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Stormwater Capture via Green Infrastructure in the Plaster Creek Watershed

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Introduction

Calvin University's campus is located within the Plaster Creek watershed, an area of land 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 focusing on education, research and "on the ground" restoration. The focus of the 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

Fifth Year Efforts

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

- Design and install curb-cut rain gardens in the Roosevelt Park, Alger Heights and Oakdale neighborhoods.
- Add and sediment traps to reduce sediment buildup in newly installed curb-cut rain gardens.
- Improve overall health of the watershed with native plantings to improve the ecological health and pollinator diversity.
- Attend community events to engage with its members and educate them about the watershed and stream health.
- Represent Calvin University in a respectful and responsible way.

Methods

Rain Gardens

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

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 of our plantings and rain gardens. These plants are the best adapted to the Michigan climate and soils, while providing habitat for native wildlife. Plaster Creek Stewards collect seeds, propagate, and grow as many native plants as possible into our gardens and restoration projects.

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

Sediment Traps

A vital feature of curb-cut rain gardens are sediment traps. Sediment traps are placed in the inlet of each rain garden and collect sediment from street runoff. As water flows into the basin of the sediment trap, it slows down, and sediment that is suspended in the water is 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 often installed near Plaster Creek or its tributaries, help control erosion and sediment deposition into the creek. These plantings also help restore the biodiversity and previous landscape promoting native insects and mammals in the areas.

Fig. 4: Shadyside Restoration Project located at the headwaters of the Plaster Creek watershed.

Figure 5: The Lake Drive Greenhouse serves as the PCS home base and location growing 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 keep it from getting worse. In time and with continued efforts Plaster Creek may stabilize and begin to recover.

There are still many small improvements that can be seen. The sediment traps have been observed with 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 on the Plaster Creek watershed is ongoing but its future is promising.

References

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