

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 12/2/2021

**Water Quality Monitoring**



District staff completed the fourth round of 2021 samples at Red Lake Watershed District long-term monitoring sites. Many sites were not sampled this month where streams had gone dry or stopped flowing.

High total suspended solids (TSS) concentrations (>65 mg/L, >30 mg/L, or >15 mg/l, depending on location) were found in:

- Burnham Creek at CSAH 48.
- O' Briens Creek at Harvest Road NE

Exceptionally clear water with very low total suspended solids concentrations (at or below the laboratory's minimum reporting limit) was found in:

- Clearwater River at CSAH 25, near Bagley
- Heartsville Coulee at 13<sup>th</sup> Street Southeast
- Judicial Ditch 30 at 140<sup>th</sup> Ave NE

Improved Red Lake River canoe/kayak access under the CSAH 11 Bridge  
(A [Red Lake River Corridor Enhancement](#) Project)



High *E. coli* concentrations (>126 MPN/100 mL) were found in:

- Blackduck River at Deer Trail Road NE
- Branch A of Judicial Ditch 21 at CSAH 49
- Chief's Coulee at Dewey Avenue
- Clear Brook at State Highway 92
- Clearwater River at CSAH 2 (north of Shevlin)
- Clearwater River at County Road 24
- Hill River at 335th Avenue SE
- Judicial Ditch 30 at 140<sup>th</sup> Ave NE
- Lost River at CSAH 28
- Lost River at 486<sup>th</sup> Street, near the outlet of Pine Lake
- Moose River at CSAH 54
- Mud River at CSAH 54
- Nasset Creek
- North Cormorant River at CSAH 36
- O' Briens Creek at Harvest Road NE
- Polk County Ditch 14, near the outlet of Maple Lake
- Poplar River at CSAH 30, near Fosston
- Red Lake River at CSAH 24 (Highlanding)
- Silver Creek at 159<sup>th</sup> Avenue
- South Cormorant River at CSAH 37
- Thief River at CSAH 7

High total phosphorus (greater than 0.5, 0.1, or 0.15 mg/L in streams, depending on location) concentrations were found in:

- Burnham Creek at 320<sup>th</sup> Avenue SW
- Burnham Creek at CSAH 48
- Chief's Coulee at Dewey Avenue (also had a high biochemical oxygen demand concentration)
- Heartsville Coulee at 13<sup>th</sup> Street Southeast
- Hill River at CSAH 35
- Hill River at 335<sup>th</sup> Avenue SE
- Long Lake (32 mg/L result and 30 mg/L standard, chlorophyll-a was also high, and blue-green algae was found along the shore)
- Lost River at 109<sup>th</sup> Ave
- Moose River at Highway 89
- Nassett Creek
- North Cormorant River at CSAH 36
- O' Briens Creek at Harvest Road NE
- Poplar River at 310<sup>th</sup> Street SE
- Ruffy Brook at CSAH 11
- South Cormorant River at CSAH 37
- Thief River at CSAH 7



Long Lake  
blue-green algae  
jar test: the green,  
floating stuff is  
blue-green algae



Due to the anticipated sulfate impairment of the channelized portion of the Clearwater River, sulfate analysis was added to the suite of parameters for water quality samples collected from that portion of the Clearwater River and upstream reaches/tributaries. High sulfate concentrations (>10 mg/L) were found in:

- Ruffy Brook at CSAH 11

Low dissolved oxygen levels (<5 mg/L) were recorded in:

- Burnham Creek at CSAH 48
- Chief's Coulee at Dewey Avenue
- Clear Brook at State Highway 92
- Clearwater River at CSAH 25, near Bagley
- Judicial Ditch 73 at the Maple Lake inlet
- Lost River at 109<sup>th</sup> Ave
- Moose River at Highway 89
- Mud River at CSAH 54
- Thief River at CSAH 7
- Walker Brook at CSAH 19

Deployments of HOBO dissolved oxygen loggers continued at key sites throughout the District. Most of the stations on tributary streams that were scheduled for continuous dissolved oxygen monitoring in 2021 were dry. The lower flow levels provided an opportunity to deploy loggers safely and

inconspicuously on mainstem sites along the Clearwater River and the Thief River. The dissolved oxygen loggers were deployed at:

- Thief River upstream of Agassiz Pool (380<sup>th</sup> Street NE)
- Clearwater River near the lower end of the channelized reach (County Road 127)
- Clearwater River at Plummer (Minnesota St. N.)
- Clearwater River near Terrebonne (CSAH 12)
- Clearwater River in Red Lake Falls (Klondike Bridge)

Discrete (manual) water quality measurements were collected at the beginning, near the middle, and at the end of each deployment. At the end of each deployment period, a freshly calibrated logger was deployed to replace the recently deployed logger. After retrieval, loggers were cleaned and re-calibrated in the District's laboratory. Quality assurance measurements were recorded to determine the extent of drift or calibration corrections. The quality assurance measurements are used to calculate any calibration/fouling drift corrections that are needed. Software is used to apply necessary drift corrections and compare logger data to discrete measurements.

Early detection zebra mussel veliger samples were collected from the Red Lake River at 420<sup>th</sup> Ave SE (East Line monitoring site, S003-944). Thankfully, RMB labs did not find any zebra mussel veligers in the 2021 samples collected from the Red Lake River.

A fall drawdown of the Thief River began in mid-August. The Thief River was dry at CSAH 7 during the first site visit, but it was revisited so that a sample could be collected when flow resumed during the drawdown. The Minnesota Pollution Control Agency collected regular samples from the Thief River during the drawdown period. Though total suspended solids, total phosphorus, and chlorophyll-a were relatively high on September 20<sup>th</sup> (receding limb of hydrograph) compared to other September samples collected at the CSAH 7 crossing of the Thief River, the samples did not exceed the state's applicable water quality standards.

### **River Watch and Public Education**

The District Natural Resource Specialist received macroinvertebrate sampling training from International Water Institute staff to prepare for macroinvertebrate sampling outings with local River Watch groups. The District Natural Resource Specialist led water quality monitoring outings with Red Lake County Central, Red Lake Falls, and Clearbrook-Gonvick River Watch groups.

The District Natural Resource Specialist presented water quality demonstrations to multiple groups of Challenger Elementary 4th Grade students on September 27<sup>th</sup> and 29<sup>th</sup>.

District water quality staff taught 6th grade students about the water cycle and aquatic invasive species at the Pennington County Outdoor Education Day at 8:30 am on September 15th in Thief River Falls. District staff also taught 4th grade students about water quality at the Northwest Minnesota Water Festival events held in Warren and Fertile. Based on the numbers provided by the schools, as many as 292 students attended the Warren water festival on September 21st. As many as 198 students attended the Fertile water festival on September 22nd. At the water quality station, students learned about the importance of clean water, as well as sediment, turbidity, erosion, and water quality monitoring. They also participated in an activity in which they were "scientists" testing water quality and a game in which

they (as “water droplets”) learned about the importance of maintaining vegetation along streams and lakes to keep sediment out of the water.





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

Construction of the Black River Impoundment diversion ditches and associated water quality features (side water inlets and in-channel rock-check grade stabilization structures) is in progress and could be nearly complete within a month. Houston Engineering created a [website for the Black River Impoundment](#), which included videos that describe the features of the project.



**Thief River Falls Oxbow Restoration Project**

Construction of the Thief River Falls Oxbow Restoration project began at the end of August 2021. The first task was excavation of the old oxbow wetland. The contractor created a clever system for navigating the wetland with equipment and hauling sediment. Mats (wooden beams) used for pipeline construction were used to create a path from the east end of the pond to the west end. A tracked, rotating dump truck was used to ferry sediment from the west end to the east end. At the east end of the project, the sediment was loaded onto Sidump'r trucks and hauled away.



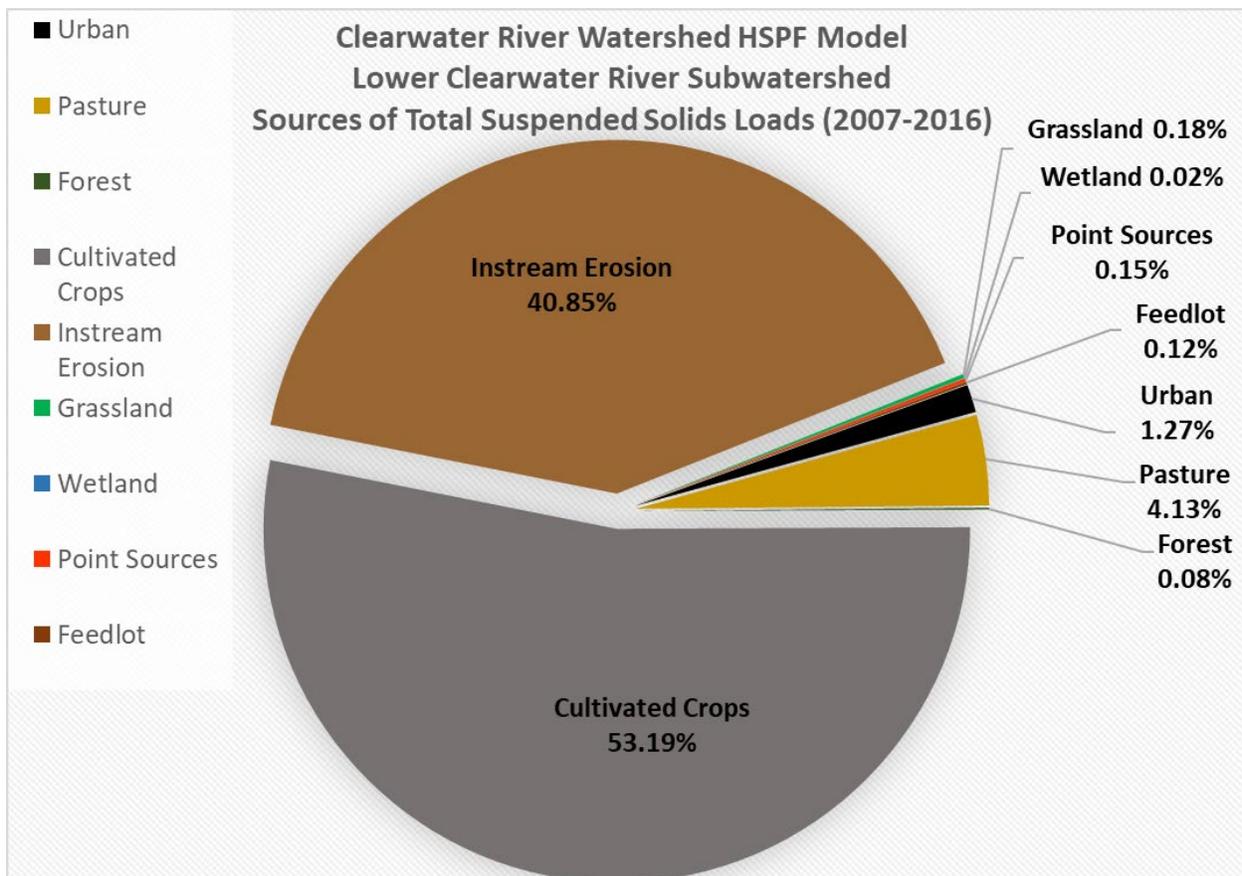
**Thief River One Watershed One Plan (1W1P)**

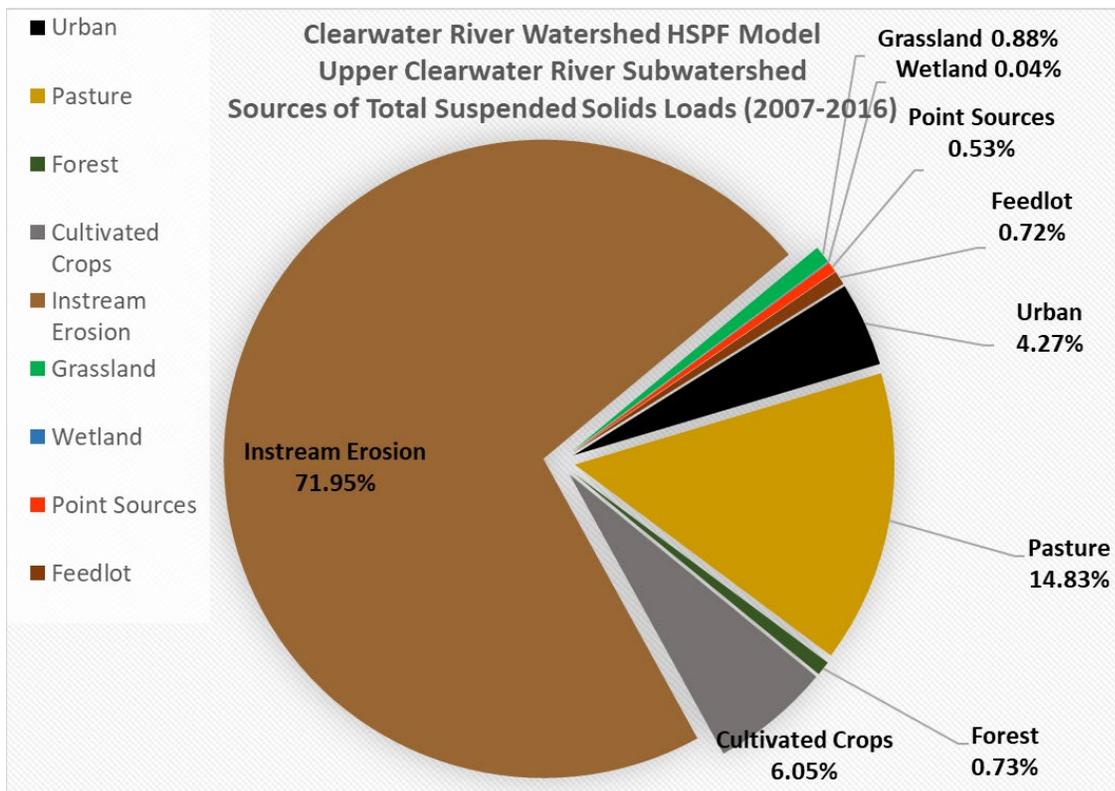
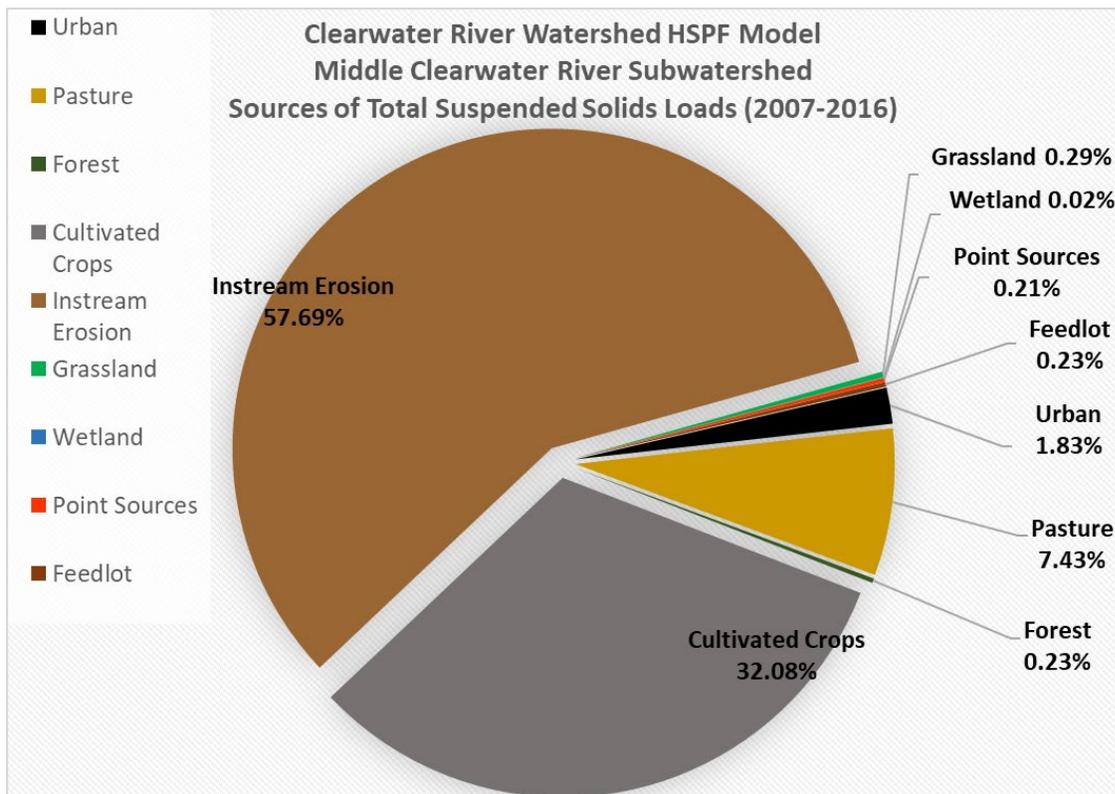
Construction of the streambank stabilization projects, stabilization of a ditch outlet, and repair of an access road along the State Ditch 83 portion of the Thief River began in August 2021. Construction was scheduled to begin in September 2021 on a project that will stabilize the Judicial Ditch 23 outlet to the Thief River, though the start of construction was delayed for several weeks, until early October.

**Clearwater River One Watershed One Plan (1W1P)**

District staff updated the Clearwater River 1W1P [website](#) to add the [August newsletter](#) and [Advisory Committee report](#).

District staff mapped known in-channel erosion problems in the Clearwater River watershed (streambank erosion, unstable ditches and ditch outlets, etc.). Information and assessments collected during the fluvial geomorphology study, ditch inspections, PTMAp groundtruthing, windshield surveys during the Watershed Restoration and Protection Strategy project, and examination of aerial photos were used to compile the map of erosion problems. District staff used the HSPF Scenarion Application Manager tool to create a spreadsheet that calculated load reduction goals for each anthropogenic source in each HUC 10 subwatershed of the Clearwater River Watershed. The following three charts show how the ratio of contributions from different sources changes along the main channel of the Clearwater River along with changes in land use.





**Other**

- District staff received a complaint about water quality in the Clearwater River (channelized portion). The water in that portion of the river had been cloudy during June and July site visits. The green duckweed on the surface of the river, which may have prompted the complaint, is not harmful and may have been present because of lower flows and wild rice paddy drainage.
- District staff began drafting an application for Red River Watershed Management Board Water Quality funding. A meeting was scheduled to discuss the advancement of some projects that were identified in the Thief River 1W1P 2020 Work Plan but were in need of additional funding (additional Thief River Streambank stabilization work and a feasibility study for the stabilization of the Judicial Ditch 30 outlet.
- District staff answered questions from the MPCA about high nitrate concentrations in the Red Lake River. There were a lot of abnormally high nitrate concentrations during that summer and examination of the data (including blank samples) suggested that there as a problem with RMB Laboratory's nitrate analysis methods for a period of time in 2018.
- The Clearwater Lake Area Association shared the fall issue of their [Dockside](#) newsletter.

Water quality related notes and minutes from the September 9, 2021 Red Lake Watershed District Board of Managers meeting.

- The Board reviewed a funding request from the Red Lake SWCD, for the Randy Myhre Grade Stabilization Project, located in Section 6, Poplar River Township, for a total project cost of \$13,600.20. The Red Lake SWCD is requesting cost share in the amount of \$2,000.00 for construction from the from the District's 2021 Erosion Control Funds, RLWD Project No. 164. Motion by Tiedemann, seconded by Page, to approve cost share in the amount of \$2,000 for the Randy Myhre Grade Stabilization Project, from the District's 2021 Erosion Control Projects Funds, RLWD Project No. 164. Motion carried.
- Construction on the Pine Lake Flood Damage Reduction and Fish Habitation Project, RLWD Project No. 26 B is slated to begin on September 13, 2021. Landowners are removing the trees today. The Board reviewed a letter to the Minnesota Department of Natural Resources (MnDNR) from the Red Lake Band of Chippewa Indians regarding the issuance of a Public Works permit for replacement of the Pine Lake outlet structure. Discussion was had on the fact that the letter and the comments/requests was received weeks after the permit was issued and the bid awarded. The request will be determined by the State of Minnesota.
- Contractor Andy Anderson, Quality Spray Foam/Anderson Excavation, plans to begin construction on September 13, 2021, on the Thief River Streambank Stabilization Projects, Thief River 1W1P Plan, RLWD Project No. 149A. Administrator Jesme indicated that there may be extra funding for additional sites to be completed.

Water quality related notes and minutes from the September 23, 2021 Red Lake Watershed District Board of Managers meeting.

- The Board reviewed two grade stabilization funding requests from the Red Lake SWCD, for landowner, Matt Knutson. Administrator Jesme stated that there are two sites in Gervais Township, for a total project cost of \$15,860.91. The Red Lake SWCD is requesting cost share in the amount of \$2,500.00 from the from the District's 2021 Erosion Control Funds, RLWD Project No. 164. Motion by Ose, seconded by Page, to approve cost share in the amount of \$2,500 for the Matt Knutson Grade Stabilization Projects, from the District's 2021 Erosion Control Projects

Funds, RLWD Project No. 164. Motion carried. Jesme stated that landowner, Matt Knutson, has an additional 10 grade stabilization sites located in Red Lake Falls Township, with a total project cost of \$89,201.26. The Red Lake SWCD is requesting cost share in the amount of \$7,500.00 from the District's 2021 Erosion Control Funds, RLWD Project No. 164. Motion by Page, seconded by Tiedemann, to approve cost share in the amount of \$7,500 for the Matt Knutson Grade Stabilization Projects, from the District's 2021 Erosion Control Projects Funds, RLWD Project No. 164. Motion carried.

- The Board reviewed two grade stabilization funding requests from the West Polk SWCD, for landowner, BTN Farms, located in Fisher Township and Sorenson Farms, Inc., located in Roome Township. The total project cost for the BTN Farms Grade Stabilization is \$7,000, with a cost share request from the District in the amount of \$5,250. The Sorenson Farms, Inc. Grade Stabilization Project has a total project cost of \$12,000, with a cost share request of \$9,000. Administrator Jesme stated that funding could come through the District's Erosion Control Funds, RLWD Project No. 164, or from the RRWMB Base Funding for Water Quality Projects, RLWD Project No. 46. Motion by Tiedemann, seconded by Sorenson, to approve the cost share request in the amount of \$5,250 for the BTN Farms Grade Stabilization Project, from the District's RRWMB Water Quality Base Funding, RLWD Project No. 46. Motion carried. Motion by Tiedemann, seconded by Ose, to approve the cost share request in the amount of \$9,000 for the Sorenson Farms, Inc. Grade Stabilization Project, from the District's RRWMB Water Quality Base Funding, RLWD Project No. 46. Motion carried.
- Engineer Nate Dalager, HDR Engineering, Inc., discussed the construction on the Pine Lake Flood Damage & Fish Habitat Project, RLWD Project No. 26B. The contractor has completed the in-channel work, with plans to place the rock riffles and structure next week. Administrator Jesme discussed the permitting comment period and public review. At the request of the Red Lake Band of Chippewa Indians, the Department of Natural Resources completed a Phase 1 archaeological review, noting that nothing was found within the project area.
- Engineer Tony Nordby, Houston Engineering, Inc., and staff member Nick Olson discussed downstream repairs to the outlet of the Schirrick Dam, RLWD Project No. 25. Nordby reviewed two alternatives to armor 600 feet of the east side bank, recommending Alternative 2 at an approximate cost of \$88,720, as the best option. Motion by Tiedemann, seconded by Page, to authorize Houston Engineering, Inc., to complete Plans and Specifications using Option 2 for the downstream repairs to the Schirrick Dam, RLWD Project No. 25. Motion carried.
- The Board reviewed the Plans, Specifications and Engineer's Opinion of Probable Cost for the Demarais/Hanson Outlet Repair Project, RLWD Project No. 149. Administrator Jesme stated that a majority of the project will be funded through the Red Lake River 1W1P, RLWD Project No. 149. Engineer Tony Nordby, Houston Engineering, Inc., estimated the approximate cost of construction to be \$160,625, recommending that Plans and Specifications be sent out to the contractors, with quotes submitted back to the District office by 9:30 a.m. on October 7th, with final approval by the Board on October 14th. Motion by Ose, seconded by Sorenson, to approve the Plans and Specification for the Demarais/Hanson outlet Repair Project, with quotes to be submitted to the District office no later than 9:30 a.m. on October 7, 2021, and presented to the Board for review at the October 14, 2021 meeting. Motion carried.
- Discussion was held on the Mud River Project Work Team meeting held on September 14, 2021. Engineer Nate Dalager, HDR Engineering, Inc. will work the staff from the MnDNR and U.S. Fish and Wildlife Service, to determine the best project concept. Dalager stated that Agassiz National Wildlife Refuge has a planned project that will complement the Mud River Project.

- Construction is proceeding on various sites of State Ditch 83, RLWD Project No. 14, in collaboration with the Thief River 1W1P, RLWD Project No. 149A. Quality Spray Foam/Anderson Excavating is completing the work. The bid was awarded to Davidson Construction for work on the Judicial Ditch 23, under the jurisdiction of Marshall County and funded for through the Thief River 1W1P, RLWD Project No. 149A. Marshall County requested that the District lead the construction portion of the project.

### **September 2021 Meetings and Events**

- **September 7, 2021** – Red Lake River 1W1P Planning Work Group meeting
  - Financial update
  - Project updates
    - Some landowners have backed out of projects. The group discussed asking for a bond from landowners to keep them committed to projects.
    - Stabilization of the Ditch 10 outlet has been completed. The final funding breakdown will depend on how much of the project will be funded by FEMA.
    - Phase I of the Pennington County Ditch 96 stabilization project was completed. Left over funding from that project's budget can be used to help fund construction of the Demarais-Hanson stabilization project.
    - SWCDs will use a selection of parcel data, based on areas prioritized by PTMApp, for outreach efforts to promote ag practices.
    - The next round of Watershed-Based Implementation Funding will likely be approved by BWSR in October and 1W1Ps can start applying for the funding in November or December.
    - The West Polk SWCD's Andover 9 grade stabilization project will be constructed as soon as possible.
    - The West Polk SWCD still plans to construct the Roome 2 grade stabilization project this year. The PWG discussed using as much of the remaining 2018 budget as possible for the West Polk grade stabilization projects.
    - Stabilization of high bluffs near Red Lake Falls was briefly discussed. It was noted that the rock weirs along a high bank of the Red Lake River near Huot appear to be working well.
    - The Red Lake SWCD is working on 2 grade stabilization projects in Section 32 of Browns Creek township, a grade stabilization structure in Section 10 of Louisville Township, and a grade stabilization project in Section 8 of Lake Pleasant Township. A bid for technical and engineering work for the Voyageurs View streambank stabilization was received from Houston Engineering.
    - A streambank failure in Section 34 of Crookston Township was discussed. Geotechnical work and surveying to determine the cause and a solution for this rotational bank failure will be very expensive and not guaranteed to work. Rotational failures are a problem along this portion of the river. The geological mechanisms that cause these failures seemingly can't be prevented by streambank protection alone. Solutions can be very expensive and complex (like the \$6.4 Million dollar project to stabilize the bank of the Red Lake River along Highway 2 in Crookston and the work done to move Highway 2 away from a rotational slump east of Crookston). One thing that we can do, however, is offer

up to 75% of the revegetation cost to plant trees, etc., using the 319 Grant budget for riparian buffer establishment.

- **September 13, 2021** - Red Lake River 1W1P Planning Work Group meeting
  - The PWG reviewed two project requests from the West Polk SWCD for projects that will stabilize gully erosion problems along the Red Lake River, near East Grand Forks. The projects could not be recommended for funding using current grants, however, because they were not located within any of the priority areas that were specified in the 2018 Watershed Based Implementation Funding (WBIF), 2020 WBIF, or 319 Grant work plans. In the 2022 Red Lake River 1W1P WBIF work plan, it will be important to budget a limited amount of funding (10-20%) for projects that accomplish written 1W1P goals for resources within lower priority management areas. District staff recommended that the West Polk SWCD should bring the projects to the next RLWD Board of Managers meeting to see if they can be approved for funding using the District's erosion control budget (the Board approved the funding at their September 23, 2021 meeting).
- **September 14, 2021** – Mud River Restoration Project Team meeting
  - Review of history, previous work, meetings, and goals
  - Discussion of design, water quality, land ownership, scope of work, etc.
    - A landowner shared that water will sometimes back up onto his farmland located 1 mile east and north of the Highway 89 crossing of the Mud River. It looks like the land would be along Branch 50 of Judicial Ditch 11.
    - Established a consensus that we are on the right path for addressing sediment sources along the Mud River (Buffer Law requirements, 1W1P Watershed Based Implementation Funding for BMPs).
    - There may be less water going into Branch 8 than the 60/40 that was previously assumed
    - DNR staff recommended examining the possibility of sending all (or most) water through the restored channel.
    - The concerns of the ditch authority (Judicial Ditch 11) would be drainage, of course. It will be important to avoid any negative impacts. The project has potential to improve the drainage system's outlet.
    - DNR staff identified another potential historical channel, but landowners thought that it was a separate stream (not the historical Mud River) and were opposed to using that path for the restoration project.
    - Branch 30 of Ditch 11 appears to come to a dead-end in forest north of Branch 8 of JD 11.
    - A landowner mentioned that in the early 1900s, before Agassiz Pool was created to restore the historic Mud Lake, a boat could travel between Grygla and Thief River Falls.
    - A landowner mentioned that the Mud River does leave its channel near the WMA.
    - A landowner mentioned that ditches and rivers carried much more sediment in the 1950s.
    - Next steps and summary
      - We need to find a solution that everyone can live with
      - The project would provide habitat for waterfowl (mergansers were specifically mentioned as an example)

- The USFWS shared long-term plans to rebuild levees along JD 11 within Agassiz Pool, which would effectively turn Agassiz Pool into an off-channel impoundment.
- Sediment from upstream sources is a concern. Will there be enough flow to move sediment through the channel or will it become a sediment trap?
- **September 14, 2021** – Clearwater River 1W1P Planning Work Group meeting
  - Houston Engineering, Inc. has completed development of the PTMApp model for the Clearwater River Watershed
  - Vision statement brainstorming
  - Discussed approach to setting numerical goals. PTMApp estimates overland sediment erosion, but not in-channel erosion. The HSPF model does estimate in-channel erosion and can be used to find a in-channel-to-overland erosion ratio for subwatersheds and priority resource points. Should TMDL pollutant reduction goals be used, or load reduction estimates be based on the newly created PTMApp model?
- **September 15, 2021** – Pennington County Outdoor Education Day
- **September 21, 2021** – Northwest Minnesota Water Festival in Warren
- **September 22, 2021** – Northwest Minnesota Water Festival in Fertile

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](http://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](http://www.rlwdwatersheds.org).

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