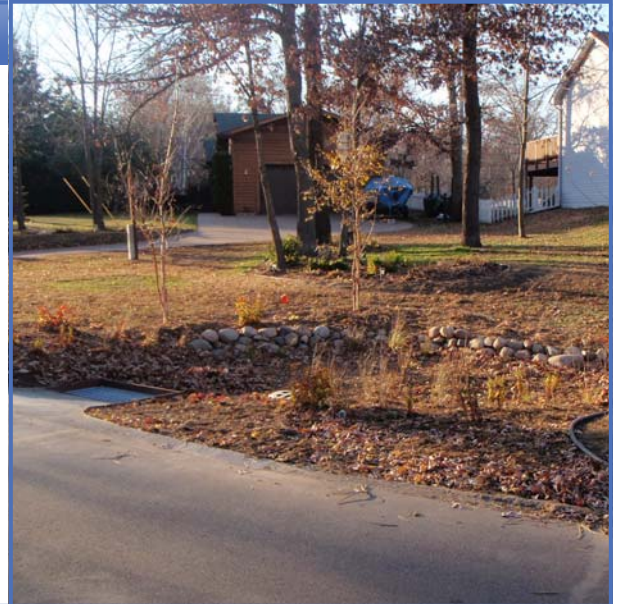




Project Summary

The Anoka Conservation District (ACD) completed a Martin Lake stormwater retrofit assessment for the Sunrise River Watershed Management Organization (SRWMO) that identified cost-effective stormwater best management practices. As a result, three curb-cut rain gardens were installed in a residential neighborhood on the west side of Martin Lake. The rain gardens will reduce the degradation of Martin Lake by infiltrating stormwater runoff that would have otherwise drained untreated to Martin Lake.

More specifically, stormwater is diverted into the rain gardens via a curb-cut and concrete inlet. The natural hydrological cycle is restored as water infiltrates through the soils and the native plant community promotes evapotranspiration. Long term maintenance will be conducted by the landowners under an agreement with the SRWMO.



Project Specs

Rain Gardens Installed 3
 Date Installed November 2011
 Live Storage Area 860 ft²
 Watershed Treated 4.72 acres

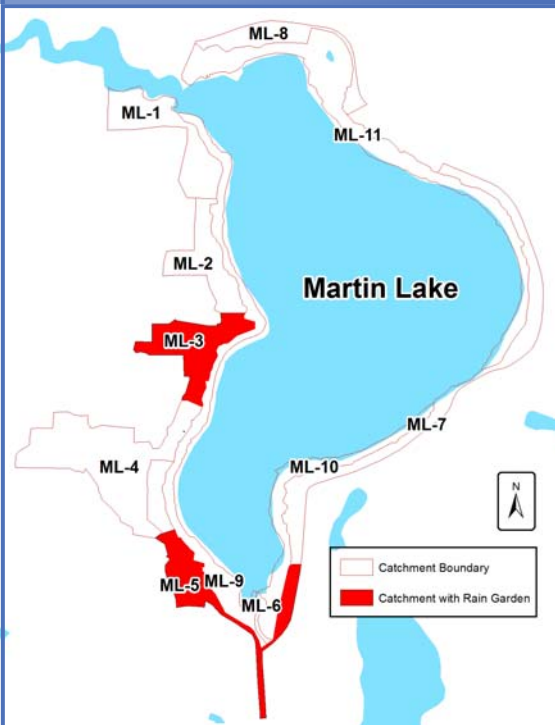
Installation Funding

State of MN CWF \$15,127.00
 SRWMO \$3,037.57
 MCC Grant \$5,640.00
 Total Project Cost \$23,804.57

Other Expenses

Design \$2,520
 Construction Oversight \$4,760
 Promotion/Administration \$2,660
 Ongoing Maintenance \$225/yr

ML-3 and ML-5 Catchments



Within the subwatershed assessment, catchments ML-3 and ML-5 were identified for retrofit projects intended to;

- Decrease stormwater volume,
- Decrease pollutant loads, and
- Increase infiltration to recharge groundwater.

The catchments consist primarily of medium density residential housing. The table below highlights important characteristics of the catchments as well as WinSLAMM model outputs of total phosphorus (TP), total suspended solids (TSS), and volume contributions prior to rain garden installations.

	ML-3	ML-5
Acres	10	10
Land Cover	Residential, 1/4 - 1/2 acre lots	Residential, 1/4 - 1/2 acre lots
Parcels	36	30
TP (lbs/yr)	4.90	7.02
TSS (lbs/yr)	1,457	2,299
Volume (acre-feet/yr)	4.00	4.52

Installation

Detailed analysis of the ML-3 and ML-5 catchments resulted in the identification of high priority properties for rain garden placement. These locations were identified to maximize the effectiveness of the installed rain gardens by ensuring close proximity to existing catch basins and large drainage areas. Property owners at high priority locations were then contacted for potential rain garden installation. A total of three curb-cut rain gardens were installed in 2011.



1. Site preparation and soil excavation to achieve desired side slopes and 1 ft. maximum ponding depth.

2. Retaining wall construction. Retaining walls can be built using traditional landscape blocks or natural stone, as seen here.



3. An 8" soil auger was used to drill 36" deep holes throughout the rain garden basins to remove any existing soil compaction and ensure acceptable infiltration rates.

4. Curb-cut construction to accept offsite runoff from curb and gutter system.



Fully functioning curb-cut rain gardens within ML-3 and ML-5. Note the pretreatment chambers that filter incoming runoff and also prevent debris and sediment from entering or exiting the rain gardens when filled to capacity.

Site Monitoring/Post-Project

Post-project monitoring will verify acceptable rain garden infiltration rates and proper pretreatment chamber function following storm events. Monitoring will occur during the 2012 growing season to ensure proper garden function and successful plant establishment.

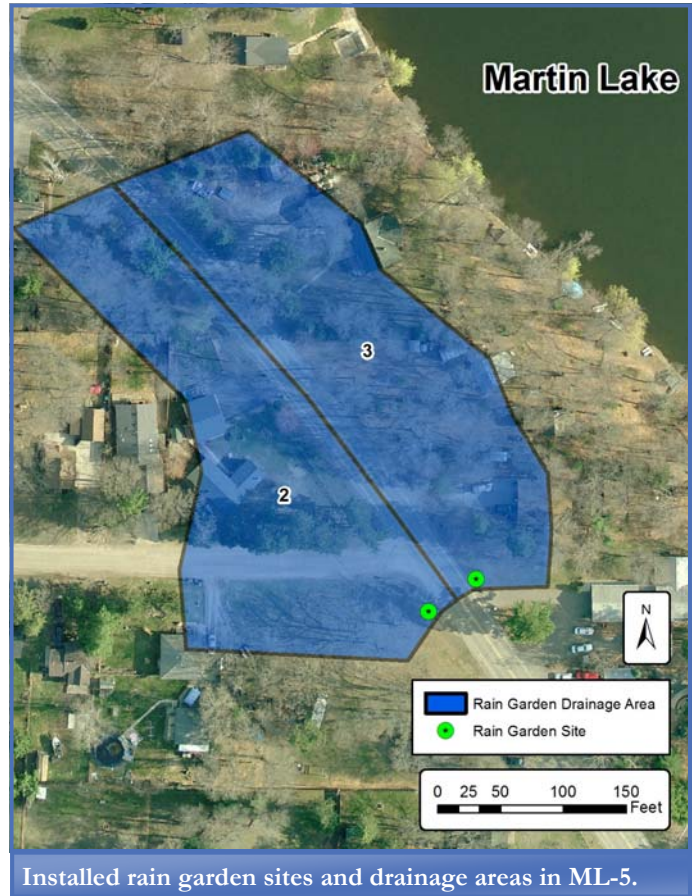
Modeled Pollutant Reductions

WinSLAMM modeling was used to estimate reductions in water volume, total suspended solids (TSS), and total phosphorus (TP) following rain garden installation. The table to the right highlights these reductions for each of the three drainage areas within ML-3 and ML-5 in which a rain garden was installed. Water quality benefits to receiving water bodies associated with these reductions include:

- Groundwater recharge,
- Increased water clarity,
- Decreased pollutant and toxin loading, and
- Decreased nutrient loading that stimulates nuisance algae blooms.

ID	Drainage Area / Live Storage Area	Volume Reductions		TSS Reductions		TP Reductions	
		ft ³ /yr	%	lbs/yr	%	lbs/yr	%
1	2.42 acres / 487 ft ²	32,829	75	328.6	80	1.035	78
2	1.14 acres / 201 ft ²	13,980	68	141.3	73	0.444	70
3	1.16 acres / 172 ft ²	13,013	62	133.0	67	0.416	65
Annual Project Total		59,822 ft³		602.9 lbs		1.895 lbs	
30 Yr Project Total		1,794,660 ft³		18,087 lbs		56.85 lbs	
Benefit / \$100 Spent* (over 30 years)		4,432 ft³		44.7 lbs		0.140 lbs	
30 Yr Cost* / Unit		\$982.88/acre-ft		\$2.24/lb		\$712.31/lb	

*The 30 year cost per unit of volume or pollutant removal includes installation, design, construction oversight, promotion, administration, and 30 year maintenance costs.



Project Partners and Funding

Project funds were provided by the Clean Water Fund (CWF) from the Clean Water, Land, and Legacy Amendment, the Sunrise River Watershed Management Organization (SRWMO), and the Minnesota Conservation Corps. Designs were completed by the Metro Conservation Districts' Landscape Restoration Program. Promotion, construction oversight, and administration was provided by the Anoka Conservation District.

