Supplementary Information

Table S1. Mean (±SD) temperature, salinity, oxygen, and PAR for the reference plot (ambient) and within the control and experimental enclosures for each month before and during the acidification period.

		Temp (ºC)						Salinity						Oxygen (μmol O_2 kg^{-1})							PAR (mol photons m^{-2} d^{-1})					
	N	Reference		Control		Experimental		Reference		Control		Experimental		Reference		Control		Experimental		n	Reference		Control		Experimental	
Month in *Period*	Samples	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	days	Mean	SD	Mean	SD	Mean	SD
Before																										
May	11840	17.7	0.5	17.8	0.4	17.8	0.4	37.76	0.06	37.72	0.06	37.76	0.06	254	14	250	27	251	29	8-12	5.36	2.27	6.13	2.25	5.41	1.64
June	8119	18.7	0.7	18.7	0.7	18.7	0.7	37.81	0.04	37.77	0.04	37.80	0.04	266	21	266	31	270	34	9-10	7.70	0.65	7.27	0.88	6.22	0.71
Acidification																										
June	6226	22.0	0.5	22.0	0.5	22.1	0.5	37.90	0.03	37.85	0.04	37.89	0.03	246	21	246	33	248	33	6	4.65	3.25	6.75	1.55	6.15	1.25
July	21007	22.9	0.5	23.0	0.5	23.0	0.5	37.89	0.04	37.84	0.04	37.91	0.05	231	18	233	33	233	34	24-25	6.15	1.47	6.21	1.28	4.99	1.40
August	22682	24.1	0.7	24.2	0.7	24.2	0.7	37.93	0.03	37.89	0.03	37.99	0.03	216	16	212	28	215	30	26-28	5.63	0.72	5.87	0.90	5.36	0.79
September	21854	23.2	0.4	23.2	0.4	23.3	0.3	37.98	0.06	38.03	0.13	38.09	0.09	210	14	206	23	205	23	25-26	4.37	1.27	4.23	1.39	4.11	1.12
October	22420	22.5	0.6	22.5	0.6	22.5	0.6	37.93	0.11	38.09	0.03	38.16	0.04	205	9	197	13	195	17	28	2.55	0.63	2.07	0.51	1.95	0.48
November	5377	20.5	0.4	20.6	0.5	20.5	0.5	37.90	0.11	38.03	0.07	37.64	0.08	211	6	198	13	193	33	5	1.78	1.03	1.30	0.84	1.40	0.93
Before	24334	18.5	1.2	18.5	1.1	18.1	1.1	37.79	0.06	37.75	0.06	37.79	0.06	258	19	254	31	258	32	20-27	6.61	1.84	6.45	2.09	5.61	1.47
Acidification	95711	23.1	0.9	23.1	0.9	23.1	0.9	37.93	0.06	37.96	0.13	38.02	0.12	217	19	213	30	213	32	113-116	4.56	1.85	4.60	2.07	4.11	1.73

Table S2. Statistical results from a two-way ANOVA with repeated measures and a two-way permutational MANOVA examining for changes in the benthic macrophyte structure. Pairwise comparisons are included when a significant main effect was found (*, $P < 0.05$). NS refers to no significant pairwise results ($P > 0.05$) and treatments are referred to by R, C, and E for reference, control, and experimental, respectively.

Change in shoot density	**RM-Two-way ANOVA**			**Pairwise comparisons**
	df	F	*P*	
Treatment	2	0.69	0.538	
Quadrat (Treatment)	6			
Month	4	3.63	0.020*	NS
Treatment x Month	8	1.17	0.362	
Percent cover	**Permutational MANOVA**			**Pairwise comparisons**
	df	Pseudo - F	*P*(MC)	
Treatment	2	2.74	0.046*	E ≠ C*, R = C, R = E,
Month	5	1.35	0.226	
Treatment x Month	10	1.02	0.461	

Table S3. Statistical results from a two-way ANOVA (used for # of leaves per shoot after a transformation) or permutational MANOVA (all other measures) used to test for main effects of treatment (experimental, control, and plot), month, and an interaction for leaf biometrics. For the permutational test, data were permutated 999 times and the reported *P*-value is the result of a Monte-Carlo simulation.

Leaf biometric	df	F/Pseudo- F	*P* or *P(MC)*
Average shoot height			
Treatment	2	1.19	0.299
Month	7	41.11	0.001*
Treatment x Month	14	1.26	0.219
# of leaves per shoots (exponential transformation)			
Treatment	2	7.44	0.017*
Month	7	4.14	0.001*
Treatment x Month	14	1.65	0.069
Leaf thickness			
Treatment	2	4.05	0.019*
Month	3	14.98	0.001*
Treatment x Month	6	2.16	0.050*
Leaf toughness			
Treatment	2	21.81	0.021*
Month	2	3.72	0.001*
Treatment x Month	4	1.31	0.256

Table S4. Results of pairwise comparisons for the number of leaves per shoot (Tukey's HSD pairwise comparison) and average shoot height (permutational (999) pairwise with a Monte-Carlo simulation) when the main effect was significant ($P < 0.05$). * indicates significance. Treatment refers to experimental or control enclosures or reference plot.

Leaf biometric	Pairwise Comparison	*P* or *P (MC)*
# of leaves per shoots (e^x)		
Treatment	Control *vs* Reference	0.011*
	Control *vs* Experimental	0.323
	Experimental *vs* Reference	0.292
Month	April *vs* May	1.000
	April *vs* June	0.662
	April *vs* July	0.465
	April *vs* August	0.816
	April *vs* September	0.840
	April *vs* October	0.009*
	May *vs* June	0.532
	May *vs* July	0.368
	May *vs* August	0.687
	May *vs* September	0.713
	May *vs* October	0.091
	June *vs* July	1.000
	June *vs* August	1.000
	June *vs* September	0.999
	June *vs* October	0.001*
	July *vs* August	1.000
	July *vs* September	0.988
	July *vs* October	0.001*
	August *vs* September	1.000
	August *vs* October	0.001*
	September *vs* October	0.001*
Average Shoot Height		
Month	April *vs* May	0.002*
	April *vs* June	0.001*
	April *vs* July	0.001*
	April *vs* August	0.001*
	April *vs* September	0.330
	April *vs* October	0.001*
	April November	0.001*
	May *vs* June	0.084
	May *vs* July	0.001*
	May *vs* August	0.006*
	May *vs* September	0.005*
	May *vs* October	0.001*
	May *vs* November	0.001*
	June *vs* July	0.049*
	June *vs* August	0.160
	June *vs* September	0.001*
	June *vs* October	0.001*
	June *vs* November	0.001*
	July *vs* August	0.918
	July *vs* September	0.001*
	July *vs* October	0.001*
	July *vs* November	0.001*
	August *vs* September	0.001*
	August *vs* October	0.001*
	August *vs* November	0.001*
	September *vs* October	0.001*
	September *vs* November	0.001*
	October *vs* November	0.433

Table S5. Results of permutational (999) pairwise comparison with a Monte-Carlo simulation when main effect was significant ($P < 0.05$) for leaf thickness and toughness. * indicates significance. Treatment refers to enclosures or reference plot.

Significant terms in model	Pairwise comparison	*P* (MC)
Leaf Thickness		
Treatment	Control *vs* Reference	0.685
	Control *vs* Experiment	0.046*
	Experimental *vs* Reference	0.008*
Month	July *vs* September	0.002*
	July *vs* October	0.897
	July *vs* November	0.002*
	September *vs* October	0.011*
	September *vs* November	0.001*
	October *vs* November	0.003*
Treatment x Month	*July*	
	Control *vs* Reference	0.051
	Control *vs* Experimental	0.505
	Experimental *vs* Reference	0.289
	September	
	Control *vs* Reference	0.433
	Control *vs* Experimental	0.246
	Experimental *vs* Reference	0.698
	October	
	Control *vs* Reference	0.893
	Control *vs* Experimental	0.571
	Experimental *vs* Reference	0.687
	November	
	Control *vs* Reference	0.17
	Control *vs* Experimental	0.002*
	Reference *vs* Experimental	0.001*
Leaf toughness		
Treatment	Control *vs* Reference	0.018*
	Control *vs* Experimental	0.888
	Reference *vs* Experimental	0.009*
Month	July *vs* September	0.114
	July *vs* October	0.001*
	September *vs* October	0.001*

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Table S6. Statistical results examining for differences in photo-physiology and respiration by month and treatment (experimental, control, or reference). * indicates significance ($P < 0.05$)

Fluorescence Measure	**df**	**F**	***P***
Dark adapted yield (F_v/F_m)			
Treatment	2	1.54	0.224
Month	3	18.74	0.001*
Treatment x Month	6	1.92	0.093
Alpha			
Treatment	2	0.59	0.559
Month	3	44.56	0.001*
Treatment x Month	6	0.77	0.602
$rETR_{max}$			
Treatment	2	1.35	0.268
Month	3	82.98	0.001*
Treatment x Month	6	0.10	0.996
E_k			
Treatment	2	1.03	0.364
Month	3	32.16	0.001*
Treatment x Month	6	0.24	0.961

Photosynthesis vs. Irradiance Parameter	**df**	**F**	***P***
Alpha (rank)			
Treatment	1	1.14	0.309
Month	1	11.15	0.007*
Treatment x Month	1	0.85	0.376
$P_{g\ max}$ (log)			
Treatment	1	0.03	0.858
Month	1	10.84	0.007*
Treatment x Month	1	0.50	0.492
I_k			
Treatment	1	0.62	0.450
Month	1	0.69	0.426
Treatment x Month	1	0.02	0.896
Respiration			
Treatment	1	1.70	0.219
Month	1	39.70	0.001*
Treatment x Month	1	0.66	0.435
I_c			
Treatment	1	0.10	0.758
Month	1	4.70	0.053
Treatment x Month	1	0.11	0.746
Pigment Analysis	**df**	**F/t-value**	**P**
Total chlorophyll			
Treatment	1	0.08	0.783
Month	1	9.43	0.008*
Treatment x Month	1	2.92	0.110
Chl a:b			
September (T-test)	6	-0.30	0.774
November (Mann-Whitney U)	6	26.00	0.476

Table S7. Statistical results for growth and biomass. Tukey's HSD post host pairwise results are included when main effects were significant (*, $P < 0.05$). Treatments are referred to by E, C, and R for experimental, control, and reference, respectively. Months are abbreviated.

Growth estimate	df	F	*P*	Pairwise comparisons
Plastochrone Interval				
Treatment	2	9.68	0.001*	E = C, R<E*, R<C*
Month	1	0.50	0.483	
Treatment x Month	2	0.37	0.694	
Leaf production				
Treatment	2	5.24	0.009*	E= C, R>E*, R>C*
Month	2	21.57	0.001*	Aug = Sept, Oct>Aug*, Oct>Sept*
Treatment x Month	4	2.03	0.107	
Above-ground biomass				
Treatment	3	1.67	0.226	
Below-ground biomass				
Treatment	3	0.40	0.757	