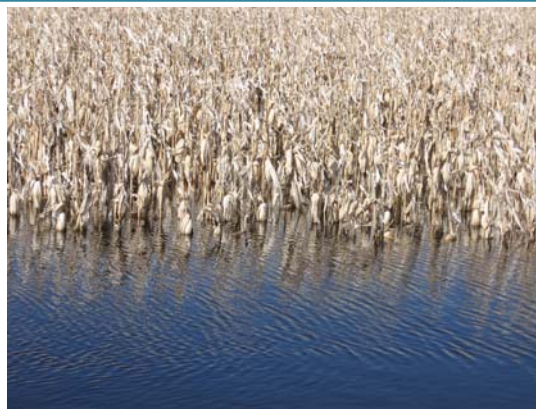
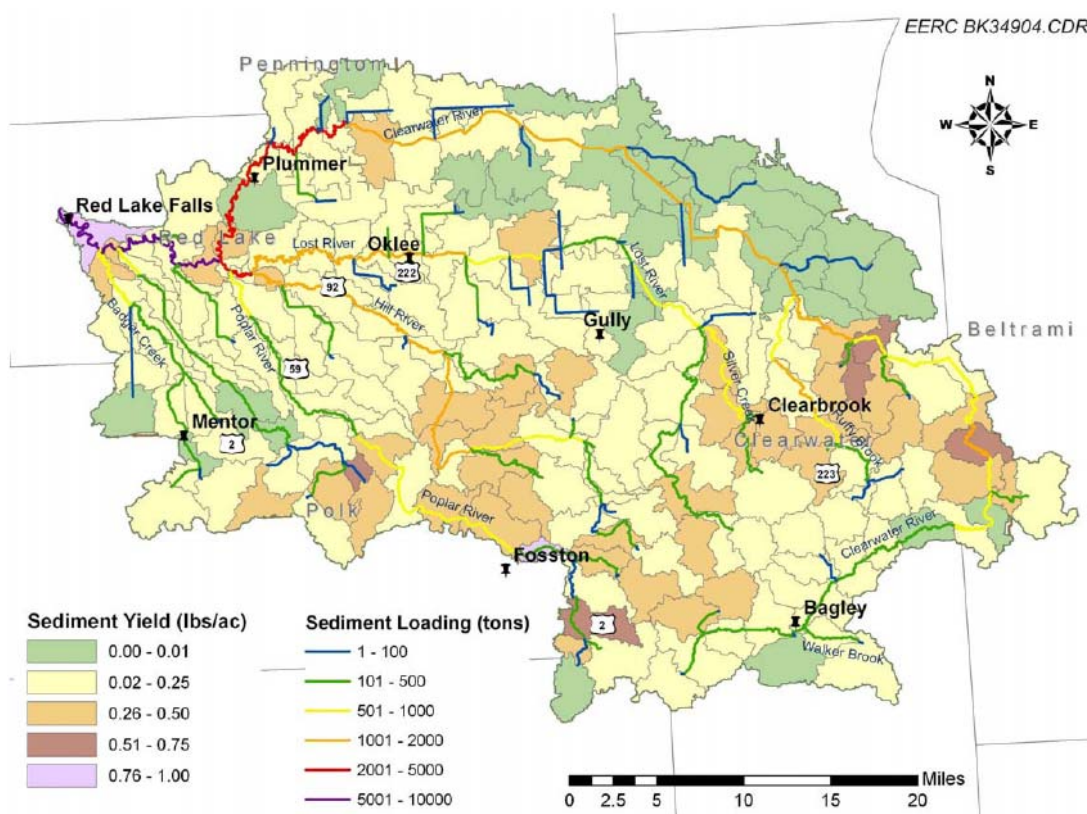


By: Corey Hanson, Water Quality Coordinator  
 For: June 11, 2009  
 Red Lake Watershed District Board Meeting



## Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study

The Soil and Water Assessment Tool (SWAT) modeling of the Clearwater River watershed was completed by the EERC in April. In early April, 2008 aerial photography and ground-truthing were used to identify feedlots and heavily pastured areas next to rivers. These select livestock operations were treated as point sources within the SWAT model. This helped improve the accuracy of the fecal coliform calibration/simulation part of the model. Current loads were calculated for the E. coli TMDL reports using historical flow data and monthly geometric means. A stakeholders' advisory meeting was also held in early April.



**Figure 1. The estimated average annual sediment erosion from the landscape of each subbasin (sediment yield) and the estimated sediment loading within each reach of the Clearwater River Watershed.**

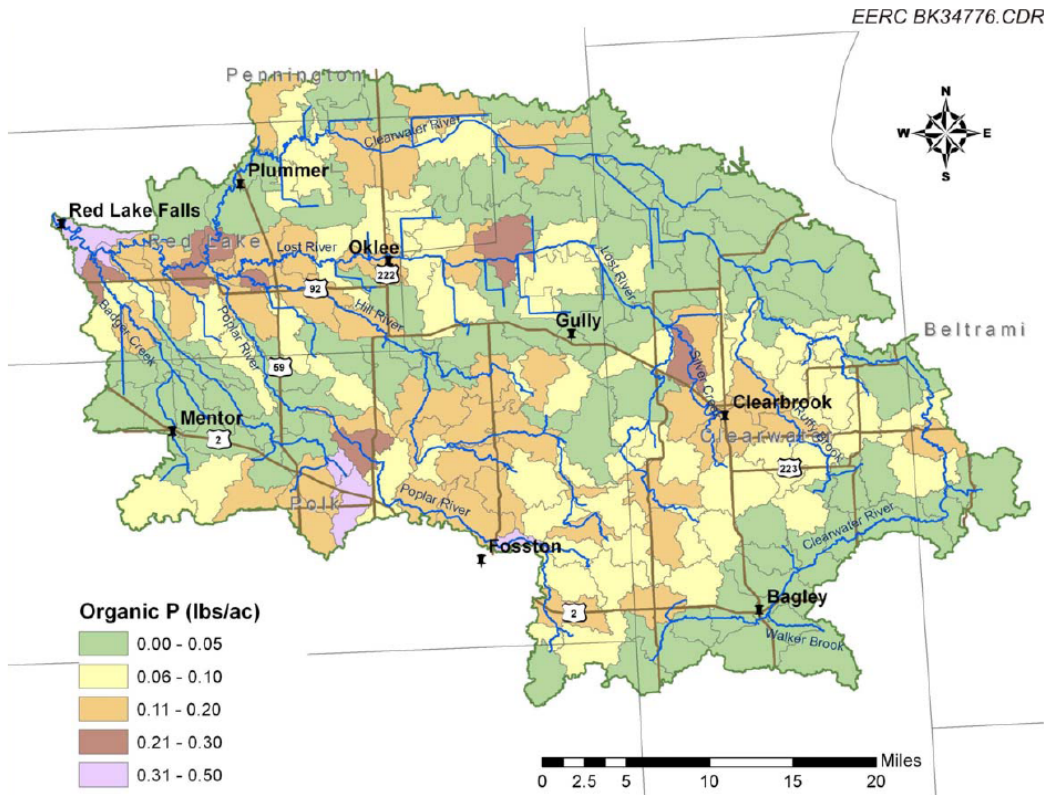


Figure 2. The predicted P yields within the Clearwater River Watershed

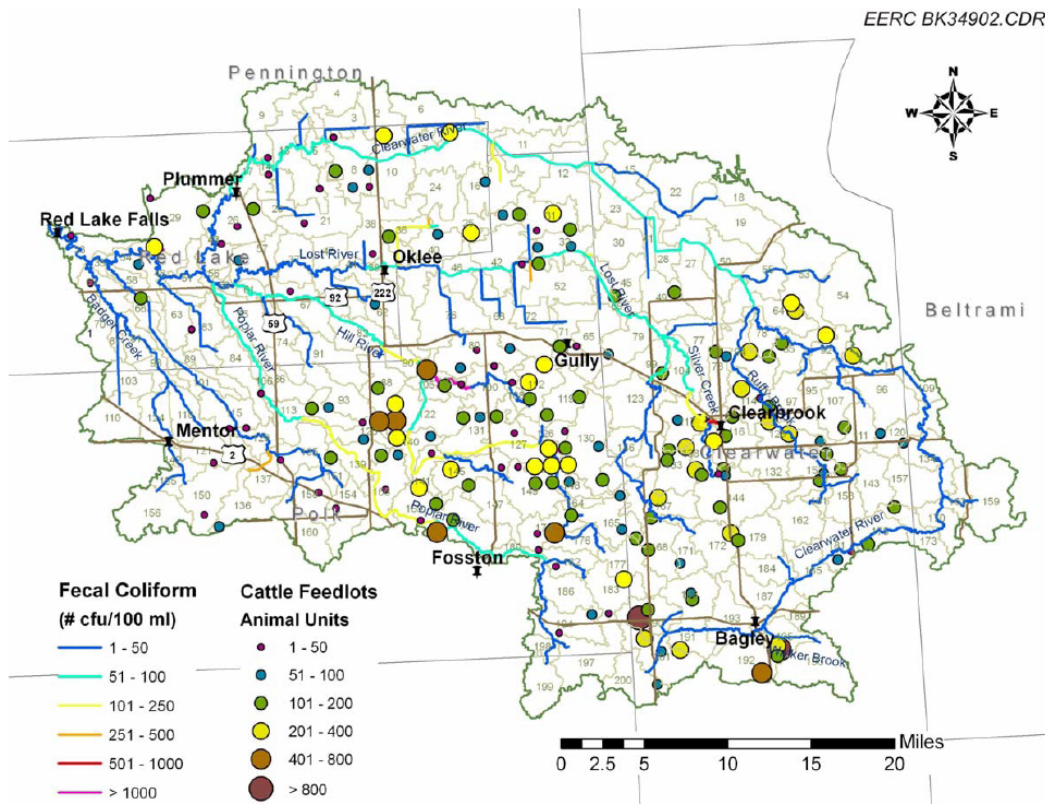


Figure 3. The location of feedlots within the watershed

**Table 9. The Effectiveness of the Various BMP Implementation Scenarios Simulated in SWAT**

BMP Implementation Scenarios (percentage of load reduction by parameter, practice, and implementation rate)					
	Sediment	FC	Organic and Mineral Phosphorus	Organic Nitrogen	Nitrate
<b>25% Implementation Rate</b>					
Combination of Three Most Effective	6.6	22.4	10.2	3.1	29.7
Field Border	2.3	5.9	2.4	0.8	2.6
Cattle Exclusion	NA*	5.2	0.7	0.1	8.1
Channel/Grade Stabilization	2.9	12.5	6.9	1.3	32.0
No-Till	0.9	25.2	-8.2	-11.0	35.1
Grassed Waterways	0.4	11.2	4.9	1.2	35.1
Rotational Grazing	0.0	0.0	0.0	0.0	0.0
Residue Management	1.2	14.5	5.0	1.4	27.4
Riparian Buffers	1.3	2.2	1.7	0.6	1.6
Stormwater Management	0.5	7.9	3.5	0.1	31.6
<b>50% Implementation Rate</b>					
Combination of Three Most Effective	17.4	35.0	21.7	6.8	36.9
Field Border	6.5	12.4	5.0	1.8	4.7
Cattle Exclusion	NA*	10.8	1.2	0.1	12.9
Channel/Grade Stabilization	6.1	9.9	10.4	0.0	32.5
No-Till	0.31	19.8	-2.5	-6.6	33.8
Grassed Waterways	1.0	7.9	6.2	2.5	26.8
Rotational Grazing	0.0	0.0	0.0	0.0	0.0
Residue Management	1.5	24.3	4.6	1.9	32.0
Riparian Buffers	3.7	4.5	3.4	1.3	4.0
Stormwater Management	0.5	19.4	4.6	1.6	31.5
<b>75% Implementation Rate</b>					
Combination of Three Most Effective	29.6	34.3	29.7	13.9	36.4
Field Border	15.4	18.5	8.2	3.6	6.4
Cattle Exclusion	NA*	16.7	2.2	0.2	28.1
Channel/Grade Stabilization	9.2	0.1	11.8	-0.6	34.7
No-Till	2.9	25.3	5.5	-0.31	35.0
Grassed Waterways	56.5	29.8	-33.0	-5.9	-39.5
Rotational Grazing	0.0	0.0	0.0	0.0	0.0
Residue Management	2.6	22.7	6.54	-0.23	35.3
Riparian Buffers	8.7	6.7	5.3	2.4	5.4
Stormwater Management	0.7	13.5	10.9	5.6	31.5

\* Sediment was not included as a direct stream input from cattle.



## Thief River Watershed Sediment Investigation

Eureka Manta continuous water quality loggers were installed in CD20, Ditch 200, and the Mud River. They are removed, cleaned, calibrated, and redeployed once every two weeks. The deployment pipes at the Hillyer Bridge and CR7 crossings of the Thief River are inaccessible due to high flows. HOBO water level loggers have also been installed where the deployment pipes were accessible (SG43, SG6).

I assisted USFWS and USGS staff with their calibrations when needed.

## Project 60 Water Quality Monitoring

HOBO water level loggers were installed at the CD2 (stream gauge #71) and Brandt channel (at Hwy 75) monitoring sites. The deployment pipe for the TS300 turbidity logger at the CD2 site was frozen in early April, so the instrument couldn't be deployed. The pipe was later bent by the high amount of runoff, so the bottom length of pipe will need to be replaced before a turbidity logger can be deployed at the site. A TS300 turbidity logger was installed at the Brandt Channel monitoring site in early April.



## District Monitoring

The first 2009 round of sampling at the RLWD's long term monitoring sites was completed in April. The second round of samples and field measurements at these sites will be collected in May. The other two rounds of monitoring will be completed in July and September.





Figure 4. Red Lake River at the Murray Bridge crossing in East Grand Forks



Figure 5. Grand Marais Creek at the Hwy 220 crossing

## Surface Water Assessment Grant Monitoring

Samples and field measurements were collected at the Blackduck River, South Cormorant River, Darrigan's Creek, O' Briens Creek, Kripple Creek, and Lower Badger Creek monitoring sites in April. This monitoring is being paid for by Surface Water Assessment Grant funds being administered by the Red River Watershed Management Board.

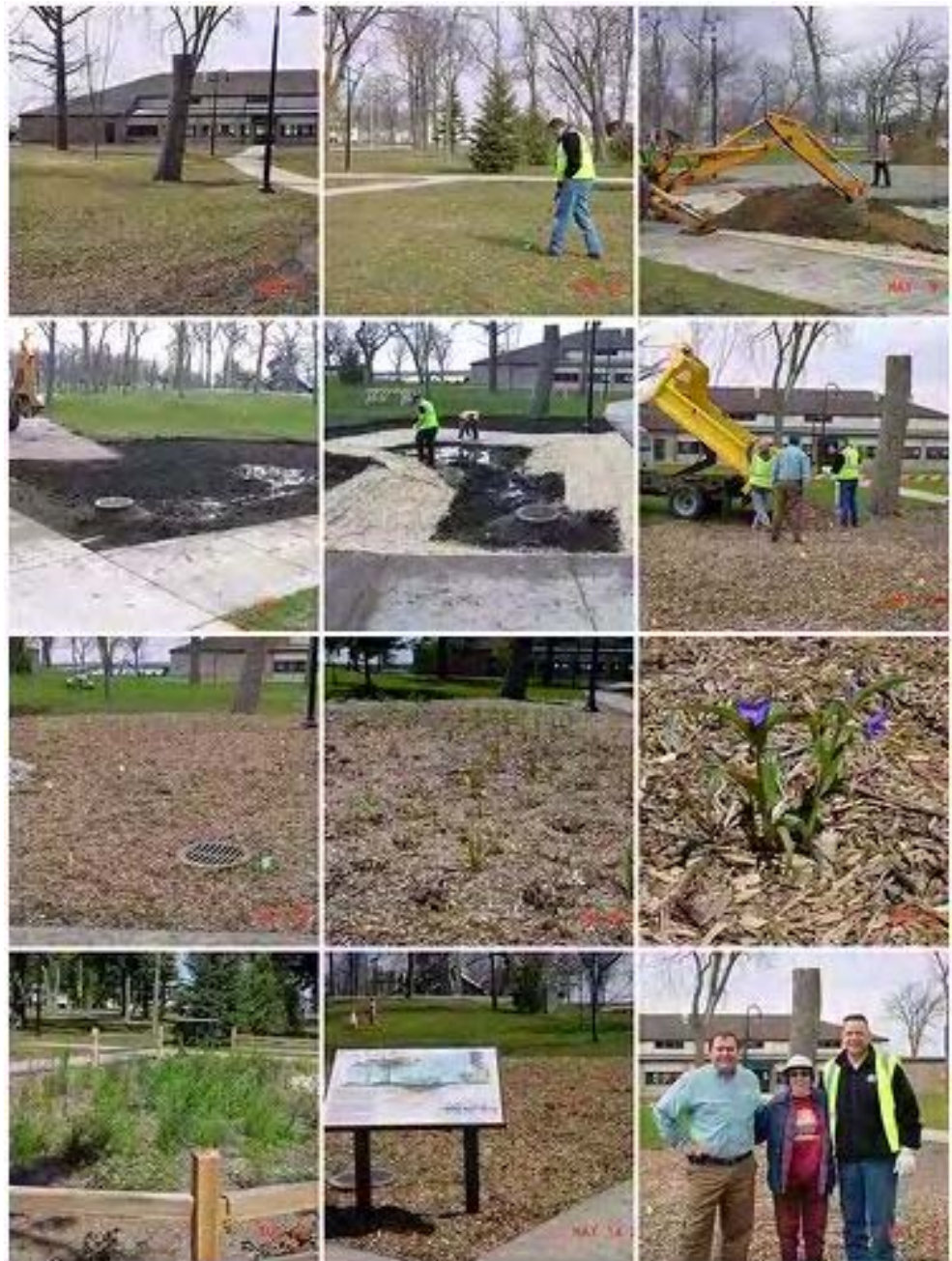
## April Meetings and Events

- **April 6, 2009** - Pennington County Water Resources Advisory Committee. 9:30 AM, Thief River Falls
  - Stormwater and rain garden projects in Thief River Falls are a couple of the specific goals listed in the Pennington County Water Plan for which the RLWD could provide assistance.
  - There has been a recent spill at Excel Dairy.
  - Project funding from the State
    - Clean Water Council
    - Lessard Heritage Council
      - Habitat dollars - \$9 million recommended for RIM
      - Conservation Partners Grant (habitat enhancement with native plantings)
      - Clean Water Fund.
        1. Local agencies need to coordinate with each other and plan specific projects
  - Reviewed draft Assessment of Priority Concerns. Here are the main goals, objectives, and new actions that list the RLWD as a partner.
    - Reduce the extent of turbidity and sedimentation in the Thief River and Red lake River watersheds.
      - Assist landowners and government entities with the reduction of water and wind erosion
        1. Work with government entities to investigate 3 possible sources of the sediment in the Thief river Falls reservoir.
        3. Cooperate with the Red Lake Watershed District on the installation of a stormwater runoff pond in the City of Thief River Falls.
        7. Install a rain garden to reduce stormwater runoff in the city of Thief River Falls, or St. Hilaire
        8. Educate and encourage landowners to plant rain gardens on their property. Host a demo workshop.
        9. Seek funding and prepare for additional streambank restoration projects.
      - Work with the county and watershed districts to identify problem reaches and to ensure watershed, county, township, and private drainage systems adequately address drainage needs to support agriculture without threatening water quality.
        1. Seek funding for ditch and culvert inventories
        2. Inventory legal ditch outlets and natural waterway outlets into the Red Lake River and install grade stabilization structures as needed.

3. Encourage right-of-way buffer seeding.
- Address surface water quality and work to protect and improve the resource through the enforcement of existing regulations, use of existing programs, and development of new programs.
    - Monitor the quality of surface water in Pennington County
    - Assist landowners with compliance of the county shoreland, sewage, and wastewater treatment and floodplain ordinances to help protect water resources.
  - Work with landowners and entities for the protection of surface waters.
    - Educate the public about water and soil stewardship and encourage BMPs
      3. Assist landowners with forest stewardship plans.
    - Coordinate and cooperate with other agencies and jurisdictions on plans and projects
      4. Encourage River Watch participation by area schools.
      5. Request feedlot cost-share or EQIP funds to assist feedlot operators with MPA compliance
      10. Work with state, county, and township officials to determine high priority snow management areas along public transportation routes.
      11. Provide surveying assistance to RRVCSA engineer for projects to protect water quality.
      12. Secure funds through Pennington County and the WRAC for projects that improve water quality.
    - Address Federal List 303(d) Impaired Waters by actively participating in the development and implementation of total maximum daily load (TMDL) plans for impaired waters of Pennington County.
      1. Provide technical assistance and best professional judgment during TMDL planning process; identifying sources, serving on TEP, and identifying programs for implementation
      2. Request the MPCA to conduct TMDL plans of impairments on a watershed basis.
- **April 7, 2009** – Overall Advisory Committee meeting – presentation on water quality projects
  - **April 10, 2009** - Clearwater River TMDL Stakeholders' Committee Meeting, 10:00 to noon @ Clearbrook Community Center.
    - SWAT modeling progress and results
    - Red Lake County BMP implementation
    - Clearwater County BMP implementation
  - **April 22, 2009** - Marshall County Water Resources Advisory Committee. 9:30 AM, Newfolden (rescheduled from April 6)
  - **April 27, 2009** – Red River Basin Water Quality Team meeting, RLWD office.
    - Rain Gardens.



- Sally Hausken, Detroit Lakes, gave a presentation about how to create a rain garden and told the story of the process of building a rain garden in a Detroit Lakes Park.



- After the presentation, we went outdoors to determine the size and location of a rain garden that would be receiving runoff from the RLWD office and parking lot. The garden would have to be approximately 1,800 ft<sup>2</sup> in size and located on the west side of the parking lot and building area.
- Master gardeners from Thief River Falls attended the meeting and expressed interesting in assisting with the garden's creation and maintenance, should it become a reality.



- To proceed with a rain garden at the RLWD office, we will need to do some surveying to map the topography of the office area and where the water drains.
- Example slides on building a rain garden:

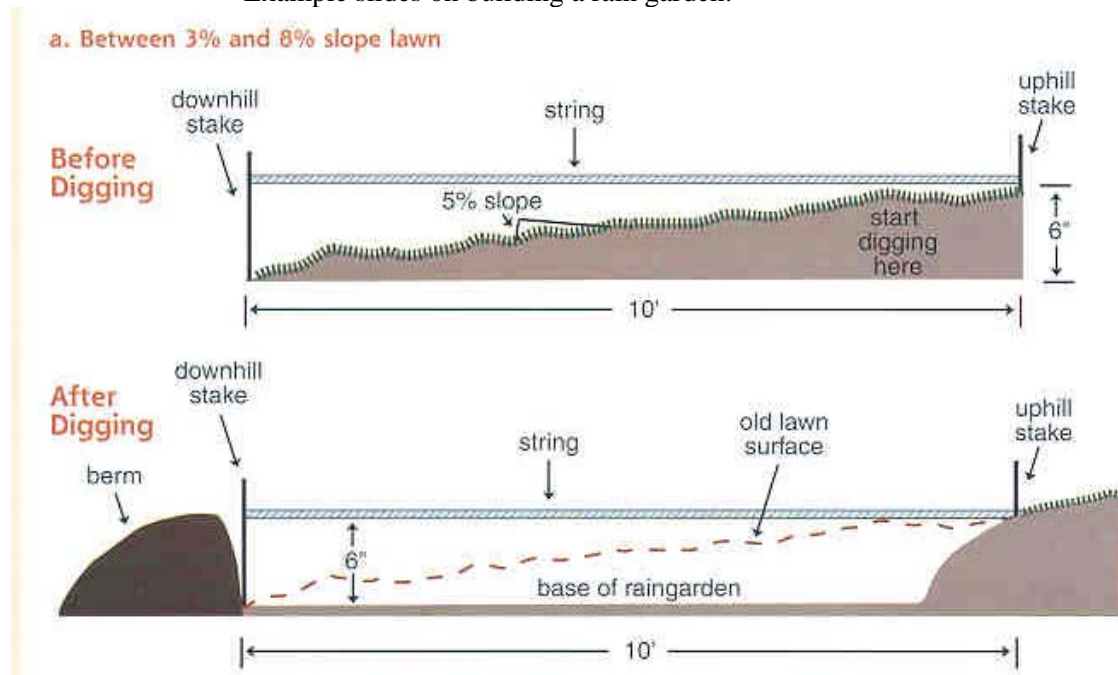


Figure 5 The top of the downhill part of the berm should come up to the same elevation as the entry to the rain garden at the uphill end.

### Making the Berm

Water flowing into the rain garden will naturally try to run off the downhill edge. A berm is needed to keep the water in the garden. The berm is a "wall" across the



On a gentle slope, soil from digging out the garden can be used to create the berm. This rain garden is 4 inches deep.

- The plants in a RLWD rain garden would need to be salt tolerant (parking lot is salted in the winter).
  - It was suggested that the City could partner in the project by providing excavation and mulch.
  - Maintenance comments from Sally
    - Existing rain gardens rely heavily on help from master gardeners
    - DL rain garden needed just 11 total hours of maintenance
    - Weeding is needed the year after planting as well
    - DL rain garden had weeds in the rocks
- **April 28, 2009** – Best Professional Judgment Group meeting for the Red River Basin for the 2009 State water quality assessment, St. Paul MPCA office.
  - Red Lake River, headwaters to Thief River – new low dissolved oxygen impairment
  - The increased amount of data from the Mud River will likely result in a delisting of the low dissolved oxygen impairment.
  - Pennington County Surface Water Assessment Grant monitoring on CD21 south of Thief River Falls has found extremely high concentrations of E. coli and ammonia. The high ammonia and E. coli concentrations occurred when there was low flow in the ditch and many cliff swallows living under the bridge. We suspect that the swallows are the cause of the high readings.\*
  - A low dissolved oxygen impairment in the Black River watershed may be added to the List of Impaired Waters. This is based on data collected by the Pennington County SWCD at the Goose Lake outlet. I didn't agree with the assessment because much of the low dissolved oxygen readings came from measurements made within the Goose Lake wetland, not within the ditch that is being assessed.\*
  - Glacial Ridge monitoring conducted by the USGS will result in several low dissolved oxygen impairment listings for ditches in the upper reaches of the Burnham Creek and Gently Creek watersheds (CD65, CD140, Burnham Creek).\*
  - Ditch 200, from Farmed Pool to the Thief River, has a low dissolved oxygen impairment.\*
  - CD 20 will be a new turbidity impairment listing.\*
  - CD57 (near Plummer), will have a turbidity listing.\*
  - The trout stream reach of the Clearwater River will be listed as impaired by un-ionized ammonia nitrogen. It should have been listed during the last assessment, but the MPCA applied the warm water fisheries standards instead of the cold water fisheries water quality standards.
  - Terrebonne Creek has been found to be impaired by high E. coli.
  - The dissolved oxygen impairment on Grand Marais Creek was extended from CD2 to the Red River.\*
  - Polk County Ditch 2 will be listed as impaired by turbidity.\*
  - \*Impairments identified on channelized reaches will be listed, but action on the impairments will be deferred until the development of tiered aquatic life use (TALU) standards is complete.
  - Continuous dissolved oxygen monitoring was recommended for several reaches, including the Upper Red Lake River and the Black River.
- **April 30, 2009** – End of SWAT modeling contract with the EERC for the Clearwater River watershed.