

## Menomonee River Watershed Restoration Plan Fact Sheet MN-13, Reach 890, Underwood Creek

Data resulting from model runs:

Figure	Overall Project Team Assessment	Analysis
Flashiness index	Good	The Flashiness Index quantifies the frequency and rapidity of short-term changes in stream flow. The index ranges from 0 to 2, with 0 being constant flow. The flashiness is reasonable at this location.
Dissolved oxygen v. days per year	Moderate	Typically, aquatic communities need 5 mg/l or more of dissolved oxygen to survive. Concentrations at this site are below this level about 10% of the time, but never below 2 mg/l.
Fecal coliform v. days per year	Variable (some good, some bad)	For recreational uses, lower fecal coliform counts (a measure of bacteria) are better (preferably under 400 counts / 100ml). The counts on majority of the days are either 'below 400' or 'above 5,000'. A potential goal in this case may be to determine the conditions that create the 'above 5,000' days and discourage recreational use on days that meet these conditions. An additional goal could be to find ways to decrease fecal coliform loads in order to increase the number of days that have 'below 400' counts.
Phosphorus v. days per year	Good	Phosphorus is a nutrient that can lead to increased growth of algae. The concentrations on majority of the days are at or below the 0.1 mg/l planning guideline. Throughout the year, the phosphorus concentration does not exceed 0.35 mg/l on any day.
Suspended solids v. days per year	Good	Suspended solids cause water to become cloudy, which is aesthetically unpleasant. They can also clog the gills of fish and invertebrates, make feeding difficult, and lead to sediment deposition (poor habitat). The concentrations are less than 25 mg/l on most of the days, but the concentrations exceed 200 mg/l on some of the days.
Monthly dissolved oxygen	Moderate to Poor	The decline in dissolved oxygen concentrations during the summer is normal due to the decreased solubility of oxygen in warmer water. The upper portion of the ranges for each month is fairly typical; however, the lower portions of the ranges (below the median or 25 <sup>th</sup> percentile) decline more than would be expected. This may indicate excess organic matter and biochemical oxygen demand in the stream.
Monthly fecal coliform	Moderate to Poor	While the ranges of concentrations are fairly consistent throughout the year, notice that the median and 75 <sup>th</sup> percentile values decline during the summer swimming season. This may be related to the die-off of bacteria due to solar radiation. Also note that the conditions are poorest in March and are likely related to snow melt.
Monthly phosphorus	Moderate	In most months, phosphorus concentrations exceed the planning guideline less than 25% of the time. Note that the minimum concentrations increase in the late spring and summer, possibly due to runoff of fertilizer. Also, the phosphorus concentration increases in March and is likely related to snow melt.
Monthly suspended solids	Very Good	The maximum values for suspended solids are lowest during the winter. This is likely due to frozen conditions, decreased construction activities, and low-impact storms (snow doesn't pound the soil like rain). In each month, the reference concentration is exceeded less than 25% of the time.

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Dissolved oxygen by flow	Moderate	Note the decline in dissolved oxygen concentrations during low flows. This is likely due to a combination of decreased water agitation and higher temperatures (low flow conditions are often associated with the warm summer months). While this is not unexpected, the concentrations of dissolved oxygen occasionally fall below desirable concentrations.
Fecal coliform by flow	Moderate to Poor	Generally, a pollutant that is present at high concentrations during high flows and low concentrations during low flows (fecal coliform, in this case) is attributed primarily to non-point sources. The infrequent sewer overflows (once every 2-5 years) would only contribute during the high flows when substantial non-point source is already present. Note that during periods with the highest flows, fecal coliform counts exceed the regulatory standard all of the time. During low flows, the standard is met nearly all of the time. This would be the safest time for any recreational uses (boating, swimming, wading, etc.), although the amount of water in the stream may limit recreational use to wading.
Phosphorus by flow	Moderate	Concentrations of phosphorus are greatest at high flows and suggest the presence of non-point loads of phosphorus. The similarities between the phosphorus and suspended solids data suggest that the phosphorus may be associated with suspended sediment.
Suspended solids by flow	Good	The concentrations of suspended solids increase with increased flows, suggesting contributions from non-point sources. The suspended solids may come from runoff that carries a sediment load, from stream bank erosion, or re-suspended stream sediments.