Benthic Macroinvertebrate Survey Results for the Roseau River Watershed

2020

Figure 1: Sampling site locations in the Roseau River Watershed

In September of 2020, 5 sites (including 2 along the Vita Drain) in the Roseau River Watershed were sampled for macroinvertebrate community composition. The goal of this sampling was to provide a rapid assessment of water quality with respect to organic pollution in the area (e.g., those that result from increase nutrient, sewage and/or manure runoff into the waterways). Of those sites, the Sprague Creek was determined to have excellent water quality, the Roseau River at Roseau River Park and the Vita Drain north of Stuartburn (2 locations) were determined to have very good water quality with the possibility of slight organic pollution and the Roseau River at the Arbakka Dam was determined to have good water quality with some organic pollution.

SAMPLING SITE	*BIOTIC INDEX*	*WATER QUALITY*
Roseau River Park	4.19	Very Good
Roseau River At Arbakka Dam	4.54	Good
Sprague Creek	3.50	Excellent (just)
Vita Drain 1	4.20	Very Good
Vita Drain 2	4.01	Very Good

Table 1: Biotic index calculated for each sampling site based on Hilsenhoff, W.L (1987), tolerance values taken from Bouchard *et al.* (2004).

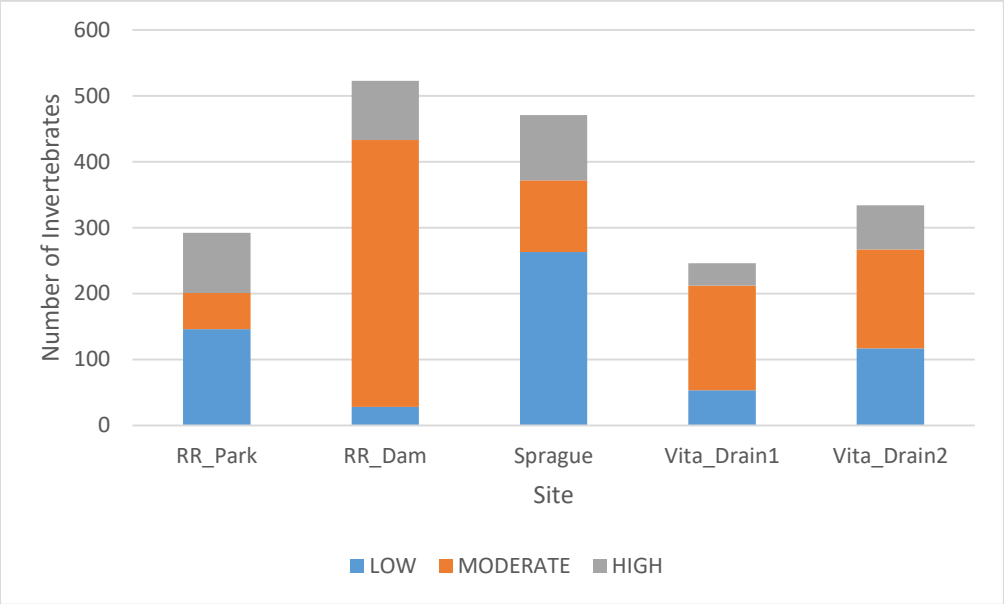

Figure 2: Abundance and tolerance of invertebrates collected at each sample site. Percent of community composition by tolerance labeled on graph. Tolerance levles for organic pollution determined per Bouchard et al. 2004.

Relatively high abundance of invertebrates with low and moderate tolerance to organic pollution are indicative of generally good to excellent water quality. Although seasonal fluctuations in the concentration of nutrients undoubtedly occurs in all location the presence of invertebrates with low pollution tolerance is indicative of overall good health of the waterways. The prevalence of invertebrates with moderate tolerance to organic pollution at the Roseau River Arbakka Dam site can almost exclusively be attributed to extremely high relative and absolute abundance of Leptophlebidae, a net spinning caddisfly that is known to become abundant in large numbers in areas that experience temporary high increases in nutrient input. Due to the location of the sampling site immediately downstream from the point where the Arbakka Drain outlets into the Roseau River, this may be indicative of seasonally high inputs of organic pollution from this tributary.

Site	*Shannon*	*ENS*	*No. Inverts*	*Richness*	*% Dominant Family*	*Dominant Family*	*Dom Family Tolerance*
RR_Park	2.12	8.37	296	25	41.89	Leptophlebidae (Ephemeroptera)	2 (Low)
RR_Dam	1.30	3.68	522	21	67.43	Hydropsychidae (Trichoptera)	4 (Moderate)
Sprague	2.31	10.12	478	29	40.59	Leptophlebidae (Ephemeroptera)	2 (Low)
Vita_Drain1	2.18	8.87	260	19	30.77	Baetidae (Ephemeroptera)	4 (Moderate)
Vita_Drain2	2.55	12.75	338	25	17.75	Hydropsychidae (Trichoptera)	4 (Moderate)

Table 2: Quantification of macroinvertebrate community composition across 5 sites in the Roseau River watershed showing Shannon Diversity Index, Effective Number of "Species", Number of Invertebrates collected, Species Richness, Percent Dominant Family and Dominant Family.

Sites with highly diverse community compositions are indicative of balanced, stable communities. The prevalence of ephemeroptera (mayflies/fishflies), plecoptera (stoneflies), trichoptera (caddisflies) and other pollution intolerant taxa are also indicative of generally healthy waterways.

It is the conclusion of this survey that the sampled waterways are in generally good health and demonstrate overall good water quality. However, this can vary between years. For comparison, it would be useful to sample drains in the more agriculturally developed areas of the watershed (e.g., the Jordan River and Main Drain and Arbakka Drain), as well as sites that are less developed (Pine Creek, Sprague Creek, outlet from Horseshoe Lake) while also repeating testing along the Roseau River for comparability.