




Water Quality Report for Brunsweler River at Hwy. C

The Brunsweler River is listed as a Class III trout stream* and has an Outstanding Resource Water classification** by the State of Wisconsin. These classifications identify the Brunsweler River at this location as one of Wisconsin’s highest quality waters, with no changes in baseline water quality due to discharges allowed except under permit if needed for economic or social wellbeing.

Bad River Watershed Association (BRWA) volunteers have collected 90 water chemistry and 14 macroinvertebrate samples over the past nine years from the Brunsweler River at Hwy. C. This site has more than enough data to meet BRWA’s objective of at least four years of baseline data for water chemistry and macroinvertebrates. The following are water chemistry and macroinvertebrate summaries for the Brunsweler River at Hwy. C using data through 2011. 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)	
<p>Class 1: Highest quality trout waters. No stocking needed to maintain populations.</p> <p>Class 2: Some natural reproduction, but stocking is needed to maintain a desirable sport fishery.</p> <p>Class 3: No natural reproduction. Populations maintained by stocking.</p>	 Brook Trout <i>Salvelinus fontinalis</i>

**Water Classification
<p>Wisconsin’s highest quality surface waters are classified as:</p> <p>Outstanding Resource Waters (ORW): Highest quality waters, typically no human point sources of pollution exist, no changes in baseline water quality allowed.</p> <p>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 for both the four- year baseline period (“Brunsweler Baseline”) and an additional five years of available data (“Brunsweler 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. A description of results for each parameter and overall summary is included.

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 dictate that 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 allowed due to a discharge. The pH of the Brunsweler River at Hwy. C 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 oxygen gas dissolved 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 dictate that DO content in surface waters listed as Class III 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 consistently averaged well above 7.0 mg/L over the entire data record, indicating favorable conditions for trout and 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 impediment of light into water. Turbidity may be caused by natural color or sediment suspended in water, which may indicate 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. Both chloride and turbidity were consistently very low at this site.

Table 1. Water chemistry results for the Brunswailer River at Hwy. C. Data are summarized by season and an overall average for the first four years of data (Brunswailer Baseline) and an additional five years of data beyond the baseline period (Brunswailer Plus).

Season	Site	# of Samples	pH	St. Dev.	Dissolved O2(mg/L)	St. Dev.	Turbidity(JTU)	St. Dev.	Chloride(mg/L)	St. Dev.
Spring	Brunswailer Baseline	10	7.1	0.3	11.7	1.6	5.3	4.2	7.0	2.7
Summer	Brunswailer Baseline	11	7.3	0.3	7.6	0.3	2.5	0.0	6.0	1.8
Fall	Brunswailer Baseline	12	7.5	0.4	9.7	1.2	2.5	0.0	12.0	9.5
Winter	Brunswailer Baseline	10	7.2	0.2	12.7	0.7	2.5	0.0	6.0	2.8
Average	Brunswailer Baseline	43	7.3	0.2	10.4	2.3	3.2	1.4	7.8	2.9
Spring	Brunswailer Plus	11	7.0	0.3	10.1	1.4	4.7	3.6	6.0	2.2
Summer	Brunswailer Plus	12	7.5	0.6	7.6	1.4	3.8	2.5	6.0	2.3
Fall	Brunswailer Plus	12	7.2	0.3	9.0	1.4	3.7	1.9	6.0	2.1
Winter	Brunswailer Plus	12	7.1	0.3	11.9	1.6	5.1	3.6	7.0	2.2
Average	Brunswailer Plus	47	7.2	0.2	9.7	1.8	4.3	0.7	6.3	0.5

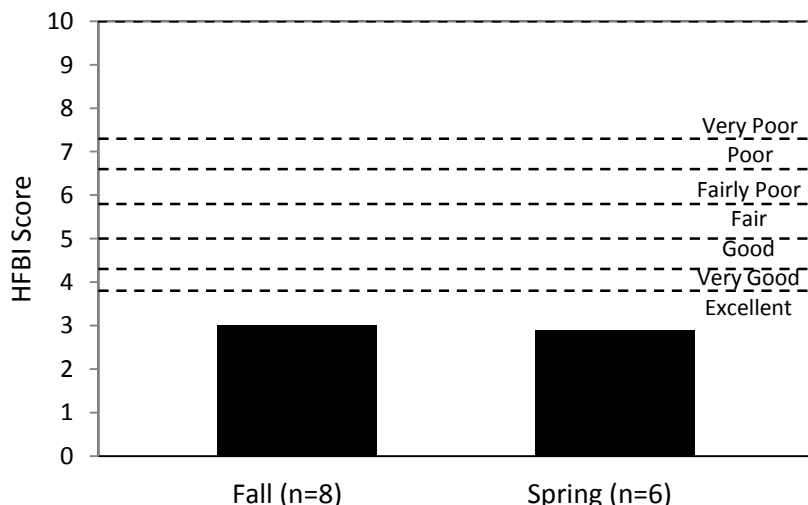
*Seasons are defined as follows: *Spring* = March, April, May; *Summer* = June, July, August; *Fall* = September, October, November; *Winter* = December, January, February; *Average* = average of all samples collected.

Macroinvertebrate Data Summary

Macroinvertebrates (aquatic insect larvae) 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 better water quality.

The average HFBI of six spring samples was 2.9, indicating “Excellent” water quality. For fall, the eight samples had an average of 3, indicating “Excellent” water quality (Graph 1).

Graph 1. Average Hilsenhoff Family Biotic Index (HFBI) scores for spring and fall macroinvertebrate samples collected from the Brunswailer River at Hwy. C. The lines indicate the water quality rating scores used in the HFBI. Index scores less than 3.8 indicate excellent water quality.



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 swimming.

Volunteers collected four *E. coli* samples from this site in 2007. All of the samples were taken during or following rain events, when counts would be expected to be highest. All samples were well below EPA's criterion, indicating good water quality.

Conclusion

BRWA volunteer water chemistry and macroinvertebrate data indicate that the Brunsweler River at Hwy. C currently has good water quality and is meeting its designated use as a Class III trout stream based on the water chemistry. BRWA's data support the State of Wisconsin's classification of "Outstanding Resource Water." Sampling will need to be continued in order to monitor the river's health.

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Picture credit: Kevin Brewster