



Water Quality Report for Long Lake Branch at Taylor Lane

The Long Lake Branch is listed as a Class I trout stream* and has an Outstanding Resource Water classification** by the State of Wisconsin. These classifications identify the Long Lake Branch 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.

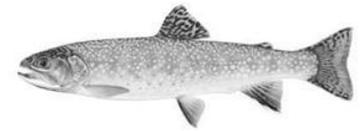
Bad River Watershed Association (BRWA) volunteers have collected 70 water chemistry and 14 macroinvertebrate samples over the past seven years from Long Lake Branch at Taylor Lane. This site has more than enough data to meet BRWA's objective of at least four years of baseline data for water chemistry and macroinvertebrates. The following are water chemistry and macroinvertebrate summaries for the Long Lake Branch at Taylor Lane using data through 2009. 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*

****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 ("Taylor Ln. Baseline") and an additional six years of available data ("Taylor Ln. 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. pH at the Long Lake Branch at Taylor Lane remained very consistent, around 7.8, 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 I 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 Long Lake Branch at Taylor Ln. Data are summarized by season and an overall average for the first four years of data (Taylor Ln. Baseline) and an additional three years of data beyond the baseline period (Taylor Ln. Plus).

Season	Site	# of Samples	pH	St. Dev.	Dissolved O2 (mg/L)	St. Dev.	Turbidity (JTU)	St. Dev.	Chloride (mg/L)	St. Dev.
Spring	Taylor Ln. Baseline	10	7.7	0.2	11.3	1.6	8.0	4.8	7.4	1.3
Summer	Taylor Ln. Baseline	12	7.8	0.1	9.1	0.6	7.1	6.1	7.3	1.6
Fall	Taylor Ln. Baseline	12	7.8	0.1	10.6	1.4	4.8	0.7	8.5	1.2
Winter	Taylor Ln. Baseline	10	7.8	0.1	12.4	0.8	6.2	3.4	7.2	1.7
Average	Taylor Ln. Baseline	42	7.8	0.1	10.9	1.1	6.5	3.8	7.6	1.5
Spring	Taylor Ln. Plus	7	7.7	0.2	11.3	0.9	10.0	7.6	8.0	0.0
Summer	Taylor Ln. Plus	10	7.8	0.1	9.2	0.4	6.5	3.2	8.0	0.0
Fall	Taylor Ln. Plus	7	7.8	0.0	10.1	1.0	11.4	10.2	8.0	0.0
Winter	Taylor Ln. Plus	4	7.8	0.1	12.4	0.7	10.6	4.2	8.0	0.0
Average	Taylor Ln. Plus	28	7.8	0.1	10.8	0.8	9.6	6.3	8.0	0.0

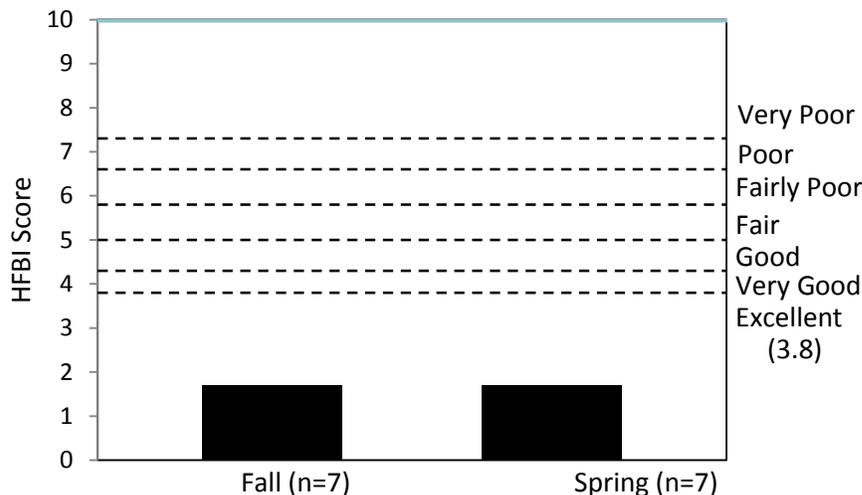
*Seasons are defined as follows: *Spring* = March, April, May; *Summer* = June, July, August; *Fall* = September, October, November; *Winter* = December, January, February; *Average* = average of all samples collected.

Macroinvertebrate Data Summary

Macroinvertebrates (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 seven spring samples was 1.7, indicating “Excellent” water quality. For the fall the seven samples averaged 1.7, again indicating “Excellent” water quality (Graph 1).

Graph 1. Average Hilsenhoff Family Biotic Index (HFBI) scores for spring and fall macroinvertebrate samples collected from the Long Lake Branch at Taylor Ln. The 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 swimming.

Volunteers collected 16 *E. coli* samples from this site in 2007 and 2009. 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 data indicate that the Long Lake Branch [of the White River] at Taylor Lane currently has good water quality and is meeting its designated use as a Class I trout stream based on the water chemistry. The macroinvertebrate data also indicate that the Long Lake Branch is in excellent condition. 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.

Acknowledgements

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Photo credit: Mariana Brewster-Brown