Silver Creek Interim Project Report
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Project Summary & Recommendations

A second year of monitoring should be done in 2012 to complete an evaluation of Silver Creek. The monitoring of one year of fish, and qualitative habitat during 2011 indicates the stream condition appears to be in good to excellent condition, and does support fish and aquatic life. Recommendations are to repeat the fish IBI in year 2012, as well as sample quantitative habitat, rather than qualitative habitat at two sites. Sauk County has agreed to cooperate on the project and collect macroinvertebrates to be analyzed by UW-Superior.

Water quality Continuous data from YSI sondes and from instantaneous sampling indicates that water temperature, dissolved oxygen, pH and conductivity are at levels adequate to support cold and cool-cold transition fish species. An additional water chemistry sampling just for the May sample that was missed in 2011, is recommended for phosphorus and suspended solids, since these parameters were listed as impairment pollutants in Silver Creek. Since this was included in the 2011 proposal, no funding is necessary to complete water chemistry sampling. Monitoring for other water chemistry parameters is not recommended, since the levels of those parameters do not raise any red flags for other stream impairments. The monitoring proposed for 2012 would ensure that multiple lines of evidence are used prior to making a decision of whether or not it should be removed from the impaired waters list.

Introduction

Silver Creek is a 4.40 mile long perennial stream located in the Crossman Creek and Little Baraboo River watershed (LW23) in Sauk County. The stream natural community is cool (cold transition) headwater, and it flows into the Baraboo River west of the City of Reedsburg. It is listed as an impaired 303 (d) stream for low dissolved oxygen and degraded habitat with pollutants that include total phosphorus, sediment and total suspended solids. The stream condition based on a cursory fish monitoring done in 1998 and a qualitative habitat assessment done in 2001, was rated as poor. A study of Silver Creek began in June, 2011 with phase two of monitoring proposed to continue into 2012 and a final report written in 2013.

Study Sites and Methods

Two sites were chosen for monitoring during 2011; one at Kinnamann Road and another at Schuette Road (Table 1). Sites were sampled for fish indices of biotic integrity (FIBI), qualitative habitat, macroinvertebrate indices of biotic integrity (MIBI). The cool (cold) fish IBI score was used in the evaluation, based on cold stream temperatures documented at both locations and because most fish sampled were transitional cool to warm species. Water quality was collected from both sites using YSI 600 XLM sondes by Serge Koenig of Sauk County while instantaneous water quality was collected by DNR staff using a YSI 556 multi-meter, to collect temperature, dissolved oxygen, pH, and conductivity side

by side with water chemistry collections. Sondes were set for approximately one week periods in June and July at each site. Water chemistry was collected between June-October from both sites for the following parameters: total phosphorus and total suspended solids (monthly); and ammonia-nitrogen, nitrate-nitrite, kjeldahl nitrogen, and ortho-phosphate only once in July. Macroinvertebrate analyses have not yet been completed so are not included in this interim report, but will be included in the final report.

Table 1. Location of sites sampled in Silver Creek

Stream	WBIC	Station Name	Swims Station ID	Date Sampling Start
Silver Creek	1280000	SILVER CR. KINNAMANN RD.	10033674	06/06/2011
Silver Creek	1280000	SILVER CR. SCHUETTE RD.	10033676	06/06/2011

Fish IBI and Qualitative Habitat Results

Most fish collected during sampling at both sites were transitional cool to cool-warm, but some species collected from the downstream site at Schuette Road were warm water species. Fish IBI ratings were good, with a scores of 70 and 80 at Kinnimann and Schuette Roads, respectively (Figure 2). Schuette Road likely had a slightly higher score likely due to the influence of fish migrating up from the Baraboo river and into this stream reach. Qualitative habitat was excellent at Kinnamann Road, and good at Schuette Road (Figure 2).

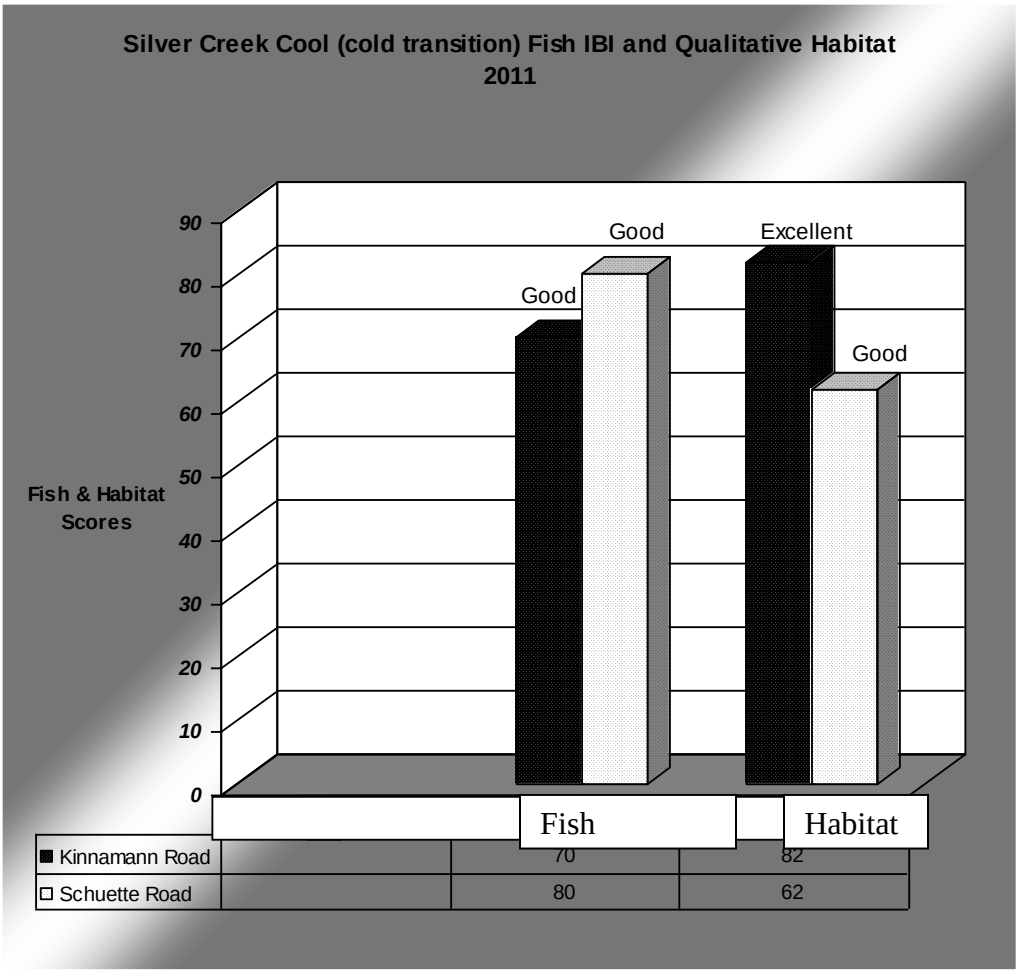

Figure 2. Fish IBI and qualitative habitat scores for both sites in Silver Creek.

Water Quality

Data were compiled from the YSI 600 XLM sondes at each site. The maximum daily mean water temperature of Silver Creek was similar between sites and never exceeded a temperature of 19.9 degrees C. Water temperature was below the 22 degrees celcius (72 degrees F), required for a cold water stream. This indicates the presence of springs, and that temperature during the summer months is adequate to support cold-cool water fish species. Minimum dissolved oxygen (DO) for both Silver Creek sites never fell below 8.5 mg/l, well above the minimum daily mean of 5.0 necessary to support fish and aquatic life. Diurnal swings in DO were evident but swings were small. The percent saturated oxygen levels were within a range of 80-120%, averaging around 100%; indicating the stream is not overly productive or having excessive plant or algae growth. pH levels for both sites ranged from 7.6 – 7.9 su, and well within the acceptable pH range, and conductivity ranged from 343-396, and was within the same range of values found for long term trend sites in this region of the state.

Water Chemistry Results

Stream flow collected at each site during baseflow water levels indicated flows were adequate to support forage fish at Kinnamann Road, and both forage and larger fish at

Schuette Road. Water chemistry was collected five times during spring to fall, with the first sample in spring collected just after a rain event of 0.36".

The median value for total suspended solids (TSS) was low at Kinnamann Road, compared to the value at Schuette Road, although both median values can be considered low. The median values were 3 mg/l at Kinnamann Road and 25 mg/l at Schuette Road. The low TSS at Kinnamann Road reflects lower levels of agricultural runoff, while at Schuette Road, the higher values indicate more agricultural runoff (Figure 3). The highest TSS occurred at Schuette Road after the spring rain event.

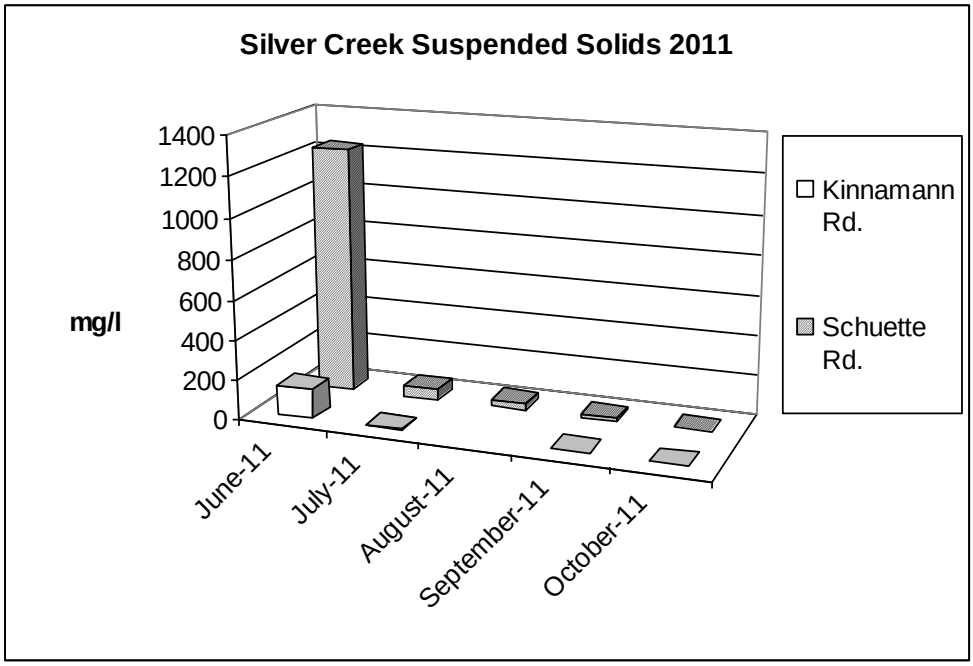

Figure 3. Silver Creek total suspended solids by date and location

Median phosphorus values were 0.085 mg/l at Kinnamann Road (Figure 4), and 0.123mg/l at Schuette Road (Figure 5), but without a May sample, it cannot be determined if the stream meets the phosphorus criterion of 75 ug/l. The highest values occurred when the sample was collected immediately after the spring rain event (Figure 4), but even if that event were removed from the data set median concentrations would still be above the 75 ug/l.

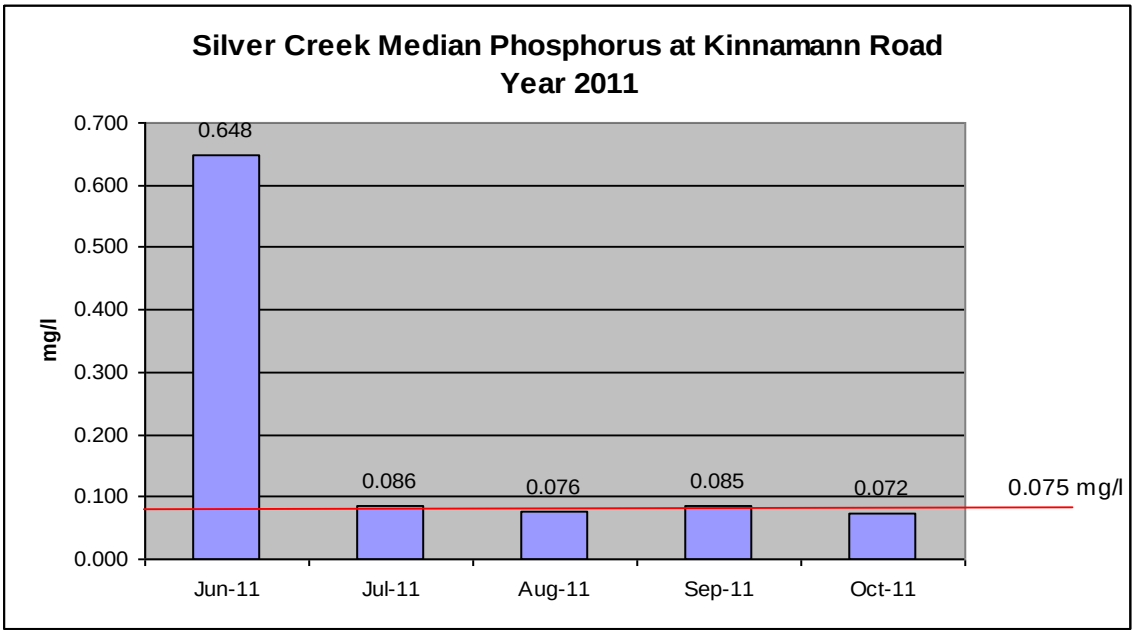

Figure 4. Phosphorus concentrations at Kinnaman Road

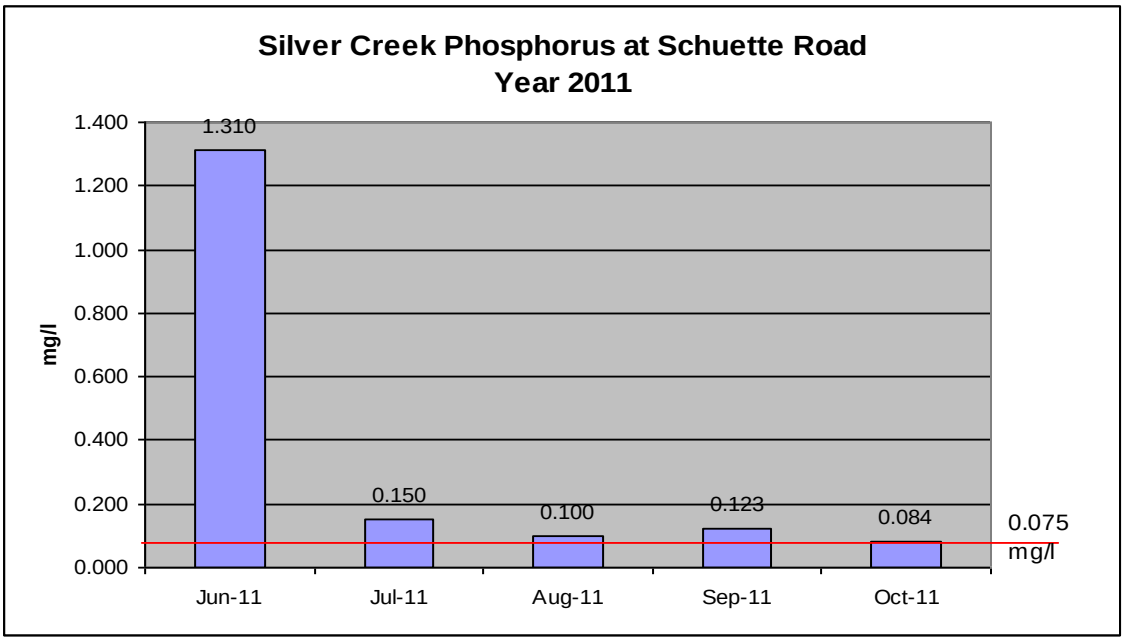

Figure 5. Phosphorus concentrations at Schuette Road.

A single collection of Ammonia nitrogen, nitrate-nitrite, Kjeldahl, and orthophospates were collected at each site during the July sample period. Ammonia levels were low and similar between sites, with levels of 0.02 mg/l at Kinnamann Road, and 0.03 mg/l at Schuetter Road. Kjehldahl nitrogen was non-detectable at Kinnamann Road, and fairly low at 0.51 mg/l at Schuette Road, indicating nitrogen coming from agricultural sources was relatively low. Orthophosphates were low and the same for both sites at 0.07 mg/l, indicating that phosphorus in the form most readily available for uptake by aquatic plants

and algae is low. Nitrate-nitrites were slightly elevated at both sites in July, with a higher nitrate-nitrite of 2.09 mg/l at Kinnamann Road nearest the headwaters, while at Schuette Road nitrate-nitrite was 1.42 mg/l. We have documented higher nitrate-nitrite levels in the headwaters of other streams in the driftless area. The source of nitrate-nitrite is from nitrogen leaching from the soil surface to where it converts to nitrate-nitrite in groundwater that flows into the surface water.

Macroinvertebrate Evaluation

Macroinvertebrate evaluations have not yet come back from UW-Stevens Point. Sauk County collected macroinvertebrates during November 2011 Kinnamann Road. And Schuette Road. Average Hilsenhoff values were good (some organic pollution suspected) at both Kinnamann Road and Schuette Road were 4.56 and 4.73, respectively.