RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

Red Lake Watershed District Long-Term Monitoring Program

The Red Lake Watershed District monitors water quality at more than 60 long-term monitoring sites throughout the District. Most sites are visited four times each year. The RLWD Water Quality Assistant and Water Quality Coordinator completed the third round of 2014 monitoring at these sites in July. Samples are analyzed for total phosphorus, orthophosphorus, total suspended solids, total Kjeldahl nitrogen, nitrates & nitrites, ammonia nitrogen, E. coli, sometimes chemical oxygen demand, and sometimes total organic carbon.

- High E. coli concentrations were found in samples collected at these sites in July:
  - Ruffy Brook at CSAH 11
  - Ruffy Brook at County Road 67
  - Silver Creek at 159th Ave, west of Clearbrook
  - Silver Creek at County Road 111, northeast of Gonvick
  - Lower Badger Creek (4 times, including the Clearwater River SWAG samples)
  - Thief River near Thief River Falls
  - Burnham Creek at 320th Ave, west of Crookston
  - Burnham Creek at County Road 48, south of Crookston
  - Brandt Channel at Highway 75, north of Euclid
  - Red Lake River at the Smiley Bridge (CSAH 7), east of Thief River Falls
  - Red Lake River in Crookston
  - Black River at CSAH 18
  - Browns Creek at CR 101 (twice)
  - Little Black River at CSAH 3 (twice)
  - Little Black River at County Road 102 (thrice)
  - Darrigan's Creek
  - South Cormorant River
  - North Cormorant River
  - Cyr Creek
- Low dissolved oxygen levels (<5 mg/l) were recorded during site visits of the following:
  - Judicial Ditch 73 near Rydell National Wildlife Refuge (multiple times)
  - Judicial Ditch 73 at the Badger Lake inlet
  - Clearwater River at CSAH 2, east of Bagley
  - Grand Marais Creek at CSAH 19 (twice)
- High turbidity levels (>25 NTRU) and or total suspended solids levels were found in:
  - Red Lake River at the Murray Bridge in East Grand Forks
- Supplemental E. coli samples were collected in Grand Marais Creek at CSAH 19. This is one of the few sites on the reach of Grand Marais Creek that will be a part of State water quality assessments into the future. A lot of monitoring has been done at the CR64 crossing (the last crossing before the Red River), but most flow and stream connectivity will be cut off from that part of the channel once the Grand Marais Creek Outlet Restoration Project is complete. Therefore, the Minnesota Pollution Control Agency has decided not to assess the cut-channel portion of Grand Marais Creek from CD2 to the Red River.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

Clearwater River Watershed Restoration and Protection (WRAP) Project

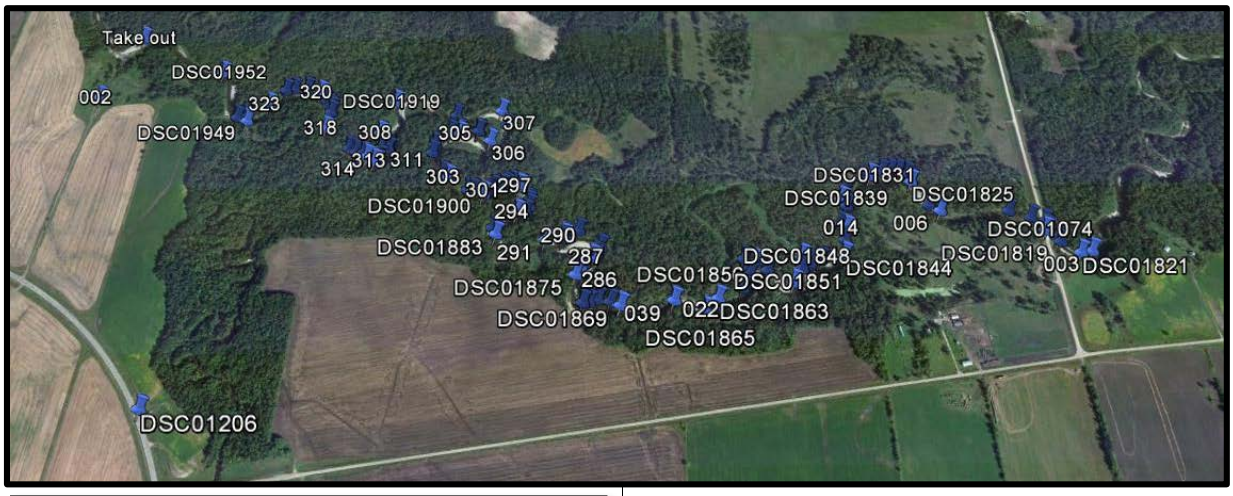
- Objective 2 – Water Quality Sampling
  - Deployment pipes for dissolved oxygen loggers and HOBO water level loggers were installed at the CSAH 6 and 380th St. SE crossings of the Poplar River in preparation for an intensive examination of a reach of the Poplar River that has been influenced by past discharge from the Fosston wastewater treatment facility lagoons. Three crossings in a row will be continuously monitored for stage and dissolved oxygen and will be intensively sampled. This will occur in two separate 2-week periods.
    - Data from the CSAH 6 and CSAH 30 crossings will show whether or not there is any current impact to the river from Fosston's WWTF lagoons (if there happens to be any discharge).
    - The CSAH 30 and 380th Street sites bracket a large riparian wetland area along the stream that could be consuming dissolved oxygen from the water flowing in the Poplar River.
    - The CSAH 30 crossing (site name: POP20) is in between the other two crossings and already has a dissolved oxygen logger deployed there all summer for this project.
    - Eureka Manta sondes with optical dissolved oxygen probes were deployed at the CSAH 6 (Poplar6) and 380th Street (Poplar380) sites in late July.
    - The City of Fosston has upgraded their wastewater treatment system recently. They been meeting the new phosphorus limit of 1.0 mg/L since the new system initiated operation on 11/5/12. So, water quality conditions at CSAH 6 and CSAH 30 are likely to be similar. The other hypothesis, however, is that conditions within the riparian wetland area downstream of CSAH 30 are negatively affecting dissolved oxygen levels. The reductions in dissolved oxygen could be significant because this wetland area has been filtering some of the excess nutrients, organic matter, and other pollutants that were discharged from the Fosston lagoons for years. Aerial photos provide some evidence of sedimentation within this area – the channel of the Poplar River nearly becomes invisible in some spots. The organic wetland soils and the accumulated sediment are likely increasing decomposition and oxygen consumption within this reach of the Poplar River compared to other reaches of the River.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

- Objective 3 – Flow Monitoring
  - A HOBO water level logger was deployed in Beau Gerlot Creek.
  - A HOBO water level logger was deployed in JD73 near Rydell National Wildlife Refuge.
  - A HOBO water level logger was deployed in the Lost River at CSAH 28, north of Trail.
- Objective 4 – Continuous Dissolved Oxygen Monitoring
  - Continuous dissolved oxygen loggers were deployed by the RLWD at the following sites in 2014. There is a goal of 10 2-week deployments at each site. In order to meet State water quality standards, ninety percent of daily minimum dissolved oxygen concentrations should be greater than 5 mg/l on most streams and greater than 7 mg/l in trout streams.
    - Poplar River at CR118 (S007-608, PR118)
      - There were many sub-5 mg/l dissolved oxygen readings during this month.
    - Poplar River at CSAH 30 (S003-127, POP20)
      - Daily minimums were less than 4 mg/L in early July, but improved to be greater than 5 mg/l, then greater than 6 mg/l later in the month.
    - Lost River at 109th Ave (S005-283, LR10)

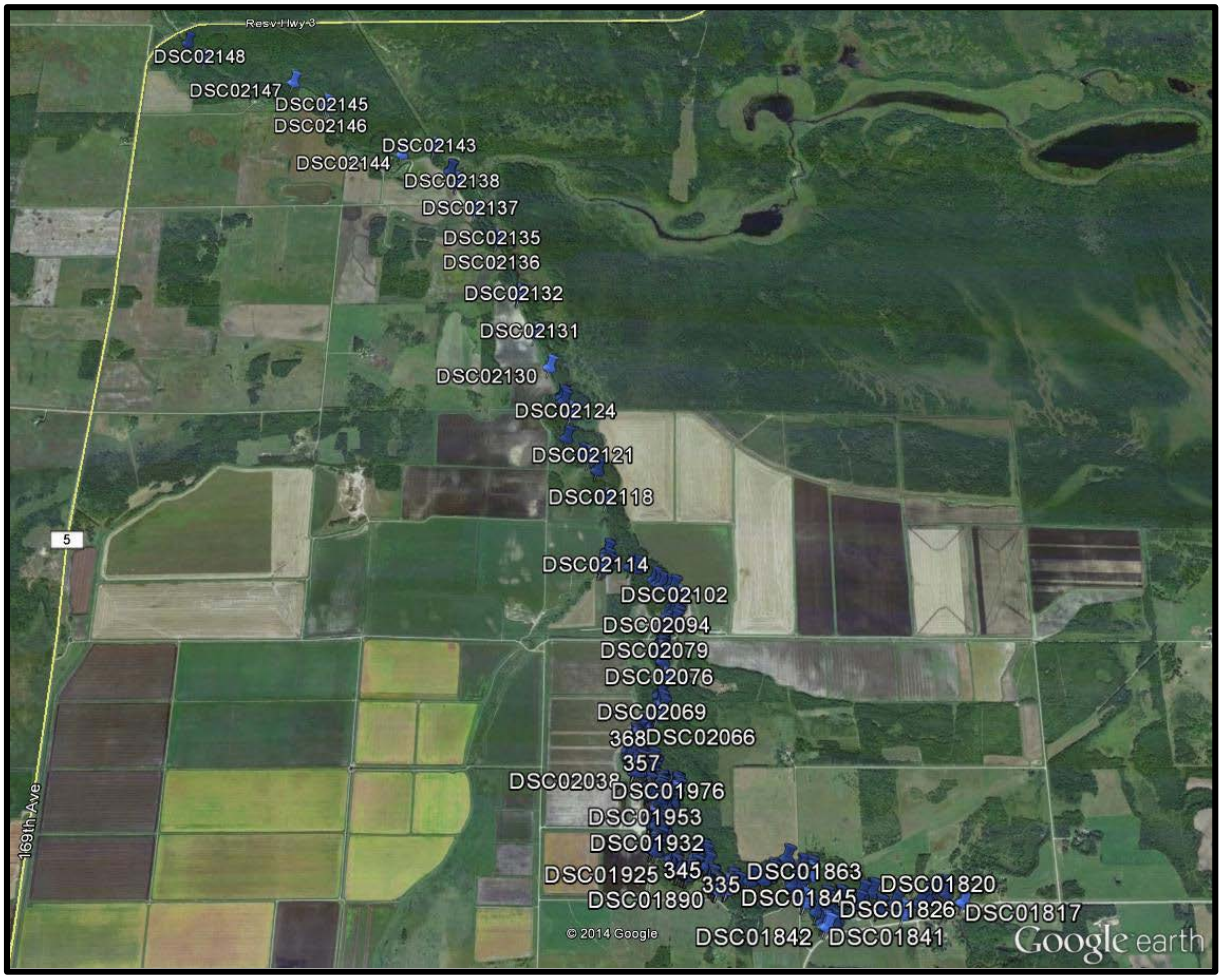
        - All daily minimums were less than 5 mg/l and many were less than 2 mg/l.
    - Lost River at 139th Ave (S000-924, Lost139)
        - Dissolved oxygen levels were okay throughout the month.
    - Silver Creek at CR111 (S002-082, 81)
        - Dissolved oxygen levels were okay in the early part of the month, but there were several days when daily minimums dropped below 5 mg/l. These data points were somewhat erratic, so the low readings could have been due to stagnant water or sedimentation around the sensor. Data will be compiled, corrected, and compared with discrete field measurements at the end of the year. If there is erroneous data, this process will discover the problem and the data can be discarded.
    - Ruffy Brook at CSAH 11 (S008-057, Ruffy11)
        - All of the readings taken with a TROLL 9500 equipped with a rugged dissolved oxygen (optical) sensor were greater than 6 mg/l. Many of the readings taken with a TROLL 9500 equipped with a Clark Cell dissolved oxygen sensor (the type that uses replaceable membranes) were less than 5 mg/l and seemed to be too low. Much of the data from the Clark Cell sonde may end up being discarded.
    - Clearwater River at CSAH 22 (S002-929, Clearwater22)
        - All readings in July were greater than 5.9 mg/l, but a bunch of days had daily minimum levels below the 7 mg/l that is desirable for trout streams.
    - Clearwater River at CSAH 11 (S002-752, Clearwater11)
        - All days had minimum dissolved oxygen readings greater than 5 mg/l and most were greater than 6 mg/l.
  - The MPCA planned to deploy some dissolved oxygen loggers in the Clearwater River at six sites. They were going to be deployed for a shorter period of time – just the months of July and August. The only site they actually deployed a logger at was the Clearwater River in Red Lake Falls (Klondike Bridge, S002-118).
- Objective 5 – Stream Channel Stability Assessment
  - DNR staff conducted bank erosion hazard index ratings along a reach of the Lost River near Gonvick.
  - RLWD staff contacted landowners to get access permission for geomorphology intensive station work.
  - The Lost River between CSAH 10 and CSAH 5 was inspected via kayak on 7/14/14. Bank erosion hazard ratings (BEHIs), Pfankuch ratings, depth measurements, georeferenced photos, and bank full width measurements were collected along the reach. There is a lot of sand moving through this reach. Sand bars were relatively large. There was a lot of woody debris along this reach. Some tree trunks and woody debris had a unique, sandblasted look to them.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014



- The Clearwater River in Greenwood Township between CSAH 11 and CSAH 5 was inspected via kayak on 7/22/14. Bank erosion hazard ratings (BEHIs),
  - Pfankuch ratings, depth measurements, georeferenced photos, and bank full width measurements were collected along the reach. This trip collected data that is upstream and downstream of the start of the channelization of the Clearwater River.
  - Stream bank condition data from upstream of the grade stabilization structures constructed by the Red Lake Watershed District can be compared with data from downstream of the lower structure. The grade control structures are working very well and are doing a good job of keeping the channel stable upstream of their location. There is a contrast between the stability of the river upstream of the grade control structure project and the stability of the river and its banks downstream of the grade stabilization project. There are noticeable headcuts in the channel bottom and many failing banks downstream of the structures. The grade control structures were fun to go float through in a kayak.
  - One of the floodplain restoration structures (rock dams plugging channels that are crossing the floodplain) has been washed-out and will have to be repaired. There are some log jams along this reach that require portaging.
  - The bank stabilization work that was done as part of the same Greenwood 27 project that created the grade stabilization and floodplain restoration structures is still holding up. The willow plantings that survived are sparse, but there are still some willows growing along those banks.

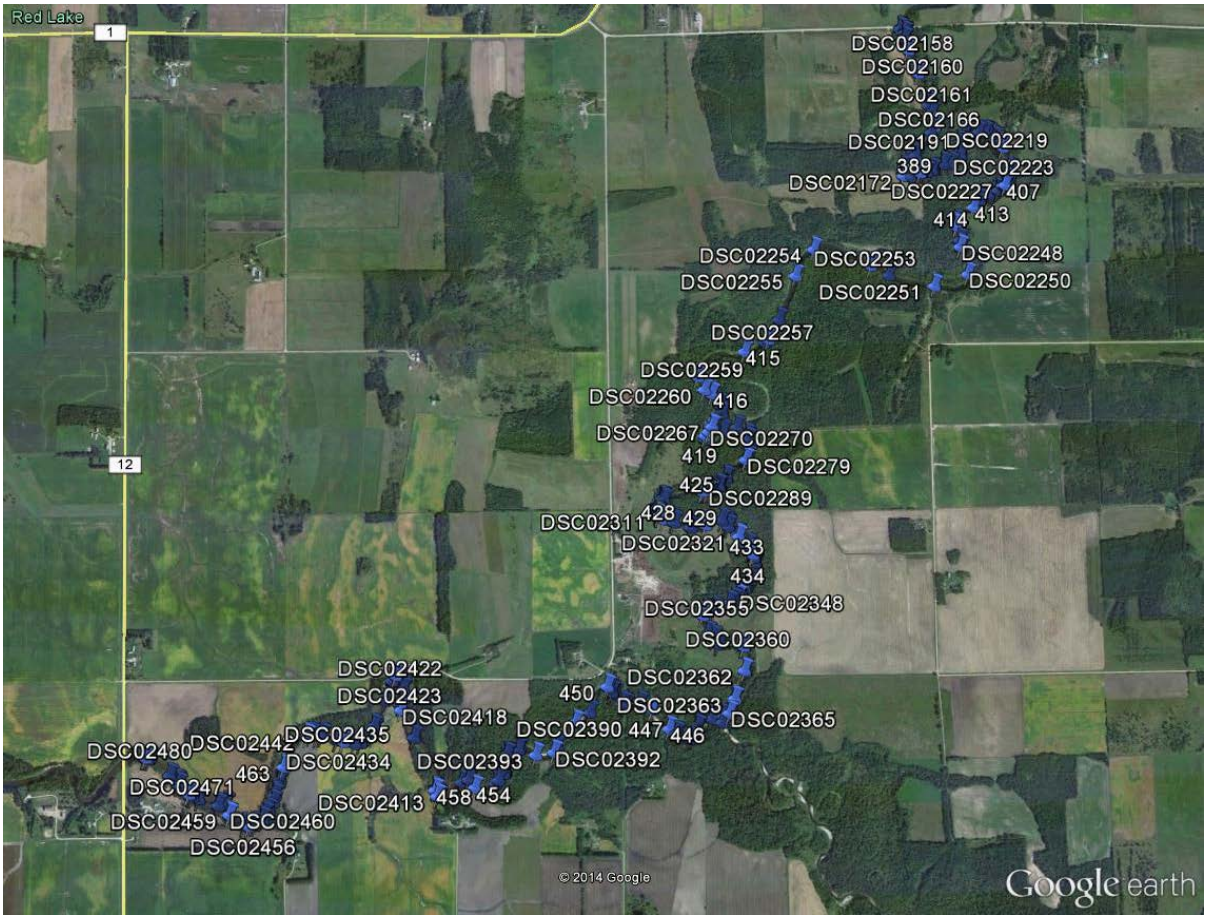
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014



- The Clearwater River near Terrebonne, between CSAH 20 and CSAH 12, was inspected via kayak on 7/23/14. Bank erosion hazard ratings (BEHIs), Pfankuch ratings, depth measurements, georeferenced photos, and bank full width measurements were collected along the reach.
  - A comparison can be made between conditions upstream and downstream of the confluence with the Lost River.
  - There are a lot of rapids to go through upstream of that confluence that make for fun paddling, but difficult note-taking.
  - This was one of the nicest reaches we paddled. There was only one tree down across the river. The portage around that tree was pretty easy due to a sand bar that made exiting and re-entering the river easy.
  - Right before those rapids, we passed a stream bank stabilization project that the Red Lake Watershed District completed in the late 90s. The toe protection and stream barbs are still keeping the bank stable.
  - A lot of trees had been knocked down along the river by the tornado that went through the area July 21, 2014.




RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

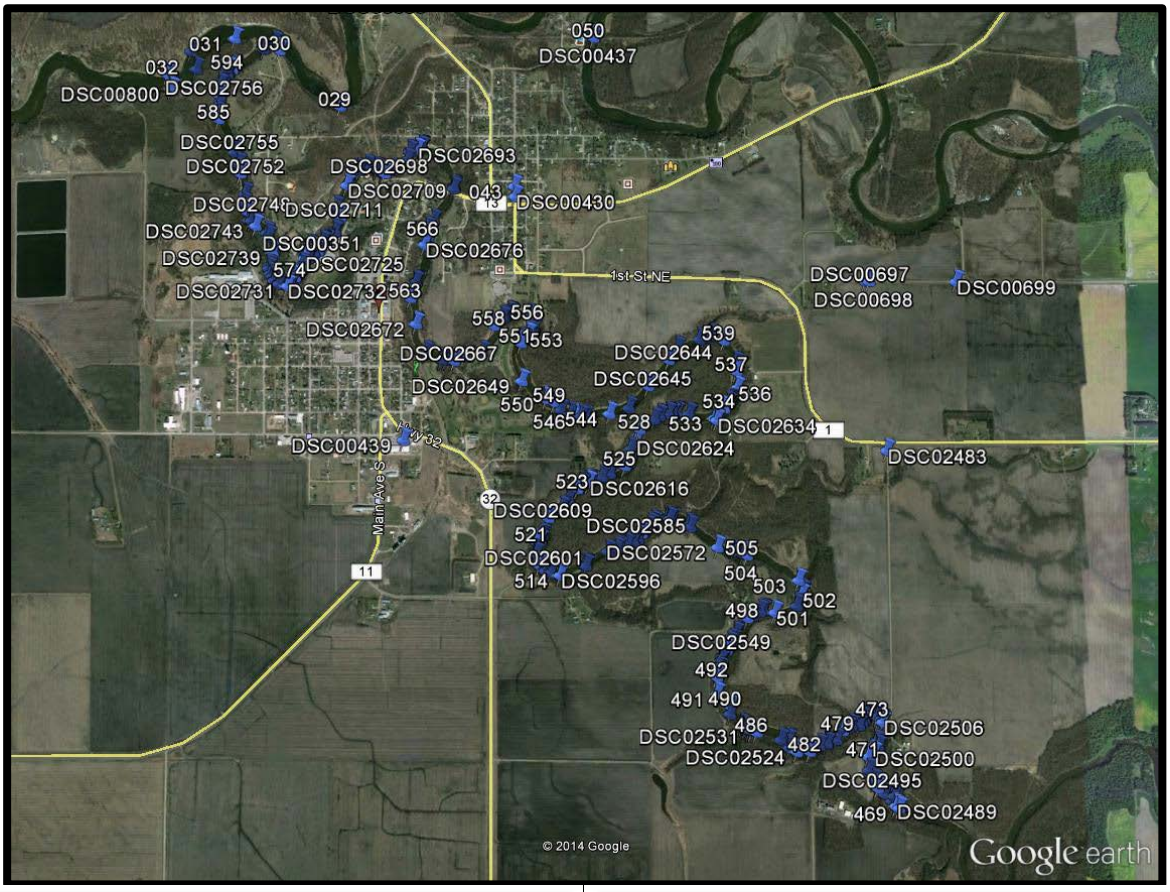


- Seven miles of the Clearwater River by Red Lake Falls, between CSAH 20 and CSAH 12, were inspected via kayak on 7/24/14. Bank erosion hazard ratings (BEHIs), Pfankuch ratings, depth measurements, georeferenced photos, and bank full width measurements were collected along the reach.
  - There were some high bluffs along this reach and a lot of rapids. The rapids just downstream of the Highway 32 crossing were tricky and it might be a good idea to portage around them during low water.

- Significant gully erosion is occurring along smaller waterways that flow into this lower reach of the Clearwater River. There is a steep drop from the uplands where the drainage begins down to the Clearwater River.

- There is at least one case where grade has been stabilized along one of these drainage-ways. An SCS water control structure south of Red Lake Falls has kept gully erosion from creeping upstream along one of small drainage paths that enter the Clearwater River along this reach.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014



- Objective 6 – Stressor Identification
  - The Red Lake River HSPF model (RESPEC Consulting) has been completed.
- Objective 9 – Civic Engagement
  - RMB Environmental Laboratories staff began working on an informational brochure about the Clearwater River WRAP. RLWD staff provided some scenic photos of the Clearwater River and its tributaries. RMB staff worked on creating a map of the Clearwater River watershed for the brochures and put together a list of contacts for a technical advisory committee for the project.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

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

- Task 2 – Water Quality Monitoring
  - Extra E. coli samples were collected at two sites along the Little Black River (County Road 102 and County State Aid Highway 3) and from Browns Creek (County Road 101).
- Task 3 – Continuous Dissolved Oxygen Monitoring
  - Dissolved oxygen was continuously monitored with a HOBO optical dissolved oxygen logger during the summer of 2014. A dissolved oxygen logger was deployed at the CSAH 7 (Smiley Bridge) crossing of the Red Lake River, which is the closest crossing upstream of Thief River Falls. There were several days in July when dissolved oxygen levels temporarily dropped below 5 mg/l in the first half of the month. All readings were greater than 5.5 mg/l in the latter half of the month.
- Task 7 – Stressor Identification
  - Microbial Source Tracking samples were collected from the Black River, Gentilly River, and Kripple Creek on July 15, 2014. Microbial source tracking is a method for identifying the type of animal that is the source of fecal coliform and E. coli pollution. The samples were analyzed by a lab in Florida (Source Molecular) that specializes in this testing. E. coli samples were also collected and sent to RMB Environmental Laboratories in Detroit Lakes so we would know the concentration of E. coli bacteria at the time of sampling. Past data was used as a guide for the timing of sample collection, but E. coli concentrations were not very high at any of the sites on this sampling day. These tests show us that human waste is getting into the Black River and Kripple Creek somehow. The results of the tests have been passed along to agencies that are in charge of regulating septic systems.
    1. Black River at CSAH 18 – 69.1 MPN/100ml
       - Cow Bacteroidetes ID: Absent
       - Human Bacteroidetes ID 1: Trace
       - Human Bacteroidetes ID 2: Absent
       - Bird Fecal ID: Absent
    2. Gentilly River at CSAH 11 – 67.7 MPN/100ml
       - Cow Bacteroidetes ID: Absent
       - Human Bacteroidetes ID 1: Absent
       - Human Bacteroidetes ID 2: Absent
       - Bird Fecal ID: Absent
    3. Kripple Creek at 180th Ave – 86 MPN/100ml
       - Cow Bacteroidetes ID: Absent
       - Human Bacteroidetes ID 1: Present
       - Human Bacteroidetes ID 2: Absent
       - Bird Fecal ID: Absent

  - MPCA stressor identification staff deployed dissolved oxygen loggers at sites along reaches of waterways in the Red Lake River watershed that will likely be deemed biologically impaired based upon preliminary results of recent MPCA biological monitoring efforts.
  - The Red Lake River HSPF model (RESPEC Consulting) has been completed.
- Task 12 – Reports
  - In July, RLWD staff completed a semi-annual report to the MPCA about the work done during the first half of the year for this project.

Thief River Watershed Assessment Project
(Watershed Restoration and Protection - WRAP)

- Task 8 – Water Quality Modeling
  - The HSPF model (RESPEC consulting) of the Thief River watershed has been completed.
- Task 10 – Data Analysis
  - The Minnesota Pollution Control Agency has completed a Watershed Monitoring and Assessment report for the Thief River watershed. The report was made available to the public after an MPCA internal review (no external review opportunity provided). http://www.pca.state.mn.us/index.php/view-document.html?gid=21496

Grand Marais Creek Watershed Restoration and Protection Project

- In July, Emmons and Olivier Resources (EOR) staff completed a semi-annual report to the MPCA about the work done during the first half of the year for this project.
- MPCA and EOR staff worked on the development of a Phase II work plan for the project.
- MPCA stressor identification staff deployed dissolved oxygen loggers in potentially biologically impaired reaches within the Grand Marais Creek watershed.
- The RESPEC consulting firm has been hired to develop an HSPF model for the Grand Marais Creek watershed.

Clearwater River Watershed Surface Water Assessment Grant (SWAG)

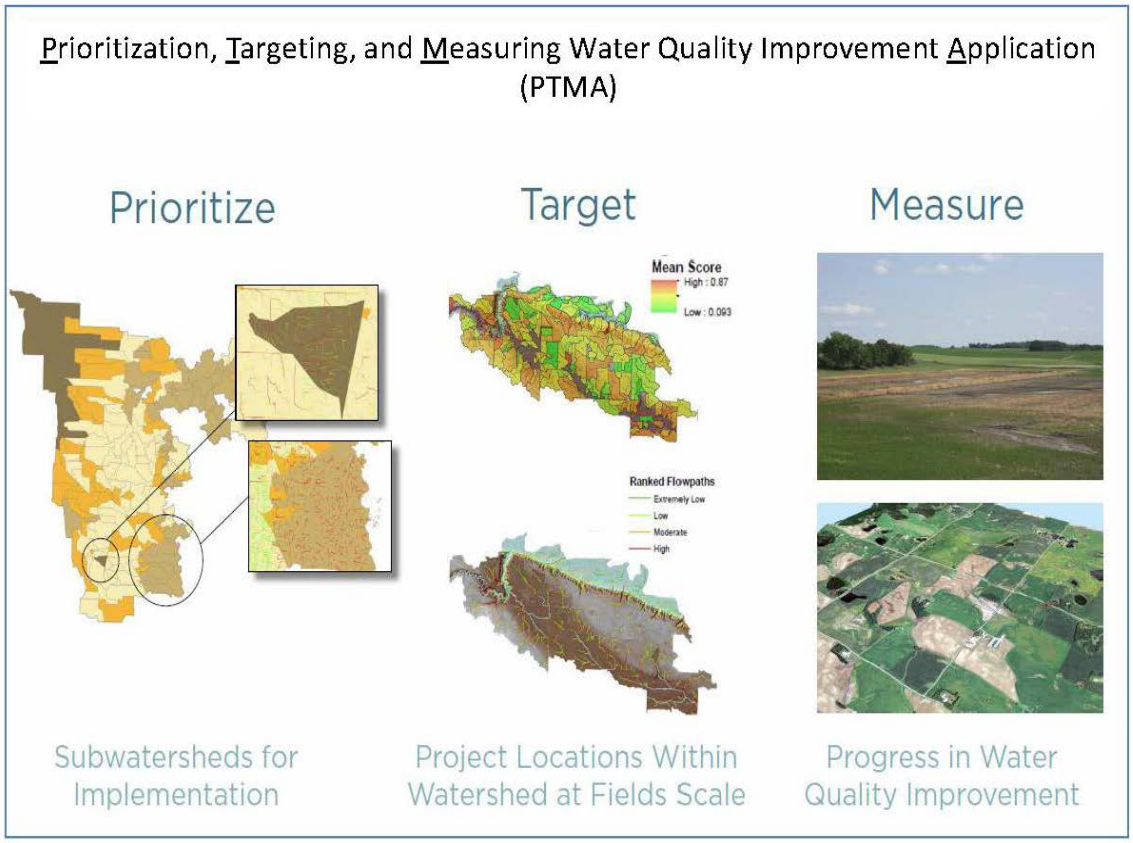
- Clearwater County Soil and Water Conservation District (SWCD), Red Lake County SWCD, and East Polk County SWCD staff continued sampling for this project in July.
- E. coli concentrations exceeded the chronic water quality standard (>126 CFU/100 ml) in at least one set of samples collected in June at the following sites:
  - Lost River at CR 139
  - Silver Creek (twice)
  - Lower Badger Creek (four times, including district monitoring)
  - Poplar River at CR118 (twice)
  - Lost River near Brooks (twice)
  - Hill River near Brooks (twice)

  - Clearwater River at CR 127
  - Hill River upstream of Hill River Lake
  - JD73 near Rydell National Wildlife Refuge
  - Lost River at CSAH 28.
  - Clearwater River in Red Lake Falls
- Ruffy Brook also had relatively high sulfates, total suspended solids, and volatile solids during the July 23rd round of samples.

Other Notes

- Water quality related topics from the July 10, 2014 RLWD Board of Managers meeting:
  - Engineer Tony Nordby, Houston Engineering, Inc. stated that Davidson Construction, Inc. plans to begin work in late August-early September on the Grand Marais Creek Channel Restoration. Nordby stated that due to the recent rains the Red River of the North has backed up into the channel up to County Road 64, therefore the Contractor is unable to resume construction. Nordby also stated that construction on the diversion structure will be delayed until construction is complete on the channel.
  - The Board reviewed the Red River Valley Avian Conservation Final Report for the Prairie Pothole Joint Venture from the Minnesota Audubon. The report included their findings for spring migrant and summer breeding birds for the Euclid East and Parnell Impoundments and also the Goose Lake Swamp.
- Water quality related topics from the July 24, 2014 RLWD Board of Managers meeting:
  - The Board reviewed Pay Estimate No. 6 in the amount of $17,519.62 for construction of the Grand Marais Creek Channel Restoration Project. The Board approved the payment of Pay Estimate No. 6 in the amount of $17,519.62 to Davidson Construction, Inc. for construction of the Grand Marais Creek Channel Restoration Project.
  - The following District Impoundments are all storing water again due to recent large rainfalls events: Euclid East, Brandt, Parnell, Moose River and Good Lake.
  - BWSR requested assistance from the District to assist Red Lake County SWCD in completing a 319 Grant Pilot Project for installation of various types of side water inlet practices. The grant was set to expire at the end of August, so very little time was given to complete the project. As part of the grant a field tour will be held on August 19, 2014, which includes a brief program and field tour.
  - Administrator Jesme will meet with representatives from BWSR on July 29th to discuss strategies in the development of the 1W1P Pilot Project for the Red Lake River sub-watershed.
- The International Water Institute is developing an online tool that can be used to prioritize, target, and measure simulated water quality improvements. They are calling it PTMA, which stands for Prioritizing, Targeting, and Measuring water quality improvement Application. This can be used in a manner similar to the SWAT and HSPF models that are being developed for watersheds in the Red River Basin. It can be used to plan projects and strategies for Watershed Restoration and Protection projects and One

Watershed One Plan projects. A benefit of this application is that anyone should be able to use it.



- Emmons and Olivier Resources and Delta Environmental consultants completed a nutrient and hydrologic model for Red Lake. It doesn't appear to be available online. Electronic copies are likely available by request from the Red Lake DNR, RLWD staff, or EOR staff.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

July Meetings/Events

- **July 7-11, 2014** – Clearwater River geomorphology
- **July 8, 2014** – Marshall County Water Resources Advisory Committee meeting at Florian Park at 9:30 AM
    - The United States Army Corps of Engineers' new "Waters of the US" rule was discussed.
        - Someone recommended a blog by Nancy Stoner entitled "Setting the Record Straight on Waters of the US" http://blog.epa.gov/epaconnect/2014/06/setting-the-record-straight-on-wous/)
        - For a more critical counter argument against the new rule, an article on the Rinke Noonan website was recommended: http://www.rinkenoonan.com/business/clean-water-act-wetlands-epa-army-corps-rule-waters-united-states-kale-van-bruggen-john-kolb/
    - MPCA staff announced the completion of the Thief River Watershed Monitoring and Assessment Report, although it wasn't immediately available to the public.
    - The MPCA created YouTube videos about the MPCA's biological monitoring efforts.
        - https://www.youtube.com/watch?v=28j4D5o2RqQ&list=UUGU_0yj95W6DRcExC0-MBdg
            - 

        - https://www.youtube.com/watch?v=V6wGhSL_FXg&list=UUGU_0yj95W6DRcExC0-MBdg&index=62
            - 

    - A CHS precision agriculture representative was present to talk about an application that packages LiDaR data for farmers to use in the field.
    - There are a lot of imminent health threat septic systems in Marshall County.
    - Agassiz Pool will be completely drained and radial gates will be left open into the winter starting in mid-August.
    - Agassiz National Wildlife Refuge is spraying and burning cattails.
    - Agassiz National Wildlife Refuge has installed continuous water quality monitoring equipment downstream of the radial gates in Ditch 11, in the Mud River at Highway 89, and in the Thief River at the northern boundary of the refuge.

Plans for the rest of 2014

- Thief River Watershed Restoration and Protection Project.
  - Creating Stream Power Index maps.
  - Create a web page dedicated to the Thief River Watershed
  - Flow measurements
  - Flow characterization
  - Finish a summary of existing data
  - Work on writing WRAPS report
  - Technical Advisory Committee meeting
  - Collect Microbial Source Tracking (Fecal DNA) samples.
  - Retrieve water level loggers, download data, and convert water level data into stage and flow records
  - Compile continuous dissolved oxygen data from Smiley Bridge at the end of the year.
- Red Lake River Watershed Assessment Project
  - Stream Power Index Analysis of the watershed
  - Create a webpage dedicated to the Red Lake River
  - Flow characterization
  - Flow measurements
  - Finish assessing water quality conditions based upon 2004-2013 data.
  - Finish a summary of existing data that will include the assessment results.
  - Begin writing parts of the WRAPS report
  - Technical Advisory Committee meeting
  - Collect Microbial Source Tracking (Fecal DNA) samples.
  - Retrieve water level loggers, download data, and convert water level data into stage and flow records
- Clearwater River Watershed Restoration and Protection Project
  - Flow measurements
  - Water level logger deployments
  - Dissolved oxygen logger deployments
  - Geomorphology intensive station work
  - Intensive study of dissolved oxygen levels and nutrients in the Poplar River near Fosston.
  - Compile 2014 continuous dissolved oxygen data
  - Retrieve water level loggers, download data, and convert water level data into stage and flow records
  - Compile existing data and summarize existing reports
- Clearwater River Surface Water Assessment Grant sampling, administration, and data management.
- Enter and submit all 2014 monitoring data to the MPCA.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT	July 2014

Upcoming Meetings/Events

- **August 2014** – Technical Advisory Committee meeting for the ongoing WRAP projects within the RLWD (date not set).
- **August 11-15, 2014** – Clearwater River geomorphology
- **August 20, 2014** – Pennington County SWCD Project Tour, 5 PM to 7:30 PM
- **August 2014** – Enter and submit monitoring data from the Red Lake River and Grand Marais Creek watersheds to the MPCA for EQuIS entry prior to the official water quality assessment.
- **September 17, 2014** – Pennington County Outdoor Education Day
- **September 23 and 24, 2014** – Northwest Minnesota Water Festival events in Warren and Fertile
- **October 6-17** – Clearwater River Geomorphology – Intensive station work
- **December 2, 2014** – Public kick-off meeting for the Clearwater River WRAP
- **December 3, 2014** – Marshall County Water Resources Advisory Committee Meeting
- **December 4-6, 2014** – Minnesota Association of Watershed Districts 2014 Annual Meeting and Trade Show
- **January and February 2015** – Thief River, Red Lake River, and Grand Marais Creek WRAP stakeholders meetings (dates not set)

Quote of the Month:

"Success has a simple formula: do your best and people may like it.""
– Sam Ewing

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.