

Fresh Air for the Mire-Breathing Hypothesis: *Sphagnum* Moss and Peat Structure Regulate the Response of CO₂ Exchange to Altered Hydrology in a Northern Peatland Ecosystem

Ally O'Neill¹, Colin Tucker^{2,*} and Evan S. Kane^{1,2}

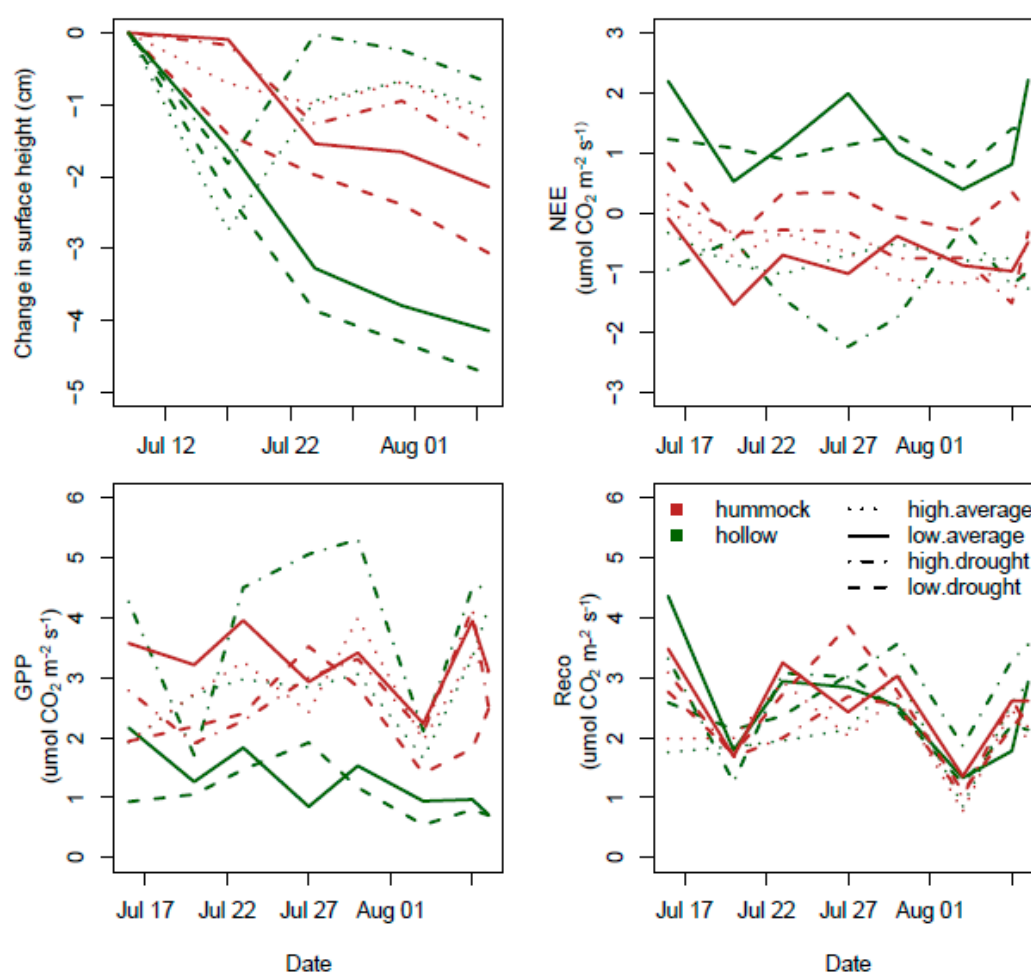


Figure S1. Time series of change in peat height and CO₂ fluxes for the 8 different treatment levels. Please note that the time series for the change in peat height begins 5 days before the time series of CO₂ fluxes because the watering and water table treatments were initiated shortly before the CO₂ flux measurements. The lines represent the mean for each treatment, data points and error bars are not shown because the plot would not be readable. Significant differences are discussed in the main text.

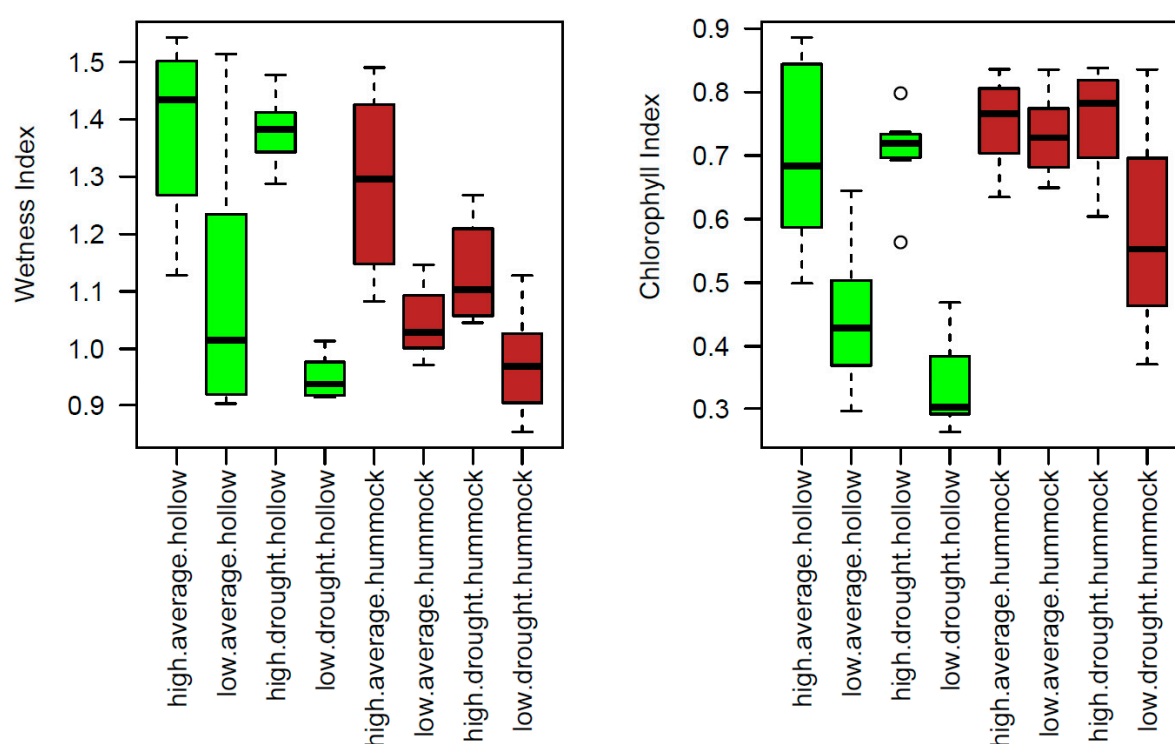


Figure S2. Spectral water content (Wetness Index) and photosynthetic capacity (NDVI) determined at the end of the study using a handheld spectroradiometer. The wetness index was significantly reduced water tables in Hollows, and by both reduced water tables and the interaction of reduced water tables and drought in hummocks, while the chlorophyll index was lowered by reduced water tables in hollows, but only by the combination of reduced water tables and drought in hummocks (see Table S1).

Table S1. Linear mixed effects models evaluating water table (WT), rainfall, landform (hummock or hollow) and their interactive effects on two hyperspectral indexes of peat surface moisture and plant/*Sphagnum* moisture stress. See [36] for details.

Wetness Index	DF	SSq	MSq	F	P
WT	1	1.2459	1.2459	75.643	6.47E-12
rainfall	1	0.146	0.146	8.865	0.00432
Landform	1	0.1354	0.1354	8.22	0.00586
WT x rainfall	1	0.003	0.003	0.182	0.67102
WTxlandform	1	0.1035	0.1035	6.284	0.01517
Rainfall x landform	1	0.0073	0.0073	0.441	0.5092
three way	1	0.0489	0.0489	2.969	0.09049
Chlorophyll Index					
WT	1	0.717	0.717	64.779	7.27E-11
rainfall	1	0.0513	0.0513	4.634	0.035745
Landform	1	0.3743	0.3743	33.814	3.20E-07
WT x rainfall	1	0.0663	0.0663	5.989	0.017616
WT: x landform	1	0.1839	0.1839	16.615	0.000149
Rainfall x landform	1	0.0024	0.0024	0.218	0.642499
three way	1	0.0018	0.0018	0.163	0.687947