

PROJECT TITLE: Evaluating stream water quality in an urbanizing watershed

INVESTIGATORS: Dr. Amy Belaire, Dr. Teresa Bilinski, Dr. David Johnson, Andres Cuartas-Olarte, Maria Rodriguez, and Andre Brebion

Research objective:

The benefits that nature provides to people are called “ecosystem services,” which include goods and services like clean air, clean water, and livable climate. This study aimed to shed light on the water filtration services that natural areas like Wild Basin provide in an urbanizing watershed. We were also interested in monitoring Bee Creek as portions of the watershed upstream of Wild Basin experienced on-going construction projects related to multiple new developments.

Methods:

Water quality parameters were tested at several locations within the Bee Creek watershed at Wild Basin. Four sample points were evaluated, each with distinct drainage basin characteristics and different upstream coverage of impervious surfaces. This included two points on Bee Creek near the culvert at Loop 360, one point in North Hollow (an intermittent creek and tributary to Bee Creek, with a partly urbanized drainage area), and one point in an ephemeral tributary to Bee Creek (with a completely wooded drainage area) (Fig. 1).

At each sample point, we collected samples on three occasions between May 15 and June 30, 2015. Multiple indicators of water quality, including pH, dissolved oxygen, conductivity, bacteria concentrations, and invertebrate biodiversity, were evaluated at each point. In addition, a time-lapse photography series was conducted downstream of the waterfall pool to provide a visual representation of changing creek conditions over time.

Results:

At the Bee Creek sample points, we found higher dissolved oxygen, conductivity, and bacterial concentrations than at the points with more forested drainage areas. The ephemeral creek with a completely wooded drainage area had the best water quality based on chemical and bacterial indicators. Total biodiversity varied between the sampling points, with the North Hollow site containing the greatest number of taxa overall and 7 species classified as sensitive to water quality impairment, and, at the other end of the spectrum, the Bee Creek sites containing fewer taxa and only 1 sensitive species. These results suggest that Wild Basin provides an ecosystem service by filtering water that flows into several



Figure 1. Points indicate sampling locations

tributaries of Bee Creek, providing better water quality and conditions that support aquatic biodiversity.

The time-lapse photography showed high turbidity in Bee Creek on multiple occasions after rain events. The photography was submitted to Linda Laack at Travis County.

Project status:

Three St. Edward's University students, Andres Cuartas-Olarte, Maria Rodriguez, and Andre Brebion, presented an oral presentation on this project at the NSF-CASAR/TG/Keck Summer 2015 Research Symposium in June 2015. No additional work under this permit is anticipated at this time.