Water Quality Report for the White River at Bibon Rd.

The White River at Bibon Rd. 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. Future monitoring can be compared to this baseline to see if changes are occurring and whether action may be needed to address pollution sources.

*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.
Brook Trout *Salvelinus fontinalis*

Through December 2010, BRWA volunteers have collected 66 water chemistry, one macroinvertebrate, and three *E. coli* samples over parts of eight years. The first BRWA water chemistry sample from this site occurred on 10/23/2002, making it one of BRWA's original and longest-monitored sites. This site has more than enough data to meet BRWA's objective of at least four years of baseline data for water chemistry. In fact, data are available from

**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.

parts of four additional years to compare to the baseline data. The following are water chemistry, macroinvertebrate, and *E. coli* data summaries for the White River at Bibon Rd. using data through December 2010. We will be presenting Bibon Rd. data compared to other volunteer data in the Bad River Watershed at a public meeting later in 2011.

Water Chemistry Data Summary

Water chemistry results are summarized for both the four- year baseline period ("Bibon Rd. Baseline") and the additional 3 years of available data ("Bibon Rd. Plus"). They 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. If you would like more detail on how we calculate baseline, 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 remained very consistent between 7.0 and 7.5 across seasons. The results consistently met Wisconsin criteria, 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). On average, this site met these

criteria, indicating that overall, this site has good water quality. Occasional detections of DO below 6.0 mg/L during the summer months is something to keep an eye on at this site because prolonged low DO levels could present a problem for trout populations.

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.

Overall, both turbidity and chloride were variable at this site and higher values were not necessarily related to each other or to rain events. The high average number for chloride in the fall of the "Bibon Rd. Plus" data is the result of one sample being much greater than the others. During the baseline period, turbidity was greater in spring, on average, than the other seasons. Spring runoff and rain events are times when we often see water quality impacts in the Bad River Watershed. Further investigation of these parameters during spring runoff and rain events may shed more light on whether there are potential sources of erosion or pollution upstream of this site that should be addressed.

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.

Nutrients were very rarely detected and do not appear to be a problem at this site.

Table 1. *Water chemistry results for the White River at Bibon Rd. Data are summarized by season and an overall average for the first four years of data (Bibon Rd. Baseline) and an additional three years of data beyond the baseline period (Bibon Rd. Plus).*

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	Bibon Rd. Baseline	11	7.0	0.5	10.4	1.0	17.4	17.6	9.1	10.8		
Summer	Bibon Rd. Baseline	10	7.4	0.4	7.3	0.9	15.0	4.7	12.6	17.2		
Fall	Bibon Rd. Baseline	11	7.5	0.5	9.4	1.2	10.2	6.2	9.1	6.4		
Winter	Bibon Rd. Baseline	11	7.2	0.3	11.3	0.7	10.7	5.8	7.1	3.7		
Average	**Bibon Rd. Baseline**	**43**	**7.1**	**1.1**	**9.3**	**2.2**	**13.3**	**10.4**	**9.6**	**10.4**	**5%**	**5%**
Spring	Bibon Rd. Plus	7	7.4	0.3	9.4	1.0	10.0	3.5	7.7	3.4		
Summer	Bibon Rd. Plus	5	7.4	0.4	6.7	2.1	11.5	8.2	7.2	3.3		
Fall	Bibon Rd. Plus	5	7.2	0.4	9.2	2.2	14.5	11.1	34.8	64.4		
Winter	Bibon Rd. Plus	6	7.3	0.2	10.3	1.6	5.5	2.3	6.2	2.4		
Average	**Bibon Rd. Plus**	**23**	**7.3**	**0.3**	**8.9**	**2.1**	**10.1**	**7.2**	**13.1**	**30.0**	**0%**	**9%**

*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.

Only one sample has been collected from this site during spring of 2003. The score was 4.4, which indicates "Good" water quality. Because this site isn't ideal for determining the HFBI, BRWA's technical committee recently recommended a better site for collecting macroinvertebrates would be at the Mason Town Park in Mason, just downstream of Bibon Rd.

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 five *E. coli* samples were collected from this site in 2006, 2007, and 2008. One sample was identified as taken during or following a rain event. This sample was above EPA's criterion. All other samples were below EPA's criterion. Any *E. coli* counts at this location are more likely due to wildlife populations because the site is directly downstream of the Bibon Swamp and there is little human influence upstream. High *E. coli* counts have been documented more frequently downstream of this site, and future *E. coli* monitoring should focus on these areas.

Conclusion

BRWA volunteer data indicates that overall, the White River at Bibon Rd. currently has good water quality. A combination of occasional low DO levels in summer, occasional spikes in chloride and turbidity, and one E. coli sample above EPA's criterion for safe water indicate some water quality concerns at this site. However its proximity to the Bibon Swamp is more likely influencing results rather than any human influence. Continued monitoring of the White River at this and other locations will help us better understand water quality in this river and whether any human influences on water quality may need to be addressed.

Thanks to volunteers that collected data at this site: Tracey Ledder, Eleanore Falck, Matti Gurney, Doug Kreiner, Stephanie Warnement, Mary Hammerbeck, Plinio Beres, Jack Wichita, Scott Bagley, Rachel Orwan, Jenna Scheub, Nancy Larson, Micheal McCutcheon, Michele Wheeler, Bob Rice, Rachel Coughtry, Caleb Coughtry-Carpenter, and Gabe Coughtry-Carpenter.