

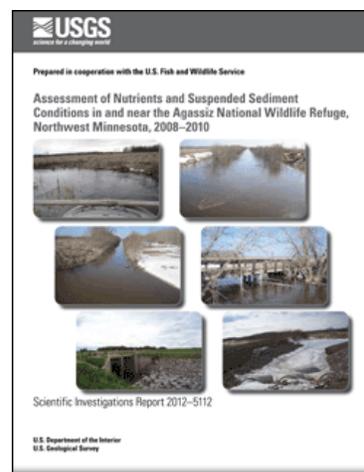
Thief River Watershed Assessment Project
(Watershed Restoration and Protection - WRAP)

- Task 3 – Continuous Water Quality Monitoring.
 - Eureka Manta and Manta 2 multi-parameter sondes were deployed at five sites throughout the Thief River watershed. They are deployed in the Thief River, JD30, Branch A of JD21, Moose River, and Mud River. Every two weeks, the deployed sondes are retrieved and replaced with clean, freshly calibrated sondes. The formerly deployed sondes are then brought back to the lab for maintenance.
 - The USFWS has installed continuous water quality and stage monitoring equipment in the Thief River at the 380th St. NE crossing (N Boundary Rd).
- Task 5 – Stage and Flow Monitoring
 - Now that the Marshall County Road 7 Bridge over the Thief River is completed, stage monitoring system can be re-installed at the site. The ultrasonic gauge that was installed at the site is still available. However, the DNR has made plans to install a more permanent gauge with a bubbler system at the site. This gauge will hopefully be installed this fall so it is in place to capture high flow data next spring. It will be used to collect flow data for the State's event-based sampling and load monitoring program.
 - Data was downloaded from deployed HOBO Water Level Loggers. The HOBOS in the Mud River and Thief River were recording at 15 minute intervals, so they were re-launched to make sure they don't run out of room to store more readings.
- Task 12 – Identification of Sources and Solutions
 - Agassiz National Wildlife Refuge began drawing down Agassiz Pool by releasing water through their water control structures at a rate of up to 1,200 CFS. This greatly increased turbidity in the river and affected the quality of drinking water in Thief River Falls. Would a lower discharge rate have been more appropriate, even if it took a little longer to draw down? Was a high rate of discharge necessary while there was very little water flowing into the pools because of the dry conditions?
 - The Red Lake Watershed District and the Minnesota Pollution Control Agency both received complaints about the taste and odor of the drinking water in the City of Thief River Falls during the Agassiz Pool drawdown. RLWD staff taste-tested the water to see if this was true. During the drawdown, there was a very strong chlorine-like taste to the water. It was undrinkable. A little while after the drawdown was over, the city's tap water tasted much better.
 - The daily mean discharge in the Thief River near Thief River Falls jumped up from 64 CFS to 629 CFS on August 2nd. On August 6th, the daily mean discharge at the USGS gauge (05076000) had decreased to 241 CFS. Monitoring on August 6th found that the turbidity at the CR7 Bridge near Agassiz National Wildlife Refuge was 25.1, which is almost right at the State water quality standard. If discharge during pool drawdowns could be managed so that it doesn't exceed the rate of discharge on August 6th, the impact of Agassiz Pool drawdowns upon water quality, aquatic life, and Thief River Falls drinking water could likely be minimized to an acceptable level.

Final Report Released for USGS Agassiz National Wildlife Refuge Water Quality Study:

Assessment of Nutrients and Suspended Sediment Conditions in and near the Agassiz National Wildlife Refuge, Northwest Minnesota, 2008-2010

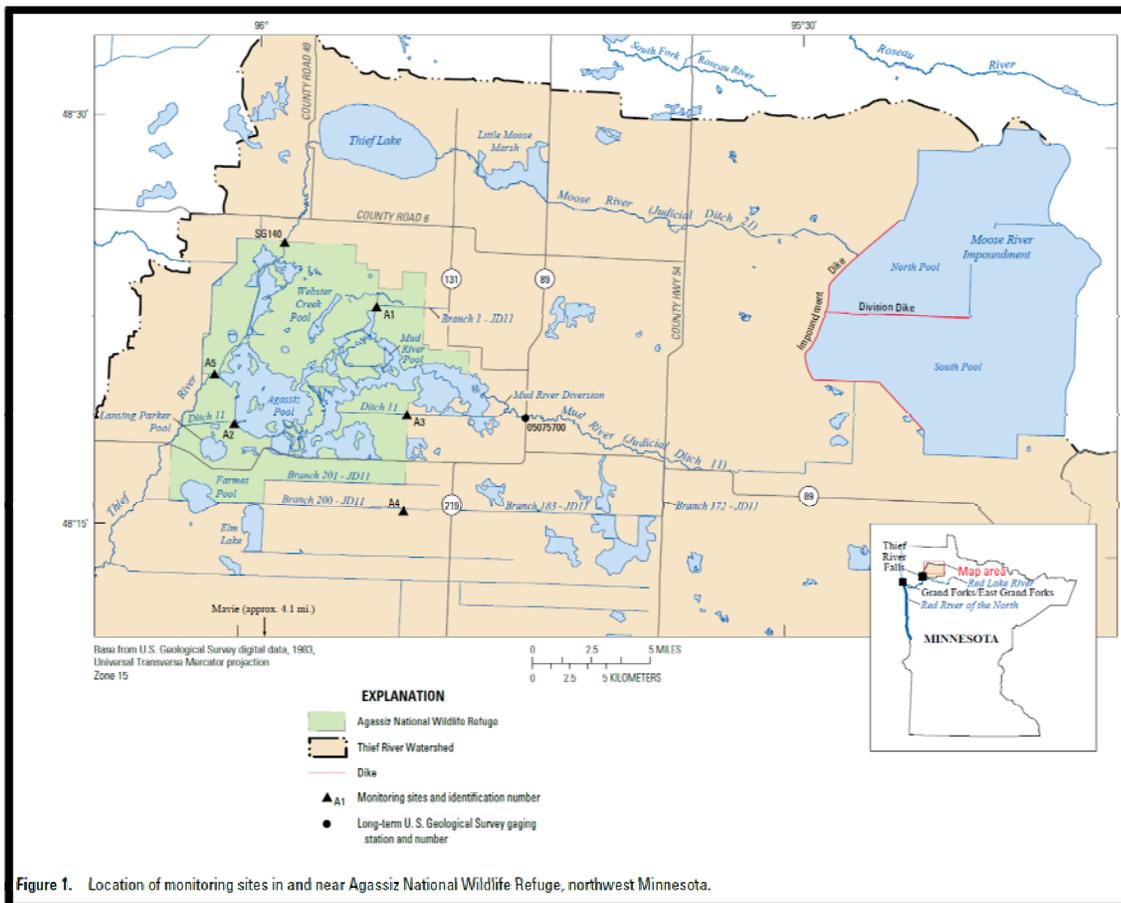
In response to concerns about water-quality impairments that may affect habitat degradation in Agassiz National Wildlife Refuge, the U.S. Geological Survey, in cooperation with the U.S. Fish and Wildlife Service collected streamflow data, discrete nutrient and suspended- sediment samples, and continuous water-quality data from 2008 to 2010. Loads were estimated for nutrients and suspended sediment using sample data and streamflow data. In addition, a potential water-quality and streamflow monitoring program design was developed for the Refuge. Results from this study can be used by resource managers to address identified impairments and protect wildlife habitat and public water supply, and may contribute toward developing more effective water-management plans for Agassiz National Wildlife Refuge.



- All samples met the 0.04-mg/L water-quality standard for un-ionized ammonia.
- There were small differences in suspended-sediment concentration among inflow sites.
- Outflow sites had greater suspended-sediment concentrations than inflow sites.
- A net loss of sediment from Agassiz Pool occurred, ranging from 650 tons/yr in 2008 to 25,300 tons/yr in 2010. This loss was likely due to several atypical water-management activities that occurred at outflow sites (new outlet structure, drawdown of Agassiz Pool).
- A study completed in 2011 for Agassiz NWR by St. Croix Watershed Research Station (Science Museum of Minnesota) indicated that Agassiz Pool has been experiencing a net gain of sediment during the last 68 years. 1.3 million tons of inorganic sediment have been deposited and trapped in Agassiz Pool from 1940 to 2008.
- At the primary outflow site, during the scheduled drawdown of Agassiz Pool from October 2009 into 2010, suspended-sediment concentrations were high compared to concentrations prior to the scheduled drawdown of Agassiz Pool.
- Orthophosphorus and total phosphorus concentrations were significantly greater at inflow site A1 (located on Branch 1 of Ditch 11) than any other site. In 2010, although this site accounted for only 3 percent of the total streamflow from inflow sites, this same site accounted for 31, 27, and 13 percent of the inflow load for nitrate plus nitrite, orthophosphorus, and total phosphorus, respectively.
- Large loads at the primary outflow site in 2010, particularly for sediment, likely resulted from the combination of greater flows in 2010 and scheduled drawdown of Agassiz Pool.
- Continuous water-quality monitor data from 2010 indicated instances when water-quality standards for dissolved oxygen, pH, and turbidity were not met.
- For sites downstream of Thief Lake and Agassiz Pool, the seasonal pattern of most mean monthly nutrient loads and mean monthly flow-weighted nutrient concentrations were affected by releases from these water bodies and the vegetative growing season.

- For all sites, spikes in turbidity occurred related to rainfall, with as little as 2 percent of the values exceeding the 25 nephelometric turbidity units water-quality standard and at most 38 percent of the values exceeding the standard.

A recent (2011) radioisotope study indicates that Agassiz Pool has been experiencing a net gain of sediment (more inflow load than outflow load) in the last 68 years, but during the 3-year period of this study (2008 to 2010), a net loss of sediment from Agassiz Pool occurred. A net loss from 2008 to 2010 was likely related to a combination of several atypical water-management activities that occurred at the two outflow sites including: the first year of operation of the water control structure at the smaller outflow site in 2008; construction downstream from the primary outflow site in 2008 and 2009; and scheduled drawdown of Agassiz Pool in fall 2009 through 2010, which occurs only once every 10 years.



It is likely that the primary source of nutrients to rivers and ditches in the Thief River Watershed is from nonpoint sources in the form of agricultural runoff and also may include some nutrient inputs from wildlife. Within Agassiz NWR, processes such as mineralization, denitrification, and plant uptake all affect nutrient concentrations.

RED LAKE WATERSHED DISTRICT
MONTHLY WATER QUALITY REPORT

**AUGUST
2012**

Table 5. Estimated annual loads (open-water period) for sites in and near Agassiz National Wildlife Refuge, northwest Minnesota, 2008 to 2010.

[yr, year; N, nitrogen; P, phosphorus]

Site identification number	Site name	Year (open-water period)	Total volume of streamflow (acre feet)	Total ammonia plus organic nitrogen as N (tons/yr)	Dissolved ammonia as N (tons/yr)	Dissolved nitrate plus nitrite (tons/yr)	Total nitrogen as N (tons/yr)	Dissolved orthophosphorus as P (tons/yr)	Total phosphorus as P (tons/yr)	Suspended sediment (tons/yr)
A1	Branch 1 of Judicial Ditch 11 above Mud River Pool	2008	1.77	1.41	0.04	1.06	2.16	0.21	0.25	9.15
		2009	8.70	8.20	0.67	9.14	15.5	1.38	1.65	53.5
		2010	11.5	10.9	0.57	65.6	34.7	1.93	2.33	142
A3	Judicial Ditch 11 above Agassiz Pool	2008	41.3	23.9	0.45	21.6	40.1	0.49	1.27	293
		2009	90.5	76.4	3.10	74.5	128	3.53	6.69	1,620
		2010	139	110	2.14	108	185	4.96	9.48	2,290
A4	Branch 200 of Judicial Ditch 11 above Farnes Pool	2008	5.13	3.32	0.07	3.83	5.87	0.04	0.11	23.5
		2009	15.2	12.0	0.29	16.0	21.8	0.19	0.60	133
		2010	32.6	24.0	0.59	32.5	43.8	0.39	1.27	286
SG140	Thief River inlet to the Agassiz NWR	2008	36.7	24.9	0.57	1.59	21.3	0.32	1.02	279
		2009	145	127	13.7	18.1	135	1.76	9.15	2,580
		2010	170	122	3.55	7.70	99.4	1.68	5.26	1,930
A2	Judicial Ditch 11 below Agassiz Pool	2008	86.0	57.7	0.99	0.32	43.9	0.16	1.72	867
		2009	239	259	18.6	28.0	263	2.72	15.4	8,950
		2010	381	375	46.0	39.3	496	2.87	23.2	29,000
A5	Northwest outlet of Agassiz Pool	2008	23.5	14.4	2.14	1.46	17.9	0.19	0.89	365
		2009	96.8	87.0	4.70	6.80	79.9	1.21	6.26	3,090
		2010	115	93.8	5.66	4.34	86.4	0.92	5.62	3,070

A future water-quality monitoring program for Agassiz National Wildlife Refuge could include data collection at 2 indicator sites (one inflow and one outflow site) with a total of 7 discrete samples and 7 streamflow measurements consisting of the following: 5 samples, along with a streamflow measurement, collected during the same week each month in April, May, June, July, and October combined with 2 supplementary samples and streamflow measurements during periods of storm runoff. In addition to the discrete samples, continuous water-quality monitors could be deployed at each site. Future water-quality monitoring in Agassiz National Wildlife Refuge would provide information that can be used to assess the changes in water quality with time, changes in management conditions, effects of upstream mitigation practices (for example, buffer strips, side-channel inlets) within the Thief River watershed, as well as other variables.

The entire report can be viewed and downloaded at <http://pubs.usgs.gov/sir/2012/5112/>.

Red Lake River Watershed Assessment Project
(Watershed Restoration and Protection - WRAP)

- Task 2 – Water Quality Monitoring
 - Pre-9AM field measurements were made at the Smiley Bridge (CR7) monitoring site on the Red Lake River. Pre-9am dissolved oxygen measurements are needed in order to confidently declare that a river is meeting the State’s dissolved oxygen water quality standard. The Smiley Bridge is close to the RLWD office in Thief River Falls, so it will be possible to get equipment calibrated and get to the site before 9:00am. This is being done on a semi-weekly basis, so we’ll have a decent number of pre-9:00am readings by the end of the monitoring season. All of the readings have been above the 5 mg/L standard this summer, even with the low water. The lowest reading we recorded was 6.22 mg/L in early August. After that, the readings trended upward during the month of August as temperatures trended downward.
 - WRAP funds were used to add biochemical oxygen demand, chemical oxygen demand, and orthophosphorus to the analysis of samples collected at sites where dissolved oxygen loggers are deployed.
- Task 3 – Continuous Water Quality Monitoring
 - Eureka Midge dissolved oxygen loggers were deployed at 4sites (down from 5 sites -Polk CD1 went dry, so the logger was removed) throughout the Red Lake River watershed (Heartsville Coulee, Burnham Creek, Kripple Creek, and Gentilly Creek). TROLL 9500 dissolved oxygen loggers with optical dissolved oxygen sensors will be deployed in the Black River this year.
 - After two weeks of deployment, sondes are retrieved and replaced with clean, freshly calibrated equipment. They are then brought back to the lab where data is downloaded, sondes are cleaned, membranes are replaced, and dissolved oxygen sensors are re-calibrated.
- Task 5 – Stage and Flow Monitoring
 - Data was downloaded from deployed HOB0 Water Level Loggers. The HOB0s in the Black River and Kripple Creek were recording at 15 minute intervals, so they were re-launched to make sure they don’t run out of room to store more readings.
- Task 6 – Stream Channel Stability Assessment
 - Full geomorphic assessments were conducted on representative reaches along the Red Lake River.
 - Dave Friedl and Jason Vinje of the DNR were joined by Corey Hanson, Jim Blix, Nick Olson, and Alisha Mosloff of the RLWD on most of the days. Stephanie Klamm of the DNR, Wayne Goeken of the International Water Institute, Asher Kingery of the International Water Institute, and Katie Panopoulos from the Thief River Falls River Watch Group also spent some time helping out with the project.
 - Landowner permission was obtained where necessary.



▪ Red Lake River upstream of the Smiley Bridge



▪ Red Lake River upstream of the Clearwater River confluence



▪ Red Lake River downstream of the Clearwater River confluence



▪ Red Lake River at St. Hilaire



▪ Red Lake River near the Thief River Falls Airport

- This site had lots of rapids and was very rocky. This site also had the most game fish that we had seen at any of the sites we visited this year. There were a lot of “keeper” sized smallmouth bass. A large catfish passed by our feet when we wading through a pool. Some small walleyes were hiding out under some logs.



▪ Red Lake River from the East Grand Forks boat access, upstream over 6.5 miles (past Hwy 220).



▪ Red Lake River at the Old Crossing Treaty Park near Huot.

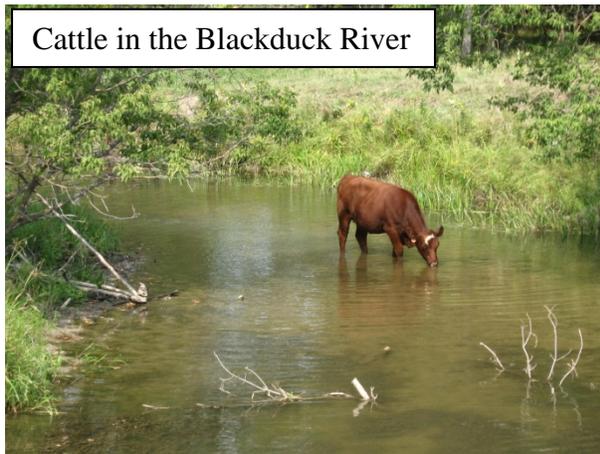
- Task 10 – Civic Engagement
 - Lori Clark of RMB Labs started working on a tabletop display that can be used during public events for the Red Lake River WRAP.
 - Good photos from the Red Lake River were gathered for use in the brochures and displays that Lori created. A map of the Red Lake River watershed was also created for use in informational materials.
- Task 11 – Identification of Sources and Solutions
 - A culvert inventory for the hydro-correction of LIDAR data continued in August.
 - Cattle are in the river just upstream of the CSAH 27 of the Red Lake River. This also happens to be the few spots along the main channel of the Red Lake River where high E. coli readings are recorded. That's likely not a coincidence. The landowner upstream of the bridge should be contacted to see if there is a possibility of implementing a grazing management project on that farm.
- Task 12 – Reports

Red Lake River and Grand Marais Creek Assessment (Surface Water Assessment Grant)

- Project partners collected three rounds of samples for this project in August. Two of the rounds included analysis for a full set of parameters. Only E. coli samples were collected in one of the rounds.
- High E. coli concentrations occurred in August 2012 at Kripple Creek (very high twice, three total), Red Lake River at CSAH 13, JD75, Polk County Ditch 2, Red Lake River at CSAH 27, and Gentilly Creek.
- Water levels have gotten very low. Sampling stopped at Polk County Ditch 1 earlier this summer because the channel had dried-up. Several other sites still have ponded water, but are not flowing.
- Dissolved oxygen levels have been very low in Heartsville Coulee throughout the summer. While there has always been plenty of water at the monitoring site, it hasn't appeared to be flowing since spring.

District Monitoring

- The third round of sampling in 2012 for the Red Lake Watershed District's long-term water quality monitoring program began in August.
- High E. coli concentrations were found at the Maple Lake Outlet, Moose River, North Cormorant River, Darrigan's Creek, Kripple Creek, Gentilly Creek, and Silver Creek.
- All four E. coli samples collected at Kripple Creek this month exceeded the chronic E. coli standard. This data further confirms the fact that Kripple Creek should be on the 303(d) List of Impairments because of an E. coli impairment.



River Watch

Several schools conducted a round of River Watch monitoring in August with the assistance of Jim Blix and Alisha Mosloff:

- Thief River Falls
- Win-E-Mac
- Bagley

Grade Stabilization for Sediment Reduction in the Thief River (CD20 Project)

- Completed a progress report for this Clean water Fund Project for the Board of Water and Soil Resources via eLINK.
- The construction of this project was completed in August (including some touch-up work that needed to be done).
- The final payment hearing was held, without any objections, on August 23, 2012.
- The cost of the construction contract came to a total of \$121,507.00.



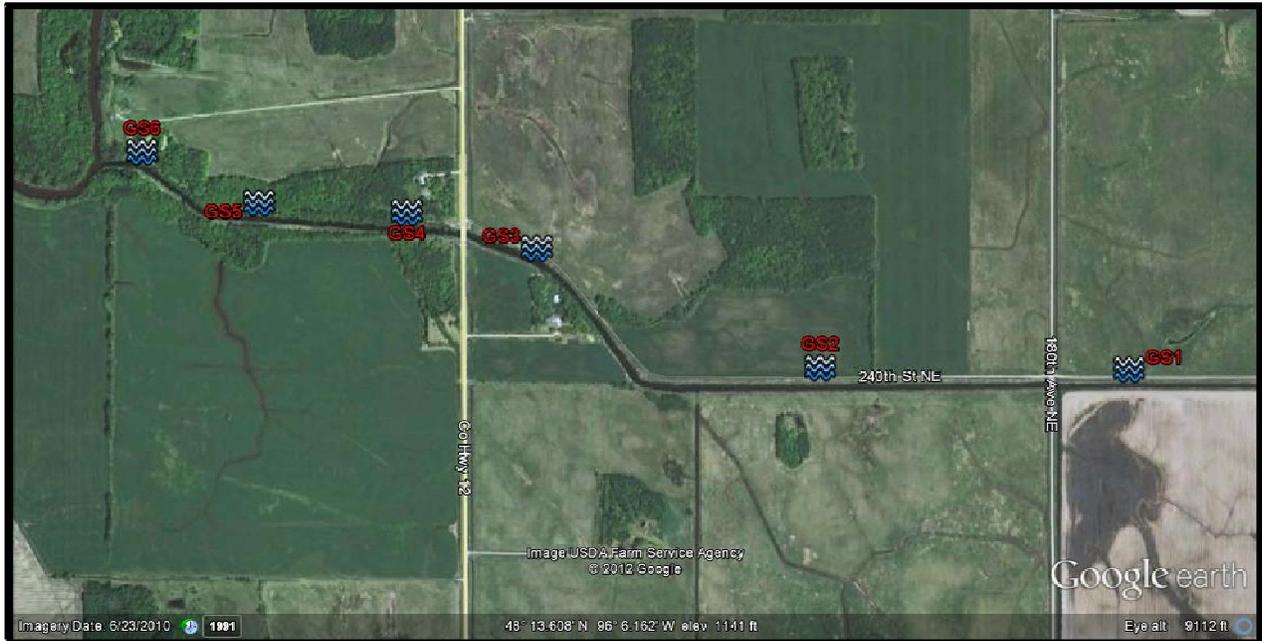
- A total of 18 side water inlets were installed along CD20 (17 funded by this project).



Grade Stabilization for Sediment Reduction in the Thief River
Side Water Inlets Installed Along Marshall County Ditch 20 in 2012



- 6 grade stabilization structures were constructed within CD20.



Grade Stabilization for Sediment Reduction in the Thief River – Project 14D Grade Stabilization Structures



- An eroding bank was stabilized with rip-rap.



Thief River Watershed Assessment Monitoring (SWAG)

- Marshall County staff collected two rounds of E. coli samples at 6 sites. Pennington County staff collected three rounds of E. coli samples at three sites. A full suite of parameters, including chlorophyll-a, were collected during each of the three visits to the site on the Thief River near the USGS gauge.
- High E. coli concentrations were found in the Thief River at CR7 and Branch 200 of JD11.
- Water levels are low.

Other Notes

- The Red Lake Watershed District Board of Managers discussed and approved a proposal from Dan Svedarsky, University of Minnesota-Crookston for a Stormwater Assessment Plan for the City of Crookston for financial assistance in the amount of \$5,368.00 to help reduce pollutants within the City of Crookston.
- EOR Engineering is developing a work plan for a Watershed Restoration and Protection Project for Grand Marais Creek.

- The Environmental Protection Agency is writing a story about water quality improvements that have been made in the Lost River (delisting of the fecal coliform impairment).
- The RLWD is planning to proceed with the construction of a stormwater pond in Clearbrook. Quotes have been solicited for the construction.
- Lots of progress is being made on the Grand Marais Cut-Channel Stabilization Project. The ditch banks are being re-sloped upstream of the CR64 bridge. Side water inlets have been installed. Much of the construction of the grade stabilization structures has been completed.

August Meetings/Events

- **August 1, 2012** – BWSR CWF Grant semi-annual progress reports are due.
- **August 1, 2012** – MPCA Thief River Watershed Assessment Project semi-annual progress report is due.
- **August 10, 2012** – Red River Basin Monitoring Advisory Committee meeting at the Sand Hill Watershed District in Fertile
 - Joe Courneya and Andy Ulven demonstrated some of the technology that they've been using to document river conditions with River Watch groups. They have been using ipads (in rugged cases) and GPS-enabled cameras to collect georeferenced photos while canoeing down rivers. Those georeferenced photos and notes can then be shared with others through Google Earth "kmz" files.
 - Chuck Fritz discussed the RRBDIN Project Planning tool.
 - The International Water Institute (IWI) will be organizing River Watch "Kick Off" events this fall.
 - IWI has started a Red River Explorers Paddling Program that gives students an opportunity to canoe/kayak down rivers near their school.
 - IWI will be organizing a macroinvertebrate monitoring workshop.

Plans for September and October 2012

- Thief River Watershed Restoration and Protection Project.
 - James Blix will continue working on terrain analysis to identify potential erosion areas throughout the watershed.
 - Continuous water quality monitoring at five sites.
 - Re-install an ultrasonic gauge at the Marshall County Road 7 crossing of the Thief River. The gauge was removed earlier this year because the bridge was being replaced.
 - Create a web page dedicated to the Thief River Watershed
- Red Lake River Watershed Assessment Project
 - Complete a report on the existing data that is available for the watershed.
 - Create a webpage dedicated to the Red Lake River
 - Flow measurements (if there is rain and runoff) and continuous stage monitoring
 - Continuous dissolved oxygen at 5 sites. Deploy and retrieve sondes. Clean, calibrate, and download data from sondes.

- Pre-9am dissolved oxygen (and other field measurements) at the “Smiley Bridge” crossing of the Red Lake River.
- Hold a public event to publicize the Red Lake River WRAP.
- Finish conducting geomorphology assessments along representative reaches of the Red Lake River.
- Data compilation and entry for both Surface Water Assessment Grant Projects
- Finish the third round of sampling at long-term monitoring sites and start the fourth.
- Download data from all stage monitoring sites. Re-launch HOBO Water Level Loggers that are recording measurements at a 15-minute interval.

Future Meetings/Events

- **September 12, 2012** – Pennington County Outdoor Education day at Oakland Park in Thief River Falls
- **September 24, 2012** – Come “Grill” Us About Your Watershed event in Crookston
- **September 25, 2012** – Northwest Minnesota Water Festival at the fairgrounds in Warren
- **September 26, 2012** – Northwest Minnesota Water Festival at the fairgrounds in Fertile
- **October 31, 2012** – Marshall County Water Resources Advisory Committee meeting in Newfolden
- **January 31, 2013** – The second progress report or final report for the Thief River SWAG monitoring is due.
- **February 1, 2013** - BWSR CWF Grant semi-annual progress reports are due.
- **February 1, 2013** - MPCA Thief River Watershed Assessment Project semi-annual progress report is due.
- **June 30, 2013** – Expiration of the Thief River Watershed Assessment Project Contract.
- **June 30, 2013** – Expiration of the Red Lake River Watershed Assessment Project – Phase I Contract.
- **June 30, 2013** – Final report for the Thief River SWAG grant is due
- **July 30, 2013** – Due date for the final progress report and final invoice for the Thief River Watershed Assessment Project
- **July 31, 2013** – Final payment request for the Thief River SWAG is due.

Red Lake Watershed District Monthly Water Quality Reports are available online at:

<http://www.redlakewatershed.org/monthwq.html>

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

Dale Carnegie Quotes of the Month:

“What seems to us as bitter trials are often blessings in disguise” - Oscar Wilde

“Nothing will work unless you do.” - John Wooden