

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 12/11/2020

Stage and Flow Monitoring

The District's water level loggers were retrieved from flow monitoring locations in late October, when temperatures started to regularly drop below freezing. The retrieval could have been delayed until the first week of November (the return of warm weather in early November wasn't anticipated at the time), but it was still good to get the loggers retrieved before the water began to freeze and before deer hunting season. Loggers were cleaned and data was downloaded.

Grand Marais Creek at 110th Street NW



District staff measured flows at two locations along the Clearwater River in early October to help with wild rice water allocation.

The U.S. Army Corps of Engineers notified the District that they were increasing the Red Lake Dam outflow from 650 cubic feet per second (cfs) to approximately 800 cfs on October 6, 2020.

Water Quality Monitoring

District staff collected weekly water quality samples before, during, and after an excavation project along Judicial Ditch 11 within Agassiz Pool. Samples were collected from the Thief River at CSAH 7 (downstream of the excavation work), Mud River at Highway 89 (upstream of the excavation) and Thief River at CSAH 6 (upstream of the excavation). In general, water was very clear at the upstream sites and cloudier at the downstream crossing of the Thief River. Though the water was cloudy, most of the total suspended solids concentrations at the CSAH 7 fell under the 30 mg/L threshold of the state water quality standard. One of the six samples collected at the CSAH 7 of the Thief River, near the end of the

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excavation work (October 19, 2020), exceeded the total suspended solids water quality standard (37.8 mg/L).

Date	Upstream		Downstream
	Thief River at CSAH 6 Total Suspended Solids (mg/L)	Mud River at Hwy. 89 Total Suspended Solids (mg/L)	Thief River at CSAH 7 Total Suspended Solids (mg/L)
9/30/2020	1.6	2.8	15
10/7/2020	1.3	2.5	5.5
10/14/2020	<1	2.1	7.8
10/19/2020	<1	2.3	37.8

Cloudy water in the Thief River at CSAH 7



District staff investigated a complaint about grayish green water in Lower Badger Creek. The water was indeed very cloudy with a strange, milky gray/green color. The cloudy water was traced upstream to a section of the river that included the confluence with County Ditch 64. Very cloudy water was found in Polk/Red Lake County Ditch 64 at County Road 14. The cloudy water in CD 64 was traced upstream to discharge from a gravel pit near Highway 2. Samples were collected the next day. Though the rate of discharge from the gravel pit had decreased, the total suspended solids concentration was still very high (188 mg/L). The results of the sampling and photographic investigation were shared with MPCA permitting staff.

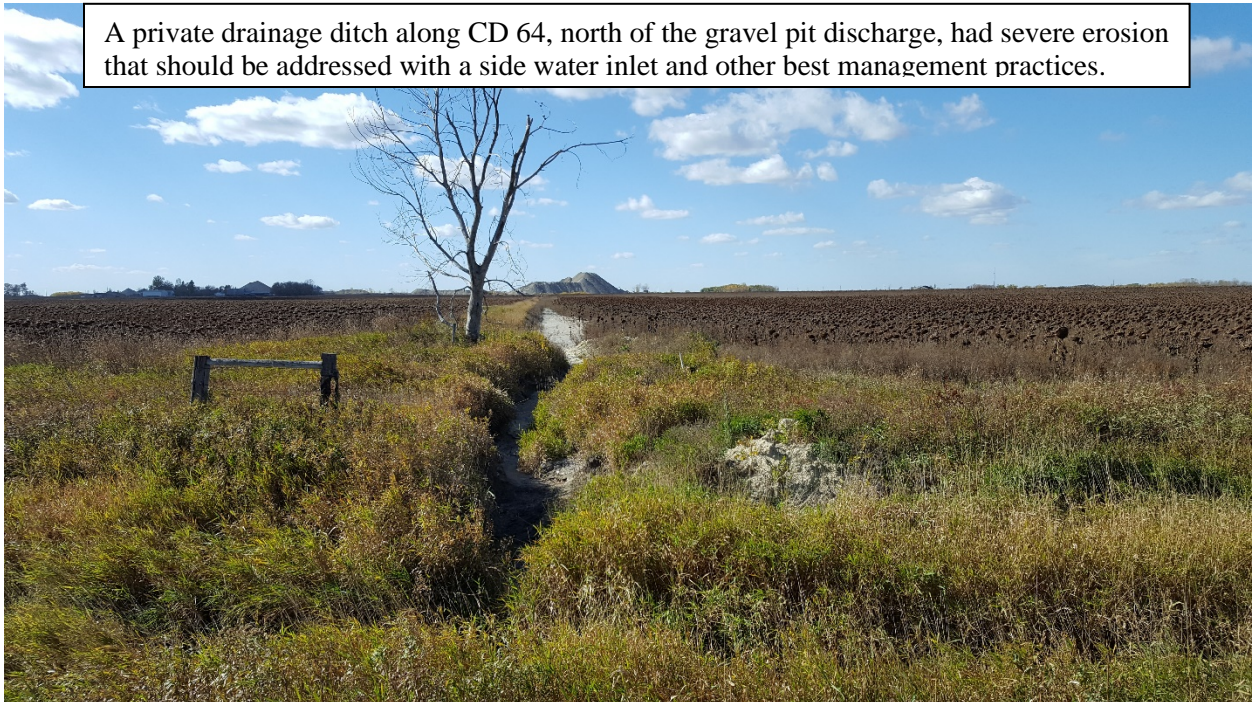
Very cloudy water in Lower Badger Creek at County Road 114 (top) and CSAH 92 (bottom)



Discharge into Polk County
Ditch 64 from a gravel pit



A private drainage ditch along CD 64, north of the gravel pit discharge, had severe erosion that should be addressed with a side water inlet and other best management practices.



High total suspended solids concentrations and/or turbidity levels were found at:

- Thief River at CSAH 7
- Discharge from a gravel pit, into Polk County Ditch 64

Exceptionally low (<1 mg/L) concentrations of total suspended solids were found on multiple occasions in the Thief River at CSAH 6, upstream of Agassiz National Wildlife Refuge.

District staff began working on data entry and station establishment for field data that will be submitted to the MPCA and (EQuIS).

River Watch and Public Education

The Red Lake Falls River Watch Team from Lafayette Secondary (along with District staff and International Water institute staff) spent a few hours at Riverside Park collecting macroinvertebrates out of the Clearwater River, building quite a diverse collection!



Ashley Hitt also met with the new Red Lake County Central River Watch teacher to provide an introduction to the program and helped the Red Lake County Central students with a round of water quality monitoring.

District staff created a worksheet and a video for the water quality station portion of the 2020 Northwest Minnesota Virtual Water Festival. This year's festival will include a lesson packet for teachers and students (activities, etc.) along with educational videos for each station's topic. District staff developed an activity that students can do at home or in their classroom. Video clips were recorded at Hartz Park and at the District office. The video was pieced together and edited by District staff and uploaded to YouTube. The worksheet includes instructions for an activity that the kids can do in their classroom or at home.

Northwest Minnesota Virtual Water Festival!!



Normally, water resource professionals from northwest Minnesota collaborate on two Northwest Minnesota Water Festival events in mid-to-late September. Many fourth-grade students from the area take part in the events, which are typically held in Warren and Fertile. Students travel from station to station to learn from presenters about water quality, watersheds, groundwater, aquatic invasive species. Most of the stations have activities for the kids, like fish painting and casting, so that they can have fun while learning.

The COVID-19 pandemic forced a change of plans for 2020. Instead of canceling the festival and missing the opportunity to provide this educational event to many students in this year's fourth-grade class, the festival has gone virtual. To allow more time to develop lessons, activities, and videos, the virtual water festival will take place around one month later than usual (in late October, or whenever it works well for the teacher).

Teachers and students will receive packets with information and activities. The packets and activities will be accompanied by educational videos. Existing videos were available in some cases (groundwater model demonstrations, for example). Some of the presenters were able to make their own videos for the festival. Some of the activities were modified so that they could be easily done in a classroom or at home. Here is a link to download the student packet for the Northwest Minnesota Water Festival:

http://www.redlakewatershed.org/waterquality/NWMN_Water_Festival_Student_Packet.pdf

Red Lake Watershed District water quality staff created a video based on the introductory presentation and activities that are typically part of the Water Quality Station at the Northwest Minnesota Water Festivals. Here is a direct link to our video: <https://youtu.be/RzQRPhBCXHE>

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

Progress has been made, in 2020, on construction and planning of projects for the Red lake River 1W1P. District staff photographed completed side water inlets along RLWD Ditch 16 for use in Red Lake River 1W1P ArcOnline project tracking. Progress on the Westside Flood Damage Reduction Outlet Stabilization work was also documented. District staff wrote a draft article/press release to publicize the 319 Small Watershed Focus Grant funding that was awarded to the Red Lake River Watershed (to be released when the contract is executed). There has also been discussion about future projects, including erosion concerns and potential grade stabilization projects in Polk Center Township, near the Black River. The West Polk SWCD submitted a request for funding for a project that would install side water inlets or other best management practices to stop gully erosion at several locations along Burnham Creek, southwest of Crookston. The Red Lake County SWCD was able to bring in additional funding sources to pay for some of their work and make room in the 1W1P budget for additional side water inlet installations in the Black River subwatershed.

Stabilization of the Thief River Falls Westside Flood Damage Reduction Project outlet was nearing completion in October.





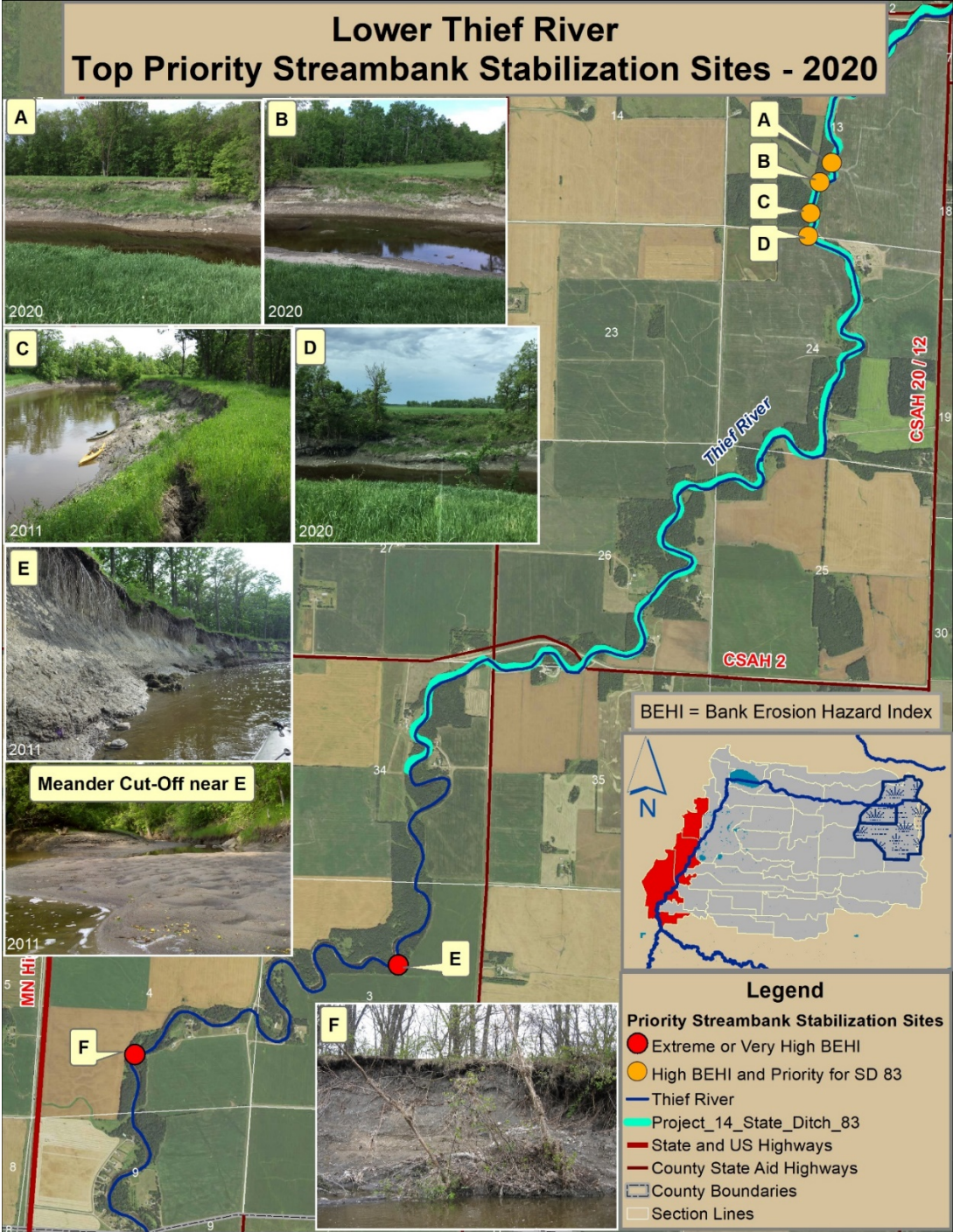
Examples of RLWD Ditch 16 Side Water Inlets



Thief River Watershed One Watershed One Plan (1W1P)

A map of priority Thief River 1W1P streambank stabilization sites along the Thief River was created. A Bank Erosion Hazard Index (BEHI) rating was completed for an additional eroding bank along State Ditch 83 that is threatening a road/trail along the top of the bank. Portions of that streambank, upstream of

CSAH 7, received just a moderate rating (possibly due to the persistence of vegetative cover despite the bank failure. Though the BEHI rating is an objective way to rank and prioritize streambank sites, that particular erosion problem sparks some thought about using other factors (like threats to infrastructure or buildings) that could factor into the prioritization of streambank stabilization work. A portion of the bank upstream of the slump had a higher BEHI score (still within the moderate range) due to the lack of vegetative cover.



Spoilbank slough along the State Ditch 83 portion of the Thief River, a short distance north of the CSAH 7 crossing

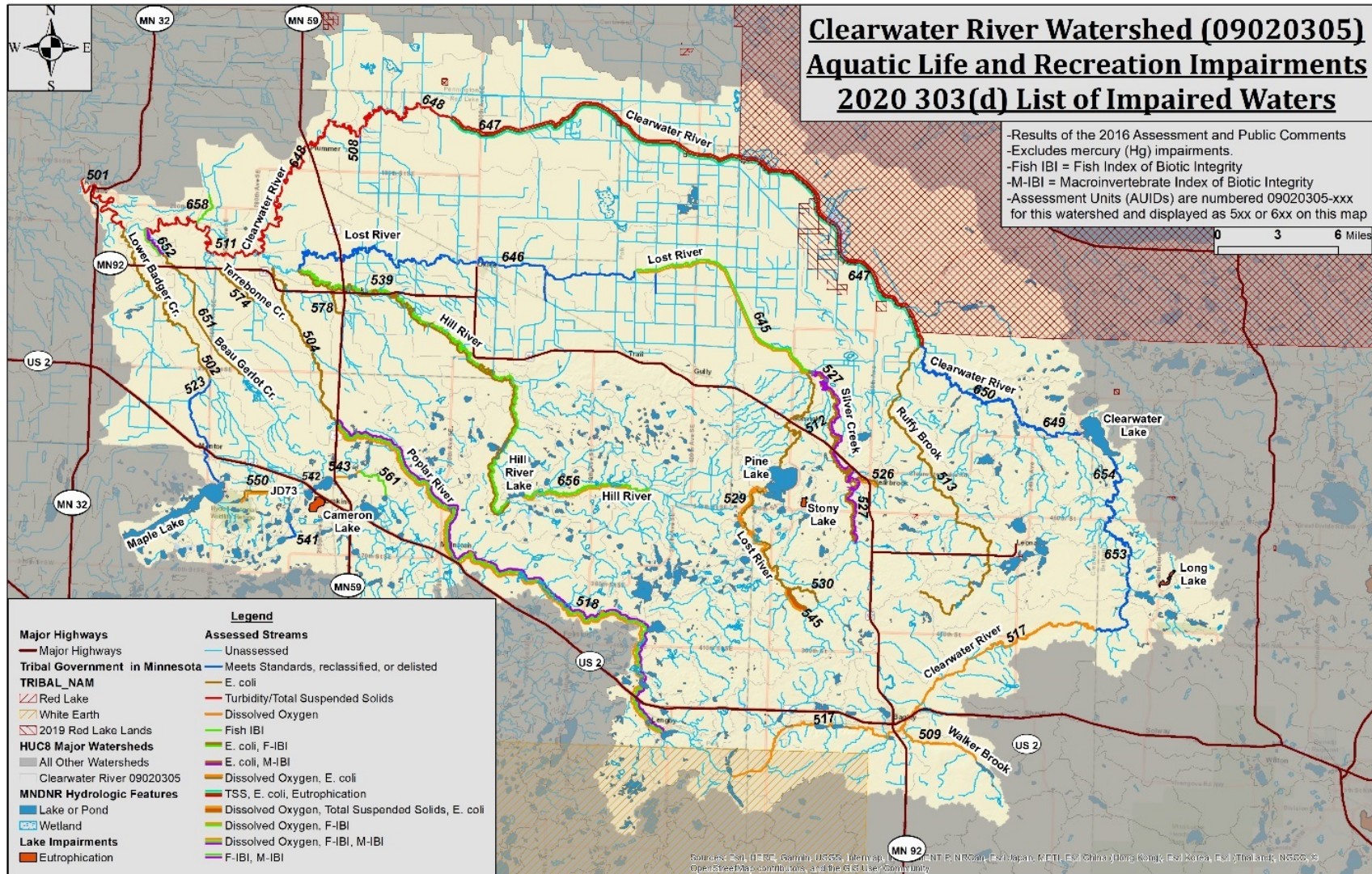


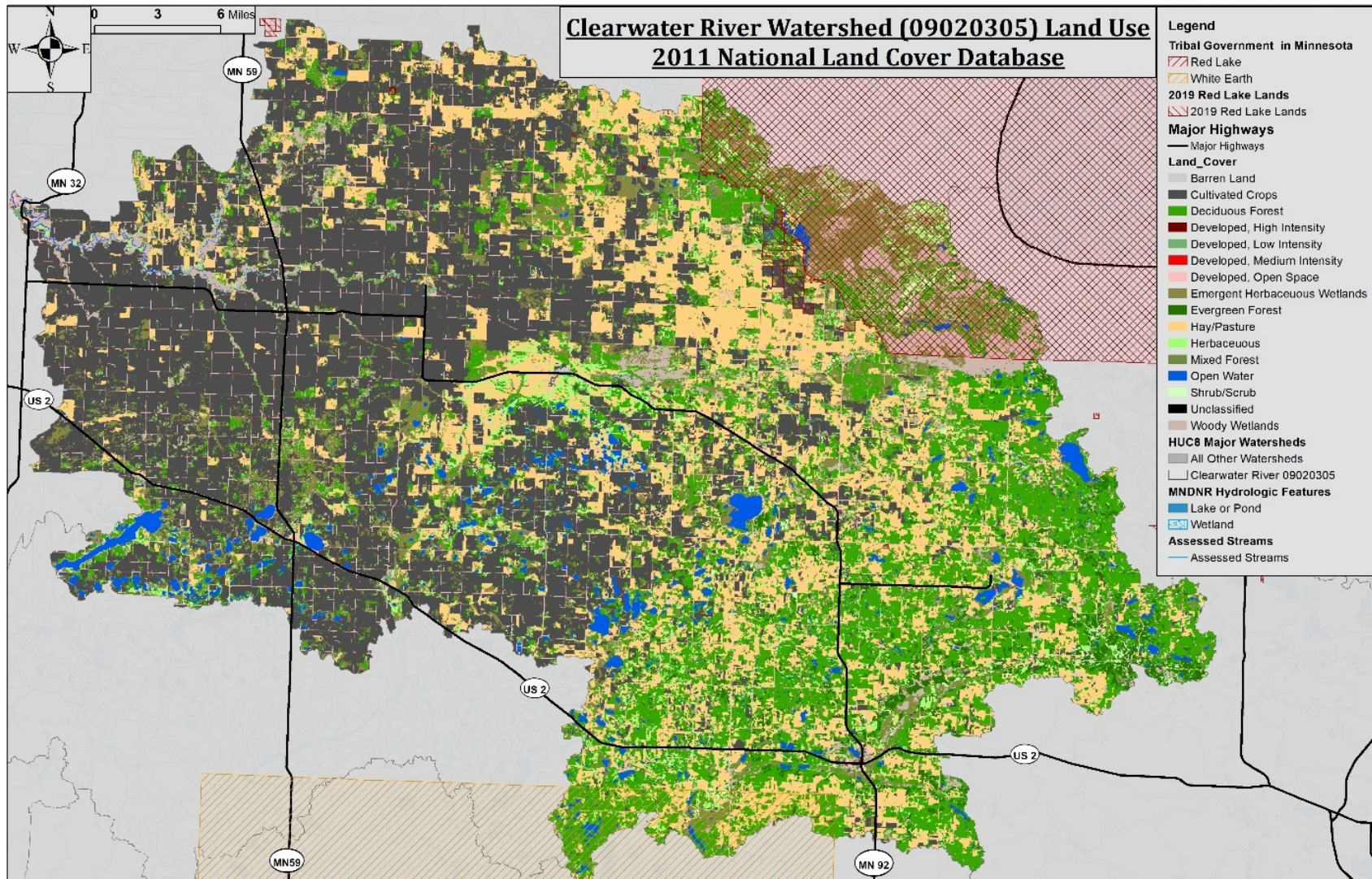
Clearwater River Watershed Restoration and Protection Strategy (WRAPS)

District staff sent trend analysis Excel files for each analyzed long-term monitoring station to the MPCA Project Manager so she could make some changes to the appearance of the tables. Some revisions were made to the trend analysis and discussion for the Bee Lake inlet and outlet monitoring stations. Some of the WRAPS and Total Maximum Daily Load (TMDL) maps were edited to include a newly acquired GIS layers that show a more complete picture of where tribal lands are located within the watershed. District staff answered additional questions for the MPCA Project Manager as the WRAPS, TMDL, and press release documents were being prepared for the public notice period.

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Other

- Northwest Minnesota (Virtual) Water Festival materials (student packets and teacher packets) and videos were finalized and distributed to teachers along with any materials/supplies that were necessary for the activities.
- District staff worked on water quality reports for the months of [June](#), [July](#), [August](#), and [September](#).
- A landowner contacted the District to discuss a failing dam at the outlet of South Connection Lake. District staff researched the history of the dam and tried to determine the entity that is responsible for the dam.
- Construction of the Black River Impoundment began in early October.
- District staff provided some input on an article written by MPCA staff ([Red River Basin Partnerships Deliver Solutions](#)) about how the partnerships formed during the Watershed Restoration and Protection Strategy and One Watershed One Plan processes are leading to projects that will reduce pollutant loading.
- The MPCA provided an [updated schedule](#) for anticipated MPCA monitoring and assessment activities. Intensive Watershed Monitoring of the Thief River Watershed was scheduled for 2021. Some planning and meetings with local partners had been completed prior to COVID-19 restrictions. The start of monitoring will be delayed for one calendar year to allow biological monitoring staff to get caught up on work that wasn't completed during the 2020 social distancing work stoppage. Start dates for all remaining watersheds (2021 and on) will also be delayed by one full year.
- Lack of a buffer is causing erosion along Polk County Ditch 14, near the confluence with Lower Badger Creek.



- While retrieving water level loggers, District staff saw that Polk County had stabilized an eroding bank of Kripple Creek, just downstream of the 180th Avenue SW crossing.

Kripple Creek at 180th Ave SW, April 2020 (Before)



Kripple Creek at 180th Ave SW, October 2020 (After)



Water quality related notes and minutes from the October 8, 2020 Red Lake Watershed District Board of Managers meeting.

- Motion by Ose, seconded by Tiedemann, to authorize President Nelson, the authority to sign the RRWMB Water Quality Program Grant Agreement for the Thief River Falls Oxbow Project, RLWD Project No. 46Q. Motion carried.
- Discussion was held on the need to appoint Board members to the Clearwater River 1W1P, RLWD Project No. 149B Policy and Advisory Committee. Motion by Ose, seconded by Tiedemann, to appoint Manager Torgerson as the Delegate and Manager Sorenson as the Alternate to the Clearwater River 1W1P, RLWD Project No. 149B Policy Committee. Motion by Torgerson, seconded by Sorenson, to appoint Manager Page to the Clearwater River 1W1P, RLWD Project No. 149B Advisory Committee.

October 2020 Meetings and Events

- **October 6, 2020** – Northwest Minnesota (Virtual) Water Festival virtual meeting to review the student packet and videos.
- **October 13, 2020** – Red Lake River 1W1P conference call
 - Red Lake County SWCD is working with a landowner to complete a grade stabilization project – survey and design has already been requested.
 - Consultants will probably be needed to help LGUs complete survey and design work for 1W1P projects – will reach out on an as-needed basis.
- **October 20 – 21** – Minnesota Water Resource Virtual Conference
 - “Collaboration in Water Resource Management”
 - Sometimes communication helps you find potential project partners that you didn’t know about.
 - The presentation included a video about NOAA’s work in the Great Lakes, that could be an idea for a future, similar RLWD public information video:
https://www.youtube.com/watch?v=ZcF07_fPmJ8
 - “Unregulated Contaminants in Source and Treated Drinking Water (PFAS)”
 - “Lake Management Strategies for Harmful Algal Bloom Management”
 - Harmful Algal Blooms (blue-green algae) are symptomatic of ecosystem imbalance and are expected to worsen with climate change (increased temperature, reduced water column mixing, longer droughts, high intensity precipitation events, habitat loss, changes in weather patterns)
 - Bi-weekly monitoring was recommended for lakes that have experienced HABs.
 - Alum treatments are used as a long-term treatment where external (watershed) nutrient sources have been addressed.
 - Elizabeth Crafton of Hazen and Sawyer shared some good resources of blue-green algae information. Apparently, hydrogen peroxide has been a successful treatment for blue-green algae blooms. It stops the proliferation of the blue-green algae without killing it (killing the algae with algaecides can lead to “side effects” from the dying algae like nutrient release and dissolved oxygen depletion.
 - [Algae and cyanotoxins resources](#)
 - [Combating algae growth and increased nutrient loadings](#)
 - [Horizons Newsletters](#)

- “A Holistic Adaptive Management Plan for Improving Como Lake over the Next 20 Years”
- “Satellite Remote Sensing for Water Quality Spatial/Temporal Trend Analysis in 10,000+ Minnesota Lakes Using and Automated High-Performance Computing Environment”
 - LCMAP (Land Change Monitoring, Assessment, and Projection)
- “Learning from Leaders of Successful Water-Quality Case Studies in the Minnesota River Basin “
- “River Nutrient Trends over the Past 20 Years”
- “Bridging the Gap between Science and the Public through Watershed Education and Engagement”
- ‘Aquatic Invasive Species: Boater Behavior and Willingness to Pay for Local Management”
- “Tracking Watershed BMP Adoption Progress Throughout Minnesota”
- “Slope Stabilization in Unprecedented Wet Times”
- “Sand Creek Bluff Erosion Mitigation Projects“
 - The Sand Creek Bluff Erosion Mitigation Projects used some prioritization considerations that may be useful for prioritizing streambank erosion projects within the RLWD ([Sand Creek Near Channel Sediment Reduction](#), 2015).

Prioritization Matrix, Weights, and Values for Streambank Stabilization Projects					
Parameter	Weight	1	3	5	7
Sediment/ nutrient loading	2	No significant load reduction to priority resource	Minor reduction in sediment loading (<X cubic yards/year), sediment is managed or deposited before reaching priority resource	Moderate reduction in sediment yield to priority resource, reduced yields to perennial tributaries (X-Z CY/YR)	Significant reduction in sediment yield to priority resources and perennial tributaries (>Z CY/YR)
Erosion/channel stability	1.5	Minimal improvement to erosion and stability	Low to moderate improvement (<X cubic feet/foot/year	Moderate improvement (<Y CF/FT/YR)	Significant improvement to overall stream stability (<Z CF/FT/YR)
Project cost	1	>\$300K	\$200K - \$300K	\$50K - \$200K	\$0 - \$50K
Project complexity	1	Geotechnical considerations, specialty design services required, difficult access, heavy oversight, major earthwork, EAW/EIS permitting	Geotechnical considerations, difficult access, engineering plans required, earthwork, significant permitting	Moderately complex, no specialty engineering required, some access issues, minor earthwork, basic permitting	Elementary solution, shelf design, volunteer and hand labor implementation, no permits
Infrastructure risk	0.5	No risk to infrastructure with no action, or no infrastructure present	Low to moderate infrastructure risk (100-150 ft away) and minimal risk to public safety with no action or value <\$100,000	Infrastructure at moderate but not immediate risk (50-100 ft away), moderate public safety risk or value <\$200,000	Infrastructure at high or imminent risk of failure with no action (<50 ft away). Public safety at risk or value >\$200,000

- “What Affects Farmer Decision-Making About the Use of Cover Crops”
- “Down the Drain: Successful Collaborations and Emerging Issues for Decentralized Wastewater Management”
- “Comprehensive and Systematic Approach to Stormwater Treatment (St. Cloud)”
- “Freshwater Mussels and Clean Water Regulation in Minnesota: The Importance of Water Quality Standards in Sustaining Ecosystem Services by Protecting Freshwater Mussels”
 - The Red Lake River and Clearwater River watersheds were among best in the state for mussel abundance, especially captured/minute.
- Some attendees watched a screening of the movie Brave Blue World, a documentary that is now available on Netflix.
- “Watershed Scale Planning and River Restoration in a Changing Climate”
 - Despite billions of dollars spent on flood damage reduction projects throughout the country, flood damages have increased.
 - Climate change is contributing to more frequent flooding events.
 - Development within floodplains is also a problem when it comes to flood damage expenses (the development of the Oxbow community along the Red River, even after the 1997 flood, comes to mind).
 - Resistance to conserving/restoring floodplains instead of developing them is often based on property tax revenue.
 - There are benefits that come from floodplain restoration:
 - Reduced storm/flood damage
 - Increase in property values
 - Business development around the restoration project
 - Increase in aquifer recharge
 - Recreation access and quality of life
 - Water quality
 - Habitat
 - Improve communication with floodplain managers (zoning authorities, state agencies, watershed districts, and FEMA) about climate (and flooding) considerations.
 - “Don’t pitch your tent in the middle of the highway, even if there are no cars coming.”
 - Allow floodplains to have natural functions.
 - Introducing fill for development reduces floodplain storage.
 - “Today’s 500-year floodplain is tomorrow’s 100-year floodplain.”
 - Compensatory storage: every acre of fill within a floodplain requires 2 acres of storage.
 - A proper channel restoration will increase floodplain capacity/connectivity instead of hard armoring so that it does not transfer energy and erosion potential downstream. Re-meandering a straightened channel reduces energy both by decreasing the slope, and the riffle pool sequencing acts to dissipate energy. Applying roughening bank protection, like toe wood structures, help to dissipate energy better than smooth rip rap and also improves fish habitat. Reaches downstream of unstable channels are often severely impacted by the

excess sediment entering the reach, so a restoration that reduces erosion will reduce sediment transport to downstream reaches.

- For incised channels, partners will need to decide if the goal is to raise the channel up to the abandoned floodplain, excavate a floodplain at the current elevation, or create a hybrid of these strategies.
 - “Putting flood prevention levees in floodways is bad – it passes the problem on to someone else (and probably makes it worse).”
 - Streams that are stable and connected to a flood plain sustained much less damage during extreme events.
 - A big problem is when dissent to climate change science is based on some form of variability (if climate change was happening, why was it so cold yesterday).
 - Variability needs to be recognized. There may be swings toward drought sometime in the future, even if we are wetter on average. The possibility of drought needs to be a consideration, even though it is wet now and getting wetter over the long term.
 - “Stream Restoration in Minnesota”
 - Evaluation program for restoration projects funded by the Clean Water Fund.
 - Adapting watershed planning and modeling for a changing climate
 - Joe Magner spoke of the benefits of 2-stage ditches.
 - Increase adoption of conservation tillage and cover crop practices on cultivated land.
 - Using Climate Tools for Adaptation and Planning in Minnesota
- **October 21, 2020** – Red Lake River 1W1P Policy Committee meeting
- **October 27 – 29** – BWSR Academy
 - Project Management
 - LGU One Watershed One Plan Retrospect to Help Others Plan Ahead
 - The Pine River 1W1P looked for lakes with declining trends in water quality and used Paul Radomski’s Phosphorus Sensitivity model to prioritize lakes for protection.
 - The Crow Wing SWCD created “mini” lake plans that took information from the 1W1P and created small informational documents for each lake association.
 - Tips and Techniques for Meetings with the Public
 - Mike Kennedy (MPCA) discussed strategies that could be used before and during a meeting:
 - “5 W’s and an H” to consider before a meeting (Who, What, Where, When, Why, How)
 - ORID method (Objective, Reflective, Interpretive, and Decisional; or “what,” “gut,” “so what,” and “now what”)
 - SWOT examination (Strengths, Weaknesses, Opportunities, and Threats).
 - Write a realistic goal/objective as an outcome statement for each meeting. That goal can be something that you can get back to if the conversation goes astray.
 - The most important part of the meeting planning process is to determine WHY you are doing the meeting.
 - “Harry Potter and the Ghastly Grant Application”

- Presenters compared grant writing to story writing (plot, resolution, conflict, characters, setting). Good story telling in a grant application can take the science and make it memorable, understandable, and relatable.

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.rldwatersheds.org.

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

Photo of the Thief River taken by Pennington SWCD

