2014

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# Vegetative succession in a restored urban wetland: If we build it will they come?

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CI Project # 803

## Abstract

Urban wetlands can provide many important ecosystem services to society. However, they are often severely degraded by runoff, pollution, and invasion by aggressive non-native plant species. This Creative Inquiry project is establishing a long-term monitoring program to document vegetation composition in a restored wetland in the Hunnicutt Creek watershed for the purposes of inventory, assessment of environmental conditions, and adaptive management. Using a standard ecological observation unit, a 10 x 10 m sampling plot originally developed by The Carolina Vegetation Survey (CVS), we are evaluating the performance of re-introduced and naturally regenerated native woody species, and documenting the recruitment of non-natives from adjacent unrestored areas. A total of eight CVS plots have been established and will be resampled twice annually for the next several years.

## Introduction

Due to the construction and activation of the man-made dam on lake Hartwell in the late 1950s, the proportion of land for this study was transformed into a wetland as a result of lack of efficient water drainage. With the wetland being in an early successional stage containing mostly bedstraw (Galium sp.) and hazel alder (Alnus serrulata), it was thought the area would be acceptable to transform into the forested wetland it had been previously. Through methods of hydraulic modification, planting of woody vegetation consisting of trees and shrubs, the stabilization of existing outlets, and the establishment of a 50 foot buffer around the perimeter, a quick but defining enhancement of the wetland is conceivable. Although challenged by space, the planting of 150-300 stems per acre is predicted to have a 75% survival rate in five years resulting in a maturing oak and hickory hardwood forest.

## Methods

- **Hydrology modification-** channels dug to drain wetland and to lower the water table to establish introduced vegetation.

- **Vegetation introduced-** native bottomland hardwood species planted with a combination of containerized, bare-root and livestake stock utilized (ex. Box Elder, Black Willow, River Birch, Sycamore and Water Oak).

- **Long-term monitoring-** CVS (Carolina Vegetative Survey) plots established to monitor the development of the community over time. Eight observation plots were established to quantify vascular species present.

Current → Future?

## NCVS Plot

CVS or Carolina Vegetative Surveying method was chosen for the wetland project due to its ability to observe change in growth, biomass density, species diversity, and successional change patterns as would be noticed throughout the time span of the restoration process. By setting up the 10 by 10 meter plots throughout different proportions of the wetland area, collected data will have the ranging factors of all areas of the wetland involving both the effects of hydrology and soil on vegetation. The CVS methodology was also chosen due to its flexibility in diverse applications and types of vegetation within a study area, is appropriate for long term studies, and is compatible with other methodologies.

## Explanation of CVS plots

We designated eight different areas of the wetland to observe and quantify vascular plant species. By spreading the plots throughout the wetland, we were able to get an appropriate idea at the relative abundance and species richness of the diversity of species. The plot appointed "plot 1" in the wetland correlates to the plot physically closest to the stream restoration section and "plot 8" being the furthest from it.
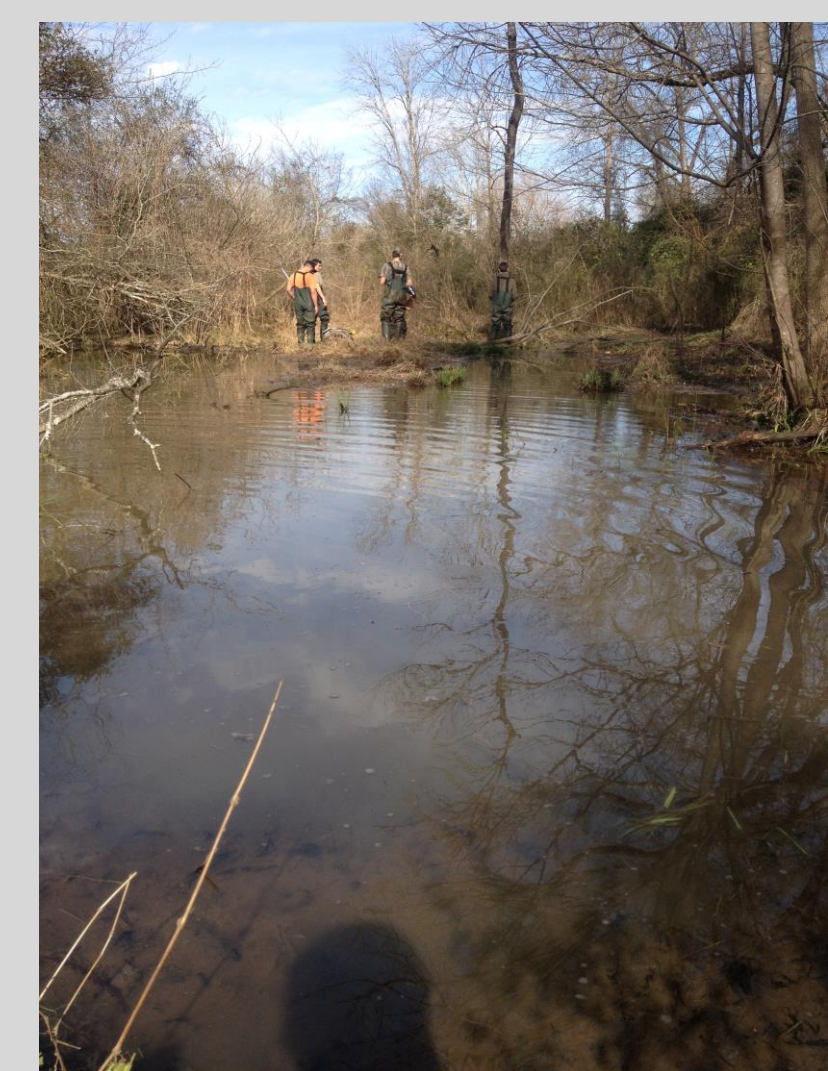
A traditional module or plot is 10 meters by 10 meters but due to challenging topography as a result of an old beaver dam having caused a wetland pooled area, plot 8 was ambiguously plotted as a 5 meter by 20 meter measurement.

## Purpose

The purpose for conducting this creative inquiry project is to look at how wetlands and wetland vegetation respond to drastic ecological changes in the form of restoration projects and be able to translate this data to future restoration projects. The installation of the long-term CVS monitoring plots will allow judgment of the success of the required plantings outlined in the mitigation plan as well as monitor natural regeneration and growth of other woody and non-woody plant species. The CVS plots will also be important for the observation of non-native invasive species and their effects on the restoration project. The data collected from this project will be useful for ecologist in future restoration projects in urban wetlands and streamside ecosystems. The research area will be undergoing many ecological and structural changes for many years to come so it will be essential to continue to observe and record these changes in the years to come.

## Reasons for interest and consideration

The research on this restoration project is going to be an on-going creative inquiry project for many years to come. The class will continue to use the CVS plots that have been established and measure native and invasive species. As well as monitor the species that were planted. This project is important because of the fact that urban wetlands are being degraded at a very drastic rate. It is important for others to see the work that we are doing and see how they can translate it to degraded wetlands and streams in their area. Once most of the construction and mitigation work is complete, it will be opened to the public for everyone to observe.