

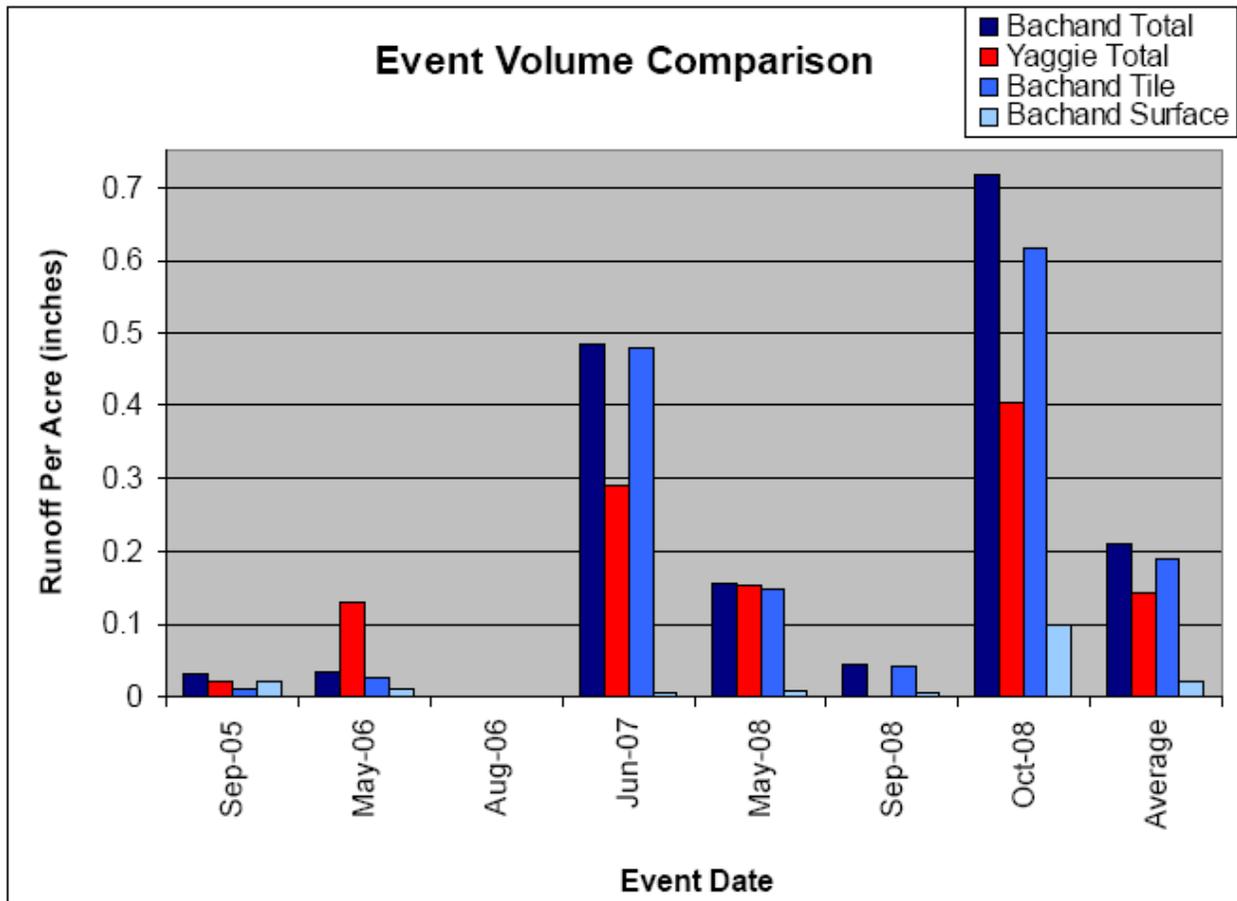
By: Corey Hanson, Water Quality Coordinator
For: March 12, 2009
Red Lake Watershed District Board Meeting

Tile Drainage Study

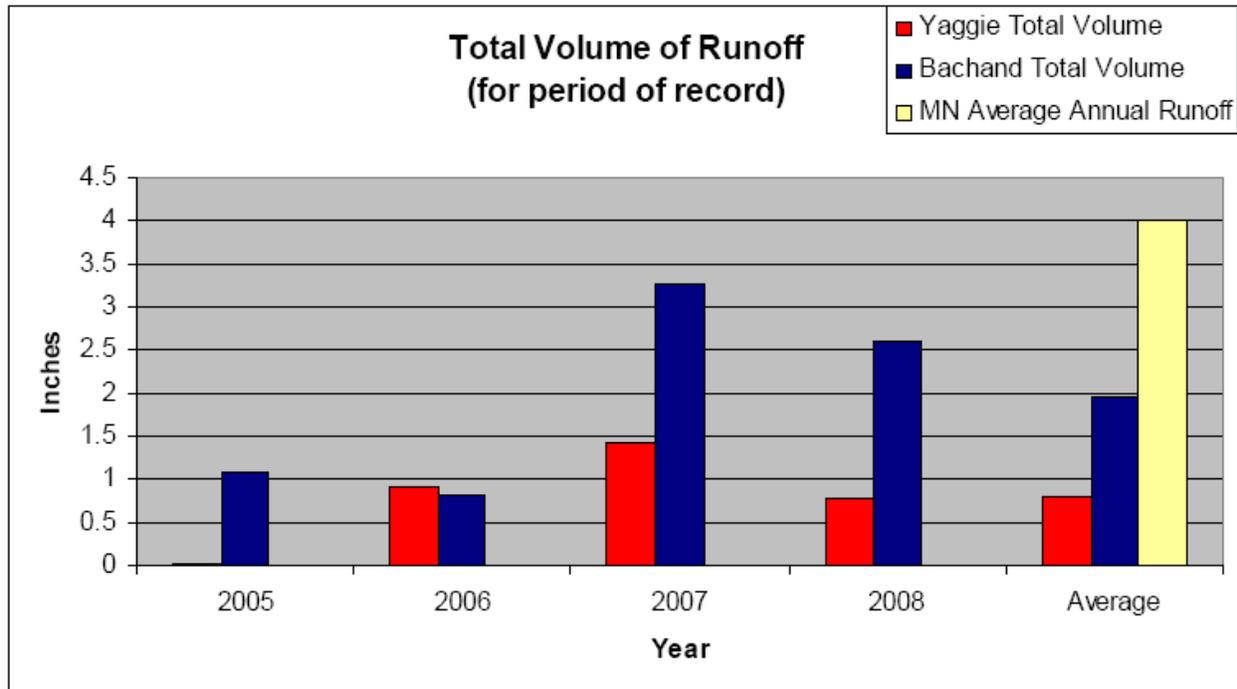
A draft revision of the tile drainage study report was completed that includes results of flow data analysis. Because it is in draft form, there is no link to the latest revision of the tile report, but it can be accessed directly for review using the following link:

<http://www.redlakewatershed.org/waterquality/Red%20Lake%20Watershed%20Farm%20to%20Stream%20Tile%20Drainage%20Study%20Final%20Report%20R3.pdf>

HDR Engineering analyzed flow records from runoff-generating storm events to compare peak flows from a surface drained field and a tile drained field. The peak flows from the surface drained field were almost always clearly higher than the peak flows from a tile drained field.



The flow records from each year's period of record from a tile drained field were also compared to flow record from a surface drained field. Perhaps because of the extended hydrograph of tile flow, the total volume of flow from a field was greater with tile drainage than it was for a field with only surface drainage over each year's period of record (post spring runoff to fall freeze-up).



Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study

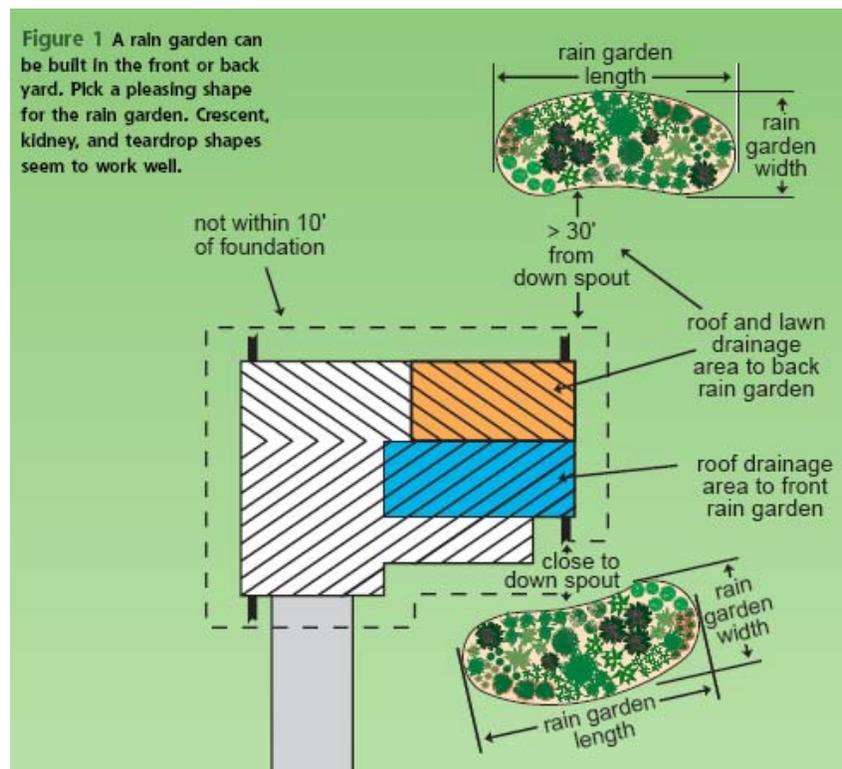
Beth Kurz is back from maternity leave and is continuing work on calibrating the model. Progress has also been made on writing TMDL reports for each of the impairments.

Other Notes

- Finished Water Quality Coordinator articles for the 2008 RLWD annual report.
- Began compiling and printing water level measurement records at stream gauge sites collected during water quality monitoring and filing them in the stream gauge file.
- Spent some time working on the Clearwater River Habitat/Bioassessment Report.
- The RLWD portable Manta multi-parameter sonde was sent to Eureka for a check-up and some maintenance.
- A Eureka Midge dissolved oxygen logger had some water leak inside of it last summer. This was also sent in for repair.
- Began assessing data for RLWD long-term monitoring sites in preparation for participation in the 2009 State water quality assessment process. In cases where it may have an effect upon final assessment results, River Watch, SWCD, and Marshall County Water Plan data was used in the assessment at each site to achieve the true assessment results. The MPCA will use data collected by all agencies that has been submitted and stored in the EPA STORET database.
- Spent some time starting a final report for the Thief River Watershed Sediment Investigation

January Meetings and Events

- **February 1, 2009** – Deadline for Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study and Thief River Watershed Sediment Investigation semi-annual reports to the MPCA.
- **February 13, 2009** – Conference call/internet meeting of RLWD staff and Brian Fisher to discuss the RLWD website. To do list:
 - Refine the GIS shapefile of stream gauge sites
 - Create an access database that can be used to store flow measurement and stage data.
- **February 23, 2009** – Red River Basin Water Quality Team meeting
 - I gave a presentation on the Clearbrook stormwater project and talked a little about the work done in Bagley.
 - After a presentation on low impact development (LID), there was discussion about opportunities to implement rain gardens. The group agreed that, if we are given the green light to do so, the RRBWQT should build a rain garden at the RLWD office in place of one of the monthly meetings. Rain gardens are landscaped areas planted with native vegetation and flowers that are designed to soak up runoff instead of allowing it to drain to a storm sewer. Some obstacles for this project will be funding, planning, time, and maintenance. A rain garden could benefit the RLWD and the community as an aesthetic improvement to the RLWD property, by reducing runoff from the RLWD property (reducing our impact on stormwater runoff), and by demonstrating a practical and aesthetic method of protecting water quality.



- **February 24th, 2009** - 2009 Tile Drainage Conference at North Dakota State University
 - Gary Sands – Drainage 301 – Design of a Tile System
 - If water can travel upwards, would it be draining water that is coming from below? How does this affect wetlands that rely on groundwater (flow-through and discharge)?
 - Increase in drainage intensity = increase in N loss
 - Preserve 20% of N in root zone by raising the tile depth 1 foot.
 - Seasonal drainage management
 - Moisture only has to be drained to a point just below the root zone
 - Hans Kandel – Reasons why agricultural producers are considering tiling
 - Treatment for salt-affected soils – salt eventually leaches out and stabilizes
 - CaCO₃ moves up from water table – Iron Chlorosis
 - Denitrification can also occur in fields if pools aren't drained (anaerobic conditions)
 - NO₃ – NO₂⁻, NO, N₂O, N₂
 - Less energy use in tilled fields (wet areas “bog down” machinery)
 - Less hassle
 - Plant and harvest in time
 - Increase in land value
 - Potential for no till
 - Tom Scherer – Pump or not to pump, that is the question
 - Used for sub-irrigation
 - Plunge pools or rip-rap at the outlet
 - More expensive (energy, electric connection, maintenance, etc.)
 - Storage volume is created by a typical distance of 3 feet between the “pump on” and “pump off” water levels.
 - Adding storage reduces wear on the motor by making stops and starts less frequent
 - Can control water table in the field using a pumped system
 - Allows you to pump water even if the drain outlet is full
 - Measuring flow: current sensor – time stamp the ends of each flow cycle
 - Dr. Xinhua Jia, Drainage research at Fairmont
 - Why is marine aquatic eutrophication and Gulf of Mexico hypoxia dependent upon the amount of nitrogen? Does the marine system use more N? Is there just a lot more P loading in the Miss. Watershed than in freshwater watersheds? Does N get used up in the Miss. R so that it becomes the limiting nutrient by the time the river reaches NO?
 - Sub-irrigation not feasible from existing system
 - Sulfates very high (up to 13847 mg/L)
 - Pumped tile had higher concentrations on nitrates + nitrites
 - Bill Schuh, Effect of tile drainage on recharge of deep aquifers
 - <http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubContentPDF/PB-1708/WRI45ForWEB.pdf>
 - Potential Effects of Subsurface Drainage on Water Appropriation and the Beneficial Use of Water in North Dakota

- Tile doesn't compete with wells, wells dominate the drawdown of the water table
- Tile can mobilize water from poorly drained landscapes and move it downstream to areas of recharge,
- Artificial recharge
- Roxanne Johnson, Water quality of water coming out of the tile
 - Salinity is a problem in eastern North Dakota
 - Sampling as done in Cass and Trail counties
 - Lift stations had higher conductivity and magnesium levels
 - Salt affected fields were the focus
- Producer Panel
 - Important to keep good relationships with neighbors
 - Tile drainage often keeps the ditch wetter longer (conflict with neighbor downstream who mows his lawn up to the ditch and doesn't like the cattails that are growing there)
 - Is pump keeping the ditch full during high flows – probably not but it's perceived to be doing so when it is running while the ditch is full.
 - Less maintenance needed on surface drainage when tile is installed
 - Todd has been able to “ignore” some of his surface ditches and farm through them for the last 8-9 years
 - “Do your poorest field first and it will be your best field”
 - Benefit of tile can be affected by the amount of standing water from upstream drainage, though.

Future Meetings/Events

- **March 3, 2009** – Thief River Water Quality Study planning meeting at Agassiz National Wildlife Refuge Headquarters, 8:30 am.
- **March 4th, 2009** - 6th Annual Red River Basin Water Quality Training Session, 8:30 am
- **March 23, 2009** – Red River Basin Water Quality Team, 10am to 3pm, Detroit Lakes
- **March 23, 2009** – Red Lake River Corridor Enhancement Project meeting in Crookston, 6:30 pm
- **March 25, 2009** – Eureka training with USFWS, USGS, and Ric Bertrand (company rep from Texas)
- **March 27, 2009** – Clearwater River TMDL Stakeholders' Committee Meeting, 9:30 to noon @ Clearbrook Community Center.
- **April 6, 2009** - Marshall County Water Resources Advisory Committee. 9:30 AM, Newfolden
- **April 6, 2009** - Pennington County Water Resources Advisory Committee. 9:30 AM, Thief River Falls
- **April 7, 2009** – Overall Advisory Committee meeting – presentation on water quality projects
- **April 28, 2009** – Best Professional Judgment Group meeting for the Red River Basin for the 2009 State water quality assessment, St. Paul MPCA office.
- **April 30, 2009** – End of SWAT modeling contract with the EERC for the Clearwater River watershed.
- **June 30, 2009** – Deadline for completion of the Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study.
- **August 31, 2010** – Deadline for completion of the Thief River Watershed Sediment Investigation