

Progress Report on Protecting the Edwards Aquifer Recharge Zone: GIS Mapping of Sewage Leaks for the Greater Edwards Aquifer Alliance



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Tay Floyd – Present Work, Work Scheduled, and Conclusion

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1 Introduction

1.1 Summary

In this report the Water Wizards consulting group will discuss the progress that we've made on the task given to us by the Greater Edwards Aquifer Alliance (GEAA) at the beginning of the semester. Since our proposal presentation a few weeks ago, we have been making strides in all areas of our project and believe that we are nearing completion. At this point in time, we have cleaned all of the data given to us by the Texas Commission on Environmental Quality (TCEQ). Additionally, we have created a master data list of all Wastewater Treatment Plants (WWTPs) in our study area and have begun using ArcGIS Pro to visually display the WWTPs, GEAA's counties of interest, and the individual zones of the Edwards Aquifer itself.

1.2 Purpose

The main objective of our project is to provide the GEAA with an interactable web map that will aid in their ability to track and manage data from relevant WWTPs. Their objective is to protect the purity of the Edwards Aquifer and its recharge zone, and ours is to support them in that goal. By providing the GEAA with an interactive web map, we will essentially be streamlining their ability to sift through the records of the individual WWTPs found within their ten counties of interest. With just one click of their mouse a user will be able to pan and zoom to a GPS point that corresponds to its appropriate treatment plant. In addition to this animation, a pop-up window will appear with permit information, notices of violations, and chemical discharge reports that are specific to the selected treatment plant. On top of providing this web map, the Water Wizards are aiming to provide the GEAA with a weighted overlay analysis which will determine which areas of the Edwards Aquifer are more at risk of contamination.

1.3 Scope

This project's main focal point is the Edwards Aquifer and its recharge zone, but its overall area of interest (AOI) spans through ten different counties spread out over Central Texas. To be blunt this is an admittedly large study area, as such it contains 330 different wastewater treatment plants and covers the drainage area, the recharge zone, the contributing zone, and the artesian

zone of the Edwards Aquifer. In response to the size of this study area, we are attempting to make our results clear and concise with our web map being as fluid and interactive as possible.

2 Tasks

2.1 Work Completed

At the beginning of this project, we were provided with all of the necessary data that we would need in order to complete the tasks that we were requested to perform. Texas Commission on Environmental Quality provided all of the wastewater treatment plant data including the general locations, notices of enforcement, and notices of violation. The data provided by TCEQ needed to be extensively cleaned by removing treatment plants that were not located in the areas of interest. Many of the treatment plant locations provided by TCEQ were also not exact and needed to be updated in order to display the correct location. Some of the treatment plant locations provided by TCEQ were unable to be found based on all of the data provided. With all of these factors considered we were able to narrow down the list of wastewater treatment plants that would be used in our study. With all the updated information the data was used to create a general map displaying all of the wastewater treatment plants in the area of interest to provide our clients with an idea of where these plants are located.

2.2 Present Work

Currently, we have finished cleaning and processing the data given to us by TCEQ and are now conducting our vulnerability analysis. Thankfully, up until this moment, we have not experienced any delays or problems with the creation of our WWTP map. However, a slight issue arose during the creation and processing of the vulnerability analysis, causing a slight delay when compared to the planned timetable. We still believe we will finish the project ahead of time, allowing GEAA to offer any additional changes to the finished product.

2.3 Work Scheduled

March

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

April

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

Wed, April 26 - All final deliverables are due by 4:00 pm

Mon, May 1 – Final Project Presentation

2.4 Problems

After having received all of the necessary data from TCEQ provided to us by our client, the Greater Edwards Aquifer Alliance, we started cleaning the extensive list of all the wastewater treatment plants. The first problem we encountered was having to narrow down the list of treatment plants that were located outside the area of interest. We then needed to go through and check the location of each wastewater treatment plant individually and re-enter a more accurate location and coordinates for the plants. This task was time-consuming and tedious although necessary for being able to produce a reliable and accurate map displaying the data. We then needed to join the tables displaying all of the information on the wastewater treatment plants. We were able to join the tables using the common RN number that each plant was given using the “Join” tool in ArcGIS Pro. Once all the data was combined into one singular table displaying all

the necessary information, we could move on to our next task of adding in the “Notice of Enforcement (NOE)” and “Notice of Violation (NOV)” fields to the table using the specific RN numbers given to each plant.

The next issue we encountered was having to go through the tables of NOEs and NOV's and create new fields within the master list of all of the wastewater data displaying how many notices of violation and notices of enforcement each of the facilities was given. In order to do this our group needed to search the RN number of each individual facility and record how many NOV's and NOEs each of them had acquired. This was also a tedious and time-consuming task that was made easier by splitting up the list and giving each group member a specific list of the facilities, they would account for. We encountered less problems throughout this task than the previous, but there were still some minor issues within the data that we encountered.

As this project progresses, we will face new problems that arise within creating a map and final product. We will need to consult with our professor, Dr. Yihong Yuan, and lab instructor, Jamil Raihan in order to further understand how to complete a full vulnerability analysis that will take into account the factors specified to us by our client. There is no specific way to complete this task which is why we will need to look for various solutions to complete the analysis that will provide us with our final product.

3 Conclusion

The final objective of this project is to create a fully interactive web map for the Greater Edwards Aquifer Alliance in order to visualize spatially how WWTPs interact with the Edwards Aquifer and its recharge zone. The final product will display all the WWTPs in the region designated to us by the GEAA with data provided to us by TCEQ with individual points displaying information for each individual WWTP. The greatest issue that has faced this project is the creation of a vulnerability analysis and the way to conduct this, as there are many different avenues to conduct this analysis. We are hoping to resolve this matter quickly and efficiently by using the resources available to us and allowing us time to make and addition changes the GEAA may provide to us after seeing the final result.

4 Participation

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