

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 10/22/2021



Water Quality Monitoring

2019 dissolved oxygen data from deployed HOB0 U26-001 temperature/dissolved oxygen (DO) loggers were processed and corrected. When data is downloaded from dissolved oxygen loggers, it is inspected and converted to .csv files using HOB0ware software. In the lab, side-by-side measurements (in water) are recorded from each logger and a “control” instrument which is usually the District’s portable Manta 2 sonde before and after the steps of cleaning and calibrating the loggers. The relative change in logger readings before and after cleaning is called “fouling drift.” The relative change in logger readings from before calibration to after calibration is called “calibration drift.” Because the HOB0 DO loggers are equipped with optical sensors, they are fairly resistant to either form of drift. Data compilation and correction is completed using Aquarius software. Dissolved oxygen data is only corrected for calibration and fouling drift if the sum of the absolute values of the drift calculations meets or exceeds a threshold of 0.3 mg/L. The data can also be inspected for individual outlier values that can be trimmed from the record. Periods of excess drift (>2 mg/L, in rare cases of excess fouling) are also trimmed from the corrected dissolved oxygen records. Because the loggers record dissolved oxygen levels 24 hours a day, they capture values that are relatively close to each day’s daily minimum concentration (compared to daytime measurements collected during site visits), which is important for accurate water quality assessments. If more than 10% of the daily minimum dissolved oxygen levels drop below 5 mg/L throughout a 10-year summer water quality record for a portion of a stream, that stream may be listed as impaired by low dissolved oxygen concentrations. The amount of daily fluctuation in dissolved oxygen is also used in water quality assessments as an indicator of eutrophication (excess nutrients). The results are shown in the following charts.

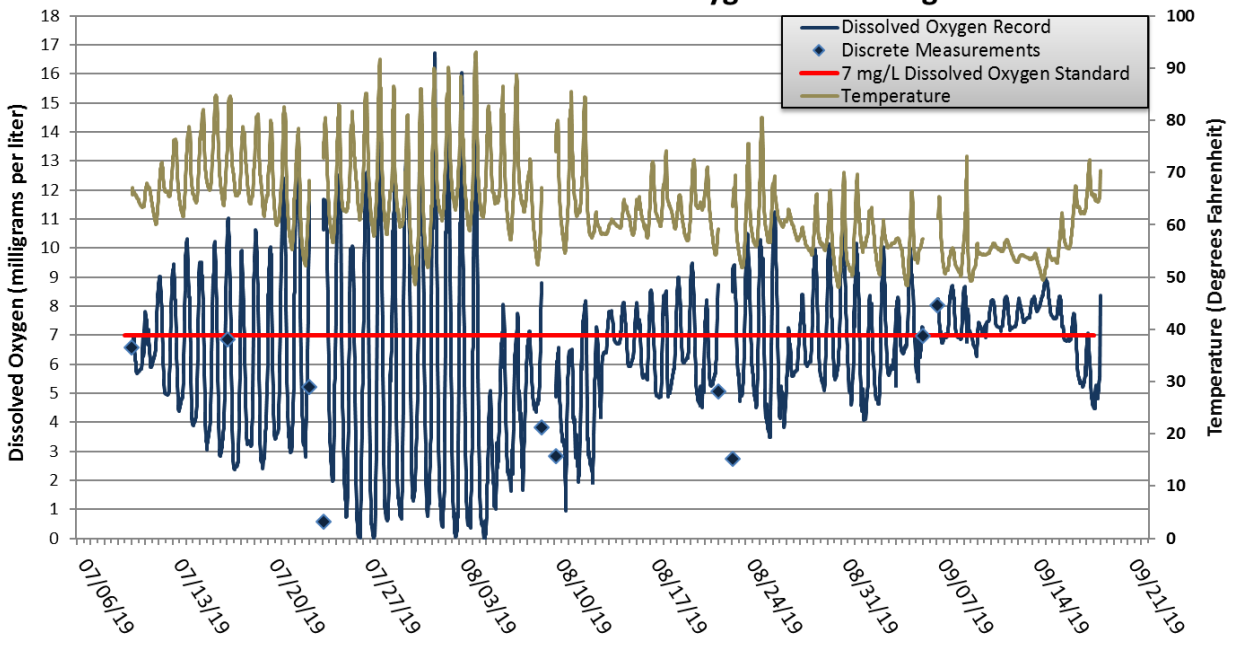
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

January 2021



68 of 72 Daily Minimums
were <7 mg/L (94.4%)

Lost River at the South Crossing of 141st Ave 2019 Continuous Dissolved Oxygen Monitoring



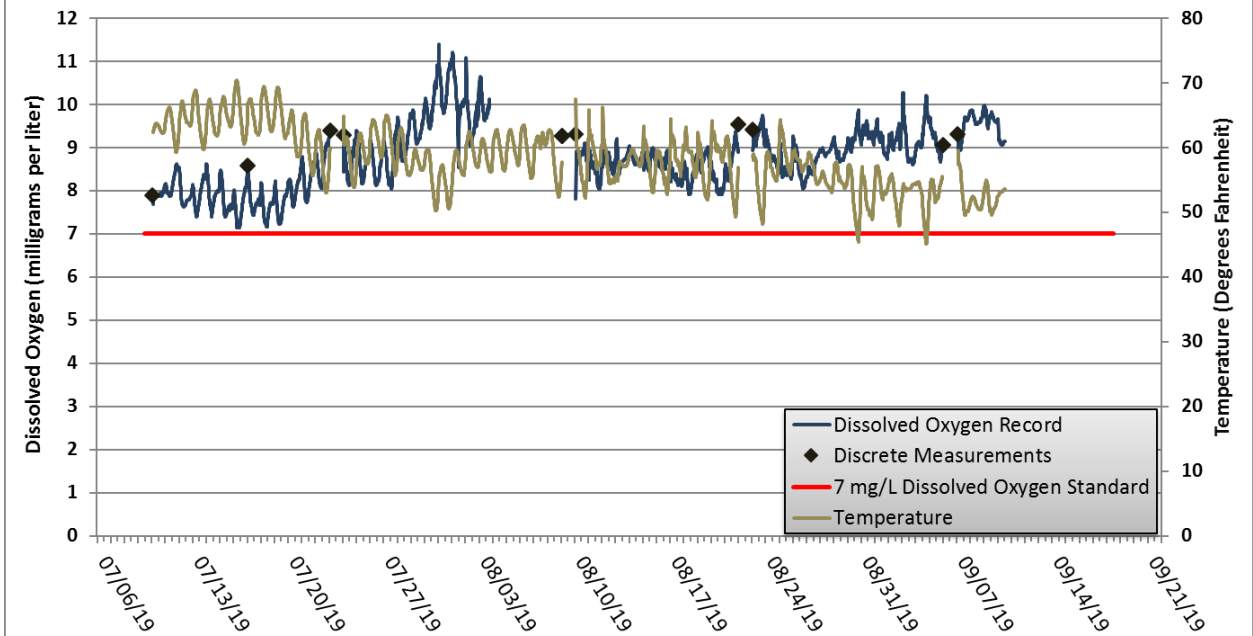
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

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0 of 67 Daily Minimums
were <7 mg/L (0.0%)

Lost River Tributary at 410th Street Upstream of Lost Lake 2019 Continuous Dissolved Oxygen Monitoring



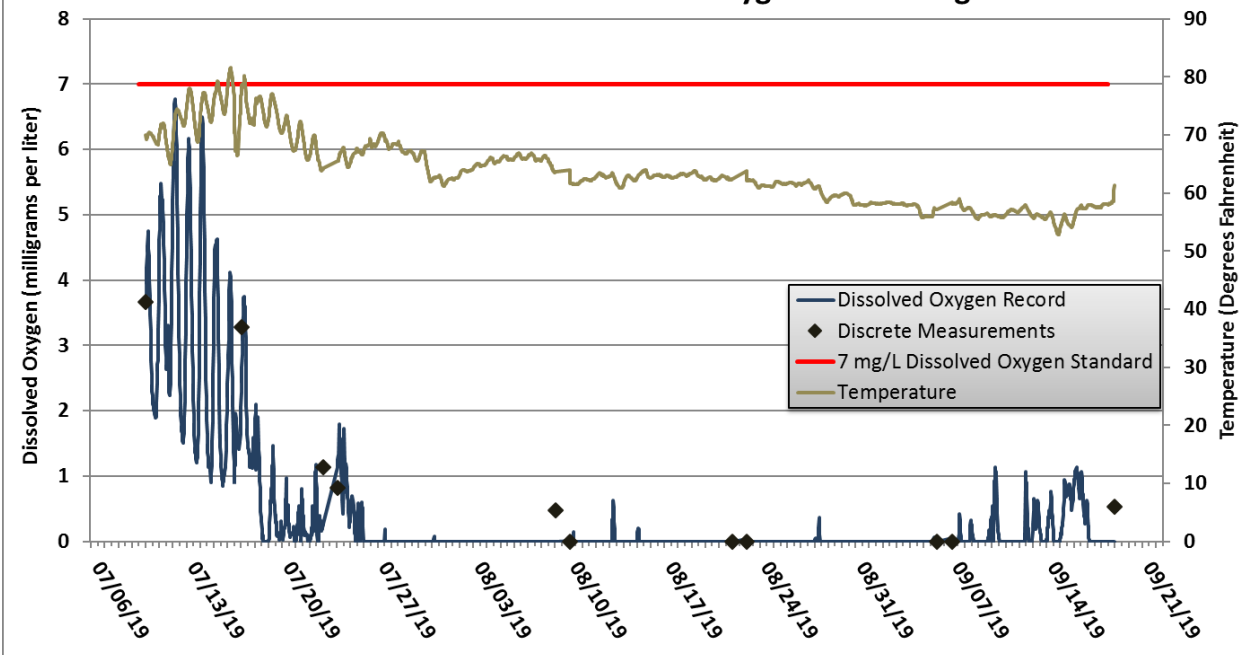
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

January 2021



72 of 72 Daily Minimums
were <7 mg/L (100%)

Lost River at 141st Ave Downstream of Lost Lake (LR20) 2019 Continuous Dissolved Oxygen Monitoring



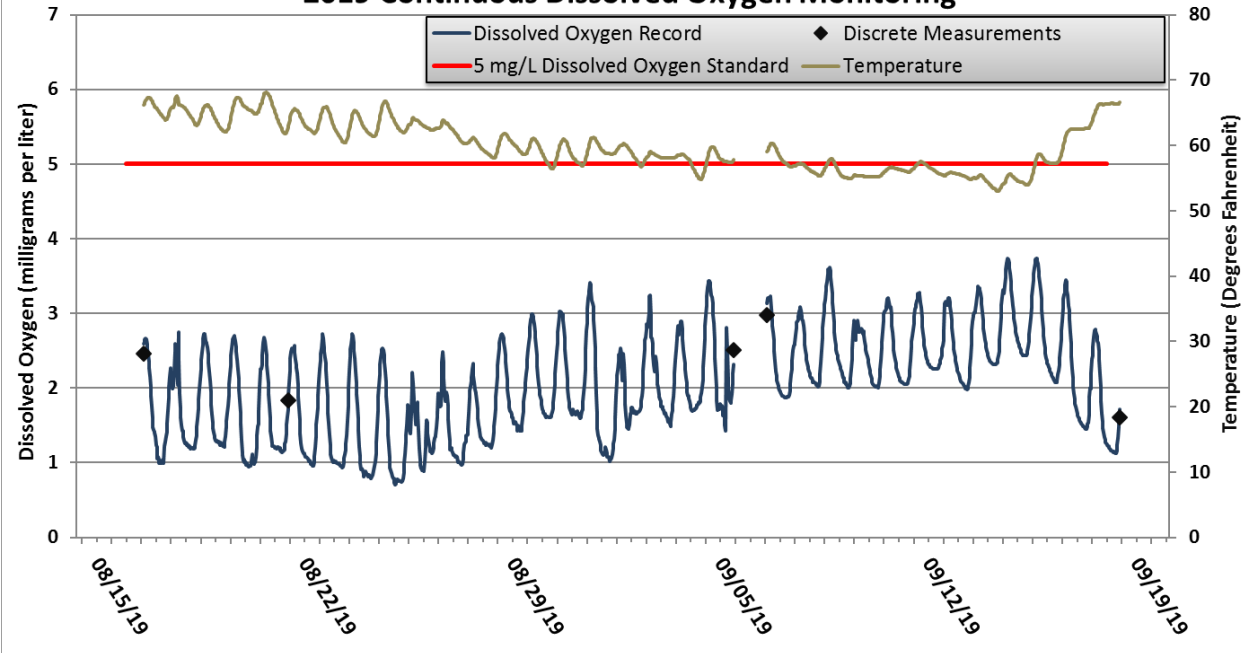
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

January 2021



34 of 34 Daily Minimums
were <5 mg/L (100%)

Lost River at 109th Ave Upstream of Pine Lake 2019 Continuous Dissolved Oxygen Monitoring



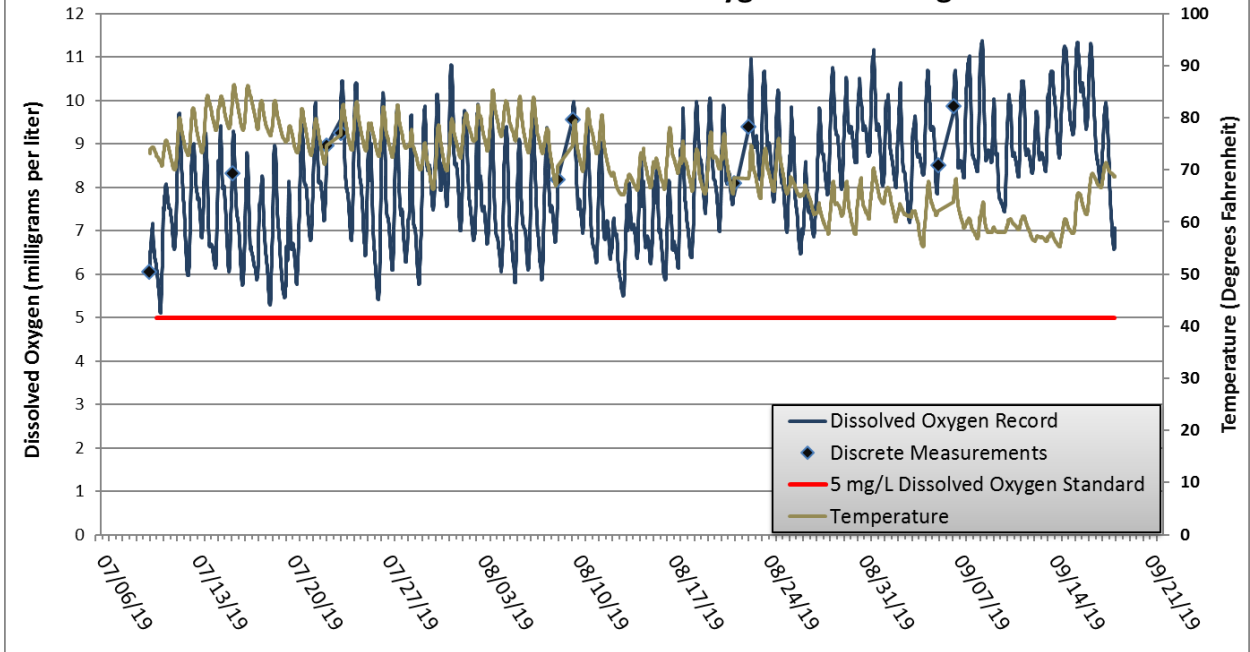
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

January 2021

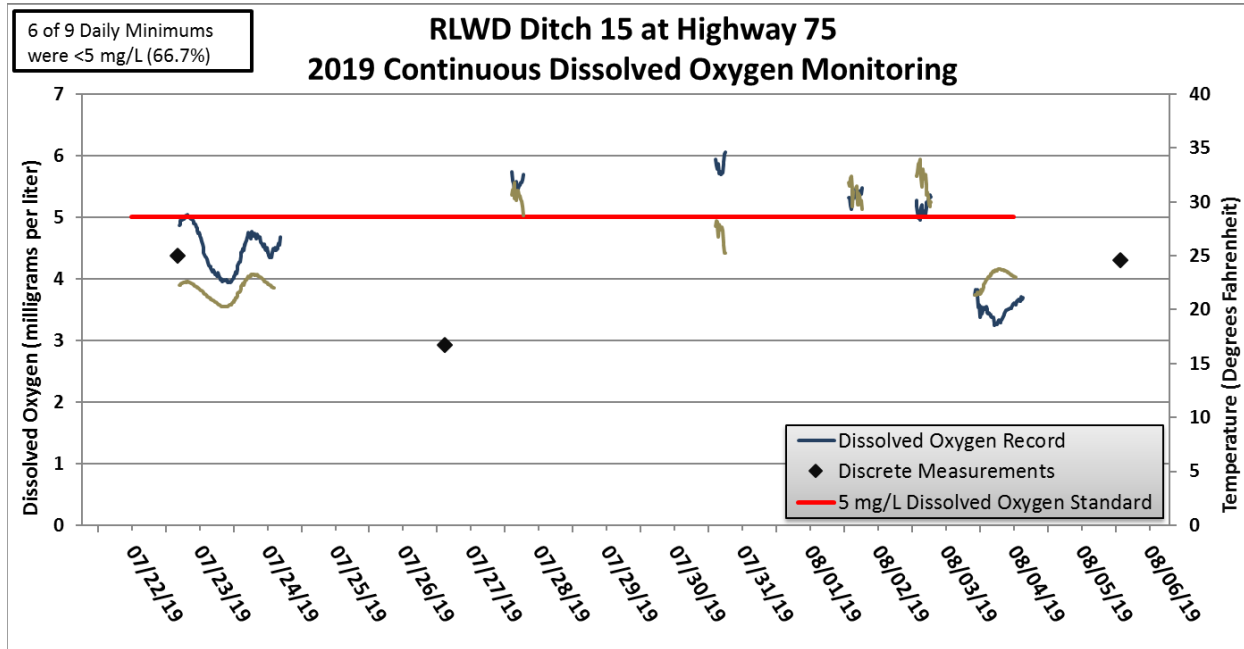


0 of 72 Daily Minimums were <5 mg/L (0.0%)

Lost River at 486th Street, Near the Pine Lake Outlet 2019 Continuous Dissolved Oxygen Monitoring



Red Lake Watershed District Ditch 15 (and Brandt Impoundment outlet channel) was monitored at the Highway 75 crossing. Though there was some flow when the logger was deployed, it became sporadic and the sensors were dry when the logger was retrieved. Due to the relatively stagnant conditions, dissolved oxygen levels below the 5 mg/L water quality standard were recorded during the majority of days in which there was flow. The channel is wide at this site, so water was very shallow, making the site unsuitable for logger deployments during low flows. Logger deployment at a different crossing was attempted for the next deployment within RLWD Ditch 15.



A summary of water quality conditions in lakes sampled by the East Polk SWCD was written to accompany a proposal for a continuation of financial support for their monitoring program:

The East Polk Soil and Water Conservation District has been helping watershed districts with the collection of water quality data from streams and lakes within their district. Within the Red Lake Watershed District, they have been sampling 9 lakes and collecting water quality measurements at 5 river monitoring locations. At the April 26, 2018 meeting, the RLWD Board of Managers approved reimbursement for lake sample analysis for 3 years. The SWCD is interested in continuing to collect lake samples for an additional 3 years (2021-2023) if the Board wishes to continue to approve the reimbursement of their sampling expenses. This has been a great deal for the RLWD because the cost of sample analysis is relatively cheap compared to the staff time that is required to travel to lakes and collect samples. Data management and submittal to the MPCA is also handled as part of the RMB Lakes Monitoring Program, which adds to the time saving value in supporting the SWCD's monitoring effort. Their sampling effort has provided valuable data, including data from lakes that had not been sampled much in the past.

From the data collected by the East Polk SWCD, we have learned that the water quality in Cameron Lake has improved a little since the 2016 assessment. Severe impairments have been identified in Hill River Lake and Oak Lake. It would be good to continue to collect data to improve the data set that would be

needed to develop TMDLs for those lakes. Several lakes are near the impairment thresholds for total phosphorus and/or chlorophyll-a and additional data would improve confidence in future water quality assessments. The nearly/barely impaired statuses of Badger Lake, Turtle Lake, Cross Lake, and Whitefish Lake could potentially make those lakes' watersheds high priority areas for implementation of water quality improvement projects. The water quality in Poplar Lake and Spring Lake comfortably met water quality standards, so those lakes should have sufficient data to show that it is meeting water quality standards during the 2017-2026 assessment period. In the place of Poplar Lake and Spring Lake, Cable Lake and Store Lake could be sampled to attain a complete picture of water quality conditions in significant lakes within the Polk County portion of the Clearwater River watershed.

A final review of the District's 2020 water quality data, prior to storage in the MPCA's EQUIS database, was completed.

Thief River Watershed One Watershed One Plan (1W1P)

HDR Engineering began surveying the meanders of the old Mud River channel in early January 2021 for the feasibility study phase of the Mud River Restoration project. They surveyed a total of 27 miles of river channel (current and historic portions).

Red Lake River Watershed One Watershed One Plan (1W1P)

The Plan Coordinator (Peter Nelson) and the Planning Work Group worked on consolidating the 2018-19 and 2020-21 biennial work plans into a single 2021 Annual Work Plan.

The RLWD Board of Managers approved the hiring of a consultant to conduct a survey and feasibility assessment of the Demarais-Hanson erosion problem. This area is a very large gully that has formed downstream of CSAH 11, near the Red Lake River west of Red Lake Falls. District staff contacted landowners in the project areas to learn about the history of the problem and get access permission. District staff completed surveying for the Demarais-Hanson feasibility study. District staff helped staff from Houston Engineering complete a survey of the project area.



District staff updated the ArcOnline progress tracking map for the Red Lake River 1W1P with information about projects that were completed in 2020 (Ditch 16 side water inlets and outlet stabilization for the Thief River Falls Westside Flood Damage Reduction project). District staff contacted DNR geomorphology staff to get Bank Erosion Hazard Index (BEHI) data for the Red Lake River to help with prioritizing locations to implement streambank stabilization projects.

An article was written to publicize the Small Watersheds Focus 319 Grant that was awarded to the priority subwatersheds of the Red Lake River watershed:

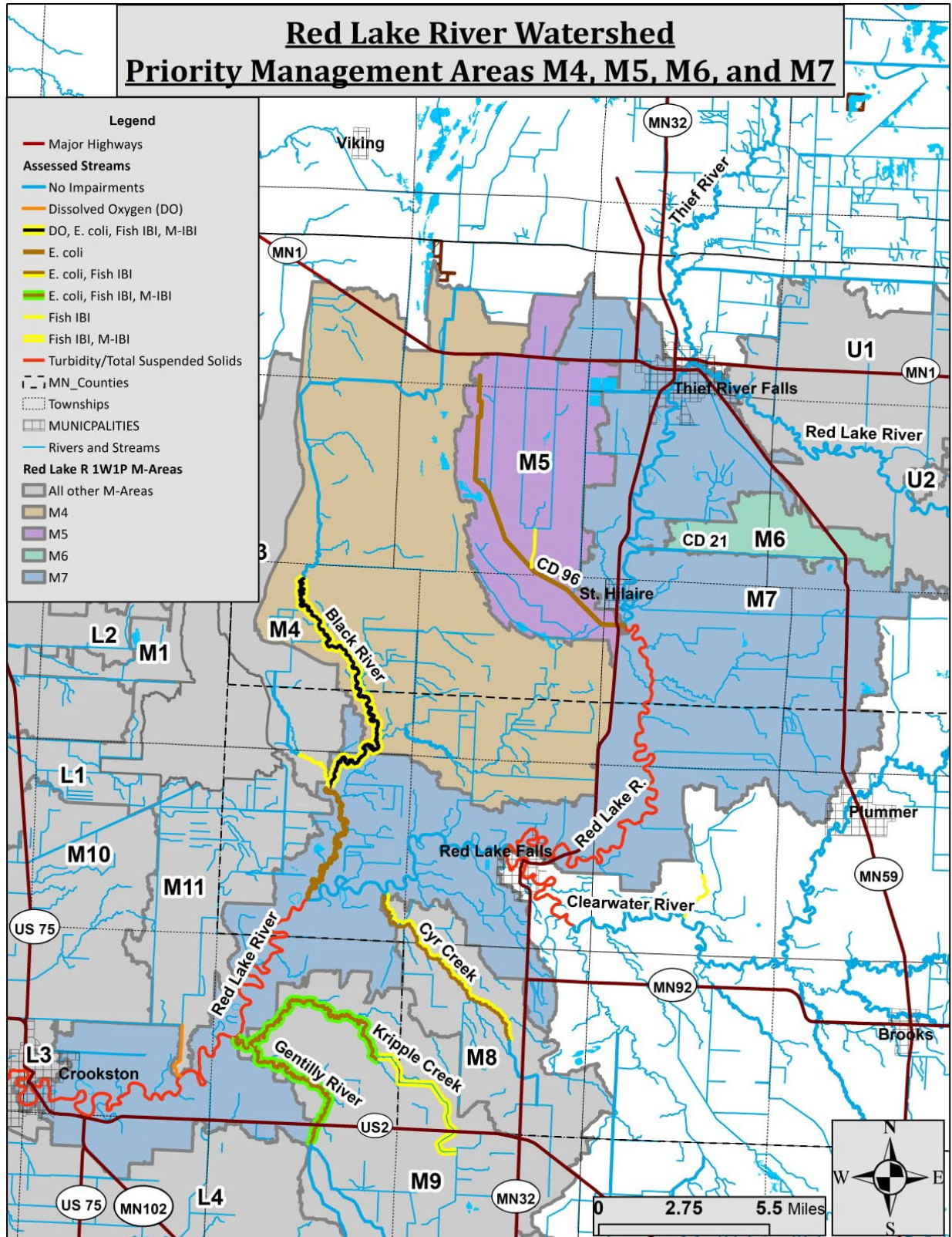
In November 2018, ten watersheds were selected to be prioritized for funding in federal fiscal year 2020. The selections were part of the transition in the federal Clean Water Act Section 319 program from one-time grants to more reliable funding focused on small watersheds. The goal of the program is to help local governments make measurable changes toward water quality improvements. Based on input from many local governments, the program is designed to provide a reliable and longer-term funding source to address all pollutants in small watersheds.

Red Lake River watershed was chosen to be one of the first 10 watersheds (Group A) to be eligible for this funding after the West Polk Soil and Water Conservation District (SWCD) successfully submitted a request for participation and Minnesota Pollution Control Agency (MPCA) staff met with local project partners. After the watershed was selected, the first step toward receiving the funding was to create a work plan. Grant applicants were required to have a nine-key-element (NKE) plan, approved by United States Environmental Protection Agency (EPA), to be eligible for funding. Group A watershed partners worked with the MPCA to develop a highly detailed plan for each watershed that, if implemented as written, will sufficiently reduce non-point source pollution so that the prioritized waterbodies will reach water quality standards in ten years. The Red Lake River (Thief River Falls – Crookston) and Black River Nine Key Element Plan was created using input from the Red Lake River One Watershed One Plan (1W1P) and the 1W1P Planning Work Group.

During the summer of 2020, the MPCA sought applications for the Fiscal Year 2020 round of funding for projects that will reduce nonpoint source pollution within the Group A watersheds. The Red Lake River 1W1P Planning Work Group developed a work plan and proposal for the funding that was allotted to the Red Lake River watershed. Peter Nelson, Pennington SWCD Water Plan Coordinator and Red Lake River 1W1P Coordinator, took the lead in writing the proposal. The proposal was officially submitted on July 16, 2020, by the Red Lake Watershed District (Red Lake River 1W1P Fiscal Agent). On August 6, 2020, MPCA staff announced that the Red Lake River proposal for a Fiscal Year 2020 Section 319 Small Watersheds Focus grant was approved for funding in the amount for \$284,275.

The projects and activities of the Red Lake River (Thief River Falls-Crookston) and Black River EPA NKE Plan will be targeted within priority management areas of CD 96, Black River, and the middle reach of the Red Lake River between Thief River Falls and Crookston. The projects will reduce the transport of eroded sediment (sediment loading) to the Red Lake River by an estimated 1,148 tons/year. Some of the projects will also reduce E. coli concentrations in the Red Lake River and its tributaries (especially the Black River and Pennington County Ditch 96). The \$284,275 in EPA grant funding, along with at least \$189,517 in matching state/local funds, will implement:

- Grade stabilization structures (including side water inlets)
- Water and Sediment Control Basins (WASCOBs)
- Streambank stabilization or meander cutoff stabilization along the Red Lake River
- Cover crops, nutrient management, and other non-structural source reduction projects
- Riparian buffers
- Riparian forest buffers
- Field borders
- Grazing management plans
- Cattle exclusion or access control plans



Clearwater River One Watershed One Plan (1W1P)

The work being done to develop PTMApp for the Clearwater River Watershed was transitioned from the former Natural Resource Technician (who left in mid-January for a new job with the NRCS) to the Water Quality Coordinator. Progress was made on completing the lakes routing phase of the PTMApp development. Lake outlines, “burn lines,” and “wall lines” were edited to make sure that the PTMAPP model correctly simulated flow through lakes. In PTMApp, a lake can have multiple inlets, but only one outlet. Some trial and error were needed to encourage the flow accumulation lines to exit odd-shaped lakes in a single location. Ground truthing and examining of LiDAR data was completed to make sure that the simulated, digital inlets and outlets matched reality as closely as possible.

A consultant for Technical Service Area 8 created a batch of 50 simple maps of the features in the Clearwater River Watershed. Project partners worked on finalizing a budget for the planning process.

Project Development

In anticipation of upcoming Red River Watershed Management Board Water Quality funding, District staff began compiling a list of known projects that could be funded and implemented soon.

- **Mud River Restoration Project:**
 - A limited amount of Thief River 1W1P Project Development money is available
 - If we reach a construction phase, RRWMB competitive water quality funding could be a resource to use to fund water quality components of the project.
 - There has been some optimistic discussion about the incorporation of flood damage reduction components, which would help with obtaining RRWMB funding.
- **Judicial Ditch 30 outlet stabilization**
 - Listed as a priority project for a feasibility study (2nd in priority) in the Thief River 1W1P, but the Mud River Restoration feasibility study may not leave sufficient Project Development funding to fully fund the JD 30 investigation.
 - Base funding could be used for Phase I, or the portion of the survey/design work not covered by the watershed-based funding.
 - Competitive RRWMB funding or the 2022 Thief River 1W1P application could be used for construction.
- **Moose River Stabilization Project**
 - Identified in the Thief River 1W1P as the 3rd priority project for a feasibility study, but there may not be sufficient funding remaining in the 2020 Thief River 1W1P Project Development budget.
 - RRWMB base water quality funding could be a good resource for funding the feasibility study
 - If the feasibility study results in plans for grade stabilization, streambank stabilization, or channel restoration, that construction work could be funded with RRWMB competitive water quality funding, 2022 Thief River 1W1P watershed-based funding, a competitive Clean Water Fund grant, or a combination of those funding sources.
 - Application of RRWMB base water quality funding to an investigation of Moose River channel/bank instability was discussed during a phone call with Beltrami County during

the summer of 2020. It sounded like Beltrami County was motivated to start working on this project.

- Clearwater River Watershed WASCObS
 - East Polk SWCD BWSR Clean Water Fund Application (currently unfunded)
 - Support from the RLWD Board in the form of pledged matching funds
- Grade Stabilization project at the outlet of Polk CD 1 (M10), Polk County JD 60 (M11), and CD 28 in Red Lake County
 - Among the list of “Other Projects” in the Red Lake River 1W1P annual work plans
- Phase III of Burnham Creek Watershed Project: Side inlet controls, vegetative buffer strips and grade stabilization structure installation
 - Among the list of “Other Projects” in the Red Lake River 1W1P annual work plans
 - MN DNR is working on an intensive geomorphological study of the Burnham Creek subwatershed that could be used to prioritize project areas within the subwatershed.

Other

- Ashley Hitt, Natural Resource Technician, accepted a new job with the NRCS. Ashley was an important member of our team, working with River Watch students, fulfilling the role of the office’s GIS specialist, helping with water quality sampling, and development of PTMapp for multiple watersheds. Christina Slowinski will transition from the Engineering Technician (Ditch Inspector) position to the Natural Resource Technician position in the spring of 2021.
- District staff worked on editing the Bartlett Lake Management Plan
- A water quality report was completed for the month of [December 2020](#).
- District staff reviewed an article about Red Lake River erosion control projects (that was being written by BWSR staff about Pennington County SWCD projects: <https://mnbwsr.medium.com/red-lake-river-bank-stabilizations-protect-water-quality-infrastructure-b6a4be1858e>).
- The Winter 2020-21 International Water Institute River Rendezvous newsletter featured an article thanking RLWD Natural Resource Technician, Ashley Hitt, for her contributions to the River Watch program: <https://mailchi.mp/56960162880b/iwi-river-rendezvous-winter-20?e=%5BUNIQID%5D>.
- District staff provided MPCA staff with GIS layers of ditches and ditch names so that they can correctly name channels in their databases. District staff also answered questions from another watershed district about working with HOBOWater Level Logger data.
- DNR staff shared GIS layers that show the results of the geomorphology assessments along the Red Lake River that were completed during the Watershed Restoration and Protection Strategy study.
- Agassiz National Wildlife Refuge staff shared the results of their 2020 water quality sampling. They found high *E. coli* concentrations upstream and downstream of the refuge. High TSS concentrations were found in the Mud River at Highway 89 and the Thief River at CSAH 7. They found high total phosphorus concentrations in the Thief River upstream of the refuge at 380th Street Northeast, Mud River at Highway 89, and Thief River at CSAH 7. The TSS concentrations at Agassiz Pool outlet monitoring sites were relatively low (the pool may not have been in a drawdown), but total organic carbon concentrations were relatively high in Judicial Ditch 11 downstream of Agassiz Pool.

- The District began the hiring process for Engineering Technician II and an Engineering Senior/Hydro II positions.

Water quality related notes and minutes from the January 14, 2021 Red Lake Watershed District Board of Managers meeting.

- The bid opening for Ditch 10 outlet repairs was conducted. The Board voted to accept the low bid from R.J. Zavoral & Sons, Inc., in the amount of \$218,498.35.
- Engineer Jacob Huwe, HDR Engineering, Inc., stated that collection of data has begun on the Preliminary Concept Report for the Mud River Restoration Project, RLWD Project No. 149A. Huwe noted that of the 27 miles to survey, five miles are left to be completed.
- Administrator Jesme discussed the funding agreement from the RRWMB for the Thief River Oxbow Project, RLWD Project No. 46Q. Construction on this project is anticipated to take place this summer.
- The RRWMB passed and approved last summer the RRWMB Water Quality Base Funding Program in the amount of \$100,000 for each watershed within the RRWMB. To receive the funding, each watershed puts in a request for water quality projects that would fit into their criteria.
- Executive Director Rob Sip, RRWMB, stated that the RRWMB allocated \$3 million for funding Water Quality projects, with \$1.3 million committed. The \$100,000 is meant to assist with smaller water quality projects, the competitive funds are for larger projects. Four projects were submitted as larger water quality projects. Sip stated that the RRWMB is looking for recommendations on what kind of funding needs there are for water quality projects through the RRWMB. Motion by Tiedemann, seconded by Ose, to support continuation of the RRWMB Water Quality Base Funding and Competitive Funding for Water Quality Projects within the RRWMB area. Upon roll call vote, motion carried unanimously.

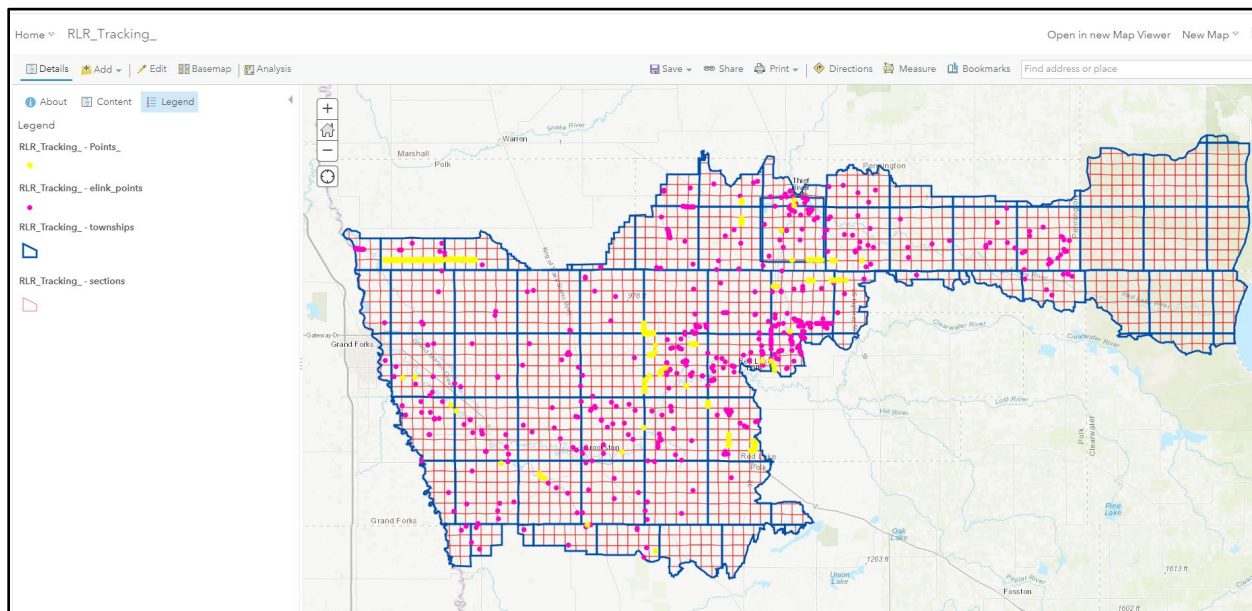
Water quality related notes and minutes from the January 28, 2021 Red Lake Watershed District Board of Managers meeting.

- District Manager, Peter Nelson, Pennington SWCD, updated the Board on construction projects for all the LGU's within the Red Lake River 1W1P, RLWD Project No. 149. Nelson and Staff member, Arlene Novak, stated that BWSR recently completed a reconciliation of the first 50% allocation of the 2018 grant, which approves the release of the next 40% of the available funding.
- Staff member Corey Hanson reviewed a proposal for continuation of financial support for the analysis of lake samples collected by the East Polk SWCD. Hanson stated that the East Polk SWCD will collect water quality samples on nine lakes for a monitoring period of three years (2021-2023). The East Polk SWCD contribution is approximately \$8,663.04, which includes staff time, administration, and transportation. The District's contribution would cover the cost of lab testing and shipping at an approximate cost of \$7,290 over the three-year term. Motion by Sorenson, seconded by Dwight, to approve the lake monitoring proposal with the East Polk SWCD at an approximate cost of \$7,290.00 for a three-year term. Motion carried.

January 2021 Meetings and Events

- **January 4, 2021** – Red River watershed Management Board Administrator's Meeting
 - Discussion of water quality funding and the status of current water quality projects

- RLWD staff provided an update on the progress of the Thief River Falls Oxbow Restoration Project, Ditch 16 side water inlets, and Black River side water inlets.
- Projected funding needs were discussed (future projects).
- **January 5, 2021** – Red Lake River 1W1P Planning Work Group meeting
 - The PWG discussed the agenda for the upcoming Policy Committee meeting.
 - The PWG discussed the possibility of using 1W1P Technical and Engineering funding to design 319 grant projects.
 - BWSR staff and Ashley Hitt, from the RLWD, were collaborating to create PTMApp tools/filters to help agencies identify locations where best management practices should be targeted.
 - The Red Lake River 1W1P ArcOnline progress tracking tool (shown below) is ready to use.



- **January 11, 2021** – Meeting to discuss the creation of maps for the Clearwater River One Watershed One Plan
 - Parcel data will be gathered for use in a forestry protection analysis/plan (percentage of land protected by buffers, conservation easements, etc.).
 - Do wild rice paddies count as storage?
 - A logo will be designed for use in Clearwater River 1W1P documents.
- **January 11, 2021** – Water quality staff meeting to discuss continuation of progress on the development of PTMApp for the Clearwater River Watershed.
- **January 12, 2021** – Red Lake River 1W1P financial meeting (organize understanding and tracking of the multiple funding sources)
- **January 13, 2021** – Red Lake River 1W1P Policy Committee meeting
 - The PC elected committee officers: Chair (Mark LaCrosse), Vice Chair (Gene Tiedemann), and Secretary (Neil Peterson).
 - The PC approved a motion to allow the fiscal agent to pay partner agencies up front, like payments to contractors, as long as the expenditures are within the budget and plan.

RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

January 2021

- A work plan change was approved to move \$44,000 in unused 2018 funding from Burnham Creek to the Thief River Westside outlet stabilization project.
- Project updates on the Thief River Westside outlet stabilization project, Ditch 16 side water inlets, Russia 13 stabilization project (Burnham Creek subwatershed), Wylie 34 grade stabilization, Joint County Ditch 60 grade stabilization, Pennington County Ditch 96 side water inlets, Pennington County Ditch 96 outlet stabilization, Regional Conservation Partnership Program (\$428,00 to use in fiscal years 2020-21, \$80,000 used in 2019, \$130,748 used in 2020), the Small Watersheds Focus 319 Grant.
- **January 26, 2021** – Clearwater River 1W1P Planning Work Group Meeting

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

Learn more about the Red Lake Watershed District at www.redlakewatershed.org.

Learn more about the watershed in which you live (Red Lake River, Thief River, Clearwater River, Grand Marais Creek, or Upper/Lower Red Lakes) at www.rlwdwatersheds.org.

“Like” the Red Lake Watershed District on [Facebook](#) to stay up-to-date on RLWD reports and activities.