
APPENDIX E-4
Analysis of Variance (ANOVA) and Tukey Pairwise
Comparison - Benthic Macro-Invertebrate Results,
2010

Table E-4-1: Analysis Of Variance (ANOVA) – Benthic Macro-Invertebrate Results, 2010

Analysis of Variance						
Density						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Sample	6252679	1	6252679	30.4156	4.71E-05	4.493998
Columns	396030.3	1	396030.3	1.926454	0.184173	4.493998
Interaction	13108.82	1	13108.82	0.063767	0.803854	4.493998
Within	3289196	16	205574.7			
Total	9951014	19				
Shannon Wiener Diversity Index						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Sample	1.752912	1	1.752912	32.9611	3.03E-05	4.493998
Columns	0.27683	1	0.27683	5.205415	0.036547	4.493998
Interaction	0.317772	1	0.317772	5.975265	0.026466	4.493998
Within	0.8509	16	0.053181			
Total	3.198414	19				
Simpson's Diversity Index						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Sample	0.254071	1	0.254071	45.50638	4.7E-06	4.493998
Columns	0.089941	1	0.089941	16.10922	0.001003	4.493998
Interaction	0.101959	1	0.101959	18.26181	0.000582	4.493998
Within	0.089331	16	0.005583			
Total	0.535302	19				
Pielou's Evenness						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Sample	0.279378	1	0.279378	41.76589	7.84E-06	4.493998
Columns	0.02429	1	0.02429	3.631331	0.074832	4.493998
Interaction	0.050562	1	0.050562	7.558764	0.014254	4.493998
Within	0.107026	16	0.006689			
Bray-Curtis Similarity Index – 2009 (one way ANOVA)						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.047853	1	0.047853	2.159629	0.172425	4.964603
Within Groups	0.22158	10	0.022158			
Total	0.269433	11				
Bray-Curtis Similarity Index – 2010 (one way ANOVA)						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.571755	1	0.571755	32.29257	0.000464	5.317655
Within Groups	0.141644	8	0.017705			
Total	0.713398	9				

Table E-4-2: Tukey Pairwise Comparison – Benthic Macro-invertebrate Results, 2010

Tukey Pairwise Comparisons				
Tukey Pairwise for Density				
	LC1	LC1-10	LC3	LC3-10
LC1	0	-1169	-333	-1400
LC1-10		0	837	-230
LC3			0	-1067
LC3-10				0
t=821 for a=4; df = 4 (5-1)				
Tukey Pairwise for Shannon-Wiener Diversity Index				
	LC1	LC1-10	LC3	LC3-10
LC1	0	0.84	0.02	0.36
LC1-10		0.00	-0.83	-0.49
LC3			0.00	0.34
LC3-10				0
t=0.42 for a=4; df = 4 (5-1)				
Tukey Pairwise for Simpson's Diversity Index				
	LC1	LC1-10	LC3	LC3-10
LC1	0	0.368	0.009	0.091
LC1-10		0.000	-0.360	-0.277
LC3			0.000	0.083
LC3-10				0
t=0.135 for a=4; df = 4 (5-1)				
Tukey Pairwise for Pielou's Evenness Index				
	LC1	LC1-10	LC3	LC3-10
LC1	0	0.33694	0.03086	0.16668
LC1-10		0	-0.30608	-0.17026
LC3			0	0.13582
LC3-10				0
t=0.148 for a=4; df = 4 (5-1)				