

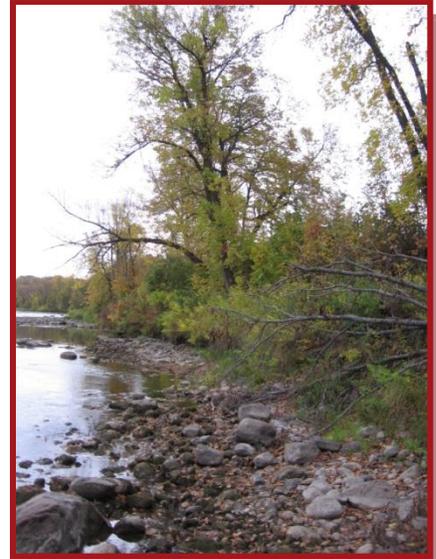
## [JANUARY 2007 WATER QUALITY PROGRAM PROGRESS SUMMARY]

February 7, 2007

haveBy: Corey Hanson, Water Quality Coordinator  
For: January 11th, 2007  
RLWD Board Mtg.

### Data Assessment

This year, the Minnesota Pollution Control Agency will once again be assessing Minnesota's surface waters. In preparation for this assessment, I have submitted RLWD data to the MPCA and have been assessing our monitoring data using the MPCA's methods. The main parameters that are assessed in this process are factors that affect aquatic life (turbidity, dissolved oxygen, un-ionized ammonia, pH, and temperature) and aquatic recreation (fecal coliform and e-coli bacteria).



Assessments of the conventional parameters of turbidity, dissolved oxygen, pH, and temperature are based on percentage, with minimum data requirements.

- If a monitoring site fails to meet standards for less than 10% of the time, it is considered to be fully supporting of aquatic life and not impaired.
- If the standard is not met for anywhere between 10% and 25% of the time, it is considered impaired and partially supporting of aquatic life.
- If the standard is not met for more than 25% of the time, the site is considered to be impaired and not supporting of aquatic life.

Other assessments are more complicated. Fecal coliform assessments involve calculating the geometric mean of aggregate data from the last ten years for each of the twelve calendar months. Un-ionized ammonia assessment first applies an equation to total ammonia nitrogen data that calculates the percentage that is in the un-ionized form. The percentage is based on pH and temperature. All it takes to establish impairment by un-ionized ammonia is to find two or more exceedances of the .04 mg/L standard within a three year period. The methods used for these assessments are described in greater detail within the MPCA *Guidelines for Assessing Minnesota Waters* and the *Red River Watershed Water Quality Reporting Handbook*.

There is a map in the Board of Managers meeting room that shows the locations of existing impairments in the Red River Basin. This information is also available on the MPCA website. Below, I will list the existing impairments and whether or not they are supported by recent data. Also, I will list any new impaired reaches or other problems that I have found. The complete results of this process have been recorded in a document that will eventually be used within a comprehensive water quality report. If anyone is interested in seeing what I have so far, I can print a copy for you. I am still working on reviewing the data and editing the document so it may be used during the data review and best professional judgment meetings that will be part of the assessment process.

**Existing Impairments:**

• **Walker Brook**

- Walker Brook Lake to Clearwater River
  - Low dissolved oxygen
    - Current data supports this impairment listing and shows that the problem may be getting worse.

• **Clearwater River**

- Headwaters to T148 R36W S36 East Line
  - Low dissolved oxygen
    - Current data supports this impairment and shows that the problem may be getting worse upstream of Bagley, but better at our monitoring site downstream of Bagley. High temperatures are frequent in this reach and may be having a negative impact on dissolved oxygen.
- Lower Badger Creek to Red Lake River
  - Turbidity
    - Current data supports this assessment, especially when data sets from other organizations are included in the assessment. RLWD data shows there has been an improvement since the last assessment, though. This may be because of lower flows in the past couple of years.
- Ruffy Brook to Lost River
  - Fecal Coliform
    - The only exceedance of the fecal coliform standard since 1995 was in a sample collected by the Red Lake SWCD last year. So, current data does not show that this site is impaired based on MPCA assessment methods.
  - Low dissolved oxygen
    - RLWD monitoring has not found a problem since the year 2000 (prior to the Greenwood 27 project). The Red Lake SWCD has found some low dissolved oxygen readings during the warm summer months of July, August, and September, however.
- Lower Badger Creek to the Red Lake River
  - Turbidity
    - The impairment persists based on RLWD data, but there seems to have been improvement since the last assessment.

• **County Ditch 57**

- Unnamed ditch to the Clearwater River
  - Low dissolved oxygen
    - This site will be part of the Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study. The impairment is based on Clearwater Nonpoint Study (1992-93) data.

• **Poplar River**

- Spring Lake to Hwy 59

- Low dissolved oxygen
  - The last two years of data improved the assessment results for our monitoring site on this reach enough so that assessment of our data no longer shows impairment, even though we continue to get an occasional low DO reading during summer monitoring.
- Poplar River Diversion
  - Unnamed ditch to Badger Lake
    - Low dissolved oxygen
      - Current data continues to support this impairment, although there has been some improvement since the last assessment. There hasn't been a low reading during RLWD monitoring since early 2002. River Watch monitoring has found only one low reading since 2002.
  - Badger Lake to Mitchell Lake
    - Low dissolved oxygen
      - Current RLWD and River Watch data shows that the rate at which this site fails to meet the dissolved oxygen standard is now <10%. Although some low readings have been found in the summer by Win-E-Mac River Watch, the decrease in percentage is likely due to fewer winter samples being included in the assessment.
- Unnamed Creek
  - Eighteen Lake to Bee Lake
    - Low dissolved oxygen
      - Win-E-Mac River Watch monitors this site for us now and continues to find low dissolved oxygen levels.
- Silver Creek
  - Headwaters to Anderson Lake
    - Fecal Coliform
      - Assessment of current data no longer shows an official impairment. The influence of the high readings found in the months of June and July (Years 2000 and 2003) upon assessment results has been lessened by recent samples with lower levels of fecal coliform.
- Lost River
  - T148 R38W S17 south line to Pine Lake
    - Low dissolved oxygen
      - The rate at which dissolved oxygen readings fail to meet the standard of 5 mg/L has decreased to less than 5%, an acceptable level according to MPCA standards. The frequency of low DO readings was much higher in the 1990's when a different method was used for this measurement.
  - Anderson Lake to Hill River
    - Fecal Coliform
      - Current data at site #782 (Oklee USGS gage) supports this assessment, but for different months and to a lesser degree than the

original listing data (Clearwater Nonpoint Study – 6 readings in the thousands, one of 30,000 co/100ml).

- Our relatively new monitoring site on the Lost River near Brooks and upstream of the confluence with the Hill River does not show impairment by high fecal coliform, even though there have been a few high readings since we began monitoring there.

• **Moose River**

- Headwaters to Thief Lake
  - Low dissolved oxygen
    - Current data still shows impairment, but also shows some improvement since the 2005 assessment.

• **Thief River**

- Aggasiz Pool to Red Lake River
  - Low dissolved oxygen
    - Our data still supports this listing, but the percentage of low dissolved oxygen readings has decreased on both ends of the reach.
  - Turbidity
    - Although it is still high, the percentage of exceedances of the turbidity standard at this site has decreased since the 2005 assessment at the downstream end of the reach, but has increased (worsened) at the upstream end of the reach near the Agassiz NWR outlet.
- Thief Lake to Aggasiz Pool
  - Un-ionized Ammonia
    - This is only based on a couple of high readings that took place within a three year time period.

• **Red Lake River**

- Burnham Creek to Unnamed Creek (East Grand Forks)
  - Turbidity
    - Current data supports this impairment. RLWD data shows that the impairment should actually extend upstream to the Crookston USGS gage. River Watch and Red Lake County SWCD data shows that the impairment extends as far upstream as Red Lake Falls.
- Unnamed Creek (East Grand Forks) to Red River
  - Turbidity
    - 68% of RLWD turbidity readings at this site exceed the standard.

• **Grand Marais Creek**

- Headwaters to County Ditch 2
  - Low dissolved oxygen
    - Our data continues to support this listing and the results of this assessment are worse than the 2005 assessment.
  - Turbidity
    - More than half of our readings exceed the standard, but the percentage of high readings has decreased.

- County Ditch 2 to the Red River
  - Turbidity
    - This listing is based on Red River Basin Monitoring Network and River Watch data.

**New impairments and problems:**

- Ruffy Brook
  - Fecal Coliform
    - Site # 797 on Ruffy Brook shows an impairment
  - Temperature
    - Our long-term monitoring site, located on the downstream end of the former trout stream reach, would not meet MPCA water temperature standards for trout streams.
- Trout stream reach of the Clearwater River
  - Temperature
    - Frequent high temperature readings relative to the 20° C standard for trout stream (Class 2A) waters at RLWD monitoring site #131 (Clearwater Lake Inlet), 130 (near Pinewood), and at CR23 (28% exceedance rate).
- Black River
  - Turbidity
    - RLWD turbidity and transparency readings, along with those from River Watch, should meet the data requirements for putting this site on the 303(d) List of Impaired Waters.
- Burnham Creek
  - Turbidity
    - We did not have enough data points for a turbidity assessment in 2005, but we do now. Crookston River Watch data also shows a turbidity impairment.
- Thief River – Thief Lake to Agassiz Pool
  - Fecal coliform
    - This site is very close to being impaired due to high fecal coliform levels found in the months of August and September. Since the high readings may be due to intensive baiting activity along the Thief Lake outlet channel, there is a good chance that the problem may be mitigated locally and voluntarily by the DNR. I will take some extra samples this year upstream and downstream of the banding area to verify that this is the source of the problem. I will also recommend that the MPCA leaves this reach un-assessed for aquatic recreation until more data is collected and/or the problem is fixed.
- pH – There are quite a few monitoring sites that don't meet the MPCA's standards for pH. The MPCA hasn't created impairments for this parameter in the past so I am not 100% sure whether or not any of these sites would cause their respective reach to be listed as impaired by pH levels that are either too high or too low according to the MPCA standards.

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- 52 - Clearwater Lake Outlet, 797 on Ruffy Brook
- 50-O – Lost River near the outlet of Pine Lake
- 53-I – JD73 at the Maple Lake inlet
- 53-O – Maple Lake outlet
- 63 – Badger/Mitchell Lake Channel at Hwy 2
- 131 – Clearwater River at the Clearwater Lake Inlet
- 62 – Poplar River at Hwy 92
- 785 – Clearwater River at the Red Lake Falls USGS gage
- PL30 – Lost River north of Brooks
- PL40 – Hill River north of Brooks
- 799 – Burnham Creek
- 826 – Grand Marais Creek
- 40 – Thief River at the CR7 Agassiz NWR road
- 98 – Thief River at the CR49 crossing downstream of the Thief Lake Outlet
- 757 – Mud River at Hwy 89
- **E-coli** – We seem to be getting a more frequent exceedance of the e-coli standard than we have had for fecal coliform at many sites. The e-coli standard is based upon a correlation between e-coli and fecal coliform. We may have to correlate our own fecal coliform and e-coli data to find a standard that would be appropriate for our area and analysis methods.

**Sites that appear to be fully supporting of aquatic life and recreation (good water quality):**

- 50-I – Lost River – Inlet to Pine Lake
- 109 – Poplar River near the beginning of the Poplar River Diversion channel
- 780 – Clearwater River at the Plummer USGS gage
- 750 – Red Lake River at the Highlanding bridge (USGS gage site)
- 66 – Red Lake River at the 1<sup>st</sup> St. Bridge in Thief River Falls
- 86 – Gentilly Creek, at the CR11 crossing in Gentilly
- 799 – Burnham Creek

**Tile Drainage Study**

I am working on a preliminary report for the project. After going through data, I have decided that another year of monitoring at certain sites should be completed before I complete a final report for the project. A lack of summer storm runoff events, especially in 2006, made opportunities for collecting samples from surface drainage rare. We were able to collect plenty of samples from tile drainage because rain that did not turn into surface runoff could still soak into the ground and into the tile drains.

As with other studies, as more is learned about a subject, more questions also develop. For example, we have found that tile drainage has an extended period of flow. One concern from scientists is that this extended flow may prolong the period of time in which receiving waters are at or above their bank full (channel forming - erosive) depth. A continuous record of flow on the Hill River compared with a continuous record of flow from tile will provide insight into the

validity of this concern. Some investigative sampling to assess the impact of the high nitrates and conductivity in tile drainage upon surface waters should also be conducted.

An equation is used to calculate flow from the water level within the flow measurement structures. A review of data shows that a continuous record of tailwater below the tile outlet and the Bachand h-flume should be logged to ensure that water levels in the flow measurement structures are not influenced by backwater. Backwater was noted upon site visits, but the exact duration of the effect is unknown without this additional water level monitoring. I will try to purchase a couple more level loggers for the study to monitor Bachand tailwater and water levels in the Hill River.

### **Clearwater River Dissolved Oxygen and Fecal Coliform TMDL**

I have been working with the Energy and Environmental Research Center to put together a contract for the Soil and Water Assessment Tool modeling that they will be doing for the Clearwater River watershed. I have also put together a preliminary monitoring plan. Draft TMDL protocols and submittal requirements documents for bacteria (fecal coliform), dissolved oxygen, turbidity, and lake nutrients have recently been released by the MPCA. They provide more specific details on what the MPCA requires from a TMDL study. I have begun reading through these and other TMDL reports on my own time to get a clearer idea of what I need to accomplish with this study (I have a pretty good to-do list already).

### **Thief River Watershed Sediment Investigation**

In mid-December, the MPCA notified us that they had approved the Thief River Watershed Sediment Investigation study for funding. Currently, I am hoping that we will receive a grant agreement in time for this Board Meeting so that it can be signed. If the study is on this meeting's agenda, then the grant agreement made it here in time. If not, we'll just have to wait until the next meeting to sign the grant agreement. The sooner we can get the grant agreement signed, the sooner we can start charging staff time and buying equipment for the project. Some of the first things to be done will be the creation of a detailed work plan and budget. I have received quotes for equipment and have also been reviewing the work plan guidance document on my own time.

### **January (and other past) Meetings and Events**

- ❖ **January 8<sup>th</sup>** – Tele-conference with Brian Fischer about Ditch Inventory Challenge Grant Project
- ❖ **January 10<sup>th</sup>** – Presentation to the Northwest Regional Sustainable Development Partnership about the Thief River Watershed Sediment Investigation. 2:30 – 3:30 at Mt. St. Benedict in Crookston
- ❖ **January 16<sup>th</sup>** – Judging at the Franklin Middle School 7<sup>th</sup> and 8<sup>th</sup> grade science fair.
- ❖ **January 18<sup>th</sup>** – Red Lake River Corridor Enhancement Project – Crookston City Hall
  - Communicatinos and PR committee is planning a Red Lake River Rendezvous that will be a canoe trip along the entire Red Lake River.

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- It will begin on May 28<sup>th</sup> in the Red Lake Reservation, or at the border of the reservation (dependent upon whether or not permission is granted by the tribe to canoe within the reservation).
- The plan is to camp at many locations and cities along the way
  - Red Lake Reservation Boundary, Highlanding, Kratka, Thief River Falls, St. Hilaire, Red Lake Falls Sportsman's Park, Huot Park, Polk Co. Rd. 11, Crookston Central Park, somewhere between Crookston and Fisher, Fisher, Mallory or O'Neil's Bridge, and the East Grand Forks Red River Recreation Area.
- The hope is to get a lot of media coverage of the event and to promote recreation on the river and the need for more accesses.
- John Steward of the DNR presented a list of proposed access work.
  - Carry-in access at Fisher
  - Shore fishing facility in Crookston near the dam conversion area.
  - Reset Huot boat ramp
  - Erosion control at the Red Lake Falls Sportsman's Park
  - State Hwy 32 access
- John and Gail Healy also talked about a bad erosion site upstream of Hwy 32. Loren, Gary, and I visited the site on January 24<sup>th</sup>.
  - It definitely is a massive erosion site. If the river continues to erode its way through the hillside, it could threaten Hwy 32 and the new bridge.
  - Remedies discussed at the site visit included reducing the pressure on the eroding bank by removing the large sandbar on the inside of the riverbend. Also, the possibility of redirecting flow with bendway weirs will be considered. It may not be possible to stop the sloughing entirely, but something should be done that will slow the process and allow for some stabilization.
  - Cost-share/grant funding options will be discussed in the future. There was discussion about getting the US Army Corps of Engineers involved by stressing the threat to the highway and bridge.



- ❖ **January 22<sup>nd</sup> 2007** – Red River Basin Water Quality Team – Moorhead
  - Pesticide monitoring

- Affordable presence vs. absence tests
- Concentration analysis for pesticides and metabolites is expensive
- Discussion on sediment monitoring – differences among methods
  - Total suspended solids
    - Current method used by the RLWD and other agencies
    - Water collected in “TSS” bottle is used for this analysis. The water in the bottle is mixed and a sample is drawn from the mixed sample. The argument against this technique is that the sample may not be completely mixed when the sample is withdrawn from the bottle.
  - Suspended Sediment Concentration
    - Used by the USGS
    - Depth integrated sampling – more time consuming
    - Is it worth the extra time
  - Whole bottle total suspended solids.
    - We will probably start using this method (probably will transition)
    - TSS is collected in a separate bottle and every bit of sediment within that bottle is accounted for. The mixing variable is removed by using this method.
- ❖ **January 26<sup>th</sup>** - Red River Basin Monitoring Advisory Committee – Fertile
  - The EPA now wants field turbidity data to be corroborated with laboratory turbidity analysis for TMDL studies.
  - The DNR is developing a database called HYDSTRA that will be used to store flow (and STORET water quality) data. It will store continuous flow data as well as actual flow measurements. The RLWD has a lot of flow measurements and water level data that we could contribute to this database.  
[http://www.dnr.state.mn.us/waters/surfacewater\\_section/stream\\_hydro/index.html#information](http://www.dnr.state.mn.us/waters/surfacewater_section/stream_hydro/index.html#information)
  - There was a presentation by the MPCA’s Jessica Poegel on diatoms (microscopic algae with silica cell walls) and their usefulness as environmental indicators. There may be applications for diatom sampling in the Thief River Sediment Investigation and TMDL studies. They not only can be used for assessing current conditions, but also can be used to look at historical conditions through sediment core analysis.
- ❖ **January 31<sup>st</sup>** – Conference call with USFWS local staff and state scientists to discuss the Thief River Watershed Sediment Investigation and the possibility of piggyback projects.

### **Future Meetings/Events**

- ❖ **February 8<sup>th</sup>** – Northwest Minnesota Foundation focus group meeting at the Evergreen Eating Emporium, Thief River Falls – 10 AM
- ❖ **February 14<sup>th</sup> 2007** – Marshall County Water Resources Advisory Committee. Jan Kaspari and I will be giving Power Point presentations on our water quality monitoring programs.
- ❖ **February 15<sup>th</sup> 2007** – Moorhead Ag Drainage Workshop

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- I will be giving a presentation about the tile drainage study again this year.
- ❖ **February 23<sup>rd</sup>** – Red River Basin Monitoring Advisory Committee – Fertile, 9:30AM.
- ❖ **February 26<sup>th</sup> 2007** – Detroit Lakes MPCA meeting to review data and assessments prior to the BPJ meeting in St. Paul.
- ❖ **February 27<sup>th</sup>** – Meeting at Agassiz NWR for planning the Thief River Watershed Sediment Investigation project and to find ways that the USFWS and USGS can assist with the project.
- ❖ **March 1<sup>st</sup>** – The final report(s) for the Tile Drainage Study are due.
- ❖ **March 7<sup>th</sup>** – Water Quality Monitoring Training Session at UMC
- ❖ **March 8<sup>th</sup>** – Red Lake River Corridor Enhancement meeting @ Red Lake Falls City Hall, 6:30 PM
- ❖ **March 12<sup>th</sup> and 13<sup>th</sup> 2007** – St. Paul Best Professional Judgment meeting for Red River Basin water quality assessments.
  - I will be down there to make sure that correct water quality assessments are made for the waters within the RLWD.
- ❖ **March 13 through 15<sup>th</sup> 2007** – International Water Conference and River Watch Forum
  - Will be giving a presentation on the macroinvertebrate monitoring we did in 2003 (Talked into it by Andre Delorme of Valley City State University).
  - River Watch Forum is on March 13th
- ❖ **March 21st** – Clearwater River Dissolved Oxygen and Fecal Coliform TMDL Study Stakeholder Advisory Committee meeting at the Clearbrook Community Center.
- ❖ **March 26<sup>th</sup> 2007** – Red River Basin Water Quality Team – Thief River Falls – Ethanol
- ❖ **April 11<sup>th</sup>** - Marshall County WRAC – Holt CC
- ❖ **April 15<sup>th</sup> 2007** – Challenge grant progress reports to BWSR are due
- ❖ **May 21<sup>st</sup>** – Red River Basin Water Quality Team – Moorhead
- ❖ **June 13<sup>th</sup>** - Marshall County WRAC
- ❖ **June 25<sup>th</sup>** – Red River Basin Water Quality Team – Thief River Falls
- ❖ **July 23<sup>rd</sup>** – Red River Basin Water Quality Team – Moorhead
- ❖ **August 8<sup>th</sup>** - Marshall County WRAC
- ❖ **August 27<sup>th</sup>** - Red River Basin Water Quality Team – Thief River Falls
- ❖ **September 24<sup>th</sup>** - Red River Basin Water Quality Team – Moorhead
- ❖ **October 10<sup>th</sup>** - Marshall County WRAC
- ❖ **October 22<sup>nd</sup>** - Red River Basin Water Quality Team – Thief River Falls
- ❖ **November 26<sup>th</sup>** - Red River Basin Water Quality Team - Moorhead

### Other Notes

- ❖ Erosion Assessment - In anticipation of a future opportunity to conduct an erosion assessment to inventory and prioritize erosion sites along the Red Lake River, I have been looking for a method for scoring the sites based on their severity. The Streambank Erosion Severity Index that is shown below is one example of the methods I have found so far. It is fairly easy (it could probably be done by volunteers) and doesn't require any surveying. One thing I may add to it, though, would be some kind of bonus points for sites that threaten infrastructure or homes.

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Streambank Erosion Severity Index						
Red Lake Falls Sportsman's Park Access Erosion Site						
Site visits on 9-25-06, 1-24-07						
OBSERVATION		SCORE				
<b>Condition of bank</b>		<b>5</b>				
Toe and upper bank eroding	5	x				
Toe undercutting	3					
Toe stable, upper bank eroding	1					
<b>Problem Trend</b>		<b>5</b>				
Increasing	5	x				
Decreasing or stable	1					
<b>Side-slope of bank</b>		<b>5</b>				
Vertical, 1:1	5	1:1				
2:1, 3:1	2					
4:1 or flatter	1					
<b>Length of eroded bank</b>		<b>3</b>				
More than 50 ft.	5					
20 to 50 ft.	3	x				
Less than 20 ft.	1					
<b>Depth of river</b>		<b>1</b>				
More than 3 ft.	2					
Less than 3 ft.	1	x				
<b>Soil type or texture</b>		<b>3</b>				
Sand	3	?				
Gravel	2					
Stratified	2					
Clay, loam	1					
<b>Vegetative Cover on bank slope</b>		<b>3</b>				
0-10%	5					
10-50%	3	x				
50-100%	1					
<b>Apparent cause of erosion</b>		<b>1.5</b>				
Light access traffic	1	x				
Obstruction in river	1					
Bank seepage	1					
Gully by side channels	1					
Bend in river	2	x				
Wave action (impoundments)	2					
Road-stream crossing;	3					
Moderate access traffic	3					
Heavy access (foot, horse, etc.)	5					
<b>Mean height of eroded bank</b>		<b>3</b>				
More than 20 ft.	7					
10 to 20 ft.	5					
5 to 10 ft.	3	x				
Less than 5 ft.	1					
<b>Current</b>		<b>2</b>				
Fast	2	x				
Slow	1					
<b>Total Points for site</b>		<b>31.5</b>	<b>Moderate</b>			
0-30	Minor	30-36	Moderate	>36	Severe	
The site is of particular interest because of its visible location and it threatens the public access.						
Erosion begins at transition between tree-lined bank and mowed grass bank.						