

Supplementary material of

The Snowball Effect of Anthropogenic Alterations in A Karst Tropical Lake in Yucatán Peninsula, Environmental Variability and Risk Assessment

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Table S1.- Physical, chemical and microbiological variables from Lake La Sabana during the dry and rainy season in Yucatán Peninsula

Site	N	W	Climatic season	Tem p (°C)	Cond (µs/cm)	pH	DO (mg/l)	Transp (m)	BOD ₅ (mg/l)	TSS (mg/l)	Fecal coliforms	Total coliforms	ortofosfates (mg/l)	Nitrites (mg/l)	Nitritates (mg/l)	sulfates (g/l)	NSF WQI
N1	18.5514	-88.3134	Dry season	26.4	577	7.9	8.75	0.25	25.4	375	310	840	0.0031	0.0031	0.0121	2.441	56
N2	18.5512	-88.3132		26.3	573	7.9	7.64	0.23	24.3	467	18	1100					56
N3	18.5503	-88.3124		26.4	583	7.7	7.9	0.25	20	570	18	1100					56
C1	18.5479	-88.3120		26.5	575	7.8	8.2	0.2	26.4	420	1600	16000	0.1935	0.2437	0.301	1.405	55
C2	18.5454	-88.3148		25.9	577	7.9	7.5	0.21	28.4	550	620	3500					52
C3	18.5443	-88.3144		26.4	580	7.6	8.14	0.25	30.4	530	940	16000					54
S1	18.5403	-88.3189		26.1	530	7.8	9.6	0.3	32.5	560	1600	16000	0.2817	1.0241	0.6047	1.397	51
S2	18.5400	-88.3185		26.3	560	7.8	10.6	0.28	40.2	550	9200	16000					48
S3	18.5395	-88.3180		26.4	570	7.7	3.14	0.2	38.5	480	3500	16000					41
W1	18.5322	-88.3263		25.9	520	7.5	8.12	0.35	20.5	220	40	3500					60
W2	18.5298	-88.3283		25.8	550	7.5	7.4	0.45	18.3	245	45	640	0.0043	0.0972	0.0013	3.523	60
W3	18.5277	-88.3333		26.7	498	7.7	8.23	0.55	17.5	350	92	1200					60
W4	18.5289	-88.3331		26.6	520	7.6	7.15	0.6	18.5	210	260	1200	0.0028	0.0897	0.0021	2.908	60

W5	18.5287	-88.3316		26.6	560	7.7	6.85	0.55	20.5	190	210	230					59
W6	18.5206	-88.3448		26.4	573	7.8	6.7	0.7	18.5	220	92	230					60
NS1			Rainy season	31.4	583	7.5	9.75	0.25	30	378	180	5400	0.0026	0.0025	0.0116	1.972	53
NS2				32.7	423	7.4	9.25	0.25	27	420	200	14000					53
NS3				35.6	446	7.5	10.9	0.25	32	390	180	9500					48
CS1				33.4	510	7.5	11.01	0.22	26	410	92000	160000	0.1720	0.216	0.420	1.235	47
CS2				34.7	443	7.6	9.85	0.24	33	420	28000	35000					52
CS3				35.4	518	7.6	10.21	0.25	36	380	160000	160000					47
SS1				32.8	565	7.4	10.87	0.2	40	385	24000	54000	0.1794	1.001	0.451	0.978	46
SS2				33.7	593	7.6	10.66	0.25	41	400	3300	7000					46
SS3				34.2	539	7.5	6.23	0.23	41	410	54000	92000					53
W1				34.4	480	7.5	9.83	0.45	23	210	92	2500					57
W2				35.5	521	7.5	7.69	0.48	23	200	95	750	0.0135	1.004	0.001	3.216	60
W3				35.2	475	7.4	8.23	0.43	25	180	150	2000					58
W4				34.6	485	7.4	7.46	0.5	25	195	210	550	0.0016	0.0451	0.001	2.147	60
W5				33.6	395	7.6	7.65	0.55	20	174	260	540					61
W6				35.6	476	7.6	8.2	0.5	18	95	150	640					60

Abbreviations are as follows: temperature (Temp), conductivity (Cond), dissolved oxygen (DO), transparency (Transp), five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and National Sanitation Foundations water quality index (NSF WQI).

Table S2. Table of pairwise Permutational Multivariate Analysis Of Variance (PERMANOVA) tests. For interaction terms (Lake sections \times season) pairwise tests are organized by levels of the corresponding factor as follows: (D) – Within level 'Dry' of factor Season, (R) – Within level 'Rainy' of factor Season, (W) – Within level 'Wetland' of factor Lake sections, (N) – Within level 'North' of factor Lake sections, (C) – Within level 'Center' of factor Lake sections, (S) – Within level 'South' of factor Lake sections. Bold values indicate significant results ($p \leq 0.05$) after applying Benjamini-Hochberg correction to α .

Term Lake section						
	Groups	<i>t</i>	<i>p</i> perm	Unique perms	<i>p</i> (MC)	α corr
	north, wetland	3.988	0.001	999	0.001	0.008
	center, wetland	4.633	0.001	999	0.001	0.017
	south, wetland	4.573	0.001	999	0.001	0.025
	north, center	1.883	0.026	984	0.043	0.033
	north, south	1.687	0.017	984	0.048	0.042
	center, south	1.364	0.119	987	0.137	0.050
Term Season						
	Groups	<i>t</i>	<i>p</i> perm	Unique perms	<i>p</i> (MC)	α corr
	dry, rainy	4.785	0.001	999	0.001	0.050
Term Lake section \times Season for pairs of levels of factor Zone						
Levels	Groups	<i>t</i>	<i>p</i> perm	Unique perms	<i>p</i> (MC)	α corr
(D)	center, wetland	3.545	0.010	84	0.002	0.008
	south, wetland	3.018	0.019	84	0.002	0.013
	north, wetland	3.286	0.013	84	0.003	0.021
	north, south	1.253	0.177	10	0.257	0.042
	north, center	0.929	0.578	10	0.458	0.046

	center, south	0.793	0.805	10	0.549	0.050
(R)	center, wetland	3.775	0.011	84	0.001	0.004
	south, wetland	3.751	0.015	84	0.002	0.017
	north, wetland	2.687	0.010	84	0.008	0.025
	north, center	1.964	0.095	10	0.082	0.029
	center, south	1.561	0.199	10	0.119	0.033
	north, south	1.523	0.088	10	0.146	0.038
Term Lake section × Season for pairs of levels of factor Season						
Levels	Groups	<i>t</i>	<i>p</i> perm	Unique perms	<i>p</i> (MC)	α corr
(W)	dry, rainy	3.536	0.003	414	0.001	0.013
(N)	dry, rainy	2.944	0.098	10	0.011	0.025
(C)	dry, rainy	2.795	0.107	10	0.018	0.038
(S)	dry, rainy	1.578	0.102	10	0.116	0.050