Figure S1. Matrix of vegetation index correlation coefficients.

Table S1. Model outputs for vegetation index-total understorey biomass GLMMs (ε_i = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Greenness + ε_i	4636.27	0	-	0.026	0.897	4	0.8594
Brightness + Greenness + ε_i	4639.89	3.62	1.31, 1.31	0.026	0.897	5	0.1406
SAVI + ε_i	4693.72	57.45	-	0.012	0.881	4	2.8778E-13
MSAVI + ε_i	4696.16	59.89	-	0.012	0.880	4	8.4963E-14
Brightness + SAVI + ε_i	4696.32	60.05	1.48, 1.48	0.013	0.882	5	7.843E-14
Brightness + MSAVI + ε_i	4696.33	60.06	1.39, 1.39	0.013	0.882	5	7.8039E-14
NDVI + ε_i	4700.51	64.24	-	0.012	0.881	4	9.6524E-15
Brightness + NDVI + ε_i	4707.18	70.91	2.3, 2.3	0.012	0.880	5	3.4377E-16
Brightness + EVI + ε_i	4716.97	80.7	1.32, 1.32	0.011	0.879	5	2.5727E-18
EVI + ε_i	4724.17	87.9	-	0.009	0.877	4	7.0296E-20
Brightness + NDMI + ε_i	4726.97	90.7	1.41, 1.41	0.011	0.879	5	1.7335E-20
NDMI + ε_i	4732.87	96.6	-	0.009	0.877	4	9.073E-22
Wetness + ε_i	4753.63	117.36	-	0.007	0.875	4	2.8169E-26
Brightness + ε_i	4760.06	123.79	-	0.008	0.873	4	1.1311E-27

Table S2. Model outputs for vegetation index-live understorey biomass GLMMs (εi = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Brightness + MSAVI + εi	3880.98	0	1.24, 1.24	0.441	0.715	5	0.8839
Brightness + SAVI + εi	3885.04	4.06	1.3, 1.3	0.437	0.718	5	0.1161
Brightness + NDVI + εi	3942.61	61.63	1.99, 1.99	0.418	0.690	5	3.6612E-14
Brightness + EVI + εi	3982.61	101.63	1.16, 1.16	0.407	0.671	5	7.5463E-23
Brightness + Greenness + εi	3989.84	108.86	1.26, 1.26	0.406	0.761	5	2.0312E-24
Brightness + NDMI + εi	4016.79	135.81	1.23, 1.23	0.382	0.675	5	2.8552E-30
MSAVI + εi	4057.41	176.43	-	0.375	0.651	4	4.3164E-39
EVI + εi	4085.80	204.82	-	0.363	0.636	4	2.9533E-45
SAVI + εi	4100.44	219.46	-	0.358	0.640	4	1.9556E-48
Greenness + εi	4149.60	268.62	-	0.362	0.716	4	4.1335E-59
NDMI + εi	4152.19	271.21	-	0.331	0.628	4	1.1322E-59
NDVI + εi	4343.04	462.06	-	0.247	0.500	4	4.0865E-101
Wetness + εi	4505.91	624.93	-	0.15	0.391	4	1.7562E-136
Brightness + εi	4656.05	775.07	-	0.00	0.132	4	4.3863E-169

Table S3. Model outputs for vegetation index-grass biomass GLMMs (εi = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Brightness + Greenness + εi	5154.42	0	1.31, 1.31	0.016	0.878	5	0.8753
Brightness + εi	5158.63	4.21	-	0.014	0.872	4	0.1067
Brightness + NDMI + εi	5165.23	10.81	1.41, 1.41	0.014	0.871	5	0.0039
Brightness + MSAVI + εi	5165.25	10.83	1.39, 1.39	0.014	0.872	5	0.0039
Brightness + SAVI + εi	5165.29	10.87	1.48, 1.48	0.014	0.872	5	0.0038
Brightness + NDVI + εi	5165.32	10.90	2.3, 2.3	0.014	0.872	5	0.0038
Brightness + EVI + εi	5166.02	11.60	1.32, 1.32	0.014	0.872	5	0.0027
NDVI + εi	5204.28	49.86	-	0.006	0.866	4	1.3037E-11
Greenness + εi	5204.89	50.47	-	0.010	0.872	4	9.6102E-12
Wetness + εi	5215.61	61.19	-	0.006	0.864	4	4.5177E-14
SAVI + εi	5225.65	71.23	-	0.004	0.862	4	2.9837E-16
MSAVI + εi	5229.49	75.07	-	0.004	0.861	4	4.3743E-17
EVI + εi	5241.28	86.86	-	0.003	0.859	4	1.2043E-19
NDMI + εi	5243.62	89.20	-	0.002	0.859	4	3.7378E-20

Table S4. Model outputs for vegetation index-total understorey biomass GLMMs with additional variables (S.M. = soil moisture (1-month window + 2-week lag), Tree C. = percentage tree cover, Dom. G.F. = dominant understorey growth form, εi = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Greenness + S.M. + Tree C. + Dom. G.F. + εi	4626.75	0	1.22, 1.16, 1.01, 1.06	0.428	0.881	9	0.6399
Brightness + Greenness +	4627.9	1.15	1.8, 2.05, 1.58,	0.433	0.88	10	0.3601

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
S.M. + Tree C. + Dom. G.F. + εi			1.01, 1.07				
Brightness + MSAVI + S.M. + Tree C. + Dom. G.F. + εi	4663.93	37.18	1.65, 1.66, 1.2, 1, 1.08	0.442	0.873	10	5.4024 E-09
Brightness + SAVI + S.M. + Tree C. + Dom. G.F. + εi	4664.32	37.57	1.76, 1.77, 1.21, 1, 1.07	0.441	0.873	10	4.4453 E-09
NDVI + S.M. + Tree C. + Dom. G.F. + εi	4666.39	39.64	1.05, 1.01, 1, 1.06	0.438	0.873	9	1.5791 E-09
Brightness + NDVI + S.M. + Tree C. + Dom. G.F. + εi	4668.33	41.58	2.7, 2.64, 1.16, 1, 1.07	0.442	0.872	10	5.9861 E-10
Brightness + EVI + S.M. + Tree C. + Dom. G.F. + εi	4671.26	44.51	1.47, 1.46, 1.12, 1, 1.08	0.444	0.872	10	1.3832 E-10
SAVI + S.M. + Tree C. + Dom. G.F. + εi	4674.71	47.96	1.08, 1.03, 1, 1.07	0.433	0.874	9	2.4646 E-11
Brightness + NDMI + S.M. + Tree C. + Dom. G.F. + εi	4678.01	51.26	1.58, 1.56, 1.12, 1, 1.07	0.444	0.871	10	4.7332 E-12
MSAVI + S.M. + Tree C. + Dom. G.F. + εi	4678.17	51.42	1.08, 1.03, 1, 1.07	0.432	0.874	9	4.3693 E-12
Brightness + S.M. + Tree C. + Dom. G.F. + εi	4688.67	61.92	1.07, 1.07, 1, 1.02	0.453	0.867	9	2.2928 E-14
Wetness + S.M. + Tree C. + Dom. G.F. + εi	4689.06	62.31	1.11, 1.08, 1, 1.06	0.441	0.871	9	1.8866 E-14
EVI + S.M. + Tree C. + Dom. G.F. + εi	4697.63	70.88	1.06, 1.01, 1, 1.07	0.433	0.872	9	2.5985 E-16
NDMI + S.M. + Tree C. + Dom. G.F. + εi	4703.38	76.63	1.06, 1.01, 1, 1.07	0.433	0.871	9	1.4660 E-17

Table S5. Model outputs for vegetation index-live understorey biomass GLMMs with additional variables (S.M. = soil moisture (1-month window + 2-week lag), Tree C. = percentage tree cover, Dom. G.F. = dominant understorey growth form, εi = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
EVI + S.M. + Tree C. + Dom. G.F. + εi	3538.29	0	2.57, 2.62, 1.03, 1.1	0.602	0.746	9	0.2688
MSAVI + S.M. + Tree C. + Dom. G.F. + εi	3538.58	0.29	2.77, 2.82, 1.03, 1.1	0.602	0.746	9	0.2325
NDMI + S.M. + Tree C. + Dom. G.F. + εi	3538.82	0.53	2.26, 2.31, 1.03, 1.1	0.600	0.748	9	0.2062
SAVI + S.M. + Tree C. + Dom. G.F. + εi	3539.31	1.02	2.55, 2.6, 1.03, 1.1	0.602	0.747	9	0.1614
Wetness + S.M. + Tree C. + Dom. G.F. + εi	3541.42	3.13	1.26, 1.32, 1.04, 1.09	0.602	0.748	9	0.0562
NDVI + S.M. + Tree C. + Dom. G.F. + εi	3542.04	3.75	1.64, 1.69, 1.03, 1.09	0.602	0.747	9	0.0412
Brightness + EVI + S.M. + Tree C. + Dom. G.F. + εi	3544.27	5.98	1.53, 3.85, 3.38, 1.03, 1.11	0.602	0.746	10	0.0135
Brightness + NDMI + S.M. + Tree C. + Dom. G.F. + εi	3544.59	6.30	1.7, 3.77, 3.12, 1.04, 1.11	0.600	0.748	10	0.0115

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Greenness + S.M. + Tree C. + Dom. G.F. + εi	3546.22	7.93	2.68, 2.66, 1.1, 1.1	0.601	0.745	9	0.0051
Brightness + S.M. + Tree C. + Dom. G.F. + εi	3546.93	8.64	1.02, 1.08, 1.03, 1.1	0.603	0.747	9	0.0036

Table S6. Model outputs for vegetation index-grass biomass GLMMs with additional variables (S.M. = soil moisture (1-month window + 2-week lag), Tree C. = percentage tree cover, Dom. G.F. = dominant understorey growth form, εi = residual error).

Model	AIC	ΔAIC	VIF explanatory variables	R²m	R²c	DF	Akaike weight
Brightness + Greenness + S.M. + Tree C. + Dom. G.F. + εi	4760.12	0	1.8, 2.05, 1.58, 1.01, 1.07	0.483	0.890	10	0.9998
Brightness + S.M. + Tree C. + Dom. G.F. + εi	4778.55	18.43	1.07, 1.07, 1, 1.02	0.495	0.884	9	9.9519 E-05
Brightness + MSAVI + S.M. + Tree C. + Dom. G.F. + εi	4781.8	21.68	1.65, 1.66, 1.2, 1, 1.08	0.491	0.886	10	1.9596 E-05
Brightness + SAVI + S.M. + Tree C. + Dom. G.F. + εi	4782.07	21.95	1.76, 1.77, 1.21, 1, 1.07	0.491	0.886	10	1.7122 E-05
Greenness + S.M. + Tree C. + Dom. G.F. + εi	4783.06	22.94	1.22, 1.16, 1.01, 1.06	0.472	0.892	9	1.0437 E-05
Brightness + NDVI + S.M. + Tree C. + Dom. G.F. + εi	4783.44	23.32	2.7, 2.64, 1.16, 1, 1.07	0.492	0.885	10	8.6309 E-06
Brightness + EVI + S.M. + Tree C. + Dom. G.F. + εi	4784.35	24.23	1.47, 1.46, 1.12, 1, 1.08	0.493	0.885	10	5.4759 E-06
Brightness + NDMI + S.M. + Tree C. + Dom. G.F. + εi	4785.77	25.65	1.58, 1.56, 1.12, 1, 1.07	0.494	0.884	10	2.6922 E-06
NDVI + S.M. + Tree C. + Dom. G.F. + εi	4812.19	52.07	1.05, 1.01, 1, 1.06	0.481	0.886	9	4.9326 E-12
Wetness + S.M. + Tree C. + Dom. G.F. + εi	4828.73	68.61	1.11, 1.08, 1, 1.06	0.484	0.884	9	1.2632 E-15
SAVI + S.M. + Tree C. + Dom. G.F. + εi	4830.92	70.8	1.08, 1.03, 1, 1.07	0.477	0.886	9	4.2258 E-16
MSAVI + S.M. + Tree C. + Dom. G.F. + εi	4835.4	75.28	1.08, 1.03, 1, 1.07	0.477	0.885	9	4.4987 E-17
EVI + S.M. + Tree C. + Dom. G.F. + εi	4854.36	94.24	1.06, 1.01, 1, 1.07	0.478	0.883	9	3.4354 E-21
NDMI + S.M. + Tree C. + Dom. G.F. + εi	4858.13	98.01	1.06, 1.01, 1, 1.07	0.479	0.883	9	5.2159 E-22

Table S7. Management models with coefficients. GLMMs trained using all seasons' (training and validation) data.

Biomass type	GLMM
Total understorey	$10.623 + 26.386(\text{greenness}) + 0.002(\text{soil moisture}) + -0.038(\text{tree cover}) + \sigma_{\text{site}} = 1.635$
Live understorey	$4.143 + 4.289(\text{EVI}) + 0.340(\text{soil moisture}) + -0.007(\text{tree cover}) + \sigma_{\text{site}} = 1.454$
Grass	$10.710 + -4.029(\text{brightness}) + 21.974(\text{greenness}) + -0.001(\text{soil moisture}) + -0.041(\text{tree cover}) + \sigma_{\text{site}} = 1.684$