

**Title: City of Portage Storm Water Quality & Trailways Facility**

Michigan AUID Number: 040500030603-04

GRTS Number: Grant # 99501499, Project # 33.

Opening Paragraph: Consolidated Drain No. 1 was a maintained ditch draining to Portage Creek in the City of Portage, Kalamazoo County, Michigan. The drain was constructed in 1963 and its watershed later became highly urbanized with development of the Portage Commerce Square, a major retail shopping mall complex. Increased urbanization resulted in flashy stream hydrology, eroding stream banks, and large sediment loads to Portage Creek. Currently, 33 % of the land use is residential, 60% is commercial, and 7% is wooded, wetland, or open space. The objective of this project was to develop a Regional Storm Water Quality and Trailways Facility to intercept storm water runoff discharging to Portage Creek.

In Spring 2001, numerous best management practices (BMPs) were installed in a treatment train arrangement to treat storm water in this urban watershed. The BMPs included a wet detention basin with a sediment forebay; four micropools/channels; three habitat islands; 3,000 linear feet of channel restoration practices including meanders, deflectors, riprap and bioengineering practices; and 11.5 acres of wetland restoration practices. Existing wetlands were combined with biological treatment and filtration methods. Storm water storage in the watershed was regionalized to eliminate numerous smaller ineffective basins throughout the watershed.

Problem: Consolidated Drain No. 1 was a ditch draining an urban area, with minimal storm water treatment, which resulted in a flashy stream hydrology, eroding stream banks, and large sediment loads to downstream Portage Creek.

Results: Benthic macroinvertebrates and periphyton were sampled three times before the BMPs were installed and twice afterwards. The number of benthic macroinvertebrate taxa decreased slightly from pre-construction to post-construction (Table 1); however:

- The percent contribution of isopods, snails, and leeches, which are typically more tolerant of degraded conditions, decreased from >60% to <20%.
- The percent contribution of surface-dependent organisms, which also indicate degraded conditions, decreased from 10.5% to 1.5%.

The two dominant periphyton groups in Consolidated Drain were blue-green bacteria and diatoms (Table 1). Prior to construction the periphyton community was dominated by blue-green bacteria indicative of warm water conditions (90%, vs. 8% diatoms), while after construction, diatoms, indicative of moderate water temperatures, were much more numerous (41% of the population, vs. 52% blue-green bacteria).

Partners and Funding: Partners in this project were the City of Portage, Kieser and Associates, The Crossroads Mall, the Kalamazoo Community Foundation, and the Water Environment Research Foundation (WERF). This project was funded by a Clean Michigan Initiative (CMI) Nonpoint Source grant for \$423,900 grant funds and \$4,163,109 in matching funds (\$4,587,009 total). The CMI grant was also used as match for the 1999 319 grant. Macroinvertebrate and periphyton monitoring was funded

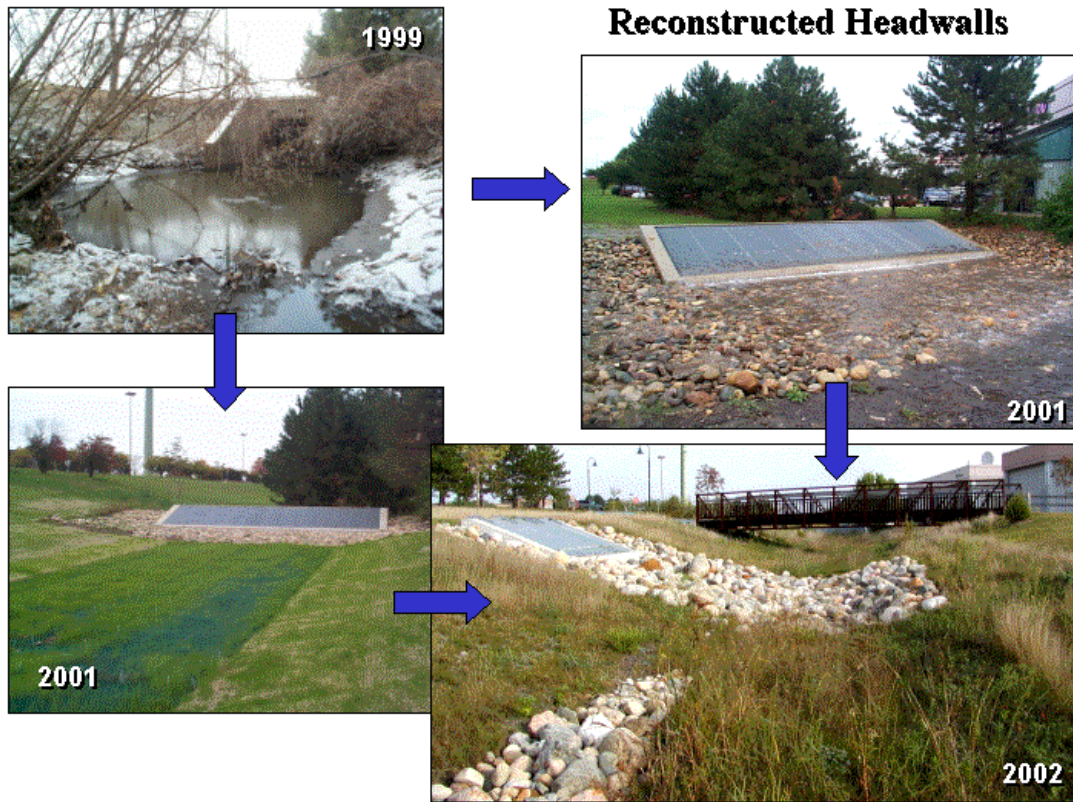
through separate WERF and Kalamazoo Community Foundation grants to Kieser and Associates, LLC, and the City of Portage, respectively.

Photographs:

Figure 1. Storm water BMPs installed in Consolidated Drain #1.



Figure #2. Pre- and post-construction photographs of select project components.



Data:

Table 1. Results of Pre- and Post-BMP Biological Monitoring.

Metric	Pre-BMP (Mean; n = 3)	Post-BMP (Mean; n = 2)
<b><i>Macroinvertebrates</i></b>		
No. of taxa	13.5	8
Percent isopods, snails and leeches	61	18
Percent surface-dependant organisms	10.5	1.5
<b><i>Periphyton</i></b>		
Blue-green bacteria (% of the periphyton)	90	52
Diatoms (% of the periphyton)	8	41

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