Title: Allen's Creek Rain Gardens

Michigan AUID Number: 040900050402-01 (*E. coli*); 040900050403-02 (phosphorus)

GRTS Number: Grant 97547403, Project 38, and Grant 97547406, Project 24

Opening Paragraph: Allen's Creek is a tributary to the Huron River, in Washtenaw County in southeast lower Michigan, within the City of Ann Arbor. Its 5.5 square mile watershed is highly urbanized and 40% impervious. The original stream channel is now 95% enclosed and many buildings have been erected within the floodplain. Pollutants from Allen's Creek contribute to impairments in two downstream impoundments (Ford and Belleville Lakes) on the Huron River, and phosphorus and *E. coli* total maximum daily loads (TMDLs) have been developed for these waterbodies. Attaining the phosphorus TMDL target can be achieved either with source control or through storm water detention and treatment. Very few detention opportunities exist within the watershed as it is completely built out. Green infrastructure installations like rain gardens, however, offer source control that will retain the first flush of storm water from smaller and more frequent rain events. The rain gardens proposed in this project were intended to fully retain the first flush of all storm events. In addition, area residents responding to a pre-project survey indicated they were willing to accept an alternative to traditional grass landscaping and had access to plenty of information about rain gardens, but needed assistance in creating a rain garden design appropriate for their site.

Problem: Allen's Creek, an urbanized tributary to the Huron River, is a source of phosphorus and bacteria to two downstream impoundments, Ford and Bellville Lakes. Its built out watershed offers few opportunities for conventional storm water detention.

Results: The grant to Washtenaw County provided nineteen homeowners with assistance in planning, designing, and installing residential rain gardens. InSite Design, an experienced local landscape architect firm, created site-specific designs tailored to each property. Material costs (plants, mulch, and topsoil) were provided through the grant, and planting and maintaining the garden was the responsibility of the property owners. Nearly all the rain gardens intercepted roof runoff and retained and infiltrated the first flush volume in conformance with county storm water regulations.

The amount of community interest in rain gardens was highly under-estimated; approximately 90 applications were received for the 20 rain gardens to be installed through the program (one property owner eventually dropped out.)

The total storm water storage volume of the 19 rain gardens was 3,107 cubic feet per rain event, or 141,500 cubic feet annually. The goal of capturing the first flush runoff from the equivalent of 1 acre of impervious surface was exceeded; the actual interception area was 1.8 acres. The per-garden storm water storage target of an average 86 cubic feet was also exceeded; the constructed average was 164 cubic feet. Calculations indicate that annual loads of total phosphorus, total suspended solids, *E. coli* and flow from the 19 properties were reduced 72 percent.

Another project objective was to evaluate obstacles and lessons learned, in hopes of continuing rain garden installations throughout the watershed and citywide following the end of the grant. This evaluation was accomplished by pre- and post construction

surveys of the participants and 14 one-on-one interviews. Notable results from the pre- and post-construction survey included:

- A 56% increase in level of concern for water quality.
- A 40% increase in recognition of construction site runoff as a major source of pollution.
- An 11% increase in drinking water being the issue that most residents were concerned about, with many of the homeowners learning for the first time that the Huron River is the source of their drinking water.

The success of the project has continued after the original grant ended. Washtenaw County committed to a four year extension of the program under its Phase II storm water program. The program has changed from design services provided by a landscape design company to training Master Gardeners to do the designs as volunteers. The County contracts with local growers for the plants and delivers the plants to the home owners, but the home owners are responsible for the cost of plants, soil amendments, and digging their own garden. The County also created a virtual tour on their website of 30 site-specific designs with the intent to educate interested property owners and to encourage them to take the initiative in creating their own designs.

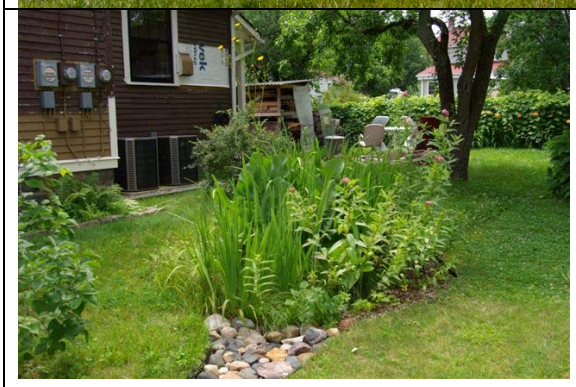
Since the end of the original grant, an additional 40 residential rain gardens have been installed throughout the community. In addition, in 2007 Ann Arbor instituted a storm water utility rate structure that provides credits for residential rain gardens. It is expected that interest in rain gardens will increase as residents seek to reduce their storm water fee.

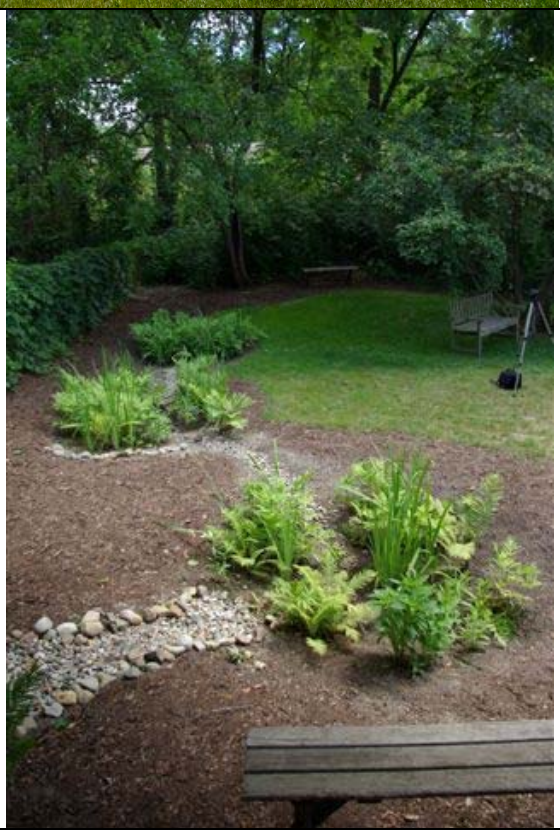
The program is now all word-of-mouth; the County no longer advertises it. They currently receive two to four times more applications than they can accept. The Washtenaw County Drain Commissioner estimates the rain gardens installed to date store one million gallons of storm water annually.

Partners and Funding: The Section 319 grant to the Washtenaw County Drain Commissioner was for $62,995, with a $39,960 match, for a total of $102,955. The City of Ann Arbor, the Huron River Watershed Council, and 19 volunteer gardeners also partnered in this project.

Photographs:

Figure 1. Example Raingardens.





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For more information on the project, please visit the Washtenaw County Drain Commission website:
https://www.washtenawcd.org/rain-gardens.html