Supplementary material for Lång et al.

Table S1: Management of the experimental plots with forage, set-aside or willow treatments in 2018-2023

Year	Forage	Set-aside*	Willow
2018	2018/6/27 sowing + fertilisation (100 kg N + 13 kg P/ha) with Poa trivialis and Festuca pratensis seeds (50%/50%)	2018/9/6 Planting of bog whortleberry	2018/6/14 Planting
2019	2019/5/15 fertilisation (100 kg N/ha) and spot sowing (15kg/ha) with seed mix of Phleum pratense, Festuca pratensis, Lolium multiflorum and Poa pratensis. 2019/5/22 herbicide Ariane S 2 l/ha 2019/6/7 harvest 2019/7/11 harvest 2019/9/2 harvest	2019/5/7: fertilisation (16 kg N/ha) 2019/7/31: fertilisation (8 kg N/ha)	
2020	2020/5/8 fertilisation (100 kg N/ha) 2020/6/16 harvest + fertilisation (100 kg N/ha) 2020/8/19 harvest 2020/9/1 last cut, biomass left on the field	2020/5/27: fertilisation (16 kg N/ha)	
2021	2021/5/12 fertilisation (80 kg N/ha) 2021/6/9 harvest + 2021/6/11 fertilisation (80 kg N/ha) 2021/7/12 harvest and 2021/7/28 fertilisation (40 kg N/ha) 2021/8/30 harvest		2021/2/22: harvest
2022	2022/5/16 fertilisation (80 kg N/ha) 2022/5/31 Spot sowing (15kg/ha) with seed mix of Phleum pratense, Festuca pratensis, Lolium multiflorum and Poa pratensis. 2022/6/16 harvest 2022/7/28 harvest and 2022/8/1 fertilisation (40 kg N/ha) 2022/9/20 harvest		
2023			2023/2/28: harvest

*Planted for bog whortleberry in the first year but turned to set-aside later.

Table S2: Fitted model parameters (±SE) for the estimation of gross photosynthesis (GP) and ecosystem respiration (ER). A_{max} is asymptotic maximum (g CO_2 m^{-2} h^{-1}), k is half-saturation value (µmol photon m^{-2} s^{-1}) n is average number of observations in individual model. $R0_s$ and $R0_p$ are soil respiration and plant respiration at the reference temperature at 10 ˚C, Es is ecosystem sensitivity, b(WTD) is coefficient for water table level. Each combination of treatment and year contains results from four plots except forage in 2021, in which one plot was discarded due to poor model performance.

	Year	Treatment	A_{max}	k	n	R^2
GP	2019	Set-aside	1.6 (0.3)	370 (130)	30	0.30 (0.12)
		Forage	5.3 (0.5)	870 (180)	35	0.88 (0.002)
	2020	Set-aside	4.3e11	1.0e14	8	0.75 (0.06)
		Forage	7.2 (1.6)	970 (340)	42	0.80 (0.02)
	2021	Set-aside	7.5 (2.4)	2000 (820)	45	0.65 (0.08)
		Forage	3.5 (0.2)	280 (70)	45	0.58 (0.08)
	2022	Set-aside	5.4 (0.6)	400 (100)	72	0.87 (0.04)
		Forage	5.2 (0.4)	380 (46)	70	0.91 (0.02)

	Year	Treatment	$R0_s$	$R0_p$	Es	b (WTD)	b p-value	n	R^2
ER	2019	Set-aside	0.31 (0.14)	0.28 (0.21)	780 (380)	-0.06 (0.09)	0.45 (0.17)	30	0.74 (0.07)
		Forage	0.41 (0.06)	0.42 (0.08)	360 (30)	-0.09 (0.09)	0.80 (0.09)	31	0.81 (0.01)
	2020	Set-aside	0.29 (0.04)	1.36 (0.43)	210 (50)	0.01 (0.19)	0.45 (0.09)	24	0.84 (0.04)
		Forage	-0.07 (0.10)	0.83 (0.09)	740 (500)	-1.2 (0.2)	0.28 (0.15)	34	0.56 (0.04)
	2021	Set-aside	0.20 (0.06)	0.51 (0.02)	450 (130)	-0.44 (0.21)	0.44 (0.19)	31	0.67 (0.01)
		Forage	0.26 (0.13)	0.46 (0.12)	670 (180)	-0.65 (0.11)	0.13 (0.07)	31	0.68 (0.06)
	2022	Set-aside	0.21 (0.02)	0.86 (0.09)	690 (20)	-0.45 (0.14)	0.43 (0.17)	41	0.82 (0.02)
		Forage	0.13 (0.09)	0.67 (0.12)	360 (160)	-0.82 (0.28)	0.35 (0.13)	40	0.74 (0.02)

*Due to poor growth on the set-aside plots in 2019 and 2020, only a few GP measurements were made in 2020.
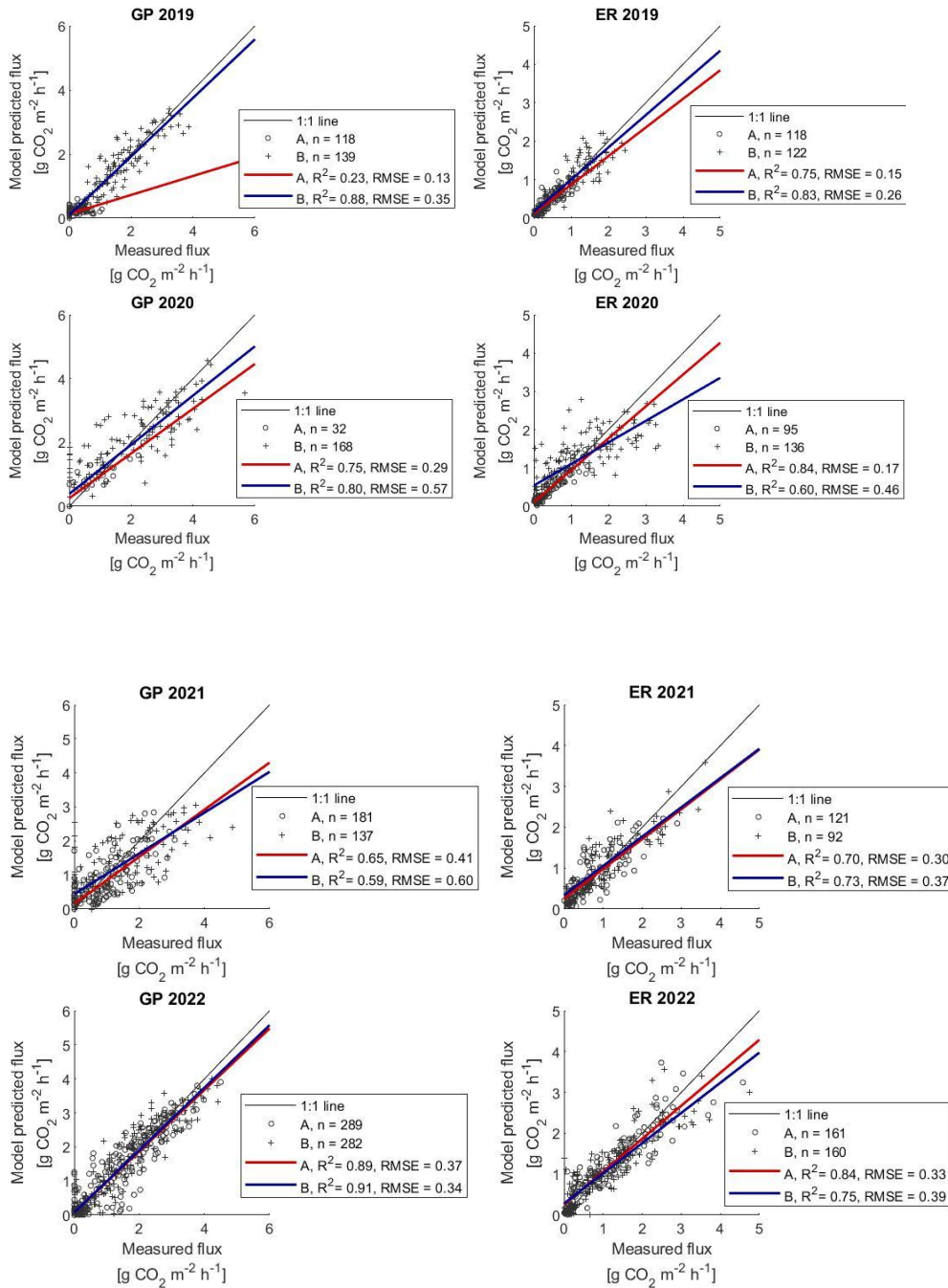
Figure S1: Comparisons between the measured and the model predicted values (g CO_2 m^{-2} h^{-1}) of gross photosynthesis (GP) and ecosystem respiration (ER) for the set-aside (A) and grass (B) treatments in 2018-2022. Outliers are excluded. Black lines represent the 1:1 line and the red and blue lines linear regression between the measured and modelled values.

Table S3: Model parameters for soil respiration

Year	Treatment	R0	WTD	R2		
2019	Willow	0.92 (0.01)	0.27 (0.02)	0.76 (0.02)		
	Set-aside	0.58 (0.05)	0.10 (0.03)	0.67 (0.03)		
	Forage	0.70 (0.14)	0.03 (0.10)	0.71 (0.05)		
2020	Willow	0.44 (0.01)	-0.12 (0.03)	0.71 (0.06)		
	Set-aside	0.38 (0.06)	-0.24 (0.10)	0.47 (0.02)		
	Forage	0.34 (0.02)	-0.22 (0.20)	0.53 (0.07)		
2021	Willow	0.39 (0.07)	-0.28 (0.07)	0.39 (0.05)		
	Set-aside	0.32 (0.07)	-0.70 (0.18)	0.74 (0.03)		
	Forage	0.38 (0.11)	-0.15 (0.12)	0.46 (0.08)		
2022	Willow	0.20 (0.10)	-1.25 (0.39)	0.71 (0.02)		
	Set-aside	0.20 (0.06)	-1.71 (0.30)	0.45 (0.05)		
	Forage	0.03 (0.05)	-1.48 (0.14)	0.43 (0.07)		

Year	Treatment	R0	Es	WTD	n	R2
2019	Willow	0.68 (0.14)	460 (80)	-0.02 (0.19)	22	0.76 (0.03)
	Set-aside	0.28 (0.10)	1000 (400)	-0.24 (0.07)	18	0.68 (0.03)
	Forage	0.55 (0.12)	400 (30)	-0.16 (0.07)	18	0.71 (0.05)
2020	Willow	0.45 (0.05)	310 (20)	-0.11 (0.07)	22	0.70 (0.06)
	Set-aside	0.43 (0.11)	300 (30)	-0.11 (0.20)	23	0.45 (0.03)
	Forage	0.43 (0.10)	310 (60)	-0.05 (0.14)	24	0.53 (0.08)
2021	Willow	0.22 (0.10)	970 (360)	-0.36 (0.07)	19	0.51 (0.10)
	Set-aside	0.18 (0.06)	690 (110)	-0.72 (0.16)	18	0.80 (0.03)
	Forage	0.17 (0.09)	1500 (600)	-0.33 (0.12)	17	0.68 (0.08)
2022	Willow	0.07 (0.07)	470 (140)	-1.48 (0.44)	19	0.72 (0.02)
	Set-aside	0.06 (0.01)	610 (140)	-1.96 (0.18)	23	0.49 (0.06)
	Forage	0.00 (0.02)	830 (880)	-1.55 (0.12)	21	0.44 (0.08)
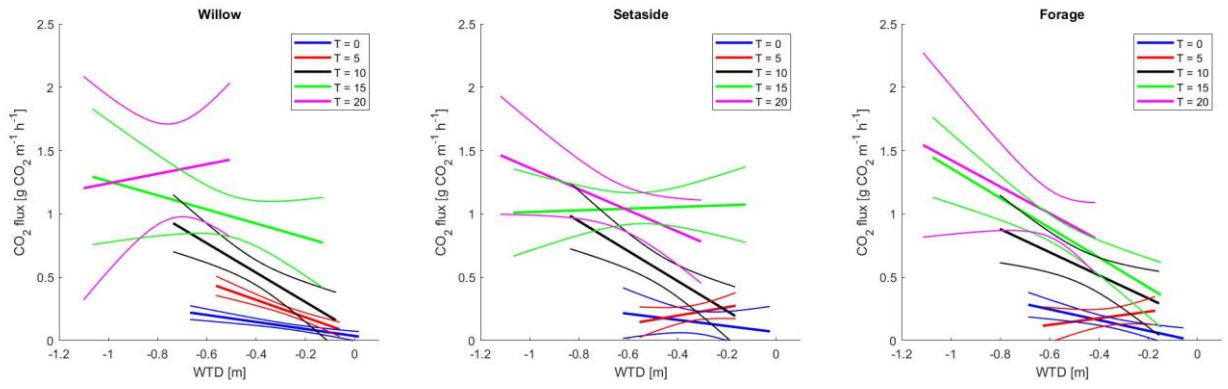
Figure S2: Bare soil respiration (with 95% confidence intervals) in relation to WTD in varying soil temperature conditions.