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# PROJECT PLAN: WATER USE IN GROUNDWATER MANAGEMENT DISTRICTS

Groundwater Management Districts 1, 3, and 4

## ABSTRACT

This project looks at water use in Kansas Groundwater Management Districts (GMDs) 1, 3, and 4 (Western KS). Water use is an important consideration to determine the longevity of the aquifer's water supply. The goal of the project is to understand how the quantity of water use is related to aquifer decline.

## 1 INTRODUCTION

In order to examine patterns of water use in GMDs 1, 3, and 4 this project will use data from the Division of Water Resources that tracks annual water use as well as data on well depth levels from the WIZARD Water Well Levels Database.

## 2 BASELINE OR INITIAL ANALYSIS

To begin this project, the students and faculty in the Kansas Data Science Consortium will work to integrate water use data and water depth data at different levels of geography. For instance, the data could be integrated at the county level as well as different HUC levels (e.g. HUC 10).

Once the data is integrated, summary statistics should be prepared to show how use and well depth levels have changed over time. These summaries should be made both graphically and with tables.

## 3 FINAL ANALYSIS

Once the data integration and the summary statistics are complete, the final analysis of this project is to establish the relationship between water use and changes in well depth levels. Doing this may require incorporating additional data about precipitation levels to think about how much water is recharging the aquifer. An element to consider is that based on geological and other conditions that effect recharge rates.

## 4 FINAL GOALS & EVALUATION

The final goal of this project is to be able to establish the quantity of water use that would lead to sustainable water levels in the aquifer. These quantities will vary across geography in GMDs 1, 3, and 4 and the level of water use reduction that will lead to sustainable aquifer levels (well depth levels) will also vary with geography. A goal of this project is to provide estimates for these water level reductions and to document the process by which those estimates were achieved.

## 5 RELATED WORK

Sophocleous, Marious and Rec Buchanan. 2003. Groundwater Recharge in Kansas. Hyperlink: [Groundwater Recharge in Kansas | Kansas Geological Survey](#)

Kansas Geological Survey. 2020. Groundwater Levels Near Stable in Western Kansas, Up Slightly in Central Kansas. Hyperlink: [Kansas Groundwater Levels](#)

Condos, David. 2022. How Kansas could lose billions in land values as its underground water runs dry. Hyperlink: [How Kansas could lose billions in land values as its underground water](#)

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[runs dry | KCUR - Kansas City news and NPR](#)

## 6 DATA & TECHNICAL REQUIREMENTS

*This project will require different sets of data:*

- *WIZARD Water Well Levels Database:* [Hyperlink](#)
- *Water Information Management and Analysis System (WIMAS):* [Hyperlink](#)

The analysis for this project will require a statistical software package such as Stata, R, or Python.