# Mapping Furman's Irrigation System

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## Abstract

In a growing world full of uncertainty, management of our natural capital and environmental systems is a topic of utmost importance. Furman's campus requires extensive amounts of irrigation in order to maintain the beauty that we see on a day to day basis. However, it is clear from a visual perspective that there is over watering and waste issues. During active irrigation times, one can see water pooling on the walkways and running into the drainage system. Although the water makes its way back to the lake, this ultimately proves to be hazardous for the Ecosystem. Much of the fertilizer used on the campus is carried into the lake. This produces eutrophication which kills much of the natural wild life. The goal of this case study is to map and assess Furman's irrigation systems, provide information essential to assist Furman in future decisions regarding irrigation management, generate future savings, assist with carbon neutral goal, and reduce waste. Through the use of ArcGIS technology, this study visually represents the sprinkler points, properties, and overlap of the irrigation system surrounding Furman Hall, Plyer Hall, and the water Fountain area that lies between them. Blueprints of the study area were used as the foundation of mapping sprinkler locations. The data was imported to ArcMap and used to geo-reference each point.

## Past Studies

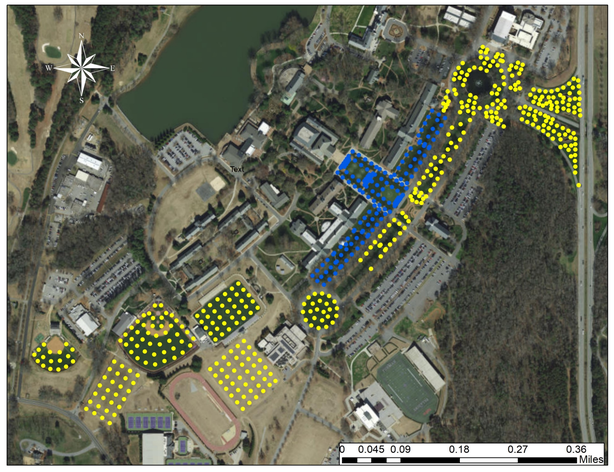
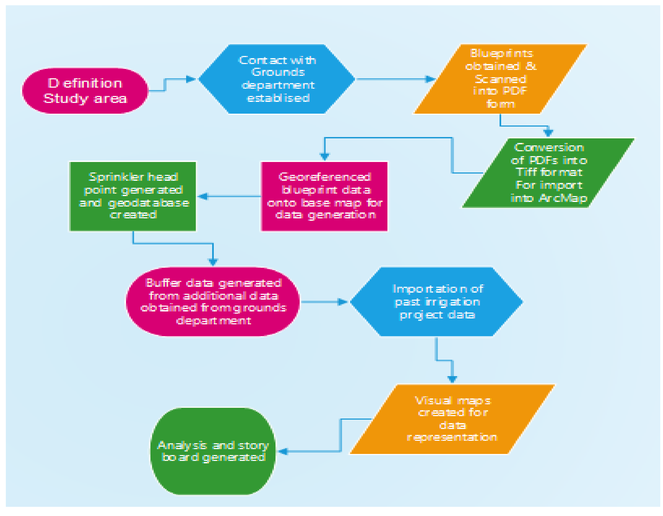



Figure 1: This map shows research of the irrigation system on the athletic fields, new study area, and the Furman Mall. Research has been previously conducted by Sarah Fleckenstein and Meredith Schosky.

## Methodology Flow Chart




## Results

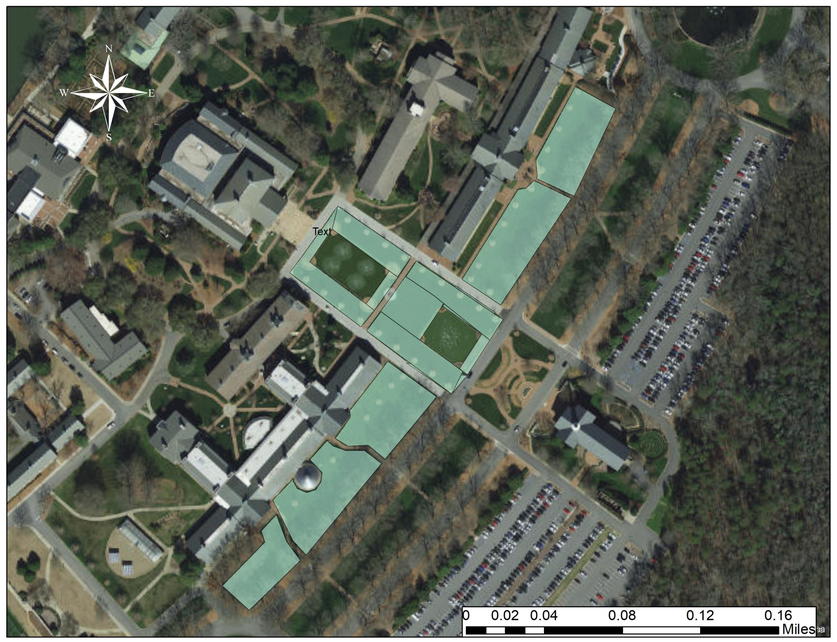



Figure 2: This map shows the determined study area for sprinkler head mapping. Each highlighted area represents a separate irrigation system for Furman grounds and lawns and there is just over 24,090 square feet of coverage. This study area is part of an ongoing effort to map the irrigation system of Furman University

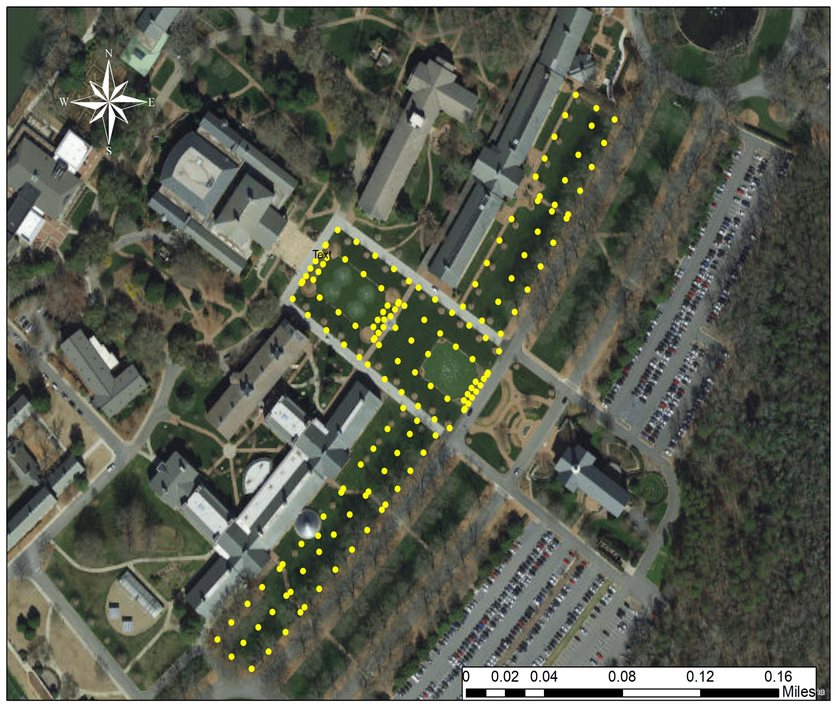



Figure 3: This map shows the locations of all sprinkler heads in the study area. Each yellow dot is representative of a newly mapped sprinkler head.

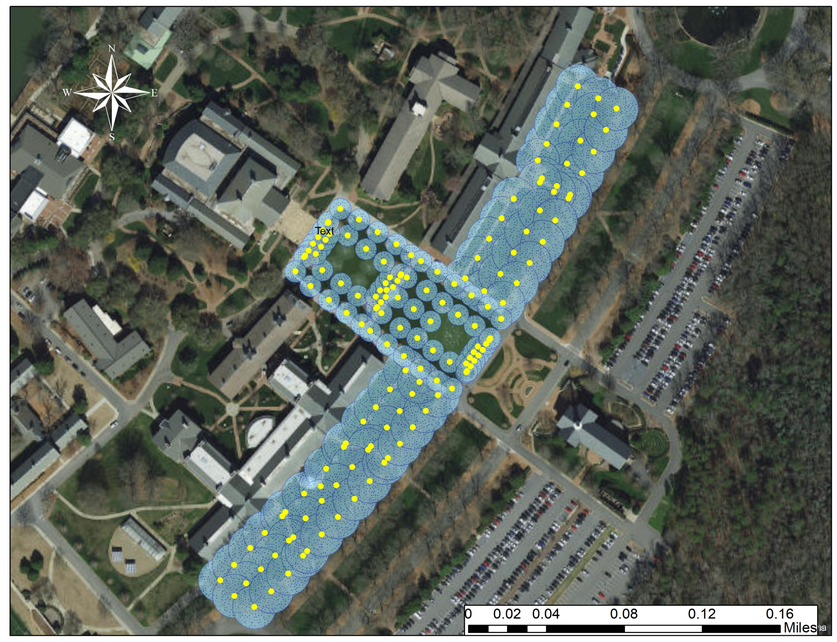



Figure 4: This map shows the locations of all sprinkler heads and their corresponding spray radius. The larger circles represent 59 ft. while smaller circles represent 29 ft. spray radius respectively. The irrigation system in these areas use approximately 54,805 gallons of water weekly, during the growing season. This statistic is based off of average run times and sprinkler out put data provided by the grounds dept. The radius was determined through analysis of the pressure out put of the irrigation system and the type of nozzle in use.

## Conclusion

Further analysis of this study area will be need in the future in order to determine needed changes. The actual watering radius of the study area will also require further study and verification based on measurement of the actual spray radiuses in field. The irrigation system for this study area was inactive at the time of the study. It is clear that there is a significant amount of overlap as seen in Figure 4 and this is likely one of the primary causes of over watering in Furman's irrigation system. Reduction of spray radius could possibly assist with water waste savings and mitigate water waste. Water naturally fills in space and if there is pooling it would likely be retained to the intended irrigation areas. Reduction of watering times would also reduce waste and power use. Saving even a small percent of waste water will in the long term save Furman money and it will help to restore the lake to a healthier ecosystem. In some ways we are paying for the beauty of the grounds with the decimation of our lake. In order to reach carbon neutral goal of 2020 it is important that Furman take in to consideration water usage and waste. It is up to us, as a university, to set a precedence of waste use minimization in order to protect our collective future.

## References and Data Sources.

Special thanks to all those that assisted with the production, generation, and data supplementation of this study.

Thank you Dr. Suresh for you support and guidance throughout this project. Your assistance with GIS has been helpful.

Thank you Andy Medgyesy. Your knowledge of the irrigation system was pivotal to the success of this study. Also, thank you for providing me with needed data.

Special thanks to Sarah Fleckenstein and Meredith Schosky for their previous work in this area of study.