WATER MANAGEMENT & HYDROLOGICAL SCIENCE
TEXAS A&M UNIVERSITY

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Streamflow variation along the course of a low-order Texas stream

Introduction

Headwaters comprise the beginnings and the periphery of all river systems with significant impacts downstream. These impacts are influenced by many aspects, such as catchment size, land cover, and land use, and their effects on streamflow [*Dingman*, 2008]. Despite such importance, headwaters are often disregarded in river system planning and study considerations [*Gomi et al.*, 2002; *Alexander et al.*, 2007]. This study observed how streamflow characteristics vary along Cypress Creek.

Methodology

Study Area

This study occurred along Cypress Creek, an 85 kilometer, second-order stream in Harris County, Texas. TX-290 divides the creek's 82,000 hectare catchment into two distinct sets of landscapes and land use patterns.

Data Collection & Analysis

I obtained data from the United States' Geologic Survey (USGS) National Water Information System Database for six water monitoring stations located on Cypress Creek. I refer to these as "upstream" and "downstream" stations depending on their position relative to TX-290. Excluding unit conversion, I performed no analyses

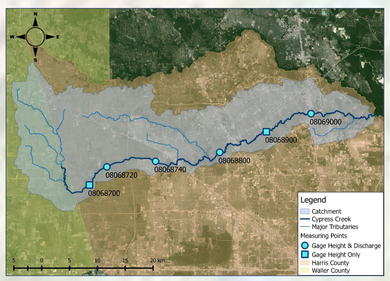

Figure 1: USGS data collection points along Cypress Creek. Four collect data on both gage height and discharge, while two disregard discharge.

Results

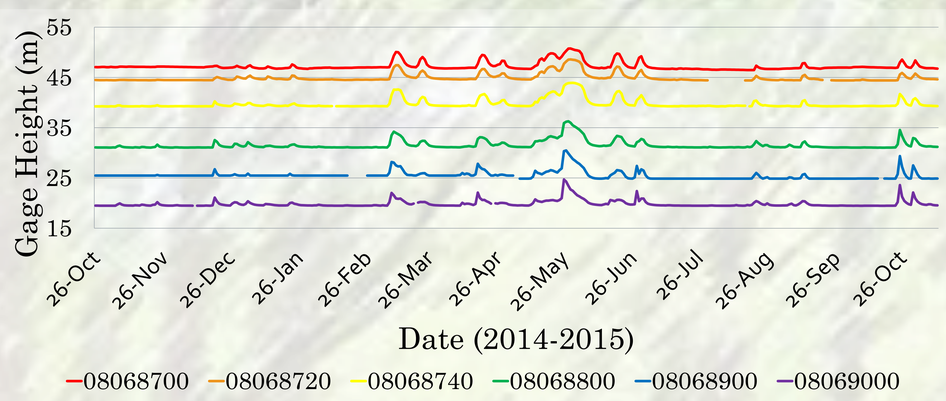

Figure 2: Gage height variations between six Cypress Creek data stations. Gage height consistently fell along the course of the creek. Downstream stations also had greater water level changes and sharper flood peaks than those upstream.

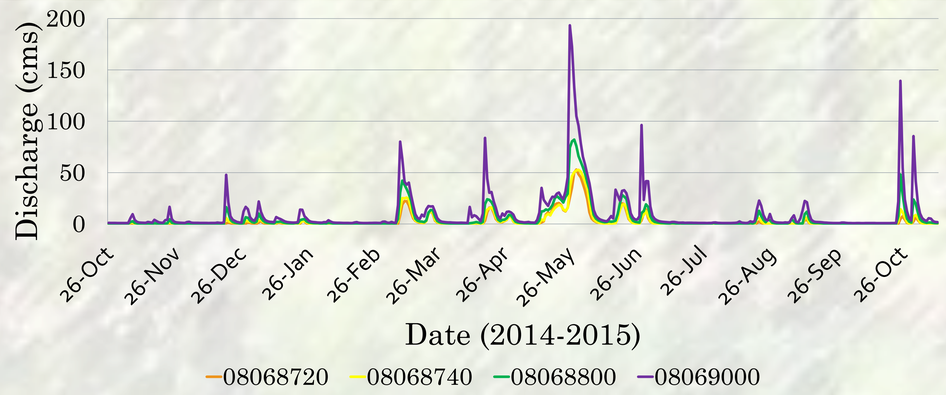

Figure 3: Discharge variations between four Cypress Creek data stations. Following rain, downstream stations had more extreme changes in discharge rates than those upstream.

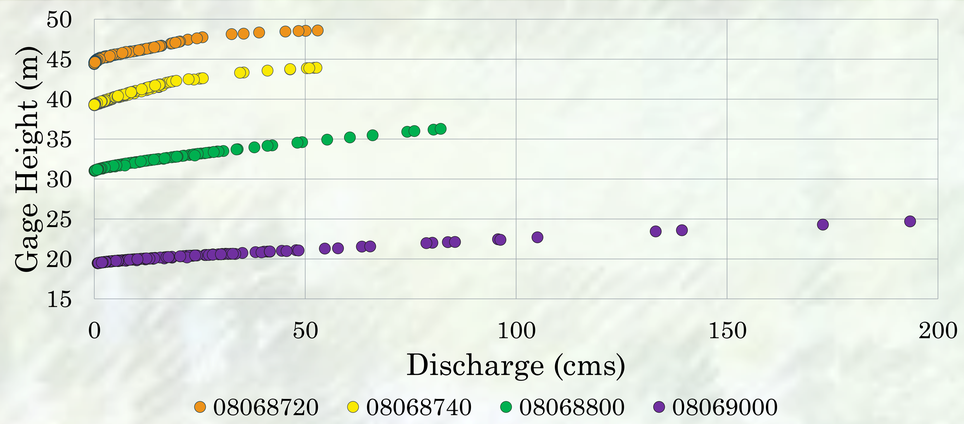

Figure 4: Stream flow variations between four Cypress Creek data stations. Changes in water height upstream affects discharge rates less than similar changes in water height further downstream.

Discussion

Location

Locations downstream have larger contributing catchment areas than those upstream and generally larger streamflow fluxes [*Dingman*, 2008]. This phenomena is magnified if there are additional tributaries, such as the numerous weirs, Dry Creek, and Little Spring Creek along Cypress Creek.

Vegetation

The different dominant habitats in the ecosystem, prairie versus woodland, also affected flow variations along Cypress Creek. Forests may reduce the amount of water entering a stream via baseflows [*Zhou et al.*, 2010].

Urban Development

Urban development significantly alters the hydraulic response of a stream to a storm event: faster and greater stream flow changes occur after development [*Price*, 2011]. A far greater degree of urbanization occurred downstream than upstream.

Acknowledgments

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References

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