

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 3/9/2017.

- ✓ Watershed Restoration and Protection project updates
- ✓ Long-Term Monitoring
- ✓ Longitudinal, investigative sampling
- ✓ Continuous dissolved oxygen logger deployments

Long-Term Monitoring

- A dissolved oxygen logger was deployed in the Mud River near Grylga, beginning on July 20, 2016. Regular (semi-weekly) visits were made to the site for water quality sampling. Water was also tested for the presence of toxic blue-green algae. The presence of blue-green algae was not identified by any of those tests.
- High concentrations of E. coli bacteria were found at many sampling locations in July 2016:
 - Judicial Ditch 73, upstream of Rydell NWR
 - Ruffy Brook at CSAH 11 (19,863 MPN/100ml)
 - Little Black River at CR 102
 - Polk County Ditch 2 at CR 62
 - Polk County Ditch 2 at CSAH 20
 - Polk County Ditch 2 at 360th Ave NW
 - Burnham Creek at CR 48
 - Poplar River at CR 118
 - Poplar River at CSAH 30
 - Gentilly River at CSAH 11
 - Clearwater River at CSAH 12, near Terrebonne
 - Clearwater River at CSAH 14
 - Clearwater River at CSAH 24, upstream of Clearwater Lake
 - Clearwater River at CSAH 2
 - Grand Marais Creek at 130th St. NW
 - Grand Marais Creek at 110th St. NW
 - Terrebonne Creek at CSAH 92
 - Darrigan's Creek
 - North Cormorant River at CSAH 36
 - Hill River at CR 119
 - Beau Gerlot Creek at CR 114
 - Moose River at CSAH 54
 - Chief's Coulee at Dewey Ave in Thief River Falls
 - O' Briens Creek
 - Mud River in Grylga
 - Clear Brook at CSAH 92
 - Silver Creek at 159th Ave, west of Clearbrook
 - RLWD Ditch 15 at Hwy 75
 - Pennington County Ditch 21 at 135th Ave NE
 - Judicial Ditch 30 at 140th Ave NE, north of Thief River Falls
 - Kripple Creek at 180th Ave SW

- Lost River at CR 119, north of Brooks
- Brandt Impoundment outlet
- Euclid East Impoundment outlet
- High concentrations of total phosphorus were found in:
 - North River Nutrient Region (>0.05 mg/L):
 - Ruffy Brook at CSAH 11
 - Clear Brook at CSAH 92
 - Darrigan's Creek
 - O' Briens Creek
 - North Cormorant River at CSAH 36
 - South Cormorant River
 - Blackduck River
 - Clearwater River at CSAH 24, upstream of Clearwater Lake
 - Clearwater River at CSAH 2
 - Central River Nutrient Region (>0.1 mg/L):
 - Judicial Ditch 30 at 140th Ave NE, north of Thief River Falls
 - Poplar River at CR 118
 - Poplar River at CSAH 30, north of Fosston (6.74 mg/L)
 - Discharge from Fosston lagoons
 - Chief's Coulee at Dewey Ave in Thief River Falls
 - Pennington County Ditch 21 at 135th Ave NE
 - Silver Creek at CR 111
 - Lost River at 109th Ave, upstream of Pine Lake
 - Clearwater River at CSAH 12, near Terrebonne
 - Clearwater River, north of Plummer
 - Hill River at CR 119
 - Judicial Ditch 73, upstream of Rydell NWR
 - South River Nutrient Region (>0.15 mg/L):
 - Heartsville Coulee at 210th St. SW
 - Grand Marais Creek at 110th St. NW
 - Grand Marais Creek at 130th St. NW
 - Polk County Ditch 2 at CSAH 20
 - Polk County Ditch 2 at CR 62
 - Burnham Creek at 320th Ave SW
- High total suspended solids (TSS) concentrations were found in:
 - >65 mg/L – All River Nutrient Regions
 - Ruffy Brook at CSAH 11 (258 mg/L)
 - Muddy water in Ruffy Brook was discovered on July 21, 2016. The muddy conditions did not last long. The water quality problem was attributed to a blown/breached beaver dam.
 - Grand Marais Creek at 130th St. NW (239 mg/L)
 - Polk County Ditch 2 at CR 62 (158 mg/L)
 - Poplar River at CSAH 30, north of Fosston (98 mg/L)
 - Discharge from Fosston lagoons

- Low dissolved oxygen concentrations (<5 mg/L) were found in:
 - Lost River at 109th Ave, upstream of Pine Lake
 - Heartsville Coulee at 210th St. SW
 - Grand Marais Creek at 110th St. NW
 - Grand Marais Creek at 130th St. NW
 - Poplar River at CSAH 30, north of Fosston
 - Heartsville Coulee at 210th St. SW
 - Poplar River Diversion channel at the Badger Lake inlet
 - Little Black River at CR 3
 - Judicial Ditch 73, upstream of Rydell NWR
 - Badger-Mitchell Lake channel at Hwy 2 (JD73/Poplar River Diversion)
 - Burnham Creek at CSAH 48
 - Branch 200 of Judicial Ditch 11, downstream of Farnes Pool
 - Ruffy Brook at CSAH 11
 - Terrebonne Creek at CSAH 92
 - Polk County Ditch 2 at CR 62
 - Polk County Ditch 2 at CSAH 20
 - Chief's Coulee at Dewey Ave in Thief River Falls
- High biochemical oxygen demand concentrations were found in:
 - Poplar River at CSAH 30, north of Fosston (143 mg/L)
 - Discharge from Fosston lagoons
 - Poplar River at CR 118
 - Red Lake River at CSAH 219 (Highlanding)
- Extremely high total Kjeldahl nitrogen (27.6 mg/L), ammonia nitrogen (11.2 mg/L), total organic carbon (76.8 mg/L), chemical oxygen demand (370 mg/L), and orthophosphate concentrations were also found in the Poplar River at CSAH 30, downstream of the Fosston lagoons on June 7, 2016.



- Sediment-laden runoff from a private ditch in Red Lake County was found on June 27, 2016. The following photo was taken approximately 1/3 mile west of the intersection of CSAH 13 and CR 105 in Section 8 of Red Lake Falls Township. This drainage flows into the Thibert Dam and the Red Lake River. Other nearby road crossings were examined. CSAH 13 is the only crossing of the ditch where the muddy water was first spotted. However, similarly turbid runoff was found to the north at the 160th St SW and CR 105 crossings of Brown's Creek. Muddy water was found in the west road ditch (along a soybean field) along CR 105. The soybean field was being farmed up to the edge of the ditch (no buffer).



160th St SW crossing of Browns Creek
July 27, 2016



CR 105 crossing of Browns Creek
July 27, 2016



Red Lake CR 105 road ditch
July 27, 2016



Thief River Watershed Restoration and Protection (WRAP) Project

The Thief River WRAP project was completed at the end of June 2016. The RLWD will enter into a new contract with the MPCA to conduct any editing of the Thief River Watershed Total Maximum Daily Load and Thief River Watershed Restoration and Protection Strategy documents as they move through the EPA and public comment phases of their approval process. Updates were made to the Thief River pages of the www.rlwdwatersheds.org website.

RMB Environmental Laboratories staff provided some final civic engagement reports for the Thief River WRAPS:

- 10 Year Civic Engagement Plan and Public Participation Strategy
- Civic Engagement Evaluation Report
- Stakeholder Contact list in Excel

Clearwater River Watershed Restoration and Protection (WRAP) Project

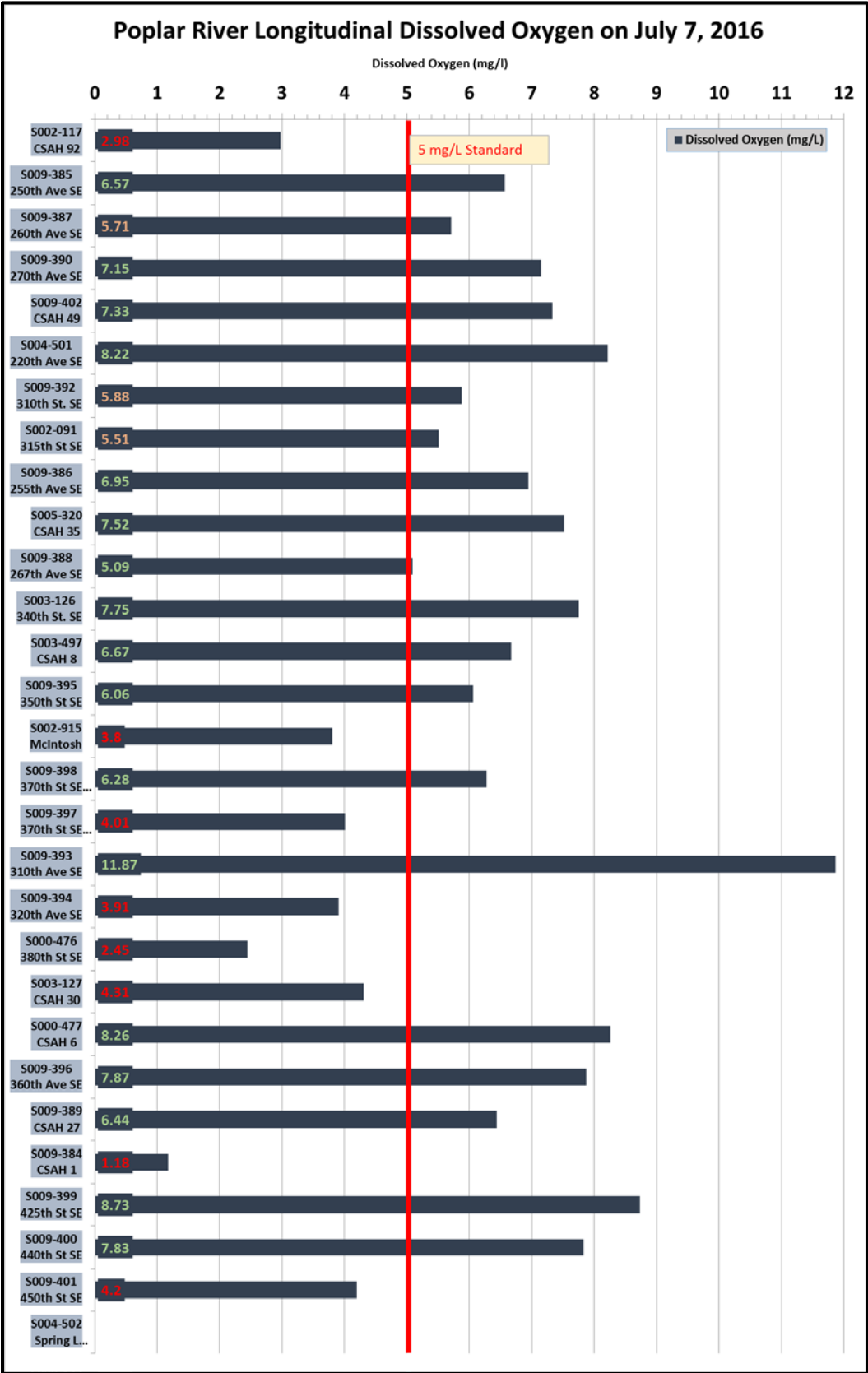
- Objective 2- Water Quality Sampling
 - Samples were collected at select sites within the Clearwater River watershed for the purpose of supplementing existing data and investigating known water quality problems (stressor identification and longitudinal sampling).
 - High concentrations of E. coli bacteria were found in:
 - Lost River at the Lindberg Lake Road
 - Nasset Brook
 - Hill River at 335th Ave SE
 - Hill River at CSAH 35
 - Hill River at CR 119
 - Poplar River at 310th St. SE
 - Poplar River at CSAH 6
 - Poplar River at CSAH 27
 - Walker Brook
 - Beau Gerlot Creek at CR 114
 - Beau Gerlot Creek at CSAH 92
 - Brooks Creek at CSAH 92
 - Terrebonne Creek at CSAH 92
 - Judicial Ditch 73 upstream of Rydell NWR
 - Lower Badger Creek at 150th Ave SE
 - Tributary of the Poplar River Diversion (Gerdin Lake Outlet) at 240th Ave SE, north of Erskine
 - Red Lake County Ditch 23
 - High concentrations of total phosphorus were found in:
 - North River Nutrient Region (>0.05 mg/L):
 - Central River Nutrient Region (>0.1 mg/L):
 - Clearwater River at CSAH 10
 - Nasset Brook
 - Hill River at CSAH 35
 - Hill River at 335th Ave SE
 - Poplar River at 310th St SE
 - Poplar River at CSAH 6
 - Poplar River at CSAH 27
 - Tributary of the Poplar River Diversion (Gerdin Lake Outlet) at 240th Ave SE, north of Erskine
 - Red Lake County Ditch 23

- Low dissolved oxygen concentrations were found in:
 - Walker Brook
 - Hill River at CSAH 35
 - Poplar River at CSAH 92
 - Poplar River at 360th St. SE
 - Poplar River at 320th Ave SE
 - Poplar River at the east crossing of 370th St. SE
 - Poplar River at 380th St. SE
 - Poplar River at CSAH 30
 - Poplar River at CSAH 27
 - Poplar River at CSAH 1
 - Poplar River at 450th St. SE
 - Poplar River Diversion at the Badger Lake inlet
 - Tributary of the Poplar River Diversion (Gerdin Lake Outlet) at 240th Ave SE, north of Erskine
 - Bee Lake Outlet
 - Lost River at the Lindberg Lake Road
 - Clearwater River at CSAH 10
 - Terrebonne Creek
- High concentrations of biochemical oxygen demand (>2.0 mg/L Central River Nutrient Region standard) were found in:
 - Hill River at CSAH 35
 - Poplar River at CSAH 6
 - Poplar River at CSAH 1
 - Tributary of the Poplar River Diversion (Gerdin Lake Outlet) at 240th Ave SE, north of Erskine
 - Lower Badger Creek at 150th Ave SE
- Objective 3 – Flow Monitoring
 - 0.19 cfs of flow was measured in the Hill River at 335th Ave on 7/1/2016.
 - 7.06 cfs of flow was measured in the Hill River at CR 119 near Brooks on 7/1/2016.
 - 0 cfs of flow was observed in Terrebonne Creek on 7/11/2016.
 - 0 cfs of flow was observed in Beau Gerlot Creek on 7/11/2016.
 - 3.23 cfs of flow was measured in Lower Badger Creek on 7/11/2016.
 - 0.99 cfs of flow was measured in Judicial Ditch 73 on 7/11/2016.
 - 0.11 cfs of flow was measured in Brooks Creek on 7/29/2016
 - 44.5 cfs of flow was measured in the Poplar River at CR 118 on 7/29/2016.
- Objective 6 – Stressor and Pollutant Identification
 - Microbial Source Tracking (fecal DNA) samples were collected on July 14, 2016.
 - Beau Gerlot Creek (CR 114, S008-058) – 125.9 MPN/100ml
 - Birds: Present (trace)
 - Humans: Present (trace)
 - Ruminants: Absent
 - Brooks Creek (Hwy 92, S006-506) – 248.1 MPN/100ml

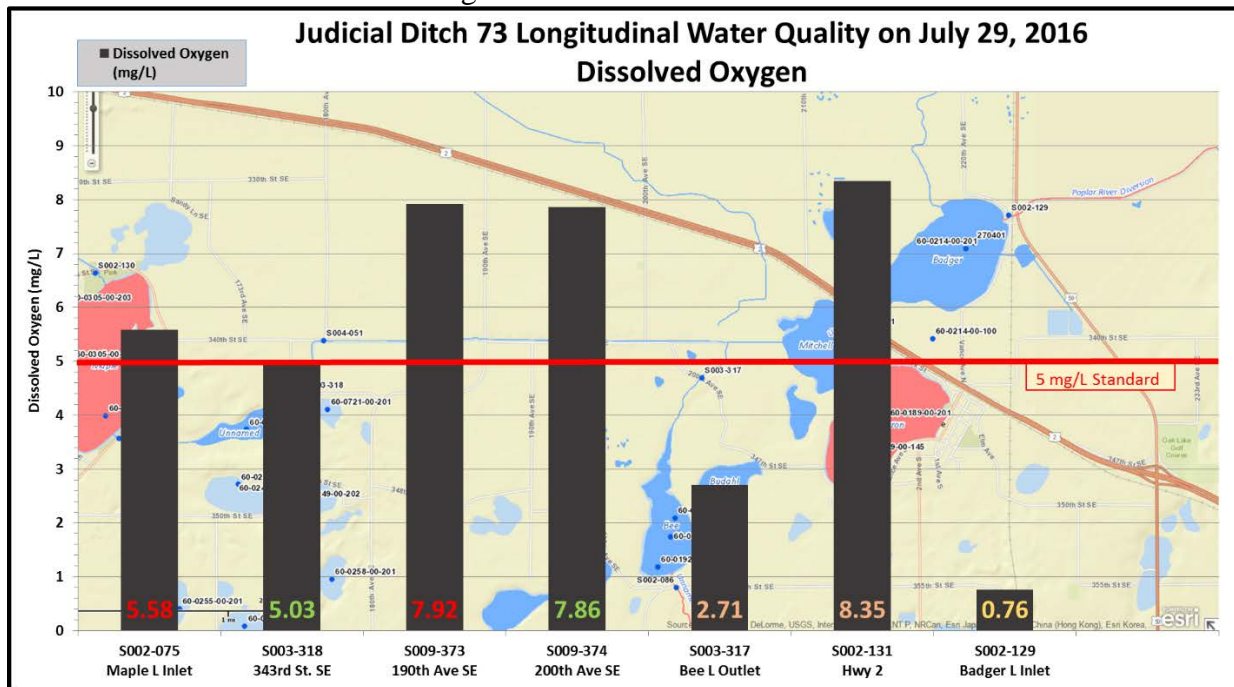
- Birds: Present (trace)
- Humans: Present (trace)
- Ruminants: Absent
- Hill River (CR 119, S002-134) – 435.2 MPN/100ml
 - Birds: Present (trace)
 - Humans: Present (trace)
 - Ruminants: Present
- Microbial Source Tracking (fecal DNA) samples were collected on July 28, 2016.
 - Lost River, upstream of Pine Lake (109th Ave, S005-283) – 50.4 MPN/100ml
 - Birds: Present (trace)
 - Humans: Not detected
 - Ruminants: Not detected
 - Judicial Ditch 73 near Rydell National Wildlife Refuge (343rd St. SE, S003-318) – 143.9 MPN/100ml
 - Birds: Present (trace)
 - Humans: Not detected
 - Ruminants: Not detected
 - Terrebonne Creek (Hwy 92, S004-819) – 73.3 MPN/100ml
 - Birds: Not detected
 - Humans: Not detected
 - Ruminants: Not detected
- Microbial Source Tracking analysis results were forwarded to county staff.
- Longitudinal water quality measurements were recorded along the Poplar River. Dissolved oxygen is the main water quality concern along the Poplar River. Dissolved oxygen levels fluctuate significantly from site to site. Dissolved oxygen levels were relatively low at the two crossings upstream of Hwy 59 (310th St SE and 315th St. SE) on 7/7/16. Dissolved oxygen was also relatively low at 260th Ave, Se of Brooks and 267th Ave SE, north of McIntosh. Dissolved oxygen levels were less than the 5 mg/l water quality standard at a number of sites. Most of the sites in the following list were separated by sites with good dissolved oxygen levels. It seems that dissolved oxygen levels in the Poplar River can be depleted by natural features as the river flows through wetlands where gradient is low and decomposition rates are relatively high. Between those areas of dissolved oxygen depletion, however, are reaches in which dissolved oxygen levels recover to acceptable levels.
 - 2.98 mg/l at Hwy 92 (S002-117)
 - 3.91 mg/l at 320th Ave SE
 - 3.80 mg/l at 360th St. SE, near McIntosh (S002-915)
 - 4.01 mg/l at the eastern crossing of 370th Ave SE. Dissolved oxygen levels improved from 4.01 mg/l at the eastern crossing of 370th Ave SE to 6.28 mg/l at western crossing of that road, over a distance of approximately 1.6 river miles. The segment of the Poplar River between the two crossings of 370th Ave SE doesn't look much different than the channel upstream of

370th Ave. The segment is prone to beaver dams that could be creating conditions at the eastern (upstream) crossing that are more stagnant than they are at the western (downstream) crossing.

- 2.45 mg/l at the 380th St. SE crossing (S000-476), NW of Fosston
- 4.31 mg/l at the CSAH 30 crossing (S003-127), N of Fosston
 - Cattle were in the river downstream. The water smelled like excrement. The water was a “weird brown color.”
 - The dissolved oxygen concentration at this crossing is just a little more than half the concentration at the next crossing upstream (8.26 mg/l). The river was being negatively impacted by discharge from the Fosston lagoons.
 - The landowner downstream of this crossing called to complain about the water quality in the Poplar River on 7/7/2016. He was worried about whether or not it would be safe for his cattle to drink. RLWD staff collected a sample from the CSAH 30 crossing. Sampling results were provided to MPCA enforcement staff.
- 1.18 mg/l at the CSAH 1 crossing, east of Fosston
- 4.20 mg/l at the 450th St SE crossing, downstream of the Spring Lake Outlet



- Longitudinal dissolved oxygen measurements were recorded along the Judicial Ditch 73 (Poplar River Diversion) drainage system. Dissolved oxygen levels fluctuated throughout the system. The dissolved oxygen concentration at the inlet of Badger Lake was only 0.76 mg/l (>5 mg/l is needed in order to meet the water quality standard). The Bee Lake outlet also had a very low dissolved oxygen concentration of 2.71 mg/l. The 343rd crossing just barely met the standard with a concentration of 5.03 mg/l. That measurement was recorded at 11:30 am. Due to the diurnal fluctuation of dissolved oxygen, the concentration was probably increasing at that time and would have been <5 mg/l if it had been measured earlier in the morning.



- Samples were collected in Whitefish Lake to see if eutrophication in the lake could be affecting the Poplar River as it flows past the lake.
- HOBO dissolved oxygen loggers were deployed in Lower Badger Creek at 150th St., Poplar River at CSAH 27, Hill River at CSAH 35, Red Lake County Ditch 23 at CSAH 1, and the unnamed ditch that flows between Gerdin Lake and the Poplar River Diversion at 240th Ave SE. All of those sites are located on reaches where biological impairments have been found, but continuous dissolved oxygen data had not yet been collected.



Hill River at CSAH 35



Lower Badger Creek at 150th St



Red Lake County Ditch 23 at CSAH 1



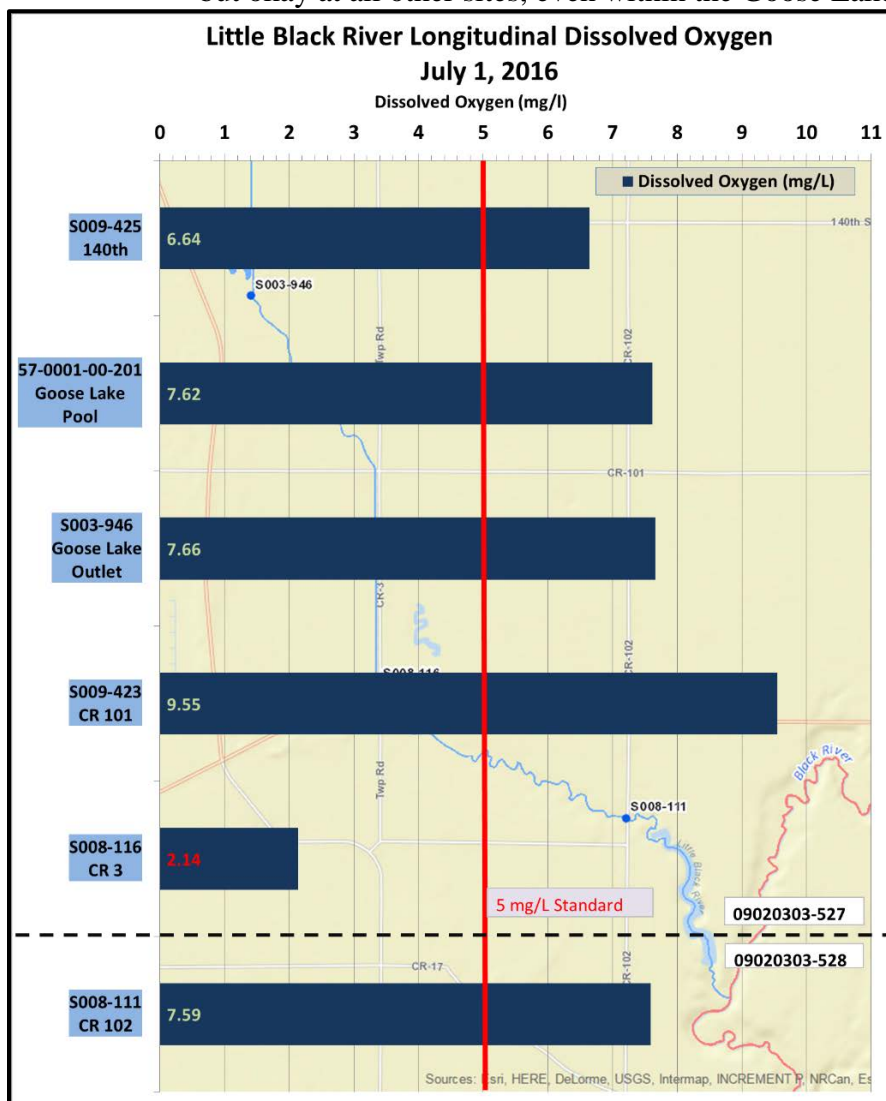
Poplar River at CSAH 27 (Older Photo)

- Objective 10 – Reports
 - A semi-annual progress report for the Clearwater River WRAP was completed and sent to the MPCA Project Manager.

Red Lake River Watershed Restoration and Protection Strategy (WRAPS)

The end date of the Red Lake River WRAP contract was extended to December 31, 2016.

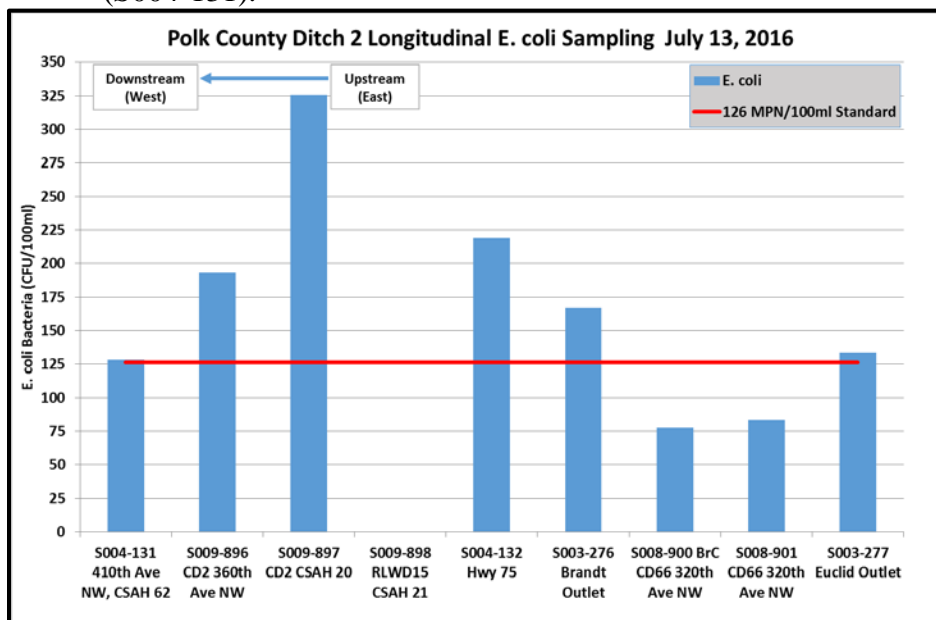
- Task 1 – Existing Data
 - The MPCA released the Draft 2016 List of Impaired Waters on July 13, 2016.
 - RLWD staff participated in the public meeting for the 2016 Draft List of Impaired Waters that was held at the Detroit Lakes MPCA office.
- Task 7 – Stressor Identification
 - Longitudinal dissolved oxygen measurements were recorded along the Little Black River on July 1, 2016. DO was very low at the CR 3 crossing (S008-116), but okay at all other sites, even within the Goose Lake pond.

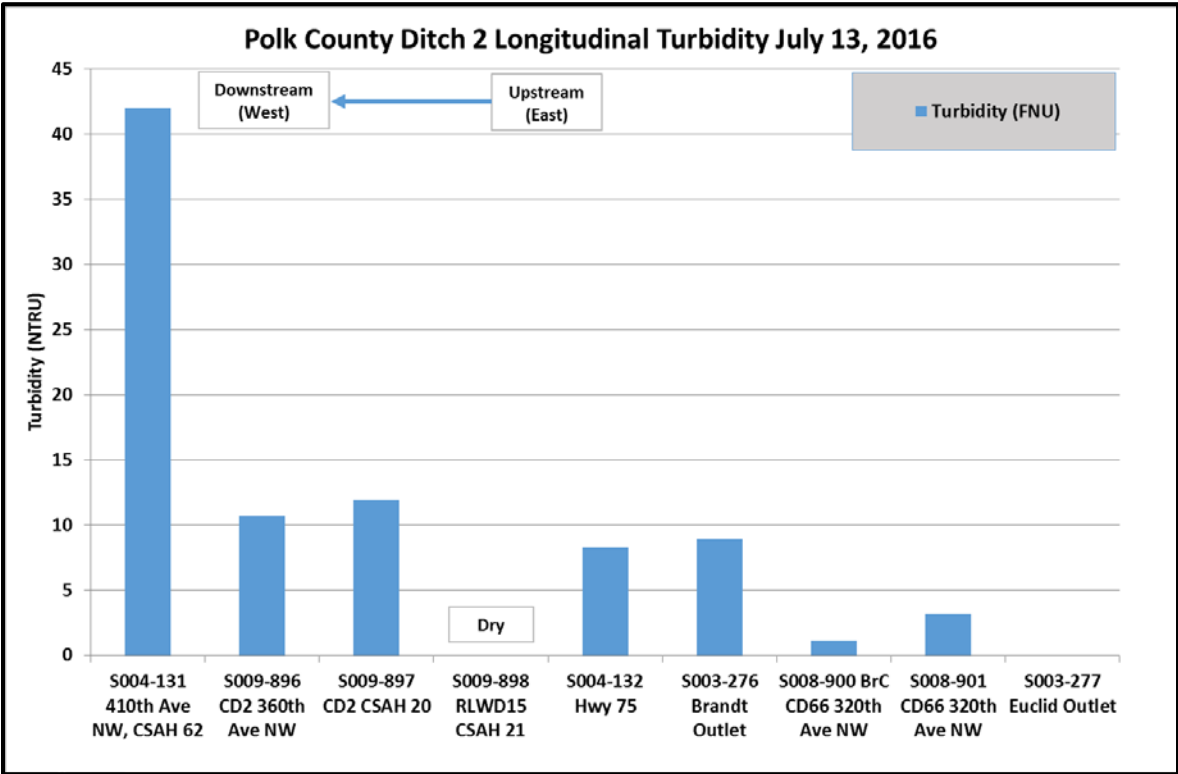
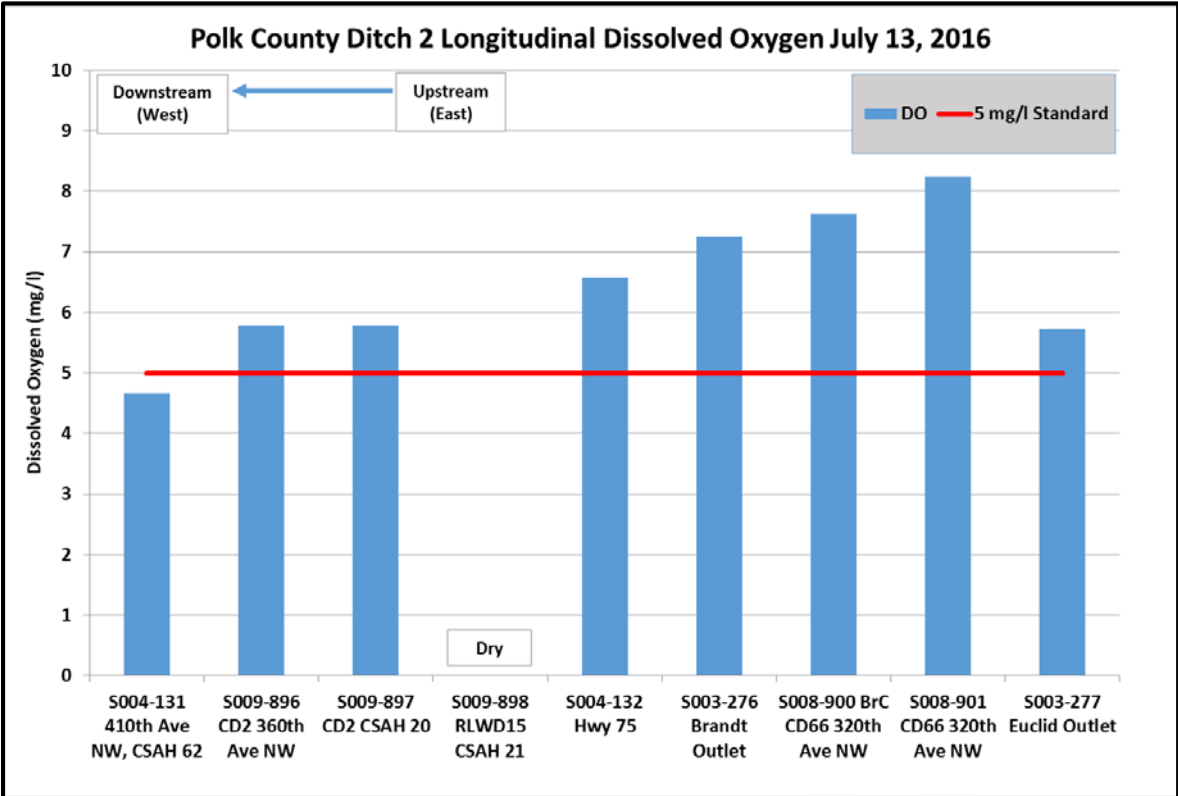


- Longitudinal dissolved oxygen measurements were made along Cyr Creek on July 1, 2016. Dissolved oxygen concentrations were good at all of the sites, despite low flow and stagnant conditions.
- Longitudinal dissolved oxygen measurements were made along Pennington County Ditch 96 on July 1, 2016. Dissolved oxygen levels were okay at all sites that had water, despite low flow conditions. One crossing, 120th St. NW, was dry.
- Task 9 – Data Analysis
 - Black River dissolved oxygen data (upstream of the Little Black River, AUID 09020303-558) was analyzed.
 - Index of biological integrity data and stressor identification results from the Black River were reviewed.
 - The LiDAR profile of the Black River was examined. A graphic of the profile was created for the Red Lake River Watershed TMDL.
 - MPCA stressor identification staff provided the RLWD with data from MPCA dissolved oxygen logger deployments that were completed in the Red Lake River watershed in 2014.
- Task 12 – Reports
 - Sections of the Red Lake River TMDL that describe stressors of fish and macroinvertebrates in the Black River were written for the Red Lake River Watershed Total Maximum Daily Load (TMDL) document.
 - A semi-annual progress report for the Red Lake River WRAPS was completed and sent to the MPCA Project Manager.

Grand Marais Creek Watershed Restoration and Protection Project

- Longitudinal samples were collected along the Polk County Ditch 2 drainage system on 7/13/2016. The dissolved oxygen concentration was low (4.66 mg/l) and the turbidity level was relatively high (42.0 NTRU) near the downstream end of the reach at CR 62 (S004-131).





- A semi-annual progress report for the Grand Marais Creek WRAPS was completed and submitted to the MPCA project manager.
- Emmons and Olivier Resources, Inc. staff worked on renewal of the project's website and drafting of TMDL/WRAPS reports.

Upper/Lower Red Lakes Watershed Restoration and Protection Strategy Project

The Red Lake DNR has deployed dissolved oxygen logging equipment at the following locations:

- Tamarac River (located approximately 3 miles upstream from Upper Red Lake)
- North Cormorant River at CSAH 23/Pioneer Rd
- South Branch Battle River at CSAH 23/Pioneer Rd
- North Branch Battle River at CSAH 23/Pioneer Rd
- Pike Creek at South Boundary Rd
- Sandy River approximately 0.75 miles upstream from Lower Red Lake

Other Notes

- The Draft 2016 List of Impaired Waters was released on July 13, 2016.
 - <https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list>
- The MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List for the 2016 assessment cycle was released on July 13, 2016 – the same day as the Draft 2016 List of Impaired Waters. It was good to finally get a chance to review the methods (particularly the application of new, regionalized standards for total suspended solids and river eutrophication), but it was very disappointing that the agency did not release the instructions for the assessment process until after the process had been completed.
- The 2016 MN DNR Buffer Map was released on July 13, 2016.
 - <http://arcgis.dnr.state.mn.us/gis/buffersviewer/>
- RLWD water quality staff reviewed and commented on the latest draft of the Red Lake River 1W1P document.
 - <http://westpolkswcd.com/1w1p.html>
- January and February monthly RLWD water quality reports were completed. The demands of the Thief River WRAP, Red Lake River WRAPS, Red Lake River 1W1P, and Clearwater River WRAP projects have prevented the completion of those monthly reports.
 - January 2016:
<http://www.redlakewatershed.org/waterquality/MonthlyWQReport/2016%201%20January%20Water%20Quality%20Report.pdf>
 - February 2016:
<http://www.redlakewatershed.org/waterquality/MonthlyWQReport/2016%202%20February%20Water%20Quality%20Report.pdf>
- The City of Crookston, with the help of an intern, was working on becoming a “Step Two” Green Step City. “Minnesota GreenStep Cities is a voluntary challenge, assistance and recognition program sponsored by the Minnesota Pollution Control Agency to help cities achieve their sustainability and quality of life goals through implementation of 29

best practices and associated actions that focus on cost savings, energy use reduction, and encouraging civic innovation. 109 cities in Minnesota have joined the program.”

- <https://www.crk.umn.edu/news/step-two%E2%80%99-greenstep-city>
- On July 20, 2016, the Red Lake Falls River Watch team, along with International Water Institute and RLWD staff, took a kayak trip down the scenic Red Lake River.

Photo Credit: International Water Institute



July 2016 Meetings and Events

- **July 6, 2016** – Marshall County Water Resources Advisory Committee meeting.
 - All counties are “on board” for moving forward on a Thief River One Watershed One Plan process.
 - There was a lot of storm damage from runoff in Marshall County in 2016.
- **July 20, 2016** - Red Lake River One Watershed One Plan meeting.
- **July 27, 2016** – Public meeting for the 2016 Draft List of Impaired Waters, Detroit Lake MPCA Conference Room.

Quotes of the Month:

“Action is the real measure of intelligence.”

- Napoleon Hill

“Action is the fundamental key to all success.”

- Pablo Picasso

Red Lake Watershed District Monthly Water Quality Reports are available online at:

<http://www.redlakewatershed.org/monthwq.html>.

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