

# Fairfield Run Watershed Implementation Plan: UD Arboretum

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## Introduction

The Fairfield Run watershed located on University of Delaware's Laird campus is the site of a proposed university arboretum. The design of the arboretum relies on the health of the watershed: good water quality and strong habitat potential. The proposed arboretum can increase the recreational and scientific value of the land; therefore, a watershed analysis of the site is crucial for designing such a project.

## Objectives

*The objective of this study was to conduct research on the Fairfield Run, located in the Piedmont Watershed of the University of Delaware Laird Campus.*

1. Assess the watershed's health in terms of water quality, forest diversity, and biological habitat potential
2. Delineate Fairfield Run watershed and sub-watersheds of surrounding tributaries
3. Design a structural plan for the proposed arboretum, including a trail system

## Methods

1. Delineate sub-watersheds and characterize tributaries
  - Contour lines and drainage patterns
2. Sample and analyze water quality
  - Turbidity, Conductivity, pH
3. Conduct EPA Habitat Bioassessment
  - 500 ft. survey of Fairfield Run (assessment every 100 ft.)
  - Rating: Excellent, Good, Fair, Poor
4. Conduct forest survey
  - Species identification
  - Diameter of trunk at breast height (DBH)
5. Map and develop plan for proposed arboretum
  - Trail systems through sub-watersheds



## Conclusions

### WATER QUALITY

Impervious surface runoff is the main contributor to high conductivity, specifically for Fairfield Run and Blue Hen Creek (the two streams closest to campus). Therefore, it is recommended to continue quality analysis and implement stream restoration techniques, such as increasing riparian buffers and forest density. The more northern sites sampled (Lost Stream, Biden Creek, Bear Creek) exhibited relatively low conductivity and turbidity and can be used as standards for watershed restoration.

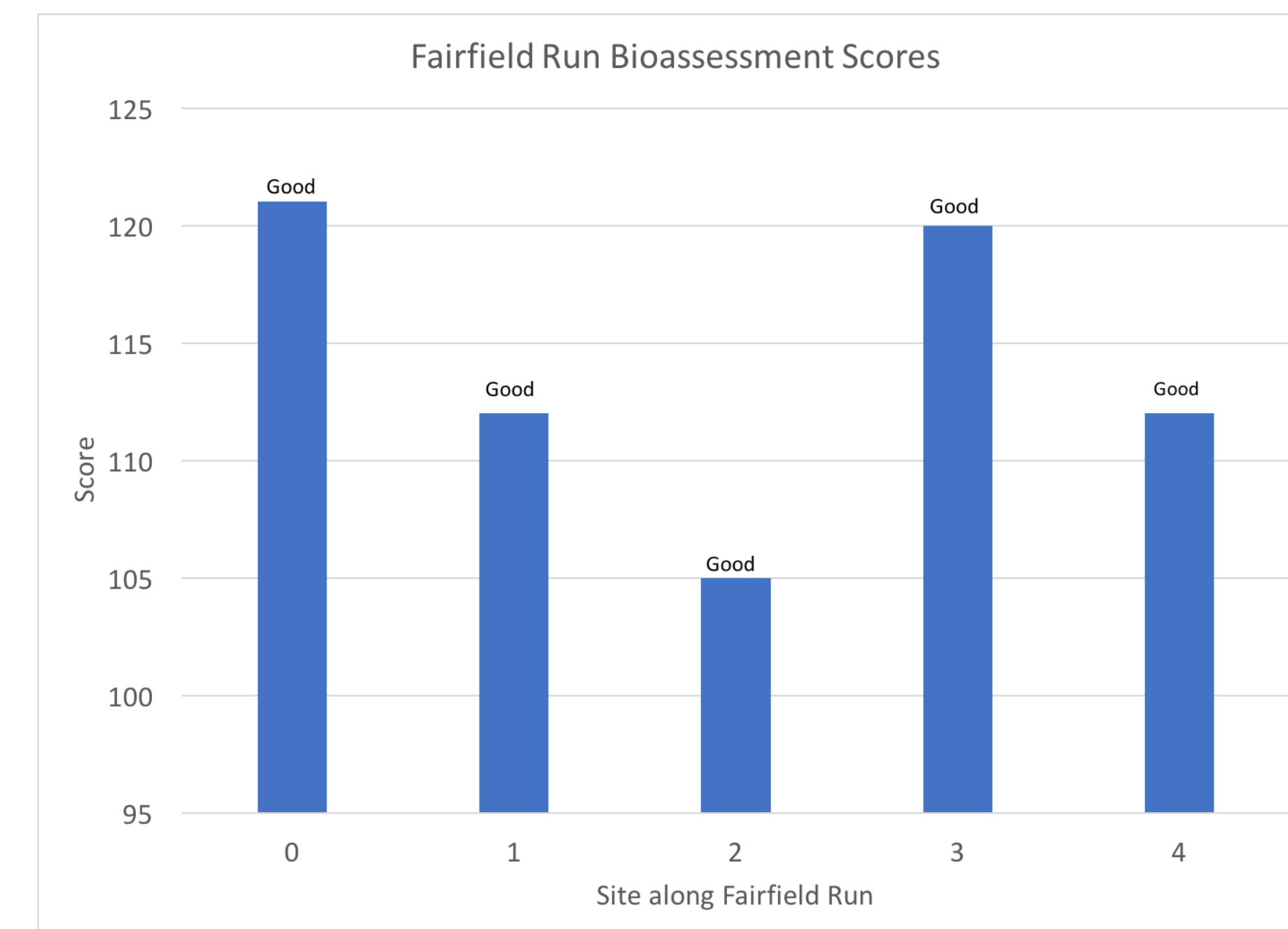
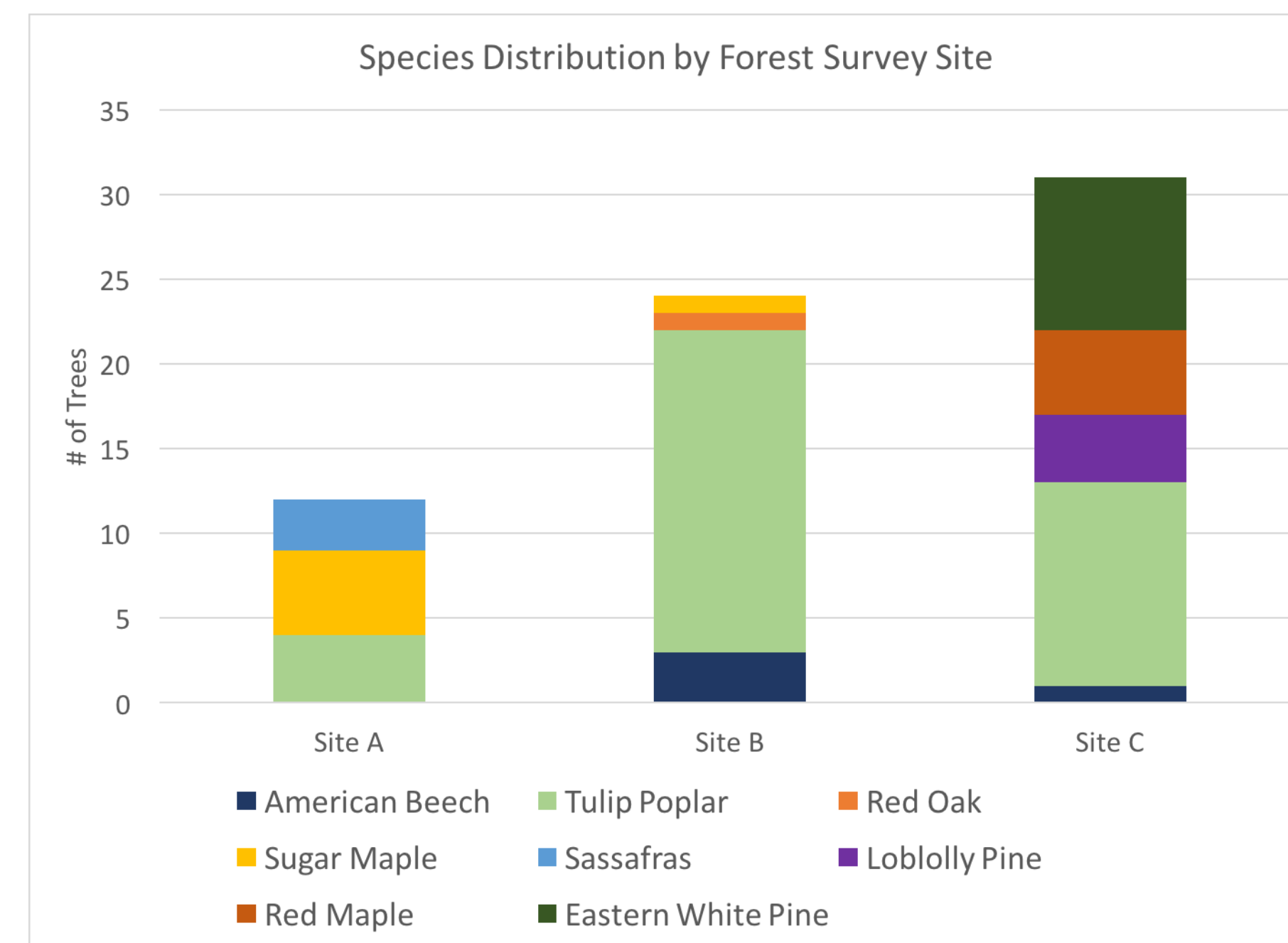
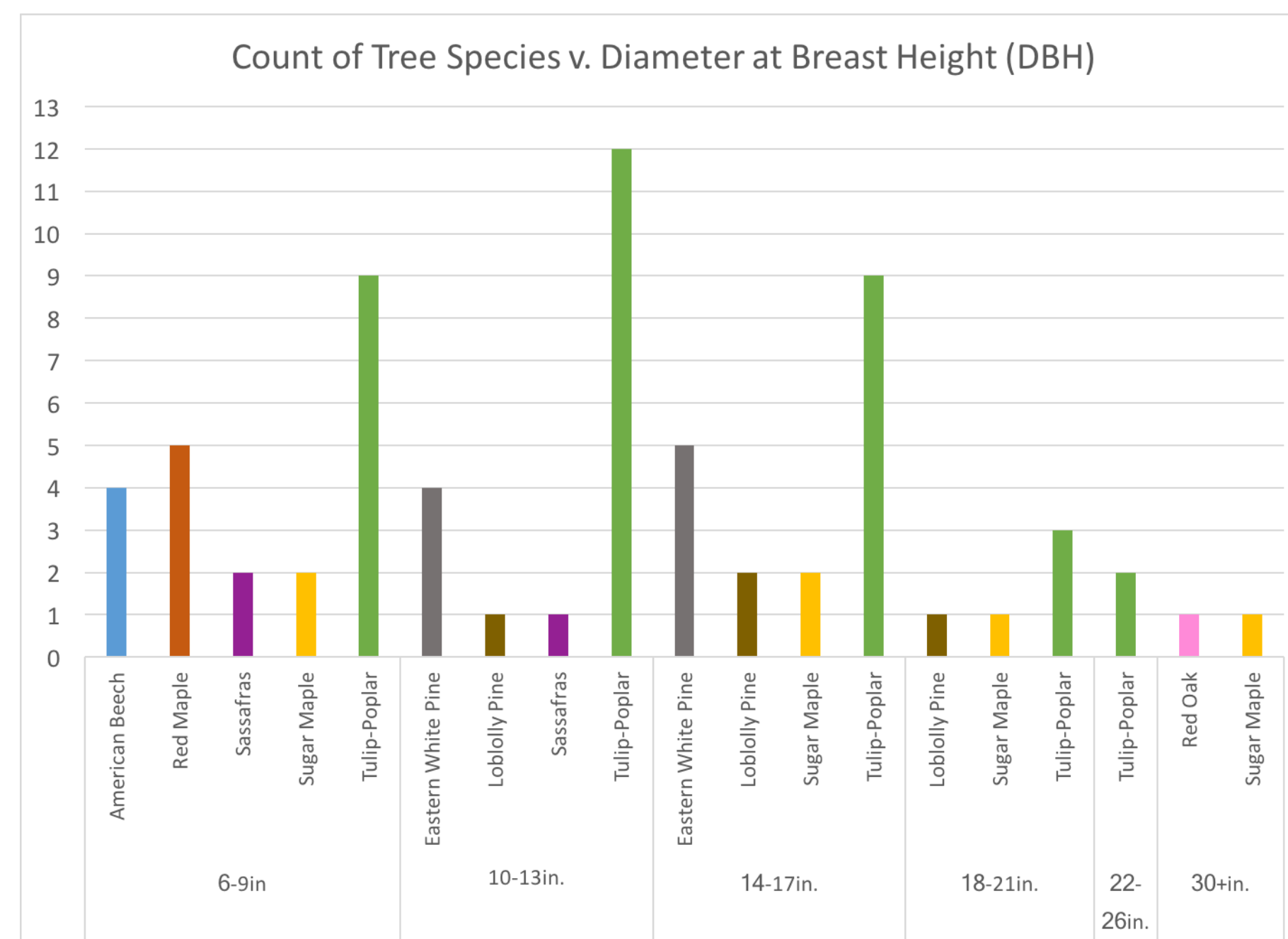
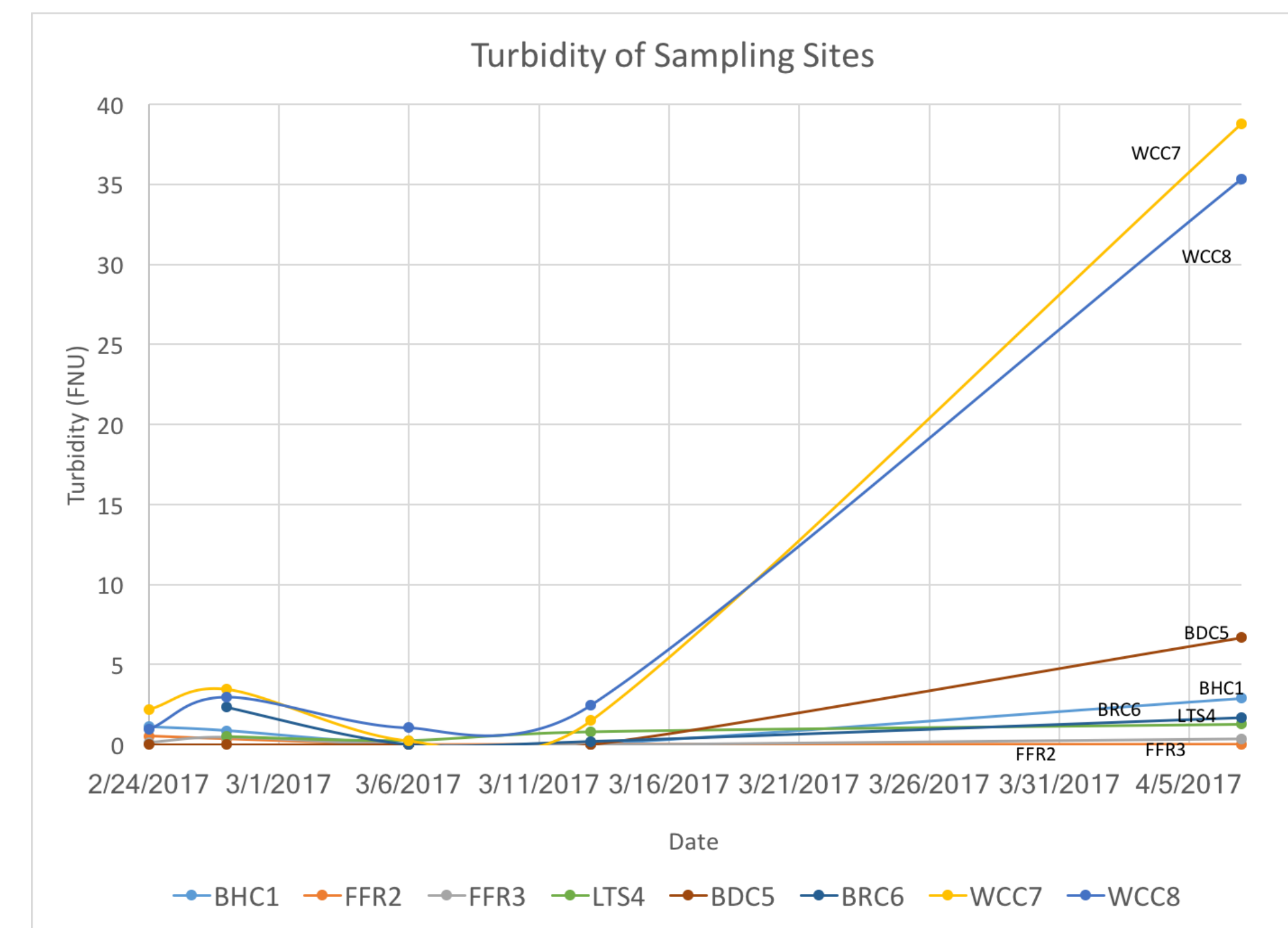
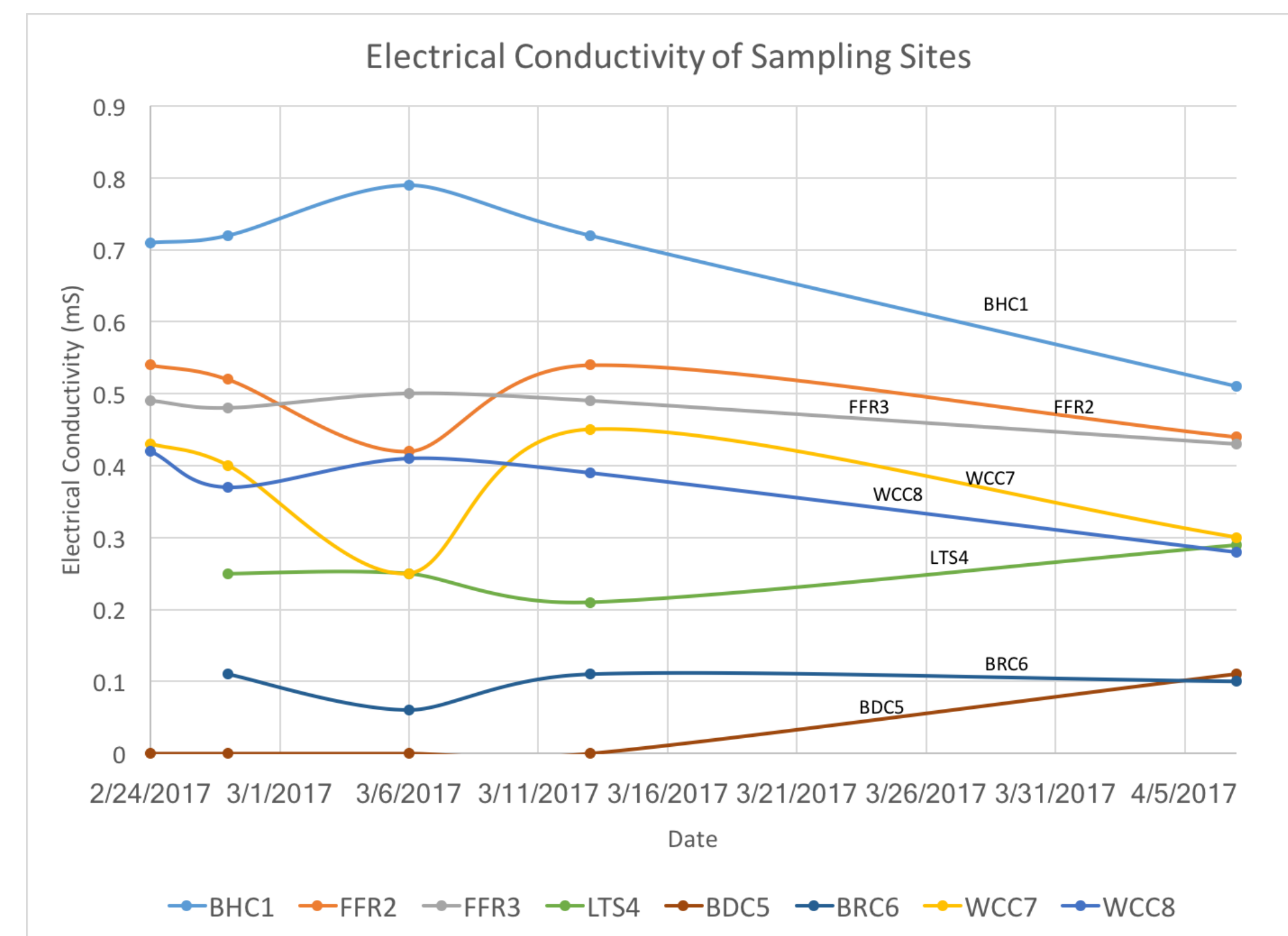
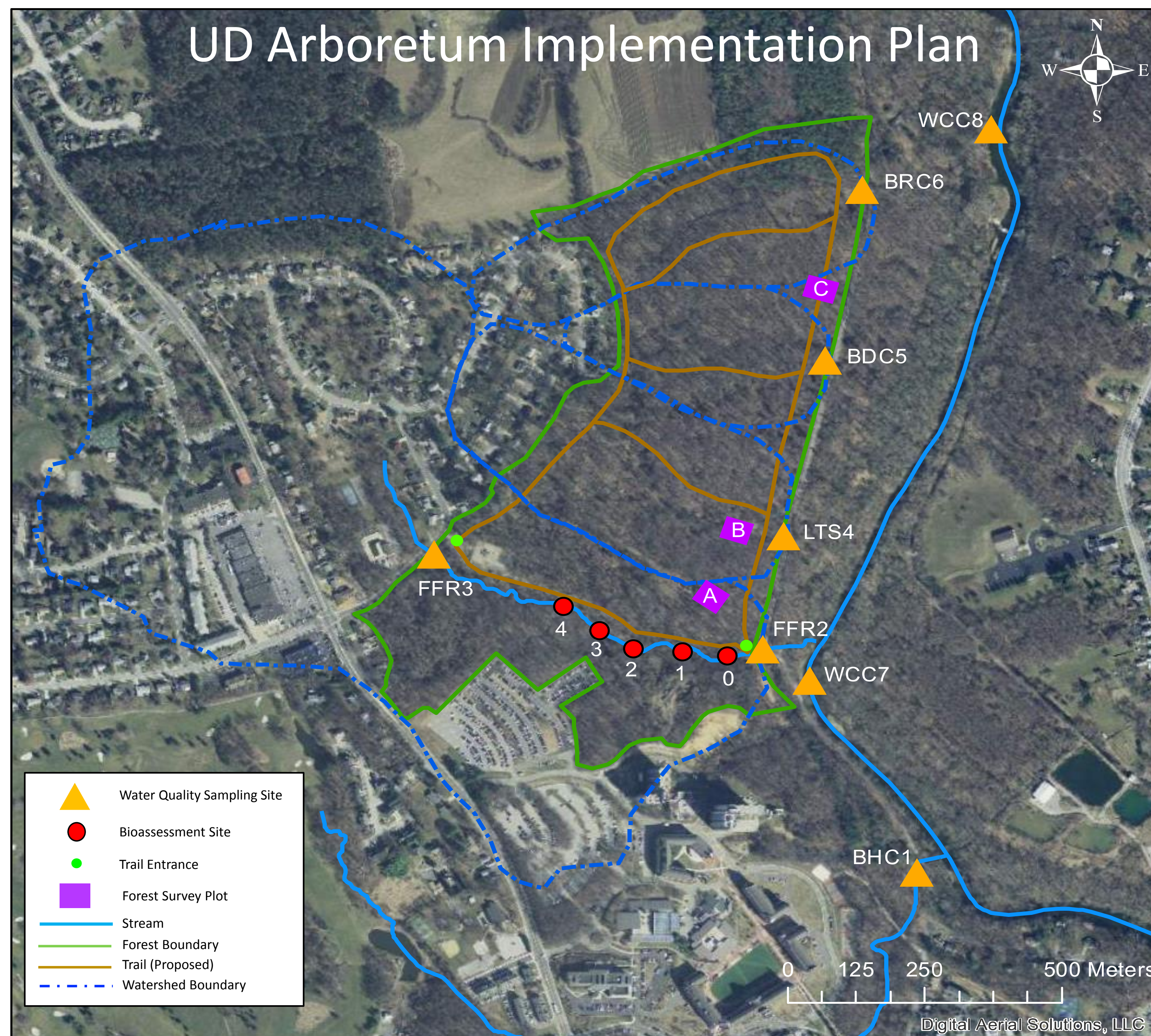
### HABITAT RESTORATION

Each site along the Fairfield Run was rated "Good." The most feasible improvements that can be made include: increasing the number of pool v. riffle zones, decreasing bank erosion, and increasing riparian vegetation, especially at Site 0 and Site 4. More structural heterogeneity in the area will increase biological potential and encourage a stable ecosystem, increasing the value of the proposed arboretum.

### FOREST RESTORATION

Watersheds with less anthropogenic interactions had higher tree density, species diversity, and increased maturity. Therefore, the areas closer to campus may require forest restoration. It is recommended to restore the forests, specifically in the Fairfield Run watershed, to a Tulip-Poplar dominated forest. The presence of this native tree species can encourage forest growth and wildlife habitat abundance.

## Results



## References

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