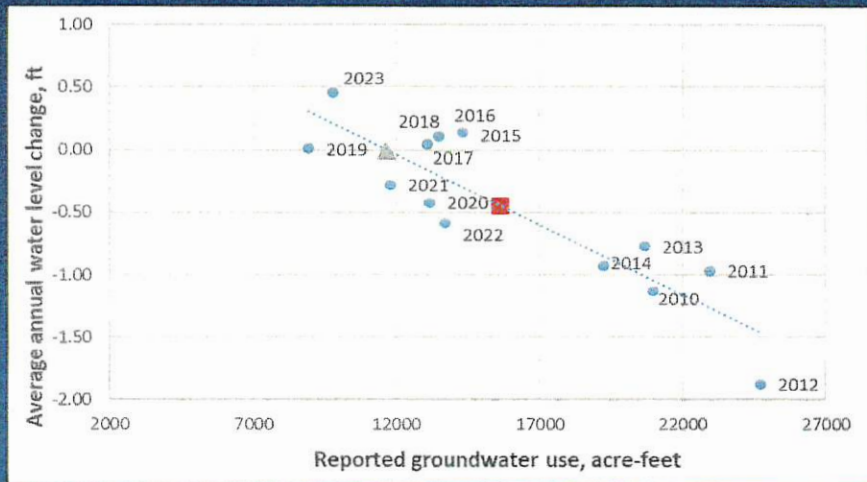
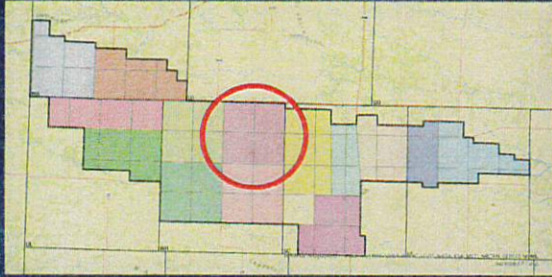
Water-level Change in Feet



Water Use Density (AF/Acre- 2mile circle)

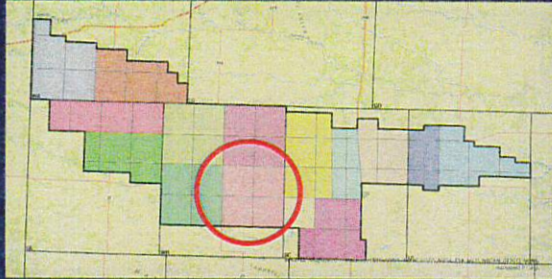


Wichita County Northeast

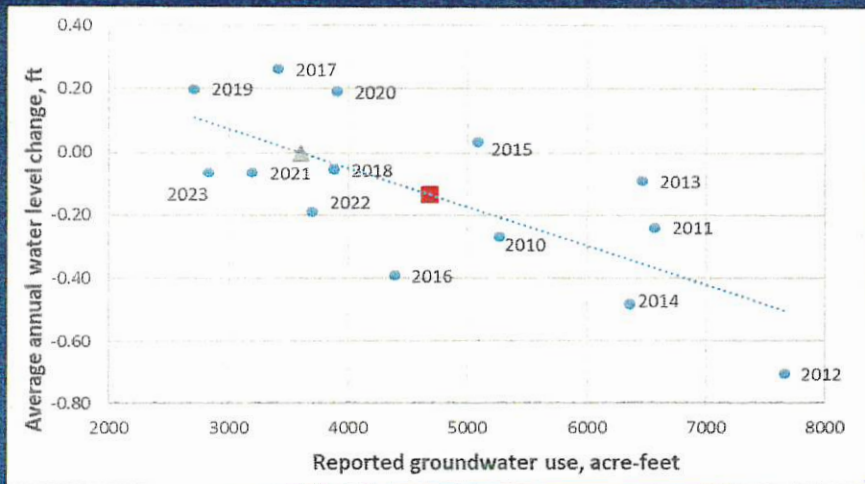


- R-squared = 0.80, P < 0.00002
- Average 2010-2023:
 - Water-level change = -0.44 ft
 - Total reported use = 15,599 AF
- Average 2019-2023:
 - Water-level change = -0.16 ft
 - Total reported use = 11,478 AF
- Net Inflows = 11,646 AF
- Percent reduction for stable water levels:
 - Average conditions = 25%
 - Drought (2011) = 49%
 - Last 5 years = 0%

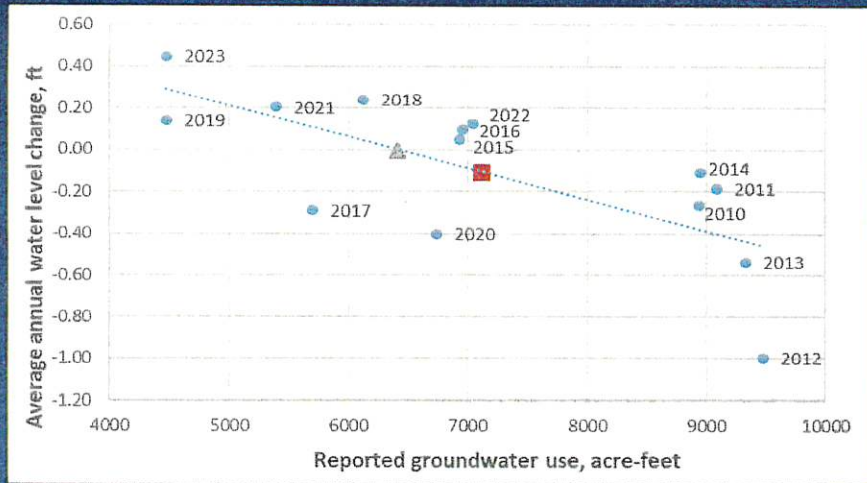
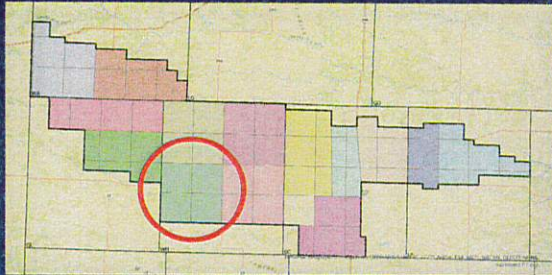
Wichita County Southeast



- R-squared = 0.51, P < 0.005
- Average 2010-2023:
 - Water-level change = -0.13 ft
 - Total reported use = 4,673 AF
- Average 2019-2023:
 - Water-level change = 0.016 ft
 - Total reported use = 3,270 AF
- Net Inflows = 3,605 AF
- Percent reduction for stable water levels:
 - Average conditions = 23%
 - Drought (2011) = 45%
 - Last 5 years = 0%

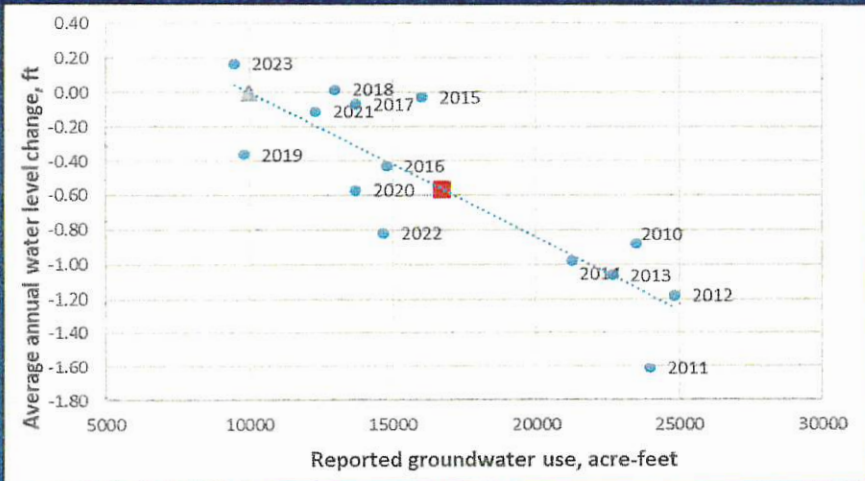
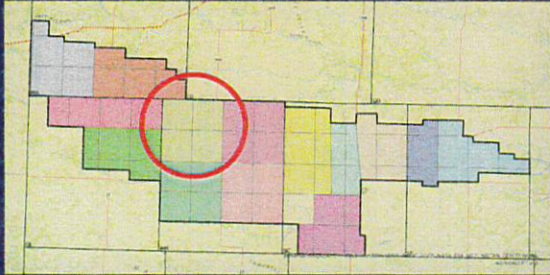


Wichita County Southwest



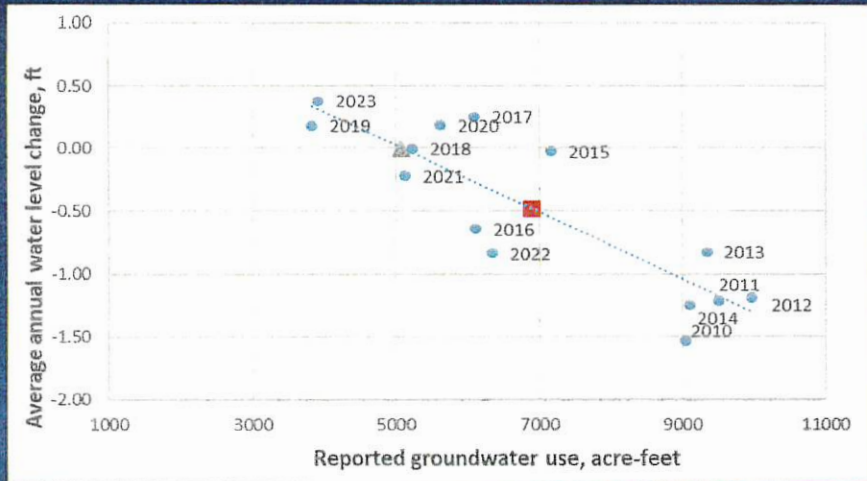
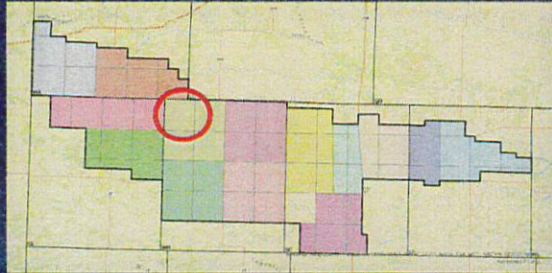
- R-squared = 0.51, P < 0.005
- Average 2010-2023:
 - Water-level change = -0.11 ft
 - Total reported use = 7,114 AF
- Average 2019-2023:
 - Water-level change = 0.103 ft
 - Total reported use = 5,623 AF
- Net Inflows = 6,412 AF
- Percent reduction for stable water levels:
 - Average conditions = 10%
 - Drought (2011) = 29%
 - Last 5 years = 0%

Wichita County Northwest



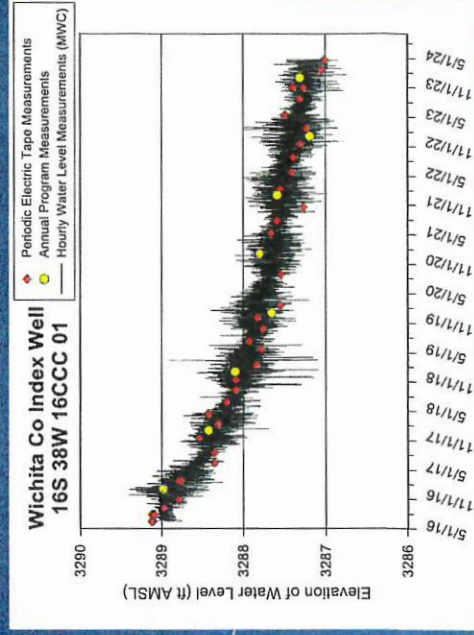
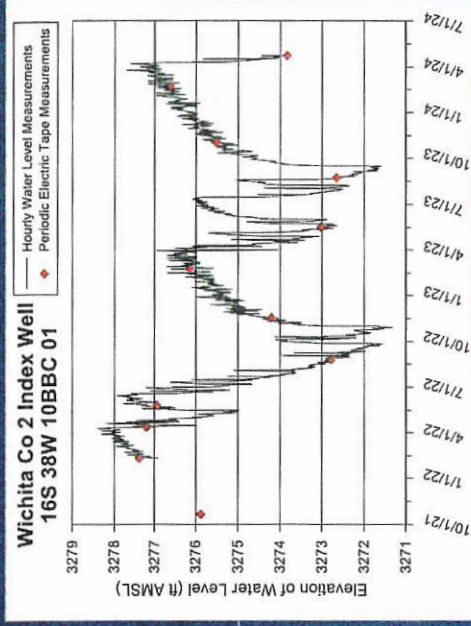
- R-squared = 0.72, P < 0.0002
- Average 2010-2023:
 - Water-level change = -0.56 ft
 - Total reported use = 16,681 AF
- Average 2019-2023:
 - Water-level change = -0.34 ft
 - Total reported use = 11,981 AF
- Net Inflows = 9,987 AF
- Percent reduction for stable water levels:
 - Average conditions = 40%
 - Drought (2011) = 58%
 - Last 5 years = 17%

Wichita County Township 16S 38W

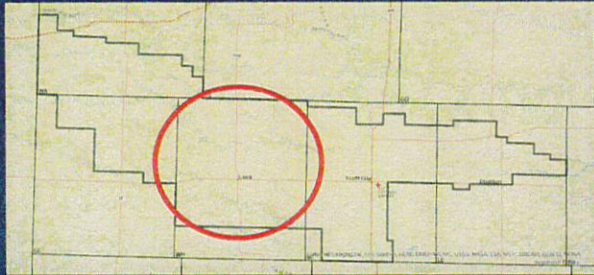


- R-squared = 0.74, P < 0.00009
- Average 2010-2023:
 - Water-level change = -0.48 ft
 - Total reported use = 6,883 AF
- Average 2019-2023:
 - Water-level change = -0.06 ft
 - Total reported use = 4,963 AF
- Net Inflows = 5,073 AF
- Percent reduction for stable water levels:
 - Average conditions = 26%
 - Drought (2011) = 46%
 - Last 5 years = 0%

Wichita County Township 16S 38W, Index Wells

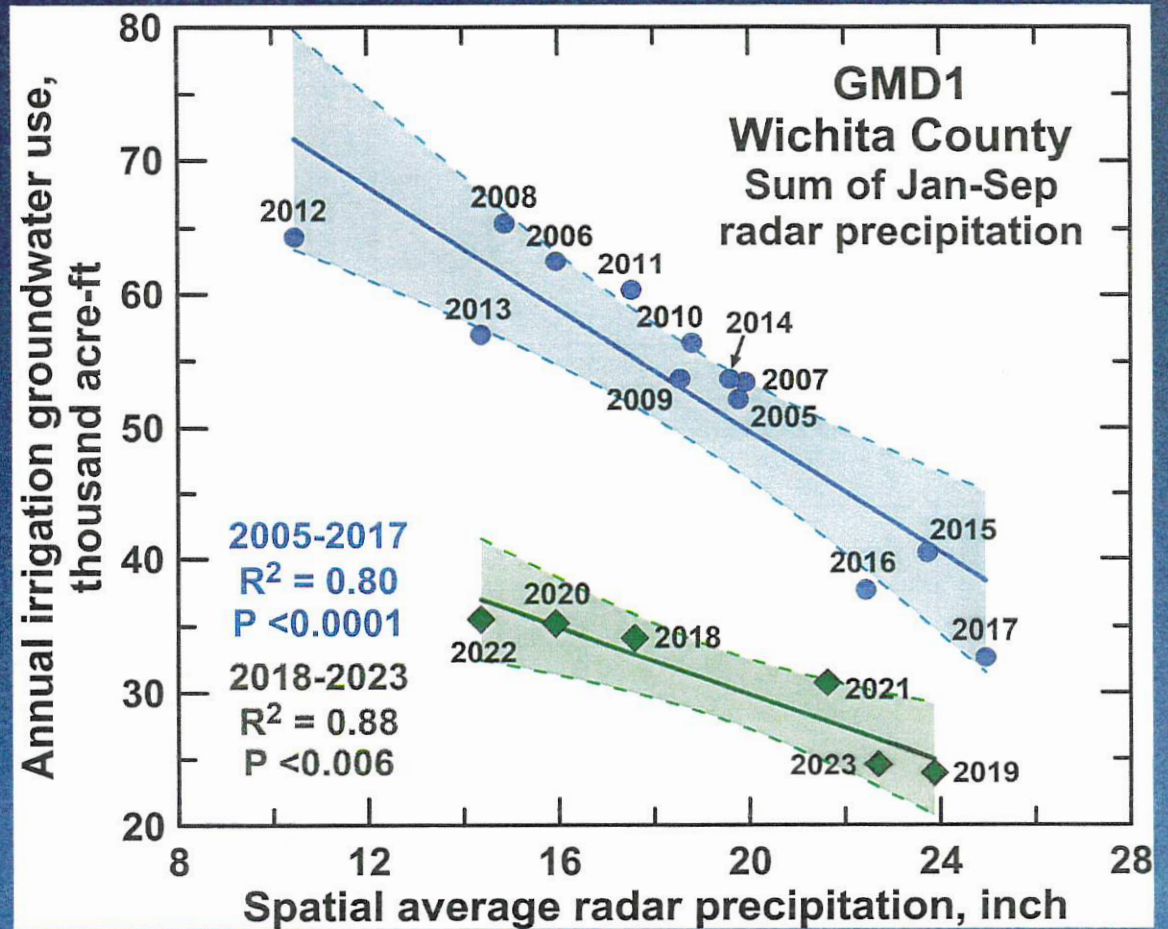


Wichita County

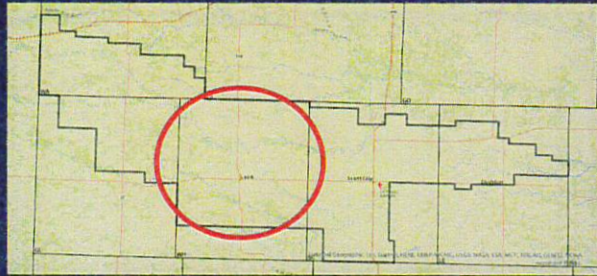


On average, 40% decrease in water use for similar climatic conditions.

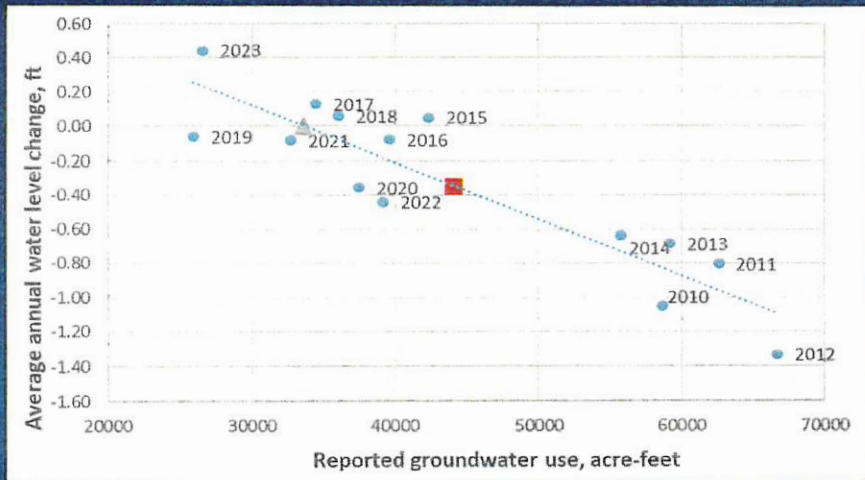
- about 25% produced by improvement in irrigation efficiency.
- about 15% produced by a decrease in irrigated area (reported decrease 19.9%).



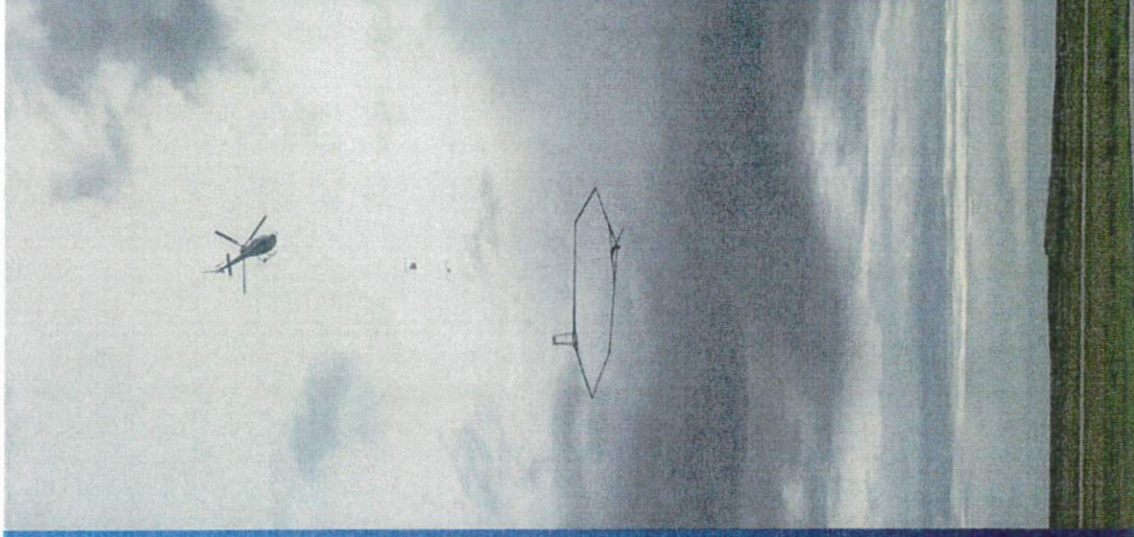
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Airborne Electromagnetic (AEM) Survey



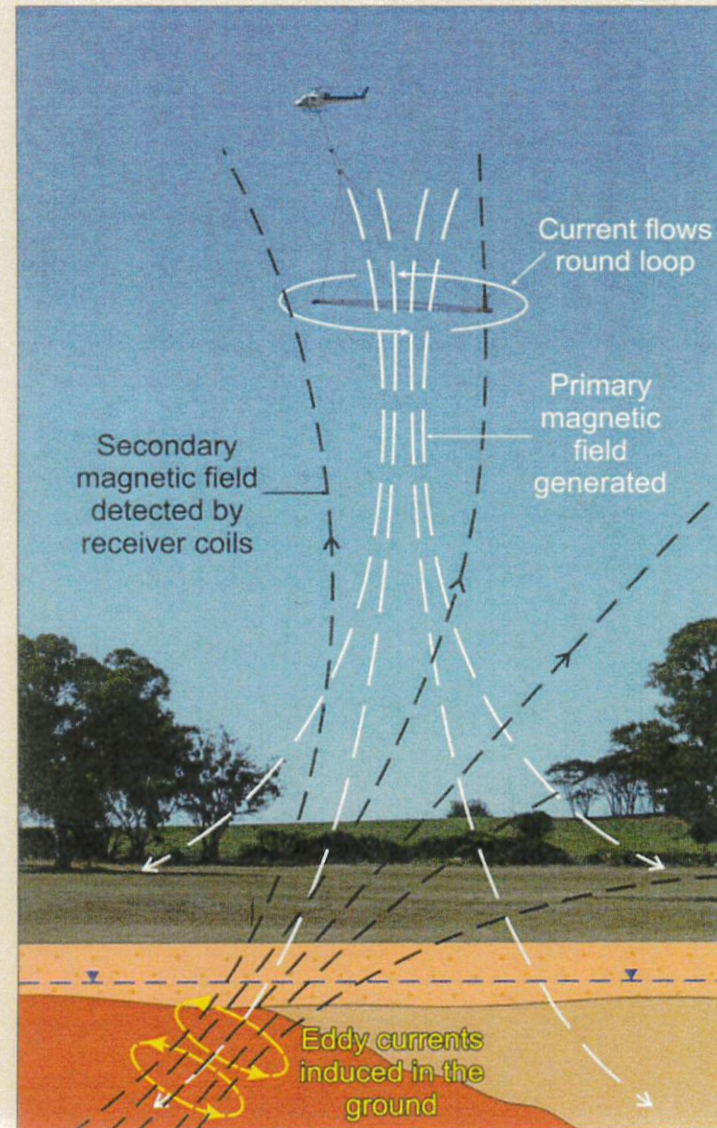
How AEM works:

The transmitter fires discrete electromagnetic pulses that generate a primary magnetic field.

The pulses induce eddy currents in the subsurface that generate a secondary magnetic field, i.e. the “response”.

The receiver “listens” for this response – we are measuring this secondary magnetic field.

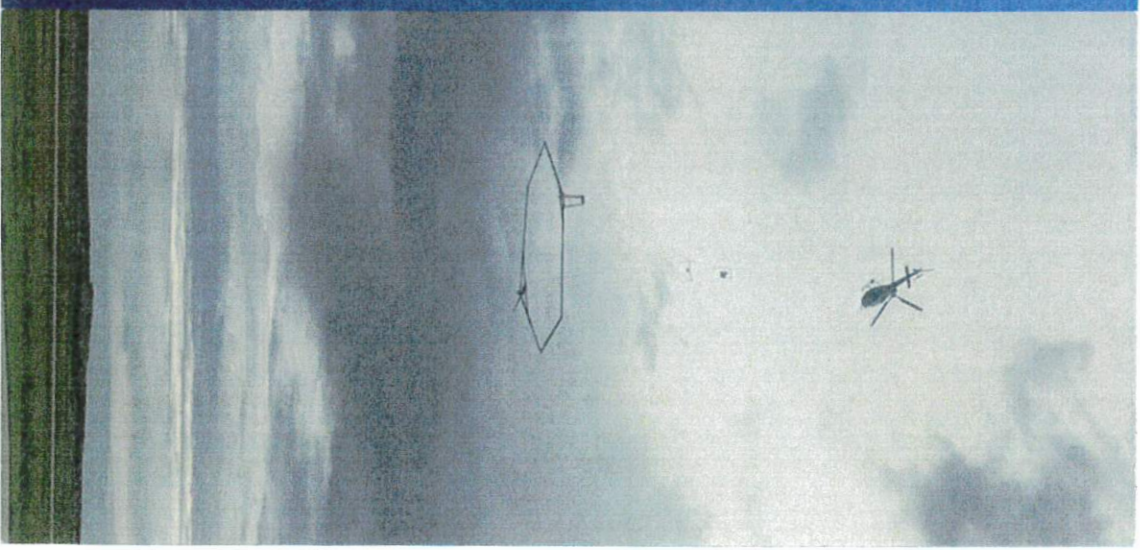
This measurement provides information on electrical resistivities in the subsurface. Sands and gravels have higher resistivities, while clays, silts, and shale bedrock have lower resistivities.



GMD4 Flights Lines – 2,443 miles (3,932 km) – May 28-June 16, 2024



GMD1 Timing – June 2025



Questions????

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



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

Update on Wichita County LEMA Review

Presented by: David Barfield, GMD 1 Consultant; August 28, 2024

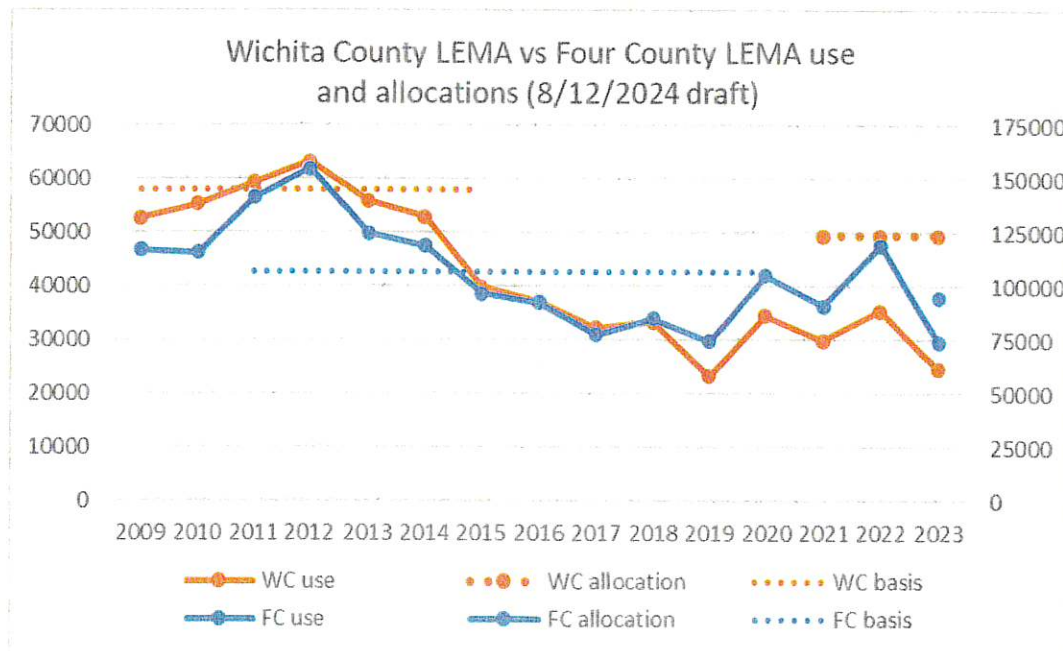
Introduction and Overview

GMD 1 manages two Local Enhanced Management Areas (LEMAs):

- **Wichita County LEMA (WC LEMA):** Established for the period 2021-2025, the WC LEMA reduces groundwater pumping by 25% from the 2009-2015 average for about 55% of water users. The remaining users, with historical use below 20% of their authorized quantity, are limited to their historic use. If the LEMA allocations are fully utilized, the LEMA would achieve a 14.7% reduction from the 2009-2015 baseline. Allocations are assigned by point of diversion unless a combined well unit was created in the LEMA's first year.
- **Four County LEMA (FC LEMA):** Established for the period 2023-2027, the FC LEMA implements reductions ranging from 0% to 25% of the 2011-2020 average water use. If LEMA allocations are fully utilized, the reduction would be 11.7%. Allocations are determined by overlap groups.

Both LEMAs undergo annual evaluations. In the fourth year, a more comprehensive review assesses whether the LEMA should be renewed and considers any necessary adjustments.

The graph below provides an overview of total water use versus overall allocations for each LEMAs. Most notably, water use within the WC LEMA has been significantly below the allocated amounts over its first three years (2021-2023).



Wichita County LEMA Review

Year 4 Review Requirements (as outlined in the WC LEMA plan):

In addition to the annual review, the GMD Board, with input from the Division of Water Resources, must conduct a more formal assessment of the WC LEMA in its fourth year. This review is to include an evaluation of economic impacts and the local public interest, while ensuring the LEMA's goals are met.

The Board will produce a report for the Chief Engineer that includes specific recommendations regarding future actions for the WC LEMA. This report will be presented at stakeholder meetings to discuss potential future LEMA plans. All recommendations must be supported by relevant data, reports, testimonials, or other records.

Draft Overview of WC LEMA Performance and Projections

- **Goal and Performance:** The original allocations under the WC LEMA, if fully utilized, would have resulting in a 14.7% reduction from the 2009-2015 average water use, reducing annual usage from 57,880 AF to 49,377 AF. However, appeals resulted in an additional 1,758 AF/year of allocations, decreasing the reduction to 11.7%.
 - **2021-2023 Water Use:** The average irrigation water use within the WC LEMA during this period was 30,582 AF/year—52.8% of the 2009-2015 average and 61.9% of the LEMA's allocated amount.
 - **Projected 5-Year Use LEMA use and savings:** If the 2021-2023 average use continues through 2024-2025, the total projected LEMA use for the 5-year LEMA period would be 152,912 AF. This would result in additional savings of 93,971 AF for the LEMA period beyond the initial projected savings of 42,562 AF.
 - **Projected Unused LEMA Allocations:** The projected unused allocations for the WC LEMA period is 94,224 AF, equivalent to approximately 1.8 years of the average LEMA allocation.
 - **Projected Individual LEMA compliance:** Similarly, for each of the 522 points of diversions (PDs) not in Combined Well Units these PDs, the projected LEMA use was estimated and compared with their allocation. It appears a relatively small number of PDs could overuse their allocations. DWR is currently contacting those with low remaining allocations.
-

Potential Carry-over of Unused LEMA Allocations

One of the key decisions related to renewal of the WC LEMA is whether to allow carry-over of unused allocations from 2021-2025 to the next LEMA period. While the GMD 4 LEMA does not permit carry-over, other multi-year programs including the Walnut Creek IGUCA, the Sheridan 6 LEMA, multi-year flex accounts (MYFAs), and most Water Conservation Areas (WCAs), allow carry-over, most typically one year's allocation or authorized quantity.

Wichita County WCA Carry-over Issue:

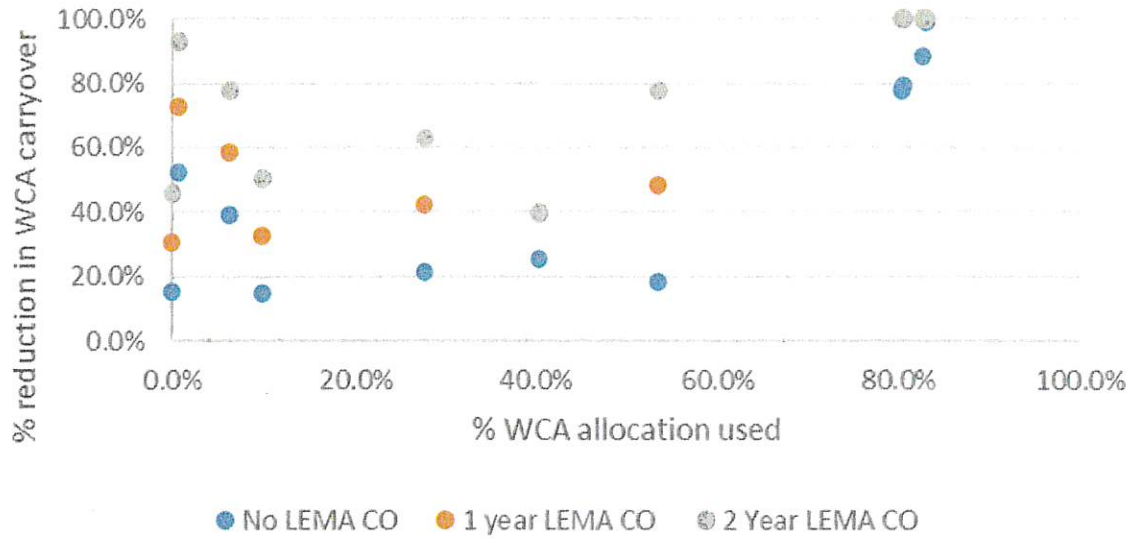
The WC Water Conservation Area (WC WCA), initiated in 2017, allows for voluntary enrollment in the long-term program of water conservation with increased flexibility in use. allows for unlimited carry-over of unused allocations. The first 7-year WCA period was from 2017-2023; the second is from 2024-2030. The WC WCA is unique allowing unlimited carry-over of unused allocations.

However, WCA participants within LEMAs must comply with the more stringent of the two allocations, WCA vs. LEMA. As a result, DWR was required to limit WCA carry-over for certain WCA participants when determining the 2024-2030 allocations, as it was unknown if the LEMA would allow carry-over. This restricted the carry-over for 11 of the 26 participants, most significantly impacting those with minimal use in the first WCA period.

If the renewed LEMA permits carry-over, the following scenarios are possible. Other options may be explored as well:

- **No LEMA Carry-over:** The average WCA carry-over for affected participants would be 54% of the unused WCA allocations.
- **1 Year of LEMA Carry-over:** The average WCA carry-over for affected participants would increase from 54% to 68% of the unused WCA allocations.
- **2 Years of LEMA Carry-over:** The average WCA carry-over would increase to 80% of the unused WCA allocations.

% WCA allocation used vs allowable WCA carryover





Western Kansas Groundwater Management District #1

Survey: Please return to GMD Staff – Feedback is Welcome

1. Do you think there should be limits as to the quantity of water that can be carried over from one LEMA or WCA to the next?
2. If you could incorporate an additional flexibility to a future LEMA, what would it be?
Open enrollment for Combined Well Units?
3. What is a resource needed to assist in the implementation of the LEMA that is currently lacking? (*technology, incentives, changes to crop insurance, etc.*)
4. How long do you think a future LEMA should be? 5 years? 2 years? 7 years? 10 years?
5. Do you support continuing the LEMA on essentially similar terms, with more flexibility?