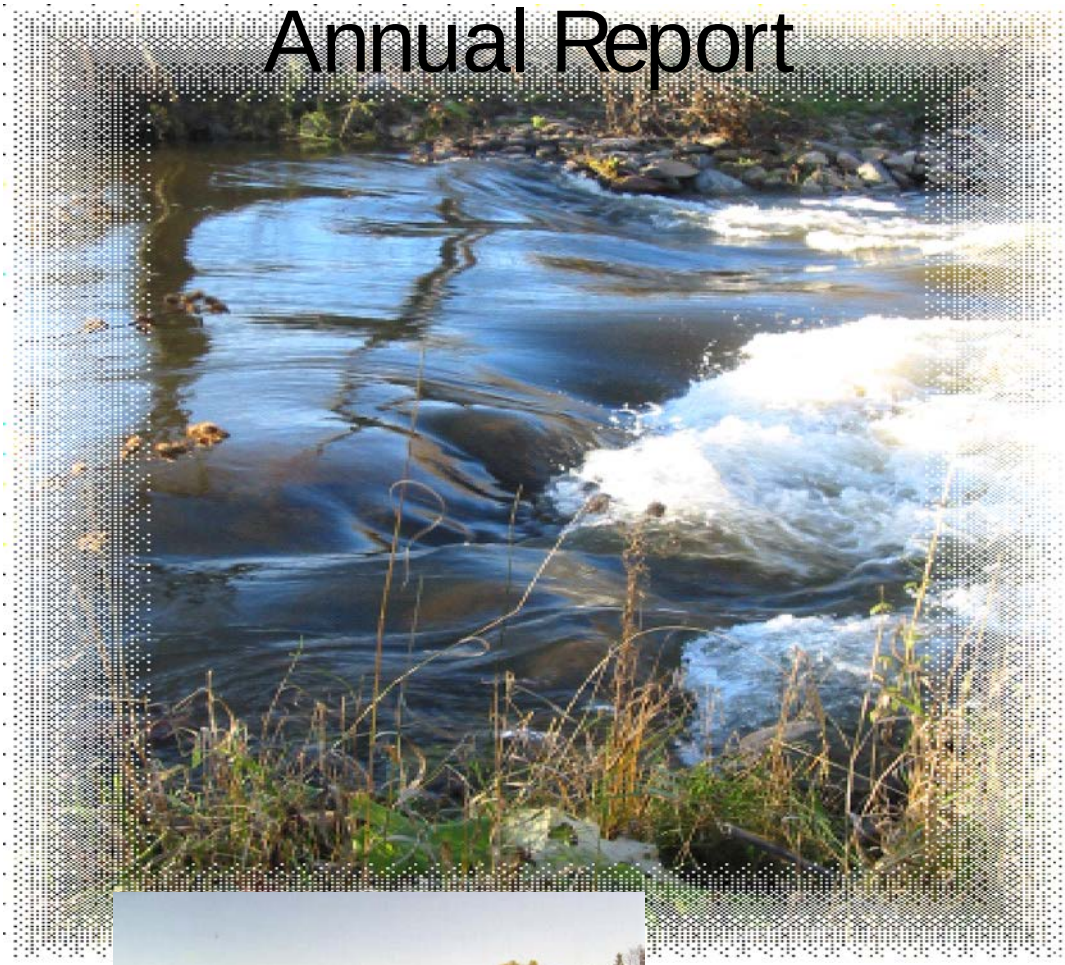
Red Lake Watershed District

Annual Report



2004

LETTER FROM THE PRESIDENT

Greetings to all the people of the Red Lake Watershed District and other interested parties. The year 2004 started quietly with a very uneventful spring thaw, followed by early spring rains in May which caused many problems throughout the eastern two thirds of the Red Lake Watershed District. The farming community never recovered from the rains and the unseasonably cool summer temperatures. To say the least this was a very trying year for the Red Lake Watershed District area.

In May of 2004, our Water Quality Technician, Stephanie Hanson resigned to explore another job opportunity in south central Minnesota. In June of 2004, the District hired James Blix from Thief River Falls, MN to fill the position left by Stephanie.

The year 2004 also brought the District two new Board members to replace the positions once held by Bob Proulx and Dennis Nikolayson. Gene Tiedemann from Euclid, MN replaced Bob Proulx who resigned one year into his three year term. Gene will complete the remaining two years of the term which will expire in January 2006. Allan Carlson from Erskine, MN joined the Board in January to replace Dennis Nikolayson and is presently serving in his first year of a three year term which will expire in January 2007.

Our goals as a watershed district are to manage water in the areas of flood control, drainage, and water quality. We continue to hold meetings on the second and fourth Thursdays of each month and welcome public interest and/or attendance at these meetings.

This year was a very busy year for our staff as we completed various old projects as well as starting many new. All projects are listed in detail in this report and I urge you to review them.

One more item that I would like to briefly mention is the fact that we are moving forward with the development of our Ten Year Comprehensive Overall Plan. The District Administrator and Project Engineer started the year of 2004 attending town meetings in six sub-watersheds and seven cities. This phase of the plan was to accumulate information from the public and present the information to the Citizen Advisory Committee and Technical Advisory Committees. These two committees were formed by the Red Lake Watershed District Board of Managers to assist in the development and writings of the Ten Year Comprehensive Overall Plan. To gather more information about this plan I invite you to refer to our website (www.redlakewatershed.org). The plan is scheduled to be presented for review to the public in early summer of 2005 with completion occurring in mid to late summer of 2005.

Our 2004 Annual Audit is included in this report in an abbreviated form. A complete copy of the 2004 Annual Audit may be obtained at the District office at 102 Main Avenue North, Thief River Falls.

Once again, it was a pleasure to serve as President of the Board in 2004.

Sincerely,

Orville Knott, President
Red Lake Watershed District

Table of Contents

Board of Managers – 2004

Front Row *(left to right):* Vernon Johnson, Orville Knott-President, Dale Nelson-Vice President
Back Row *(left to right):* Delray Sparby-Legal Counsel, Lowell Smeby-Treasurer, LeRoy Ose-Secretary, Gene Tiedemann, Allan Carlson, Myron Jesme-Administrator

2004 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
William Malwitz, Landowners/Fosston
Dan Schmitz, Black River Area
Gilbert Weber, Burnham Creek Area
John Gunvalson, Clearwater River Area
Roger Love, Grand Marais Area
Robert Torkelson, Lost River Area
Dave Rodahl, Thief River Area
Ron Edevold, Pine Lake Area
Daniel Johnson, Red Lake River Area
John Florhaug, Upper Red Lake Area
Joel Rohde, Red Lake Band of Chippewa Indians

History of the Red Lake Watershed District

The Red Lake Watershed District covers an area of 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 Red Lake Watershed 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 Watershed 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 Red Lake Watershed 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, to be entitled "Permit and Drainage Rules of the Red Lake Watershed District."

In 1977, the Red Lake Watershed 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 Red Lake Watershed 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.

Staff -- 2004

Front row: Loren Sanderson-Engineering Assistant **Second Row** *(left to right)*: Myron Jesme-Administrator, Tammy Audette-Accounting Assistant/Secretary, Arlene Novak- Accounting Technician/Secretary II, **Back Row** *(left to right):* Corey Hanson-Water Quality Coordinator, Gary Lane-Engineering Technician II, Jim Blix ,Water Quality/Natural Resources Technician. Summer staff *(not pictured):* Brian Loe and Nate Sorvig.

James Blix

James Blix was hired as the new Water Quality Technician starting in June 2004. James is a native of Fosston, MN and currently lives in Thief River Falls with his wife and 3 sons. James replaced Stephanie Hanson who resigned in May, 2004.

Gene Tiedemann

Gene Tiedemann was appointed to the Red Lake Watershed District Board of Managers to serve the unexpired term of Bob Proulx who resigned in March of 2004. Gene is a representative of West Polk County from 2004-2006.

Allan Carlson

Allan Carlson was appointed to the Red Lake Watershed District Board of Managers for a 3-year term. Allan is a representative of East Polk County from 2004-2007.

I. Water Quality

River Watch 2004

Purpose and Scope of the River Watch Program

The Red River Basin River Watch Program began in Minnesota in 1995 and has since grown to include schools in North Dakota and Manitoba. The Red Lake Watershed District is involved with seven school groups, located within the watershed, who gather water quality data on a regular basis at predetermined sites. They receive, in exchange, a variety of educational resources and an opportunity to partake in real-world environmental monitoring and data analysis.

The Red Lake Watershed District provides reimbursement for a substitute teacher and basic transportation expenses, access to monitoring equipment, staff guidance, and the assurance that rigorous quality control standards are applied to the whole process. In exchange, the District receives water quality data and a wider audience for its public education efforts.

Water Quality Technician Jim Blix traveled with six groups: Grygla, Clearbrook-Gonvick, Red Lake County Central, Red Lake Falls, Win-E-Mac, and Fosston. Typically, each group does a monthly monitoring trip during ice-off conditions. Red Lake County Central has also taken field measurements during ice-on conditions by auguring through the ice at each site and performing field measurements on flowing water. Each group made a minimum of four monitoring sessions during 2004.

Water Quality Measurements

All water quality measurements were made using the same equipment and methods. Conductivity, pH, water temperature and dissolved oxygen were measured with a YSI Sonde, turbidity was measured with a Hach 2100P turbidimeter, and water transparency with a standard 100cm clear tube. Channel stage and stream depth were measured with a flexible measuring tape, and general observations were recorded on a standardized data sheet.

Data entry & analysis

The Red River Watershed Management Board discontinued lab chemistry in 2003 due to cost factors and quality control problems. It has made efforts to compensate for the loss of lab data by detecting statistical correlations, where they exist, between the field data and lab intensive parameters such as total phosphorus and total suspended solids.

District staff member Jim Blix accompanied staff members from the Red River Watershed Management Board and the MPCA to assist each River Watch School with their data analysis and year-end presentation. Each group was shown how to compare at least ten data points from each monitoring site with benchmarks established by the EPA's "designated use" system of classification. Then, the students built a panel displays on which to present their analysis.

Results/Correlations

Students have gathered and assembled their 2004 data, but the RLWD must integrate this information into its database. Much of that has already been accomplished where River Watch sites overlap with RLWD sites. River watch data may eventually be used for assessment purposes and can be used to identify stream reaches that do no meet MPCA standards for dissolved oxygen and turbidity. The MPCA may eventually use transparency tube data for conducting assessments of aquatic life support as well. The use of this inexpensive field test as a standard will further increase the importance of volunteer monitoring.

Looking Forward to 2005

Experience drawn from 2004 has resulted in a list of steps to be taken in 2005 to improve the quality of data and enhance student learning.

- Improve educational references and presentations
    - Efforts at RLWD will be made to better educate the River Watch participants about the meaning and significance of each water quality parameter. The intent is to ensure improved data collection practices and more thorough site observations. This will require handouts and presentations that are better organized and written to the students' level of learning.

- Incorporate improved quality control procedures
    - Perform duplicates measurements at one site per trip
- Establish group goals at the beginning of the monitoring season
- Expand River Watch participation within the District
    - Approach the Bagley High School to begin a River Watch group.
    - Pursue monitoring volunteers in Thief River Falls, possibly a home school group.

- Improved Watershed Analysis
    - Drainage areas for all River Watch sites have been delineated, measured, and digitized as ArcView shape files. In 2005-06, information about each drainage area, including soil profiles and land use, will be digitized to provide faster and more thorough analysis of watershed events.

RLWD Long-Term Water Quality Monitoring Program - Stream Sampling

The RLWD conducted monitoring at 33 stream sites as part of it long-term monitoring program in 2004. Each site was sampled at least four times. Dissolved oxygen, pH, conductivity, temperature, turbidity, transparency, and stage measurements were collected in the field. Samples were collected and analyzed for concentrations of total phosphorus, orthophosphorus, total suspended solids, total dissolved solids, total Kjeldahl nitrogen, nitrates and nitrites, ammonia nitrogen, chemical oxygen demand, and fecal coliform.

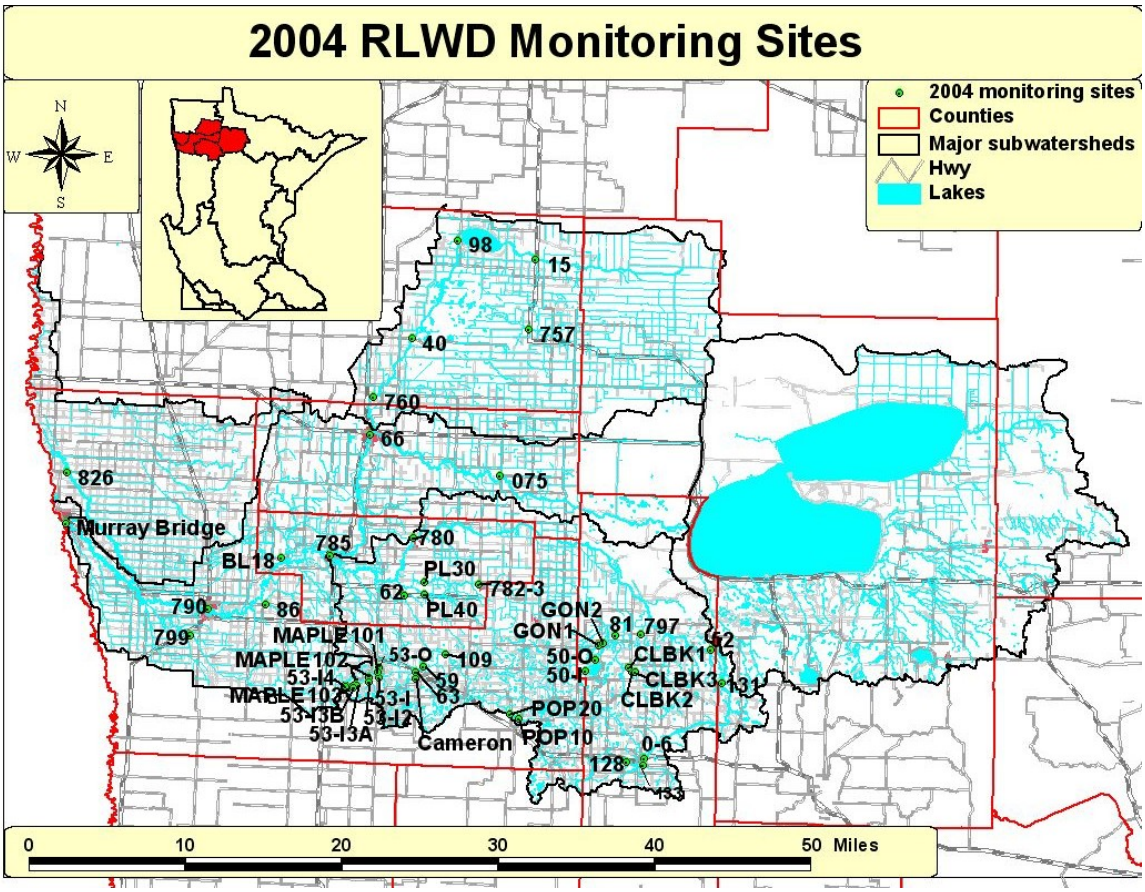
In 2004, Red Lake Watershed District water quality monitoring staff continued the RLWD long-term monitoring program – with a twist. One of the actions of the Red River Watershed Assessment Protocol Project was to review the RLWD monitoring program and set monitoring goals. One purpose of the program is to collect sufficient data for the assessment of waters within the RLWD. An important way to assess a body of water is to determine whether or not it would be considered impaired by comparing data from the site to a standard. In order to do this, the RLWD uses the MPCA methods for assessing the quality of Minnesota Surface Waters for the Determination of Impairment 305 (b) Report and 303 (d) List. During this process of reviewing the monitoring program, the current quarterly sampling plan was altered so that river reaches could be more reliably and completely assessed for fecal coliform. In order to assess whether or not a body of water is impaired by fecal coliform, there needs to be at least 10 samples within the most recent 10 years of sampling, as well as 5 samples for each calendar aggregate month within the last 10 years (within the last 10 years, there should be at least 5 samples that were taken during the month of June). The MPCA focuses on the months of April through October for these assessments since these are the months in which fecal coliform bacteria are living and growing. In order to meet the MPCA's data requirements, there was no need to increase the overall number of samples. Just the timing has been changed. The RLWD will abandon its quarterly sampling schedule, where samples were taken during the same time each year (February, May, July, and October). In its place, the RLWD has adopted an alternating schedule and will only do full sampling rounds during the open-water months of April through October. Each of these months will be sampled every-other-year. This should ensure that, within a ten-year period, the RLWD would collect at least five fecal coliform samples in each month and meet the MPCA's data requirements for assessment of waters. The RLWD will collect additional fecal coliform samples at all sites during the months of June through August 2005 in order to meet MPCA fecal coliform data requirements for these three critical months.

The RLWD will continue to conduct winter monitoring on the Red Lake and Thief Rivers near Thief River Falls. This is because of the importance of the Red Lake River in Thief

River Falls as a public water supply. Water quality problems on the Thief River regularly cause problems at the Thief River Falls water treatment plant.

The Thief River contributes to the water supply of Thief River Falls, which is a reservoir on the Red Lake River within the city. Data shows that water quality on the Red Lake River is quite good upstream of Thief River Falls and that water quality on the Thief River is comparatively much worse. Throughout most of the open water season – particularly in the summer months – water quality on the Thief River is relatively good. However, there are seasonal problems on the river that create anoxic conditions, hydrogen sulfide problems, high sediment loads, and high loads of organic material. Low dissolved oxygen levels occur under the ice of the Thief River during the winter. High total dissolved solids concentrations and high conductivity readings have been found during spring runoff. High total suspended solids and total phosphorus concentrations have been associated with discharges from Agassiz National Wildlife Refuge. Eroding ditches empty into the Thief River and, at times, increase the levels of turbidity and total suspended solids in the river. The public water supply of Thief River Falls has a strong chlorine smell and taste in spring due to the extra treatment that is made necessary by degraded water quality. The USDA Natural Resources Conservation Service *Erosion Sedimentation Sediment Yield Report: Thief and Red Lake Rivers Basin, Minnesota* states that "the major source of sediment yielded to streams and ditches is from streambank and ditch bank erosion (63 percent)." The study recommends the implementation of filter strips, field windbreaks, strip cropping and crop residue management. It also estimated that streambank stabilization and in-stream structural measures (cross-vane weirs) on the Thief and Red Lake Rivers could reduce sediment yields at Thief River Falls by up to 58%.

There is a problem with the volatilization of hydrogen sulfide at the dam in Thief River Falls. This hydrogen sulfide comes from the Thief River and is caused by the anaerobic activity within shallow reservoirs such as Agassiz NWR and Thief Lake WMA. The river is completely ice-covered from Agassiz NWR to Thief River Falls, so H_2S is not able to volatilize (be released into the air) until it reaches the dam. The *Hydrogen Sulfide Problems In Thief River Falls: Causes, Effects, and Possible Solutions* study by Brent Johnson states that the H_2S problem can be alleviated through revised reservoir management and/or volatilization with weirs upstream of town where the odor won't be a nuisance.



The RLWD made some changes to its water quality monitoring network in 2004. Monitoring was suspended on the Red Lake River at the Lower Red Lake Dam. The Walker Brook monitoring site (#133) and the Clearwater Lake Inlet were added to the long-term monitoring program due to their importance in TMDL studies. The RLWD also began monitoring Gentilly Creek at the CR #11 crossing in Gentilly (Site #86).

Investigative Sampling

Effect of Water from Agassiz Pool on Water Quality in the Thief River

In the spring of 2004, the RLWD received advance notice that Agassiz National Wildlife Refuge would be releasing water into the Thief River from its main pool. Although it is not the only major source of pollution on the Thief River, spring and fall releases of water from Agassiz NWR have been associated with poor water quality– in the form of high total phosphorus, total suspended solids, and turbidity levels. Water in the Thief River is visibly thick with organic matter and there are numerous chunks of cattails floating down the river when the refuge is releasing water at a high rate of flow. To examine and document how water quality is affected by these discharges, samples were collected on April 5, 12, 14, and 15, and 19 of 2004. Samples were collected upstream of the refuge at Marshal County Road #6 and downstream of the refuge at Marshall County Road #7. Agassiz NWR began discharging at a rate of 100 cubic feet per second (cfs) and

increased the discharge daily until a level of 500 cfs was reached and sustained. Samples were analyzed for total phosphorus (TP), orthophosphorus (OP), total suspended solids (TSS), and total dissolved solids (TDS). Field measurements of dissolved oxygen, pH, conductivity, temperature, turbidity, and transparency were also collected.

The April 5th sample was collected as a regularly scheduled sample for the RLWD long-term monitoring program and was collected prior to the release of water from Agassiz Pool. The results of this sample were not bad when compared to water quality standards, even though the samples were collected during the spring runoff season.

The April 12th – 19th samples were collected while Agassiz was discharging. The average TSS and turbidity levels at CR #7 were more than twice as high as those at CR #6. When we sampled the 500 cfs flow, the refuge had been discharging at this rate for several days. The TSS levels were similar on this day, which implies that once a moderate, steady flow is reached, the increased sediment loading from Agassiz begin to diminish. The concentrations are still high, but not a lot higher than what is already in the river upstream of the refuge. TDS levels, as expected, remained at a normal level and were not affected by the discharge from Agassiz NWR. Total Phosphorus increased downstream of Agassiz NWR vs. upstream but orthophosphorus was very low and did not change from upstream to downstream. This implies that the increase in phosphorus levels comes from an increase in organic phosphorus found in particulate organic matter and suspended sediment. The high amount of suspended, decaying plant matter was very noticeable.

Turbidity (NTU)	Date						
Site	4/5/2004	4/12/2004	4/13/2004	4/14/2004	4/15/2004	4/19/2004	Grand Total
CR6		14.40		12.90	19.50	12.90	14.93
CR7	10.60	37.30	52.10	21.30	55.00	16.60	32.15
TSS (mg/L)	Date						
Site	4/5/2004	4/12/2004	4/13/2004	4/14/2004	4/15/2004	4/19/2004	Grand Total
CR6		10.00		14.00	24.00	22.00	17.50
CR7	2.00	50.00	72.00	30.00	80.00	26.00	43.33
TP (mg/L)	Date						
Site	4/5/2004	4/12/2004	4/13/2004	4/14/2004	4/15/2004	4/19/2004	Grand Total
CR6		0.084		0.07	0.088	0.075	0.07925
CR7	0.194	0.111	0.115	0.088	0.111	0.101	0.12

The Mud River flows into Agassiz NWR and its contribution was overlooked during this sampling. Any increases in TSS or TP may be partially caused by the Mud River. However, assessment of RLWD monitoring data shows that the Mud River is not impaired by turbidity, low dissolved oxygen or fecal coliform levels. In fact, the RLWD has not found any exceedances of the MPCA turbidity standard on the Mud River.

This investigative sampling focused on Agassiz NWR, but Agassiz is not the only source of pollution along the Thief River. Although water quality decreases in the Thief River from upstream of Agassiz NWR to downstream of Agassiz NWR, the water quality in the river often decreases from Agassiz downstream to the Hillyer Bridge monitoring site north of Thief River Falls. If the majority of sediment in the river truly comes from channel erosion, large spikes in flow would facilitate this erosion.

There were several questions raised by this investigative monitoring that may require more intensive monitoring and research to answer. What is the impact of the Mud River upon water quality in and leaving Agassiz Pool? Could the relatively high level of flow into Agassiz during the 2004 discharge increase the amount of bottom material that was suspended and carried downstream from the refuge? Can the Agassiz operating plan be altered to attempt to achieve as steady and as moderate an outflow as possible? Can the operating plan be altered with measures to keep the Thief River below bank-full stage if possible? Is there a way that water can be released from Agassiz without severely impacting water quality? Do TSS, turbidity, and TP concentrations begin to decrease as a particular level of flow is maintained for a period of time, or does the pool simply begin to run out of loose sediment to flush out through the outlet (or both)? Does the amount of time since gates were adjusted (flow increased) have an effect on water quality results? What is the extent of erosion within the Agassiz Pool? What is the effect of sediment loading to the refuge while the outlet is closed upon sediment concentrations in water being discharged for Agassiz Pools? Can erosion in ditches be effectively reduced?

Effect of Discharge from Fosston Lagoons Upon Water Quality in the Poplar River

During the summer of 2004, at the request of RLWD Board Managers, water quality staff collected two sets of water quality samples from the Poplar River. The results were very interesting (and shocking). The samples were collected at a monitoring site upstream of the Fosston lagoons and a site downstream of the lagoons on the Poplar River. The upstream site is located at the Polk County Road #6 (POP10) crossing and the downstream site is located at the Polk County Road #30 (POP20) crossing of the Poplar River. The samples were collected on May 26th (not discharging) and June 23rd, 2004 (discharging). The May samples showed a minimal change in water quality from the upstream site to the downstream site. The June samples, however, showed that the Poplar River was severely impacted by the discharging lagoons. This was visually evident, without even collecting samples for laboratory analysis. We were alerted to this fact by the local River Watch program. The water in this particular reach of the Poplar River is normally quite clear and the water quality is good for a stream in this area. On the day of the June samples, the water at the upstream sampling site fit this description. The downstream site, however, did not show these characteristics. The water was very turbid (not clear at all) and was very green. Transparency was reduced from a maximum reading of >100 cm upstream to a near minimum reading of 7.5 cm downstream of the lagoons.

The laboratory results from the June downstream monitoring site samples were some of the worst ever recorded by the RLWD, particularly for total phosphorus, ammonia, total dissolved solids, and total suspended solids. Most total phosphorus results in the Clearwater River Watershed are under .3 mg/L. The concentration of total phosphorus downstream of the Fosston lagoons on June 23rd was 9.32 mg/L. This is "off the charts" for a natural waterway (hence, the green color of the water). Ammonia levels at most sites within the RLWD are either too low to detect or are well below 1 mg/L. The 19.9 mg/l concentration on June 23rd was an extremely high level and suggests that water with an ammonia nitrogen concentration of over 20 mg/L was being discharged into the river.

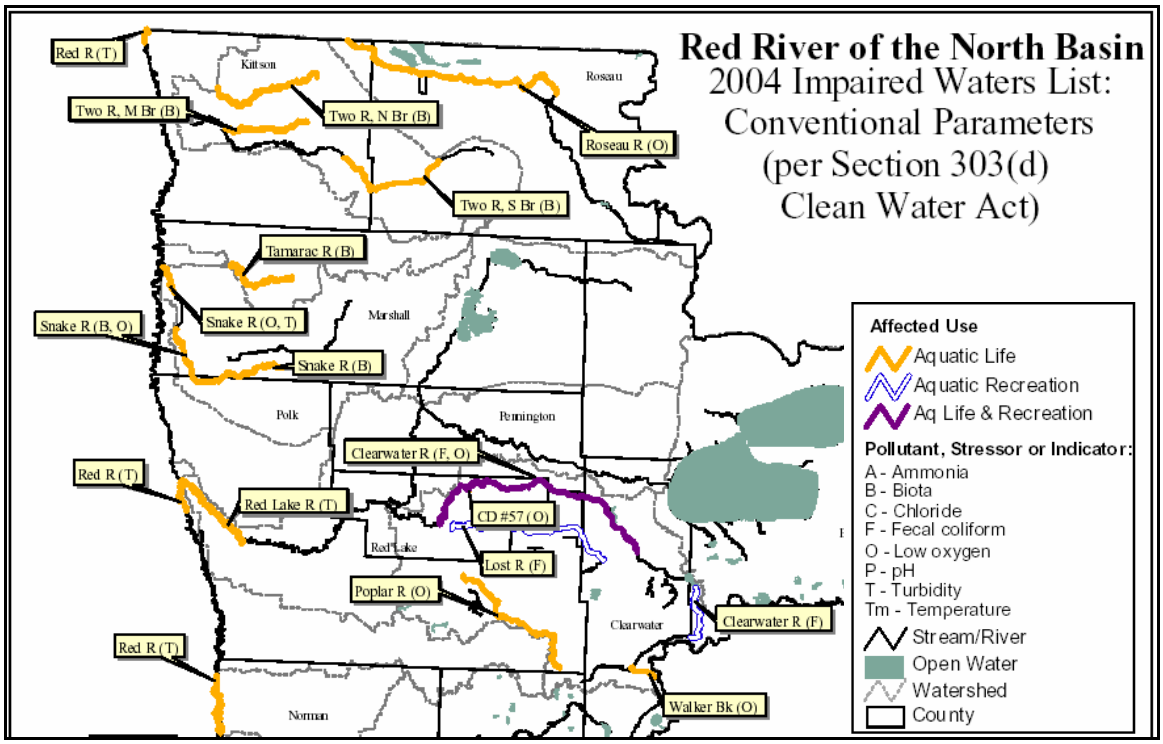
For reference purposes, the total ammonia standard for rivers and streams in the North Central Hardwood Forest ecoregion is .22 mg/L. The highest level of ammonia our monitoring program had ever observed on the Poplar River before June 23, 2004 was 0.96 mg/L. The concentration of total suspended solids was also unnaturally high at 96 mg/L. The North Central Hardwood Forest ecoregion value for minimally impacted streams is 16 mg/L. The TSS concentration increased by 90 mg/L from the upstream site to the downstream site on June 23.

In the spring and summer of 2004 the City of Fosston was working on a waste water pre-treatment project to fix odor problems and meet MPCA requirements. Hopefully this will help reduce future impacts upon the river. The information in this section was sent to the Fosston Public Works Department (no reply) and the MPCA were also informed of these findings.

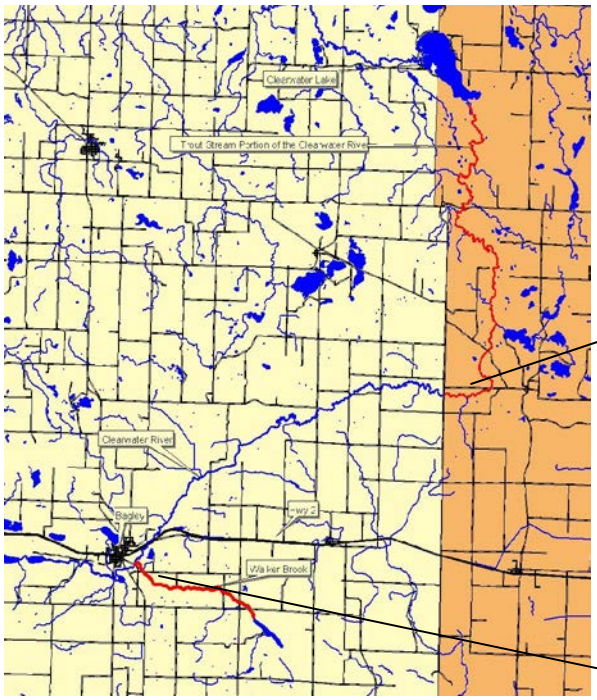
TMDLs

In 2004, the MPCA finalized another 305 (b) Report (assessment of all waters in the state for which data exist) and 303 (d) List (list of all impaired waters within the state). The assessment for these reports was conducted in 2003. The MPCA uses data in the EPA STORET database for these assessments. The RLWD had submitted water quality data to the MPCA for STORET entry in 2002. Due to the volume of data and number of new sites that had to be established, the data wasn't fully entered by the MPCA into the STORET database until after the assessment process. So, there weren't many differences, if any, within the RLWD between the 2002 list of impaired waters and the 2004 list of impaired waters.

Once a body of water is determined to be impaired, it is put in line to receive funds for a TMDL study. These studies are conducted to identify the sources of water quality problems. They also make recommendations regarding the extent of pollutant load reductions that are necessary from each pollutant source in order for the stream/river/lake so that it will support its designated uses (swimming, aquatic life).



TMDLs on the Clearwater River



Clearwater River at Beltrami CR 22

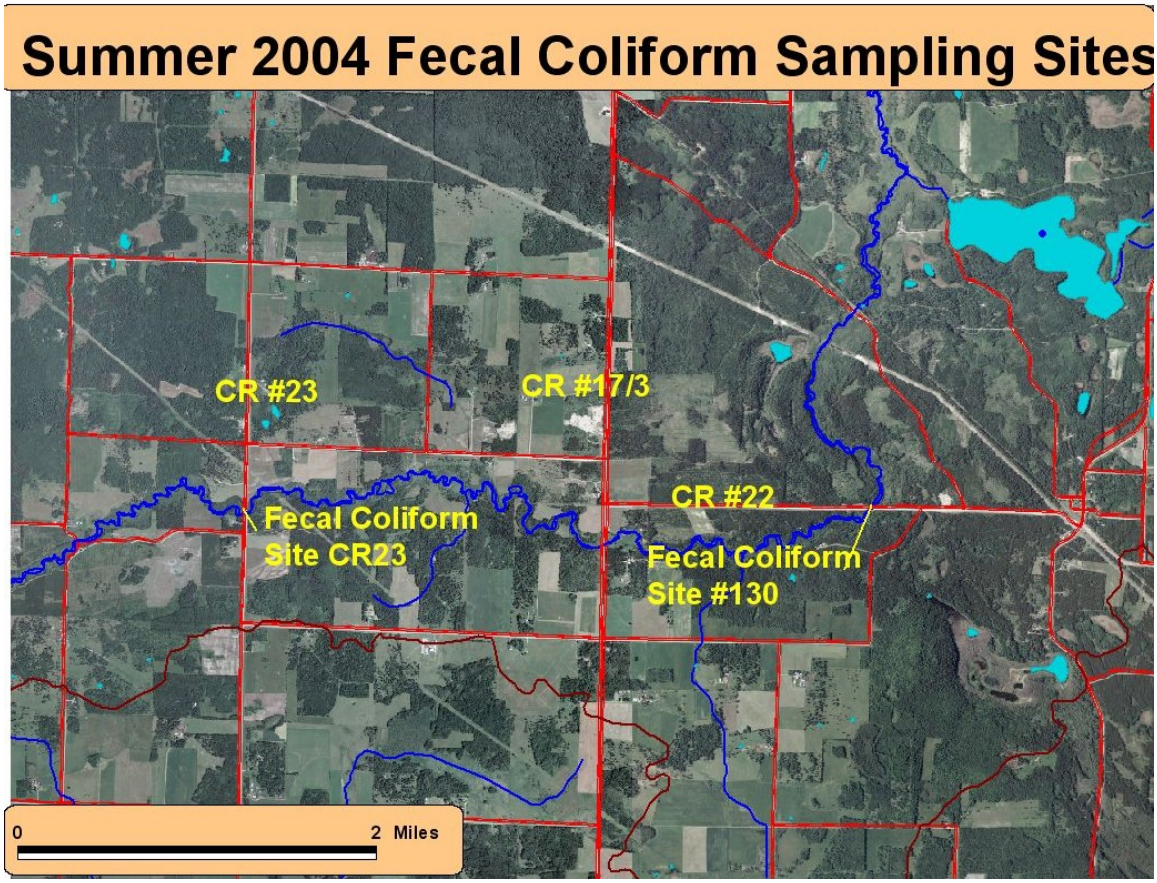
Walker Brook at Clearwater CR 19

The TMDLs on the Clearwater River Study, initiated in 2002, was completed in 2004. This project focused on the trout stream portion of the Clearwater River, which was impaired by fecal coliform and Walker Brook, which was impaired by low dissolved oxygen. Intensive monitoring on these two reaches was conducted during the summers of 2002 and 2004. Continuous stage measurement equipment was installed at each site and flow measurements were taken in order to create rating curves for the sites and obtain a continuous record of flow throughout the sampling period. A rain gauge was installed at the Walker Brook monitoring site.

Field measurements, which included dissolved oxygen readings, were collected at the Walker Brook site. The 2004 monitoring, along with previous monitoring, shows that Walker Brook definitely does not meet MPCA standards for dissolved oxygen. If a body of water fails to meet the MPCA state standard for dissolved oxygen (5 mg/L minimum) in more than 25 percent of samples, it is considered to be not supporting of aquatic life. According to RLWD data collected through November 2004, Walker Brook failed to meet the state standard for dissolved oxygen in 31.58% of the measurements that have been taken.

The result of the study will be a re-classification of Walker Brook so that less stringent standards are applied to this stream. The research conducted by the study group, particularly that done by Professor Emeritus Bob Melchior, found that the impairment on Walker Brook is caused by natural conditions in the watershed. Walker Brook is partly fed by ancient groundwater that is low in dissolved oxygen and constitutes the majority of base flow during low flow conditions. The stream also flows through calcareous fens and organic soils in which decomposition consumes oxygen. Also, Walker Brook experiences low flow situations periodically during the summer, which are compounded by beaver dams on the downstream end of the reach. All of these factors combine to lower dissolved oxygen levels below the state standard during low flow conditions.

Monitoring conducted in 2002 and 2004 did not support the fecal coliform impairment on the trout stream reach of the Clearwater. A delisting of the reach was attempted in 2003, however, a high fecal coliform concentration in samples collected at several sites along the trout stream reach during a heavy rain storm on August 28, 2002 kept the reach from being delisted. In an attempt to determine the general location of the source of the problem, more intensive monitoring was conducted in 2004. The 2004 monitoring sites were located at the site of the high reading and upstream of this site. Monitoring confirmed that fecal coliform levels on this reach only exceed the standard during heavy rainfall events and that these exceedances only occur downstream of Clearwater County Road 23.



Overflows from the Bagley wastewater treatment plant and runoff from the city could have contributed to the original impairment on the river (1992-1993 data). However, the city has done a commendable job of rectifying these problems. The city upgraded its wastewater treatment plant in 2002 and also constructed 3 stormwater retention ponds and an infiltration pond in 2003. No exceedances of the state fecal coliform standard have been recorded directly downstream of Bagley since the improvements. Data collected through 2004 shows that no sites within the trout stream reach of the Clearwater River have an exceedance rate greater than 10% (MPCA's exceedance frequency threshold for the determination of impairment) or a monthly geometric mean greater than 200 col/100ml. This reach is currently being taken off of the MPCA's list of impaired waters.

Red River Basin Buffer Initiative

In 2004, the RLWD extended its contract with the Clearwater County Soil and Water Conservation District (SWCD) for the Silver Creek Buffer Strip Initiative. Silver Creek, a tributary of the Lost River, flows between the towns of Clearbrook and Gonvick. It meets the Lost River at Anderson Lake, northeast of Gonvick. The RLWD had been providing the funding necessary for the SWCD to target the Silver Creek subwatershed for intensive implementation of conservation buffer strips. The Red River Basin Commission, with the assistance of the MPCA, received an EPA 319 Grant to expand the project to other subwatersheds within the Red River Basin and assume the funding responsibilities. The extension from the RLWD allowed the

SWCD to continue working on the project until the RRBC started receiving grant money and was able to administer it to the SWCDs working on the project. The subwatersheds currently being targeted by the project include the Silver Creek; Sand Lake, which is on the border of Becker and Clay Counties; Coon Creek and Spring Creek, which are tributaries of the Wild Rice River; and Whiskey Creek, which is in Wilkin County. The RLWD is conducting monthly water quality monitoring on Silver Creek as an in-kind contribution to the project.

Assessment of Stream Water Quality Data

Methods from the MPCA *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for the Determination of Impairment 305 (b) Report and 303 (d) List* were used to assess data from rivers and streams within the RLWD. This was done in preparation for the Best Professional Judgment meeting for the MPCA's 2005 assessment process. A summary of the results of this assessment is also included in this report on the following pages. The MPCA has set state standards for several water quality parameters, including minimum dissolved oxygen levels (5 mg/L), maximum turbidity levels (25 NTU), an acceptable pH range (6.5 - 8.5/9), maximum fecal coliform levels (200 col/100ml), and maximum un-ionized ammonia levels (.04 mg/L). Other water quality parameters such as total phosphorus, nitrates and nitrites, and total suspended solids are compared to standards (minimally impacted stream values) that are different in each ecoregion. The MPCA's 2005 assessment and determination of impairment process will result in many more reaches within the RLWD that are listed as impaired waters. Of the 33 RLWD monitoring sites that were assessed for this report, eight had turbidity impairments, twelve had dissolved oxygen impairments, and three were impaired by fecal coliforms.

Assessment of RLWD Monitoring Data Collected from 1995 - 2004

The percentages in the table below represent the percentage of sample results that fail to meet their respective standards

<10% Exceedance Rate = Fully supporting of aquatic life or aquatic recreation

10% - 25% Exceedance Rate = Only partially supporting of aquatic life or aquatic recreation - highlighted in light yellow

>25% Exceedance Rate = Not supporting of aquatic life or aquatic recreation - highlighted in bright yellow

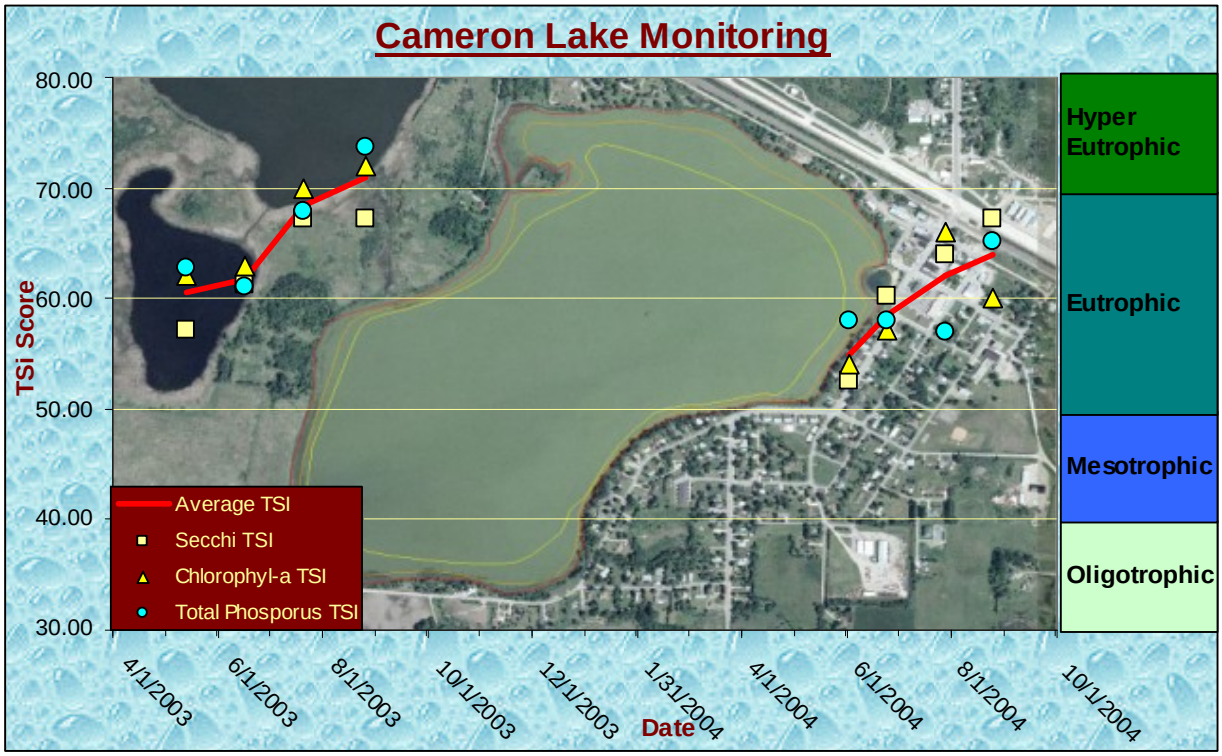
* = More data is needed in order to verify assessment

			Main Parameters for Assessment - State Standards					Supporting Parameters		
			Aquatic Life				Aq. Rec.	Based on Ecoregion Standards		
River	Reach (Defined by MPCA)	Monitoring Site(s)	Turbidity	Dissolved Oxygen	Un-ionized Ammonia	pH	Fecal Coliform	Nitrates & Nitrites	Total Phosphorus	Total Suspended Solids
Grand Marais Creek	Headwaters to Unnamed Creek (CD #2)	826	58.82%	17.24%	0.00%	12.50%	7.41%	34.62%	77.42%	22.58%
Mud River	T150N R33W south line to Lower Red Lake	NEB-2	0.00%	0.00%	0.00%	0.00%	4.55%	29.41%	4.00%	5.26%
Red Lake River	Headwaters to Thief River	740	0.00%	3.57%	0.00%	36.00%	0.00%	20.00%	0.00%	5.71%
Red Lake River	Headwaters to Thief River	750	0.00%	2.78%	0.00%	2.86%	0.00%	10.71%	0.00%	0.00%
Red Lake River	Thief R to Thief River Falls Dam	66	0.00%	2.86%	0.00%	2.86%	6.67%	11.54%	0.00%	0.00%
Red Lake River	Crookston Dam to Burnham Creek	790	30.43%	0.00%	0.00%	0.00%	5.71%	25.00%	15.79%	13.51%
Red Lake River	Unnamed Cr to Red R (RLR within Grand Forks)	Murray Bridge	54.55%	0.00%	3.45%	0.00%	2.78%	32.14%	8.11%	29.73%
Burnham Creek	Unnamed Cr to Red Lake R	799	21.43%	4.00%	0.00%	3.57%	0.00%	38.46%	17.24%	14.81%
Moose River	Headwaters to Thief Lk	15	4.35%	19.44%	0.00%	2.70%	0.00%	33.33%	48.65%	13.89%
Mud River	Headwaters to Agassiz Pool	757	0.00%	2.86%	0.00%	0.00%	3.03%	40.74%	2.86%	2.94%
Thief River	Thief Lake to Agassiz Pool	98	13.64%	11.11%	7.69%	2.78%	6.06%	0.00%	0.00%	2.86%
Thief River	Agassiz Pool to Red Lk R	40	22.22%	15.38%	0.00%	2.50%	3.33%	18.52%	7.32%	10.00%
Thief River	Agassiz Pool to Red Lk R	760	36.36%	21.62%	3.57%	2.70%	11.43% Partial*	21.43%	5.26%	2.78%

			Main Parameters for Assessments - State Standards					Supporting Parameters		
			Aquatic Life				Aq. Rec.	Based on Ecoregion Standards		
River	Reach (Defined by MPCA)	Monitoring Site(s)	Turbidity	Dissolved Oxygen	Un-ionized Ammonia	pH	Fecal Coliform	Nitrates & Nitrites	Total Phospho-rus	Total Suspen-ded Solids
Clearwater River	Headwaters to T148 R36W S36 east line (*Belt/Clrwtr Co Bndry*)	0-6	0.00%	22.22%	0.00%	5.88%	5.88%	15.00%	56.76%	10.81%
Clearwater River	Headwaters to T148 R36W S36 east line (*Belt/Clrwtr Co Bndry*)	128	0.00%	15.25%	0.00%	1.82%	4.35%	11.36%	20.00%	7.55%
Clearwater River	T148 R35W S31 west line (*Beltrami/Clearwater Co Bndry*) to Clearwater Lk (*Trout Stream*)	131	0.00%	0.00%	0.00%	0.00%	0.00%	33.33%	50.00%	41.67%
Clearwater River	T148 R35W S31 west line to Clearwater Lk (*Trout Stream*)	130	0.00%	0.00%		0.00%	4.76%			
Clearwater River	T148 R35W S31 west line to Clearwater Lk (*Trout Stream*)	CR #23	0.00%	0.00%		0.00%	0.00%			
Clearwater River	Clearwater Lk to Ruffy Bk	52	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Clearwater River	Ruffy Bk to Lost R	780	9.09%	2.63%	0.00%	0.00%	3.23%	53.57%	8.33%	2.78%
Clearwater River	Lower Badger Cr to Red Lk R	785	19.05%	0.00%	0.00%	0.00%	6.25%	66.67%	3.03%	14.71%
Walker Brook	Walker Brook Lk to Clearwater R	133	0.00%	31.58%	0.00%	15.79%	4.76%	0.00%	57.69%	0.00%
Ruffy Brook	Headwaters to Clearwater R	797	0.00%	0.00%	0.00%	0.00%	27%-Not*	7.41%	10.53%	35.71%
Lost River	T148 R38W S17 south line to Pine Lk	50-I	4.76%	11.11%	0.00%	0.00%	10% Full*	11.11%	5.56%	2.94%
Lost River	Pine Lk to Anderson Lk	50-O	0.00%	0.00%	0.00%	0.00%	6.25%	3.70%	0.00%	2.78%
Silver Creek	Headwaters to Anderson Lake	81	3.85%	0.00%	2.38%	4.35%	17%-Not	30.95%	6.00%	4.00%
Lost River	Anderson Lk to Hill R	782	8.00%	0.00%	0.00%	2.78%	12%-Full*	50.00%	0.00%	2.70%
Poplar River	Highway 59 to Lost R	62	4.76%	0.00%	0.00%	0.00%	3.13%	37.04%	11.43%	2.86%
Poplar River Diversion	Pond to Badger Lk	59	0.00%	31.43%	0.00%	0.00%	3.03%	18.52%	8.33%	2.78%
Unnamed Creek	Mitchell Lk to Badger Lk	63	0.00%	11.43%	0.00%	5.88%	3.45%	7.41%	5.71%	3.03%
Unnamed Creek	Eighteen Lk to Bee Lk	85 (Bee Lake Inlet)	0.00%	37.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Unnamed Creek	Tamarack Lk to Maple Lk	53-I	0.00%	5.00%	0.00%	2.63%	3.13%	14.81%	5.13%	5.13%
CD 14	Headwaters (*Maple Lake Outlet*) to Lower Badger Cr	53-O	0.00%	0.00%	0.00%	0.00%	0.00%	3.85%	0.00%	5.26%

Lake Monitoring

In 2004, the RLWD conducted lake monitoring at Cameron Lake (near Erskine) and Maple Lake (near Mentor). Clearwater Lake (east of Clearbrook on CR#4) was sufficiently monitored by the Clearwater SWCD this year, so the RLWD suspended monitoring there in 2004 and will resume monitoring Clearwater Lake in 2005. 2004 was the first year that samples have been collected on Maple Lake since 1991 (see the following article). Cameron Lake continues to exhibit poor water quality, although 2004 results were improved when compared to 2003 results. Cameron Lake is a shallow lake with nutrient rich sediment. The nutrients from this sediment that are mixed into the water column by wave action, along with nutrients entering the lake with runoff cause severe algae blooms in the lake. These blooms are so bad that the recreational value of the lake is essentially reduced to zero. In the past, the lake was used for disposal of creamery and septic waste.



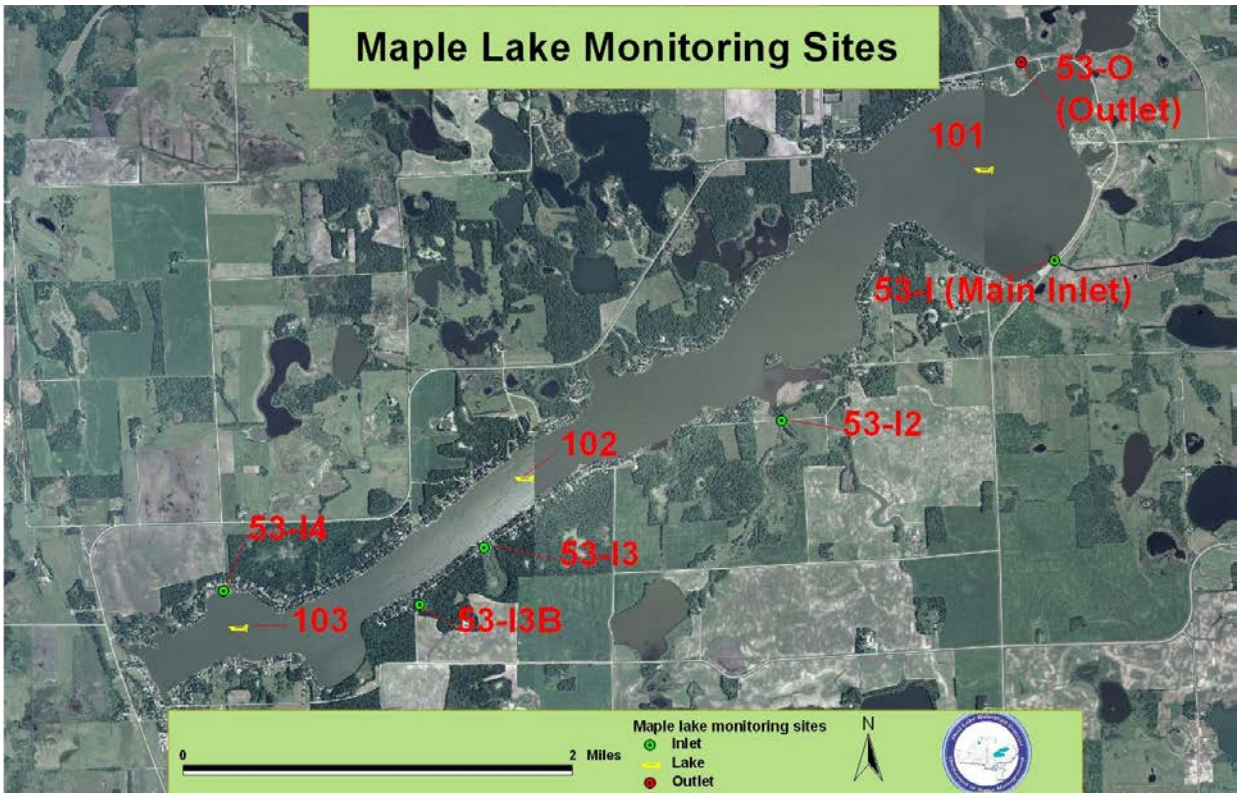
Concerned citizens in the city have expressed an interest in doing something to improve water quality within the lake. There are several methods of lake restoration that could be used, and they are all very expensive. Treating the lake with chemicals such as alum (aluminum sulfate) to reduce the amount of available nutrients in the lake would only be a temporary solution to the problem due to the fact the lake is so shallow (wave action would still disturb sediment). Dredging the nutrient rich sediment from the lake would be a more permanent solution that would also deepen the lake, which may also have the effect of improving fish populations in the lake. However, a similar project in the Thief River Falls reservoir cost well over a million dollars (cost prohibitive for a small town like Erskine). Disposal of the sediment is also problematic. A less expensive solution is to limit the amount of nutrients entering the lake so that the lake can essentially heal itself, as suggested by the *Cameron Lake Investigative Study Report– February*

1997. Since two of the City of Erskine's storm sewers contribute the greatest amounts of total phosphorus to the lake, stormwater retention ponds on these inlets and the implementation of best management practices throughout the rest of the lake's watershed should have a positive effect upon water quality within the lake.

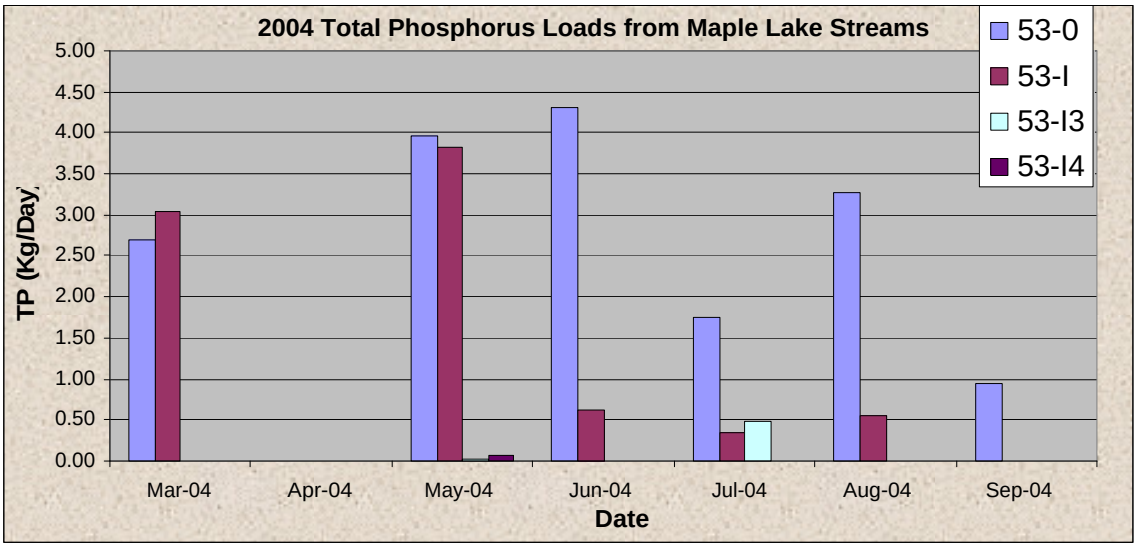
Maple Lake Monitoring

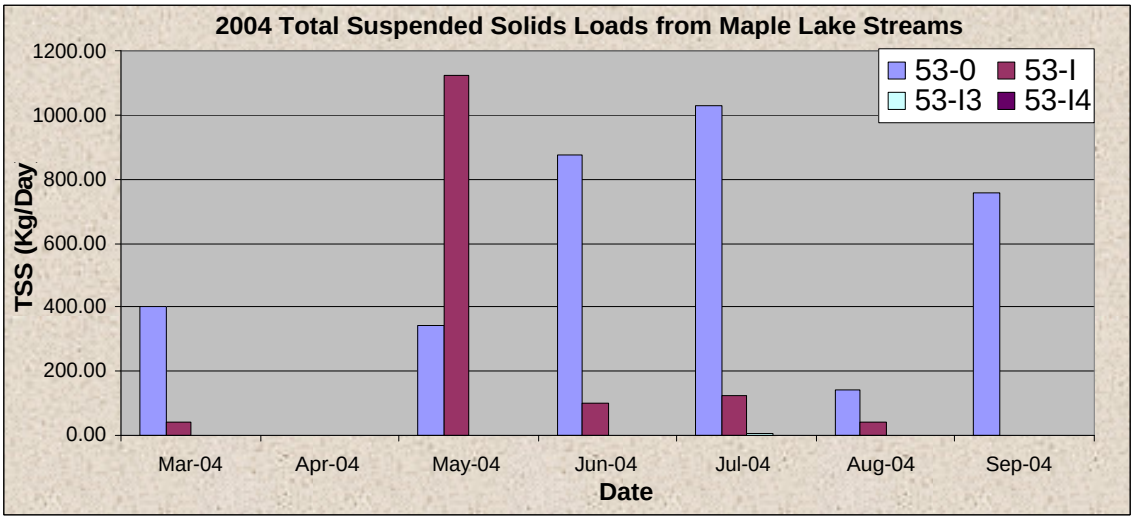
In 2004, the Red Lake Watershed District (RLWD) and the Maple Lake Improvement District formed a partnership to monitor water quality in and around Maple Lake. The Maple Lake District had expressed concern about water quality within the lake, particularly with the clarity of the water. Storm events cause large plumes of sediment and decaying vegetation to issue into the lake from it inlets. Algae blooms impair the usability of the lake for swimming and other forms of recreation. Local residents have noted that low water clarity has also affected visibility for spearing fish in the winter.

For this monitoring project, the Maple Lake District provided funds for sample analysis and the RLWD provided the staff and equipment necessary to conduct the monitoring. RMB Environmental Laboratories in Detroit Lakes analyzed the samples. Stream water quality samples were collected at the main inlet (JD73/Poplar River Diversion) and outlet (CD 14) along with additional inlets around the lake. The inlets and the outlet of the lake were monitored for dissolved oxygen, temperature, conductivity, pH, total phosphorus and total suspended solids. The main inlet and outlet were sampled monthly. The additional inlets of the lake have intermittent flow and usually only flow during spring runoff and large storm events so a limited number of samples were collected from these sites. Samples were collected at three sites within the lake itself. Samples collected within the lake were analyzed for total phosphorus, orthophosphorus, and chlorophyll-a. Secchi depth readings, dissolved oxygen profiles, and temperature profiles were also collected within the lake. Monitoring will resume in 2005.

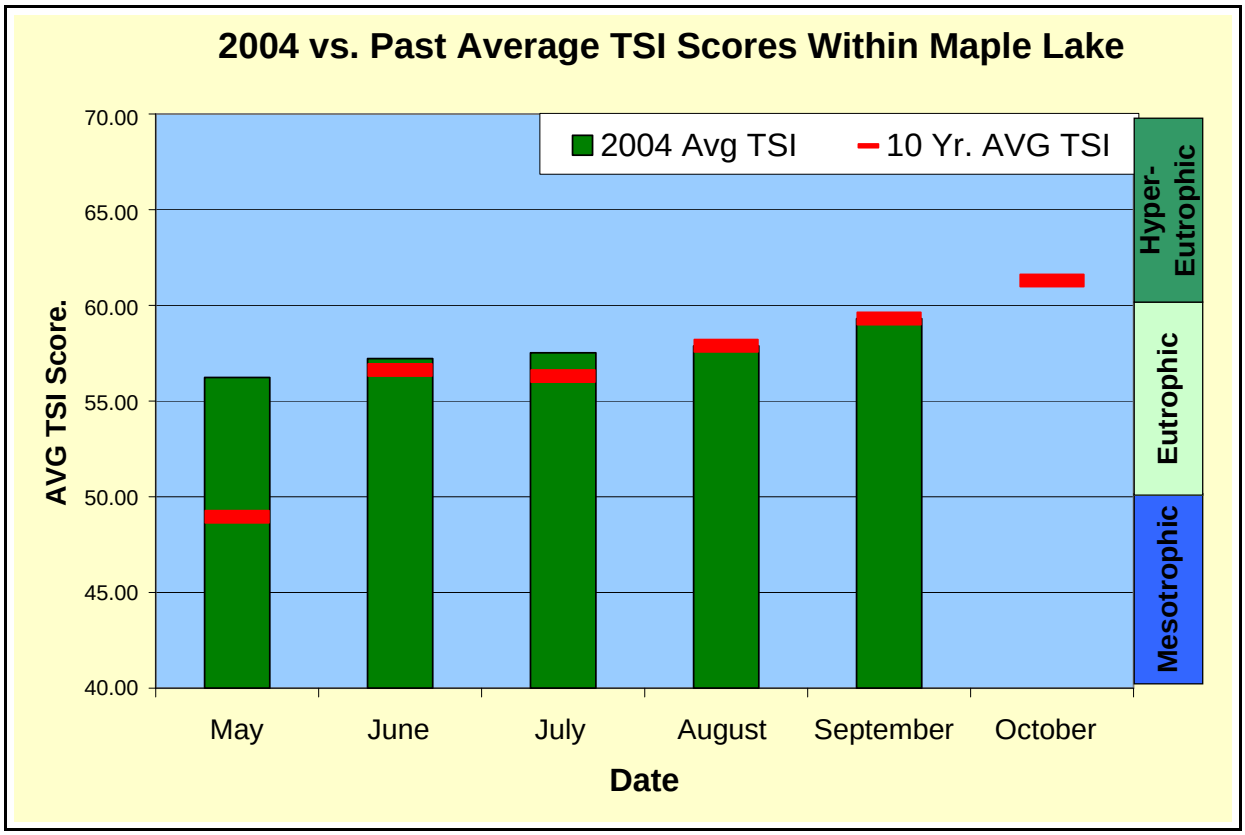


The main inlet (near the public access on the NE end of the lake) seems to be the source of most the nutrients that are entering the lake from streams. Since the inlet is essentially a ditch running through a series of wetlands, large storm events can flush decaying vegetation from these wetlands into the lake. The sediment and nutrient rich water, filled with visible chunks of suspended decaying vegetation, creates a large brown plume that extends into the lake during large runoff events. During normal flows, water quality entering the lake from the main inlet is relatively good when compared to water quality standards and results from other sites monitored by the RLWD. A recent preliminary assessment of Minnesota lakes and streams by the MPCA shows that the reaches of JD73 (inlet) and CD14 (outlet) adjacent to the lake are fully supporting for the designated uses of recreation and aquatic life. The wetlands and lakes along the Poplar River Diversion and JD73 most likely filter nutrients and sediment from the water during moderate flows. Unfortunately, the flow through a ditch can increase greatly and quickly during a storm or spring runoff. This increase in flow can cause sediment and organic matter (decaying vegetation) to be suspended in the stream and carried into the lake. Moderating flow within JD 73 may help minimize the occurrence of large flushes of nutrients and sediment into lake.





One of the main factors contributing to poor water clarity within a lake is algae. Phosphorus is the limiting nutrient for algae growth in lakes. So, the more total phosphorus that is in the water, the greater the prevalence of algae blooms will be. A measure of the amount of nutrients/productivity within a lake is the Carlson's Trophic State Index (TSI). A TSI score can be calculated for total phosphorus (limiting nutrient), chlorophyll-a (amount of algae), and Secchi depth readings (water clarity). A higher the TSI score indicates a higher level of nutrients and productivity. A lake needs a certain level of productivity to maintain a fishery, but there is a point at which there is an overabundance of nutrients, too much productivity occurs, and nuisance algae blooms become a more common occurrence. A preferable TSI score range for a lake in Minnesota is between 40 and 50 (mesotrophic). When there gets to be excess nutrients and algae growth (TSI>50), the lake is referred to as being eutrophic, or even hypereutrophic if there are enough excess nutrients.



The 2004 monitoring results for Maple Lake showed that the lake was eutrophic, but the TSI scores matched the lake's 10-year averages for the months of June through September. The May trophic state was higher than average. This was likely due to heavy rains that occurred during the Memorial Day weekend and flushed sediment and nutrients into the lake. In a relatively shallow lake, like Maple Lake, the lake rarely, if ever, stratifies. So, the entire water column is mixed. When the lake is always mixed, there is a greater possibility of nutrient (phosphorus) contributions from the sediment at the bottom of the lake. Also, it is important not to forget about nutrient contributions from the immediate watershed of the lake. Lakeshore owners can influence water quality within their lake (positively or negatively). Making sure that septic systems are up-to-code, refraining from using fertilizers containing phosphorus, and stabilizing shoreline are just some of the basic ways lakeshore residents can help protect the quality of their lake. Fortunately, a greater awareness of the causes of and solutions to lake water quality problems is spreading among lakeshore landowners. Volunteer monitors collect data for the Minnesota Pollution Control Agency. Lakescaping (planting native vegetation to stabilize shoreline) is gaining popularity. Also, lake management plans are being created by lake associations and districts to set goals for protecting and improving the quality of lake.

Tile Drainage Study

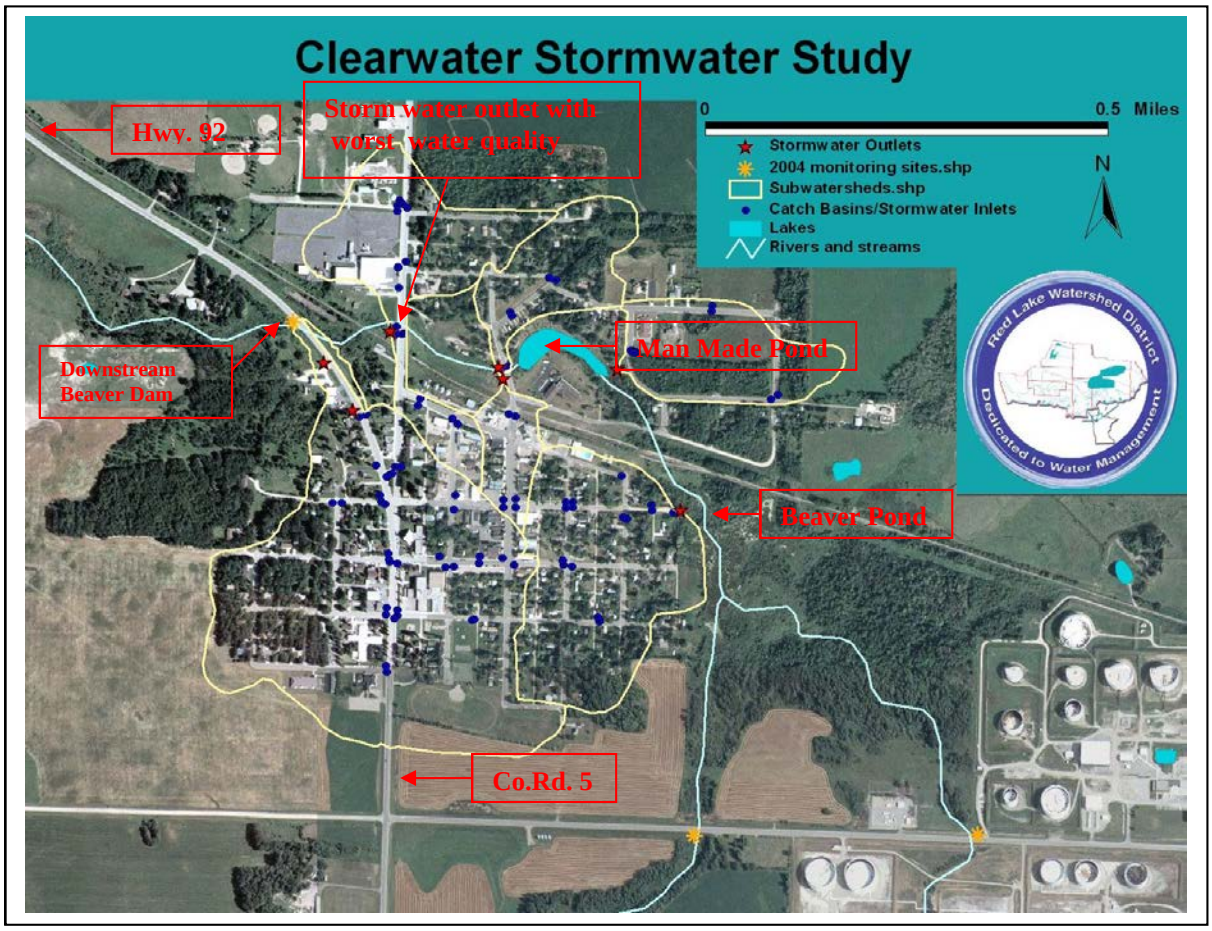
The Red Lake Watershed District has received a $17,500 grant from the Northwest Minnesota Foundation to study the effects of tile drainage on water quality. The Red Lake Watershed Farm to Stream Project will compare different tiling techniques, tile drainage with surface drainage, and agricultural drainage with natural drainage. The original cost of the project is $35,000. Due to increasing interest in the project, funding for additional flow monitoring will be provided by the Red River Watershed Management Board. The study will be conducted in 2005 and 2006. Results will be presented in the form of a scientific report and will be summarized for informational pamphlets as well. Study results will be available on the RLWD website (http://www.redlakewatershed.org/projects.html).

The amount of tile drainage within the Red River Valley has been increasing, as has interest in its effects upon water quality and flow volume. Tile drainage can reduce the amount of soil erosion, total suspended solids loadings, and total phosphorus concentrations. One criticism of tile drainage is that it may be introducing high concentrations of nitrates to streams and rivers. Some drainage management practices may be able to reduce nitrogen losses through increased denitrification and reduced leaching. These methods include proper nutrient management, shallow tile drainage, and controlled tile drainage.

Water quality samples will be collected and analyzed for total suspended solids, total phosphorus, and nitrates. Field measurements will be conducted for dissolved oxygen, temperature, conductivity, pH, turbidity, and transparency. Flow will be monitored continuously at each monitoring site so that loads can be calculated and compared. If additional funding is received, flow will be monitored from tile drained fields and surface drained fields to determine the effect of tile drainage on peak flows and total flows when compared to surface drainage. Monitoring sites will be chosen for each comparison (water quality and/or quantity) so that land use and soil characteristics are comparable. The different types of tile drainage outlets that will be compared include gravity outlets, pumping stations, and water control structures. The primary goal of this study is to successfully collect water quality and flow data from gravity tile drainage outlets, pumped tile drainage outlets, controlled tile drainage outlets, surface drainage, and reference sites. Study areas will be located in the Clearwater River watershed in Red Lake County (near Oklee) and in the Thief River watershed near Grygla.

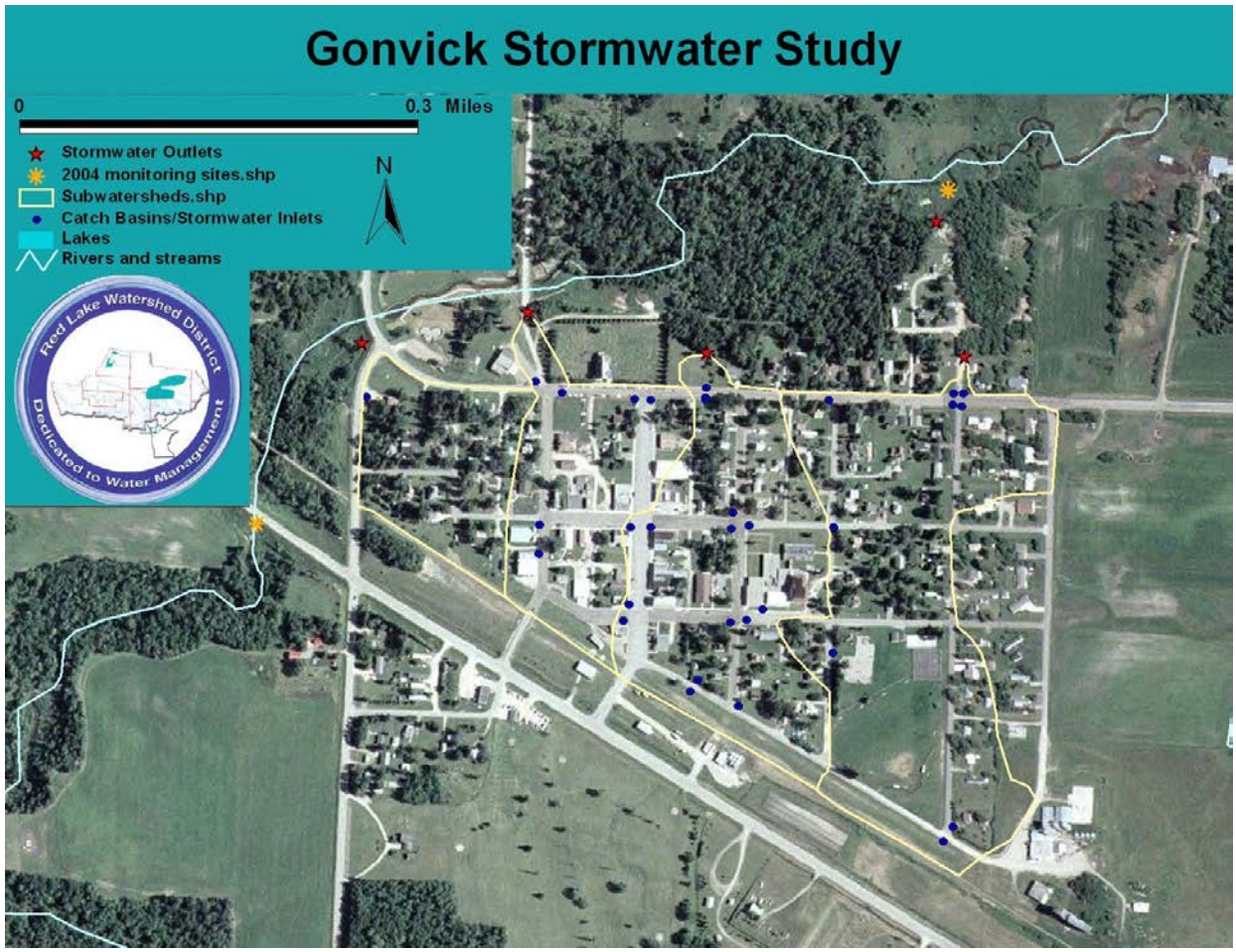
Clearwater River Small Cities Stormwater Study

In 2004, the RLWD Board of Managers requested that RLWD water quality staff conduct a stormwater study for the cities of Clearbrook and Gonvick, even though applications for grant money had been unsuccessful. The basic goals of the project are to conduct stormwater modeling and to collect water quantity and quality measurements to confirm the modeling results. The Lost River, a tributary of the Clearwater River, flows through the town of Gonvick. Clear Brook, a tributary of Silver Creek (a tributary of the Lost River) flows through the city of Clearbrook. During the summer of 2004, water quality was monitored upstream and downstream of the two towns. Continuous flow measurement equipment was installed at each monitoring site. Some samples were taken from stormwater outlets in Clearbrook during a rain event. The subwatersheds of the stormwater systems in the towns were delineated using GPS/GIS equipment. There were limited storm events during the summer of 2004 so there were fewer samples collected for the project than anticipated. The number of samples should be sufficient to confirm modeling results, however.



Several deductions can be made from the Clearbrook water quality monitoring data. There are three on-channel ponds in the City of Clearbrook. There is a beaver dam upstream of the first stormwater pond, a man-made pond near an apartment complex, and a beaver dam on the downstream of town. Even though phosphorus concentrations increased from upstream to downstream during small rain events and when there was no flow from stormwater outlets, total suspended solids and fecal coliform concentrations generally decreased.

When the accessible stormwater outlets were sampled during a significant rain event on September 15, 2004, the stormwater outlet along CR#5 had much higher concentrations of total suspended solids (92 mg/L), total phosphorus (2.63 mg/L), and orthophosphorus (1.98 mg/L) than the other outlets. There is an undeveloped area near the CR #5 stormwater outlet that may be able to accommodate a stormwater retention pond. The furthest upstream (SE side of town) and furthest downstream (along Highway 92) stormwater outlets in the town still had sediment and phosphorus levels higher than what is normally found in area streams and rivers, even though they weren't as bad as the CR#5 outlet. When comparing results from downstream of Clearbrook to results from upstream of Clearbrook, there was an astronomical increase in fecal coliform concentrations on August 24, 2004 and the concentration more-than-doubled from upstream to downstream on July 28, 2004, even though levels were already very high upstream of town. Samples were collected upstream and downstream of the beaver dam located downstream of the city of Clearbrook on July 28. The fecal coliform concentration decreased by 23,000 col/100ml from upstream to downstream of the dam (10% reduction). So, sampling results seem to suggest that beaver dams may not the source of the extremely high levels of fecal coliform. Faulty septic systems and/or some other waste management problems could also be at fault.



The concentration of sediment in the Lost River downstream of Gonvick did not show a significant increase from upstream of the city. However, there was an increase in the concentrations of fecal coliform every time samples were collected and an increase in phosphorus concentrations during and after rain events. Two out of the three fecal coliform samples collected were higher than the state standard of 200 col/100 ml. Water from one of Gonvick's stormwater outlets has to flow through about 50 feet of grass before it enters the river. Another stormwater system flows into a small rock-lined pool that functions as a sediment trap. The furthest downstream stormwater outlet flows into a creek bed that carries a perennial base flow from groundwater that should be relatively clean (although it is apparent that a lot of erosion has occurred along this creek). Stormwater samples from Gonvick stormwater and wastewater outlets should be collected in 2005 to determine the source of fecal coliform.

Red River Watershed Assessment Protocol

The RLWD is completing the Red River Watershed Assessment Protocol Project. The purpose of this project was to create a model water quality program for the Red River Basin. This project involved the creation of a website with interactive GIS mapping and a water quality database (www.redlakewatershed.org), entry of RLWD data into the EPA's STORET database, statistical analysis of RLWD data, water quality modeling, reviewing monitoring goals, development of standard operating procedures (SOP), development of a quality assurance project plan (QAPP),

the creation of a biennial water quality report, and the creation of a statistical methods manual. The parts of this project that were completed in 2004 were the review of monitoring goals and the *Red Lake Watershed District Water Quality Report – July 2004.* A draft of the statistical methods manual has also been created and is currently in the process of being reviewed by the MPCA. This manual includes all of the statistical methods that will be used for RLWD water quality reports, step-by-step methods for using the FLUX modeling program, and many other statistical and trend analysis methods that may be used to interpret water quality data. The RLWD QAPP is in the draft stage and will describe the RLWD monitoring program in detail when it is completed. The production of an SOP, QAPP, and a statistical methods manual will ensure continuity of methods throughout the life of the RLWD water quality program. The SOP and statistical methods manual are written in a manner that will be useful to any other agency or group that is conducting water quality monitoring. The SOP, water quality report, and many other documents and study reports are available on the RLWD website at http://www.redlakewatershed.org/projects.html.

II. District Projects

Parnell Operating Plan (RLWD Project #81A)

In 1997, the Red Lake Watershed District started construction of the Parnell Impoundment, which is located in Parnell Township, Polk County, Minnesota. This impoundment is a two pool impoundment with 3,600 acre feet of flood storage capacity and a drainage area of 23 square miles. This impoundment is an earthen dike structure with a concrete emergency spillway, with a gated outlet control structure. This project was funded in cooperation with the Red River Watershed Management Board (RRWMB). Construction was completed in 1998 and was operational in the spring of 1999. Because of a moratorium put on by the US Army Corps of Engineers on the construction of impoundments, an operating plan was not established at the time of construction.

In 2000, after the moratorium was lifted, the Board ordered that an Engineer be retained to develop an operable impoundment.

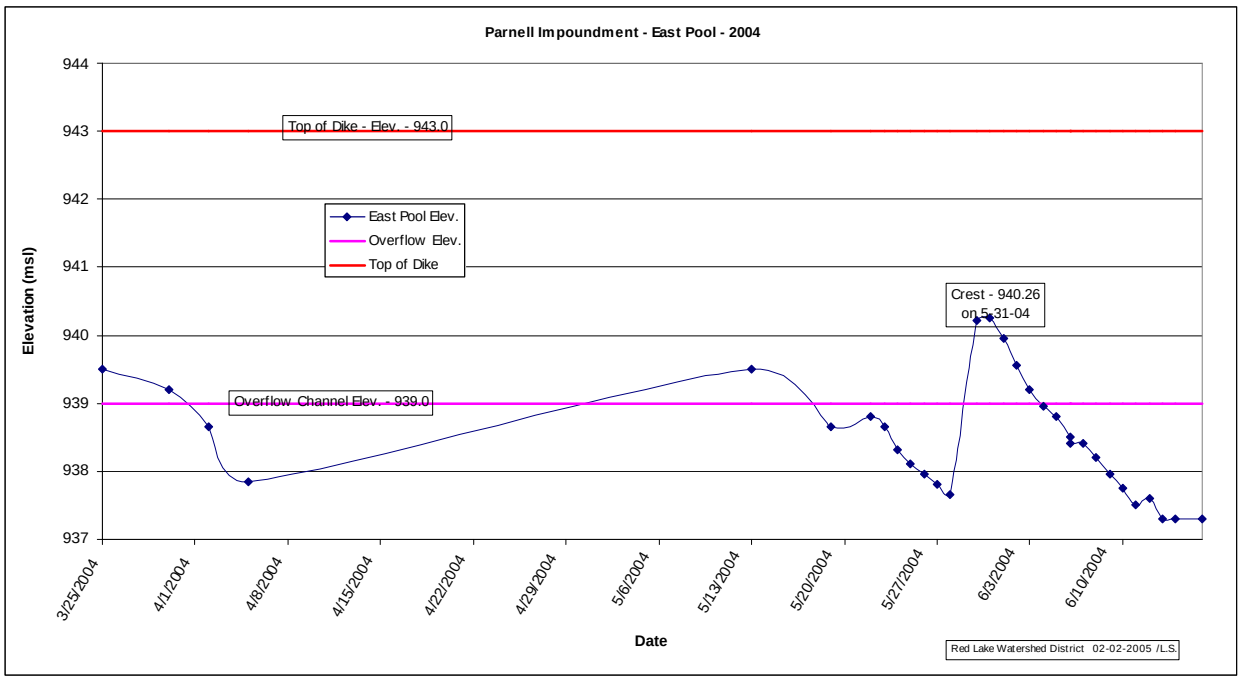
In July of 2002, after various delays in developing an operating plan, the Preliminary Engineers Report was completed and a hearing date set. There were more delays which stalled the implementation of the Operating Plan into the year of 2003. The construction of the Operating Plan consists of the lowering of the emergency spillway by 1.5 feet, expand the connector channel between the two pools, and revise the Lateral 2 weir at the south outlet.

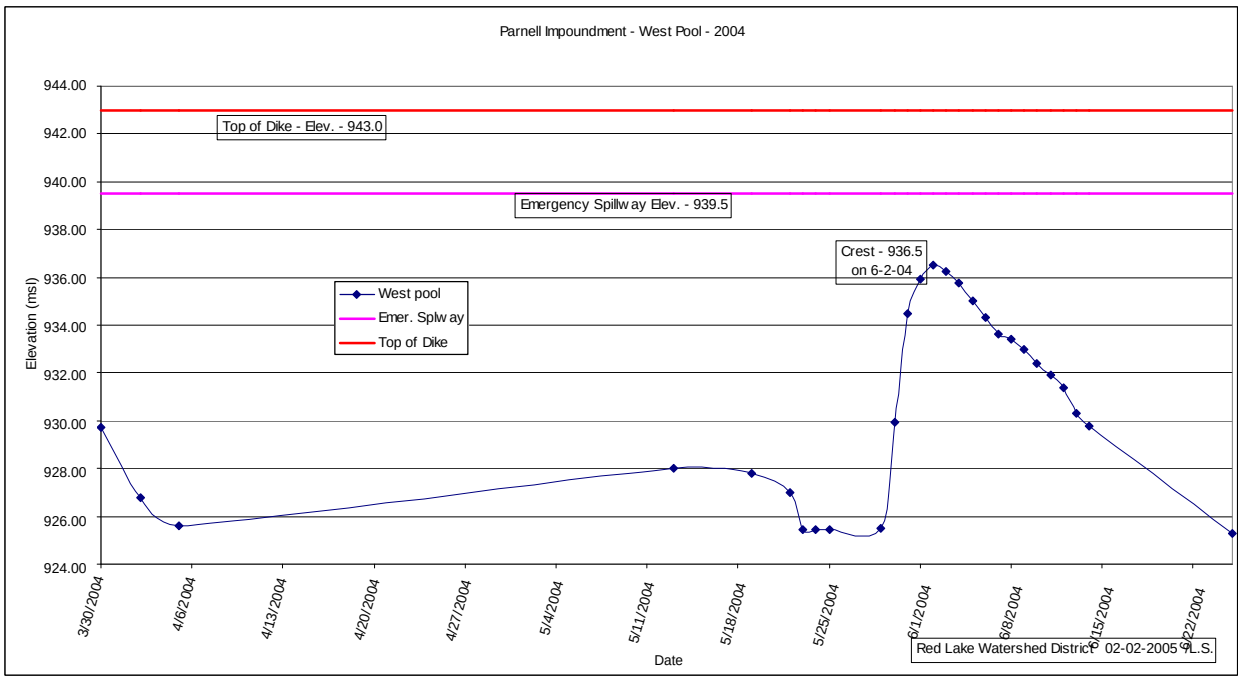
In June of 2003, the Red Lake Watershed District approved Plans and Specification for the "Parnell Operating Plans" and advertised for bids. Davidson Construction from Holt, MN was the low bid. The contract amount was $127,684.80 with the completion of construction occurring in the fall of 2003.

2004 was the first year to implement the project's revised Operating Plan for controlling runoff events. The impoundment is now better utilized to store flood waters by operating control gates. Releases from both the east and west pools are made when downstream conditions are acceptable. Stream gage monitoring sites are located in strategic locations in both JD #60 and Polk CD #126 which are the outlet channels for the East and West Pools, respectfully. A local (neutral party) person was contracted to record stream gage data, record water elevations for the pools, and operate the control gates. Gate operation is directed by the Red Lake Watershed District.

An advisory committee for the project has been established. It is comprised of local landowners who represent the two outlet channels (JD #60 & Polk CD #126), County Commissioners, Gate Operator, and Red Lake Watershed District Board Managers and staff. This committee will meet, at a minimum, of one time per year to discuss operations and address any other concerns or questions related to the project.

In mid-May, 2.53 inches of rain fell but this did not cause enough runoff to perform any gate operation. On May 29, 2.20 inches of rain fell near the site and reports of 4+ inches upstream of the impoundment. This precipitation occurred when soil conditions were still saturated and generated significant runoff. The control gates were closed and flood waters were stored in the impoundment and released slowly when downstream water levels receded. The stored water for each pool can easily be seen on the graphs below.





Parnell Impoundment - West Pool Control Structure
Outlet into Polk County Ditch #126

Parnell Impoundment South Outlet Control Structure
Judicial Ditch #60 Weir Operable Gate

BWSR Flood Storage Easement Site #1 (RLWD Project #133C)

In January of 2002, the Board of Managers initiated, by resolution, a project to establish an off-channel impoundment in the vicinity of Section 5 of Parnell Township in Polk County. This impoundment will capture waters that now outlet into Polk County Ditch #126, as well as overflows from the Parnell Impoundment and hold it until downstream conditions can accommodate the flow.

The Board appointed an Engineer and in December of 2002, the Preliminary Engineer's Report was completed with a public hearing date set for January 2003 at the Red Lake Watershed District office. Subsequent to this hearing the Board of Managers issued an order directing that a final engineers report be prepared for this project.

In April of 2003, the Board approved the Plans and Specification for the "BWSR Flood Storage Easement Site #1" and advertised for bids. In May of 2003, bids were opened with Lunke Construction from Middle River, MN being awarded the contract for the low bid in the amount of $176,774.80. The total cost of this project, including land acquisitions and engineering totaled approximately $400,000.

The storage capacity of this site is approximately 250 acre-feet of gated primary flood storage with a drainage area of 3.1 square miles. The gated storage represents 1.5 inches of runoff from the contributing watershed. The facility is designed to contain runoff from up to the 50-year 24-hour event, with the ability to safely pass the 100-year 24-hour or greater event over the emergency spillway.

Construction started on this project in 2003 and was completed in the summer of 2004. This impoundment will be fully operational in 2005.

Site #1 Principal Outlet Structure

North Parnell Storage Site #2 (RLWD Project #154)

In January of 2002, the Board of Managers initiated, by resolution, a project to establish an off channel impoundment in the vicinity of Sections 3 and 4 of Parnell Township in Polk County. This impoundment will capture waters that now outlet into Polk County Ditch #126 and hold it until downstream conditions can accommodate the flow.

The Board appointed an Engineer and in December of 2002, the Preliminary Engineer's Report was completed and a public hearing set for January 2003 at the Red Lake Watershed District office. Subsequent to this hearing the Board of Managers issued an order directing that a Final Engineers Report be prepared for this project.

In April of 2003, the Board approved the Plans and Specification for the North Parnell Storage Site #2" and decided to advertise for bids. In May of 2003, bids were opened with Lunke Construction from Middle River, MN being awarded the contract for the low bid in the amount of $101,451.27. The total cost of this project, including land acquisitions and engineering totaled approximately $145,000.

The storage capacity of this site is approximately 343 acre-feet of gated primary flood storage with a drainage area of 2.5 square miles. The gated storage represents 2.55 inches of runoff from the contributing watershed. The facility is designed to contain runoff from up to the 100-year 24-hour event, with the ability to safely pass greater events over the emergency spillway.

Construction started on this project in 2003 and was completed in the summer of 2004. This impoundment will be fully operational in 2005.

North Parnell Storage Site Outlet Control Structure

Seeger Dam (RLWD Project #155D)

Seeger Dam is located in Red Lake County, approximately two miles west of the city of Red Lake Falls, in Section 29, Red Lake Falls Township. Emergency repairs were necessary because a slope failure occurred on the downstream slope of the earthen embankment. The top of the dike is a township road used for bus/mail routes and road closure was necessary for safety concerns.

1973 – The Natural Resource Conservation Service (NRCS), formerly called the Soil Conservation Service (SCS), designed and contracted for the construction of Seeger Dam. The earthen dam was constructed using clay borrow material from the pool area of the site. The compacted embankment is approximately 800 feet in length, 46 feet in height, with a 3H: 1V upstream slope, 2H: 1V downstream slope and a top width of 14 feet. The control structure is a fixed crest concrete drop inlet structure with a 48 inch diameter concrete outlet pipe. The flood pool has the ability to store 450 acre feet of water from a 6.4 square mile drainage area.

2000 – The first slide occurred on the downstream embankment slope. The area of failure was relatively small and near the extreme south end of the embankment. The slide area was excavated and recompacted to a slightly flatter slope than original.

2002 – In June, a second failure occurred. This slide area was also on the downstream embankment slope, and immediately north of the first slide area. This larger slide occurred after approximately 7.4 inches of rainfall in a 6 day period, including a 6.3 inch total in one day. The consulting firm, HDR Engineering assisted the District with geo-technical support and repair plan recommendations. The slide area was repaired by excavating the failed soils and reconstructing to a slightly flatter slope than original.

2003 – Two slide areas occurred in July, both being on the downstream slope of the embankment. No large precipitation events were noted in conjunction with these failures. One of these slides occurred in the same general location as in 2002 and the other was directly above the outlet pipe. NRCS and MN Board of Soil and Water Resources Engineers, NRCS soil specialist, local NRCS, Red Lake County Soil and Water Conservation District, and Red Lake Watershed District personnel inspected the site, and in September, a report was submitted by the NRCS. HDR Engineering also assisted with the repair, which consisted of extending the 48 in. outlet pipe, excavating the slide area, obtaining clay borrow material from an offsite borrow pit, constructing the entire downstream embankment slope to a 3H: 1V cross section, using self-propelled scrapers and compacting equipment. Compaction specifications required at least 95 percent of the maximum dry density as established by ASTM D698. An independent testing lab performed density tests during construction. Cost for the repair includes: inspections, engineering, surveying, administration, and construction totaling $59,969.00.

2004 – In the fall of 2004 this dam encountered another failure at approximately the same location as the one in 2000. The Board of Managers determined that until a plan can be developed to accomplish a long term repair, the pool should be lowered from its normal level to help reduce the risks of damages should the dam fail completely.

In November, Davidson Construction of Holt, MN was hired to perform excavation, re-sloping, and modify the existing outlet structure to draw-down the permanent pool. The original structure was constructed with a fixed crest weir with no screw gate for draw-down purposes. Two holes at different elevations were made in the structure for the draw-down and excavations were performed on the downstream embankment slope to inspect for seepage. No seepage/ saturated soils were found during this inspection.

Slope Failure

Slope Repair

Structure Excavation

Structure Opening

Excavation for Pool Drawdown

Drawdown

Red Lake Watershed Ditch #10 (RLWD Project #161)

In July of 2003, the Board received a petition for the establishment of a new drainage ditch in River and Gervais Townships in Red Lake County, Minnesota. The petition requested that the ditch would be approximately 3 ¾ miles of open channel. Subsequent to receiving the petition, the Board adopted a resolution that, upon the approval of the bond, that the petition received was to be designated as Red Lake Watershed Ditch #10 and that an Engineer be appointed and directed to make the preliminary survey, and prepare the necessary plans and reports as required by law. In August of 2003, the required bond was received.

In 2004, at their regularly scheduled Board meeting held February 26th, 2004, the project engineers presented the Preliminary Engineers Report to the Board of Managers. At that meeting, the Board decided that upon the filing of the Preliminary Engineers Report, that a public hearing would be set in accordance with Minnesota Statutes 103D and 103E.

The preliminary hearing for this project was held on March 25, 2004 at the Red Lake Watershed District Board room. The Engineer presented to the public, the Preliminary Engineers Report in accordance to the petition. (A video copy of the hearing is on file at the Red Lake Watershed District office for public viewing). Following the closing of the hearing, the Board passed by unanimous vote, that they deem the Preliminary Engineers report practical and feasible, and to appoint three viewers and direct the Engineer to prepare a detailed study and final report.

On December 9, 2004 at the Red Lake Watershed District Board room, the final hearing was held concerning the Final Engineers Report and Viewers Report. After lengthy testimony and questions, the hearing was adjourned until December 23, 2004. On December 23, the hearing was reconvened and after testimony and questions from the public was entertained, the hearing was closed. After the completion of the hearing, a motion was made and passed by unanimous vote that the Board request Legal Counsel to prepare the Findings of Fact and Order and to present it to the Board at their next meeting in January of 2005.

If the Board accepts the Finding of Fact and Order, the construction of this new ditch should be bid sometime in March or April, with construction starting in the spring of 2005 and completed in the summer of 2005.

State Ditch #83 (RLWD Project #14)

In early August of 2003 the Red Lake Watershed District received a Petition for the repair of State Ditch #83. This petition called for the cleaning of approximately 9 miles of continuous channel which consisted of the removal of trees from the bottom of the ditch and up over the top of the spoil bank, removal of silt and debris on the channel so it retains the original designed grade.

On August 28, 2003 at their regularly scheduled Board meeting, the Board of Managers found the petition to be in proper form and appointed Houston Engineering to prepare a Preliminary Engineers Report for the repair as indicated in the petition.

On July 8, 2004 at 10:00 a.m. the public hearing was called to order at the Red Lake Watershed District Board Room. The Engineer presented the Preliminary Engineer's Report and explained the project. Landowners and interested parties addressed the Board stating their opinion of the potential project. At the hearing Legal Counsel informed the public that the RLWD would accept written comments for 30 days after which time the Board will take action.

On August 12, 2004 at their regularly scheduled Board meeting, the Board of Managers, after reviewing the evidence and facts, determined that it was not at the best public interest to proceed with the repair and instructed Legal Counsel to prepare the Findings of Fact and the Order for review and filing.

On August 26, 2004 at their regularly scheduled Board meeting, approved by unanimous vote to approve the Findings of Fact and Order.

In the summer of 2004 various locations along State Ditch #83 were identified for spot cleaning. Due to the higher than normal flows throughout the summer, construction to these sites had to be postponed until the summer of 2005 or when conditions improve.

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

In 1999, a Project Work Team was organized consisting of Local, State, Federal Agencies and local landowners; 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.

In 2003, the Project Work Team held 9 meetings in our District office. From these meetings, the Project Work Team identified a series of potential projects to an area east of East Grand Forks, MN that would help alleviate flooding problems to an area consisting of approximately 50 square miles. This area would be later identified as the "Grand Marais Creek Sub Watershed Project".

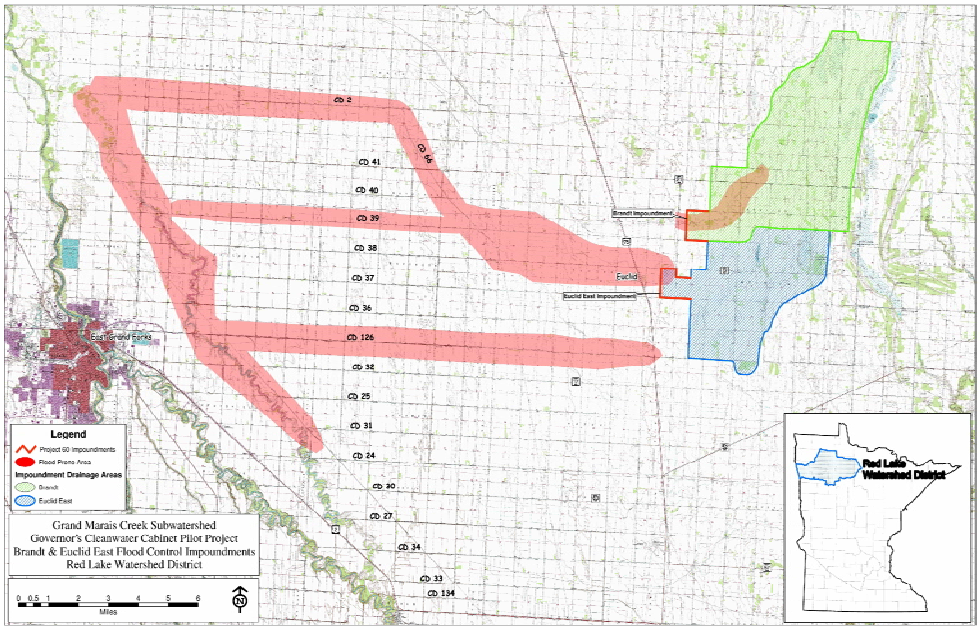
In May of 2003 the Board voted to proceed with the Step 1 submittal for funding to the Flood Damage Reduction Work Group in the event that the Board would decide to proceed with this project. This submittal was accepted by the Work Group and at their June meeting they appropriated $20,000 toward the preliminary engineering of this project.

In the summer of 2003, Governor Pawlenty announced his vision for a Clean Water Initiative. Part of this initiative was the selection of demonstration projects from four general areas that represent some of the state's most unique and important water challenges. Projects were selected using criteria based on value, measurable results within three years, local support, and alignment of local and state priorities, transferability, and scale. As part of this Initiative, the "Grand Marais Sub Watershed Project" was selected by the Governors Clean Water Cabinet as a pilot project for the Red River Basin. Selection of this project acknowledges that the Pawlenty administration has placed a priority on flood damage reduction efforts.

In August of 2003, the Board voted to proceed with the preliminary engineers report to better identify the potential costs of this project.

In January of 2004, the Board instructed the District Administrator to pursue with the negotiations for the land required for this project. Discussion with the land owners progressed throughout the year and at present have options signed for acquisitions of property for almost the entire project area.

In May of 2004, the preliminary engineers report for both the Euclid East site and the Brandt site was presented to the Board of Managers. Due to the Minnesota Legislators lack of progress on a 2004 bonding bill, a motion was made and passed, to table the two reports until state funding could be secured. It is the hopes of the District that the 2005 bonding bill will be passed in May and that the District will exercise the options on all the land in late 2005 with construction starting early in 2006.



DRAINAGE SYSTEM MAINTENANCE

Inspection of the districts drainage systems is an ongoing function of the Watershed. Annual inspections are done to determine if there is any maintenance to be preformed to these ditch systems in the year 2004.

Polk County Ditch Improvement, Project # 119

Sediment bars where removed from the outlet end of approximately 33 side inlet pipes in Sections 7, 8 and 9 of Hammond Township, Polk County, a distance of 3 miles.

Burnham Creek, Project #43B

Rock rip-rap and geotextile fabric was replaced on the inlet end of a box culvert in Section 30, Fairfax Township, Polk County.

Polk County Ditch 63, Project #134

This ditch is 3 miles in length, 2 miles of cattails were sprayed in Sections 2, 3, and 9 of Andover Township, Polk County.

Kenneth Johnson Petition, Project # 117

This ditch is 2.75 miles in length, only .25 miles of cattails in Section 18 of Russia Township, Polk County needed to be sprayed.

Polk County Ditch 33, Project # 135

This system is 4.5 miles in length, 1.5 miles of cattails were sprayed in a number of locations in this ditch, the system is located in Sections 13, 14, 15, 16 of Fisher Township and Section 18 Lowell Township, Polk County.

JD 72, Project # 41

This system is 12 miles in length, 9 miles of cattails were sprayed in Sections 30 and 31 of Hangaard Township and Sections 6, 7, 18, 19, 20, 29, and 30 of Winsor Township Clearwater County.

Winsor – Hangaard, Project # 113

This system is 13.9 miles in length, 8 miles of cattails were sprayed in Sections 3, 10, 14, 15 of Winsor Township, Clearwater County.

JD 2 Main, Project # 51

This system is 4.25 miles in length, 3.5 miles of cattails were sprayed in Sections 25, 26, 30, and 31 of Winsor Township and Section 1 of Pine Lake Township, Clearwater County. Three beaver dams and 6 beaver were removed from this system.

State Ditch 83, Project # 14

The District entered into an agreement with the "Sentence to Serve" program to remove any downed and or fallen trees from State Ditch 83. Approximately 11.5 river miles of State Ditch 83 were brushed the winter of 2004. Brushing started in the NE corner of Section 32, East Valley Township (Agassiz Bridge) and continued downstream to the middle of Section 34, Excel Township.

Legal Drainage Systems under jurisdiction of the Red Lake Watershed District

The Red Lake Watershed District at present has jurisdiction of approximately 271 miles of legal drainage systems throughout the Watershed. The list of all the systems is shown below.

Ditch #	County	Length (mi.)
Red Lake River	Clearwater, 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	Pennington, Marshall, Beltrami	22.0
Clifford Arveson Ditch	Pennington	2.2
Challenger Ditch	Pennington	0.32
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 #2B	Clearwater	5.6
Judicial Ditch #4	Clearwater	3.6
Judicial Ditch #5	Clearwater	2.75
County Ditch #1	Clearwater	5.5
Winsor-Hangaard	Clearwater, Polk	13.9
Judicial Ditch #72	Clearwater, Polk	16.0
RLWD Ditch #8	Polk	2.0
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
Kramer Petition	Polk	1.1
Krostue Petition	Polk	1.6
Jensen Petition	Polk	5.5
Kenneth Johnson Petition	Polk	2.75
Scott Baatz Petition	Polk	~~1.5~~
Total Miles of Ditches		**271.42**

Farmstead Ring Dikes

Since 1997, the District has received grants to assist landowners with the construction of farmstead ring dikes. With the funds, the District has established a cost share program for new construction and for upgrading of existing dikes.

Design Criteria

- Elevation of the dike will be two feet above previous high-water elevation or 1 foot above the administrative 100-year flood, whichever is higher.
- Side slopes of three feet horizontal to one foot vertical.
- Top width of six feet (minimum.

Construction includes all material for constructing embankment, culvert flapgates, any clearing/grubbing, seed, fertilizer and mulch, gravel, etc.

Funding

The funding breakdown for the ring dike program will be shared by the following parties, in the following percentages:

- State of Minnesota 50%
- Red River Watershed Management Board 25%
- Red Lake Watershed District 12.5%
- Applicant 12.5%

In 2004 the District completed the construction of one ring dike and partially completed another. In 2005 we hope to complete the partially constructed ring dike and construct two additional rings dikes if adequate funding becomes available. To date 94 requests have been received for the Ring Dike Program; 57 have been completed, 3 are pending and 34 have declined to participate.

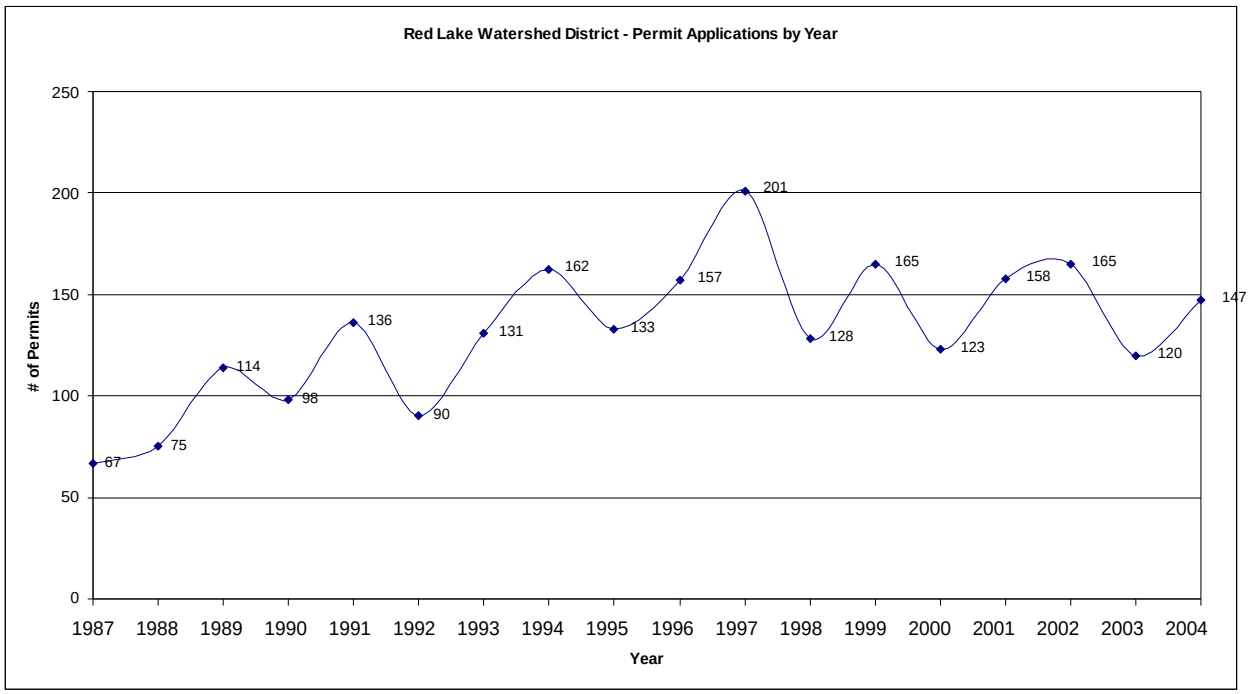
Ken Cwikla Ring Dike
Section 32, Thief Lake Twp., Marshall Co.

III. Permits

In 2004, the Board received 147 permit applications and approved 140 under the Rules and Regulations of the District. Of the permits approved by the Board, most were approved with special conditions. The numbers listed below indicate the permits received and how they are categorized within our rules for permitting:

- 82 culvert/bridge replacements
- 5 road projects
- 23 drainage
- 6 wetlands
- 2 dike
- 16 utilities
- 2 structures
- 1 bank stabilization
- 2 structures
- 1 fishing pier

The following graph is a recording of yearly permit applications from 1987 to 2004.



IV. Impoundments

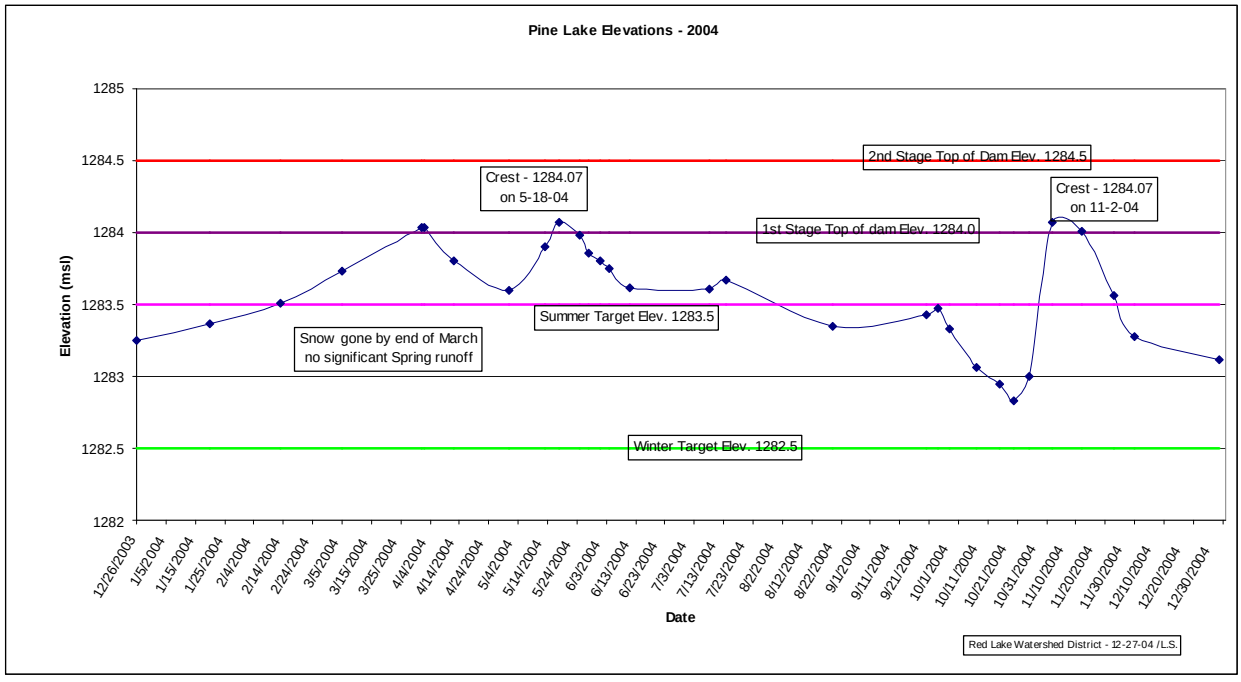
For the operation of impoundments, the watershed district works cooperatively with the Minnesota Department of Natural Resources, U.S. Fish & Wildlife Service, and other local entities. The facilities operated by the Red Lake Watershed District routine maintenance was performed at several locations. Maintenance consisted of mowing embankments, removing brush, spraying and graveling.

Pine Lake

Located in Clearwater County near Gonvick

Sheet Piling Weir with 2 adjustable stoplog bays

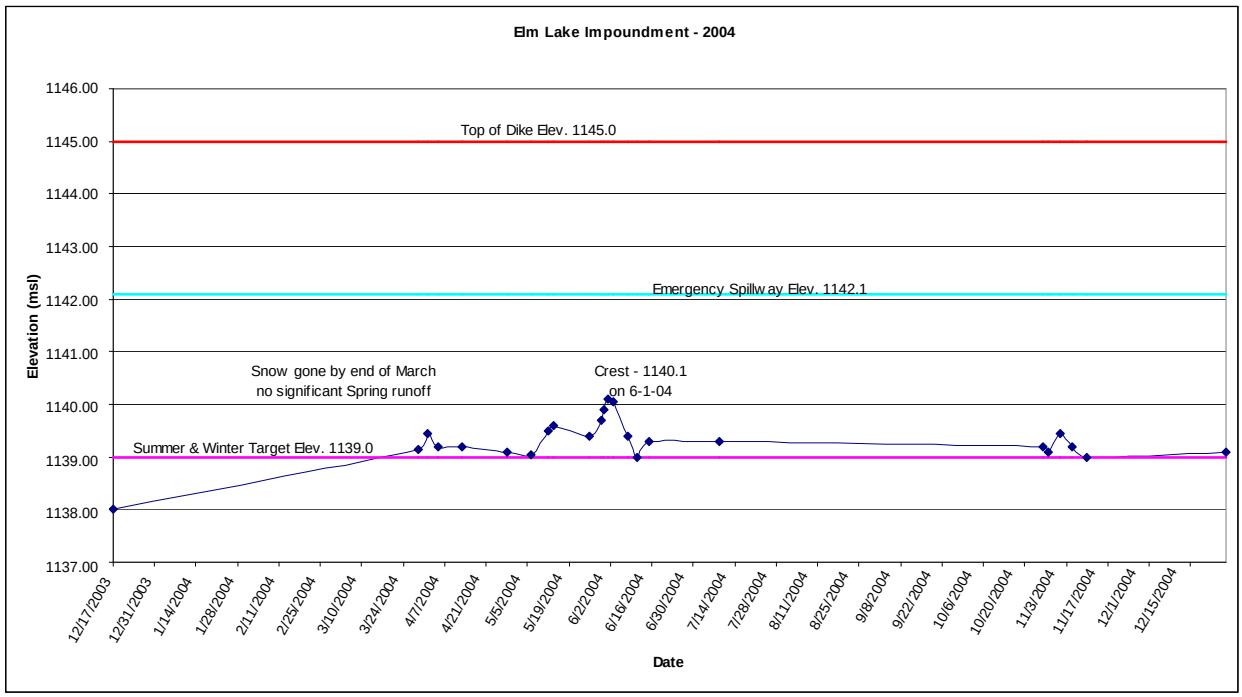
Removing stoplogs to manage lake level



Elm Lake

Located in Marshall County

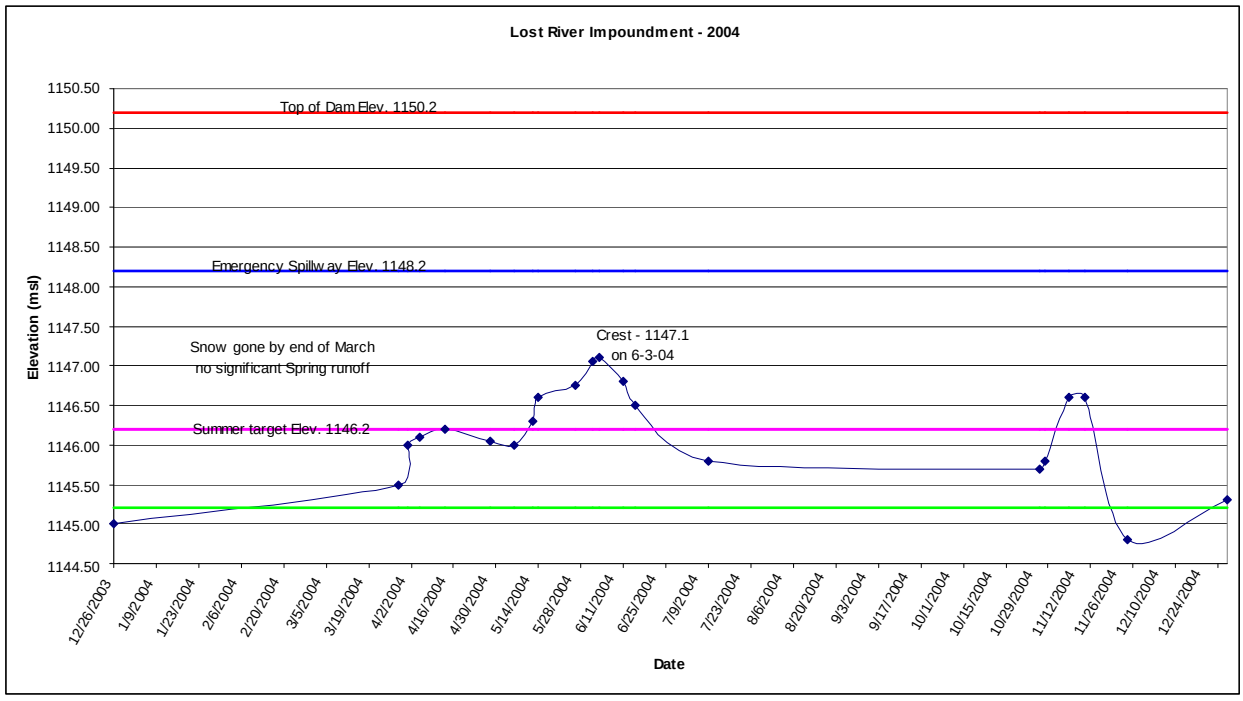
Principal Outlet Structure
Outlets to Marshall County Ditch #200
approximately 2 miles upstream of the Thief River



Lost River Pool

Located in Marshall County

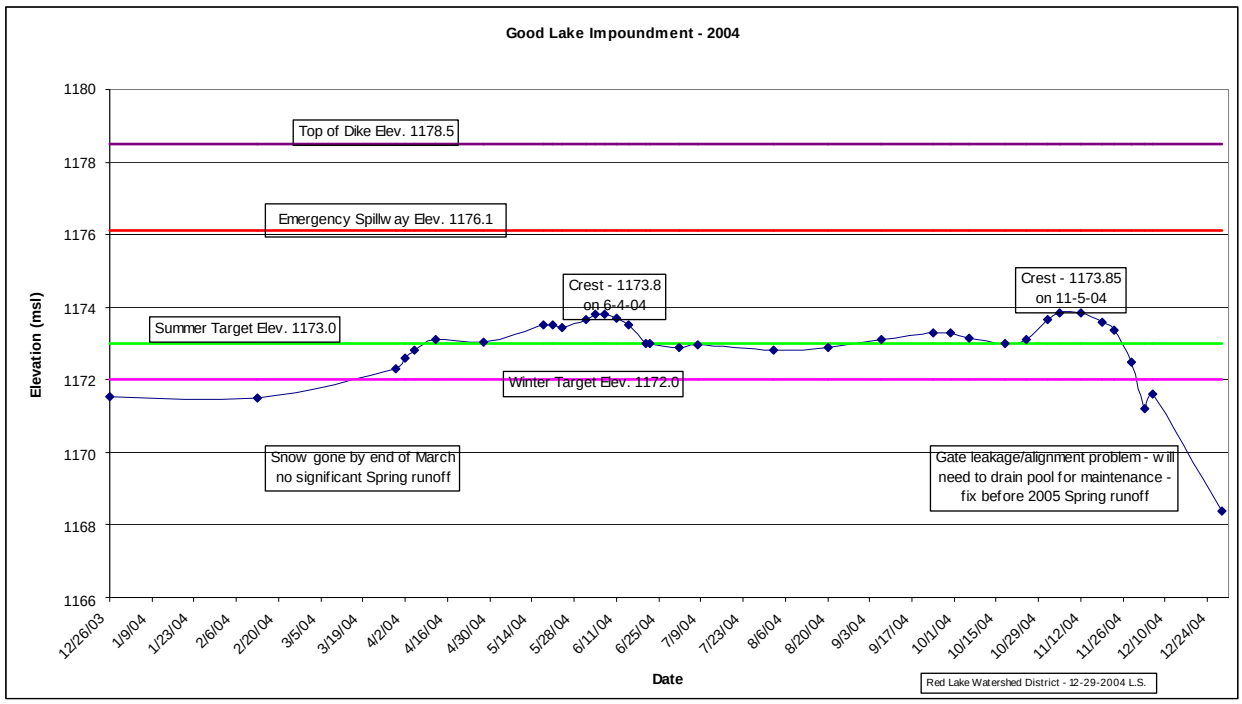
Outlet Control Structure
Outlets to Marshall County Ditch #200



Good Lake Impoundment

Located in Beltrami and Clearwater Counties within the Red Lake Indian Reservation

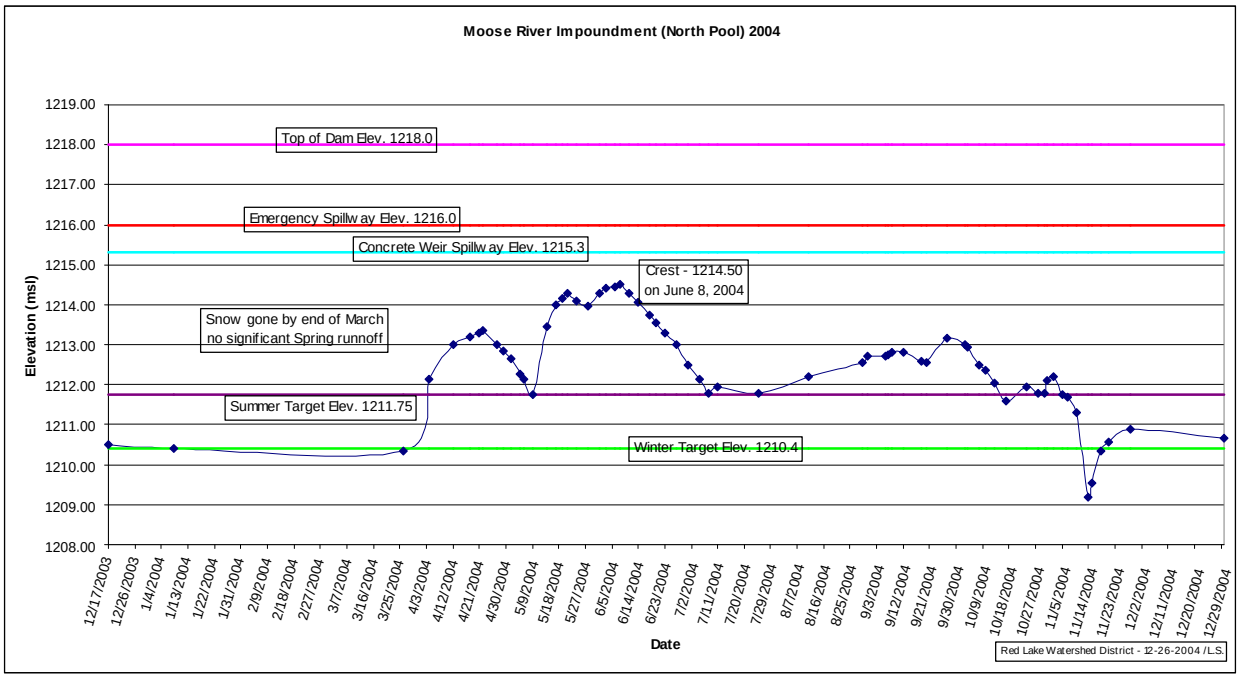
Principal Outlet Structure



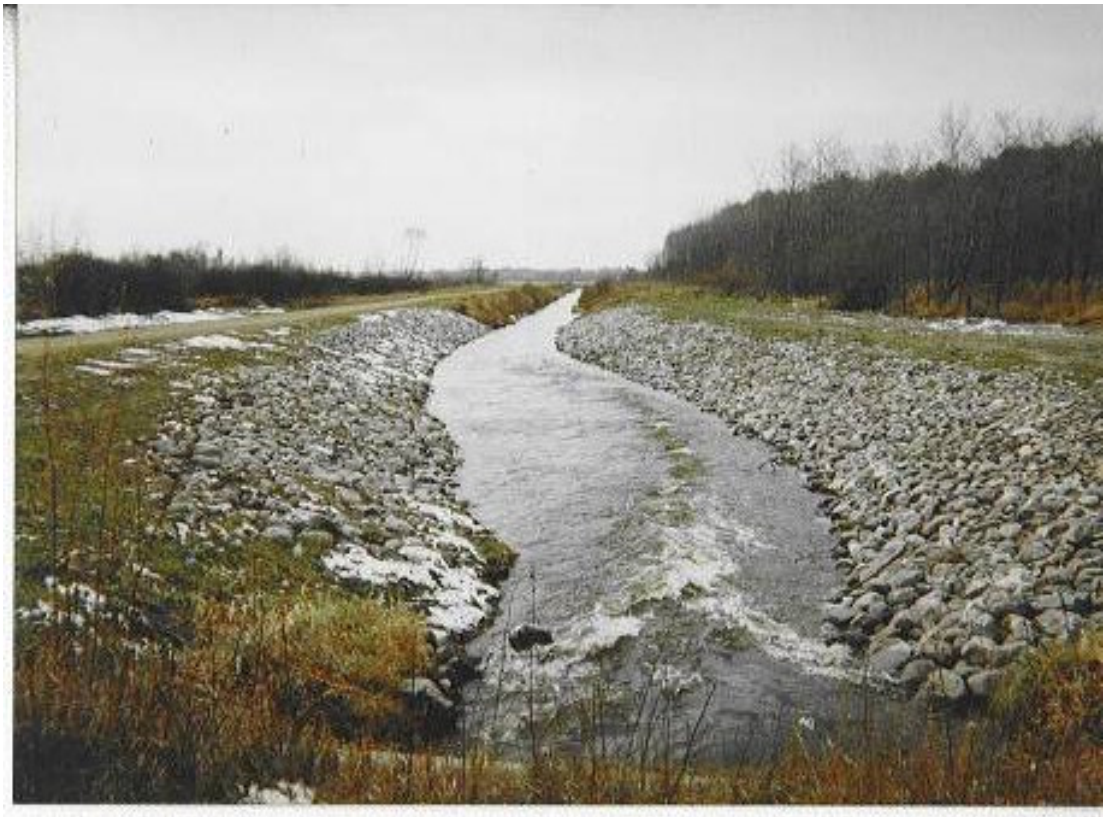
Moose River Impoundment

Located in Beltrami County

North Pool Principal Outlet Structure
Outlets to Judicial Ditch #21 (Moose River)

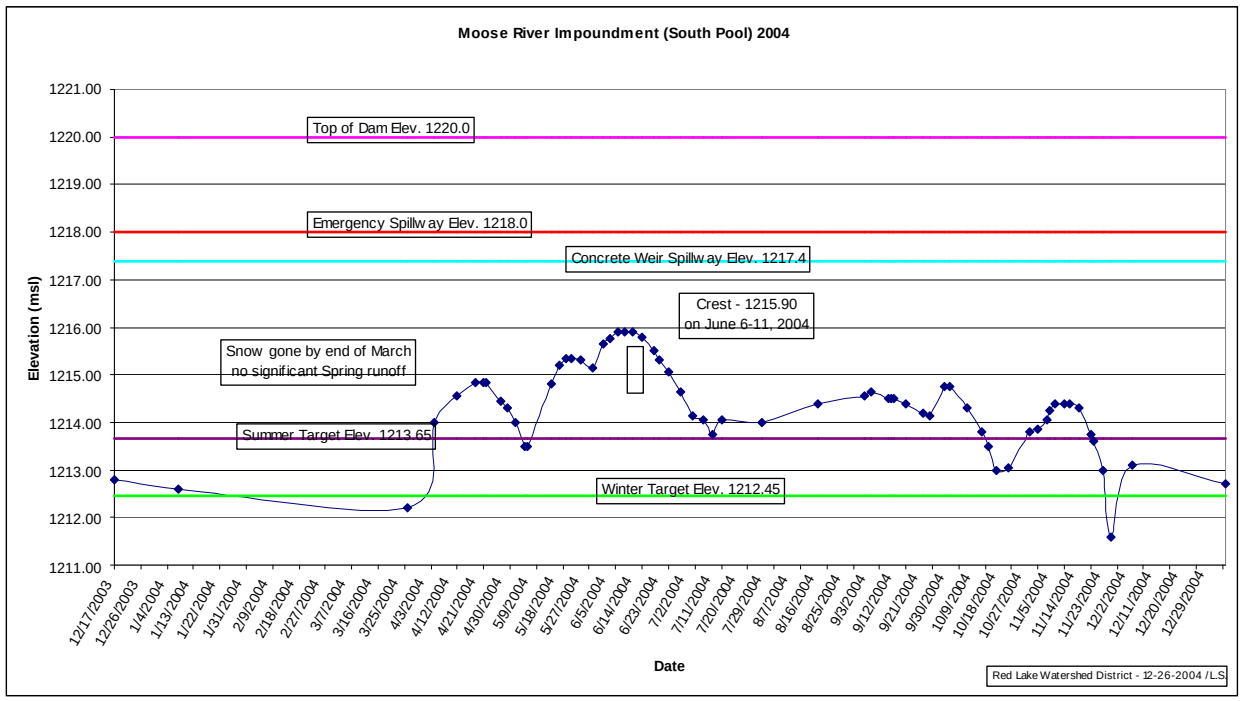


Red Lake Watershed District cost shared with the Marshall Beltrami SWCD for erosion control on Judicial Ditch 21, located adjacent to Beltrami County Road #706, Section 1, Northwood Township. J.D. 21 is an outlet channel for the North Pool of the Moose River Impoundment and this erosion control project is located directly downstream of a box culvert. The soils in this area are unstable and erosion prone, therefore geotextile filter fabric and rock riprap were installed by Holthusen Construction, Grygla.



Judicial Ditch 21 (Moose River)

South Pool Principal Outlet Structure
Outlets to Judicial Ditch #11 (Mud River)



Non-Gated Dams

Thibert Dam, Red Lake County

Odney Flaat, Polk County

BR-6, Polk County

Knutson Dam, Red Lake County

V. Other Watershed Activities

Other on-going activities include water appropriation for wild rice growers, stream flow monitoring, benchmark surveys, hydrologic analysis, flood studies and inspection, operation and maintenance of watershed district projects and facilities.

Wild Rice Water Allocation Pumping Station, Clearwater River

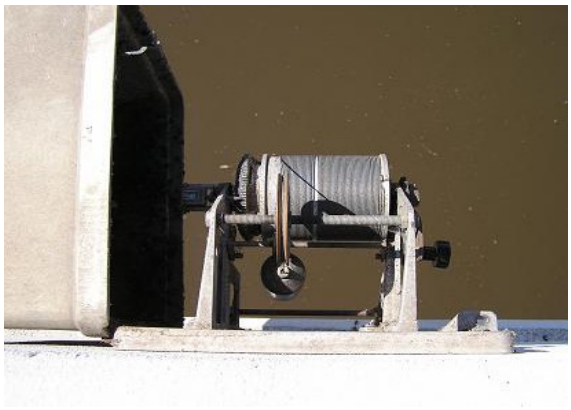
Clearwater River at Red Lake Falls
automated river level gage

Clearwater River at Red Lake Falls
looking downstream

Clearwater River at Red Lake Falls
at automated gage site

Thief River near Thief River Falls
automated gaging station

Streamgaging - Stage Gage



Streamgaging - Wire Weight Gage

10 Year Overall Plan

The Red Lake Watershed District last updated their 10 Year Overall Plan in 1988. Due to delays at the State and local levels, the District started the process of updating their 10 Year Overall Plan in 2003. This plan, under Minnesota law, must be updated every 10 years. The adoption of this plan sets forth a long range planning process, which will assess the current water related actives of the District to set forth a proposed management plan.

A Technical Advisory Committee (TAC) and a Citizens Advisory Committee (CAC) were organized as part of this process. These committees consist of local, state and federal agencies and citizens within the District. These committee's have assisted the District in defining plan priorities, collect issues and concerns and aid in the writing of this plan. The first meeting of the committees was held in 2003 and met periodically to discuss various water management issues and provide input to the Board of Managers for development of the 10 Year Overall Plan. It is the hopes of the District that this report will be completed by the fall of 2005.

Funding is through the State of Minnesota, Flood Damage Reduction Project; Red River Watershed Management Board; and the RLWD.

VI. Projections for 2005

The activities of the District are expected to continue in 2005 much as they did in 2004. It is expected that news on funding for the Governors Pilot Project, Grand Marais Watershed Project, will materialize in the spring of 2005. If it is determined that adequate funding is in place, it is assumed that land transactions will be complete by late fall of 2005 and construction starting in 2006. The District will also continue with the ring dike agreements, ditch maintenance and construction of RLWD #10.

In September of 2004, a public hearing was held concerning the proposed 2005 General Fund budget. Notice of the hearing and the proposed budget was published as required by state statutes. The General Fund budget was adopted and the levies were set for 2005. The General Fund levy was set at $155,000.

VII. Financial Report