Data Collection Towards Understanding Stormwater Management in the Town of Gainesboro, Jackson County, TN
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INTRODUCTION
During the summer of 2018, the Town of Gainesboro in Jackson County experienced significant flooding and stormwater management issues (shown in Figure 2) that have continued to this day. Ideas surrounding the causes of the recent flooding relate to: overgrown vegetation present in Doe Creek, the age and condition of the town’s stormwater infrastructure, and increased stormwater runoff due to land-use change in the draining locations. However, no data repository exists for the Town to what may be leading to the flooding. This research project, therefore, focused on data collection and organization to allow for a better understanding of what may have caused the floods. It is part of a larger project that aims to develop a watershed-wide stormwater management plan for the Town of Gainesboro.

OBJECTIVES
- Collect available and relevant data surrounding the recent significant flooding and stormwater management issues affecting the Town of Gainesboro
- Identify data gaps that are necessary to understand the cause of flooding
- Address these gaps by collecting additional data cost-effectively

METHODOLOGY
The following data was collected to characterize the watershed:
- Historic weather data
- Historic land-use data
- Topographical information
- Soil data
- Flow data on Doe Creek and its tributaries
- Water quality data
- Flood maps
- Storm drain and sewer maps

All information was stored in a shared drive and organized in a Geodatabase if it was GIS data. A continuous water level logger was installed at Doe Creek to understand stream flow in response to the storm events.

RESULTS
I. Data Collection and Analysis
- Historic weather data was compiled since Year 2000 and displayed graphically. As shown in Figure 3, the total annual precipitation was plotted for each of the nineteen years. The mean total annual precipitation for Gainesboro for these years was calculated to be 57.999 inches. This value is plotted in light blue while the true total annual precipitation levels of the town are plotted in dark blue. A formal hypothesis test was performed utilizing RStudio to investigate whether the 2000 to 2019 mean annual precipitation exceeded the mean annual accumulated precipitation from 1981 to 2010 of 56.000 inches. A one-sided t-test was employed and found that there is insufficient evidence to suggest that the mean annual precipitation level for Gainesboro increased significantly.

II. Identifying Data Gaps
- Data gaps were identified to be Flow data; Water quality data; Storm drain maps

III. Addressing Data Gaps
- A HOBO Water Level Logger was installed on July 19, 2019 in Doe Creek in order to provide water level data. This instrument collects data every 15 minutes. The results as of August 5th are displayed in Figure 5 as well as temperature data.

CONCLUSIONS
Through initial data collection and analysis, it is being hypothesized that the age and overall inadequacy of the Town’s stormwater infrastructure, combined with overgrowth and debris accumulation in Doe Creek may be causing the floods; however, additional surveying is necessary in order to confirm this.

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