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### Ecological Restoration in the Plaster Creek Watershed

Calvin College's campus is situated partially within the Plaster Creek watershed which stretches from Dutton to the Grand River south of downtown Grand Rapids. All of the water within the watershed drains into Plaster Creek, which, after many years of neglect and mistreatment, has become one of the most polluted waterways in Michigan. One of its primary sources of pollution is storm water runoff which contains high amounts of sediment, chemicals, and other pollutants. As a member of the watershed community, it is important for us to work to restore the watershed to a usable and ecologically healthy state. Calvin College responded to this issue by starting Plaster Creek Stewards (PCS). PCS is an organization that seeks to reduce pollution and educate the community in the watershed.

The most important ways to improve the health of the watershed is to reduce storm water runoff. One of the ways which we reduce runoff is to install rain gardens, in our case we use curb cut raingardens. A curb cut rain garden (ccrg) is constructed in parkways in the area between the curb and the sidewalk. Water flows from the street into the ccrg and percolates into the soil reducing runoff to storm drains. This reduces pollution entering the stream as well as reducing the flashiness or fluctuation of a stream volume due to storms.

Before we install a ccrg, we take measurements to ensure that the ccrg can handle the amount of water that would drain to it. We do this because the land is city owned and must be approved by the city before installation can begin. Next the area is excavated so there is a depression approximately 12 inches deep, a rock channel is placed beginning at the curb cut and meandering through the garden, these rocks reduce erosion and slow the water. Then compost and mulch are added around the rock channel. Finally the garden is planted with Michigan native plants. Native plants are used because they are adapted to the climate and soils of the region. They also have extensive root systems which allow for increased percolation into groundwater. We grow all the plants at the Calvin greenhouse on lake drive. We wait to cut the curbs until the plants have had ample time to expand their root systems.

An addition to the ccrgs for 2017 is the sediment trap. A sediment trap consists of paving stones arranged in a way that slows the water so sediment settles and is captured in a catch basin, so it can be easily removed. This saves time and energy as in the past sediment removal would require sorting through of the rock channel to remove sediment.

So far this summer we have installed and planted 23 ccrg around the Oakdale and Alger Heights neighborhoods as well as several native plantings in various areas around the watershed. In addition to curb cut rain gardens, we have installed rain gardens in yards to help collect roof runoff and manage water on property. We have also continued work on the oak savannah and other native plantings at the CRC denomination building on 28<sup>th</sup> street. In total we have planted over 10,000 plants.

This position has allowed me to gain insight into the workings of native landscaping. I have learned more about native plants and urban green infrastructure. This research built on most of my biology classes that I have taken at Calvin College from Bio 250 with watershed research to environmental management courses.