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Supplementary Material

Habitat distributions of 12 co-occurring wallaby grasses (*Rytidosperma* spp., Poaceae) and their response to a transition from pastoral to conservation land use

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Table S1. Mean percentage of total biomass in the 13 habitat × slope position combinations surveyed in 2005.

Habitat	Slope Position	Number of sites	Mean biomass (percentage of total)	log-transformed biomass		Significance of differences
				Mean	s.e.	
<i>(a) 'Cryptic Rytidosperma' (Rytidosperma auriculatum, R. caespitosum, R. carphoides, R. erianthum, R. monticola, R. penicillatum, R. pilosum, R. racemosum, R. setaceum, R. tenuius combined)</i>						
Camp	Upper	4	2.19	0.88	0.52	de
Drainage	Lower	6	0.01	0.01	0.42	e
Drainage	Mid	4	2.19	0.88	0.52	de
Drainage	Upper	4	24.37	2.38	0.52	bc
Forest	Lower	4	0.01	0.01	0.52	e
Forest	Mid	7	0	0	0.39	e
Forest	Upper	6	0.1	0.08	0.42	e
Open	Lower	9	7.91	1.37	0.34	cd
Open	Mid	10	9.02	1.84	0.33	cd
Open	Upper	8	55.91	3.83	0.36	a
Tree	Lower	4	10.51	1.55	0.52	cd
Tree	Mid	3	0.02	0.02	0.6	e
Tree	Upper	4	40.72	3.17	0.52	ab
Average standard error of difference				0.65		
Average least significant difference (LSD)				1.31		
<i>(b) Rytidosperma erianthum/monticola combined</i>						
Camp	Upper	4	0	0	0.41	d
Drainage	Lower	6	0	0	0.34	d
Drainage	Mid	4	0.97	0.53	0.41	bcd
Drainage	Upper	4	7.72	1.61	0.41	ab
Forest	Lower	4	0	0	0.41	d
Forest	Mid	7	0	0	0.31	d
Forest	Upper	6	0.1	0.08	0.34	d
Open	Lower	9	1.69	0.46	0.28	cd
Open	Mid	10	3.87	1.18	0.26	bc
Open	Upper	8	15.73	2.52	0.29	a
Tree	Lower	4	0	0	0.41	d
Tree	Mid	3	0	0	0.48	d
Tree	Upper	4	29.63	2.57	0.41	a
Average standard error of difference				0.52		
Average least significant difference (LSD)				1.05		
<i>(c) Rytidosperma pilosum</i>						
Camp	Upper	4	0.16	0.12	0.48	cd
Drainage	Lower	6	0.01	0	0.39	d
Drainage	Mid	4	0.89	0.44	0.48	bcd
Drainage	Upper	4	5.76	1.53	0.48	ab
Forest	Lower	4	0	0	0.48	d
Forest	Mid	7	0	0	0.36	d
Forest	Upper	6	0	0	0.39	d
Open	Lower	9	2.53	0.77	0.32	bcd
Open	Mid	10	3.98	1.28	0.3	abc
Open	Upper	8	19.49	2.01	0.34	a
Tree	Lower	4	7.88	1.39	0.48	ab
Tree	Mid	3	0.02	0.02	0.55	d
Tree	Upper	4	5.27	1.4	0.48	ab
Average standard error of difference				0.6		
Average least significant difference (LSD)				1.21		

Means with one of the letters the same are not significantly different ($P < 0.05$).

Table S2. Species ranked 1, 2 or 3 in the 32 sites where cryptic *Rytidosperma* was a dominant (ranked 1–3) in any one of the four surveys conducted between 2005 and 2020.

Open, upper slope (Site 1)	2005	2010	2013	2016	2020
<i>Austrostipa scabra</i>	2	1	-	1	1
<i>Cheilanthes sieberi</i>	-	-	-	3	-
<i>Hypochoeris glabra</i>	-	2	-	-	-
<i>Hypochoeris radicata</i>	-	-	1	-	-
<i>Petrorhagia nanteuilii</i>	-	-	3	-	-
<i>Poa bulbosa</i>	1	-	-	-	-
<i>Tolpis umbellata</i>	-	3	-	-	2
<i>Vulpia bromoides</i>	-	-	2	-	-
<i>Trifolium subterraneum</i>	-	-	-	-	3
<i>Vulpia myuros</i>	-	-	-	2	-
Cryptic <i>Rytidosperma</i>	3	-	-	-	-
Open, upper slope (Site 2)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	-	-	-	2	-
<i>Austrostipa scabra</i>	2	1	3	-	1
<i>Lomandra filiformis</i>	-	-	2	3	-
<i>Poa bulbosa</i>	3	-	-	-	-
<i>Tolpis umbellata</i>	-	3	-	-	-
<i>Cheilanthes sieberi</i>	-	-	-	-	3
Cryptic <i>Rytidosperma</i>	1	2	1	1	2
Open, upper slope (Site 3)	2005	2010	2013	2016	2020
<i>Acacia gunnii</i>	3	2	-	-	-
<i>Aira elegantissima</i>	2	-	-	-	-
<i>Aristida ramosa</i>	-	3	-	1	-
<i>Briza maxima</i>	-	-	-	3	-
<i>Goodenia hederacea</i>	-	-	3	-	-
<i>Melichrus urceolatus</i>	-	-	-	-	3
<i>Lomandra filiformis</i>	-	-	2	2	2
Cryptic <i>Rytidosperma</i>	1	1	1	-	1
Open, upper slope (Site 4)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	2	-	-	-	-
<i>Aristida ramosa</i>	-	-	2	2	-
<i>Austrostipa scabra</i>	-	3	-	-	2
<i>Hypochoeris glabra</i>	-	2	-	-	3
<i>Lomandra filiformis</i>	3	-	3	1	-
Cryptic <i>Rytidosperma</i>	1	1	1	3	1
Open, mid-slope (Site 5)	2005	2010	2013	2016	2020
<i>Acacia genistifolia</i>	-	3	-	-	-
<i>Briza maxima</i>	-	-	-	3	3
<i>Lomandra filiformis</i>	-	-	3	-	-
<i>Themeda triandra</i>	1	2	2	2	2
<i>Xanthorrhoea glauca</i>	3	1	1	1	1
Cryptic <i>Rytidosperma</i>	2	-	-	-	-
Open, mid-slope (Site 6)	2005	2010	2013	2016	2020
<i>Rumex acetosella</i>	-	3	-	-	-
<i>Aristida ramosa</i>	2	-	-	-	-
<i>Briza maxima</i>	-	-	-	2	3
<i>Hypochoeris radicata</i>	-	2	-	-	-
<i>Lomandra filiformis</i>	-	-	2	3	-
<i>Lomandra multiflora</i>	-	-	3	-	3
<i>Themeda triandra</i>	1	1	1	1	1
Cryptic <i>Rytidosperma</i>	3	-	-	-	-
Open, mid-slope (Site 8)	2005	2010	2013	2016	2020
<i>Aristida ramosa</i>	1	1	2	2	-
<i>Daviesia leptophylla</i>	-	3	-	3	-
<i>Rytidosperma pallidum</i>	-	2	-	-	-
<i>Lomandra filiformis</i>	-	-	3	-	3
<i>Melichrus urceolatus</i>	-	-	-	1	1
<i>Hibbertia obtusifolia</i>	-	-	-	-	2
<i>Microlaena stipoides</i>	2	-	1	-	-
Cryptic <i>Rytidosperma</i>	3	-	-	-	-
Open, lower slope (Site 10)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	3	-	-	-	-
<i>Briza maxima</i>	-	-	-	2	3
<i>Gonocarpus tetragynus</i>	-	-	3	-	-
<i>Luzula densiflora</i>	-	3	-	-	-
<i>Melichrus urceolatus</i>	-	-	2	3	1
<i>Themeda triandra</i>	1	1	1	1	2
Cryptic <i>Rytidosperma</i>	2	2	-	-	-
Open, upper slope (Site 13)	2005	2010	2013	2016	2020
<i>Acacia genistifolia</i>	-	2	-	-	-
<i>Aristida ramosa</i>	1	-	-	3	-

<i>Dillwynia phyllicoides</i>	3	1	1	1	1
<i>Hibbertia obtusifolia</i>	-	-	3	-	2
<i>Pultenaea subspicata</i>	-	-	-	-	3
<i>Melichrus urceolatus</i>	-	-	2	2	-
Cryptic Rytidosperma	2	3	-	-	-
Open, upper slope (Site 14)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	3	-	-	-	-
<i>Austrostipa scabra</i>	2	2	3	-	2
<i>Lomandra filiformis</i>	-	-	2	2	-
<i>Panicum effusum</i>	-	-	-	3	-
<i>Tolpis umbellata</i>	-	3	-	-	-
<i>Hypochoeris glabra</i>	-	-	-	-	3
Cryptic Rytidosperma	1	1	1	1	1
Open, upper slope (Site 15)	2005	2010	2013	2016	2020
<i>Aira caryophylla</i>	-	-	-	3	-
<i>Aira elegantissima</i>	3	-	-	-	-
<i>Aristida ramosa</i>	-	3	-	2	-
<i>Hypochoeris glabra</i>	-	-	3	-	-
<i>Lomandra filiformis</i>	-	-	2	1	-
<i>Poa bulbosa</i>	2	2	-	-	-
Cryptic Rytidosperma	1	1	1	-	-
Open, upper slope (Site 16)	2005	2010	2013	2016	2020
<i>Aira caryophylla</i>	3	-	-	-	-
<i>Aira elegantissima</i>	-	-	-	2	-
<i>Austrostipa scabra</i>	2	2	-	-	1
<i>Hypochoeris glabra</i>	-	1	-	-	-
<i>Hypochoeris radicata</i>	-	-	1	-	-
<i>Juncus subg. Genuini</i>	-	-	3	-	-
<i>Lomandra filiformis</i>	-	-	2	1	-
<i>Euchiton sphaericus</i>	-	-	-	-	3
<i>Panicum effusum</i>	-	-	-	3	-
<i>Tolpis umbellata</i>	-	3	-	-	-
Cryptic Rytidosperma	1	-	-	-	2
Open, mid-slope (Site 17)	2005	2010	2013	2016	2020
<i>Acetosella vulgaris</i>	-	2	-	-	-
<i>Aira caryophylla</i>	-	-	-	3	-
<i>Aristida ramosa</i>	3	-	-	-	2
<i>Hypochoeris glabra</i>	-	1	-	-	1
<i>Lomandra filiformis</i>	-	-	3	2	-
<i>Poa bulbosa</i>	1	-	-	-	-
<i>Themeda triandra</i>	-	3	1	1	3
Cryptic Rytidosperma	2	-	2	-	-
Open, mid-slope (Site 18)	2005	2010	2013	2016	2020

<i>Aira elegantissima</i>	2	-	-	-	-
<i>Briza maxima</i>	-	2	3	2	-
<i>Hypochoeris glabra</i>	-	-	-	-	2
<i>Lomandra filiformis</i>	-	3	2	3	3
<i>Themeda triandra</i>	1	1	1	1	1
Cryptic Rytidosperma	3	-	-	-	-
Open, mid-slope (Site 19)	2005	2010	2013	2016	2020
<i>Aristida ramosa</i>	3	-	-	-	-
<i>Daviesia genistifolia</i>	-	-	-	2	-
<i>Trifolium subterraneum</i>	-	2	-	-	-
<i>Aira elegantissima</i>	-	-	-	-	3
<i>Gonocarpus tetragynus</i>	-	-	3	-	-
<i>Hypochoeris glabra</i>	-	3	-	-	2
<i>Lomandra filiformis</i>	-	-	2	-	-
<i>Luzula densiflora</i>	-	-	-	3	-
<i>Themeda triandra</i>	1	1	1	1	1
Cryptic Rytidosperma	2	-	-	-	-
Open, mid-slope (Site 20)	2005	2010	2013	2016	2020
<i>Lomandra filiformis</i>	-	-	-	-	1
<i>Acacia genistifolia</i>	-	-	2	-	-
<i>Aristida ramosa</i>	2	3	-	-	-
<i>Dillwynia sericea</i>	-	-	3	-	-
<i>Melichrus urceolatus</i>	-	-	-	3	2
<i>Pultenaea subspicata</i>	-	2	-	2	-
<i>Themeda triandra</i>	1	1	1	1	3
Cryptic Rytidosperma	3	-	-	-	-
Open, lower slope (Site 22)	2005	2010	2013	2016	2020
<i>Acacia genistifolia</i>	-	2	1	-	-
<i>Lomandra filiformis</i>	3	-	3	2	2
<i>Themeda triandra</i>	1	1	2	1	3
<i>Triptilodiscus pygmaeus</i>	-	-	-	3	1
Cryptic Rytidosperma	2	3	-	-	-
Open, lower slope (Site 23)	2005	2010	2013	2016	2020
<i>Briza maxima</i>	-	3	-	3	-
<i>Trifolium arvense</i>	-	-	-	-	3
<i>Hypochoeris glabra</i>	-	2	-	-	-
<i>Lomandra filiformis</i>	3	-	2	2	2
<i>Themeda triandra</i>	1	1	1	1	1
<i>Vulpia bromoides</i>	-	-	3	-	-
Cryptic Rytidosperma	2	-	-	-	-
Open, lower slope (Site 24)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	2	-	-	-	-
<i>Rytidosperma pallidum</i>	-	2	-	-	-

<i>Lomandra filiformis</i>	-	-	2	-	2
<i>Lomandra multiflora</i>	-	-	3	2	3
<i>Melichrus urceolatus</i>	-	-	-	3	-
<i>Themeda triandra</i>	1	1	1	1	1
Cryptic Rytidosperma	3	3	-	-	-
Under tree, upper slope (Site 26)	2005	2010	2013	2016	2020
<i>Acetosella vulgaris</i>	-	3	-	-	-
<i>Aira caryophylla</i>	2	-	-	-	-
<i>Austrostipa scabra</i>	-	2	-	-	-
<i>Lomandra filiformis</i>	-	-	2	2	2
<i>Melichrus urceolatus</i>	3	1	1	1	1
<i>Microlaena stipoides</i>	-	-	-	3	-
Cryptic Rytidosperma	1	-	3	-	3
Under tree, upper slope (Site 27)	2005	2010	2013	2016	2020
<i>Aira caryophylla</i>	3	-	-	-	-
<i>Rytidosperma pallidum</i>	-	1	1	1	-
<i>Lomandra filiformis</i>	-	-	2	3	1
<i>Melichrus urceolatus</i>	-	2	-	-	-
<i>Microlaena stipoides</i>	2	-	-	2	2
<i>Petrorhagia nanteuilii</i>	-	3	3	-	3
Cryptic Rytidosperma	1	-	-	-	-
Under tree, upper slope (Site 28)	2005	2010	2013	2016	2020
<i>Acacia genistifolia</i>	-	-	3	3	-
<i>Hypochoeris glabra</i>	-	3	-	-	-
<i>Rytidosperma pallidum</i>	1	1	1	2	2
<i>Lomandra filiformis</i>	-	-	-	-	3
<i>Melichrus urceolatus</i>	3	2	2	1	1
Cryptic Rytidosperma	2	-	-	-	-
Under tree, lower slope (Site 34)	2005	2010	2013	2016	2020
<i>Dianella revoluta</i>	-	-	2	1	1
<i>Lolium perenne</i>	-	2	-	-	-
<i>Lomandra filiformis</i>	-	-	1	-	-
<i>Plantago varia</i>	1	1	-	2	2
<i>Scutellaria humilis</i>	3	3	-	3	3
Cryptic Rytidosperma	2	-	3	-	-
Under tree, lower slope (Site 36)	2005	2010	2013	2016	2020
<i>Acacia genistifolia</i>	1	1	-	-	-
<i>Dianella revoluta</i>	-	-	-	2	1
<i>Elymus scaber</i>	-	3	-	-	-
<i>Lomandra filiformis</i>	-	-	-	3	2
<i>Plantago varia</i>	3	-	-	-	-
<i>Poa sieberiana</i>	-	-	3	-	-
<i>Pultenaea subspicata</i>	-	2	1	1	-

<i>Lomandra multiflora</i>	-	-	-	-	3
Cryptic Rytidosperma	2	-	2	-	-
Under tree, lower slope (Site 37)	2005	2010	2013	2016	2020
<i>Briza maxima</i>	-	3	-	2	3
<i>Lysimachia arvensis</i>	-	-	-	-	1
<i>Carex apressa</i>	1	1	1	1	2
<i>Eragrostis brownii</i>	3	-	-	-	-
<i>Juncus subg. Genuini</i>	-	-	2	3	-
<i>Lomandra filiformis</i>	-	-	3	-	-
Cryptic Rytidosperma	2	2	-	-	-
Drainage line, upper (Site 39)	2005	2010	2013	2016	2020
<i>Briza maxima</i>	-	-	-	3	-
<i>Schoenus apogon</i>	-	-	-	-	2
<i>Lysimachia arvensis</i>	-	-	-	-	3
<i>Carex apressa</i>	2	2	2	1	-
<i>Holchus lanatus</i>	-	3	3	-	-
<i>Themeda triandra</i>	1	1	1	2	1
Cryptic Rytidosperma	3	-	-	-	-
Drainage line, upper (Site 40)	2005	2010	2013	2016	2020
<i>Acacia rubida</i>	-	-	-	1	-
<i>Aira elegantissima</i>	3	-	-	-	-
<i>Schoenus apogon</i>	-	-	-	-	1
<i>Aristida ramosa</i>	-	-	-	-	2
<i>Elaeocharis plana</i>	-	-	3	2	-
<i>Themeda triandra</i>	2	1	1	3	-
<i>Vulpia bromoides</i>	-	3	2	-	-
Cryptic Rytidosperma	1	2	-	-	3
Drainage line, mid (Site 41)	2005	2010	2013	2016	2020
<i>Briza maxima</i>	-	-	-	3	-
<i>Carex apressa</i>	1	1	1	1	1
<i>Holchus lanatus</i>	-	3	3	-	-
<i>Themeda triandra</i>	2	2	2	2	3
<i>Lomandra filiformis</i>	-	-	-	-	2
Cryptic Rytidosperma	3	-	-	-	-
Sheep camp (Site 66)	2005	2010	2013	2016	2020
<i>Rumex acetosella</i>	-	2	-	2	-
<i>Bromus racemosus</i>	-	-	1	1	-
<i>Hordeum glaucum</i>	-	1	-	-	-
<i>Poa bulbosa</i>	1	-	2	-	-
<i>Vulpia myuros</i>	2	3	-	3	-
<i>Trifolium subterraneum</i>	-	-	-	-	1
<i>Paronychia brasiliana</i>	-	-	-	-	2
<i>Arctotheca calendula</i>	-	-	-	-	3

Cryptic Rytidosperma	3	-	3	-	-
Sheep camp (Site 67)	2005	2010	2013	2016	2020
<i>Arctotheca calendula</i>	2	-	-	-	1
<i>Austrostipa scabra</i>	-	3	-	-	-
<i>Bromus racemosus</i>	-	-	-	1	-
<i>Hordeum glaucum</i>	1	1	2	2	-
<i>Microlaena stipoides</i>	-	-	1	3	2
<i>Spergularia rubra</i>	3	-	-	-	-
<i>Rumex acetosella</i>	-	-	-	-	3
Cryptic Rytidosperma	-	2	3	-	-
Sheep camp (Site 68)	2005	2010	2013	2016	2020
<i>Rumex acetosella</i>	2	-	-	-	-
<i>Arctotheca calendula</i>	3	-	-	-	-
<i>Austrostipa scabra</i>	-	2	-	-	2
<i>Hypochoeris glabra</i>	-	1	-	-	-
<i>Microlaena stipoides</i>	-	-	1	2	-
<i>Panicum effusum</i>	-	-	-	1	-
<i>Poa bulbosa</i>	1	3	3	-	-
<i>Trifolium arvense</i>	-	-	-	3	3
<i>Trifolium subterraneum</i>	-	-	-	-	1
Cryptic Rytidosperma	-	-	2	-	-
Open, mid- slope (Site 69)	2005	2010	2013	2016	2020
<i>Aira elegantissima</i>	2	-	-	-	-
<i>Austrostipa scabra</i>	-	2	-	-	-
<i>Hydrocotyle laxiflora</i>	-	3	-	-	-
<i>Lomandra filiformis</i>	-	-	2	-	2
<i>Themeda triandra</i>	1	1	1	1	1
<i>Vulpia bromoides</i>	-	-	-	2	-
<i>Wahlenbergia multicaulis</i>	3	-	-	-	-
<i>Trifolium arvense</i>	-	-	-	-	3
<i>Trifolium dubium</i>	-	-	-	3	-
Cryptic Rytidosperma	-	-	3	-	-