



## Water Quality Report for Tyler Forks at Will Road

The Tyler Forks River is listed as a Class II trout stream\* and has an Outstanding Resource Water classification\*\* by the State of Wisconsin. These classifications identify the Tyler Forks 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 100 water chemistry and seven macroinvertebrate samples over the past ten years from Tyler Forks at Will Road. This site has more than enough data to meet BRWA’s objective of at least four years of baseline data for water chemistry, but more samples are needed to meet the macroinvertebrate baseline. The following are water chemistry and macroinvertebrate data summaries for the Tyler Forks River at Will Road using data through 2013. 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 (“Tyler Forks Baseline”) and an additional six years of available data (“Tyler Forks 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 states 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 Tyler Forks at Will Road 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 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 consistently averaged well above 7.0 mg/L over the entire data record. This indicates 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 Tyler Forks at Will Road. Data are summarized by season and an overall average for the first four years of data (Tyler Forks Baseline) and an additional six years of data beyond the baseline period (Tyler Forks Plus).*

Season	Site	# Samples	pH	Std. Dev.	Dissolved O2 (mg/l)	Std. Dev.	Turbidity (JTU)	Std. Dev.	Chloride (mg/L)	Std. Dev.
Spring	Will Rd. Baseline	10	7.0	0.3	10.0	1.9	3.5	1.2	5.7	1.5
Summer	Will Rd. Baseline	10	7.3	0.2	7.0	0.7	3.5	1.2	5.7	1.0
Fall	Will Rd. Baseline	11	7.2	0.3	9.0	1.2	3.2	1.1	7.1	1.3
Winter	Will Rd. Baseline	10	6.9	0.3	11.3	1.2	3.0	1.1	7.2	1.1
<b>Average</b>	Will Rd. Baseline	41	7.1	0.2	9.3	1.6	3.3	0.2	6.2	0.6
Spring	Will Rd. Plus	12	7.1	0.4	10.1	1.2	3.8	4.1	6.8	3.0
Summer	Will Rd. Plus	15	7.2	0.3	7.1	1.1	3.7	2.5	9.3	5.4
Fall	Will Rd. Plus	13	7.0	0.4	8.7	1.5	4.1	3.0	10.0	3.2
Winter	Will Rd. Plus	10	7.2	0.2	10.3	0.9	2.6	0.9	10.5	3.6
<b>Average</b>	Will Rd. Plus	50	7.1	0.1	9.0	1.3	2.5	0.6	9.1	1.4

\*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. There was only one fall sample, with an HFBI score of 4.7, indicating “Very Good” to “Good” water quality. One sample is not enough information to reach baseline or be representative of the water quality during fall.

## **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 eight *E. coli* samples from this site in 2007 and 2008. All of the samples were taken during or following rain events. All samples were well below EPA’s criterion, indicating good water quality.

## **Conclusion**

BRWA volunteer data indicate that Tyler Forks River at Will Road currently has good water quality and is meeting its designated use as a Class II trout stream based on the water chemistry. There is not enough

data to have a baseline, in BRWA's definition, for macroinvertebrates as four years of samples from both fall and spring are needed. Additional samples are needed to have enough data for a baseline. Overall, this section of the river is outstanding. Sampling will need to be continued in order to monitor the river's health.

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Photo credit: Kevin Brewster