Preliminary Results of Spring 2012 Hinkson Creek Survey

Eight of 11 Hinkson Creek stations, and 2 Bonne Femme Creek stations, were sampled on April 3, 2012. The 3 stations farthest downstream on Hinkson Creek were not sampled due to a pulse disturbance of contaminated water from Flat Branch Creek, a tributary entering Hinkson Creek just upstream of those stations. Macroinvertebrate samples were collected using MDNR stream bioassessment methodology. In situ data (temperature, dissolved oxygen concentration, pH, conductivity, and discharge) and grab samples for nutrient concentrations and other variables were taken concurrently with biological samples.

MSCI scores at Hinkson Creek stations were generally in the fully supporting category (16 – 20). The exceptions were Station 6 (immediately downstream of the Highway 63 and Interstate 70 bridge crossings) and Station 3.5 (upstream of Providence Road) – each of which scored 14. At Station 6, the community characteristic that most differed from the other stations was diversity (2.75, as compared to a range of 3.04-3.36). At Station 3.5, taxa richness was somewhat lower than observed at the other stations, and the biotic index was higher than the other stations (Table 1). Community characteristics at Bonne Femme Creek included greater taxa richness and EPT richness, but comparable Shannon diversity and biotic index values.

Assemblages at all stations were numerically dominated by chironomids, which made up 42-65% of the sample. EPT taxa accounted for 6-14% of the total, and were primarily represented by the mayfly *Caenis*. Stoneflies were present in modest numbers at both Bonne Femme Creek stations and the most upstream Hinkson Creek station. Other than chironomids, taxa that were consistently common or abundant at Hinkson Creek sites included the blackfly *Simulium*, the riffle beetle *Stenelmis*, and the snail *Physella*.

Water quality variables were either similar among Hinkson Creek stations, or conformed to expected diurnal or spatial patterns. Temperature and DO concentration generally increased with time of sample collection (Table 2). Discharge increased with distance from the upstream station. Levels of pH ranged from 7.75 to 8.09 at all sites. Conductivity increased, and turbidity decreased from upstream to downstream stations. Total nitrogen, nitrate+nitrite-nitrogen and ammonia-nitrogen did not exhibit clear longitudinal trends. Total phosphorus concentrations, however, were marked higher at the 3 most upstream stations (range = 0.14-0.48 mg/L) than at the remaining Hinkson Creek sites (range = 0.024-0.054). Chloride concentrations increased consistently from the most upstream station (17.5 mg/L) to the most downstream (40.1 mg/L). With regard to water quality characteristics at Bonne Femme Creek, temperature, DO, and pH were similar to levels in Hinkson Creek. Conductivity was lower, and turbidity was higher, at Bonne Femme Creek. Total nitrogen, ammonia-nitrogen and chloride all were lower at Bonne Femme Creek than at Hinkson Creek sites. Nitrate+nitrite-nitrogen concentration was considerably greater at Bonne Femme Creek than at any of the Hinkson Creek stations. Total phosphorus at Bonne Femme Creek (0.11 mg/L) was intermediate between the high levels at Hinkson Creek's upstream sites and the lower levels at the downstream sites.

Table 1. Macroinvertebrate community characteristics in samples collected from Hinkson Creek and Bonne Femme Creek, April 3, 2012.

	Hinkson									Bonne Femme	
Variable	8	7	6.5	6	5.5	5	4	3.5		2	1
Total richness	77	72	81	72	75	73	74	67		92	88
EPT richness	15	10	12	12	10	10	10	9		17	19
Biotic index	6.2	6.4	6.7	6.4	6.9	6.9	6.7	7.3		6.4	6.2
Shannon diversity	3.04	3.09	3.3	2.75	3.05	3.36	3.34	3.21		3.26	3.38
% Ephemeroptera	7.0	9.1	11.2	8.5	4.5	10.7	9.4	12.8		6.1	8.4
% Plecoptera	4.2	1.0	0.5	0.2	0.2	0.0	0.0	0.1		2.7	3.8
% Trichoptera	1.2	0.5	1.1	0.4	1.2	1.0	1.0	1.0		1.8	1.4
% EPT	12.4	10.6	12.8	9.1	5.9	11.7	10.4	13.9		10.6	13.6
% Chironomidae	46.0	42.2	55.9	52.7	62.5	59.4	59.2	51.2		49.8	64.7
MSCI score	18	16	16	14	16	16	16	14		16	20
	Rogers Rd bridge	Hinkson Rd bridge	upst of Hwy 63 & Hwy 70	dnst of Hwy 63 & Hwy 70	dnst Broadway	upst Grind-stone Ck	dnst Grind-stone Ck	upst Provi-dence Rd			

Table 2. Water quality characteristics in samples collected from Hinkson Creek and Bonne Femme Creek, April 3, 2012.											
	Hinkson									Bonne Femme	
Variable	8	7	6.5	6	5.5	5	4	3.5		2	1
Time	1115	1030	945	855	805	1135	1035	945			1230
Temp	20	19.7	19.7	20.2	19.5	21.4	20.4	19.5			19.4
Dissolved oxygen	8.59	8.36	7.9	7.86	7.32	9.3	9.13	7.51			9.52
pH	8.03	7.94	7.9	7.96	7.84	8.09	8.05	7.75			7.88
Conductivity	378	416	477	490	494	531	533	544			317
Turbidity	3.74	3.11	2.73	2.66	2.12	2.3	1.86	1.89			4.1
Discharge	2.0	2.2	5.5	7.6	8.3	10.3	10.6	12.9			3.8
Total Nitrogen	0.50	0.44	0.47	0.39	0.38	0.40	0.37	0.35			0.38
Nitrogen - ammonia	0.062	0.060	0.041	0.046	0.057	0.064	0.049	0.067			0.036
Nitrogen - NO2+NO3	nd	nd	nd	nd	nd	nd	nd	0.009			0.070
Total Phosphorus	0.140	0.170	0.480	0.048	0.054	0.025	0.024	0.025			0.110
Chloride	17.5	20.6	29.8	33.9	33.9	37.7	39.1	40.1			12.0
Non-filterable residue (TSS)	nd	nd	nd	nd	nd	nd	nd	nd			nd
	Rogers Rd	Hinkson Rd	upst of Hwy	dnst of Hwy	dnst	upst Grind-	dnst Grind-	upst Provi-			
	bridge	bridge	63 & Hwy 70	63 & Hwy 70	Broadway	stone Ck	stone Ck	dence Rd			