Tour of Nonpoint Source Pollution Reduction Projects in the Western Lake Superior Watershed

On September 8th, 2006 Minnesota's Lake Superior Coastal Program and the South St Louis Soil and Water Conservation District coordinated a 3-hour bus tour of nonpoint source reduction sites throughout the Western Lake Superior Watershed.

Over 40 people participated in the tour, which highlighted innovative stormwater treatment devices including rain gardens, biofiltration basins, underground stormwater storage, grassed swales, and open space preservation. Discussion topics at tour sites included engineering and design aspects of innovative stormwater practices, owner perspectives, future monitoring needs, and important lessons learned.

Tour participants included attendees of the Minnesota Waters 2006 Conference, Lake and River Association members, engineers, local planning staff, and area natural resource managers.

Site hosts included the University of Minnesota-Duluth, S.E.H. Inc., Barr Engineering, City of Hermantown, CCLNS Joint Powers Board #3, East Ridge Community Church, and Glensheen Mansion.

Glensheen: Engineer Keith Anderson of the CCLNS Joint Powers Board #3, explains the grassed swale and biofiltration system built in the parking lot of the Glensheen Mansion Historic Site and Museum (owned by the University of MN-Duluth). Keith discussed challenges the project faced in regards to establishing native plants in the biofiltration basin. The project won a Minnesota Governor's award for environmental achievement.

University of Minnesota-Duluth: Carol Andrews, Barr Engineering, explains the engineering aspects of building UMD's Rain Garden, including the higher than expected number of truckloads needed to haul away the

East Ridge Community Church: Pastor Fred Lund explains that the Church chose biofilitration basins over regular curb and gutter for their parking lot because "it was the right thing to do". He added that the biofiltration islands lend a more welcoming, relaxing, and natural look for the Church.

MINNESOTA'S LAKE SUPERIOR COASTAL PROGRAM

lake superior streams.org

South St. Louis SOIL & WATER CONSERVATION DISTRICT

INNOVATIVE STORMWATER MANAGEMENT
Friday September 8, 2006
1:00 PM - 4:00 PM

If You Were a Raindrop, Where Would You Go?

A Tour of Nonpoint Source Pollution Reduction Projects
in the Western Lake Superior Watershed

Tour Hosts:

South St. Louis Soil & Water Conservation District

Minnesota's Lake Superior Coastal Program

City of Quality Living Hermantown Minnesota

BARR

Glensheen

Eastridge Community Church

SEH

University of Minnesota Duluth

Tour Agenda

Stop 1	Glensheen Mansion
Drive-by	St. Germain's Diamond Paint Store
Stop 2	University of Minnesota Duluth
Stop 3	East Ridge Community Church
Stop 4	Country Inn/Gander Mountain
Stop 5	Hidden Creek Preserve Development
Stop 6	Miller Hill Mall—Sediment Trap
Drive-by	Construction Site—MnDOT Hwy 53

Much of the information for this Tour Guide was taken from the Conservation Design Toolkit featured on:
www.LakeSuperiorStreams.org

lake superior streams.org

Please visit the LakeSuperiorStreams.org website for more information on the Lake Superior watershed, stream and land-use data, and conservation design.

Stop 1: Glensheen Mansion Parking Lot

Issues:

- Erosion problems along Lake Superior shoreline.
- Runoff from parking lot.
- Protect integrity of historical property

Project Goal:

- Improve water quality of parking lot runoff and reduce lakeshore bank erosion.

Solutions:

- Two grass swales to slow, cool, filter, and infiltrate parking lot runoff.
- Rock check dams to further slow water and allow sediment to settle out.
- Bioretention area to hold and infiltrate 1" of rain.
- Plant native plants: deep roots help infiltrate and absorb water.
- Rock chutes to prevent additional shoreline erosion.

Water flows from the parking lot into two grass swales. The grass and rock check dams cools, slows, and filters the water. Water that reaches the lower part of the swale flows into the bioretention area for further treatment.

The bioretention area is a shallow, temporary pond where stormwater runoff from the parking lot is gathered. The soil is a mix of sand, topsoil, and compost. Water infiltrates within 6 hours. The soil and plant material removes most of the pollutants before it reaches Lake Superior. Water from one swale and direct runoff from another portion of the parking lot is treated in this area.

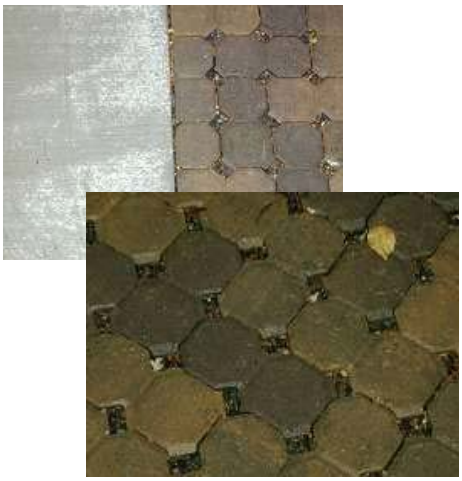
Drive-by #1: St. Germain's - Diamond - Vogel

Issue:

- The parking lot is within the Lake Superior Coastal Zone, therefore they needed to stay under the percent impervious surface limit.

Solution:

- Pervious paving block was installed with an under drain to a grassy area. This system treats the stormwater before reaching the storm sewer.



Stop 2: University of MN Duluth Rain Garden

Project Goals:

- The existing lot shed most of its water to a single point on the surface.
- The garden would enhance the appearance of the area.
- The existing trees could be preserved and incorporated into the garden.
- The location provided a good opportunity to educate the public on the benefits of rain gardens.

Overview of Rain Garden:

- Rain garden is 1/3 of an acre and holds 60,000 gallons of water.
- Storm water from a 2.5 acre lot is directed into a settling basin, the sediment is allowed to settle before overflowing into the rain garden.
- The planting soil is made up of 40% peat and 60% topsoil. The soil treats the water in two ways: bacteria in the soil breaks down oil and greases while the soil particle themselves bind to phosphorus and heavy metals removing them from the water.
- There are 75 different plant species and 3,800 plants in the rain garden.

Results:

- By directing stormwater through the Rain Garden, UMD is decreasing the quantity of water that will reach Oregon Creek. And the water that is delivered to the Creek will be slower, cooler, and cleaner than if it flowed directly off the parking lot into the storm sewer.

Designed by Barr Engineering

Stop 3: East Ridge Community Church Biofiltration

Issues:

- Runoff from parking lot.
- Protecting the upstream area of Chester Creek.
- Importance of keeping construction sediment out of basin to prevent plugging.

Reasons for biofiltration design:

- Better for the nearby stream's water quality.
- More aesthetically pleasing.
- It would be a demonstration project encouraging others while helping to educate the children and parents of the congregation.

Stop 4: Country Inn & Suites/Gander Mountain

Issues:

- Trout streams require additional care beyond standard storm water practices
- Trout are highly sensitive to water temperature fluctuations.
- Storm water runoff from paved areas can be quite warm at times.

Designed by Short Elliott Hendrickson Inc.

Solutions:

- An underground storage unit with small diameter holes was constructed at the Country Inn & Suites site.
- The holes allow groundwater to enter the storage unit. The groundwater is relatively cold, and mixes with the warmer storm water runoff from the parking area.
- Water leaves the system at a much cooler temperature. The system provides rate control and pre-treatment prior to entering the underground temperature control unit.
- The underground systems provide similar benefits to above-ground storm water pond and infiltration system. In addition , they allow for additional parking on the site.

Stop 5: Hidden Creek Preserve Development

Issue: A tributary to the Midway River runs along western boundary

Approach:

- All landowners are required to read and sign the MPCA's construction stormwater permit, which mandates stormwater and wetland protection.
- Individual homeowners and contractors work with the City of Hermantown to ensure individual home site plans meet or exceed stormwater and wetland protection requirements.
- Of the 50 acre development, 19 acres is left as community open space, including an extensive trail network through property
- The development has 44 lots, each being ½-1 acre

Developer: John Hovland,White Pine Development

Hidden Creek Preserve Land Use Distribution		
Private lots	50%	25 acres
Community open space	38%	19 acres
Road right of ways, lighted boulevards	12%	6 acres
Total	100%	50 acres

Fast Facts about Hermantown, MN

- There are around 9,000 residents, and it is one of the most rapidly developing cities in northern Minnesota
- Geographically, the City is 30-40% wetlands
- The area contains headwaters to 4 trout streams: Midway River, Kingsbury Creek, Keene Creek, and Miller Creek
- Commercial construction in the City of Hermantown between 2000-2005 resulted in $49.3 million in value and 959,000 square feet of space

City of Quality Living
HERMANTOWN
MINNESOTA

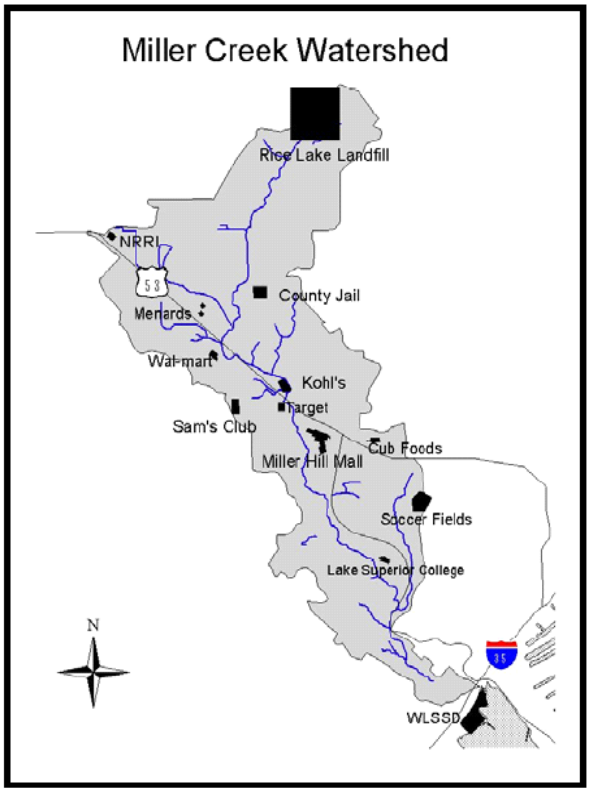
Stop 6: Miller Hill Mall - Miller Creek Sediment Trap/TMDL

Sediment Trap:

- In 2004, a sediment trap was completed in Miller Creek, located just below the Miller Hill Mall area.
- The simple natural-bottomed sediment trap is designed to provide a settling basin for the removal of sediment .

Miller Creek Total Maximum Daily Load (TMDL):

- TMDL is the maximum amount of a pollutant a stream can assimilate without violating water quality standards.
- Miller Creek is located within the cities of Duluth and Hermantown. The watershed is approximately 10 mi^2 and originates from headwater wetlands.
- A TMDL study is currently underway concerning temperature impairments.



Drive-by #2: Trinity Road/Highway 53 Road Construction

Construction BMPs:

- Minimize disturbance: Preserve existing vegetation, seed bare soil immediately, and place sod or final seed with erosion control mats as soon as possible.
- Contain Sediment: Install silt fence, protect surface water inlets, place mulch, blankets, and mats over disturbed areas, install ditch checks, and use sediment basins and traps.
- Remove Sediment: Clean out sediment traps and sweep construction access areas.