

By Corey Hanson, Red Lake Watershed District Water Quality Coordinator. 4/3/2017.

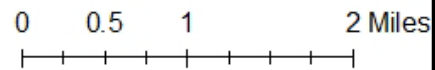
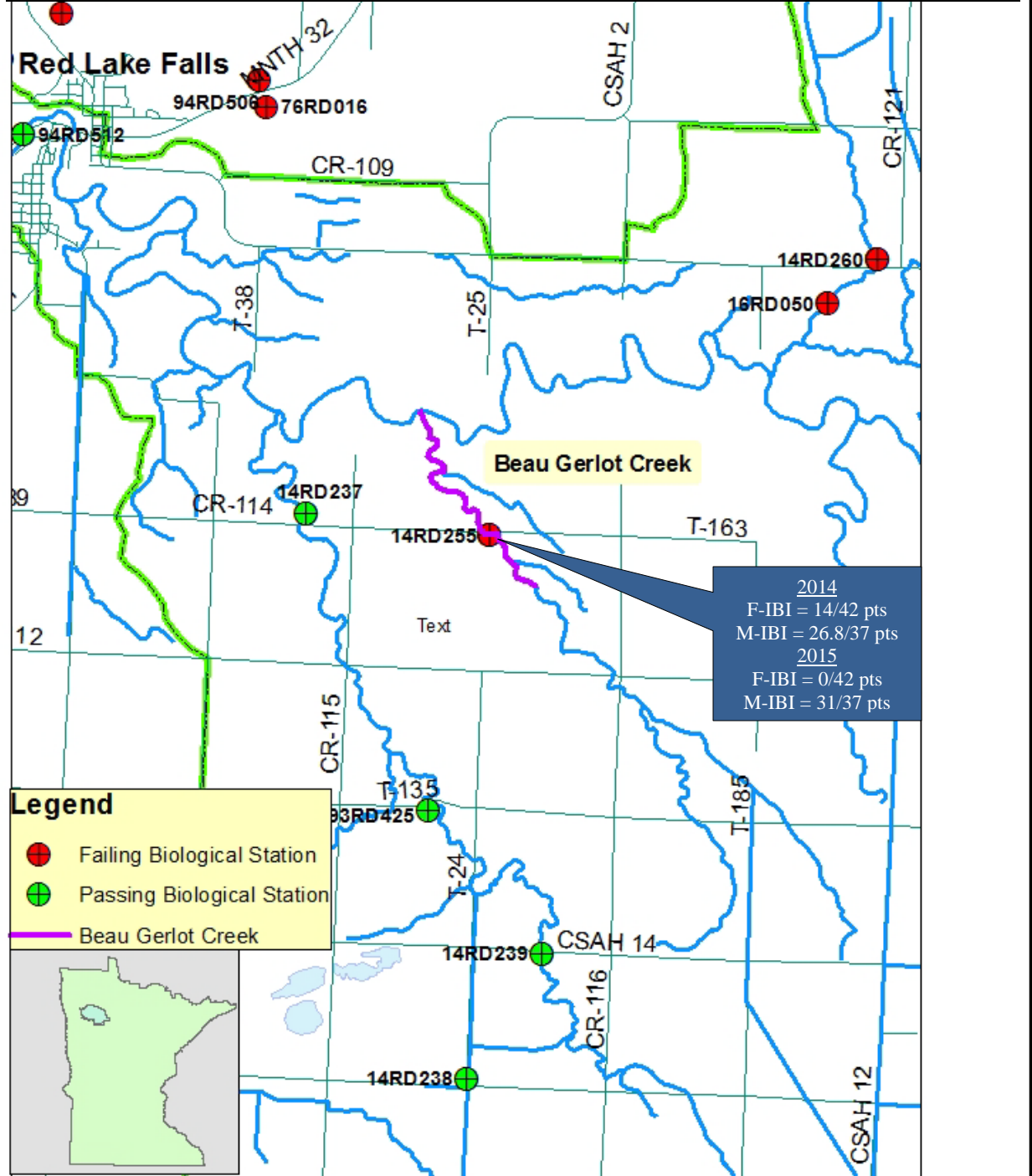
- ✓ Clearwater River watershed stressor identification

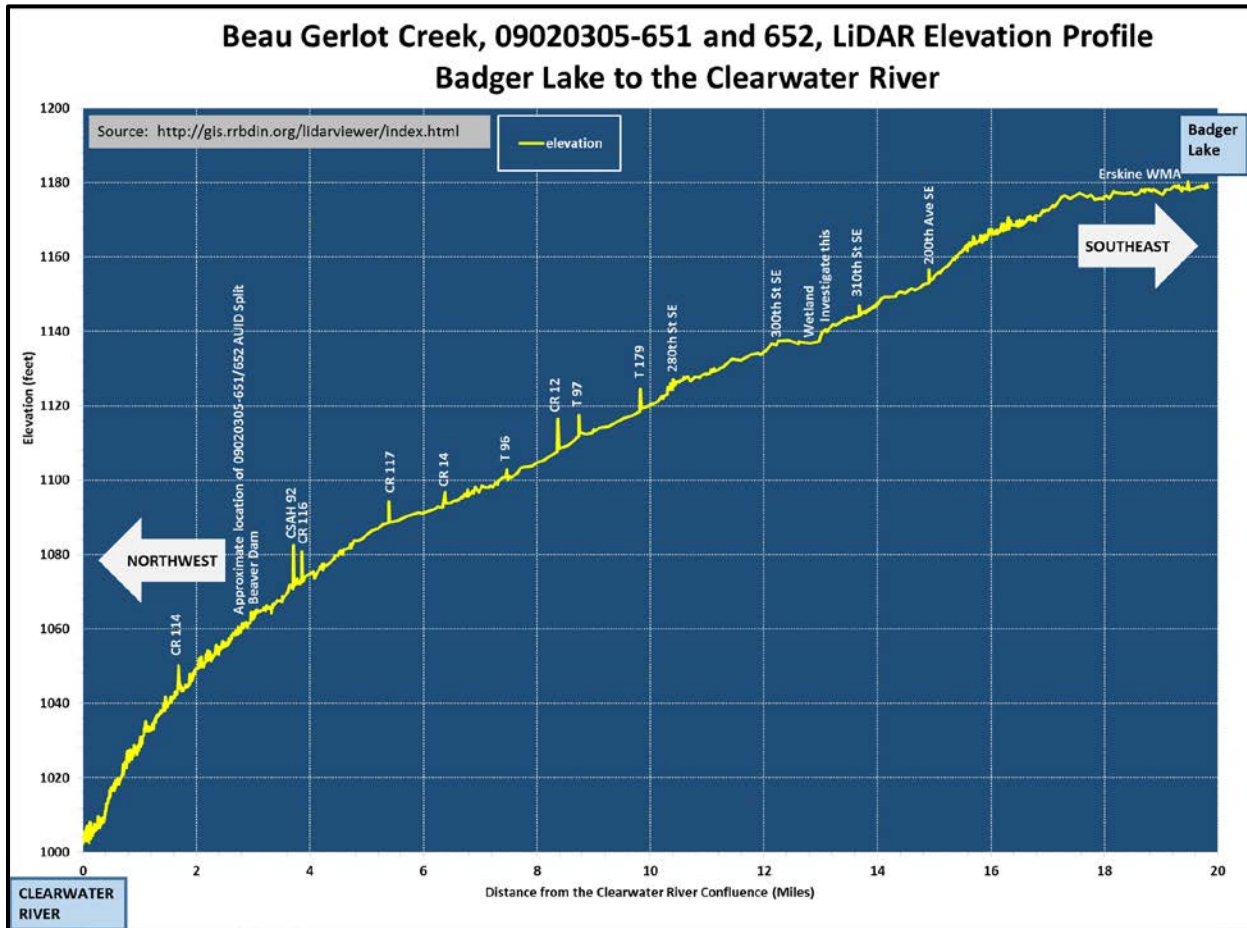
### **Clearwater River Watershed Restoration and Protection Strategy (WRAPS) Project**

- Objective 6 – Stressor and Pollutant Source Identification
  - RLWD and MPCA staff worked together to complete and review each section of the Clearwater River Watershed Stressor Identification Report in detail. Stressor identification is a formal and rigorous process that identifies stressors that are causing biological impairments of aquatic ecosystems and provides a structure for organizing the scientific evidence that supports the conclusions. The process involves identification of the problem (low index of biological integrity scores), listing candidate causes (low dissolved oxygen, poor habitat, fish passage barriers, or pollutants), examination of data/evidence, and identifying the most probable causes of the problem. Often, the causes of biological impairments are not as straightforward as a total suspended solids impairment in a watershed with erosion problems or an *E. coli* bacteria impairment downstream of multiple feedlots. A great deal of data analysis and exploration of the watershed is needed in order to come to a confident conclusion about the causes of a biological impairment.
    - Photos from the impaired reaches were shared with MPCA stressor ID staff.

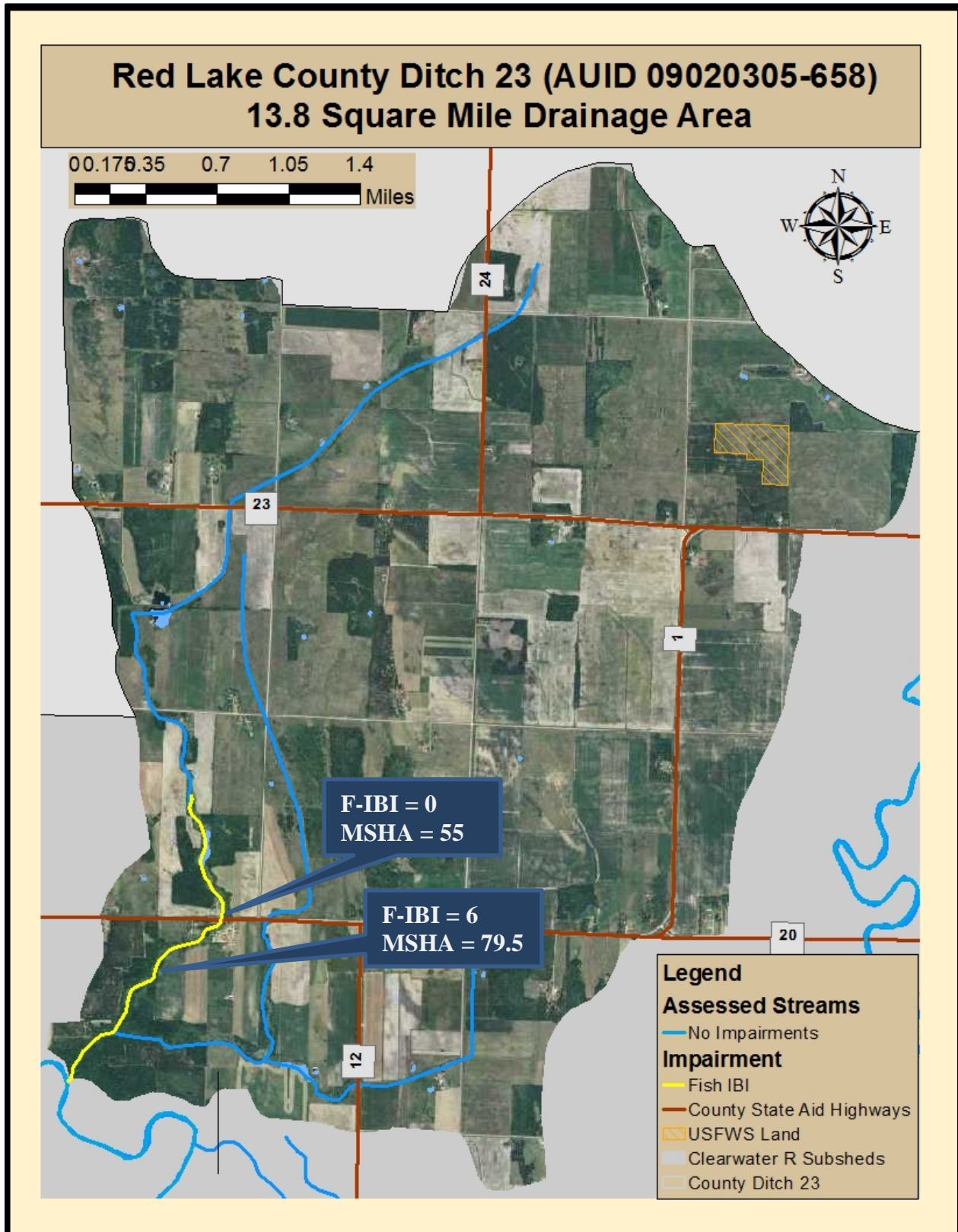
**Beau Gerlot Creek** (AUID 09020305-652) is impaired by low fish and macroinvertebrate IBI scores. Beau Gerlot Creek meets water quality standards for the water chemistry parameters that affect aquatic life (dissolved oxygen, nutrients, and total suspended solids), so physical characteristics of the stream were examined. Flow alterations (upstream channelization, flashy flows, and extended periods of no flow), lack of connectivity, and lack of habitat were the primary candidate causes of the impairments. There is strong evidence that suggests that the combination of a steep gradient and crude private crossings may contribute to fish passage barriers, especially during lower flows. The LiDAR Elevation profile shows a significant increase in gradient downstream of County Road 114.

**Beau Gerlot Creek**  
**Fish and Macroinvertebrate Index of Biotic Integrity Impairments**

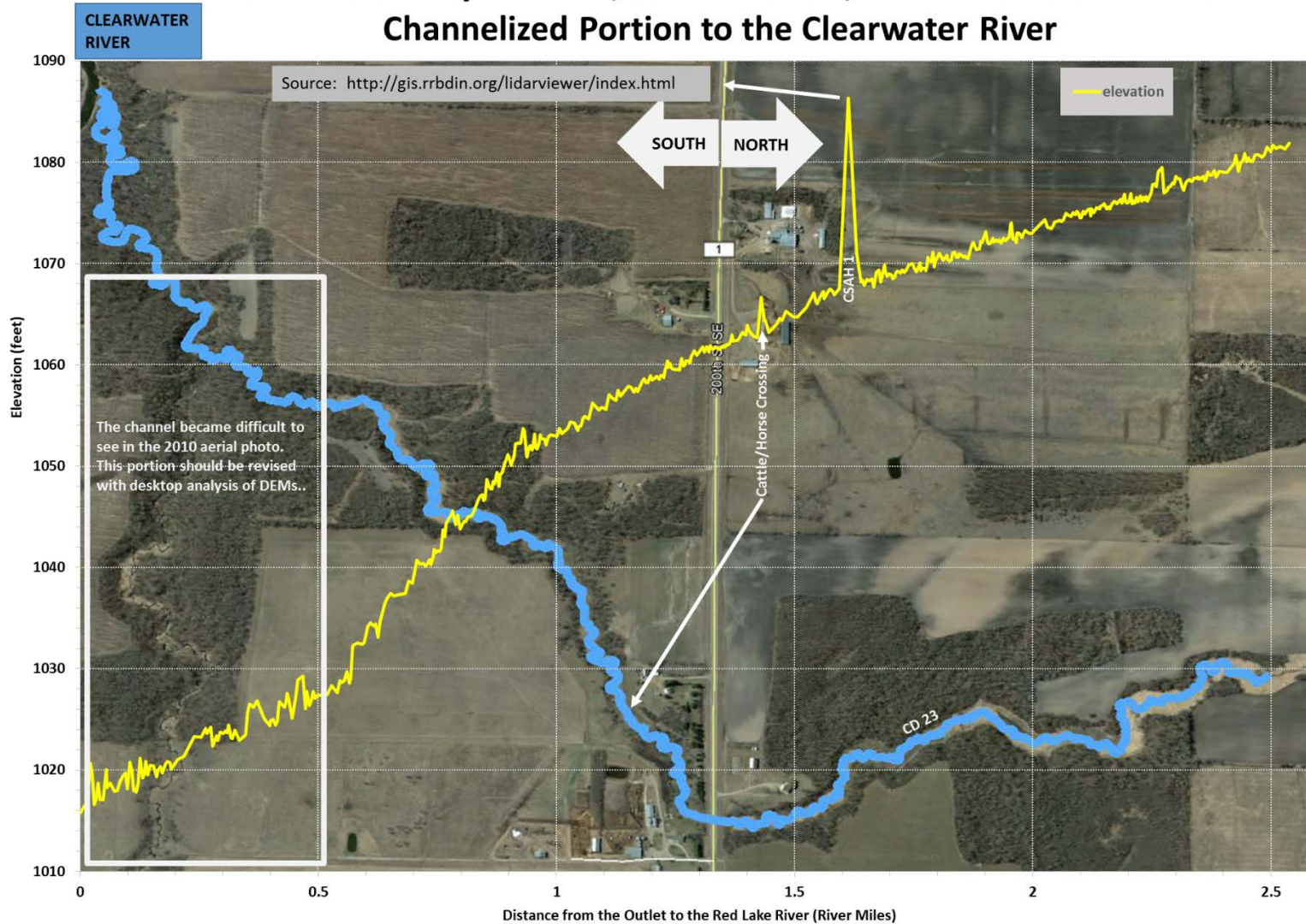




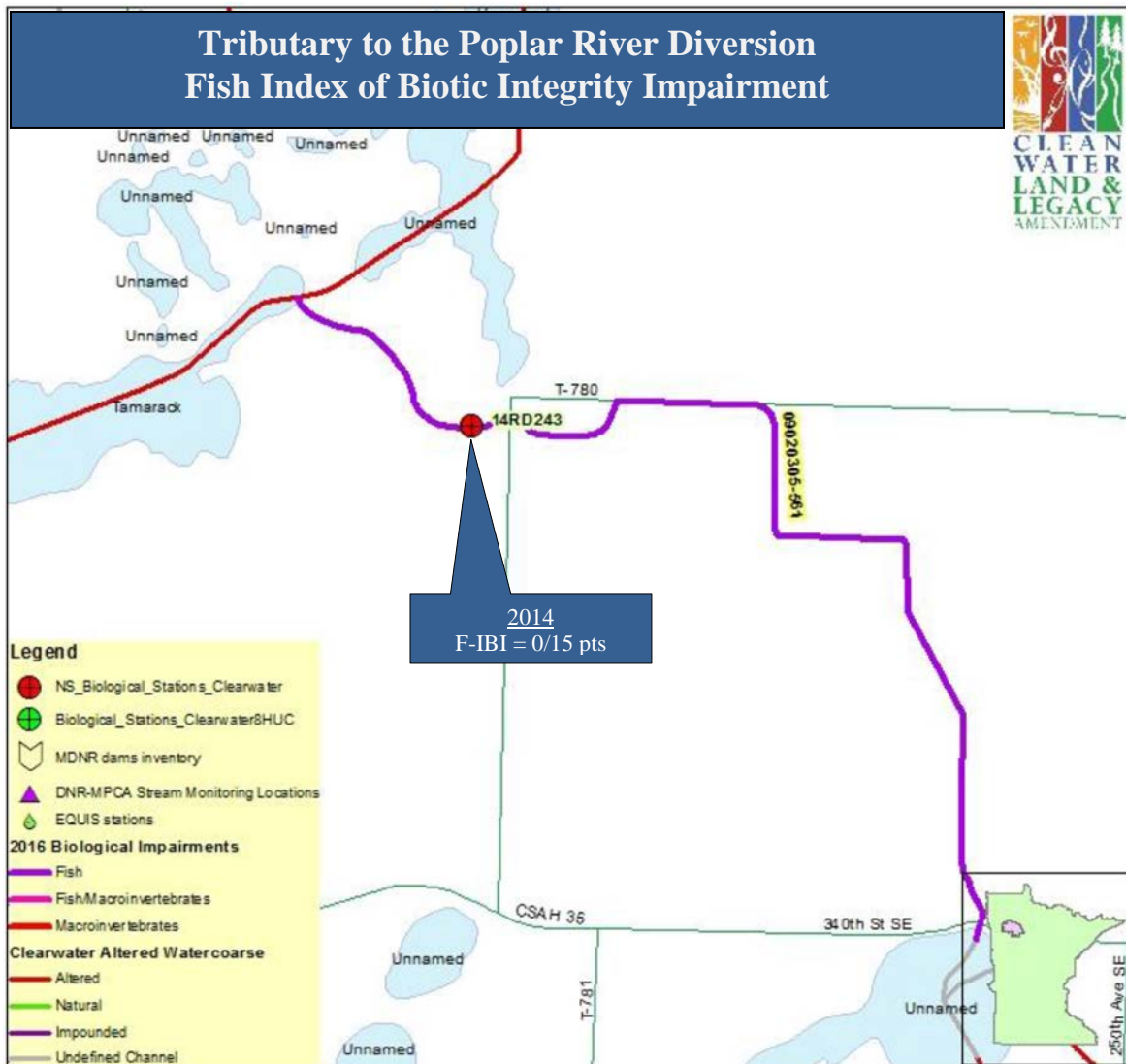
The natural outlet of the **Red Lake County Ditch 23** drainage system (AUID 09020305-658) was found to be impaired by low fish IBI scores. Flows were too low for the stream to be sampled for macroinvertebrates. The outlet of Red Lake County Ditch 23 is a natural channel that has a high gradient between CSAH 1 and the Clearwater River. It also receives drainage from the Red Lake County Ditch 17 drainage area. Dissolved oxygen barely failed (11% of daily minimums were <5 mg/L) to meet standards. Habitat scores were less than desired. DO and habitat values are not as poor, however, as the zero-point fish index of biotic integrity score would suggest. Fish passage and a lack of base flow are more likely to be the primary stressors of aquatic life in the stream. The culvert at CSAH 1 was a concern for MPCA stressor identification staff. They felt that the culvert could be negatively affecting fish passage during low flows and high flows. During lower flows, there is insufficient depth within the culvert to allow fish passage. During high flows, the velocities within the culvert could be too fast to allow fish passage.



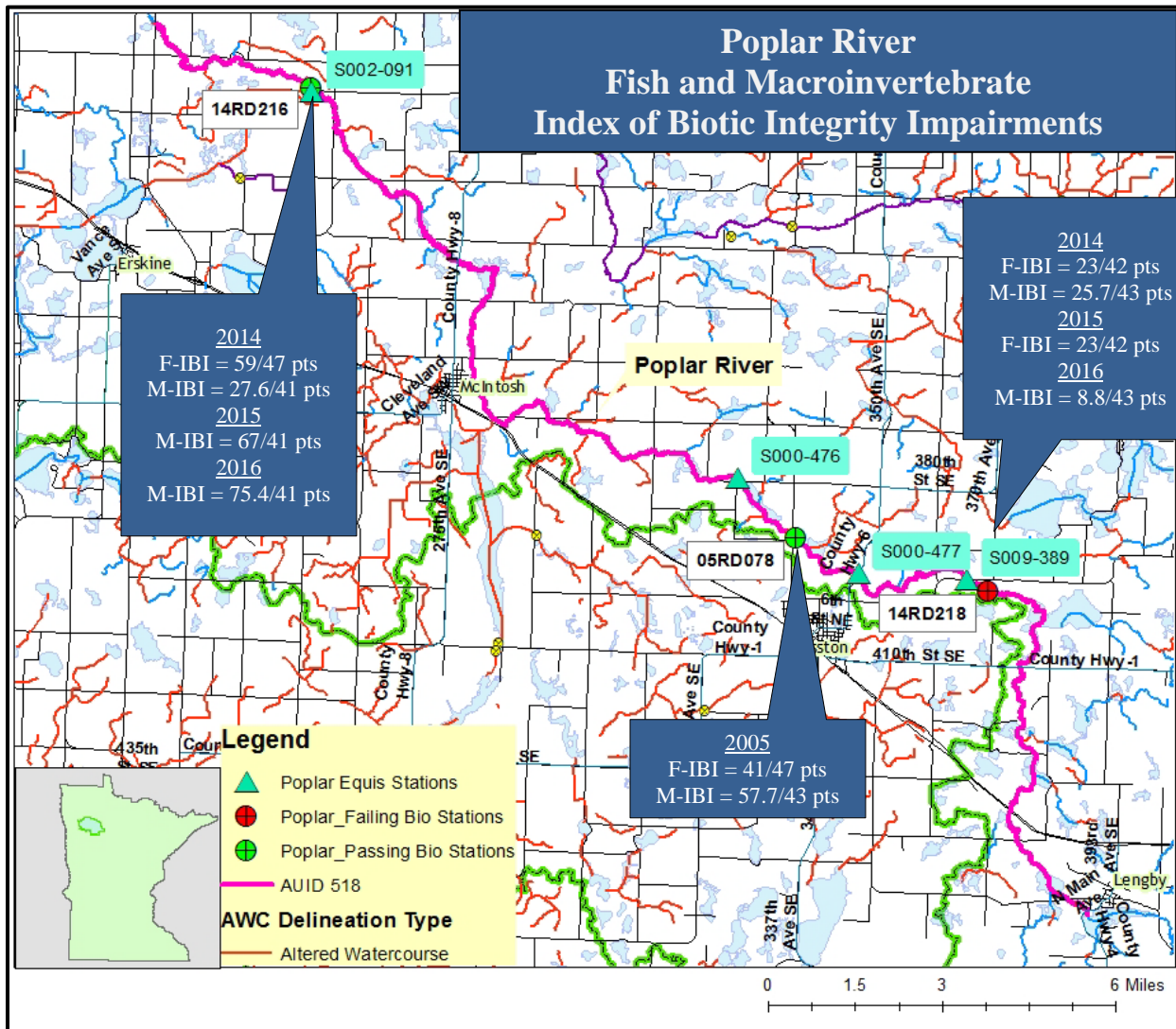
### Red Lake County Ditch 23, 09020305-658, LiDAR Elevation Profile Channelized Portion to the Clearwater River



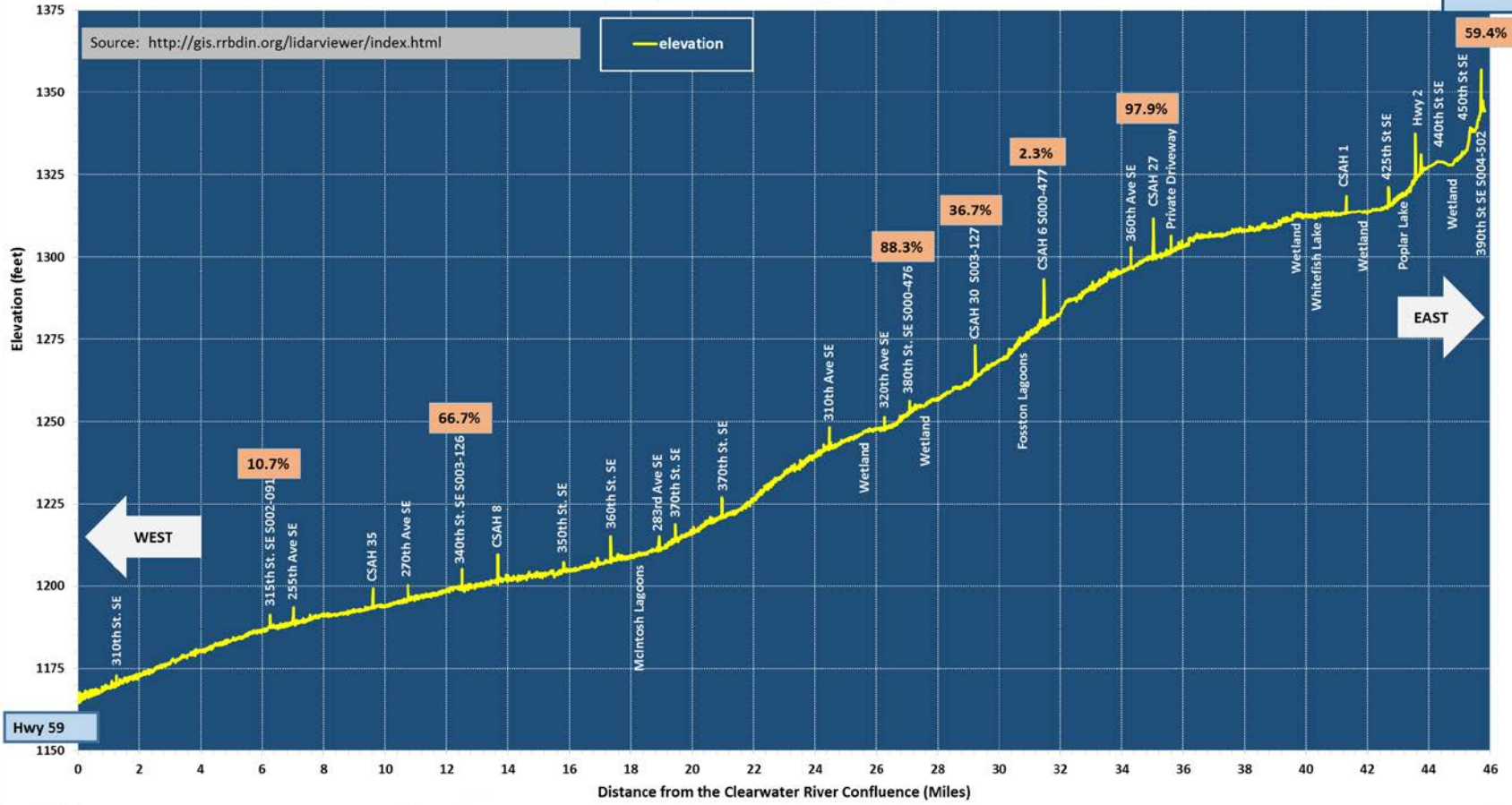
A **tributary (AUID 09020305-561) to the Poplar River Diversion** that flows from Gerdin Lake to the Poplar River Diversion was a site at which the MPCA sampled fish and found that the reach is impaired by a low fish IBI score (zero points). Stagnant conditions in the stream led to extremely low dissolved oxygen concentrations when water quality was monitored at the site in 2016. The sampling of this ditch for fish is highly questionable. According to the information presented for the review of tiered aquatic life use (TALU) standards, this ditch should be considered a limited resource value watercourse. It does not meet the IBI expectations for general use or modified use streams. It is a man-made channel. Restoration of this channel would not mean restoration of a meandering stream channel. Rather, it would mean abandonment/plugging of the channel and restoration of the wetlands that it appears to be draining. The area has been considered for a large storage (flood damage reduction) project in the past. Aerial photos show that beaver dams are a frequent occurrence along the reach and downstream of the final road crossing. The Poplar River Diversion, into which this channel drains, was not sampled or assessed.



The **Poplar River** (AUID 09020305-518) upstream of Highway 59 is impaired by low fish and macroinvertebrate IBI scores. The poorest DO levels and IBI scores were found near the CSAH 27 crossing of the Poplar River, NE of Fosston at stations 14RD218 and S009-389. Both stations are located downstream of a large wetland complex near the outlet of Whitefish Lake. The Poplar River channel nearly disappears within the wetland complex between the CSAH 1 and CSAH 27 crossings as it flows past Whitefish Lake. Aerial photos show that the channel has been gradually filled-in with vegetation between 1991 and the present. The land use surrounding this wetland complex is primarily row crop agriculture. During periods of medium to high flow, it is likely that these wetland complexes flush out nutrients that can affect downstream DO concentrations. Nutrient samples collected during the 2016 deployment did not show elevated TP or nitrogen concentrations. DO levels recover downstream of CSAH 27, but drop significantly after passing through a riparian wetland downstream of CSAH 30. Some beaver dams have been found along the reach that may temporarily affect fish passage.

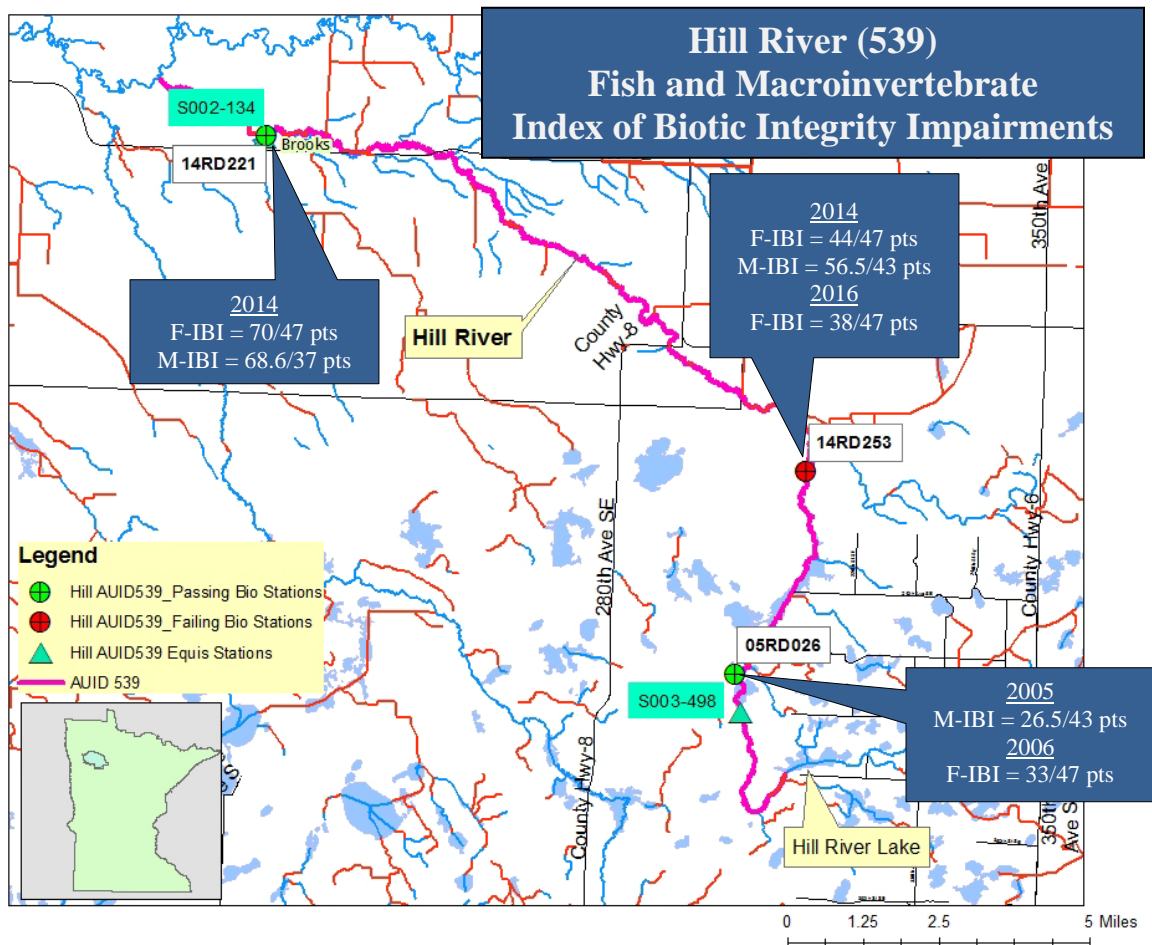


Poplar River, 09020305-518, LiDAR Elevation Profile  
Spring Lake to Highway 59





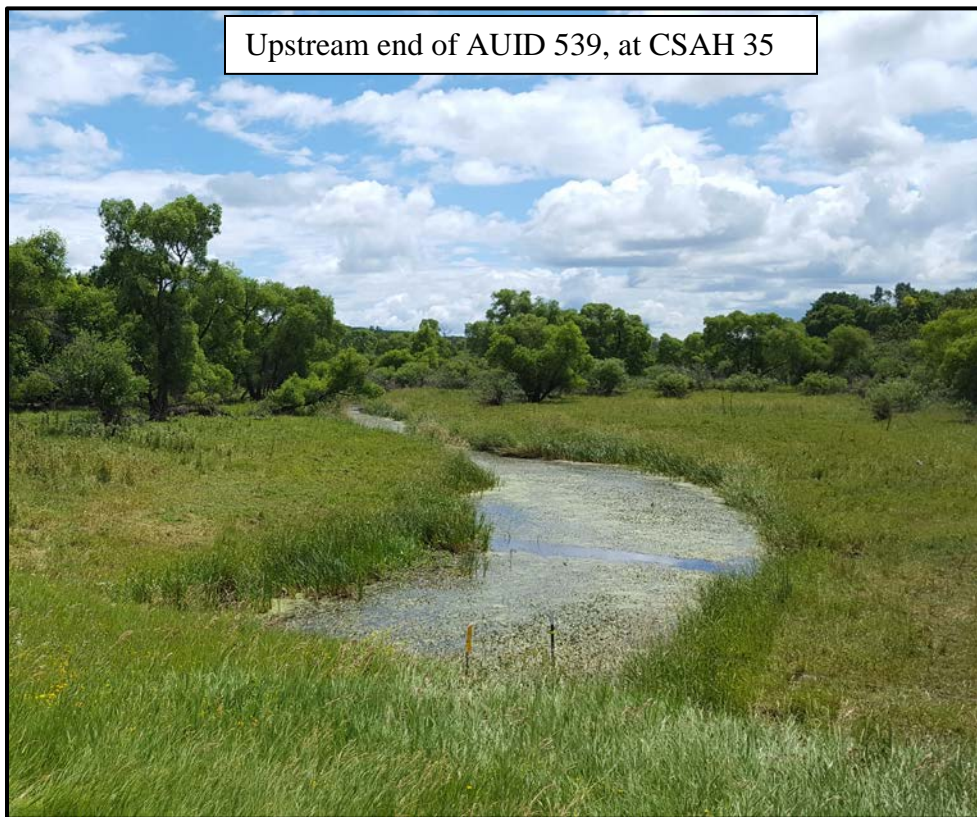
The **Hill River** (AUID 09020305-539) between Hill River Lake and the Lost River is impaired by low fish and macroinvertebrate IBI scores. Scores were very good at the downstream end of the reach near Brooks, but were poor near the upstream end of the reach near Hill River Lake. The river looks significantly different at either end of this reach. The upstream end has consistently low dissolved oxygen concentrations, a lower gradient, a mucky bottom, stagnant water, and a lot of in-channel vegetation. The downstream end of the Hill River has consistently good dissolved oxygen concentrations, gradient, consistent flow, and a sand/gravel bottom. A LiDAR profile of the reach revealed that there is a change in gradient where the channel begins flowing west toward Brooks (near the 14RD263 site on the following map). Additional continuous dissolved oxygen monitoring is recommended for the summer of 2017 within the portion of the river that changes from a northerly direction to a westerly direction (somewhere between 310<sup>th</sup> Ave SE and CSAH 8). The primary stressors to aquatic life suspected in AUID 539 on the Hill River are most evident at (and upstream of) site 05RD026. Those stressors are lack of connectivity, low DO/daily DO flux, and lack of habitat. Low dissolved oxygen seems to be the primary stressor for aquatic life. DO concentrations are being more greatly affected by physical characteristic of the stream rather than by pollutant concentrations. There is evidence that, despite not being a direct cause of the IBI impairments, there is also room for improvement of the in-stream habitat of this portion of the Hill River.



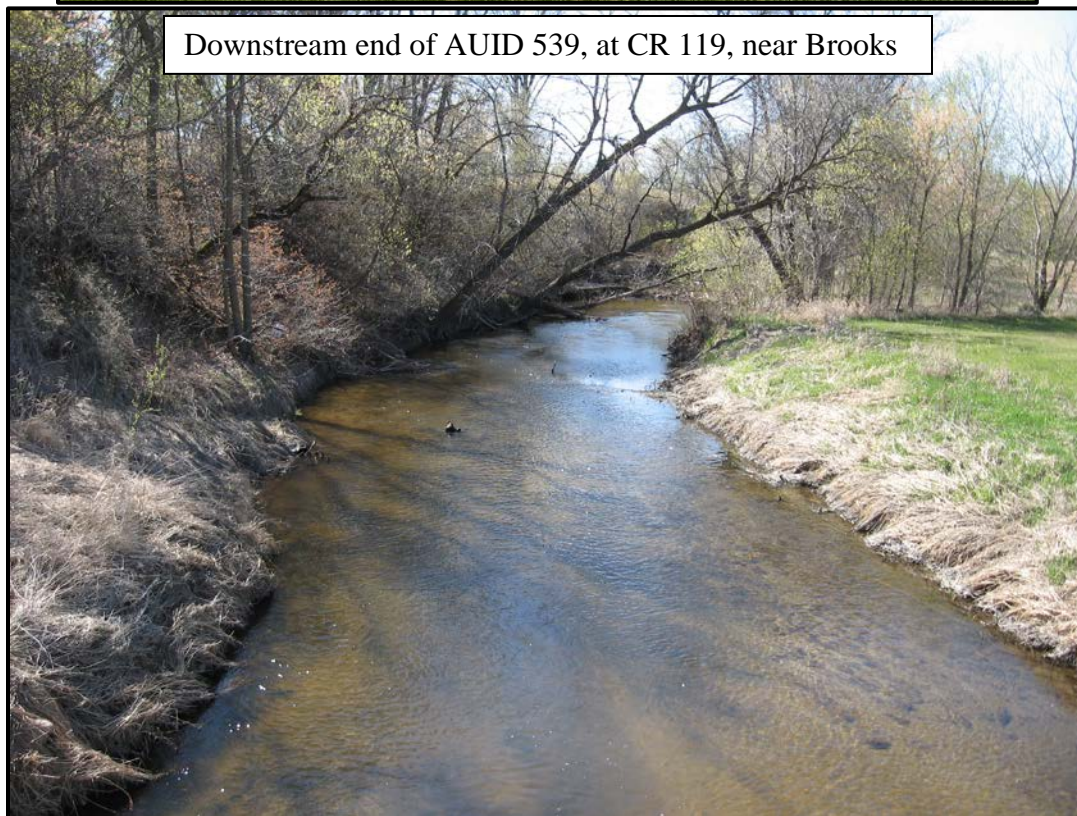
RED LAKE WATERSHED DISTRICT  
MONTHLY WATER QUALITY REPORT

February 2017

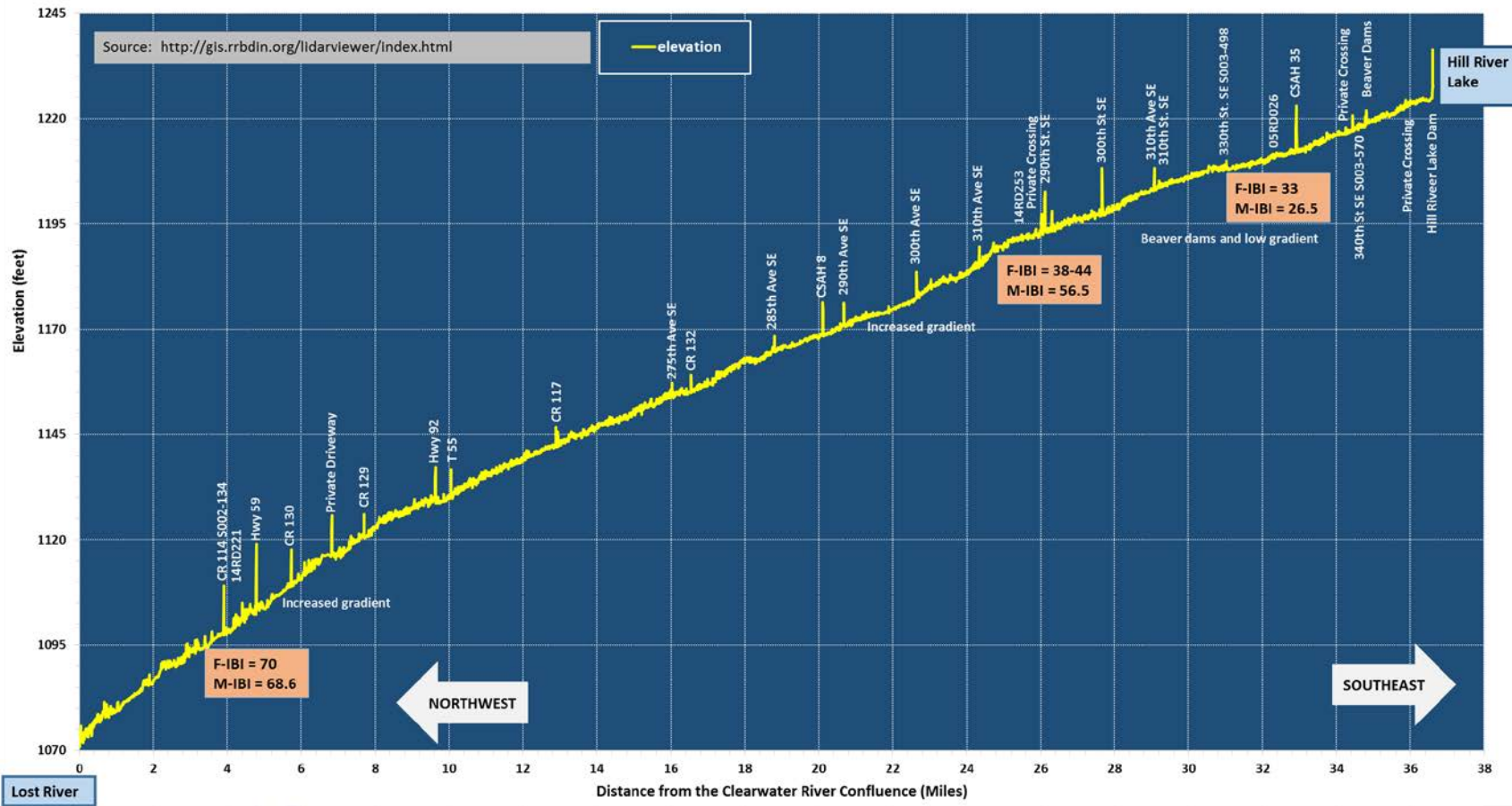
Upstream end of AUID 539, at CSAH 35



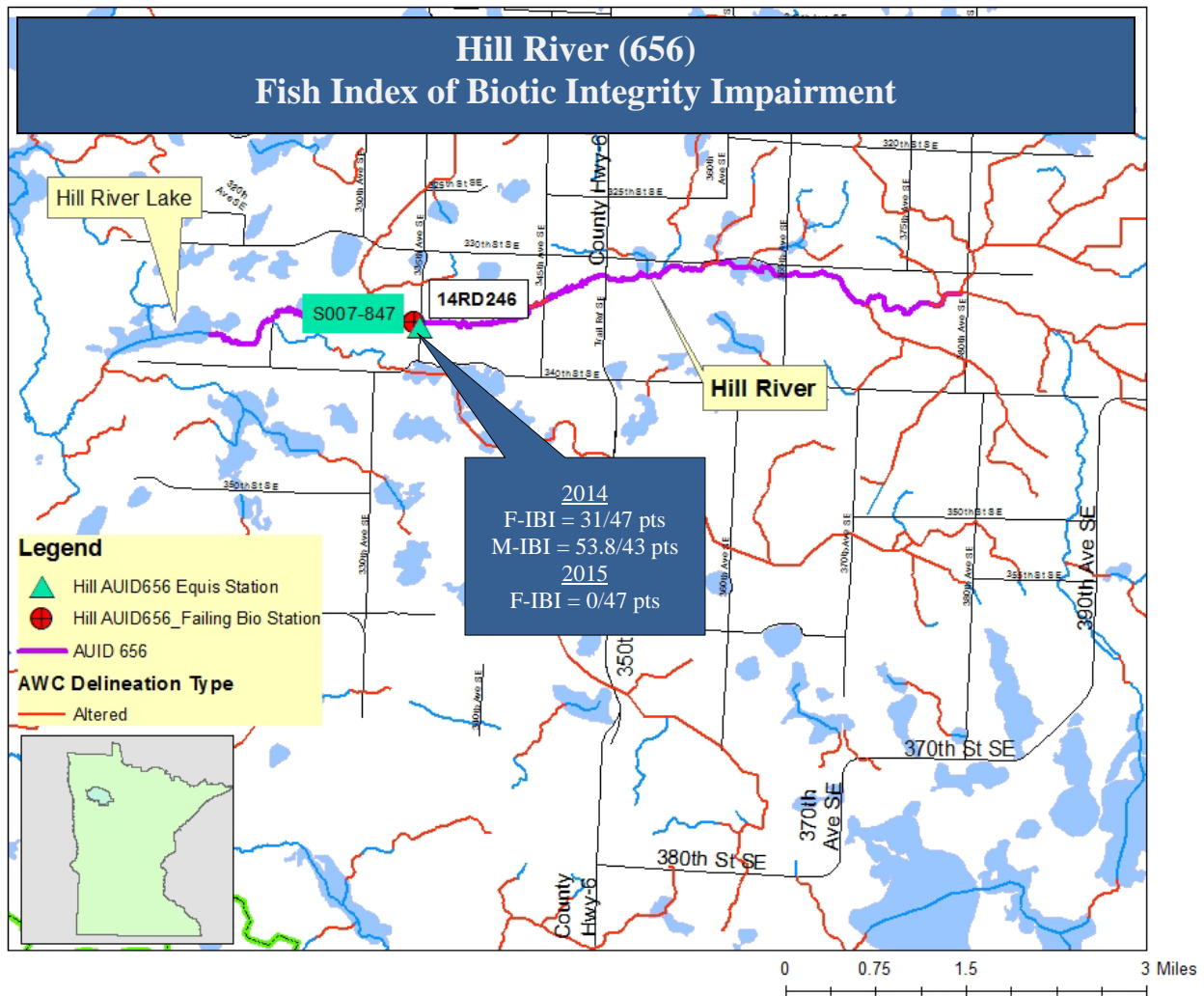
Downstream end of AUID 539, at CR 119, near Brooks



Hill River, 09020305-539, LiDAR Elevation Profile  
Hill River Lake to Lost River



The **Hill River** (AUID 09020305-656) upstream of Hill River Lake is impaired by low fish IBI scores. The dam at the outlet of Hill River Lake prevents a barrier to fish passage to upstream reaches of the Hill River. Low dissolved oxygen is another significant stressor to aquatic life along this reach. Although dissolved oxygen levels are not as bad upstream of Hill River Lake as they are downstream of Hill River Lake, the river failed to meet dissolved oxygen and dissolved oxygen fluctuation standards at the 335<sup>th</sup> Ave SE crossing. Portions of the Hill River have been channelized upstream of this reach. Wetlands, including some large basins, have been drained with ditches. The channelization and wetland drainage would increase flashiness of flow and reduce base flow. Flow can become stagnant in the late summer and the channel becomes filled with dense macrophyte growth. Habitat scores were “fair” but the quality of the substrate was a concern. Further evidence of channel instability is provided by pictures of severe bank erosion and frequent channel damage from the many livestock access points throughout the river.



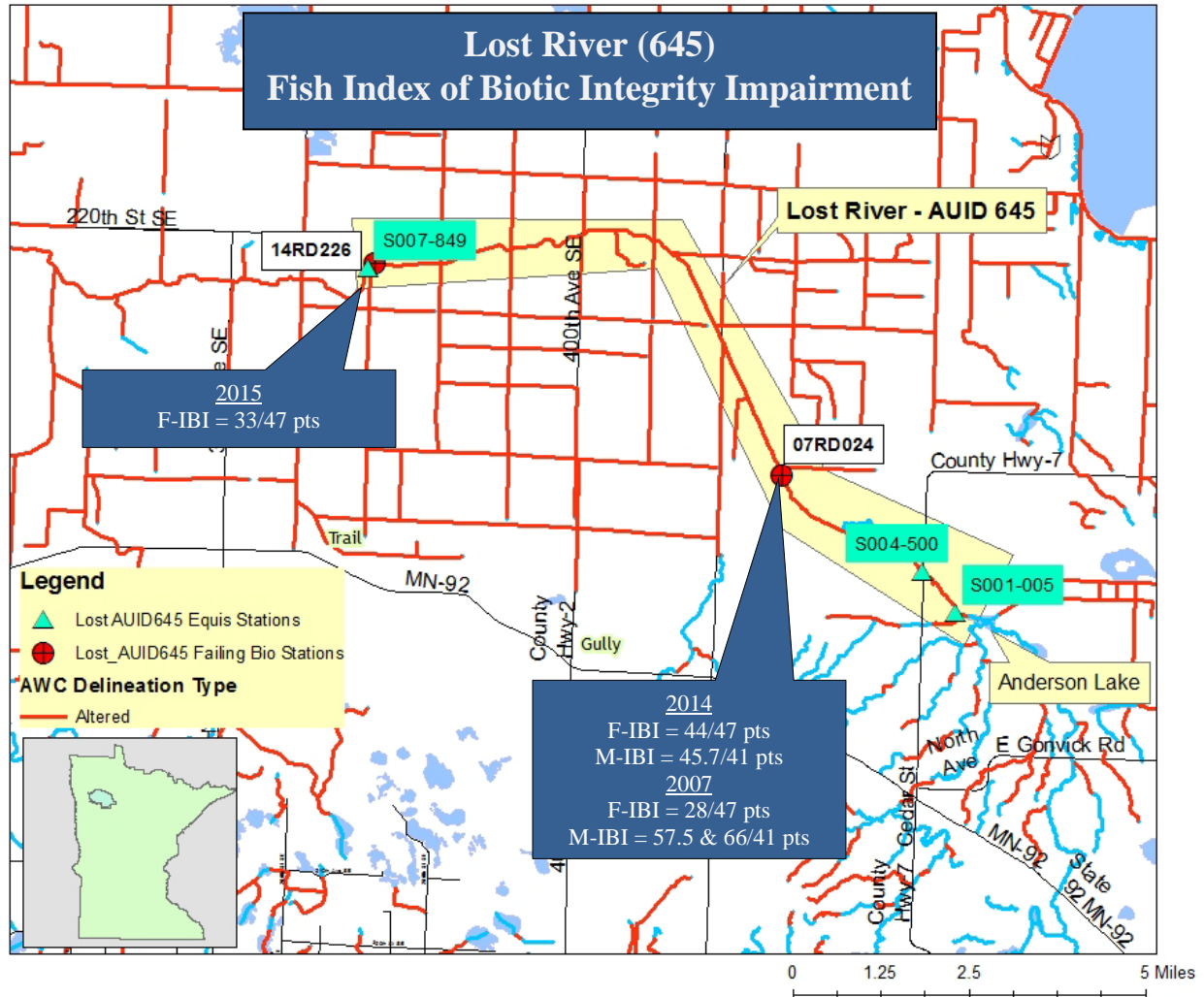
RED LAKE WATERSHED DISTRICT  
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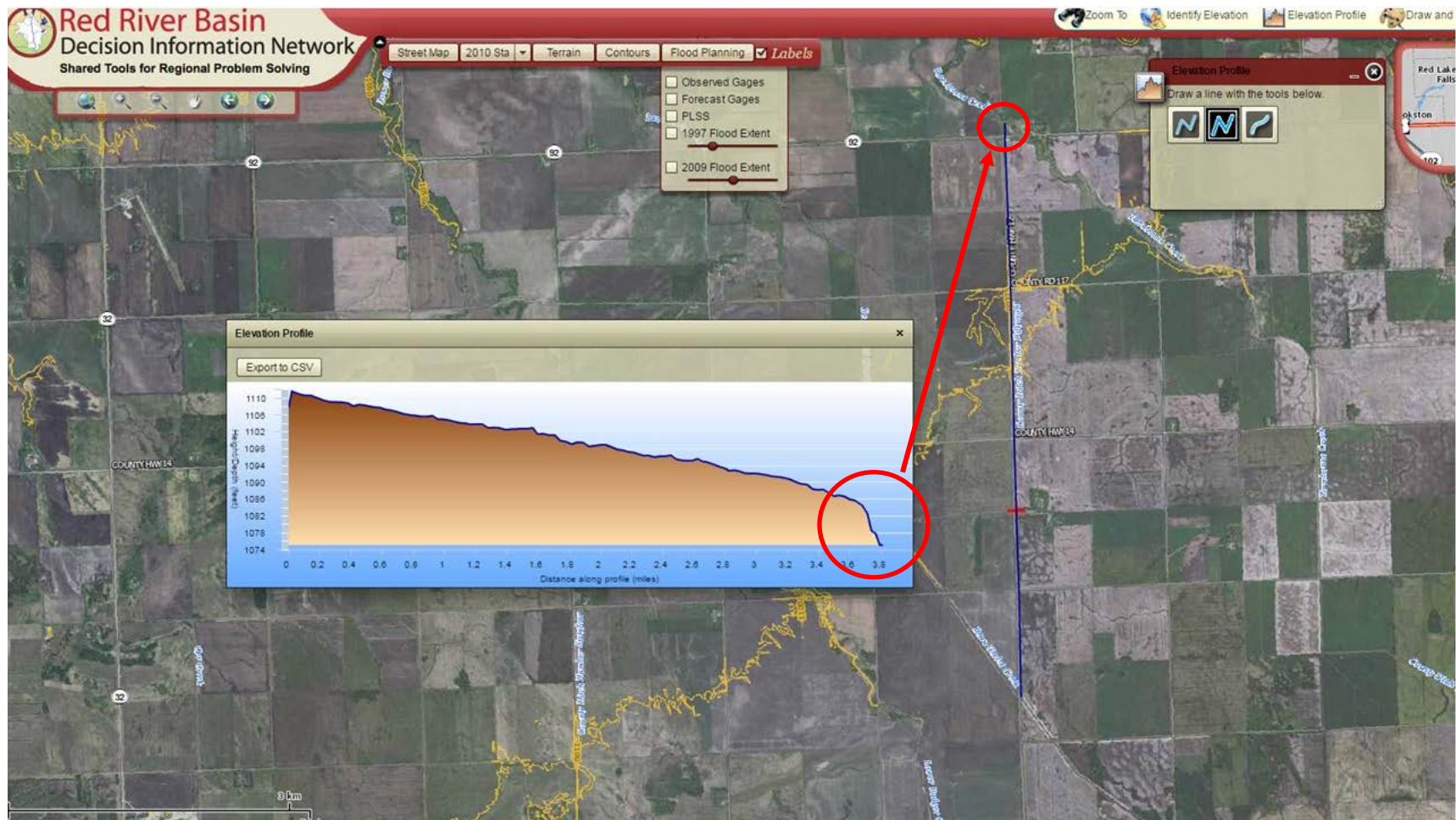
MPCA staff pointed out a feedlot along an upper reach of the Hill River that is very close to the stream and has a crude, private crossing that could cause problems with fish passage (and may have been unlawfully constructed). The cattle have damaged the stream banks.



The channelized portion of the **Lost River (645)** (09020305-645) between Anderson Lake and a ditch along CSAH 28 is impaired by low fish IBI scores. Dissolved oxygen concentrations at the downstream end of the reach failed to meet state standards (frequently lower than 5 mg/L). Along with the low dissolved oxygen concentrations, the daily dissolved oxygen fluctuation was also high. Poor habitat quality is a stressor of aquatic life along this reach, particularly near the upstream, 07RD024 sampling station near 550<sup>th</sup> St. There are beaver dams along the reach that can act as temporary fish passage barriers.



- While looking at LiDAR data for neighboring streams, RLWD staff noticed a potential need for a grade stabilization along Red Lake County Ditch 58 (a tributary of Terrebonne Creek).



### **Grand Marais Creek Watershed Restoration and Protection Project**

A semi-annual report was completed for the project and submitted to the MPCA Project Manager. RLWD staff reviewed and commented on the draft Grand Marais Creek watershed Restoration and Protection Strategy document and wrote a civic engagement section for the document. Emmons and Olivier Resources, Inc.

### **Other Notes**

- MPCA and RLWD staff developed work plans for the Thief River and Red Lake River Watershed Restoration and Protection Strategy Public Review process contracts.
- The Water Quality Coordinator worked on a backlog monthly water quality reports from 2016.
- RLWD staff provided information about Maple Lake water quality to the East Polk SWCD. The assessment results for Maple Lake are interesting. The maximum depth (14 feet) of Maple Lake is very near the threshold (15 feet) between shallow lakes and other lakes. The state's water quality standards allow higher nutrient concentrations and lower Secchi disk transparency levels within shallow lakes. Maple Lake meets the standards that are set for shallow lakes, but would not meet the more protective standards that are applied to other lakes.
- Information relevant to the connection between a lack of base flow in the Black River watershed and biological impairments and provided to engineers that are working on plans for a new impoundment in the Black River watershed.
- RLWD and RRWMB staff worked together to submit comments on the proposed amendments to state water quality standards, which will establish a Tiered Aquatic Life Uses (TALU) framework and modify Class 2 beneficial use designations. To boil the comments down, they essentially acknowledged the benefits of the TALU system but found some areas in which improvement is needed. Improved engagement with local stakeholders is needed in order to avoid under-protecting high quality waters and over-protecting artificial watercourses. The MPCA needs to understand/recognize the difference, as stated in statute, between artificial watercourses and altered natural watercourses. The MPCA tends to conflate the two types of watercourses by using the term "altered watercourses."
  - An "artificial watercourse" is a watercourse artificially constructed by human beings where a natural watercourse was not previously located.
  - An "altered natural watercourse" is a former natural watercourse that has been affected by artificial changes to straighten, deepen, narrow, or widen the original channel. The restoration potential of these watercourses would logically have a higher "ceiling" than an artificial watercourse.
- RLWD staff met with a graduate student who is examining alternative strategies for restoring a portion of the Mud River upstream of Agassiz Pool.



### **February 2017 Meetings and Events**

**February 6, 2017** – Red Lake River Corridor Enhancement Project Joint Powers Board and Partners meeting

- Feedback from the Greater Minnesota Regional Parks and Trails Commission on funding request
- Border To Border Off-Road Vehicle Touring Trail
  - [http://www.dnr.state.mn.us/input/mgmtplans/ohv/plans/border\\_to\\_border\\_trail.html](http://www.dnr.state.mn.us/input/mgmtplans/ohv/plans/border_to_border_trail.html)
- **February 9, 2017** – RLWD Board of Managers meeting. Water quality related items from the agenda and minutes:
  - The Water Quality Coordinator gave a presentation on Tiered Aquatic Life Use standards to the Board.
  - The Water Quality Coordinator gave a presentation (with handouts) to the Board about the status and findings of the Red Lake River Watershed Restoration and Protection Strategy project.
- **February 15, 2017** – Red River Basin Water Quality Training Session
  - The Water Quality Coordinator put together a new presentation for the training session to provide basic information about the common water quality parameters that are tested.
  - The schedule of this year’s training session was improved from previous years. Presentations were arranged in a logical order that started with “what” we monitor, and then proceeded to “why” we monitor and “how” we monitor water quality. After the presentation on how to use proper procedures and collect quality samples, RMB Environmental Labs gave a presentation on the shipment and analysis of samples. Hands-on training and data-related presentations were conducted later in the day. Presentations from the day can be found on the International Water Institute’s website: <http://www.iwinst.org/monitoring-network/sops>.
  - Water Quality Parameters
    - [http://www.iwinst.org/wp-content/uploads/2017/02/WQ-Parameters\\_Descriptions.pdf](http://www.iwinst.org/wp-content/uploads/2017/02/WQ-Parameters_Descriptions.pdf)
  - Why We Sample, Data uses
    - <http://www.iwinst.org/wp-content/uploads/2017/02/Why-we-Sample-What-the-Data-is-Used-For.pdf>
  - SOPs and Field Equipment
    - <http://www.iwinst.org/wp-content/uploads/2017/02/2017-Water-Quality-Monitoring-SOPs.pdf>
  - Lab Quality Control and Chain of Custody
    - <http://www.iwinst.org/wp-content/uploads/2017/02/Lab-QC-and-Chain-of-Custody.pdf>
  - Water Quality Data and Data Products
    - <http://www.iwinst.org/wp-content/uploads/2017/02/WQ-Data-and-Data-Products.pdf>

- YSI Sonde Maintenance and Care
  - <http://www.iwinst.org/wp-content/uploads/2015/04/Sonde-Maintenance-and-Care-2015.ppt.pdf>
- Turbidimeter Calibration
  - [http://www.iwinst.org/wp-content/uploads/2012/04/Hach\\_2100p\\_Calibration\\_and\\_Use\\_2012.pdf](http://www.iwinst.org/wp-content/uploads/2012/04/Hach_2100p_Calibration_and_Use_2012.pdf).
- **February 23, 2017** – RLWD Board of Managers meeting. Water quality related items from the agenda and minutes:
  - Staff member, Loren Sanderson, stated that aeration on Pine Lake, RLWD Project No. 35 started on February 7, 2017. The District is the permit holder for the aeration system. The Sportsman’s Club is using an oxygen meter that was provided by the District to monitor the oxygen levels.
  - The Board reviewed a Buffer Program updated published by BWSR on February 21, 2017. Discussion was held in regard to non-compliance of ditches under the jurisdiction of the District. Legal Counsel Sparby stated that in his opinion, installation of buffer strips would fall under Minnesota State Statute 103E, which would require the District to hold a hearing for each project where the landowners would be assessed for the purchase of right of way and installation of the buffer strip. Staff member, Nick Olson, discussed the process of obtaining survey information to determine additional right of way that will be required. Further discussion was held on the hiring of additional summer staff to assist Olson with survey requirements.
  - Staff member, Nick Olson, stated that he submitted a proposal to the Conservation Corps requesting an estimate for removal and clearing of trees in the dredged portion of the Clearwater River, RLWD Project No. 3. Olson stated that he was recently made aware that the District is required to maintain the portion downstream of the dredged area of the Clearwater River to Highway 59, for a total of 10.62 miles.
  - Staff member, Nick Olson, stated that while viewing the dredged portion of the Clearwater River, RLWD Project No. 3, it was determined that there were several logjams that needed removal prior to the spring runoff. Olson stated that due to the recent warm weather and rain event, ice conditions were deteriorating so an immediate decision was made to hire a crew to remove the area of concern.

Red Lake Watershed District Monthly Water Quality Reports are available online:  
<http://www.redlakewatershed.org/monthwq.html>.

Learn more about the Red Lake Watershed District at [www.redlakewatershed.org](http://www.redlakewatershed.org).

Learn more about the watershed in which you live (Red Lake River, Thief River, Clearwater River, Grand Marais Creek, or Upper/Lower Red Lakes) at [www.rlwdwatersheds.org](http://www.rlwdwatersheds.org).

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