Client Perspective Report
Wetlands Team
17 June 2022

The Sewanee Utility District (SUD) uses tertiary treatment, a combination of physical, biological, and chemical processes, to filter and treat wastewater, one of which is the constructed wetlands. Natural wetlands are bodies of water that cover soil for parts of the year. Wetlands can naturally clean wastewater by filtering out excess nutrients and pathogens through their aquatic plant life and microbial activity. Constructed wetlands mimic the filtering processes that natural wetlands have through careful engineering so that they can treat domestic wastewater. Constructed wetlands have been used on a larger scale in Orange County, California, as well as, in a smaller system, like Sewanee.

The goal of the Wetland Project is to analyze and visualize the constructed wetland data of Sewanee to show how it can be a viable option for wastewater treatment in smaller-scale, rural areas where traditional wastewater treatment plants are not economically feasible and they need a cheaper treatment option, or in areas with high environmental pollution and they need a solution. The data that the SUD and I have collected are water quality reports using probes to show measurements of water quality like dissolved oxygen, turbidity, conductivity, temperature, and acidity (pH), to show the effectiveness of constructed wetlands as a wastewater treatment option. The data ranges from the years 2020 to 2021, and it shows reports of monthly water quality measurements.

My main objective is to be able to take these measurements and look at them on a monthly scale. I want to see trends over time, first, with the trend over the year, and second, the trends are broken down into monthly reports. The time, meaning the month or year, is the independent variable and I want it compared to the dependent variables of turbidity, dissolved oxygen, temperature, etc., which are the variables that I have measured at the wetlands. If someone can visualize these independent and dependent variables through charts and graphs, I will be able to use that data to show how water quality has either improved or worsened as a result of constructed wetlands. This data will be accessible to the public so they can understand the effectiveness of wetlands for Sewanee's wastewater treatment

Furthermore, there is also very little data on the trends of wetland wastewater treatment in different seasons of the year, so visualizations of the water quality at different times of the year will show me which times of the year constructed wetlands should be most utilized. For example, if they process wastewater at a higher rate in the summer than in the winter I will know that the SUD should run more wastewater through it in the summer than in the winter.

I have collected all of this data on water quality in the constructed wetlands, but I do not have a way of visualizing this information to see the trends in water quality at a monthly and yearly rate. If someone can find these trends and then show me how they found them in the data and how they visualized this data, then I will be able to input my own data after this project has ended and continue to see trends monthly. My current goal is to discover patterns in the data I

have collected; however, my future goal is to obtain and understand a model for a continuous upload of constructed wetland data.

I recently put in an aerator in the constructed wetlands, which allows for plants to get more oxygen and nutrients due to the compaction of soil in the wetlands. Because I recently installed this aerator, I want to see how it will impact wastewater treatment in the constructed wetland. The data I have collected thus far excludes the input of the aerator. If I can find out how to find trends in the data and visualize them, then I can compare constructed wetland data with the aerator and without to see how it has positively or negatively affected the wetland wastewater treatment system.

The goal I have is to see how the constructed wetlands' wastewater treatment has changed the water quality over time so that I can see where I need to make adjustments to this system to make it more effective.