RED LAKE WATERSHED DISTRICT
MONTHLY WATER QUALITY REPORT

December 2020

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 1/14/2021

Water Quality Monitoring

District staff investigated a report of red-colored water within a ditch on the west side of Thief River Falls, along CSAH 1. The red colored water originated at a tile outlet, located near the western edge of a gas station and car wash property. Though water turning red is on par for the year 2020, it is not something we should be seeing and indicates the presence of an illicit discharge. District staff sampled water from the tile outlet. In addition to the red color, the discharge also had a strong septic smell. Information about the discharge and sample results were shared with Minnesota Pollution Control Agency (MPCA) staff. The sample had extremely high concentrations of ammonia nitrogen (188 mg/L), biochemical oxygen demand (236 mg/L), total Kjeldahl nitrogen (264 mg/L), total phosphorus (70.6 mg/L), and orthophosphorus (58.3 mg/L) compared to what should be found in surface waters. The sample also had a high concentration of total suspended solids (66 mg/L). Another cause for concern was the discovery of volatile organic compounds (chemicals that can vaporize into the air and dissolve in water). Measurable concentrations of the solvents 4-Methyl-2 pentanone (8.23 µg/L), acetone (146 µg/L), and tetrachloroethene (71.2 µg/L) were found in the sample.

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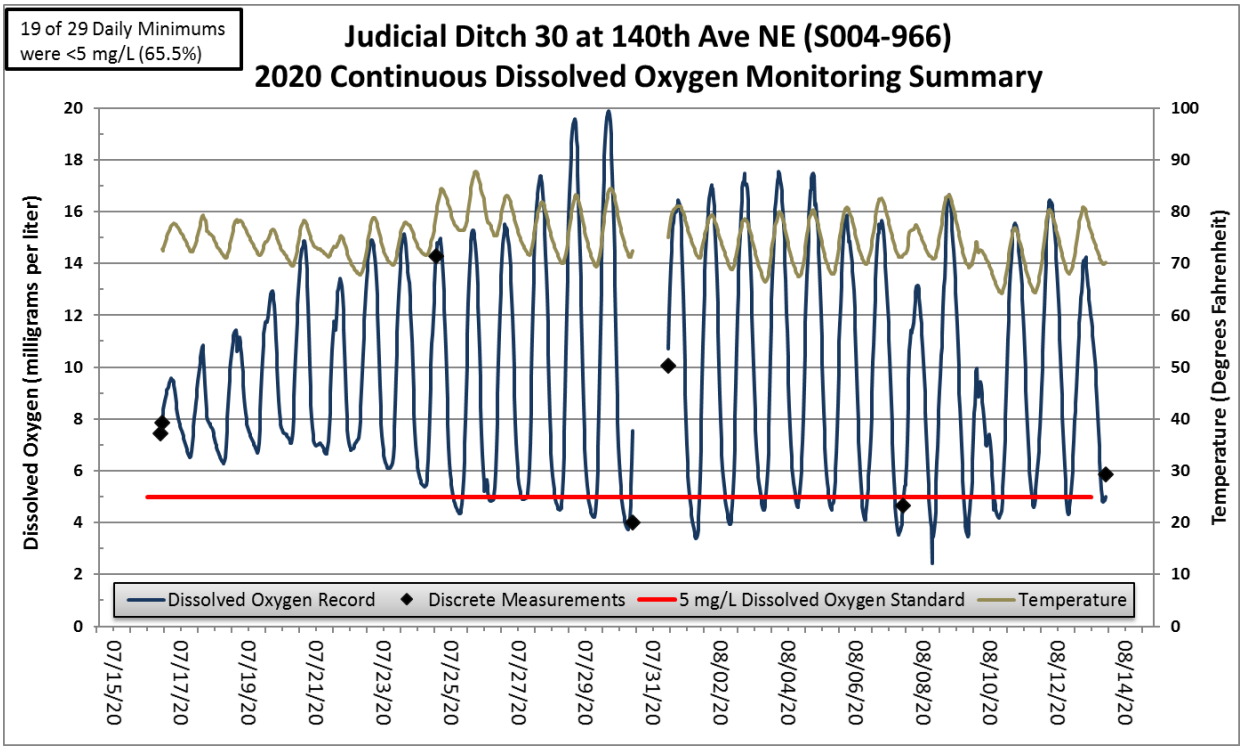
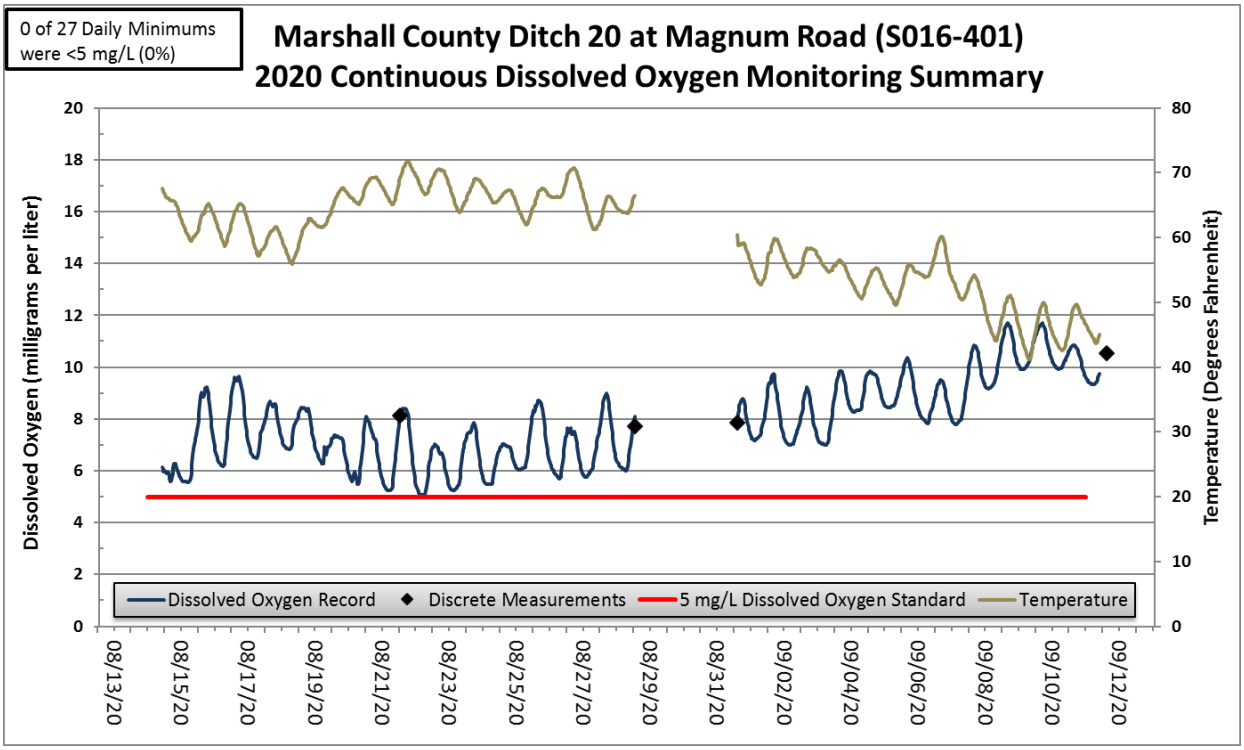
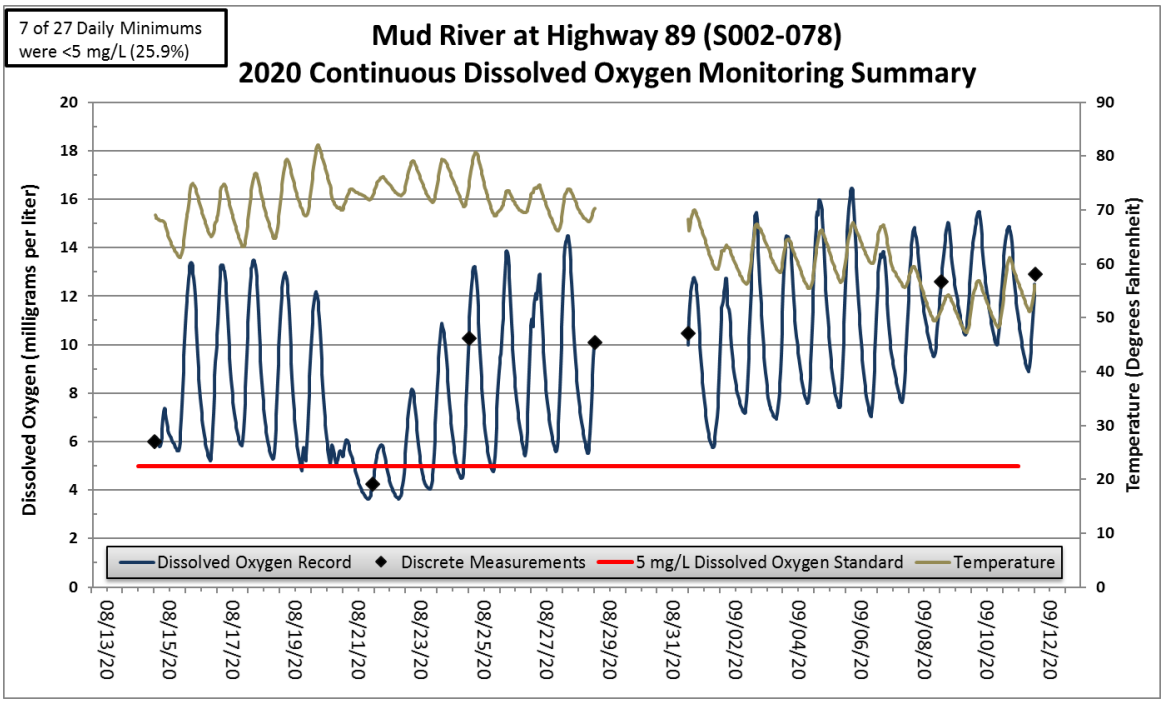
The 2020 dissolved oxygen data recorded by deployed HOBO U26-001 temperature/dissolved oxygen loggers was processed and corrected. When data is downloaded from dissolved oxygen loggers, it is inspected and converted to .csv files using HOBOware software. In the lab, side-by-side measurements (in water) 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 HOBO loggers are equipped with optical sensors with sensor caps that are replaced each year, 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).

Judicial Ditch 30, at 140th Ave NE (S004-966) had high levels of dissolved oxygen fluctuation. Dissolved oxygen levels dipped below the 5 mg/L threshold almost daily in late July and early August. Though summer average phosphorus concentrations in Judicial Ditch 30 have met the 0.1 mg/L total phosphorus (river eutrophication) standard in the past, July and August 2020 total phosphorus samples exceeded the state's water quality standard.



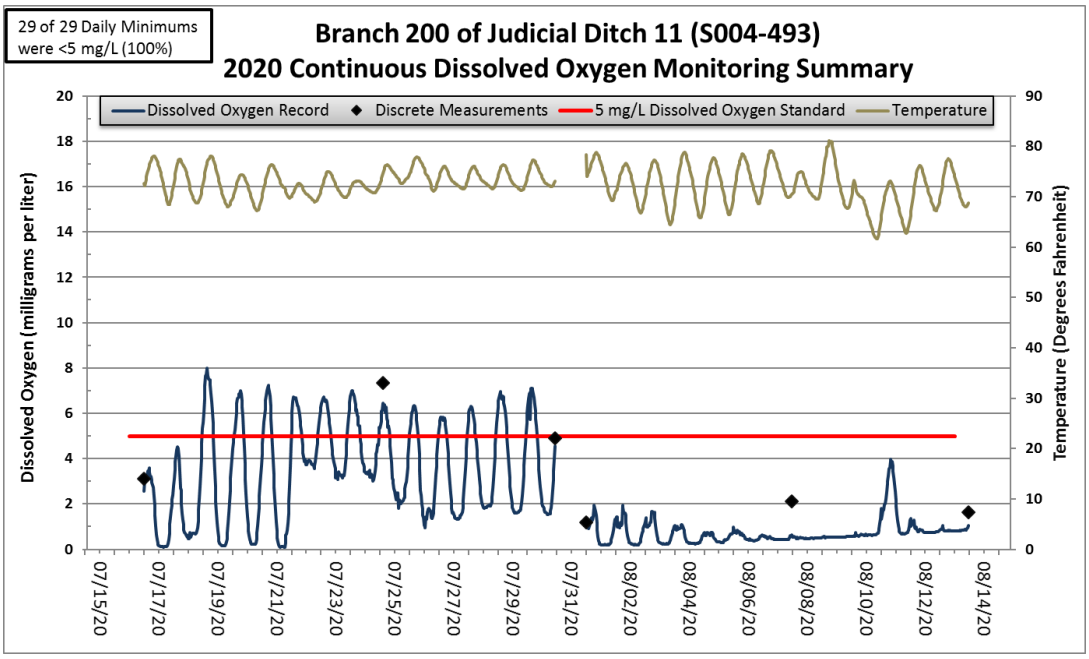
The dissolved oxygen levels in Marshall County Ditch 20, at Magnum Road, met the 5 mg/L dissolved oxygen standard throughout both of the 2-week deployments. Another indication of good water quality and suitability for aquatic life was the relatively low daily fluctuation in dissolved oxygen concentrations.

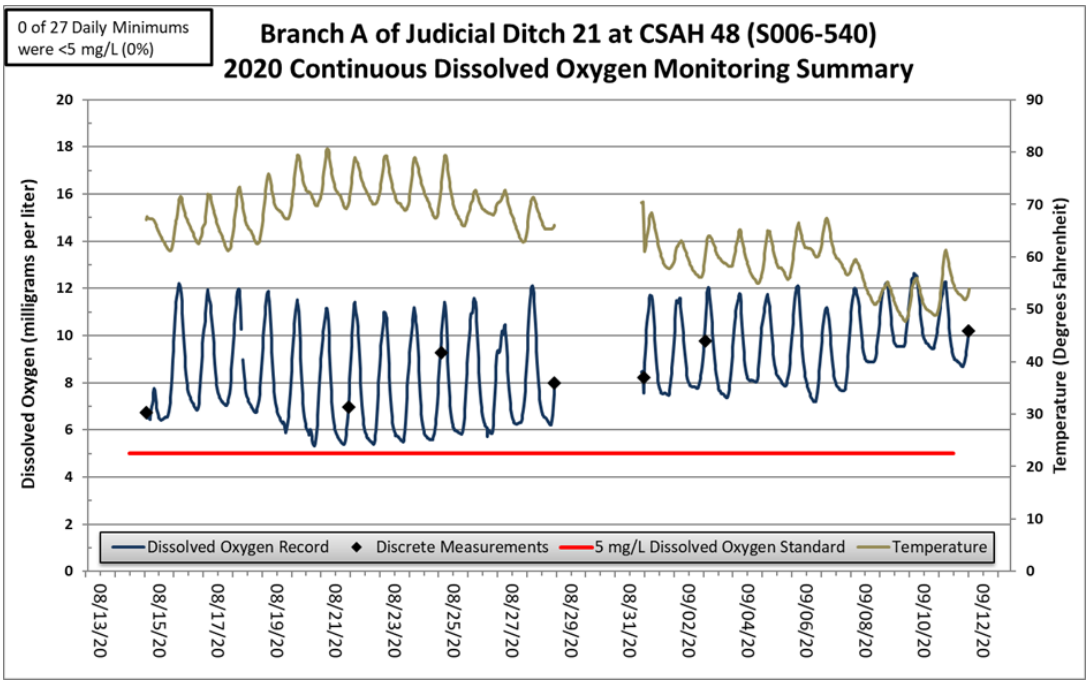




The dissolved oxygen levels in the Mud River remained above the 5 mg/L threshold throughout the majority of the 2020 deployment periods. However, runoff from a large August 20, 2020 rain event depressed dissolved oxygen levels. Dissolved oxygen levels gradually recovered, but it took several days.

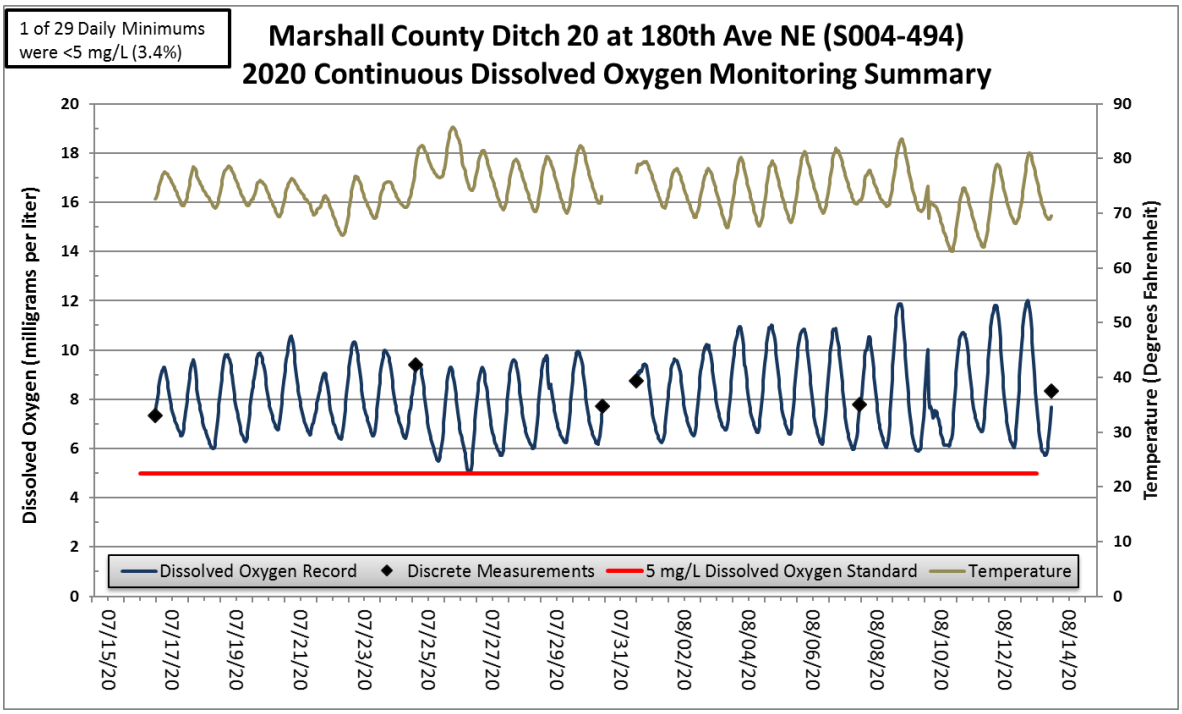
The relatively stagnant water within Branch 200 of Judicial Ditch 11 created a situation in which dissolved oxygen levels recorded by a deployed logger and by a portable sonde were extremely low.

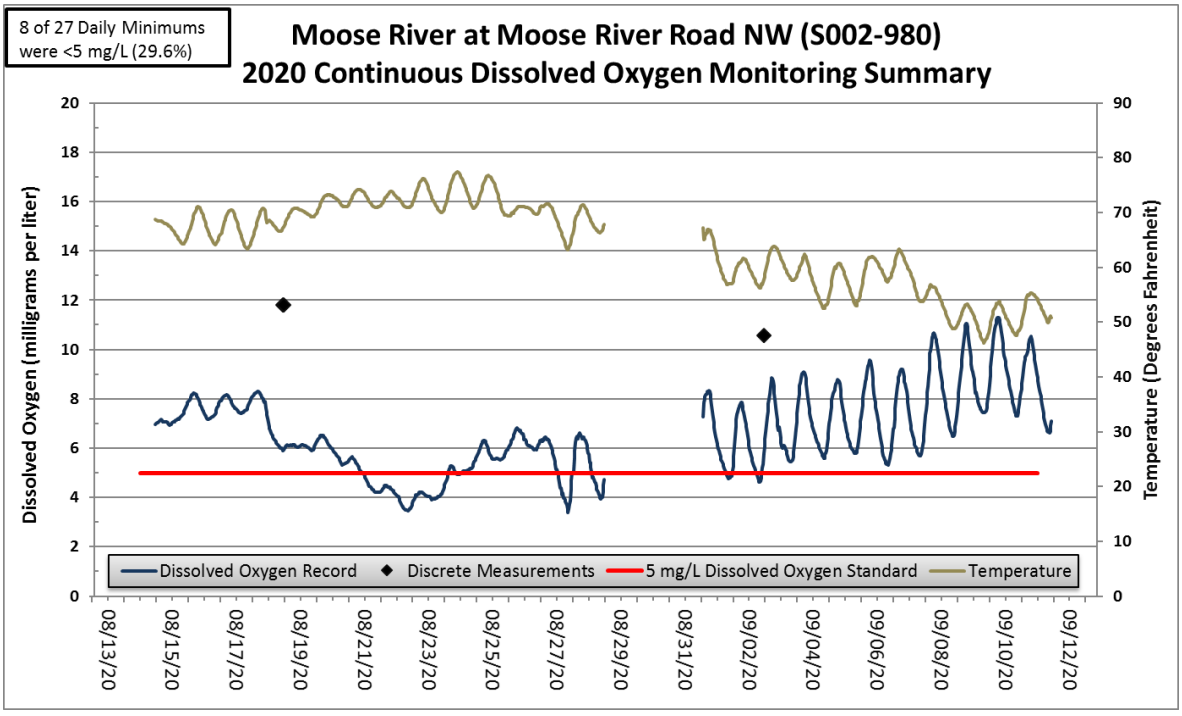




As in the monitoring completed for prior assessments, dissolved oxygen levels in Branch A of Judicial Ditch 21 continued to meet the 5 mg/L water quality standard.

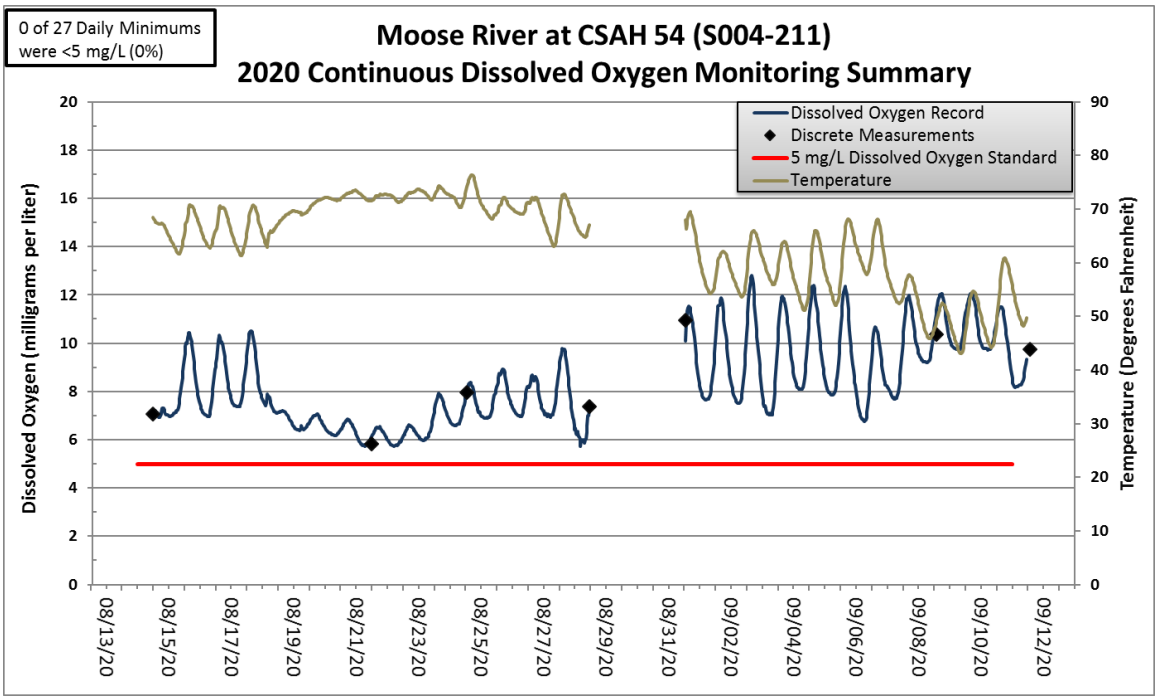
The dissolved oxygen concentrations in Marshall County Ditch 20 met the 5 mg/L standard.

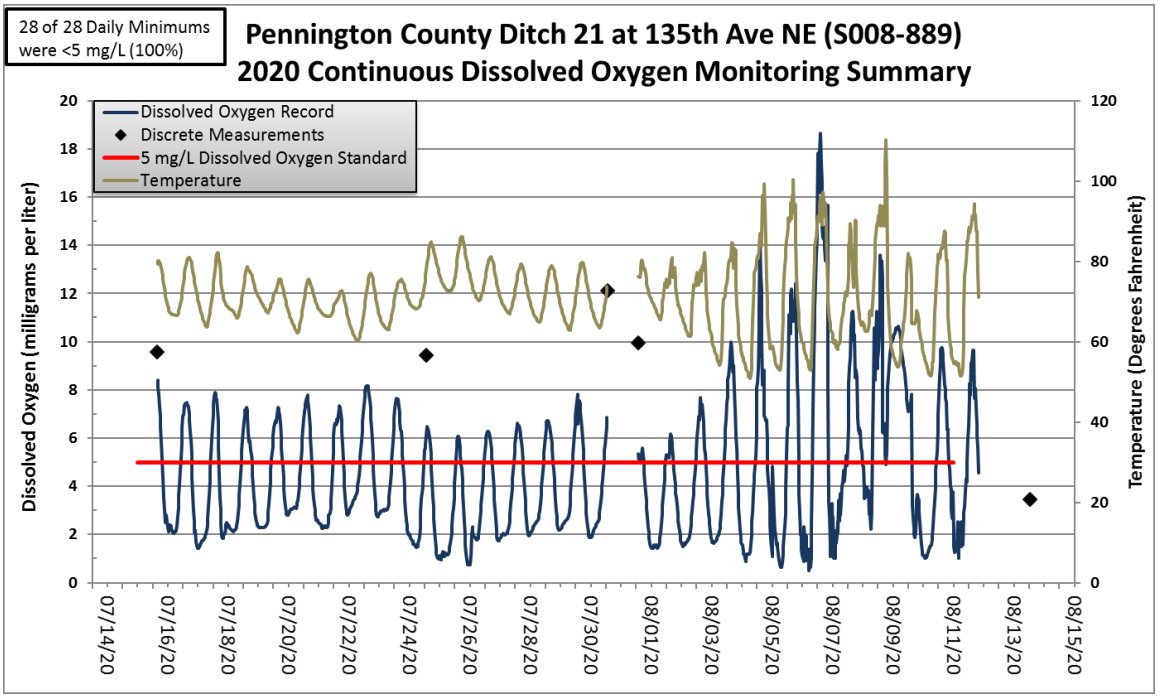




The dissolved oxygen levels near the upstream end of the Moose River, at Moose River Road NW, were lower than expected. Dissolved oxygen levels were depressed after an August runoff event and improved with cooler temperatures in September.

The dissolved oxygen levels in the Moose River were much better at CSAH 54 than they were at Moose River Road. Dissolved oxygen levels met the 5 mg/L standard throughout the deployments.





Flow in Pennington County Ditch 21 was very low in July and August 2020 and the ditch stopped flowing before mid-August. There daily fluctuation of dissolved oxygen levels was high.

A thorough, final review of field data and lab data was completed for the MPCA so that the data can be stored in the EQuIS database and made available on the Surface Water Data Access webpage.

Clearwater River Watershed Restoration and Protection Strategy (WRAPS)

The Public Notice period for the Clearwater River Watershed Restoration and Protection Strategy and Total Maximum Daily Load reports concluded in December 2020. The only comments received on the documents involved edits to a series of maps in the WRAPS document that were easily completed by swapping in a better GIS layers so that they were consistent with other maps in the document and properly represented tribal lands.

BWSR Awards Clean Water Fund Grants to the RLWD and Local SWCDs

"The Minnesota Board of Water and Soil Resources (BWSR) approved $12.3 million in Clean Water Fund grants at the Dec. 17 board meeting. The grants will be used to improve water quality in lakes, rivers, streams and groundwater across the state...The $12.3 million will fund 37 separate grants that will be awarded to local government entities (soil and water conservation districts, counties, watershed districts, watershed management organizations, and cities)."

http://bwsr.state.mn.us/bwsr-awards-123-million-clean...

A total of $1,034,525 in grant funding out of that $12.3 million has been awarded to projects within the Red Lake Watershed District.

The Red Lake County Soil and Water Conservation District (SWCD) was awarded $268,525 to fix prioritized erosion problems within the Lower Clearwater River subwatershed. The project will install structural agricultural practices that will include, but are not limited to, grade stabilization structures, grassed waterways, and water and sediment basins. The implementation of these practices is estimated to reduce sediment loading to the Clearwater River by 793 tons/year.

The Red Lake Watershed District (RLWD) was awarded $250,000 for the Thief River Falls Oxbow Restoration and Stormwater Treatment Project. The project will restore three acres of an oxbow wetland by removing 17,000 cubic yards of accumulated sediment to restore the wetland habitat, filtration, and retention qualities. A rock structure will be constructed at the outlet of the restored wetland to stabilize the outlet, improve detention, and oxygenate water as it flows out of the pond. In line hydrodynamic separator structures will be installed to trap pollutants and trash from future stormwater runoff before it enters the wetland or the Red Lake River. A settling pond will be constructed to intercept runoff from a portion of the wetland's drainage area. This project will reduce loading rates for sediment by 4 tons/year and of phosphorus by 28 pounds/year from stormwater runoff as part of a coordinated effort to restore downstream impairments of the Red Lake River. This project is a cooperative effort between the city and the RLWD, with assistance from HDR Engineering. The Thief River Falls Water Quality Study, a stormwater study completed by the Pennington SWCD and Houston Engineering, Inc., provided information that helped with the planning of this project and the successful

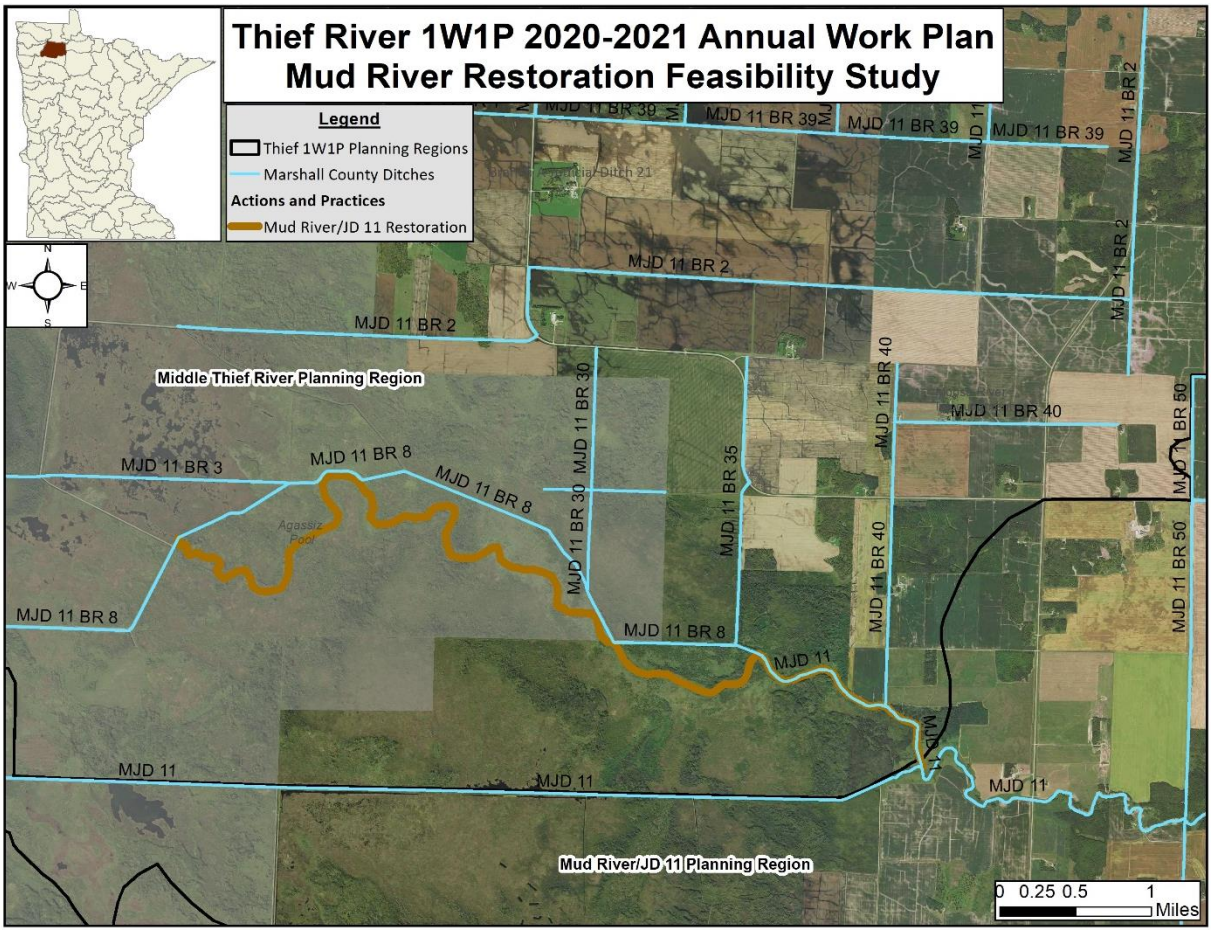
application. The Red River Watershed Management Board has also approved funding for this project ($166,000).

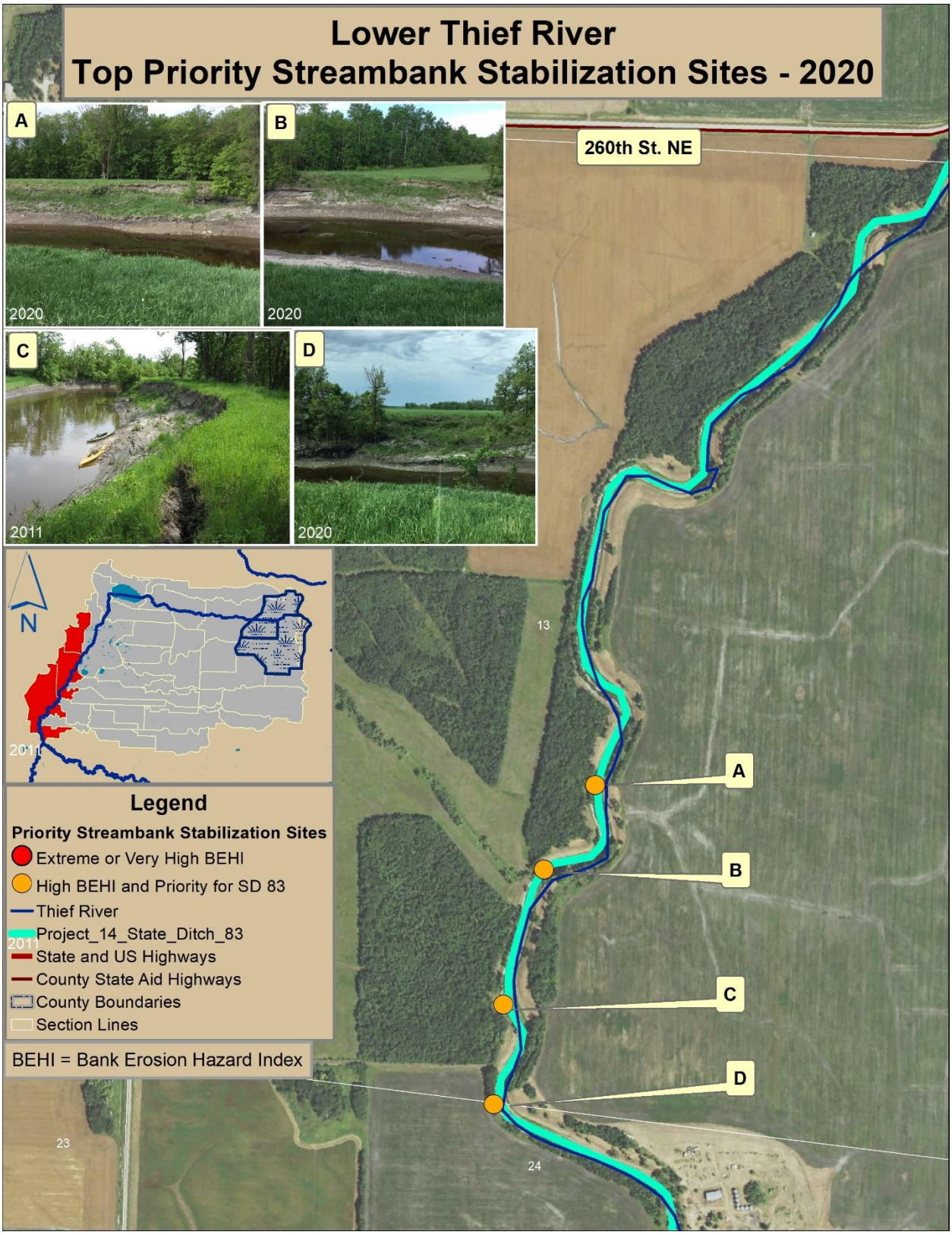
The Pennington SWCD was awarded $516,000 to stabilize erosion along the south bank of Pennington County Ditch 96, west (upstream) of the Highway 32 crossing near St. Hilaire. This project will reduce sediment loading to an impaired portion of the Red Lake River by an estimated 559 tons/year.

Thief River Watershed One Watershed One Plan (1W1P)

The design work for the outlet of Judicial Ditch 23 (near the 140th Ave NE crossing of the Thief River) will be completed by Widseth, Smith, and Nolting (WSN) to provide some continuity in staff that are familiar with the project.

District staff worked with United States Fish and wildlife staff and HDR Engineering to get started on the feasibility study for a potential Mud River Restoration Project. District staff compiled background information about the project into a summary document. USFWS staff created a presentation that was used during a virtual meeting that was held on December 15, 2020. A proposal was prepared by HDR Engineering for the creation of a Mud River Restoration Concept Report. This first phase of work will include data collection (survey and data processing), hydrologic analysis, and a concept report. Decisions regarding the feasibility and future of the project will depend upon the findings of this first phase.




Lower Thief River
Top Priority Streambank Stabilization Sites - 2020
A
2020
B
2020
C
2011
D
2020
260th St. NE
N
2011
13
23
24
A
B
C
D
Legend
Priority Streambank Stabilization Sites
Extreme or Very High BEHI
High BEHI and Priority for SD 83
Thief River
Project_14_State_Ditch_83
2011
State and US Highways
County State Aid Highways
County Boundaries
Section Lines
BEHI = Bank Erosion Hazard Index

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District staff toured priority streambank stabilization sites along the Thief River with an engineer from Houston Engineering, Inc (HEI). One of the banks, Site C, seemed to be trending toward stability. Two of the other banks, Sites A and B, were actively and severely eroding. A severely eroding drainage outlet between 260th Street NE and the Thief River was also examined. District and HEI staff finished the tour by examining a bank slump that occurred a short distance upstream of the CSAH 7 bridge. District engineering staff completed surveying work on Site A, Site B, the eroding gully, and Site D in December, before significant snowfall became an obstacle. Site D was still unstable and eroding, like Site A and Site B. State Ditch 83 plans were found and shared with HEI to help with the design process. Houston Engineering, Inc. developed a proposal to document the scope of their services (preliminary design, final design, and construction management). The proposal was approved by the RLWD Board of Managers during their December 30, 2020 meeting.

Site A

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Site B

Site C

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Site D

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 Red Lake County SWCD found and shared an old survey of the Demarais-Hanson gully. The RLWD Board of Managers approved the hiring of a consultant to conduct a survey and feasibility assessment of the Demarais-Hanson erosion problem. The RLWD Board of Managers approved the hiring of an engineering firm to complete the surveying and other work that would be necessary to evaluate the feasibility of a project to stabilize the gully.

Clearwater River One Watershed One Plan (1W1P)

The Clearwater River 1W1P Planning Work Group met on December 10, 2020. The group reviewed the draft work plan for the planning process. Technical Service Area (TSA) staff will likely be able to draft a logo for the Clearwater River 1W1P. Policy Committee and Advisory Committee membership/appointment was discussed. To take a lesson from previous 1W1Ps, a rule will be added to the by-laws to prevent the addition of committee members (except for specified circumstances) after

the process has started. The group discussed the planning of a kickoff meeting and the logistics of holding such a meeting during the COVID pandemic (hybrid meeting, outdoor meeting). A questionnaire will be sent to potential Advisory Committee members to see if they would be able to attend a virtual meeting. TSA staff will also be able to help with the creation of maps. Due to changes in District staff, Houston Engineering will have a larger role in the completion of the Clearwater River PTMApp and Targeted Implementation Plans. The Clearwater SWCD will take on the roles of the Plan Coordinator and Fiscal Agent. The agenda for the first Policy Committee meeting was discussed (by-laws, election of officers, 1W1P informational presentation, notification of plan initiation, schedule for future committee meetings).

Other

- The 2020 Outstanding Soil and Water Conservation District Employee award was awarded to Pennington Soil and Water Conservation District Water Plan Coordinator Peter Nelson. Peter and the Pennington SWCD have been a great partner on many projects within the district, like the Red Lake River and Thief River One Watershed One Plan projects and the many successful grants that the SWCD has secured for water quality projects.
- Time was spent on reviewing budgets of 2020 projects to organize information on expenditures and funding sources.
- Monthly water quality reports were completed for the months of September, October, and November 2020.
- The District's Natural Resource Specialist has been helping the Lake of the Woods Watershed One Watershed One Plan committee members learn how to use PTMApp.

Water quality related notes and minutes from the December 10, 2020 Red Lake Watershed District Board of Managers meeting.

- Engineer Jerry Pribula, Pribula Engineering, joined the meeting via conference call. Pribula stated that construction on Ditch 16 was substantially completed and reminded the Board that the final completion date is May 18, 2021. Pribula discussed the original construction bid, and additions to the contract. Administrator Jesme stated that the additional side water inlet culverts that were installed are reimbursable through the Red Lake River 1W1P, RLWD Project No. 149 and Red River Watershed Management Water Quality funds.
- Engineer Tony Nordby, Houston Engineering, Inc., reported that construction on the Black River Impoundment, RLWD Project No. 176, has proceeded extremely well with the good weather conditions. Nordby stated that the concrete in the outlet structure is in-place. Discussion was held on a clay liner that was installed on the emergency spillway to reduce the risk of erosion and discussion with a landowner's concern regarding the diversion ditch around the church and potential of erosion.
- The Board reviewed an itemized worksheet for the installation of side water inlet (SWI) culverts located in Marshall County. The Marshall SWCD is requesting their 2020 Erosion Control Funds, RLWD Project No. 164, appropriation for the installation of SWI's. Motion by Dwight, seconded by Page, to approve payment in the amount of $12,500 from the District's 2020 Erosion Control Funds, RLWD Project No. 164, to the Marshall SWCD. Upon roll call vote, motion carried unanimously.
- The Board reviewed the Project Evaluation Worksheet that will be submitted to the RRWMB as part of the Step 1 funding submittal for the Pine Lake Flood Damage Reduction and Fish Passage

Project, RLWD Project No. 26B. Motion by Torgerson, seconded by Sorenson, to authorize President Nelson, sign the Project Evaluation Worksheet and Step 1 funding submittal to the RRWMB for the Pine Lake Flood Damage Reduction and Fish Passage Project, RLWD Project No. 26B. Upon roll call vote, motion carried unanimously.

- Administrator Jesme discussed hiring Engineer Services for two projects for the Thief River 1W1P, RLWD Project No. 149A. Jesme recommended hiring HDR Engineering, Inc., to complete a reconnaissance report on the restoration of the Mud River in Agassiz National Wildlife Refuge which was diverted during the construction of Judicial Ditch 11 Main. Motion by Ose, seconded Tiedemann, to retain HDR Engineering, Inc., for the draft proposal of services to complete the Mud River/JD 11 Reconnaissance Report for the Thief River 1W1P, RLWD Project No. 149A. Upon roll call vote, motion carried unanimously. Jesme recommend retaining Houston Engineering, Inc., to complete a study to prioritize areas for the Thief River Streambank Project. Motion by Page, seconded by Sorenson, to retain Houston Engineering, Inc., for completion of the Thief River Streambank Study, RLWD Project No. 149A. Upon roll call vote, motion carried unanimously. Both engineering firms will submit proposals to the Board.
- Administrator Jesme reviewed the Work Plan that was approved for the 2020 biennium for the Red Lake River 1W1P, RLWD Project No. 149. Discussion was held on the repairs to the outlet of Pennington County Ditch 96, west of the old railroad bed south of St. Hilaire, and additional items that need attention. President Nelson stated that he will contact the Pennington County Commissioners and Engineer regarding potential repairs to the system.

Water quality related notes and minutes from the December 30, 2020 Red Lake Watershed District Board of Managers meeting.

- Discussion was had on the Ditch 10, RLWD Project No. 161 and the advertisement for bids on the project. Staff realized that even though we had a date set in the bid opening, we could not find that the Board officially set the date and time. Motion by Page, seconded by Sorenson, to set the Bid Opening for the repairs to the outlet of Ditch 10, RLWD Project No. 161, for January 14, 2021 at 9:30 a.m. at the District office. Upon roll call vote, motion carried unanimously. A virtual pre-bid meeting will be held at 1:30 p.m. on January 7, 2021.
- The Board reviewed a Scope and Fee Proposal – Summary of Engineering Services from Houston Engineering, Inc., for the Thief River Streambank Study, RLWD Project No. 149A in the amount of $34,759.00. Engineer Tony Nordby, Houston Engineering, Inc., stated that he reviewed five locations with District staff, having different goals for each site. Nordby noted that District staff have completed surveying of all five sites. Motion by Dwight, seconded by Sorenson, to authorize the Administrator Jesme the authority to sign the Agreement for Engineering Services with Houston Engineering, Inc., for the Thief River Streambank Study, RLWD Project No. 149A. Upon roll call vote, motion carried unanimously.
- The Board viewed a proposal from HDR Engineering, Inc., for completion of a Preliminary Concept Report for the Mud River Restoration Project, RLWD Project No. 149A. Engineer Jacob Huwe, HDR Engineering, Inc., stated that a conference call was held with staff from the District, HDR Engineering and the U.S. Fish and Wildlife Service to determine the scope of the project. Discussion was held on restoring the old channel of the Mud River and ditches that feed into the Agassiz pool. Completion of a survey, ditch inverts and crossing sections will need to be completed to ground truth Lidar. Huwe estimated surveying will take approximately two weeks and could potentially begin next week. Motion by Dwight, seconded by Torgerson, to authorize

Administration Jesme the authority to sign the Notice to Proceed for the Preliminary Concept Report in the amount of $40,800 for the Mud River Restoration project, RLWD Project No. 149A.

- Discussion was held on an erosion control project that outlets into an oxbow of the Red Lake River referred to as the Demarais/Hanson site, located in Sections 26 and 27, Louisville Township, Red Lake County (6 miles east of Red Lake Falls along CSAH 11). Staff member Corey Hanson stated that the Red Lake River 1W1P Planning Work Group (PWG) identified this as a potential project, to be completed in phases due to the magnitude of the project. It was also discussed by the PWG, that the RLWD should take the lead on this project due to the sheer size or scope of the project. Discussion was held on hiring an engineering firm to complete a reconnaissance of the project. Motion by Page, seconded by Ose, to approve the District to take the lead on this project and hire Houston Engineering, Inc., to prepare a feasibility study for the Demarais/Hanson Erosion Control Project, RLWD Project No. 149. Upon roll call vote, motion carried unanimously.
- Administrator Jesme stated that District was awarded a $250,000 competitive grant from the 2021 Clean Water Funds (CWF) for the Thief River Falls Oxbow Project, RLWD Project No. 46Q. Jesme informed the Board that of the 61 CWF competitive grant applications BWSR received, the District grant application ranked 13th.
- The Board reviewed a letter of resignation from Staff member Ashley Hitt (Natural Resources Technician). Motion by Torgerson, seconded by Dwight, to approve with regrets, the letter of resignation from Ashley Hitt. Upon roll call vote, motion carried unanimously.
    - Ashley has accepted a Wetland Biologist position with the Natural Resources Conservation Service.
- Administrator Jesme stated that with the resignation of Staff member Ashley Hitt, Staff member Christina Slowinski requested transferring to the Natural Resource Specialist position. Jesme reminded the Board that Slowinski had originally applied for the position filled by Hitt, further stating that the District has a statutory requirement to have a Ditch Inspector on staff and that no transfer of position should occur until the Ditch Inspector position is filled. Motion by Ose, seconded by Sorenson, to approve the transfer of Christina Slowinski to the Natural Resource Specialist position once a Ditch Inspector is hired. Upon roll call vote, motion carried unanimously.
- Motion by Tiedemann, seconded by Dwight, to approve advertising for a Ditch Inspector/Technician II and an Engineer Specialist for the District office. Upon roll call vote, motion carried unanimously. District staff will develop the job posting for review by the Budget and Salary Committee.
- A meeting was held on December 15, 2020, with staff from the USFWS to discuss restoration of the old channel within the Agassiz NWR that was cutoff since JD 11 main was constructed. In restoring the channel, it is assumed we would see significant reduction of sediment that presently enters the Agassiz NWR and ultimately is deposited into SD 83/Thief River.

December 2020 Meetings and Events

- **December 1, 2020** – Minnesota Association of Watershed District Virtual Annual Conference
    - Drainage Workshop
    - Financing Watershed District Projects
- **December 2, 2020** – Minnesota Association of Watershed District Virtual Annual Conference
    - Keynote Speaker Kit Welchlin, Embracing Change: Thriving (Not Just Surviving)

- Mistakes in dealing with change include:
    1. Joining the anti-change crowd
    2. Acting like a victim
    3. Trying to control the uncontrollable
    4. Being overly cautious – freezing
    5. Being afraid of the unknown
    6. Making a big deal out of little things
    7. Psychologically disengaging from your work
    8. Trying to get all the answers/directions
    9. Failing to manage the stress

- Stream Meander Restoration in an Urban Creek (Middle Rice Creek)
    - Evaluated the banks of the creek with Bank Erosion Hazard Index (BEHI) ratings
    - Constructed the restored channels first, then put them "online" to send water through them
    - Created off-channel floodplain wetlands
    - Post-construction monitoring noted some sedimentation within the channel, but the tops of the banks remained stable. There was no post-construction lateral movement of the channel.
- Phased Project Implementation – Managing Water One Step at a Time
- Balancing Flood Damage Reduction and Water Quality Needs in the Red River Basin
- If You Build It, They Will Come: Pelican River Low Head Dam Case Study
    - Winter construction works better (ground is frozen instead of muddy).
    - Bypass step pools were used for higher dams.
    - Sturgeon habitat has been improved.
    - Sturgeon eat zebra mussels.
- Achieving the Public's Expectations for Water Quality in Minnesota
    - More public funding should go toward implementation projects and less should go to the hiring of new state government employees.
    - International Water Institute staff discussed some techniques for prioritizing waters for implementation work. It is important to examine of the duration, causes, severity, and frequency of water quality problems. The District has completed similar processes for the Red Lake River, Thief River, and Clearwater River watersheds to prioritize barely impaired and nearly impaired streams.
    - Problem Identification Steps (Example = Wall Lake Protection Strategy)
        1. What Resource (name, location)
            - Wall Lake (MN Lake ID: #56-0658-00) is located 5 miles east of Fergus Falls, MN in Otter Tail County
        2. How are water quality problems manifested?
            - Example: visible algae bloom inhibits swimming
        3. How long does it last (duration)?
            - Example: a bloom lasts 1-2 days
        4. Frequency (how often does it occur)?
            - Example: 3 to 4 blooms per year. 1 out of every 3 years
            - Time series charts can help with steps 3 and 4
        5. How bad is the problem?

        - Example: Bloom level is 20 µg/L chlorophyll-a and levels reach 40 µg/L
    6. Suspected causes (parameters)?
        - Example: excess total phosphorus, low winds, and poor mixing
- May I Have Your Attention for Retention (by Nate Dalager)
    - Drone video of Black River Impoundment construction
- "Night at the Movies"
    - Watershed districts had submitted videos about their districts and projects. The Capital Region Watershed District video had some spectacular aerial video footage of an alum treatment. The Carnelian-Marine-St. Croix video highlighted paddleboarding and recreation on the St. Croix River, which looked like something to add to one's "bucket list." The Nine Mile Creek Watershed District has activities and YouTube videos to help kids explore their watershed.
- Minnesota Stormwater Research Council - Background and Highlights
- Effective Uses for the PTM App in Watershed Planning and Implementation
    - Use a cost-effectiveness filter to create a targeted BMP layer
    - Determine a percentage of funding that will be spent on each type of pratice or prioritize practices by sediment load reduction.
    - Loading and load reductions to an outlet of a planning region is substantially lower than the cumulative field-edge load reduction estimates. The load reduction goals (TMDLs, for example) are typically established at the outlet of a subwatershed or planning region, but field-edge load reduction is usually used to estimate and evaluate the cost-effectiveness of implementation projects.
    - Some new PTMApp features that have added or will be added soon include desktop toolbar revisions and upgrades, web application enhancements, new watershed data, and training videos. A new release of the web app is planned for early 2021.
- Delivering a Watershed-based Public Private Partnership to Achieve Shared Goals (Cannon River Agricultural Collaborative RCPP)
- Planning for Resiliency: Natural Asset Valuation in a Changing World
    - Use a model to estimate the benefits provided by a natural asset.
    - Use a model to identify estimate the cost of the BMPs that would be needed to replace the natural asset or provide equivalent benefits.
    - Estimate the cost of replacing the natural asset.
- Stretching Outreach Budgets by Partnering with the Blue Thumb Program
    - Pollinators are a gateway topic to clean water concepts. The same things that benefit pollinators benefit water quality.
    - "Fescue to the Rescue"
- Raising the Grade: Seeking Solutions to Improve the Health of the Mississippi River
    - Pinwheel graphics display a waterbody's score/grade for multiple goals and categories.
- Minnesota's 2020 State Water Plan: Water and Climate
    - Environmental Quality Board
    - More monitoring of beaches for harmful algae and bacteria
- Complex Project Development: A Case Study of Lake Traverse Water Quality Project
    - Bois de Sioux Watershed District

        - Project cost distribution was based on runoff contribution.
    - Using Future Hydrology Planning to Achieve Watershed Goals
        - Measured hydrology and water quality (for the Redpath project) were worse than was expected based on watershed characteristics. Flat topography and culvert changes caused breakout flows.
- **December 3, 2020** – Minnesota Association of Watershed District Virtual Annual Conference
- **December 10, 2020** – Red Lake Watershed District Board of Managers meeting
- **December 10, 2020 –** BWSR Academy hydrogeology presentation: Once Upon a Time in Hydrogeology
    - The presentation's maps showed that county groundwater atlas development has not been completed within the RLWD yet.
        - The groundwater atlases will include water table elevation maps and water table depth maps. The atlases will include hydrogeologic cross sections
    - Groundwater testing and stable isotope testing were also discussed.
    - Minnesota Hydrogeology Atlas
    - Groundwater residence time and pollution sensitivity can be estimated using tritium testing.
    - MN DNR groundwater mapping program
- **December 10, 2020 -** Clearwater River One Watershed One Plan Planning Work Group Meeting
- **December 10, 2020 –** Polk County AIS Committee meeting.
    - The committee approved the purchase of a CD3 (Clean, Drain, Dry, and Dispose) unit, pending approval by the County Board of Commissioners.
- **December 15, 2020** – Mud River Restoration Project meeting
    - HDR Engineering will put together a proposal for surveying the old, meandering channel.
    - A permit will be obtained from the DNR to access portions of the project area for surveying.
- **December 16, 2020** – BWSR Academy presentation on pollinator habitat and seed mixes
    - 70% of described species on the planet are invertebrates
    - Bees are the most efficient and important pollinators.
        - Actively collect and transport pollen
        - Butterflies are just thee for the nectar
        - Bees exhibit flower constancy – keep working the same species.
        - Bees are very diverse and adapted to work with different flowers (different tongue lengths, for example).
    - Fall and spring resources/flowers are important for bumblebees.
    - Habitat Assessment Guide
    - Recognize existing habitat and identify habitat deficiencies.
    - Consider abundance (# of individuals), richness (# of species), and evenness (relative abundance) when choosing species for seed mixes.
    - Provide flowers that bloom throughout the season and provide different plant families.
    - Not all coneflowers are the same. Narrowleaf coneflower (Echiniacea angustifolia) is the only one that is supposed to be in Polk County, for example.
    - Pounds/acre varies by plant due to a wide variation in seed sizes. Seeds per square foot is a better way to plan.

  - Include at least 9 pollinator-friendly species, at least one of which should be a legume. Include 3 species from each bloom period. At least 60% of forbs in the mix should be plants that provide nectar for monarchs.
  - Have lower seeds/ft2 rates for aggressive species like big bluestem, Indian grass, sunflowers, cup plant, and wild bergamot). Areas dominated by 8-foot-tall stands of big bluestem are not that great for pollinators and wildlife.
  - Adding diversity to seed mixes does increase the price, though. Use a smaller amount of the diverse mix to offset some of the increased cost. The increase cost is also balanced by long-term savings on maintenance and the benefit of a better ecological function.
  - Review any seed substitutions that are made by your supplier to make sure that the replacement species are appropriate. Double-check all species ranges in the seed mix.
  - Resources:
    - Minnesota Wildflowers
    - BONAP (Biota of North America Program) maps
    - USDA PLANTS database
    - Prairie Moon Nursery
  - Some recommended species included early figwort, culver's root, march/butterfly/Sullivant's milkweed, bottle gentian, fringed gentian, button blazing star, lead plant, fringed puccoon, prairie rose, harebell, cup plant, long-bract spiderwort, and meadow sweet.

- **December 16, 2020** – Meeting between District staff and a Houston Engineering, Inc. engineer to discuss the Lower Thief River Streambank Stabilization work.
- **December 17, 2020** – BWSR Academy presentation about the MN Atlas website
- **December 17, 2020** – Red Lake River One Watershed One Plan Planning Work Group meeting
- **December 21, 2020** – Pennington County Cooperative Weed Management Area Zoom Conference
- **December 30, 2020** – Red Lake Watershed District Board of Managers 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.