

## Water Quality Report for the Potato River at Upson

The Potato River at Upson is listed as a Class II trout stream\* and has an Outstanding Resource Water classification\*\* by the State of Wisconsin. These classifications identify the Potato 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*

The Potato River at Upson has a total of 62 water chemistry, and four macroinvertebrate samples collected over six years. The first BRWA water chemistry sample from this site occurred on 1/5/2005 and the first macroinvertebrate sample in the spring of 2006. This site has more than enough data to meet BRWA's objective of at least four years of baseline data for water chemistry. At least one more spring macroinvertebrate sample should be collected at this site to have enough data for a baseline macroinvertebrate assessment. The following are water chemistry and macroinvertebrate data summaries for the Potato River at Upson using data through 2010. We will be presenting these data compared to other volunteer data in the Bad River Watershed at a public meeting later in 2011.

### **\*\*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.

## Water Chemistry Data Summary

Water chemistry results are summarized for both the four-year baseline period ("Upson Baseline") and an additional two years of available data ("Upson 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 around 7.0 across seasons and between the baseline and newer results. 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). This site had very good DO levels, consistently averaging greater than 7.0mg/L over the entire data record. This indicates 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. Both chloride and turbidity were consistently very low at this site, indicating erosion and human influences at this site are very low.

**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 Potato River at Upson. Data are summarized by season and an overall average for the first four years of data (Upson Baseline) and an additional two years of data beyond the baseline period (Upson 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	Upson Baseline	10	6.9	0.3	11.9	1.7	7.9	6.8	6.2	3.8		
Summer	Upson Baseline	12	7.4	0.6	8.6	0.7	6.6	6.3	11.8	5.0		
Fall	Upson Baseline	11	7.0	0.3	10.4	1.5	4.9	2.7	10.7	3.8		
Winter	Upson Baseline	11	7.0	0.2	13.1	0.9	4.4	1.1	8.7	5.0		
<b>Average</b>	Upson Baseline	44	7.1	0.4	10.9	2.1	5.9	4.9	9.5	4.8	0%	5%
Spring	Upson Plus	6	7.0	0.3	10.3	1.2	4.8	2.7	6.3	3.7		
Summer	Upson Plus	4	7.1	0.3	8.6	1.0	4.0	1.2	7.5	4.1		
Fall	Upson Plus	5	6.9	0.2	10.5	0.9	4.4	1.9	8.0	4.0		
Winter	Upson Plus	3	6.9	0.1	10.9	4.1	2.8	0.3	5.3	3.1		
<b>Average</b>	Upson Plus	18	6.9	0.3	10.1	1.9	4.2	1.9	6.9	3.6	6%	0%

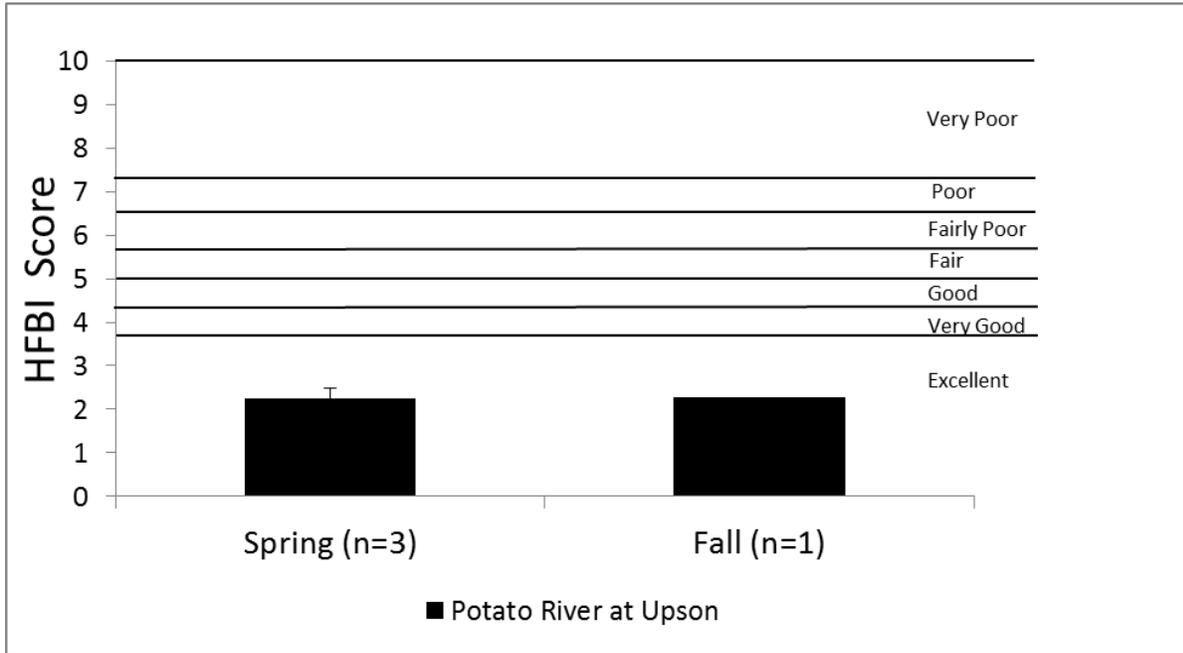
\*Seasons are defined as follows: *Spring* = March, April, May; *Summer* = June, July, August; *Fall* = September, October, November; *Winter* = December, January, February; *Average* = average of all samples collected.

## **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.

Three spring and one fall sample have been collected over three years at this site. At least one more spring sample should be collected to complete a four-year baseline. To date, the average HFBI of the three spring samples was 2.2 and the one fall sample scored 2.3, both indicating “Excellent” water quality (Graph 1).

Graph 1. Average Hilsenhoff Family Biotic Index (HFBI, with one standard deviation) scores for spring and fall macroinvertebrate samples collected from the Potato River at Upson. The lines indicate the water quality rating scores used in the HFBI.



**Conclusion**

BRWA volunteer data indicates that the Potato River at Upson currently has good water quality and is meeting or exceeding standards for its designation as a Class II trout stream based on the water chemistry and macroinvertebrate parameters. Baseline water quality conditions and the additional data collected at this site provide a reference to ensure this river continues to meet its designation as an Outstanding Resource Water by the State of Wisconsin.

Thanks to volunteers that collected data at this site: Dr. Andy Goyke and his students, Mike Trieschmann, John Franke, Tana Turonie, Plinio Beres, Heather Palmquist and MaryJo Gingras.