ACTION PLAN (2026)

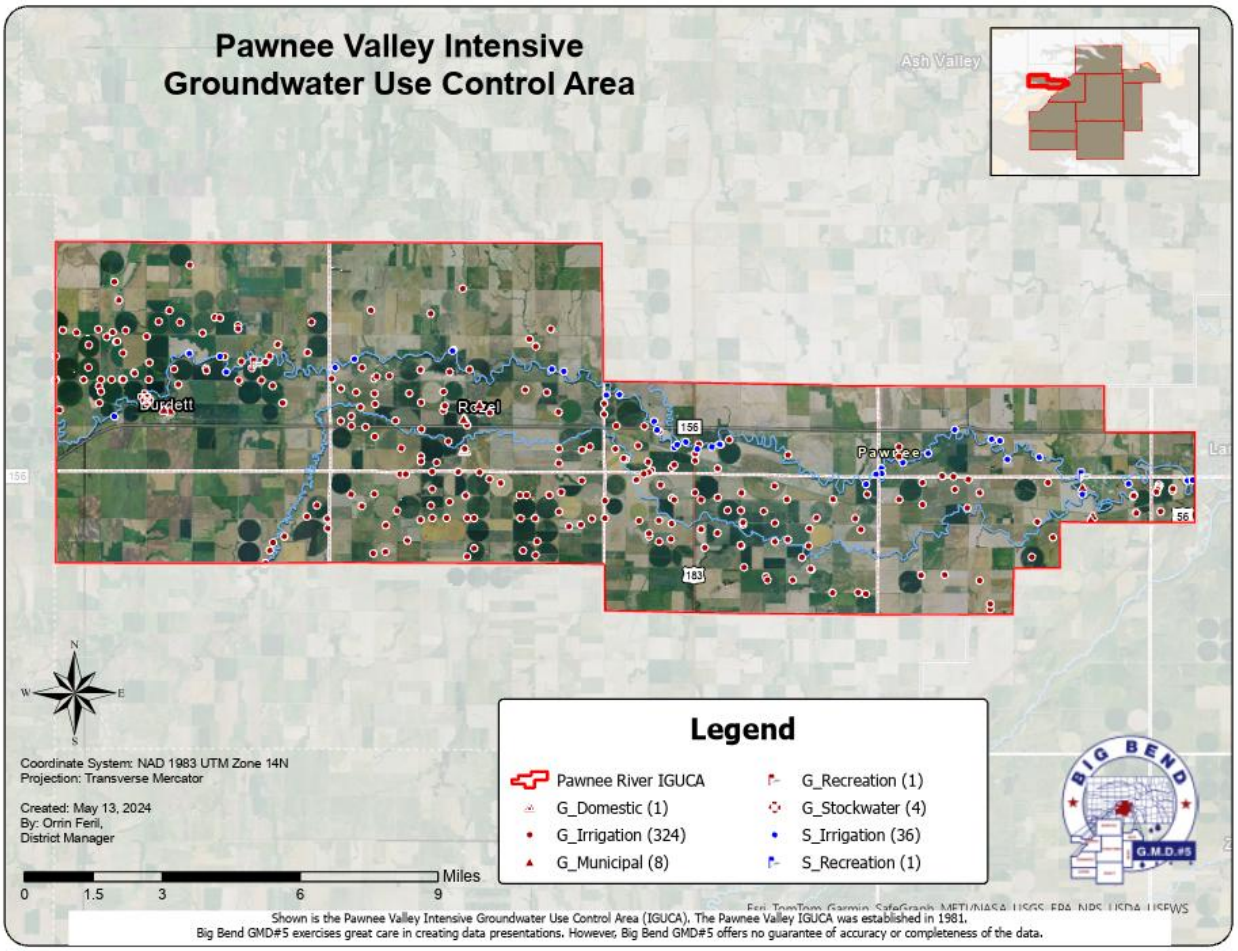
Summary

The District has implemented a variety of programs to address hydrologic issues throughout the region since the inception of the District in 1976. Early in the District's history this involved the development of the District's management program which resulted in the establishment of several policies and regulations that laid the foundation for the current hydrologic conditions of the region. These included strict monitoring of water use with flow meters, well spacing requirements, discouragement of waste of water and encouragement of the re-used water sources. Recently, the Kansas Geological Survey published a technical publication which indicated the District is within 1.6% from sustainable water level fluctuations (Whittemore, Butler, Jr., & Wilson, 2023). This study looks at the average annual water level fluctuations in comparison to the annual withdrawals from the aquifer through well diversions. This does not, however, indicate that there are no issues to address, but rather the goal of long-term sustainability is within reach for the region. As the District works through this process, there are two subsections below: 1) Priority Areas of Concern and 2) Supplemental Areas Under Consideration. These areas have been submitted and accepted by the Chief Engineer per K.S.A. 82a-1044 in July 2024. The areas of concern and supplemental areas are published to the District's website (https://gmd5.org/annual-report) for public outreach.

Priority Areas of Concern

Water Quantity

Pawnee Valley Intensive Groundwater Use Control Area



Background

In 1980, the District noted declining water levels in the region upstream from the City of Larned along the Pawnee River. Accordingly, the District requested that the Chief Engineer initiate proceedings for an Intensive Groundwater Use Control Area (IGUCA). Following public hearings in late 1980, the Chief Engineer issued the Pawnee Valley IGUCA order. In the years since its establishment, this order has been amended twice by KDA-DWR at the request of the District. In 2007, the Phase I order was issued to expand the IGUCA to the upstream watershed to the west. However, this expansion has not taken place at this point. The Kansas Department of Agriculture – Division of Water Resources maintains a website with a useful timeline and details regarding the corrective controls and copies of the Pawnee Valley IGUCA ("PN IGUCA") orders (Department of Agriculture, 2007).

The water level trends in the PN IGUCA region have stabilized and are responsive to water recharge. This trend can be attributed to several factors. 1) As a corrective control for this IGUCA, the development of new water rights was stopped, and water rights are closed to new appropriations. 2) Horsethief Reservoir has been completed and maintains routine downstream deliveries of water to the Pawnee River to aid in further recharge to the underlying aquifer in the region. 3) Water metering has been required for all diversions of water within the District. Through the water flowmeter program, water users are more mindful of the amount of water used annually and can better manage that water use throughout the irrigation growing season.

Outreach

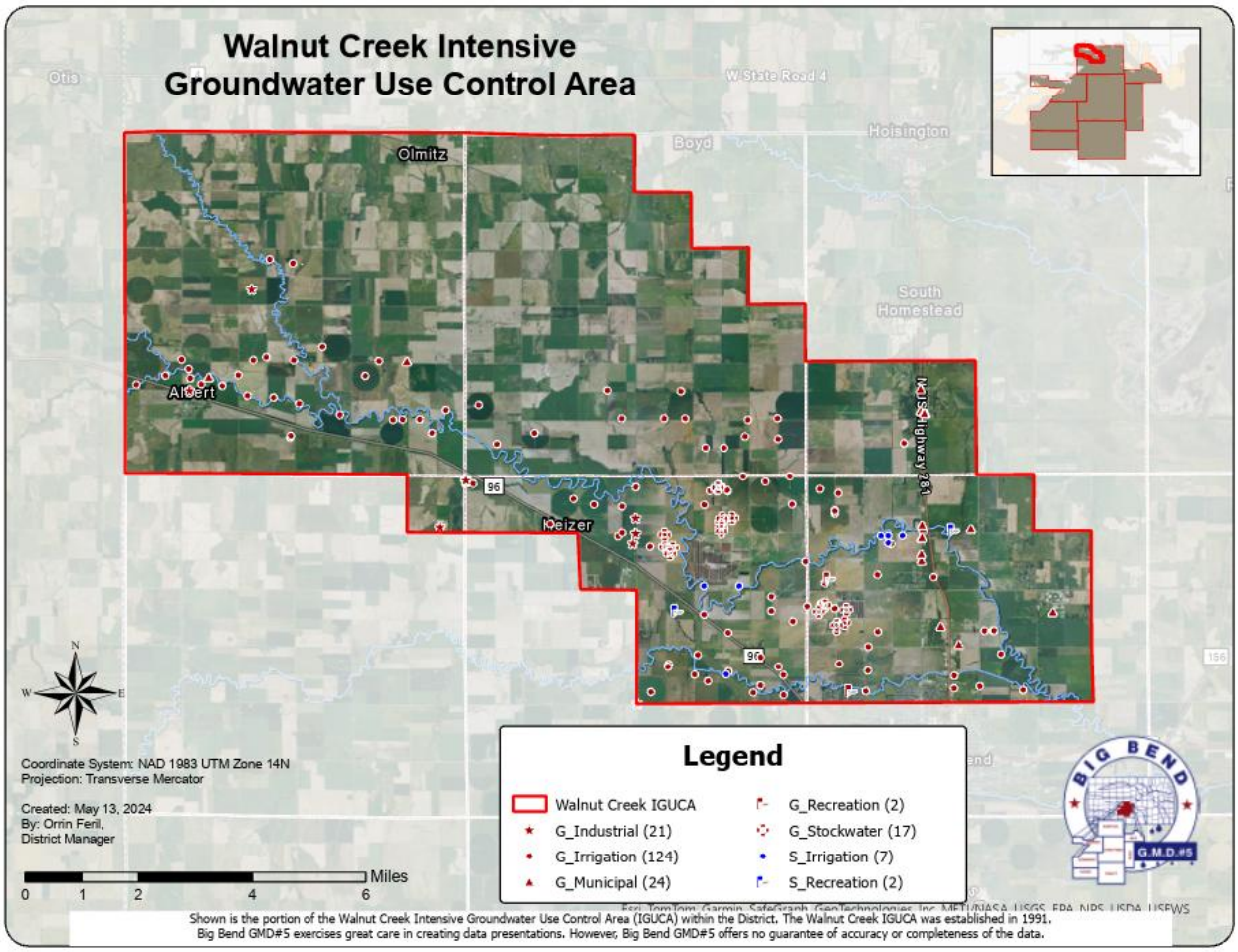
On October 21, 2025, District staff held a meeting in Larned at the Larned Community Center to discuss regional hydrology and prospective outcomes through changes in water management in the Pawnee county portion of the PN IGUCA. There were approximately 20 stakeholders in attendance at this meeting. Since the meeting in October, the District has received two written comments pertaining to Pawnee county water management. One of these comments pertained to the PN IGUCA.

Implementation

Based on information received from the public and data collected by District staff, the District action plan implementation for the PN IGUCA region will include, but are not limited to the following:

1. Continue monitoring the water level trends within this region;
2. Continue the water flow meter program to ensure accurate water use accounting;
3. Encourage utilization of the Irrigation Technology Initiative; and
4. Request review by KDA-DWR of the PN IGUCA order based upon current hydrologic conditions and water management within the region.

Walnut Creek Intensive Groundwater Use Control Area



Background

In early 1990, in response to reports from KDA-DWR, the Kansas Department of Wildlife and Parks, along with the District, requested the Chief Engineer initiate proceedings for an IGUCA in the watershed upstream of Cheyenne Bottoms Wildlife Area. There were concerns that the water withdrawals from the watershed had negatively impacted the groundwater levels to an extent that Walnut Creek was negatively affected thus limiting the supply of water to Cheyenne Bottoms. Following public input and formal public hearings throughout 1990 and 1991, the Chief Engineer established the Walnut IGUCA in portions of Rush, Ness, and Barton counties. The KDA-DWR website has another useful timeline with details regarding the corrective controls and copies of the Walnut Creek IGUCA ("WC IGUCA") orders (Department of Agriculture, 2021).

The water level trends in the WC IGUCA region have stabilized and are responsive to water recharge. This trend can be attributed to several factors. 1) As a corrective control for this

IGUCA, the development of new water rights was stopped and water rights are closed to new appropriations. 2) Water right allocations were established for water rights within the region that restricted the use of water by junior water rights. 3) Water metering has been required for all diversions of water within the District. Through the water flowmeter program, water users are more mindful of the amount of water used annually and can better manage that water use throughout the irrigation growing season

Outreach

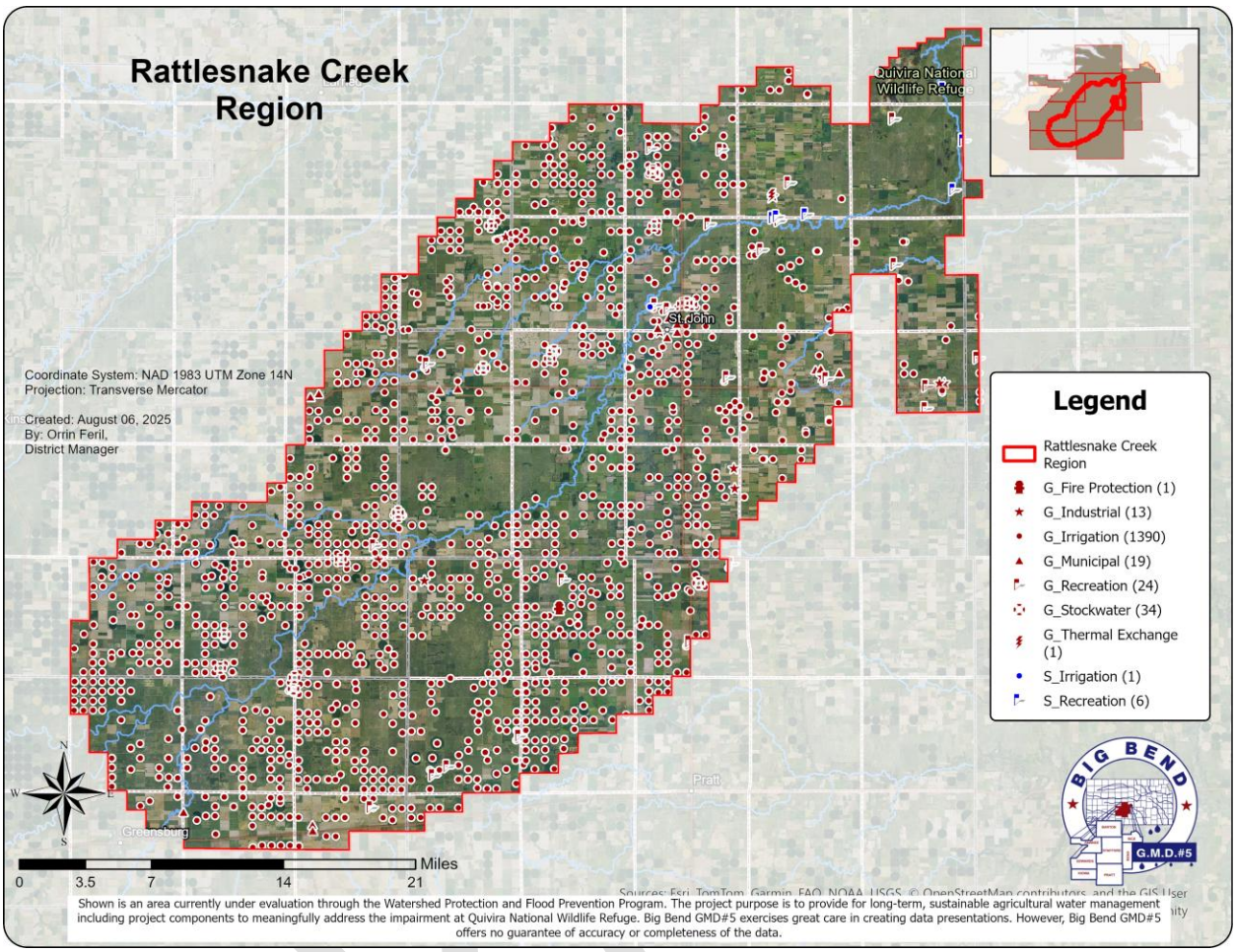
On October 21, 2025, District staff held a meeting in Great Bend at the Great Bend Chamber of Commerce to discuss regional hydrology and prospective outcomes through changes in water management in the Barton county portion of the WC IGUCA. There were approximately 20 stakeholders in attendance at this meeting. Since the meeting in October, the District has not received written comments pertaining to Barton county water management.

Implementation

Based on data collected by District staff, the District action plan implementation for the Walnut Creek IGUCA region will include but are not limited to the following:

1. Continue monitoring the water level trends within this region;
2. Continue the water flow meter program to ensure accurate water use accounting;
3. Encourage utilization of the Irrigation Technology Initiative;
4. Request finalization of the review by KDA-DWR of the Walnut Creek IGUCA order based upon current hydrologic conditions and water management within the region;
5. Consider conversion of Barton county portion of the Walnut Creek IGUCA to Local Enhanced Management Area ("LEMA") following WC IGUCA review.

Rattlesnake Creek Region



Background

For several decades, the District has been working with local, state, and federal agencies to develop a long-term sustainable program to address the water resource needs at Quivira National Wildlife Refuge ("Refuge") in Stafford County. Since 2020 the District has contracted with Olsson to conduct a thorough evaluation of several alternatives for water management issues in the Rattlesnake Creek region. This highly anticipated plan is nearing completion and will provide a long-term sustainable program to the region that is largely funded by USDA-NRCS funds through the Watershed Protection and Flood Prevention Program. Currently, the plan is finalized and awaiting record of decision from NRCS. Meanwhile, the KDA-DWR has initiated a working group of stakeholder organizations to coordinate efforts to implement short-term projects for providing water use conservation and/or streamflow improvements. The District is involved in this working group effort while finalizing a larger long-term resolution for the region.

The Rattlesnake Creek region has been one of the most studied regions in Kansas for many decades. Over that time frame, there have been several management plans and programs to stabilize the aquifer and streamflow balance. Water table trends throughout the region are stable and respond very rapidly to recharge events. Local conservation efforts through the working group can be coupled with the forthcoming Watershed Plan document ensuring long-term stability in the region.

Outreach

On October 20 and 22, 2025, District staff held meetings in Pratt, Greensburg, Kinsley, and St. John to discuss regional hydrology and potential management actions for the Rattlesnake Creek region priority area. There were over 50 stakeholders in attendance at these meetings. Since the meetings in October, the District has received one written comment pertaining to water management. As a part of the Watershed Plan process, the District along with NRCS completed multiple public review and comment periods for the Watershed Plan – EIS document. Pertinent revisions were made throughout the process in response to public review.

Implementation

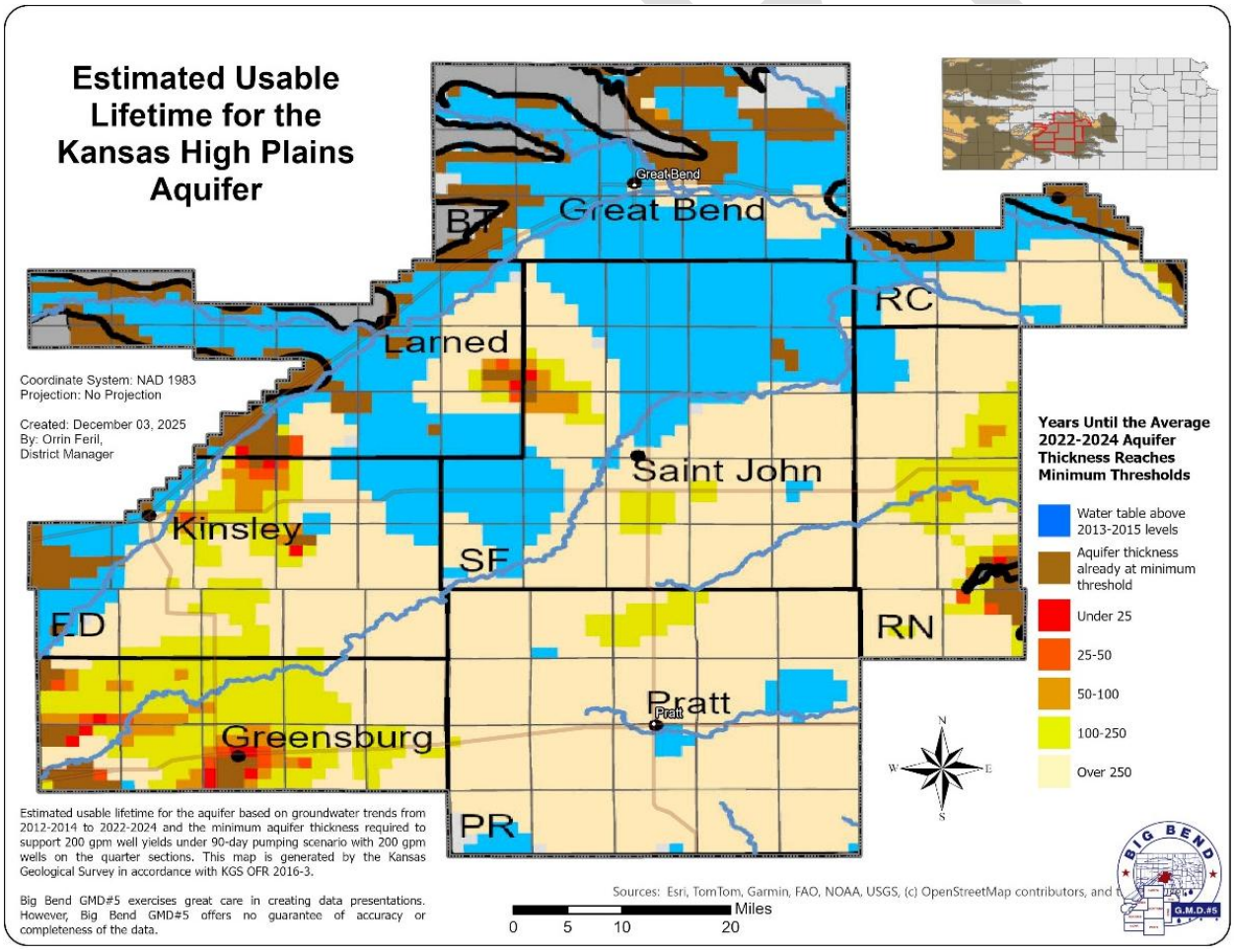
Based on information received from the public and data collected by District staff, the District action plan implementation for the Rattlesnake Creek region will include but are not limited to the following:

1. Support and implement the proposed alternative as outlined in the Watershed Plan – EIS document;
2. Continue to engage with and support local conservation efforts brought forward through the working group;
3. Prioritize Kansas' WTAP program for water rights in the 40 percent or greater response zones;
4. Continue monitoring the water level trends within this region;
5. Continue the water flow meter program to ensure accurate water use accounting; and
6. Prioritize utilization of the Irrigation Technology Initiative.

Estimated Useable Lifetime Evaluation

The Kansas Geological Survey (KGS) has developed a method to project historic water-level trends into the future and estimate how long the aquifer can continue supplying reliable well yields (Wilson, Young, & Buddemeier, 2002). By combining the current saturated thickness with the previous ten years of measured water level change, KGS calculates an "Estimated Useable Lifetime" for the aquifer. This process identifies the minimum aquifer saturated thickness needed to consistently produce 200 gallons per minute from a well.

Although, KGS notes that the method is most accurate for the Ogallala portion of the High Plains Aquifer located farther west of the District, it still provides valuable insight into areas that may face reduced well yields over time. The map below is the Estimated Usable Lifetime map as of 2023. Quarter sections shaded brown have already reached the minimum threshold, which in this region typically occurs along aquifer edges or over higher bedrock elevation.



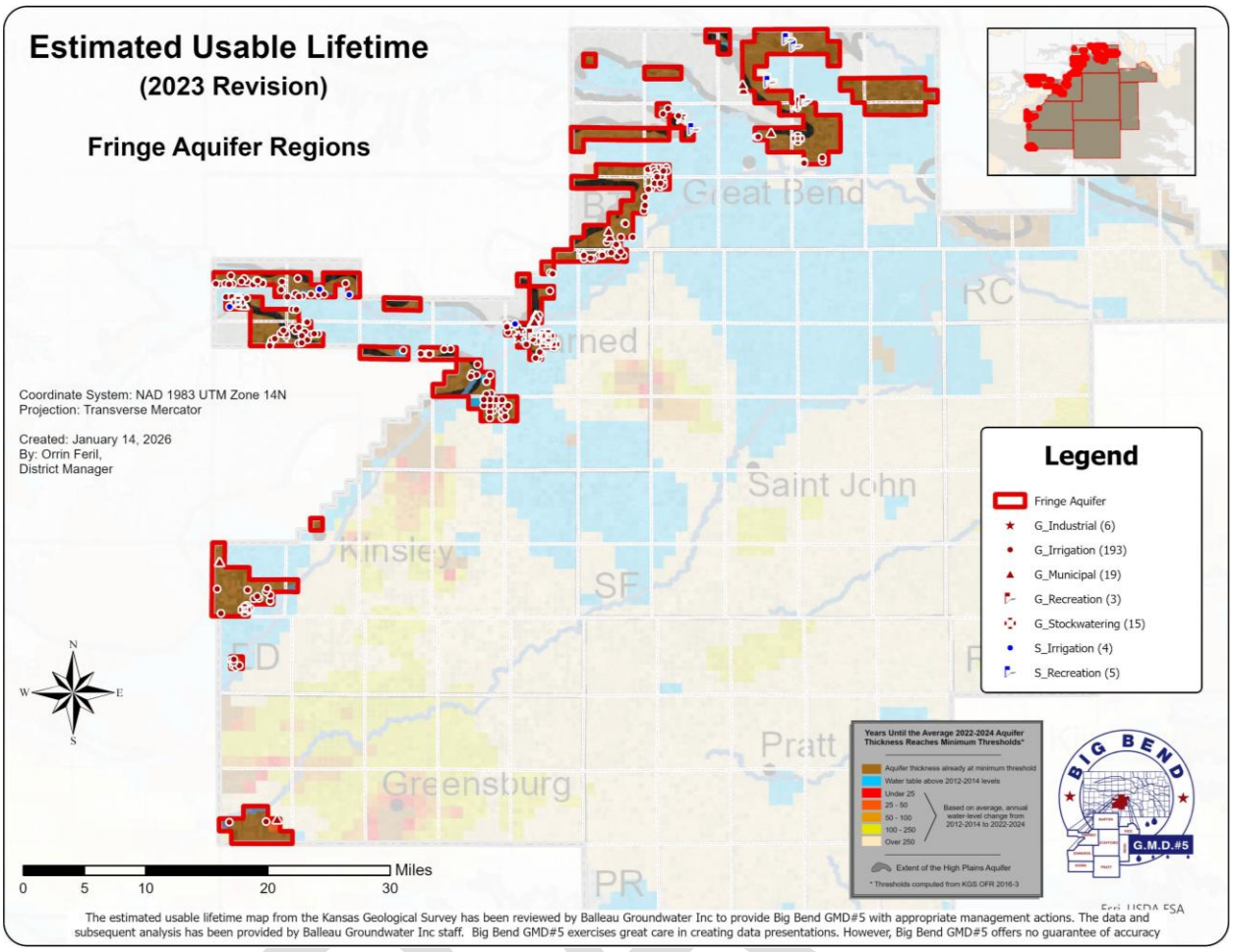
In 2025, the District requested additional analysis by BGW, in coordination with the KGS, for specific areas to help determine appropriate management actions. This analysis was completed in December 2025 and presented to the Board of Directors on December 11, 2025.

The analysis indicated that areas identified within the District as having less than 50 years of estimated usable aquifer life, were in similar condition prior to large-scale water right development in the region. Specifically, these areas were characterized by thin saturated thickness during what KGS refers to as the predevelopment period (1940s–1950s).

The areas discussed at the December 2025 board meeting are shown in the following maps and have been designated as priority areas of concern. For management and evaluation purposes, they are categorized into three classifications:

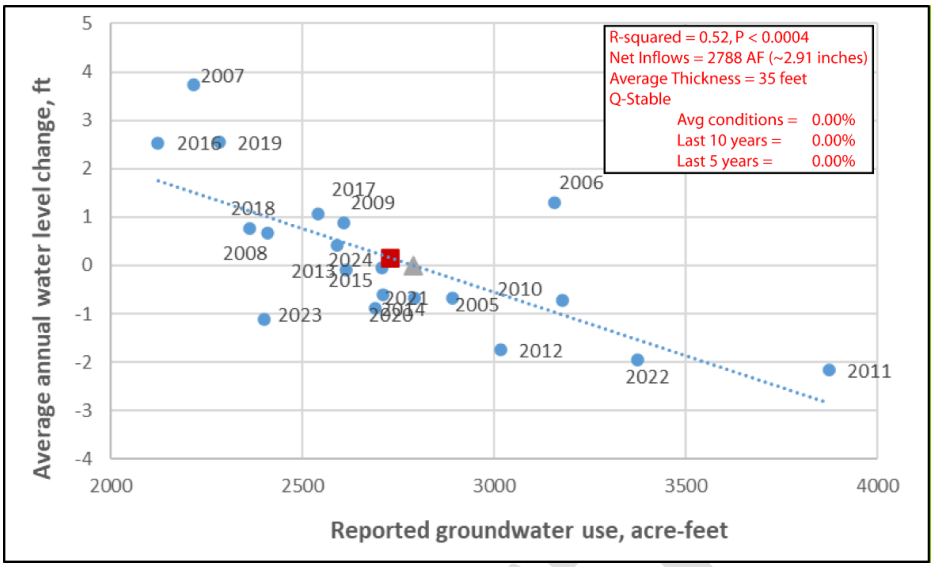
(1) Fringe aquifer areas
(2) Areas with stable water levels
(3) Areas with declining water levels

The KGS has developed a methodology to assist with local water management decisions often referred to as the Q-stable analysis (Butler Jr. J. J., Whittemore, Wilson, & Bohling, 2016). This approach compares the total pumping within an area to the net inflows into the aquifer. Q-stable is the total amount of pumping within that area that would result in stabilizing the water table. Following the identification of the regions having less than 50 years of estimated usable aquifer life, the District reached out to KGS for additional information regarding the Q-stable amount for each of these regions.



Background

The red-outlined regions shown on the map represent areas along the margins of the Great Bend Prairie aquifer where the saturated thickness is thin. Available datasets indicate that these areas have exhibited thin saturated thickness for as long as records exist. Approximately 250 points of diversion are located within these 24 regions. Some of the 24 regions are as small as a single section along the edges of the District boundary. Water table levels in these regions do not tend to fluctuate significantly from year to year, indicating limited capacity for improvement through management actions. KGS staff ran the Q-stable analysis for these regions, and the results are presented in the chart below:



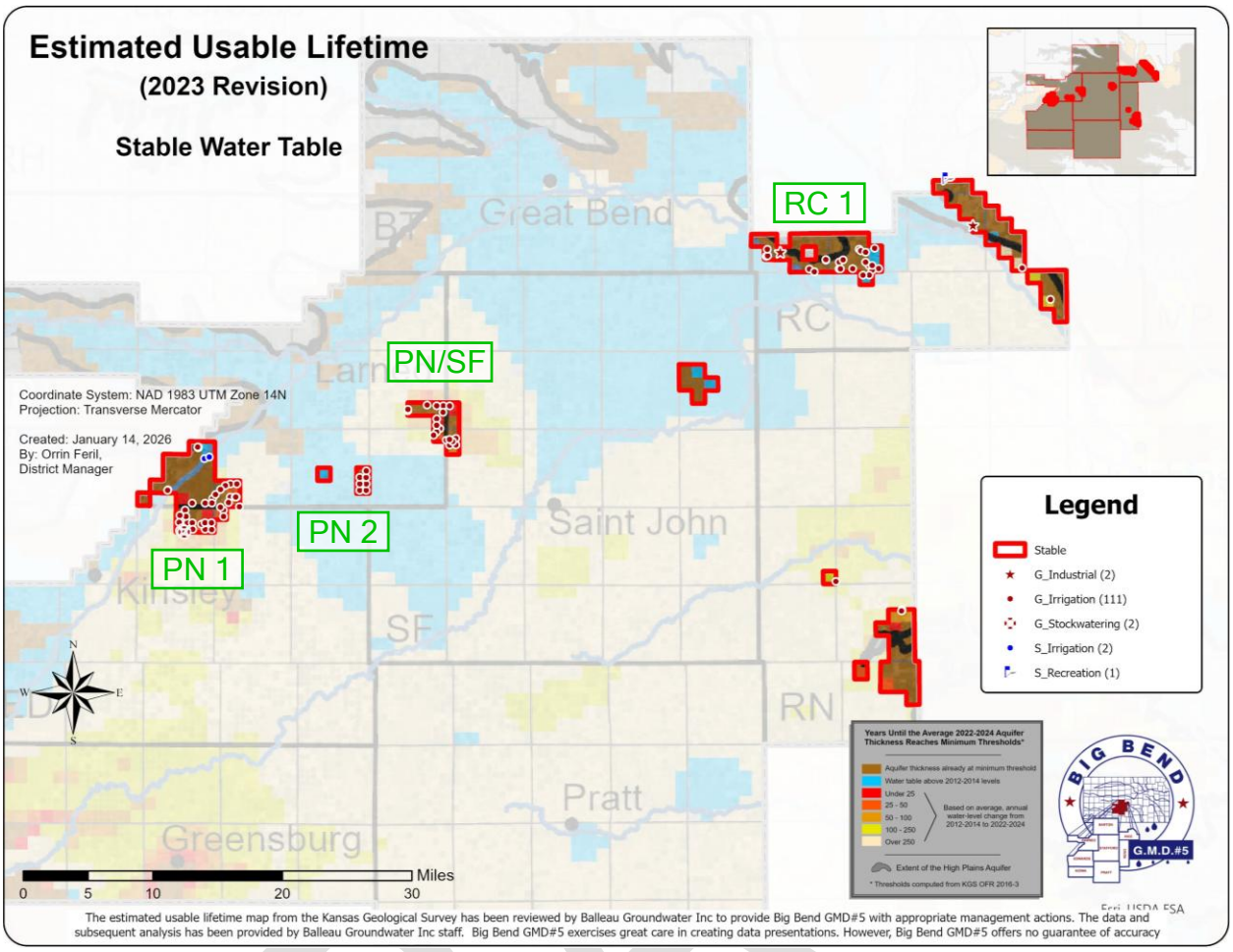
Outreach

The District is planning meetings in early spring to discuss these fringe areas and potential management actions. Further refinement of action steps and implementation will be discussed in these meetings.

Implementation

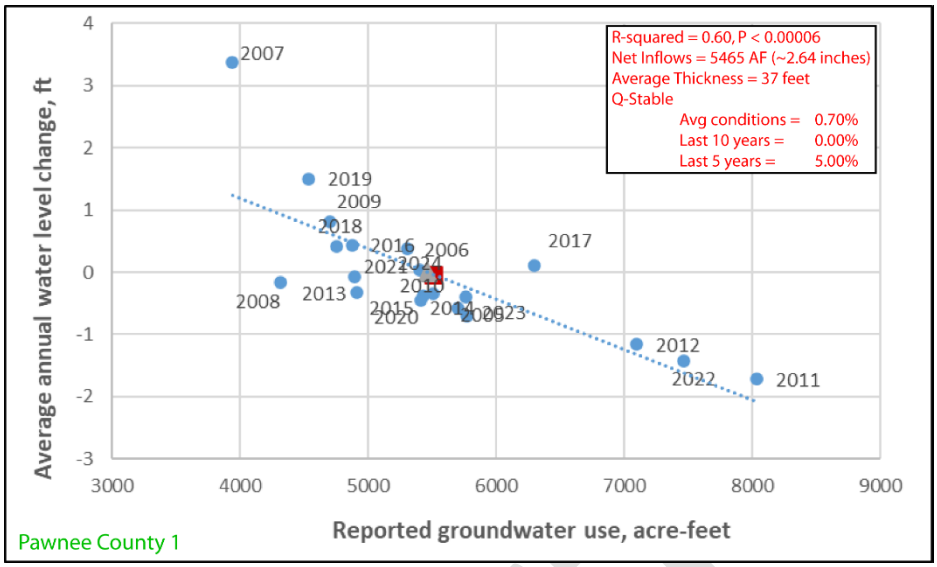
Based on information received from BGW and KGS more data is needed in these regions. Therefore, the District action plan implementation for the fringe aquifer regions will include but are not limited to the following:

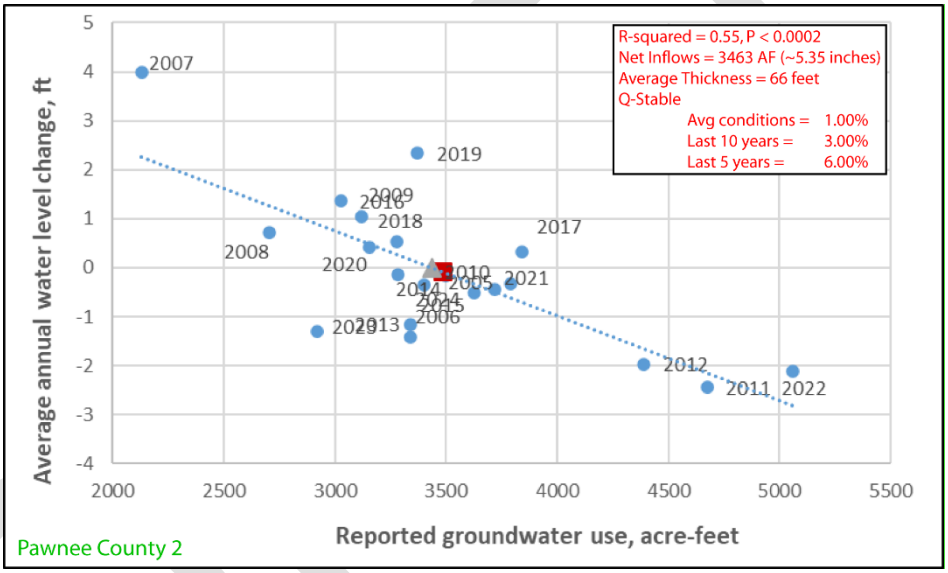
1. Continue monitoring the water level trends within these regions;
2. Where needed, install groundwater monitoring wells in coordination with KGS and BGW;
3. Conduct controlled pumping tests to collect specific capacity and refine hydraulic conductivity within these regions; and
4. Continue the water flow meter program to ensure accurate water use accounting.

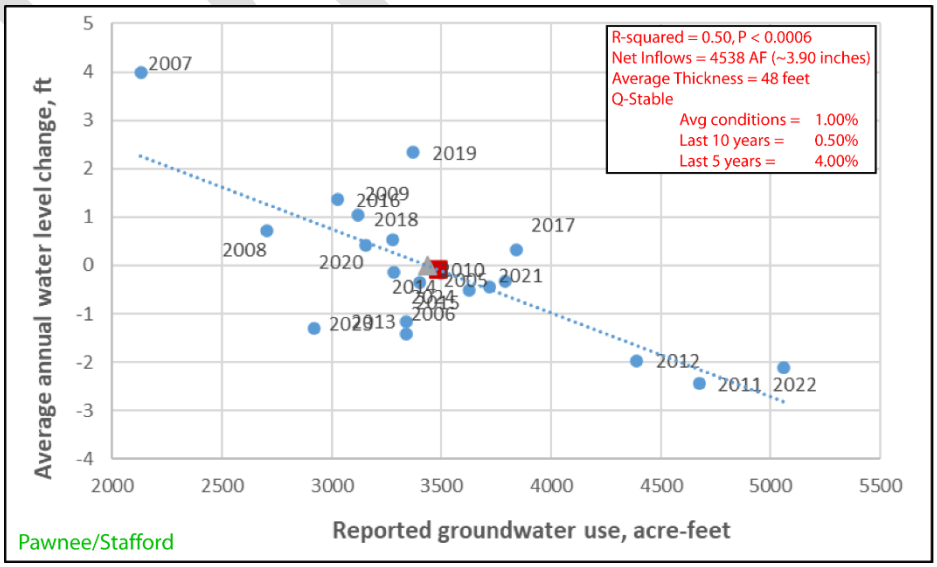


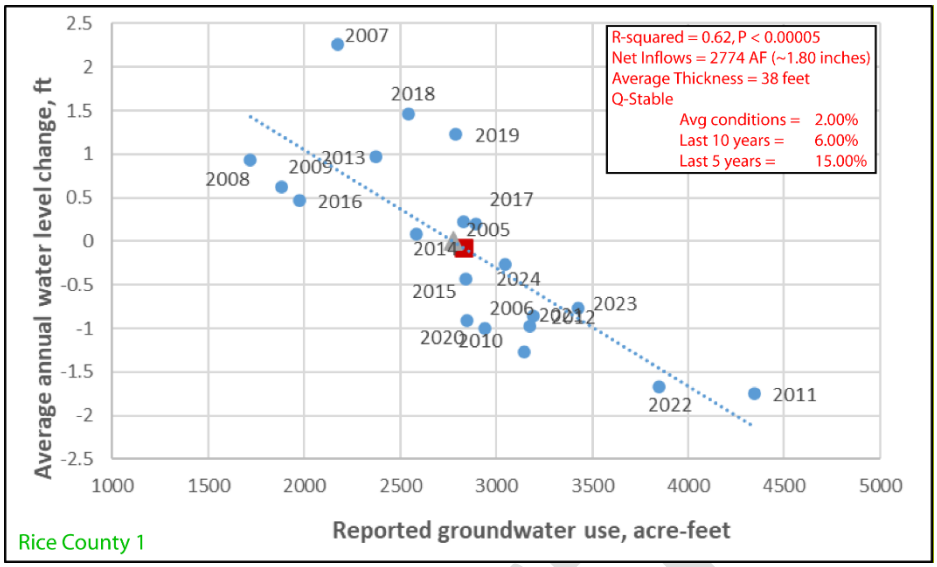
Background

According to analysis by BGW, the water level trends in the red-outlined areas shown on the map have remained generally stable over the past 40 years. Areas not located along the edges of the District boundary represent “bedrock islands,” where the aquifer thickness is thinner than in surrounding areas. In these locations, the water table does fluctuate from year to year in response to recharge events. However, the overall long-term trend remains stable at this point. There are approximately 120 points of diversion within these 12 areas. KGS staff ran the Q-stable analysis for regions that had sufficient data availability. In the map above there are labels for specific regions. These regions had sufficient data to conduct KGS’ Q-stable analysis, and the respective results are presented in the charts below:


R-squared = 0.60, P < 0.00006
Net Inflows = 5465 AF (~2.64 inches)
Average Thickness = 37 feet
Q-Stable
Avg conditions = 0.70%
Last 10 years = 0.00%
Last 5 years = 5.00%
Average annual water level change, ft
Reported groundwater use, acre-feet
Pawnee County 1


R-squared = 0.55, P < 0.0002
Net Inflows = 3463 AF (~5.35 inches)
Average Thickness = 66 feet
Q-Stable
Avg conditions = 1.00%
Last 10 years = 3.00%
Last 5 years = 6.00%
Average annual water level change, ft
Reported groundwater use, acre-feet
Pawnee County 2


R-squared = 0.50, P < 0.0006
Net Inflows = 4538 AF (~3.90 inches)
Average Thickness = 48 feet
Q-Stable
Avg conditions = 1.00%
Last 10 years = 0.50%
Last 5 years = 4.00%
Average annual water level change, ft
Reported groundwater use, acre-feet
Pawnee/Stafford



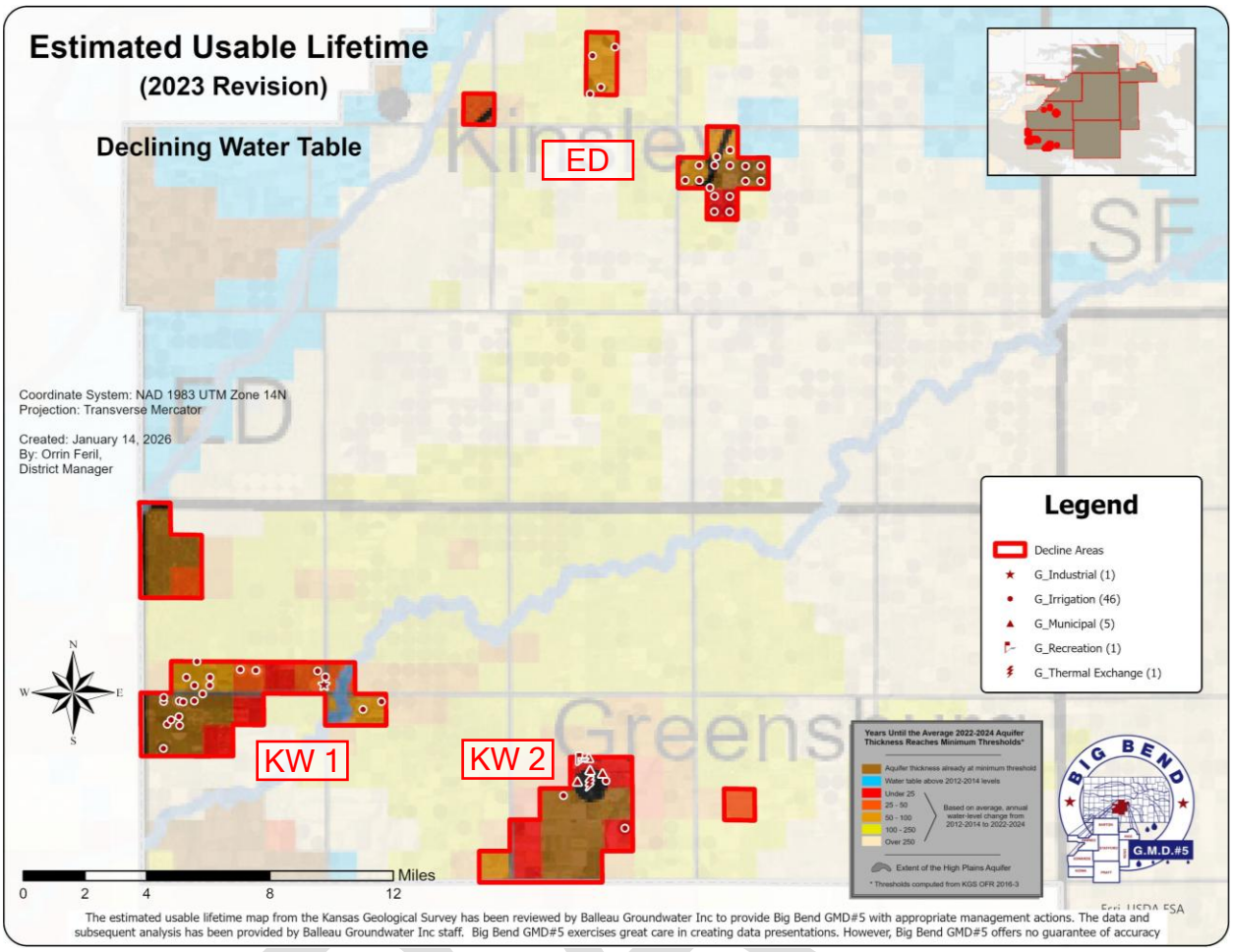
Outreach

The District is planning meetings in early spring to discuss these fringe areas and potential management actions. Further refinement of action steps and implementation will be discussed in these meetings.

Implementation

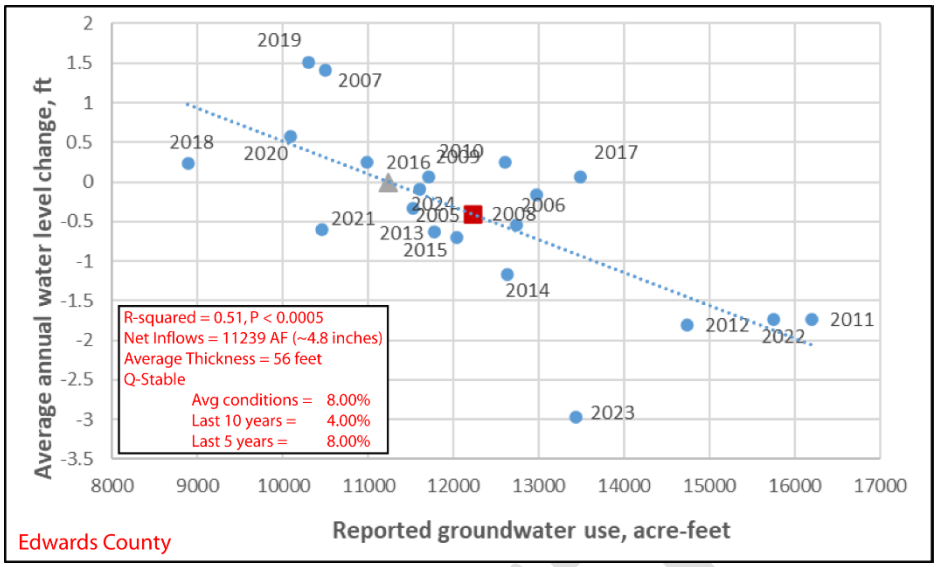
Based on information received from BGW and KGS more data is needed in these regions. Therefore, the District action plan implementation for the stable aquifer regions will include but are not limited to the following:

1. Continue monitoring the water level trends within these regions;
2. Where needed, install groundwater monitoring wells in coordination with KGS and BGW;
3. Conduct controlled pumping tests to collect specific capacity and refine hydraulic conductivity within these regions;
4. Continue the water flow meter program to ensure accurate water use accounting; and
5. Prioritize utilization of the Irrigation Technology Initiative.

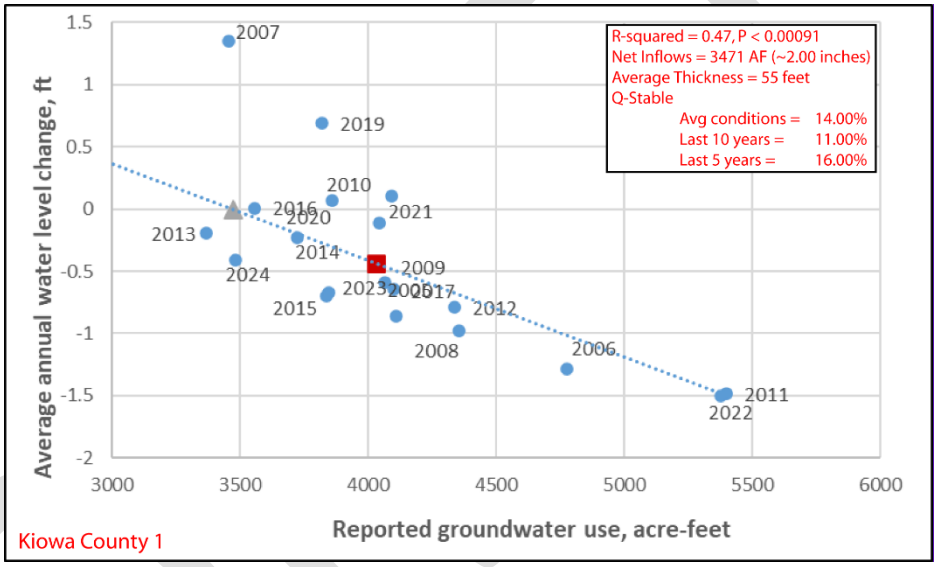


Background

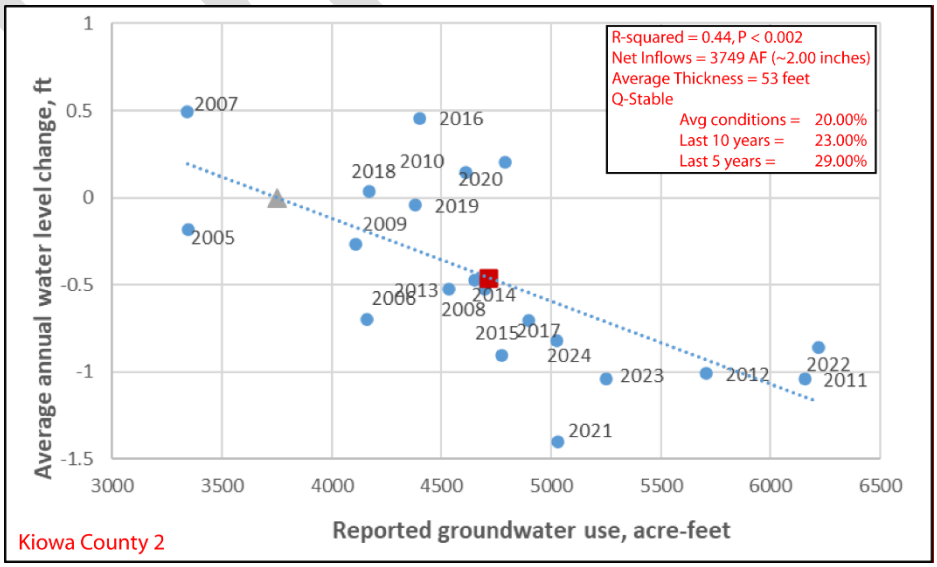
The analysis provided by BGW indicated that the regions outlined in red above represent thin portions of the aquifer that have experienced localized water level declines over the past 40 years. These declining trends are generally less than one-quarter foot per year over that period. The water levels do fluctuate in response to water recharge events, indicating potential responsiveness to management actions. Approximately 50 points of diversion are located within these seven regions, including five points of diversion serving the City of Greensburg's public water supply. KGS staff ran the Q-stable analysis for regions that had sufficient data availability. In the map above there are labels for specific regions. These regions had sufficient data to conduct KGS' Q-stable analysis, and the respective results are presented in the charts below:



Edwards County



Kiowa County 1



Kiowa County 2

Outreach

The District is planning meetings in early spring to discuss these fringe areas and potential management actions. Further refinement of action steps and implementation will be discussed in these meetings.

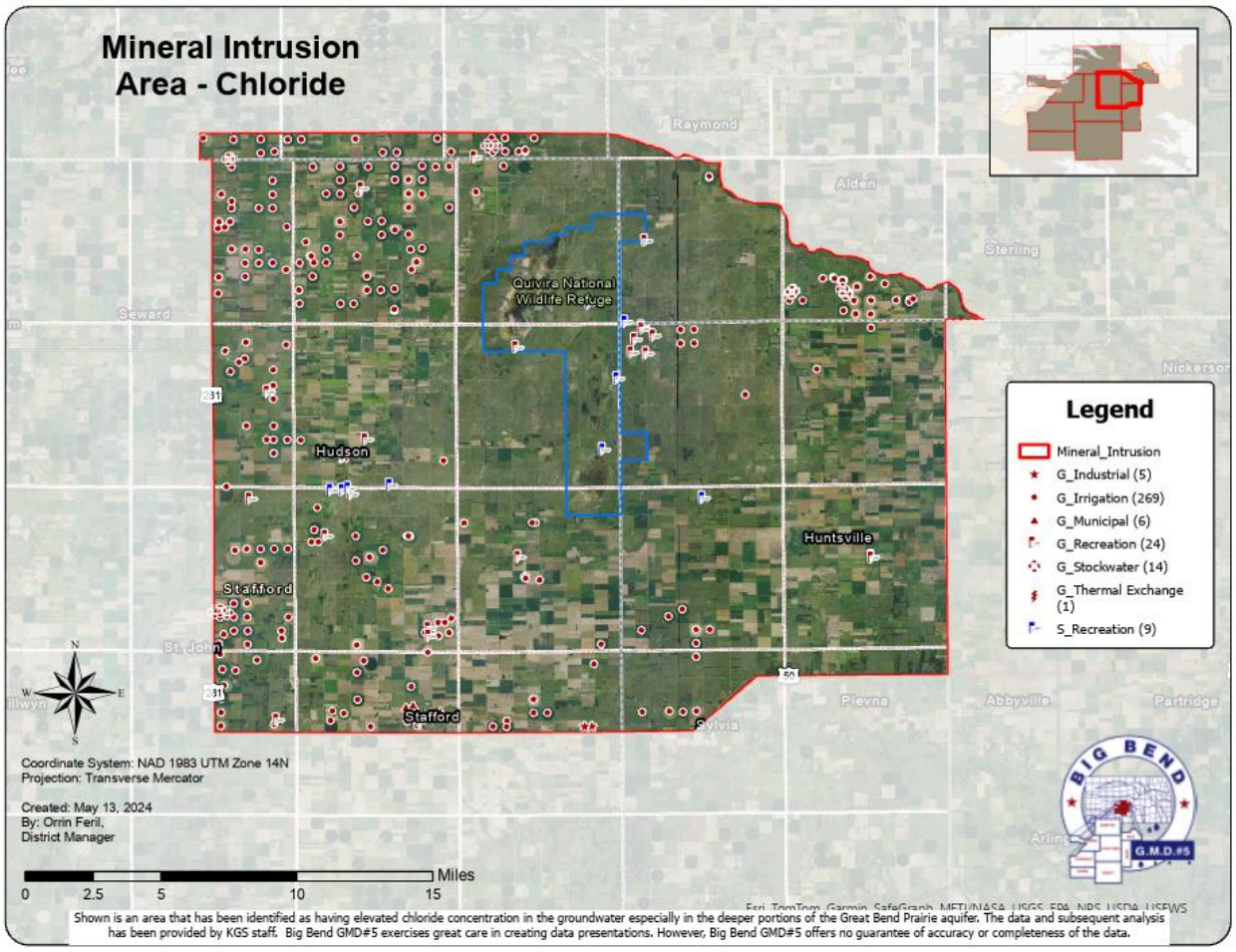
Implementation

Based on information received from BGW and KGS more data is needed in these regions. Therefore, the District action plan implementation for the declining aquifer regions will include but are not limited to the following:

1. Potential Local Enhanced Management Area for KW1 and KW2 regions;
2. Continue monitoring the water level trends within these regions;
3. Where needed, install groundwater monitoring wells in coordination with KGS and BGW;
4. Conduct controlled pumping tests to collect specific capacity and refine hydraulic conductivity within these regions;
5. Continue the water flow meter program to ensure accurate water use accounting; and
6. Prioritize utilization of the Irrigation Technology Initiative.

Water Quality

Chloride



Background

In the late 1970's to the early 1990's, with coordination with KGS staff, the District initiated a significant study of the water quality in the eastern half of the District. Specifically, this study identified the intrusion of saltwater (from the dissolution of salt) in the Permian bedrock into the overlying Great Bend Prairie aquifer (Whittemore D. O., 1993). As a result of this study, the District identified the Mineral Intrusion area and instituted regulations to reduce the up-coning of the brackish water into the Great Bend Prairie aquifer through groundwater pumping. The District maintains a network of observation wells throughout the region to collect water samples to track changes in the regional water quality.

Outreach

On October 22 and 23, 2025, District staff held meetings in St John, Sylvia and Sterling to discuss regional hydrology and prospective outcomes through changes in water management

in the previously identified mineral intrusion area. There were approximately 20 stakeholders in attendance at this meeting. Since the meetings in October, the District has not received written comments pertaining to the mineral intrusion area.

Implementation

Based on data collected by District staff, the District action plan implementation for the mineral intrusion area region will include but are not limited to the following:

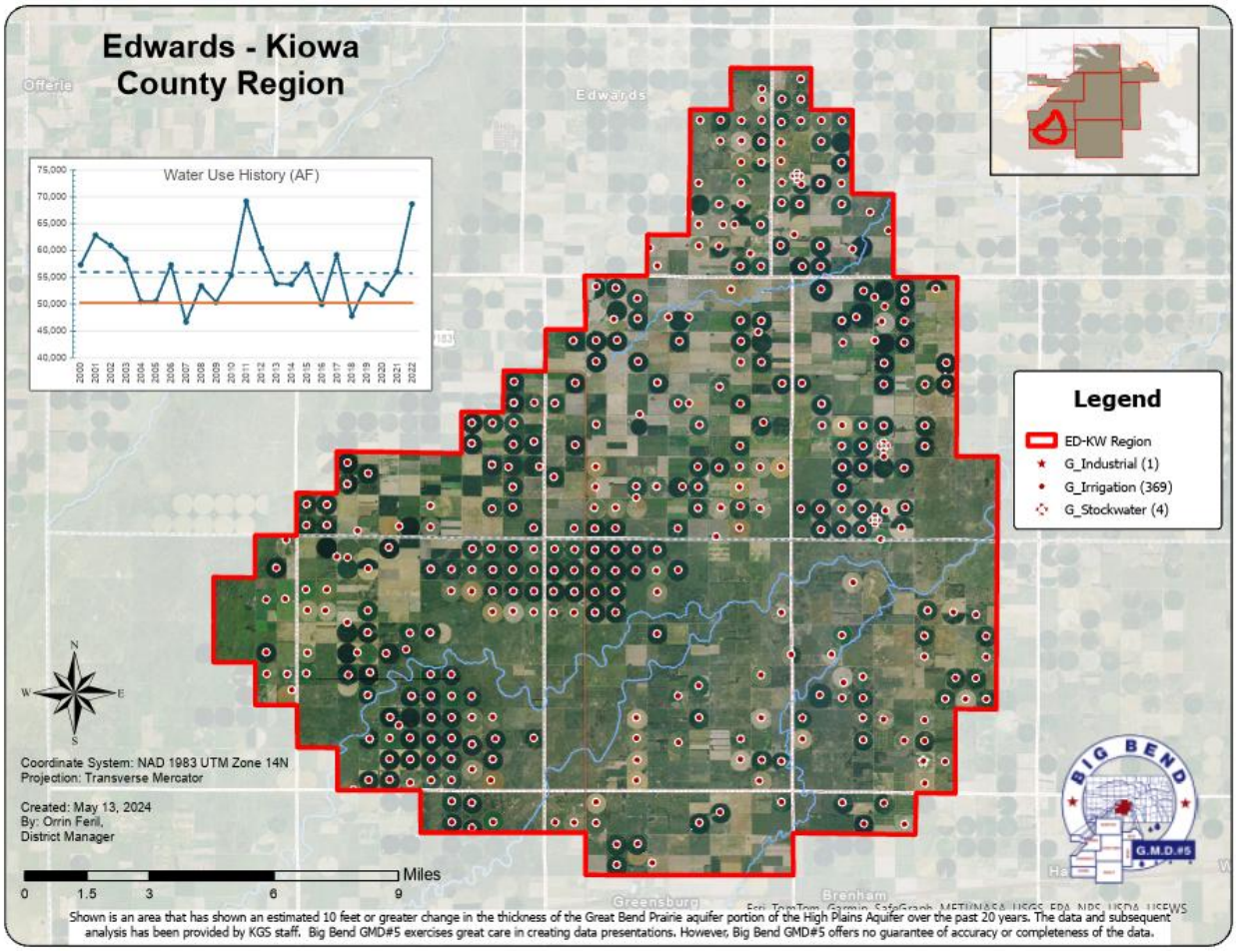
1. Reestablish water quality monitoring for chloride concentrations throughout the region from District observation wells;
2. Review K.A.R. 5-25-10, K.A.R. 5-25-16 for metrics to ensure proper monitoring and proactive mitigation to maintain the integrity of the upper zones of the aquifer in the region; and
3. Coordinate with KDHE and KGS to review water quality results and consider expansion of the mineral intrusion areas as necessary to properly maintain the regional water quality.

Supplemental Areas Under Consideration

The District board is in the process of collecting data sets for additional analysis and observation. The District either does not yet have enough data to sufficiently identify the area or considers the area to not currently require action. This does not preclude the District from escalating such areas to Priority Areas of Concern in future revisions of this document. This section will be utilized for identifying active areas being investigated and studied by the District and other partners.

Water Quantity

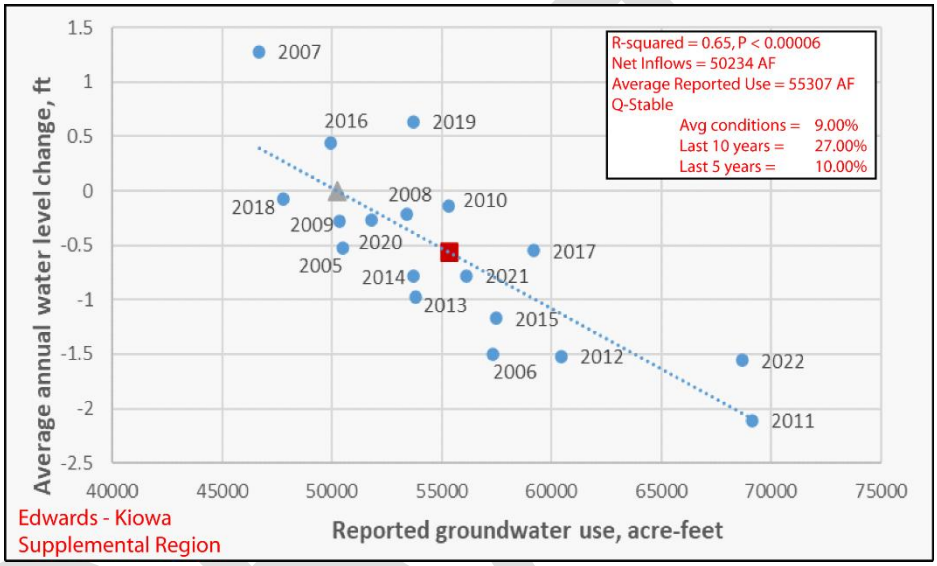
Edwards-Kiowa County Region



Background

In coordination with KGS staff, the District board has held public meetings in Edwards and Kiowa Counties to present water level trends in this area. The District board has identified an area between these two counties that has, over the past 20 years, shown a decline of 10 feet cumulatively. KGS' analysis has indicated that this area is experiencing approximately 0.5 ft

decline annually. Currently, the District is watching this area to determine if this trend is growing due to escalated pumping from the region or long-term climate shifts. A major reason for not elevating this area to a priority area of concern is that approximately half of this area is overlapped by the Rattlesnake Creek Region. When the action plan for the Rattlesnake Creek Region is determined, this region's boundary is likely to be modified. As for the reasons above, it is premature to identify this as a Priority Area of Concern, but it is being considered by the District. In an effort to continue to obtain comprehensive datasets for consideration by the District as well as public, KGS staff ran the Q-stable analysis for this region, and the result is presented in the chart below:



Outreach

The District held initial outreach meetings in Kinsley and Greensburg and St John in early 2024 to present information to the public during the development of the areas of concern. Feedback received in those meetings indicated that when considering the estimated usable lifetime of the region compared to the water level trend is considered reasonable by the stakeholders. Further outreach meetings were held in October 2025 to outline updated hydrology for the region.

Implementation

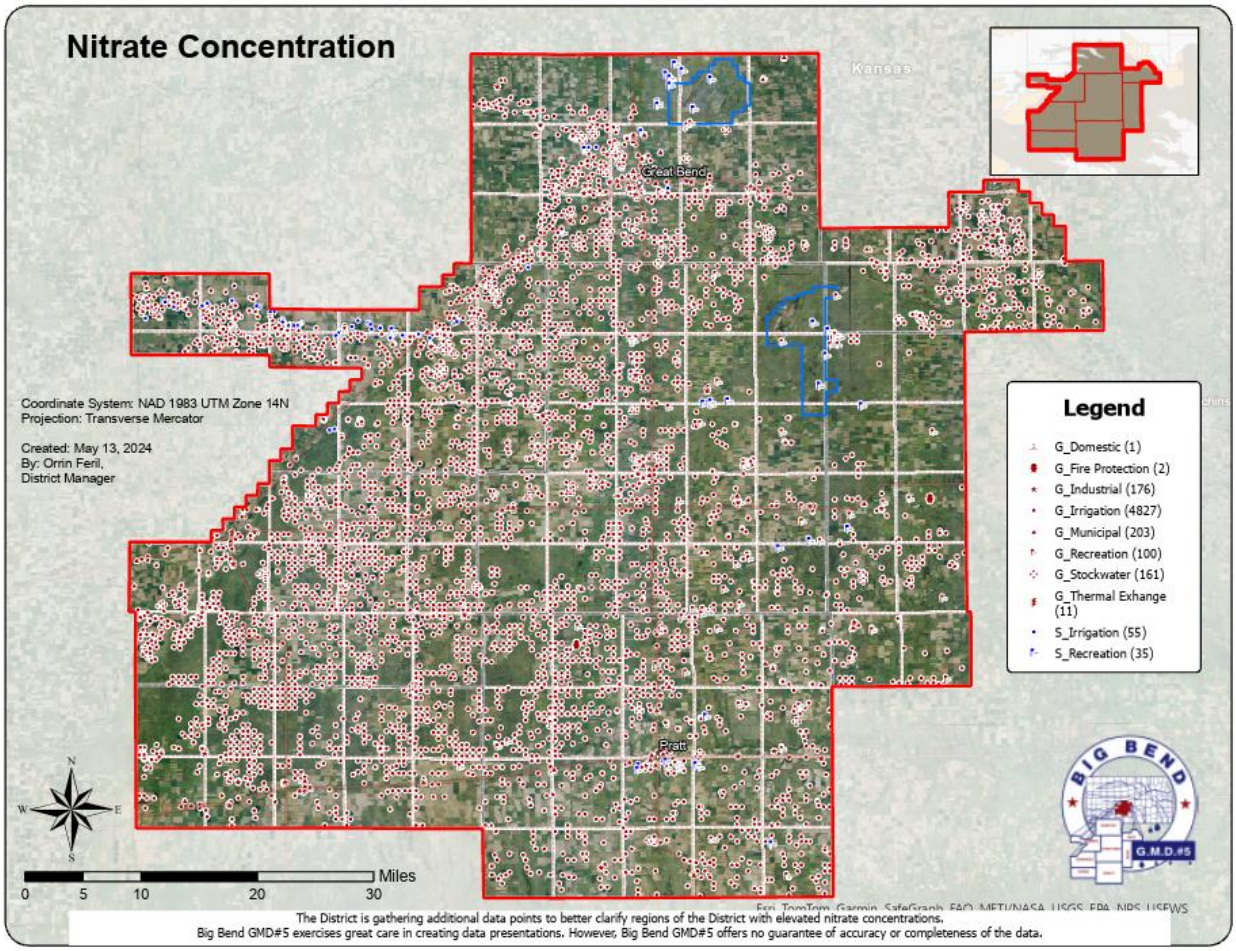
Based on information received from stakeholder outreach during multiple outreach meetings, the District will continue the following:

1. Continue monitoring the water level trends within these regions;
2. Where needed, install groundwater monitoring wells in coordination with KGS and BGW;

3. Conduct controlled pumping tests to collect specific capacity and refine hydraulic conductivity within these regions; and
4. Continue the water flow meter program to ensure accurate water use accounting.

Water Quality

Nitrate



Background

Early KGS studies have indicated elevated nitrate concentrations in the groundwater of the District (Townsend & Young, 1995). The District is currently gathering additional data points and coordinating with KDHE to better clarify the regions within the District with elevated nitrate concentrations.

Outreach

Until such a time that a narrower area can be identified, the District is conducting a District-wide effort to inform and encourage all water users to collect and analyze their water wells for nitrate concentrations. The District is providing water bottles for public and private use to bring water

samples to the District lab for analysis. The District laboratory is not KDHE-certified, but this provides a quick and economical assessment for the public while allowing the District to collect water quality data from across the District. Once more data is collected, this can be analyzed to determine focused areas impacted by elevated nitrate concentrations. Since the District has not yet received a sufficient number of samples for analysis, effective identification of Priority Areas for nitrate concentrations is not possible. The District is continuing to collect water samples from a variety of sources to track trends in nitrate concentrations over time. In the past two years, the District has collected over 300 water samples. The data is currently being compiled into a unified database that will be shared with KGS in an effort to get this information public. The District held initial outreach meetings in 2025 to increase awareness of the concentrations of nitrate in the groundwater.

Implementation

Based on information received from stakeholders during multiple outreach meetings, the District will continue the following:

1. Continue water quality monitoring throughout the District;
2. Encourage private well sampling and submit analysis results to the District;
3. Where needed, install groundwater monitoring wells in coordination with KGS and BGW;
4. Integrate District water quality records with KGS' water quality database for public distribution; and
5. Research potential mitigation techniques to determine possible future actions as needed once priority areas are identified.

REFERENCES

Butler Jr., J. J., Whittemore, D. O., Wilson, B. B., & Bohling, G. C. (2016). A new approach for assessing the future of aquifers supporting irrigated agriculture. *Geophysical Research Letter*, 2004-2010.

Butler Jr., J. J., Whittemore, D. O., Wilson, B. B., & Bohling, G. C. (2018). Sustainability of aquifers supporting irrigated agriculture: a case study of the High Plains aquifer in Kansas. *Water International*, 815-828.

Department of Agriculture. (2007). *Pawnee Valley IGUCA*. Retrieved from Kansas Department of Agriculture - Division of Water Resources: https://www.agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/intensive-groundwater-use-control-areas/pawnee-valley-iguca

Department of Agriculture. (2021). *Walnut Creek IGUCA*. Retrieved from Kansas Department of Agriculture - Division of Water Resources: https://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/intensive-groundwater-use-control-areas/walnut-creek-iguca

Townsend, M. A., & Young, D. P. (1995). Factors Affecting Nitrate Concentrations in Ground Water in Stafford County, Kansas. *Current Research in Earth Sciences, no. 238 (January)*, 1-9.

Whittemore, D. O. (1993). *Ground-water Geochemistry in the Mineral Intrusion area of Groundwater Management District No. 5, South-central Kansas.* Lawrence: Kansas Geological Survey.

Whittemore, D. O., Butler, Jr., J. J., & Wilson, B. B. (2023). *2023 Status of the High Plains Aquifer in Kansas.* Lawrence: Kansas Geological Survey.

Wilson, B. B., Young, D. P., & Buddemeier, R. W. (2002). *Exploring Relationships Between Water Table Elevations, Reported Water Use, and Aquifer Lifetime as Paremeters for Consideration in Aquifer Subunit Delineations.* Lawrence: Kansas Geological Survey.