

Appendix D

Quality Assurance Tests

Duplicates

Metric	spring 2020		summer 2020		summer 2020		fall 2019		fall 2019		winter 2018		winter 2018	
	BR Comp	BR duplicate Comp	KN-Comp	KN duplicate Comp	SL-Comp	SL duplicate Comp	BR-Comp	BR duplicate Comp	RB-Comp	RB duplicate Comp	SL-Comp	SL duplicate Comp	SC Comp	SC duplicate Comp
Taxa Richness	35	31	35	31	34	28	34	34	34	32	32	24	25	28
Modified EPT	15	12	10	9	13	10	12	14	17	15	17	15	12	15
Beck's version 3	23	17	12	12	31	23	16	19	28	18	27	24	15	20
Shannon's	2.85	2.67	2.93	2.96	2.76	2.67	2.81	2.85	2.67	2.58	2.59	2.24	2.28	2.46
Hilsenhoff	3.4	3.5	4.1	4.2	3.4	3.7	4.6	4.6	2.9	3.1	2.8	2.4	3.3	3.4
Percent Sensitive Organisms	54	54	33	30	35	24	16	19	53	47	54	61	39	41
IBI Score	81	73	66	63	78	66	65	69	84	76	83	76	64	72
Aquatic Life Use Determination	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining

Duplicate samples were taken in two ways; either by taking a second random subsample from the sorting tray, or by taking a second random subsample from a picked subsample that had more than twice the requisite number of individuals. In both cases the duplicate samples did provide different results for individual metrics, but the ALU determinations were the same. Duplicate sample results are reported, but in all cases the original sample was used for comparisons and drawing conclusions regarding the site.

Kick v. Jab

Metric	Sample ID														
	KNKQ1	KNJQ1	KNQ1	SCKQ1	SCJQ1	SCQ1	BRKQ1	BRJQ1	BRQ1	RBKQ1	RBQ1	SLKQ1	SLJQ1	SLQ1	
Taxa Richness	31	30	40	25	28	37	35	30	44	28	26	38	36	16	37
Modified EPT	12	10	14	12	12	17	16	11	18	13	14	18	22	11	22
Beck's version 3	13	14	19	17	17	23	19	12	23	18	17	25	36	16	36
Shannon's	2.70	2.49	2.87	2.29	2.05	2.50	2.50	2.56	2.71	1.82	1.43	1.82	2.38	1.51	2.43
Hilsenhoff	3.2	3.1	3.2	4.4	3.1	3.6	2.9	3.4	3.0	1.9	1.7	1.9	2.2	3.5	2.6
Percent Sensitive Organisms	49	50	49	20	51	38	65	44	57	79	84	81	74	27	60
IBI Score	71	69	78	59	68	77	81	67	84	76	74	87	94	52	90
Aquatic Life Use for Dec sampling period	Attaining	Attaining	Attaining	Marginally Impaired	Attaining	marginally attaining	Attaining	Attaining							

In the December 2018 sampling period, kick and jab samples were processed separately. As might be expected the results of kick and jab samples varied considerably. However, there appears to be no discernable trend for the metrics. In some cases the metrics for the kick samples were higher than the jab, for others the opposite was true. Note that the IBI scores for the two sample types resulted in a different ALU for the Silver Creek samples and the Slifer Valley samples, with the Silver Creek kick net sample and the Slifer Valley jab sample not achieving the standard. Note that for the Slifer Valley site, the kick net sample IBI score was the highest achieved across the entire study period, but the jab sample IBI score was the lowest observed. Since the jab technique is ostensibly used to collect organisms that would be missed with the kick net technique, but jab samples are not necessarily comparable site to site due to differences in habitat, it would be appropriate to evaluate the stations on kick net samples alone. In the case of Silver Creek, the kick net sample (SCKQ1) did not achieve the ALU standard, but the jab sample did. Silver Creek does appear to have additional indications of stress that would support a conclusion of marginal impairment. See the main body of the paper for more discussion on the Silver Creek site.

Combining the kick and jab results into a single sample and re-evaluating the metrics resulted in a consistent increase in metric value in most cases. This is expected since the method increased the number of organisms subsampled. Importantly, we note that the ALU determination was Attaining at all five sites using the composited samples. Therefore, kick and jab samples were composited in all future sampling periods.

Abundance Adjustment

December 2018 Sampling Period									
Original	Resub	Original	Resub	Original	Resub	Original	Resub	Original	Resub
KNQ1	KN-comp	SCQ1	SC Comp	BRQ1	BR-Comp	RBQ1	RB-Comp	SLQ1	SL-Comp
597	206	597	203	666	213	1033	186	777	217
40	32	37	25	44	34	38	21	37	32
14	14	17	12	18	14	18	11	22	17
17	14	23	15	22	15	26	11	37	27
2.87	2.98	2.50	2.28	2.71	2.60	1.82	1.79	2.43	2.59
3.16	3.53	3.62	3.33	3.04	2.69	1.87	1.81	2.56	2.82
49	41	38	39	57	62	81	81	60	54
77	73	77	64	83	78	87	68	91	83
Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining	Attaining

October 2019 Sampling Period									
Original	Resub	Original	Resub	Original	Resub	Original	Resub	Original	Resub
KN-Comp	KN-comp	SC-comp	SC Comp	BR-Comp	BR-Comp	RB-Comp	RB-Comp	SL-Comp	SL-Comp
719	207	521	205	646	177	481	212	497	189
51	31	29	24	42	34	41	34	36	28
16	10	10	9	15	12	19	17	16	12
22	13	14	13	19	16	28	28	32	19
2.83	2.72	2.43	2.47	2.77	2.81	2.61	2.67	2.64	2.53
4.22	4.16	4.39	4.47	4.58	4.60	3.03	2.92	4.05	4.31
19	20	15	14	15	16	48	53	20	15
73	62	58	54	68	65	85	84	76	62
MA	MI	MI	MI	attaining	attaining	attaining	attaining	attaining	MI

					Spring 2020 Sampling Period			
					Original	Resub	Original	Resub
Metric					BR Comp	BR Comp	SL Comp	SL Comp
Abundance					412	211	268	231
Taxa Richness					41	35	26	25
Modified EPT					17	15	15	14
Beck's version 3					28	23	25	25
Shannon's					2.82	2.85	2.14	2.60
Hilsenhoff					3.4	3.4	3.4	2.8
Percent Sensitive Organisms					54	54	66	65
IBI Score					84	81	76	79
Aquatic Life Use Determination					Attaining	Attaining	Attaining	Attaining

Original subsample size was determined based on a visual assessment of organism abundance in the unprocessed sample spread out in a gridded pan. Once the subsample was taken, all organisms were removed and counted, regardless of actual quantity. PADEP protocol recommends 200+/- 40 individuals per subsample. In these cases, it is suggested that all the organisms retrieved be refloated and further subsampled to reduce the quantity into the correct range. Those samples initially keyed at the larger amounts were resampled using this method. Comparing the initial high counts and assessments to the resampled counts and assessments does show considerable variation in metric absolute value, however the ALU determinations did not change (except for one case). While all results are presented, the reported comparisons and ALU determinations for each site are based on the adjusted resampled counts.