By: Corey Hanson, Water Quality Coordinator
For: February 14th, 2008
RLWD Board Mtg.

Tile Drainage Study

A final report has been completed for the Red Lake Watershed Farm to Stream Tile Drainage Water Quality Study. This project was partially funded by a $17,500 grant from the Northwest Minnesota Foundation. Final reports have been submitted to the NMF. Seventy copies of the tile drainage study report have been printed for distribution to project partners, fellow water resources staff, and others. The report is also available on the RLWD Projects webpage (http://www.redlakewatershed.org/projects.html#RLWFTSTile). A copy of the report is included in today's Board meeting handouts. I will be giving two presentations in February for this project, and another in March.

Clearwater River Dissolved Oxygen and Fecal Coliform TMDL

Semi-annual progress and financial reports have been completed and submitted to the local MPCA project representative. Invoices for reimbursement $3,932.23 of RLWD expenditures for the project and $4,182.24 of payments to the EERC have been sent to the MPCA.

All of the data collected in 2007 for this project was analyzed to accomplish the first goal of the project – verification of impairment. The continuous dissolved oxygen data processing was time consuming, but the end product is a very reliable set of data. A waterway's ability to support aquatic life is considered to be impaired by low dissolved oxygen if the daily minimum concentration of dissolved oxygen drops below 5 mg/L in more than 10% of the days that dissolved oxygen is monitored. E. coli replaced fecal coliform as the MPCA's standard used to indicate the risk of harmful bacteria in the water and impairment of aquatic recreation. The two-step analysis of bacteria data first looks at the percentage of samples that exceed the standard and then looks at composite geometric means for the calendar months of April through October.

The existing data shows that the Clearwater River from Ruffy Brook to the Lost River is fully supporting of aquatic recreation based on the old fecal coliform standard and also fully supports aquatic recreation as a composite reach based on E. coli data. The E. coli monitoring site within the channelized reach of the river did, however, indicate that that more specific reach of the Clearwater River is impaired for aquatic recreation by E. coli bacteria.

The E. coli data collected in 2007 undoubtedly verifies the aquatic recreation impairment on this stream. The monitoring site located just downstream of Silver Creek's confluence with Clear Brook exceeded the E. coli standard in nearly every sample collected.

The Lost River aquatic recreation impairment was not verified in the 2007 E. coli monitoring. The percentage of samples that exceeded the standard was high enough to be a cause for concern, but there were no monthly geometric mean E. coli bacteria concentrations that were high enough to qualify the reach as impaired. The exceedance rate for the fecal coliform standard

has decreased after this last year of monitoring, although it was still high enough to be a cause for concern. There no longer are any months in which the geometric mean concentration of fecal coliform is greater than 200 col/100ml. Bacteria levels in the Lost River are relatively low in the upper part of the reach and increase in the lower reaches of the river. Exceedances of the fecal coliform and E. coli standards increase in the lower part of the reach. So, the recent data for this reach indicates that the aquatic recreation impairment on the Lost River should be delisted.

		E. coli				Fecal Coliform			
Site	River	#Data Pts	% data pts. >126 CFU/100ml	% of Values >1260 CFU/100ml	# Mos. >126 GeoMean CFU E.coli Std	#Data Pts	% data pts. >200 CFU/100ml	% of Values >2000 CFU/100ml	>200 GeoMean CFU E.coli Std
37	Clearwater	32	25.0%	0.0%	1	60	5.0%	0.0%	0
780	Clearwater	52	13.5%	2.0%	0	130	3.1%	0.0%	0
21	Clearwater	9	22.2%	0.0%	0	61	2.0%	0.0%	0
Clearwater River Ruffy Brk. to Lost R.		93	18.3%	1.1%	0	235	2.1%	0.0%	0
157	Silver Creek	25	96.0%	28.0%	5	0	0.0%	0.0%	n/a
81	Silver Creek	32	41.0%	3.0%	1	58	14.0%	2.0%	0
Silver Creek 2		5	80.0%	0.0%	n/a	10	10.0%	0.0%	n/a
Silver Creek		62	66.1%	12.9%	5	68	13.2%	1.5%	0
51	Lost	26	8.0%	0.0%	0	0	0.0%	0.0%	n/a
782	Lost	34	18.0%	0.0%	0	42	10.0%	0.0%	0
PL30	Lost	10	20.0%	0.0%	n/a	19	5.0%	0.0%	0
Lost River		70	16.0%	0.0%	0	61	8.0%	0.0%	0

Overall, the Clearwater River appears to fully suportive aquatic life based on dissolved oxygen concentrations. The low dissolved oxygen impairment on the Clearwater River, for a conglomerated reach, has not been verified for this study. Data collected by the Red Lake County SWCD water quality monitoring program shows that there may be a dissolved oxygen problem within the channelized reach, though. If the MPCA wishes to assess the reach as a whole, then the low dissolved oxygen impairment on this reach of the Clearwater River will likely be delisted.

Stagnant water and warm summer temperatures caused dissolved oxygen levels in County Ditch 57 to plummet. The 2007 unquestionably verified the dissolved oxygen impairment. This is a reach that should be reclassified beause it is a ditch, not a warm water fishery, even though there were small northern pike living in the ditch throughout the summer.

The Poplar River is listed as impaired for the support of aquatic life from the headwaters to Highway 59. An extensive dataset of continuous monitoring data was collected at four sites along the Poplar River in 2007. This data has verified the dissolved oxygen impairment for most of the listed reach of the river. Even the outlet of Spring Lake had some daily minimum dissolved oxygen levels that dropped below the 5 mg/L standard – usually at night. Further monitoring in 2008 will be used to more decisively verify or disprove the impairment at sites in the upper part of the impaired reach.

Site	780	21	37	All C.R. Sites	CD57	105	WINPOP	POP20/O-4	Spring Lake Outlet
# of Valid Data points collected in 2007	1949	472	454	3129	7287	2458	2196	3820	871
Number of days from start to finish of 2007 Monitoring at this site	180	148	158	204	190	193	193	193	193
Number of Days with Valid DO measurements in '07	95	31	47	115	160	101	92	105	54
Number of Daily Mins below 5 mg/L	1	1	1	2	134	54	47	49	6
% of Daily Minimums that are below 5 mg/L in '07	1.05%	3.23%	2.13%	1.74%	83.75%	53.47%	51.09%	46.67%	11.11%
% Completeness of 2007 monitoring effort	53%	21%	30%	56%	84%	52%	48%	54%	28%
# of Days in which DO was measured - last 10 yrs	208	76	105	283	174	101	113	124	54
# of Daily measured daily mins <5mg/L - last 10 yrs	7	10	9	15	137	54	53	49	6
% of Daily Mins <5 mg/L in last 10 years	3.37%	13.16%	8.57%	5.30%	78.74%	53.47%	46.90%	39.52%	11.11%
	Clearwater River				CD57	Poplar River			

Stream Gauging Equipment

The RLWD stream gauging equipment has been upgraded to optical connections and an AquaCalc 5000 has been purchased for the collection of data.

Thief River Watershed Sediment Investigation

The Eureka Manta continuous water quality monitoring equipment that had problems (mostly the pH and depth probes) were shipped to Eureka Environmental Engineering for repair. All but one of these (malfunctioning turbidity probe) have been received.

Semi-annual progress and financial reports have been completed and submitted to the local MPCA project representative.

Clearwater Lake Winter Algae Bloom

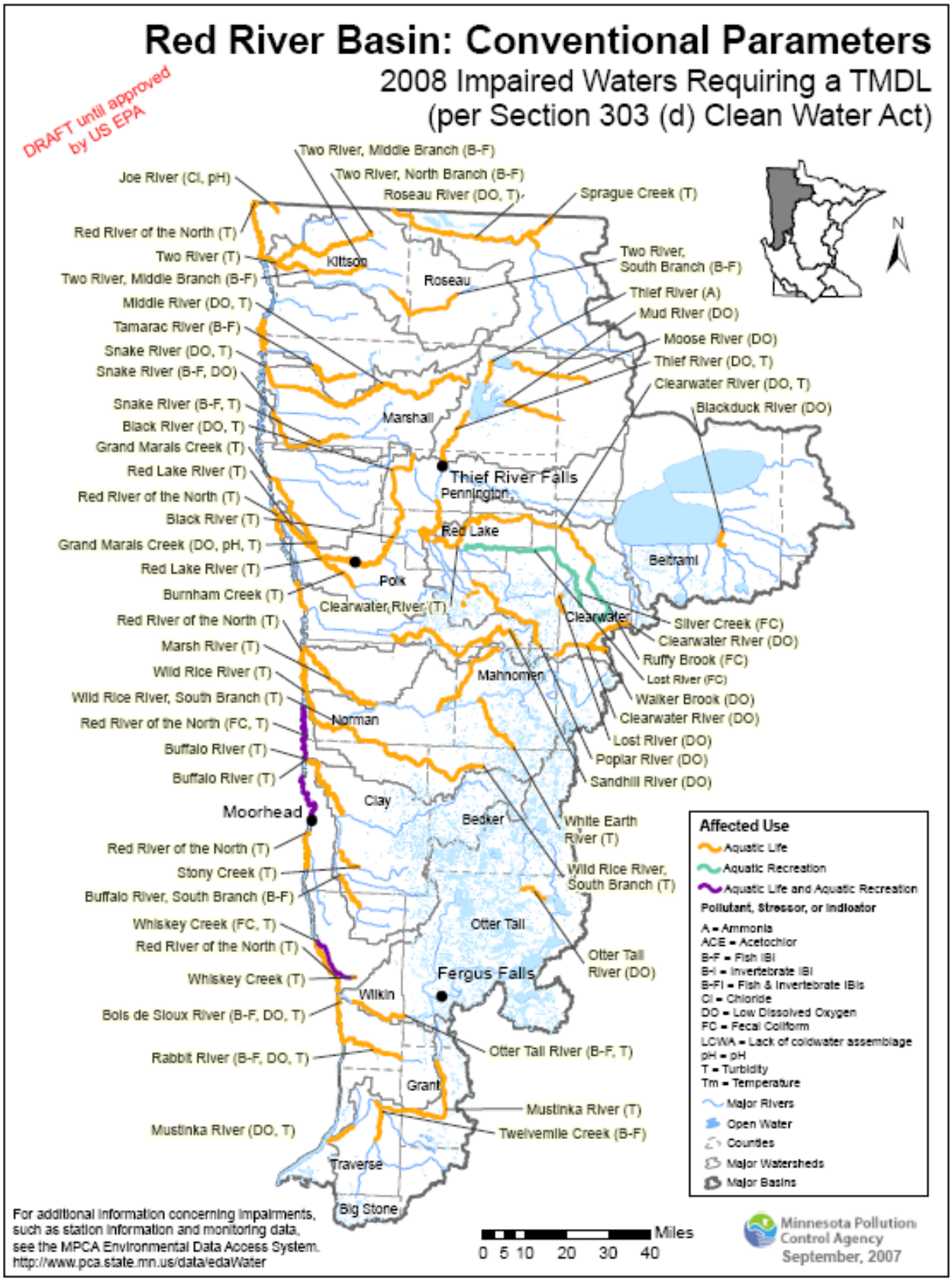
John Cucci and Vernon Johnson informed me that there has been an abnormally high amount of algae under the ice in Clearwater Lake. A relative of John Cucci identified the algae as blue-green algae. John volunteered to collect samples for nutrient analysis at several locations along the lake (NW end, by the dam, and near the SE end). The sites by outlet and inlet of the lake had low nutrient concentrations (TSI of near 43 – very good). The site near the northern end of the lake – in the deepest part of the lake and near John's fish house – had a much higher concentration of total phosphorus (126 µg/L). The Carlson's Trophic State Index score for this nutrient concentration would be approximately 74, which is classified as hypereutrophic (possibility of heavy algae blooms). The next question would be why is the high nutrient concentration localized in the NE bay? If the nutrients aren't coming from the Clearwater River, are there some problems along the lake like a leaking septic system or some pollution related to ice fishing?

John is also interested in volunteering to collect samples from Clearwater Lake during the summer.

2008 Draft List of Impaired Waters

New impairments within RLWD on the 2008 Draft 303(d) List of Impaired Waters:

Impairment	Waterbody	Reach
Low Dissolved Oxygen	Blackduck River	S. Cormorant R. to N. Cormorant R.
Low Dissolved Oxygen	Mud River	Headwaters to Agassiz Pool
Fecal Coliform	Ruffy Brook	Headwaters to Clearwater R
Turbidity	Clearwater River	Ruffy Brook to the Lost River
Turbidity	Clearwater River	Lost R to Beau Gerlot Cr
Turbidity	Black River	Little Black R to Red Lake R
Turbidity	Black River	Headwaters to Little Black R
Low Dissolved Oxygen	Black River	Headwaters to Little Black R
Turbidity	Burnham Creek	Unnamed cr to Red Lake R
Turbidity	Red Lake River	Black R to Gentilly R
Turbidity	Red Lake River	Unnamed cr to Clearwater R
Turbidity	Red Lake River	Crookston Dam to Burnham Cr
Turbidity	Red Lake River	Gentilly R to Crookston Dam
Total Phosphorus	Cameron Lake	Lake ID #60-0189-00


Red River Basin: Conventional Parameters
2008 Impaired Waters Requiring a TMDL
(per Section 303 (d) Clean Water Act)
DRAFT until approved by US EPA
Two River, Middle Branch (B-F)
Two River, North Branch (B-F)
Joe River (Cl, pH)
Roseau River (DO, T)
Sprague Creek (T)
Red River of the North (T)
Two River (T)
Kittson
Roseau
Two River, South Branch (B-F)
Two River, Middle Branch (B-F)
Thief River (A)
Middle River (DO, T)
Mud River (DO)
Tamarac River (B-F)
Moose River (DO)
Snake River (DO, T)
Thief River (DO, T)
Snake River (B-F, DO)
Clearwater River (DO, T)
Snake River (B-F, T)
Blackduck River (DO)
Marshall
Black River (DO, T)
Grand Marais Creek (T)
Thief River Falls
Pennington
Red Lake River (T)
Red River of the North (T)
Red Lake
Black River (T)
Grand Marais Creek (DO, pH, T)
Beltrami
Red Lake River (T)
Polk
Burnham Creek (T)
Clearwater River (T)
Clearwater
Red River of the North (T)
Silver Creek (FC)
Clearwater River (DO)
Marsh River (T)
Ruffy Brook (FC)
Wild Rice River (T)
Mahnomen
Lost River (FC)
Wild Rice River, South Branch (T)
Walker Brook (DO)
Red River of the North (FC, T)
Norman
Clearwater River (DO)
Buffalo River (T)
Lost River (DO)
Poplar River (DO)
Buffalo River (T)
Sandhill River (DO)
Clay
Moorhead
Becker
White Earth River (T)
Red River of the North (T)
Stony Creek (T)
Wild Rice River, South Branch (T)
Buffalo River, South Branch (B-F)
Otter Tail
Whiskey Creek (FC, T)
Red River of the North (T)
Otter Tail River (DO)
Fergus Falls
Whiskey Creek (T)
Wilkin
Bois de Sioux River (B-F, DO, T)
Otter Tail River (B-F, T)
Rabbit River (B-F, DO, T)
Grant
Mustinka River (T)
Mustinka River (DO, T)
Twelvemile Creek (B-F)
Traverse
Big Stone
Affected Use
Aquatic Life
Aquatic Recreation
Aquatic Life and Aquatic Recreation
Pollutant, Stressor, or Indicator
A = Ammonia
ACE = Acetochlor
B-F = Fish IBI
B-I = Invertebrate IBI
B-FI = Fish & Invertebrate IBIs
Cl = Chloride
DO = Low Dissolved Oxygen
FC = Fecal Coliform
LCWA = Lack of coldwater assemblage
pH = pH
T = Turbidity
Tm = Temperature
Major Rivers
Open Water
Counties
Major Watersheds
Major Basins
N
Miles
0 5 10 20 30 40
For additional information concerning impairments, such as station information and monitoring data, see the MPCA Environmental Data Access System. http://www.pca.state.mn.us/data/edaWater
Minnesota Pollution Control Agency
September, 2007

Other Notes

- The RLWD's portable Manta and Amphibian portable water quality multiprobe and hand pad combo were also shipped to Eureka Environmental Engineering for inspection, upgrade, and repair (if necessary). This equipment has returned to the RLWD already with some upgrades.
- Two In-Situ TROLL 9000 continuous water quality monitoring probes were damaged in high flows on the Clearwater River in June of 2007. A quote was received from In-Situ for upgrading the damaged probes to the current model (In-Situ TROLL 9500). The total cost of the quote was $8,784.25 without shipping. There is $4,649.32 of value left on the 2 probes. The cost of upgrading just one of the probes would likely be $4,493.63 before shipping and tax. So, insurance could be used to replace one of these probes with little extra cost to the RLWD. There isn't an immediate need for both of these probes. I could find a use for one more, but I can accomplish a lot with 7 dissolved oxygen logging probes without needing the eighth. If more equipment is needed for a future project, grant money can be sought to help pay for whatever is needed.
- Began filling in calendar to set aside time for everything that I need to get done this year. Every single day of the calendar is now filled.
- Area SWCDs and the RRWMB have been successful in receiving Surface Water Assessment Grants that will improve the capabilities of these key project partners to monitor water quality in new locations and help provide better assessments.
- Continued to keep minutes updated on the RLWD website.
- Set up Gary and Loren's new computers
- Started writing RLWD 2007 annual report articles

February and March Tasks

- Distribution of the Tile Drainage Study Report
- Begin a comprehensive water quality report for the RLWD long-term monitoring program (originally scheduled for 2006)
- Complete articles for the RLWD 2007 Annual Report
- Work on the Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study Report.
- Provide information and data to the EERC for calibration of the SWAT model.
- Schedule another TMDL Stakeholders' meeting
- Revise the *Standard Operating Procedures for Water Quality Monitoring in the Red River Watershed*

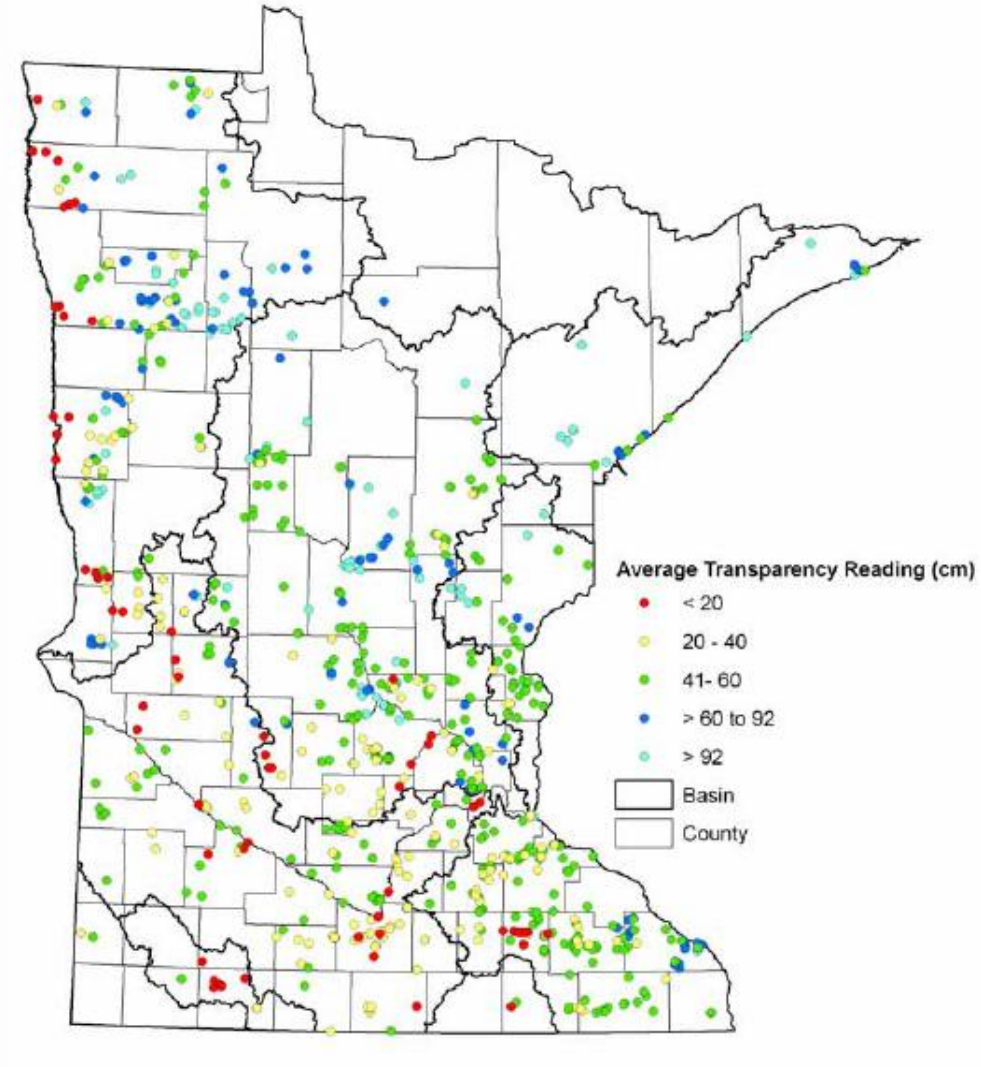
January Meetings and Events

- **January 15, 2008** – Pennington County Water Resources Advisory Committee
  - SWCD has distributed a Pennington County Land Use Guide and a Septic System Owner's Guide
  - SSTS Update: New rules effective Feb. 4, 2008 (e.g. Building permits are not given unless the septic system is inspected.)
  - A sewage leak was discovered in a backyard in a trailer court.
  - Groundwater testing
    - Nitrate levels in the County are OK.
    - Bacteria was found in one of the wells.
  - Congress has upped the level of payments for CRP continuous practices
  - The Pennington SWCD has submitted grant applications for erosion control by Jerome Street (near planned location of new bridge in TRF) and for surface water monitoring.
- **January 16, 2008**—Marshall County Water Resources Advisory Committee, 9:30am—11am @ Middle River City Office
  - Pennington and Marshall County Boards sent letters opposing the Oberstar legislation that would give the Federal Government jurisdiction over wetlands.
  - Discussion of Basin Board legislation – Some committee members voiced concern over whether or not the legislation will take power away from the local people (county level).
  - NRCS report highlight: Conservation Securities Program sign-up in the Thief River Watershed will begin in the spring of 2008. The Conservation Security program (CSP) is a voluntary program which supports ongoing stewardship of working agricultural lands by providing payments for maintaining and enhancing natural resources.
- **January 17, 2008** – Judging at the Franklin Middle School Science Fair, 12-3 pm
- **January 28, 2008**—Joint meeting of the Red River Basin Water Quality Team and The Red River Basin Monitoring Advisory Committee, 10am @ the RLWD mtg. Room
  - Need to report on the RLWD Board's opinion on the <u>concept</u> of statewide Basin Board proposal. Molly MacGregor has set up an online survey. People will have the month of February to respond.
  - Dave Christopherson of the MPCA Environmental Assessment and Outcomes division gave a presentation about the MPCA's effort to create a total suspended solids concentration standard that correlates with the 25 NTU turbidity standard.
    - Turbidity and total suspended solids (TSS) correlate differently in different ecoregions. This can be influenced by particle size.
      - Northern Glaciated Plains and Western Corn Belt Plains
        - 25 NTU = 60 mg/L TSS
      - North Central Hardwood Forests
        - 25 NTU = 100 mg/L TSS
      - Red River Valley
        - 25 NTU = 35 mg/L TSS
    - Other states' turbidity standards are duration based (e.g. >25 NTU for 10

consecutive days = impairment)

- Representatives of the MPCA's Citizen Stream Monitoring Program (Johanna Schussler and Laurie Sovell) spoke about their network of volunteer monitoring. In addition to the River Watch and River Keepers groups, there are 6 individuals who have been volunteering to collect water quality data from streams within the Red river Basin. In all, 182 sites are being monitored by volunteers in the RRB. Gary Lee is the volunteer within the RLWD and has been monitoring the Sand Hill River, Clearwater River, Hill River, Lost River, and Poplar River.
- They are looking for more volunteers, so if someone calls and is interested in the water quality on a stream, tell them about the CSMP program.
- Target TMDL implementation areas
- Study effectiveness of BMPS, ditch maintenance (side water inlets)

Figure 7. 2006 Average Transparency Readings



2006 Report on the Water Quality of Minnesota Streams • August 2007 Minnesota Pollution Control Agency

- Molly and the RRBWQT have also been working on a scoring system strategy for prioritizing watershed within the basin for allocation of funds for water quality improvement projects. The table below shows the most recent results of this process.

Red River Basin Watershed Prioritization Which watersheds should receive resources first in order to meet water quality goal of reducing sediment?																	
Scoring Measure	Bois de Sioux	Mustinka	Otter Tail	Upper Red	Buffalo	Wild Rice	Marsh	Sand Hill	Clearwater	Red Lake	Thief	Red Lake River	Grand Maraus	Snake	Lower Red	Two Rivers	Roseau
Watershed Condition	11	10	6	9	8	7	10	11	7	4	9	7	12	10	12	9	5
Pollution	12	8	10	13	13	12	10	10	8	5	9	11	11	11	11	13	11
Capacity to Implement Solutions	5	5	5	8	5	5	5	5	4	4	4	4	4	5	5	5	5
All Measures	**28**	**23**	**21**	**30**	**26**	**24**	**25**	**26**	**19**	**13**	**22**	**22**	**27**	**26**	**28**	**27**	**21**

- **January 30, 2008**—Clearwater County Water Plan Task Force meeting, 10am @ Clearwater County Courthouse
  - PowerPoint presentation of Clearwater County Local Water Management History, ongoing projects within the County, and the LWM planning process.
    - Clearbrook Stormwater Study
      - 2 out of 3 possible sites have been surveyed. The 2 eastern sites are owned by the city and the western site (by body shop) is privately owned.
    - The Clearwater SWCD has received a Surface Water Assessment Grant to conduct more lake monitoring, particularly in the southern part of the county. They will be using some of the grant for the training of citizen volunteers.
  - A planner from the Headwaters Regional Development Commission collected priority concern from all meeting participants and gave everyone a chance to vote on the concerns they felt were most important. Results of the voting will be used to select the priority concerns for the next Clearwater County Local Water Management Plan.
- **January 31, 2008** – Final Report deadline for the Tile Drainage Study, semi-annual reports to the MPCA for the TMDL study and Thief River study are also due.

Future Meetings/Events

- **February 1, 2008** – Semi-annual report for the Thief River Watershed Sediment Investigation is due.
- **February 14th** – Presentation at Tile Drainage Forum
- **February 21st, 2008**—Red Lake River Corridor Enhancement Project Meeting, 4-6:30 pm @ Room 116 of the Kiehle Auditorium on UMC Campus
- **February 25th** – Red River Basin Water Quality Team Meeting at the RLWD, 10am
    - I will be giving a presentation on the results of the Tile Drainage Study
    - Environmental Assessment Worksheet for Ethanol Plant
- **March 20, 2008** – Red Lake River Corridor Enhancement Project meeting, St Hilaire City Hall, 6:30 PM
- **March 24, 2008** - Red River Basin Water Quality Team Meeting in Moorhead, 10am
    - Education for decision makers
    - I will be giving another presentation on the Tile Drainage Study results
- **Late March 2008** – Clearwater Dissolved Oxygen and Fecal Coliform TMDL Study stakeholders' meeting (not scheduled yet)
- **April 9** - Marshall County Water Resources Advisory Committee, 9:30am
- **April 17, 2008** – Red Lake River Corridor Enhancement Project meeting, Thief River Falls City Hall, 6:30 PM
- **April 28, 2008** - Red River Basin Water Quality Team Meeting at the RLWD, 10am
- **May 15, 2008** – Red Lake River Corridor Enhancement Project meeting, East Grand Forks – Campbell Library, 6:30 PM
- **May 19, 2008** - Red River Basin Water Quality Team Meeting in Moorhead, 10am
- **June 19, 2008** – Red Lake River Corridor Enhancement Project meeting, Fisher School Library, 6:30 PM
- **June 23rd, 2008** - Red River Basin Water Quality Team Meeting at the RLWD, 10am
- **July 9th** - Marshall County Water Resources Advisory Committee, 9:30am
- **July 28, 2008** - Red River Basin Water Quality Team Meeting in Moorhead, 10am
- **May 15, 2008** – Red Lake River Corridor Enhancement Project meeting, East Grand Forks – Campbell Library, 6:30 PM
- **June 19, 2008** – Red Lake River Corridor Enhancement Project meeting, Fisher School Library, 6:30 PM
- **August 25, 2008** – Red River Basin Water Quality Team Meeting at the RLWD, 10am
- **September 22, 2008** – Red River Basin Water Quality Team Meeting in Moorhead, 10am
- **October 24, 2008** – Red River Basin Water Quality Team Meeting at the RLWD, 10am
- **November 5, 2008** - Marshall County Water Resources Advisory Committee, 9:30am
- **November 22, 2008** – Red River Basin Water Quality Team Meeting in Moorhead, 10am
- **December 22, 2008** - Red River Basin Water Quality Team Meeting at the RLWD, 10am