

## **Title: Storm Water Detention Practices Improve Millers Creek Hydrology and Macroinvertebrates**

Waterbody Improved: Millers Creek, a small tributary to the Huron River in the city of Ann Arbor, Washtenaw County, Michigan (AUID 040900050402-04).

GRTS Number: 97547406, Project 15.

Problem: Excessive urban storm water runoff has destabilized Millers Creek, altering instream hydraulics and causing high rates of bank erosion, an unstable stream bed, and destruction of instream habitat features.

Project Highlights: In 2009, the Huron River Watershed Council and its partners:

- Built a 3,100 square foot rain garden at Thurston Elementary School, designed to retain a 2.7 inch rain event (Figure 1)
- Removed 3,900 square feet of impervious asphalt at the end of Briarcliff Street and installed a 5,100 square foot rain garden, designed to retain a 2.7 inch rain event (Figure 2)
- Built four residential rain gardens
- Retrofitted a storm water detention pond to hold more storm water (increasing its capacity from 2,240 cubic feet to 9,870 cubic feet), and installed native plantings (Figure 3)
- Distributed 61 rain barrels throughout the project neighborhood
- Conducted a public education program consisting of a pre-construction questionnaire, a public meeting (attended by 40 local residents), a brochure describing the project, a tour of other rain gardens (attended by 30 residents), interpretive signage, a project website, and a post-construction online and phone-based survey of homeowners in the project neighborhoods.

Together the detention basin, rain gardens, and rain barrels retain 30 percent of a 1 inch rain event on the portion of the watershed upstream of where these practices were installed (12 acres, or 0.8 percent of the 1,531 acre Millers Creek watershed).

Results: Pre and post discharge and macroinvertebrate monitoring downstream of the storm water management practices was complicated by the limited monitoring period funded by the grant (6 months, although macroinvertebrate sampling has continued after the grant ended) and the inevitable variation in rain events. Nonetheless, the monitoring found:

- Lower peak discharges and longer times to peak discharges (Figure 4)
- A small increase in the number of macroinvertebrate families immediately downstream of the storm water practices (Figure 5)

The information and education program was also successful:

- Fifteen neighborhood residents and three third grade classes helped install native plants in the Thurston Elementary School rain garden.
- 25 residents helped plant the Briarcliff Rain Garden.
- 10 volunteers from a nearby business helped plant the shoreline of the storm water retention basin.
- The post-construction surveys showed that awareness of issues/problems with Millers Creek had increased at least slightly for 76 percent of survey respondents, and that awareness of actions to protect the Creek had increased in 85 percent of the respondents.

Partners, Funding, and Congressional District: This work was funded by a Section 319 grant to the Huron River Watershed Council. The grant amount was \$396,962 and the match was \$201,730, for a total of \$598,692. Partners in the project were the City of Ann Arbor, the Washtenaw County Water Resources Commission, the Millers Creek Action Team, Cardno JFNew, Ann Arbor Public Schools, and the Orchard Hills Maplewood Homeowners Association. This project is located in Michigan's 12<sup>th</sup> Congressional District.

Photographs:



Figure 1. Rain garden at Thurston Elementary School, 1 year after installation.



Figure 2. Rain garden at Briarcliff Street, 1 year after installation.



Figure 3. Retrofitted storm water detention pond, 1 year after installation.

Data table/graph/chart:

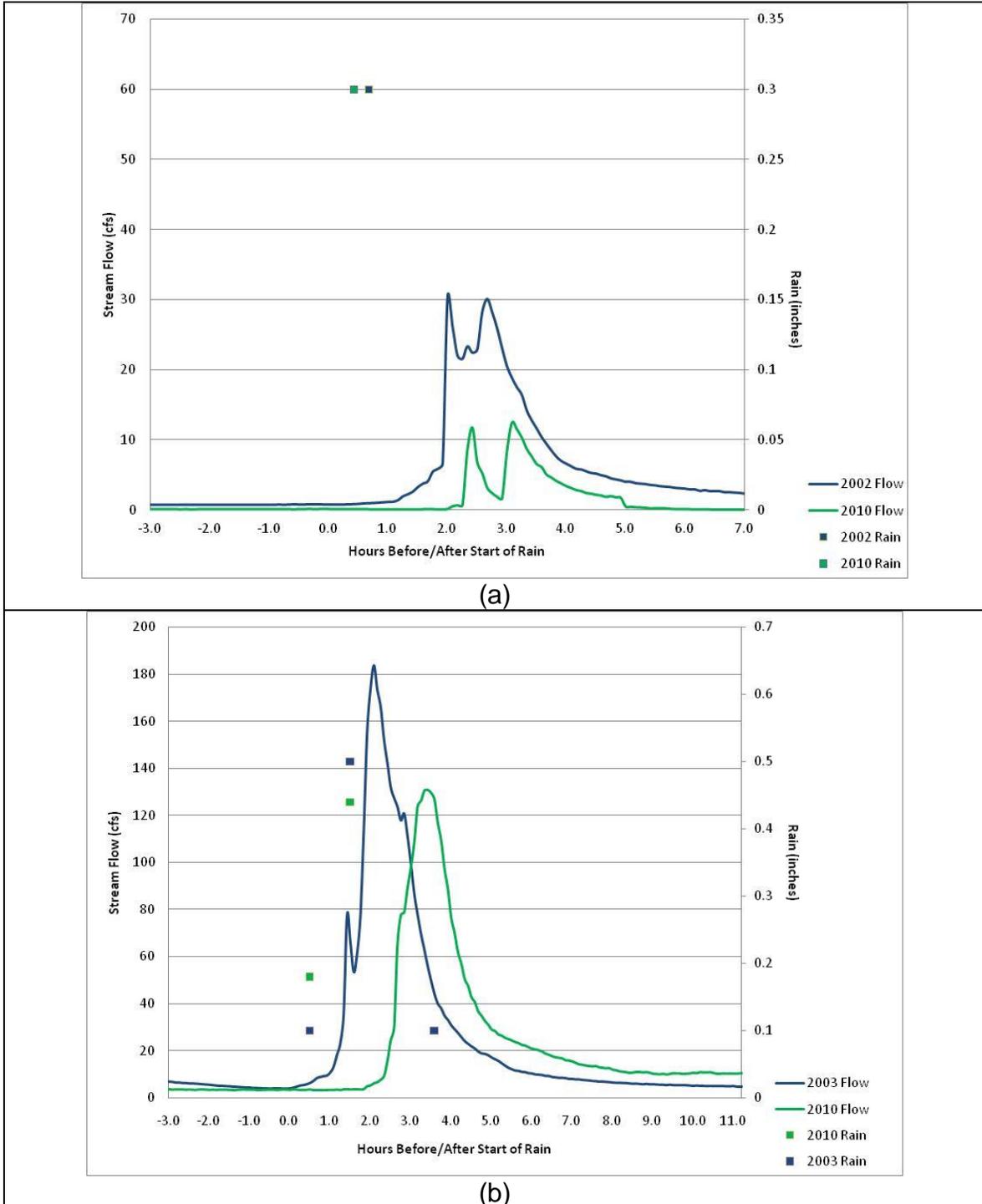


Figure 4. Hydrographs of stream discharge at Plymouth Road for comparable rain events before and after the project: (a) a 0.3 inch rain event over 1 hour and (b) a 0.62 to 0.70 inch rain event over 2 to 3 hours.

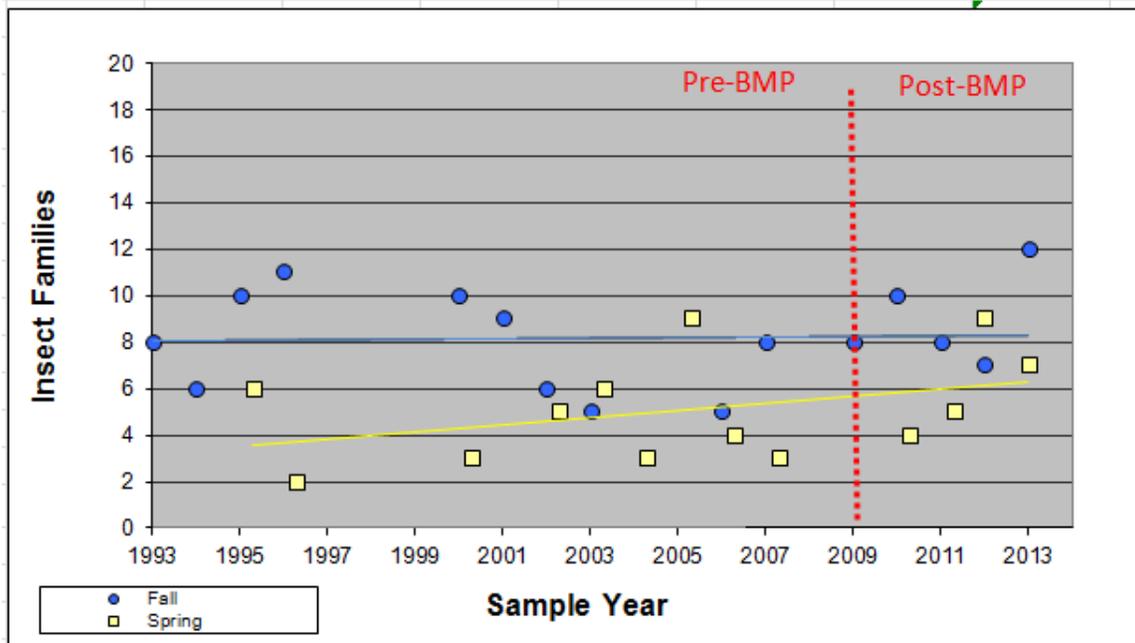


Figure 5. Number of macroinvertebrate families at Plymouth Road in the Spring and Fall, immediately downstream of the storm water practices.

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