

Appendix B. Ranking of candidate models for changes in functional composition with land use.

Models with $\Delta AIC \leq 2$ are shown in bold, along with the sign of the estimated effects for the model terms. All models include site as a random effect in the model. See Material and Methods for details about individual variables and the selection of candidate model sets.

a) Overstory

Table B1. Candidate model rankings for overstory maximum height.

Model	K	AICc	$\Delta AICc$	AICc weight	Cumulative weight	Log likelihood
Grass cover (-)	4	84.03	0	0.21	0.21	-35.79
Site only	3	84.23	0.2	0.19	0.4	-37.92
PC2 (+)	4	84.65	0.62	0.15	0.55	-36.1
Grass cover (-) & Livestock (-)	5	85.36	1.33	0.11	0.66	-33.93
Livestock	4	87.14	3.11	0.04	0.7	-37.35
PC1	4	87.18	3.15	0.04	0.74	-37.37
Fire	4	87.29	3.26	0.04	0.78	-37.42
Canopy openness	4	87.55	3.52	0.04	0.82	-37.55
Grass cover & LUI	5	87.59	3.56	0.04	0.85	-35.04
LUI	4	87.64	3.61	0.03	0.89	-37.6
PC1 & PC2	5	87.96	3.93	0.03	0.92	-35.23
Biomass extraction	4	88.12	4.09	0.03	0.94	-37.84
Elevation	4	88.27	4.24	0.02	0.97	-37.91
Grass cover & Biomass extraction	5	88.84	4.81	0.02	0.99	-35.67
Grass cover & Biomass extraction & Livestock	6	90.36	6.33	0.01	1	-33.18
Biomass extraction & Livestock	5	92.31	8.28	0	1	-37.4

Table B2. Candidate model rankings for overstory physical defense.

Model	K	AICc	$\Delta AICc$	AICc weight	Cumulative weight	Log likelihood
Elevation (-)	4	-18.68	0	0.25	0.25	15.56
Site only	3	-18.67	0.01	0.24	0.49	13.54
PC1 (-)	4	-17.44	1.25	0.13	0.62	14.94
PC2 (+)	4	-17.09	1.59	0.11	0.73	14.77
Canopy openness	4	-16.64	2.04	0.09	0.82	14.54
PC1 & PC2	5	-15.46	3.22	0.05	0.87	16.48
Fire	4	-15.18	3.5	0.04	0.91	13.81
Livestock	4	-14.84	3.84	0.04	0.95	13.64
Grass cover	4	-14.63	4.06	0.03	0.98	13.54

Table B3. Candidate model rankings for overstory wood density.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	-29.72	0	0.41	0.41	19.06
Fire	4	-26.41	3.31	0.08	0.49	19.43
PC2	4	-26.26	3.46	0.07	0.56	19.35
Biomass extraction	4	-25.98	3.75	0.06	0.63	19.21
Grass cover	4	-25.84	3.88	0.06	0.69	19.14
Elevation	4	-25.79	3.93	0.06	0.75	19.12
Livestock	4	-25.76	3.96	0.06	0.8	19.1
LUI	4	-25.71	4.02	0.06	0.86	19.08
Canopy openness	4	-25.69	4.03	0.05	0.91	19.07
PC1	4	-25.68	4.04	0.05	0.97	19.06
Fire & Livestock	5	-21.53	8.2	0.01	0.97	19.51
Biomass extraction & Livestock	5	-21.42	8.3	0.01	0.98	19.46
Fire & Biomass extraction	5	-21.39	8.34	0.01	0.99	19.44
Fire & LUI	5	-21.37	8.35	0.01	0.99	19.44
PC1 & PC2	5	-21.21	8.51	0.01	1	19.36
Fire & Biomass extraction & Livestock	6	-15.26	14.46	0	1	19.63

Clonality: Too few plots with clonally reproducing trees, so not tested.

Table B4. Candidate model rankings for overstory resprouting capacity.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	1.16	0	0.4	0.4	3.62
PC2	4	4.18	3.02	0.09	0.48	4.13
Grass cover	4	4.68	3.51	0.07	0.55	3.88
PC1	4	4.71	3.55	0.07	0.62	3.87
Fire	4	4.72	3.56	0.07	0.69	3.86
Biomass extraction	4	4.92	3.76	0.06	0.75	3.76
LUI	4	5.05	3.88	0.06	0.8	3.7
Livestock	4	5.18	4.02	0.05	0.86	3.63
Elevation	4	5.19	4.03	0.05	0.91	3.63
Canopy openness	4	5.21	4.04	0.05	0.96	3.62
PC2 & Livestock	5	8.7	7.54	0.01	0.97	4.4
PC1 & PC2	5	8.7	7.54	0.01	0.98	4.4
PC2 & LUI	5	9.01	7.84	0.01	0.99	4.25
PC2 & Biomass extraction	5	9.18	8.02	0.01	0.99	4.16
Biomass extraction & Livestock	5	9.95	8.79	0	1	3.78
PC2 & Biomass extraction & Livestock	6	14.71	13.55	0	1	4.65

Table B5. Candidate model rankings for overstory seed mass.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (+)	4	208.21	0	0.31	0.31	-97.88
Site only	3	209.57	1.36	0.16	0.47	-100.58
Elevation (+)	4	210.21	2	0.11	0.58	-98.88
Canopy openness	4	210.57	2.36	0.1	0.68	-99.06
Grass cover	4	211.81	3.6	0.05	0.73	-99.68
PC1 & Biomass extraction	5	211.81	3.61	0.05	0.78	-97.16
PC1 & LUI	5	212	3.8	0.05	0.83	-97.25
PC1 & Livestock	5	212.58	4.37	0.03	0.86	-97.54
Livestock	4	213.18	4.98	0.03	0.89	-100.37
PC1 & PC2	5	213.24	5.03	0.03	0.91	-97.87
Biomass extraction	4	213.55	5.34	0.02	0.93	-100.55
LUI	4	213.57	5.36	0.02	0.95	-100.56
PC2	4	213.6	5.39	0.02	0.97	-100.58
Fire	4	213.61	5.4	0.02	1	-100.58
Biomass extraction & Livestock	5	217.69	9.48	0	1	-100.09
PC1 & Biomass extraction & Livestock	6	218.3	10.1	0	1	-97.15

Table B6. Candidate model rankings for overstory wind dispersal.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Elevation (-) & Biomass extraction (-)	5	3.99	0	0.23	0.23	6.75
Elevation (-)	4	4.15	0.15	0.21	0.43	4.15
Site only	3	5.18	1.19	0.12	0.56	1.61
Elevation (-) & LUI (-)	5	5.73	1.74	0.09	0.65	5.89
Canopy openness	4	6.16	2.17	0.08	0.73	3.14
PC1	4	6.52	2.53	0.06	0.79	2.96
Elevation & Livestock	5	7.33	3.34	0.04	0.84	5.08
Livestock	4	7.61	3.62	0.04	0.87	2.42
Fire	4	8.1	4.11	0.03	0.9	2.17
LUI	4	8.75	4.76	0.02	0.92	1.85
PC2	4	9.1	5.11	0.02	0.94	1.67
Grass cover	4	9.22	5.22	0.02	0.96	1.61
Biomass extraction	4	9.22	5.23	0.02	0.97	1.61
Elevation & Biomass extraction & Livestock	6	9.39	5.4	0.02	0.99	7.31
PC1 & PC2	5	11.07	7.08	0.01	0.99	3.21
Biomass extraction & Livestock	5	11.41	7.42	0.01	1	3.05

Table B7. Candidate model rankings for overstory endozoochory.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Elevation (+) & Biomass extraction (+)	5	-0.07	0	0.4	0.4	8.79
Elevation (+)	4	1.53	1.6	0.18	0.59	5.46
Elevation & LUI (+)	5	1.76	1.83	0.16	0.75	7.87
Canopy openness	4	3.04	3.11	0.09	0.83	4.7
Elevation & Livestock	5	3.89	3.96	0.06	0.89	6.81
Site only	3	5.2	5.27	0.03	0.92	1.6
Elevation & Biomass extraction & Livestock	6	5.52	5.59	0.02	0.94	9.24
PC1	4	5.79	5.87	0.02	0.96	3.32
Livestock	4	7.27	7.34	0.01	0.97	2.59
LUI	4	8.73	8.8	0	0.98	1.86
Fire	4	8.78	8.85	0	0.98	1.83
PC2	4	8.99	9.06	0	0.99	1.73
Grass cover	4	9.1	9.18	0	0.99	1.67
Biomass extraction	4	9.25	9.32	0	0.99	1.6
PC1 & PC2	5	9.77	9.84	0	1	3.86
Biomass extraction & Livestock	5	10.38	10.45	0	1	3.56

Overstory exozoochory: Not tested because no exozoochorous overstory species

b) Understory, all species included

Table B8. Candidate model rankings for understory maximum height (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC2 (+)	4	79.36	0	0.23	0.23	-33.46
Site only	3	79.73	0.37	0.19	0.43	-35.67
Elevation (-)	4	80.52	1.16	0.13	0.56	-34.04
Biomass extraction	4	81.66	2.3	0.07	0.63	-34.61
Grass cover	4	81.93	2.57	0.06	0.7	-34.74
PC1	4	83.04	3.68	0.04	0.74	-35.3
Fire	4	83.21	3.85	0.03	0.77	-35.38
Canopy openness	4	83.25	3.89	0.03	0.8	-35.4
PC1 & PC2	5	83.4	4.04	0.03	0.84	-32.95
LUI	4	83.47	4.11	0.03	0.87	-35.51
PC2 & Biomass extraction	5	83.48	4.12	0.03	0.9	-32.99
Livestock	4	83.51	4.15	0.03	0.92	-35.53
Biomass extraction & Livestock	5	83.69	4.33	0.03	0.95	-33.09
PC2 & LUI	5	83.78	4.42	0.03	0.98	-33.14
PC2 & Livestock	5	84.14	4.78	0.02	1	-33.32
PC2 & Biomass extraction & Livestock	6	89.71	10.35	0	1	-32.86

Table B9. Candidate model rankings for understory physical defense (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Livestock (+)	4	-13.02	0	0.25	0.25	12.73
PC2 (-)	4	-12.49	0.54	0.19	0.44	12.47
Grass cover (-)	4	-11.76	1.26	0.13	0.57	12.1
Site only	3	-11.48	1.54	0.11	0.68	9.94
Canopy openness (+)	4	-11.38	1.64	0.11	0.79	11.91
PC2 (-) & Livestock (+)	5	-11.04	1.99	0.09	0.88	14.27
Elevation	4	-10.23	2.79	0.06	0.94	11.34
PC1 & PC2	5	-9.03	3.99	0.03	0.98	13.27
PC1	4	-8.2	4.82	0.02	1	10.32

Table B10. Candidate model rankings for understory clonality (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-3.4	0	0.21	0.21	7.92
Grass cover (+) & Livestock (-)	5	-3.13	0.27	0.19	0.4	10.32
Site only	3	-3.12	0.28	0.18	0.58	5.76
Livestock (-)	4	-1.5	1.9	0.08	0.66	6.97
Grass cover & LUI	5	-1.18	2.23	0.07	0.73	9.34
LUI	4	-0.37	3.03	0.05	0.78	6.41
Elevation	4	0.1	3.5	0.04	0.82	6.17
Fire	4	0.36	3.76	0.03	0.85	6.04
PC1	4	0.37	3.78	0.03	0.88	6.04
Biomass extraction	4	0.6	4	0.03	0.91	5.92
Canopy openness	4	0.91	4.32	0.02	0.93	5.77
PC2	4	0.92	4.32	0.02	0.96	5.76
Grass cover & Biomass extraction	5	0.93	4.34	0.02	0.98	8.28
Biomass extraction & Livestock	5	3.29	6.69	0.01	0.99	7.11
Grass cover & Biomass extraction & Livestock	6	3.34	6.75	0.01	1	10.33
PC1 & PC2	5	5.41	8.82	0	1	6.04

Table B11. Candidate model rankings for understory resprouting capacity (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (-)	4	-11.93	0	0.34	0.34	12.19
Grass cover (+)	4	-10.98	0.95	0.21	0.56	11.71
Site only	3	-9.55	2.39	0.1	0.66	8.97
PC1 & Biomass extraction	5	-8.47	3.46	0.06	0.72	12.99
PC1 & LUI	5	-8.19	3.74	0.05	0.77	12.85
Elevation	4	-8.16	3.78	0.05	0.82	10.3
PC1 & PC2	5	-7.55	4.39	0.04	0.86	12.52
PC1 & Livestock	5	-7.54	4.39	0.04	0.9	12.52
PC2	4	-6.29	5.65	0.02	0.92	9.37
Biomass extraction	4	-5.98	5.96	0.02	0.94	9.21
Canopy openness	4	-5.72	6.22	0.02	0.95	9.08
LUI	4	-5.61	6.33	0.01	0.97	9.03
Livestock	4	-5.51	6.42	0.01	0.98	8.98
Fire	4	-5.5	6.43	0.01	1	8.97
PC1 & Biomass extraction & Livestock	6	-1.98	9.96	0	1	12.99
Biomass extraction & Livestock	5	-1.47	10.46	0	1	9.49

Table B12. Candidate model rankings for understory seed mass (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
LUI (-)	4	135.03	0	0.24	0.24	-61.29
Biomass extraction (-)	4	135.52	0.48	0.19	0.42	-61.54
Site only	3	135.8	0.76	0.16	0.59	-63.7
Livestock (-)	4	136.99	1.95	0.09	0.68	-62.27
PC1	4	137.21	2.18	0.08	0.76	-62.38
PC1 & LUI	5	138.69	3.66	0.04	0.79	-60.6
PC1 & Livestock	5	138.84	3.8	0.04	0.83	-60.67
Elevation	4	139.07	4.04	0.03	0.86	-63.32
Grass cover	4	139.54	4.51	0.02	0.89	-63.55
Canopy openness	4	139.65	4.62	0.02	0.91	-63.6
Fire	4	139.82	4.79	0.02	0.93	-63.69
PC2	4	139.84	4.81	0.02	0.95	-63.7
Biomass extraction & Livestock	5	139.97	4.94	0.02	0.97	-61.24
PC1 & Biomass extraction	5	139.98	4.94	0.02	0.99	-61.24
PC1 & PC2	5	142.26	7.23	0.01	1	-62.38
PC1 & Biomass extraction & Livestock	6	145.07	10.03	0	1	-60.53

Table B13. Candidate model rankings for understory wind dispersal (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-5.98	0	0.64	0.64	9.21
Grass cover & Livestock	5	-2.71	3.27	0.13	0.77	10.11
Grass cover & Biomass extraction	5	-1.67	4.31	0.07	0.84	9.58
Grass cover & LUI	5	-1.18	4.8	0.06	0.9	9.34
Grass cover & Biomass extraction & Livestock	6	-0.95	5.03	0.05	0.95	12.48
PC1	4	1.83	7.8	0.01	0.96	5.31
Elevation	4	1.94	7.92	0.01	0.98	5.25
Site only	3	2.21	8.19	0.01	0.99	3.09
Canopy openness	4	4.96	10.93	0	0.99	3.74
Livestock	4	4.99	10.97	0	0.99	3.73
PC1 & PC2	5	5.72	11.7	0	0.99	5.89
PC2	4	5.99	11.97	0	0.99	3.23
LUI	4	6.08	12.06	0	1	3.18
Biomass extraction	4	6.19	12.17	0	1	3.13
Fire	4	6.24	12.22	0	1	3.1
Biomass extraction & Livestock	5	7.91	13.89	0	1	4.79

Table B14. Candidate model rankings for understory endozoochory (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Livestock (+)	4	-9.16	0	0.21	0.21	10.8
Grass cover (-) & Livestock (+)	5	-8.25	0.91	0.13	0.34	12.87
Grass cover (-)	4	-8.08	1.08	0.12	0.46	10.26
Canopy openness (+)	4	-7.79	1.37	0.11	0.57	10.12
Site only	3	-7.48	1.68	0.09	0.66	7.94
Elevation	4	-6.92	2.24	0.07	0.73	9.68
Biomass extraction & Livestock	5	-6.9	2.26	0.07	0.79	12.2
PC2	4	-6.75	2.41	0.06	0.86	9.6
LUI	4	-5.12	4.03	0.03	0.88	8.78
Grass cover & Biomass extraction & Livestock	6	-4.67	4.48	0.02	0.91	14.34
PC1	4	-4.63	4.53	0.02	0.93	8.54
Grass cover & LUI	5	-4.61	4.55	0.02	0.95	11.05
PC1 & PC2	5	-3.91	5.25	0.02	0.96	10.71
Biomass extraction	4	-3.55	5.61	0.01	0.98	8
Fire	4	-3.48	5.68	0.01	0.99	7.96
Grass cover & Biomass extraction	5	-3.13	6.03	0.01	1	10.31

Table B15. Candidate model rankings for understory exozoochory (all species included).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-3.89	0	0.45	0.45	8.17
PC1 (-)	4	-2.49	1.4	0.22	0.67	7.47
Elevation	4	0.01	3.9	0.06	0.73	6.22
Site only	3	0.27	4.16	0.06	0.79	4.07
Grass cover & Livestock	5	0.6	4.49	0.05	0.83	8.45
Grass cover & Biomass extraction	5	0.74	4.64	0.04	0.88	8.38
Grass cover & LUI	5	1.15	5.05	0.04	0.91	8.17
PC1 & PC2	5	2.16	6.05	0.02	0.93	7.67
Canopy openness	4	3.41	7.3	0.01	0.95	4.52
Grass cover & Biomass extraction & Livestock	6	3.47	7.36	0.01	0.96	10.26
Livestock	4	3.65	7.54	0.01	0.97	4.4
Biomass extraction	4	4.17	8.06	0.01	0.98	4.14
LUI	4	4.27	8.16	0.01	0.98	4.09
Fire	4	4.28	8.18	0.01	0.99	4.08
PC2	4	4.31	8.2	0.01	1	4.07
Biomass extraction & Livestock	5	6.98	10.87	0	1	5.26

c) Understory, excluding non-native invasive species**Table B16.** Candidate model rankings for understory maximum height (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC2 (+)	4	85.27	0	0.26	0.26	-36.41
Site only	3	86.01	0.74	0.18	0.43	-38.8
Elevation (-)	4	86.62	1.35	0.13	0.56	-37.09
Biomass extraction	4	87.96	2.69	0.07	0.63	-37.76
Grass cover	4	88.16	2.89	0.06	0.69	-37.86
PC1 & PC2	5	89.1	3.83	0.04	0.73	-35.8
PC2 & Biomass extraction	5	89.1	3.83	0.04	0.77	-35.8
Biomass extraction & Livestock	5	89.12	3.85	0.04	0.8	-35.81
Fire	4	89.41	4.14	0.03	0.84	-38.48
PC2 & LUI	5	89.54	4.27	0.03	0.87	-36.02
PC1	4	89.68	4.41	0.03	0.89	-38.62
Canopy openness	4	89.78	4.51	0.03	0.92	-38.67
Livestock	4	89.79	4.53	0.03	0.95	-38.68
LUI	4	89.87	4.6	0.03	0.97	-38.71
PC2 & Livestock	5	90.02	4.75	0.02	1	-36.26
PC2 & Biomass extraction & Livestock	6	95.14	9.87	0	1	-35.57

Table B17. Candidate model rankings for understory physical defense (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	-15.89	0	0.36	0.36	12.15
PC1 (+)	4	-14.54	1.36	0.18	0.54	13.49
Elevation	4	-13.78	2.11	0.12	0.66	13.11
Grass cover	4	-13.22	2.67	0.09	0.76	12.83
PC2	4	-13.03	2.87	0.09	0.84	12.74
Canopy openness	4	-12.22	3.67	0.06	0.9	12.33
Livestock	4	-12.05	3.85	0.05	0.95	12.25
PC1 & PC2	5	-10.92	4.97	0.03	0.98	14.21
PC1 & Livestock	5	-9.7	6.19	0.02	1	13.6

Table B18. Candidate model rankings for understory clonality (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-7.67	0	0.47	0.47	10.06
Site only	3	-5.17	2.5	0.13	0.6	6.79
Grass cover & Livestock	5	-4.13	3.54	0.08	0.68	10.81
Grass cover & LUI	5	-3.83	3.84	0.07	0.75	10.67
Grass cover & Biomass extraction	5	-3.17	4.5	0.05	0.8	10.33
PC1	4	-2.49	5.18	0.03	0.83	7.47
Elevation	4	-2.1	5.57	0.03	0.86	7.27
Livestock	4	-2.07	5.6	0.03	0.89	7.26
Fire	4	-1.64	6.03	0.02	0.91	7.04
LUI	4	-1.59	6.08	0.02	0.94	7.02
PC2	4	-1.38	6.29	0.02	0.96	6.91
Biomass extraction	4	-1.21	6.46	0.02	0.97	6.83
Canopy openness	4	-1.13	6.54	0.02	0.99	6.79
Grass cover & Biomass extraction & Livestock	6	2.37	10.03	0	0.99	10.82
PC1 & PC2	5	2.47	10.14	0	1	7.52
Biomass extraction & Livestock	5	2.82	10.49	0	1	7.34

Table B19. Candidate model rankings for understory resprouting capacity (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-10.03	0	0.4	0.4	11.24
Site only	3	-8.38	1.65	0.17	0.57	8.39
Grass cover & Livestock	5	-6.4	3.63	0.06	0.64	11.95
Elevation	4	-6.24	3.79	0.06	0.7	9.34
PC1	4	-6.2	3.83	0.06	0.75	9.32
Grass cover & LUI	5	-5.35	4.68	0.04	0.79	11.43
Livestock	4	-5.25	4.78	0.04	0.83	8.85
Grass cover & Biomass extraction	5	-4.98	5.05	0.03	0.86	11.24
Fire	4	-4.76	5.27	0.03	0.89	8.6
LUI	4	-4.59	5.44	0.03	0.91	8.52
PC2	4	-4.5	5.53	0.03	0.94	8.47
Canopy openness	4	-4.47	5.56	0.02	0.96	8.46
Biomass extraction	4	-4.33	5.7	0.02	0.99	8.39
PC1 & PC2	5	-1.14	8.89	0	0.99	9.32
Biomass extraction & Livestock	5	-0.91	9.12	0	1	9.2
Grass cover & Biomass extraction & Livestock	6	-0.59	9.44	0	1	12.29

Table B20. Candidate model rankings for understory seed mass (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
LUI (-)	4	138	0	0.24	0.24	-62.78
Biomass extraction (-)	4	138.38	0.39	0.2	0.43	-62.97
Site only	3	138.56	0.56	0.18	0.61	-65.08
Livestock (-)	4	139.92	1.92	0.09	0.71	-63.74
PC1	4	140.61	2.61	0.06	0.77	-64.08
Elevation	4	142.06	4.07	0.03	0.8	-64.81
PC1 & LUI	5	142.16	4.17	0.03	0.83	-62.33
Grass cover	4	142.22	4.22	0.03	0.86	-64.89
Canopy openness	4	142.58	4.58	0.02	0.88	-65.07
PC2	4	142.58	4.59	0.02	0.91	-65.07
PC1 & Livestock	5	142.6	4.6	0.02	0.93	-62.55
Fire	4	142.6	4.61	0.02	0.96	-65.08
Biomass extraction & Livestock	5	142.91	4.92	0.02	0.98	-62.71
PC1 & Biomass extraction	5	143.16	5.16	0.02	0.99	-62.83
PC1 & PC2	5	145.64	7.64	0.01	1	-64.07
PC1 & Biomass extraction & Livestock	6	148.64	10.64	0	1	-62.32

Table B21. Candidate model rankings for understory wind dispersal (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Grass cover (+)	4	-8.74	0	0.6	0.6	10.59
Grass cover (+) & Biomass extraction (+)	5	-6.76	1.97	0.22	0.82	12.13
Grass cover & LUI	5	-4.78	3.96	0.08	0.91	11.14
Grass cover & Livestock	5	-3.68	5.05	0.05	0.95	10.59
Grass cover & Biomass extraction & Livestock	6	-1.7	7.04	0.02	0.97	12.85
PC1	4	-1.49	7.25	0.02	0.99	6.97
Elevation	4	1.03	9.76	0	0.99	5.71
Site only	3	1.43	10.17	0	0.99	3.48
PC1 & PC2	5	3.22	11.95	0	1	7.14
Canopy openness	4	4.47	13.21	0	1	3.99
Biomass extraction	4	4.93	13.66	0	1	3.76
Livestock	4	5.35	14.08	0	1	3.55
PC2	4	5.41	14.15	0	1	3.52
Fire	4	5.46	14.2	0	1	3.49
LUI	4	5.46	14.2	0	1	3.49
Biomass extraction & Livestock	5	7.98	16.72	0	1	4.76

Table B22. Candidate model rankings for understory endozoochory (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	-11.86	0	0.22	0.22	10.13
PC1 (+)	4	-11.38	0.48	0.18	0.4	11.91
Elevation (+)	4	-10.76	1.1	0.13	0.53	11.6
Grass cover (-)	4	-10.7	1.16	0.13	0.66	11.57
Biomass extraction	4	-9.21	2.66	0.06	0.71	10.83
Canopy openness	4	-9	2.86	0.05	0.77	10.72
PC2	4	-8.92	2.94	0.05	0.82	10.68
LUI	4	-8.09	3.77	0.03	0.85	10.27
Fire	4	-7.98	3.88	0.03	0.89	10.21
Livestock	4	-7.91	3.95	0.03	0.92	10.18
PC1 & PC2	5	-7.77	4.09	0.03	0.95	12.63
PC1 & Livestock	5	-6.46	5.4	0.02	0.96	11.98
PC1 & Biomass extraction	5	-6.43	5.43	0.01	0.98	11.96
PC1 & LUI	5	-6.32	5.54	0.01	0.99	11.91
Biomass extraction & Livestock	5	-5.6	6.26	0.01	1	11.55
PC1 & Biomass extraction & Livestock	6	-0.49	11.37	0	1	12.24

Table B23. Candidate model rankings for understory exozoochory (excluding non-native invasive species).

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (-)	4	-7	0	0.51	0.51	9.72
Grass cover	4	-4.52	2.48	0.15	0.66	8.48
PC1 & LUI	5	-3.41	3.59	0.09	0.75	10.46
PC1 & Biomass extraction	5	-3.39	3.61	0.08	0.83	10.45
PC1 & Livestock	5	-2.91	4.09	0.07	0.9	10.2
PC1 & PC2	5	-1.99	5.02	0.04	0.94	9.74
Elevation	4	-0.63	6.37	0.02	0.96	6.54
Site only	3	-0.44	6.56	0.02	0.98	4.42
Biomass extraction	4	2.95	9.95	0	0.98	4.75
PC1 & Biomass extraction & Livestock	6	3.01	10.01	0	0.99	10.49
Canopy openness	4	3.24	10.24	0	0.99	4.6
PC2	4	3.44	10.44	0	0.99	4.5
LUI	4	3.48	10.48	0	0.99	4.48
Fire	4	3.51	10.51	0	1	4.47
Livestock	4	3.57	10.57	0	1	4.44
Biomass extraction & Livestock	5	7.06	14.07	0	1	5.22

d) Saplings**Table B24.** Candidate model rankings for sapling maximum height.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	82.24	0	0.27	0.27	-36.92
Grass cover (-)	4	82.62	0.37	0.22	0.49	-35.09
PC2	4	84.75	2.51	0.08	0.57	-36.15
Biomass extraction	4	84.87	2.63	0.07	0.64	-36.21
Grass cover & Biomass extraction	5	85.22	2.98	0.06	0.7	-33.86
LUI	4	85.67	3.43	0.05	0.75	-36.61
PC1	4	86.1	3.86	0.04	0.79	-36.83
Livestock	4	86.13	3.88	0.04	0.83	-36.84
Fire	4	86.16	3.92	0.04	0.86	-36.86
Canopy openness	4	86.21	3.97	0.04	0.9	-36.88
Elevation	4	86.24	4	0.04	0.94	-36.9
Grass cover & LUI	5	86.8	4.56	0.03	0.97	-34.65
Grass cover & Livestock	5	87.67	5.43	0.02	0.98	-35.08
PC1 & PC2	5	89.57	7.32	0.01	0.99	-36.03
Biomass extraction & Livestock	5	89.83	7.59	0.01	1	-36.17
Grass cover & Biomass extraction & Livestock	6	90.57	8.33	0	1	-33.29

Table B25. Candidate model rankings for sapling physical defense.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC2 (-)	4	2.69	0	0.46	0.46	4.88
Site only	3	4.64	1.96	0.17	0.63	1.88
Canopy openness	4	5.08	2.39	0.14	0.77	3.68
Elevation	4	7.53	4.85	0.04	0.81	2.46
PC2 & Livestock	5	7.67	4.98	0.04	0.85	4.92
Grass cover	4	7.69	5	0.04	0.89	2.38
PC1 & PC2	5	7.74	5.05	0.04	0.92	4.88
Livestock	4	7.97	5.29	0.03	0.96	2.24
PC1	4	8.69	6	0.02	0.98	1.88
Fire	4	8.92	6.24	0.02	1	1.76

Table B26. Candidate model rankings for sapling wood density.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (+)	4	-24.57	0	0.26	0.26	18.51
PC1 (+) & PC2 (+)	5	-23.64	0.93	0.16	0.43	20.57
Canopy openness (+)	4	-23.15	1.41	0.13	0.55	17.8
Site only	3	-22.77	1.8	0.11	0.66	15.59
PC1 & Biomass extraction	5	-22.3	2.27	0.08	0.75	19.9
PC2	4	-21.18	3.39	0.05	0.79	16.81
Fire	4	-20.77	3.8	0.04	0.83	16.61
Elevation	4	-20.48	4.09	0.03	0.87	16.46
PC1 & Biomass extraction & Livestock	6	-20.13	4.44	0.03	0.89	22.06
PC1 & LUI	5	-19.77	4.8	0.02	0.92	18.63
PC1 & Livestock	5	-19.59	4.98	0.02	0.94	18.55
Livestock	4	-18.85	5.72	0.02	0.96	15.65
LUI	4	-18.82	5.75	0.01	0.97	15.63
Grass cover	4	-18.77	5.8	0.01	0.98	15.61
Biomass extraction	4	-18.77	5.8	0.01	1	15.61
Biomass extraction & Livestock	5	-13.8	10.77	0	1	15.65

Table B27. Candidate model rankings for sapling clonality.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Site only	3	-1.83	0	0.25	0.25	5.12
PC2 (+)	4	-1.3	0.53	0.19	0.44	6.87
Elevation (-)	4	0.07	1.9	0.1	0.54	6.19
Biomass extraction	4	0.19	2.02	0.09	0.63	6.13
Canopy openness	4	1.41	3.24	0.05	0.68	5.52
PC1	4	1.61	3.44	0.04	0.72	5.42
Grass cover	4	1.77	3.6	0.04	0.76	5.34
Fire	4	1.93	3.76	0.04	0.8	5.26
Livestock	4	2.06	3.89	0.04	0.84	5.19
LUI	4	2.11	3.95	0.03	0.87	5.17
Biomass extraction & Livestock	5	2.26	4.09	0.03	0.9	7.62
PC1 & PC2	5	2.58	4.41	0.03	0.93	7.46
PC2 & Biomass extraction	5	2.61	4.44	0.03	0.96	7.45
PC2 & LUI	5	3.04	4.87	0.02	0.98	7.23
PC2 & Livestock	5	3.5	5.33	0.02	1	7
PC2 & Biomass extraction & Livestock	6	8.59	10.42	0	1	7.71

Table B28. Candidate model rankings for sapling resprouting capacity.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (-)	4	-4.79	0	0.33	0.33	8.62
Grass cover (+)	4	-4.22	0.57	0.25	0.57	8.33
Site only	3	-2.82	1.97	0.12	0.69	5.61
Fire	4	-1.05	3.74	0.05	0.74	6.75
Elevation	4	-0.24	4.55	0.03	0.78	6.34
Biomass extraction	4	-0.2	4.59	0.03	0.81	6.32
PC2 & Livestock	5	0.14	4.93	0.03	0.84	8.68
PC2 & LUI	5	0.21	5	0.03	0.87	8.65
PC1 & PC2	5	0.22	5.01	0.03	0.89	8.64
PC2 & Biomass extraction	5	0.26	5.05	0.03	0.92	8.62
LUI	4	0.36	5.15	0.02	0.94	6.04
Livestock	4	0.97	5.76	0.02	0.96	5.74
PC2	4	0.98	5.77	0.02	0.98	5.73
Canopy openness	4	1.22	6.01	0.02	1	5.61
Biomass extraction & Livestock	5	4.75	9.54	0	1	6.37
PC2 & Biomass extraction & Livestock	6	6.6	11.39	0	1	8.7

Table B29. Candidate model rankings for sapling seed mass.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC1 (+)	4	215.31	0	0.42	0.42	-101.43
Site only	3	217.35	2.04	0.15	0.57	-104.48
Elevation	4	219.06	3.75	0.06	0.63	-103.31
PC1 & PC2	5	219.23	3.92	0.06	0.69	-100.87
PC1 & Biomass extraction	5	219.3	3.99	0.06	0.75	-100.9
PC1 & LUI	5	220.11	4.8	0.04	0.78	-101.31
Grass cover	4	220.18	4.86	0.04	0.82	-103.87
PC1 & Livestock	5	220.36	5.05	0.03	0.85	-101.43
Canopy openness	4	220.67	5.36	0.03	0.88	-104.11
PC2	4	220.67	5.36	0.03	0.91	-104.11
Biomass extraction	4	221.21	5.9	0.02	0.93	-104.38
LUI	4	221.31	5.99	0.02	0.95	-104.43
Fire	4	221.35	6.04	0.02	0.97	-104.45
Livestock	4	221.39	6.08	0.02	0.99	-104.47
PC1 & Biomass extraction & Livestock	6	224.87	9.56	0	1	-100.43
Biomass extraction & Livestock	5	226.23	10.92	0	1	-104.37

Table B30. Candidate model rankings for sapling wind dispersal.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
Elevation (-)	4	4.7	0	0.47	0.47	3.87
PC1 & PC2	5	7.75	3.05	0.1	0.57	4.87
Canopy openness	4	8.59	3.9	0.07	0.63	1.93
Elevation & Livestock	5	9.02	4.33	0.05	0.69	4.24
PC2	4	9.03	4.33	0.05	0.74	1.71
Biomass extraction & Livestock	5	9.22	4.53	0.05	0.79	4.14
Elevation & LUI	5	9.4	4.71	0.04	0.83	4.05
Site only	3	9.6	4.9	0.04	0.87	-0.6
Elevation & Biomass extraction	5	9.66	4.97	0.04	0.91	3.92
Fire	4	10.25	5.56	0.03	0.94	1.1
PC1	4	11.09	6.4	0.02	0.96	0.68
Grass cover	4	12.1	7.4	0.01	0.97	0.17
Livestock	4	12.12	7.42	0.01	0.98	0.16
Biomass extraction	4	13.13	8.43	0.01	0.99	-0.34
LUI	4	13.58	8.89	0.01	1	-0.57
Elevation & Biomass extraction & Livestock	6	14.64	9.95	0	1	4.68

Table B31. Candidate model rankings for sapling endozoochory.

Model	K	AICc	Δ AICc	AICc weight	Cumulative weight	Log likelihood
PC2 (-)	4	0.92	0	0.34	0.34	5.76
PC2 (-) & Livestock (+)	5	2.78	1.86	0.13	0.47	7.36
Biomass extraction & Livestock	5	2.93	2.01	0.12	0.59	7.29
PC2 & LUI	5	4.06	3.14	0.07	0.66	6.72
PC1 & PC2	5	4.39	3.47	0.06	0.72	6.55
Livestock	4	4.47	3.55	0.06	0.78	3.99
Site only	3	4.51	3.58	0.06	0.84	1.95
Elevation	4	4.79	3.87	0.05	0.89	3.83
PC2 & Biomass extraction	5	5.39	4.47	0.04	0.92	6.06
Canopy openness	4	6.91	5.99	0.02	0.94	2.77
PC2 & Biomass extraction & Livestock	6	7.36	6.44	0.01	0.95	8.32
LUI	4	7.39	6.47	0.01	0.97	2.53
Fire	4	8.17	7.25	0.01	0.98	2.14
PC1	4	8.18	7.26	0.01	0.98	2.13
Grass cover	4	8.37	7.45	0.01	0.99	2.04
Biomass extraction	4	8.52	7.6	0.01	1	1.96

Sapling exozoochory: Too few plots with exozoochorous species to test.