APPROVED
By GMD5 at 7:30 pm, Sep 10, 2026

APPROVED
By KDA-DWR at 5:18 pm, Sep 30, 2026

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 (KGS) 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.

The District has invested significantly in the development and application of the Big Bend GMD5 groundwater model (BBGMDMOD). The model was developed by Balleau Groundwater, Inc. (BGW) and finalized in 2010 through collaboration with District staff and a Technical Advisory Committee (Balleau Groundwater Inc, 2010). To ensure the model accurately represented regional hydrogeologic conditions, it underwent an independent peer review by S.S. Papadopulos & Associates, Inc (S.S. Papadopulos & Associates, Inc., 2011).

The primary objectives of the BBGMDMOD were to:

1. Evaluate the relationship between alternative groundwater management actions and their resulting impacts on aquifer and stream conditions.

2. Provide a scientifically defensible tool to address questions related to watershed management, aquifer sustainability, source-water accounting, and the condition of groundwater and surface water resources.

Since its completion, the BBGMDMOD has been utilized by the District, state agencies, and private entities to evaluate a variety of groundwater management scenarios and policy alternatives throughout the region. BGW is currently coordinating with KGS to complete a comprehensive update of the BBGMDMOD, incorporating additional data and advances in hydrogeologic understanding developed since the model's original release.

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 on the District's website (https://gmd5.org/district-action-plan) for public outreach.

The District has also established dedicated webpages for each of the areas identified:

Priority Areas:

- Pawnee River (https://gmd5.org/pawnee-river)
- Walnut Creek (https://gmd5.org/walnut-creek)
- Rattlesnake Creek (https://gmd5.org/rattlesnake-creek)
- Estimated Usable Lifetime (https://gmd5.org/estimated-usable-lifetime)
- Mineral Intrusion (https://gmd5.org/mineral-intrusion)

Supplemental Areas:

- Edwards – Kiowa County Region (https://gmd5.org/edwards-kiowa)
- Nitrate (https://gmd5.org/nitrate)

Priority Areas of Concern

Water Quantity

Pawnee Valley Intensive Groundwater Use Control Area

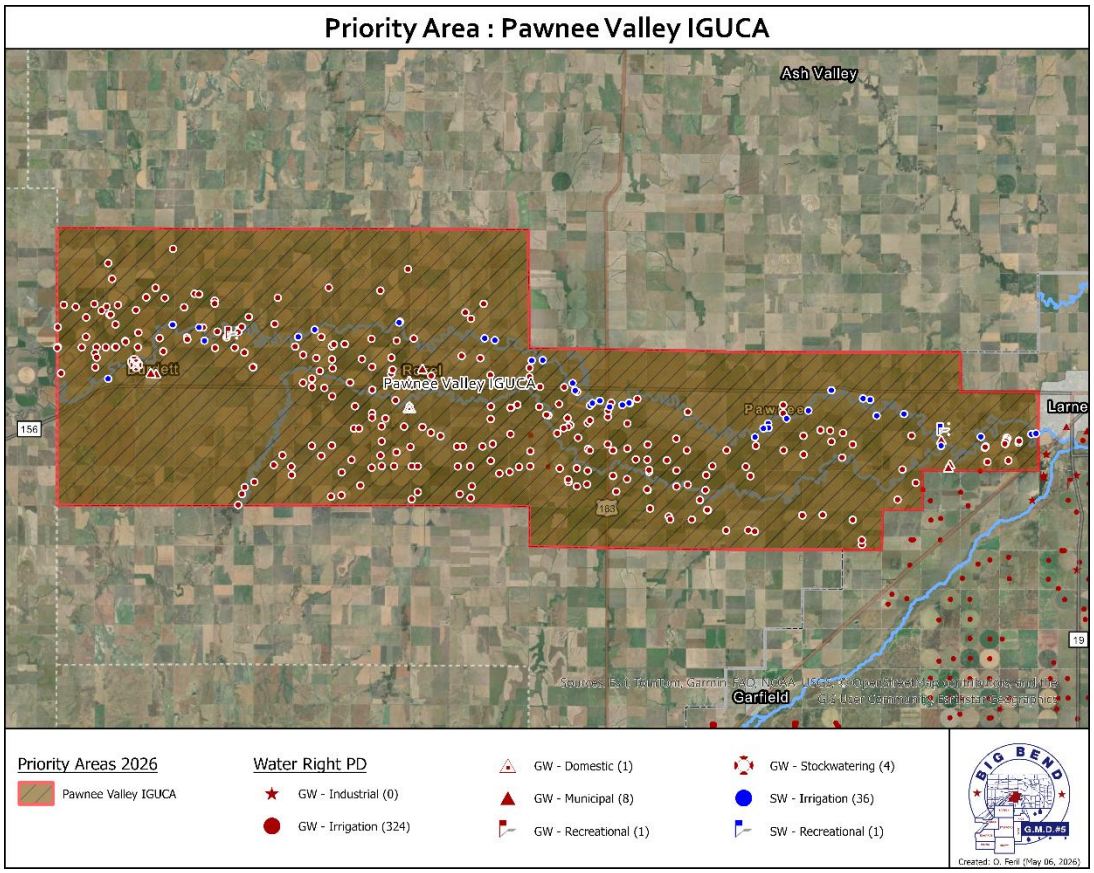

Figure 1 - Pawnee Valley IGUCA

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 (PN IGUCA) order. In the years since its establishment, this order has been amended twice by the Kansas Department of Agriculture – Division of Water Resources (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 KDA-DWR maintains a website with a useful timeline and details regarding the corrective controls and copies of the 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. Another meeting was held at the Larned Community Center on April 07, 2026, to lay out additional hydrologic information and to discuss potential actions that could be taken for 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. Request review by KDA-DWR of the PN IGUCA order based upon current hydrologic conditions and water management (2027).
2. Continue monitoring the water level trends within this region.
3. Continue the water flow meter program to ensure accurate water use accounting.
4. Encourage utilization of the Irrigation Technology Initiative.

Walnut Creek Intensive Groundwater Use Control Area

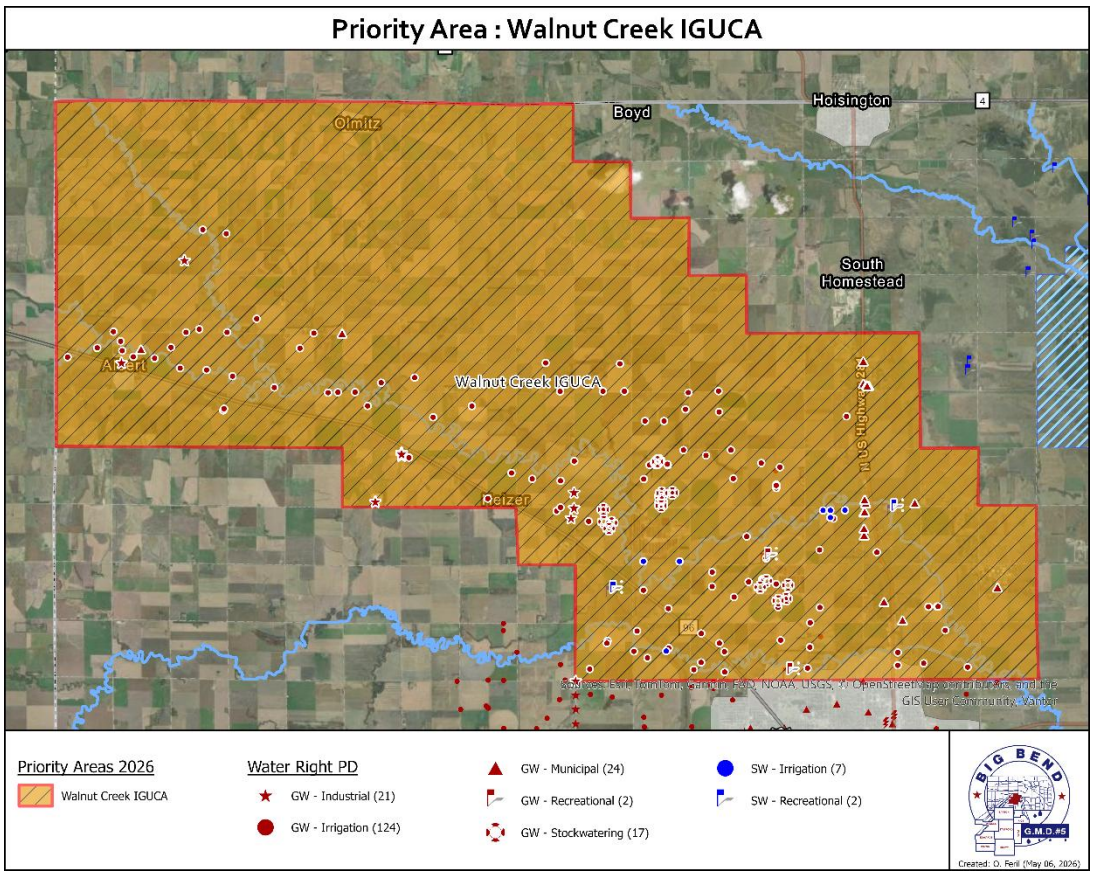

Figure 2 - Walnut Creek IGUCA

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 Creek IGUCA (WC 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 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. Another meeting was held at the Great Bend Water Office on April 07, 2026, to lay out additional hydrologic information and to discuss potential actions that could be taken for the WC IGUCA.

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. 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 (2026-2027).
2. Consider conversion of Barton County portion of the WC IGUCA to Local Enhanced Management Area (LEMA) following WC IGUCA review.
3. Continue monitoring the water level trends within this region.
4. Continue the water flow meter program to ensure accurate water use accounting.
5. Encourage utilization of the Irrigation Technology Initiative.

Rattlesnake Creek Region

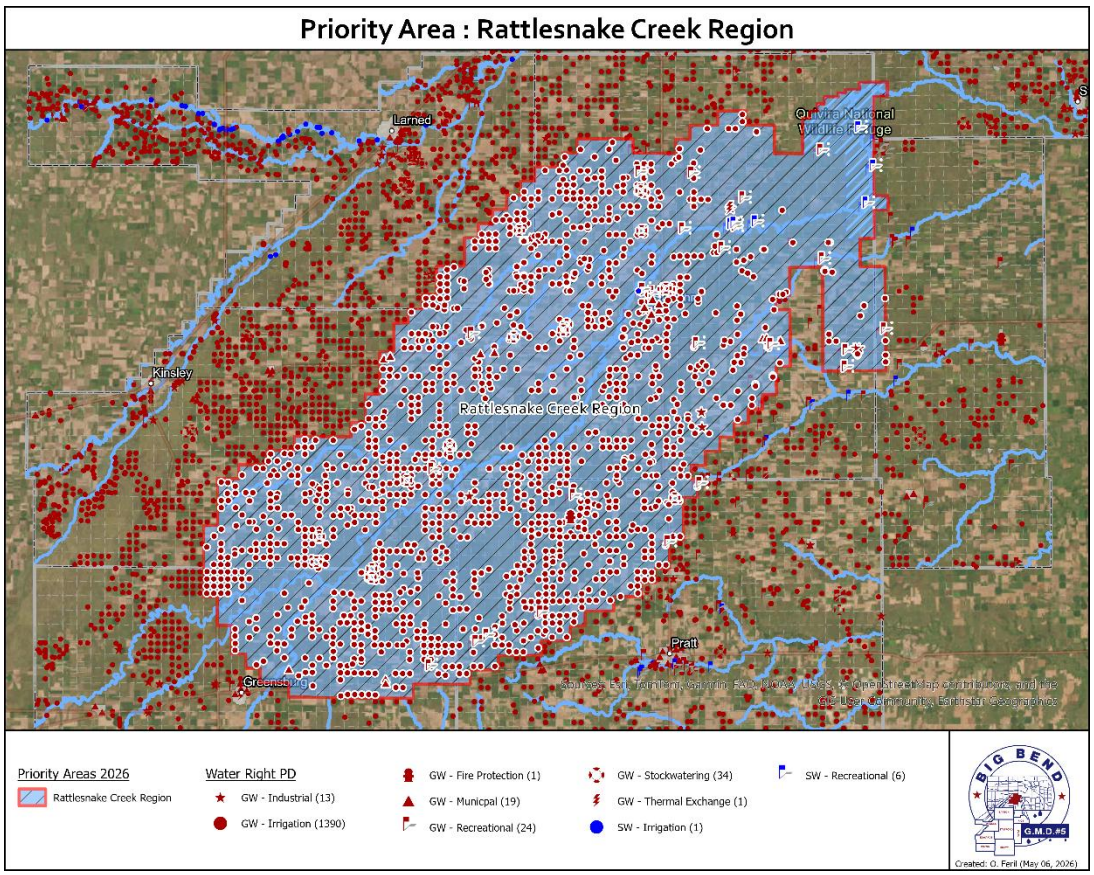

Figure 3 - Rattlesnake Creek Region

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 Rattlesnake Creek 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 Rattlesnake Creek 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 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. More meetings were held in the same towns on April 09 and 14, 2026, to provide updated hydrologic information and to discuss potential actions that could be taken for the Rattlesnake Creek region.

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. Implement the preferred alternative as outlined in the Record of Decision (U.S. Department of Agriculture, Natural Resources Conservation Service, 2026):
    a. Complete engineering design for a streamflow augmentation wellfield (up to 28 well sites) in Stafford County capable of supplying up to 18 cfs (2026-2027).
    b. Complete land acquisition/easement access for wellfield (2026-2027).
    c. Complete permitting requirements for federal, state and local agencies (2027).
    d. Construct streamflow augmentation wellfield in Stafford County (2028-2030).
    e. Retire/Lease 2500 acre-feet of authorized water use within Zone D (Department of Agriculture, 2018) (2026-2030).
2. Continue to engage with and support local conservation efforts brought forward through the Rattlesnake Creek working group.
3. Prioritize Kansas' WTAP program for the 40 percent or greater response zones.
4. Prioritize utilization of the Irrigation Technology Initiative.
5. Continue monitoring the water level trends within this region.
6. Continue the water flow meter program to ensure accurate water use accounting.

Estimated Usable Lifetime Evaluation

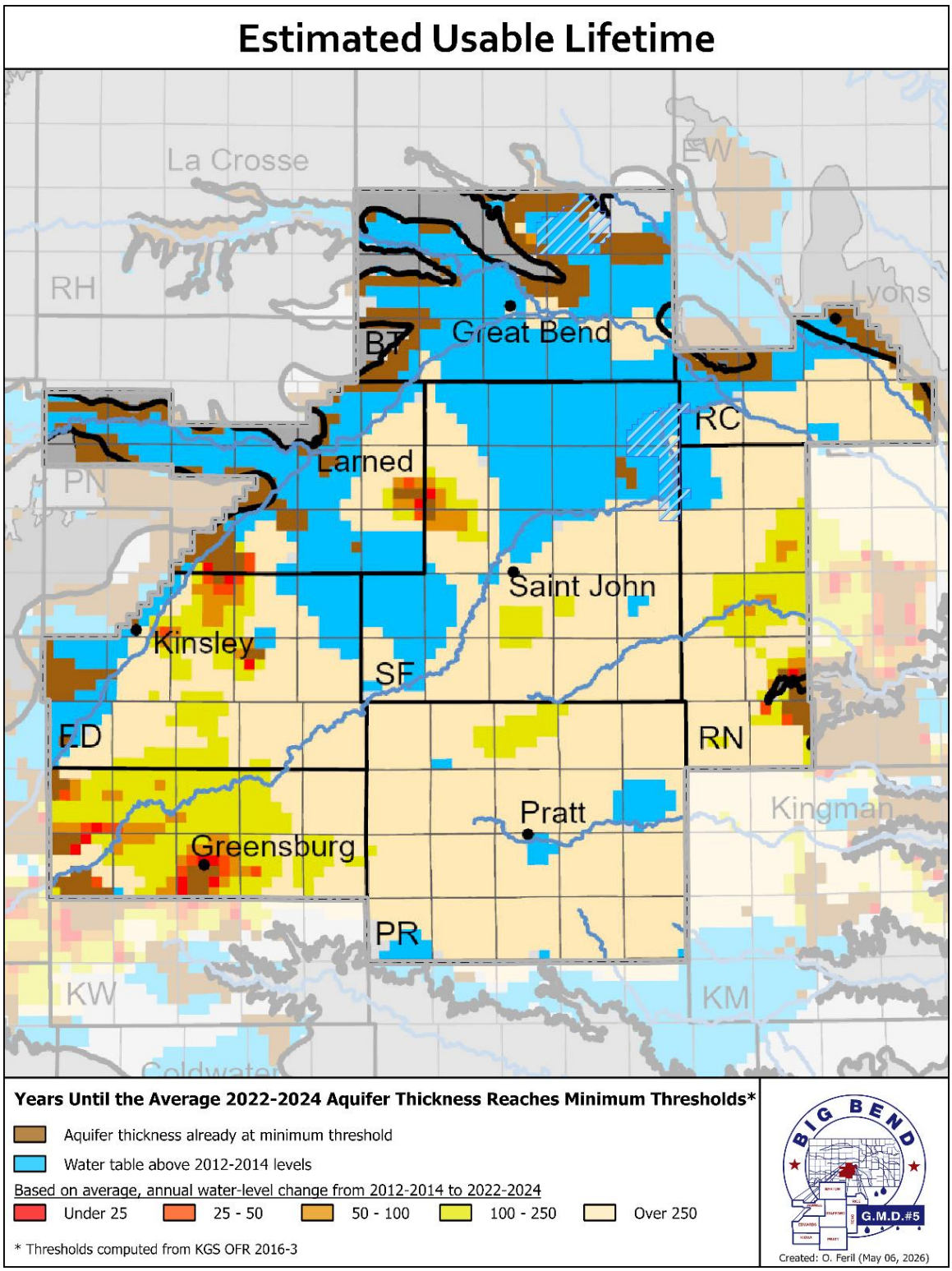

Figure 4 - Estimated Usable Lifetime

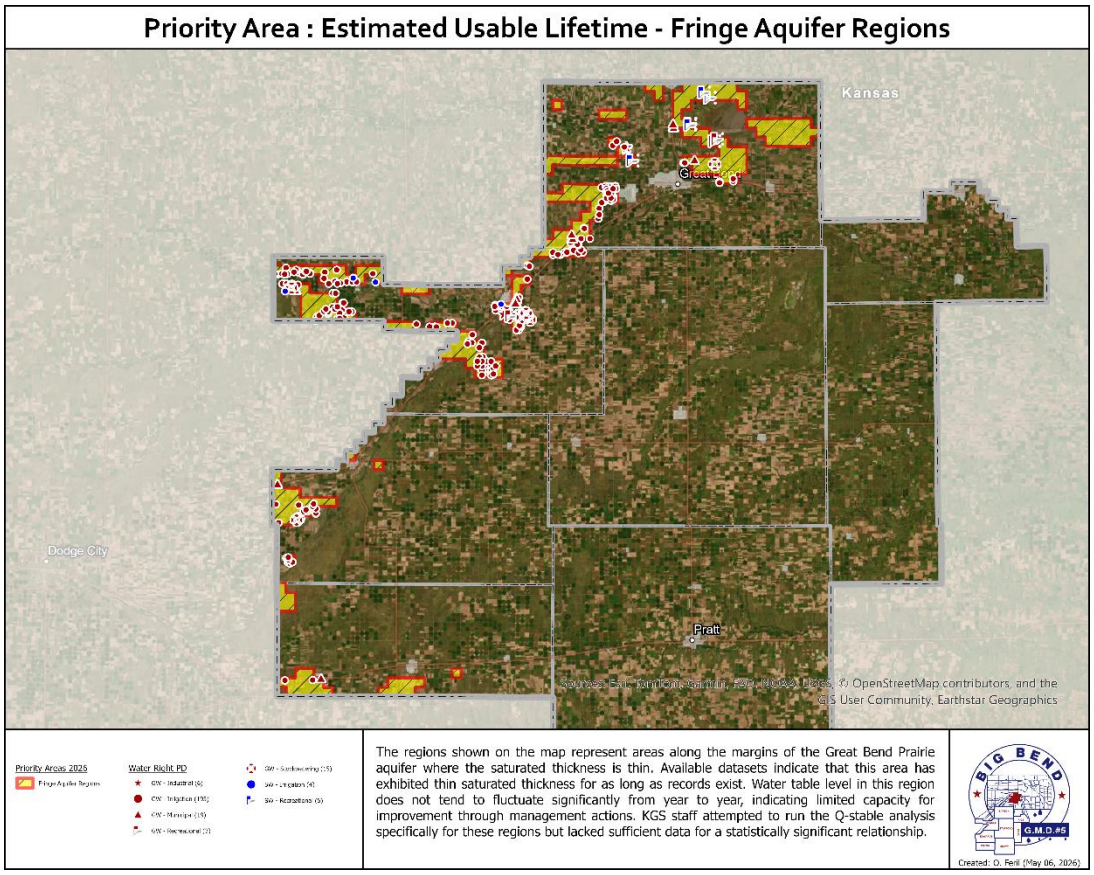

Figure 5 - Fringe Aquifer Regions

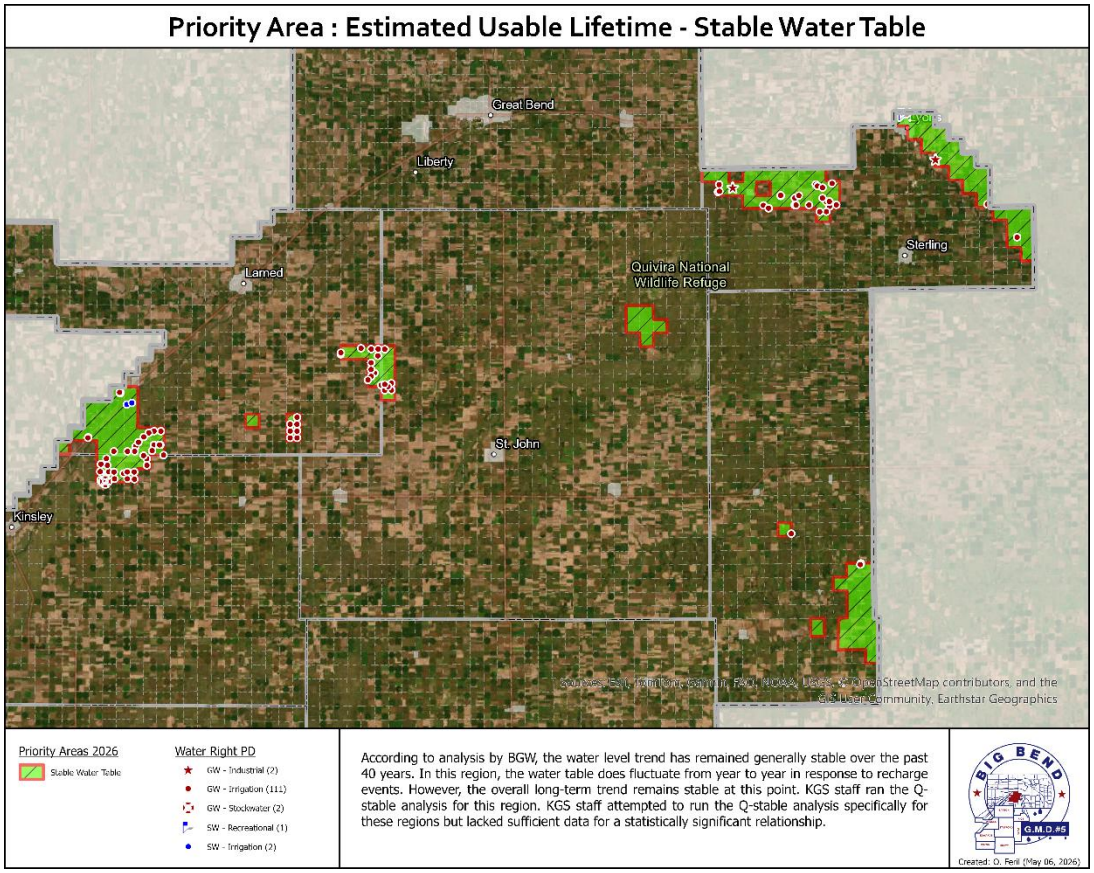

Figure 6 - Stable Water Table

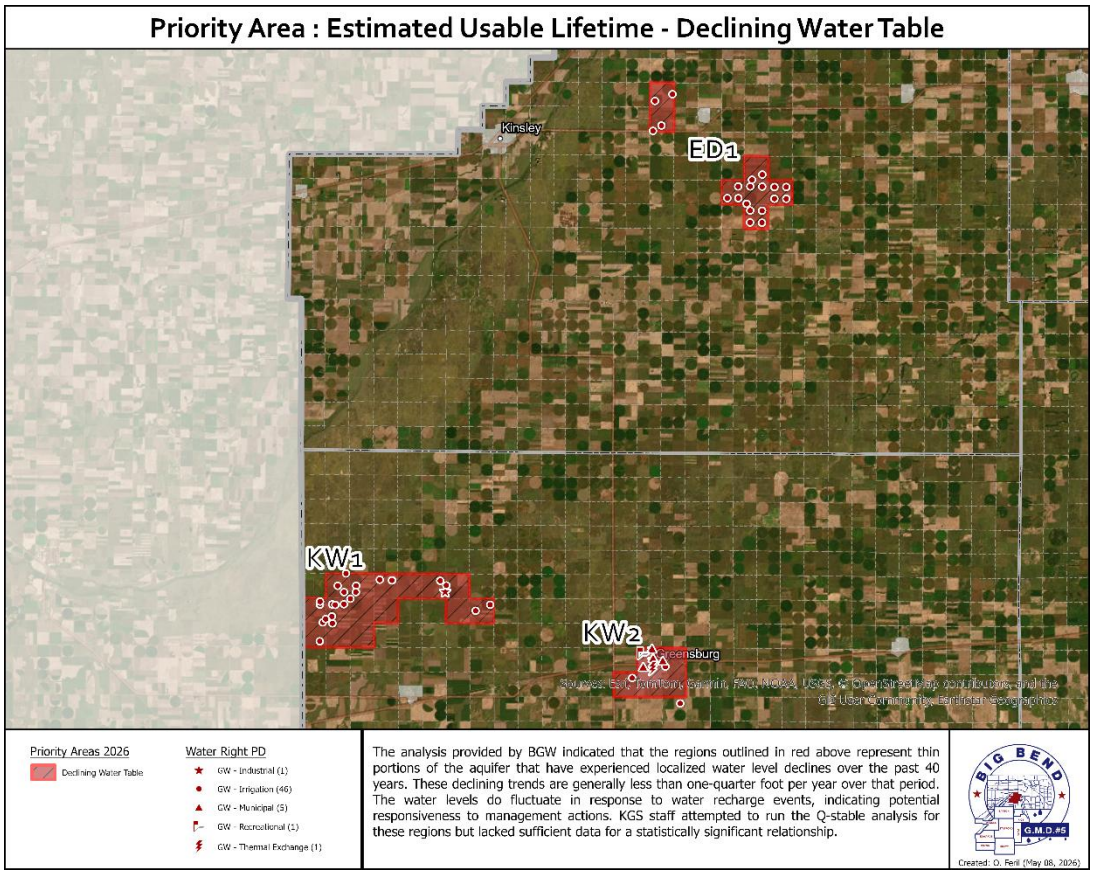

Figure 7 - Declining Water Table

Background

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 Usable 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 well construction analysis of these areas indicated that out of the nearly 300 wells installed in the regions over half of the wells were drilled into the bedrock below the High Plains Aquifer. The KGS estimated usable lifetime methodology does not consider this as it only looks at the High Plains Aquifer system. BGW staff made the recommendation to collect additional data to confirm rates of decline, along with testing of local well specific capacity. This information will enhance the estimates of usable aquifer lifetime in accordance with OFR 2002-25C (Hecox, Macfarlane, & Wilson, 2002).

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 regions
(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. The Q-stable analysis was unable to be conducted for the specific regions requested due to a limited amount of data. According to KGS staff, additional sections around the identified areas would have to be included in the analysis to be able to have enough data for a statistically significant result. As a result, using the Q-stable approach is not feasible for these regions due to the small size of the regions.

The mapped regions highlight areas of varying aquifer conditions across the District. Yellow-filled areas occur along the margins of the Great Bend Prairie aquifer where saturated thickness has historically been thin and shows little year-to-year fluctuation, suggesting limited potential for improvement through management actions. These 24 fringe regions include approximately 250 points of diversion. In contrast, green-filled areas represent generally stable water level conditions over the past 40 years, including interior “bedrock islands” where aquifer thickness is thinner than surrounding areas but still responsive to recharge events; these 12 regions contain about 120 points of diversion. Red-filled areas indicate thin aquifer zones that have experienced localized declines but still show responsiveness to recharge, suggesting potential for management impact. These seven regions include approximately 50 points of diversion, including five that supply the City of Greensburg.

Outreach

The District presented these newly identified areas at the District annual meeting in February as well as in the area meetings in April 2026. A variety of ideas were discussed in these meetings including options for potential LEMAs.

Implementation

Since these areas meet the statutory definition for areas of concern, they have been identified by the board of directors. However, based on information received from BGW and KGS more data is needed in these regions. Therefore, the District action plan implementation for the regions identified by the estimated usable lifetime map will include but are not limited to the following:

1. Gather additional information to evaluate potential LEMAs for ED1, KW1, and KW2 regions:
    a. Analyze water use trends to better assess sustainable groundwater use within each region (2026-2028).
    b. Install groundwater monitoring wells where needed, in coordination with KGS and BGW (2026-2028).
    c. Conduct controlled pumping tests to determine specific capacity and refine hydraulic conductivity estimates within the BBGMDMOD (2026-2028).
2. Upon evaluation of the information gathered up to July 1, 2029, the District will determine which corrective actions are needed for the implementation of a LEMA or IGUCA, or other corrective actions to be developed in consultation with the Chief Engineer to address the hydrologic conditions in the regions.
3. The priority goal of such corrective actions should be to reasonably stabilize the hydrologic conditions in the regions within 20 years following the establishment of the corrective controls.
4. Strengthen public outreach in each region with the following goals:
    a. Promote implementation of effective water management practices.
    b. Increase stakeholder understanding of local water resource concerns.
    c. Enhance peer-to-peer networking opportunities among water users.
5. Prioritize utilization of the Irrigation Technology Initiative.
6. Continue the water flow meter program to ensure accurate water use accounting.

Water Quality

Chloride

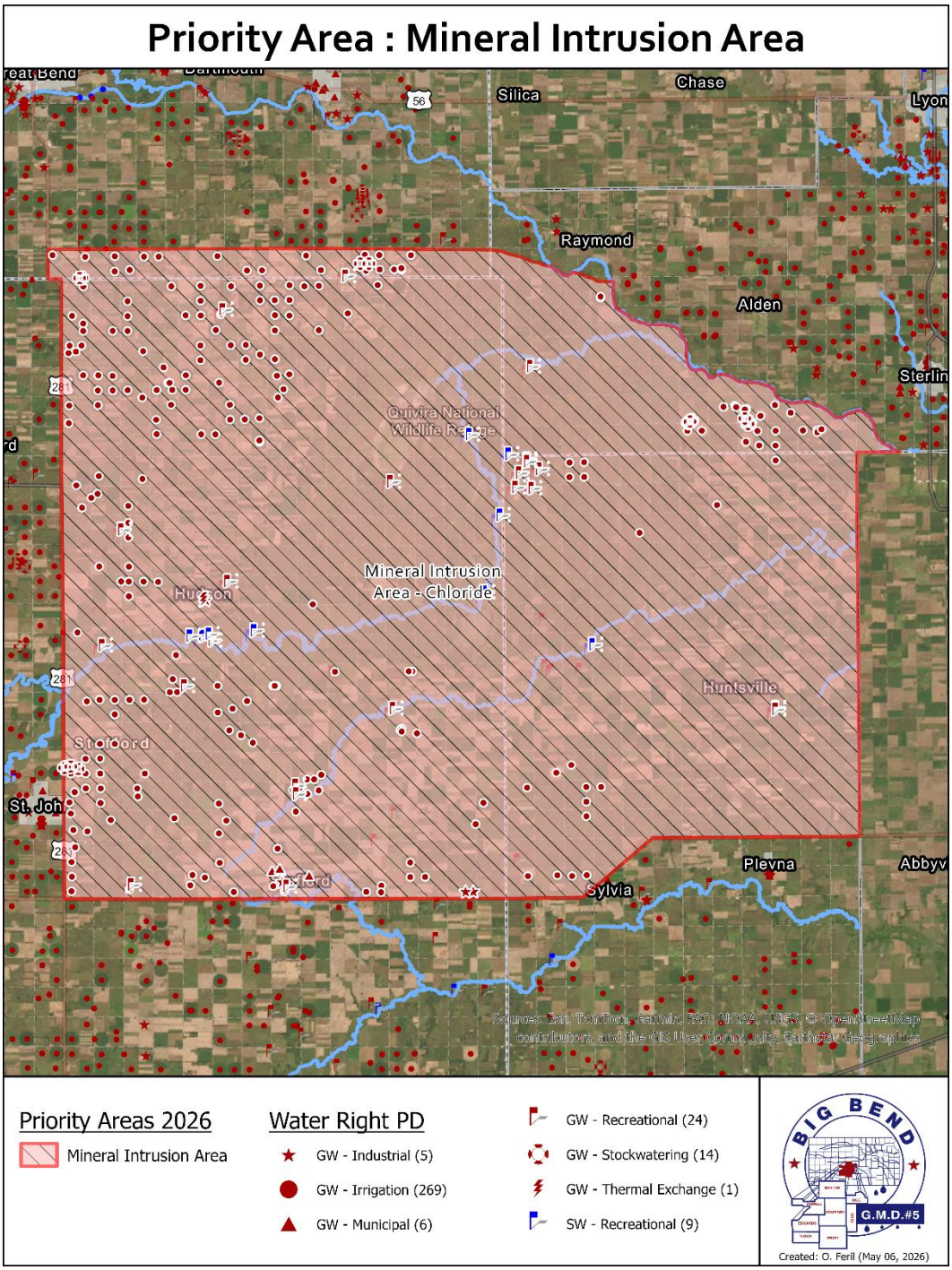

Figure 8 - Mineral Intrusion Area

Background

In the late 1970's to the early 1990's, with coordination with KGS staff, the District initiated a significant study of 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. In April 2026, additional meetings were held in the same towns to provide additional information to the public.

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 (2026).
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 (2026-2027).
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

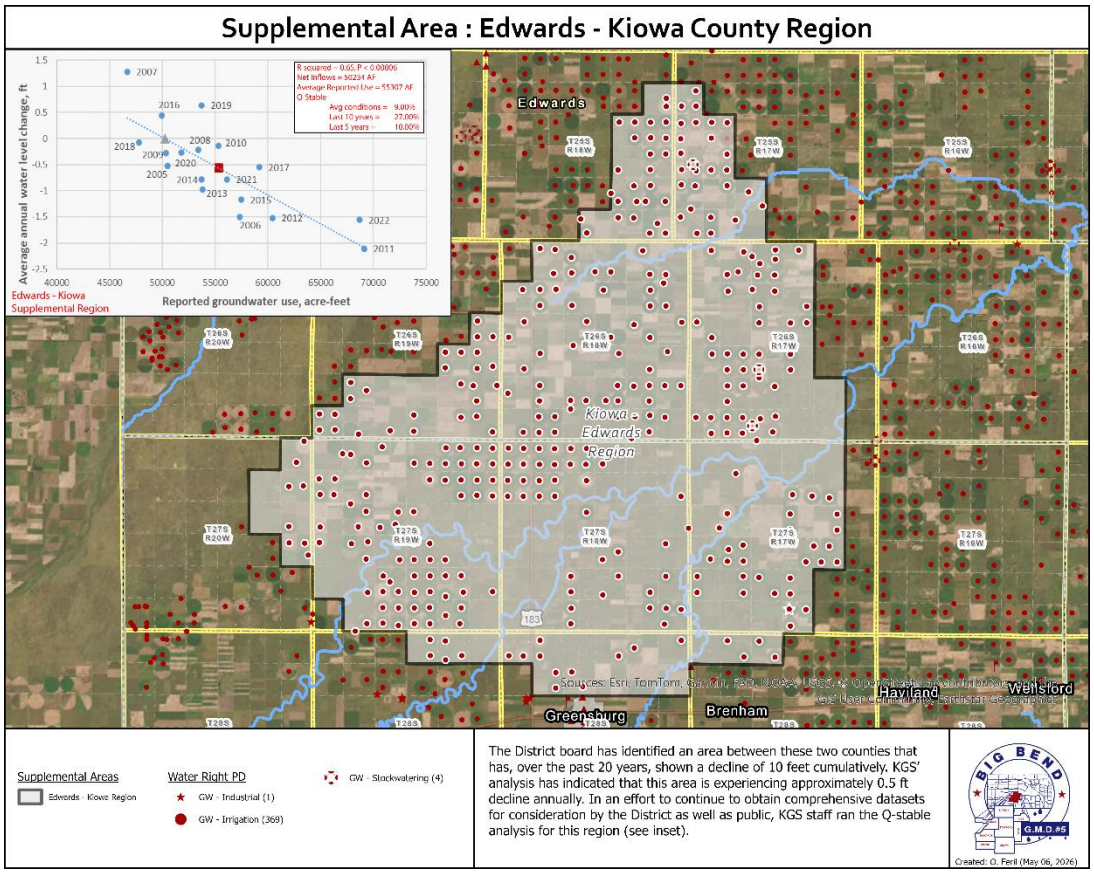

Figure 9 - Edwards - Kiowa County Region

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. 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.

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. Additional meetings were held in April 2026 in Greensburg and Kinsley. The consensus received during the outreach meetings supports the following implementation approach.

Implementation

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

1. Install groundwater monitoring wells where needed, in coordination with KGS and BGW (2027-2028).
2. Conduct controlled pumping tests to determine specific capacity and refine hydraulic conductivity estimates (2027-2028).
3. Continue monitoring the water level trends within these regions.
4. Continue the water flow meter program to ensure accurate water use accounting.

Water Quality

Nitrate

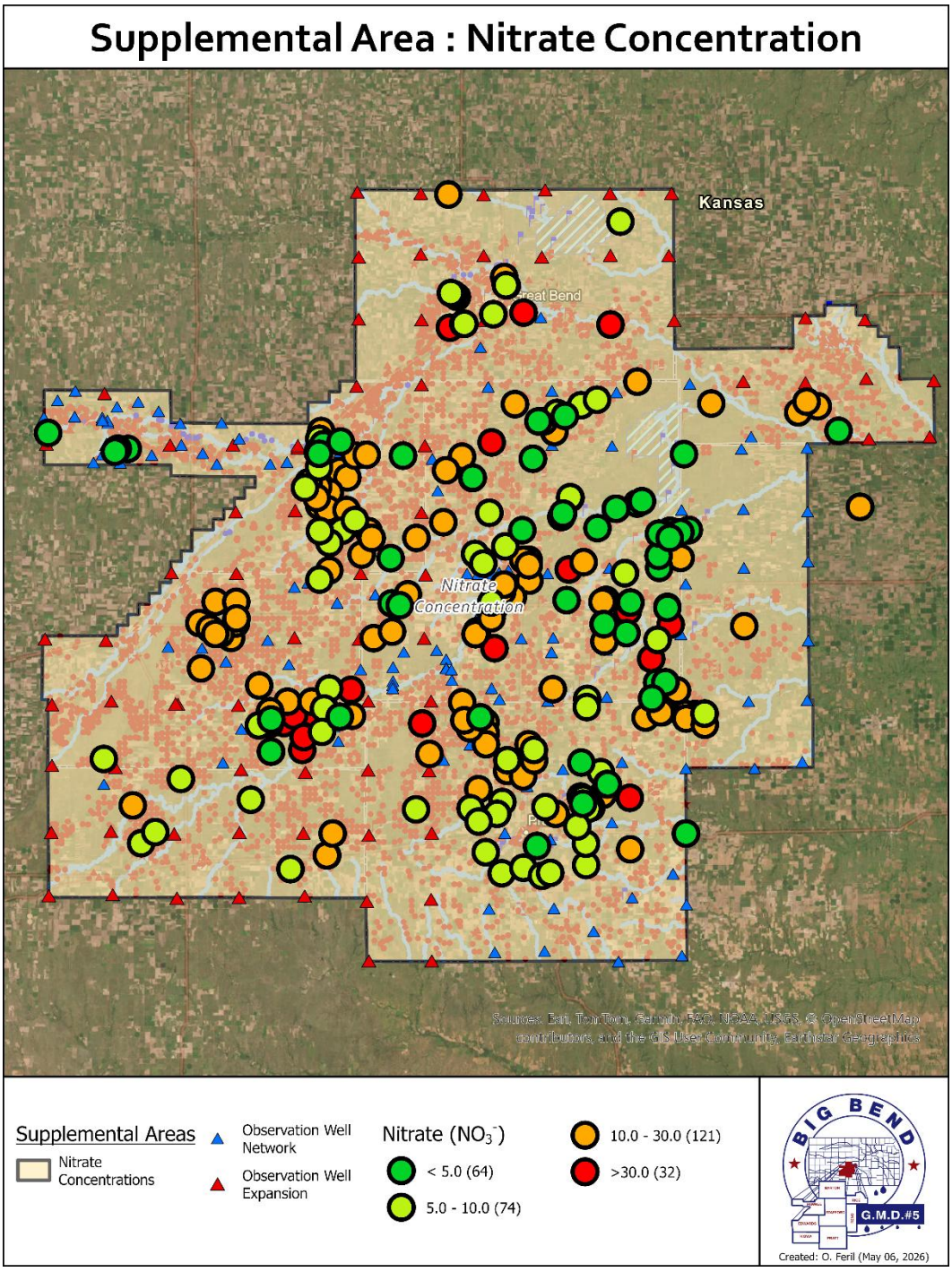

Figure 10 - Nitrate Concentrations

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 to get this information public. The District held initial outreach meetings in 2025 and 2026 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. Install groundwater monitoring wells, where needed, in coordination with KGS and BGW (2027-2028).
2. Integrate District water quality records with KGS' water quality database for public distribution (2026).
3. Research potential mitigation techniques to determine possible future actions as needed once priority areas are identified.
4. Continue water quality monitoring throughout the District.
5. Encourage private well sampling and submit analysis results to the District.

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