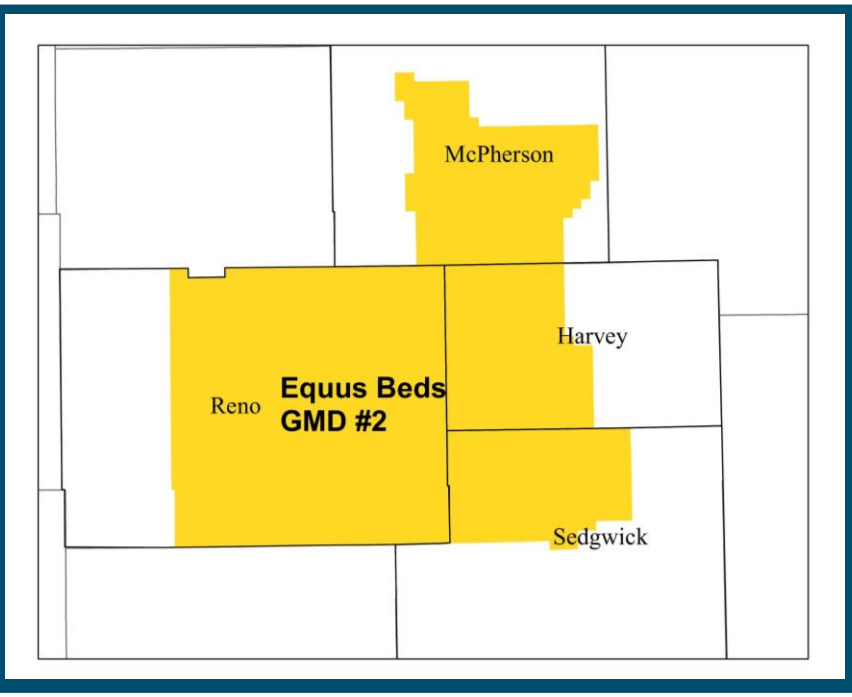

GMD2
Priority Area Report
2024

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GMD2 PRIORITY AREAS OF CONCERN

Background

The Equus Beds Groundwater Management District No. 2 (GMD2) has been proactive and remains active in establishing regulations, programs, and special management areas to properly manage the Equus Beds Aquifer. The district was one of the first areas in the state to establish safe yield criteria in 1980 for reviewing new water permit applications. Additionally, at the request of the GMD2 Board, the McPherson Intensive Groundwater Control Area (IGUCA) was established in 1980 to address declining groundwater levels in a portion of McPherson County. Two water quality areas were also established in the 1980s to deal with oil field saltwater contamination – the Burrton IGUCA and the Equus Beds Hollow-Nikkel Special Water Quality Use Area (SWQUA). More recently, a special management area was established in a portion of Reno County to reduce impairment risks by requiring new non-domestic wells to be spaced farther away from existing non-domestic wells, requiring certain change applications to meet safe yield, and the safe yield calculation recharge rates were reduced to help ensure the area would not be over-appropriated.

In addition to major activities associated with water rights, permits, and applications, GMD2 also has programs and rules and regulations dealing with water quality. The district owns and maintains approximately 450 monitoring wells and collects both water level and water quality data from the monitoring wells, including over 3,000 water-level measurements and over 300 water samples annually. GMD2 has an active abandoned and inactive well program and established regulations through the Kansas Department of Health and Environment (KDHE) and provides technical assistance to ensure the wells are properly constructed or plugged. Additionally, the district permits and inspects cathodic protection boreholes and has specific regulations through the Kansas Corporation Commission (KCC) in this regard.

Recent studies by the Kansas Geological Survey, including the “2023 Status of the High Plains Aquifer in Kansas” (Technical Series 25 – November 2023) indicates that

groundwater use in GMD2 is at or near sustainable levels, with some areas, such as a portion of McPherson County, showing slight groundwater level declines. As previously stated, GMD2 has an extensive monitoring well network and conducts approximately 3,000 water-level measurements per year (3,347 in 2023). The data is used to evaluate water level changes and trends. Data collection and review is an ongoing process to determine if any additional special management areas are needed or if additional corrective control provisions are needed in any of the established areas.

In 2023, the Kansas Legislature passed HB 2279 into law. A portion of that bill became K.S.A. 82a-1044, requiring all Kansas Groundwater Management Districts to identify priority areas of concern within their boundaries by July 1, 2024, and then to develop action plans that reasonably address those concerns by July 1, 2026. Pursuant to HB 2279, there are already two established Priority Areas of Concern in GMD2 – The McPherson IGUCA and the Burrton IGUCA. Additionally, the Chief Engineer has determined that the Equus Beds Hollow-Nikkel SWQUA is also an established Priority Area of Concern. GMD2 has reviewed available water quality and water-level data, including reports and data from the Kansas Geological Survey (KGS) and the Division of Water Resources (DWR), to identify existing and new priority areas of concern in GMD2, which are shown in Figure 1 and summarized below. Figures 2 through 5 are water-level change maps created by KGS and show water-level changes throughout the High Plains Aquifer, including the GMD2 area, through varying timeframes.

Priority Areas of Concern

McPherson IGUCA and the Area Immediately South of the McPherson IGUCA

The McPherson IGUCA encompasses a 56-square-mile area located in the extreme northern portion of GMD2 in McPherson County (Figure 1). The control area was established March 28, 1980, by the Chief Engineer, DWR, at the request of the Equus Beds Groundwater Management District No. 2 because of declining water levels in the Equus Beds aquifer. Groundwater development or withdrawal exceeded natural groundwater recharge, and groundwater mining resulted. Groundwater management action established in the control area included:

- closing the area to further groundwater development, except for domestic use,
- dismissing all groundwater permit applications filed prior to the establishment of the control area, and
- requiring the installation of water meters on all water wells in the control area, expect domestic wells.

Pursuant to K.A.R. 5-20-2, DWR, in cooperation with GMD2, reviewed the McPherson IGUCA and developed the McPherson IGUCA Review Report, which was admitted to the record of the hearing conducted by the Chief Engineer in October, 2016. The Chief Engineer issued the Findings and Conclusions from the McPherson IGUCA Review on February 26, 2020. DWR maintains a website that includes information about the McPherson IGUCA, which has can be accessed at the following link: https://www.agriculture.ks.gov/divisions-programs/division-of-water-resources/managing-kansas-water-resources/intensive-groundwater-use-control-areas/mcpherson-iguca

The 2016 McPherson IGUCA Review Report and the 2020 Chief Engineer's Findings and Conclusions from the McPherson IGUCA Review can both be found on the DWR website. The McPherson IGUGA Review Report noted groundwater declines occurring immediately south of the McPherson IGUCA and recommended that the boundaries of the IGUCA may need to be expanded to the south, especially in an area designated as Tier 1 in the report. Tier 1 is located directly south of the McPherson IGUCA as follows:

Township	Range	Section	County
20 South	3 West	15 through 22; 27 through 35	McPherson
20 South	4 West	13 through 16; 21 through28; 33 through 36	McPherson

In addition to the McPherson IGUCA, the GMD2 Board of Directors on June 6, 2024, designated the Tier 1 area directly south of the McPherson IGUCA as a new Priority Area of Concern (Figure 1).

Burrton IGUCA and the Area Immediately South and East of the Burrton IGUCA

The Burrton Intensive Groundwater Use Control Area (IGUCA) encompasses a 36-square-mile area located in Western Harvey County and Eastern Reno County in GMD2 (Figure 1). The IGUCA was established June 1, 1984 (correction order issued July 28, 1984), by the Chief Engineer, DWR, at the request of GMD2 because of groundwater quality deterioration caused by chloride contamination (oil field brine) in the Burrton area. The order defined a control area, made thirteen recommendations from a task force report, and contained three main corrective control provisions:

1. That all applications to appropriate water or change a point of diversion within the IGUCA shall be reviewed on an individual basis using a computer model;
2. That the Board of Directors of GMD2 will annually review all hydrologic information in the IGUCA and may request a hearing on any matter related to the IGUCA; and
3. That water flow meters shall be installed on all groundwater wells, except domestic and temporary wells.

Additionally, at the request of GMD2, water permits approved after the establishment of the Burrton IGUCA contain conditions requiring that water samples be collected from the authorized point of diversion (well) and analyzed for chloride and conductivity on a biannual basis.

Pursuant to K.A.R. 5-20-2, DWR, in cooperation with GMD2, reviewed the Burrton IGUCA and developed the Burrton IGUCA Review Report, which was admitted to the record of the hearing conducted by the Chief Engineer in October, 2016. The Chief Engineer issued the Findings and Conclusions from the McPherson IGUCA Review on February 28, 2020. DWR maintains a website that includes information about the Burrton IGUCA, which has can be accessed at the following link:
https://www.agriculture.ks.gov/divisions-programs/division-of-water-resources/managing-kansas-water-resources/intensive-groundwater-use-control-areas/burrton-iguca

The 2016 Burrton IGUCA Report and the 2020 Chief Engineer's Findings and Conclusions from the Burrton IGUCA Review can both be found on the DWR website.

The Burrton IGUGA Review Report noted the continued movement of the chloride contamination to the east-southeast and recommended that the boundaries of the IGUCA may need to be expanded to the east and south as follows:

Township	Range	Section	County
23 South	3 West	23, 26, 35	Harvey
24 South	3 West	2, 11, 14 through 17	Harvey

In addition to the existing Burrton IGUCA, the GMD2 Board of Directors on June 6, 2024, designated the area directly East and South of the Burrton IGUCA as described above as a new Priority Area of Concern (Figure 1).

Equus Beds Hollow-Nikkel Special Water Quality Use Area (SWQUA

The Equus Beds Hollow-Nikkel SWQUA encompasses a 35-square-mile area located in northwest Harvey County, south-central McPherson County, and northwest Reno County in the District (Figure 1). The SWQUA was established September 17, 1986, by the Chief Engineer, DWR, at the request of GMD2 because of groundwater quality deterioration caused by chloride contamination (oil field brine) in the area. The SWQUA designation and provisions were codified by K.A.R. 5-3-27, effective September 22, 2000. The Equus Beds Hollow-Nikkel SWQUA contains similar provisions to the Burrton IGUCA corrective controls, specifically water permit applications reviewed on an individual basis and water meters installations requirements. Additionally, like the Burrton IGUCA, water permits approved after the establishment of the SWQUA contain conditions that water samples must be collected and analyzed for chloride and conductivity on a biannual basis.

The GMD2 Board of Directors on June 6, 2024, designated the Equus Beds Hollow-Nikkel SWQUA as an established Priority Area of Concern (Figure 1).

Reno County Enhanced Well Spacing Area

At the request of GMD2, the GMD2 Well Spacing Regulation K.A.R. 5-22-2 was modified in 2003 to designate an area of Reno County with a relatively thin aquifer saturated zone and require new non-domestic wells to be spaced farther away from existing non-

domestic wells to reduce impairment risks. Due to continued groundwater permit development and a slight decline in groundwater levels trend, the GMD2 Safe Yield Regulation K.A.R. 5-22-7 was modified in 2016 and requires certain change in point of diversion applications to meet safe yield, and the safe yield calculation recharge rates were reduced to help ensure the area would not be over-appropriated. The area is described in K.A.R 5-22-2(d)(1) as follows:

Township	Range	Section	County
23 South	6 West	31, 32 and 33	Reno
23 South	7 West	31 through 36	Reno
24 South	6 West	4 through 9; and 13 through 36	Reno
24 South	7 West	1 through 36	Reno
25 South	5 West	30 and 31	Reno
25 South	6 West	1 through 36	Reno
25 South	7 West	1 through 36	Reno
26 South	5 West	6,7 and 8; 17 through 21; and 27 through 35	Reno
26 South	6 West	1 through 36	Reno
26 South	7 West	1 through 36	Reno

Due to slight groundwater levels decline trend and a thin aquifer saturated zone, the GMD2 Board of Directors on June 6, 2024, designated the Reno County Enhanced Well Spacing Area as a new Priority Area of Concern (Figure 1). GMD2 will continue to evaluate the area to determine if any further action is needed.

Water Quality Priority Area(s) of Concern Being Determined

Due to the relatively shallow groundwater throughout much of GMD2, the District is classified as a Sensitive Groundwater Area. There are many areas in GMD2 where the groundwater has been contaminated to varying degrees by various pollutants. Past oil field brine disposal practices resulted in numerous groundwater chloride contaminated areas, such as the Burrton IGUCA and Equus Beds Hollow-Nikkel SWQUA areas. Other oil field brine contaminated areas are being monitored and studied by GMD2 and KCC. Additionally, nitrate contamination has been found in groundwater in some areas of

GMD2, including around the City of Pretty Prairie area. Past studies by GMD2 and KDHE have identified some of these areas, and monitoring wells have been installed and sampled. There are some smaller areas in GMD2 where the groundwater is contaminated with other pollutants, such as volatile organic compounds (VOCs). Figure 6 shows the generalized location of many of the known groundwater contamination sites in GMD2, but it should not be considered inclusive of all groundwater contamination sites in GMD2.

GMD2 is fortunate to have a comprehensive monitoring well network, with most monitoring wells having decades worth of water quality data. GMD2 also maintains a robust water quality database. In anticipation of HB 2279, GMD2 staff sampled 541 wells in 2023, including all the GMD2 owned monitoring wells, as well as numerous other monitoring and production wells. GMD2 and KGS have recently begun the process of KGS performing a geospatial/time series analysis on the GMD2 groundwater quality dataset, with the focus planned to be on chloride and nitrate levels in the groundwater.

Due to the numerous groundwater contamination areas in GMD2, and the ongoing GMD2/ KGS collaborative water quality data review project, the GMD2 Board of Directors on June 6, 2024, designated the entire GMD2 area as a new Priority Area of Concern. GMD2 will continue to evaluate the available water quality data to delineate the different contaminated areas to describe the levels and extent of contamination and determine if any further action is needed.

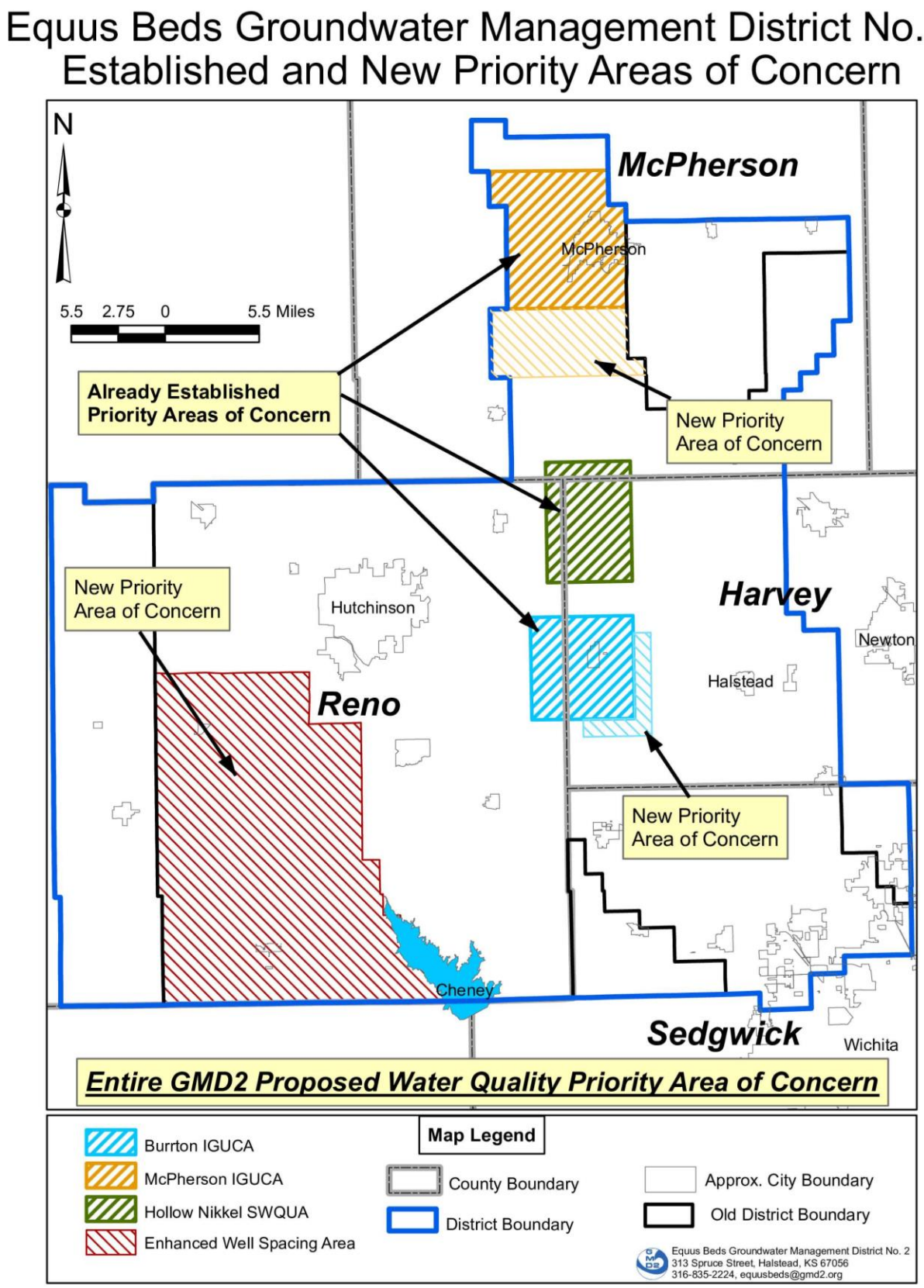

Figure – 1: GMD2 Priority Areas of Concern Map.

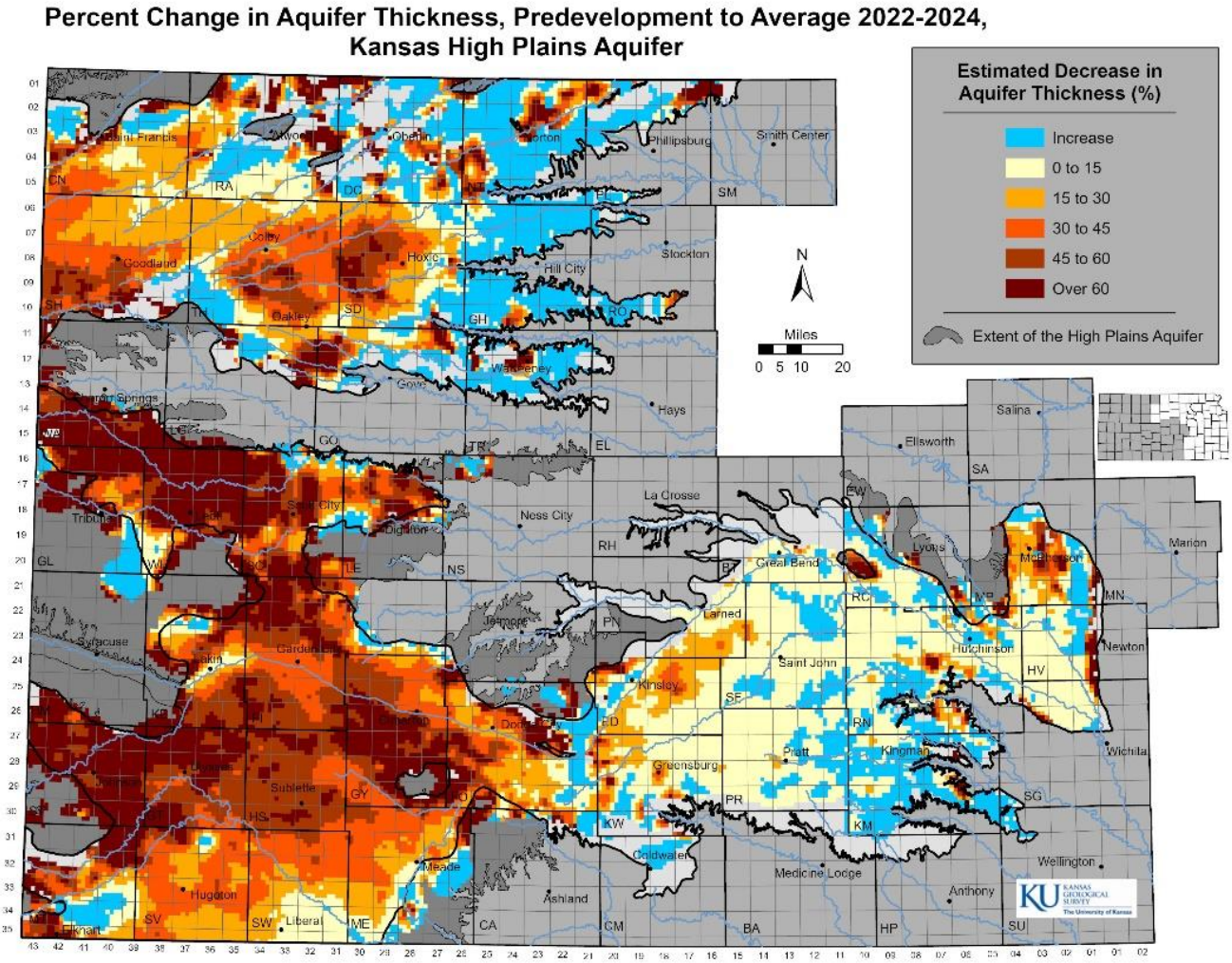

Figure – 2: KGS map showing groundwater level changes since predevelopment.

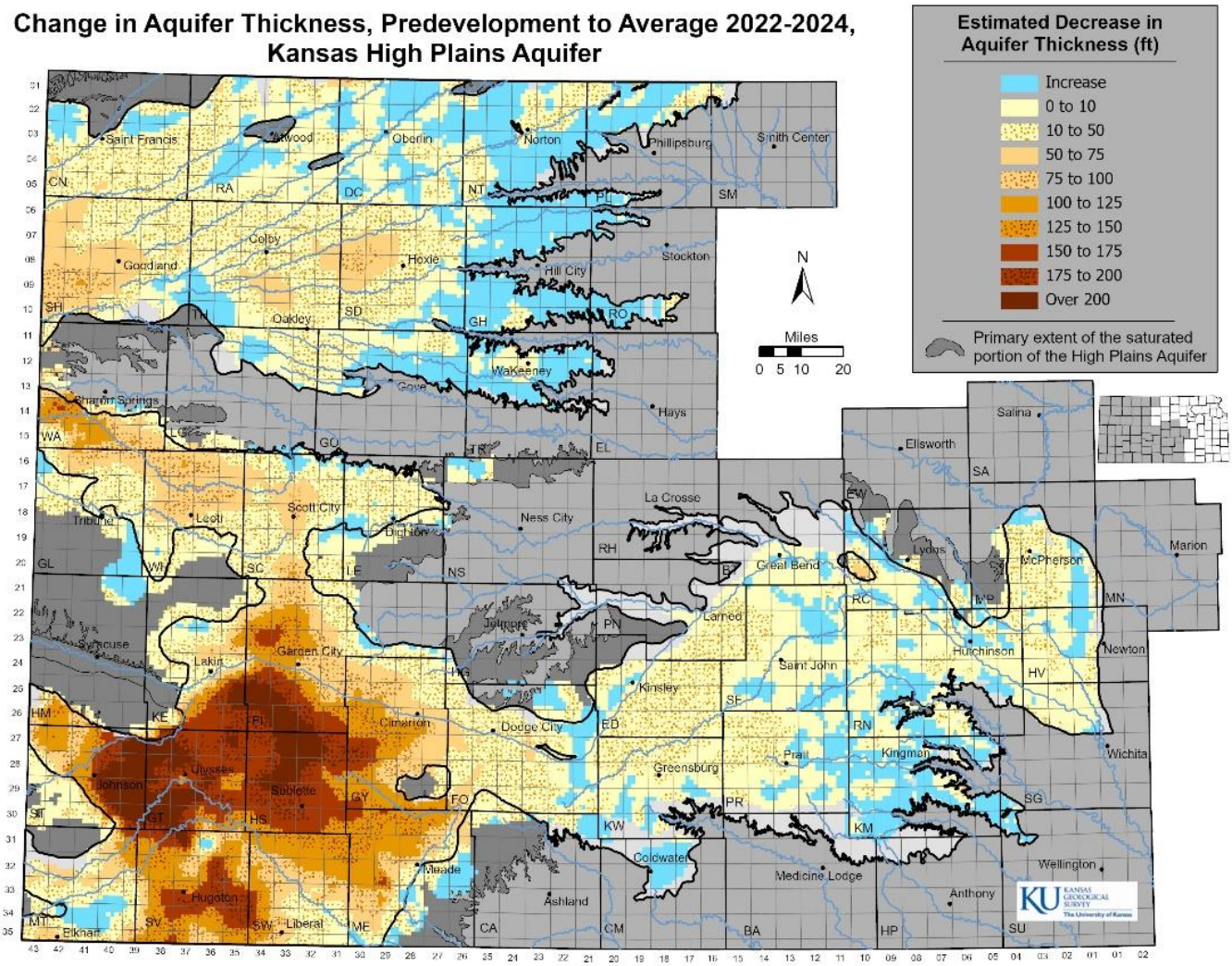

Figure – 3: KGS map showing groundwater level changes since predevelopment.

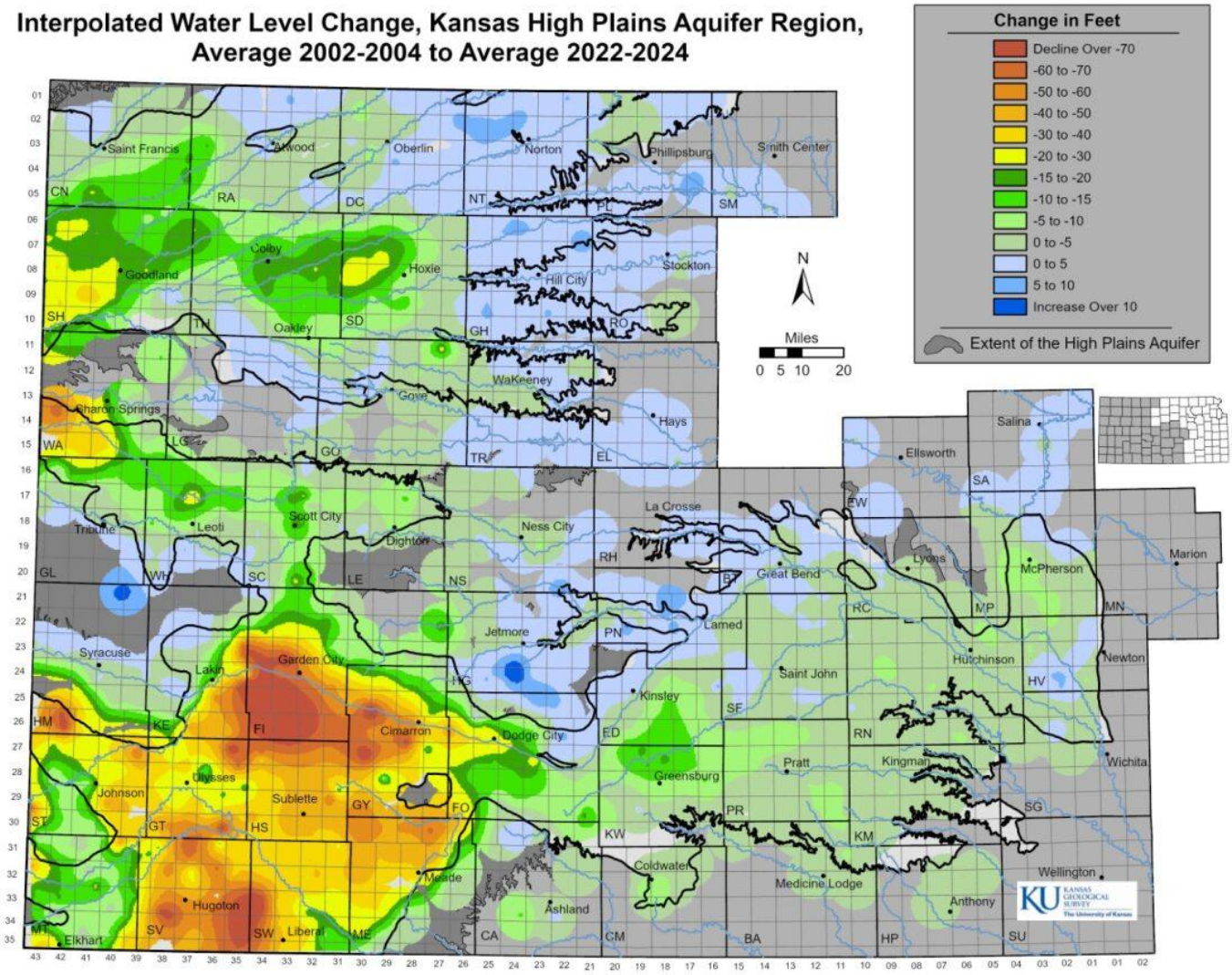

Figure – 4: KGS map showing 20-year groundwater level changes.

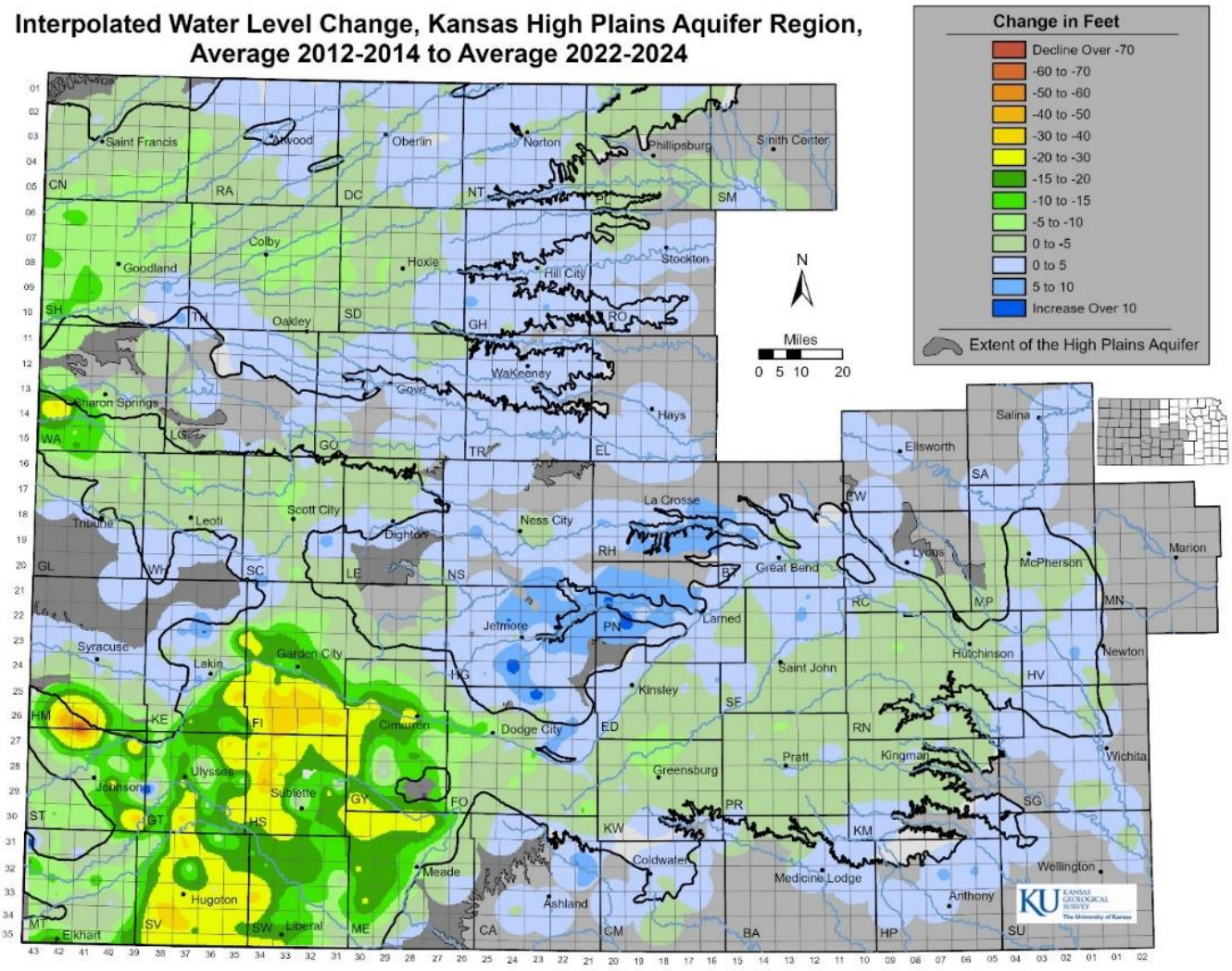

Figure 5 - KGS map showing 10-year groundwater level changes.

Equus Beds Groundwater Management District No. 2 Contamination Sites and Active Remediation Permitted Sites within GMD2 Boundary

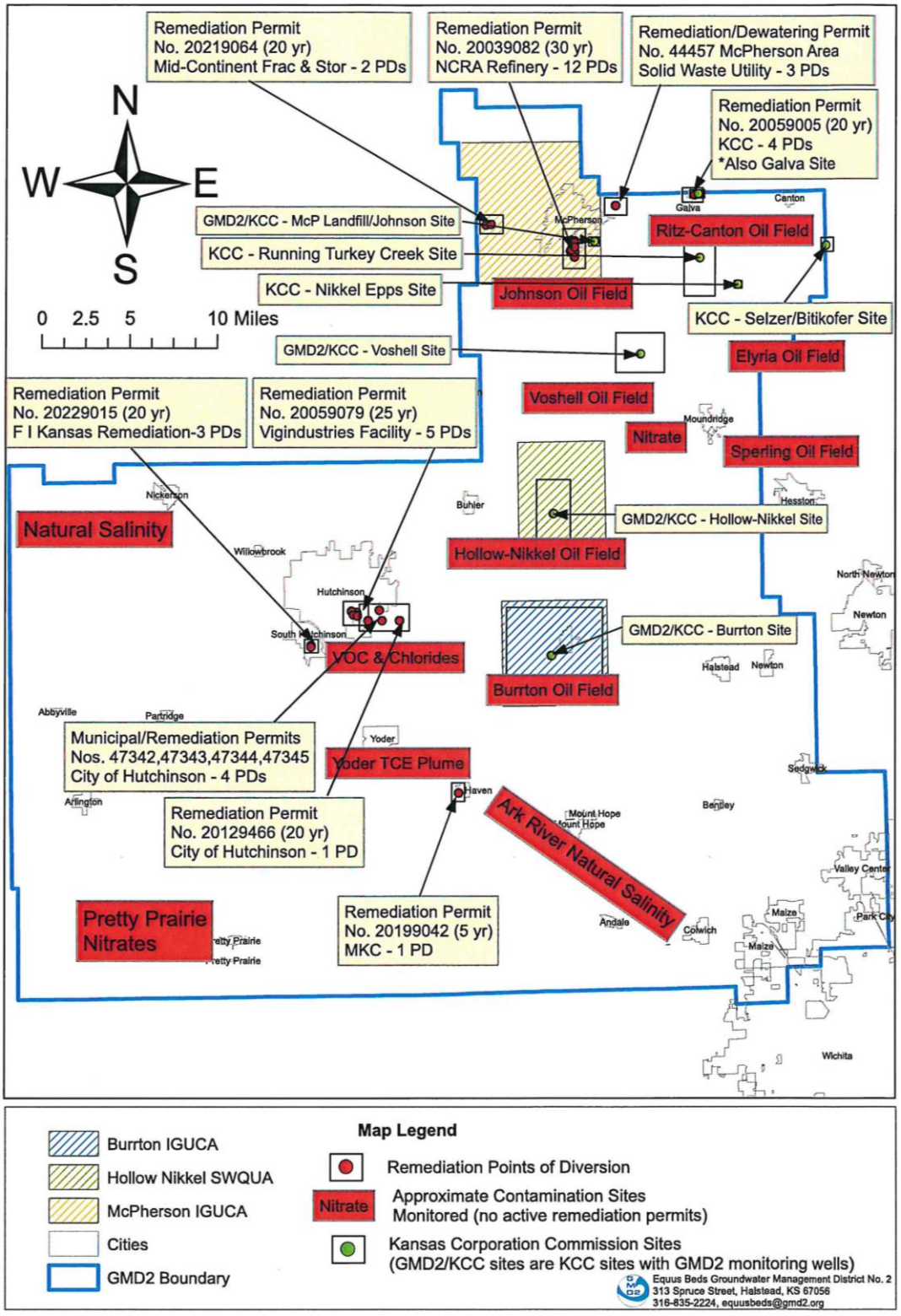

Figure 6 – Generalized map showing various groundwater contamination sites in GMD2