Trees vs. Reed Canary Grass

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Introduction

Reed canary grass (*Phalaris arundinacea*) is a prominent invasive species that threatens native Michigan biodiversity around the state. One of the affected areas includes a stretch of agricultural land along Schooley Drain in Caledonia, MI, located in the headwaters of the Plaster Creek watershed. Our study will pursue the following question: "Do native trees produce enough shade to reduce the growth of Reed canary grass?" To answer this question, we will evaluate seven different species of native Michigan trees to see which species most inhibits the growth of Reed canary grass.

Study Area

Schooley Drain, shown below, is in the headwaters of Plaster Creek in Caledonia, MI. The surrounding area is agricultural land, causing significant amounts of runoff to flow into the drain after it rains. Reed canary grass has taken over the landscape on both banks, decreasing native growth, biodiversity, and drainage capability. The grass grows into the drain, blocking water flow, which can lead to localized flooding after heavy rain events.

Proposed Research

Overview

For this research project, 220 trees will be planted in the Fall of 2020 along Schooley Drain near 84th St. SE and East Paris Ave. SE in Caledonia, MI. Trees will be planted in single-species clusters of 4 so that the interior area forms a square [1].

Tree Species

We propose to use the following 7 species in our project: Bur oak (*Quercus macrocarpa*), Black walnut *(Juglans nigra*), Hackberry (*Celtis occidentalis)*, Red maple *(Acer rubrum*), Swamp White oak (*Quercus bicolor*), Sycamore (*Platanus occidentalis*), and Tulip tree (*Liriodendron tulipifera*).

Planting Procedure

There will be either 7 or 8 replicated clusters for each species, generating a total of 55 clusters (Figure 1). The clusters will be planted at least 4.5 meters apart from each other. Within each cluster, each tree will be planted 3 meters apart and no closer than 6 meters from the drain.

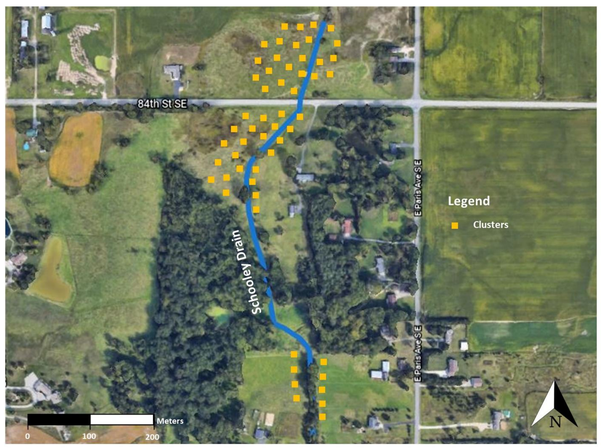

Figure 1. A sample map of where the clusters may be planted

Reed Canary Grass Data

The interior area of each cluster will be periodically monitored for Reed canary grass density, height, biomass, and cover to determine the extent of Reed canary grass success following the planting. To obtain these measurements we will use quadrats to sample each cluster. Baseline data will also be collected and mapped prior to planting the trees. Mapping will involve the use of a GPS to collect

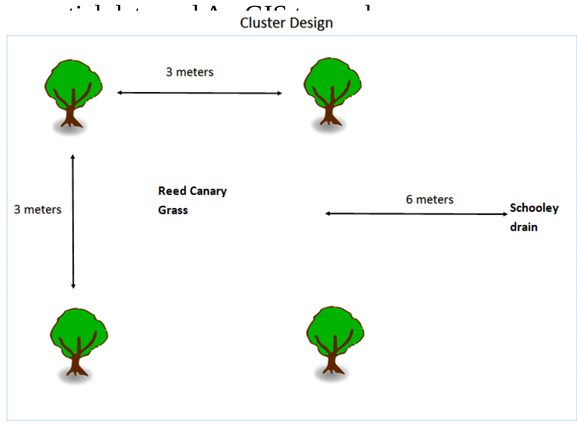

Figure 2. Map of a single cluster of trees

Tree Performance Data

Tree performance data will include the collection of tree height, tree girth, crown spread, transpiration rate, light intensity, and survivorship. Tree height data will be collected using the cross-triangulation method. Tree girth will be collected by measuring the diameter at breast height perpendicular to the axis of the trunk using DBH tape. Crown spread will be measured using the Spoke method [2]. Transpiration rate will be collected using a leaf porometer to measure stomatal conductance. Light intensity will be collected with a digital light meter to measure illuminance. Tree health (and survivorship) will be measured using a Likert scale visual assessment of tree health.

Figure 3. A map of Schooley Drain in Caledonia, MI. The area designated for planting is outlined in red.

Timeline

We collected Reed canary grass biomass samples pre-planting late this summer. This fall the Kent County Drain Commission and Plaster Creek Stewards will plant the 220 trees along Schooley Drain. After the trees are planted, data on Reed canary grass will be collected once a year in late summer. Tree data will be collected about three times throughout each year.

References

[1] Miller, T., Martin, L., & MacConnell, C. (2008). Managing Reed Canarygrass (Phalaris arundinacea) to Aid in Revegetation of Riparian Buffers. *Weed Technology, 22*(3), 507-513.

[2] Blozan, T. (2006). Tree Measuring Guidelines of the Eastern Native Tree Society. Bulletin of the Eastern Native Tree Society, 1(1), 3-9.

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