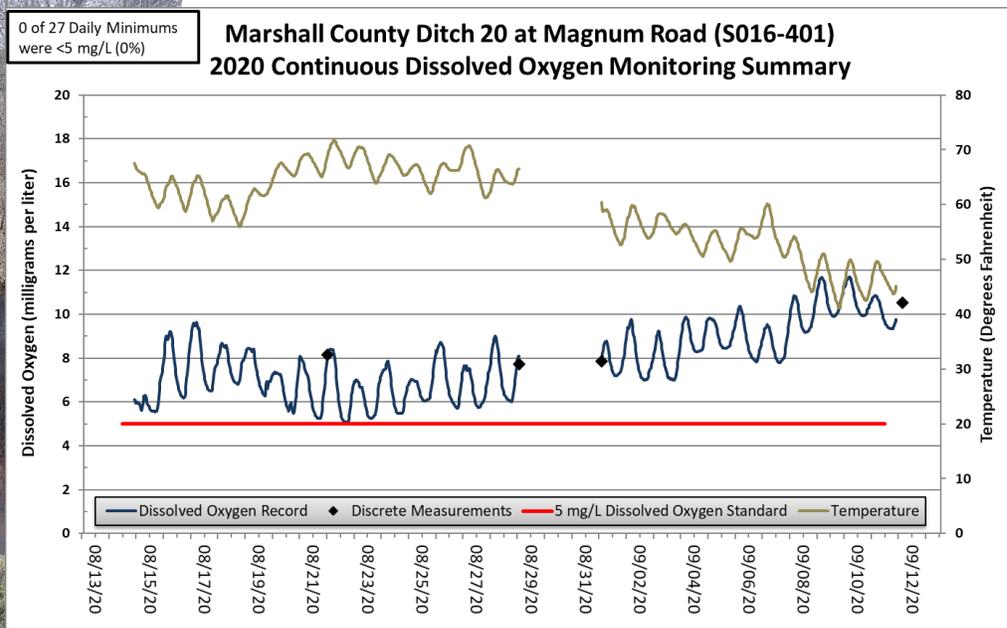
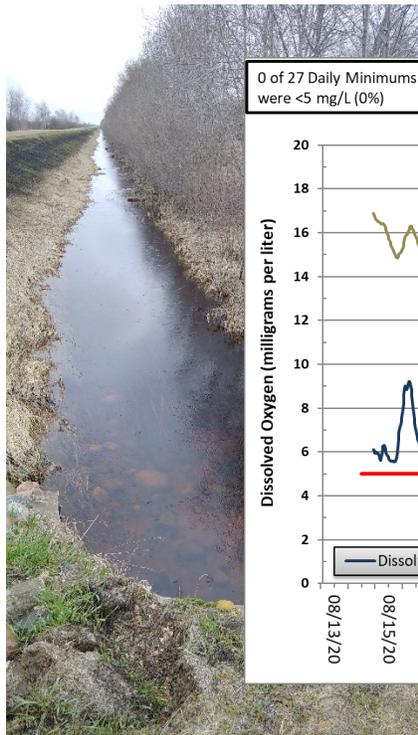


By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 10/25/2021

Water Quality Monitoring

2020 dissolved oxygen data from deployed HOBO U26-001 temperature/dissolved oxygen loggers was processed and corrected. When data is downloaded from dissolved oxygen loggers, it is inspected and converted to .csv files using HOBOWare 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 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 each day’s daily minimum concentration, 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 2020 dissolved oxygen records collected with deployed instruments are summarized in the following charts. Ideally, the blue lines (dissolved oxygen) should stay above the red lines (water quality standard) through at least 90% of the days shown in these charts.



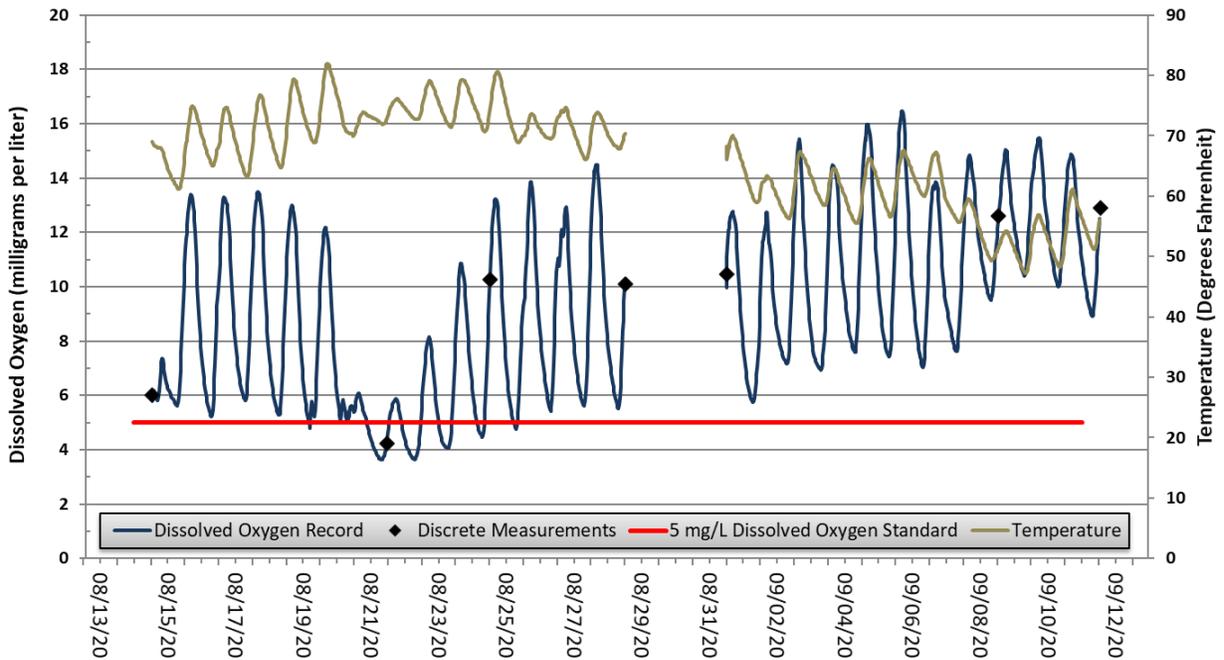
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



7 of 27 Daily Minimums
were <5 mg/L (25.9%)

Mud River at Highway 89 (S002-078) 2020 Continuous Dissolved Oxygen Monitoring Summary



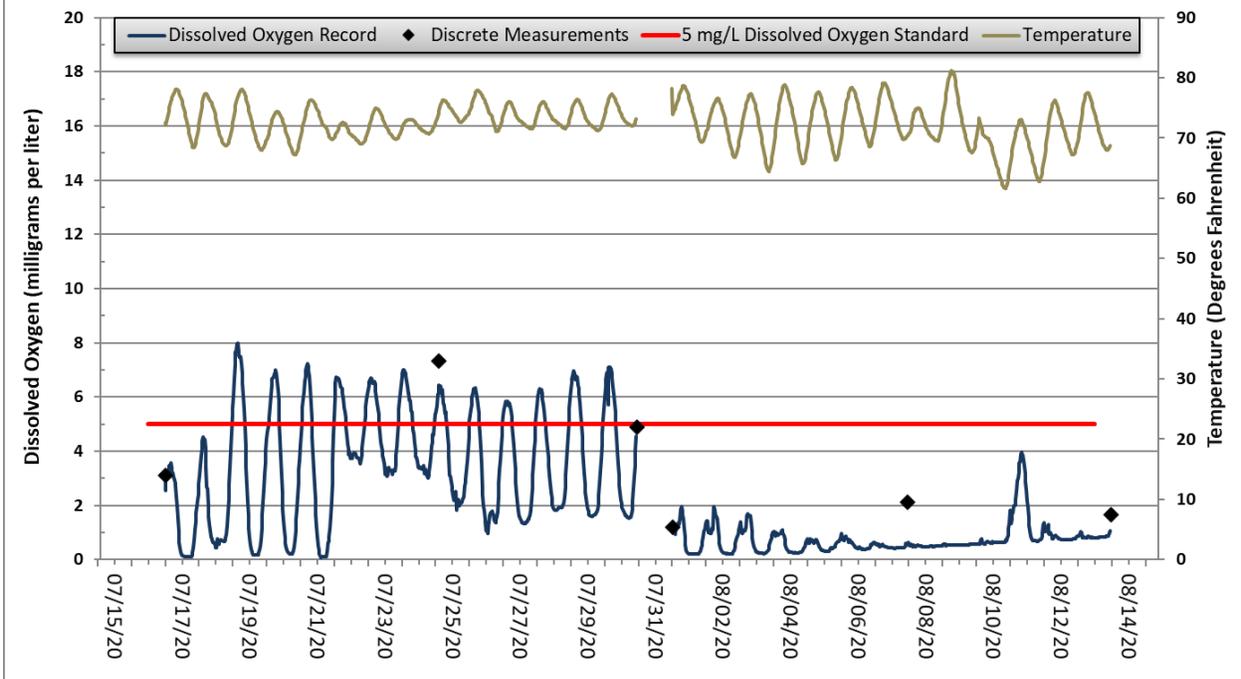
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



29 of 29 Daily Minimums
were <5 mg/L (100%)

Branch 200 of Judicial Ditch 11 (S004-493) 2020 Continuous Dissolved Oxygen Monitoring Summary



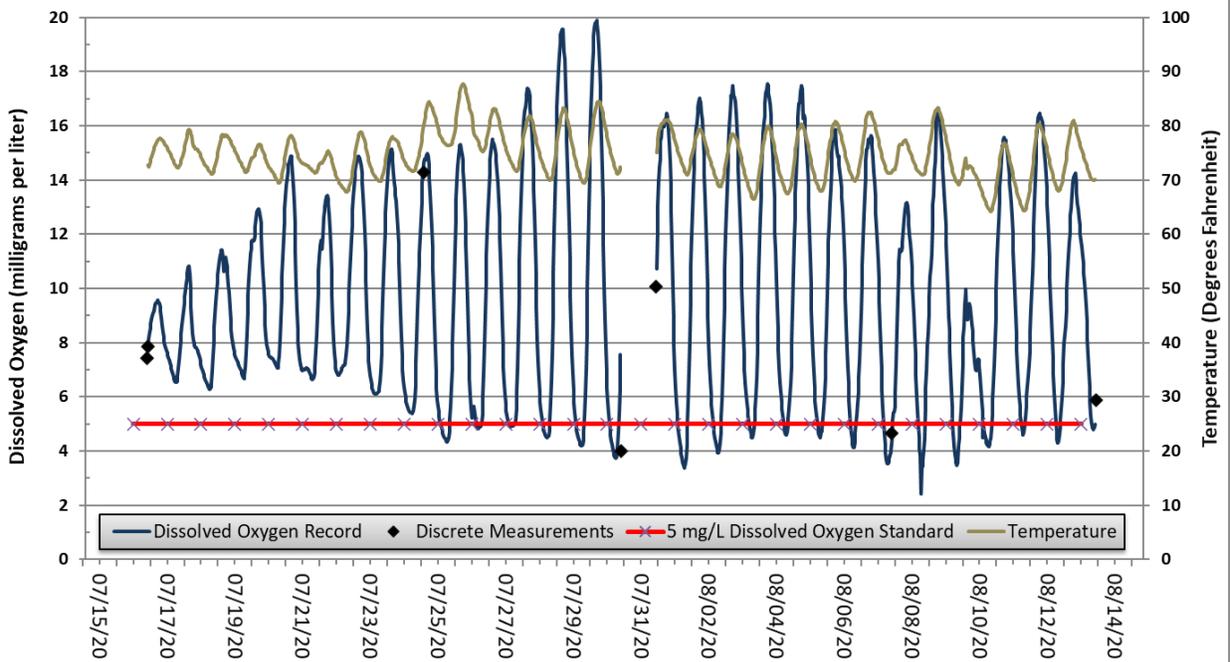
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



19 of 29 Daily Minimums
were <5 mg/L (65.5%)

Judicial Ditch 30 at 140th Ave NE (S004-966) 2020 Continuous Dissolved Oxygen Monitoring Summary



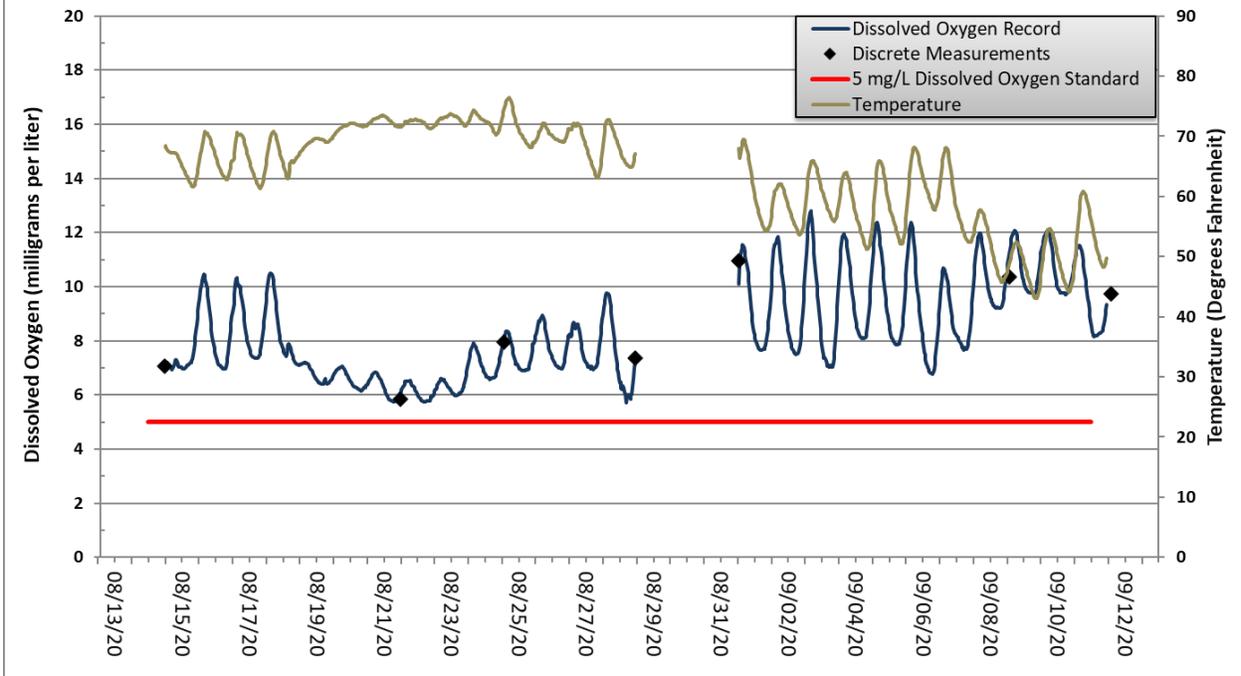
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



0 of 27 Daily Minimums
were <5 mg/L (0%)

Moose River at CSAH 54 (S004-211) 2020 Continuous Dissolved Oxygen Monitoring Summary



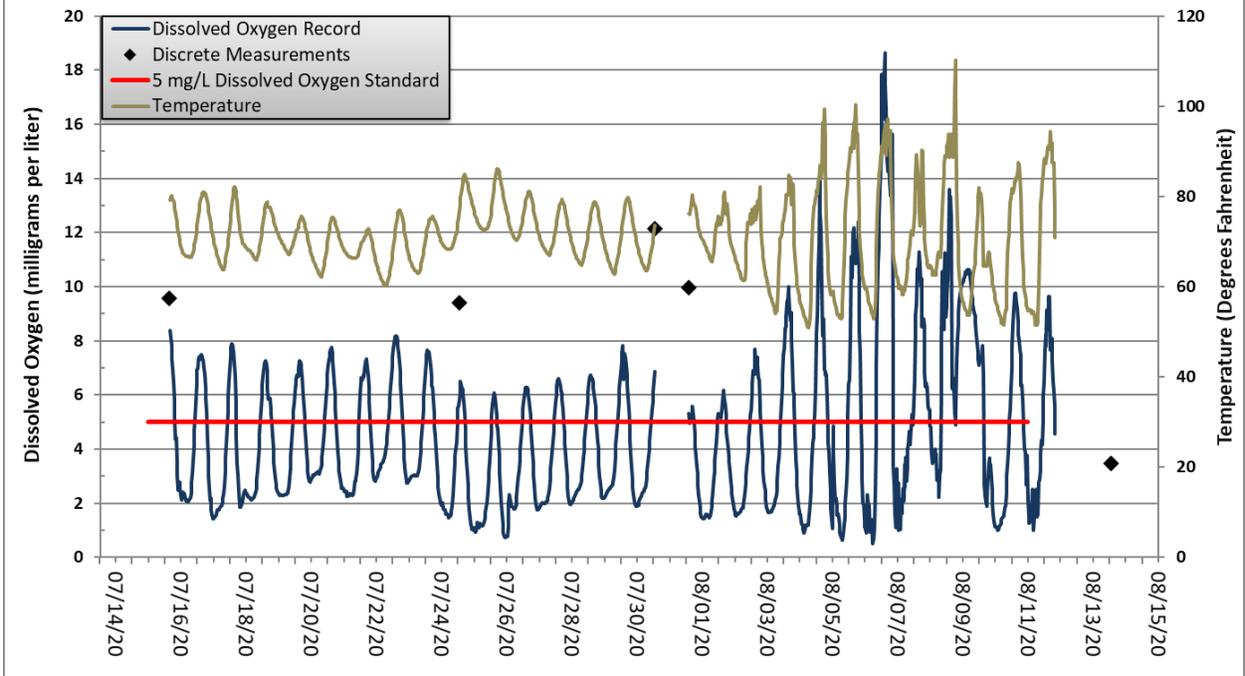
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



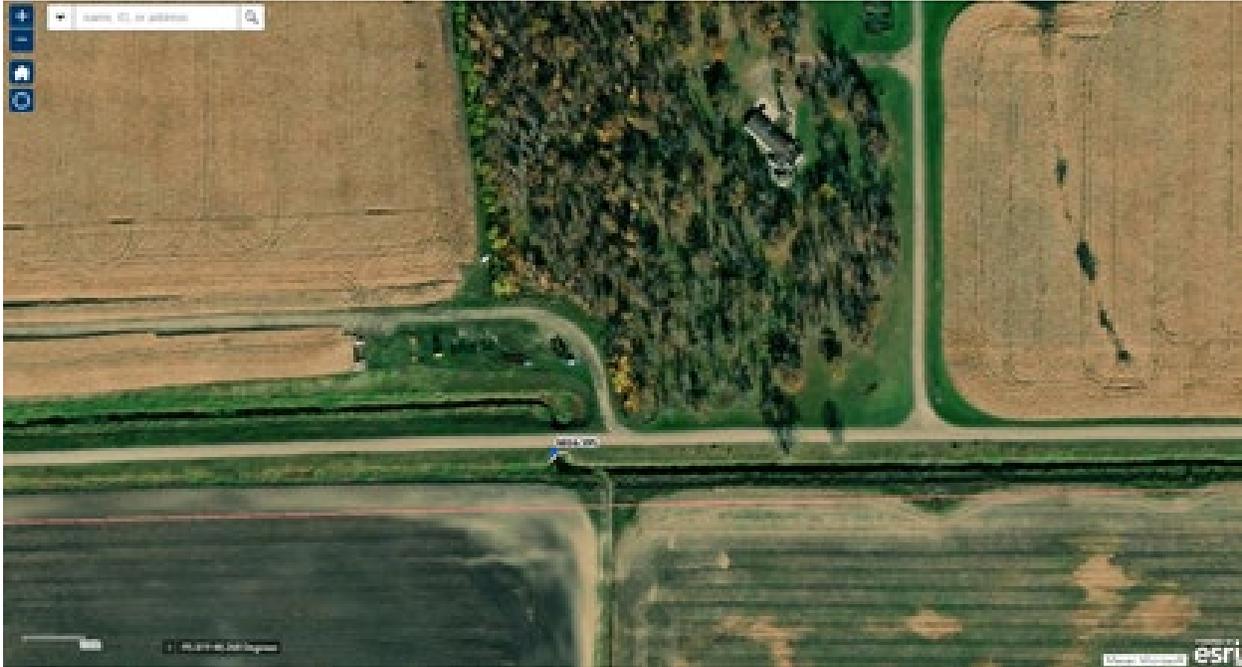
28 of 28 Daily Minimums
were <5 mg/L (100%)

Pennington County Ditch 21 at 135th Ave NE (S008-889) 2020 Continuous Dissolved Oxygen Monitoring Summary



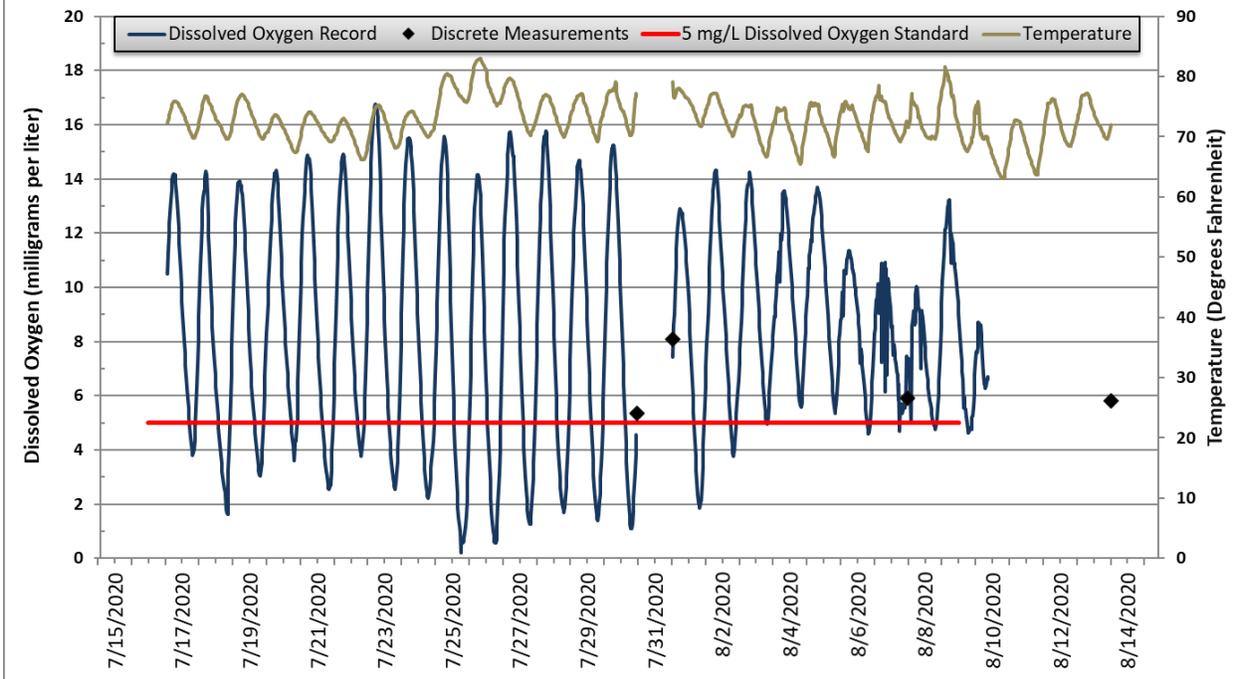
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



21 of 25 Daily Minimums were <5 mg/L (84%)

Branch 200 of Judicial Ditch 11 at 270th St. NE (S016-395) 2020 Continuous Dissolved Oxygen Monitoring Summary



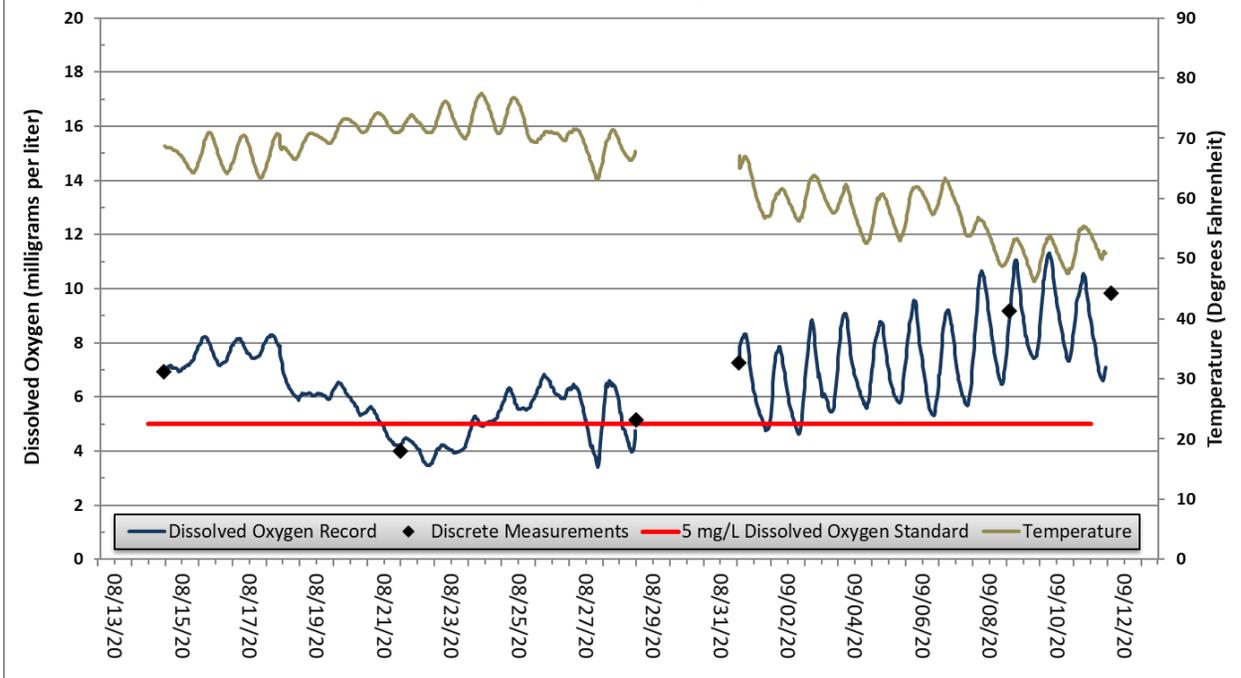
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



8 of 27 Daily Minimums
were <5 mg/L (29.6%)

Moose River at Moose River Road NW (S002-980) 2020 Continuous Dissolved Oxygen Monitoring Summary



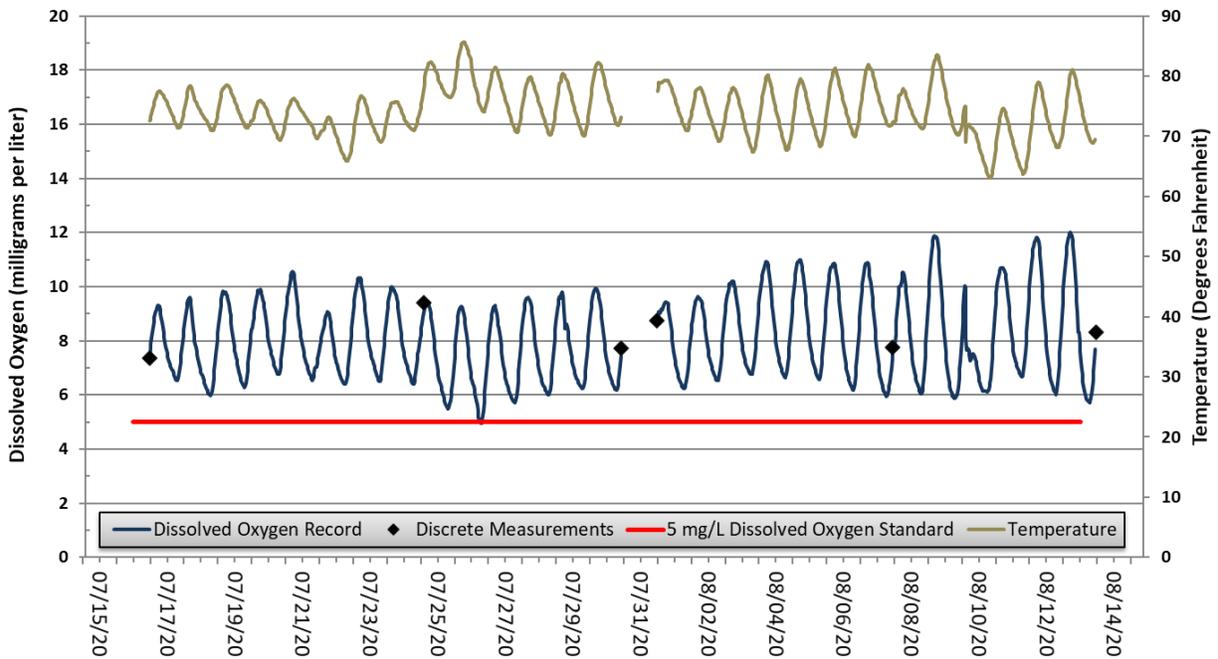
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



1 of 29 Daily Minimums
were <5 mg/L (3.4%)

Marshall County Ditch 20 at 180th Ave NE (S004-494) 2020 Continuous Dissolved Oxygen Monitoring Summary



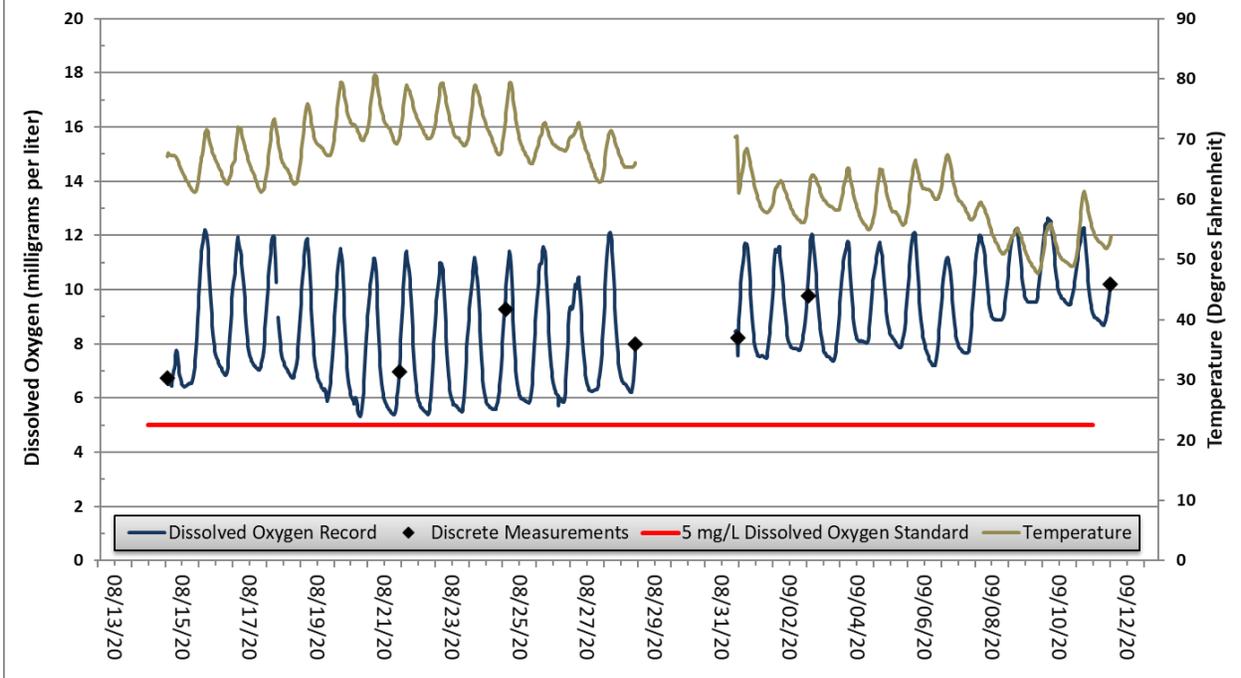
RED LAKE WATERSHED DISTRICT MONTHLY WATER QUALITY REPORT

February 2021



0 of 27 Daily Minimums
were <5 mg/L (0%)

Branch A of Judicial Ditch 21 at CSAH 48 (S006-540) 2020 Continuous Dissolved Oxygen Monitoring Summary



Thief River Falls Oxbow Restoration and Stormwater Treatment Project

District staff worked on a project work plan for the \$250,000 Clean Water Fund grant that was awarded to the project by the Minnesota Board of Water and Soil Resources.

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

Houston Engineering, hired to complete a feasibility study for stabilization of the “Demarais-Hanson” gully erosion problem (a large Gully north/downstream of CSAH 11, west of Red Lake Falls), evaluated alternative concepts for stabilization of the erosion.

Clearwater River One Watershed One Plan (1W1P)

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 293 lakes and other large pools in the watershed. In PTMApp, a lake can have multiple inlets, but only one outlet. Multiple rounds of “trial and error” editing 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. After each round of groundtruthing, wall-line edits, and creation of a new flow accumulation layer, the number of lakes needing additional edits incrementally dropped until flow properly entered and exited all lakes.

Areas where flow is stopped (in the digital model) and creates a “pool” were examined to find areas where digital flow accumulation may be artificially halted by a roadway or other structure that may have a culvert. Potential culvert locations that could not be verified in aerial photos were marked on a map that was used to guide the groundtruthing effort. Along with an examination of those “non-contributing areas,” flow accumulation lines (digital flow paths) were examined to find unnatural-looking alterations to flow (90-degree turns, for example) where a culvert location may need to be groundtruthed and “burned” into the digital LiDAR elevation surface. A Google Earth layer was created to mark locations that needed to be visited to locate potential culverts, mark groundtruthed locations that did not have culverts, and record other observations from the groundtruthing effort.

The Planning Work Group was informed that a portion of the Clearwater River Watershed planning area boundary was slightly changed as a result of the completion of the Wild Rice River Watershed 1W1P process. Because of the change, work plan maps were revised to include the altered planning boundary.

Other

- District staff provided photos to MPCA public information staff to help with the creation of public notice materials for the Upper/Lower Red Lake Watershed Restoration and Protection Strategy and Total Maximum Daily Load reports.
- District staff wrote articles for the 2020 Red Lake Watershed District Annual Report.
- District staff looked at different options for remote water level monitoring equipment that could be deployed in Pine Lake.
- The Environmental Protection Agency approved the 24 TMDLs that were addressed in the Clearwater River Watershed Total Maximum Daily Load report.

Water quality related notes and minutes from the February 11, 2021 Red Lake Watershed District Board of Managers meeting.

- Staff member Nick Olson stated that aeration at Pine Lake has not begun. MnDNR staff completed oxygen testing last week and the Gonvick Sportsman's Club will complete additional testing next week. Criteria has been met for notice publication in the local paper. Olson stated that the District is the MNDNR permit holder for the aeration, and the Gonvick Sportsman Club pays the cost to install and run the aeration system.
- Administrator Jesme stated that he and Staff member Corey Hanson have been working with Chester Powell, Clearwater SWCD and other partners, on the Work Plan for Clearwater River 1W1P, RLWD Project No. 149B. Once a draft is completed, it will be presented to the Policy Committee for review and approval. Hanson is working on completing the editing on the PTMApp model before handing it off to Houston Engineering, Inc. Discussion was held on staff time spent on development of the PTMApp model. The Policy Committee meeting will be held on February 24, 2021 at 1:00 p.m. Notices for the meeting will come from Powell.
- Jesme and staff member Hanson have been working with the Clearwater SWCD on the Clearwater River 1W1P.

Water quality related notes and minutes from the February 25, 2021 Red Lake Watershed District Board of Managers meeting.

- Administrator Jesme stated that the District applied for and received a \$166,000 grant from the RRWMB and a \$250,000 BWSR Clean Water Funds Competitive Grant for construction of the Thief River Falls Oxbow Project, RLWD Project No. 46Q. The estimated project cost is \$500,000, with a remaining balance of needed funds in the amount \$84,000. Discussion was held on the administrative portion of the grants that the District will be required to complete for the Work Plans and various reporting requirements. Wayne Johnson, City of Thief River Falls, stated that in 2017 the city applied for a Storm Water Assessment Grant that identified 10 projects within the city limits. The city prioritized the projects, and applied for BWSR funding in 2018/2019, where three riverbank sloughing projects were funded and are currently being designed. The next priority project was the oxbow project. Johnson stated that the city hired HDR Engineering, Inc., to complete a preliminary design of the project, further stating that the city has spent approximately \$38,000 for design and survey. Jesme referenced invoices in the amount of \$42,769.25, that were included in the packet from HDR Engineering, Inc., that have not been paid yet for completion of the Environmental Assessment Worksheet. The City of Thief River Falls is requesting a partnership from the District for financial assistance in the amount of \$50,000. Staff member Corey Hanson discussed the benefits of the project, further stating that a Work Plan needs to be submitted by March 15, 2021. Manager Dwight inquired if any administrative costs are included in the grant applications. Hanson stated that he will look into the administrative portion of the grants. Motion by Dwight, seconded by Ose, to partner with the City of Thief River Falls in the amount of \$50,000 for construction of the Thief River Falls Oxbow Project, RLWD Project No. 46Q. Motion carried. Motion by Ose, seconded by Sorenson, to authorize payment of invoices to HDR Engineering, Inc., in the amount of \$42,769.25, for the Thief River Falls Oxbow Project, RLWD Project No. 46Q. Motion carried.
- Staff member Nick Olson stated that the aeration system on Pine Lake, RLWD Project No. 35, began on February 16, 2021. Olson is required to inspect the system weekly. Very little fish kill is anticipated.

- The Policy Committee for the Clearwater River One Watershed One Plan (1W1P) met for the first time on February 24, 2021 via virtual meeting. The Bylaws were approved by the Policy Committee. BWSR approved the Work Plan's proposed work. Houston Engineering, Inc., is the consultant and will assist on an as-needed basis.
- Jesme and Staff member Hanson attended the Clearwater River 1W1P Policy Committee meeting on February 24, 2021. The next meeting is scheduled for March 24 at 1:00 p.m.
- There was a Red Lake River 1W1P meeting on February 22nd, to discuss the upcoming RCPP/BWSR funding agreement, and if it would be an option for a 1W1P. No decision was made.
- A Planning Work Group meeting for the Thief River 1W1P will be held on March 4th at 10:00 a.m.

February 2021 Meetings and Events

- **February 8, 2021** – Pennington County Water Resources Advisory Committee
 - Pennington County Ditch Outlet Analysis Clean Water Fund Grant: As many outlets as possible will be flown to collect LiDAR data with drones before the grant expires.
 - Thief River PTMApp: This project has been completed and has already been used to help plan a project that received a Clean Water Fund grant.
 - Pennington County Ditch 96: Groundwater moves from south to north, which is why the south banks are less stable and special drainage features were incorporated in the stabilization project.
 - Thief River Falls Streambank Stabilization Projects: The design for the Hartz Park project had to be revised due to the use of a plastic product in the design (DNR did not like that option).
 - Cover Crop and Grade Stabilization – Lower Thief River and JD 30/18/13: There has been a relative lack of interest in the Regional Conservation Partnership Program (RCPP).
 - Cooperative Weed Management Area Grant: Prevention will be promoted, not just control. A county-specific watch list will be created and shared. A memorandum of agreement is being drafted for project partners to sign.
 - The Pennington SWCD received a Clean Water Fund grant to complete Phase II of the CD 96 Stabilization Project.
 - The Upper/Lower Red Lakes TMDL and WRAPS reports will be on public notice in less than a month.
 - Denise Oakes noted that the Environmental Assessment Worksheet for the Thief River Falls Oxbow Restoration Project was well done.
 - The City of Thief River Falls is still working with the Federal government to try to find the funding necessary to move the intake for the city's drinking water supply to the Red Lake River.
 - The RLWD Water Quality Coordinator reported on RLWD projects like the Thief River Streambank Stabilization, Mud River Restoration Project, Thief River Falls Oxbow Restoration Project, Clearwater River 1W1P, Clearwater River PTMApp development, Clearwater River TMDL/WRAPS completion, and the Black River Impoundment.
- **February 8, 2021** – Clearwater 1W1P meeting to discuss PTMApp development
- **February 12, 2021** – Thief River 1W1P Planning Work Group meeting
 - Most of the Project Development budget has been spent.

- The Marshall SWCD completed survey and design work for 6 side water inlets, but used other funding sources to get them constructed (buffer cost-share).
- Pennington SWCD and Marshall SWCD sent cover crop letters to landowners, but responses were minimal.
- Project tracking was discussed
- Judicial Ditch 23 outlet stabilization engineering work might be finished in mid-March.
- There was discussion about seeking assistance from the MN DNR for the Mud River Restoration project.
- A Policy Committee meeting was scheduled to approve bills and keep the Policy Committee “in-the-loop.”
- **February 22, 2021** – Red Lake River Regional Conservation Partnership Program (RCPP) meeting
- **February 24, 2021** – Clearwater River 1W1P Policy Committee meeting
 - By-laws and signature requirements were discussed
 - Each local government unit (LGU) can nominate up to 3 individuals for the Advisory Committee
 - A kick-off meeting will be held in May or June, in-person but outdoors if possible.

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](https://www.facebook.com/redlakewatershed) to stay up-to-date on RLWD reports and activities.