Ruffy Brook Monitoring

Location

Ruffy Brook is a tributary of the Clearwater River in Clearwater County. It begins in Dudley Township, near Leonard, and flows north through Holst, Leon, and Greenwood Townships before entering the Clearwater River. The trout stream is located in Leon Township.

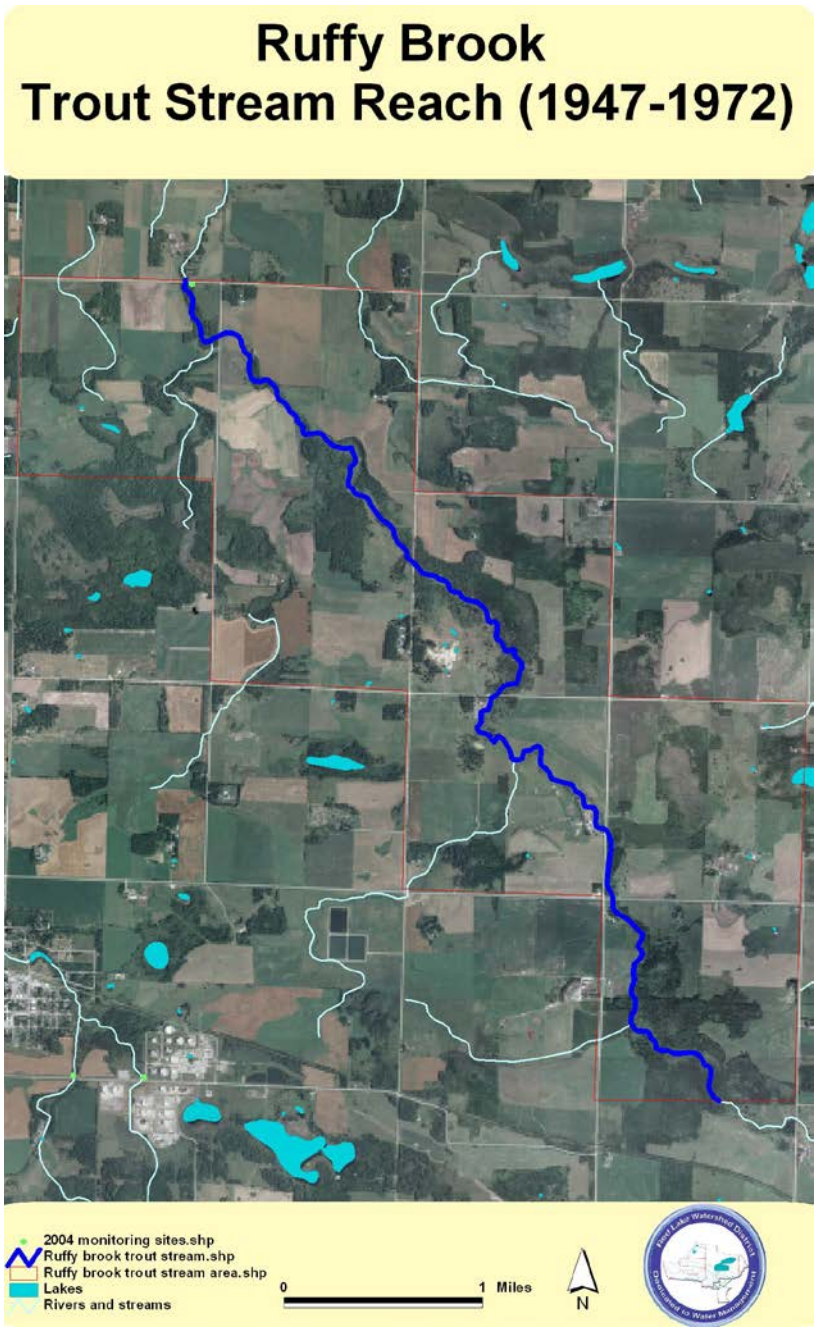

Figure 1. Trout Stream Reach Map

History of Ruffy Brook

Did you know there were brook trout in Ruffy Brook? This picture was taken in 1925 of Ernest and Judy Engebretson with six brook trout. Look for more about Ruffy Brook trout in future issues.

According to a report from Roy Johannes, Area Fisheries Supervisor in 1992, "the first records available from Ruffy Brook are from 1947. The stream is 20 miles in length and at that time, 5 miles of the river were considered fair to good trout waters." Brook trout were captured in the stream in 1947, at which time the trout stream reach of Ruffy Brook was designated. Brown trout were stocked until 1962. Removal of timber and increased cultivation of land occurred, leading to erosion, sedimentation, and a reduction of the ability of the stream to support trout.

A 1967 reconnaissance led to the stream being declared "no longer being able to support trout." The stream was removed from the designated trout stream list in 1972. The February 9, 1972 Commissioner's Order Request states the reconnaissance results, poor water quality for trout, and no attempt to limit access to hogs and cattle as the reasons for delisting the reach.

There have been some land use changes within the trout stream reach over the years. The 1967 reconnaissance showed that the Sections 15-16 crossing was pastured above the crossing, which differs from today. It is now pastured on the downstream side of the crossing and left in a natural state on the upstream side of the crossing.

At the Sections 15-22 crossing, the reconnaissance mentions that it is a spring area with good flow, but mentions that it is pastured above and below the crossing (and that there was a hog in the stream directly upstream). Today, there is a feedlot on the upstream side

of this crossing, but the downstream side is wooded and appears to be a good reference site for this project.

The Sections 22-23 crossing is similar today to what it was in 1967, with pasture on the downstream side of the crossing. There has been a partial buffer installed as part of the implementation phase of the RLWD Clearwater Nonpoint project, but it appears to be on either one side of the stream or the other (not continuous on both sides). The feedlot is not very well buffered from the stream. There were some trees planted along the stream, but they aren't big enough to provide any shade. Although grazing was allowed in the buffer strip easement agreement, parts of the buffer appear to be over-grazed.

At the Sections 23 and 26 crossing (County Road 4), timber cutting in the stream was observed above and below the crossing in 1967. Also, it was also noted as a pastured area. Today, the upstream side has very few trees along the stream. Vic Thompson, the landowner on the upstream side of the crossing, has been trying to restore the reach on his land. It is no longer pastured and has a good grass buffer, but more trees could be planted along the stream, particularly the stretch of the stream that is visible from the road. The downstream side of the County Road 4 crossing is reasonably buffered and wooded. There is a residence on the East side of the stream. There is a small buffer with trees between the yard and the stream.

The Sections 35 and 36 crossing was pastured in 1967 and it still is today. The Section 36/2 crossing didn't mention any pastured land, and it remains in a relatively pristine condition today.

State land along Ruffy Brook was sold to private landowners in 1970. According to old letters from the DNR and county officials, there was some concern that this sale would negatively affect spawning habitat and fish populations upstream, especially if the land was to be developed into rice paddies (which it was). Prior to the sale of the land, a letter from Roger Lehmann, Area Game Manager for the DNR, advised then County Land Commissioner Roger Kanton to take another look at some of the 40's that were being reclassified for sale as agricultural land because they were adjacent to the trout stream portion of Ruffy Brook.

There have been a couple of oil spills in the Ruffy Brook watershed. There was a pipeline break in Leonard on July 21, 1982. Another occurred on April 5, 2001.

Background for the Ruffy Brook Restoration Project

The MN DNR has made recommendations for the restoration of Ruffy Brook as long ago as 1967. However, only a few landowners have done something to fix the problems on the stream since then.

In late 2004, the Red Lake Watershed District and Minnesota Department of Natural Resources were contacted about the possibility of restoring Ruffy Brook to a trout stream. Vic Thompson (Clearbrook) was the landowner who initiated the contact. Vernon

Johnson, a RLWD Board Manager from Clearwater County, brought the idea to RLWD staff and the RLWD Board of Managers. Bill Evarts from the DNR was contacted and involved with the project. The Ruffy Brook watershed was toured by Vic Thompson (landowner), Bill Evarts (MN DNR), Doug Thompson (Clearwater SWCD), Myron Jesme (RLWD Administrator), and Vernon Johnson (RLWD Board Manager) in the fall of 2004. After the RLWD decided to commence with preliminary monitoring, three In-Situ continuously monitoring multiparameter sondes were purchased through a special end-of-the-year deal in December 2004. The three sondes were purchased for $10,000. They will be used for this project as long as necessary and then will be applied to future dissolved oxygen TMDL studies.

Initial Monitoring Plan

The main concerns of this project are dissolved oxygen, temperature, and water level, as these directly affect the ability of trout to survive in the stream. These parameters can vary from day-to-day, and even hour-to-hour. Since it is not possible for water quality staff or volunteer monitors to monitor the stream 24 hours a day, 7 days a week, the purchase of continuous stage, dissolved oxygen, and temperature monitoring probes is necessary for this project.

Probes will be installed at the upstream end, middle, and the downstream end of the trout stream reach of Ruffy Brook. These probes will continuously record water level, dissolved oxygen, and temperature levels throughout the entire open water season at hourly intervals. Data will be downloaded from these probes bi-weekly. Water level readings from the probes will be correlated with readings collected from a staff gauge or measure-down readings from a benchmark on a bridge or culvert. Every time a monitoring site is visited, field measurements will be collected with the RLWD's Hydrolab, Eureka Manta, or YSI multiprobe, a transparency reading will be taken, a turbidity reading will be taken, and stage will be recorded.

Long-Term Monitoring Plan

Continuous monitoring will continue through the 2006 monitoring season. After these two years of monitoring we should have all the water temperature and dissolved oxygen data that we will need. Stream classification surveys will be conducted on a disturbed site (pastured), undisturbed site (reference), and a site that is currently pastured but is being put into CRP. Pre-project stream classification surveys will need to be conducted to determine whether or not Ruffy Brook has the habitat necessary to support trout.

The disturbed site is a pastured reach on the Bonik property, upstream of the Sections 8/9 crossing. The reference site is on Engebretson property, downstream of the Sections 9/16 crossing. The before-and-after site is on the downstream of the Sections 15/16 road crossing on the James and Doreen Aackre property.

If restoration projects are implemented, future dissolved oxygen and temperature monitoring (continuous) and stream classification surveys will be needed to, once again,

determine whether conditions within Ruffy Brook will support trout. In the less distant future, a post-project stream classification survey should be conducted downstream of the

Outcomes

This study will determine whether or not Ruffy Brook can support trout and then, whether or not it can be restored to a condition that can support trout. If it can be restored, the installation of riparian buffer strips will have to be pursued. These can be installed as a cost-share program with landowners and easements can be funded by Conservation Reserve Program contracts. Access easements will also eventually be necessary. The DNR requires these easements to be in place before stocking trout.

Likely, as stated in the 1967 reconnaissance report, many improvement projects will need to be done. “This would include erosion control (with fencing), fish shelters, channel cleanup and planting shade trees. Most of the trout water is on private land which would make securing easements necessary.”

A February 1, 1967 letter from William Joy, Regional Fisheries Manager, states: “It is possible to improve these waters and restore trout stocking. Trees could be planted along the stream to create shade and cover, livestock could be fenced out in certain areas, low head dams could be constructed, deflectors and shelters could be installed. Before any of this work could be done, it will be necessary to secure proper easements from the landowners along the stream. This would make it possible for the State to spend money for the purpose of stream improvement.”

2005 Monitoring

Continuous monitoring was conducted at three sites along the former trout stream reach of Ruffy Brook. All sites were located within Leon Township of Clearwater County. The downstream site was located at the Sections 5/8 road crossing. The middle site was located at the Sections 15/16 crossing. The upstream site was located at the Clearwater County Road #4 (Sections 23/26) crossing.

Flow measurements were taken when possible so that a rating curve can eventually be created for the project. The In-Situ probes measured water level and this was correlated to stage to get a continuous stage record. Probes were set to take a measurement once every 15 minutes.

There were some problems with sedimentation of the probes. When the probes became covered with sediment, the dissolved oxygen levels recorded dropped significantly. These readings were deleted from the continuous record.

As for results, there were several days in the summer where temperatures were above the lethal limit for trout at all of the sites. The suitability of dissolved oxygen levels decreased from upstream to downstream.

2005 Ruffy Brook Temperature Monitoring				
Percentages of Readings Below Specified Temperatures				
Site	Position in Reach	<15 Deg C	<21 Deg C	<23.8 Deg C
Sections 5/8	Downstream End	50.80%	85.71%	92.40%
Sections 15/16	Middle	43.45%	85.23%	95.51%
Sections 23/26	Near Upstream End	47.09%	83.80%	95.23%

2005 Dissolved Oxygen Monitoring			
	Sections 5-8	Sections 15-16	Sections 23-26
Percentage of Readings >7 mg.L	53.86%	85.18%	62.49%
Percentage of Readings >5 mg.L	98.14%	98.89%	99.92%

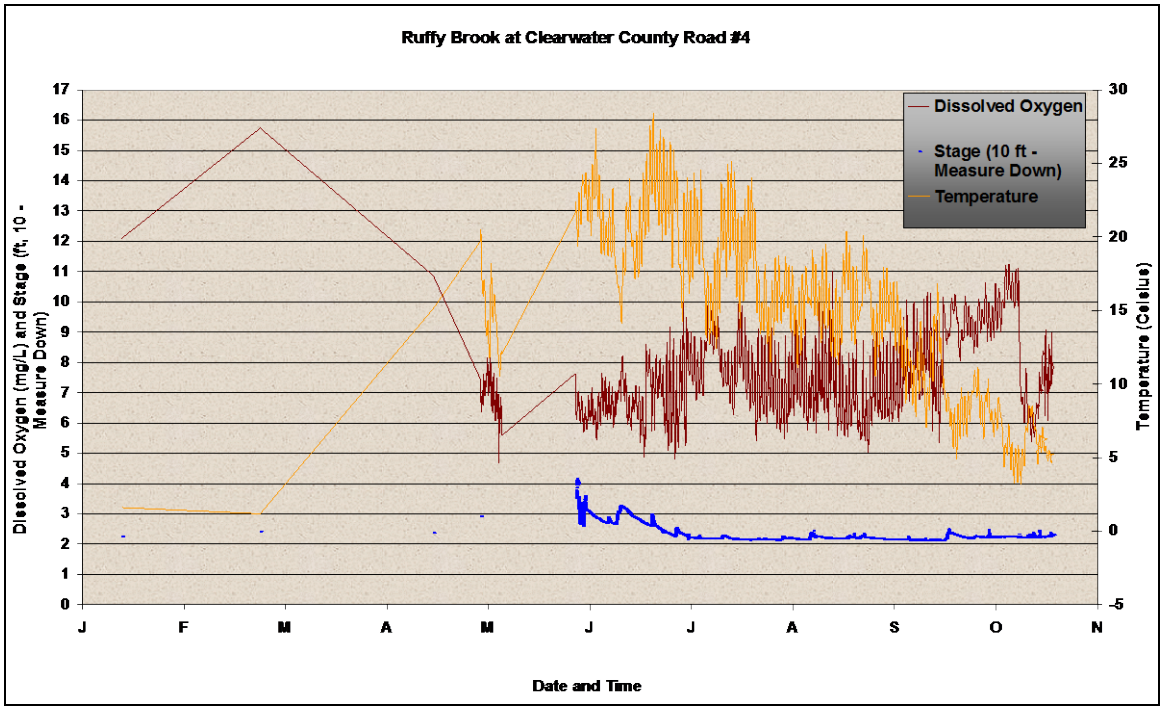

Figure 2. 2005 Monitoring at CR #4 (Upstream Site)

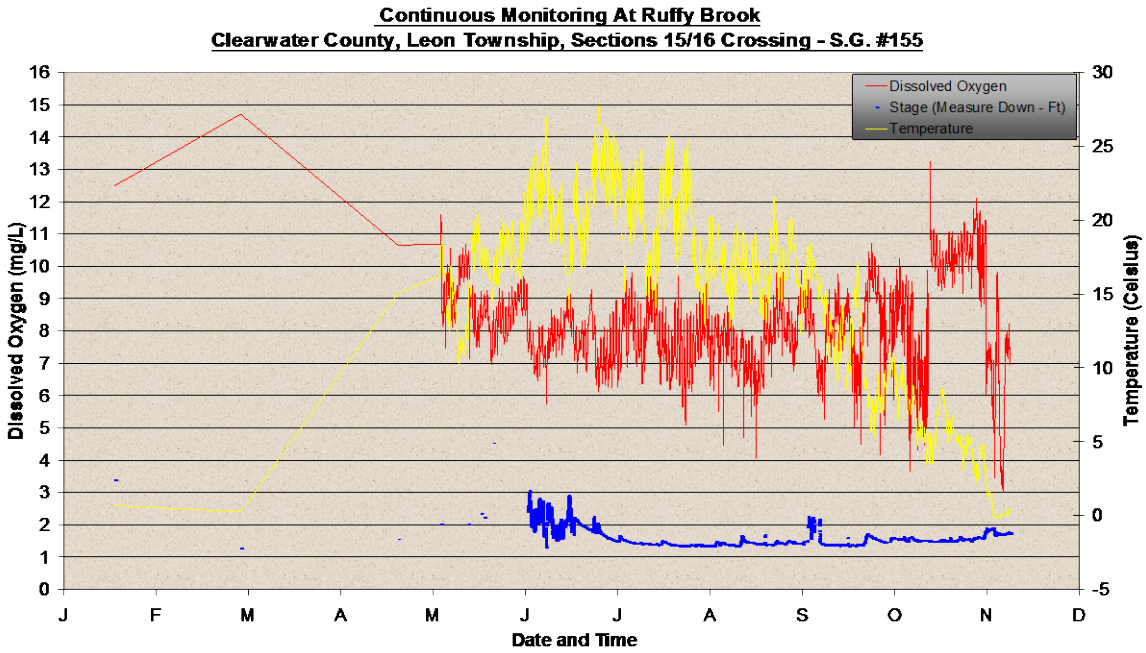

Figure 3. 2005 Monitoring at the Section 15-16 Crossing (Middle of Reach)

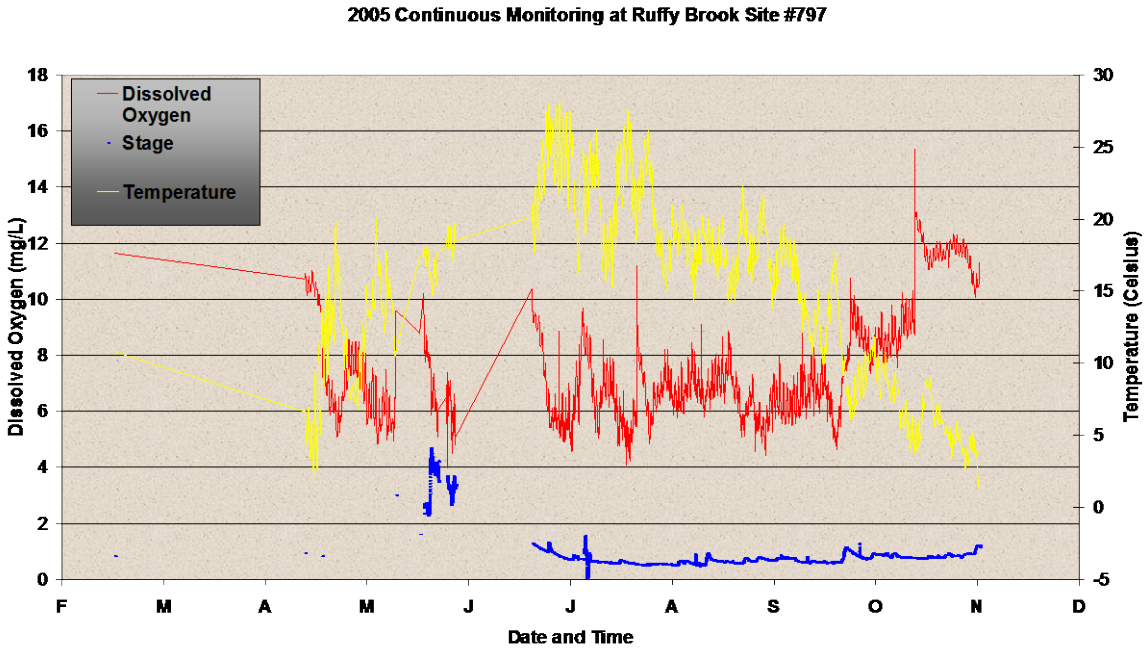

Figure 4. 2005 Monitoring at Stream Gage # 797 (Downstream Site & Sect. 5/8 Crossing)

Ruffy Brook Trout Stream Reach
Dissolved Oxygen Readings
February 3, 2005

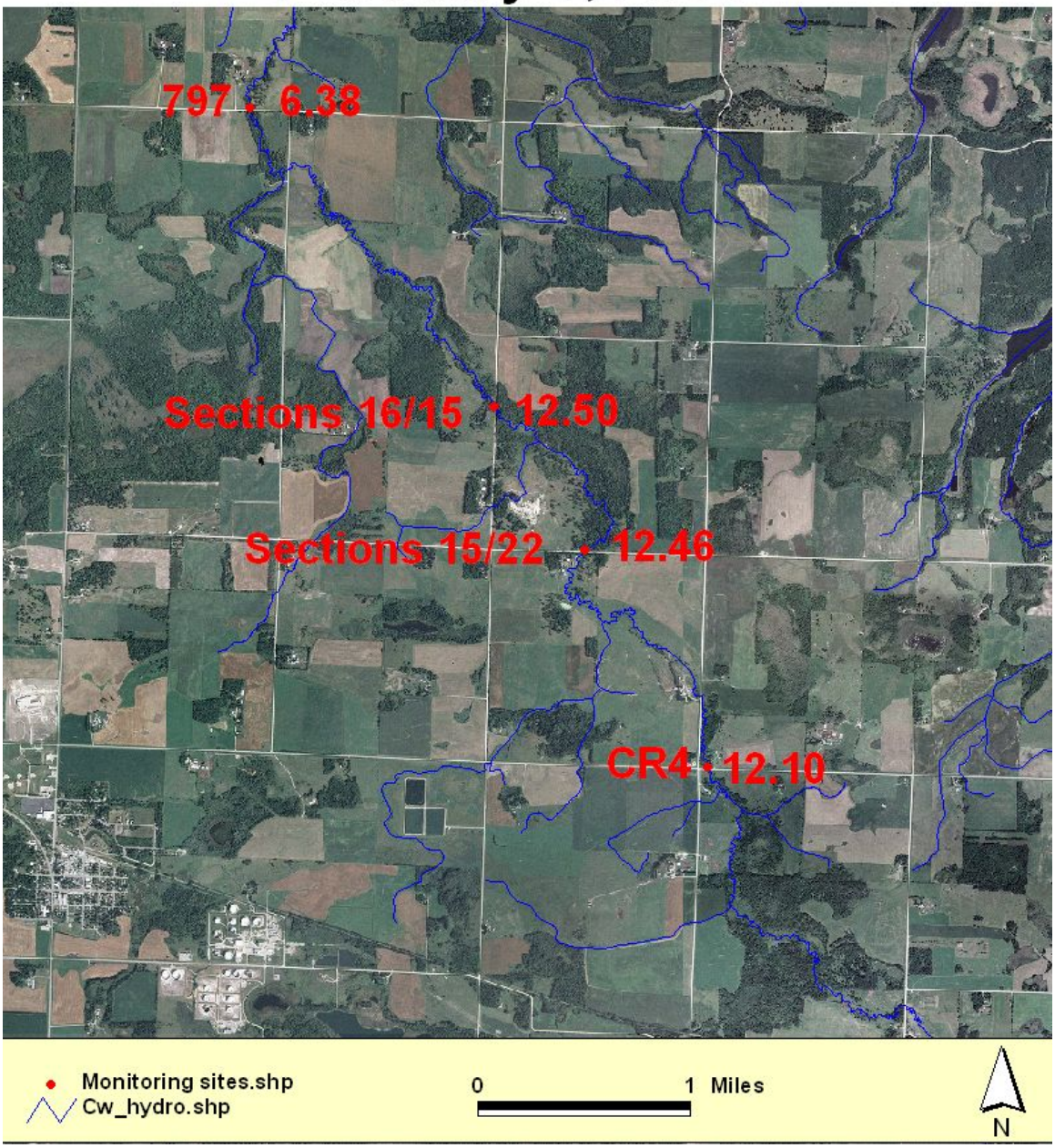

Figure 5. Snapshot monitoring in the winter of 2005.

Stream classification survey work was completed at the Bonik (pastured) site in early November. Conflicts with deer hunting prevented the completion of further work.

2006 Monitoring

More stream gaging needs to be conducted during high flows to get better rating curves. Stilling wells should be mounted higher (6-10 inches) within the water column than they were in 2005 to avoid sedimentation around the sensors on the multiparameter probes. Stream classification survey work will need to be completed at the reference site and the site downstream of the Section 15/16 crossing that will be used as a before-and-after site.