

## Kinnickinnic River Watershed Restoration Plan Fact Sheet

### KK-5, Reach 830, Holmes Avenue Creek

Data resulting from model runs:

<b>Figure</b>	<b>Overall Project Team Assessment</b>	<b>Analysis</b>
Flashiness index	Moderate	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 slightly high at this location.
Dissolved oxygen v. days per year	Good to Moderate	Typically, aquatic communities need 5 mg/l or more of dissolved oxygen to survive. Concentrations at this site nearly always exceed this level, but the concentrations are generally lower than other sites along the river.
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 are 'below 400'.
Phosphorus v. days per year	Moderate to Poor	Phosphorus is a nutrient that can lead to increased growth of algae. The concentrations on most days are at or below the 0.1 mg/l planning guideline. However, there are several days with phosphorus concentrations that exceed 0.5 mg/l.
Suspended solids v. days per year	Very Good to Good	Suspended solids cause water to become cloudy and aesthetically unpleasant. They can clog the gills of fish and invertebrates, make feeding difficult, and lead to sediment deposition (poor habitat). The concentrations on most of the days fall below 25 mg/l and the concentrations do not exceed 200 mg/l on any day.
Monthly dissolved oxygen	Moderate	Dissolved oxygen concentrations are highly variable, particularly in the spring. This variability suggests that either there is excessive algal growth or organic enrichment and biochemical oxygen demand in the ecosystem. The decline in concentrations during the summer is typical due to the decreased solubility of oxygen in warmer water.
Monthly fecal coliform	Moderate	While the ranges of values are fairly consistent throughout the year, notice that the median value declines during the summer swimming season. This may be related to the die-off of bacteria due to solar radiation. Also note that the summer and fall account for many of the 'below 400' days mentioned above while the winter and early spring have many of the 'above 5,000' days. Conditions are particularly poor in March and are likely related to snow melt.
Monthly phosphorus	Moderate to Poor	Phosphorus concentrations decline in the late spring, summer, and early fall. This may be related to uptake by plants during the growing season and the release of phosphorus from sediments and decomposing organic matter. In addition, potential winter stormwater inputs from the airport may be a source of de-icing chemicals for the stream. De-icing chemicals may contain phosphorus compounds that serve as corrosion inhibitors.
Monthly suspended solids	Very Good	Suspended solids concentrations fall below the reference concentration most of the time. The majority of the higher concentrations are likely related to larger rain or snow melt events that disturb bare soil. As this is a concrete-lined channel, there is little sediment to re-suspend from the stream bed.

Figure	Overall Project Team Assessment	Analysis
Dissolved oxygen by flow	Good	During dry conditions and low flows, dissolved oxygen concentrations are lower relative to other flow conditions. This is likely due to a lack of water agitation (which would allow greater diffusion of oxygen into the water) and high temperatures (low flow conditions are often associated with summer which has higher temperatures and lower oxygen solubility).
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. Note that during any period with the highest flows, fecal coliform counts exceed the regulatory standard and during moist conditions, fecal coliform counts exceed the standard nearly 75% of the time. During low flows and dry conditions, the standard is met nearly all of the time. During these low flows would be the safest time for recreational uses (boating, wading, swimming), although the amount of water in the stream may limit recreational use to wading.
Phosphorus by flow	Moderate	Concentrations are greatest at high flows, with concentrations exceeding the 0.1 mg/l planning guideline nearly 75% of the time at the highest flows. This suggests the prevalence of non-point loads of phosphorus.
Suspended solids by flow	Good	Suspended solids concentrations increase with increased flows. This suggests a prevalence of non-point sources. All of the instances when the concentrations exceed the reference condition occur at the high flow condition. These conditions most often occur following large storms or major snow-melt events. The suspended solids may come from runoff that carries a sediment load, from stream bank erosion, or re-suspended stream sediments. Note that this site is located downstream of some concrete-lined reaches within the watershed. As a result, upstream activities such as stream bank erosion and re-suspension of stream sediments likely make less of a contribution to suspended sediment loads at this site compared to sites that are situated downstream of natural reaches that experience these activities.