

PROJECT PROFILE

2011 LAKE MCKUSICK BIORETENTION



Project Summary

The Washington Conservation District (WCD) completed the Lake McKusick subwatershed stormwater retrofit assessment for the Middle St. Croix Water Management Organization (MSCWMO) that identified costeffective stormwater BMPs. As a result of the assessment, six bioretention cells were installed within catchments McK-NE and McK-18 that drain directly to Lake McKusick . The bioretention cells will reduce the degradation of Lake McKusick by infiltrating stormwater runoff.

Project promotion, design, and construction oversight were conducted by WCD with in-kind funding from MSCWMO and cash funding from the St. Croix River Association (SCRA) and the Clean Water Fund (CWF) from the Clean Water, Land and Legacy Amendment. Long-term maintenance will be conducted by the landowners under an agreement with MSCWMO.



Project Specifications

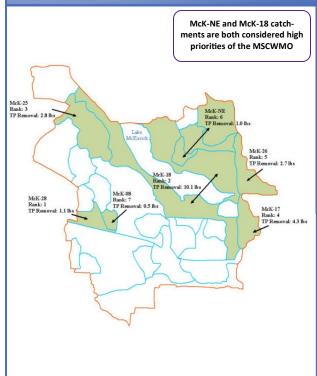
Bioretention Cells Installed6
Date InstalledOctober 2011
Total Bioretention Area1,140 ft ²
Total Capacity950 ft ³
Watershed Treated3.0 acres

<u>Installation Funding</u> SCRA.....\$383.50 State of MN CWF<u>\$20,000.00</u> Total Project Cost\$20,383.50

Other Funding

Design\$1,800
Construction Oversight \$800
Promotion/Administration\$1,000
Ongoing Maintenance\$1,200/yr

Lake McKusick Priority Catchments



Within the subwatershed assessment, catchments McK-NE and McK -18 were identified for several retrofit projects intended to:

- Decrease stormwater volume
- Decrease pollutant loads (TP, TSS)

The catchments consist of residential development with a high percentage of impervious cover. The table below highlights important characteristics of the catchment as well as WinSLAMM model outputs of total phosphorus (TP), total suspended solids (TSS), and volume contributions prior to bioretention cell installation.

Acres	154.8
Dominant Land Cover	Residential
Parcels	418
<u>TP (lbs/yr)</u>	125.8
<u>TSS (lbs/yr)</u>	39,487
<u>Volume (acre-feet/yr)</u>	108.1

Installation

Detailed analysis of the catchments resulted in the identification of high priority locations for bioretention placement. These locations were identified to maximize the effectiveness of the installed cells by ensuring close proximity to existing catch basins and large drainage areas. Six curb-cut bioretention cells were installed in 2011 in conjunction with a City of Stillwater street reconstruction project. The figure to the right shows an overview of the catchments and the bioretention cell locations. The contributing drainage areas include roadway, lawn, driveway, and roof.



Curb cuts were installed during the associated Stillwater road reconstruction project in summer 2011.

Bioretention cell roughed in during road reconstruction project, summer 2011.





Completed bioretention cell from above photo. Pretreatment in this case is rock at the inlet; two pretreatment inlet box chambers were used at other sites.

Completed bioretention cell with pretreatment inlet box chamber (Anoka Conservation District's "Rainguardian").

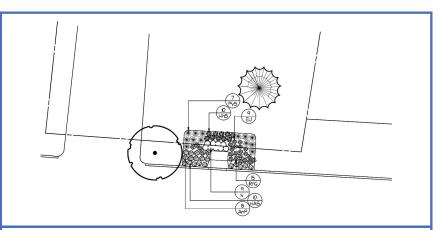




O raingarden location



Project locations within catchments McK-NE and McK-18



Example planting plan design, developed by WCD staff. The selected contractor was able to complete all project sites using the WCD designs and materials lists.

Modeled Pollutant Reductions

WinSLAMM modeling was used to estimate reductions in water volume, total suspended solids (TSS), and total phosphorus (TP) following bioretention cell installation. The table to the right highlights these reductions for the combined drainage areas within McK-NE and McK-18 in which bioretention cells were installed. Water quality benefits to receiving water bodies associated with these reductions include:

Cost/Benefit Analysis	Volume Reduction	TSS Reduction	TP Reduction
Annual Project Total	139,314 ft ³	2,477 lbs	5.8 lbs
30 Yr Project Total	4,179,420 ft ³	74,310 lbs	174.0 lbs
Benefit / \$100 Spent* (over 30 years)	6,968 ft ³	123.9 lbs	0.3 lbs
30 Yr Cost* / Unit	\$625.18/acre-ft	\$0.81/lb	\$344.73/1b

* Includes install., design, oversight, administration, and 30 year maintenance cost

- Groundwater recharge
- Increased water clarity
- Decreased pollutant loading
- Decreased nutrient loading

Site Monitoring/Post-Project

Post-project monitoring verified acceptable vegetation establishment and proper pretreatment function following storm events. Monitoring will continue to ensure proper long-term functionality and vegetation quality.



Completed bioretention cell, October 2011. Inlet pretreatment box chamber prevents debris and sediment entry into the bioretention cell. Lake McKusick is visible in the background.