

Water Quality Report for Deer Creek at Hwy. 13

Deer Creek at Hwy. 13 is a tributary to the White River in an area characterized by clay soils and agriculture land use. Deer Creek does not have a trout stream* or water classification** by the State of Wisconsin. Deer Creek would likely be considered under the more general category of Wisconsin streams known as a “warmwater sport fish community.” This doesn’t mean that Deer Creek can be degraded, it just means that the stream has either not been evaluated or does not meet the criteria as one of Wisconsin’s highest quality waters. BRWA volunteer data collected from this site will help establish baseline conditions and assist in determining whether applicable water quality standards are being met.

Sampling at this site began very recently (2009) and not enough data have been collected for an assessment of baseline conditions. However, enough data are available to get a preliminary look at water quality conditions. The following is a summary of available BRWA volunteer data from Deer Creek at Hwy. 13. We will be presenting these data compared to other volunteer data in the Bad River Watershed at a public meeting later in 2011.

<p>*Trout Stream Classification (State of Wisconsin) Class 1: Highest quality trout waters. No stocking needed to maintain populations. Class 2: Some natural reproduction, but stocking is needed to maintain a desirable sport fishery. Class 3: No natural reproduction. Populations maintained by stocking.</p>	<p>Brook Trout <i>Salvelinus fontinalis</i></p>
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<p>**Water Classification Wisconsin’s highest quality surface waters are classified as: Outstanding Resource Waters (ORW): Highest quality waters, typically no human point sources of pollution exist, no changes in baseline water quality allowed. Exceptional Resource Waters (ERW): Similar to ORW but some human point sources of pollution exist. No changes in baseline water quality allowed.</p>

Water Chemistry Data Summary

Water chemistry results are summarized into seasonal averages and overall averages. No winter data have been collected at this site. The standard deviation (std. dev.) gives an idea of how much the results vary from the reported averages. The nutrient data are summarized into the percentage of total samples that exceeded the surface water benchmarks BRWA uses to evaluate these data. A description of results for each parameter and overall summary is included. Keep in mind that this isn’t a full baseline assessment at this site because there are only about 1.5 years of data available as of December 2010. If you would like more detail on how we summarize the data, please contact Matt at (715) 682-2661.

pH: A measurement of water acidity. A pH of 7.0 is neutral. pH affects what type of organisms can live in a stream. State of Wisconsin criteria indicate natural waters must maintain a pH between 6.0 and 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum. pH at this site has remained within the Wisconsin criteria to date, indicating good water quality.

Dissolved Oxygen: Dissolved oxygen (DO), which is critical for sustaining aquatic life, is a gas found in water. State of Wisconsin criteria states that DO content in surface waters listed as a “warmwater sport fish community” may not be artificially lowered to less than 5.0 mg/L at any time. To date, DO at this site has remained above 8.0 mg/L, indicating good water quality, although data have not been collected in winter. This site may freeze to the bottom and therefore be uninhabitable to fish during winter.

Chloride and Turbidity: Chloride is a measure of salt in water. It occurs naturally but can also indicate human influences from things such as failing septic systems, road salt use, and agricultural runoff. Turbidity is a measure of sediment suspended in water, indicating areas where erosion may be a

problem. Wisconsin’s chronic toxicity criterion for chloride is 395 mg/L. There is currently no criterion for turbidity. BRWA monitoring will establish baselines for both parameters from which future data can be compared.

Chloride has not been particularly elevated at this site, but some turbidity results have been high compared to other Bad River watershed sites. These higher values seem to be associated with rain events and indicate there may be sources of erosion upstream in Deer Creek.

Nutrients: Phosphate and nitrate are nutrients critical for plant growth and occur naturally in water. Elevated nutrients may indicate pollution such as agricultural runoff, failing septic systems, and storm water runoff. Until criteria for Wisconsin’s Lake Superior region are developed, BRWA compares its data to U.S. Geological Survey (USGS) surface water benchmarks for phosphate (0.1 mg/L) and nitrate (1.0 mg/L). These benchmarks are not regulatory criteria, but they provide an indication of where nutrients may be a problem. By looking at the percent of sample events where the benchmarks are exceeded, BRWA can determine where testing with more sensitive methods may be needed.

Both phosphate and nitrate have occasionally been detected above the benchmark, but not enough data exist to determine whether there may be a problem.

Table 1. *Water chemistry results for Deer Creek at Hwy. 13. Data are summarized by season and an overall average for all available data at this site.*

Season*	Site	# samples	pH	Std. Dev.	Dissolved Oxygen (mg/L)	Std. Dev.	Turbidity (JTU)	Std. Dev.	Chloride (mg/L)	Std. Dev.	Phosphate % of samples >0.1	Nitrate % of samples >1.0
Spring	Deer Cr. at Hwy. 13	3	7.5	0.7	11	1.4	42.3	42.1	11	3.6		
Summer	Deer Cr. at Hwy. 13	4	7.8	0	8.5	0.5	31.3	18	11.8	2.9		
Fall	Deer Cr. at Hwy. 13	6	7.7	0.5	10.5	1.5	33.1	29.9	12	2.5		
Winter	Deer Cr. at Hwy. 13	0										
Average	Deer Cr. at Hwy. 13	13	7.7	0.4	10	1.6	34.7	27.7	11.7	2.7	23%	8%

*Seasons are defined as follows: *Spring* = March, April, May; *Summer* = June, July, August; *Fall* = September, October, November; *Winter* = December, January, February; *Average* = average of all samples collected.

Macroinvertebrate Data Summary

Macroinvertebrates (different types of aquatic bugs) provide important long term information about water quality in a stream because they typically spend a large part of their lives in the water and differ in their tolerance to pollution. The types of macroinvertebrates found at a site are translated into a score called the Hilsenhoff Family Biotic Index (HFBI), which allows us to interpret the macroinvertebrate data and get an idea of water quality at the site. The HFBI score can range between 0 and 10, with lower scores indicating the best water quality.

One sample has been collected from this site (spring of 2009) and it scored an HFBI of 5.8. This indicates water quality is “Fairly Poor” at this site.

E. coli Data Summary

Escherichia coli (*E. coli*) are a type of fecal coliform bacteria found in the intestines of all warm-blooded animals, including humans. The presence of *E. coli* in water may indicate contamination from sewage or animal waste. During rain events or snow melts, *E. coli* may be washed into streams. BRWA compares its *E. coli* data to the United States Environmental Protection Agency (EPA) criterion of 235 CFU/100mL

(colony forming units per 100 mL). Colony counts above this number may indicate water that is unsafe for drinking and swimming.

A total of 15 *E. coli* samples were collected from this site in 2007, 2009, and 2010. Overall, seven of the samples exceeded EPA's criterion. Six samples were taken during or following a rain event and four of these were above EPA's criterion, with the highest one being over 10 times greater than the criterion. Frequent elevated *E. coli* counts at this site indicate potential human and/or livestock waste pollution sources upstream of this site.

Conclusion

Available water chemistry, macroinvertebrate, and *E. coli* data from this site indicate that erosion and pollution sources of human and/or livestock waste are occurring upstream and degrading water quality. In particular, almost half of the *E. coli* samples collected from this site have exceeded EPA's criterion indicating water unlikely to be safe for swimming or drinking. Additional monitoring upstream of this site could help identify pollution and erosion sources to Deer Creek.

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