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Supplementary Material

Understanding the spatiotemporal dynamics of understorey biomass in semi-arid woodlands of south-eastern Australia

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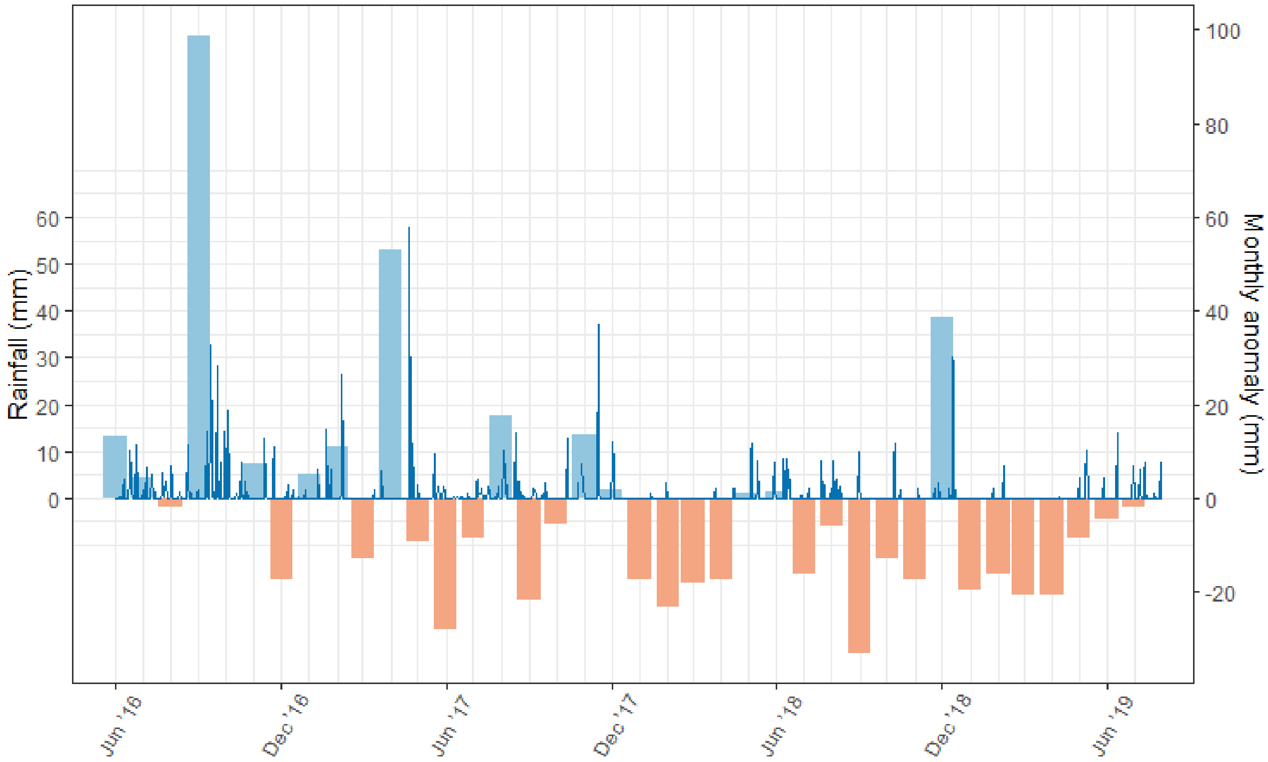
Fig. S1.

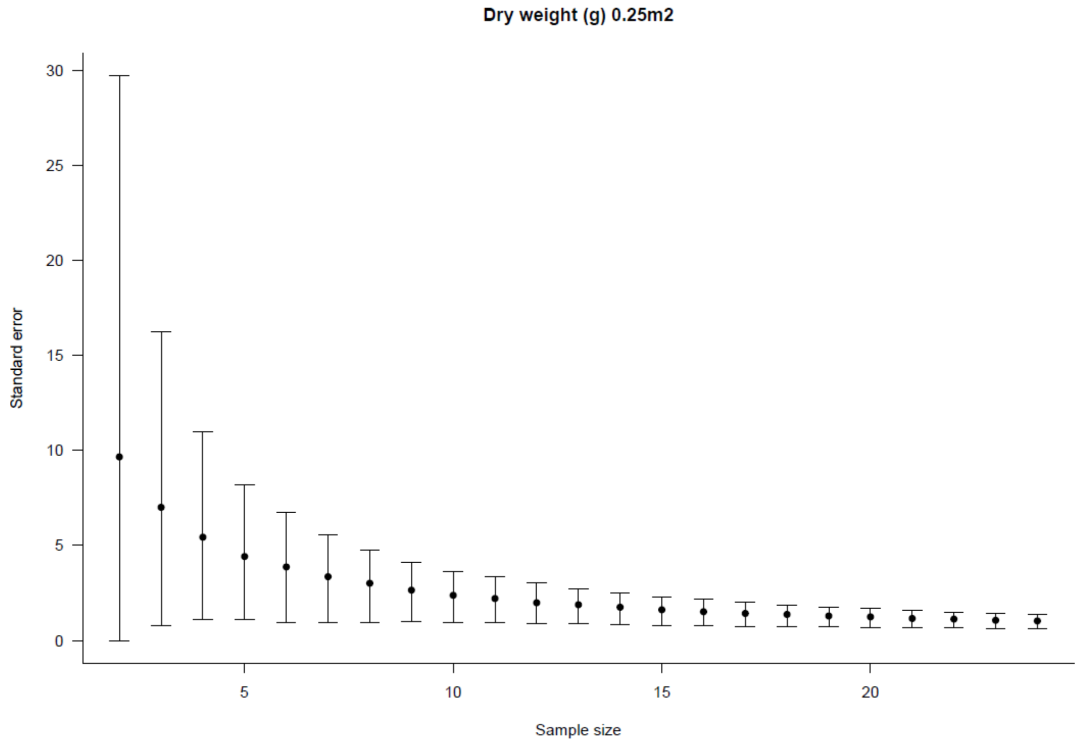


Rainfall (mm)
60
50
40
30
20
10
0
100
80
60
40
20
0
-20
Monthly anomaly (mm)
Jun '16
Dec '16
Jun '17
Dec '17
Jun '18
Dec '18
Jun '19

Pilot studies

Pilot studies were carried out to gauge the amount of sampling effort required for biomass clipping. At a test site, two transects (each 100 m in length) were set up. To test clipping times, six 1 m^2 quadrats were clipped along each of the transects (total 12 m^2) using two different quadrat sizes: 0.25 m^2 and 1 m^2. On average, it took one person 1.5 hours to clip an entire transect (6 m^2). Curiously, the smaller quadrats were faster to clip than the larger quadrats even though total area clipped was the same; however, this variation could have been due to the person clipping. We decided to clip using the smaller quadrat, as it would allow for more quadrats to be distributed across the plot. It also allowed the sampler to view the entire quadrat at once, without having to scan over a larger area, and therefore facilitating species ranking. Clippings were dried and weighed; standard errors of mean understorey biomass weights for different sample sizes were then plotted and visually analysed (Fig. S2). There was a relatively small decrease in standard error after 10 samples. It was initially decided that in each plot, 10 biomass quadrats would be clipped (50 cm x 50 cm; total 2.5 m^2). In the first field season, biomass was not separated into live and dead. In subsequent seasons, we decided to separate biomass; this increased time at each quadrat, hence, we finally decided to sample 5 quadrats per site to maximise the number of sites visited each season.

Fig. S2.


Dry weight (g) 0.25m2
Standard error
Sample size
0
5
10
15
20
25
30
5
10
15
20

Field methods

At each site, a tape was run out at 90° from the bottom-left corner (point 1) for 90 m to the top-right corner (point 2) (Fig. S3). A tape was then run out from point 1 at 45°, which became transect 1, then another from point 2 at 315°, which became transect 2. Only the edge between points 1 and 2 was marked out to save time and maximise the number of plots sampled in the field. Coordinates were recorded using a GPS at each corner, though the coordinates recorded at point 1 became the overall site coordinates.

In the first field season, quadrats were laid out at 20 m, 40 m, 60 m, 80 m, and 100 m along each transect (total of 10 per site). From the second field season onwards, 5 quadrats were sampled at each site (Fig. S3). Three quadrats were placed along transect 1: at 42 m, at 63 m (intersection of transects), and at 84 m. Two were placed along transect 2: at 42 m, and at 84 m. These quadrat locations were chosen to focus sampling on the centre pixel (30 m^2) at each site. Quadrats were used for biomass clipping and for estimating relative species composition using the dry-weight-rank method developed by Mannetje and Haydock (1963).

Fig. S3.

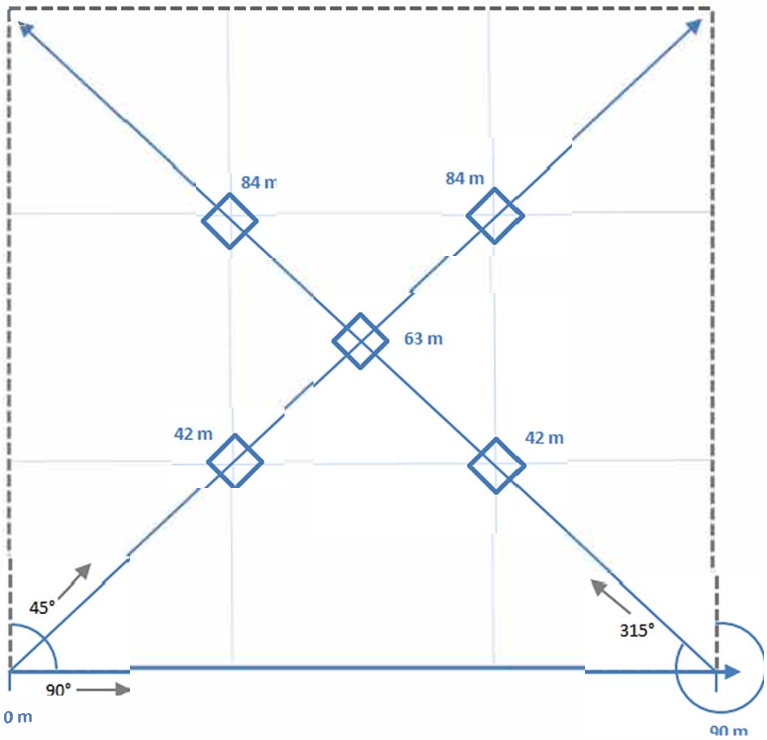
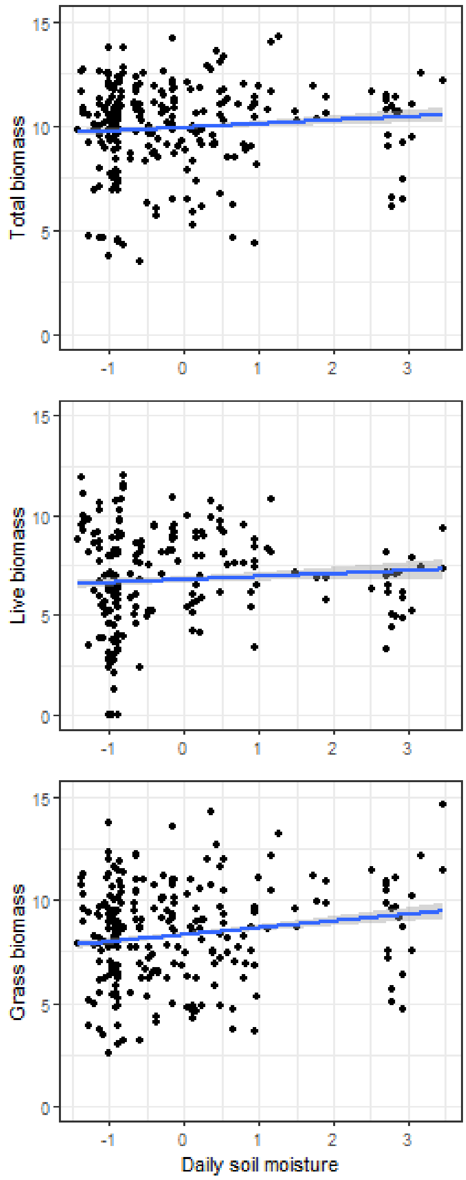


Fig. S4.



Total biomass
Live biomass
Grass biomass
Daily soil moisture

Fig. S5.

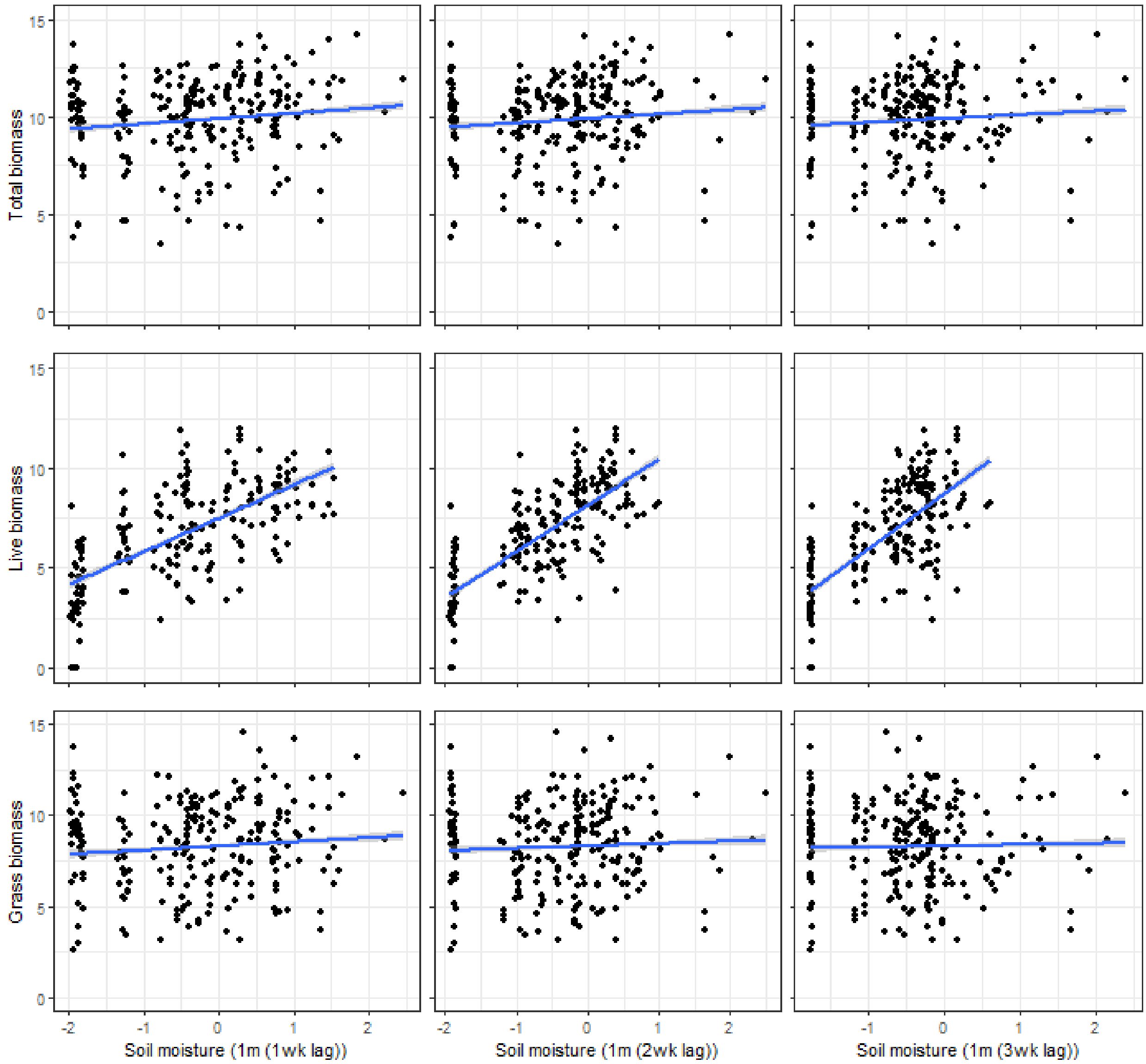
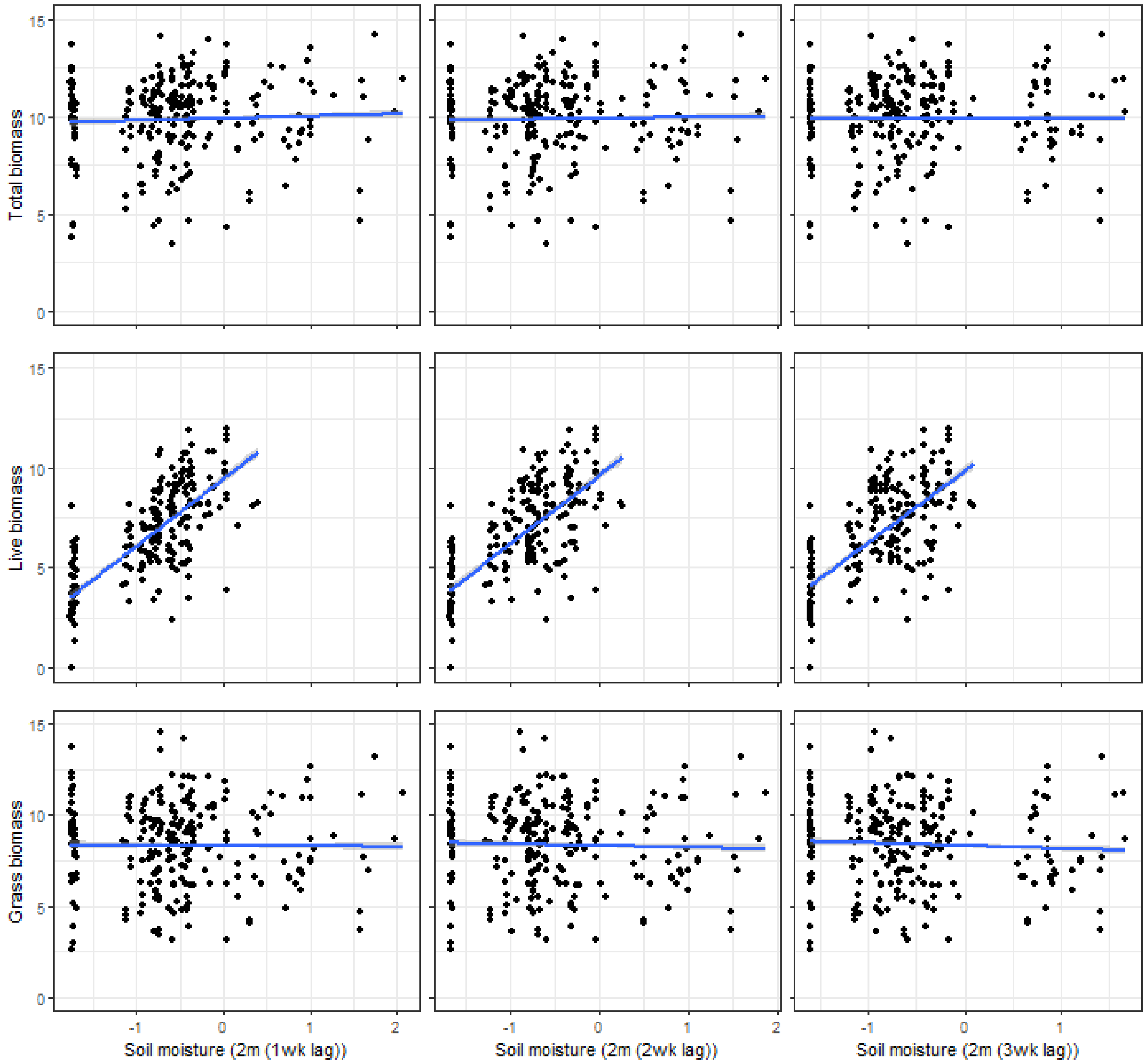
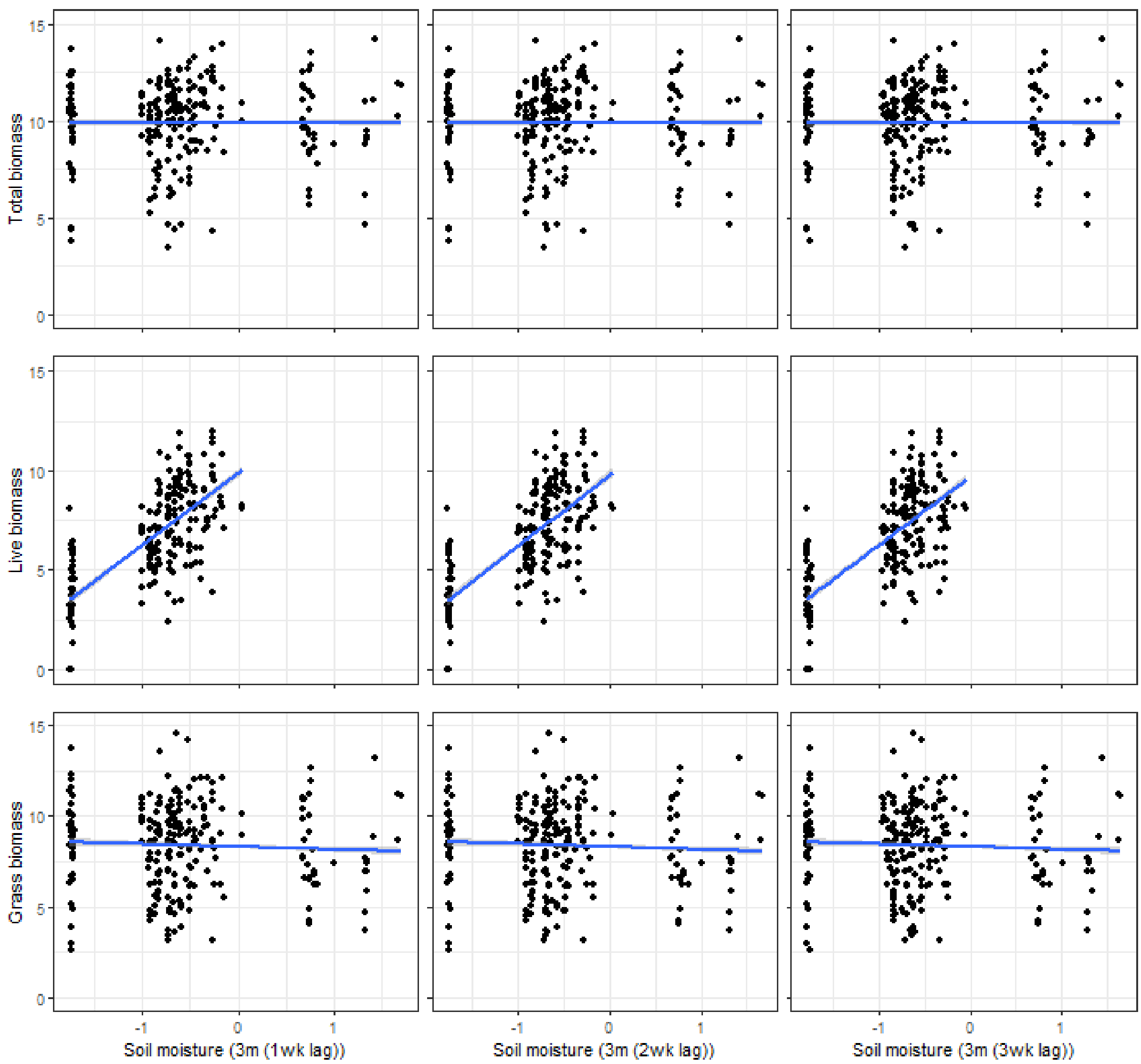

Total biomass
Live biomass
Grass biomass
Soil moisture (1m (1wk lag))
Soil moisture (1m (2wk lag))
Soil moisture (1m (3wk lag))

Fig. S6.



15
10
5
0
Total biomass
Live biomass
Grass biomass
-1
0
1
2
Soil moisture (2m (1wk lag))
Soil moisture (2m (2wk lag))
Soil moisture (2m (3wk lag))

Fig. S7.



Total biomass
Live biomass
Grass biomass
Soil moisture (3m (1wk lag))
Soil moisture (3m (2wk lag))
Soil moisture (3m (3wk lag))

Fig. S8.

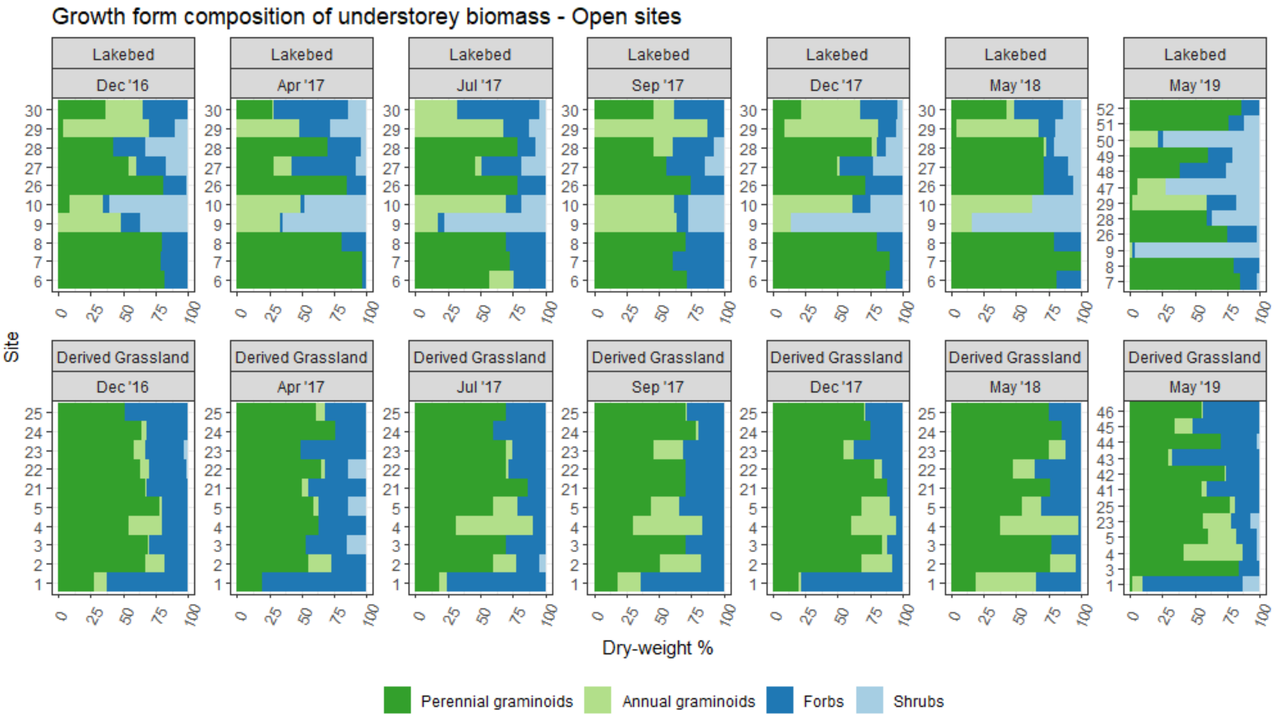

Growth form composition of understorey biomass - Open sites
Lakebed
Dec '16
Apr '17
Jul '17
Sep '17
Dec '17
May '18
May '19
Derived Grassland
Site
Dry-weight %
Perennial graminoids
Annual graminoids
Forbs
Shrubs

Fig. S9.

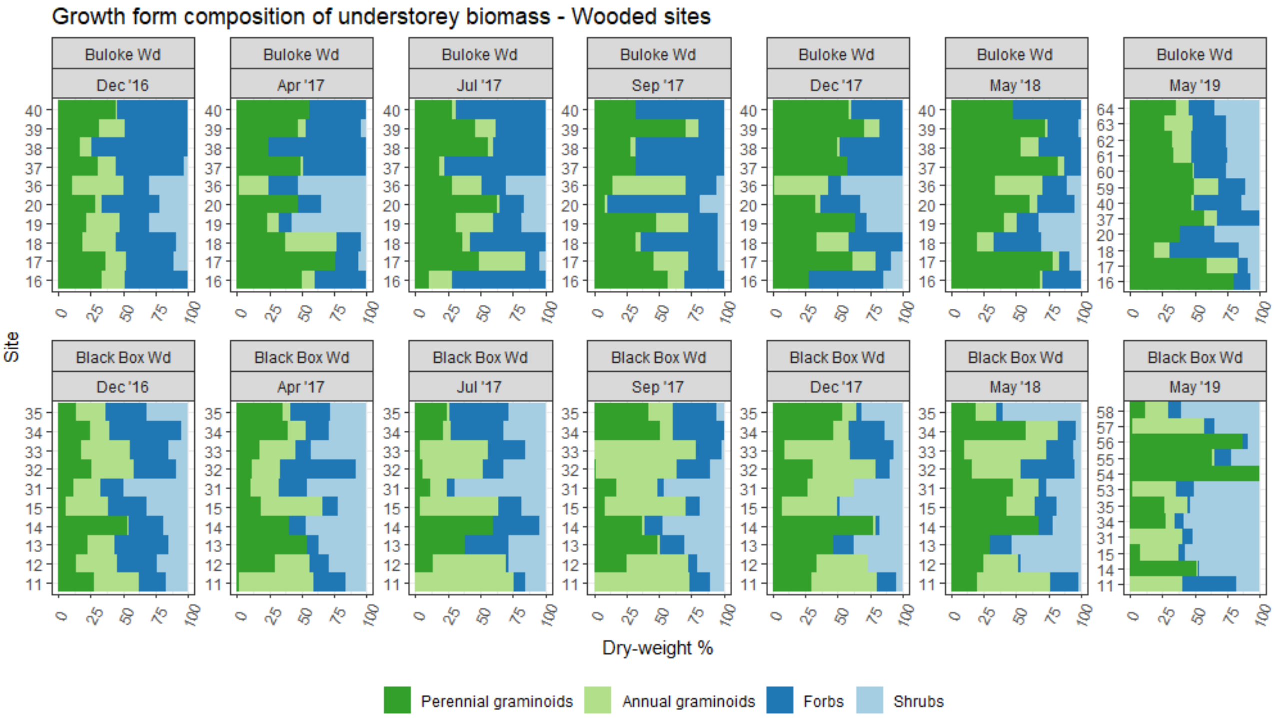

Growth form composition of understorey biomass - Wooded sites
Buloke Wd
Black Box Wd
Dec '16
Apr '17
Jul '17
Sep '17
Dec '17
May '18
May '19
Site
Dry-weight %
Perennial graminoids
Annual graminoids
Forbs
Shrubs

Table S1.

Model	AIC	ΔAIC	R^2m	R^2c	DF	Akaike weight
TOTAL ~ SM (2-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4726.55	0	0.3866	0.8663	9	0.936964
TOTAL ~ SM (3-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4733.21	6.66	0.3816	0.8683	11	0.033506
TOTAL ~ SM (3-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4734.89	8.34	0.3866	0.8655	9	0.014479
TOTAL ~ SM (3-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4736.65	10.10	0.3864	0.8654	9	0.006012
TOTAL ~ SM (3-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4737.13	10.58	0.3863	0.8654	9	0.004733
TOTAL ~ SM (3-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4738.55	12.00	0.3863	0.8653	9	0.002326
TOTAL ~ SM (2-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4741.44	14.89	0.3823	0.8672	11	0.000548
TOTAL ~ SM (2-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4741.63	15.08	0.3864	0.8649	9	0.000499
TOTAL ~ SM (1-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4741.77	15.22	0.3842	0.8669	11	0.000465
TOTAL ~ SM (3-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4742.24	15.69	0.3813	0.8676	11	0.000367
TOTAL ~ SM (3-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4746.74	20.19	0.3811	0.8672	11	3.87E-05
TOTAL ~ SM (3-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4747.82	21.27	0.3810	0.8671	11	2.25E-05

TOTAL ~ SM (1-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4748.01	21.46	0.3869	0.8643	9	2.05E-05
TOTAL ~ SM (1-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4748.34	21.79	0.3857	0.8640	8	1.74E-05
TOTAL ~ SM (2-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4752.63	26.08	0.3861	0.8639	9	2.03E-06
TOTAL ~ SM (2-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4757.53	30.98	0.3814	0.8658	11	1.75E-07
TOTAL ~ SM (2-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4759.39	32.84	0.3862	0.8633	9	6.93E-08
TOTAL ~ SM (1-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4761.80	35.25	0.3863	0.8630	9	2.08E-08
TOTAL ~ SM (2-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4771.58	45.03	0.3807	0.8646	11	1.56E-10
TOTAL ~ SM (1-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4772.47	45.92	0.3853	0.8623	9	1.00E-10
TOTAL ~ SM (2-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4773.69	47.14	0.3802	0.8646	11	5.43E-11
TOTAL ~ SM (1-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4775.28	48.73	0.3818	0.8637	11	2.45E-11
TOTAL ~ SM (1-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4777.58	51.02	0.3852	0.8618	9	7.80E-12
TOTAL ~ SM (1-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4779.02	52.47	0.3833	0.8617	8	3.78E-12
TOTAL ~ SM (1-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4785.09	58.54	0.3812	0.8633	11	1.82E-13
TOTAL ~ SM (2-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4790.32	63.77	0.3821	0.8609	8	1.33E-14

TOTAL ~ SM (1-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4791.90	65.35	0.3809	0.8623	11	6.04E-15
TOTAL ~ SM (2-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4795.69	69.14	0.3818	0.8605	8	9.10E-16
TOTAL ~ SM (3-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4795.87	69.32	0.3817	0.8605	8	8.30E-16
TOTAL ~ SM (3-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4796.43	69.88	0.3817	0.8605	8	6.29E-16
TOTAL ~ SM (3-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4796.69	70.13	0.3817	0.8604	8	5.52E-16
TOTAL ~ SM (3-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4796.93	70.38	0.3817	0.8604	8	4.88E-16
TOTAL ~ SM (1-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4797.56	71.01	0.3819	0.8603	8	3.57E-16
TOTAL ~ SM (1-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4798.27	71.72	0.3817	0.8603	8	2.50E-16
TOTAL ~ SM (2-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4798.48	71.93	0.3817	0.8603	8	2.25E-16
TOTAL ~ SM (2-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4798.97	72.42	0.3817	0.8602	8	1.76E-16

Table S2.

Model	AIC	ΔAIC	R2m	R2c	DF	Akaike weight
LIVE ~ SM (1-month mean + 2-week lag) * CANOPY + DOM_GF + εi	3452.94	0	0.6172	0.7705	9	0.999999
LIVE ~ SM (1-month mean + 2-week lag) * DOM_GF + CANOPY + εi	3499.53	46.59	0.5939	0.7649	11	7.64E-11
LIVE ~ SM (1-month mean + 2-week lag) + CANOPY + DOM_GF + εi	3546.66	93.73	0.5860	0.7476	8	4.44E-21
LIVE ~ SM (2-month mean + 1-week lag) * CANOPY + DOM_GF + εi	3578.61	125.67	0.5894	0.7362	9	5.15E-28
LIVE ~ SM (2-month mean + 1-week lag) * DOM_GF + CANOPY + εi	3600.89	147.95	0.5696	0.7377	11	7.47E-33
LIVE ~ SM (3-month mean + 2-week lag) * CANOPY + DOM_GF + εi	3639.10	186.16	0.5725	0.7241	9	3.76E-41
LIVE ~ SM (3-month mean + 1-week lag) * CANOPY + DOM_GF + εi	3639.43	186.50	0.5726	0.7251	9	3.18E-41
LIVE ~ SM (2-month mean + 1-week lag) + CANOPY + DOM_GF + εi	3655.19	202.25	0.5609	0.7139	8	1.21E-44
LIVE ~ SM (3-month mean + 1-week lag) * DOM_GF + CANOPY + εi	3664.06	211.12	0.5485	0.7294	11	1.43E-46
LIVE ~ SM (3-month mean + 2-week lag) * DOM_GF + CANOPY + εi	3666.68	213.75	0.5473	0.7281	11	3.85E-47
LIVE ~ SM (1-month mean + 3-week lag) * CANOPY + DOM_GF + εi	3715.85	262.92	0.5502	0.6942	9	8.09E-58
LIVE ~ SM (3-month mean + 3-week lag) * CANOPY + DOM_GF + εi	3723.66	270.73	0.5484	0.6990	9	1.63E-59

LIVE ~ SM (3-month mean + 1-week lag) + CANOPY + DOM_GF + εi	3730.15	277.21	0.5385	0.6958	8	6.37E-61
LIVE ~ SM (3-month mean + 2-week lag) + CANOPY + DOM_GF + εi	3735.39	282.45	0.5366	0.6929	8	4.64E-62
LIVE ~ SM (2-month mean + 2-week lag) * CANOPY + DOM_GF + εi	3738.00	285.06	0.5461	0.6808	9	1.26E-62
LIVE ~ SM (1-month mean + 3-week lag) * DOM_GF + CANOPY + εi	3738.80	285.87	0.5314	0.6957	11	8.40E-63
LIVE ~ SM (3-month mean + 3-week lag) * DOM_GF + CANOPY + εi	3749.28	296.34	0.5230	0.7057	11	4.46E-65
LIVE ~ SM (2-month mean + 2-week lag) * DOM_GF + CANOPY + εi	3765.11	312.17	0.5277	0.6780	11	1.63E-68
LIVE ~ SM (1-month mean + 3-week lag) + CANOPY + DOM_GF + εi	3776.26	323.33	0.5238	0.6745	8	6.17E-71
LIVE ~ SM (2-month mean + 2-week lag) + CANOPY + DOM_GF + εi	3808.80	355.86	0.5164	0.6550	8	5.32E-78
LIVE ~ SM (3-month mean + 3-week lag) + CANOPY + DOM_GF + εi	3815.94	363.00	0.5111	0.6662	8	1.50E-79
LIVE ~ SM (1-month mean + 1-week lag) * CANOPY + DOM_GF + εi	3819.99	367.05	0.5181	0.6616	9	1.97E-80
LIVE ~ SM (3-month mean + 1-month lag) * CANOPY + DOM_GF + εi	3852.68	399.75	0.5077	0.6538	9	1.57E-87
LIVE ~ SM (1-month mean + 1-week lag) * DOM_GF + CANOPY + εi	3857.11	404.17	0.4959	0.6540	11	1.72E-88
LIVE ~ SM (3-month mean + 1-month lag) * DOM_GF + CANOPY + εi	3877.03	424.09	0.4831	0.6631	11	8.12E-93
LIVE ~ SM (2-month mean + 3-week lag) * CANOPY + DOM_GF + εi	3878.66	425.72	0.4987	0.6311	9	3.59E-93

LIVE ~ SM (1-month mean + 1-week lag) + CANOPY + DOM_GF + εi	3889.99	437.06	0.4845	0.6353	8	1.24E-95
LIVE ~ SM (2-month mean + 3-week lag) * DOM_GF + CANOPY + εi	3907.72	454.79	0.4795	0.6269	11	1.75E-99
LIVE ~ SM (3-month mean + 1-month lag) + CANOPY + DOM_GF + εi	3936.32	483.38	0.4695	0.6190	8	1.09E-105
LIVE ~ SM (2-month mean + 3-week lag) + CANOPY + DOM_GF + εi	3941.10	488.17	0.4687	0.6046	8	9.91E-107
LIVE ~ SM (2-month mean + 1-month lag) * CANOPY + DOM_GF + εi	3970.55	517.62	0.4643	0.5955	9	3.99E-113
LIVE ~ SM (2-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4001.56	548.63	0.4438	0.5898	11	7.36E-120
LIVE ~ SM (2-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4030.34	577.41	0.4332	0.5671	8	4.15E-126
LIVE ~ SM (1-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4080.83	627.89	0.4155	0.5374	9	4.52E-137
LIVE ~ SM (1-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4093.81	640.87	0.4041	0.5389	11	6.87E-140
LIVE ~ SM (1-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4115.56	662.62	0.3943	0.5192	8	1.30E-144

Table S3.

Model	AIC	ΔAIC	R^2m	R^2c	DF	Akaike weight
GRASS ~ SM (2-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4667.85	0	0.4602	0.8926	9	0.999991
GRASS ~ SM (2-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4691.41	23.56	0.4593	0.8909	9	7.66E-06
GRASS ~ SM (3-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4694.73	26.88	0.4589	0.8909	9	1.46E-06
GRASS ~ SM (3-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4700.00	32.15	0.4585	0.8906	9	1.04E-07
GRASS ~ SM (3-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4702.20	34.35	0.4584	0.8905	9	3.47E-08
GRASS ~ SM (3-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4703.90	36.05	0.4583	0.8904	9	1.49E-08
GRASS ~ SM (2-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4714.53	46.69	0.4582	0.8894	9	7.28E-11
GRASS ~ SM (1-month mean + 1-month lag) * CANOPY + DOM_GF + εi	4714.74	46.89	0.4588	0.8890	9	6.58E-11
GRASS ~ SM (2-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4739.59	71.75	0.4572	0.8877	9	2.63E-16
GRASS ~ SM (1-month mean + 3-week lag) * CANOPY + DOM_GF + εi	4774.06	106.21	0.4552	0.8854	9	8.64E-24
GRASS ~ SM (2-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4805.06	137.21	0.4525	0.8834	8	1.60E-30
GRASS ~ SM (2-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4809.71	141.86	0.4547	0.8833	11	1.57E-31

GRASS ~ SM (2-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4823.17	155.32	0.4513	0.8822	8	1.87E-34
GRASS ~ SM (2-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4830.31	162.47	0.4530	0.8819	11	5.26E-36
GRASS ~ SM (3-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4832.44	164.59	0.4507	0.8817	8	1.82E-36
GRASS ~ SM (3-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4833.76	165.92	0.4507	0.8816	8	9.37E-37
GRASS ~ SM (1-month mean + 2-week lag) * CANOPY + DOM_GF + εi	4834.79	166.95	0.4522	0.8814	9	5.60E-37
GRASS ~ SM (3-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4835.05	167.20	0.4506	0.8815	8	4.93E-37
GRASS ~ SM (3-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4835.05	167.20	0.4506	0.8815	8	4.93E-37
GRASS ~ SM (3-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4839.75	171.90	0.4525	0.8818	11	4.70E-38
GRASS ~ SM (1-month mean + 1-month lag) + CANOPY + DOM_GF + εi	4840.81	172.96	0.4497	0.8810	8	2.76E-38
GRASS ~ SM (1-month mean + 1-month lag) * DOM_GF + CANOPY + εi	4841.45	173.60	0.4522	0.8808	11	2.01E-38
GRASS ~ SM (2-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4841.71	173.87	0.4500	0.8810	8	1.76E-38
GRASS ~ SM (3-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4842.91	175.06	0.4521	0.8816	11	9.68E-39
GRASS ~ SM (3-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4845.10	177.25	0.4518	0.8814	11	3.24E-39
GRASS ~ SM (3-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4845.60	177.76	0.4518	0.8814	11	2.52E-39

GRASS ~ SM (2-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4851.53	183.68	0.4511	0.8806	11	1.30E-40
GRASS ~ SM (1-month mean + 1-week lag) * CANOPY + DOM_GF + εi	4852.43	184.58	0.4519	0.8803	9	8.28E-41
GRASS ~ SM (2-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4859.74	191.89	0.4489	0.8798	8	2.15E-42
GRASS ~ SM (1-month mean + 3-week lag) + CANOPY + DOM_GF + εi	4870.47	202.62	0.4481	0.8791	8	1.00E-44
GRASS ~ SM (2-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4870.58	202.73	0.4496	0.8794	11	9.50E-45
GRASS ~ SM (1-month mean + 3-week lag) * DOM_GF + CANOPY + εi	4879.57	211.72	0.4487	0.8786	11	1.06E-46
GRASS ~ SM (1-month mean + 1-week lag) * DOM_GF + CANOPY + εi	4880.96	213.12	0.4502	0.8795	11	5.28E-47
GRASS ~ SM (1-month mean + 1-week lag) + CANOPY + DOM_GF + εi	4882.52	214.68	0.4494	0.8780	8	2.42E-47
GRASS ~ SM (1-month mean + 2-week lag) + CANOPY + DOM_GF + εi	4894.20	226.35	0.4475	0.8774	8	7.06E-50
GRASS ~ SM (1-month mean + 2-week lag) * DOM_GF + CANOPY + εi	4901.74	233.89	0.4470	0.8776	11	1.62E-51

Table S4.

Model	AIC	ΔAIC	R^2m	R^2c	DF	Akaike weight
TOTAL ~ SM * CANOPY + DOM_GF + DIST + SILT + ε_i	4769.66	0	0.4411	0.8652	11	0.336562
TOTAL ~ SM * CANOPY + DOM_GF + SILT + ε_i	4769.93	0.27	0.4462	0.8636	10	0.293351
TOTAL ~ SM * CANOPY + DOM_GF + DIST + ε_i	4771.51	1.86	0.3914	0.8642	10	0.133038
TOTAL ~ SM * CANOPY + DOM_GF + ε_i	4772.47	2.82	0.3853	0.8623	9	0.082294
TOTAL ~ SM * CANOPY + DOM_GF + DIST + SAND + ε_i	4773.33	3.68	0.3955	0.8656	11	0.053562
TOTAL ~ SM * CANOPY + DOM_GF + SAND + ε_i	4773.89	4.23	0.3991	0.8638	10	0.040593
TOTAL ~ SM * CANOPY + DOM_GF + DIST + CLAY + ε_i	4774.12	4.46	0.3880	0.8659	11	0.036123
TOTAL ~ SM * CANOPY + DOM_GF + CLAY + ε_i	4774.90	5.24	0.3871	0.8640	10	0.024476

Table S5.

Model	AIC	ΔAIC	R^2m	R^2c	DF	Akaike weight
LIVE ~ SM * CANOPY + DOM_GF + ε_i	3452.94	0	0.6172	0.7705	9	0.288891
LIVE ~ SM * CANOPY + DOM_GF + DIST + ε_i	3453.33	0.39	0.6145	0.7712	10	0.237707
LIVE ~ SM * CANOPY + DOM_GF + CLAY + ε_i	3454.86	1.92	0.6168	0.7690	10	0.110447
LIVE ~ SM * CANOPY + DOM_GF + DIST + CLAY + ε_i	3455.17	2.23	0.6141	0.7701	11	0.094663
LIVE ~ SM * CANOPY + DOM_GF + DIST + SILT + ε_i	3455.40	2.46	0.6182	0.7718	11	0.084469
LIVE ~ SM * CANOPY + DOM_GF + SILT + ε_i	3455.81	2.87	0.6188	0.7716	10	0.068644
LIVE ~ SM * CANOPY + DOM_GF + SAND + ε_i	3456.07	3.14	0.6143	0.7705	10	0.060249
LIVE ~ SM * CANOPY + DOM_GF + DIST + SAND + ε_i	3456.26	3.32	0.6115	0.7716	11	0.054931

Table S6.

Model	AIC	ΔAIC	R^2m	R^2c	DF	Akaike weight
GRASS ~ SM * CANOPY + DOM_GF + DIST + SILT + ε_i	4831.84	0	0.4949	0.8822	11	0.313230
GRASS ~ SM * CANOPY + DOM_GF + SILT + ε_i	4832.18	0.34	0.5001	0.8810	10	0.263866
GRASS ~ SM * CANOPY + DOM_GF + DIST + ε_i	4833.70	1.86	0.4558	0.8825	10	0.123680
GRASS ~ SM * CANOPY + DOM_GF + DIST + SAND + ε_i	4834.59	2.75	0.4633	0.8824	11	0.079390
GRASS ~ SM * CANOPY + DOM_GF + ε_i	4834.79	2.95	0.4522	0.8814	9	0.071568
GRASS ~ SM * CANOPY + DOM_GF + SAND + ε_i	4835.12	3.28	0.4683	0.8811	10	0.060894
GRASS ~ SM * CANOPY + DOM_GF + DIST + CLAY + ε_i	4835.50	3.66	0.4560	0.8828	11	0.050349
GRASS ~ SM * CANOPY + DOM_GF + CLAY + ε_i	4836.11	4.27	0.4586	0.8814	10	0.037023

Fig. S1. Daily rainfall (mm) and mean monthly rainfall anomaly (mm) for Walpeup BoM station (no. 76065).

Fig. S2. Standard error for dry weight of biomass clipped using a 0.25 m^2 (50 cm x 50 cm) quadrat.

Fig. S3. Layout of 90 m x 90 m field site from April 2017 (season 2) onwards. Blue lines represent transects where measuring tapes were placed. Transect 1 began at 0 m (point 1) and transect 2 at 90 m (point 2). Blue squares indicate biomass clipping quadrats.

Fig. S4. Daily soil moisture vs total, live, and grass biomass.

Fig. S5. Comparison of 1-month mean soil moisture with 1-, 2-, and 3-week lags (left to right), and total, live, and grass biomass (top to bottom).

Fig. S6. Comparison of 2-month mean soil moisture with 1-, 2-, and 3-week lags (left to right), and total, live, and grass biomass (top to bottom).

Fig. S7. Comparison of 3-month mean soil moisture with 1-, 2-, and 3-week lags (left to right), and total, live, and grass biomass (top to bottom).

Fig. S8. Growth form composition for open sites over all seasons.

Fig. S9. Growth form composition for woodland sites over all seasons.

Table S1. First round GLMMs exploring relationships between varying soil moisture intervals and total understorey biomass (live & dead, all growth forms). (TOTAL = total understorey biomass, SM = soil moisture, CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form, ε_i = residual error)

Table S2. First round GLMMs exploring relationships between varying soil moisture intervals and live understorey biomass (all growth forms). (LIVE = live understorey biomass, SM = soil moisture, CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form, ε_i = residual error)

Table S3. First round GLMMs exploring relationships between varying soil moisture intervals and grass biomass (live & dead). (GRASS = grass biomass, SM = soil moisture, CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form, ε_i = residual error)

Table S4. Final round GLMMs exploring effects of distance from tree cover and soil texture on total understorey biomass (live & dead, all growth forms). GLMMs based on top-ranked first round live biomass model. (TOTAL = total understorey biomass, SM = soil moisture (1-month window + 2-week lag), CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form), DIST = distance from tree cover, SAND/SILT/CLAY = percentage sand/silt/clay in soil, ε_i = residual error)

Table S5. Final round GLMMs exploring effects of distance from tree cover and soil texture on live understorey biomass (all growth forms). GLMMs based on top-ranked first round live biomass model. (LIVE = live understorey biomass, SM = soil moisture (1-month window + 2-week lag), CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form), DIST = distance from tree cover, SAND/SILT/CLAY = percentage sand/silt/clay in soil, εi = residual error)

Table S6. Final round GLMMs exploring effects of distance from tree cover and soil texture on grass biomass (live & dead). GLMMs based on top-ranked first round live biomass model. (GRASS = grass biomass, SM = soil moisture (1-month window + 2-week lag), CANOPY = canopy type (open vs wooded), DOM_GF = dominant understorey growth form), DIST = distance from tree cover, SAND/SILT/CLAY = percentage sand/silt/clay in soil, ε_i = residual error)