

Stormwater Capture via Green Infrastructure in the Plaster Creek Watershed

Brett Barents, Kiara Bromley, Haley Weesies, Deanna Geelhoed, Dr. David Warners - Calvin University, Grand Rapids, Michigan



Introduction

Calvin University's campus is located within the Plaster Creek watershed, an area of land that extends from Caledonia to the Grand River near downtown Grand Rapids. All of the water within this region drains into Plaster Creek, which, after many years of neglect and mistreatment, has become one of the most polluted waterways in West Michigan.

Plaster Creek Stewards (PCS) aims to restore the local watershed by means of education, research and "on the ground" restoration. The focus of their restoration work is to reduce stormwater runoff containing high amounts of sediment, chemicals, and other pollutants. A variety of green infrastructure practices are used to accomplish this goal.

Objectives

Sixth Year Efforts

Our objectives were to continue, expand, refine, and promote the work done by PCS in years before.

- Design and install curb-cut rain gardens in the Roosevelt Park, Alger Heights and Oakdale neighborhoods. Small changes were made to garden design this year to improve their functionality and aesthetic appeal.
- Add sediment traps to reduce sediment buildup in newly installed curb-cut rain gardens.
- Improve overall health of the watershed with native plantings to promote ecological health and pollinator diversity within the watershed.
- Represent Calvin University in a respectful and responsible way.

Methods

Rain Gardens

Plaster Creek Stewards uses rain gardens to capture stormwater runoff and encourage a slow percolation of water into the ground. PCS focuses on the curb-cut rain garden, which directs stormwater from the streets into the plant-filled basin of the garden. Here, the rain water seeps into the garden, where the plants aid in stormwater evapotranspiration.



Fig. 1: A curb-cut rain garden installed by Plaster Creek Stewards being watered by a dedicated volunteer.

Native Plants

Native plants are used in all PCS plantings and rain gardens. These plants are well-adapted to the Michigan climate and soils, while also providing habitats for native wildlife. Plaster Creek Stewards collect seeds, propagate, and plant as many native plants as possible into all gardens and restoration projects.



Fig. 2: Native plant grown in the greenhouse. The roots of many native plant species are extensive and aid in the drainage of stormwater in the rain garden.

Sediment Traps

A vital feature of curb-cut rain gardens is their sediment traps. Sediment traps are placed in the inlet of each rain garden and collect sediment from street runoff. Runoff slows down as it flows into the basin of the sediment trap, allowing sediment that was suspended in the water to be deposited into the traps. These sediment traps help with the maintenance of the rain gardens and make disposal of polluted sediment easier.



Fig. 3: A sediment trap in a rain garden filling with water, and depositing sediment into the trap that would have ultimately ended up in Plaster Creek.

Native Plant Landscaping

Plaster Creek Stewards also does native landscaping projects. These include Shadyside Park, Calvin Avenue Basin, and fee for service plantings. Native plants installed near Plaster Creek or its tributaries help mitigate erosion and sediment deposition into the creek. These plantings also help restore native biodiversity to the watershed, promoting native insects and mammals in the areas.



Fig. 4: Calvin Avenue Basin Restoration Project, located along a tributary of Plaster Creek.



Figure 5: The Lake Drive Greenhouse serves as the PCS home base and the growing site for native plants for various projects.

Results

The Plaster Creek Watershed has been neglected for over 100 years. It will take many years of hard work to prevent its condition from worsening. In time and with continued efforts, Plaster Creek may eventually stabilize and begin to recover.

Yet there are many small improvements to notice. The sediment traps have been observed containing trapped sediment. Many community members have expressed interest in having their own rain gardens installed. Some native plantings have reached full maturity and provide habitat for local fauna. The work in the Plaster Creek watershed is ongoing but its future is promising.

References

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