

Water Quality Report for the White River at Hwy. 13

The White River at Hwy. 13 is listed as a Class II trout stream* and has an Exceptional Resource Water classification** by the State of Wisconsin. These classifications identify the White River at this location as one of Wisconsin's highest quality waters, with no changes in baseline water quality allowed. The data collected from this site will help establish those baseline conditions.

Through December 2010, BRWA volunteers have collected 15 water chemistry, 7 macroinvertebrate, and 14 *E. coli* samples collected over parts of five years. The first BRWA water chemistry sample from this site occurred in July of 2009, the first macroinvertebrate sample in the fall of 2005, and the first *E. coli* sample in June of 2007. This has enough macroinvertebrate data during the spring season to meet BRWA's objective of at least four years of baseline data, but needs another two years of water chemistry data to have enough data for a full baseline assessment. This site has *E. coli* samples collected from three different summer seasons, providing a good snapshot of whether this parameter may be of concern here. The following is a summary of available BRWA volunteer data from the White River 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. 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. DO concentration is especially important to the success of trout spawning, because trout eggs need well oxygenated water to survive. State of Wisconsin criteria states that DO content in surface waters listed as Class II trout streams may not be artificially lowered to less than 6.0 mg/L at any time nor less than 7.0 mg/L during trout spawning season (typically fall). To date, DO at this site has remained above 8.0 mg/L, indicating good water quality and favorable conditions for trout & trout spawning.

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 consistently been low at this site. Turbidity has been variable to date, but has generally been higher than what we typically see from sites further up in the watershed. We often see elevated turbidity at sites like this one on the Lake Superior clay plain. The results indicate sources of erosion upstream, some of which are natural and some related to human activities. BRWA is working with partners on further understanding erosion and sedimentation issues in the Bad River watershed and determining where actions could occur to reduce them.

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.

Phosphate has occasionally been detected above the benchmark, but not enough data exist to determine whether there may be a problem. Nitrate has not been detected to date.

Table 1. *Water chemistry results for the White River 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	White at Hwy. 13	3	7.4	0.6	10.4	2.2	23.0	23.5	5.3	2.3		
Summer	White at Hwy. 13	5	7.8	0.0	8.2	0.7	15.1	3.0	5.2	1.8		
Fall	White at Hwy. 13	6	7.8	0.4	10.2	1.4	19.1	15.8	5.3	1.6		
Winter	White at Hwy. 13	1	7.0		10.2		7.0		6.0			
Average	White at Hwy. 13	15	7.7	0.4	9.5	1.6	17.7	13.7	5.3	1.6	13%	0%

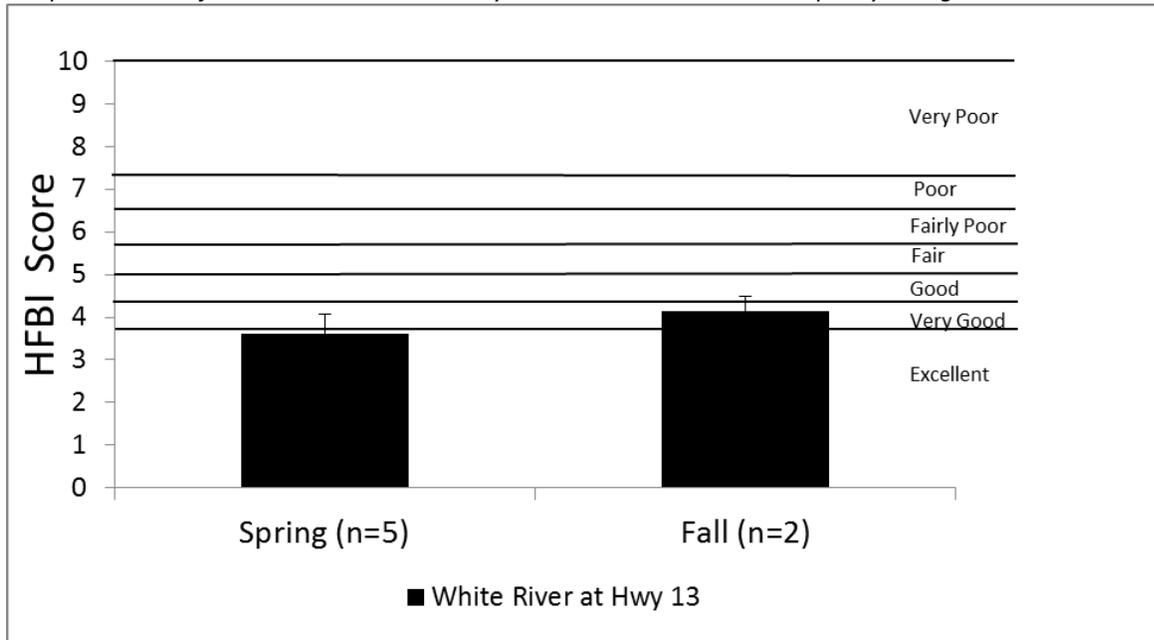
*Seasons are defined as follows: *Spring* = March, April, May; *Summer* = June, July, August; *Fall* = September, October, November; *Winter* = December, January, February; *Average* = average of all samples collected.

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.

The average HFBI of the five spring samples was 3.6, indicating “Excellent” to “Very Good” water quality. The two fall samples averaged 4.1, indicating “Very Good” to “Good” water quality (Graph 1).

Graph 1. Average Hilsenhoff Family Biotic Index (HFBI, with one standard deviation) scores for macroinvertebrate samples collected from the White River at Hwy. 13 lines indicate the water quality rating scores used in the HFBI.



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 14 *E. coli* samples were collected from this site in 2007, 2009, and 2010. Four samples were taken during or following a rain event, with one of these above EPA’s criterion. All other samples were below the criterion, indicating that overall; *E. coli* does not appear to be a problem at this site.

Conclusion

Another two years of water chemistry data will help establish a full baseline at this site. Elevated turbidity at measured thus far is not surprising given the location of this and the nature of erosion and sedimentation issues in the Bad River Watershed. BRWA is working with partners to further investigate this issue. Overall, BRWA volunteer data to date indicates that the White River at Hwy. 13 has good water quality and is meeting standards for its designation as a Class II trout stream and an Exceptional Resource Water.

Thanks to volunteers that collected data at this site: Dr. Andy Goyke and his classes, Cathy Zimmerman, Miles Falck, Tracey Ledder, and Eleanore Falck.