

## Introduction and Objectives

### Introduction:

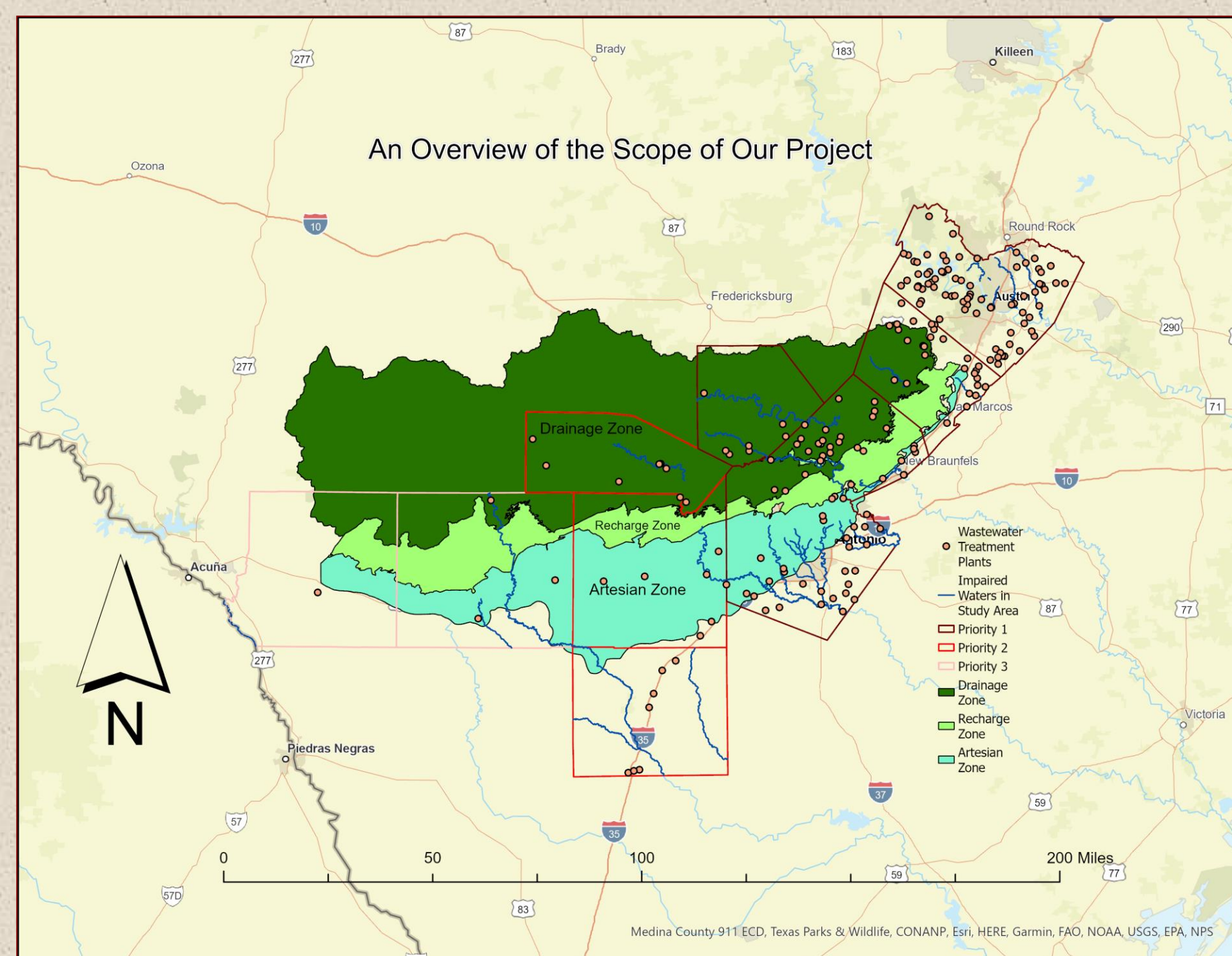
For this project, our sole subject was the Edwards Aquifer with additional emphasis of interest being placed on ten counties that surround it, and each wastewater treatment plant that releases effluent discharge into a waterway that connects to the aquifer. The Edwards Aquifer is an impressively vast geological phenomenon that is made up of an abundance of karst limestone chambers, holes, and caves. Its unique permeable structure allows it to rapidly fill with various types of water, whether that be from the natural flows of the rivers of Central Texas, the rainfall from the clouds above, or from effluent discharge released by local wastewater treatment plants.

### Objectives:

- Compile given data from the Texas Commission of Environmental Quality (TCEQ) and the Greater Edwards Aquifer Alliance (GEAA).
- Produce a static “working map” of relevant shapefiles such as the zones of the Edwards Aquifer, the boundaries of each included county, and the individual locations of each wastewater treatment plant (WWTP) that operates in our study area.
- The development and deliverance of an interactive web map application.
- Provide a weighted overlay analysis that identifies which WWTPs are most at risk of contaminating the Edwards Aquifer with effluent discharge.

## Study Area

Our Group’s study area was the Edwards Aquifer’s Artesian, Drainage and Recharge zone, ten different counties that exist around them, and every Wastewater treatment plant that operates within those counties. The counties were broken down into three different priority zones at the Greater Edwards Aquifer Alliance’s (GEAA) request.

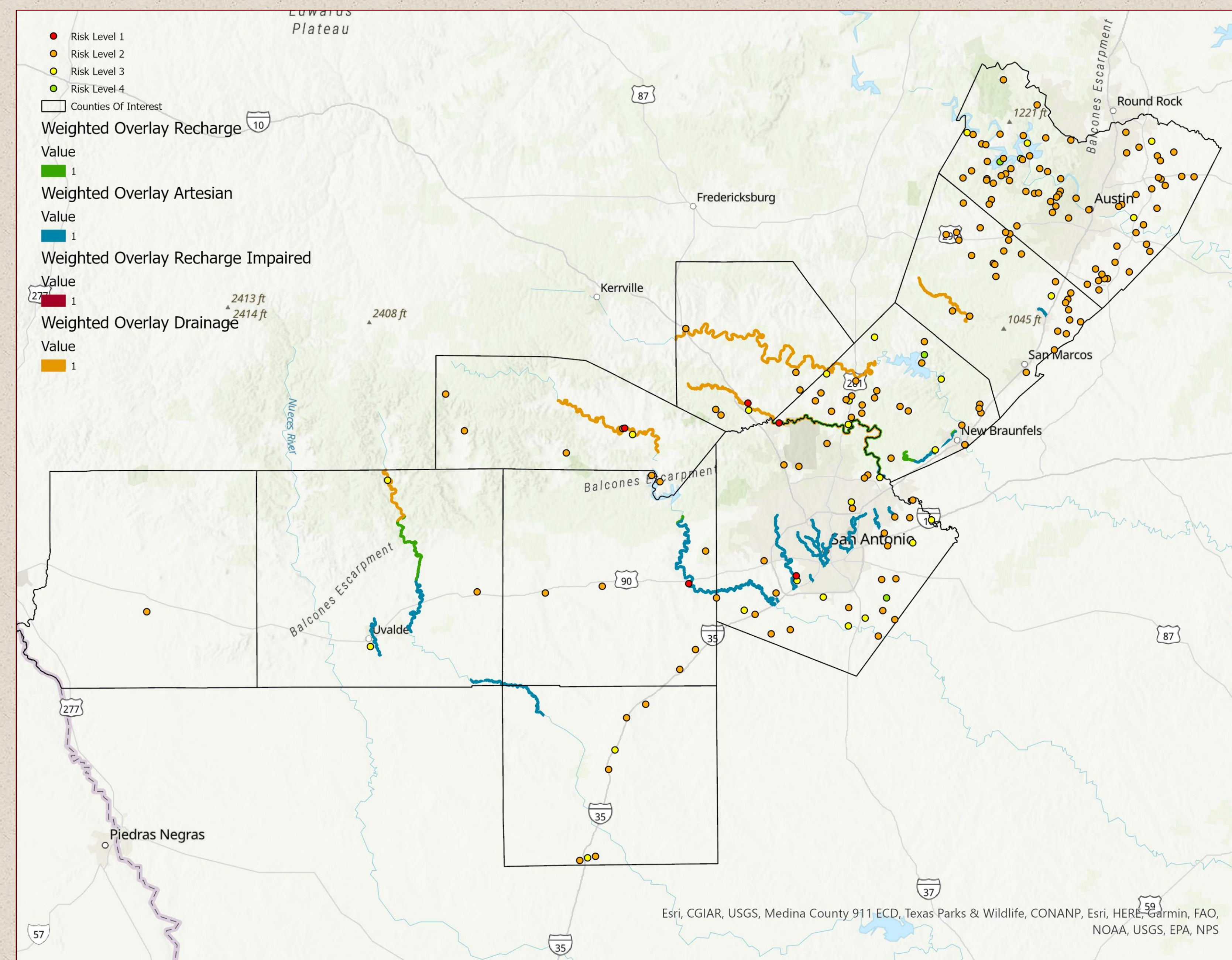


**Figure 1.** A Static map of the study area for our project. The zones of the Edwards aquifer, county priority zones, and operational WWTPs can be seen simultaneously.

## Data, Methodology, and Results

- After receiving the data from TCEQ that would allow us to view the individual effluent discharge data of each WWTP, our group cleaned out everything that was deemed unnecessary. This data cleanse included removing all data from every WWTP that fell outside of the GEAA’s ten counties of interest. Additionally, this portion of our project included creating fields to display a count for each WWTP’s Notice of Violations (NOV) and Notice of Enforcements (NOE), a summarized facility location, and a field that identified each WWTP’s discharge route into the spreadsheet provided by TCEQ.
- Following the data cleanse and inclusions, our group moved on to preparing a weighted overlay analysis. This analysis would investigate all relevant WWTPs based off their individual NOV and NOE counts, as well as their proximity to an impaired water source and which county priority zone they operate in.
- With everything else ready to go, our group rasterized everything in final preparation. As a result of this weighted overlay analysis, each WWTP was assigned a level of risk based off the information previously mentioned.

### Weighted Overlay Analysis:



**Figure 2** A completed weighted overlay analysis of our study area. Each WWTP has been designated a risk level based off the factors listed above.

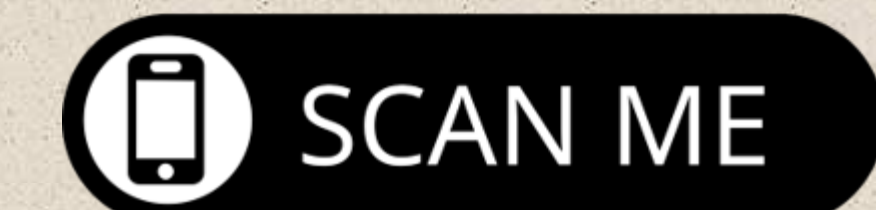
## Summary

At the request of the Greater Edwards Aquifer Alliance (GEAA) the Water Wizards consulting group has completed several different tasks:

- First, we have completed a new weighted overlay analysis that has been updated with relevant data provided by the Texas Commission of Environmental Quality (TCEQ). This weighted overlay analysis focuses on Wastewater Treatment Plants (WWTPs) that are in our study area with varying levels of importance being assigned to each plant based on their proximity to an impaired water source, and which priority zone they operate in.
- Secondly, we have created an interactive web map and dashboard for the GEAA that will allow them to track the effluent data of each WWTP that operates within the region of the Edwards Aquifer and its nearby surrounding area.
- Lastly, we are providing the GEAA and Texas State University with this poster which will provide a brief in-depth explanation of the goal of our project, a few of our data sources, methodology, our results, and a link and QR code to our interactive web map. We believe that providing these deliverables will further enable the GEAA to maintain water purity levels within the Edwards Aquifer.

### Interactive Web Map:

<https://txst.maps.arcgis.com/apps/mapviewer/index.html?webmap=1136af6f185746b6b2a46ba68ec74d6b>



## References

“2020 Census Geography.” *Capitol Data Portal, Texas Legislative Council*, 1 Sept. 2021, <https://data.capitol.texas.gov/dataset/2020-census-geography>.

*TNRIS DataHub*, <https://data.tnris.org/>.