RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	August 2015

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. October 14, 2015.

- ✓ Watershed Restoration and Protection Project Updates
- ✓ Findings from August sample collection
- ✓ Chief's Coulee sampling and investigation
- ✓ Investigation of blue-green algae problems in the Mud River in Grygla
- ✓ Water quality trends in the Thief River Watershed


RLWD Rain Garden

Red Lake Watershed District Long-Term Monitoring Program

The third round of sampling for the Red Lake Watershed District's long-term water quality monitoring program was completed in August. Samples and/or field measurements of water quality parameters were collected at 66 long-term monitoring sites in August. The RLWD purchased a new Eureka Manta2 sonde and Amphibian2 hand pad this summer. The new equipment arrived in mid-August and has worked very well.

High E. coli concentrations were found in:

- Beau Gerlot Creek at CR114
- Burnham Creek at CSAH 48
- Clear Brook at Highway 92 in the town of Clearbrook
- Clearwater River at CSAH 14
- Darrigan's Creek at CSAH 23 (Everts Rd. NE)
- Grand Marais Creek at 110th St. NW
- Heartsville Coulee at 210th St. SW
- Hill River at CSAH 35
- Judicial Ditch 73 at the Badger Lake inlet
- Judicial Ditch 73 at the Mitchell Lake inlet (Badger-Mitchell Lake channel at Hwy 2)
- Judicial Ditch 73 near Rydell National Wildlife Refuge
- Little Black River at CR 102
- Lost River at CSAH 8
- Lost River at 109th Ave, upstream of Pine Lake
- Maple Lake outlet
- Mud River at CSAH 54
- North Cormorant River at CSAH 36
- O' Briens Creek at Harvest Rd. NE
- Pennington County Ditch 21
- Polk County Ditch 2
- Poplar River at CR118

- Ruffy Brook at CSAH 11
- Silver Creek at 159th Ave, west of Clearbrook
- Silver Creek at CR 111
- South Cormorant River at CSAH 37 (Corlan Rd. NE)
- Terrebonne Creek at Hwy. 92
- Thief River at CSAH 7, near Agassiz National Wildlife Refuge

It was odd to see high E. coli concentrations coming from lakes. There is a wetland between Maple Lake and the CSAH 10 crossing where samples are collected downstream of the lake's outlet. Maple and Badger Lakes are shallow lakes in which there could be more mixing between the bottom sediment and the water column.

Low dissolved oxygen levels were found in:

- Grand Marais Creek at 110th St. NW
- Heartsville Coulee at 210th St. SW
- Judical Ditch 73 at the Badger Lake Inlet
- Judicial Ditch 73 at the Mitchell Lake inlet (Badger-Mitchell Lake channel at Hwy 2)
- Judicial Ditch 73 near Rydell National Wildlife Refuge (regularly low)
- Lost River in Oklee
- Maple Lake Outlet at CSAH10
- Silver Creek at County road 111
- Walker Brook at CSAH 19, near Bagley

High concentrations of total phosphorus (relative to new eutrophication standards) were found:

- Clearwater River, north of Plummer
- Grand Marais Creek at 110th St. NW
- Heartsville Coulee at 210th St. SW
- Hill River at 335th Ave
- Judicial Ditch 73 near Rydell National Wildlife Refuge
- Lost River at 109th Ave, upstream of Pine Lake
- Polk County Ditch 2
- Poplar River at CSAH 30, near Fosston
- Poplar River at 315th St. SE
- Poplar River at CR118
- Ruffy Brook at CSAH 11
- Silver Creek at CR 111
- Thief River at CSAH 7, near Agassiz National Wildlife Refuge

High concentrations of total suspended solids were found in:

- Thief River at 140th Ave NE, north of Thief River Falls
- Thief River at CSAH 7, near Agassiz National Wildlife Refuge

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Water in the Clearwater River was exceptionally clean upstream of Clearwater Lake when it was sampled on August 20th. The total phosphorus concentration was low. Water quality in the Clearwater River was also excellent near its confluence with the Red Lake River in Red Lake Falls.

The Red Lake River was meeting the new total phosphorus and total suspended solids standards at the Louis Murray Bridge in East Grand Forks. E. coli concentrations were also at an acceptable level at that site. It is good news whenever the furthest downstream site in the watershed is meeting water quality standards.

Grand Marais Creek is now being monitored upstream and downstream of a portion of the outlet restoration project at 110th St NW and 130th St. NW. Below, are some photos of the Grand Marais Outlet Restoration Project that were taken on August 24, 2015.

Clearwater River Surface Water Assessment

Red Lake County, Clearwater County, and East Polk County Soil and Water Conservation staff continued sampling for the Clearwater River SWAG in the month of July. Two rounds of samples are being collected at sites in each month of June, July, and August in 2015. Most of the sampling collection in the second year of the SWAG has been limited to E. coli bacteria. The Clearwater River in Red Lake Falls is being sampled for nutrients and chlorophyll-a. The SWAG project pays for staff time, supplies, shipping, and laboratory analysis of samples.

Low dissolved oxygen concentrations were found in:

- Judicial Ditch 73 near Rydell National Wildlife Refuge

High concentrations of total phosphorus (relative to new eutrophication standards) were found:

- Clearwater River at CR 127
- Hill River at 335th Ave
- Hill River at CR 119 near Brooks
- Judicial Ditch 73 near Rydell National Wildlife Refuge

- Lost River at CR 119, north of Brooks

High E. coli concentrations were found in:

- Clearwater River at CR 127
- Clearwater River at CSAH 11
- Clearwater River at CSAH 2
- Hill River at 335th Ave
- Hill River at CR 119 near Brooks
- Judicial Ditch 73 near Rydell National Wildlife Refuge
- Lost River at 139th Ave, north of Gonvick
- Lost River at CR 119, north of Brooks
- Poplar River at CR 118
- Ruffy Brook
- Silver Creek at 520th St., north of Gonvick

Clearwater River Watershed Restoration and Protection (WRAP) Project

Filamentous Algae in the Clearwater River

- Objective 2 – Water Quality Sampling
  - Early morning (pre-9am) dissolved oxygen measurements were made at Terrebonne Bridge. All of the dissolved oxygen measurements collected there in 2015 have been good.
  - Mid-deployment samples were collected at dissolved oxygen logger deployment sites. This data will not only provide more information for the assessment process, but will help identify pollutants of concern at sites that end up needing TMDLs written for dissolved oxygen impairments.

- Objective 4 – Continuous Dissolved Oxygen monitoring

  - Dissolved oxygen loggers were deployed at 9 sites throughout the Clearwater River watershed in August of 2015. This report includes some observations of raw (not yet corrected for fouling and calibration drift) dissolved oxygen records from August. The current water quality standard for dissolved oxygen requires that daily minimum dissolved concentrations are greater than 5 mg/l during 90% of the days in which data is collected.
    - Lower Badger Creek at CR114
      - Nearly all of the DO records in August were greater than 5 mg/l (one day dropped below 5 mg/l).
    - Terrebonne Creek at Hwy 92
      - Many days had dissolved oxygen levels that dropped below 5 mg/l. Later in the summer, flows decreased, and the water became stagnant at this site.
    - Judicial Ditch 73 by Rydell National Wildlife Refuge
      - Dissolved oxygen levels were extremely low on a daily basis. The dissolved oxygen levels measured with portable sondes during site visits were also very low. The ditch flows through a wetland. The water has become stagnant during the latter part of the summer.

- Hill River at 335th Ave
  - There were several days with dissolved oxygen levels below 5 mg/l. The channel has become filled with vegetation.
- Clearwater River at CSAH 2
  - There were 7 days in which dissolved oxygen levels dropped below 5 mg/l.
- Lost River at CSAH 28
  - Flows at the logger installation site were slowed by a beaver dam, so dissolved oxygen levels dropped below 5 mg/l on most days.


Hill River at 335th Ave

- Clearwater River at County Road 127
  - There were just a few days in which dissolved oxygen levels dropped below 5 mg/l.
- Hill River at County Road 119, north of Brooks
  - All of the DO records between August 12th and 26th were greater than 5 mg/l.
- Beau Gerlot Creek at CR 114
  - All but 3 days in August had daily minimum dissolved oxygen levels that were greater than 5 mg/l.

- Objective 6 – Stressor and Pollutant ID
  - A large gully was spotted along CSAH 35 in Polk County

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Red Lake River Watershed Assessment Project
(Watershed Restoration and Protection - WRAP)


Burnham Creek

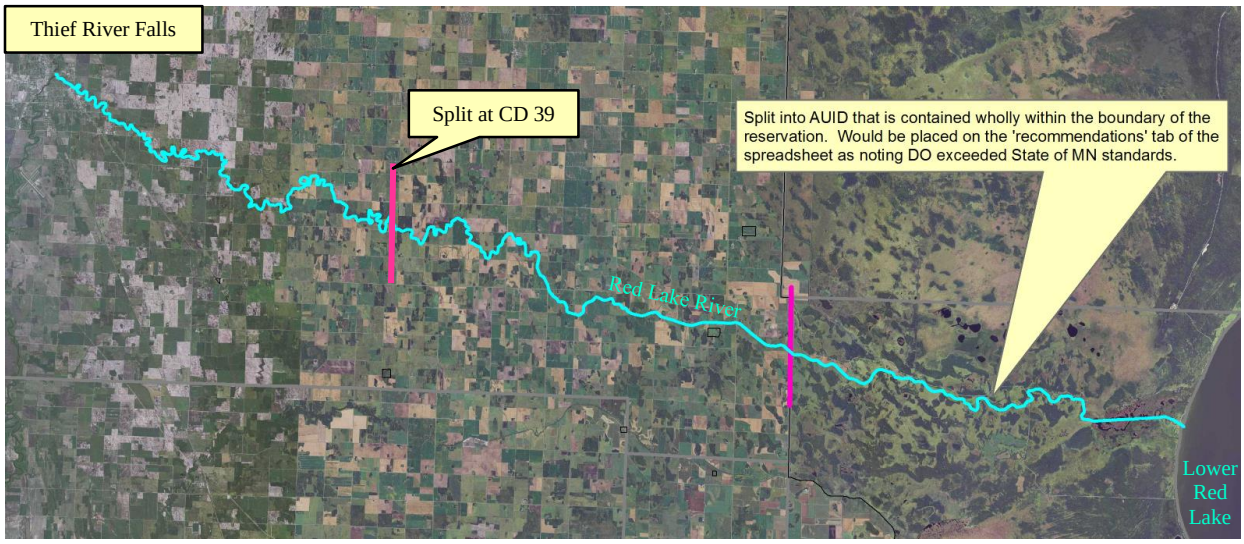
- Task 3 – Continuous Dissolved Oxygen Monitoring
    - MPCA staff suggested collecting some additional continuous dissolved oxygen data at sites in the Red Lake River watershed to create a better understanding of the extent of some of the dissolved oxygen impairments that were identified in the watershed. There was enough money left in the budget to monitor two sites for half of the monitoring season (5 deployments). Dissolved oxygen loggers were deployed in Burnham Creek at CSAH 45 and the Black River at CR 58.
        - Black River at the County Road 58 crossing
            - Dissolved oxygen levels were extremely low.
        - Burnham Creek at CSAH 45
            - Some days had dissolved oxygen levels that dropped below 5 mg/l.
- Task 5 – Flow Monitoring
    - Flow has been high in the Red Lake River upstream of Thief River Falls. It has been too high to reach the HOBO deployment pipe or to measure flow with a wading rod.
- Task 9 – Data Analysis:

The Red Lake River upstream of Thief River Falls, from the Lower Red Lake Outlet to the Thief River confluence, has been assessed as an entire unit in the past. The reach is currently listed as impaired by low dissolved oxygen. Continuous dissolved oxygen monitoring data collected with deployed dissolved oxygen loggers has shown that the dissolved oxygen levels in the river improve from upstream to downstream. In the upstream part of the reach, there is channelization, riparian wetlands (which aren't necessarily a bad thing, but can contribute to naturally low dissolved oxygen levels), and a lack of woody vegetation along the channelized riparian corridor (less shading).

The channelization stops near the confluence with Pennington County Ditch 39. In that downstream portion of the river, prior to the Thief River Falls Reservoir, the river exhibits a natural pool-and-riffle morphology and has sections of forested riparian corridor.

The river begins on the tribal nation of Red Lake where the State of Minnesota does not have the authority to conduct water quality assessments.

Because of the changes in authority, water quality, and river morphology that occur along this reach, the Minnesota Pollution Control Agency is splitting the reach into three segments. The splits will be made at the reservation boundary and at the Pennington County Ditch 39 confluence.

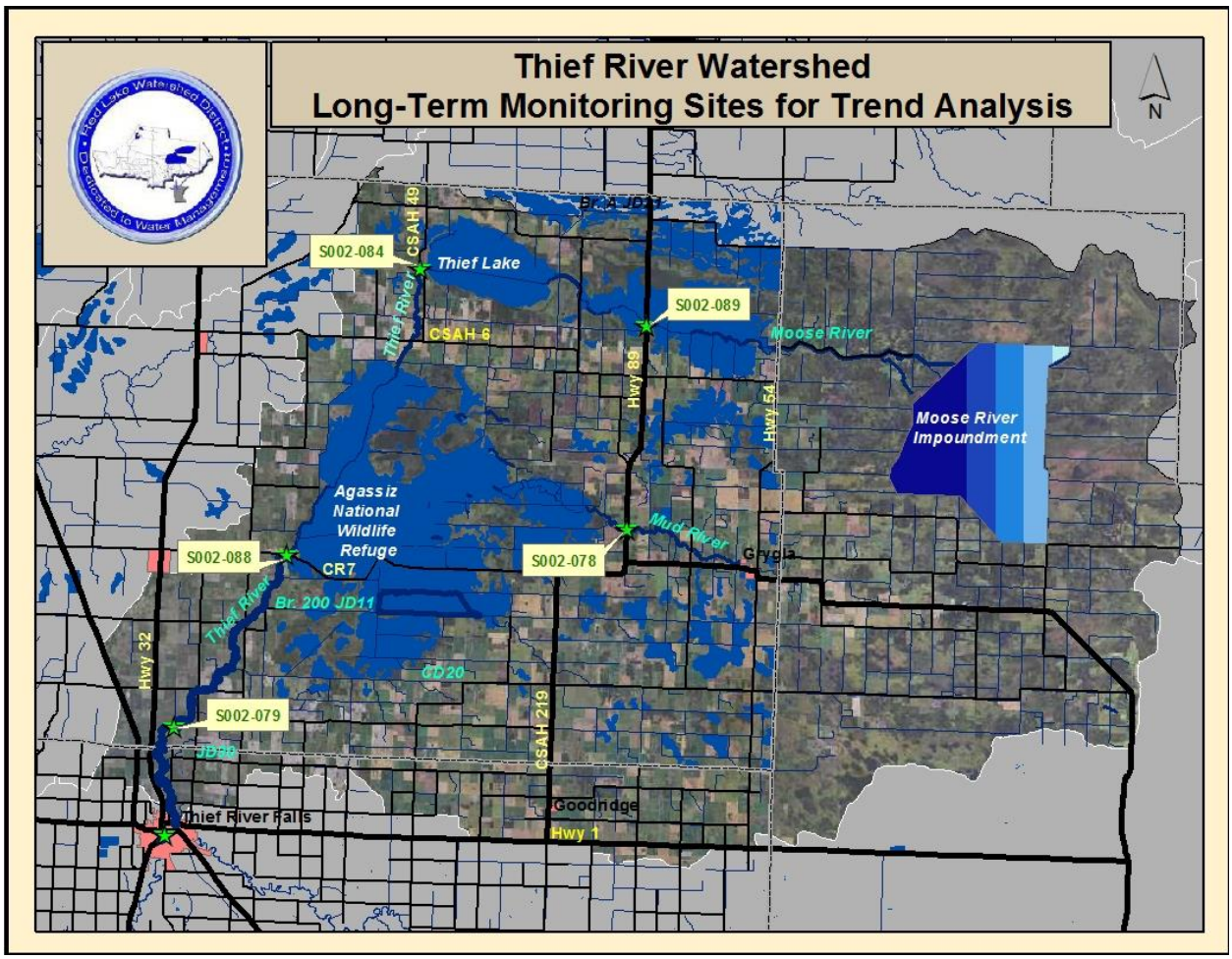


Thief River Watershed Restoration and Protection (WRAP) Project

- Task 2 – Water Quality Monitoring
  - RLWD water quality staff began collected frequent early morning dissolved oxygen data and samples from the lower Thief River (downstream of Agassiz National Wildlife Refuge) before and during the 2015 late-summer drawdown of Agassiz Pool. This data was being collected to help with the identification of a pollutant that has a negative correlation with dissolved oxygen levels.

During a review of previously collected monitoring data, Agassiz Pool drawdowns were identified as periods of time in which low dissolved oxygen levels have been recorded. Samples were analyzed for the basic parameters of total suspended solids, total phosphorus, orthophosphorus, total Kjeldahl nitrogen, ammonia nitrogen, nitrates + nitrites, and E. coli bacteria. The samples were also analyzed for additional parameters like sulfates, total organic carbon, and chlorophyll-a. By the end of the month, turbidity and totals suspended solids concentrations at the CSAH 7 bridge (near Agassiz NWR) had risen to very high levels. This sampling will continue throughout the drawdown period.

- Task 10 – Data Analysis
  - Water quality trends were analyzed at five long-term monitoring sites in the Thief River watershed. Mann-Kendall trend analysis was applied to monitoring sites within the Thief River watershed with at least 10 years of sampling data. The method was applied on an annual and a seasonal basis in an attempt to identify trends. In order to determine that a trend exists in a set of data, a threshold Z (absolute) value of 1.282 (90% confidence for a standard normal distribution) was used. Z values greater than 1.282 indicated a significant upward trend with some confidence. Z values lower than -1.282 indicated a significant downward trend. All data available in EQuIS as of early 2015 was used. Monthly/seasonal/annual averages were calculated for each year of data using a pivot table that summarized that data.



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Trend Analysis of April - September Annual Average Total Suspended Solids Data

River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	7	57.2%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	88	99.6%	Increasing
Thief River	S002-084	CSAH 49	1994-2014	-57	95.6%	Decreasing
Mud River	S002-078	Hwy 89	1994-2014	-16	67.5%	Stable
Moose River	S002-089	Hwy 89	1998-2014	-56	99.0%	Decreasing

Trend Analysis of April - October Annual Average E. coli Bacteria Data

River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	1	50.0%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	7	70.4%	No Trend
Thief River	S002-084	CSAH 49	1994-2014	-19	94.6%	Probably Decreasing
Mud River	S002-078	Hwy 89	1994-2014	1	50.0%	No trend
Moose River	S002-089	Hwy 89	1998-2014	-23	97.5%	Decreasing

Trend Analysis of April - October Annual Average Dissolved Oxygen Data

River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	15	64.4%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	66	94.7%	Probably Increasing
Thief River	S002-084	CSAH 49	1994-2014	101	99.4%	Increasing
Mud River	S002-078	Hwy 89	1994-2014	-4	53.0%	Stable
Moose River	S002-089	Hwy 89	1998-2014	131	99.9%	Increasing

Trend Analysis of April - October Annual Average Total Phosphorus Data

River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	29	77.0%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	-21	35.3%	Stable
Thief River	S002-084	CSAH 49	1994-2014	-56	88.8%	Stable
Mud River	S002-078	Hwy 89	1994-2014	-96	96.3%	Decreasing
Moose River	S002-089	Hwy 89	1998-2014	-194	100.0%	Decreasing

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Trends of Seasonal Averages Using Seasonal Mann-Kendall Analysis				
Thief River 140th Ave NE Crossing Site S002-079/05076000	**Total Suspended Solids**	**Dissolved Oxygen**	**Total Phosphorus**	**E. coli**
Years	1994-2014	1992-2014	1992-2014	2005-2014
Annual Average	X	X	X	X
April	↓	X	↓	↑
May	X	X	X	X
June	X	X	X	X
July	X	X	X	X
August	+	X	X	X
September	X	↕	X	X
October	X	↕	X	X
November - March	X	X	X	No data

X = No Trend

↕ = Upward Trend (Getting Better)

↕ = Downward Trend (Getting Worse)

+ = Strong Upward Trend (Getting Significantly Worse)

↑ = Upward Trend (Getting Worse)

↓ = Downward Trend (Improvement)

The stronger trend that was identified was the increasing total suspended solids (TSS) concentrations during the month of August in the Thief River downstream of Agassiz National Wildlife Refuge. Compared to the 1.282 Z-value threshold, the August Z value for average August TSS concentrations at the 140th Ave NE crossing of the Thief River (S002-079) was 1.642. The Z value increases to 2.737 (more than twice as high as the threshold) if August maximum TSS concentrations are analyzed. Drawdowns of Agassiz Pool have been occurring regularly in the month of August in recent years. Recent high August TSS can also be attributed to Agassiz Pool management strategies aimed at opening up channels within the pool by flushing sediment downstream.

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Trends of Seasonal Averages Using Seasonal Mann-Kendall Analysis				
Thief River CSAH 7 Crossing Site S002-088	**Total Suspended Solids**	**Dissolved Oxygen**	**Total Phosphorus**	**E. coli**
Years	1998-2014	1984-2014	1984-2014	2005-2014
Annual Average	+	↑	X	X
April	X	X	X	↑
May	X	X	↓	X
June	↑	X	X	X
July	X	X	X	X
August	+	X	X	X
September	↑	↑	↑	X
October	X	X	X	X
November - March	X	X	↑	No data

X = No Trend

↑ = Upward Trend (Getting Better)

↓ = Downward Trend (Getting Worse)

↑ = Upward Trend (Getting Worse)

↓ = Downward Trend (Improvement)

+ = Strong Upward Trend (Getting Significantly Worse)

- = Strong Downward Trend (Significant Improvement)

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Water quality conditions within the Moose River appear to be improving in multiple ways. Total phosphorus, E. coli, and total suspended solids pollutant concentrations appear to be decreasing during many months of the year. Dissolved oxygen readings, on average, have improved over the last 30 years.

Trends of Seasonal Averages Using Seasonal Mann-Kendall Analysis				
Moose River Highway 89 Crossing Site S002-089	**Total Suspended Solids**	**Dissolved Oxygen**	**Total Phosphorus**	**E. coli**
Years	1998-2014	1984-2014	1984-2014	2005-2014
Annual Average	↓	↑+	↓	↓
April	X	X	↓	X
May	X	X	↓	X
June	↓-	↑	X	X
July	↓-	↑	↓	X
August	↓	↑	X	X
September	X	X	↓	X
October	↓-	X	↓	↓
November - March	X	X	X	No data

X = No Trend

↕ = Upward Trend (Getting Better)

↕ = Downward Trend (Getting Worse)

↕ = Upward Trend (Getting Worse)

↕ = Downward Trend (Improvement)

↕+ = Strong Upward Trend (Getting Significantly Better)

↕- = Strong Downward Trend (Significant Improvement)

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Despite its name, the Mud River meets the North Region 15 mg/l total suspended solids standard. The river also now appears to be meeting the E. coli water quality standard. The downward E. coli trend that shows up in September and October isn't a gradual decrease, but rather more of a function of steadily lower levels in recent years compared to some high levels in earlier years. The trend shows up in Mann-Kendall analysis, but doesn't look quite as great in regression analysis. If it wasn't for the 2012 continuous monitoring data collected during a period of very low flow, the reach may have been recommended for a delisting of the dissolved oxygen impairment.

Trends of Seasonal Averages Using Seasonal Mann-Kendall Analysis				
Mud River Highway 89 Crossing Site S002-078	**Total Suspended Solids**	**Dissolved Oxygen**	**Total Phosphorus**	**E. coli**
Years	1994-2014	1984-2014	1984-2014	2005-2014
Annual Average	X	X	↓	X
April	X	X	X	X
May	X	X	X	X
June	X	X	X	X
July	↓	X	X	X
August	↓	X	↓	X
September	X	X	X	↓
October	X	X	X	↓
November - March	X	X	X	No data

X = No Trend

↑ = Upward Trend (Getting Better)

↓ = Downward Trend (Getting Worse)

↑ = Upward Trend (Getting Worse)

↓ = Downward Trend (Improvement)

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A long-term monitoring site is located on the Thief River near the Thief Lake outlet. The water quality improvements at this site have been impressive. Two impairments have been removed from the 303(d) List of Impaired Waters. The identifiable trends presented good news about water quality in the Thief River downstream of Thief Lake.

Trends of Seasonal Averages Using Seasonal Mann-Kendall Analysis				
Thief River CSAH 49 Crossing Site S002-084	**Total Suspended Solids**	**Dissolved Oxygen**	**Total Phosphorus**	**E. coli**
Years	1994-2014	1984-2014	1984-2014	2005-2014
Annual Average	↓	+ ↑	- ↓	↓
April	X	+ ↑	↓	X
May	X	+ ↑	↓	X
June	X	X	X	X
July	- ↓	X	X	X
August	↓	↑	X	↓
September	X	+ ↑	X	X
October	- ↓	X	X	X
November - March	X	X	X	No data

X	= No Trend
↑	= Upward Trend (Getting Better)
↓	= Downward Trend (Getting Worse)
↑	= Upward Trend (Getting Worse)
↓	= Downward Trend (Improvement)
+ ↑	= Strong Upward Trend (Getting Significantly Better)
+ ↑	= Strong Upward Trend (Getting Significantly Worse)
- ↓	= Strong Downward Trend (Significant Improvement)

- Task 13 – Reports
  - Progress continued on the Thief River Watershed Restoration and Protection Strategy (WRAPS) and Total Maximum Daily Load reports.
  - The majority of the report writing work focused upon the Restoration and Protection Strategy section of the WRAPS report. For each of the major measurements of water quality (total suspended solids, E. coli, dissolved oxygen, and indices of biotic integrity), in each HUC10-level watershed and for the Thief River watershed as a whole, strategies will be listed within a table. Each strategy will have a timeline for completion and a 10-year interim goal. Maps were created for each HUC10 subwatershed (Moose River, Upper Thief River, Middle Thief River, Mud River, Lower Thief River, Branch 200 of JD11, Marshall County Ditch 20, and Judicial Ditch 30/18/13). Existing reports and monitoring results were scoured and used to compile this section of the report. Input will be sought from the project's technical advisory committee.

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Grand Marais Creek Watershed Restoration and Protection Project

Stage data from MPCA gauging stations in the Grand Marais Creek HUC8 was requested and retrieved for Judicial Ditch 1, Judicial Ditch 75, and Polk County Ditch 2. Flow rating curves for Polk County Ditch 2, Judicial Ditch 71, and Judicial Ditch 1 were updated using recent flow measurement data. Those stage records were used to calculate flow records, which were sent to Emmons and Olivier Resources to aid with TMDL calculations. Emmons and Olivier Resources staff also worked on reviewing this data and participated in a PTMApp (Prioritize, Target, and Measure Application) training session.

A rock dam on the downstream end of Polk County Ditch 2 was identified as a potential barrier to fish passage in the Grand Marais Creek Stressor Identification Report. In the 2014 photos included in that report, the structure did not seem to be "keyed" into the bank. Because of that, there was some concern that the streambanks would erode away from either side of the structure. A site visit in August of 2015 found that the ditch had indeed eroded around the structure. It likely isn't creating a fish passage barrier anymore, but has created an erosion problem.

Chief's Coulee Water Quality Investigation

This summer, the Red Lake Watershed District and the Pennington County Soil and Water Conservation District have been collecting samples in a drainage system in northern Thief River Falls that is referred to as Chief's Coulee. The drainage system empties into the Red Lake River within the Thief River Falls Reservoir. The reservoir is the drinking water source for the City of Thief River Falls.

Sampling efforts found some extremely high E. coli concentrations (>24,196 MPN/100ml in one sample) at the lower end of the drainage system - at the Dewey Ave crossing. On August 6th, 2015, very septic water was found to be flowing in Chief's Coulee at that Dewey Ave crossing. No flow was observed at the next upstream street crossing. Therefore, the source of the problem had to have been coming from somewhere in between the Atlantic and Dewey Ave crossings. Between those crossings are a series of co-op grain elevators, a pallet company, a sanitary sewer line that parallels Dewey Avenue (approximately 150 feet west of the street), and homes.

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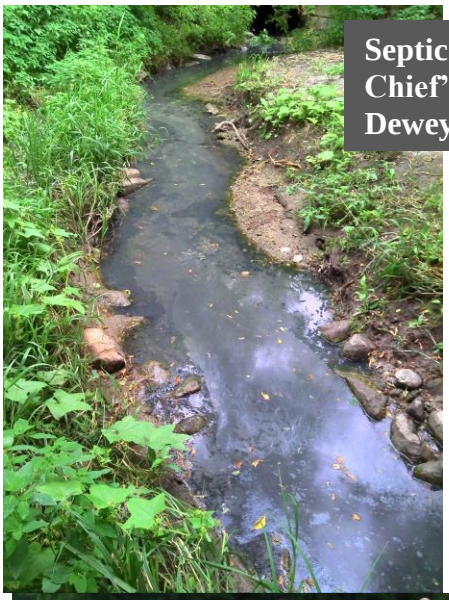
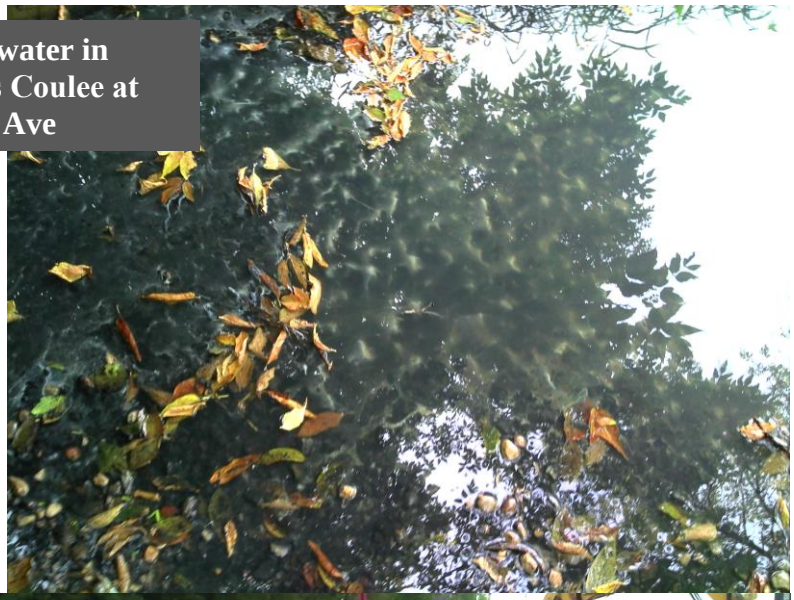


Septic water in Chief's Coulee at Dewey Ave



Water from the sump pump drainage

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City of Thief River Falls and Pennington County Soil and Water Conservation District staff assisted with identifying potential sources. A hose was found to be draining discolored water from a large sump pump well. The pool that was receiving water from this hose was very green and looked…bad. It had a "rotten grain" sort of smell (not septic). Samples were collected directly from the hose and the search continued for the septic inflow. The sample analysis results from the sump pump drainage system had a maxed-out E. coli bacteria concentration of >2,419.6 MPN/100ml along with high levels of sulfates, total suspended solids, total phosphorus, orthophosphorus, total Kjeldahl nitrogen, and ammonia nitrogen.

A ditch near the sanitary sewer line was inspected A septic smell was evident near the lower end of the ditch. Septic seepage was found within that ditch. Samples were collected from the seepage (TRF 10th St E Ditch) and sent them to RMB Environmental Laboratories for quantification and to the Source Molecular laboratory in Florida for identification of human fecal DNA markers. Analysis of the samples collected from the ditch showed high concentrations of E. coli bacteria (in the ditch and in Chief's Coulee) and high levels of human biomarkers. City staff discovered that a home near the ditch was not hooked up to the sanitary sewer line and the effluent was seeping into the ditch from the home's septic system. The homeowner has been cooperative and is working with the city to get the home hooked up to the city's sanitary sewer system soon (note: the home was hooked up to the sanitary sewer in early October 2015).

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Investigation of the Blue-Green Algae Problem in the Mud River in Grygla

The Mud River in Grygla continued to be monitored for blue-green algae and the conditions that may allow a bloom to occur. Sondes were deployed to monitor dissolved oxygen levels. Increased fluctuation in dissolved oxygen levels may be an indicator of greater concentrations of algae. Abraxis test strips are being used to test for the presence of algal toxins. Those strips will also give a rough estimate of the concentration in the sample. Chlorophyl-a samples are being collected to record the overall concentration of algae in the river. Despite some lower flows and warm weather, all of the weekly tests for blue green algae were negative (zero blue-green algae present). The flows may not have been as low as they were when dogs were poisoned in previous years. Relatively high (>126 MPN/100ml) E. coli concentrations were found at both monitoring sites (CSAH 54 Bridge and in the City Park) on multiple occasions.

Other Notes

- Water quality related topics from the August 13, 2015 RLWD Board of Managers meeting minutes:
    - Thief River Falls Regional Airport Manager Joe Hedrick and Pennington County Highway Department Engineer Mike Flaagan appeared before the Board in regard to a large sink hole that was created from a rusted out 48" drop structure/culvert west of the Thief River Falls Airport, near the archery range. Flaagan stated that this structure, which outlets into an oxbow thus out letting into the Red Lake River, have rusted out therefore causing a severe erosion issue. Flaagan stated that he estimated the cost to be approximately $20,000 for the installation of a 90' culvert with a riprapped outlet. Hedrick and Flaagan requested a 50% cost share from the District for erosion control. Flaagan stated that the SWCD has a cost share program, but funding would not be awarded until the end of year, with construction taking placing in 2016. Flaagan is concerned about additional erosion and water quality concerns. Motion by Ose, seconded by Knott, to authorize the District to cost share 50% of the construction costs, not to exceed $10,000 from the District's Water Quality Funds for the installation and repair of the culvert and outlet structure. Motion carried. Flaagan stated that he will work with Staff Member Loren Sanderson for assistance in culvert sizing.
- Water quality related topics from the August 27, 2015 RLWD Board of Managers meeting minutes:
    - Staff member Nick Olson stated that four side water inlet culverts with traps will be installed on State Ditch. 83, RWLD Project No. 14 located in Section 32, East Valley Township, Marshall County. 75% of the cost will be paid for through the Marshall County SWCD, with the remaining costs assessed to the ditch system. Installation of the pipes should be completed within the next several weeks. With high summer water levels and Agassiz National Wildlife Refuge currently releasing water, no cleaning will be done on the system this year. Olson stated that mowing along the ditch system was completed the first week of August.
    - Administrator Jesme discussed the Altered Hydrology Tool Development Grant that the International Water Institute (IWI) has applied for through the Board of

Water and Soil Resources (BWSR). This grant will help further develop a tool within the PTMApp that will measure on channel stream erosion as well as measuring downstream effects. If this grant is approved it has been determined that we would focus on the Red Lake River Watershed in conjunction with the development of the Red Lake River 1W1P. Jesme stated that the grant is in the amount of $207,000, with the IWI asking for approximately five organizations to help contribute $15,000 each towards the grant. The District would be allowed to do some in-kind work towards the $15,000. Engineer Jeff Langan stated that the PTMApp tool will allow the District to go out into our watershed and help to quickly quantify things that can be used in future grant applications in prioritizing sites. Motion by Coe, seconded by Ose, to approve a $15,000 cash/in-kind contribution towards a grant through the BWSR for the development of the PTMApp for the Red Lake River 1W1P, RLWD Project No. 149. Motion carried.

  - The Board reviewed an agreement between the District and the Clearbrook-Gonvick Independent School District for the River Watch Program. Motion by Coe, seconded by Torgerson, to authorize President Nelson to sign the River Watch Agreement with the Clearbrook-Gonvick Independent School District. Motion carried.

- Researchers planned to collect sediment core samples from Bartlett Lake (near Northome) this August.

Upcoming Meetings/Events

- **September 14, 2015** – Pennington County Water Resources Advisory Committee mtg.
- **September 16, 2015** – Pennington County Outdoor Education Day
- **September 22-23, 2015** – Northwest Minnesota Water Festival in Fertile and Warren
- **September 29, 2015** – Red Lake River 1 Watershed 1 Plan planning group meeting in Red Lake Falls.
- **September 30, 2015** – Thief River Watershed Restoration and Protection Project Technical Advisory Committee Meeting – 9:30 am at the RLWD office
- **October 2015** – Creation and distribution of a Red Lake River newsletter.
- **October 23, 2015** – Red River Basin Monitoring Advisory Committee Meeting in Fertile (9:30 am at the Sand Hill Watershed District Office)
- **November 4, 2015** – Marshall County Water Resources Advisory Committee Meeting
- **December 2015** – Thief River Watershed Restoration and Protection Project Open House Meeting
- **December 2, 2015** – Marshall County Water Resources Advisory Committee Meeting
- **December 14, 2015** – Pennington County Water Resources Advisory Committee mtg.
- **December 31, 2015** – End date for the Thief River Watershed Restoration and Protection Project (extended from June 30, 2015).
- **December 31, 2015** – Deadline for Red Lake River Watershed TMDL and WRAPS reports
- **June 30, 2016** – End date for the Red Lake River Watershed Restoration and Protection Project (extended from June 30, 2015)

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	August 2015

Plans for late 2015

- Thief River Watershed Restoration and Protection Project.
  - Creating Stream Power Index maps.
  - Maps of HSPF model results
  - Flow characterization and load calculations
  - Pollutant identification for reaches with dissolved oxygen impairments
  - Restoration and Protection Strategies
  - Complete a draft Thief River Watershed TMDL Report
  - Complete a draft Thief River Watershed Restoration and Protection Strategy Report
  - Technical Advisory meeting to review TMDL and WRAPS reports
  - Edit TMDL and WRAPS reports based on comments during the review process.
- Red Lake River Watershed Assessment Project
  - Continuous dissolved oxygen monitoring in the Black River and in Burnham Creek
    - Compile and correct the dissolved oxygen records from those two sites after the end of the monitoring season.
  - Creating Stream Power Index maps.
  - Flow characterization
  - Provide input during the assessment process
  - Complete a draft Red River Watershed TMDL Report
  - Complete a draft Red River Watershed Restoration and Protection Strategy Report
  - Technical Advisory meeting to review TMDL and WRAPS reports
- Clearwater River Watershed Restoration and Protection Project
  - Write a short report on existing data, conditions, and knowledge of the watershed (summarizations of existing reports).
  - Stage and flow measurements at sites where HOBO water level loggers are deployed.
  - Continuous dissolved oxygen data collection at a minimum of 9 sites. Consider moving sondes to new sites midway through the monitoring season if aquatic life support is verified.
  - Move dissolved oxygen loggers to new sites if aquatic life support is proven during the first half of the monitoring season.
  - Water quality sampling.
  - Dissolved oxygen data compilation after the monitoring season.
    - Continuous dissolved oxygen data will be summarized and submitted to the MPCA so that it can be used in the upcoming water quality assessment.
  - Data entry and submittal to EQuIS
  - Stage and flow data compilation.
- Grand Marais Creek Watershed Restoration and Protection project
  - Technical advisory committee and public open house meetings.

  - Emmons and Olivier Resources staff will work on writing the TMDL and WRAPS reports.
- Sampling and monitoring dissolved oxygen in the Mud River in Grygla in an attempt to better understand the blue-green algae problem that was discovered last fall. Abraxis blue-green algae testing kits were ordered.
- Continue sampling Chief's Coulee and investigating the high E. coli and diesel range organic levels that have been recorded there.
- The fourth round of the District's long-term monitoring program will be conducted in October.

2015 RLWD Staff Photo:
Left to Right: Loren Sanderson, Tammy Audette, Myron Jesme, Ashley Hitt, Nick Olson, Claire Carlson, Corey Hanson, and Arlene Novak

Quote of the Month:

"Nothing will work unless you do."
– John Wooden

Red Lake Watershed District Monthly Water Quality Reports are available online at: http://www.redlakewatershed.org/monthwq.html.

"Like" the Red Lake Watershed District on Facebook to stay up-to-date on RLWD reports and activities.