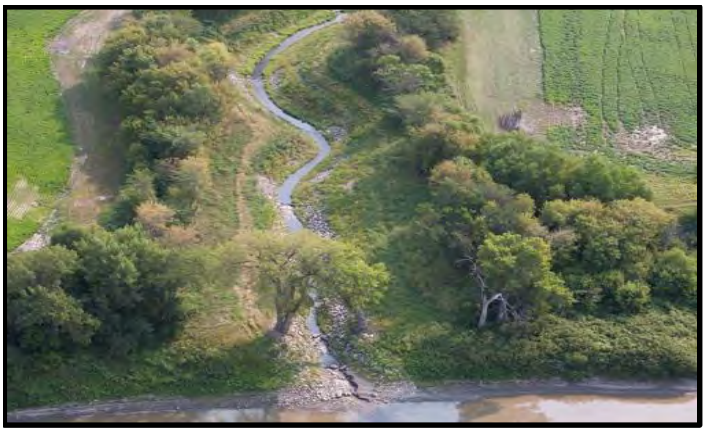
Red Lake Watershed District



2015 Annual Report

Contents

Letter from the President

Greetings to all the citizens of the Red Lake Watershed District and other interested parties.

Another year has passed and those of us who deal in water resource issues never really know what to expect from one year to the next. Winter of 2014 and 2015 started out with rather large amount of snow fall along with extremely cold conditions. Starting late December 2014 and into the second week of January 2015, northwestern Minnesota witnessed 17 days in a row of temperatures reaching lows of -2 degrees to -27 degrees. As we progressed into the spring, it appeared the Red River Valley could once again witness flood conditions with the National Weather Service projecting above average flood conditions up and down the valley. As we started reaching mid-March it was getting apparently clear that what moisture was in the snow pack was absorbing into the ground as by late March all snow was gone and there was no runoff event to measure.

This year was another very busy year for our staff as we completed various projects as well as developing new projects. Two projects that were completed this year was the Grand Marais Creek Outlet Restoration Project #60F and a new legal drainage system referred to the public as Red Lake Watershed District Ditch #15. Final payment hearings were held on both projects with the District being very satisfied with the budget and all construction aspects. The Districts water quality staff was been very busy working on various Watershed Restoration and Protection Strategy (WRAPS) projects as well as starting the Total Maximum Daily Load (TMDL) Report for the Thief River Watershed. The water quality staff was also very busy this year with various youth educational events throughout the District.

In 2015, two members of the Red Lake Watershed Board of Managers were re-appointed by their respective counties to serve three year terms. Gene Tiedemann, rural Euclid, was reappointed by the Polk County Board of Commissioners and Les Torgerson, rural Leonard, was appointed by the Clearwater County Board of Commissioners. I am very pleased that these two fine gentleman agreed to serve your communities once again and the entire Board of Managers look forward in serving the folks of northwestern Minnesota to the best of our ability.

With a heavy heart I am sad to report that on June 10, 2015 the Red Lake Watershed District received the news of the sudden death of Board member Albert Mandt. Albert was a true friend and served citizens of East Polk County with great respect. He will be remembered for his quick wit as well as his jokes and will be missed by the staff and Board of Managers of the Red Lake Watershed District.

There is one more item that I would like to share with you folks and that is Gary Lane, District Ditch Inspector since 1998, has retired and is now working full time in his honey bee business. The staff and the Board of Managers would like to thank Gary for his years of service and wish him the very best in his new found passion.

I would like to remind the citizens that the goals of a watershed district is to manage water in the areas of flood control, drainage, and water quality. We continue to hold our meetings on the second and fourth Thursday of each month and welcome public interests and/or attendance at these meetings.

The Watershed District office is located at 1000 Pennington Avenue South, Thief River Falls, MN. Feel free to stop in and have a cup of coffee but if you do not have time, please go to our website http://www.redlakewatershed.org and take a virtual tour of our facility as well as get updates of projects throughout the year.

Our 2015 Annual Audit is included in this report in an abbreviated form. A complete copy of the Annual Audit may be obtained at the District office at 1000 Pennington Avenue South, Thief River Falls, as well as on our website www.redlakewatershed.org .

Once again, it was a pleasure to serve as President of the Board in 2015.

Sincerely,

Dale M. Nelson, President
Red Lake Watershed District

Board of Managers – 2015

Front Row *(left to right)*: Gene Tiedemann, Vice President; Dale M. Nelson, President; and LeRoy Ose, Secretary
Second Row *(left to right)*: Les Torgerson; Lee Coe, Treasurer; Orville Knott; and Albert Mandt

Gene Teidemann was re-appointed to the RLWD Board of Managers for a 3-year term. Gene will represent West Polk County for the years 2015-2017.

Les Torgerson was appointed to the RLWD Board of Managers for a 3-year term. Les will represent Clearwater County for the years 2015-2017.

In Memory of Albert D. Mandt

Albert Mandt served on the Red Lake Watershed District Board representing East Polk County since January 10, 2010. Albert passed away on June 10, 2015 at the age of 69. Albert's commitment and dedication as a public officer was evident as he served on the District Board as well as his contributions to the East Polk SWCD and King Township Board and other community involvement throughout his life. In his time on the District Board, his compassion and kindness towards the District Staff and Board Members will not be forgotten. His quick wit and personality will be greatly missed.

Staff – 2015

Left to right: Loren Sanderson-Engineering Specialist; Tammy Audette-Office Manager; Myron Jesme-Administrator; Ashley Hitt-Natural Resources Technician; Nick Olson-Ditch Inspector/Technician II; Claire Carlson Summer Intern; Corey Hanson-Water Quality Coordinator; and Arlene Novak-Accounting Officer/Office & Admin.Spec.Prin.

After 17 years of dedicated service to the Red Lake Watershed District as Ditch Inspector/Technician II, Gary Lane retired on April 30, 2015. The District Board and Staff would like to congratulate Gary on his retirement! Gary will continue working with his honey bee business and enjoy additional time to spend at his cabin at Lake of the Woods. Best wishes Gary!

Office

Red Lake Watershed District
1000 Pennington Avenue South
Thief River Falls, MN 5670
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Phone: 218-681-5800
Fax: 218-681-5839
Website: redlakewatershed.org
E-Mail: rlwaters@wiktel.com

Meetings

The Board of Managers held twenty-four regularly scheduled board meetings in 2015. These regular meetings are normally held the 2nd and 4th Thursday of each month at the District office at 9:00 a.m. Notice of these meetings are mailed or e-mailed to the Advisory Committees, county auditors, county commissioners, and SWCD/NRCS offices and by request. The agenda and minutes from board meetings are available by visiting our website at www.redlakewatershed.org/minutes. The 2015 General Fund Budget hearing was held on August 28, 2014. The General Fund budget was adopted and the levies were set for 2015 in the amount of $157,200.00 which was reduced from the 2014 General Fund Budget of $168,913.00. Notice for the General Fund Budget hearing was published in at least one newspaper in each of the 10 counties within the watershed district.

2015 Overall Advisory Committee

John A. Nelson, Walker Brook Area
Lloyd Wiseth, Marshall/Beltrami SWCD, Grygla
Steve Holte, Farmer/Landowner
Emmitt Weidenborner, Upper Red Lake Area
John Ungerecht, Upper Red Lake Area
Dan Schmitz, Black River Area
John Gunvalson, Clearwater River Area
Roger Love, Grand Marais Area
Dave Rodahl, Thief River Area
Shane Bowe, Red Lake Band of Chippewa Indians

2015 Subwatershed Advisory Committee Members

Black River Area
*Dan Schmitz, RLF
Curt Beyer, RLF
Greg Dyrdal, TRF

Lost River Area
Gary Mathis, Gonvick

Walker Brook Area
*John A. Nelson, Clearbrook

Moose River Area
Wayne Larson, Middle River
Elroy Aune, Gatzke

Grand Marais/Red Area
Jeep Mattson, EGF
Allen Love, Euclid
Conrad Zak, EGF

Pine Lake Area

Burnham Creek
Dan Geist, Crookston

Poplar River Area

Red Lake River Area
Keith Driscoll, EGF

Clearwater River Area
Steve Linder, Oklee
*John Gunvalson, Gonvick
Arthur Wagner, Gonvick

Upper Red Lake Area
*Emmitt Weidenborner, Kelliher
*John Ungerecht, Northome

Clearwater Lake Area
John Cucci, Clearbrook

Hill River Area
Jake Martell, Oklee

Thief River Area
Richard Engelstad, Gatzke
*Dave Rodahl, TRF
Larry Hagen, Gatzke
Trent Stanley

*Overall Advisory Committee Member

The members of the Overall Advisory and the Subwatershed Advisory Committees met on March 16, 2015. Twelve advisory members, along with District Board members and staff were in attendance. Staff members from the District gave presentations on projects within the District and answered questions from the Advisory Committee members.

History of the Red Lake Watershed District

The Red Lake Watershed District (District) covers an area of approximately 5,990 square miles in northwestern Minnesota and includes all of Red Lake County, most of Pennington County, and parts of Mahnomen, Polk, Itasca, Marshall, Clearwater, Beltrami, Roseau, and Koochiching Counties.

A governmental unit known as the Red Lake Drainage and Conservancy District preceded the District, whose territory included approximately the same land. Under the Conservancy District, three major improvement projects were completed: dredging of the Clearwater, Red Lake, and Lost Rivers.

The Board of Directors of the Red Lake Drainage and Conservancy District felt the District could better function under the Minnesota Watershed Act. The Board petitioned the District Court for the right to operate under Chapter 112, the Minnesota Watershed Act. A hearing was held in Thief River Falls on January 25, 1969, and the Conservancy District was authorized to operate under and exercise all the rights and authorities contained in the Minnesota Watershed Act.

The Board petitioned the Minnesota Water Resources Board (now the Board of Water and Soil Resources) on July 24, 1969, amended January 20, 1970, for a change of name, review of boundary, and distribution of managers of the District. A hearing on the matter was held at Thief River Falls on March 31, 1970, and at Kelliher on April 2, 1970. In their Order, the Water Resources Board stated that the principle place of business shall be at Thief River Falls; that a description of the land within the District be written; specified that the Board of Managers be seven members, the procedure by which county boards shall appoint managers and terms of office for the Managers.

On March 25, 1975, the District adopted the Rules and Regulations pursuant to Minnesota Statutes. They were amended on May 12, 1978; December 14, 1978; August 10, 1989; and reviewed and updated on June 24, 1993, and again in 2015 to be entitled "Permit and Drainage Rules of the Red Lake Watershed District."

In 1977, the District signed a Joint Powers Agreement with other watershed districts in the Red River Basin to form the Lower Red River Watershed Management Board. In 1991, the name was changed to the Red River Watershed Management Board. This organization currently consists of eight watershed districts in the Red River Basin and provides funding to member districts, primarily for floodwater detention structures, which benefit more than one member district. The levy collected is used for funding the development, construction, and maintenance of projects of common benefit to the Red River Basin.

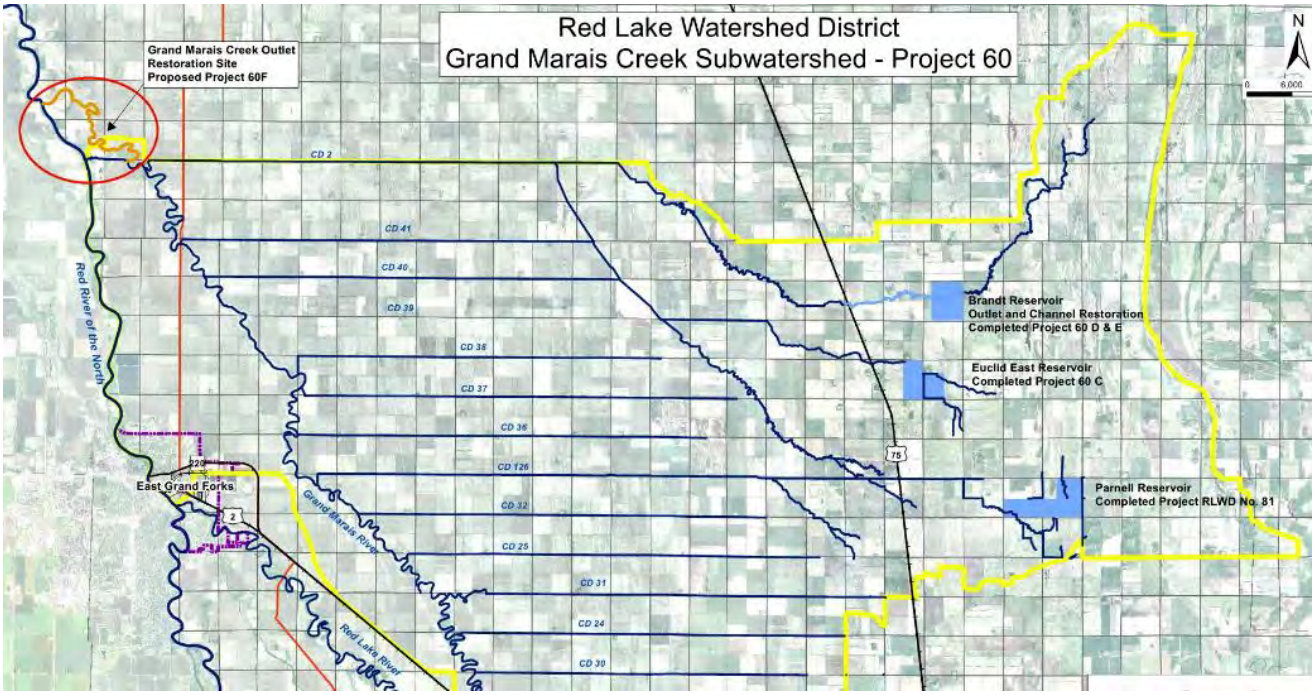
The District currently is governed by Minnesota Statutes 103D, which provides a broader scope for a local unit of government to manage quantity and quality of water within the hydrological boundaries.

2015 District Projects

Grand Marais Sub Watershed Project (RLWD Project #60B)

In 1999, a Project Work Team consisting of Local, State, Federal Agencies and local landowners was organized to review various concerns in the Grand Marais Sub Watershed; this project team was identified as Project 60 Work Team. Through a series of meetings and consensus based agreements, priorities were identified for the Project Work Team to focus on for the foreseeable future. Throughout the past 16 years the project team has been very instrumental in assisting with the development of various flood damage reduction and water quality projects in this sub watershed. Some of the projects that have been developed are explained in detail in this report and are listed as Project 60C (Euclid East Impoundment), Project 60D (Brandt Impoundment), Project 60E and Project 60EE (Stream Restoration), Project 60FF (Grand Marais Creek Cut Channel) and most recently Project 60F (Grand Marais Outlet Restoration) which is in the construction phase.

Due to the completion of the Grand Marais Creek Outlet Restoration/Project 60F in late 2015, the Project Work Team for the Grand Marais will no longer be meeting. This Project Team has accomplished a lot and the Red Lake Watershed District would like to thank them for all that was accomplished.



Grand Marais Creek Outlet Restoration (RLWD Project 60F)

Project 60F was a single component of the "Grand Marais Creek Subwatershed Flood Damage Reduction Project – Project 60B" which was described above. This project addresses the Natural Resource Enhancement goals of the 1998 Flood Damage Reduction Mediation Agreement and restoring an adequate and stable outlet to the Grand Marais Creek subwatershed and its several tributaries. The project objective focuses on restoring riparian and aquatic characteristics along the lower six miles of the Grand Marais Creek to its confluence with the Red River. This lower reach was abandoned in the early 1900's as a result of drainage improvements.

The project objectives for the 6 mile Grand Marais Creek Outlet Restoration Project are as follows:

- Restore the original Grand Marais Creek (channel and riparian area) aquatic features and wildlife habitat
- Protect the restored corridor along the entire 6 mile outlet of the Grand Marais Creek through establishment of a perpetual RIM easement
- Restore entire corridor with native vegetation
- Restore fish passage ability along the original Grand Marais Creek
- Enhance water quality in the Red River by significantly reducing existing outlet channel erosion

The project features proposed to achieve the intended project goals are as follows:

- Construction of a diversion structure ("Weir") capable of diverting all low flows from the existing outlet channel (Legal Drainage Ditch) to the restored Grand Marais Creek outlet
- Reconstruct original Grand Marais channel to restore, enhance and protect the original Natural Resource Benefits (riparian corridor, aquatic/wildlife habitat, fish passage, etc.)
- Construct setback levees to contain the diverted high flows and create a riparian buffer between the restored channel and agricultural land
- Construct grade stabilization structures on the existing outlet channel (Legal Drainage Ditch) to reduce erosion and improve water quality on the Red River
- Provide project partner information on site (signage, etc.)

This project is located within the boundaries of the Red Lake Watershed District and the Middle Snake Tamarac Rivers Watershed District and because of this, on December 15, 2008, the Red Lake Watershed District and the Middle Snake Tamarac Rivers Watershed District entered into a "Joint Powers Agreement" to follow this project through the necessary procedures. Part of this agreement was to establish a "Joint Board" comprised of three members of the RLWD and two members of the MSTRWD. This Board shall have all powers to exercise any power common to either watershed district Board of Managers.

In 2009, the Joint Board instructed the engineer to proceed with the Environmental Assessment Worksheet for the project. On May 28, 2009, the Joint Board approved the EAW and authorized the Red Lake Watershed District staff to proceed with the distribution and advertising of the document. On August 13, 2009, the engineer commented on the EAW submittal and the Joint Board adopted a Resolution approving the Negative EIS Declaration, Findings of Fact, Conclusion of Law, and Order.

The Joint Board also decided to move forward with land easement acquisition of approximately 470 acres of land which will be funded in part by Reinvest in Minnesota (RIM) program, a grant from Working Lands Initiative, and the Red Lake Watershed District. This program will ensure that land easements will be in place at such time funding for the project becomes available.

In 2010 the Joint Powers Board, applied for a grant through the Lessard Sams Outdoor Heritage Council in the amount of $4.7 million. This grant would have been funded through the constitutional amendment voted on and passed by the citizens of Minnesota in 2008. After making it through the hearing phase of the grant application, we were informed that we were denied funding for the project.

In 2011 the Red Lake Watershed District Board of Managers decided to separate the Grand Marais Creek Cut Channel, now referred to as RLWD Project 60FF, from that of the Grand Marais Creek Outlet Restoration (RLWD Project 60F). This was done in part at the request of the Lessard Sams Outdoor Heritage Council (LSOHC) during the funding request hearings held in 2010. The Council made it very clear that the "Cut Channel" did not fit under their funding criteria and that future funding requests through the Outdoor Heritage Council could be more favorable if that part of the project was omitted.

In 2011 the Joint Board requested the engineer to present a revised preliminary cost estimate based on the separation of the project. Based on the engineers findings, it was determined that the Grand Marais Outlet Restoration Project/Project 60F cost estimate was $5.4 million and the Grand Marais Creek "Cut Channel" Project 60FF was $900,000. Based on the revised estimate, the Joint Board once again applied for funding through the LSOHC. Due to the fact the project scope had changed, this year's grant application was for $2,764,000 which was significantly less than the previous request of $4,700,000. Once again we were asked to present our grant application though the hearing phase but this time we were pleased to announce that we were awarded $2,320,000 for the project. The Joint Board then proceeded to apply for a Flood Hazard Mitigation Grant through the State of Minnesota in the amount of $1.3 million which was approved. To date, the total project costs have increased from the previously mentioned $5.4 million to approximately $6 million.

On October 25, 2012, a final hearing was held on the final engineering plan and report. After considerable discussion, a motion was had by the Joint Board to accept the final report and proceed with bids and specifications.

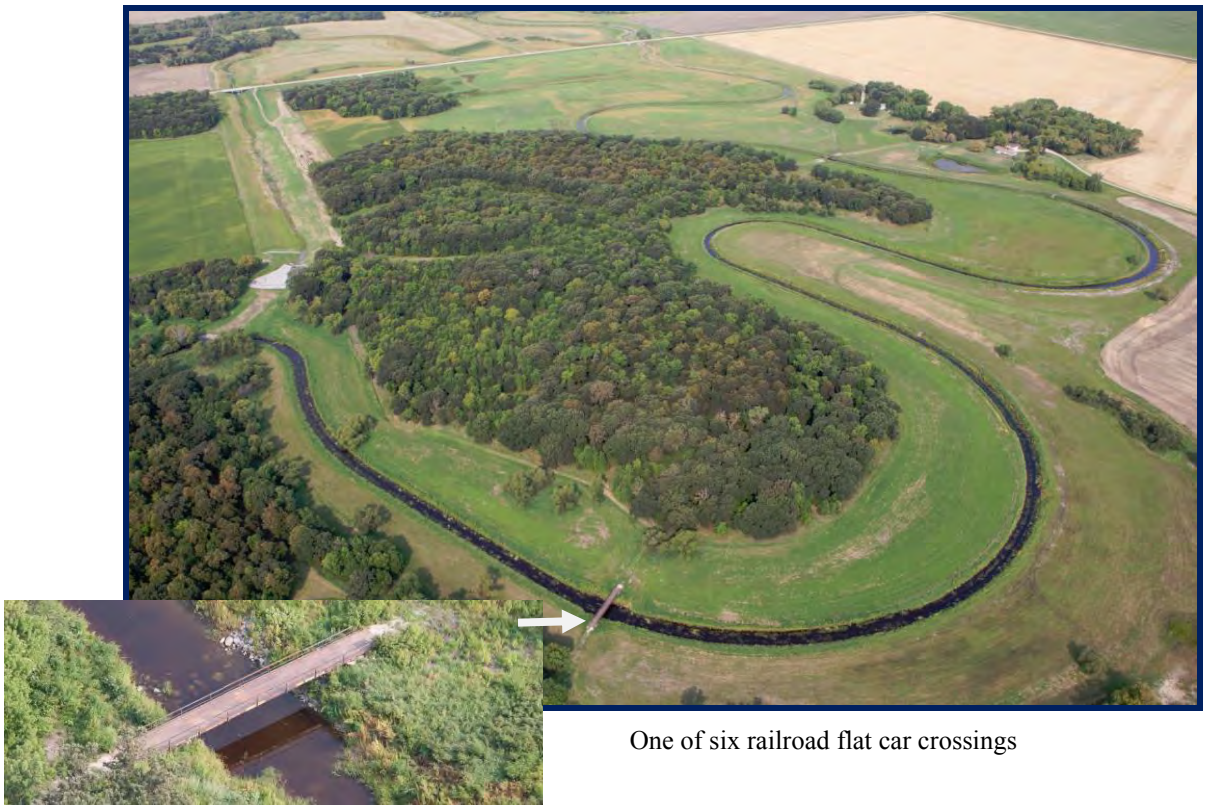
On June 13, 2013, bids were opened for the construction of Phase I of the Grand Marais Outlet Restoration Project. Low bid was awarded to Davidson Construction, Inc. in the amount of $3,944,226.50.
On August 12, 2013 a preconstruction and site meeting was held with RLWD staff, representatives from Davidson Construction, Inc. and Houston Engineering, Inc. Construction started on this project the last week of August and proceeded to freeze up in mid-December.

On June 26, 2014, bids were open by the Joint Board for a portion of the project referred to as Grand Marais Outlet Restoration Diversion Structure. After opening all bids, the apparent low bid was awarded to The Spruce Valley Corporation in the amount of $393,208.30 upon review of the bid documents by the engineer. August 24, 2014, the Joint Board reconvened to discuss the low bid from The Spruce Valley Corporation. It was determined that upon the engineer's review of the bid documents, the specification pertaining to fractured rock presented in the bid did not meet the specified criteria. After considerable discussion at the request of the engineer, it was determined that the Board should release the Spruce Valley Corporation from the bid and choose R.J. Zavoral & Sons, Inc. next lowest bid in the amount of $463,166.00.

Due to wet spring conditions and frequent early summer rainfall in 2014, construction to the Grand Marais Creek Channel was delayed until late fall. On November 12, 2014 the engineer recommended to the Joint Board to suspend work for the year as weather conditions did not allow construction to continue.

August 27, 2015 a final payment hearing was held for contractors on Grand Marais Outlet Restoration, Project 60F as well as Phase 2 Diversion Structure, Project 60F. The District will continue to monitor all components of the project which include upland prairie and wetland vegetation and channel erosion .

Grand Marais Creek flows into the Red River of the North



One of six railroad flat car crossings

Cut Channel Outlet Structure – Phase II

Grand Marais Creek "Cut Channel" (RLWD Project #60FF)

On December 15, 2010, the District was approved for a grant applied through the Board of Water and Soil Resources Clean Water Legacy Competitive Grant Fund. The grant totaling $662,000 which will be used on a portion of the Grand Marais Outlet Restoration, also referred to as the Grand Marais Creek Cut Channel. The grant, along with matching funds, will initiate a construction project that will reduce sediment loads that are presently settling into the Red River of the North. The proposed project consists of stabilizing the existing channel and stream banks, establishment of buffer strips along with installation of side water inlet culverts.

In 2011, the District removed this portion of the Grand Marais Outlet Restoration Project from the jurisdiction of the Joint Board due to funding difficulties on Project 60F.

On February 9, 2012, the Board in cooperation with Polk County Ditch Authority, approved the Engineers Report for the Project. On March 5, 2012 a public hearing was held for the Final Survey Report. After considerable discussion by the Board of Managers, a motion was passed to approve the Final Report and proceed with the development of Plans and Specifications. On May 10, 2012, bids were opened with low bid being awarded to R.J. Zavoral & Sons, Inc. in the amount of $540,547.00. After construction was completed on this phase of the project, it was determined that additional funding was available and that construction should proceed to address other concerns along the project area. It was determined that re-sloping the north side of the channel would assist in stabilizing the bank thus reducing sediment being transported to the Red River of the North. The Board of Managers entered into an agreement with the contractor to proceed under the existing contract and complete Phase II of the project as directed by the engineer. Upon receiving the required permits, construction on Phase II was completed in December of 2012 with total construction costs totaling $769,222.76.

On January 24, 2013, a final payment hearing was held for R.J. Zavoral & Sons, Inc. and upon a motion at the hearing, final payment was paid in the amount of $38,461.14.

In the summer of 2015, it was noticed that an area near the eastern portion along the north slope was sloughing. At the recommendation by the Engineering staff, the Board of Managers elected to repair the slough which was completed early summer.

Stabilized channel looking upstream.

Drop structure looking downstream

Red Lake Watershed District Ditch #15 (RLWD Project #175)

On April 26, 2012, a petition for an establishment of a legal drainage system downstream of the Brandt Impoundment located in Tabor, Angus, Euclid and Belgium Townships, Polk County, was presented to the Red Lake Watershed District Board of Managers. After considerable discussion, the Board accepted the petition for filing of the Establishment of a New Drainage System referred to as Red Lake Watershed District Ditch #15, RLWD Project No. 175. The Board then proceeded to appoint HDR Engineering, Inc. to complete the Preliminary Engineers Report.

On September 13, 2012, the Preliminary Survey Report was accepted by the Red Lake Watershed Board of Managers and a Preliminary Hearing date was set for October 25, 2012. On October 25, 2012, a Preliminary Hearing was held at the Red Lake Watershed District office. Upon lengthy discussion by the Board of Managers and questions from the audience, the Red Lake Watershed District Board of Managers by motion ordered the engineer to complete a Detailed Survey Report and appoint three viewers for the project.

On May 23, 2013, a final hearing was held for the Detailed Survey Report and Viewers Report. After all in attendance were given a chance to ask questions or give comments, the hearing was closed. After considerable discussion by the Board, a motion was made and seconded, to set a subsequent final hearing for the project to be held June 27, 2013. On June 27, 2013, the final hearing was reconvened. After considerable discussion by the Board and questions from the audience, a motion was made, and seconded to adjourn the final hearing to July 25, 2013.

On July 25, 2013, the final hearing was reconvened. After considerable discussion and comments by the Board and the public, a motion and second was approved to establish the Brandt Channel, RLWD Ditch 15, Project 175, according to the Engineers Report with a 10 year design; to adopt the Viewers Report of benefits and damages, as amended or corrected; findings that the statutory factors necessary to establish the drainage project were present and to direct staff to prepare Findings and Orders consistent with the motion for the Board's consideration and adoption.

On March 13, 2014, at the regularly scheduled Board meeting, bids were opened with low bid in the amount of $1,017,680.20 awarded to Davidson Const. & Ready Mix, Inc. of Holt, Minnesota. Construction on this project got off to a rocky start with unusual frequent rainfall events and permitting delays. By the middle of May, construction started and plugged along through various rain delays which ultimately led to the contractor pulling off the project for about a month and returning with a skeleton crew in mid-August.

Channel excavation in the first mile of the project.

On September 11, 2014, at the regularly scheduled Board meeting, a representative of Davidson Const. & Ready Mix, Inc. came before the Board to request an extension to the contract which was to expire September 15, 2014. Upon hearing the request, the Board of Managers made a motion to extend the contract by 30 days which will expire October 15, 2014.

On November 13, 2014, at the regularly scheduled Board meeting, the engineer reported to the Board that construction has been substantially completed with 16 days of liquidated damages being charged to the contractor. Construction will continue in the spring of 2015 with final payment hearing held mid-summer.

On August 27, 2015, at the regularly scheduled Board meeting, a final payment hearing was held for Davidson Construction with final payment totaling $39,287.43 with construction cost totaling $1,016,479.49.

Finish work complete. Ready for seeding.

Side water inlet pipes installed.
Finish work underway.

Right-of-way buffer strip sprouting.

Four Legged Lake Watershed (RLWD Projects #102 & 102A)

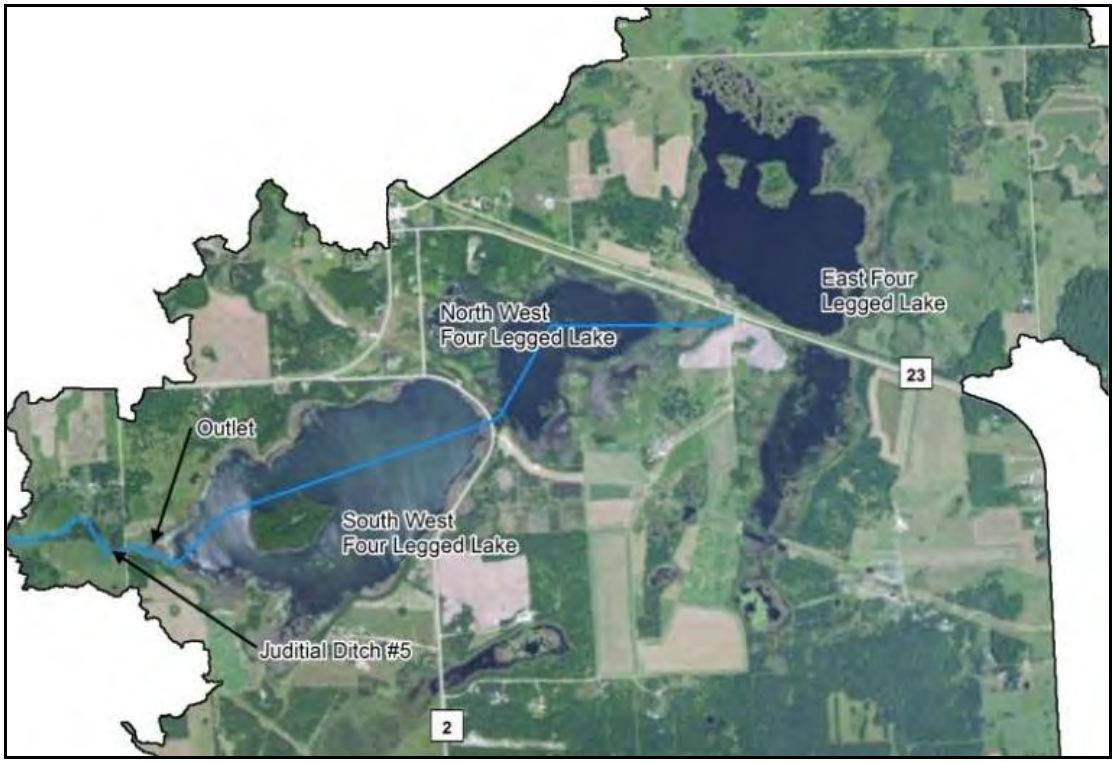
Four Legged Lake is located in northwestern Minnesota within Clearwater County. The chain of lakes is part of the RLWD Judicial Ditch #5 system which was established in 1921. Over the years, most recently in 1999, the downstream basin's outlet culvert had been raised without Drainage Authority permission or legal actions. The results of the raising of culvert from its historical elevation has caused increased flooding to major county roadways and properties of upstream landowners.

On January 4, 2011 a public informational meeting was held in Leonard, Minnesota with Clearwater County commissioners and engineer, township officials and local landowners to get a feel of how the public wanted to proceed to remedy this flooding situation. It was determined that most landowners were not opposed to the lake being reestablished but that a proper elevation should be set on the lakes to assure future flooding would not occur to the public roadways and upstream landowners in the event of large runoff events. As a result of the meeting and due to the fact the only ditch records available was an original viewers report and old blue line set of plans dating back to early 1920's, it was determine by the RLWD Board of Managers that updated information had to be developed to better identify the alternatives as we move forward.

On May 8, 2014 and again May 14, 2015 informational landowner meetings were held and it was determined that a petition for abandonment of the legal drainage system should be presented to the RLWD Board of Managers in conjunction with the Managers developing a Flood Damage Reduction Project (FDR) that would satisfy State, County and local interests.

On July 23, 2015 a public hearing was held for the abandonment of the legal drainage system. After considerable discussion and testimony the Board of Managers elected to table the proceedings until at such time more information could be made available to the public.

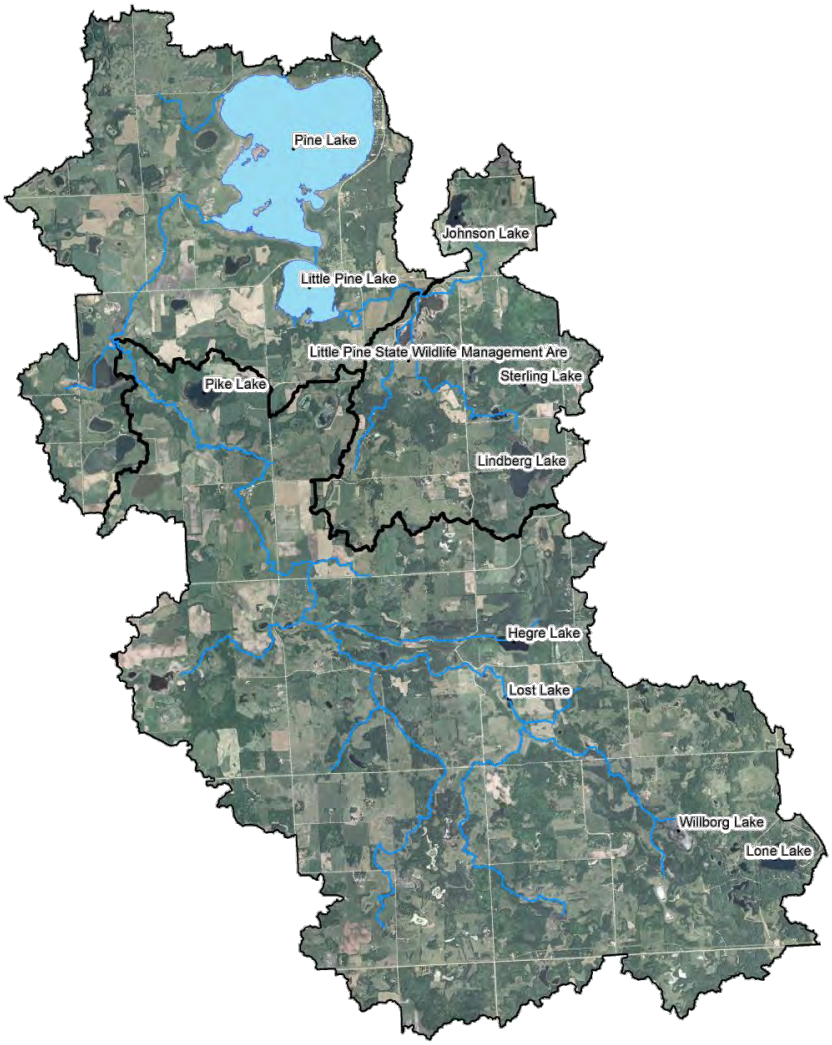
The District is presently pursuing funding for the FDR study on the Four Legged Lake Watershed and it is our hope that engineering and design can be completed in 2016 which could lead to the establishment of a project.



Pine Lake Watershed (RLWD Projects #26)

In 2013, at the request of the Property Owners of Pine Lake Association (POOPLA), the Board of Managers hired HDR Engineering, Inc. to investigate the Pine Lake Watershed to not only come up with solutions and alternatives that could assist in frequent flooding on Pine Lake but also investigate the opportunities for distributed storage sites which may assist the District in our long range plan to reduce flooding to the Red River of the North by implementing the Red Lake Watershed 20% Reduction Strategy.

After various landowner meetings held in 2014 and 2015, it was apparent that there was interest in looking at areas upstream of Pine Lake to determine if any Flood Damage Reduction (FDR) projects could be developed. This interest lead the RLWD in applying for and being approved for a Natural Resource Conservation Service PL566 grant which will assist in a study which could lead to the possibility of engineering and design of Flood Damage Reduction (FDR) projects in the Pine Lake Watershed. It is the hopes of the District that the contracts will be signed and executed in early 2016, with a comprehensive study to be completed which would lead to projects being developed to reduce flood damages in the Red Lake Watershed District.



Erosion Control Project #164

This project category was established in 2004 and is used on a yearly basis to fund various erosion control projects which are usually initiated by projects developed by local Soil and Water Conservation Districts (SWCD). In 2015 there were various projects funded from requests by SWCDs, but this year we would like to highlight a project referred to as JD#72 Bank Stabilization Project initiated by Clearwater Soil and Water Conservation District. This erosion control project was funded in part by a $78,375.00 Board of Water and Soil Resource Clean Water Fund 13 Grant applied for and received by the Clearwater SWCD. This was one of the larger SWCD projects in 2015 which featured stabilization of drainage system side slopes, installation of culverts, establishment of buffer strip along approximately 1 ½ miles of drainage system. The easement for right of way was paid in part by the Red Lake Watershed District Capital Project fund with future maintenance of buffer strip being funded using the special revenue fund set put for the maintenance to Judicial Ditch #72.

Looking South at repaired crossing and side slopes.

Looking north at repaired side slopes.

Looking south at repaired side slopes and mulch.

Looking south at repaired side slopes and mulch.

Looking south at seeded buffer strip.

Looking north at seeded buffer strip.

Erosion Control Projects (RLWD Project #164)

- The Board reviewed and approved an additional funding request from the Clearwater SWCD for installation of two lakeshore protection projects on Pine Lake from the District's Erosion Control Funds, RLWD Project No. 164. Administrator Jesme stated that that in 2013 the Board funded two lakeshore protection projects with the Clearwater SWCD. Construction has been completed, with a shortfall of funding in the amount of $711.28. The Board approved the contribution of an additional $711.28 from the 2013 Erosion Control Funds to the Clearwater SWCD for completion of two lakeshore protection projects on Pine Lake.
- The West Polk SWCD completed construction on the Wayne Sorenson Grade Stabilization Project. The District cost shared with the West Polk SWCD through the 2013 Erosion Control Funds.
- The District Board of Managers approved a 25% match in the amount of $10,000 for a Pennington SWCD Shoreland Buffer Inventory Grant. The SWCD applied for a Shoreland Buffer Inventory Grant application through BWSR to complete an inventory on the 50' buffer requirement ordinance. The SWCD will inventory and contact landowners regarding the ordinance. The Pennington SWCD was awarded a $40,000 grant through BWSR that requires a 25% grant match.
- The District Board of Managers voted to approve the request of the Clearwater SWCD in the amount of $4,100 for the Ruffy Brook Riparian Buffer Strip Project from the 2015 Erosion Control Funds Nathan Nordlund, Clearwater SWCD presented information on the Ruffy Brook Riparian Buffer Project. Nordlund stated that the SWCD received a Clean Water Fund Grant to complete projects on rivers and lakes within the Clearwater River watershed to protect water quality. The Ruffy Brook Riparian Buffer would consist of the installation of 4,840 feet of fence that would exclude 15 acres of access to the Ruffy Brook from cattle grazing. The project would also include the installation of a solar water pump, pipe and tank and installation of a crossing to allow cattle to access to both sides. The grant includes the installation of trees and shrubs to develop a riparian forest buffer. Nordlund stated that the total project cost is $32,200.
- Nathan Nordlund, Clearwater SWCD, stated that he has been working with District staff member Gary Lane and volunteer landowners to purchase right of way easements for Judicial Ditch 72, RLWD Project No. 41. The Clearwater SWCD received a grant to establish buffer strips as there is no current easement for right of way to allow for ditch maintenance. Landowners are offered $1,500 per acre for establishment of the buffer strip.
- The District Board of Managers approved a total of $23,845 in funding to help complete two erosion control projects along the Thief River, north of Thief River Falls. Bryan Malone, Pennington SWCD, presented information to the District Board of Managers about the repair of two erosion sites within the banks of the Thief River referred to as: Thief River Cut-Off Project and Thief River Golf Club Green #5. Malone stated the Thief River Cut-Off Project site was identified as a potential project by Dave Friedl, MnDNR, and District staff member Corey Hanson to avoid cutting of the riverbank and creation of an oxbow. Malone stated that the site is currently blocked with debris. Installation of a dike will prevent the cutting of the riverbank. Malone stated that the Pennington SWCD applied for a Clean Water Fund Grant for repair of the river bank near the golf course and has referred to that project as Thief River Golf Club Green #5 site. Approximately 150 feet of streambank needs to be stabilized at this location with possible retaining wall or reslope of the channel.
- The District Board of Managers approved cost share in the amount of $933.00 for the installation of bio-engineering with core logs for the Aakre Pine Lake Shoreline Protection Project. Nathan Nordlund, Clearwater SWCD, presented a funding request for installation of bio-engineering with core logs for the Aakre Pine Lake Shoreline Protection Project, located in Section 27, Pine Lake Township, Clearwater County.
- The Board reviewed and approved a funding request from the Red Lake SWCD for the Brule Grade Stabilization Project and installation of four water and sediment basins, located in Section 3, Terrebonne Township.
- The Board reviewed and approved a funding request from the Red Lake SWCD for the Weiss Water & Sediment Basins Project for the installation of five water and sediment basins, located in Section 8 and 9, Lake Pleasant Township.

Flood Control Impoundments

The 2015 spring melt and runoff was basically a "non-event" in the basin. By March 12th, the landscape was void of snow cover and the surface water was also gone. Rainfall events in June and July occurred at various locations in the District which generated runoff. During this time, both "gated and "non-gated' impoundments were utilized for flood water storage. The remainder of the year was relatively dry.

Impoundments operated by the District are quite diverse. Actual project operations are based on available flood storage, outlet structure facilities, and outlet channel capacity. Each impoundment is designed, based on upstream drainage area, topography, and runoff conditions. Some of the flood storage facilities are operated with adjustable stop-logs, adjustable flood gates, and some are non-gated fixed crest weir structures.

Non-gated – Fixed Crest Weir Type

'Fixed crest' structures store water to the specific elevation of a weir. When the water surface raises above the weir elevation, outflows occur automatically. Most of the non-gated projects were constructed in the 1970's and early 1980's by the former Soil Conservation Service (SCS), known today as the Natural Resource Conservation Service (NRCS). The Red Lake Watershed District (RLWD) is working with local landowners, MnDNR, and consulting firm Houston Engineering to prepare plans, specifications and cost estimates for repairs and to improve three selected small dam facilities.
The following pictures are of the three sites:

Miller Dam - Red Lake County – Pool Control Structure

Miller Dam – Outlet / Plunge Pool

Latendresse Dam – Red Lake County – Slope failure & metal control structure has deteriorated


Odney / Flaat Dam - Polk County – scheduled for repair in 2016 – metal structure has deteriorated


Water storage is calculated in acre feet, which is a volume measurement that is one acre in area by one foot deep. Storage capacity in impoundments varies depending on acreage and depth of the storage area. One foot of water depth in an impoundment can be many thousand acre feet of storage. Some impoundments are considered "dry" which means that the pool is basically drained dry after stored flood waters are released. Other impoundments are operated with a small permanent pool throughout the year.

Operation and maintenance varies, depending on the specific project. Some are operated solely by the District, and others are operated cooperatively with the Red Lake Band of Chippewa Indians, Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, and local Soil and Water Conservation Districts.

Routine inspections are performed and the condition of the embankment and control structures is evaluated. Typical maintenance includes flood damage repairs, debris removal, removal of beaver dams/debris, nuisance beaver, and vegetation control.

The following pages describe some of the larger impoundment facilities that have gated and/or stop-log control flexibility.

Gated / Stop-log Type

Projects with 'adjustable flood gates and/or stop-logs' have more flexibility for storing and also for controlling outflows from flood events. During large runoff events, flood waters are stored within the impoundments and, as downstream conditions allow, the stored water is released in a controlled manner. This is done by operating flood gates or by adjusting stop-logs, depending on the respective flood storage facility. Water levels are typically lowered during the fall season. This 'fall drawdown' is performed to create additional flood storage for the next spring's runoff.

Euclid East Impoundment (RLWD Project #60C)

GENERAL: Construction of the Euclid East Impoundment began on June 15, 2006. Due to excellent working conditions, it was substantially completed by the middle of November. The project became functional for operation in the spring of 2007. The project is funded jointly with the State of Minnesota, Red River Watershed Management Board and the District.

LOCATION: The project is located in Section 24, Euclid Township, and Section 19, Belgium Township, Polk County, approximately 12 miles north of Crookston.

PURPOSE: The project will store runoff and reduce flooding on downstream agricultural lands and urban areas by retaining up to approximately 2,443 acre-feet of floodwater. The storage of water in the reservoir will also reduce peak discharges on legal ditch systems, Branch C of County Ditch #66, County Ditch #66 (Main), and County Ditch #2.

PROJECT COMPONENTS: The embankment and reservoir is constructed of approximately 3.6 miles of earthen clay embankment (332,681 cubic yards & approx. 12 feet at highest point), a grass lined emergency spillway, 2.4 miles of inlet channels and culvert works, 0.8 mile of outlet channel, and a gated concrete outlet structure. The operable components are the gated structure which releases water from the impoundment into an outlet channel. This water then flows northwesterly through legal ditch systems and eventually to the Red River of the North.


Principal Outlet Structure

FUNCTIONAL DESIGN DATA

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam (Total Storage)	908.0	2,443 (2.68 in. runoff)
Secondary Spillway	905.0	
Ungated Storage to Emergency Spillway	906.0	565 (0.62 in. runoff)
Gated Storage		1,878 (2.06 in. runoff)
Drainage Area – 17.1 sq. mi.		

OPERATIONAL: Summer 2007

2015 – Occasional gate operation and short term storage throughout the year.

Brandt Impoundment (RLWD Project #60D)

GENERAL: Construction of the Brandt Impoundment began on July 31, 2006, and was substantially completed by the middle of November. The District and HDR Engineering of Thief River Falls jointly performed construction surveying and inspection duties. The project is funded by the State of Minnesota, Red River Watershed Management Board, and the District.

LOCATION: Section 7, Belgium Township, Polk County, approximately 14 miles north of Crookston, or 1 ½ miles east and 1 mile north of Euclid.

PURPOSE: The project will store runoff and reduce flooding on downstream agricultural lands and urban areas by retaining up to approximately 3,912 acre-feet of floodwater. The storage of water in the reservoir will also reduce peak discharges on the downstream "Brandt Channel," RLWD Ditch 15 and legal County Ditch #2 system.

PROJECT COMPONENTS:
The embankment and reservoir is constructed of approximately 3.5 miles of earthen clay embankment (492,579 cubic yards & approx. 19 feet at highest point), a grass lined emergency spillway, 2 – lines of 6 x 8 concrete box culverts and a gated concrete outlet structure.

Operable components are the gated structure which releases water from the impoundment into an outlet channel. This water then flows west - northwest through the "Brandt Channel" legal County Ditch #2 system and eventually to the Red River of the North.


Principal Outlet Structure

FUNCTIONAL DESIGN DATA

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam (Total Storage)	918.0	3,912 (3.1 in. runoff)
Secondary Spillway	914.5	
Ungated Storage to Emergency Spillway	916.0	786 (0.62 in. runoff)
Gated Storage		3,126 (2.48 in. runoff)
Drainage Area – 23.6 sq. mi.		

OPERATIONAL: Spring 2008

2015 – occasional gate operation and short term storage throughout the year.

Parnell Impoundment (RLWD Project #81)

GENERAL: Construction of the Parnell Impoundment began in 1997 and was completed in 1999. In 2003 modifications were made to the original design by lowering the emergency spillway 1.5 feet, expanding the inter-pool connecting channel, and installing an operable screw gate on the weir structure in the JD #60 outlet. The impoundment is now better utilized to store floodwaters by operating control gates.

LOCATION: Sections 3 and 4, Parnell Township, Polk County, approximately 12 miles northeast of Crookston.

PURPOSE: The project will reduce flooding on downstream agricultural lands and urban areas by retaining up to approximately 4,000 acre-feet of floodwater. The storage of water in the reservoir will also reduce peak discharges on four legal ditch systems, County Ditch #126, Judicial Ditch #60, County Ditch #66, and County Ditch #2.

PROJECT COMPONENTS: The impoundment incorporates a 2 – pool design (no permanent pool), with two separate outlets, and an inter-pool connecting channel. The embankment and reservoir is constructed of approximately 5 miles of earthen embankment (approx. 18 feet at highest point), a concrete emergency spillway and two gated concrete outlet structures. Operable components are the two gated structures which release water from the impoundment into two separate outlet channels. One of these channels is JD #60, which flows south to the Red Lake River and the other is CD #126, which flows west and eventually to the Red River of the North.

FUNCTIONAL DESIGN DATA:

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam	943.0	4,000
Emergency Spillway	939.5	3,000
Drainage Area – 23 sq. mi.		

OPERATIONAL: 1999 – Original Design 2004 – Modified Plan

COST: Approximately - $3,200,000
Funded the RLWD and Red River Watershed Management Board

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	March 25, 2009	939.75
2	April 22, 2011	939.50
3	April 13, 2006	939.00
4	March 29, 2010	938.20
5	June 12, 2002	937.10

2015 – Occasional gate operation and short term storage throughout the year. Mechanical brush control was done at various locations.

Pine Lake (RLWD Project #35)

GENERAL: In 1980, the Clearwater County Board of Commissioners petitioned the District for an improvement of the Pine Lake outlet. Constructed in 1981, a sheet pile dam with two adjustable stop log bays was built about 800 feet north of the lake on the Lost River.

LOCATION: The site is near the south center of section 21, Pine Lake Township, Clearwater County. The drainage area above the dam is 45 square miles.

PURPOSE: This multi-purpose project designed to provide the public with flood control and wildlife benefits. The Gonvick Lions Club has donated hundreds of man-hours and when necessary, members operate the aeration system, install and maintain signage.

FUNCTIONAL DESIGN DATA:

	Elev. (ft.=msl)
2nd Stage – Top of Dam	1284.5
1st Stage – Top of Dam	1284.0
Typical Summer – top of stop logs	1283.5
Typical Winter	1282.5

Typical Fall Drawdown with Stop-logs Removed

The Pine Lake control structure is a sheet pile dam with 2 – four foot wide adjustable stop-log bays. The stop-logs can be adjusted between elevations 1281.5 to 1283.5. There is also 26 feet of fixed crest weir at elevation 1284.0, and 65 feet of fixed crest weir at elevation 1284.5. Based primarily on lake elevation, stop-logs may be removed from the dam to allow additional outflow until the lake recedes, and then they are replaced to the typical summer or winter elevation.

The dam is also designed with a small fixed crest weir at elevation 1282.5, which is one foot lower than the normal summer stop-log elevation. This was an innovative design in the early 1980's, and allows for minor outflows that provides stream flow maintenance. This is very important for keeping some flow in the Lost River especially during periods of low flow. Factors to consider when adjusting the stop-logs are: monitoring "inflows" to the lake, existing lake elevation, downstream conditions and predicted runoff. Staff personnel at the Sportsman's Lodge are very helpful in reading the lake elevation gauge located inside the business and a local resident records rainfall data at the lake.

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	April 11, 2009	1286.0
t2	July 5, 1997	1285.7
t2	June 26, 2002	1285.7
3	April 27, 1996	1285.5
4	April 18, 2001	1285.4
5	April 8, 1999	1285.1

<u>Pine Lake 2015 Operation</u> (Lake crest – May 29, 2015– elev. 1283.97)

The local Sportsman's Club <u>did not</u> operate the aeration system during the winter season.

On March 30th, stop-logs were installed to the typical summer elevation of 1283.5 and did not have to be removed or adjusted throughout the open water season. The 'earlier than typical' stop-log installation was due to the fact that very little upstream runoff from snow melt was remaining.

On September 18th, stop-logs were removed for the normal fall drawdown.

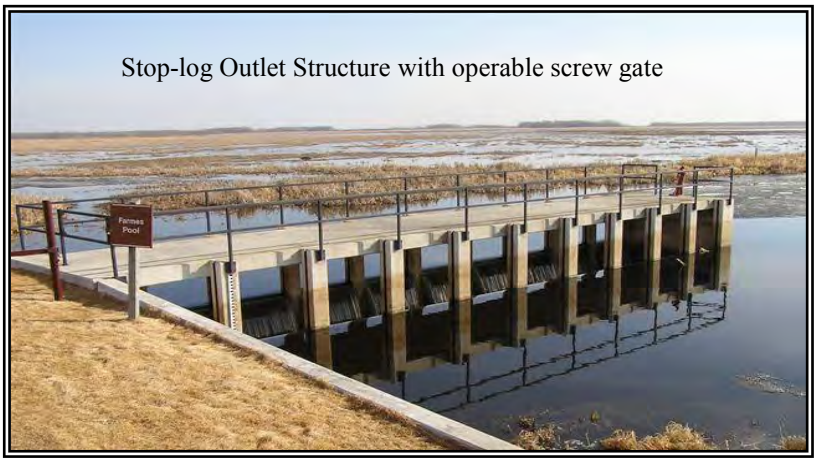
Meetings are continuing in regards to the potential for water storage sites upstream of Pine Lake proper, and to also study the possibly of raising the existing typical summer lake elevation from 1283.5 to 1284.0.

Lake "ice out" occurred on approximately April 11, 2015.

Good example of the "low flow" notch – designed to provide streamflow maintenance to the Lost River during extended periods of dry conditions and low water levels

Elm Lake-Farmes Pool (RLWD Project #52)

GENERAL: Elm Lake was drained in about 1920 by the construction of Branch #200 of Judicial Ditch #11. The Elm Lake project is a cooperative effort of the U.S. Fish and Wildlife Service, MN Department of Natural Resources, Red Lake Watershed District, and Ducks Unlimited. The majority of funding for the project was provided by Ducks Unlimited and at the time Elm Lake was created, it was the largest Ducks Unlimited project in the lower 48 states.



Stop-log Outlet Structure with operable screw gate

LOCATION: Marshall County, approximately 17 miles northeast of Thief River Falls. The drainage area of Ditch 200 above Elm Lake is 63 square miles.

PURPOSE: Multi-purpose – designed to meet three major objectives: Flood control, increase wildlife values, and upstream drainage improvement.

PROJECT COMPONENTS:
Approximately 9 miles of earthen embankment, an outlet control structure, rock lined emergency spillway, and an enlargement of a portion of Ditch 200.

FUNCTIONAL DESIGN DATA:

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam	1145.0	19,700
Emergency Spillway	1142.0	11,000
Max Summer	1141.0	7,500
Typical Summer	1140.0	5,500
Typical Winter	1139.0	3,500

Drainage Area – 63.0 sq. mi.

COST: Approximately - $2 million

OPERATIONAL: 1991

Agassiz National Wildlife Refuge staff performs the actual operation of the outlet structure (stop-logs and screw gate) with cooperation from the District. In 2009, repairs were made to the principal outlet structure. Work consisted of repairing stop-log bays and channels, removal of corroded stop-logs and installation of new handrails and safety grates.

2015 – Pool was in 'drawdown' most of the season – refilled to winter level in the fall

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	April 23, 1997	1143.3
t2	April 28, 1996	1142.4
t2	April 4, 1999	1142.4
t2	June 14, 2002	1142.4
3	April 10, 2006	1142.0
4	April 3, 2009	1141.9
5	July 28, 1993	1141.3

Lost River Impoundment (RLWD Project #17)

GENERAL: Approximately in the mid-1970's, the project was constructed by the Minnesota Department of Natural Resources to improve waterfowl habitat. On December 14, 1978, the District entered into a formal agreement with the Minnesota Department of Natural Resources to modify the original impoundment by raising the elevation of the dike and emergency spillway. Four (4) 48 in. diameter gated pipes and a spillway from Ditch 200 of JD #11 supply water to the impoundment which is an "off channel" reservoir.

LOCATION: Marshall County, Grand Plain Township, approximately 20 miles northeast of Thief River Falls. The drainage area above the impoundment is 53 square miles.

PURPOSE: Multi-purpose – designed to increase wildlife values, and provide flood control.

PROJECT COMPONENTS: Approximately 10 miles of earthen embankment, an outlet control structure, and an emergency spillway into Ditch 200.

FUNCTIONAL DESIGN DATA:

	Elev. (ft.–msl)	Storage (ac.–ft.)
Top of Dam	1150.2	14,600
Emergency Spillway	1148.2	10,000
Typical Summer	1146.2	5,500
Typical Winter	1145.2	3,700

Drainage Area – 53.0 sq. mi.

COST: To modify - approximately - $109,000

OPERATIONAL: 1978

The Minnesota Department of Natural Resources (MnDNR) staff perform the actual operation of the outlet structure with cooperation from the District. In 2014, the MnDNR obtained funding to make repairs on the outlet end of the control structure. Most of the work consisted of sediment removal, re-shaping of the plunge pool and ditch banks, plus installing rock riprap. The Watershed District helped with the design, cost estimate, and partial funding. The work was completed late in the year.

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	April 14, 1999	1147.8
t2	April 26, 1997	1147.6
t2	June 25, 2002	1147.6
3	April 1, 1985	1147.5
4	April 10, 2006	1147.45
5	August 20, 2001	1147.3

Good Lake Impoundment (RLWD Project #67)

Gated Principal Outlet Structure

GENERAL: The Good Lake Project is a cooperative effort between the Red Lake Band of Chippewa Indians and the District.

LOCATION: The project area lies entirely within the Red Lake Indian Reservation. The impoundment is approximately 30 miles east of Thief River Falls, in Clearwater and Beltrami Counties. The drainage area above the dam is 73 square miles.

PURPOSE: Multi-purpose project to provide wetland habitat, flood water retention, and potential irrigation water supply.

Fish and Wildlife: Enhanced wetland habitat for waterfowl, furbearers, and other wetland species. The reservoir also has the potential for seasonal rearing of northern pike.

Flood Control: The project will reduce flood peaks on both the Red Lake River and the Red River of the North. The dam will store runoff from the 73 square mile drainage area. Spring storage capacity is 11,300 acre-feet and is equal to 2.6 inches of runoff from the drainage area. The project will also reduce flooding on approximately 4,000 acres of private land immediately west of the project, by intercepting overland flows.

Water Supply: The reservoir may be used as a water source for irrigation of wild rice paddies. Paddies have not been built, but there is potential for paddy development in adjacent areas.

PROJECT COMPONENTS: Approximately 9 miles of earthen embankment, 7.5 miles of inlet channels, a reinforced concrete outlet structure, and 2 miles of outlet channel. Water released from the impoundment, enters the Red Lake River approximately 2.5 miles downstream (south easterly) from the outlet control structure.

FUNCTIONAL DESIGN DATA:

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam	1178.5	27,500
Flood Pool (Emer. Splwy.)	1176.1	13,100
Norm. Summer Pool	1173.0	3,250
Norm. Winter Pool	1172.0	1,800
Drainage Area – 73 sq. mi.		

COST: Approximately - $2,129,000

Funding or in-kind contributions were provided by:

Red Lake Band of Chippewa Indians
Red Lake Watershed District
Red River Watershed Management Board
State of Minnesota

OPERATIONAL: 1996

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	May 25, 1999	1176.8
2	May 6, 1997	1176.2
3	May 20, 1996	1176.0
4	April 21, 2009	1175.9
5	May 14, 1998	1175.8

On April 12, 2011, the Red Lake Tribal Council approved a new 5 year Special Land Permit (Resolution No. 61-11) granted to the District. The original permit had expired on January 12, 2010. In part, the permit states "The purpose of this permit is to facilitate cooperative management of the Good Lake Impoundment, where the District and the Red Lake Band will cooperatively inspect, supervise and conduct necessary maintenance at the Good Lake Flood Control project site. Activities will be coordinated with the Red Lake Department of Natural Resources." Also, as part of the land use permit, the District is granted a right of access to the land described for a period of five years, starting on the date the permit commenced. It was signed by the Tribal Chairman and Secretary on April 13, 2011.

2015 – Spring runoff from snow melt and summer rainfall events did not significantly raise the pool to require gate operation during the year. Pool elevations above the typical summer level were temporarily stored, and outflows were released automatically through the stop-log bays and the overflow weir. In mid-October, stop-logs were removed for the normal fall drawdown.

Pool Crest - June 18, 2015 – Elevation – 1173.5

Moose River Impoundment (RLWD Project #13)

GENERAL: The project, which is a two pool design, is the largest impoundment operated by the District. It was a cooperative effort of the District, Red River Watershed Management Board, and the Minnesota Department of Natural Resources for flood control and wildlife management. Flood damages will be reduced by impounding floodwaters in the upper reaches of the watershed. Wildlife and associated recreational benefits will be enhanced by water retained in the two pools. The project is constructed on lands managed by the Minnesota Department of Natural Resources.

LOCATION: The project is located at the headwaters of the Moose and Mud Rivers in northwestern Beltrami County, approximately 15 miles northeast of Grygla, MN.

PURPOSE: Multi-purpose – designed to provide flood control, streamflow maintenance, increase wildlife values, and benefit fire control.

COST: The total project cost was approximately $3.4 million. Funding was provided by the following:

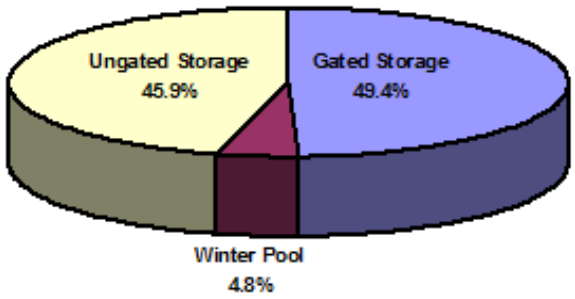
State of Minnesota	$1,690,000
Red Lake Watershed District	$ 612,000
Red R. Watershed Management Board	$1,126,000

OPERATIONAL: 1988

FUNCTIONAL DESIGN DATA:

	North Pool	South Pool	Total
Top of Dam Elev. (ft.–msl)	1218.0	1220.0	
Freeboard Flood Elev. (ft.–msl)	1217.2	1219.3	
Freeboard Flood Storage (ac.ft)	16,250	38,250	54,500
Emer. Spillway Elev. (ft.–msl)	1216.0	1218.0	
Emer. Spillway Storage (ac.ft.)	12,000	24,250	36,250
Gated Pool Elev. (ft.-msl)	1215.3	1217.4	
Gated Pool Storage (ac.ft.)	9,750	19,750	29,500
Typical Summer Elev. (ft.-msl)	1211.7	1213.6	
Typical Summer Storage (ac.ft.)	2,000	4,000	6,000
Typical Winter Elev. (ft.-msl)	1210.5	1212.4	
Typical Winter Storage (ac.ft.)	800	1,800	2,600
Max No-Flood Elev. (ft.-msl)	1212.5	1214.5	
Max No-Flood Storage (ac.ft.)	3,000	6,000	9,000
Project Drainage Area (sq. mi.)	41.7	83.3	125.0

This impoundment has a small permanent winter pool to allow for maximum storage capacity as indicated on the graph shown to the right.



Moose River Impoundment – North Pool

The North Pool outlets into the Moose River (JD #21). The major components of the north pool are: 5 miles of diversion ditch, 4 miles of earthen dike with a top elevation of 1218.0, one gated outlet structure, one rock lined emergency spillway at an elevation of 1216.0. Approximately 1/3 (41.7 sq. mi.) of the total project drainage area (125.0 sq. mi.) drains to the Moose River.

North Pool – Gated Principal Outlet Structure

2015 - Flood water storage and gate operations occurred during the spring melt and during large summer rainfall events, primarily in June and July.

The maximum North Pool elevation for 2015 was 1213.65 (5503 ac/ft) which occurred on June 4th.

The Minnesota Department of Natural Resources performed spotted knapweed control at various locations of the project. The watershed performed other routine maintenance (dike mowing, stream gage repair, and debris removal).

The normal 'fall drawdown' occurred from October 19 to 25 at which time the floodgates were closed for the winter season.

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	May 16, 1999	1215.90
t2	April 22, 1997	1215.85
t2	June 15, 2002	1215.85
3	May 21, 1996	1215.80
4	May 2, 2011	1215.25
t5	August 7, 2001	1214.80
t5	April 19, 2009	1214.80

Moose River Impoundment – South Pool

The South Pool outlets into the Mud River (JD #11). The major components of the south pool are: 3 miles of diversion ditch, 9 miles of earthen dike with a top elevation of 1220.0, 4 miles of earthen dike between the north and south pools, one gated outlet structure, two rock lined emergency spillways at an elevation of 1218.0. Between the North and South pools is an inter-pool structure which may be used to pass water between the pools. Approximately 2/3 (83.3 sq. mi.) of the total project drainage area (125.0 sq. mi.) drains to the Mud River.

2015 - Flood water storage and gate operations occurred during the spring melt and during large summer rainfall events, primarily in June and July.

The maximum South Pool elevation for 2015 was 1215.6 (10,158 ac/ft) which occurred on June 14th.

The Minnesota Department of Natural Resources performed spotted knapweed control at various locations of the project. The watershed performed other routine maintenance (dike mowing, stream gage repair and debris removal).

The 'fall drawdown' occurred from August 16 to 22, which is about 2 months earlier than normal (mid Oct.) The early drawdown was at the request of Agassiz National Wildlife Refuge.

Historical ranking of five highest recorded pool elevations		
Ranking	Date	Elevation
1	May 16, 1999	1218.05
2	May 9, 1997	1217.90
3	June 7, 1996	1217.80
4	July 11, 2002	1217.65
5	May 2, 2011	1217.25

Schirrick Dam (RLWD Project #25)

Principal outlet structure hydraulic gate operation

Looking downstream from outlet structure

GENERAL: The Schirrick Dam was constructed on the Black River in 1984. The project is constructed on property owned by Don Schirrick.

LOCATION: Section 35, Wylie Township, Red Lake County, approximately 20 miles northeast of Crookston. The drainage area above the dam is 107.7 square miles.

PURPOSE: The primary purpose is to provide flood relief on the Red Lake River and the Red River of the North by controlling the flow contribution from the Black River. A small permanent pool is also provided.

PROJECT COMPONENTS: An earthen embankment (38 feet at highest point) and a gated concrete outlet structure. The reservoir has the capacity to detain up to 4,800 acre-feet of water. Operable components are stop-log bays to control the elevation of the permanent pool and hydraulic flood gates to control the flow contribution of the Black River during floods. The gates will normally be open and will only close in the event of severe mainstem flooding.

FUNCTIONAL DESIGN DATA:

	Elev. (ft. – msl)	Storage (ac. – ft.)
Top of Dam	992.5	6,100
Gated Storage	987.0	4,000
Emergency Spillway	989.3	4,800
Permanent Pool	962.0	70

Drainage Area – 107.7 sq. mi.

The highest recorded pool elevation is 988.75 during historic flood of 1997

COST: Approximately - $1,019,000

OPERATIONAL: 1985

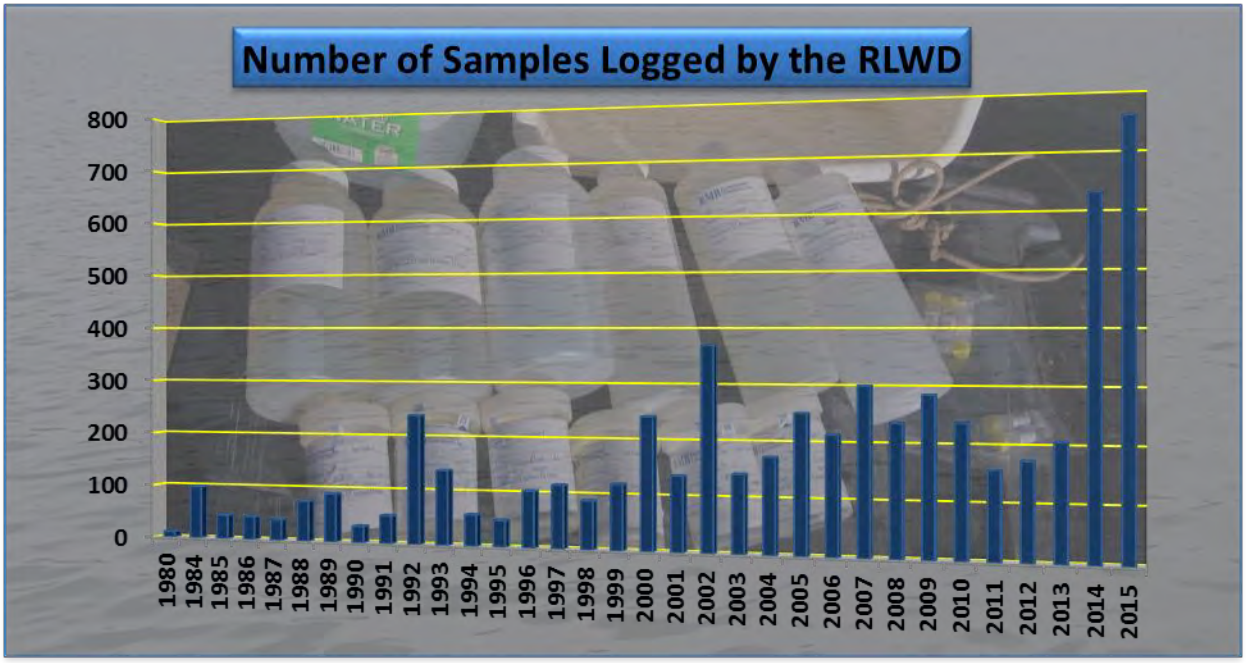
2015 – Again this year, the spring and summer runoff events, were not large enough to raise downstream river levels to the plan "trigger point" elevations, therefore no gate operation was required. In October, yearly routine maintenance was performed on the two hydraulic gates and lifting mechanism. The gates were also test operated (closed and opened) to make sure that they function properly. This is done to be prepared in the event of a severe 2016 spring flood which would require closure.

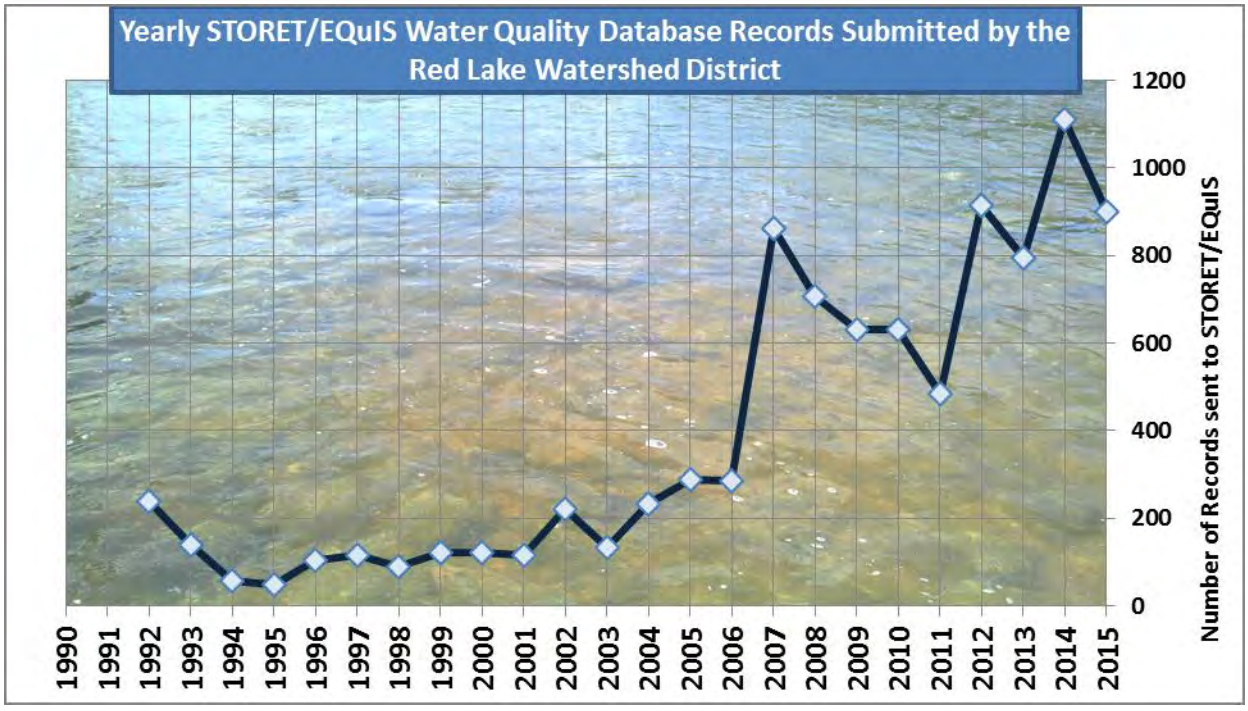
Aerial view of Schirrick Dam looking south

This dam and the timing of closure are vitally important for the city of Crookston.

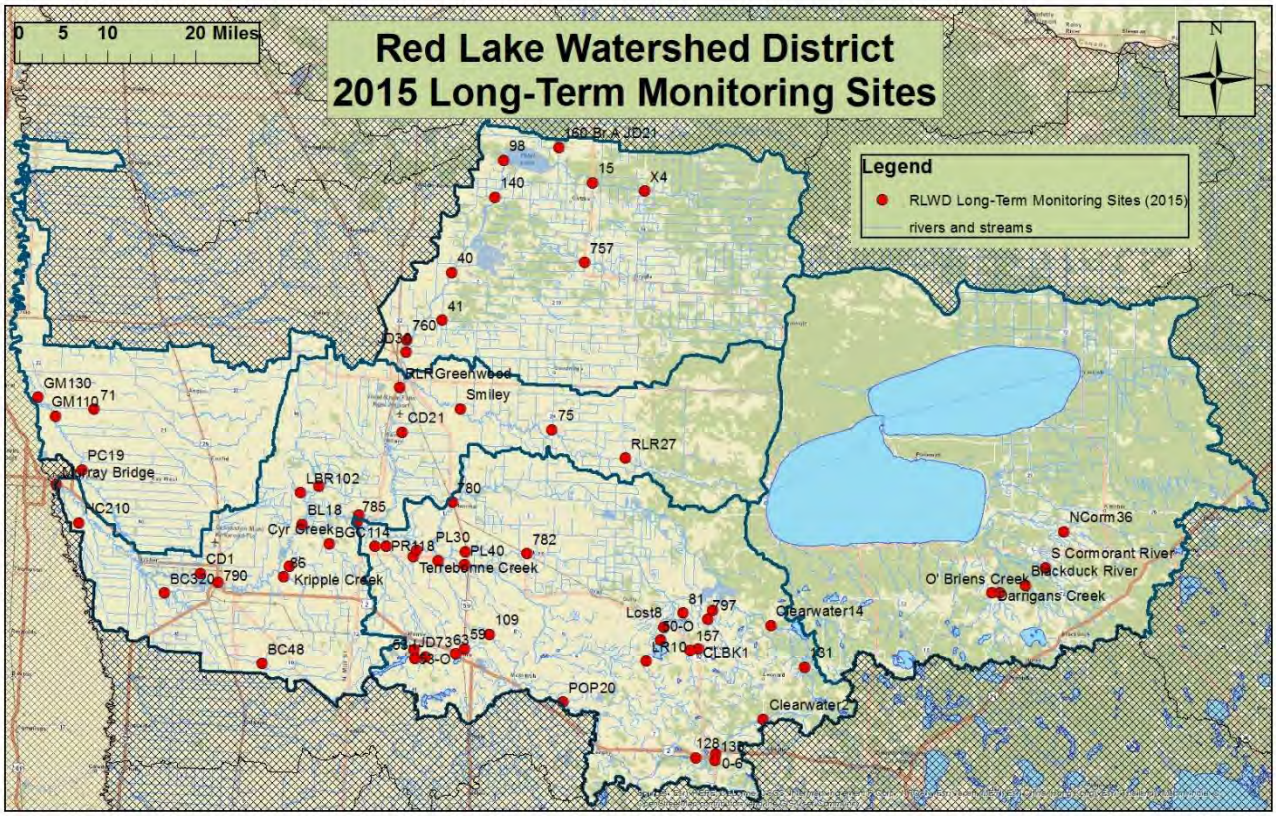
Water Quality Report

The District monitors water quality in the waterbodies that lie within its borders. The long-term district monitoring program has collected water quality data throughout the district for 36 years. Thanks to the Clean Water Land and Legacy Act, the MPCA has been able to provide the District with funding for four watershed restoration and protection (WRAP) projects (Thief River, Red Lake River, Grand Marais Creek, and Clearwater River watersheds) and a surface water assessment grant (SWAG) monitoring project for sampling in the Clearwater River watershed. Water quality monitoring was conducted at 66 sites as part of the District's regular monitoring program in 2015. The District hired a summer water quality assistant, Claire Carlson, to help with water quality monitoring. In 2015, District water quality staff logged the collection of more samples than in any other year in the history of water quality monitoring within the Red Lake Watershed District.





Long-Term Monitoring



The District has an ongoing monitoring program that began in the early 1980's and has grown to include sixty-six sites throughout the District in 2015. Field measurements of dissolved oxygen, temperature, turbidity, specific conductivity, pH, and stage are collected during each site visit (if there is water). Four rounds of samples are also collected at and analyzed for total phosphorus, orthopohosphorus, total suspended solids, total dissolved solids, total Kjeldahl nitrogen, ammonia nitrogen, nitrates + nitrites, and E. coli at fifty-eight of the sites. Chemical oxygen demand analysis is performed on samples from rivers and streams that are impaired by low dissolved oxygen levels. The four 2015 rounds of sampling began in April, June, August, and October. The 2015 Water Quality Assistant, Claire Carlson, was able to conduct much of the June and August sampling prior to leaving for college.

Grand Marais Creek is now being monitored upstream and downstream of a portion of the outlet restoration project at 110th St NW and 130th St. NW. Some additional sites were monitored this year to assist the Clearwater and Red Lake River WRAP projects.

The Red Lake River was meeting the new total phosphorus and total suspended solids standards at the Louis Murray Bridge in East Grand Forks when it was sampled in August 2015. E. coli concentrations were also at an acceptable level at that site. It is good news whenever the furthest downstream site in the watershed is meeting water quality standards. Water in the Clearwater River was exceptionally clean (very low total phosphorus concentration) upstream of Clearwater Lake when it was sampled on August 20, 2015. The total phosphorus concentration was low. Water quality in the Clearwater River was also excellent near its confluence with the Red Lake River in Red Lake Falls.

Very clear water in the Clearwater River at CSAH 14, downstream of Clearwater Lake

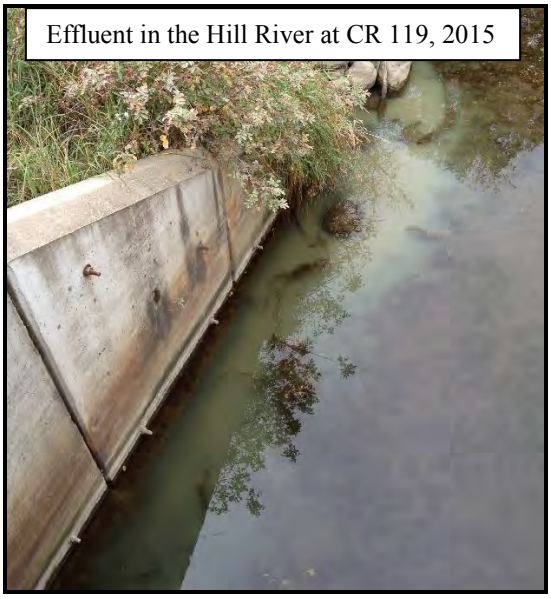
Spring runoff was minimal in 2015. Thus, overland and in-channel erosion was also minimal during the first round of sampling. Results from the first round of water quality samples were good at most sites due to a lack of runoff. However, dry weather, rolled fields, and high winds combined to cause some extreme wind erosion in the area. Dust storms occurred in multiple locations. The field in the photos below, by St. Hilaire, had extreme wind erosion and deposition within the road ditch.

A relatively high concentration of ammonia (2.28 mg/l) was found in Pennington County Ditch 21 at Highway 17, south of Thief River Falls. This likely has something to do with the bird droppings at the site.

Two of the highest E. coli concentrations ever recorded by the District's sampling efforts were found in samples collected at Pennington County Ditch 21. Pre-analysis dilution of samples by the lab allowed for these higher readings. In previous years, they would have been recorded as >2,419.6.

Septic effluent was once again found to be entering the Hill River at the CR119 crossing, north of Brooks. District staff smelled and photographed effluent entering the river on multiple sampling visits. This problem has been identified in the past (2005) and Red Lake County staff were notified of the problem at that time. The effluent was sampled on one occasion. County officials were notified that the problem is still occurring. The analysis of samples collected from the effluent revealed very high concentrations of total phosphorus (8.44 mg/l), orthophosphorus (3.1 mg/l), and total Kjeldahl nitrogen (6.14 mg/l). Ammonia and total suspended solids concentrations were also high relative to the concentrations that were found in the river that day.


Effluent in the Hill River at CR119, 2005


Effluent in the Hill River at CR 119, 2015

High E. coli concentrations (>126 CFU/100ml) occurred in 2015 in the following waters, order of the highest reading and/or the number of high readings (notable concentrations in parenthesis). The list includes sampling conducted for the Red Lake River, Thief River, and Clearwater River WRAP projects.

1. Chief's Coulee at Dewey Avenue in Thief River Falls (>24,196; 11,199; >2,419.6; 571)
2. Pennington County Ditch 21 (24,196; 14,136; >2,419.6; 1413.6; 488.4; 461.1; 450)
3. Silver Creek at 159th Ave, west of Clearbrook (>2,419.6; 767; 512; 495; 410)
4. Ruffy Brook at CSAH 11 (>2419.6; 1,203.3; 932; 292)
5. Polk County Ditch 2 at County Road 62 (>2,419.6; 1,986.3; 350)
6. North Cormorant River at CSAH 36 (>2,419.6; 816.4; 602)
7. Silver Creek at County Road 111 (>2,419.6; 162.4)
8. Terrebonne Creek at Hwy 92 (1,986.3; 1553.1; 727; 648.8; 461.1; 387.3; 307.6)
9. Darrigan's Creek (1,986.3; 1,259; 677; 435.2)
10. Chief's Coulee at Hwy 32 (1,732.9; 920.8)
11. Lost River at 109th Ave, upstream of Pine Lake (1553.1; 816.4; 325.5; 272.3)
12. Chief's Coulee at Atlantic Ave (1,413.6; 410.6; 178.5)
13. Chief's Coulee near Labree Ave (1,413.6; 186)
14. Heartsville Coulee (1,413.6)
15. Judicial Ditch 73 near Rydell National Wildlife Refuge (8 samples)
16. Mud River at CSAH 54 in Grygla (7 samples)
17. Thief River at CSAH 7 (6 samples)
18. Clearwater River at CSAH 2 (5 samples)
19. Hill River at CSAH 35, downstream of Hill River Lake (5 samples)
20. Mud River at the Grygla City Park (4 samples)
21. Poplar River at CR 118, near the Lost River confluence northwest of Brooks (4 samples)
22. Thief River at 140th Ave NE, north of Thief River Falls (4 samples)
23. Browns Creek at County Road 101 (3 samples)
24. Lower Badger Creek at CR 114 (3 samples)
25. Hill River at CR 119, north of Brooks (3 samples)
26. Burnham Creek at CR 48 (3 samples)
27. Cyr Creek (twice)
28. Poplar River at CSAH 30 near Fosston (twice)
29. Lost River at CSAH 28 (twice)
30. Gentilly River at CSAH 11 (twice)
31. Lost River at CSAH 8 (twice)
32. Beau Gerlot Creek at CR 114 (twice)

33. Clearwater River at CSAH 24, upstream of Clearwater Lake (twice)
34. Clearwater River at CSAH 14, downstream of Clearwater Lake (twice)
35. Clear Brook at Hwy 92 in Clearbrook (twice)
36. Chief's Coulee at 13th Street
37. South Cormorant River at CSAH 37
38. Kripple Creek at 180th Ave
39. Blackduck River at Deer Trail Road NE
40. Heartsville Coulee at 210th Street, south of East Grand Forks
41. Judicial Ditch 73 (Poplar River Diversion ditch) at the Badger Lake Inlet
42. O' Briens Creek at Harvest Rd. NE
43. Poplar River at 315th St. SE near the Poplar River Diversion structure
44. Clearwater River at CR 126, north of Plummer
45. Maple Lake outlet at 336th St. SE
46. Little Black River at CR 102
47. Judicial Ditch 73 at the Badger-Mitchell Lake channel
48. Branch A of JD21
49. Hill River at 335th Ave
50. Clearwater River at Highway 2, east of Bagley
51. Lost River at CR 119, north of Brooks
52. Burnham Creek at 320th Ave

- The lowest possible E. coli concentration is a censored value of <1 MPN/100ml (less than the laboratory's minimum reporting limit). It was recorded at several sites in 2015:
    - Clearwater River north of Plummer
    - Clearwater River at CSAH 25, upstream of Bagley. This site also made it onto the list of sites with a total suspended solids concentration of <1 mg/l.
    - Burnham Creek at 320th Ave
    - Branch A of Judicial Ditch 21

High total suspended solids concentrations (>65 mg/l, >30 mg/l, or >15 mg/l, depending on the site's location) were found in the following rivers and streams in 2015:

1. Red Lake River at the Louis Murray Bridge in East Grand Forks (just one sample > 65 mg/l)
2. Red Lake River in Crookston (>65 mg/l)
3. Lower Badger Creek at CR 114 (during an extreme June runoff event, >30 mg/l)
4. Kripple Creek
5. Thief River at CSAH 7 (6 samples > 30 mg/l)
6. Judicial Ditch 30, north of Thief River Falls (>30 mg/l)
7. Cyr Creek (twice >30 mg/l)
8. Thief River at 140th Ave NE, north of Thief River Falls (3 samples >30 mg/l)
9. Polk County Ditch 2 at County Road 62 (>65 mg/l)
10. Chief's Coulee at Dewy Ave (>30 mg/l)
11. North Cormorant River at CSAH 36 (>15 mg/l)
12. Ruffy Brook at CSAH 11 (>15 mg/l)
13. Silver Creek at CR 111 (>15 mg/l)
14. Clearwater River at CSAH 2 (> 15 mg/l)
15. Clearwater River at CSAH 24, upstream of Clearwater Lake (>15 mg/l)

- The lowest possible total suspended solids (cleanest water) is a censored value of <1 mg/l (less than the laboratory's minimum reporting limit). It was recorded at a number of sites:
    - Mud River at CSAH 54 in Grygla
    - Mud River at the city park in Grygla (3 samples)
    - Pennington County Ditch 21
    - Clearwater River at CSAH 25, upstream of Bagley

- Clearwater River at Hwy 2, east of Bagley
- Clearwater River at CSAH 2 (2 samples)
- Clearwater River at CSAH 24, upstream of Clearwater Lake
- Clear Brook at Highway 92 in Clearbrook (2 samples)
- Hill River at 335th Ave (2 samples)
- Hill River at CR 119, north of Brooks
- Poplar River at 109th Ave, upstream of Pine Lake (2 samples)
- Poplar River at 315th St. SE near the Poplar River Diversion structure
- Lost River in Oklee
- Clearwater River at CSAH 12, north of Terrebonne (2 samples)
- Beau Gerlot Creek at CR 114
- Judicial Ditch 73 near Rydell National Wildlife Refuge (3 samples)
- Lower Badger Creek at CR 114
- Clearwater River in Red Lake Falls
- Little Black River at CR 102 (2 samples)
- Gentilly River at CSAH 11

Low dissolved oxygen levels (<5 mg/l) were found in the following rivers and streams in May/June 2014 (ranked, beginning with the lowest concentration).

1. Judicial Ditch 73 near Rydell National Wildlife Refuge (0.31 mg /l, 15 measurements below 5 mg/l)
2. Walker Brook at CSAH 19 (1.02 mg/l, 2 measurements <5 mg/l)
3. Heartsville Coulee at 210th Street, south of East Grand Forks (1.49 mg/l, 2 measurements <5 mg/l)
4. Judicial Ditch 73 (Poplar River Diversion ditch) at the Badger Lake Inlet (1.81 mg/l, 2 measurements below 5 mg/l)
5. Lost River at 109th Ave, upstream of Pine Lake (2.42 mg/l, 3 measurements <5 mg/l)
6. Lost River in Oklee (2.78 mg/l)
7. Silver Creek at CR 111 (2.82 mg/l, 2 measurements <5 mg/l)
8. Pennington County Ditch 21 (3.25 mg/l, 2 measurements <5 mg/l)
9. Poplar River at CR 118 (3.82 mg/l, 2 measurements <5 mg/l)
10. Lost River at the Pine Lake inlet at the South Pine lake Rd. crossing (3.83 mg/l)
11. Lost River at CSAH 28 (3.98 mg/l, 3 measurements <5 mg/l)
12. Maple Lake outlet at 336th St. SE (4.03 mg/l, 2 measurements <5 mg/l)
13. Chief's Coulee at Atlantic Ave (4.05 mg/l)
14. Burnham Creek at CSAH 45 (4.13 mg/l)
15. Pennington County Ditch 96 at Hwy 32, south of St. Hilaire (4.43 mg/l)
16. Branch A of JD21 (4.46 mg/l)
17. Thief River at CSAH 7 (4.62 mg/l, 2 measurements <5 mg/l)
18. Black River at Pennington County Road 58 (4.7 mg/l)
19. Judicial Ditch 73 at the Badger-Mitchell Lake channel (4.88 mg/l)
20. Chief's Coulee near Labree Ave (4.96 mg/l)

- The best dissolved oxygen concentration recorded in 2015 was 16.47 mg/l in the Lost River in Oklee.

The state's water quality standard for total phosphorous varies by river nutrient region. Rivers and tributaries in the western part of the District have to meet a 0.150 mg/l standard in the South River Nutrient Region. Rivers and tributaries assigned to the Central River Nutrient region have to meet a 0.100 mg/l standard. Rivers and tributaries in the eastern part of the District have to meet a more protective standard of 0.050 mg/l in the North River Nutrient Region. High total phosphorus concentrations relative to the State of Minnesota's new regionalized river eutrophication nutrient criteria were recorded in samples collected at the following sites. The following list is organized in order of the highest-to-lowest in regards to the number of high readings that were recorded and each site and the severity of high 2015 total phosphorus concentrations found at each site.

1. Chief's Coulee at Dewey Ave (1.43 mg/l on 8/31/15, 2 others > 0.10 mg/l))
2. Heartsville Coulee at 210th St. (1.11 mg/l on 10/1/15, 1.08 mg/l on 8/24/15, 2 others >0.15 mg/l)

3. Clearwater River at CSAH 2 (7 samples >0.05 mg/l)
4. Poplar River at CR 118 (6 samples >0.10 mg/l)
5. Pennington County Ditch 21 (5 samples >0.10 mg/l)
6. Ruffy Brook at CSAH 11 (5 samples >0.05 mg/l)
7. Thief River at CSAH 7 (5 samples >0.10 mg/l)
8. Polk County Ditch 2 at CR 62 (4 samples >0.15 mg/l)
9. Silver Creek at CR 111 (4 samples >0.05 mg/l)
10. North Cormorant River at CSAH 36 (4 samples >0.05 mg/l)
11. Judicial Ditch 73 near Rydell National Wildlife Refuge (4 samples >0.10 mg/l)
12. O' Briens Creek at Harvest Rd. (4 samples >0.05 mg/l)
13. Burnham Creek at 320th Ave (3 samples >0.15 mg/l)
14. Poplar River at 315th St. SE near the Poplar River Diversion structure (3 samples >0.10 mg/l)
15. Hill River at 335th Ave (3 samples >0.10 mg/l)
16. Hill River at CR 119, north of Brooks (3 samples >0.10 mg/l)
17. Thief River at 140th Ave NE, north of Thief River Falls (3 samples >0.10 mg/l)
18. Darrigan's Creek at CSAH 23 (3 samples >0.05 mg/l)
19. Clearwater River at CSAH 24, upstream of Clearwater Lake (3 samples >0.05 mg/l)
20. South Cormorant River at CSAH 37 (3 samples >0.05 mg/l)
21. Clear Brook at Hwy 92 in Clearbrook (3 samples >0.05 mg/l)
22. Blackduck River at Deer Trail Rd. (3 samples >0.05 mg/l)
23. Browns Creek at CR 101 (2 samples >0.15 mg/l)
24. Poplar River at CSAH 30, near Fosston (2 samples >0.10 mg/l)
25. Clearwater River at CR 127 (2 samples >0.10 mg/l)
26. Clearwater River north of Plummer (2 samples >0.10 mg/l)
27. Judicial Ditch 73 (Poplar River Diversion) at the Badger Lake Inlet (2 samples >0.10 mg/l)
28. Lost River at CR 119, north of Brooks (2 samples >0.10 mg/l)
29. Terrebonne Creek at Hwy. 92 (2 samples >0.10 mg/l)
30. Moose River at Hwy 89 (2 samples >0.05 mg/l)
31. Clearwater River at Hwy 2, east of Bagley (2 samples >0.05 mg/l)
32. Polk County Ditch 1 at CR 61 (>0.15 mg/l)
33. Chief's Coulee downstream of the city lot, east of Labree Ave (>0.10 mg/l)
34. Chief's Coulee at Atlantic Ave (>0.10 mg/l)
35. Chief's Coulee at Highway 32 (>0.10 mg/l)
36. Red Lake River at the Louis Murray Bridge in East Grand Forks (>0.15 mg/l)
37. Lower Badger Creek at CR 114 (>0.10 mg/l)
38. Kripple Creek at 180th Ave (>0.15 mg/l)
39. Cyr Creek (>0.10 mg/l)
40. Red Lake River in Crookston (>0.15 mg/l)
41. Judicial Ditch 30, north of Thief River Falls (>0.10 mg/l)
42. Judicial Ditch 73 at the Maple Lake inlet (>0.10 mg/l)
43. Beau Gerlot Creek at CR 114 (>0.10 mg/l)
44. Hill River at CSAH 35 (>0.10 mg/l)
45. Poplar River at 109th Ave, upstream of Pine Lake (>0.10 mg/l)
46. Mud River in Grygla (>0.05 mg/l)
47. Red Lake River at CSAH 7 (Smiley Bridge) east of Thief River Falls (>0.05 mg/l)
48. Mud River at Hwy 89 (>0.05 mg/l)

- The lowest 2015 concentration of total phosphorus, 0.012 mg/l, was found in October samples from the Clearwater River at CSAH 14 downstream of Clearwater Lake and Marshall County Ditch 20.

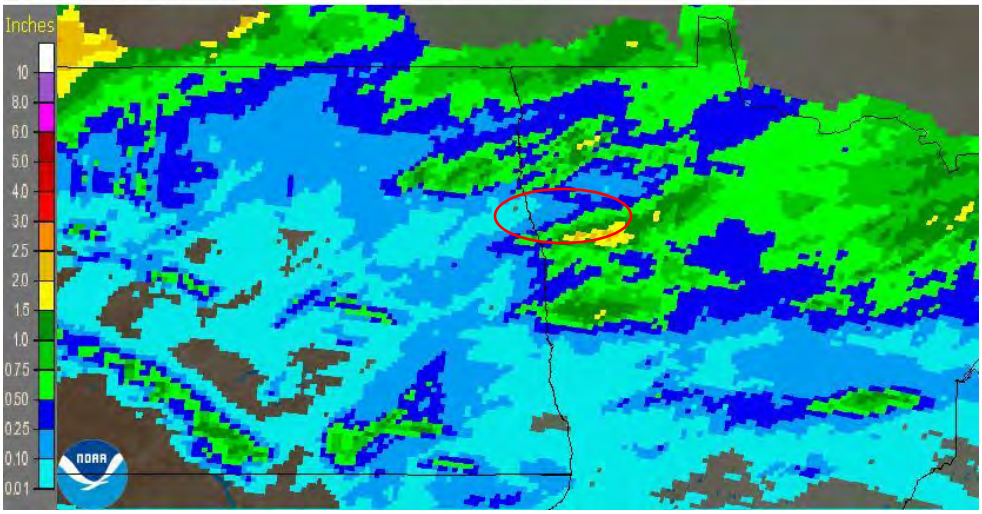
2015 monitoring data was entered and submitted to the MPCA for storage in the State's EQuIS database. The records were reviewed by comparing data stored in spreadsheets to field data sheets and lab reports to make sure they are accurate.

June 3, 2015 Rainfall Event and Runoff

An area north of Highway 2, east of Gentilly, west of Brooks, and south of Red Lake Falls was subjected to an intense rainfall event in the early morning hours of June 3rd, 2015. Rainfall amounts greater than 5 inches were reported. The circled area on the following 24-hour rainfall map from the National Weather Service shows the size of area that was hit by the storm. Cyr Creek was high enough to be flowing over Highway 32. In lower Badger Creek, the water was so high that it covered the top of the dissolved oxygen logger deployment pipe and it couldn't be retrieved until a later day. Even if the top of the deployment pipe was reachable under the water, it was impossible to see even inches into the muddy water. There was so much sediment in Lower Badger Creek that the water looked black and smelled like a freshly plowed field or a freshly tilled garden. Water was also black with sediment in Terrebonne Creek, Beau Gerlot Creek, and the Hill River.

Photo courtesy of
Annalee Jones
Taken on 6/3/2015
1.5 miles east of Gentilly

Eastern North Dakota/Grand Forks, ND (FGF): 6/3/2015 1-Day Observed Precipitation
Valid at 6/3/2015 1200 UTC- Created 6/12/15 8:37 UTC

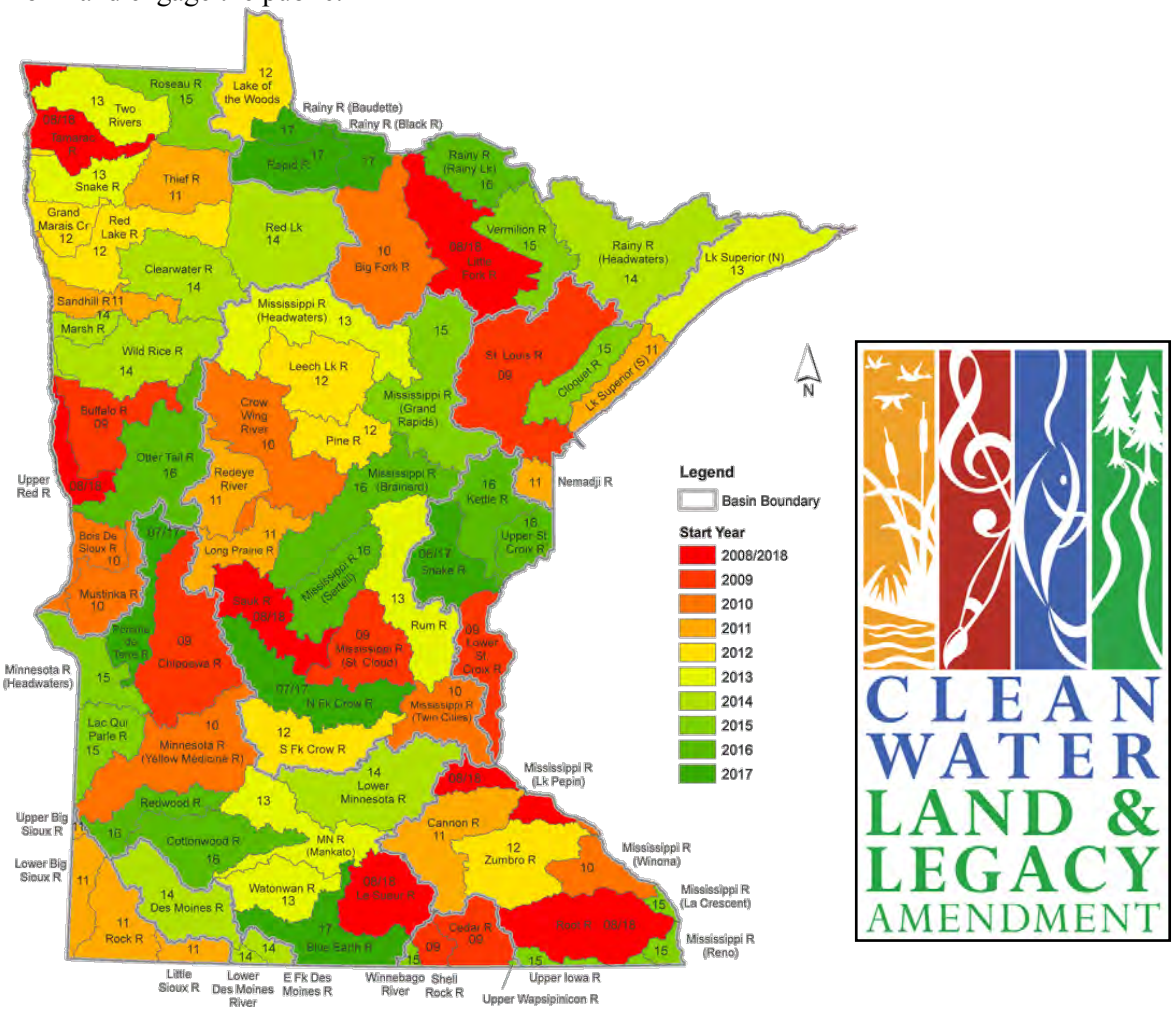



Lower Badger Creek
6/3/2015


Terrebonne Creek
6/3/2015

Watershed Restoration and Protection (WRAP) Projects

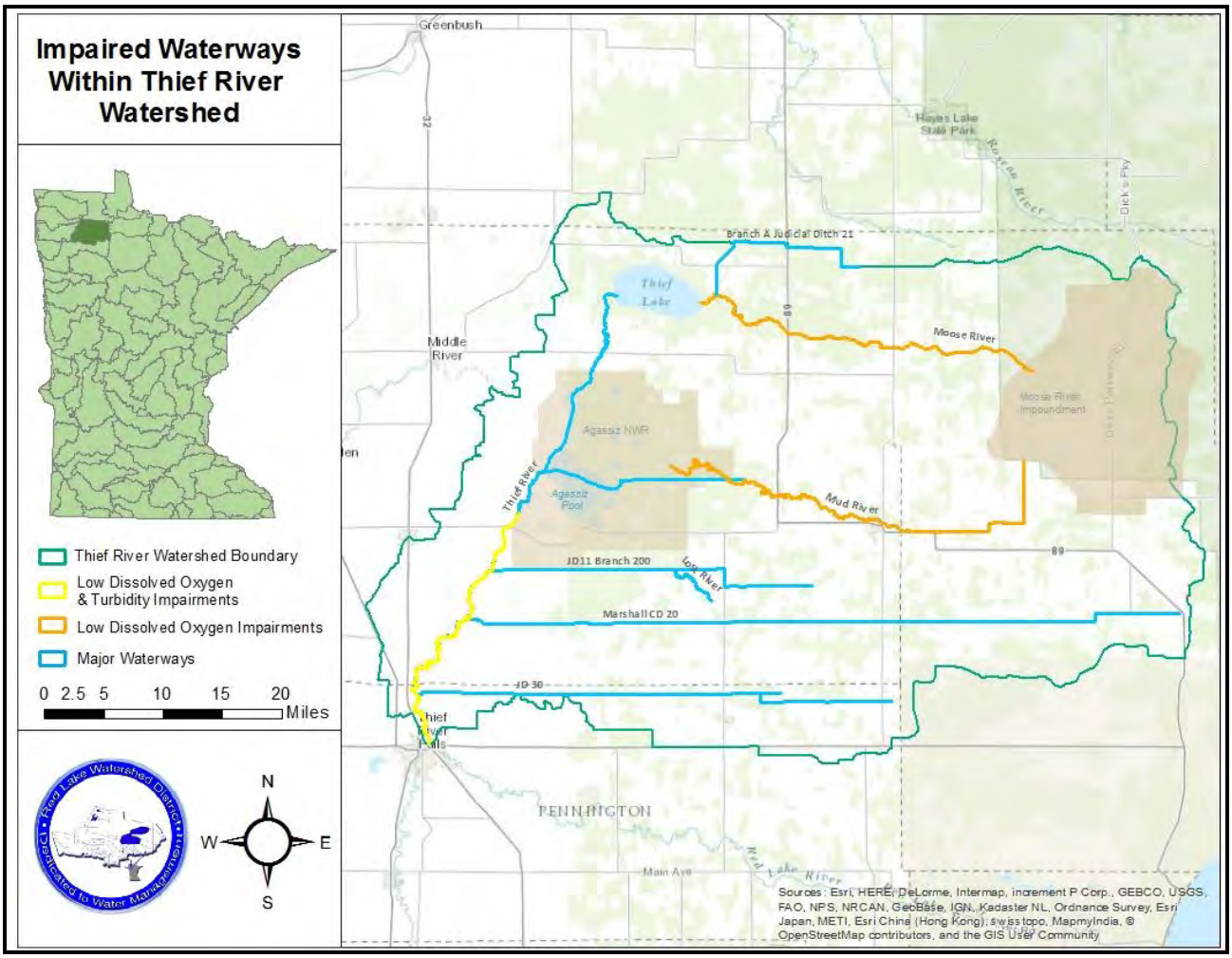
The Minnesota Pollution Control Agency (MPCA) has adopted a watershed approach to monitoring, assessments, and addressing impaired waters. Information about the watershed approach can be found on the MPCA's website (http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html). There are 81 major watersheds in Minnesota. Intensive water quality monitoring and assessments will be conducted in each of these watersheds every 10 years. During the 10-year cycle, the MPCA and its partner organizations work on each of the state's watersheds to evaluate water conditions, establish priorities and goals for improvement, and take actions designed to restore or protect water quality. When a watershed's 10-year cycle is completed, a new cycle begins. The starting dates for intensive watershed monitoring and WRAP projects in Minnesota's watershed are shown in the following map. The first two years of the project focus on data collection. During the third year, an official water quality assessment is conducted by the MPCA and the causes of water quality problems are investigated. In the last two years of these four-year projects, watershed-based total maximum daily load (TMDL) reports and watershed restoration and protection strategy (WRAPS) reports are written. The projects also fund civic engagement efforts to inform and engage the public.



The MPCA has released some informational videos about the watershed approach to monitoring, assessment, restoration, and protection.

- Part 1: What is a Watershed? http://youtu.be/ACim1rj-RZw
- Part 2: How we got to where we are. http://youtu.be/zG0so5AZANs
- Part 3: Watershed Approach and the 10-Year Cycle. http://youtu.be/cGqFO9G6UnA
- Part 4: Getting involved in the process. http://youtu.be/Bl5EKurqFAA

Thief River Watershed Restoration and Protection (WRAP) Project



The primary goal of this project is the completion of a watershed-based Total Maximum Daily Load (TMDL) study that will produce a watershed-based Total Maximum Daily Load (TMDL) report (restoration plan) and a Watershed Restoration and Protection Strategy (WRAPS) report (restoration and protection plan). There are several objectives that take this project beyond a typical TMDL, including biological monitoring, stream channel stability assessments and civic engagement. This project's planned work has been divided into thirteen tasks. Phase I of this project began in early 2011. Phase II began in mid-2013. The project is currently scheduled to be completed on June 30, 2016. Here is a report on what was accomplished in 2015:

Thief River WRAP, Task 1: Evaluation of Existing Data

This task has involved an independent assessment of water quality conditions, an inventory of existing data from water quality and summaries of past reports. An assessment of 2005 – 2014 monitoring data was conducted to provide information in the Watershed Restoration and Protection Strategy Report about the current condition of rivers, streams, and ditches in the Thief River watershed.

During the 2013 MPCA water quality assessment (2003-2012 data), many reaches with water quality monitoring data were not officially assessed for aquatic life due to channelization. Despite extensive data collection (2,350 total discrete daily data points available = 235 per year) in the watershed, only 35% of the 260.99 miles of stream channels in the watershed were officially assessed in some form that year. The 2015 local assessment applied all existing (E. coli, pH, DO, un-ionized ammonia) and new (TSS, TP, BOD, DO Flux) State water quality standards to data collected during the years of 2005 through 2014.

River/ Stream/ Ditch	AUID (Last 3 Digits)	Reach Description	Miles	Days With Data	Fish IBI	Macro-invertebrate IBI	Total Suspended Solids	Eutrophication (TP & Chl-a, DO Flux, BOD, or pH)	Un-ionized Ammonia	Dissolved Oxygen	E. coli Bacteria	Better Since the 2013 Assessment	Worse Since the 2013 Assessment
Thief River	501	Agassiz Pool to Red Lake R	21.96	712	Sup	Sup	Imp	PI	Sup	Imp	Sup	E. coli, DO5_All	DO12, DO7
Thief River	504	Thief Lk to Agassiz Pool	7.9	229	PI	Sup	Sup	Sup	Sup	Sup	Sup	E. coli	
Moose River	505	Headwaters to Thief Lk	23.35	184	PI	Sup	Sup	PI	Sup	Imp	Sup		DO, TSS
Mud River	507	Headwaters to Agassiz Pool	20.01	290	PI	Sup	Sup	PI	Sup	Imp	Sup		
Unnamed Ditch (Judicial Ditch ~~18~~ 30)	509	T154 R42W S14, east line (JD30) to Thief R	8.45	125	PI	IF	Sup	PI	Sup	PI	Sup		DO
County Ditch 20	510	Unnamed ditch to Thief River	0.95	3	IF	IF	IF	IF concern	IF	IF	IF concern		
Unnamed Ditch (Dtich 200)	511	Unnamed ditch to unnamed ditch	5	155	PI	PI	Sup	PI	Sup	PI	Sup	DO	
Unnamed Ditch (Dtich 200)	512	Unnamed ditch (Upstream of 180th Ave NE) to Thief River	0.11	1	IF	IF	IF	IF	IF	IF	IF		
County Ditch 20	513	Unnamed ditch to CD 32	8.4	38	Sup	Sup	IF	IF	IF	IF	IF concern		DO
County Ditch 20	515	CD 32 to CD 31	2	1	IF	IF	IF	IF	IF	IF	IF concern		E. coli
County Ditch 21	517	Unnamed ditch to Unnamed ditch	4.98	1	IF	IF	IF	IF	IF	IF	IF concern		E. coli
County Ditch 20	519	Unnamed ditch (Branch A CD 30) to Unnamed ditch (Branch D CD 20)	1	171	PI	PI	Sup	Sup	Sup	Sup	Sup	TSS, DO	
Judicial Ditch 11	521	Unnamed ditch (Moose R Impoundment South Pool Outlet) to unnamed ditch (Benville Rd)	0.98	37	IF	IF	IF	IF	IF	IF	IF		
Judicial Ditch 11	522	Unnamed ditch (Benville Rd) to Unnamed ditch	1.51	2	IF	IF	IF	IF	IF	IF	IF		
Judicial Ditch 11	525	Unnamed ditch to JD 11 (Outpost Rd to Gunpowder Rd)	0.52	2	IF	IF	IF	IF	IF	IF	IF		
Judicial Ditch 11	526	Unnamed ditch to Mud R	4.39	1	IF	IF	IF	IF	IF	IF	IF		
Unnamed Ditch	527	Unnamed ditch to unnamed ditch	7.9	14	Sup	IF	Sup	Sup	IF	IF	IF		
Unnamed Ditch	534	Unnamed ditch to unnamed ditch	2	103	IF	IF	Sup	IF concern	IF	PI	IF		
Judicial Ditch 11	536	Unnamed ditch (Branch 194 of JD11) to Thief River	9.7	84	Sup	PI	IF	IF	Sup	IF	IF		
Unnamed ditch	537	Unnamed ditch to JD 13	3.4	2	PI	PI	IF	IF	IF	IF	IF		
Judicial Ditch 13	540	T154 R40W S16, east line to JD 18	3.01	1	PI	Sup	IF	IF	IF	IF	IF		
Judicial Ditch 18	541	T154 R40W S27, midpoint to T154 R42W S	12.5	1	PI	IF	IF	IF concern	IF	IF	IF		
Unnamed Ditch (Br1 of JD11)	543	Unnamed ditch (Br15 JD11) to unnamed ditch (Br 7 JD11)	1.98	95	Sup	IF	IF	IF concern	Sup	IF	IF		

IF	Insufficient data. Either there is no data, or the data doesn't meet minimum requirements for an assessment.
IF concern	Insufficient data to assess the reach, but some of values collected fail to meet the water quality standard. Target this reach for additional monitoring.
PI	2005-2014 data indicates that the reach is not meeting the standard for this parameter, but it the reach is not officially listed as impaired.
Imp	The reach is officially listed as impaired for this parameter.
Sup	Current data indicates that the reach is meeting the standard for this parameter.

River/ Stream/ Ditch	AUID (Last 3 Digits)	Reach Description	Miles	Days With Data	Fish IBI	Macro-invertebrate IBI	Total Suspended Solids	Eutrophication (TP & Chl-a, DO Flux, BOD, or pH)	Un-ionized Ammonia	Dissolved Oxygen	E. coli Bacteria	Better Since the 2013 Assessment	Worse Since the 2013 Assessment
County Ditch 20	546	Unnamed ditch to Unnamed ditch	3.02	1	IF	IF	IF	IF	IF	IF	IF concern		
County Ditch 20	548	Unnamed ditch to unnamed ditch	5.4	2	PI	PI	IF	IF	IF	IF	IF concern		
Unnamed Ditch (Jelle Rd Ditch)	549	Unnamed ditch to CD 30	4	1	Sup	IF	IF	IF	IF	IF	IF concern		
Unnamed Ditch (Lat 1, JD23)	550	Headwaters to Thief R	5.8	1	PI	PI	IF	IF	IF	IF	IF		
Unnamed Ditch (Main JD23)	551	Unnamed ditch to Thief River	4.6	2	PI	PI	IF	IF	IF	IF	IF		
County Ditch 27	552	Unnamed ditch to unnamed ditch	4	2	PI	PI	IF	IF	IF	IF	IF		
County Ditch 32	554	Unnamed ditch to CD 20	2.5	2	PI	PI	IF	IF	IF	IF	IF		
Unnamed Ditch (Branch A of JD21)	555	Unnamed ditch to Moose R	1.7	70	Sup	Sup	Sup	Sup	Sup	Sup	Imp (June)	E. coli	
Unnamed Ditch (Branch A of JD21)	556	Unnamed ditch to Unnamed ditch	5.72	1	IF	IF	IF	IF	IF	IF	IF		
Unnamed Ditch	557	Unnamed ditch to unnamed ditch	7	2	Sup	PI	IF	IF	IF	IF	IF		
Unnamed Ditch (Marshall CD 35)	558	Unnamed ditch to Thief River	2.33	1	PI	IF	IF	IF	IF	IF	IF		
Unnamed Ditch (Br 2 JD11)	559	Headwaters to Mud Lk	6.3	1	Sup	PI	IF	IF	IF	IF	IF		

IF	Insufficient data. Either there is no data, or the data doesn't meet minimum requirements for an assessment.
IF concern	Insufficient data to assess the reach, but some of values collected fail to meet the water quality standard. Target this reach for additional monitoring.
PI	2005-2014 data indicates that the reach is not meeting the standard for this parameter, but it the reach is not officially listed as impaired.
Imp	The reach is officially listed as impaired for this parameter.
Sup	Current data indicates that the reach is meeting the standard for this parameter.

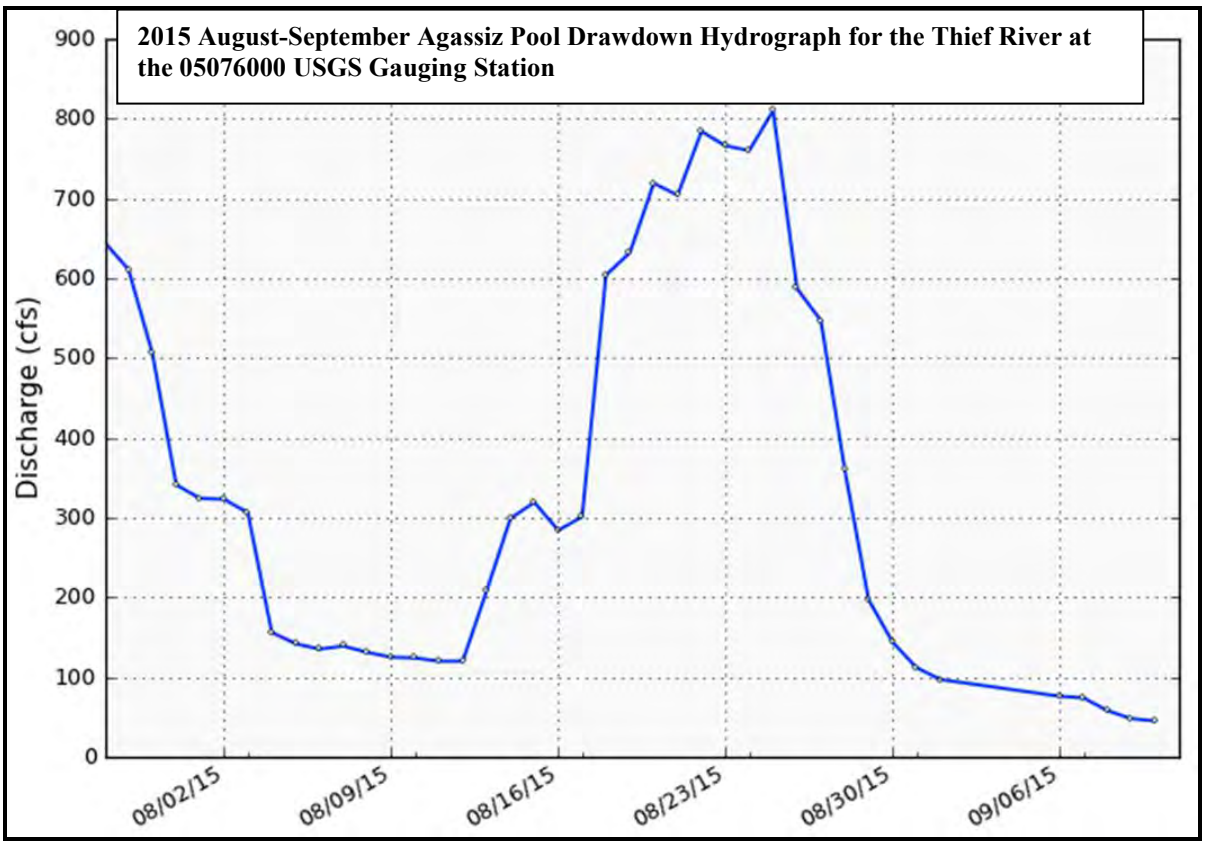
Thief River WRAP, Task 2: Water Quality Sampling

The purpose of this task is to collect water quality data that will be used to fill in the gaps in existing monitoring programs, investigate problems, and to collect the extra data that is needed to understand the watershed and report on conditions.

RLWD water quality staff began collecting frequent early morning dissolved oxygen data and samples from the lower Thief River (downstream of Agassiz National Wildlife Refuge) before and during the 2015 late-summer drawdown of Agassiz Pool. This data was being collected to help with the identification of a pollutant that has a negative correlation with dissolved oxygen levels.

District water quality staff collected frequent early morning dissolved oxygen data and samples from the lower Thief River (downstream of Agassiz National Wildlife Refuge) before and during the 2015 late-summer drawdown of Agassiz Pool. Samples were analyzed for the basic parameters of total suspended solids, total phosphorus, orthophosphorus, total Kjeldahl nitrogen, ammonia nitrogen, nitrates + nitrites, and E. coli bacteria. The samples were also analyzed for additional parameters like sulfates, total organic carbon, and chlorophyll-a.

Flows peaked in late August. When the river was sampled on August 31 and in early September, flows had decreased, but turbidity and total suspended solids levels increased. Turbidity levels in the Thief River at CSAH 7 rose to 100 NTRU and dissolved oxygen levels fell below 5 mg/l. As flows decreased during the latter stages of the drawdown, concentrations of pollutants increased.


2015 August-September Agassiz Pool Drawdown Hydrograph for the Thief River at the 05076000 USGS Gauging Station
Discharge (cfs)
900
800
700
600
500
400
300
200
100
0
08/02/15
08/09/15
08/16/15
08/23/15
08/30/15
09/06/15


THIEF RIVER AT CSAH 7
AUGUST 27, 2015


THIEF RIVER AT CSAH 7
SEPTEMBER 1, 2015


THIEF RIVER AT CSAH 7
SEPTEMBER 1, 2015


THIEF RIVER AT CSAH 7
SEPTEMBER 3, 2015

High E. coli concentrations (>126 CFU/100ml) were found at the CSAH 7 crossing of the Thief River on 6 days during this effort (every sample collected from 8/31/2015 through 9/10/15) and at the 140th Ave NE crossing of the Thief River (twice). E. coli concentrations at the CSAH 7 crossing, near Agassiz National Wildlife Refuge were several times higher than the concentrations found at the 140th Ave crossing near Thief River Falls in all of the days that were sampled in September.

High Total Phosphorus concentrations were found at the CSAH 7 on 5 days (every sample in September) and 140th Ave NE (on 3 days) crossings of the Thief River.

High total suspended solids concentrations (>30 mg/l) were found at the CSAH 7 crossing of the Thief River on 6 days during this effort (every sample collected from 8/31/2015 - 9/10/15).

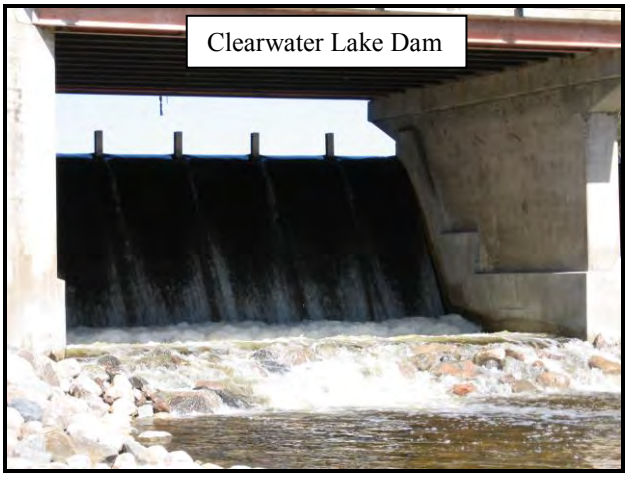
Low dissolved oxygen levels (<5 mg/l) were found at the CSAH 7 crossing of the Thief River on 2 days and another day was only 5.48 mg/l at 9:45 AM, so it is reasonable to assume that the true daily minimum was less than 5 mg/l early in the morning.

Receding water levels revealed deep, freshly deposited sedimentation along the banks of the river. The dark, organic sediment was over 2.5 feet deep in some places.

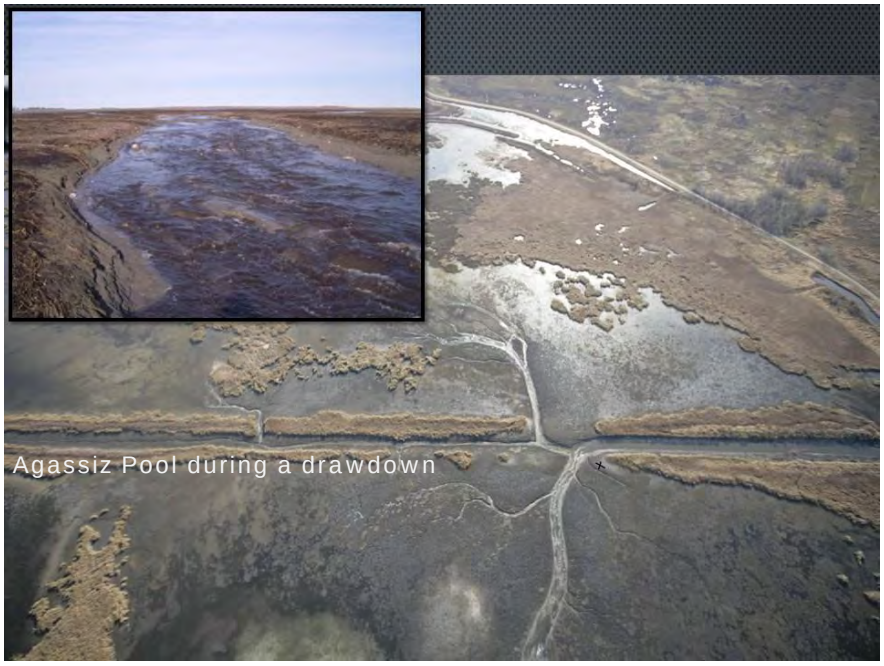
The data from this intensive monitoring effort was analyzed in September. The monitoring effort was successful in improving our understanding of how the drawdown of Agassiz Pool negatively affects downstream water quality. It also successfully discovered negative correlations between pollutants and dissolved oxygen levels. The way that the correlations differed in the upstream end of the reach versus the downstream end of the reach also shed light upon what happens to nutrients and other pollutants as they travel downstream.

The data from this intensive monitoring effort shows that the nutrients contained in that sediment that is being transported out of Agassiz Pool seem to have relatively strong correlations with dissolved oxygen concentrations during the drawdown period. The strength of the correlation between daily minimum dissolved oxygen levels and parameters like sulfates, total phosphorus, orthophosphorus, and ammonia nitrogen increase greatly from CSAH 7 to 140th Ave. The correlation between dissolved oxygen and sulfates is very strong. The correlation increases from an R2 of 0.33 at CSAH to and R2 of 0.84 at 140th Ave. A possible explanation about why this change occurs is that decomposition/oxidation of pollutants occurs along the reach and the pollutants have had more time to affect dissolved oxygen concentrations by the time the water reaches the downstream monitoring site.

Normally, the water leaving natural outlets of large bodies of water is relatively clean. The outlets of Clearwater Lake and Moose River impoundment, for example, have consistently low concentrations of pollutants. In most cases, surface water needs to flow over something in order to leave a pool, pond, or lake. Clearwater Lake happens to be a lake in which water levels are maintained by a dam. Pollutants from the Clearwater River are deposited into the lake at the inlet and the clean water on the surface of the lake is the water that leaves the lake through the outlet. The outlet of Agassiz Pool along JD11 is different in that it uses a radial gate, which opens from the bottom. This allows more movement of water along the bottom of the pond and the remains of Judicial Ditch 11.



How can it be that sediment concentrations increase as flows decrease? As the water levels drop in the pool, the movement of water becomes more concentrated within the channels and gullies within the pool. There will be less dilution from ponded water. There will be an ample supply of loose sediment within the channels that has been deposited throughout the summer.



A similar process was observed in wild rice paddy drainage during the Red Lake Watershed Farm to Stream Tile Drainage Study. Some of the wild rice paddies that used internal surfaced ditches to move water. During the pre-harvest draining of the ponds, sediment concentrations would be relatively low at the beginning of the drawdown when most of the water leaving the paddy is the water that was ponded above the "ground level" in the paddy. Sediment concentrations increased extremely as a greater and greater percentage of water was flowing within the surface ditches. Total suspended solids concentrations peaked at extremely high levels as the loose sediment that had been deposited within the ditches by wave action and other processes throughout the summer began being carried out of the pool with a lessening dilution factor from water that was pooled. In the case of Agassiz Pool, this also includes sediment deposited by the Mud River and Thief River. The concentrations eventually decreased toward the end of the drawdown, likely because of lower flow velocities, a depleted supply of easily moveable sediment, or a combination of those two factors.

Thief River WRAP, Task 3: Continuous Dissolved Oxygen Monitoring

USGS staff provided District staff with continuous dissolved oxygen data that was collected in and around Agassiz National Wildlife Refuge.

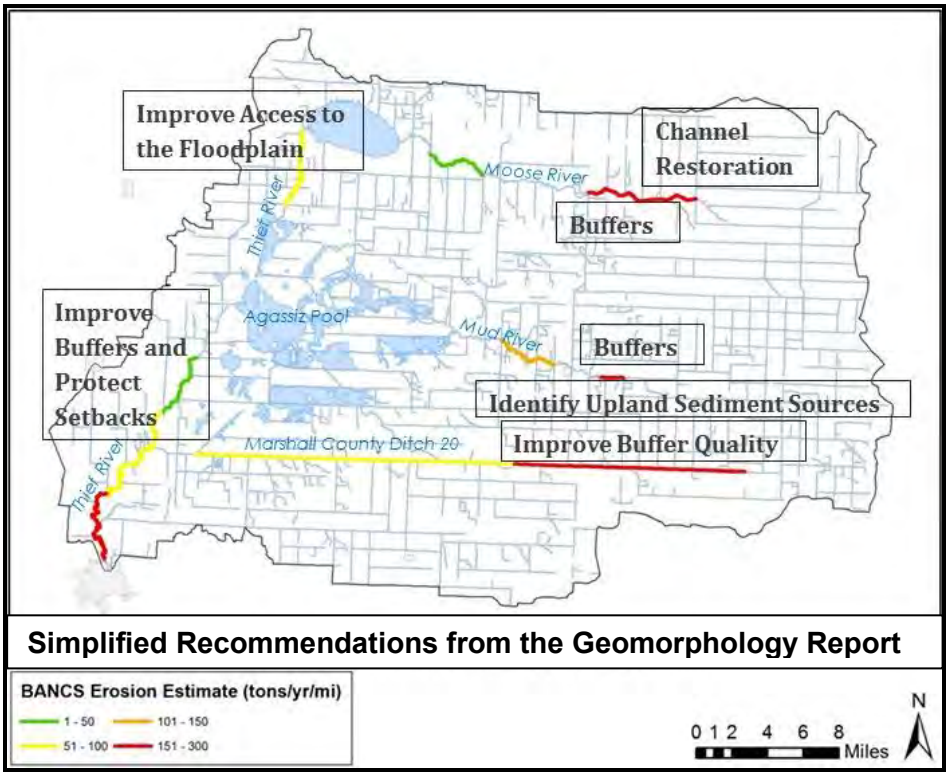
Thief River WRAP, Task 5: Stage and Flow Monitoring

Having a flow record is critical for determining total maximum daily loads and quantifying the pollutant reductions that will be sufficient to allow the river to meet water quality standards. The District, USGS, and MNDNR are monitoring stage and flow throughout the Thief River Watershed. HOBO Water Level Loggers were deployed in mid-March. Check-ups of HOBO water level loggers were conducted. The loggers were cleaned and data was downloaded to make sure they were working properly. Loggers were retrieved for the winter in late November. HOBO water level loggers were installed at the following sites:

- The District office (Barometric Pressure)
- Judicial Ditch 30
- Marshall County Ditch 20
- Branch 200 of Judicial Ditch 11
- Branch A of Judicial Ditch 21
- Moose River at Highway 54

The USGS monitors flow in the Thief River at a gauge near Thief River Falls. There also are two MPCA/DNR cooperative gauges in the watershed. Real-time information from all of the USGS and cooperative gaging stations can be accessed through a map-based search on the DNR/MPCA Cooperative Stream Gaging website: http://www.dnr.state.mn.us/waters/csg/index.html.

Thief River WRAP, Task 6: Stream Channel Stability Assessment



Erosion and sedimentation problems have been found in the Thief River watershed. Understanding these problems requires an understanding of stream channel morphology within the watershed. MN DNR staff completed a draft geomorphology report for the Thief River watershed. The District Water Quality Coordinator read and provided feedback on a draft version of the Thief River watershed Fluvial Geomorphology Report. Recommendations from the Thief River Watershed Fluvial Geomorphology Report were incorporated into the Thief River WRAPS Report. A link to the 2015 Thief River Watershed Fluvial Geomorphology Report was added to the list of Thief River documents on the rlwdwatersheds.org website. http://redlakewatershed.org/waterquality/Thief%20R%20Geomorphology%20Report%20Nov2015.pdf

Thief River WRAP, Task 7: Stressor Identification and Pollutant Source Investigation

In order to recommend effective solutions for solving water quality problems, it is necessary to collect evidence as proof that a particular stressor is affecting water quality. This task will identify those stressors, such as gully erosion, insufficient riparian buffers, and feedlots. Georeferenced photos were taken when erosion problems or sites in need of BMPs were found.

Separate, official stressor ID reports will not be required at this time for any of the reaches in the Thief River watershed because no official biotic impairments were established. This is mostly due to the fact that only one biological monitoring site was located on a natural reach that could be assessed. The rest were located on channelized reaches that won't be assessed for the ability to support aquatic life until the next official assessment in 2023. A stressor identification section was still written by Detroit Lakes MPCA staff and added to the Thief River Monitoring and Assessment Report.

Thief River WRAP, Task 8: Water Quality Model Development

The MPCA has funded the development of a Hydrologic Simulation Program FORTRAN (HSPF) model of the Thief River Watershed that will coincide with the WRAP project. Modeling results are available upon request from MPCA modeling staff. MPCA modeling staff will simulate best management practice implementation by using the Thief River Watershed HSPF Model to predict their effectiveness for making water quality improvements. An essential best management practice to model will by the improvement of riparian buffers, especially now that the buffers will be required by law.

Thief River WRAP, Task 9: Monitoring Data Entry

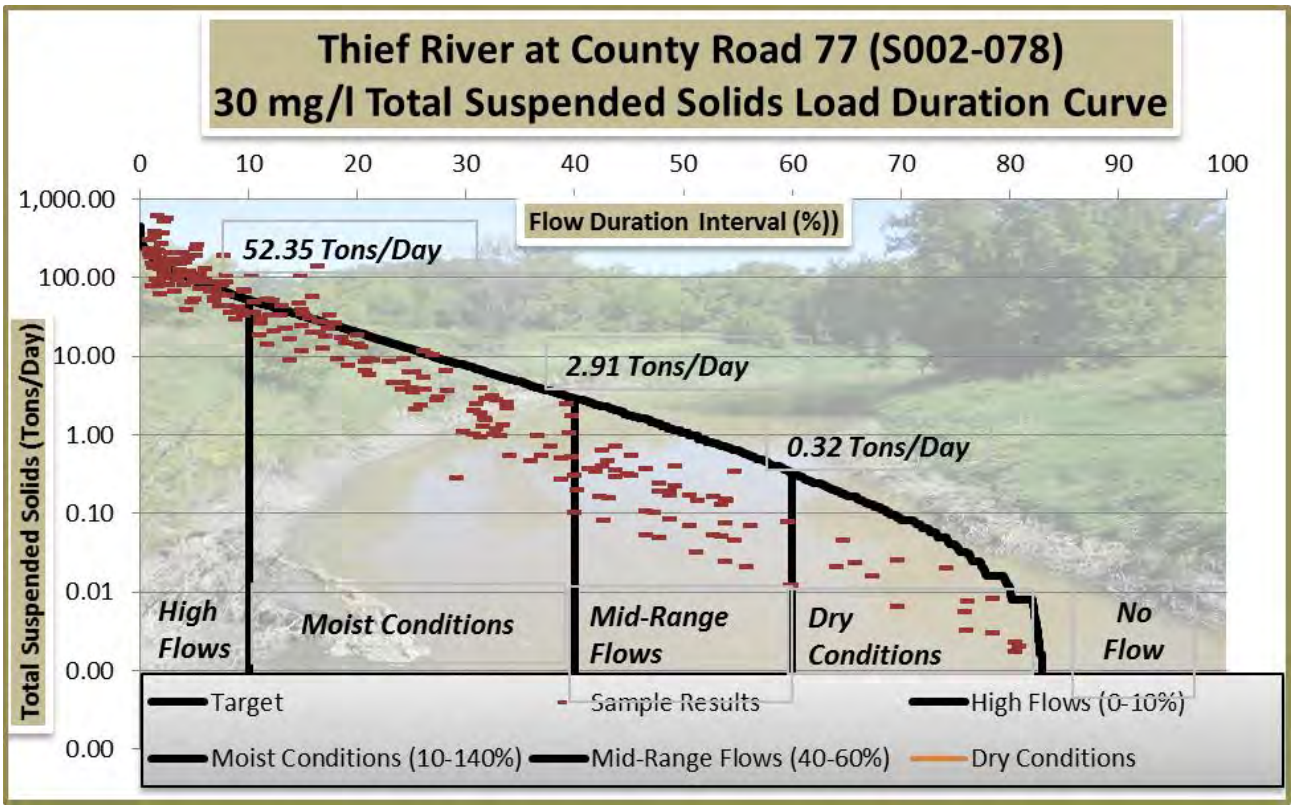
2015 data from this project was entered into the District water quality database and submitted to the MPCA for entry into the State's EQuIS database. A subsequent data review was quickly completed for this set of data by checking 10% of the records against field data sheets and lab reports to make sure they are accurate.

Thief River WRAP, Task 10: Monitoring Data Analysis

The Thief River, between Agassiz National Wildlife Refuge and the Red Lake River, is officially listed as impaired by high turbidity on the 303(d) List of Impaired Waters. It continues to exceed the 25 NTU turbidity standard and the 30 mg/l total suspended solids (TSS) standard that replaced it.

The MPCA adopted a new, regional water quality standards for TSS in 2015. The Thief River has been assigned to the Central River Nutrient Region in which rivers have to meet a 30 mg/l standard for TSS in at least 90% of April – September samples. A comparison of paired turbidity and TSS measurements shows that the new TSS standard will provide a level of protection that is similar to the former 25 NTU turbidity standard.

Flow and load duration curves were created for the total suspended solids impairment on the lower Thief River using flow and water quality sampling data from the monitoring site (S002-079) near the USGS gaging station (05076000). A load duration curve was created for the lower reach of the Thief River. Median flows and loads within each flow regime along the load duration curve were used to calculate the total suspended solids load allocations for the reach. Total suspended solids TMDLs were calculated for the Agassiz Pool to Red Lake River reach of the Thief River.

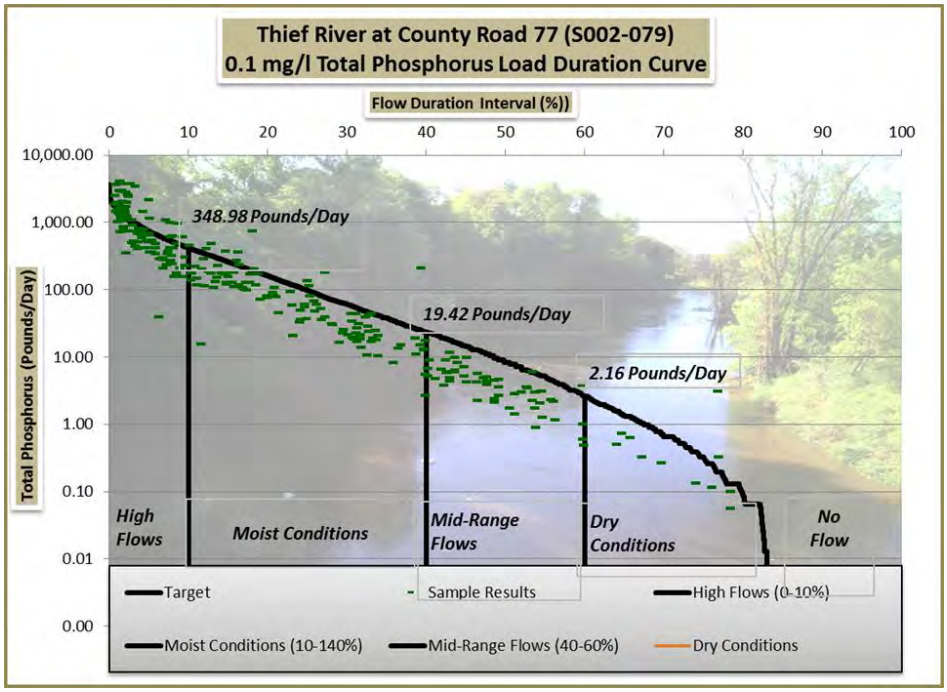


The Thief River between Agassiz Pool and the Red Lake River (09020304-501) is officially listed as impaired by low dissolved oxygen levels on the 303(d) List of Impaired Waters.

Continuous dissolved oxygen data from the Agassiz Pool to Red Lake River reach of the Thief River was reviewed. An improvement in dissolved oxygen levels that brings the reach into compliance with water quality standards may be achievable. Dissolved oxygen needs to remain above 5 mg/l on 90% of days (especially during the summer months of May through September) in which it is measured. Overall, the reach is within a few percentage points of meeting the standard. The assessment results improve when individual sites are examined. The only site that doesn't appear to meet the standard during the months of May through September is the 140th Ave NE crossing (S002-079) where continuous monitoring results push the rate of low dissolved oxygen readings up to 11.85%. At County Road 7 (near Agassiz National Wildlife Refuge), the rate of low dissolved oxygen readings (including continuous DO) during the months of May through September was just 4.48%. The difference between the two sites is mostly due to 2012 data that was collected at County Road 77, sites throughout the Red Lake Watershed District. When 2012 data is excluded from the S002-079 record, the rate of low dissolved oxygen readings drops from 11.85% to 6.85%. If only 6.85% of daily minimum dissolved oxygen readings fall below 5 mg/l, then the water quality standard would be met.

District staff attempted to find a correlation between dissolved oxygen and a pollutant of concern along the lower reach of the Thief River. A pollutant of concern is necessary because TMDL calculations are aimed setting a limit on the quantity particular pollutant that is transported by a river in a day. Dissolved oxygen isn't a pollutant. The TMDL needs to focus on fixing a problem that is leading to the low dissolved oxygen problem. At site S002-079, the only parameter that correlated somewhat with dissolved oxygen was sulfates. Sulfates, however, are more of a symptom than an input. Sulfates themselves probably can't be the cause of the low dissolved oxygen levels because sulfate is already in an oxidized form (can't take any more oxygen out of the water). Hydrogen sulfide, and organic matter, however, can be oxidized and decomposed. Sulfates are the product of that decomposition and oxidization. During a review of previously collected monitoring data, Agassiz Pool drawdowns were identified as periods of time in which low dissolved oxygen levels have been recorded. Additional intensive sampling on the Thief River was conducted in 2015 in order to see if there is any correlation with other parameters such as total organic carbon or total phosphorus.

Several pollutants exhibited decent negative correlations with dissolved oxygen during the late-summer 2015 intensive sampling effort. Total phosphorus is the pollutant for which there is an existing eutrophication-related water quality standard. Total Maximum Daily Loads have to be written for a pollutant that is causing an impairment. This sampling effort has provided evidence that regular condition monitoring failed to provide about which pollutant can be used. Load allocations were calculated to address the Thief River dissolved oxygen impairment by establishing total phosphorus total maximum daily loads (TMDL) for multiple flow regimes.

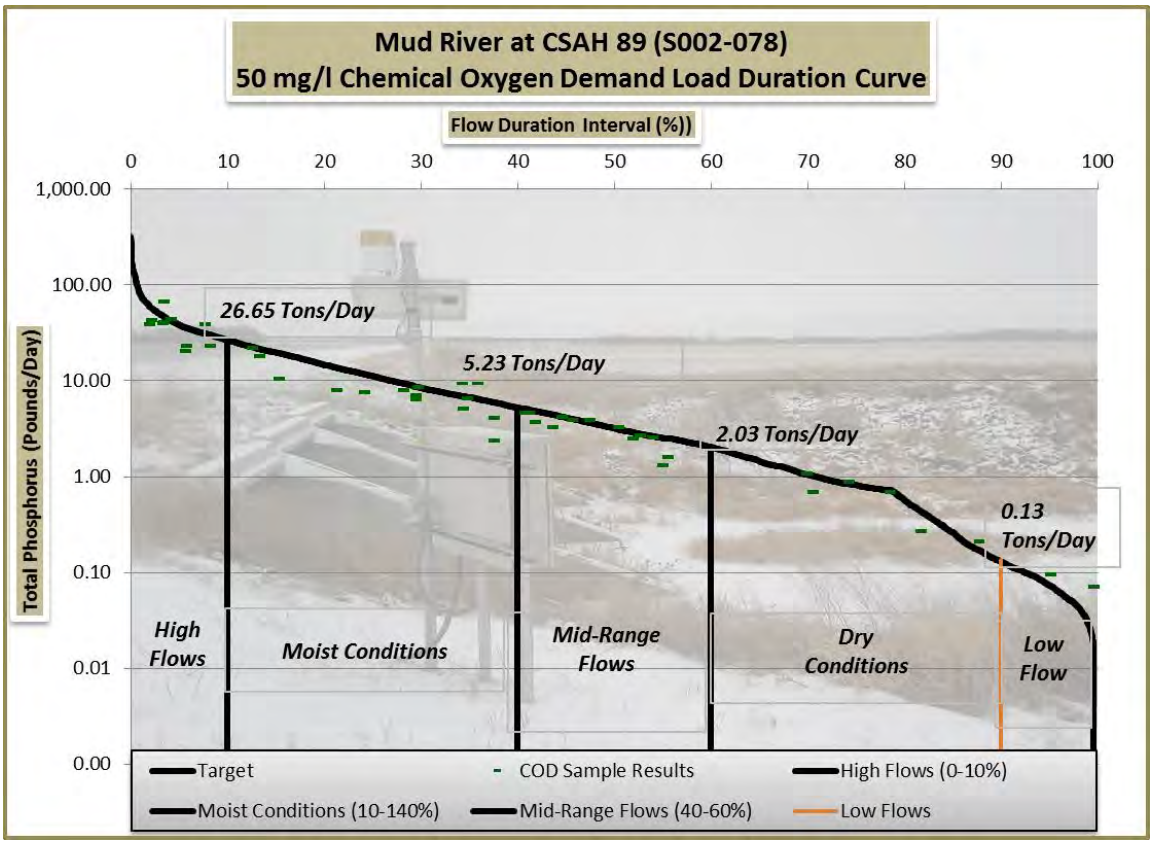


The Mud River and Branch A of Judicial Ditch 21 were both found to be violating the State of Minnesota's 126 MPN/100ml monthly geometric mean water quality standard for E. coli bacteria (for the protection of aquatic recreation safety) and were placed on the 303(d) List of Impaired Waters during the 2013 water quality assessment (using 2003-2012 data). Recent data shows that conditions have improved to the point where both reaches are now meeting the water quality standard. TMDLs will not be required for the reaches that are meeting the water quality standard and those reaches will be recommended for delisting. Delisting paperwork was prepared to begin the process of recommending that the E. coli impairments on the Mud River and Branch A of JD21 be removed from the 303(d) List of Impaired Waters.

Mud River Assessment Reach 09020304-507 2005-2014 E. coli Data	
Month	E. coli Geometric Mean
April	17
May	28
June	93
July	117
August	68
September	41
October	101

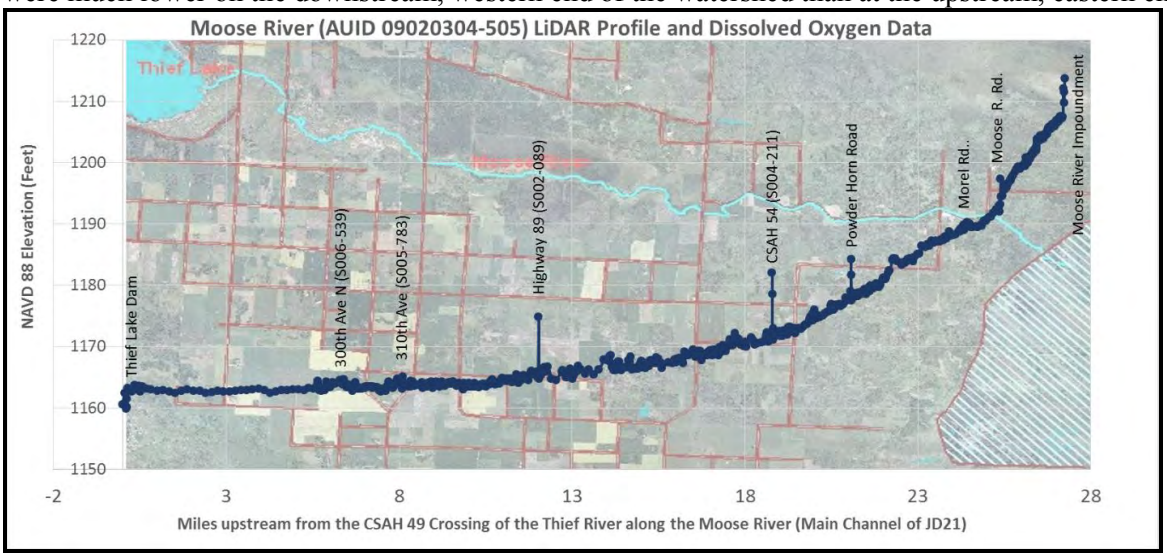
The Mud River is still considered to be impaired by low dissolved oxygen data on the 303(d) List of Impaired Waters. Like the Thief River, the Mud River was close to being delisted, but poor dissolved oxygen levels during the very low flows in 2012 have prevented a delisting of the reach.

The Mud River dissolved oxygen data (daily minimums and dissolved oxygen fluctuation from dissolved oxygen loggers) correlated best with temperature (as expected) and correlated relatively well with chemical oxygen demand (COD). Load allocations were calculated for the Mud River dissolved oxygen impairment by establishing chemical oxygen demand TMDLs for multiple flow regimes.



Another dissolved oxygen impairment in the watershed that will require a TMDL is the Moose River between the headwaters at the outlet of the Moose River and where it enters Thief Lake. The data shows that the reach is still impaired by low dissolved oxygen, especially due to low daily minimums recorded during a 2012 continuous dissolved oxygen monitoring effort and low dissolved oxygen readings recorded in stagnant water at the inlet to Thief Lake for the MPCA.

Data from the Moose River was analyzed in an attempt to find a pollutant that is influencing dissolved oxygen. Correlations between dissolved oxygen data and pollutants were weak. Flow levels seemed to be more important for keeping dissolved oxygen levels above 5 mg/l than any of the potential pollutants of concern. Part of the problem with dissolved oxygen in parts of the Moose River is that the gradient flattens out and the water becomes more stagnant near Thief Lake. Longitudinal measurements found that dissolved oxygen levels were much lower on the downstream, western end of the watershed than at the upstream, eastern end.



Analysis of Moose River dissolved oxygen (DO) data revealed that most of the reach between the outlet of the Moose River Impoundment and Thief Lake does meet the dissolved oxygen standard as long as there is measureable flow at the CSAH 54 stage/flow monitoring site. Daily minimum DO data from the Moose River was cross-referenced with daily average flow data. Measurements made in the ponded water at the Thief Lake inlet (300th Ave NE, S006-539) were filtered from the analysis. All dissolved oxygen measurements made on days in which the average flow at CSAH 54 was zero were filtered out of the analysis. After those two filters were applied, all of the calculated occurrence rates of low dissolved oxygen levels were less than 10%.

Moose River Flow Based Dissolved Oxygen Assessment

All sites except S006-539 (Thief Lake Inlet). Continuous data from 2009 and 2012 at site S004-211 (CSASH 54). Flow recorded at site S004-211.

Dissolved Oxygen Data was filtered for seasons and flow.		All DO Data Points			All DO Data Points with Flow Data			All DO Data Points with > 0 CFS Flow		
		Total #	# < 5 mg/l	Rate (%)	Total #	# < 5 mg/l	Rate (%)	**Total #**	**# < 5 mg/l**	**Rate (%)**
DO12_All	Discrete Data	132	10	8%	108	7	6%	**74**	**4**	**5%**
	Continuous Data	139	65	47%	109	43	39%	**43**	**2**	**5%**
	Discrete & Continuous	249	73	29%	199	49	25%	**106**	**6**	**6%**
DO5_All	Discrete Data	98	9	9%	79	6	8%	**54**	**4**	**7%**
	Continuous Data	125	65	52%	95	43	45%	**37**	**2**	**5%**
	Discrete & Continuous	203	72	35%	160	48	30%	**82**	**6**	**7%**
DO5_9am	Discrete Data	5	2	Insufficient Data	5	2	Insufficient Data	**2**	**1**	**Insufficient Data**
	Continuous Data	119	64	54%	98	43	44%	**31**	**2**	**6%**
	Discrete & Continuous	123	66	54%	103	45	44%	**33**	**3**	**9%**

DO12 = All discrete dissolved oxygen measurements from all 12 months of January through December (% of daily minimums < 5 mg/l)

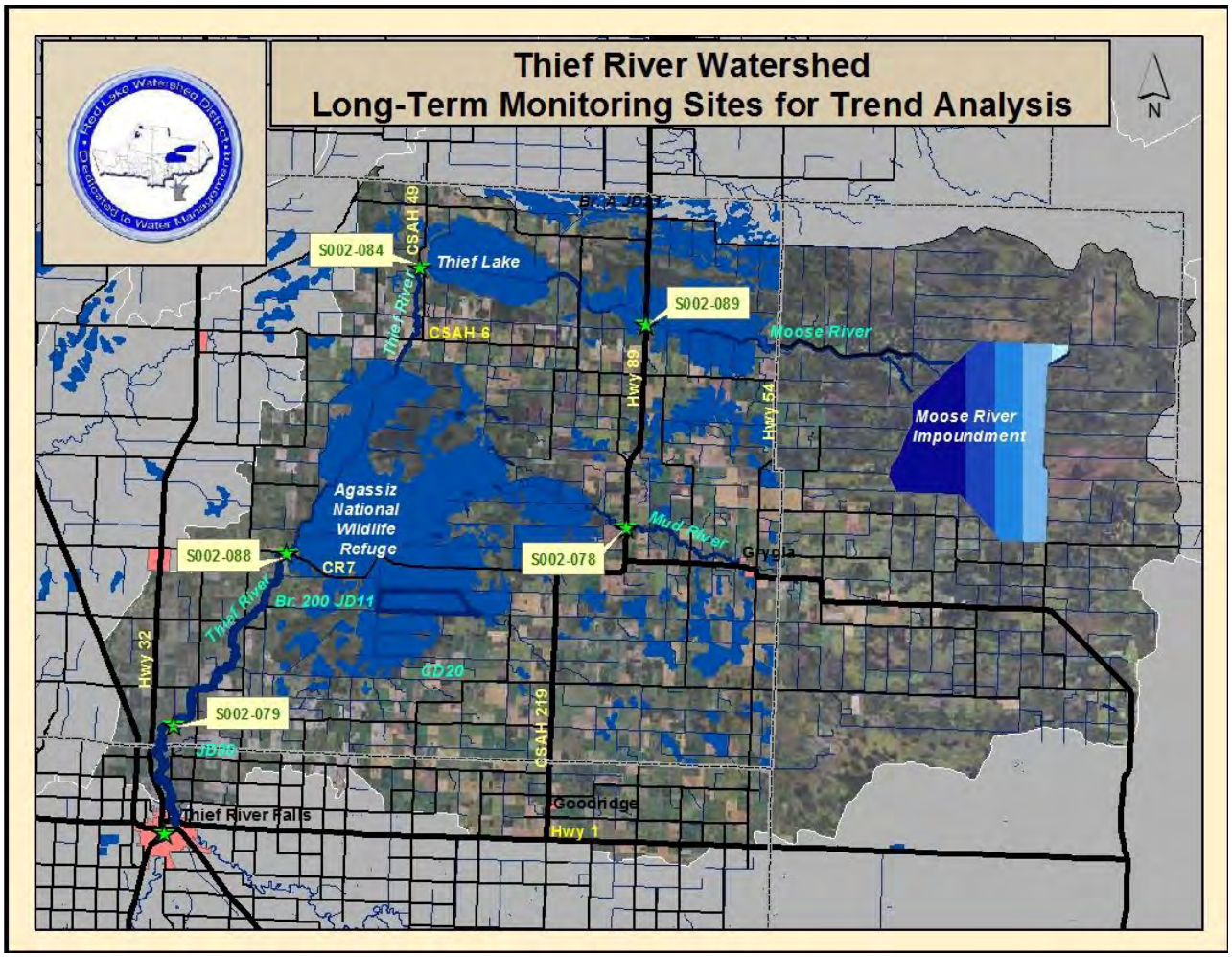
DO5 = Dissolved oxygen over the 5 summer months of May through September (% <5 mg/l)

DO5 9am = Dissolved oxygen measurements collected during the months of May through September prior to 9am plus any low readings observed during those months (daily minimum would definitely fall below 5 mg/l if any measurement during the dat is <5 mg/l). This column may not be complete, time metadata was not readily available for every dissolved oxygen measurement.

An assessment of total suspended solids data from the Mud River was conducted prior to a May 12, 2015 project planning meeting. In the most recent 10 years of monitoring (2005-2014), the Mud River has only exceeded the 15 mg/l total suspended solids standard in 8.7% of samples. That exceedance rate needs to be under 10% to meet the standard, so this indicates that the river is meeting the standard.

Mann-Kendall Trend analysis (annual and seasonal) was conducted for total suspended solids, E. coli, dissolved oxygen, and total phosphorus levels at long-term monitoring sites.

Water quality trends were analyzed at five long-term monitoring sites in the Thief River watershed. Mann-Kendall trend analysis was applied to monitoring sites within the Thief River watershed with at least 10 years of sampling data. The method was applied on an annual and a seasonal basis in an attempt to identify trends. All data points available in EQuIS as of early 2015 were used. Monthly/seasonal/annual averages were calculated for each year of data using a pivot table that summarized that data.



Trend Analysis of April - September Annual Average Total Suspended Solids Data						
River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	7	57.2%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	88	99.6%	Increasing
Thief River	S002-084	CSAH 49	1994-2014	-57	95.6%	Decreasing
Mud River	S002-078	Hwy 89	1994-2014	-16	67.5%	Stable
Moose River	S002-089	Hwy 89	1998-2014	-56	99.0%	Decreasing

Trend Analysis of April - October Annual Average E. coli Bacteria Data						
River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	1	50.0%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	7	70.4%	No Trend
Thief River	S002-084	CSAH 49	1994-2014	-19	94.6%	Probably Decreasing
Mud River	S002-078	Hwy 89	1994-2014	1	50.0%	No trend
Moose River	S002-089	Hwy 89	1998-2014	-23	97.5%	Decreasing

Trend Analysis of April - October Annual Average Dissolved Oxygen Data						
River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	15	64.4%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	66	94.7%	Probably Increasing
Thief River	S002-084	CSAH 49	1994-2014	101	99.4%	Increasing
Mud River	S002-078	Hwy 89	1994-2014	-4	53.0%	Stable
Moose River	S002-089	Hwy 89	1998-2014	131	99.9%	Increasing

Trend Analysis of April - October Annual Average Total Phosphorus Data						
River	Site #	Road Crossing	Period	Mann-Kendall Statistic	Confidence Factor	Trend Description
Thief River	S002-079	140th Ave NE	1994-2014	29	77.0%	No Trend
Thief River	S002-088	CSAH 7	1994-2014	-21	35.3%	Stable
Thief River	S002-084	CSAH 49	1994-2014	-56	88.8%	Stable
Mud River	S002-078	Hwy 89	1994-2014	-96	96.3%	Decreasing
Moose River	S002-089	Hwy 89	1998-2014	-194	100.0%	Decreasing

The stronger trend that was identified was the increasing total suspended solids (TSS) Drawdowns of Agassiz Pool have been occurring regularly in the month of August in recent years. Recent high August TSS can also be attributed to Agassiz Pool management strategies aimed at opening up channels within the pool by flushing sediment downstream.

Water quality conditions within the Moose River appear to be improving in multiple ways. Total phosphorus, E. coli, and total suspended solids pollutant concentrations appear to be decreasing during many months of the year. Dissolved oxygen readings, on average, have improved over the last 30 years.

Despite its name, the Mud River meets the North Region 15 mg/l total suspended solids standard. The river also now appears to be meeting the E. coli water quality standard. The downward E. coli trend found in September and October isn't a gradual decrease, but rather more of a function of steadily lower levels in recent years compared to some high levels in earlier years. If it wasn't for the 2012 continuous monitoring data collected during a period of very low flow, the reach may have been recommended for a delisting of the dissolved oxygen impairment.

A long-term monitoring site is located on the upper reach of the Thief River near the Thief Lake outlet. The water quality improvements at this site have been impressive. Two impairments have been removed from the 303(d) List of Impaired Waters. The identifiable trends presented good news about water quality in the Thief River downstream of Thief Lake.

Thief River WRAP, Task 11: Civic Engagement

Civic engagement is an enhanced version of stakeholder involvement that is being incorporated into WRAP projects throughout the state. Public participation, education, outreach, and involvement will help assure supporters and participants that this watershed study will result in positive change in the Thief River watershed. The civic engagement process will provide a method for identifying public concerns and values, developing consensus among stakeholders, and establish an open and inclusive process that should produce

efficient and effective solutions. The District hired RMB Environmental Laboratories as a subcontractor and they have been handling the majority of the civic engagement work.

A blog was been created for the Thief River watershed at **http://thiefriver.wordpress.com/.** People also can stay up-to-date on water quality related news about the Thief River by following the Red Lake Watershed District's Facebook page, reading Red Lake Watershed District monthly water quality reports (http://www.redlakewatershed.org/monthwq.html), and through direct emails to Thief River stakeholders.

Emmons and Olivier Consulting staff created a set of watershed-based webpages dedicated to the Thief River watershed. District staff provided photos and text for the web pages along with a list of URL links to existing reports, maps, and resources. Reports that were unavailable on the internet were scanned and uploaded to an FTP site. The watershed-based web pages became "live" in early 2015. Thief River Watershed information can be found online at: http://www.rlwdwatersheds.org/tr-watershed-info

The Red Lake Watershed District set up a booth at the Thief River Falls Community Expo at the Ralph Engelstad Arena on April 2015. Display boards were set up with information about the WRAP projects and local drainage projects.

RMB Environmental Laboratories and District staff have prepared a newsletter for the Thief River watershed that will be mailed once a website address is established (and added to the newsletter) for the Thief River watershed webpage that is currently under development. Once the new web pages were launched, RMB Environmental Labs staff were able to add the address to newsletters that were prepared for the purpose of updating stakeholders on the progress of the project. The newsletters were soon thereafter mailed to residents of the Thief River watershed. Thief River WRAP newsletters were mailed to approximately 150 people. There also are printed copies available at the District office.

Thief River WRAP, Task 13: Final Reports, Semi-Annual Reporting, and the TMDL Process.

Under this task, the District regularly submits invoices and semi-annual progress reports to the MPCA. Most importantly, the District is writing TMDL reports for impaired waters and protection plans for the rest of the HUC10 sub-basins in the Thief River watershed. The District will follow through with the TMDL process after TMDL reports are submitted to the MPCA and EPA for comments. Protection plans will be used as a guide for implementing projects that will protect waters that aren't currently impaired. Semi-annual reports were completed and sent to the MPCA Project Manager in January and July of 2015. Much time was spent working on drafts of the Thief River TMDL and WRAPS reports. A draft Thief River watershed-based TMDL report was nearing completion as of the end of 2015. A draft Watershed Restoration and Protection Strategy (WRAPS) report has been compiled, but needs a section on the targeting of geographic areas (waiting for HSPF modeling results) and TMDL summaries (waiting for the completion of the draft TMDL).

A lot of work was put into the completion of the Restoration and Protection Strategy section for the WRAPS report. This is one of the most important sections of the report because it lists all of the different types of projects that will be implemented to improve and protect water quality in each major subwatershed. For each of the most important water quality parameters (total suspended solids, E. coli, dissolved oxygen, and indices of biotic integrity), in each HUC10-level watershed and for the Thief River watershed as a whole, strategies will be listed within a table. Each strategy will have a timeline for completion and a 10-year interim goal. Maps were created for each HUC10 subwatershed (Moose River, Upper Thief River, Middle Thief River, Mud River, Lower Thief River, Branch 200 of JD11, Marshall County Ditch 20, and Judicial Ditch 30/18/13). Existing reports and monitoring results were scoured and used to compile this section of the report. Input will be sought from the project's technical advisory committee. Staff from the Minnesota Board of Water and Soil Resources (Matt Fisher), Minnesota Department of Natural Resources (Stephanie Klamm, Lori Clark, and Jason Vinje), Minnesota Pollution Control Agency (Denise Oakes), and the Pennington Soil and Water Conservation District (Peter Nelson) reviewed the draft Restoration and Protection Strategies section of the Thief River WRAPS report. Their comments were incorporated into the document. The lists of compiled strategies for the watershed as a whole and for each HUC10 subwatershed will be compiled into tables for each geographic area. Stephanie Klamm of the Minnesota DNR volunteered to help with that task.

Red Lake River Watershed Restoration and Protection (WRAP) Project

This is a watershed-based TMDL, assessment, and civil engagement project similar to the one planned for the Thief River watershed. The components of the Red Lake River Watershed Assessment Project are also very similar to those of the Thief River Watershed Assessment Project. Phase I of a watershed-based TMDL for the Red Lake River Watershed officially began on August 19, 2011. Phase II of the project began in 2013 and added additional funding for water quality monitoring, continuous dissolved oxygen monitoring, flow data collection, stressor identification, geomorphology, data entry, data analysis, civic engagement, identification of sources/solutions, and report writing. The project is scheduled to be completed on June 30, 2016. Here are some updates for the tasks that we worked on in 2015.

Task 1: Evaluation of Existing Data

This task has involved an independent assessment of water quality conditions in 2012 and 2014, an inventory of existing data from water quality and stage loggers that can be used for HSPF model calibration, and summaries of past reports. This information was used to help plan monitoring efforts and will be incorporated into the WRAPS reports.

Assessment results (exceedances, geometric means, etc.) for the Red Lake River and the Grand Marais Creek watersheds were compiled into a table. Those results were then used to identify sites that were the closest to being restored (greater than, but close to the impairment threshold) and those that are in the most danger of becoming impaired (below, but closest to the impairment threshold). The

information in these tables can be used for both the Red Lake River and Grand Marais Creek WRAP projects and for the One Watershed One Plan process.

Top Five Reaches Needing Protection to Avoid Impairment by E. coli Bacteria (2004-2014)			
River	Reach	AUID	Maximum Monthly Geomean
Red Lake River	County Ditch 96 to Clearwater R	09020303-504	121.3
Black River	Headwaters to -96.4328 48.0146	09020303-557	114.2
Unnamed ditch (Little Black River)	Unnamed ditch (Headwaters) to Little Black R	09020303-527	103.8
RLWD 15 (Brandt Channel)	Headwaters to CD 66	09020306-509	98.4
Red Lake River	Black R to Gentilly R	09020303-502	97.4

Top Five Reaches Impaired by E. coli Bacteria that are Closest to Being Restored (2004-2014)			
River	Reach	AUID	Maximum Monthly Geomean
Black River	-96.4328 48.0146 to Little Black R	09020303-558	153.0
Gentilly River	CD 140 to Red Lake R	09020303-554	200.7
Penn. County Ditch 96	Headwaters to Red Lake R	09020303-505	264.0
Black River	Little Black R to Red Lake R	09020303-529	278.0
Kripple Creek	Unnamed cr to Gentilly R	09020303-525	491.3

Top Five Reaches Needing Protection to Avoid Impairment by Total Suspended Solids (2004-14)			
River	Reach	AUID	Exceedance Rate
Black River	Little Black R to Red Lake R	09020303-529	8.9%
Black River	Headwaters to -96.4328 48.0146	09020303-557	7.3%
Burnham Creek	Polk CD 15 to Red Lake R	09020303-515	6.4%
Penn. County Ditch 96	Headwaters to Red Lake R	09020303-505	5.7%
Kripple Creek	Unnamed cr to Gentilly R	09020303-525	5.3%

Top Five Reaches Impaired by Total Suspended Solids that are Closest to Being Restored (2004-14)			
River	Reach	AUID	Exceedance Rate
Red Lake River	County Ditch 99 to Burnham Cr	09020303-506	13.8%
Red Lake River	Headwaters to Thief R	09020303-508	16.2%
Red Lake River	County Ditch 96 to Clearwater R	09020303-504	24.0%
Red Lake River	Black R to Gentilly R	09020303-502	29.3%
Red Lake River	Unnamed cr (Heartsville Coulee) to Red R	09020303-503	34.1%

Top Five Reaches Needing Protection to Avoid Impairment by Low Dissolved Oxygen (2004-2014 DO5)				
River	AUID	Reach	Existing or Proposed Impairments	Percent of DO5 Daily Mins <5 mg/l
Gentilly River	09020303-554	CD 140 to Red Lake R	E. coli, fish,	5.6%
Cyr Creek	09020303-556	CR 14 to Red Lake R	E. coli, fish	5.6%
Black River	09020303-529	Little Black R to Red Lake R	Turbidity, E. coli	5.4%
County Ditch 1	09020303-536	CD 60 to Red Lake R	Not assessed	5.0%
Burnham Creek	09020303-515	Polk CD 15 to Red Lake R	Turbidity, fish, macroinvertebrates	4.4%

Top Five Reaches Impaired by Dissolved Oxygen that are Closest to Being Restored (2004-2014 DO5)				
River	AUID	Reach	Existing or Proposed Impairments	Percent of Daily Mins <5 mg/l
Judicial Ditch 60	09020303-542	Lateral DItch 4 to Red Lake R	DO	11.4%
Black River	09020303-558	-96.4328 48.0146 to Little Black R	Turbidity, E. coli, fish, macroinvertebrates	17.3%
Branch C of CD 66	09020306-510	Headwaters to CD 66	Not assessed	17.6%
Red Lake River	09020303-508	Headwaters to Thief R	DO, HgF	2.1%
Unnamed ditch (Little Black River)	09020303-527	Unnamed ditch (Headwaters) to Little Black R	E. coli	25.0%

Red Lake River watershed water quality assessment results were reviewed and recommendations were made to MPCA staff for the removal of waterbodies from the 303(d) List of Impaired Waters that were originally listed as impaired by high turbidity but currently meet the new water quality standard for total suspended solids.

Task 3: Continuous Water Quality Monitoring

MPCA staff suggested collecting some additional continuous dissolved oxygen data at sites in the Red Lake River watershed to create a better understanding of the extent of some of the dissolved oxygen impairments that were identified in the watershed. There was enough money left in the budget to monitor two sites for half of the monitoring season (5 deployments). Dissolved oxygen loggers were deployed in Burnham Creek at CSAH 45 and the Black River at CR 58. Frequent low dissolved oxygen levels were recorded at both sites. Low flow was a contributing factor to the low dissolved oxygen readings. Flow dropped to zero in the Black River – leaving only small intermittent pools. A series of beaver dams on Burnham Creek affected flow before they were removed.

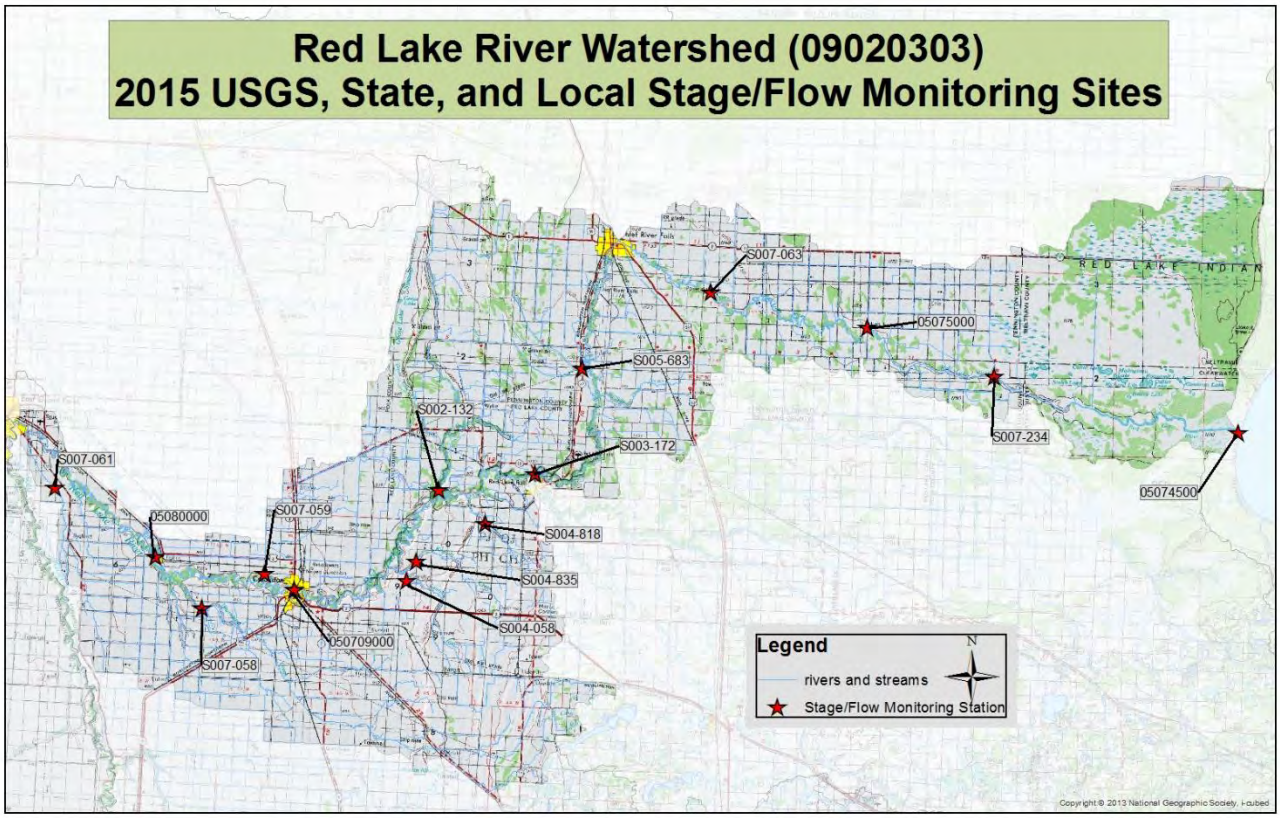
Black River at CR 58

Burnham Creek at CSAH 45


Task 5: Stage and Flow Monitoring

In addition to water quality data, flow data is needed in order to calculate loads of pollutants. There are five long-term USGS and DNR/MPCA Cooperative gauging stations along the main channel of the Red Lake River that will provide excellent flow records for use in load calculation and model calibration. The MPCA added ultrasonic gauges on the Red Lake River at CSAH 7 (Smiley Bridge) and Burnham Creek at 320th Ave SW. The smaller tributaries within the Red Lake River major watershed (excluding the Clearwater River and Thief River) lacked flow data before this project. Flow data has been collected in order to accurately calculate loads and characterize flows in those streams and ditches. A SWAG monitoring site along the Upper Red Lake River will also need flow data. HOBO Water Level Loggers were purchased and deployed at temporary stage monitoring stations. They were deployed at 9 sites within the Red Lake River watershed in 2015. Stage monitoring will continue throughout this project and possibly longer if there is a need for long-term project-effectiveness monitoring. As early as possible in the spring (mid-March), loggers were deployed at:

1. Black River at CR18 west of Red Lake Falls
2. Kripple Creek at 180th Ave SW near Gentilly (twice)
3. Gentilly River at CSAH 11 in Gentilly (twice)
4. Heartsville Coulee at 210th St. SW near Grand Forks
5. Polk County Ditch 1 at CR61 near Crookston
6. Judicial Ditch 60 at CR11 between Gentilly and Crookston
7. Cyr Creek at CR110 southwest of Red Lake Falls (twice)
8. Pennington County Ditch 96 at Highway 32 near St. Hilaire
9. Red Lake River at CSAH 27



HOBO water level logger deployments for the 2015 monitoring season were completed in April. Spring runoff was minimal in 2015. Spring runoff was insufficient to wash out beaver dams on some smaller streams in the watershed. Cyr Creek, Kripple Creek (upstream of the monitoring site, thankfully), and Gentilly Creek were all affected by beaver dams that were still in place after spring runoff.

Stage measurements were made at all HOBO water level logger deployment sites. Check-ups of HOBO water level loggers were conducted in July. The loggers were cleaned and data was downloaded to make sure they were working properly. Flow in the Red Lake River has been high throughout the summer of 2015. HOBO water level loggers were then retrieved as ice began to form in late November. Flow was measured in:

- Polk County Ditch 1 at CR 61
- Black River at CSAH 18
- Red Lake River at CASH 27 (4 times)
- Pennington County Ditch 96

Flow in the Red Lake River was high throughout the summer of 2015. Summer stage measurements at the CSAH 27 crossing were at times approximately 2 feet higher than they were in the spring. Water levels were too high to allow for the retrieval of the HOBO water level logger that is installed at that site. As of July 16th, the U.S. Army Corps of Engineers had been releasing 500 cubic feet per second (CFS) of water from the Lower Red Lake Dam. After the torrential rains that occurred on July 16th in Thief River Falls, however, discharge was lowered to 250 CFS until flow was increased again on July 23rd, 2015.

Task 6: Stream Channel Stability

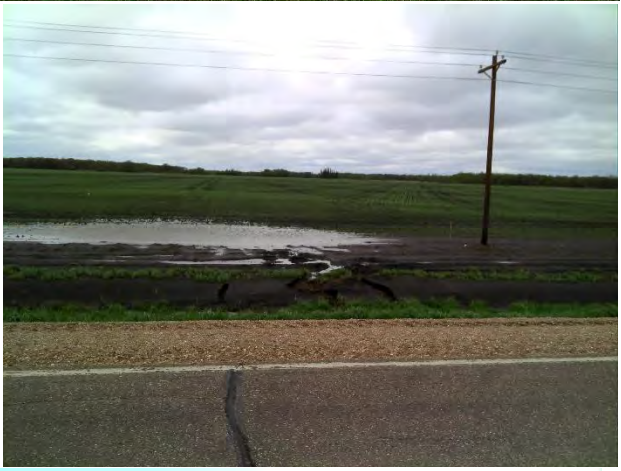
Minnesota Department of Natural Resources staff are writing a report on the results of the geomorphology data and other information that was collected in 2012 and 2013.

Task 7 – Stressor Identification and Pollutant Source Investigation

A Red Lake River Watershed Biotic Stressor Identification Report was written for the Red Lake River watershed by MPCA staff. District staff reviewed the report and provided comments and suggestions.

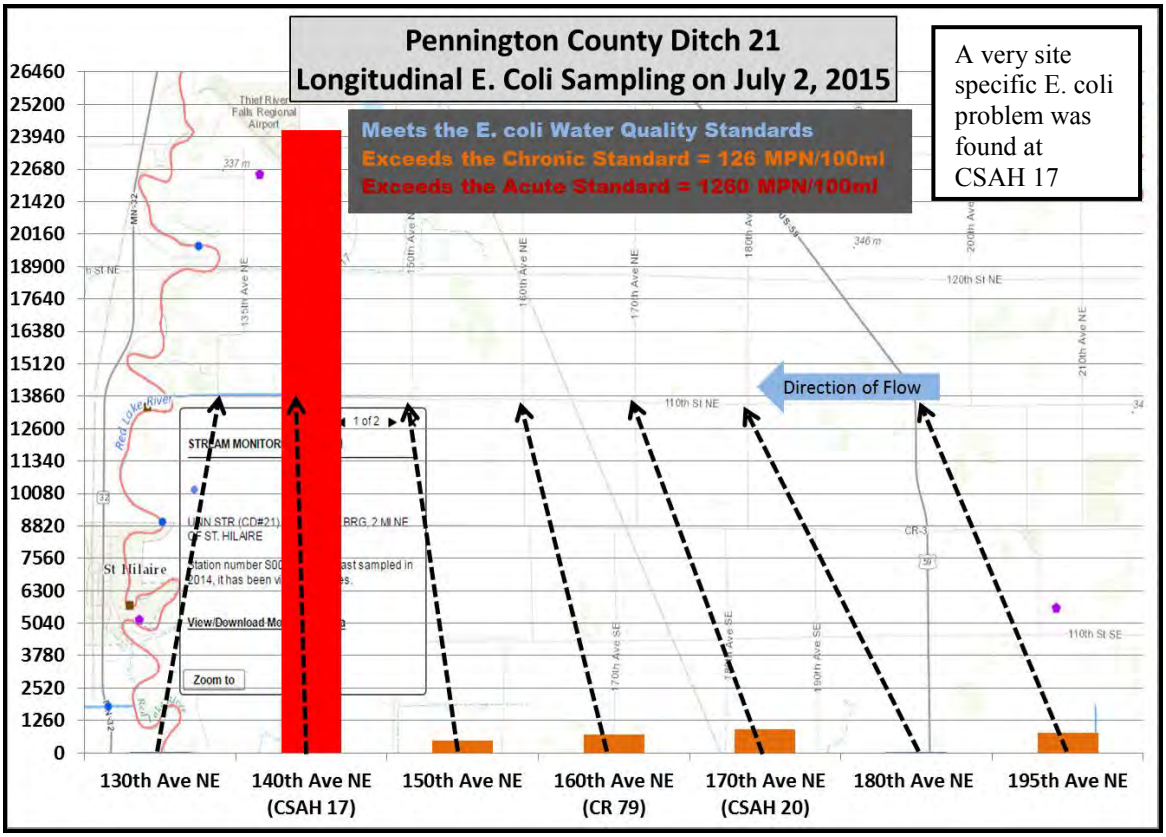
A significant fish barrier was discovered on the downstream side of the Highway 32 crossing of Pennington County Ditch 96.

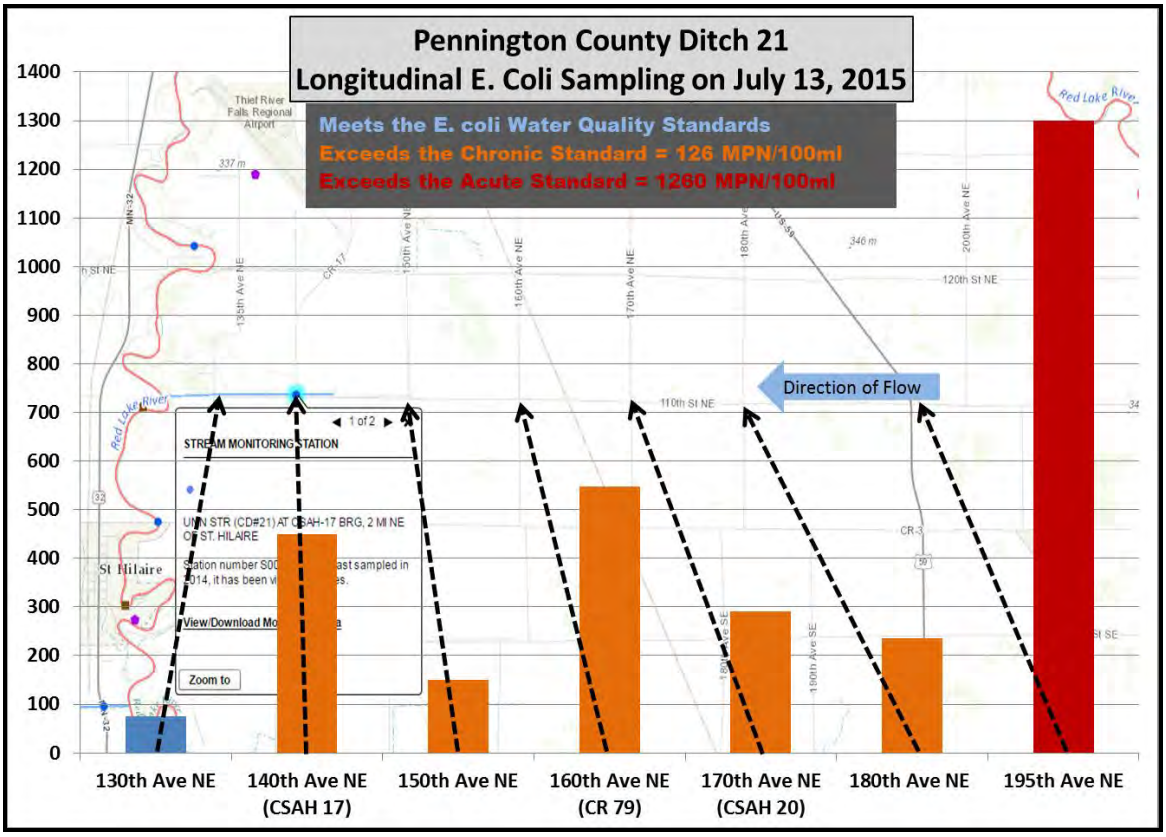
Georeferenced photos of erosion problems and poorly buffered fields/ditches were taken during monitoring. Erosion was reported along fields on the north side of the Red Lake River, east of Thief River Falls after a rain event. Because of the timing and intensity of the early June rain fall event south of Red Lake Falls, there was a lot of soil loss from fields in the area.

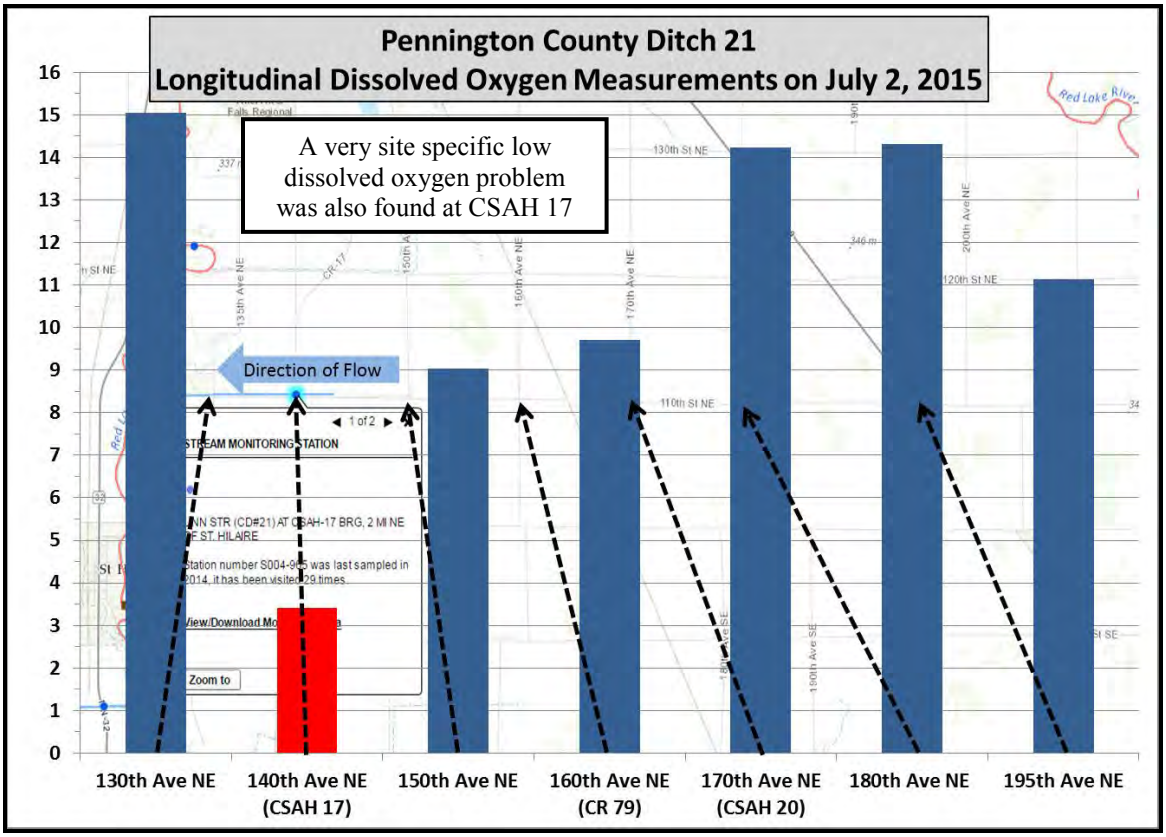


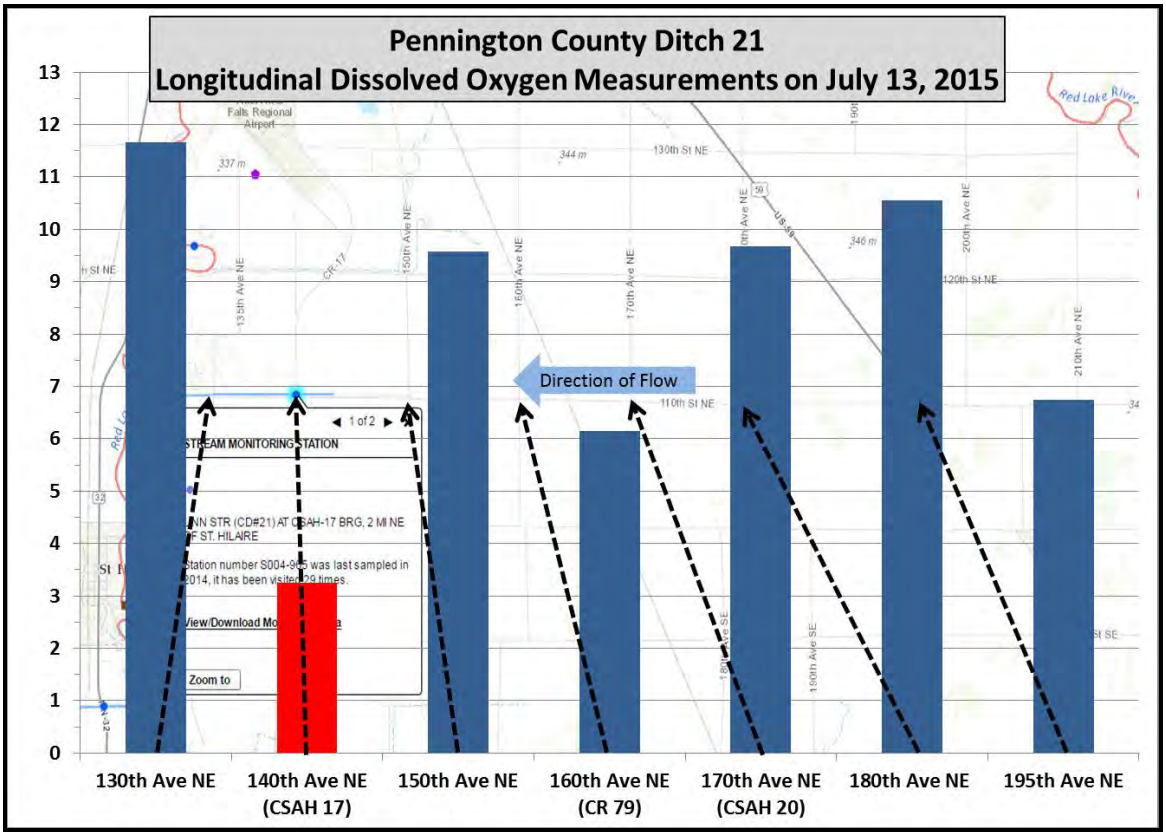
Longitudinal samples and field measurements were collected along Pennington County Ditch 21 on two occasions in July (July 2nd and July 13th).

- A record high E. coli concentration (for the District monitoring program, at the time) of 24,196 MPN/100ml was recorded at the CSAH 17 (Airport Road) crossing of Pennington County Ditch 21 on July 2nd, 2015.
- High E. coli concentrations were found at multiple locations along Pennington County Ditch 21 on July 13th, 2015 during a longitudinal sampling effort along the ditch. The highest readings were found at 195th Avenue NE, near Highway 59 (1,299.7 MPN/100ml) and CSAH 17 (450 MPN/100ml). In both instances, E. coli concentrations were much lower at the next crossings downstream. E. coli sources may be localized (e.g. birds under a bridge) and are not traveling far downstream during low flows due to settling, filtering, and die-off.
- Low dissolved oxygen levels were recorded at the CSAH 17 crossing on both trips. The dissolved oxygen levels at that site were considerably lower than the next crossing upstream and downstream.
- All of the turbidity levels were less than 10 NTRU on July 13t, 2015. Most were under 5 NTRU. Five of the seven total suspended solids (TSS) samples were only 1 mg/l.
- Temperatures were lower at the CSAH 17 crossing than any other crossing by several degrees on both days that the ditch was sampled. Yet, dissolved oxygen was much lower.
- Further investigation of the area between the 150th Avenue and CSAH 17 crossings will need to be investigated more closely to see what could be affecting dissolved oxygen and E. coli bacteria levels so greatly at that specific site.




Pennington County Ditch 21
Longitudinal E. Coli Sampling on July 13, 2015
Meets the E. coli Water Quality Standards
Exceeds the Chronic Standard = 126 MPN/100ml
Exceeds the Acute Standard = 1260 MPN/100ml
Direction of Flow
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
130th Ave NE
140th Ave NE (CSAH 17)
150th Ave NE
160th Ave NE (CR 79)
170th Ave NE (CSAH 20)
180th Ave NE
195th Ave NE

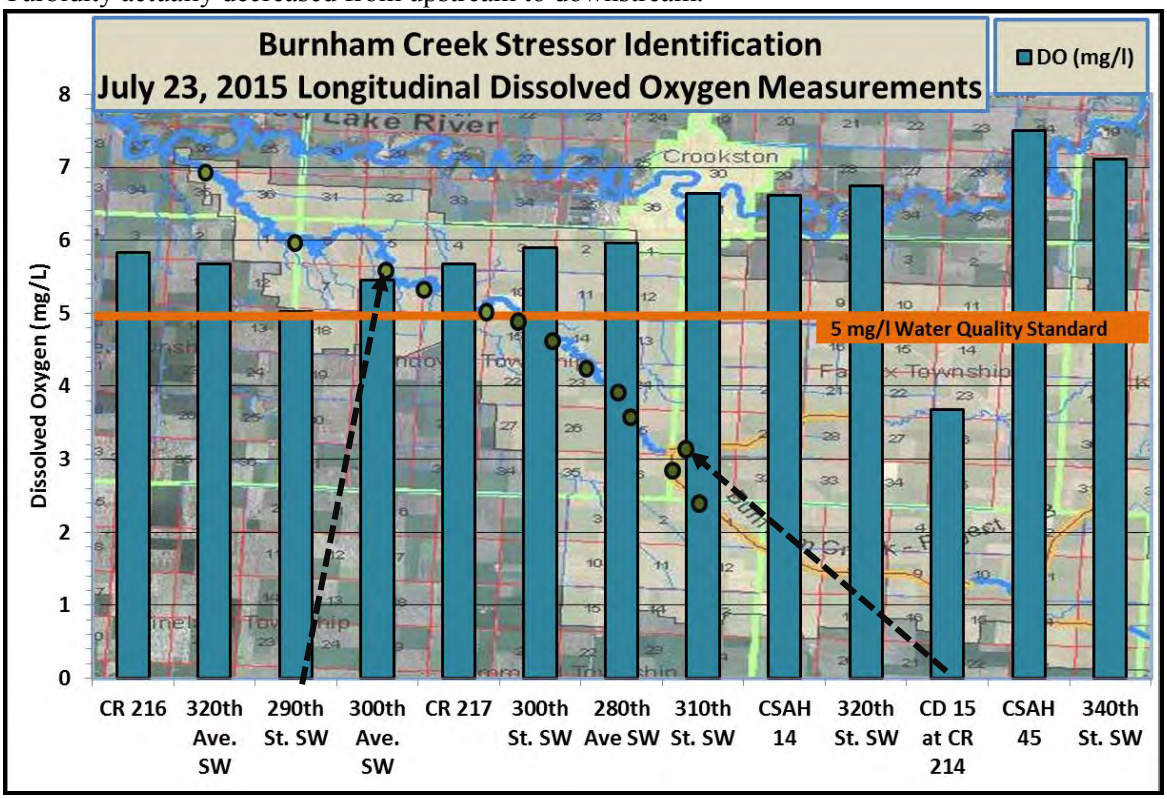

Pennington County Ditch 21
Longitudinal Dissolved Oxygen Measurements on July 2, 2015
A very site specific low dissolved oxygen problem was also found at CSAH 17
Direction of Flow
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
130th Ave NE
140th Ave NE (CSAH 17)
150th Ave NE
160th Ave NE (CR 79)
170th Ave NE (CSAH 20)
180th Ave NE
195th Ave NE


Pennington County Ditch 21
Longitudinal Dissolved Oxygen Measurements on July 13, 2015
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Direction of Flow
130th Ave NE
140th Ave NE (CSAH 17)
150th Ave NE
160th Ave NE (CR 79)
170th Ave NE (CSAH 20)
180th Ave NE
195th Ave NE

Because of the extremely high concentrations of E. coli bacteria (14,136 MPN/100ml) were found in samples collected at the County State Aid Highway 17 crossing of Pennington County Ditch 21, District staff visited the site to look for possible sources. A large number of pigeons are living under the bridge. It is a wooden bridge and there are flat nooks that provide roosting spots between the horizontal beams. The pool of water under the bridge was covered with feathers and scum. A hazardous materials inspector happened to be visiting the bridge at the same time. This means that the bridge is scheduled to be replaced in the near future. The replacement of this bridge will eliminate the pigeon roosting areas and should reduce the amount of E. coli being "deposited" into the water at that location.

Longitudinal field measurements of water quality were collected along Burnham Creek on July 23, 2015 to learn more about the extent of the dissolved oxygen problems along Burnham Creek. Downstream of CSAH 45, there are areas in which water becomes ponded and stagnant within the channel.

- Dissolved oxygen was significantly lower at the sites in the lower reaches of the creek. None of the sites on Burnham Creek were lower than the 5 mg/l standard, but a number of the sites in the downstream reaches of Burnham Creek were close to that threshold.
- Polk County Ditch 15, which flows into Burnham Creek downstream of CSAH 45, had a low dissolved oxygen concentration of just 3.68 mg/l.
- Turbidity actually decreased from upstream to downstream.



Task 8: Data Entry

Site establishment forms were completed and submitted for sites in the Pennington County Ditch 21 at which water quality data was collected for the first time in 2015. 2015 Red Lake River WRAP monitoring data was entered, compiled in the EQuIS data submittal spreadsheet template, reviewed, and submitted to the MPCA for entry into the state's EQuIS water quality database. A data review of 2015 monitoring data was completed by checking 10% of the records against field data sheets and lab reports to make sure they are accurate.

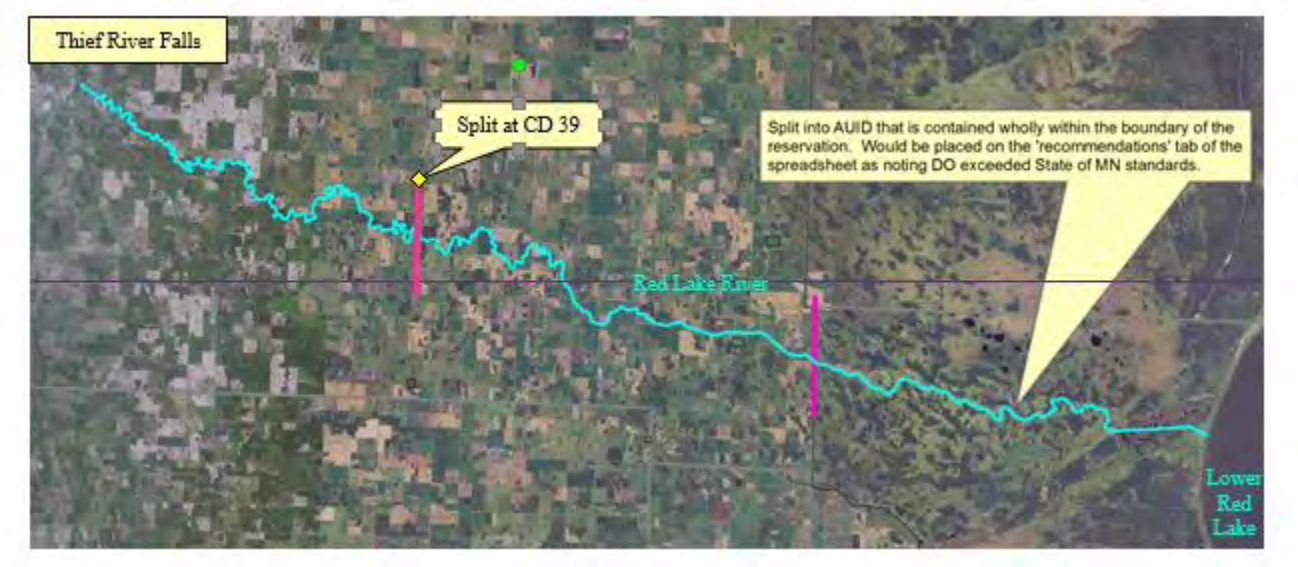
Task 9: Data Analysis

In January, 2015, District and EOR staff prepared for a Professional Judgement Group meeting that was held in February 2015 to discuss the results of the 2014-15 water quality assessment of the Grand Marais Creek and Red Lake River watershed.

District staff reviewed the preliminary results of the MPCA's assessment of water quality and aquatic biology in the Red Lake River watershed. The assessment period was extended to include 11 years of monitoring data instead of the usual 10 years. Instead of the 2004-2013 period of monitoring that was scheduled for assessment in early 2014, a period of 2004-2014 was examined in early 2015. The assessment was delayed by the process of upgrading the software that the MPCA uses for the assessments. So, an additional monitoring season (2014) had been completed since the time that the 2014 assessment was supposed to have started. This additional year

of monitoring data was helpful for providing some extra data for reaches that were lacking data, thus improving confidence in the assessment results.

The Red Lake River upstream of Thief River Falls, from the Lower Red Lake Outlet to the Thief River confluence, has been assessed as an entire unit in the past. The reach is currently listed as impaired by low dissolved oxygen. Continuous dissolved oxygen monitoring data collected with deployed dissolved oxygen loggers has shown that the dissolved oxygen levels in the river improve from upstream to downstream. In the upstream part of the reach, there is channelization, riparian wetlands (which aren't necessarily a bad thing, but can contribute to naturally low dissolved oxygen levels), and a lack of woody vegetation along the channelized riparian corridor (less shading). The channelization stops near the confluence with Pennington County Ditch 39. In that downstream portion of the river, prior to the Thief River Falls Reservoir, the river exhibits a natural pool-and-riffle morphology and has sections of forested riparian corridor. The river begins on the tribal nation of Red Lake where the State of Minnesota does not have the authority to conduct water quality assessments. Because of the changes in authority, water quality, and river morphology that occur along this reach, the Minnesota Pollution Control Agency is splitting the reach into three segments. The splits will be made at the reservation boundary and at the Pennington County Ditch 39 confluence.



At the Professional Judgement Group meeting, there was some question about whether or not Pennington County Ditch 21 was flowing when high E. coli concentrations were recorded at the site. The site's data was re-analyzed after filtering out site visits during which monitoring staff noted that there was no flow in the ditch. Most of the readings from July through the end of each sampling season had "no flow" comments. May and June geomeans appear to be okay. Most, but not all of the extremely high (>2419.6) E. coli concentrations occurred when there is low-to-no flow. There is still a reason for concern about the water quality in this ditch, no matter what the flow situation is. Some extreme nutrient concentrations have also been recorded at this site. There was still evidence of a source of E. coli and nutrients along the ditch that warranted investigative sampling. Longitudinal samples were collected in 2015 and the results are described earlier in this section of this report under "Task 7."

E. coli data from Pennington County Ditch 96 that was collected during time of no flow was filtered out of the data set and then the remaining data was re-assessed. The remaining data still confirmed the impairment.

When 2004-2013 monitoring data was analyzed, the Red Lake River slightly exceeded the threshold set by the chronic water quality standard for E. coli (monthly geometric mean of 126 CFU/100ml) along the reach between Pennington County Ditch 96 and the Clearwater River. Two samples were collected in June of 2014. The sample collected on June 18th was higher than the chronic standard with a concentration of 157.60

CFU/100ml and the sample collected on June 24th was only 27.2 CFU/100ml. These two concentrations together had the effect of lowering the June geometric mean E. coli concentration to 121.25 CFU/100ml in the 2004-2014 data set. So, the E. coli concentrations at the site indicate that the reach is just barely meeting the E. coli water quality standard for the month of June. The monthly geometric means for the popular river tubing months of July (53.3 CFU/100ml) and August (60.35 CFU/100ml) safely fall below the 126 CFU/100ml E. coli impairment threshold.

One of the reaches for which 2014 data revealed an E. coli bacteria impairment was an upper reach of the Black River that begins at the end of JD25 (by the CSAH 3 crossing) and ends at the confluence with the Little Black River.

Task 10: Civic Engagement

RMB Environmental Laboratories was hired as a subcontractor to help with the extensive public outreach effort that is a significant part of this project. A blog has been started for the Red Lake River watershed and it can be found at http://redlakeriver.wordpress.com/. Emmons and Olivier Consulting staff began working on a watershed-based webpage dedicated to the Red Lake River watershed. District staff provided all known links to reports, maps, and other informational resources pertinent to the Red Lake River watershed for use in building the site. Some documents and presentations that were previously unavailable online were scanned and saved to the District FTP site so that they will be available to the public through the links that will be found on the new web pages that EOR is creating. Red Lake River Watershed information can be found online at: http://www.rlwdwatersheds.org/rl-watershed-info

Task 11: Identification of Sources and Solutions

Stream power index GIS layers were created and can be downloaded is: http://www.redlakewatershed.org/downloads.html.

RESPEC Consulting and Services developed an HSPF model for the Red Lake River watershed. This model will be used to help identify sources of water quality problems, prioritize areas for project implementation, and evaluate the effectiveness of potential implementation efforts. Modeling results are available upon request from MPCA modeling staff.

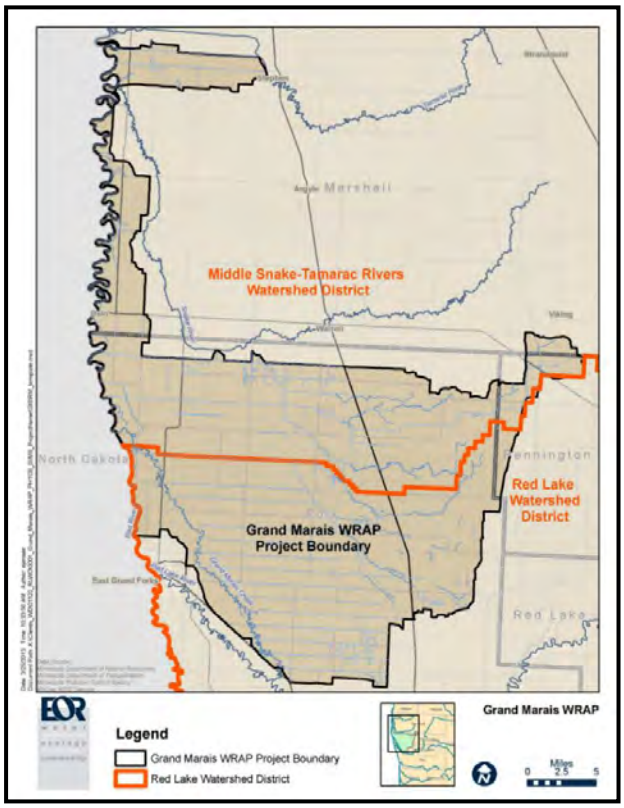
Task 12: Final Reports, Semi-Annual Reporting, and the TMDL Process.

Under this task, the District regularly submits invoices and semi-annual progress reports to the MPCA. Most importantly, the District will be writing TMDL reports and protection plans for all the HUC10 sub-basins in the Thief River watershed. The District will follow through with the TMDL process after TMDL reports are submitted to the MPCA and EPA for comments. There are some reaches that aren't currently impaired but they won't be ignored. The Watershed Restoration and Protection Strategy document for the watershed will be used as a guide for implementing projects that will protect waters that aren't currently impaired so that they don't become impaired in the future. Semi-annual reports were completed and sent to the MPCA Project Manager in January and July of 2015.

Grand Marais Creek Watershed Restoration and Protection Project

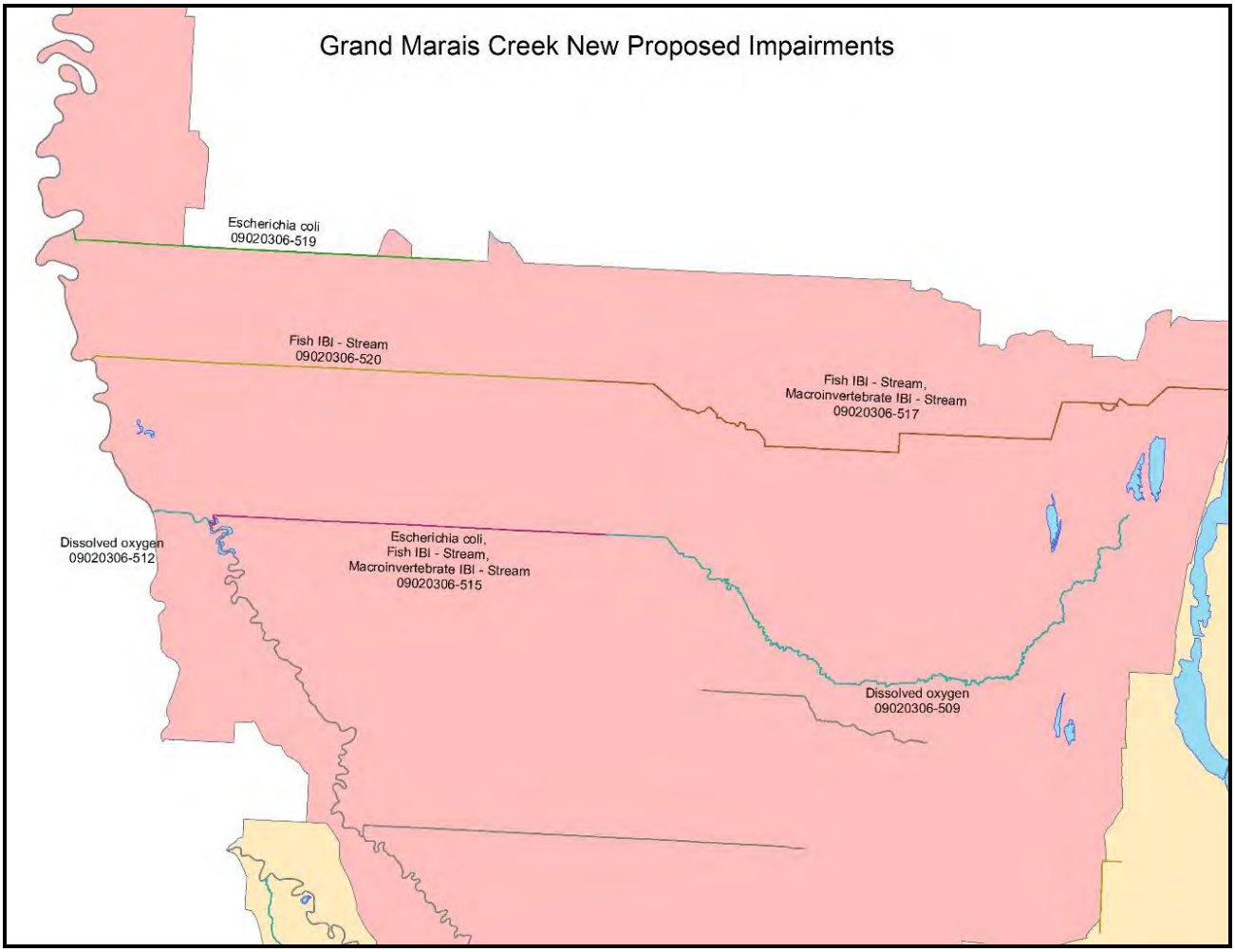
The Grand Marais Creek Watershed Restoration and Protection project began in February of 2013. The Grand Marais Creek WRAP contract was amended to extend Phase I of the project through December 2014. In the fall of 2014 a Phase II amendment for the project added $100,000 to the project and funded the completion of TMDL/WRAPS reports, and extended the project through the end of 2016.

Project partners planned and prepared for a public open house meeting for the Grand Marais Creek Watershed Restoration and Protection Project. Emmons and Olivier Resources staff worked on coordination and scheduling. A venue for the meeting was found and an agenda was created. Project partners created displays and posters to display at the event. A meeting notice was created and mailed to residents of the watershed. More project information, project reports, and plans are available on the website that was created for the Grand Marais Creek WRAP process on the www.prairiebasin.com website.



A Professional Judgement Group meeting was held on February 11, 2015 at the District Office to discuss the assessment of the Red Lake River and Grand Marais Creek watersheds, especially the new impairments that were identified by the assessment process. New impairments due to low biotic integrity, low dissolved oxygen, and high E. coli bacteria were found. A pH impairment on the Headwaters to County Ditch 2 reach of Grand Marais Creek (AUID 09020306-507) will likely be taken off of the 303(d) List of Impaired Waters.

Turbidity impairments in the Grand Marais Creek watershed will most likely be delisted. A new total suspended solids (TSS) standard that has been adopted by the State of Minnesota. Grand Marais Creek and its tributaries meet the new TSS standard of 65 mg/l. The new standard is less stringent than the turbidity standard of 25 NTU. For context, the equivalent TSS concentration to the 25 NTU turbidity standard in this area is somewhere around 25-30 mg/l. So, the new TSS standard moves the impairment threshold up to a level of cloudiness/muddiness that is approximately twice as high as it was under the past turbidity standard.

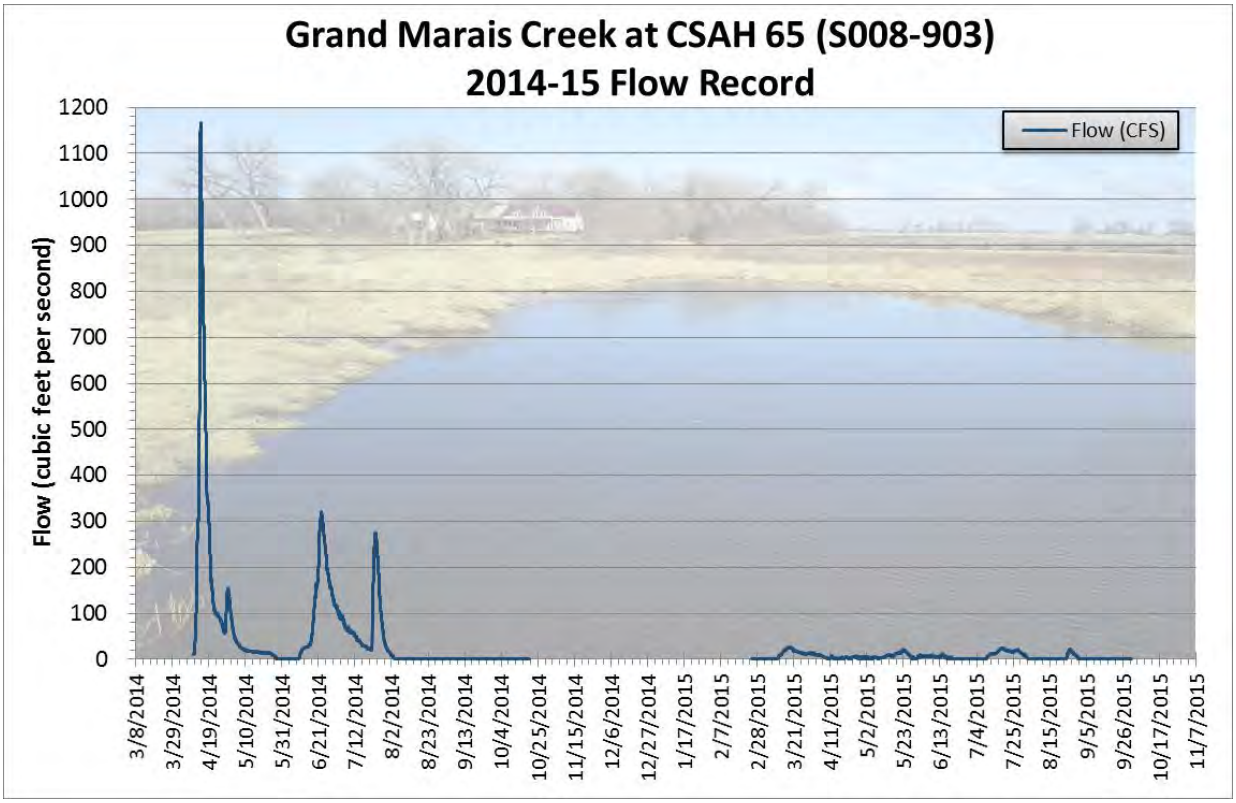


District staff worked with Red Lake Department of Natural Resources staff to plan flow monitoring in the Grand Marais Creek watershed during the spring of 2015. Red Lake DNR staff measured flow at monitoring sites within the watershed in the spring and early summer.

District staff requested 2014 continuous dissolved oxygen data from MPCA staff. This data was collected in 2014 as part of a stressor identification process. The results are summarized in the Grand Marais Creek Watershed biotic Stressor Identification Project Report, but the data will also be useful when analyzing data for the TMDL reports. Emmons and Olivier Resources, Inc. staff spent some time reviewing the data.

Stage data from MPCA gauging stations in the Grand Marais Creek HUC8 was requested and retrieved for Judicial Ditch 1, Judicial Ditch 75, and Polk County Ditch 2. Flow rating curves for Polk County Ditch 2, Judicial Ditch 71, and Judicial Ditch 1 were updated using recent flow measurement data. Those stage records were used to calculate flow records, which were sent to Emmons and Olivier Resources to aid with TMDL calculations. Emmons and Olivier Resources staff also worked on reviewing this data and participated in a PTMApp (Prioritize, Target, and Measure Application) training session.

Flow data from the Polk County Road 65 crossing of Grand Marais Creek from the MPCA gauge at the site. The following graph shows how little flow there was in Grand Marais Creek in 2015 compared to the previous year.

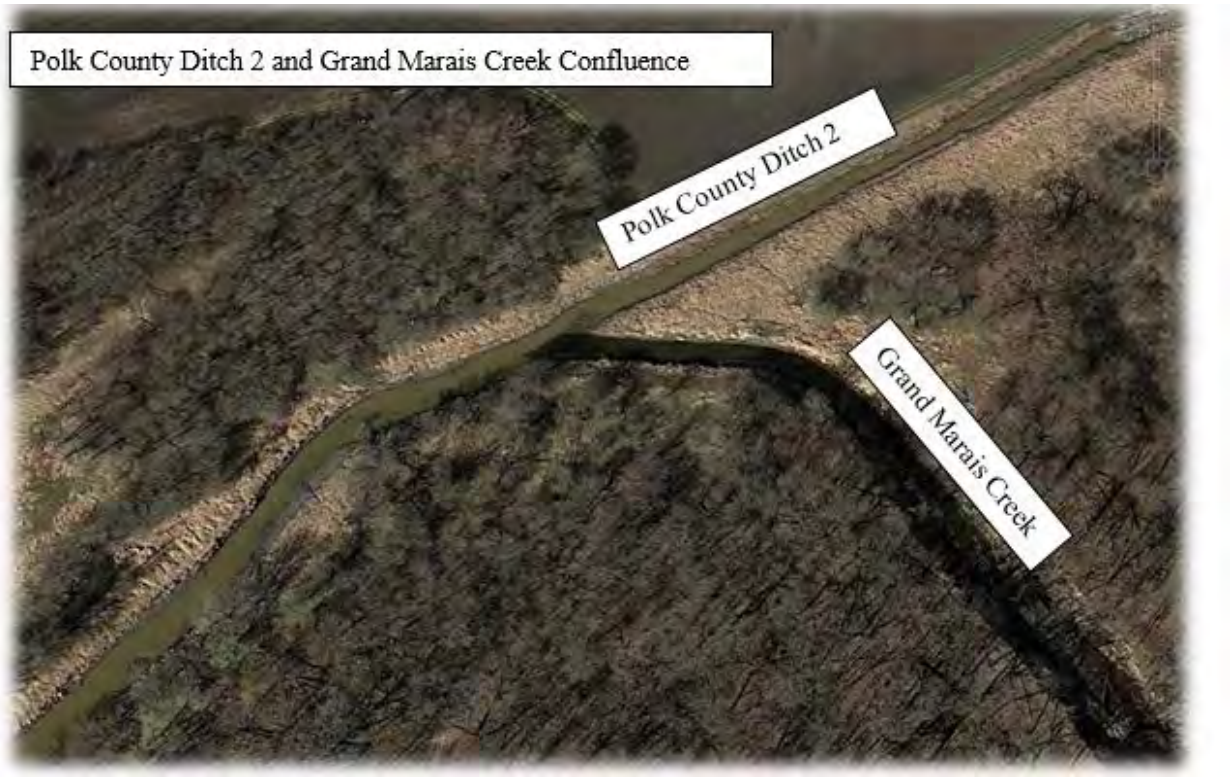


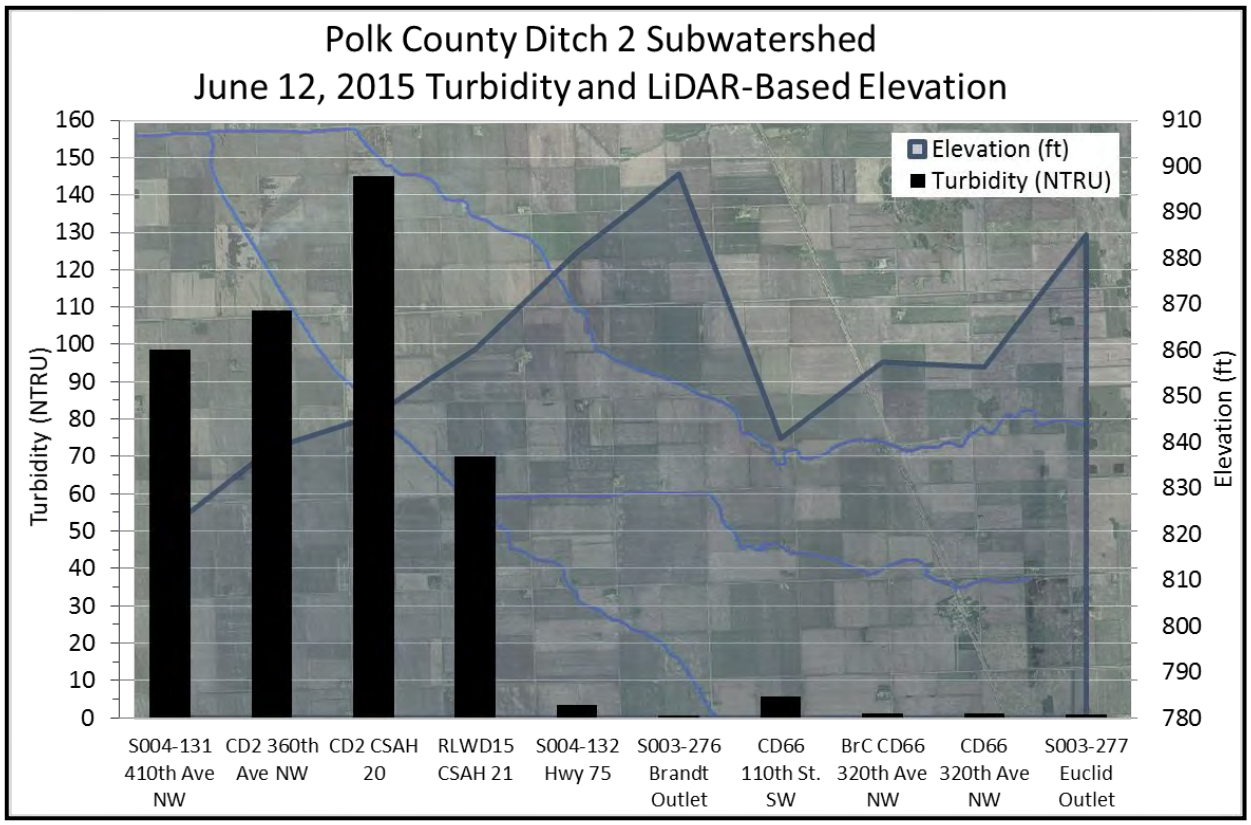
Photos of a rock check dam along AUID 515 immediately upstream of its confluence with the Grand Marais Creek on July 30, 2014 (left) and September 24, 2014 (right).

District staff reviewed and commented on a draft version of the Grand Marais Creek Stressor Identification Report. District staff provided input on the historical section of the Grand Marais Creek Watershed Monitoring and Assessment Report that is being written by the MPCA. The stressor identification process identified a rock check dam that is a potential fish passage barrier and an erosion hazard at the lower end of Polk County Ditch

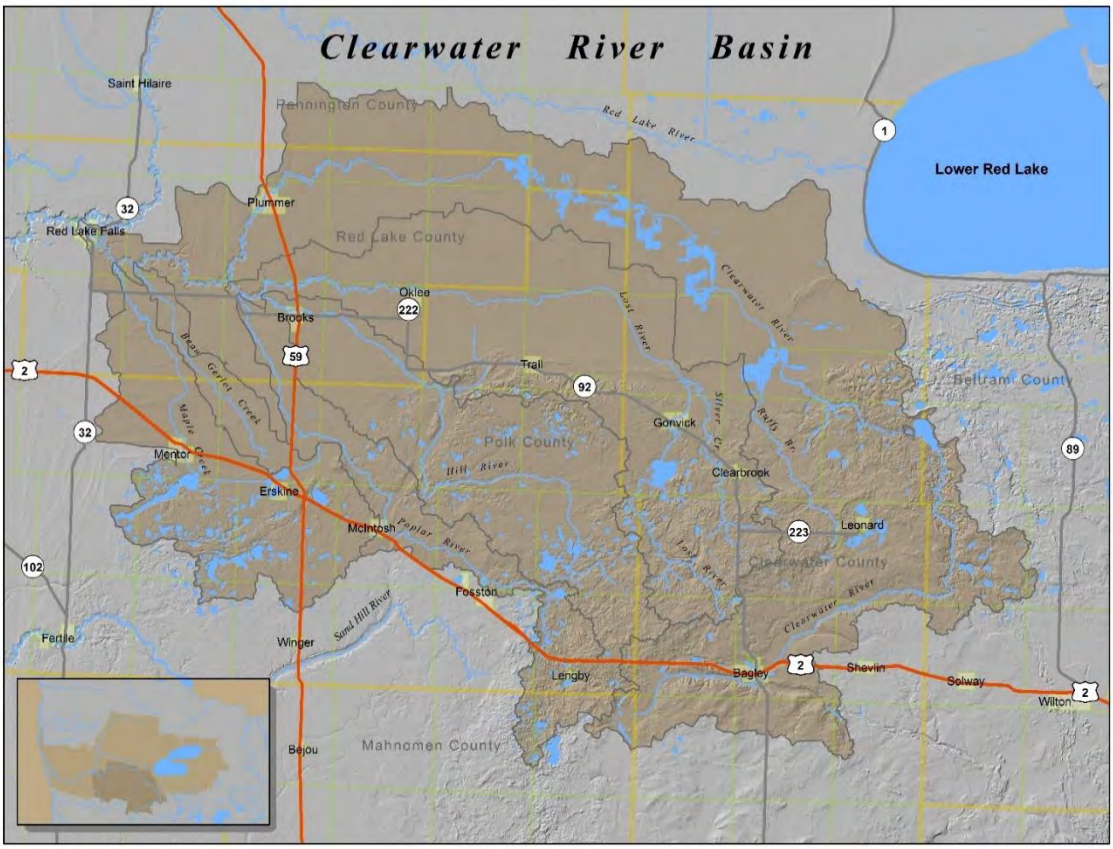
2. The structure doesn't seem to have been keyed into the bank, so the bank appears to be eroding around the edges of the structure.

Aerial photos in Google Earth (4/2/2012 imagery date) displayed a sharp contrast between muddy-looking water in Polk County Ditch 2 (CD 2) and cleaner-looking water in Grand Marais Creek. The muddy-looking water in CD 2 was visually traced up to where that ditch officially begins (near the CSAH 20 crossing). The water in the aerial photo became muddy looking (turbid) somewhere along the channel that is now called RLWD Ditch 15 (unnamed at the time of the photo). The channel bottom was not visible at the lower end of the Ditch 15 reach, but was visible upstream at the Highway 75 crossing. Longitudinal turbidity levels were subsequently measured on June 12, 2015 along the CD 2 drainage system to learn more about how water quality changes along this drainage system. The measurements identified a large increase in turbidity along the RLWD Ditch 15 portion of the drainage system. Turbidity was just 3.46 NTRU at Highway 75, but increased to 145 NTRU downstream at CSAH 20. Polk County Ditch 66 had relatively low turbidity. Although the results match what can be seen in earlier aerial photos, a lack of vegetation after recent construction along the RLWD Ditch 15 channel is the most likely cause of the current increase in turbidity. Post-construction vegetation establishment and BMP implementation should improve water quality conditions along the ditch.





Clearwater River Watershed Restoration and Protection Project



The Minnesota Pollution Control Agency has targeted the Clearwater River for a Watershed Restoration and Protection Project. MPCA staff worked to obtain $185,473 to fund the Clearwater River WRAP. Work plan creation and approval, along with contract development and execution were completed in early 2014.

Objective 1: Evaluation of Existing Data

It will be important to examine existing data to identify data needs that can be addressed in the two monitoring seasons prior to the 2016 water quality assessment. A lot of water quality studies and monitoring projects have been completed in the Clearwater River watershed. Knowledge gained from these previous efforts will be utilized throughout this WRAP project.

2005-2014 monitoring data was assessed by District staff using MPCA methods and water quality standards (including the proposed total suspended solids and river eutrophication standards). Total suspended solids, total phosphorus, biochemical oxygen demand, and dissolved oxygen flux water quality standards differ by region. Water quality standards are more protective in the eastern, headwaters portion of the watershed than they are in the western portion of the watershed. This local water quality assessment is a preview for the 2016 official water quality assessment by the Minnesota Pollution Control Agency (MPCA) that will assess 2006-2015 water quality data. It gives us a "heads-up" on areas that are lacking data and areas where more data should be collected during the remainder of the 2015 monitoring season in order to assess as many reaches as reasonably possible during the 2016 assessment.

A total of 101 reaches (a.k.a. assessment units, a.k.a. AUIDs) were examined for this assessment. Reaches in need of additional sampling were identified from this analysis.

- The Terrebonne Bridge monitoring site on the Clearwater River (S002-914) should be targeted for some extra sampling to get more data for the Lost River to Beau Gerlot Creek reach of the Clearwater River (09020305-511). E. coli levels are close to exceeding the standard. More E. coli samples should be collected to increase confidence in the assessment. More dissolved oxygen data is also needed from this reach to prove that it is meeting the water quality standards for that parameter.
- The Hill River upstream on Hill River Lake has some high E. coli readings, but insufficient data for an assessment. The minimum data requirements should be met by the Clearwater River Surface Water Assessment Grant project (09020305-539). This reach also needs more total suspended solids data to conduct an assessment. TSS data looks okay so far, but a minimum amount of data is needed to prove that it is meeting the standard.
- Polk County Ditch 14 (Maple Lake Outlet) from Maple Lake to Lower Badger Creek needs some extra sampling in the month of September because the E. coli geometric mean is very borderline at 125.6 CFU/100ml.
- Clear Brook had a borderline E. coli geomeans of 134.2 CFU/100ml. It was sampled again in 2015 and had an E. coli concentration of 166.4 CFU/100ml that supports an impairment designation.
- Brooks Creek could use some additional E. coli data (09020305-578) and dissolved oxygen data.
- JD73 between Badger Lake and Mitchell Lake needs more sampling data for E. coli and total suspended solids. There are high readings that are cause for concern for both of those parameters.
- There is insufficient data for an assessment, but high total suspended solids concentrations have been recorded in the upper reaches of Clear Brook, a tributary of Silver Creek that runs through the town of Clearbrook, (AUID 09020305-572, Site S004-046, 470th Street crossing).
- The Lost River upstream of Pine Lake (09020305-529) needs some extra E. coli and BOD samples.

Data shows that the Clearwater River reach from Ruffy Brook to the Lost River may still be a candidate for delisting of the dissolved oxygen impairment. The August E. coli geometric mean is uncomfortably close to exceeding the 126 CFU/100ml chronic standard at 122.7 CFU/100ml.

The Lost River (Anderson Lake to Hill River) is still meeting the E. coli and dissolved oxygen standards. That reach is also meeting the 30 mg/l total suspended solids standard.

The Lost River is split at the Hill River confluence. So, there are reaches of the Lost River between the Hill River and the Poplar River and between the Poplar River and the Clearwater River that have no recent data. The amount of sand being moved by the channel appears to increase as the Lost River gets closer to the Clearwater River. So, some additional data collection at the County Road 118 crossing (S002-728) may be beneficial. There are no crossings of the Lost River between the Polar River and Clearwater River confluences from which to collect water quality data.

The Clearwater River, in all assessable reaches downstream of Ruffy Brook, fails to meet the **30 mg/l water quality standard of total suspended solids**. Here are all of the reaches that are currently not meet the 30 mg/l total suspended solids standard:

- Clearwater River from Lower Badger Creek to the Red Lake River (AUID 09020305-501)
- Clearwater River from the Lost River to Beau Gerlot Creek (AUID 09020305-511)
- Clearwater River from Ruffy Brook to the Lost River (AUID 09020305-510)

There were reaches that may have to meet a more protective standard for total suspended solids. All of the reaches that may have to meet the **15 mg/l total suspended solids standard**, and had enough data for an assessment, seem to be meeting that standard. There are a couple of reaches where the exceedance rate is in the upper single digits and may be streams that should be targeted for protection efforts.

- Ruffy Brook from the headwater to the Clearwater River (AUID 09020305-513)
- The trout stream reach of the Clearwater River (AUID 09020305-516)

Assessments for E. coli are conducted by first calculating daily geometric means for each AUID (*n*th root of the product of the values). Then, using the most recent 10 years of data (2005-2014 in this case), geometric means are calculated for each calendar month. The river/stream/ditch cannot exceed 126 CFU/100ml in a calendar month, especially during months of May through September when aquatic recreation is most likely to occur. There is an acute standard of 1,260 CFU/100ml that is applied like conventional parameters in that an exceedance rate greater than 10% triggers an impairment. There are a number of reaches in the Clearwater River watershed that fail to meet this standard. Some reaches also have months that are close to exceeding the standard. There are some reaches that don't yet have the minimum number of samples, but are areas of concern because high E. coli concentrations have been found in the limited number of samples that have been collected there. Extra sampling is recommended for those reaches.

Assessment of Clearwater River Stream Data from 2005 through 2014 - Exceedances of the E. coli Standard								
River	AUID	Reach	May E. coli	June E. coli	July E. coli	Aug. E. coli	Sept. E. coli	E. coli Years
Impairment Thresholds and Years Covered by the 2015 Assessment:			126	126	126	126	126	2004-2014
Lower Badger Crk	09020305-502	CD 14 to Clearwater R	28.1	129.0	188.7	55.2	118.5	2008-14
Poplar River	09020305-504	Highway 59 to Lost R	27.9	119.8	224.6	120.3	70.0	2005-2014
Ruffy Brook	09020305-513	Headwaters to Clearwater R	152.3	310.3	195.6	199.6	194.7	2005-2014
Beau Gerlot Creek	09020305-520	Upper Badger Cr to Clearwater R	22.2	90.3	722.3	212.4	56.7	2008-10
Unnamed Creek (Clear Brook)	09020305-526	Headwaters to Silver Cr	34.4	134.2	98.5	64.9	No data	2007-2014
Silver Creek	09020305-527	Headwaters to Anderson Lk	35.1	235.6	390.0	358.9	159.8	2005-2014
Lost River	09020305-529	T148 R38W S17, south line to Pine Lk	IF, OK	89.0	146.1	IF, OK	IF, concern	2005-2014
Lost River	09020305-530	Unnamed cr to T148 R38W S20, north line	28.2	67.6	81.0	159.5	67.3	2009-2010
Hill River	09020305-539	Hill River Lk to Lost R	35.7	346.1	305.8	203	130.5	2005-2014
Hill River	09020305-539	Cross Lk to Hill River Lk	IF, 3.1	IF, 52.5	IF, 86.5	IF, 108.6	IF, 149	2014
Unnamed Creek (JD73)	09020305-542	Mitchell Lk to Badger Lk	IF	IF	IF	IF, concern	IF	2005-06
Poplar River Diversion	09020305-543	Unnamed ditch to Badger Lk	IF, 25.8	IF, 128.8	IF, 28.8	IF, 387.3	IF, 56.1	05, 06, 14
Unnamed creek (Nassett Creek)	09020305-545	T148 R38W S28, south line to Lost R	33	277.8	300.8	279.9	113.6	2009-2010
Judicial Ditch 73	09020305-550	Unnamed ditch to Tamarack Lk	IF, 10.2	IF, 129.5	IF, 125.1	IF, 1081.9	IF, 837	2014
Unnamed Creek (Clear Brook Tributary)	09020305-572	Headwaters to Unnamed cr (Clear Brook)	No data	IF	No data	No data	IF, concern	2007-2014
Terrebonne Creek	09020305-574	CD 4 to CD 58	30.7	349.9	614.1	287.4	300.1	2008-2010
Brooks Creek	09020305-578	Unnamed cr to Hill R	IF, 63.9	184.4	IF, 173.9	IF, 288.5	IF, 181.4	2011, 2012
IF = Insufficient data. Data exists, but not in the quanitity needed to assess the reach								
IF, Concern - Insufficient data to assess, but some of the few values collected fail to meet the water quality standard								

Four parameters are used to assess rivers and streams for eutrophication: total phosphorus (TP), chlorophyll-a, biochemical oxygen demand (BOD), and daily dissolved oxygen fluctuation (DO Flux).

- TP standard = 0.05 mg/l in the North Region and 0.10 mg/l in the Central Region
- Chlorophyll-a = 7 mg/l in the North Region and 18 mg/l in the Central Region. (not commonly sampled within rivers)
- BOD standard = 1.5 mg/l in the North Region and 2 mg/l in the Central Region
- DO Flux standard = 3 mg/l in the North Region and 3.5 mg/l in the Central Region

Assessment of Clearwater River Stream Data from 2005 through 2014 - Exceedances of Eutrophication Standards										
River	AUID	Reach	TP	TP Std (mg/l)	Chl-a	Chl-a Std (µg/l)	BOD	BOD Std (mg/l	DO Flux	DO Flux Std
Impairment Thresholds and Years Covered by the 2015 Assessment:			**10%**	**.05/.1/.15**	**10.0%**	**7/18/35**	**10%**	**1.5/2/3**	**10.0%**	**3/3.5/4.5**
Clearwater River	09020305-501	Lower Badger Cr to Red Lake R	37.2	0.100	0%	18	No data	2.0		3.5
Clearwater River	09020305-510	Ruffy Bk to Lost R	49.7%	0.100	No data	18	38.2%	2.0	30.1%	3.5
Lost River	09020305-507	Anderson Lk to Hill R	13.9%	0.100	No data	18	No data	2.0	No data	3.5
Hill River	09020305-539	Hill River Lk to Lost R	63.6%	0.100	No data	18	No data	2.0	No data	3.5
Clearwater River	09020305-517	Headwaters to T148 R36W S36, east line	53.8%	0.050	No data	7	100%/ 27.8%	1.5/2		3
Silver Creek	09020305-527	Headwaters to Anderson Lk	62.5%	0.100	No data	18	No data	2.0	66.4%	3.5
Clearwater River	09020305-516	T148 R35W S31, west line to Clearwater Lk	37.8%	.05, Apr-Sept	No data	7	No data	1.5	45.6%	3
Lost River	09020305-529	T148 R38W S17, south line to Pine Lk	25.0%	0.100	No data	18	IF, 16.7%	2.0	55.7%	3.5
Poplar River	09020305-504	Highway 59 to Lost R	80.5%	0.100	No data	18	18.2%	2.0	9.3	3.5
Poplar River	09020305-504	Spring Lk to Highway 59	62.8%	0.100	No data	18	No data	2.0	63.7	3.5
Walker Brook	09020305-509	Walker Brook Lk to Clearwater R	IF, concern	0.050	No data	7	No data	1.5	No data	3
Ruffy Brook	09020305-513	Headwaters to Clearwater R	82.6%	0.050	No data	7	No data	1.5	38.3%	3
Lost River	09020305-512	Pine Lk to Anderson Lk	2.1%	0.100	No data	18	No data	2.0	51.9%	3.5
Poplar River Diversion	09020305-543	Unnamed ditch to Badger Lk	IF, concern	0.100	No data	18	No data	2.0	No data	3.5
County Ditch 57	09020305-508	Unnamed ditch to Clearwater R	25.0%	0.100	No data	18	No data	2.0	30.6%	3.5
Hill River	09020305-539	Cross Lk to Hill River Lk	60.0%	0.100	No data	18	No data	2.0	No data	3.5
Clearwater River	09020305-511	Lost R to Beau Gerlot Cr	48.5	0.100	No data	18	No data	2.0	No data	3.5
Terrebonne Creek	09020305-574	CD 4 to CD 58	20.0%	0.100	No data	18	No data	2.0	No data	3.5
Unnamed Creek (Clear Brook)	09020305-526	Headwaters to Silver Cr	75.0%	0.050	No data	7	No data	1.5	No data	3
Brooks Creek	09020305-578	Unnamed cr to Hill R	IF, OK	0.100	No data	18	No data	2.0	No data	3.5
Unnamed Creek (Clear Brook Tributary)	09020305-572	Headwaters to Unnamed cr (Clear Brook)	76.5%	0.050	No data	7	No data	1.5	No data	3
Unnamed creek	09020305-569	Headwaters to Maple Lk	IF, concern	0.100	No data	18	No data	2.0	No data	3.5
Unnamed creek	09020305-570	Unnamed cr to Maple Lk	IF, concern	0.100	No data	18	No data	2.0	No data	3.5
IF = Insufficient data. Data exists, but not in the quanitity needed to assess the reach										
IF, Concern - Insufficient data to assess, but some of the few values collected fail to meet the water quality standard										
IF, OK = Insufficient data for assessment, but enough to indicate that the reach is meeting the standard										
No data = No data for this parameter is available in EQuIS										

Dissolved oxygen is necessary for the support of aquatic life. The standard is based upon the daily minimum dissolved oxygen values. Most warm water streams and rivers need to maintain a concentration of 5 mg/l for 90% of the days for which data is collected. Cold water fisheries (trout streams) need to meet a more protective standard of 7 mg/l. Dissolved oxygen typically reaches its daily minimum level in the early morning hours. The MPCA requires a certain number of measurements taken prior to 9 am in order to prove that a reach is meeting the standard. Ideally, dissolved oxygen loggers can be deployed to record dissolved oxygen levels at regular intervals. These loggers record the true daily minimum and maximum dissolve oxygen levels. The daily minimum concentrations can be subtracted from the daily maximum concentrations to calculate daily dissolved oxygen fluctuation. Data from dissolved oxygen loggers (within the 2005-2014 window of time) is available from 11 of the assessment units in the Clearwater River watershed. At least 10 additional sites are being monitored with dissolved oxygen loggers in 2015. The sites that have data available for an assessment of pre-9am data were either monitored with deployed dissolved oxygen loggers or are close enough to the District office to allow for pre-9am discrete measurements. Water quality sampling does not start until 11 AM due to the time due to a 24-hour holding time for E. coli samples and the timing of overnight shipping deliveries of samples to RMB Environmental Laboratories. So, special efforts are needed in order to visit sites prior to 9 am to measure dissolved oxygen levels. The WRAP project provides some funding for those efforts. The following table lists the reaches in which potential dissolved oxygen impairments were identified.

Assessment of Clearwater River Stream Data from 2005 through 2014 - Potential Dissolved Oxygen Impairments						
River	AUID	Reach	DO12_All (EQuIS)	DO5_All (EQuIS)	DO5_9am	DO7_All (EQuIS)
Impairment Thresholds and Years Covered by the 2015 Assessment:			**10.0%**	**10.0%**	**10.0%**	**10.0%**
Poplar River	09020305-504	Highway 59 to Lost R	2.1%	2.6	37.4	0.0
Poplar River	09020305-504	Spring Lk to Highway 59	12.8%	17.0	57.6	0.0
County Ditch 57	09020305-508	Unnamed ditch to Clearwater R	30.4%	31.0%	84.4%	0.0%
Walker Brook	09020305-509	Walker Brook Lk to Clearwater R	65.7%	83.1%		21.4%
Ruffy Brook	09020305-513	Headwaters to Clearwater R	0.0%	0.0%	10.5%	0.0%
Clearwater River	09020305-516	T148 R35W S31, west line to Clearwater Lk	0.0%	0.0%	16.5%	0.0%
Clearwater River	09020305-517	Headwaters to T148 R36W S36, east line	40.0%	45.2%		22.2%
Unnamed Creek (Clear Brook)	09020305-526	Headwaters to Silver Cr	44.4%	52.2%	No data	0.0%
Silver Creek	09020305-527	Headwaters to Anderson Lk	1.1%	1.4%	28.8%	0.0%
Lost River	09020305-529	T148 R38W S17, south line to Pine Lk	22.3%	28.9%	86.3%	3.4%
Lost River	09020305-530	Unnamed cr to T148 R38W S20, north line	46.3%	39.5%	IF	72.7%
Hill River	09020305-539	Cross Lk to Hill River Lk	12.5	17.4	No data	66.7%
Unnamed Creek (Bee Lake Inlet)	09020305-541	Eighteen Lk to Bee Lk	18.2%	25.5%	IF	0.0%
Unnamed Creek (JD73)	09020305-542	Mitchell Lk to Badger Lk	12.8%	17.0%	IF	0.0%
Poplar River Diversion	09020305-543	Unnamed ditch to Badger Lk	27.7%	35.8	IF	0.0
Judicial Ditch 73	09020305-550	Unnamed ditch to Tamarack Lk	31.9%	40.5	No data	IF, OK
Unnamed creek (Bee Lake Outlet)	09020305-551	Bee Lk to JD 73	18.3%	25.6%	IF	0.0%
Unnamed creek	09020305-569	Headwaters to Maple Lk	IF, concern	IF, concern	No data	No data
Unnamed Creek (Clear Brook Tributary)	09020305-572	Headwaters to Unnamed cr (Clear Brook)	41.7%	50.0%	No data	0.0%
Unnamed Ditch	09020305-638	Unnamed ditch to Clearwater River	61.5%	66.7%	IF	IF
Unnamed Creek	09020305-639	Lk Lomond to Clearwater R	72.7%	80.0%		IF
IF = Insufficient data. Data exists, but not in the quanitity needed to assess the reach						
IF, Concern - Insufficient data to assess, but some of the few values collected fail to meet the water quality stan						
IF, OK = Insufficient data for assessment, but enough to indicate that the reach is meeting the standard						
No data = No data for this parameter is available in EQuIS						
DO12 = All discrete dissolved oxygen measurements from all 12 months of January through December (% of dail						
DO5 = Dissolved oxygen over the 5 summer months of May through September (% <5 mg/l)						
DO7 = Dissolved oxygen over the 7 cooler months of October through April (% <5 mg/l)						
DO5 9am = Dissolved oxygen measurements collected during the months of May through September prior to 9am plus any low readings observed during those months (daily minimum would definitely fall below 5 mg/l if						

Un-ionized ammonia is the toxic form of ammonia. The percentage of total ammonia that is in the un-ionized form increases with temperature and pH levels (an equation is used to determine the percentage of a sample that may be in the un-ionized form). The standard for most warm-water rivers and streams is 0.04 mg/l, but cold-water streams must meet a more protective standard of 0.016 mg/l. No impairments were found for this parameter in 2005-2014 data collected within the Clearwater River watershed. The trout stream reach of the Clearwater River (09020305-516) is currently listed as impaired for un-ionized ammonia. However, more recent data (2005-2014) shows that the reach is no longer exceeding the water quality standard and is a reach that should be **delisted from the 303(d) List of Impaired Waters.**

Objective 2: Water Quality Sampling

Water quality data was collected at monitoring sites during dissolved oxygen logger deployments. This data will be compared to daily minimum concentrations and/or daily fluctuation of dissolved oxygen. This comparison will be used to aid the identification of a pollutant of concern and a threshold at which that pollutant causes dissolved oxygen levels to fail to meet the standard. Water quality measurements collection prior to 9:00 AM using a multi-parameter sonde at sites near the Red Lake Watershed District office was part of this task. Regular water quality samples and field measurements were collected at strategic sites that are not included in the Surface Water Assessment Grant sampling.

In order to prove that a stream is meeting the 5 mg/l daily minimum water quality standard for dissolved oxygen, there need to be a sufficient number of readings taken prior to 9 am. Dissolved oxygen concentrations are lowest in the morning because photosynthetic activity drops off at night. Pre-9am dissolved oxygen readings were recorded throughout the summer of 2015 in the Clearwater River at CSAH 12 near Terrebonne, Terrebonne Creek, Lost River at CR 119, and JD73 near Rydell National Wildlife Refuge. All of the early morning measurements made at the Clearwater and Lost River sites were good. Some very low dissolved oxygen levels were measured in Judicial Ditch 73.

Additional parameters will be added to the suite of parameters that are analyzed for samples that are collected for the Clearwater River Surface Water Assessment Grant at sites at which dissolved oxygen loggers are deployed.

Mid-deployment samples were collected at dissolved oxygen logger deployment sites. This data will not only provide more information for the assessment process, but will help identify pollutants of concern at sites that end up needing TMDLs written for dissolved oxygen impairments.

Objective 3: Flow Monitoring

2015 HOBO water level logger deployments began in mid-March. HOBO water level loggers were retrieved in late November when air temperatures dropped below freezing and ice started to form on rivers and streams. The sites at which stage and flow were monitored throughout the Clearwater River watershed by the District and other agencies in 2014 included:

1. Clearwater River in Red Lake Falls (USGS Gauge #05078500)
    - http://waterdata.usgs.gov/mn/nwis/uv?site_no=05078500
2. Clearwater River at CSAH 13 near Red Lake Falls (MPCA/DNR Cooperative Gauge)
    - http://www.dnr.state.mn.us/waters/csg/site_report.html?mode=getsitereport&site=63025001
3. Clearwater River near Plummer (USGS Gauge 05078000)
    - http://waterdata.usgs.gov/mn/nwis/uv?site_no=05078000
4. Clearwater River at CSAH 11 (RLWD)
5. Clearwater River at CSAH 24 upstream of Clearwater Lake (MPCA/DNR Cooperative Gauge)
6. Clearwater River at CSAH 2, east of Bagley (RLWD)
7. Lower Badger Creek at CR114 (RLWD)
8. Judicial Ditch 73 at Rydell National Wildlife Refuge (RLWD)
9. Beau Gerlot Creek at CR 114 (RLWD)
10. Terrebonne Creek at Highway 92 (RLWD)
11. Lost River, north of Brooks (MPCA/DNR Cooperative Gauge)
    - http://www.dnr.state.mn.us/waters/csg/site_report.html?mode=getsitereport&site=66048001
12. Lost River at Oklee (USGS Gauge 05078230)
    - http://waterdata.usgs.gov/mn/nwis/uv?site_no=05078230
13. Lost River at CSAH 28 (RLWD)
14. Lost River 109th Ave, upstream of Pine Lake (RLWD)
15. Poplar River at CR118 (RLWD, MPCA/DNR Cooperative Gauge)
16. Poplar River at 380th St., near Fosston (RLWD)
17. Poplar River at CSAH 30 near Fosston (RLWD)
18. Poplar River at CSAH 6, near Fosston (RLWD)
19. Hill River, north of Brooks (MPCA/DNR Cooperative Gauge)
20. Ruffy at CSAH 11 (RLWD)
21. Ruffy Brook at 510th St. (RLWD)
22. Silver Creek at CR 111 (RLWD)

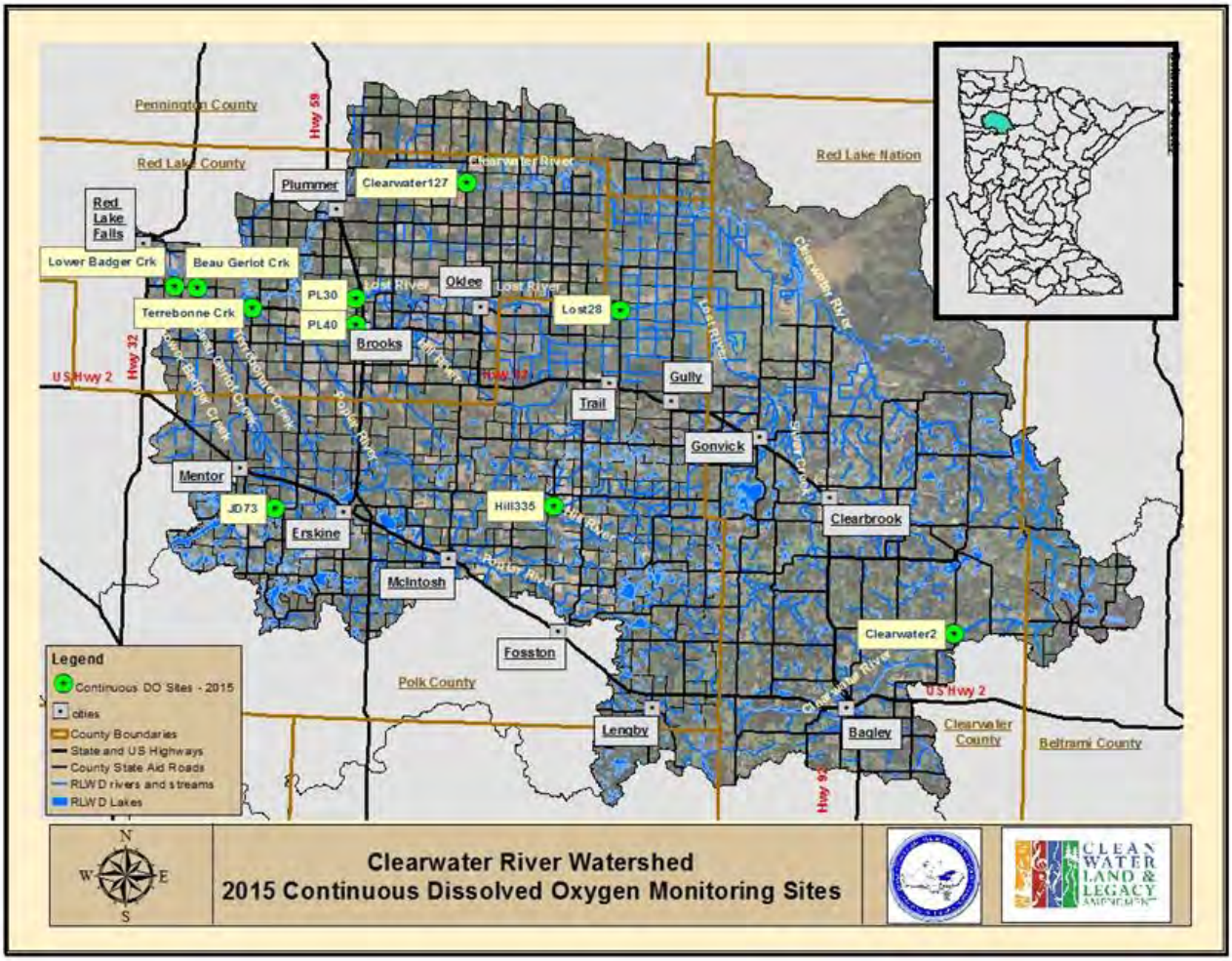
A round of spring flow measurements was made at stage/flow monitoring sites throughout the watershed, but flows were relatively low compared to what they usually are in the spring. A beaver dam was obstructing flow on Lower Badger Creek between CR114 and the Clearwater River in the spring, but must have been washed-out during the early June rainfall event. Throughout the monitoring season, flow was measured in:

1. Lower Badger Creek at CR 114 (twice)
2. Terrebonne Creek at Hwy 92
3. Judicial Ditch 73 near Rydell NWR (twice)
4. Poplar River at CSAH 30 near Fosston (3 times)
5. Lost River near Pine Lake
6. Clearwater River at CSAH 2
7. Lost River at CSAH 28
8. Clearwater River at CSAH 11
9. Ruffy Brook at CSAH 11
10. Beau Gerlot Creek at CR 114
11. Poplar River at CR 118

Check-ups of HOBO water level loggers were conducted. The loggers were cleaned and data was downloaded to make sure they were working properly. HOBO water level loggers were retrieved in late November as ice began to form.

Objective 4: Continuous Dissolved Oxygen Monitoring

Dissolved oxygen loggers will be deployed at least sixteen strategic sites throughout the watershed. Ten two-week deployments will be completed at each site. Installation of these loggers is necessary for dissolved oxygen assessments where it is not feasible to collect sufficient pre-9 am dissolved oxygen readings. A twenty-four hour daily record of dissolved oxygen concentrations provides accurate daily minimum dissolved oxygen values and accurate daily dissolved oxygen fluctuation values that can be compared to sampling data to find a correlation between dissolved oxygen and a pollutant.



Dissolved oxygen loggers were calibrated in preparation for deployment in early May. Through the first half of the monitoring season, dissolved oxygen levels were great in the Lost River at CR 119, north of Brooks. Because enough data was collected to prove that the lower reach of the Lost River is meeting the dissolved oxygen standard, the HOBO dissolved oxygen logger that was installed at the CR 119 crossing was moved to a site on a stream that needed more data – Beau Gerlot Creek. When Beau Gerlot Creek went dry by the beginning of September, the dissolved oxygen logger was moved to another site. A confirmation of low dissolved oxygen levels in the Poplar River at CR 118 with an optical dissolved oxygen logger was desired. So, the HOBO dissolved oxygen logger that had been deployed in the Lost River and Beau Gerlot Creek was deployed in the Poplar River during the month of September.

Throughout the summer, dissolved oxygen loggers were deployed at the following sites:

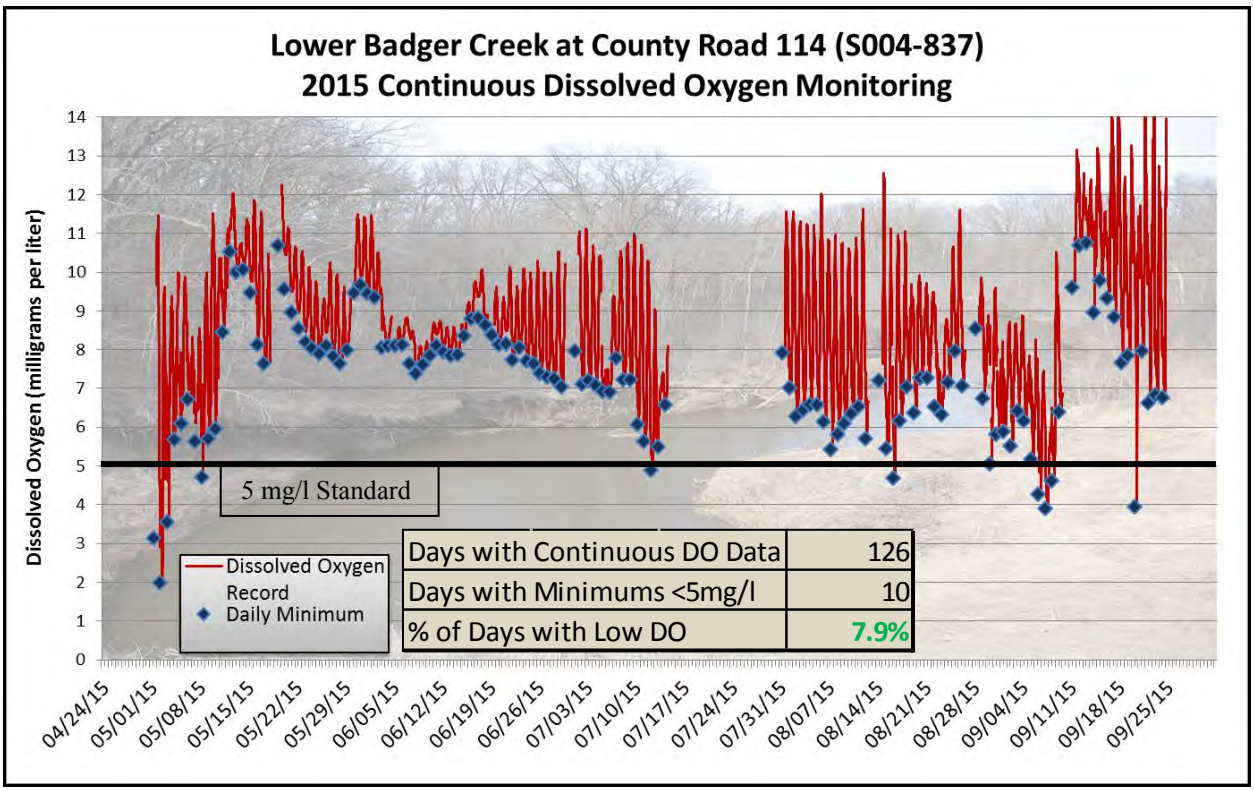
- Lower Badger Creek at CR114
- Terrebonne Creek at Hwy 92
- Judicial Ditch 73 by Rydell National Wildlife Refuge
- Hill River at 335th Ave
- Clearwater River at CSAH 2
- Clearwater River at County Road 127
- Hill River at County Road 119, north of Brooks
- Lost River at County Road 119, north of Brooks
- Beau Gerlot Creek at CR 114
- Poplar River at CR 118

Dissolved oxygen logger deployment pipe in Beau Gerlot Creek at CR 114

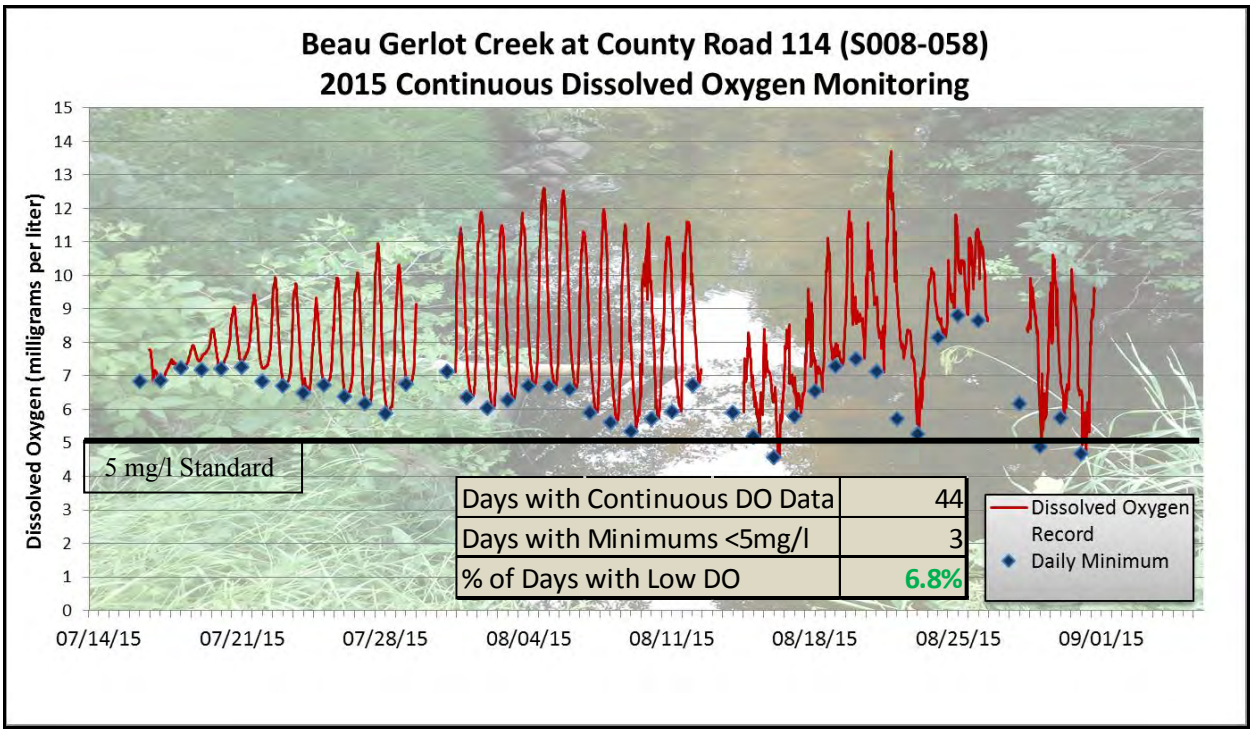
MPCA staff provided District staff with dissolved oxygen data that was collected using a dissolved oxygen logger deployed in the Clearwater River in Red Lake Falls (Site S002-118 at the Klondike Bridge) in August and September of 2014. Dissolved oxygen levels were great at this site. The lowest reading was 7.31 mg/l, which is better than the 7 mg/l water quality standard for trout streams.

In November, continuous dissolved oxygen monitoring data was compiled, corrected, summarized, graphed, and submitted to the MPCA for use in the upcoming water quality assessment. In December, District staff also provided MPCA staff with the full raw and corrected 2015 continuous dissolved oxygen data sets from the Clearwater River watershed. More than 90% of the daily minimum dissolved oxygen readings need to be greater than 5 mg/l in order to meet the state water quality standard

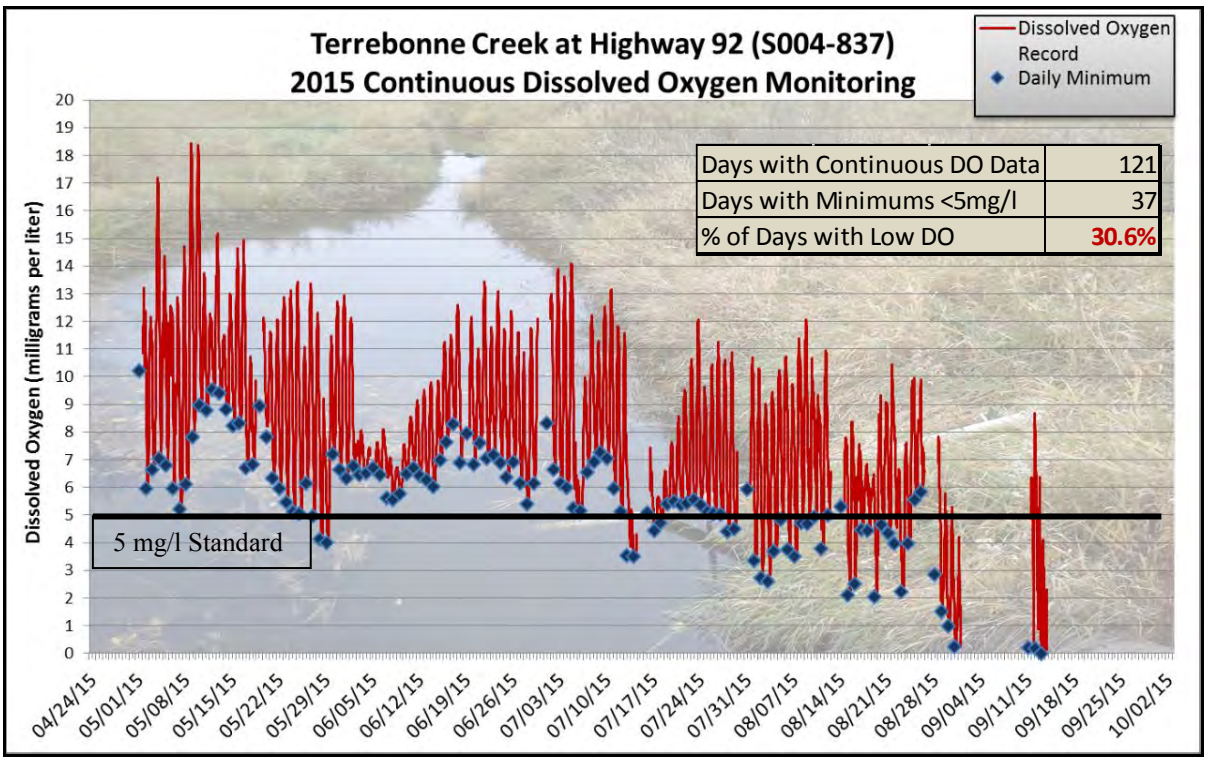
Lower Badger Creek at Red Lake County Road 114 (S004-837). Lower Badger Creek appears to be meeting the dissolved oxygen standard at this site.



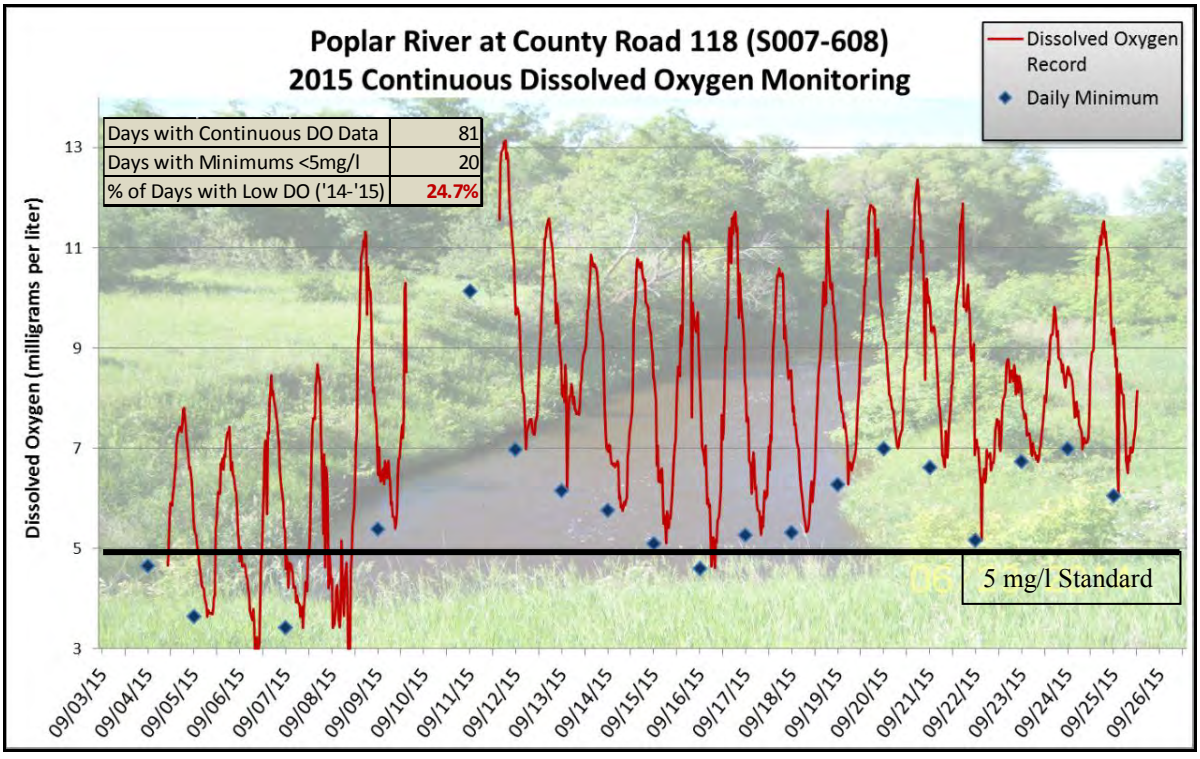
Beau Gerlot Creek at Red Lake County Road 114 (BGC114, S008-058). Beau Gerlot Creek seems to be meeting the dissolved oxygen standard at this site.



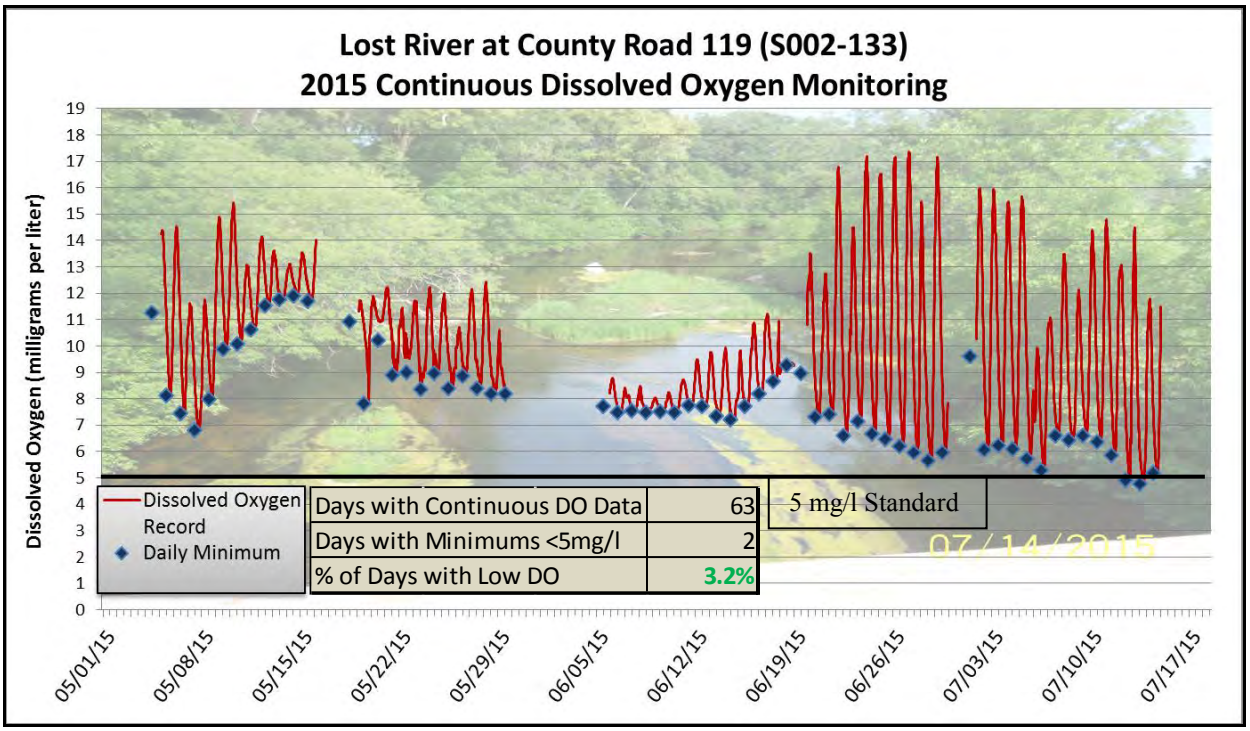
Terrebonne Creek at State Highway 92 (S004-837). Terrebonne Creek is not meeting the dissolved oxygen standard at this site. Stagnant water in the late summer is one of the probably causes of the low dissolved oxygen levels.



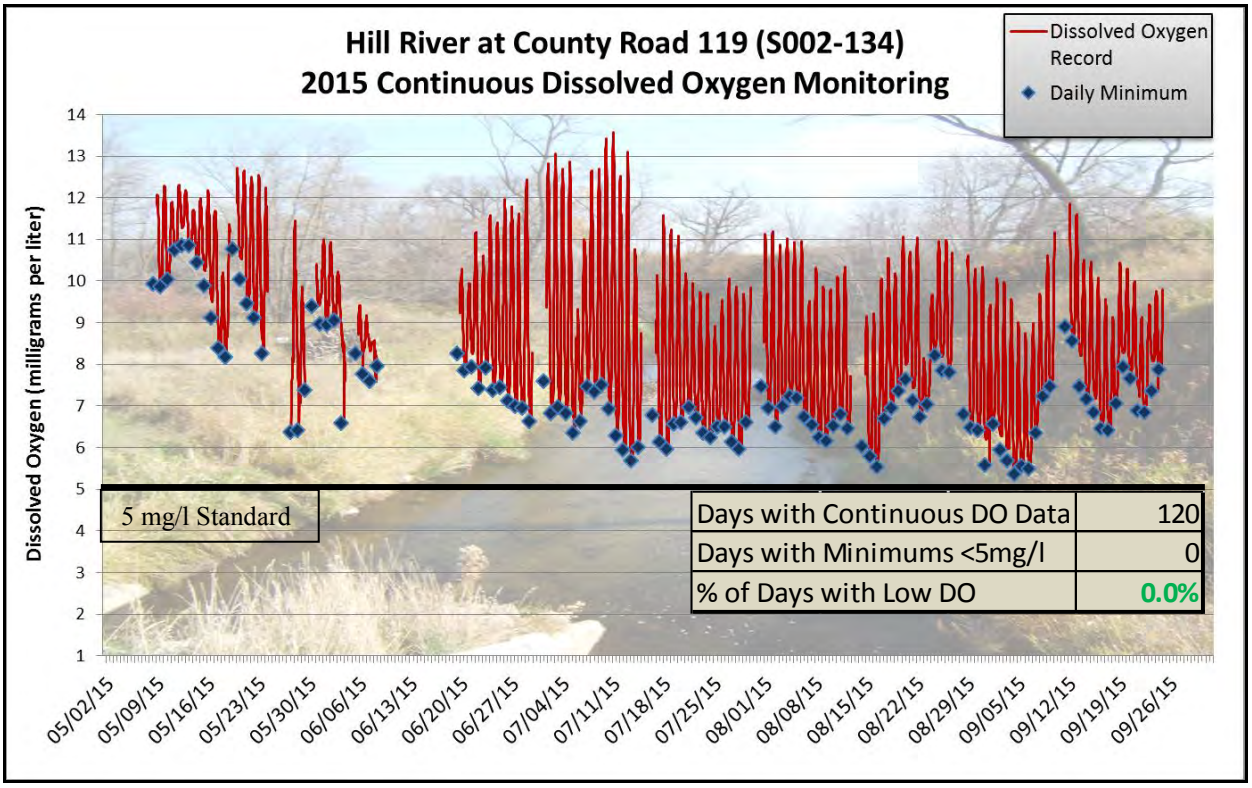
Poplar River at Red Lake County Road 118 (PR118, S007-608). The Poplar River was continuously monitored in 2014 and 2015. The results of the 2015 monitoring supported the results of the 2014 monitoring. The Poplar River is not meeting the dissolved oxygen standard at this site.



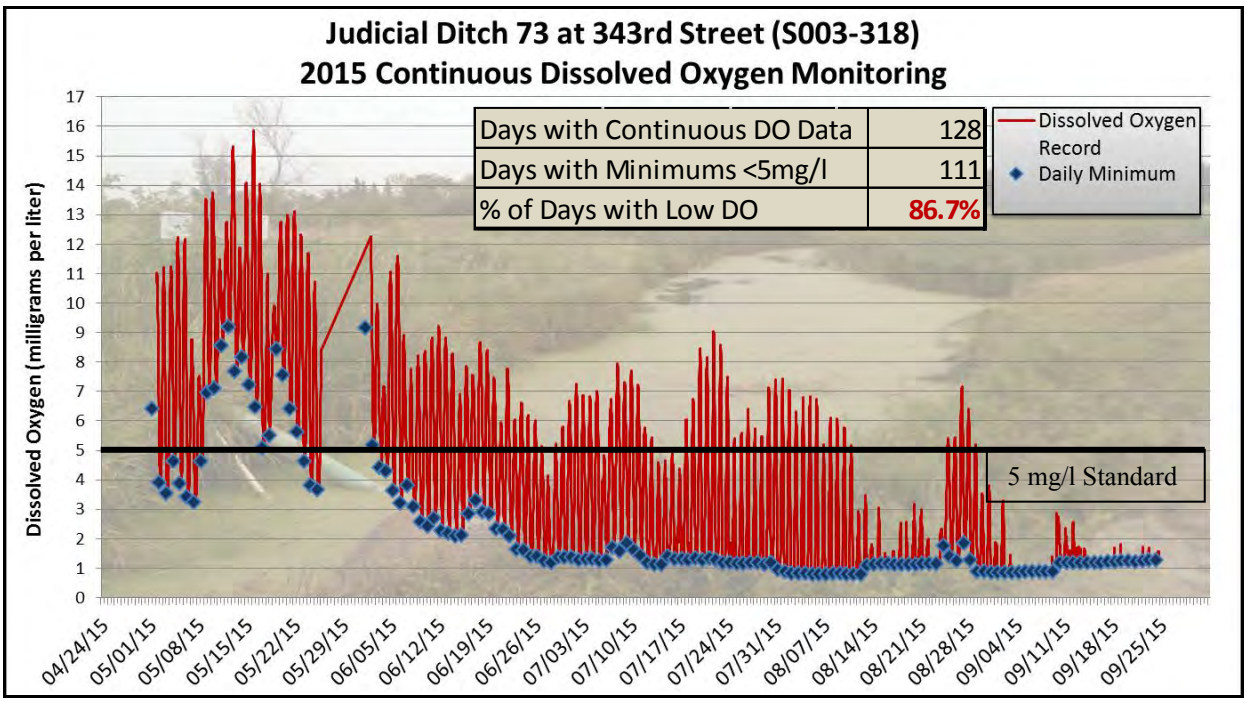
Lost River at Red Lake County Road 119 (PL30, S002-133). Dissolved oxygen levels are good at this site.



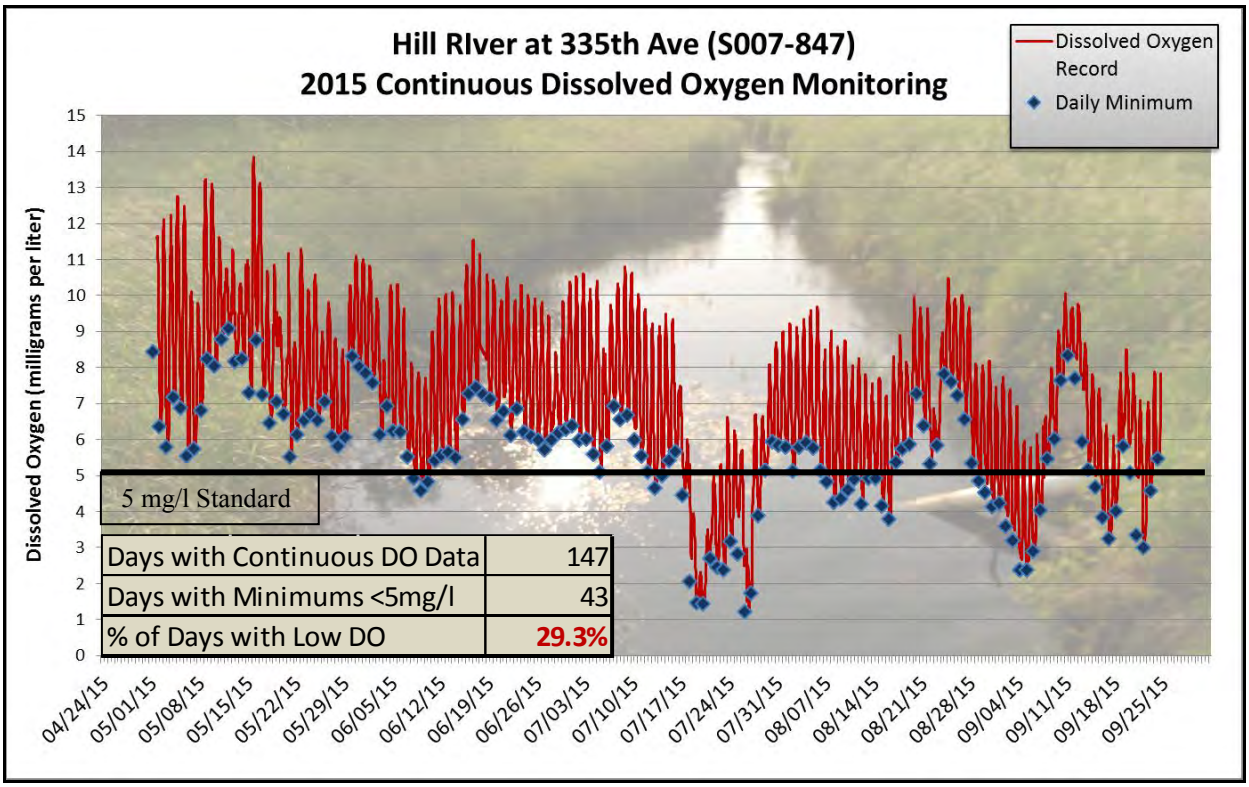
Hill River at Red Lake County Road 119 (PL40, S002-134). Dissolved oxygen levels were great at this site.



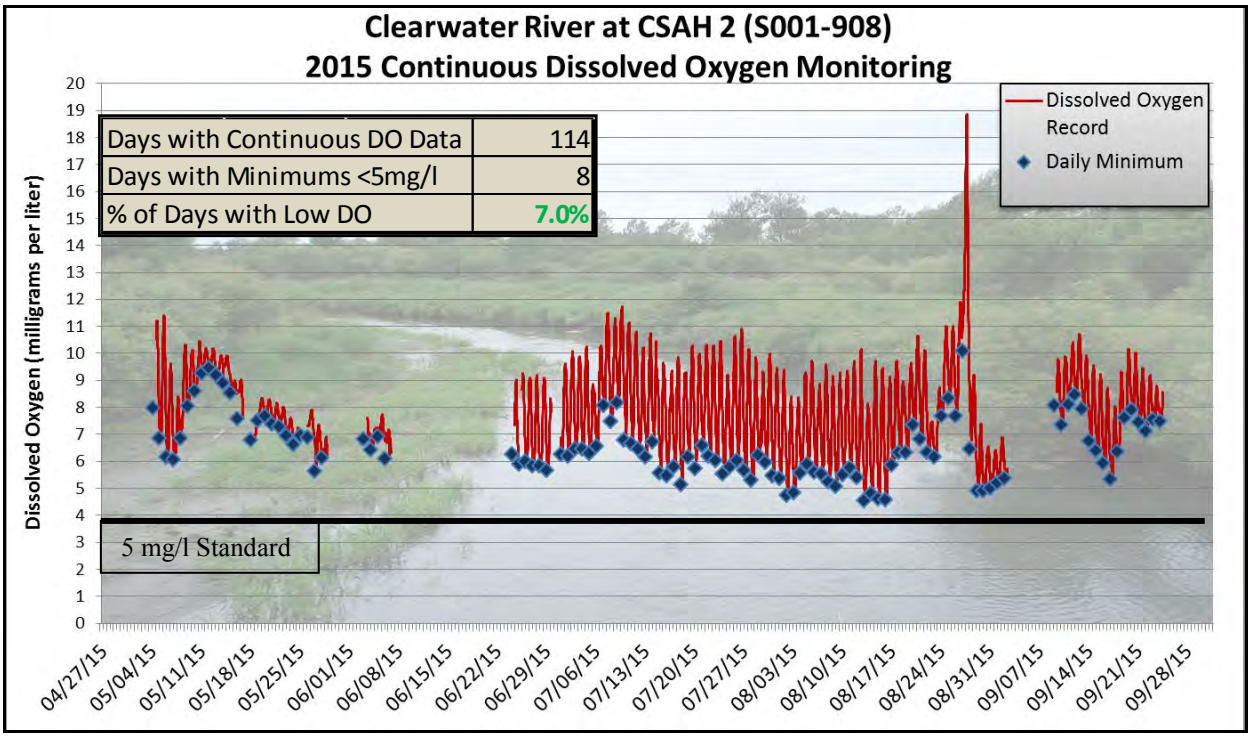
Judicial Ditch 73 at 343rd Street SE, upstream of Rydell National Wildlife Refuge (JD73, S003-318). Dissolved oxygen levels were consistently low at this site.



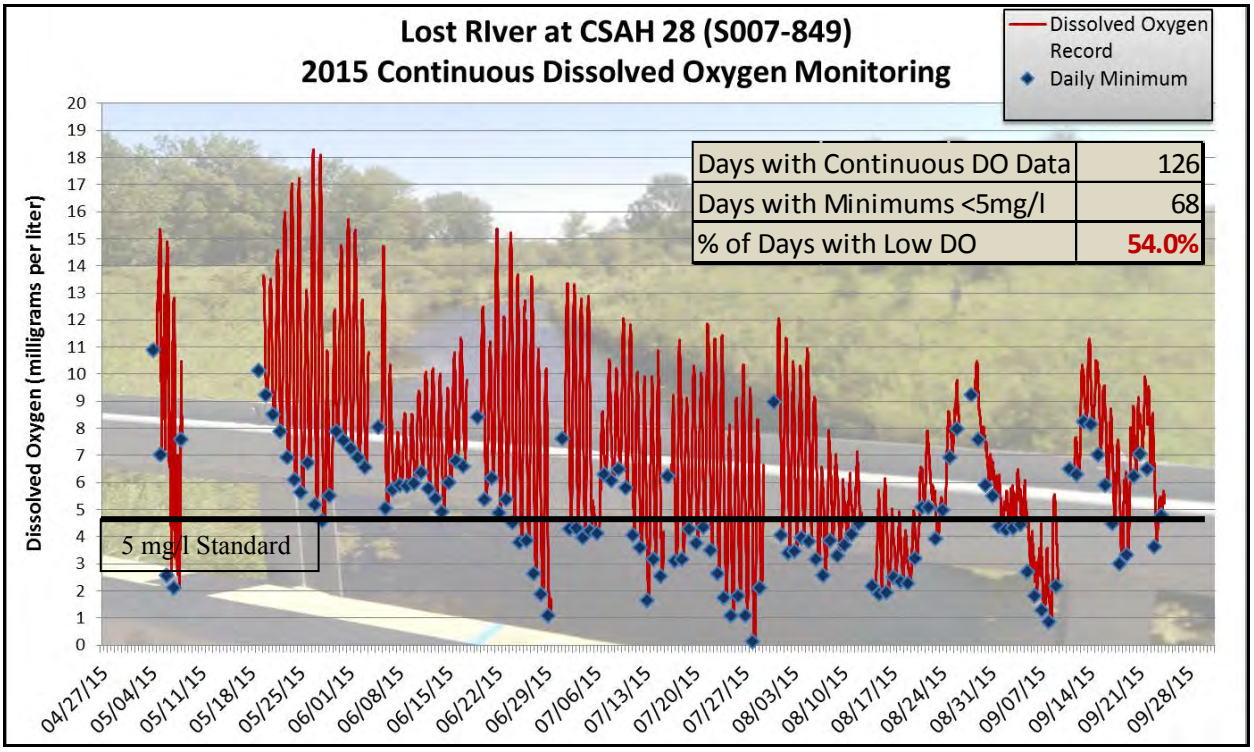
Hill River at 335th Ave (Hill335, S007-847). Stagnant water led to an increased frequency of low dissolved oxygen levels in the late summer.



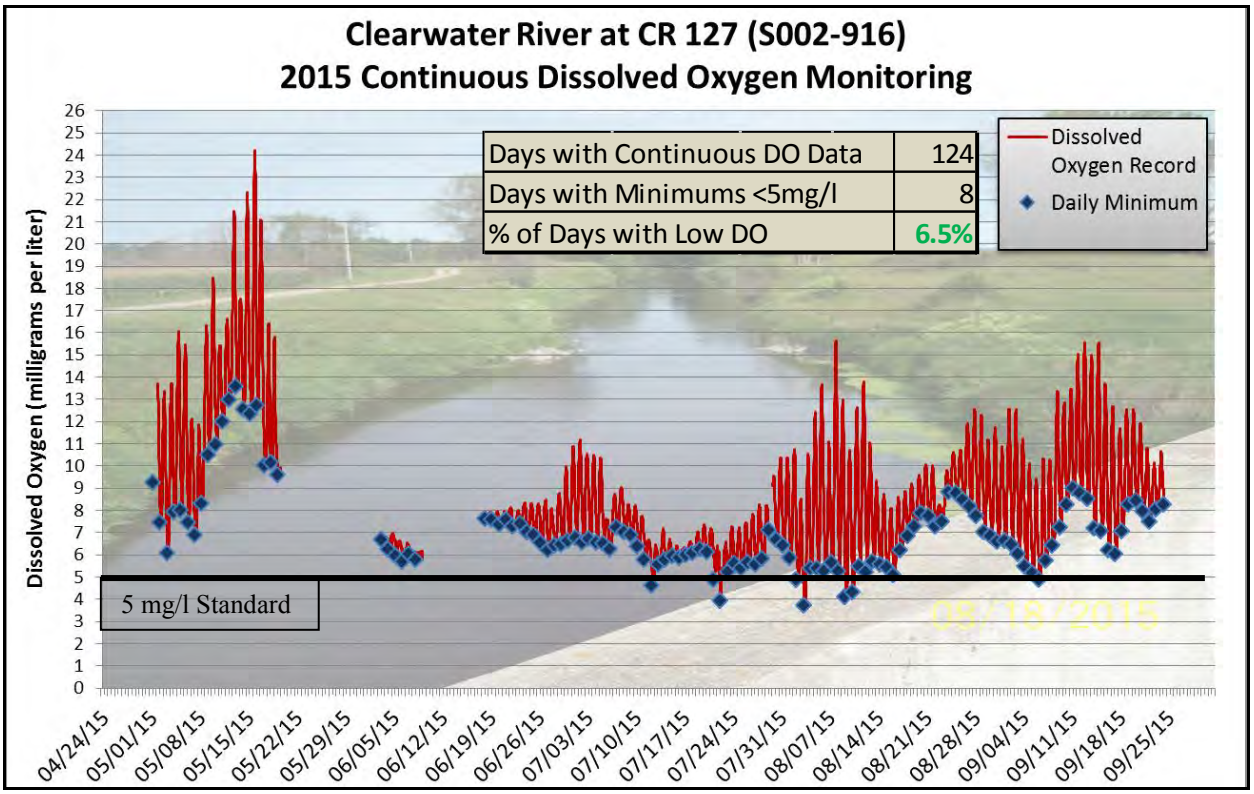
Clearwater River at County State Aid Highway 2 (Clearwater2, S001-908). Even though it is located within an impaired reach, DO levels at this site were okay.



Lost River at Polk County Road 28 (Lost28, S007-849). The pooling of water behind a rock structure and beaver activity may have negatively affected DO levels at this site. It is not meeting the water quality standard.



Clearwater River at Red Lake County Road 127 (Clearwater127, S002-916). Despite some periodic low dissolved oxygen readings, The Clearwater River seems to be meeting the water quality standard at this site. This is important because this site lies on a reach of the Clearwater River that is listed as impaired by low dissolved oxygen. Monitoring during a previous TMDL study indicated that the reach may be meeting the dissolved oxygen water quality standard. This set of data could serve as that additional proof that could lead to removing the reach from the 303(d) List of Impaired Waters.



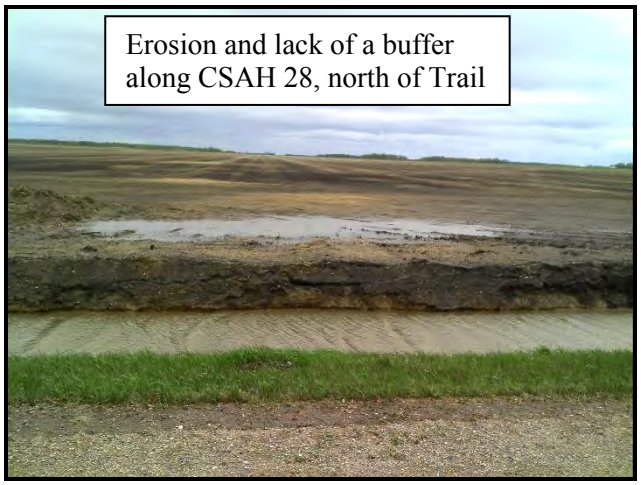
Objective 5: Stream Channel Stability Assessment

The Clearwater River watershed was closely examined during a geomorphic assessment in 2014. District staff will assist Minnesota Department of Natural resources staff with developing a report on the results of the geomorphological analysis of the Clearwater River and some of its main tributaries.

Objective 6: Pollutant Source Investigation and Stressor Identification

District staff will collect stressor identification samples and field water quality measurements. Windshield surveys of sub-basins with high pollutant yields, existing impairments, and anticipated impairments. Desktop mapping will be used to identify problem areas in the watershed that may be degrading water quality. This objective will also include some additional inspection of stream reaches for erosion problems and cattle access via kayak on the Clearwater River and its tributaries.

Photos of erosion were taken during monitoring. Some sites were identified where side water inlets should be installed to reduce gully erosion. There are many miles of road ditches within the Clearwater River watershed with almost no vegetative buffer, especially in the western half of the watershed. Erosion problems were also found along the Judicial Ditch 72 portion of the Lost River, downstream of Anderson Lake. Photos of erosion were taken during monitoring. Some sites were identified where side water inlets should be installed to reduce gully erosion. There are many miles of road ditches within the Clearwater River watershed with almost no vegetative buffer, especially in the western half of the watershed. Barriers to fish passage were also noted.



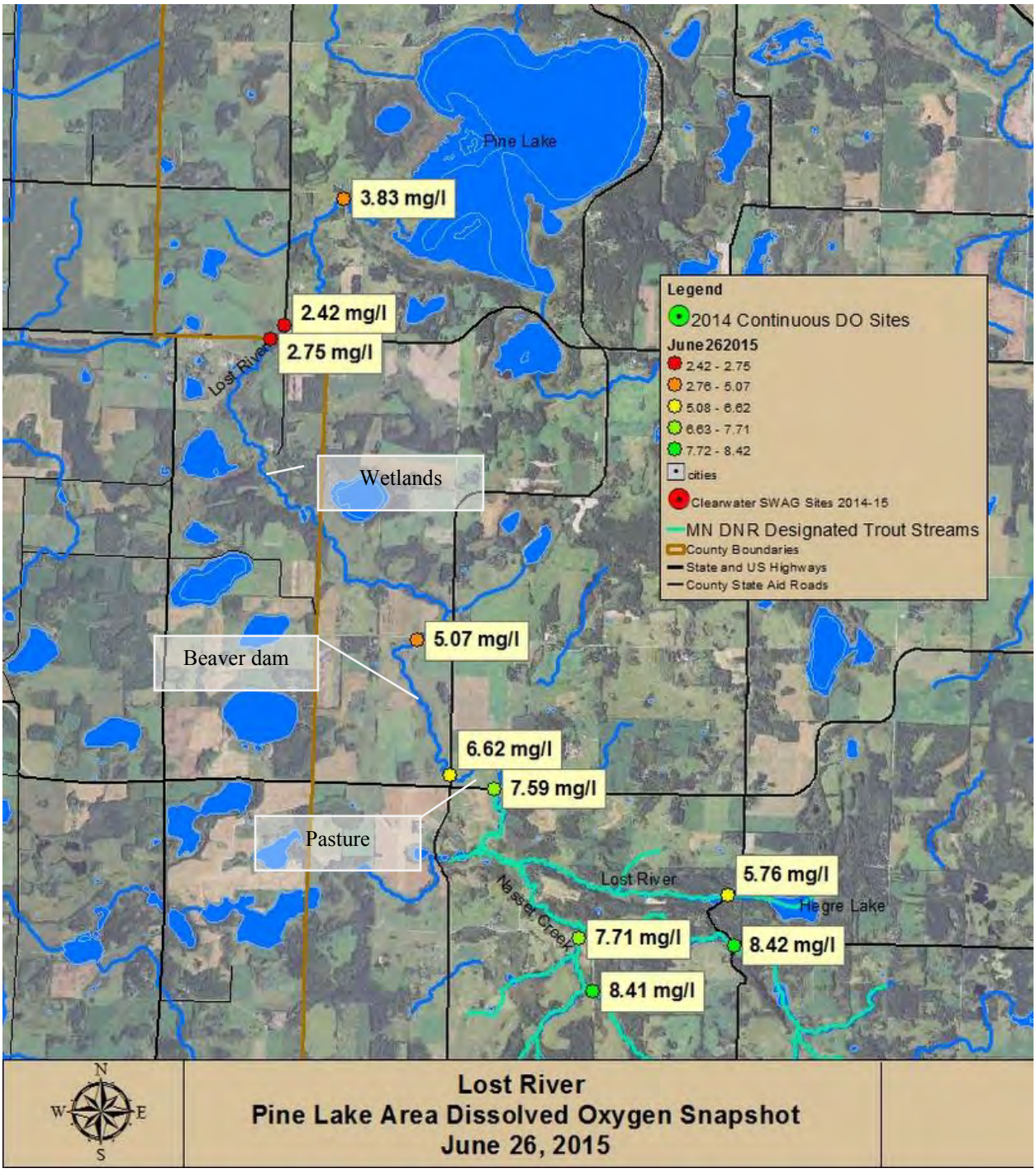
Erosion and lack of a buffer along CSAH 28, north of Trail

A large gully was spotted along CSAH 35 in Polk County.

A large number of cliff swallows were living under the CR119 Bridge over the Lost River. Their droppings regularly plopped into the river as they flew around when they were observed on June 25, 2015.

A reach of the Clearwater River where it transitions from the channelized reach to a natural meandering channel was traveled via kayak to look for erosion and other problems that could be negatively affecting water quality on July 27th. The route began at County Road 127 and ended Cattle along the river, a large beaver dam, some eroding stream banks, log jams, a large rip-rap project, and a stream barb erosion control project were noted along the route.

Longitudinal dissolved oxygen measurements were collected in the Lost River and Nassett Brook upstream of Pine Lake to determine the extent of the dissolved oxygen problem. Dissolved oxygen levels ranged from a low of 2.42 mg/l upstream of Pine Lake to highs of 8.41 and 8.42 mg/l in the upper, designated trout stream reaches of Nassett Creek and the Lost River. Pasture, beaver dams, and riparian wetlands are identifiable as potential causes of decreases in dissolved oxygen along this section of the Lost River.



Objective 7: Water Quality Monitoring Data Entry

This objective includes the entry of monitoring data and submission of that data to the MPCA for entry into the EQuIS database. The District will also compile, correct, and summarize continuous dissolved oxygen data collected by deployed dissolved oxygen loggers.

Site establishment forms were completed and submitted to the MPCA for sites that were monitored for the first time in 2015. 2015 monitoring data that was collected specifically for this project (pre-9am dissolved oxygen readings, additional parameters added to SWAG samples, field measurements at dissolved oxygen logger deployment sites) was entered and submitted to the MPCA using the EQuIS data submittal template. Continuous dissolved oxygen records from the Clearwater River were summarized (daily minimum, maximum, and average) and sent to the MPCA for entry into the EQuIS water quality database. A data review was completed on the 2014 submittal of data from the Clearwater River WRAP project so that the MPCA could finalize the data and store it in the EQuIS database.

Objective 8: Data Analysis

Data will be analyzed during the official water quality assessment in 2016. Red Lake Watershed District staff will participate in that process. Data will also be analyzed for the purpose of TMDL development.

Clearwater River water quality assessment results were reviewed to find waterbodies that are candidates for removal from the 303(d) List of Impaired Waters because they are currently meeting water quality standards or because the impairments are caused by natural conditions.

Objective 9: Civic Engagement

The goal of this objective is to involve the public in the WRAP process through public meetings and other forms of engaging the public. RMB Environmental Laboratories has been contracted to help with this part of the project. RMB Labs will help the District develop and deliver outreach strategies, create a measurement and evaluation strategy, and plan meetings. A website will be developed for the Clearwater River watershed. Clearwater River Watershed information can be found at: http://www.rlwdwatersheds.org/cw-watershed

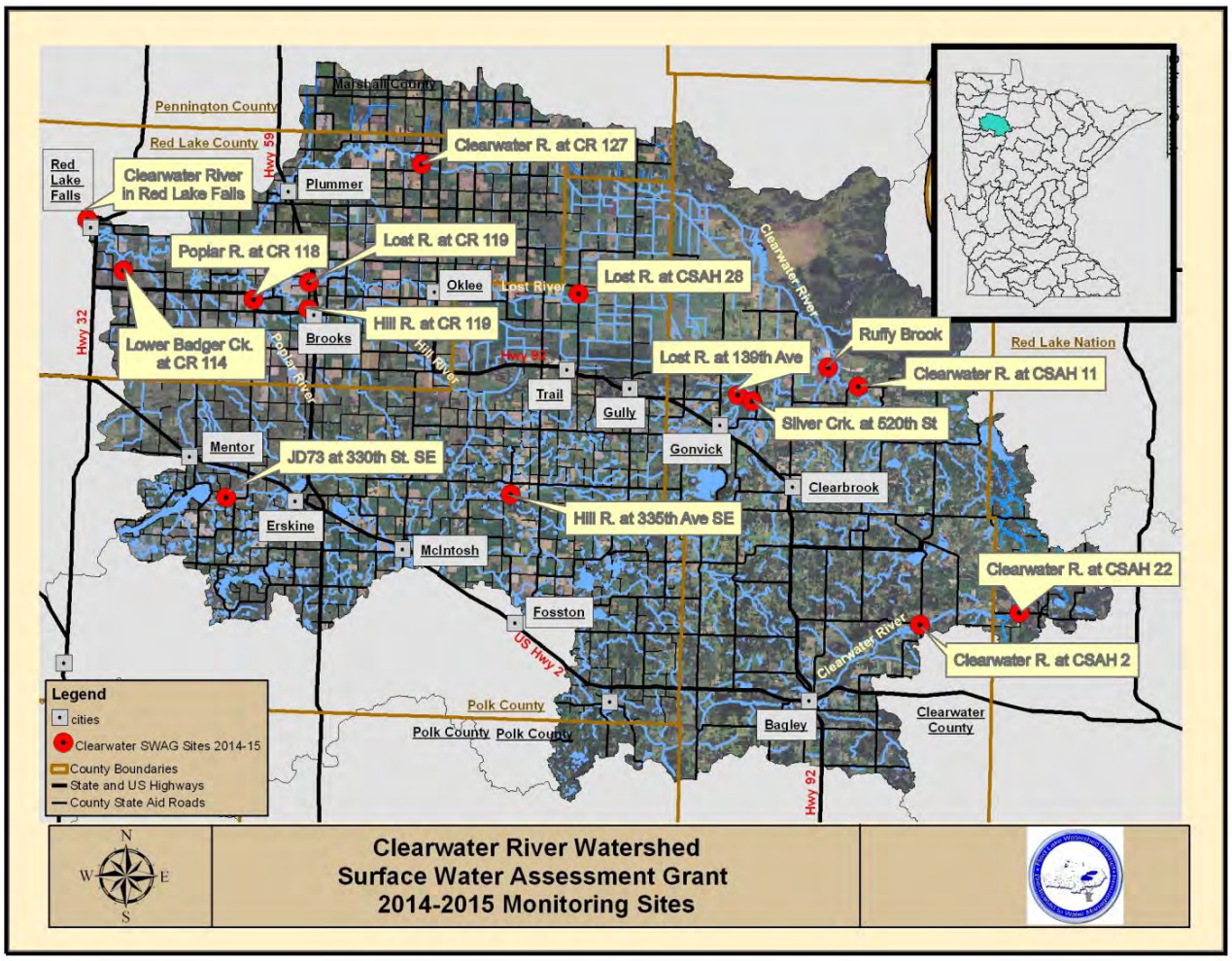
Emmons and Olivier Resources, Inc. staff created a watershed-based website for the Clearwater River. District staff provided the consultant with photos, text, links to water quality reports, informational resources, and links to partner agencies and organizations that are relevant to the Clearwater River Watershed. Some reports, presentations, and maps that were previously unavailable on the internet were uploaded to the District FTP site so that they can available through the links on the new Clearwater River watershed website. Clearwater River Watershed information can be found at: http://www.rlwdwatersheds.org/cw-watershed

Objective 10: Reports

Semi-Annual Reports, monthly invoices, and updates are regularly provided to the MPCA Project Manager. District staff will begin writing the TMDL and WRAPS reports that will be the final products at the end of this four-year project.

Clearwater River Surface Water Assessment Project

The Minnesota Pollution Control Agency targeted the Clearwater River for Intensive Watershed Monitoring that began in 2014 and concluded in 2015. This monitoring effort involves the collection of water quality data by local agencies and collection of biological data by the MPCA. The water quality sampling is funded by the Clean Water, Land, and Legacy Act through Surface Water Assessment Grants that are administered by the MPCA. The District submitted an application for the monitoring and was awarded funding. The District Board of Managers approved the signing of a contract with the MPCA for this work. The District partnered with Clearwater SWCD, Red Lake SWCD, and East Polk SWCD staff to collect samples at 15 sites throughout the watershed. These local agencies sampled during the months of June through August in 2015.



Significant rainfall events on July 5th and 6th of 2015 may have resulted in some higher levels of pollutants in the samples collected during that week.

E. coli concentrations exceeded the chronic water quality standard (>126 CFU/100 ml) in at least one set of samples collected at the following sites:

- Hill River near Brooks (6 days – every sample)
- JD73 near Rydell National Wildlife Refuge (5 days)
- Silver Creek at 520th Street (4 days)
- Poplar River at CR 118 (4 days)
- Lost River at 139th Ave (4 days)
- Hill River at 335th Ave (3 days)
- Ruffy Brook (3 days)
- Lower Badger Creek at CR 114 (2 days)
- Clearwater River at CSAH 2 (twice, both high concentrations were recorded in August)
- Clearwater River at the Klondike Bridge in Red Lake Falls (twice)
- Lost River at CR 119, north of Brooks (twice)
- Clearwater River at CR 127 (twice)
- Lost River at CSAH 28 (just once)
- Clearwater River at CSAH 11 (just once)
- Clearwater River at CSAH 22 (just once)

Low dissolved oxygen levels (<5 mg/l) were observed in:

- Judicial Ditch 73 near Rydell National Wildlife Refuge during multiple site visits
- Lost River at CSAH 28
- Hill River at 335th Ave

High total suspended solids concentrations (relative to the State's proposed 30 mg/l and 15 mg/l standards) were found in:

- Lower Badger Creek at CR 114 (82 mg/l on 6/8/15)
- Hill River, north of Brooks (37 mg/l on 6/8/15)
- Clearwater River at County Road 127, east of Plummer (51 mg/l on 6/8/15)

High total phosphorus concentrations (relative to the State's proposed 0.05 mg/l and 0.10 mg/l standards) were found in:

- Hill River at 335th Avenue SE (6 days > 0.10 mg/l)
- Clearwater River at CSAH 2 (5 days > 0.05 mg/l)
- Clearwater River at CR 127 (5 days > 0.1 mg/l)
- Hill River at CR 119 (4 days > 0.10 mg/l)
- Clearwater River in Red Lake Falls (3 days > 0.10 mg/l)
- Judicial Ditch 73 by Rydell National Wildlife Refuge (2 days > 0.10 mg/l)
- Lower Badger Creek at CR 114 (1 day > 0.10 mg/l)
- Lost River at CSAH 28 (1 day > 0.10 mg/l)
- Lost River at CR 119, north of Brooks (1 day > 0.10 mg/l)

After the end of the monitoring season, Clearwater River Surface Water Assessment Grant data was gathered from project partners, entered into an EQuIS data submittal template, and submitted to the MPCA. 2015 photos (labeled) and calibration records were also submitted to the MPCA Project Manager. A data review was completed on the 2015 Clearwater River SWAG monitoring data so it could be finalized in the EQuIS water quality database. A final progress report for this project was written and submitted to the Minnesota Pollution Control Agency Project Manager. The final report compares the number of samples collected to the number of samples that were planned and also provides an analysis of blank and field replicate sample results.

Investigation of Blue-Green Algae in the Mud River in Grygla

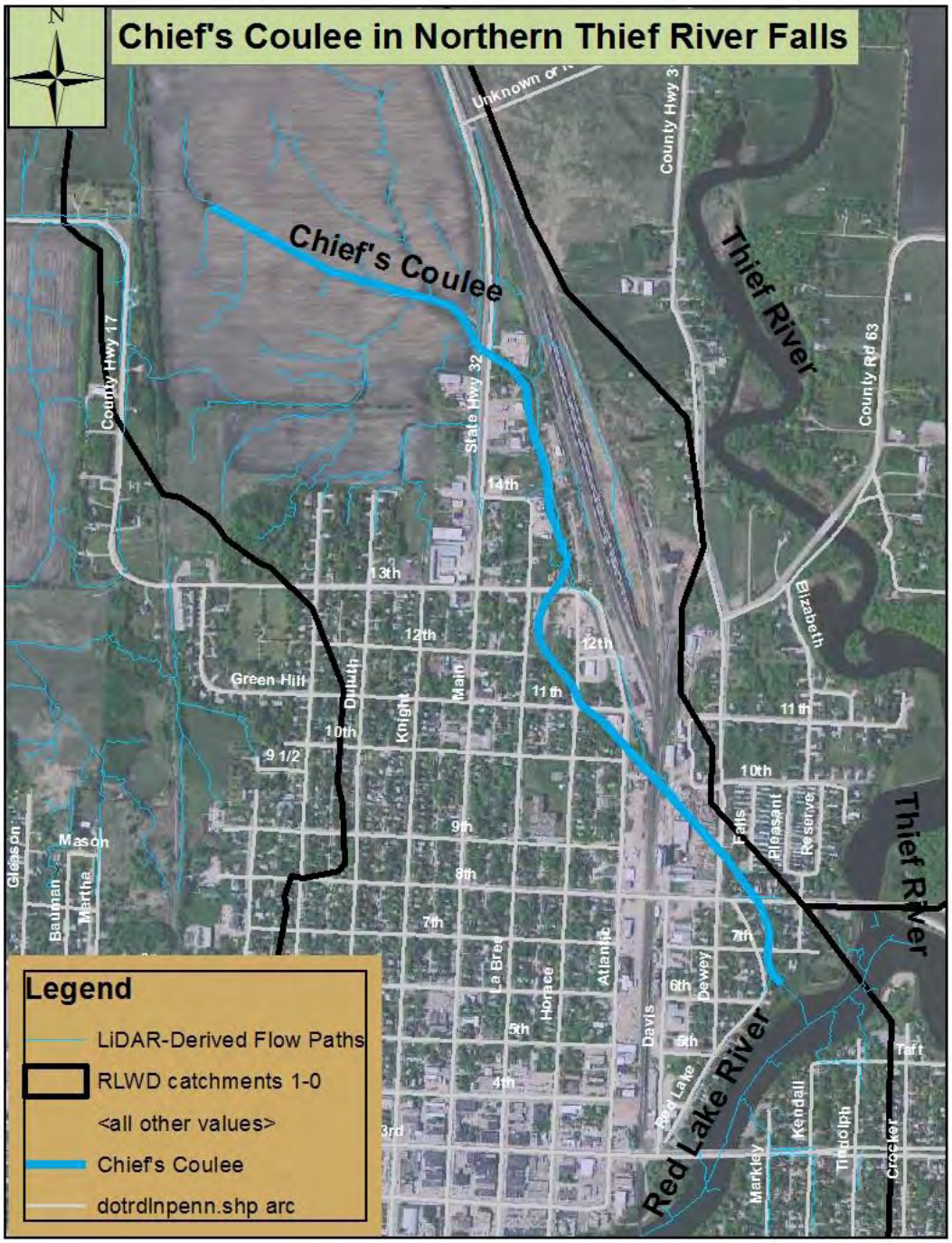
Over the past two years, dog sicknesses and even deaths occurred due to poisoning from blue-green algae (microcystin). Both events occurred after the dogs drank water from the Mud River in Grygla during the latter part of the summer. In early 2015, Marshall County and District staff worked on the development of a monitoring plan in order to learn more about the blue-green algae problem that has been discovered in the Mud River in the town of Grygla. There is evidence that the problem is recurring. One of the dogs that died from cyanotoxin (toxin produced by blue-green algae) poisoning in 2014 had also been ill in the fall of 2013 and recovered from symptoms that were indicative of cyanotoxin poisoning. Past continuous monitoring data was examined to see if high dissolved oxygen fluctuation and high pH levels (indicative of algae blooms) occurred during the summers that were monitored (2007, 2008, 2009, 2012). Late summer (August-September) increases in dissolved oxygen fluctuation occurred in 2007, 2009, and 2012. High pH levels (at or above the top of the 6.5-9 desirable range for aquatic life support) occurred in 2007, 2008, and 2009. 2012 pH data was not available.

The District began conducting some intensive sampling in the Mud River in July 2015 to attempt to understand more about when the problem occurs and what might be causing it. Abraxis blue-green algae test strips have been purchased and will be used to test the water when flows are relatively low. A dissolved oxygen logger has been deployed in the river. District staff began sampling two sites along the Mud River in Grygla in the third week of July and will continue to sample those sites weekly through the end of September. A resident of Grygla has been measuring dissolved oxygen and other parameters with a multi-parameter sonde on a regular basis at multiple sites. Initially, flows were high in the river due to discharge from the Moose River Impoundment and chlorophyll-a concentrations were low. Total phosphorus and E. coli concentrations were also low. Despite some lower flows and warm weather, all of the weekly tests for blue green algae were negative (zero blue-green algae present). The flows may not have been as low as they were when dogs were poisoned in previous years. Relatively high (>126 MPN/100ml) E. coli concentrations were found at both monitoring sites (CSAH 54 Bridge and in the City Park) on multiple occasions.

A sign has been posted in the park along the river to warn of the potential hazard.

Dissolved oxygen logger deployment pipe.

Investigation of Water Quality in Chief's Coulee in northern Thief River Falls



Pennington County SWCD and District staff worked together to plan a sampling effort on Chief's Coulee in Thief River Falls. Chief's coulee drains urban and agricultural land in northwest Thief River Falls. The outlet of the Coulee is downstream of the confluence of the Thief River and Red Lake River at Red Robe Park on the west side of the Red Lake River. There is little or no flow in the coulee most of the year except during rainfall events or high flows in spring. Monitoring of the coulee is needed to gather data for a potential drainage improvement project. The plan was to collect some data prior to planning a project to improve drainage and repair rusting and damaged pipes. Sampling results have revealed that there are big problems occurring along this drainage-way.

Sites along Chief's Coulee were sampled for E. coli, nitrogen: (ammonia as N, nitrate & nitrite, and total Kjeldahl nitrogen), orthophosphate as P, total phosphorus, total suspended solids (TSS), diesel range organics, gasoline range organics (GROs) chlorophyll-a and fluoride. Field measurements were taken with a Sonde when possible for dissolved oxygen, pH, conductivity, temperature. Turbidity was measured using a portable turbidimeter and photos will be taken at the sites. The field data and water samples was collected alternately by the Pennington SWCD the District. Costs for the lab analysis will be paid alternately by the Pennington SWCD and the District.

The first samples along Chief's Coulee were collected on May 18, 2015. At Dewey Avenue N, the E. coli concentration was 11,199 CFU/100ml! That was a record high concentration for any sample collected by the Red Lake Watershed District at that time! It was eventually topped by another sample at the site and a sample at Pennington County Ditch 21. Another interesting thing about this high concentration is that the concentration at Atlantic Avenue (upstream) was a lot lower at 178.5 CFU/100ml. Much of Chief's Coulee is actually underground between those two crossings. So, the source of the bacteria was a mystery until further investigation was conducted.

Diesel range organics were detected at both the Dewey Avenue and Atlantic Ave crossings. The concentration of total suspended solids increases from 4 mg/l to 18 mg/l from Atlantic Avenue to Dewey Avenue. E. coli concentrations exceeded the chronic standard of 126 CFU/100ml at all of the sites, even at the furthest upstream site at Highway 32.

The second set of samples were collected along Chief's Coulee on June 2, 2015. Between Atlantic Avenue and Dewey Avenue, the E. coli level increased from 1,413.6 CFU/100ml to >2,419.6 CFU/100ml. Diesel range organics were detected at both Dewey Avenue (24 mg/l) and Atlantic Ave (.23 mg/l).

High E. coli concentrations were again found at the Dewey Avenue crossing of Chief's Coulee when it was sampled by the Pennington County SWCD on July 8th, 2015. The record high for E. coli concentrations from samples collected within the Red Lake Watershed District was broken again with a concentration of >24,196 MPN/100ml. A major source of fecal bacteria was located somewhere in between the Atlantic and Dewey Avenue crossings of Chief's Coulee was causing a tremendous increase in E. coli concentrations. Between those crossings are a grain elevator, a pallet business, some homes, and a sanitary sewer line. Diesel range organics were once again present in measurable concentrations at two of the monitoring sites.

On August 6th, 2015, very septic water was found to be flowing in Chief's Coulee at that Dewey Ave crossing. No flow was observed at the upstream street crossing. Therefore, the source of the problem had to have been coming from somewhere in between the Atlantic and Dewey Ave crossings. Between those crossings are a series of co-op grain elevators, a pallet company, a sanitary sewer line that parallels Dewey Avenue (approximately 150 feet west of the street), and homes.

City of Thief River Falls and Pennington County Soil and Water Conservation District staff assisted with identifying potential sources. A hose was found to be draining discolored water from a large sump pump well. The pool that was receiving water from this hose was very green and looked…bad. It had a "rotten grain" sort of smell (not septic). Samples were collected directly from the hose and the search continued for the septic inflow. The sample analysis results from the sump pump drainage system had a maxed-out E. coli bacteria concentration of >2,419.6 MPN/100ml along with high levels of sulfates, total suspended solids, total phosphorus, orthophosphorus, total Kjeldahl nitrogen, and ammonia nitrogen.

A ditch near the sanitary sewer line was also inspected A septic smell was evident near the lower end of the ditch and septic seepage was found within that ditch. Samples were collected from the seepage (TRF 10th St E Ditch) and sent them to RMB Environmental Laboratories for quantification and to the Source Molecular laboratory in Florida for identification of human fecal DNA markers. Analysis of the samples collected from the ditch showed high concentrations of E. coli bacteria (in the ditch and in Chief's Coulee) and high levels of human biomarkers. City staff discovered that a home near the ditch was not hooked up to the sanitary sewer line and the effluent was seeping into the ditch from the home's septic system. The homeowner was very cooperative and worked with the city to get the home hooked up to the city's sanitary sewer system by early October, 2015.

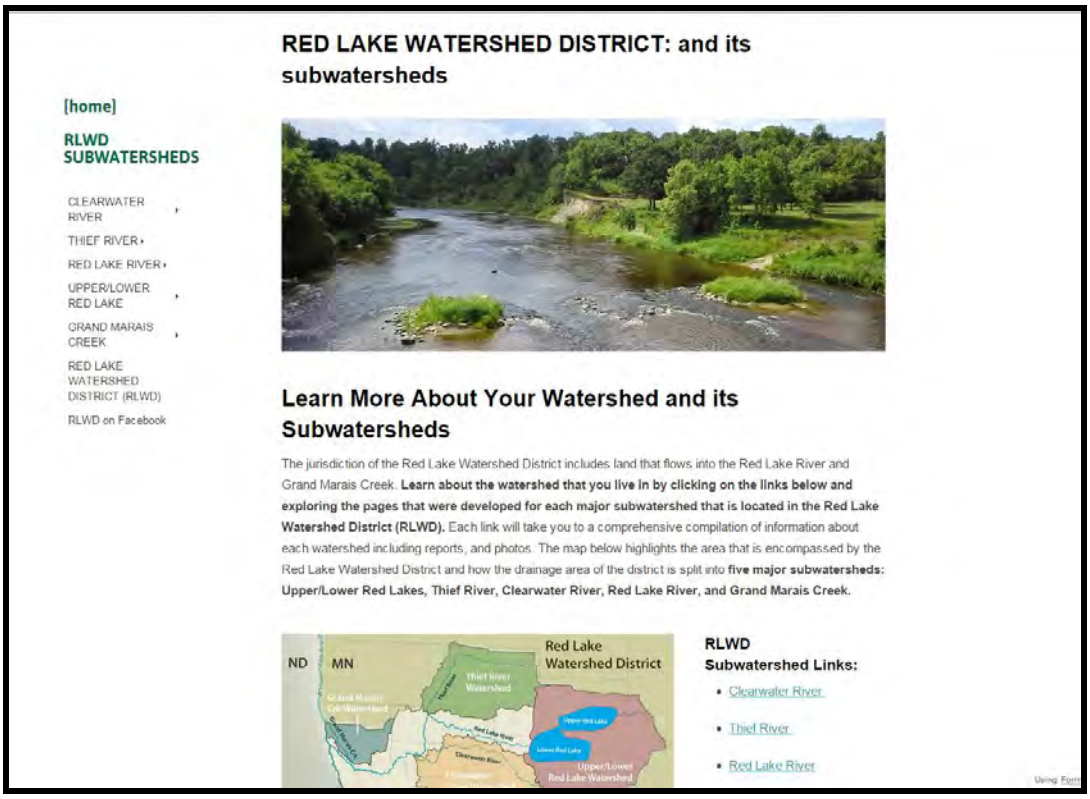
New Webpages Provide Watershed-Based Information

The Red Lake Watershed District, with help from Emmons and Olivier Resources, Inc., has launched a new set of web pages to make it easier for anyone to learn more about a watershed. Each of the five major watersheds within the Red Lake Watershed District will have has its own set of pages with general information, links to reports, a photo gallery, Watershed Restoration and Protection project information, maps, and contacts. Organizing information by watershed should make it easier for people to find information that is pertinent to the area in which they live/farm/hunt/fish.

Grand Marais Creek has had its own web pages for a while now. The Thief River, Clearwater River and Red Lake River watersheds were completed using this new format and the Upper/Lower Red Lakes watershed will get its own dedicated web pages during the Upper/Lower Red Lakes Watershed Restoration and Protection project.

These pages were made possible by the civic engagement objectives that are a part of each watershed's Watershed Restoration and Protection projects, which are funded by the Clean Water Land and Legacy Amendment.

Follow this link to begin exploring your watershed: http://www.rlwdwatersheds.org/



Public Education

District staff helped run stations at the Pennington County Outdoor Education Day (Minnow Races and "The Incredible Journey"). They also helped with the Northwest Minnesota Water Festival events for 4th graders that were held in Fertile and Warren at the Water Quality and Watersheds stations ("Watersheds" and "Turbidity or not Turbidity"). Also, various other presentations were given by District staff in 2015. The District donated $300 to the Area I Envirothon.

District staff created a Flickr account for sharing georeferenced photos of erosion problems and georeferenced scenic photos. Other local government staff can use this as a tool for finding areas where erosion control projects can be implemented. A map-based search for photos can be conducted at this site: https://www.flickr.com/map. The District photos can be found at this site: https://www.flickr.com/photos/131072259@N04/.

The District has a Facebook page. By "liking" the Red Lake Watershed District, people can stay updated with meeting announcements, photos, progress of District projects, events, photos, and news. "Like" the Red Lake Watershed District on Facebook to stay up to date on the work that we are doing. "Like" us at: http://www.facebook.com/pages/Red-Lake-Watershed-District/266521753412008?sk=wall

A new website was created to provide information on a watershed-by-watershed basis. Users can pick the watershed in which they are interested (e.g. the one that they live within) and see all of the information that is available for that watershed, view maps, view photos, and view up-to-date WRAP project information. Go to www.rlwdwatersheds.org to learn more about your watershed.

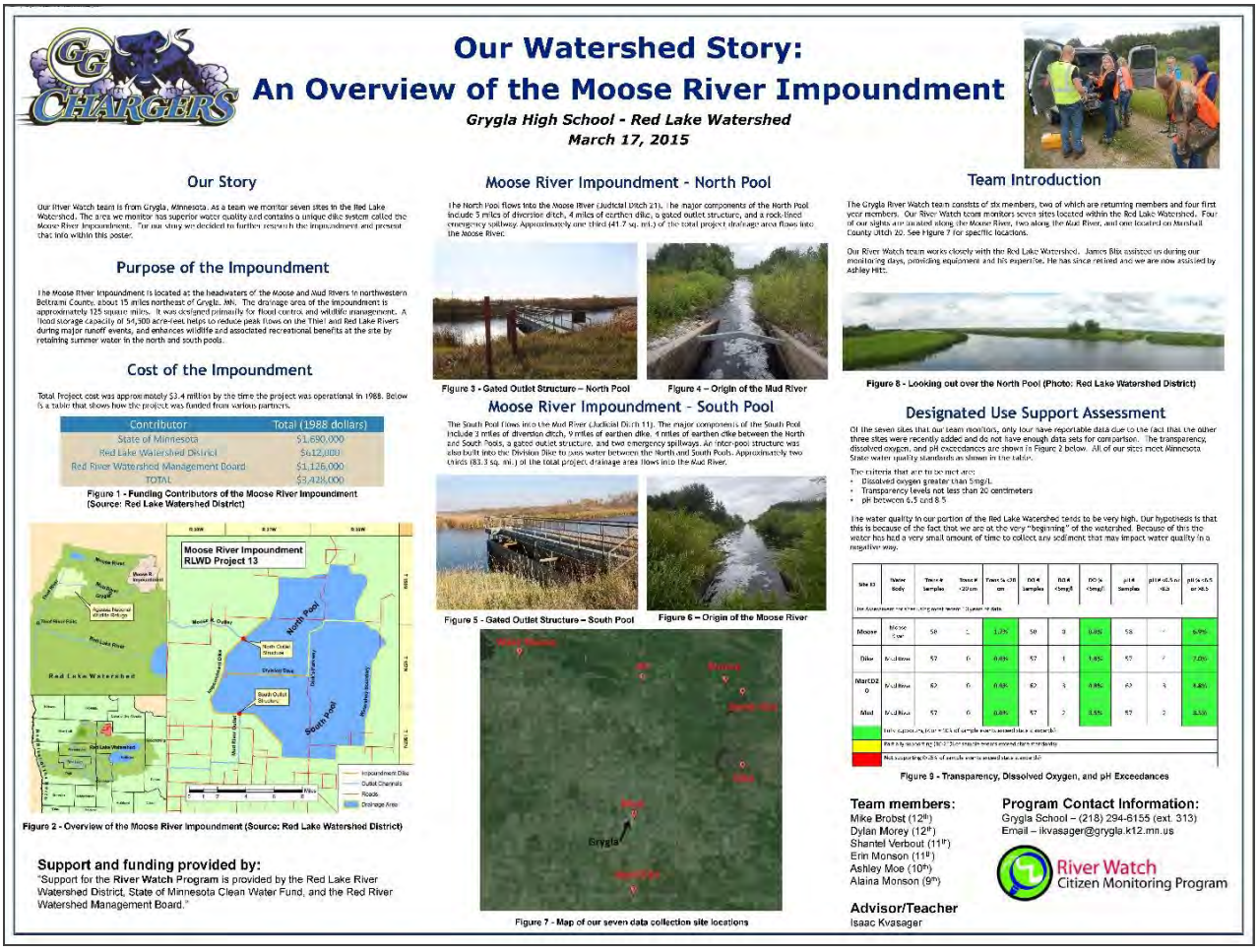
Monthly water quality reports continue to be available on the District's website: http://www.redlakewatershed.org/monthwq.html

River Watch

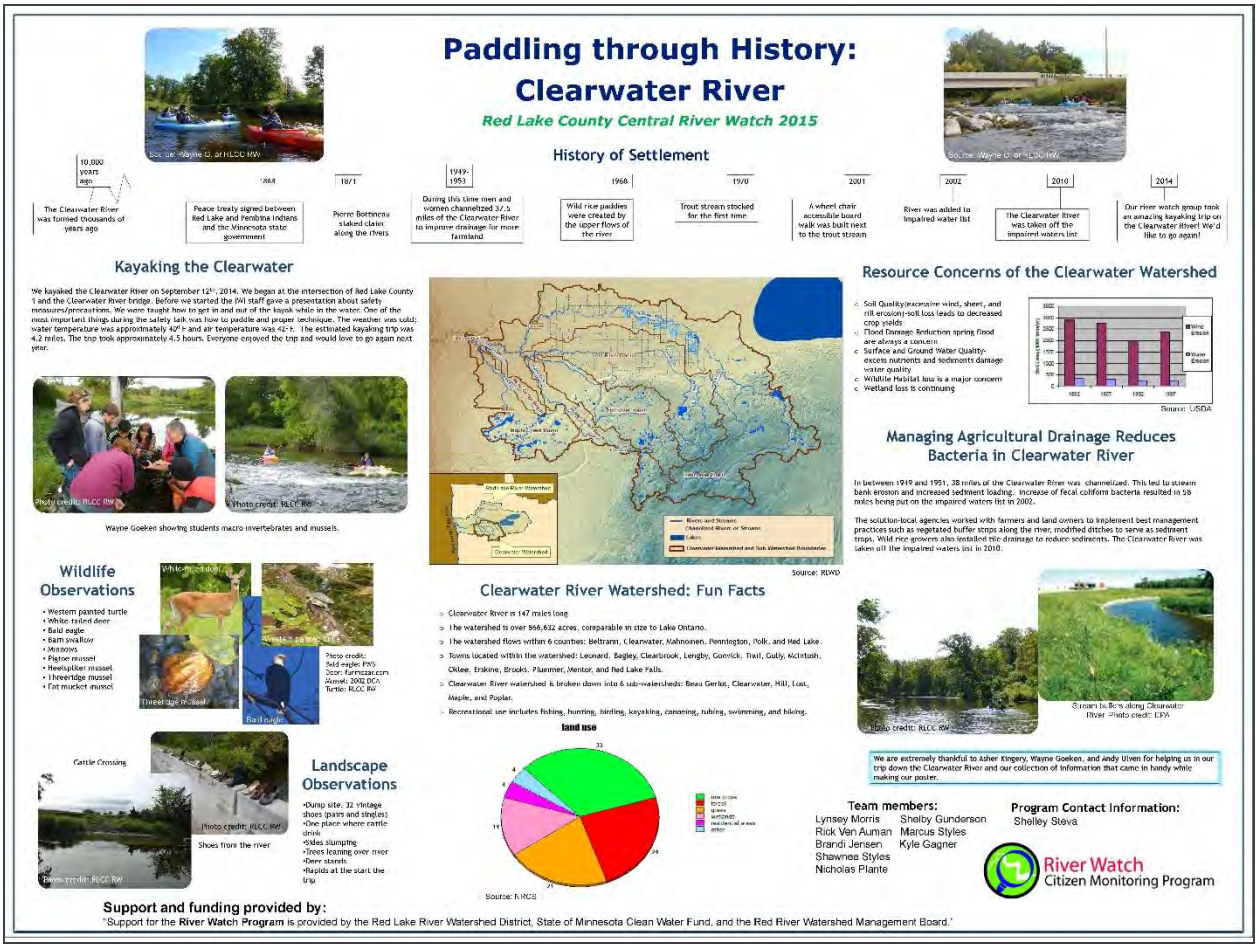
2015 River Watch involved 9 schools located within Red Lake Watershed District's boundaries. 5 of which received direct support from RLWD staff, they included: Grygla, Win-E-Mac, Red Lake County Central, Red Lake Falls and Clearbrook-Gonvick. International Water Institute and University of MN Crookston led the other school groups in the watershed including: Fisher, Red Lake, Crookston, and Sacred Heart of East Grand Forks, MN. River Watch water quality monitoring began late March and ended early November.

In March schools from Minnesota and North Dakota descended upon the University of Minnesota Crookston campus for the 20th annual River Watch Forum hosted by International Water Institute. This year's poster contest theme was "Watershed Stories". Win-E-Mac won silver in the people's choice category and received a plaque honoring them for 20 years of River Watch monitoring. Red Lake County Central and Red Lake High School each received awards for 10 years of River Watch monitoring. Grygla took home the golden canoe trophy for winning River Watch Jeopardy, a lucky Grygla student also took home a kayak, one of many door prizes given out. Students and teachers attended several breakout session with topics ranging from aquatic invasive species, climate change, and natural resource professions.

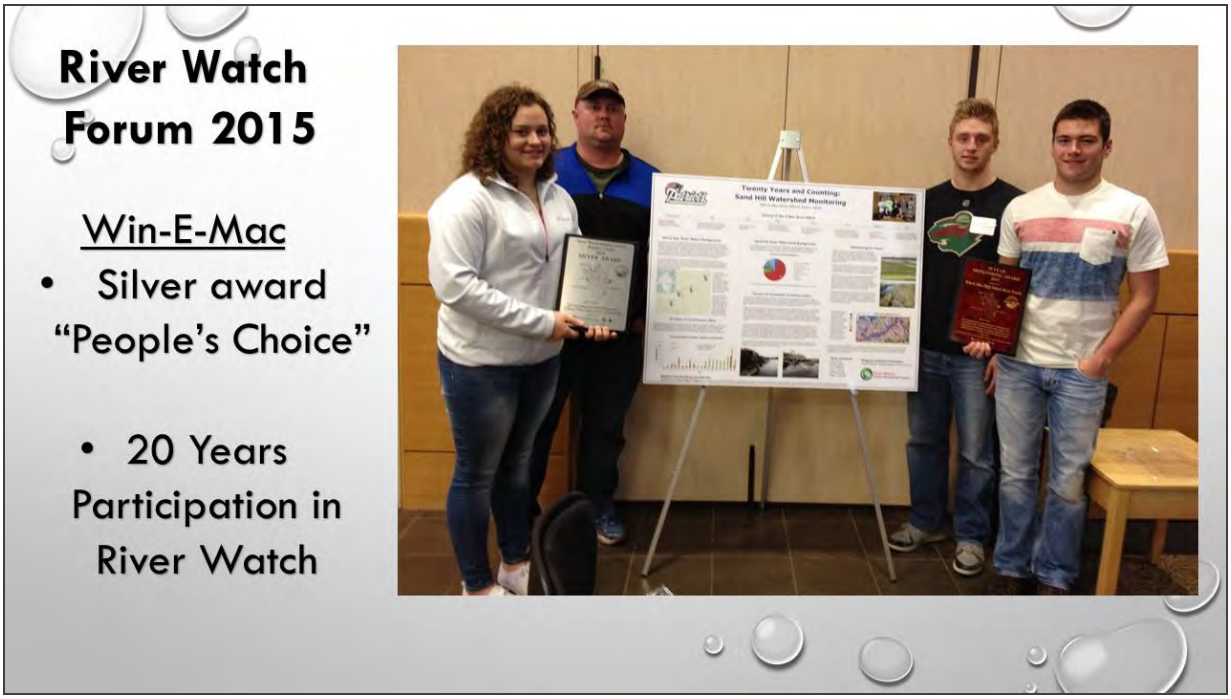
River Watch water quality data is part of a data set used by the Minnesota Pollution Control Agency to conduct use assessment, there are some areas within the watershed where River Watch data is the only data collected, making River Watch a very beneficial program for collecting water quality data within the watershed district.

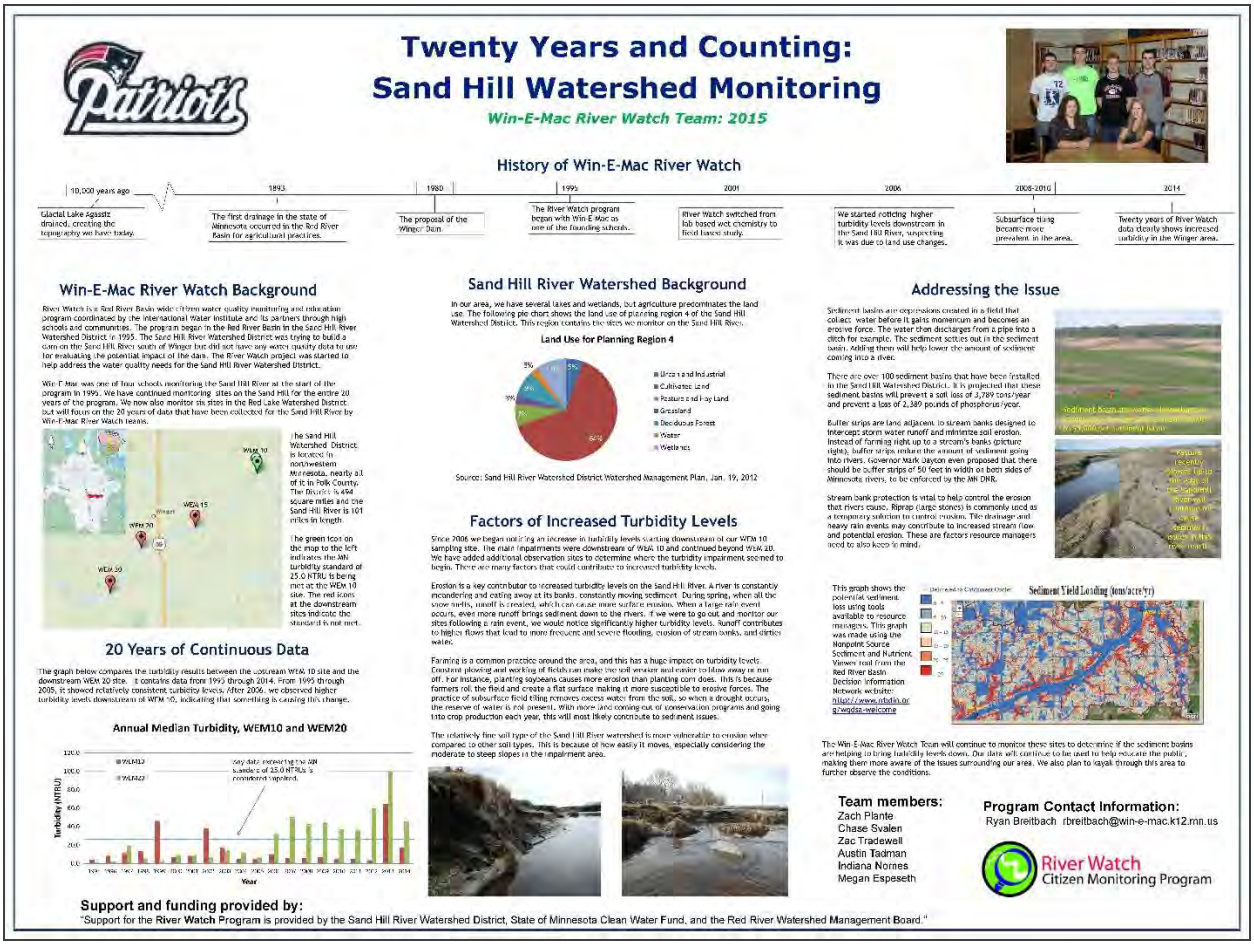


Grygla – 2015 River Watch Forum Poster



Red Lake County Central 2015 River Watch Forum Poster





Win-E-Mac 2015 River Watch Forum Poster

River Explores Kayak Trip

Students and their advisor from Win-E-Mac River Watch team participated in a River Explores kayak trip in July under the guidance of Wayne Goeken and Andy Ulven of the International Water Institute. Students kayaked a stretch of the Sandhill River, paddling through areas they had sampled for water quality earlier that day. Students observed river characteristics, local flora and fauna, and overcame challenges such as kayaking over beaver dams. Students were encouraged to take photos using waterproof geotagging cameras, that log the exact location a picture is taken. Students had a great time getting to know a portion of one of the rivers they monitor, they are also still talking about the only person that flipped their kayak that day.

Win-E-Mac River Watch team kayaking the Sandhill River

Challenger Elementary Field Trip

2015 was the 5th consecutive year of RLWD involvement with 4th graders at Challenger Elementary in Thief River Falls. In October RLWD staff and 4th grade science teacher Sherry Miller gathered students in Hartz Park to learn about watersheds and water quality. RLWD staff did a hands on activity demonstrating what a watershed is and how it works. Staff also demonstrated the use of a Van Dorn water sampler and Secchi transparency tube. Students were furnished with field kits to do their own water quality testing of Red Lake River water collected with the Van Dorn sampler.

Geographic Information Systems (GIS)

Culvert Detection– Clearwater Basin (157E)

Much of January and February 2015 was spent identifying culverts and other structures that create subsurface drainage in the Clearwater River Basin. These subsurface drainage structures cannot be detected by LiDAR thus must be identified manually. Line features were placed along real word culvert locations using LiDAR and aerial imagery used to locate culverts. Culvert line features will serve as guides for flow paths when "burned" into the LiDAR Digital Elevation Model (DEM). When all culverts have been identified the DEM can be used for modeling using ArcGIS.

PTMapp (Prioritize Target and Measure Application)

Much of November and December was spent learning about and trial testing a new GIS tool, PTMApp, developed by International Water Institute, Red River Watershed Management Board, MN Board of Soil and Water Resources, and Houston Engineering Inc. PTMApp uses LiDAR data and terrain analysis methods to prioritize field scale locations for conservation and best management practices. Generating data to prioritize resources/issues, target specific fields to place CPs and BMPs, and **measure** water quality improvement by tracking expected nutrient and sediment load reduction to priority resources. The tool enables users to build prioritized and targeted implementation scenarios, measure the cost-effectiveness of the scenario for improving water quality, and report the results to pursue funds for project implementation. PTMApp is being applied to the One Watershed One Plan development for the Red Lake River Watershed. More training and data development needs to take place before PTMApp can be used to generate data in other sub-watersheds within RLWD.

Other Watershed Activities

2015 Summer Storm

A significant summer rainfall event occurred in early June and impacted parts of Polk and Red Lake Counties. The intense 4 to 6 inch rain occurred in about a 3 hour duration. Runoff overtopped and washed out roads, seeded cropland was flooded for a short time, and homes were damaged east of Crookston.

St. Hwy. 32 & U.S. Hwy. 2 (Marcoux Corner) – June 3, 2015
Water had flowed over the intersection

Upper Cyr Creek – South Central - Red Lake Co.

June 3, 2015

June 4, 2015

Terrebonne Twp. - Red Lake Co. – June 3, 2015

June 4, 2015

Red Lake Co. – County Ditch #2 – June 3, 2015

June 4, 2015

Polk / Red Lake Co. Line – Co. Hwy. #49

Permits (RLWD Project #90)

A total of 184 permit applications were received in 2015. In addition, the District also dealt with permit violations relating to unpermitted/unauthorized work. Written warnings were sent explaining that if there is a second offense, the responsible person or entity could possibly be subject to an administrative fee, re-storing the work to the original condition, and paying for any engineering and attorney's fees incurred by the District.

Addition to Permit rules – to include Subsurface Drain Tile

Throughout the year, several meetings and discussions were held to address drain tile projects and how to best incorporate logical criteria into the existing rules and regulations. These meetings involved 3 Watershed board members, staff, landowners, installers, and was also discussed at the Advisory Committee meeting in March. On September 30th, the Watershed District Board of Managers implemented into the Rules and Regulations, the new permitting policy for field tiling as part of the permit application.

Lost River at U.S. Highway #59 near Brooks: MnDOT permit new culvert installation - 3 lines of 12' x 10' boxes.

U.S. Highway #2 & Red Lake River at Crookston: MnDOT project – river bank slump was threatening the highway. Picture shows excavating one of 10 vertical walls on 'outside bank' – walls are 4' wide, 50' to 100' in length and an average of 70'below ground where the backhoe is working.

Polk County, Badger Township: Approximately ½ mile of unacceptable/unauthorized work. Road culvert was placed about 21 inches too low. District staff surveyed excavation and developed a repair plan which the applicant will complete in 2016

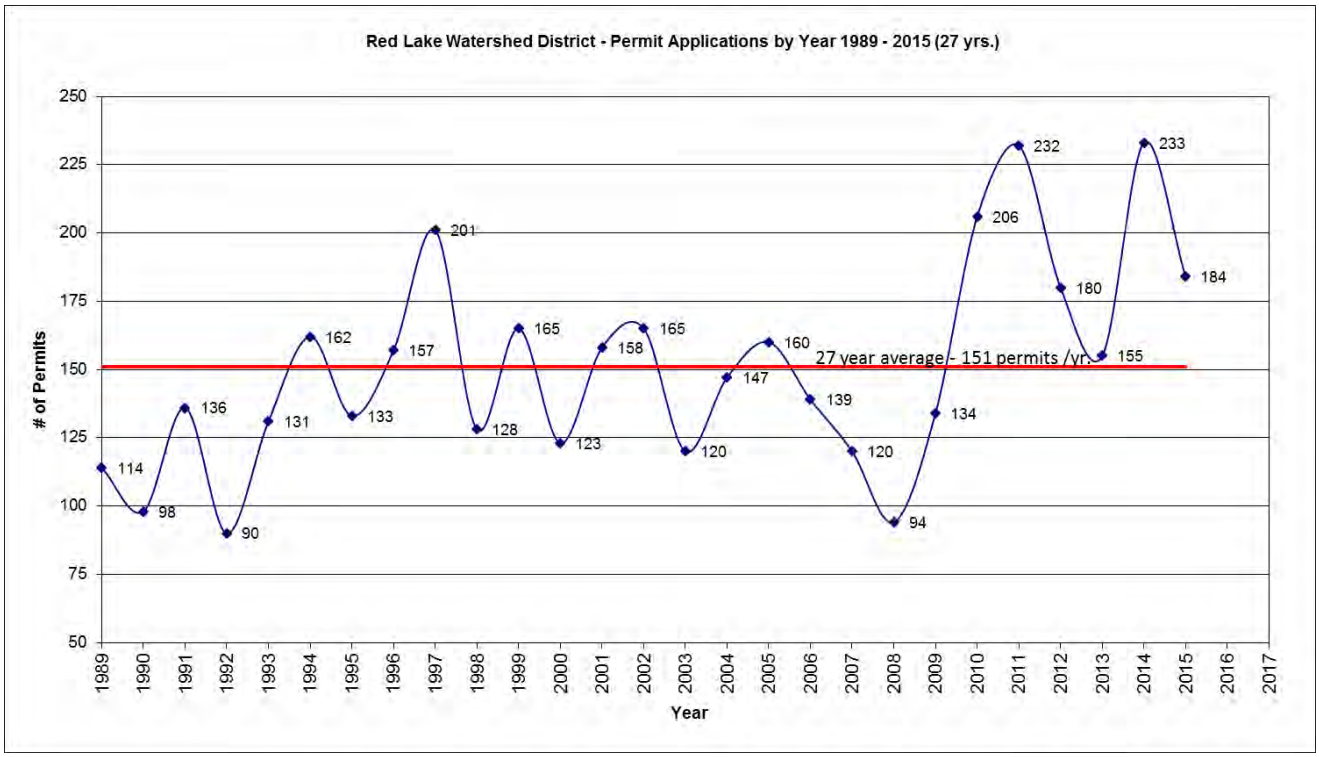
Polk County, Crookston Township: Applicant performed more work than listed on permit. District staff surveyed area, established design elevations, and had meetings with the Township and adjoining landowner to resolve concerns

Of the permits received in 2015, one was tabled, one denied and one withdrawn. The numbers listed below indicate the permits approved and how they are categorized within our rules for permitting:

- 2 utility
- 2 re-grade
- 134 culvert/bridge
- 28 drainage
- 9 tile

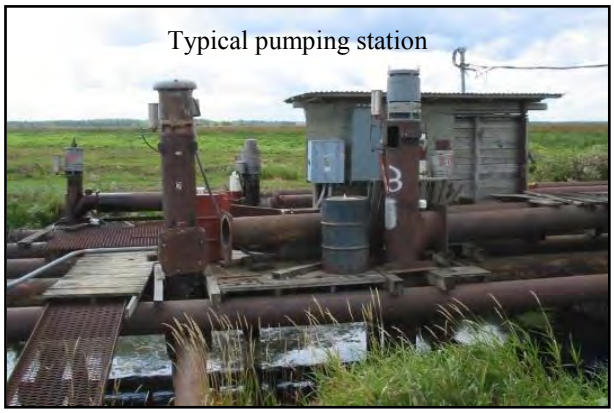
Applicants included state and county highway departments, railroads, townships, cities, utility companies, State & Federal agencies, landowners, and private individuals. Examples of the work consisted of road and bridge projects, wetland restoration, culvert installations, and ditch cleaning. Work associated with permit review consists of, watershed delineations, detailed surveys, drainage area and culvert sizing recommendations, and meetings.

Permit applications are available on the District web site:www.redlakewatershed.org



Wild Rice Water Allocation (RLWD Project #45)

As a domesticated agricultural grain crop, wild rice is grown in paddies, flooded with water to an average depth of about 1 foot.


Typical pumping station

Wild rice production along the Clearwater River began in 1968. The water allocation project was petitioned by the growers in 1984 and involves the appropriation of water for the production of wild rice on approximately 12,000 acres of paddies along the Clearwater River. Spring flood storage capacity is substantial, and amounts to about 23,000 acre feet, which is equivalent to 1.1 inches of runoff. This storage helps to reduce downstream flood flows/peaks.


Wild rice paddy

Throughout the year, during periods of low flow, the District allocates water to the growers. The allocation program ensures that each grower receives their appropriate share of available flow and that the protected flow of 36 cubic feet per second (cfs) is maintained in the Clearwater River. The paddies are drained during July and August to facilitate harvest.

When there is adequate flow, some growers partially flood paddies in the fall through freeze up. By doing this, it helps to reduce the need of pumping activity in the spring, at which time, water supplies may not be sufficient to meet all of their needs.

During much of 2015, there were very few rainfall events to provide substantial and extended runoff to the Clearwater River. Extensive staff time was needed this year, as allocation was necessary for several weeks in the spring and also from late October to late December. At times, during the summer season, flows in the Clearwater River dropped below the minimum level and pumping was suspended. Staff also needed to perform extra stream flow measurements. Normal duties include correspondence with growers, and recording river levels at various sites. The growers also provide valuable information on river conditions and stream gage data.


Harvesting wild rice

Stream Flow & Pool Elevation Monitoring (RLWD Project #21)

Stream flow monitoring is a vital on-going activity. The District has an active stream gauging program and local volunteers assist us in recording gauge readings and monitoring river conditions during runoff events. Approximately 160 gauges of various types (staff, wire weight, automated) are located throughout the District. Many automated river level gauges within the district can be accessed via the internet, and are extremely valuable to obtain "real time" data. In recent years, various State and Federal Agencies have installed additional automated gauges at various locations.

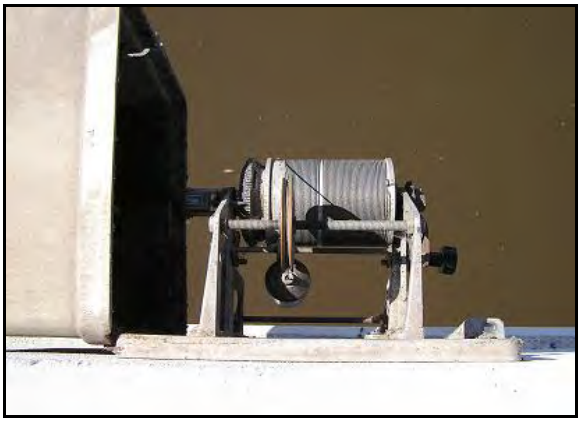
District staff performs flow measurements and continues to develop stage (gauge height) and discharge (flow in cubic feet per second) curves at many locations. This data, in conjunction with records and cooperative efforts from other agencies such as the U. S. Geological Survey (USGS), National Weather Service, and the MnDNR will help everyone better understand drainage and runoff characteristics within the District. With several years of recorded data, it will become increasingly valuable for the Board of Managers and staff, in the operation and maintenance of existing projects and also for the development of potential projects.

High-water staff gauge – Moose R.at Mar. Co.Hwy. #54


Measuring flow Clearwater River at Plummer

Typical staff gage at structure


Automated river gauge–Clearwater R. at Red Lake Falls


Wire weight gauge on bridge

Snow Surveys

Each year, the District performs snow surveys which usually begin in about the middle to late February and continues through the spring melt. Eight sampling sites are monitored throughout the District. The locations of these sites are near impoundment facilities which are designed and operated for floodwater retention.

Due to the existing weather and snowpack conditions, only one snow survey was obtained in 2015. On March 6th, the average depth of the snow at our sampling sites was 9.6 inches and the water equivalent (moisture content) was 1.52 inches. The 2015 spring melt and runoff was basically "non eventful" in the basin. By March 12th, the landscape was void of snow cover and the surface water was also gone.

The depth of the snowpack is measured and a 'core sample' is obtained. The tube and snow core are weighed, and the "water content" of the snow is calculated. Five samples are taken at each site and averaged for the data.

Establish base weight of empty sampling tube

Obtaining snow depth and core sample

Establishing weight of snow sample to calculate water content

This information is forwarded to the National Weather Service, the North Central River Forecast Center and also local officials. This helps them to estimate the amount of runoff and make flood forecasting predictions. The relationship between snowpack and the amount of snowmelt runoff is complex, and depends on many factors.

Some of the criteria used to determine flood potential of spring snowmelt are:

- Depth of existing snow cover and snow moisture content
- Existing soil moisture (was it wet or dry the previous fall?)
- Depth of frost - or, is there any frost?
- River ice and ice jams

Fast and slow thaws:

- Gradual or intermittent thawing may reduce the potential for serious flooding, especially in areas with minimal frost depths
- Flood potential usually increases with late season melting, when a rapid melt is more likely; and if additional precipitation occurs during the runoff event.

Maintenance of Drainage Systems

One of the many tasks of the staff at the Red Lake Watershed District is to inspect the 300 plus miles of legal drainage ditch systems that are under the jurisdiction of the District. Semi-annual or annual inspections are conducted on these legal drainage systems to determine what type of repairs or any maintenance work that may be needed to keep these ditches functioning in good working order. Some of the many things that the District is looking for are, erosion around culverts, runoff event water damage to slopes or scouring of the ditch bottom, violation to the right-of-ways or buffer strips, and cattails or other weeds that may need to be sprayed.

Larson Helicopters from Perham, Minnesota was contracted this year to spray the Districts ditches due to an abrupt cancellation by Midwest Helicopters. A helicopter is used as many of the District ditches are not accessible to a ground sprayer because of fences, wet ground, and some of the ditches go cross country with no right of way to drive on. Very limited cattail control was needed on the District ditches and other projects this year. There was a total of 22.25 miles of ditch that needed to be sprayed for cattails out of the 316.5 miles of ditch that are under the jurisdiction of the Red Lake Watershed District.

Most of the Districts ditches have a permanent grass buffer strip, on one or both sides, by state law the buffer strip is required to be a minimum of 16 ½ feet wide, but is wider on some ditches. The District is required to inspect and maintain the grass strips. Maintenance of these buffer strips will consist of mowing the ditch and its right-of-way at least once a year, starting on or about July 1st, spraying for any noxious weeds as needed, and trying to keep them from being encroached on by farming practices. Contractors are hired each year to mow the many watershed projects and the approximately 161 miles of ditches that have ditch right-of-way.

Clearwater County

Clearwater River, RLWD Project #3 (Clearwater, Polk, Pennington, and Red Lake Counties)
A kayak inspection was performed by District staff in the summer. Staff reported numerous overhanging trees and 3 log jam locations, which severely restrict flows. Triple D Construction was hired to clean up these log jam locations. All log jams were located in Section 32, Garnes Township, Red Lake County. Pictured below is the removal process of the largest of the three log jams.


Before.


During.


After.

Judicial Ditch 72, RLWD Project #41

Larson Helicopters sprayed 3.5 miles for cattails out of the 16 miles in this ditch system. The District partnered with the Clearwater County SWCD and obtained a Clean Water Fund Grant. Under this partnership, 1.95 miles of buffer strip was established in Sections 19 and 30, Winsor Township. Also under that same partnership and grant, an erosion control project on this ditch system was completed in Section 19, Winsor Township. 1300' was re-sloped where there has been severe erosion taking place on both the field and road side slopes. The Clean Water Fund Grant was obtained to pay for 75% of land acquisition, establishment of buffer strip, and repair of failing bank erosion. The remaining 25% of cost to the project was provided by the RLWD using our Capital Project Funding related to Project #164.

Repairs to Stabilize JD 72 Channel.

Main Judicial Ditch 2, RLWD Project #51

Inspection of this system in the summer is very limited and is only possible from various road crossings and some trails. Trees were noted that will need to be removed at a later date. Areas of any erosion will be located and mapped for future projects. No mowing was done on this system as there are no buffer strips on this system. No cattail spraying was needed.

Judicial Ditch 2A, RLWD Project #48

Complaints about beaver dams on this ditch system were investigated, with two dams being found. District staff removed the dams by hand to alleviate the high water levels in the ditch and a trapper was called. Three beaver were trapped and the dams were permanently removed by the county. No spraying for cattails was needed on this ditch system this year. No grass buffer strip has been established on this ditch system at this time as it is presently not required under current ditch law therefore no mowing is needed.

Dam located in Section 17, Greenwood Township along Clearwater County Road 5.

Winsor/Hangaard, RLWD Project #113

Mowing of this ditch and its right-of-way was completed in late July/early August. Larson Helicopters sprayed 7.55 miles of the 13.9 miles of this ditch system for cattails. More of the old abandoned fences have been removed so the access has been greatly improved for the mowing of this ditch and its right-of-way. Some of the right-of-way stakes that the District had installed over the years have been removed or destroyed, the right-of-way is still intact. One right-of-way violation was found during this summer's inspection. The violation was 1 mile in length. The landowner was contacted and the area was reseeded in the fall.

1 Mile of Right of Way killed by spray.

Re-seeded in September.

Judicial Ditch 2B, RLWD Project #49

No spraying for cattails was needed in this ditch system this year. Mowing of the ditch and its right-of-way was completed in late July early August. A beaver dam was found during our annual inspection. Staff broke open a hole in the dam by hand to alleviate the high water level. A trapper was called in removed one beaver. The beaver dam was removed with a backhoe in late summer. The District contracted Roy Abraham to spray thistle, which was sprayed in the fall. A spring inspection will determine the effectiveness of the application, it will be determined at that time if it shall be sprayed again.

Seemingly annual beaver dam.

Flourishing thistle in Section 26, Winsor Township

Judicial Ditch 5, RLWD Project #102

Beaver still remain a big problem at three different road culvert locations on this system. The District removed an inactive dam under Clearwater County Road 23. Clearwater County Land Department removed a dam under the snowmobile trail just upstream of County Road 23. Clearwater County, Dudley Township, and the District are responsible for the removal of the beaver and beaver dams, depending on their locations. Informational meetings have been held with the landowners within the benefitted area, and a project work team was put together. Meetings have been held with the possibility of making a Flood Damage Reduction Project out of 4 Legged Lake, and also the possibility of the abandonment of the ditch. No type of action on this matter has been taken to date. There is no right-of-way on this ditch system, so no mowing was done (due to illegal culvert raising on this system, most of the legal ditch is under water in three different lakes). No spraying for cattails was needed on this ditch system.

Lost River, RLWD Project #4 (Clearwater, Polk, and Red Lake Counties.)

Inspection is scheduled for the winter of 2016, when the system is frozen and a snowmobile can be utilized. As this is our only access to this ditch system. The District will try and partner with the Clearwater SWCD on some erosion control projects in areas. Beaver are starting to become a problem building dams in some areas of this system, 2 beaver were trapped. One dam was removed this summer on the upstream of Polk County Road Bridge #28. No mowing or spraying was done on this ditch system.

Beaver Dam that was removed.

Red Lake County

RLWD Ditch 1, Lateral A and B, RLWD Project #5

Mowing of this ditch and its right-of-way was completed in late July to early August. No spraying was required on this system. It was observed that some right-of-way stakes that the District had previously installed have been removed or destroyed, but the right-of-way is intact.

RLWD Ditch 1 Lateral C, RLWD Project #115

Mowing of this ditch and its right-of-way was completed in late July early August. No spraying was needed this year. Some right-of-way stakes on this system have been removed or destroyed, but the right-of-way is still intact.

RLWD Ditch 7, RLWD Project #20
Mowing of this ditch and its right-of-way was completed in late July early August. No spraying was done on this system this year. Some right-of-way stakes have been removed or destroyed on this system but the buffer strip is still intact.

RLWD Ditch 3, RLWD Project #7
Mowing of this ditch and its right-of-way was completed in July. Larson Helicopters Sprayed 3.62 miles of the 5 mile system. Due to dry conditions, the District was able to mow the bottom of the ditch thus eliminating the need to spray cattails or small brush.

RLWD Ditch 10, RLWD Project #161
A local landowner is still haying the ditch right-of-way. The District once again had the bottom of this ditch system mowed in early August to remove any woody vegetation and cattails that may have started to grow. No spraying was needed in this ditch system this year. Manual labor was required on this system at the outlets of side water inlet pipes. Willows and other grasses have started to come through the rip-rap. Inspection of the rock chute was again completed after the spring runoff for any type of damage from winter frost action, and again in late summer for any water erosion that may have occurred over the past summer. This part of the project (rock shoot) was built in the summer of 2005, it has held up very well over the years, with only some small cracks showing in the grout, and has needed very little maintenance in the past 11 years.

Spring runoff water flowing down the rock chute and into the plunge pool on RLWD Ditch 10.

Polk County

RLWD Ditch 8, RLWD Project #36
Mowing of this ditch and its right-of-way was completed in late July early August. The right-of-way was inspected in the fall and was found to be intact with no encroachments.

Krostue Petition, RLWD Project #53
Mowing of this ditch and its right-of-ways were completed in early July. With dry conditions at the time of mowing, the bottom of this ditch system was able to be mowed. No spraying for cattails was needed in this ditch system this year. Some right-of-way stakes have been removed or destroyed on this ditch system but the right-of-way is still intact.

Kenneth Johnson Petition, RLWD Project #117
Mowing on this ditch and its right-of-way was completed in early July. No spraying for cattails was needed in this ditch system this year. With the dry conditions, the mower was able to mow the bottom of this ditch system. Some of the right-of-way stakes are missing or have been destroyed on this ditch system but the right-of-way is still intact.

Polk County Ditch Improvement, RLWD Project #119
Mowing of this ditch and its right-of-way was completed in July. No spraying of cattails was needed this year. LM Road Services did a very small amount of right-of-way spraying to kill woody vegetation.

Scott Baatz Petition, RLWD Project #12
This ditch and its right-of-way was mowed in early August by the landowner. No spraying for cattails was needed in this ditch system this year. With the dry weather in August, the landowner was able to mow the bottom of this ditch system and remove any cattails and small brush that may have been starting to grow. A few of the right-of-way stakes have also disappeared on this ditch system.

Polk County Ditch 63, RLWD Project #134
Mowing of this ditch and its right-of-way was completed in early July. Larson Helicopters sprayed 1.5 miles for cattails out of the 3 miles that are in this ditch system. The right-of-way was checked in early July and was found to be in compliance, but some right of way stakes have disappeared or been removed on this ditch system. With the assistance of West Polk SWCD, a BWSR Multipurpose Drainage Management Grant was applied for to assist in funding an erosion area at the outlet of this project. This grant was not approved so other options will be sought.

Polk County Ditch 33, RLWD Project #135
Mowing of this ditch and its right-of-way was completed in early July. No cattail spraying was necessary this year. The right-of-way was checked in the late fall and was found to be in compliance, but some of the right-of-way stakes have also disappeared or been removed from this ditch system. One right-of-way violation was found in this ditch system that was a 1 mile in length, a registered letter was sent to the landowners explaining how to get these back into compliance with the mandatory grass buffer strip that the District requires. The right- of-way was measured and stakes were installed. The landowner hired Wagner Landscaping to reseed the area and was brought back to compliance.


Reseeded right-of-way. Visible wheat stubble infraction.

RLWD Ditch 11, RLWD Project #166
Part of this ditch system is still being mowed by a local landowner and it is used for hay, with the remainder of the ditch being mowed by the District. Mowing was completed in July. Spraying for cattails was not needed in this ditch system this year. The right-of-way was checked in the late fall and was in compliance but some of the right-of-way stakes have been removed or destroyed.

Burnham Creek, RLWD Project #43B
Mowing of the ditch and its right-of-ways were completed by the middle of July. No cattail spraying was needed this year on the system. The right-of-way was checked late in July and was found to be intact. However, we did notice that some right-of-way stakes were either missing or destroyed. A local trapper was hired and six beaver were trapped. Two beaver dams were also removed.


Dam upstream of Polk County Road 45


Dam downstream of Polk County Road 45

RLWD Ditch 12, Project #169
Mowing of the ditch and its right-of-way was completed in early July. Larson Helicopters only needed to spray 1.54 miles for cattails out of the 17.5 miles in this ditch system this year. Because of the dry conditions, the mower was able to mow almost all of the bottom of this ditch. Some of the local landowners are haying parts of this ditch system. A few cottonwood trees that split from the trunk and fell into the right of way were cut up and hauled away off site. Snow removal was not required from the lateral ditches this year. The right-of-way was checked this summer and was found to be intact, but most of the right-of-way stakes on this ditch system have disappeared or have been destroyed.

RLWD Ditch 15, Project #175
This was the first summer of fully functioning operation for this system. Davidson Construction finished a small list of final payment punch list items early in the summer. The list included: finish shaping in some areas, small amount of right of way re-seeding, additional rip-rap, graveling of various field entrances, and installation of three additional side water inlets to alleviate field water issues. Due to the late completion of the system in the fall of 2014, some noxious weeds took hold in the summer of 2015. The system was mowed twice by the District for weed management. The District will continue to monitor vegetation 2016.

Pennington County

Red Lake River, RLWD Project #2
No Inspection was completed this year. No complaints were received.

Arveson Ditch, RLWD Project #109
Mowing of this ditch and its right-of-way was completed in early August. The mowing operator informed the District of four rocks that he had hit. The rocks were removed out of the right-of-way. Spraying for cattails was not required. The right-of-way was checked late fall and was found to be intact, most of the right-of-way stakes were still there.

Challenger Ditch, RLWD Project #122
Mowing of the ditch and its right-of-way was completed in early August. Larson Helicopters sprayed .27 miles of cattails in this ditch system this year. The drop structure trash rack had to be cleaned a number of times again this year, this is due to grass, straw, and household trash and litter getting caught on it and severely restricting the flow of water, this is something that will have to be watched and monitored after each runoff event.


Cleaned trash rack.

RLWD Ditch 13, RLWD Project #170A
Most of this ditch and its right-of-way is being mowed by some local landowners that are using it for hay, with other parts being mowed by the District. Mowing was completed in August. With the dry conditions, the ditch bottom was able to be mowed. we were . Due to minimal runoff this spring and a good establishment of grass, there has been no signs of any erosion so no major maintenance has been needed in this ditch system.

Thief River Flood Damage Reduction, Project #171A
Most of this ditch and its right-of-way is being mowed by local landowners that are using it for hay, with other parts being mowed by the District. Mowing was completed in late August. Pennington County was hired to spot spray a few areas of cattails at the inlet and outlet ends of culverts. Larson Helicopters sprayed 1.13 miles on the ditch system this year. Olson Construction TRF Inc. (Steve) was hired to utilize his mowing attachment on his excavator. The contractor mowed cattails that a conventional mower could not mow because of wet ditch bottom.

RLWD Ditch 14, RLWD Project #171
Most of this ditch and its right-of-way is being mowed by local landowners that are using it for hay, with other parts being mowed by the District. Right-of-way was checked late this fall and was found to be intact and most of the right-of-way stakes still standing. Larson Helicopters sprayed 3.14 miles for cattails. An area of right-of-way had to be re-seeded behind Aaseby Trailer Court. Damage was attributed to individuals on four wheelers and dirt bikes. Signs were put in place to deter travel on the right-of-way. Litter and cattails annually plug the trash rack at Greenwood Street. This summer there was so much debris at this location that a contractor was

hired to clean it up and haul it away. A complaint from a farmer concerning water ponding behind our right-of-way berm was investigated. A contractor was utilized to remedy this problem. An open outlet was dug at this location with a 10' bottom and 4/1 side slopes for ease of travel over this location.

Right-of-way that was re-seeded Aaseby Mobile home court.

Trash that had to be removed at Greenwood Street.

Cutting a hole in the berm to alleviate ponding water.

Final shaping taking place.

Beltrami County

RLWD Ditch 9, RLWD Project #39

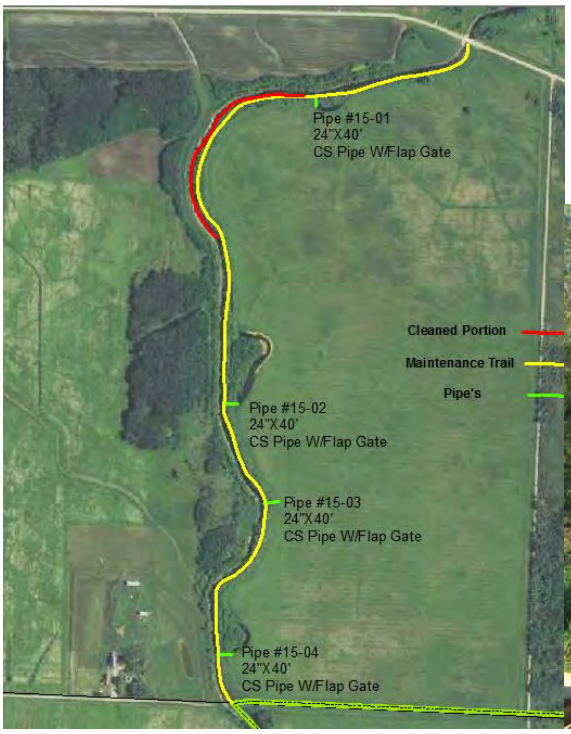
This ditch and right-of-way was mowed for both brush and weeds by Todd and Debra Stanley late in the summer. Cattail spraying was not needed again this year in this ditch system. Inspection of the right-of-way was done late this fall and was found to be intact.

Marshall County

State Ditch 83, RLWD Project #14

Mowing was completed in August on most of the established access trails and all other areas of this ditch system that the District has been working on over the past 12 years. Some areas could not be reached again this year due to slumps that have occurred, and other areas where fields that were in CRP are now being cropped. State Ditch 83 had high flows most of the summer that prevented a timely start to spot cleaning work this year. The District staff again inspected the channel of State Ditch 83 by four wheeler and pickup truck where it was possible.

The District again partnered with the Marshall County Soil and Water Conservation District to cost share on four side water inlet pipes with traps. Late summer the water levels were low enough to install the pipes and traps. The District started clearing a trail on the east side of the ditch throughout Section 32 of East Valley Township for maintenance purposes. Silt removal was completed on an 1800' stretch. A large number of trees were cleared and piled up to dry, and set to burn in the winter of 2016/2017. The District was notified of a silt bar that had formed in the ditch just upstream of a bridge along 380th Street NE or the north boundary of Agassiz National Wildlife Refuge. A contractor was hired to clean the silt to grade with the assistance of the District. The silt material was hauled off site.



2015 Maintenance work.


Contractor clearing trees in order to install side water inlets.


Silt bar in Channel.


Removed silt bar in channel.

To date we have approximately two miles of ditch channel left to spot clean. Some of these areas have very large amounts of silt that has built up over the years which will be excavated from the channel. It is the goal of the District to once again partner with Marshall County Soil and Water Conservation District and continue to install side water inlet culverts with traps on an as need basis.

To date there have been 83 sites cleaned in State Ditch 83 for a total construction cost of $379,145.00

Year	Sites Completed	Construction Cost
2003	5	$ 17,924.00
2004	High water levels	$ 0.00
2005	7	$ 39,033.00
2006	11	$ 36,004.00
2007	16	$ 42,144.00
2008	11	$ 34,450.00
2009	7	$ 41,574.00
2010	High water levels	$ 0.00
2011	6	$ 41,400.00
2012	11	$ 80,480.00
2013	5	$ 30,096.00
2014	High water levels	$ 0.00
2015	4	$ 16,040.00
Total	83	$ 379,145.00

Legal Drainage Systems under jurisdiction of Red Lake Watershed District

The District at present has jurisdiction of approximately 316.50 miles of legal drainage systems throughout the Watershed. The list of all the systems is shown below.

Ditch #	County	Length (mi.)
Red Lake River	Pennington	27.0
Clearwater River	Clearwater, Polk, Pennington, Red Lake	48.0
Lost River	Clearwater, Polk, Red Lake	43.3
RLWD Ditch #9	Beltrami	1.0
State Ditch #83	Marshall, Beltrami	22.0
Clifford Arveson Ditch	Pennington	2.2
RLWD Ditch 13	Pennington	2.1
RLWD Ditch 14	Pennington	5.42
Challenger Ditch	Pennington	0.32
RLWD Ditch #10	Red Lake	4.76
Equality/RLWD Ditch #1	Red Lake	2.25
RLWD Ditch #3	Red Lake	5.0
RLWD Ditch #1 lat A, B,	Red Lake, Polk	6.5
RLWD Ditch #7	Red Lake, Polk	12.6
Main Judicial Ditch #2	Clearwater	2.25 (e)
Judicial Ditch #2A	Clearwater	5.25
Judicial Ditch #4	Clearwater	3.6
Judicial Ditch #5	Clearwater	2.75
County Ditch #1	Clearwater	5.5
Judicial Ditch 2 B & C	Clearwater	5.6
Winsor-Hangaard	Clearwater, Polk	13.9
Judicial Ditch #72	Clearwater, Polk	16.0
RLWD Ditch #8	Polk	2.0
RLWD Ditch #11	Polk	6.5
RLWD Ditch #12	Polk	17.5
Polk County Ditch #63	Polk	3.0
Polk County Ditch #33	Polk	4.5
Polk County Ditch Improv.	Polk	12.7
Burnham Creek	Polk	14.0
Krostue Petition	Polk	1.6
Kenneth Johnson Petition	Polk	2.7
Scott Baatz Petition	Polk	1.5
RLWD Ditch #15	Polk	13.2
Total Miles of Ditches		316.5

Projects for 2016

Red Lake River/Grand Marais One Watershed One Plan Pilot Project – Red Lake Watershed District along with Polk, Red Lake and Pennington Counties and respective Soil Water Conservation Districts are continuing to work on a the Red Lake River/Grand Marais One Watershed One Plan Pilot Project. It is assumed that this project will be finalized mid-Summer with upward of three public hearings being held in each respective County with Red Lake Watershed District participating jointly with a hearing yet to be determined.

Four Legged Lake Watershed, RLWD Project 102A – Continue to meet with Project Work Team to develop a consensus for a project that will address the public concerns with that of the State. This may include a legal drainage system abandonment along with the development of a flood damage reduction project working in conjunction with a waterfowl management plan for the chain of lakes. Late 2015, the Red Lake Watershed District applied for a grant under Public Law 566 funding which is managed by the Natural Resource Conservation Service (NRCS). It is expected that the executed grant agreements will be approved early to middle February 2016.

Pine Lake Watershed, RLWD Project 26 - Continue to meet with Project Work team to develop a consensus for a project that will address the public concerns with the operation of the structure on Pine Lake and upstream investigation for flood damage reduction. Late 2015 the Red Lake Watershed District applied for a grant under Public Law 566 funding which is managed by the Natural Resource Conservation Service (NRCS). It is expected that the executed grant agreements will be approved early to middle February 2016.

Red River Basin Long Term Flood Solution, RLWD Project 92A – Continue to search various areas throughout the Red Lake Watershed District to incorporate 20% reduction strategies wherever possible.

The District will also continue to provided technical support for River Watch Program and participate in public education opportunities as well as continuing to look for project or opportunities to assist the public as the needs arise.

Work will continue on Thief River Watershed Restoration Assessment Project (WRAP), Red Lake River WRAP, Clearwater River WRAP, and Grand Marais Creek WRAP. Draft TMDL and WRAPS reports are expected to be completed for the Thief River and Red Lake River watersheds in 2016.

A WRAP for the Upper and Lower Red Lakes watershed is also in progress and will be managed by the Red Lake Department of Natural Resources.

Sampling for the District's long-term monitoring program will take place in May, June, July, and September of 2016.

The MPCA will conduct an official water quality assessment of the Clearwater River and Upper/Lower Red Lakes watersheds in 2016. District staff will provide input during the assessment process.

Financial Report

RED LAKE WATERSHED DISTRICT

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2015

Our discussion and analysis of the Red Lake Watershed District financial performance provides an overview of the District's financial activities for the fiscal year ended December 31, 2015, within the limitations of the District's modified cash basis of accounting. Please read it in conjunction with the District's full financial statements which may be attained from the RLWD website www.redlakewatershed.org or by contacting the RLWD for a full copy of the 2015 audit report.

FINANCIAL HIGHLIGHTS

- The District's governmental funds total revenues exceeded total expenditures, on the modified cash basis of accounting, by $2,299,052 for the year ended December 31, 2015.
- The general fund showed an increase on the modified cash basis fund balance in the amount of $8,511.
- The District's General Fund ended the year with a fund balance of $437,486.
- The District's combined fund balance at the close of the current year was $5,220,513.

Overview of the Financial Statements

This annual report is presented in a format consistent with the presentation requirements of the Governmental Accounting Standards Board (GASB) Statement No. 34, as applicable to the District's modified cash basis of accounting.

Report Components

This annual report consists of five parts as follows:

Government—Wide Financial Statements: The Statement of Net Cash Position and the Statement of Activities Arising from Cash Transactions on pages 14 and 15 provide information about the activities of the District government-wide (or "as a whole") and present a longer-term view of the District's finances.

Fund Financial Statements: Fund financial statements (starting on page 16) focus on the individual parts of the District government. Fund financial statements also report the District's operations in more detail than the governmental-wide statements by providing information about the District's most significant ("major") funds. For governmental activities, these statements tell how these services were financed in the short term as well as what remains for future spending.

Notes to the Basic Financial Statements: The notes to the basic financial statements are an integral part of the government-wide and fund financial statements and provide expanded explanation and detail regarding the information reported in the statements.

Other Supplementary Information: This Management's Discussion and Analysis and the General Fund Budgetary Comparison Schedule (starting on page 33) represent other financial information. Such information provides users of this report with additional data that supplements the government-wide statements, fund financial statements, and notes (referred to as "the basic financial statements").

Other Supplementary Statements: This part of the annual report (starting on page 35) includes other supplemental financial information which is provided to address certain specific needs of various users of the District's annual report. These statements and schedules include individual Fund Statements for Governmental units.

Basis of Accounting

The District has elected to present its financial statements on a modified cash basis of accounting. This modified cash basis of accounting is a basis of accounting other than accounting principles generally accepted in the United States of America. Basis of accounting is a reference to when financial events are recorded, such as the timing for recognizing revenues, expenses, and their related assets and liabilities. Under the District's modified cash basis of accounting, revenues and expenses and related assets and liabilities are recorded when they result from cash transactions, except for the recording of depreciation expense on the capital assets in the government-wide financial statements.

As a result of the use of this cash basis of accounting, certain assets and their related revenues (such as accounts receivable and revenue for billed or provided services not yet collected) and certain liabilities and their related expenses (such as accounts payable and expenses for goods or services received but not yet paid, and accrued expenses and liabilities) are not recorded in the basic financial statements. Therefore, when reviewing the financial information and discussion within this annual report, the reader should keep in mind the limitations resulting from the use of the modified cash basis of accounting.

Reporting the District as a Whole

The District's Reporting Entity Presentation

This annual report includes all activities for which the Red Lake Watershed District Board of Managers is fiscally responsible. These activities, defined as the District's reporting entity, are operated within separate legal entities that make up the primary government. The District has no reportable component units.

The Government-Wide Statement of Net Cash Position and the Statement of Activities Arising from Cash Transactions

Our financial analysis of the District as a whole begins on page 7. The government-wide financial statements are presented on pages 14 and 15. One of the most important questions asked about the District's finances is, "Is the District as a whole better off or worse off as a result of the year's activities?" The Statement of Net Cash Position and the Statement of Activities Arising from Cash Transactions report information about the District as a whole and about its activities in a way that helps answer this question. These statements include all of the District's assets and liabilities resulting from the use of the modified cash basis of accounting.

These two statements report the District's net cash position and changes in them. Keeping in mind the limitations of the modified cash basis of accounting, you can think of the District's net cash position—the difference between assets and liabilities—as one way to measure the District's financial health or financial position. Over time, increases or decreases in the District's net cash position are one indicator of whether its financial health is improving or deteriorating. You will need to consider other nonfinancial factors, however, such as changes in the District's property tax base and the condition of the District's infrastructure, to assess the overall health of the District.

In the Statement of Net Cash Position and the Statement of Activities Arising from Cash Transactions, the District has one type of activity:

Government Activities - The District's basic services are reported here, including the general administration, and capital projects. Property taxes, state aids, and state and federal grants finance most of these activities.

The Fund Financial Statements

The fund financial statements begin on page 16 and provide detailed information about the most significant funds. Some funds are required to be established by state law and by bond covenants.

However, the Board of Managers establishes certain other funds to help it control and manage money for particular purposes or to show that it is meeting legal responsibilities for using certain taxes, grants, and other money. The District's two kinds of funds—governmental and fiduciary—use different accounting approaches.

Governmental funds— Most of the District's basic services are reported as governmental funds, which focus on how money flows into and out of those funds and the balances left at year-end that are available for spending. These funds report the acquisition of capital assets and payments for debt principal as a detailed short-term view of the District's general government operations and the basic services it provides. Governmental fund information helps you to determine (through a review of changes to fund balance) whether there are more or fewer financial resources that can be spent in the near future to finance the District's programs.

The District considers the General Fund and various Capital Project funds as significant or major governmental funds. All other governmental funds are aggregated in a single column entitled other governmental funds.

Fiduciary funds— These fund types are often used to account for assets that are held in a trustee or fiduciary capacity such as pension plan assets, assets held per trust agreements, and similar arrangements.

A FINANCIAL ANALYSIS OF THE DISTRICT AS A WHOLE

Net Cash Position

The District's combined government-wide Net Position, resulting from modified cash basis transactions increased by $2,924,542 between fiscal years 2015 and 2014. As noted earlier, net position - modified cash basis may serve over time as a useful indicator of a government's financial position. In the case of Red Lake Watershed District, assets exceeded liabilities by $18,145,542 at December 31, 2015, which is an increase of $2,924,542 over the year ended December 31, 2014; which is more than an 18.50% increase over the prior year.

A portion of Red Lake Watershed District's net position ($12,925,029 or 71.23%) reflects its investment in capital assets. Red Lake Watershed District uses these capital assets to provide services to citizens; consequently, these are not available for future spending.

A portion of Red Lake Watershed District's net position ($156,211) reflects a portion of net position that is restricted for ditch maintenance.

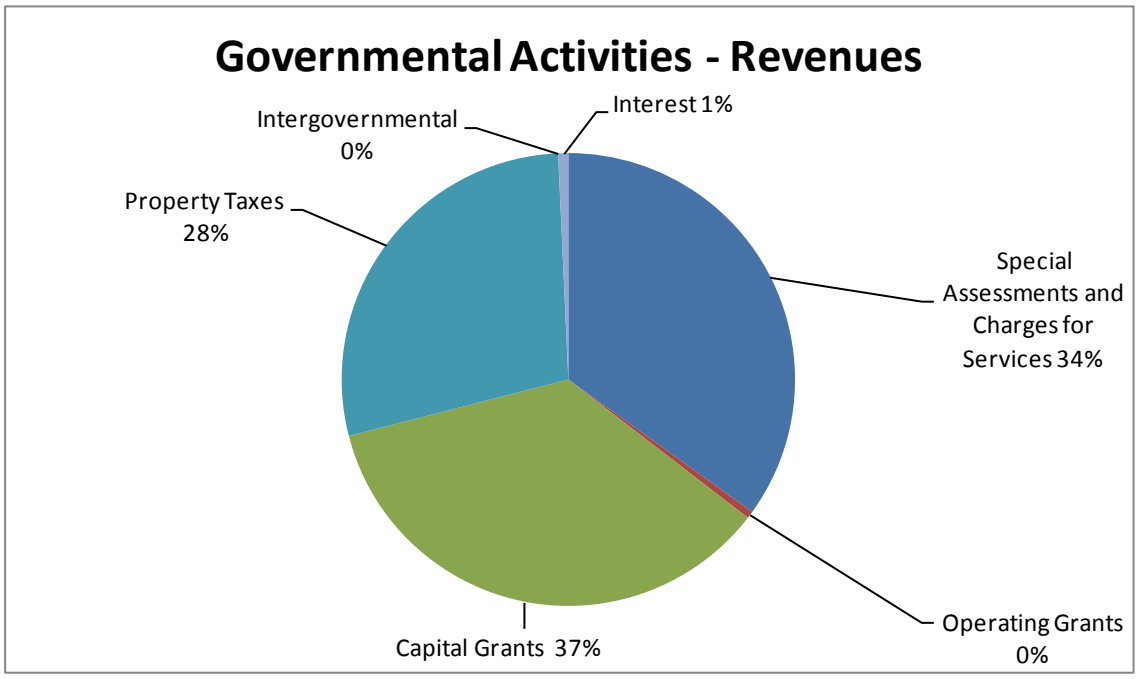
	Governmental Activities		Change
	2015	2014	14-15
ASSETS			
Total Current Assets	$ 5,220,513	$ 2,921,461	$ 2,299,052
Net Capital Assets	12,925,029	12,299,539	625,490
Total Assets	$ 18,145,542	$ 15,221,000	$ 2,924,542
Net Position	$ 18,145,542	$ 15,221,000	$ 2,924,542

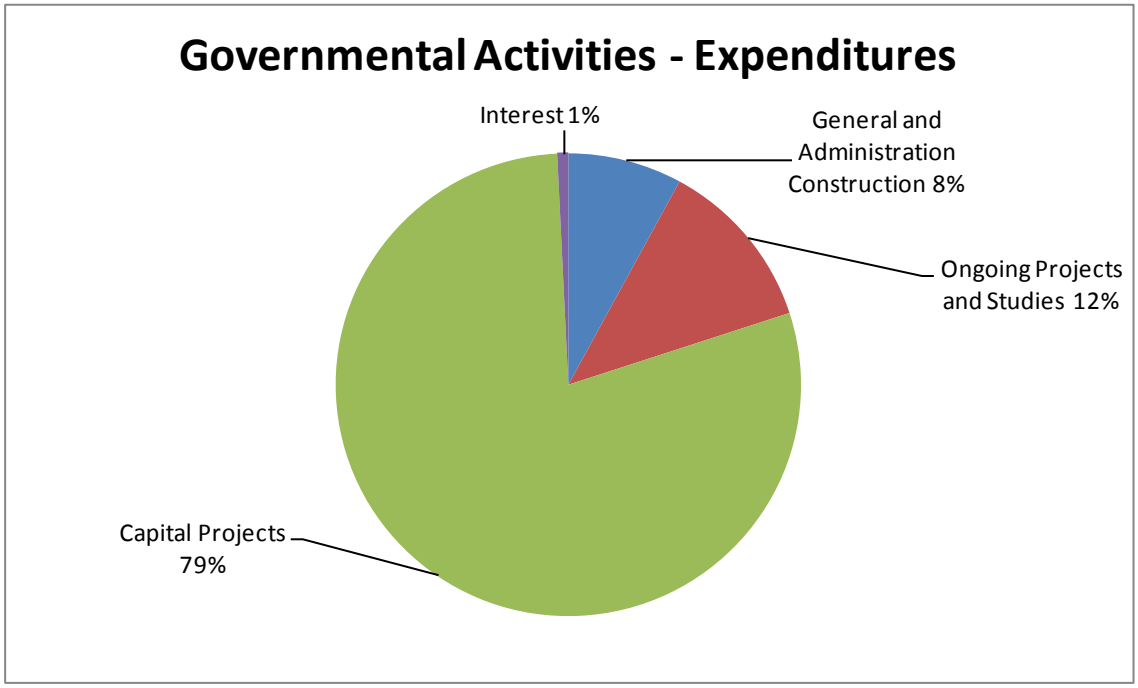
Changes in Net Cash Position

For the years ended December 31, 2015 and 2014, Net Position of the primary government (resulting from modified cash basis transaction) changed as follows:

	Governmental Activities		Change
	2015	2014	14-15
Revenues			
Program Revenues			
Special Assessments and Charges for Services	$ 1,662,262	$ 310,433	$ 1,351,829
Operating Grants	24,496	15,525	8,971
Capital Grants	1,690,332	2,662,817	(972,485)
General Revenues			
Property Taxes	1,345,842	1,635,529	(289,687)
Intergovernmental	-	32,903	(32,903)
Interest	34,334	29,864	4,470
Total Revenues	$ 4,757,266	$ 4,687,071	$ 70,195
Expenses			
General and Administration			
Construction	$ 154,582	$ 131,864	$ 22,718
Ongoing Projects and Studies	233,832	1,470,789	(1,236,957)
Capital Projects	1,538,551	1,896,345	(357,794)
Allocated Interest	14,925	12,556	2,369
Total Expenses	$ 1,941,890	$ 3,511,554	$ (1,569,664)
Increase in Net Position	$ 2,815,376	$ 1,175,517	

Below are specific graphs which provide comparisons of the governmental activities revenues and expenditures for the year ended December 31, 2015:





Governmental Activities

To aid in the understanding of the Statement of Activities on page 15, some additional explanation is given. Of particular interest is the format that is significantly different from a typical Statement of Revenues, Expenses, and Changes in Fund Balance. You will notice that expenses are listed in the first column, with revenues from that particular program reported to the right. The result is a Net (Expense)/Revenue. This type of format highlights the relative financial burden of each of the functions on the District's taxpayers. It also identifies how much each function draws from the general revenues or if it is self-financing through fees and grants or contributions. All other governmental revenues are reported as general. It is important to note that all taxes are classified as general revenue, even if restricted for a specific purpose.

A FINANCIAL ANALYSIS OF THE DISTRICT'S FUNDS

General Fund Budgetary Highlights

For the year ended December 31, 2015, General Fund expenditures were $940 under final budget. Certain funds experienced noteworthy changes from the prior year and are highlighted as follows:

> General Fund increased by $8,511 in 2015, which was due to higher net increases in general revenues over expenses than was originally expected in the budget. The general fund cash balance remained relatively unchanged, however.

CAPITAL ASSET AND DEBT ADMINISTRATION

Capital Assets—Modified Cash Basis

At December 31, 2015, the District had approximately $12,925,029 (net of accumulated depreciation) invested in capital assets. This investment in capital assets consists of building, equipment, and infrastructure assets necessary for the District to carryout watershed and conservation management within its service area.

	2015			2014
	Cost	Accumulated Depreciation	Cost - Less Accumulated Depreciation	Cost - Less Accumulated Depreciation
Building and Improvements	$ 762,888	$ 251,654	$ 511,234	$ 533,258
Infrastructure Improvements	12,260,172	1,870,409	10,389,763	8,089,227
Engineering Equipment	389,267	314,212	75,055	73,442
Office Equipment	139,308	112,035	27,273	40,558
Land and Permanent Easements	1,876,922	-	1,876,922	1,876,741
Construction in Progress	44,782	-	44,782	1,686,313
	$ 15,473,339	$ 2,548,310	$ 12,925,029	$ 12,299,539

ECONOMIC FACTORS AND NEXT YEAR'S BUDGET

As noted below, the District had two major projects in construction in 2015 as well as work on several water quality grants, flow through-grants, and cooperative projects with other agencies.

OTHER ITEMS OF INTEREST

Water Quality grants from the State of Minnesota, Minnesota Pollution Control Agency, for Surface Water Assessment Grants, Watershed Assessment Projects (watershed based TMDL), are ongoing for Clearwater River, Red Lake River, Thief River and Grand Marais Creek. Expenses over and above the grants are expended from the Capital Projects Fund.

In 2013, the Red Lake Watershed District and Middle Snake Tamarac Rivers Watershed District started construction on a Joint Powers Project referred to the public as Grand Marais Creek Outlet Restoration Project, Project 60F. Project 60F is a single component of the "Grand Marais Creek Sub-watershed Flood Damage Reduction Project – Project 60B" which is described at length in the 2015 RLWD Annual Report. This project addresses the Natural Resource Enhancement goals of the 1998 Flood Damage Reduction Mediation Agreement and restoring an adequate and stable outlet to the Grand Marais Creek Sub-watershed and several of its tributaries. The project objective focused on restoring riparian and aquatic characteristics along the lower six miles of the Grand Marais Creek to its confluence with the Red River as well as construction of a diversion structure at the upper most reach of the restoration project. The diversion structure, referred to as Phase II, was bid in June 26, 2014 with low bid in the amount of $466,166.00 being awarded to R.J. Zavoral & Sons, Inc. Since this entire project was initiated in 2011, costs increased from an estimated cost of $5.4 million to a total project cost of $6.3 million. This project was funded in part through federal, state, and local dollars with the Red Lake Watershed District's portion being funded through their Capital Project Funding. This project was completed in 2015 with a maintenance fund set up for yearly general maintenance.

In 2013, the Red Lake Watershed District in partnership with the United States Geological Survey, applied for and was approved for a $400,000.00 flow through grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR) for a project referred to in this report as Glacial Ridge Water Quality Study, Project 152B. The project's goals are intended to measure and characterize water flows through all parts of the water cycle in 4 surface (SW) and groundwater (GW) basins covering 28,754 acres as well as measure and characterize water quality in four groundwater and surface-water basins for comparison with pre-restoration water quality. Although the LCCMR grant was intended to cover all costs of the project, it is assumed any overrun of Red Lake Watershed District staff time will be paid from the Capital Project Funding. In 2014, USGS asked the Red Lake Watershed District to apply for a six month extension of the existing grant that was scheduled to expire on June 30, 2016. The grant extension was approved by the LCCMR. This project is expected to continue into 2016 and with the grant extension it is assumed that the project will be completed by December 31, 2016.

In August of 2014, the Red Lake Watershed District in partnership with the United States Geological Survey, was approved for a $168,000.00 flow through grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR) for a project referred to in this report as Glacial Ridge Water Quality Study, Project 152C. The project's goals are intended work in conjunction with the existing $400,000 grant mentioned above which is to measure and characterize water flows through all parts of the water cycle in 4 surface (SW) and groundwater (GW) basins covering 28,754 acres as well as measure and characterize water quality in four groundwater and surface-water basins for comparison with pre-restoration water quality. Although the LCCMR grant was intended to cover all costs of the project, it is assumed any overrun of Red Lake Watershed District staff time will be paid from the Capital Project Funding. In 2014 USGS asked the Red Lake Watershed District to apply for a six month extension of the existing grant that was scheduled to expire on June 30, 2016.

The grant extension was approved by the LCCMR. This project is expected to continue into 2016 and with the grant extension it is assumed that the project will be completed by December 31, 2016.

State of Minnesota flow-through grant with Federal Emergency Management Agency (FEMA) for flood plan analysis along on the Red Lake River in Polk, Red Lake, and Pennington Counties was extended to April 30, 2015. This extension was intended to allow time for FEMA to determine how past modeling within the Cities of Crookston and East Grand Forks will match present datum.

Bids for the construction for a new 12.5 mile legal drainage system, referred to in the 2014 Annual Report as RLWD Ditch #15, were opened on March 13, 2014. Construction started late spring and due to frequent rainfall events and other contractual obligations by the contractor, construction on this project was not completed in the timeline outlined in the contract. At year end 2014, the project was approximately 95% complete and was completed in 2015, with final payment hearing held August 27, 2015.

In the mid 1980's, the Soil Conservation Service (SCS) worked with local landowners to fund eight erosion control and habitat restoration projects mostly in Red Lake County. In the late 1980's and at the request of SCS, the Red Lake Watershed District agreed to take over the inspection and repair of the dams in the foreseeable future. In 2015, after District staff inspected all eight dams, it was determined that three dams known by the public as Odney Flaat, Latendresse, and Miller Dams were all in need of substantial repair. At the direction of the Board, plans and specifications were developed for Odney Flaat and three quotes were accepted with low quote in the amount of $68,124.75 being awarded to Wright Construction Inc. It is anticipated that construction on Odney Flaat will be completed in 2016. The District also asked staff to review and prioritize all the dams and bring recommendations back to the Board. Upon completion of the review, the Board of Managers decided to move forward with the plans and specification for repairs to Latendresse and Miller Dams as well with construction being completed in 2016.

The Red Lake Watershed District also entered into a cost share agreement with the Clearwater County Soil & Water Conservation Service to repair an erosion site along a legal drainage system referred to the public a Judicial Ditch #72. The project was administered by the SWCD with total cost of the project totaling $82,816.80.

The District was informed of a slope failure on a project completed in late 2012 referred to as the Grand Marais Creek Cut Channel. The Board of Managers instructed the Engineer to inspect the problem and report back to the Board. Upon review it was determined that additional repairs should be completed at which point the Board agreed to repair the project for the estimated cost of $64,147. This project was completed in 2015.

More details of the 2015 construction, maintenance, and ongoing water quality programs of Red Lake Watershed District are included in the 2015 Annual Report or by contacting the Red Lake Watershed District.

CONTACTING THE DISTRICT'S FINANCIAL MANAGEMENT

This financial report is designed to provide a general overview of Red Lake Watershed District's finances for all those with an interest in the government's finances. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to the Red Lake Watershed District, 1000 Pennington Avenue South, Thief River Falls, Minnesota 56701.

RED LAKE WATERSHED DISTRICT
STATEMENT OF NET CASH POSITION
AS OF DECEMBER 31, 2015

	Total
Assets	
Current Assets:	
Petty Cash	$ 100
Pooled Cash and Investments	5,220,413
Total Current Assets	5,220,513
Capital Assets:	
Property and Equipment	15,473,339
Less: Accumulated Depreciation	(2,548,310)
Net Capital Assets	12,925,029
Total Assets	18,145,542
Net Position	
Investment in Capital Assets	12,925,029
Restricted for Ditch Maintenance	156,211
Unrestricted	5,064,302
Total Net Position	$ 18,145,542

RED LAKE WATERSHED DISTRICT

STATEMENT OF ACTIVITIES ARISING FROM CASH TRANSACTIONS

FOR THE YEAR ENDED DECEMBER 31, 2015

	Expenses			Program Receipts and Sources			Net Cash Sources (Uses) and Changes in Net Cash Position
Functions/Programs	Direct	Allocated Salaries and Overhead	Total	Special Assessments and Charges For Services	Operating Grants and Contributions	Capital Grants and Contributions	Governmental Activities
Governmental Activities:							
General and Administrative Construction	$ (704,260)	$ 549,678	$ (154,582)	$ 1,976	$ -	$ -	$ (152,606)
Ongoing Projects and Studies	(171,096)	(62,736)	(233,832)	1,615,396	24,496	-	1,406,060
Capital Projects	(1,051,609)	(486,942)	(1,538,551)	44,890	-	1,690,332	196,671
Allocated Interest	(14,925)	-	(14,925)	-	-	-	(14,925)
Total Governmental Activities	$ (1,941,890)	$ -	$ (1,941,890)	$ 1,662,262	$ 24,496	$ 1,690,332	$ 1,435,200
General Receipts:							
Tax Levies							$ 1,345,842
Intergovernmental (not restricted to specific programs)							
State MV, Disparity Reduction Credits, and PERA aid							109,166
Allocated Interest							34,334
Total General Receipts							1,489,342
Change in Net Position							2,924,542
Net Position - Beginning							15,221,000
Net Position - Ending							$ 18,145,542

RED LAKE WATERSHED DISTRICT

STATEMENT OF ACTIVITIES ARISING FROM CASH TRANSACTIONS – GOVERNMENTAL FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2015

ASSETS	General Fund	Special Revenue Fund	Capital Project Fund	Total Governmental Funds
Petty Cash	$ 100	$ -	$ -	$ 100
Pooled Cash and Investments	437,386	156,211	4,626,816	5,220,413
Total Assets	$ 437,486	$ 156,211	$ 4,626,816	$ 5,220,513
FUND BALANCES				
Fund Balances:				
Restricted for Ditch Maintenance	$ -	$ 156,211	$ -	$ 156,211
Committed for Capital Projects	-	-	4,626,816	4,626,816
Unassigned	437,486	-	-	437,486
Total Fund Balances	437,486	156,211	4,626,816	5,220,513
Total Fund Balances	$ 437,486	$ 156,211	$ 4,626,816	$ 5,220,513

Amounts reported from governmental activities in the Statement of Net Position are different because:

Total Fund Balance per Statement of Balances Arising from Cash Transactions, from above	$ 5,220,513
When capital assets (land, building, equipment and infrastructure) that are to be used in governmental activities are purchased or constructed, the cost of those assets are reported as expenditures in governmental funds. However, the statement of net position include those capital assets among the assets of the District as a whole.	
Cost of Capital Assets	15,473,339
Accumulated Depreciation	(2,548,310)
Total Net Position	$ 18,145,542

RED LAKE WATERSHED DISTRICT

STATEMENT OF CASH RECEIPTS, DISBURSEMENTS, AND CHANGES IN CASH FUND BALANCES – GOVERNMENTAL FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2015

	General Fund	Special Revenue Fund	Capital Project Fund	Total Governmental Funds
RECEIPTS				
Property Taxes	$ 157,200	$ -	$ 1,188,642	$ 1,345,842
Special Assessments	-	1,602,046	-	1,602,046
Intergovernmental:				
Federal	-	-	-	-
State	1,805	16,000	1,375,005	1,392,810
Local	-	8,496	422,688	431,184
Other:				
Miscellaneous	1,976	13,350	44,890	60,216
Allocated Interest	3,790	910	29,634	34,334
Total Receipts	164,771	1,640,802	3,060,859	4,866,432
DISBURSEMENTS				
General and Administrative Construction	154,582	-	-	154,582
Ongoing Projects and Studies	-	233,832	-	233,832
Capital Projects	-	-	2,164,041	2,164,041
Allocated Interest	1,678	6,288	6,959	14,925
Total Disbursements	156,260	240,120	2,171,000	2,567,380
EXCESS OF RECEIPTS OVER (UNDER) DISBURSEMENTS	8,511	1,400,682	889,859	2,299,052
OTHER FINANCING SOURCES (USES)				
Transfers In	-	200,000	-	200,000
Transfers Out	-	-	(200,000)	(200,000)
Net Other Sources (Uses)	-	200,000	(200,000)	-
Net Change in Fund Balances	8,511	1,600,682	689,859	2,299,052
FUND BALANCE JANUARY 1	428,975	(1,444,471)	3,936,957	2,921,461
FUND BALANCE DECEMBER 31	$ 437,486	$ 156,211	$ 4,626,816	$ 5,220,513

RED LAKE WATERSHED DISTRICT
RECONCILIATION OF CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED DECEMBER 31, 2015

Net Change in Fund Balances - Total Governmental Funds	$ 2,299,052
Governmental Funds Report Capital Outlay as Expenditures, while governmental activities	
report depreciation expense allocating those expenditures over the life of the asset:	
Capital Additions	1,157,859
Depreciation Expense	(532,369)
Change in Net Position - Governmental Activities	$ 2,924,542

RED LAKE WATERSHED DISTRICT
BUDGETARY COMPARISON SCHEDULE – GENERAL FUND
FOR THE YEAR ENDED DECEMBER 31, 2015

REVENUES	Original and Final Budget	Actual 2015	Variance
Tax Levies	$ 157,200	$ 157,200	$ -
Intergovernmental			
State	-	1,805	1,805
Miscellaneous	-	1,976	1,976
Allocated Interest	-	3,790	3,790
Total Revenues	157,200	164,771	7,571
EXPENDITURES			
General and Administrative	157,200	154,582	(2,618)
Interest	-	1,678	1,678
Total Expenditures	157,200	156,260	(940)
Revenue Over Expenditures	-	8,511	8,511
FUND BALANCE JANUARY 1	428,975	428,975	
FUND BALANCE DECEMBER 31	$ 428,975	$ 437,486	

NOTE 1 – BUDGETARY COMPARISON

The budget is prepared using the same method of accounting as the financial statements. The annual adopted budget is not legally binding on the District, with the exception of the budget for the general fund, which is limited by state statute at $250,000 and set by the Board for 2015 at $157,200. All appropriations lapse at year-end.

RED LAKE WATERSHED DISTRICT
STATEMENT OF RECEIPTS AND DISBURSEMENTS AND CHANGES IN FUND BALANCE – SPECIAL REVENUE PROJECTS - MODIFIED CASH BASIS
FOR THE YEAR ENDED DECEMBER 31, 2015

		Revenues				Expenses			Transfer	
	Fund Balance (Deficit) January 1	Assessments and Other Charges for Services	Operating/ Capital Grants and Contribution	Allocated Interest Earned	Taxes	Direct	Allocated Interest Charged	Allocated Salary and Overhead	In (Out)	Fund Balance (Deficit) December 31
GENERAL FUND	$ 428,975	$ 1,976	$ 1,805	$ 3,790	$ 157,200	$ 704,260	$ 1,678	$ (549,678)	$ -	$ 437,486
SPECIAL REVENUE FUND JOBS:										
Red Lake River Project	58,128	-	-	296	-	-	-	356	-	58,068
Clearwater River Project	27,641	-	-	140	-	-	-	1,245	-	26,536
Lost River Project	12,364	-	-	57	-	458	-	3,345	-	8,618
RLWD Ditch #1	4,181	-	-	14	-	288	-	1,669	-	2,238
RLWD Ditch #3	440	4,796	-	12	-	-	-	90	-	5,158
State Ditch #83	(44,342)	37,802	24,496	-	-	28,952	93	6,639	-	(17,728)
RLWD Ditch #7	8,890	4,867	-	35	-	5,234	-	135	-	8,423
Pine Lake Maintenance	1,096	4,063	-	6	-	567	-	3,264	-	1,334
RLWD Ditch #8	(13,734)	8,625	-	-	-	465	55	23	-	(5,652)
RLWD Ditch #9	2,516	-	-	12	-	313	-	-	-	2,215
J.D. Ditch #72	1,462	4,553	-	-	-	3,536	10	4,530	-	(2,061)
Clearwater/Wild Rice River	4,749	2,235	-	-	-	97	8	14,618	-	(7,739)
Branch A & 1, J.D. #2	1,662	-	-	8	-	225	-	316	-	1,129
Main J.D. #2 and Branch B&C	(5,246)	6,301	-	-	-	842	14	383	-	(184)
Main J.D. 2C. Eck	3,559	-	-	13	-	-	-	962	-	2,610
Krostue Petition	1,784	2,000	-	11	-	985	-	118	-	2,692
Clearwater County Joint Ditch #1	(137)	-	-	-	-	-	-	-	-	(137)
Clearwater County Joint Ditch #4	343	-	-	2	-	-	-	-	-	345
Clearwater County Joint Ditch #5	1,161	46	-	4	-	789	-	459	-	(37)
Clearwater County Ditch #1	290	-	-	-	-	-	-	-	-	290
Clifford Arveson Ditch	(750)	2,951	-	-	-	-	3	276	-	1,922
Winsor/Hangaard/Clearwater County Petition	(3,793)	6,011	-	-	-	5,130	22	1,457	-	(4,391)
Equality RLWD Ditch #1, lat C	3,790	1,728	-	37	-	753	-	1,031	-	3,771
K. Johnson Petition	4,067	1,940	-	14	-	1,902	-	129	-	3,990
Polk County Ditch #'s 104, 61, 47, 94	(3,332)	5,359	-	-	-	6,947	33	332	-	(5,285)
TRF Drainage Ditch (Challenger Ditch)	951	978	-	5	-	-	-	-	-	1,934
Scott Baatz Petition	2,127	-	-	7	-	1,121	-	45	-	968
Polk County Ditch #63 Improvement	13,079	-	-	56	-	2,423	-	2,215	-	8,497
Polk County Ditch #33 Improvement	220	2,508	-	-	-	1,485	-	933	-	310
RLWD Ditch #10	(3,004)	1,101	-	-	-	174	15	732	-	(2,824)
RLWD Ditch #11	33,262	-	-	165	-	1,563	-	281	-	31,583
RLWD Ditch #12	(21,762)	15,450	-	-	-	5,777	97	1,256	-	(13,442)
Improvement to Penn. Co. Dt. 1	5,138	-	-	-	-	7,471	7	2,330	-	(4,670)
Brandt Channel Ditch #15	(1,485,592)	1,481,083	-	-	-	80,361	5,624	9,936	200,000	99,570
Burnham Creek Channel	(53,086)	14,778	-	-	-	7,305	267	1,044	-	(46,924)
RLWD Ditch #13	3,115	-	-	16	-	-	-	45	-	3,086
Thief River Falls Flood Damage Reduction Project	(5,708)	6,221	-	-	-	5,933	40	2,542	-	(8,002)
TOTAL SPECIAL REVENUE	$ (1,444,471)	$ 1,615,396	$ 24,496	$ 910	$ -	$ 171,096	$ 6,288	$ 62,736	$ 200,000	$ 156,211

RED LAKE WATERSHED DISTRICT

STATEMENT OF RECEIPTS AND DISBURSEMENTS AND CHANGES IN FUND BALANCE – CAPITAL PROJECTS – MODIFIED CASH BASIS FOR THE YEAR ENDED DECEMBER 31, 2015

		Revenues				Expenses			Transfer	
	Fund Balance (Deficit) January 1	Assessments and Other Charges for Services	Operating/ Capital Grants and Contribution	Allocated Interest Earned	Taxes	Direct	Allocated Interest Charged	Allocated Salary and Overhead	In (Out)	Fund Balance (Deficit) December 31
CAPITAL PROJECT FUND JOBS:										
Moose River Project	$ -	$ -	$ -	$ -	$ -	$ 8,512	$ 38	$ 5,547	$ 14,097	$ -
Lost River Impoundment	-	-	-	-	-	-	-	193	193	-
Stream Gauging	-	-	-	-	-	101	34	10,048	10,183	-
Culvert Sizing	-	-	-	-	-	-	14	6,916	6,930	-
Schirrick Dam	-	-	-	-	-	721	3	1,128	1,852	-
Pine Lake PWT	(2,246)	-	24,310	-	-	81,512	220	11,690	-	(71,358)
Hydrologic Analysis	-	-	-	-	-	-	13	6,479	6,492	-
Flood Control Study	-	-	-	-	-	-	4	776	780	-
Benchmarks	-	-	-	-	-	-	5	1,487	1,492	-
Emergency Maintenance	108,695	-	-	556	-	-	-	-	-	109,251
RRWMB - Technical Com	-	-	460	-	-	460	-	-	-	-
Water Quality	-	597	-	-	-	52,010	266	67,014	118,693	-
Maintenance Dams	-	-	-	-	-	21,034	64	5,644	26,742	-
Odney Flaat Dam	-	-	-	-	-	13,627	19	1,134	-	(14,780)
Latundresse Dam	-	-	-	-	-	15,277	11	190	-	(15,478)
Miller Dam	-	-	-	-	-	16,111	16	633	-	(16,760)
Elm Lake	-	-	-	-	-	50	5	2,636	2,691	-
Red Lake Res./Good Lake	-	-	-	-	-	14,150	21	3,063	17,234	-
Parnell Impoundment	-	3,210	-	-	-	22,158	69	6,654	25,671	-
Greenwood 27 Bank Stabilization	-	-	-	-	-	-	-	95	95	-
Rocksbury Erosion Site	-	-	-	-	-	-	-	169	169	-
Permits	-	-	-	-	-	13,742	260	94,103	108,105	-
Project Development	-	-	-	-	-	3,988	90	33,187	37,265	-
Louisville/Parnell Project	-	11,847	-	10	-	8,146	-	1,838	(1,873)	-
Ring Dike Program - General	-	-	-	-	-	-	1	760	762	1
Ross Ring Dike	-	-	-	-	-	-	1	348	-	(349)
G.I.S.	-	-	-	-	-	140	108	27,991	28,239	-
Wetland Banking	5,753	-	-	26	-	-	-	1,059	-	4,720
Ten Year Overall Plan	(16,824)	-	11,894	-	-	1,631	132	25,880	-	(32,573)
Clearwater River - TMDL	-	-	-	-	-	-	3	566	569	-
Erosion Control Projects	-	-	62,719	-	-	116,141	169	8,334	61,925	-
WS Ditch System Inventory & Mapping	-	-	19,350	82	-	-	-	142	-	19,290
FEMA D-Firm Grant	-	-	5,619	6	-	3,373	-	1,625	(627)	-
Web Page Development	-	-	1,500	1	-	1,340	-	1,872	1,711	-
Administrative Construction	5,147,697	25,013	53,681	28,952	1,188,642	-	-	-	(1,699,267)	4,744,718
Burnham Creek - BR6	-	-	-	-	-	-	1	436	437	-
B. CRK. Erosion Control	(240,771)	-	194,180	1	-	-	531	685	47,806	-
B. CRK. Fish Habitat	(98,518)	-	50,000	-	-	225	316	1,008	50,067	-
Grand Marais Creek Subwatershed	(1,929)	-	1,847	-	-	-	3	274	359	-
Euclid East Impoundment	-	3,094	-	-	-	3,387	12	1,579	1,884	-
Brandt Impoundment	-	408	-	-	-	5,965	21	1,500	7,078	-

RED LAKE WATERSHED DISTRICT
STATEMENT OF RECEIPTS AND DISBURSEMENTS AND CHANGES IN FUND BALANCE –
CAPITAL PROJECTS –
MODIFIED CASH BASIS - CONTINUED
FOR THE YEAR ENDED DECEMBER 31, 2015

		Revenues				Expenses			Transfer	
	Fund Balance (Deficit) January 1	Assessments and Other Charges for Services	Operating/ Capital Grants and Contribution	Allocated Interest Earned	Taxes	Direct	Allocated Interest Charged	Allocated Salary and Overhead	In (Out)	Fund Balance (Deficit) December 31
Brandt Channel Restoration	-	-	-	-	-	2,768	8	237	3,013	-
Grand Marais - Restoration	(820,608)	400	1,038,171	-	-	1,021,327	3,919	22,281	829,564	-
Grand Marais Cut Channel Stabilization	-	-	-	-	-	61,583	166	2,398	64,147	-
Clearwater Public Education (River Watch)	-	321	-	-	-	3,198	47	14,209	17,133	-
Red River Basin Long Term Flood Control	-	-	-	-	-	512	17	5,385	5,914	-
Four Legged Lake PWT	(4,918)	-	20,624	-	-	47,172	84	10,378	-	(41,928)
BWSR Flood Storage Pilot Project	-	-	-	-	-	-	-	70	70	-
Glacial Ridge/LCCMR/400k	(69,687)	-	101,231	-	-	31,544	20	1,915	1,935	-
Glacial Ridge/LCCMR/168k	(38,545)	-	53,633	-	-	15,088	9	366	375	-
Thief River TMDL	(5,808)	-	30,383	-	-	8,767	60	32,601	-	(16,853)
Red Lake River Watershed Assessment	(10,433)	-	18,866	-	-	5,105	62	14,690	-	(11,424)
RLRVR Grand Marais SWAG	-	-	-	-	-	-	-	95	95	-
Grand Marais WRAP	(6,451)	-	47,678	-	-	48,026	55	7,211	-	(14,065)
Clearwater River WRAP	(5,440)	-	46,800	-	-	15,381	47	37,388	-	(11,456)
Clearwater River SWAG	(3,010)	-	14,747	-	-	12,827	15	3,035	-	(4,140)
Total Capital Projects	3,936,957	44,890	1,797,693	29,634	1,188,642	1,677,099	6,959	486,942	(200,000)	4,626,816
Total All Funds	$ 2,921,461	$ 1,662,262	$ 1,823,994	$ 34,334	$ 1,345,842	$ 2,552,455	$ 14,925	$ -	$ -	$ 5,220,513

RED LAKE WATERSHED DISTRICT
STATEMENT OF DIRECT EXPENDITURES BY CLASSIFICATION –
GOVERNMENTAL FUNDS - MODIFIED CASH BASIS
FOR THE YEAR ENDED DECEMBER 31, 2015

DIRECT EXPENDITURES:	2015
Salaries -	
Inspection	$ 3,221
Survey - preliminary	1,852
Survey - construction	195
Drafting	5,867
Engineering	75,562
Project Administration	199,499
Field Work - Water Programs	15,164
Other	64,225
Compensated Absences	43,159
Payroll Taxes and Benefits	121,956
Manager's Expense	25,004
Travel, Mileage, Meetings and Per Diems	4,503
Audit	8,750
Legal	18,619
Appraisal and Viewers	320
Other Professional Fees	149,545
Office Supplies	13,390
Office Equipment	2,709
Dues & Subscriptions	4,570
Insurance and Bonds	20,833
Repairs and Maintenance	13,999
Utilities	7,624
Telephone	9,034
Advertising and Publications	4,701
Truck Expense	16,141
Land Acquisition and Easements	181
Construction	1,309,252
Engineering Costs & Fees	12,565
Engineering Fees	321,560
Engineering Equipment	31,823
Glacial Ridge	46,632
Total Expenditures	$ 2,552,455

Acronyms

The following is a list of common acronyms used by the Red Lake Watershed District.

State, Regional, and Local Government	
BWSR	Board of Water and Soil Resources
DNR	Department of Natural Resources
JPB	Joint Powers Board
LCMR	Legislative Commission on Minnesota Rivers
LGU	Local Governmental Unit
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSTRWD	Middle Snake Tamarac Watershed District
RLWD	Red Lake Watershed District
SWCD	Soil and Water Conservation District
TAC	Technical Advisory Committee
Federal Agencies	
Corps	U.S. Army Corps of Engineers
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FSA	Farm Services Administration
NRCS	Natural Resources Conservation Service
USF&WS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
Organizations	
MAWD	Minnesota Association of Watershed Districts
Programs	
CLWP	Comprehensive Local Water Planning
CRP	Conservation Reserve Program
EQIP	Environmental Quality Incentive Program
FDR	Flood Damage Reduction
RIM	Reinvest in Minnesota Program
WCA	Wetland Conservation Act
SWAG	Surface Water Assessment Grant
WRAP	Watershed Restoration and Protection
WRAPS	Watershed Restoration and Protection Strategy
Terms	
CP	Conservation Practice
BMP	Best Management Practice
GIS	Geographic Information System
GPS	Geographic Positioning System
LIDAR	Laser Imaging Detection and Ranging
NPS	Nonpoint Source Pollution
TMDL	Total Maximum Daily Load
PTMApp	Prioritize Target Measure Application