

SUPPLEMENTAL TABLE S1. BEST FIT MODEL RESULTS FOR EACH STREAM RESPONSE VARIABLE FOR EACH SAMPLING TIME

Year	Model Type	R ² Adj.	AIC	Sites	Significance	RL	RD	UL	UD	Intercept	Response Variable
2009	Riparian (Bivariate)	0.57	37.2	13	**	-5.16	3.13	0	0	2.31	Canopy Cover
2010	Riparian (Bivariate)	0.6	37.6	14	**	-4.54	1.94	0	0	2.02	Canopy Cover
2011	Local Riparian	0.57	45.1	17	***	-2.88	0	0	0	2.41	Canopy Cover
2012	Local Riparian	0.55	52.1	21	****	-2.83	0	0	0	2.39	Canopy Cover
2013	Local Riparian	0.61	38	19	****	-2.36	0	0	0	2.55	Canopy Cover
2014	Local Riparian	0.5	29.5	12	**	-2.06	0	0	0	2.75	Canopy Cover
2015	Local Riparian	0.29	25.2	12	*	-1.16	0	0	0	2.33	Canopy Cover
2016	Local (Bivariate)	0.55	17.1	9	*	-2.53	0	1.2	0	2.18	Canopy Cover
2017	Local Riparian	0.39	53.9	19	**	-2.38	0	0	0	1.73	Canopy Cover
2018	Local Riparian	0.36	40.1	13	*	-2.09	0	0	0	1.85	Canopy Cover
2020	Local Riparian	0.32	28.5	9		-1.73	0	0	0	2.16	Canopy Cover
2009	Upland (Bivariate)	0.71	2.3	13	***	0	0	0.94	0.49	1.06	Leaf Litter Mass
2010	Distant Upland	0.58	-14	14	**	0	0	0	-0.52	0.58	Leaf Litter Mass
2013	Local Riparian	0.35	14.1	19	**	-0.77	0	0	0	2.01	Leaf Litter Mass
2014	Local Riparian, Distant Upland	0.64	2.6	12	**	-1.21	0	0	1.16	1.61	Leaf Litter Mass
2015	Local Riparian	-0.07	22.9	12		-0.24	0	0	0	1.76	Leaf Litter Mass
2016	Local Riparian, Distant Upland	0.17	16.7	9		-1.29	0	0	1.1	1.63	Leaf Litter Mass
2017	Local Riparian	0.12	15.5	19		-0.45	0	0	0	1.63	Leaf Litter Mass
2018	Distant Upland	0.06	21.4	13		0	0	0	0.62	1.49	Leaf Litter Mass
2020	Local Riparian	0.06	2.6	9		-0.23	0	0	0	1.69	Leaf Litter Mass
2009	Local Riparian	-0.04	40.1	13		0.7	0	0	0	-5.9	Cladophora Pool Soft
2010	Local Riparian	0.28	53	14	*	3.36	0	0	0	-3.02	Cladophora Pool Soft
2009	Local Riparian	0.67	39.8	13	***	4.78	0	0	0	-5.66	Cladophora Riffle Hard
2010	Distant Riparian	0.05	61.9	14		0	2.38	0	0	-1.71	Cladophora Riffle Hard
2009	Local Upland	0.01	96.4	13		0	0	-10.01	0	0.23	Change in Pool Area
2010	Upland (Bivariate)	0.53	90.8	14	*	0	0	42.74	-52.81	-4.13	Change in Pool Area
2009	Distant Upland	0.42	113	13	*	0	0	0	50.27	-8.58	Change in Riffle Area
2010	Riparian (Bivariate)	0.49	101.7	14	*	54.59	-75.21	0	0	1.99	Change in Riffle Area
2009	Riparian (Bivariate)	0.13	17.9	13		1.11	-1.05	0	0	0.92	Pool Area / Riffle Area
2010	Distant Upland	0.61	-7.6	14	***	0	0	0	-0.69	0.67	Pool Area / Riffle Area
2009	Local Riparian	0.24	59.5	13		4.42	0	0	0	15.82	Temperature
2010	Distant Riparian	0.44	51.4	14	**	0	4.22	0	0	15.16	Temperature
2011	Local Riparian	0.31	63.9	17	*	3.04	0	0	0	16.46	Temperature
2012	Local Riparian	0.08	92.2	21		2.37	0	0	0	17.08	Temperature
2013	Local Riparian	0.04	64.3	19		1.15	0	0	0	16.18	Temperature
2014	Local Riparian	-0.07	41.6	12		0.55	0	0	0	16.82	Temperature
2015	Distant Upland	0.59	33	12	**	0	0	0	3.19	17.41	Temperature
2016	Distant Upland	-0.07	34.2	9		0	0	0	-1	18.11	Temperature
2017	Distant Upland	-0.05	75.1	19		0	0	0	-0.49	18.57	Temperature
2018	Local Riparian	-0.03	68.7	13		1.85	0	0	0	17.87	Temperature
2020	Local Riparian, Distant Upland	0.13	32.7	9		2.08	0	0	-2.56	17.32	Temperature
2009	Local Riparian	0.26	37.2	13	*	1.96	0	0	0	16.45	Thermal Index
2010	Distant Upland	0.42	17.5	14	**	0	0	0	1.19	16.24	Thermal Index
2011	Riparian (Bivariate)	0.76	43.7	17	****	2.87	2.01	0	0	15.97	Thermal Index
2012	Local Riparian, Distant Upland	0.23	67.6	21	*	1.27	0	0	1.37	16.28	Thermal Index
2013	Local (Bivariate)	0.44	54.3	19	**	3.97	0	-2.84	0	17.4	Thermal Index

2014 Local (Bivariate)	0.52	33.4	12 *	3.71	0	-2.63	0	17.76 Thermal Index
2015 All Predictors	0.74	26.5	12 **	3.08	0	-4.61	3	17.33 Thermal Index
2016 Distant Upland	0.17	31.7	9	0	0	0	2.01	16.97 Thermal Index
2017 Riparian (Bivariate)	0.39	72.9	19 **	2.02	2.65	0	0	16.57 Thermal Index
2018 Distant Upland	0.05	46.7	13	0	0	0	1.54	17.17 Thermal Index
2020 Local Riparian	0.34	31.4	9	2.1	0	0	0	16.97 Thermal Index
2009 Riparian (Bivariate)	0.22	41	13	3.29	-2.06	0	0	2.04 Biotic Index
2010 Local Riparian	0.62	41.2	14 ***	4.22	0	0	0	1.96 Biotic Index
2011 Local Riparian	0.38	57	17 **	2.86	0	0	0	1.67 Biotic Index
2012 Local Riparian	0.41	63.8	21 ***	2.88	0	0	0	1.9 Biotic Index
2013 Local Riparian	-0.02	70.5	19	0.83	0	0	0	2.94 Biotic Index
2014 Local Riparian	0.01	44.3	12	1.15	0	0	0	3.1 Biotic Index
2015 Distant Upland	0.31	40.2	12 *	0	0	0	2.58	2.67 Biotic Index
2016 Local Riparian	0.36	35.2	9	3.95	0	0	0	3.51 Biotic Index
2017 Local Upland	-0.02	77.4	19	0	0	-1.25	0	3.65 Biotic Index
2018 Local Upland	0.17	49.4	13	0	0	2.56	0	2.68 Biotic Index
2020 Local Riparian	0.01	31.4	9	0.97	0	0	0	2.56 Biotic Index
2010 Distant Upland	0.36	-31	14 *	0	0	0	0.19	0.07 Sediment Depth
2011 Local Riparian	0.05	-50.6	17	0.05	0	0	0	0.08 Sediment Depth
2012 Distant Riparian	0.09	-79.9	21	0	0.04	0	0	0.05 Sediment Depth
2013 Distant Riparian	0.2	-79.2	19 *	0	0.05	0	0	0.03 Sediment Depth
2014 Upland (Bivariate)	0.3	-48.8	12	0	0	-0.09	0.11	0.06 Sediment Depth
2015 Upland (Bivariate)	0.26	-38.8	12	0	0	-0.16	0.15	0.07 Sediment Depth
2016 Upland (Bivariate)	0.38	-33.9	9	0	0	-0.14	0.1	0.05 Sediment Depth
2017 Distant Riparian	0.01	-66.2	19	0	-0.03	0	0	0.08 Sediment Depth
2018 Local Riparian	-0.05	-48.6	13	-0.02	0	0	0	0.05 Sediment Depth
2020 Upland (Bivariate)	0.38	-24.5	9	0	0	-0.18	0.21	0.06 Sediment Depth
2009 Distant Riparian	0.14	-26.2	13	0	0.13	0	0	-0.03 Pool Depth Change
2010 Distant Upland	0.31	-5.5	14 *	0	0	0	-0.41	0.05 Pool Depth Change
2011 Distant Upland	0.25	-4.4	17 *	0	0	0	0.38	0.08 Pool Depth Change
2012 Local Upland	-0.03	-29.1	21	0	0	-0.06	0	-0.06 Pool Depth Change
2013 Distant Upland	0.09	-49.1	19	0	0	0	-0.07	-0.04 Pool Depth Change
2014 Local Upland	0.01	-21.2	12	0	0	-0.08	0	0.02 Pool Depth Change
2015 Distant Upland	-0.06	-13.5	12	0	0	0	0.07	-0.04 Pool Depth Change
2016 Local Riparian, Distant Upland	0.24	-28.8	9	0.09	0	0	-0.11	-0.02 Pool Depth Change
2017 Local Riparian	-0.06	0	19	-0.17	0	0	0	0.11 Pool Depth Change
2018 Distant Upland	-0.04	-22.6	13	0	0	0	0.06	-0.05 Pool Depth Change
2020 Upland (Bivariate)	0.46	-18.3	9	0	0	0.27	-0.16	-0.07 Pool Depth Change
2009.5 Distant Upland	0.2	22.1	13	0	0	0	0.98	1.1 Nitrate Concentration
2010.25 Distant Upland	0.69	24.9	14 ***	0	0	0	2.96	1.1 Nitrate Concentration
2010.5 Distant Upland	0.5	13.7	14 **	0	0	0	1.19	1.24 Nitrate Concentration
2011.5 Distant Upland	0.03	38	17	0	0	0	0.76	-0.17 Nitrate Concentration
2009.5 Distant Upland	0.08	4.8	13	0	0	0	0.36	1.1 Phosphorus Concentration
2010.25 Local Riparian, Distant Upland	0.73	-9.4	14 **	-0.28	0	0	0.88	0.83 Phosphorus Concentration
2010.5 Local Riparian, Distant Upland	0.58	4.9	14 **	-0.45	0	0	1.15	0.93 Phosphorus Concentration
2011.5 Distant Upland	0.11	8.2	17	0	0	0	0.41	-0.54 Phosphorus Concentration
2009 Local Riparian	0.38	-24.6	13 *	0.23	0	0	0	2.89 Conductivity

2010 Local Riparian	0.27	-27.9	14 *	0.18	0	0	0	2.84 Conductivity
2011 Local Riparian	0.33	-28.1	17 **	0.21	0	0	0	2.77 Conductivity
2012 Upland (Bivariate)	0.19	-12.6	21	0	0	-0.53	0.32	2.77 Conductivity
2013 Local Riparian	0.35	-16.8	19 **	0.34	0	0	0	2.91 Conductivity
2014 Local Riparian	0.56	-14.8	12 **	0.37	0	0	0	2.96 Conductivity
2015 Local Riparian	0.53	-15.9	12 **	0.33	0	0	0	2.99 Conductivity
2016 Distant Riparian	0.13	-22.2	9	0	0.09	0	0	3 Conductivity
2017 Local Riparian	0.2	-22.8	19 *	0.21	0	0	0	2.99 Conductivity
2018 Local Riparian	0.2	-10.9	13	0.21	0	0	0	3.01 Conductivity
2020 Local (Bivariate)	0.68	-24.7	9 *	0.24	0	-0.15	0	2.9 Conductivity
2009 Upland (Bivariate)	0.37	4.5	13 *	0	0	-0.86	1.11	2.05 Shredders
2010 Local Riparian, Distant Upland	0.84	12	14 ****	1.29	0	0	-2.75	1.86 Shredders
2011 Local (Bivariate)	0.3	25.1	17 *	-1.45	0	0.96	0	1.89 Shredders
2012 Local Riparian	0.37	6	21 **	-0.66	0	0	0	2.27 Shredders
2013 Local Riparian	0.2	51.8	19 *	-1.49	0	0	0	2.01 Shredders
2014 Local Riparian	0.49	22.4	12 **	-1.52	0	0	0	1.73 Shredders
2015 Upland (Bivariate)	0.4	31.5	12 *	0	0	2.33	-3.5	1.87 Shredders
2016 Local Upland	-0.11	23.2	9	0	0	0.41	0	1.59 Shredders
2017 Distant Riparian	0.32	52.6	19 **	0	-2.11	0	0	1.77 Shredders
2018 Distant Upland	0.12	38.4	13	0	0	0	-1.43	1.41 Shredders
2020 Local Riparian	0.35	18.9	9	-1.08	0	0	0	1.91 Shredders
2009 Local Upland	0.07	13.2	13	0	0	0.54	0	1.73 Collectors
2010 Local Riparian	0.7	4.3	14 ***	1.34	0	0	0	2.07 Collectors
2011 Local (Bivariate)	0.41	19.3	17 **	1.51	0	-1.08	0	2.12 Collectors
2012 Distant Riparian	0.07	35.9	21	0	-0.61	0	0	1.81 Collectors
2013 Distant Upland	0.1	23.7	19	0	0	0	-0.59	1.96 Collectors
2014 Local Upland	-0.06	21.9	12	0	0	-0.3	0	1.82 Collectors
2015 Local Upland	-0.06	22	12	0	0	-0.32	0	1.82 Collectors
2016 Local Riparian	0.37	17.7	9 *	1.53	0	0	0	1.71 Collectors
2017 Local Riparian	-0.03	44.4	19	0.35	0	0	0	2.09 Collectors
2018 Distant Upland	0.41	19.7	13 *	0	0	0	-1.32	2.06 Collectors
2020 Distant Upland	0.63	5.3	9 **	0	0	0	-1.11	2.24 Collectors
2009 Local Riparian, Distant Upland	0.04	19.8	13	0.68	0	0	-0.75	2.18 Predators
2010 Local Upland	0.01	21.7	14	0	0	-0.55	0	1.94 Predators
2011 Distant Riparian	0.11	26	17	0	0.69	0	0	1.6 Predators
2012 Distant Riparian	0.12	26.1	21	0	0.58	0	0	1.99 Predators
2013 Distant Upland	0.26	5.6	19 *	0	0	0	0.57	2.17 Predators
2014 Distant Riparian	-0.01	15.8	12	0	0.36	0	0	2.05 Predators
2015 Local Upland	0.1	10.5	12	0	0	0.49	0	2.04 Predators
2016 Local Upland	0.24	2.8	9	0	0	0.53	0	2.09 Predators
2017 Local Riparian	0.01	18.3	19	-0.29	0	0	0	2.38 Predators
2018 Distant Upland	-0.03	9.9	13	0	0	0	0.23	2.31 Predators
2020 Distant Riparian	0.17	7.5	9	0	0.53	0	0	2.01 Predators
2009 Local Riparian	0.03	2	13	0.26	0	0	0	2.64 Total Invertebrates
2010 Local Riparian, Distant Upland	0.64	-1.3	14 **	1.08	0	0	-0.36	2.54 Total Invertebrates
2011 Local Riparian	0.37	3.2	17 **	0.57	0	0	0	2.56 Total Invertebrates
2012 Distant Upland	0.07	-10	21	0	0	0	0.21	2.65 Total Invertebrates

2013 Distant Upland	-0.02	6.8	19	0	0	0	-0.18	2.96 Total Invertebrates
2014 Distant Riparian	-0.06	1.3	12	0	-0.12	0	0	2.67 Total Invertebrates
2015 Local Upland	-0.09	0.4	12	0	0	0.08	0	2.67 Total Invertebrates
2016 Local Riparian	0.05	10.6	9	0.51	0	0	0	2.74 Total Invertebrates
2017 Distant Upland	0.01	15.9	19	0	0	0	-0.28	2.9 Total Invertebrates
2018 Distant Upland	0	-5.4	13	0	0	0	-0.16	2.77 Total Invertebrates
2020 Local Upland	-0.08	-4	9	0	0	0.11	0	2.55 Total Invertebrates
2009 Local Riparian	-0.02	31	13	0.59	0	0	0	0.52 Total Amphibians
2010 Local Riparian	0.3	32.4	14 *	1.69	0	0	0	0.97 Total Amphibians
2011 All Predictors	0.8	28.1	17 ****	2.16	0	-1.44	2.37	0.11 Total Amphibians
2012 All Predictors	0.56	44.3	21 ***	2.05	0	-2.55	2.46	0.08 Total Amphibians
2013 Riparian (Bivariate)	0.47	46.3	19 **	1.2	1.5	0	0	0.46 Total Amphibians
2014 Local Riparian	0.29	29.9	12 *	1.42	0	0	0	0.61 Total Amphibians
2015 Distant Upland	0.22	25.5	12	0	0	0	1.17	1.01 Total Amphibians
2016 Distant Riparian	0.07	24.6	9	0	1.05	0	0	1 Total Amphibians
2017 Distant Upland	0.15	44.8	19	0	0	0	1.12	1.28 Total Amphibians
2018 Local Riparian, Distant Upland	0.5	27.1	13 *	1.05	0	0	1.11	0.78 Total Amphibians
2020 Local Riparian	0.56	20.4	9 *	1.69	0	0	0	0.7 Total Amphibians
2013 Distant Upland	0.02	43.3	19	0	0	0	-0.67	0.11 Algae Wet Weight
2014 Upland (Bivariate)	0.22	35.8	12	0	0	-3.48	2.71	0.22 Algae Wet Weight
2015 Local Riparian, Distant Upland	0.24	36.8	12	-2.51	0	0	2.44	0.27 Algae Wet Weight
2016 Local Upland	-0.03	27.2	9	0	0	-0.97	0	0.85 Algae Wet Weight
2017 Local Riparian	0.31	54.5	19 **	2.06	0	0	0	1.78 Algae Wet Weight
2018 Distant Upland	0.03	37	13	0	0	0	-0.99	1.36 Algae Wet Weight
2020 Local Riparian	0.09	31.9	9	1.3	0	0	0	0.45 Algae Wet Weight