

Ecography

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Supplementary material

Appendix 1

Table A1. Study sites and their current and historical land uses. Land use abbreviations are as follows: current cattle grazing (C), current conservation reserve (R), current sheep grazing (S), historical sheep grazing, where sheep grazing has now ceased (H). The dominant land uses at the time of survey, used in the land use analysis, are in bold print.

Treatment	Region	Study area	Land use	No. of sites
Dingo	Moondiepitchnie Dunefield	Billa Kalina Station	C, H	19
		Stuart Creek Station	C, H	17
	Strzelecki Desert	Lindon Station	C	14
		Omicron Station	C	15
		Quinyambie Station	C, H	17
		Strzelecki Regional Reserve	R, H, C	30
No Dingo	Moondiepitchnie Dunefield	Andamooka Station	C, H	6
		Mulgaria Station	C	9
		Parakylia Station	S	20
	Strzelecki Desert	Border Downs	S	2
		Lake Stewart Station	S, C	8
		Sturt National Park	R, H	23
		Waka Station	S, C	3
		Winnathee Station	S, C	21

Table A2. For each species recorded in this study, the proportion of surveys in which the species was recorded for each dingo barrier fence (DBF) treatment (Presence), the mean abundance per survey of the species in each dingo barrier fence (DBF) treatment (Abundance (\bar{x})) and the traits of species included in the traits analysis (Traits). Bold print indicates species significantly affected by dingo functional extinction based on unadjusted p-values (P). Trait abbreviations are as follows: *mobility* – D(dispersive), S(sedentary); *diet* – G(grass seed), FG(forb seed and grass seed), M(mixed grain), TS(tree and shrub seed), C(carrion), I(invertebrate), B(bird), N(nectar), P(terrestrial small vertebrate prey), F(fruit); *nest* – GV(ground vegetation), LV(low vegetation <1m), TP(platform in tree), OG(open ground), S(shrub), TH(tree hollow), OB(open branch), TD(domed nest in tree), HV(high vegetation >1m), GT(tunnel below ground), V(variable); *chick* – P(precocial), A(altricial).

Species		Presence				Abundance (\bar{x})		Traits				
Common name	Scientific name	dingo	no dingo	β	P	dingo \pm SE	no dingo \pm SE	mobility	female weight (g)	diet	nest	chick
Stubble quail	<i>Coturnix pectoralis</i>	0.03	0	-11.22	0.07	0.1 \pm 0.06	0 \pm 0	D	110	G, I	GV	P
Black kite	<i>Milvus migrans</i>	0.06	0.02	-1.04	0.18	0.07 \pm 0.03	0.02 \pm 0.02	D	600	C	TP	A
Whistling kite	<i>Haliastur sphenurus</i>	0	0.01	10.36	0.25	0 \pm 0	0.02 \pm 0.02	D	850	C	TP	A
Wedge-tailed eagle	<i>Aquila audax</i>	0.09	0.22	1.05	0.01	0.11\pm0.03	0.26\pm0.06	S	4200	C	TP	A
Spotted harrier	<i>Circus assimilis</i>	0.02	0	-10.81	0.13	0.02 \pm 0.01	0 \pm 0	D	720	P	TP	A
Collared sparrowhawk	<i>Accipiter cirrhocephalus</i>	0	0.01	10.36	0.28	0 \pm 0	0.01 \pm 0.01	D	240	B	TP	A
Brown goshawk	<i>Accipiter fasciatus</i>	0.01	0	-10.11	0.45	0.01 \pm 0.01	0 \pm 0	S	570	P	TP	A

Nankeen kestrel	<i>Falco cenchroides</i>	0.09	0.08	-0.11	0.82	0.1±0.03	0.08±0.03	D	185	I, P	TP	A
Brown falcon	<i>Falco berigora</i>	0.04	0.07	0.46	0.51	0.08±0.04	0.09±0.04	S	625	P	TP	A
Black falcon	<i>Falco subniger</i>	0.01	0	-10.11	0.43	0.01±0.01	0±0	D	900	B	TP	A
Little button-quail	<i>Turnix velox</i>	0.02	0	-10.81	0.13	0.03±0.02	0±0	D	50	G, I	GV	P
Australian pratincole	<i>Stiltia isabella</i>	0	0.01	10.36	0.23	0±0	0.01±0.01	D	75	I	OG	P
Banded lapwing	<i>Vanellus tricolor</i>	0.03	0.01	-0.86	0.56	0.04±0.02	0.03±0.03	D	200	I	OG	P
Flock bronzewing pigeon	<i>Phaps histrionica</i>	0.02	0	-10.81	0.15	0.18±0.13	0±0	D	300	FG	OG	A
Crested pigeon	<i>Ocyphaps lophotes</i>	0.38	0.26	-0.55	0.08	1.15±0.28	1.09±0.33	D	250	FG	S	A
Common bronzewing pigeon	<i>Phaps chalcoptera</i>	0	0.01	10.36	0.25	0±0	0.02±0.02	D	350	TS	S	A
Diamond dove	<i>Geopelia cuneata</i>	0.03	0.08	1.16	0.10	0.04±0.02	0.34±0.16	D	33	FG	S	A
Little corella	<i>Cacatua sanguinea</i>	0.12	0.08	-0.41	0.38	2.83±1.3	2.39±1.07	D	590	M	TH	A
Cockatiel	<i>Nymphicus hollandicus</i>	0.11	0.02	-1.63	0.01	0.98±0.44	0.17±0.12	D	100	FG	TH	A
Galah	<i>Cacatua roseicapilla</i>	0.12	0.16	0.38	0.36	0.5±0.16	0.51±0.18	D	330	M	TH	A
Mulga parrot	<i>Psephotus varius</i>	0.05	0.01	-1.58	0.11	0.16±0.07	0.04±0.04	D	60	FG	TH	A

Blue bonnet	<i>Northiella haematogaster</i>	0.09	0.05	-0.71	0.23	0.24±0.08	0.17±0.1	D	100	FG	TH	A
Bourke's parrot	<i>Neopsephotus bourkii</i>	0.04	0.01	-1.39	0.19	0.11±0.05	0.07±0.07	D	50	FG	TH	A
Budgerigar	<i>Melanopsittacus undulatus</i>	0.32	0.26	-0.28	0.36	5.81±1.46	2.83±1.05	D	30	G	TH	A
Blue-winged parrot	<i>Neophema chrysostoma</i>	0	0.01	10.36	0.17	0±0	0.01±0.01	na	na	na	na	na
Variegated fairywren	<i>Malurus lamberti</i>	0.11	0.16	0.47	0.26	0.46±0.16	1.09±0.3	S	8	I	GV	A
White-winged fairywren	<i>Malurus leucopterus</i>	0.71	0.47	-0.99	0.00	4.06±0.44	2.98±0.5	S	8	I	GV	A
Red-browed pardalote	<i>Pardalotus rubricatus</i>	0	0.02	11.07	0.07	0±0	0.04±0.03	S	11	I	GT	A
Rufous fieldwren	<i>Calamanthus campestris</i>	0.04	0	-11.75	0.02	0.08±0.04	0±0	S	14	I	GV	A
Yellow-rumped thornbill	<i>Acanthiza chrysorrhoa</i>	0.01	0	-10.11	0.49	0.02±0.02	0±0	S	9	I	HV	A
Chestnut-rumped thornbill	<i>Acanthiza uropygialis</i>	0.04	0.06	0.27	0.65	0.28±0.13	0.32±0.16	S	6	I	TH	A
Inland thornbill	<i>Acanthiza apicalis</i>	0.02	0	-10.81	0.19	0.11±0.09	0±0	S	7	I	LV	A
Southern whiteface	<i>Aphelocephala leucopsis</i>	0.13	0.2	0.45	0.25	0.79±0.23	0.85±0.26	S	12.5	I	TH	A
Banded whiteface	<i>Aphelocephala nigricincta</i>	0.05	0	-11.94	0.01	0.19±0.09	0±0	D	11	I	LV	A
Yellow-throated miner	<i>Manorina flavigula</i>	0.09	0.09	0.03	0.95	0.21±0.08	0.23±0.11	S	55	N	S	A

Spiny-cheeked honeyeater	<i>Acanthagenys rufogularis</i>	0.07	0.1	0.41	0.43	0.09±0.03	0.26±0.12	D	50	N	S	A
Singing honeyeater	<i>Lichenostomus virescens</i>	0.71	0.67	-0.22	0.49	1.73±0.16	1.61±0.22	S	35	N	S	A
Black honeyeater	<i>Certhionix niger</i>	0	0.01	10.36	0.16	0±0	0.01±0.01	D	9.5	N	S	A
Pied honeyeater	<i>Certhionyx variegatus</i>	0.01	0.01	0.26	0.72	0.01±0.01	0.01±0.01	D	27	N	S	A
Crimson chat	<i>Epthianura tricolor</i>	0.25	0.14	-0.73	0.04	2.96±0.85	0.86±0.53	D	11	I	GV	A
Orange chat	<i>Epthianura aurifrons</i>	0.04	0.02	-0.69	0.41	0.46±0.35	0.07±0.05	D	11	I	GV	A
Red-capped robin	<i>Petroica goodenovii</i>	0.02	0.08	1.57	0.04	0.02±0.01	0.08±0.03	D	9	I	OB	A
Jacky winter	<i>Microeca fascinans</i>	0	0.01	10.36	0.13	0±0	0.01±0.01	D	15	I	OB	A
White-browed babbler	<i>Pomatostomus superciliosus</i>	0.05	0.09	0.58	0.32	0.21±0.09	0.26±0.1	S	40	I	TD	A
Chestnut-crowned babbler	<i>Pomatotomus ruficeps</i>	0.09	0.05	-0.71	0.21	0.48±0.17	0.09±0.05	S	55	I	TD	A
Chirruping wedgebill	<i>Psophodes cristatus</i>	0.7	0.26	-1.85	0.00	2.64±0.27	0.7±0.18	S	40	I	LV	A
Cinnamon quail-thrush	<i>Cinclosoma cinnamomeum</i>	0.29	0.01	-3.58	0.00	0.47±0.09	0.01±0.01	S	57	I	GV	A
Varied sitella	<i>Daphoenositta chrysoptera</i>	0	0.01	10.36	0.23	0±0	0.12±0.12	S	13	I	OB	A
Crested bellbird	<i>Oreoica gutturalis</i>	0.09	0.03	-1.01	0.13	0.13±0.04	0.03±0.02	S	63	I	LV	A

Rufous whistler	<i>Pachycephala rufiventris</i>	0.01	0	-10.11	0.35	0.01±0.01	0±0	D	25	I	S	A
Grey shrike-thrush	<i>Colluricincla harmonica</i>	0.02	0.02	0.26	0.80	0.02±0.01	0.03±0.02	S	65	I	V	A
Willie wagtail	<i>Rhipidura leucophrys</i>	0.43	0.18	-1.20	0.00	0.65±0.09	0.21±0.05	S	18	I	OB	A
Magpie lark	<i>Grallina cyanoleuca</i>	0.03	0.01	-0.86	0.53	0.04±0.03	0.02±0.02	D	85	I	OB	A
White-winged triller	<i>Lalage tricolor</i>	0	0.01	10.36	0.13	0±0	0.01±0.01	D	26	I	OB	A
Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>	0	0.01	10.36	0.19	0±0	0.07±0.07	D	115	I	HV	A
White-breasted woodswallow	<i>Artamus leucorhynchus</i>	0	0.02	11.07	0.12	0±0	0.11±0.08	D	41	I	TH	A
White-browed woodswallow	<i>Artamus superciliosus</i>	0	0.01	10.36	0.13	0±0	0.04±0.04	D	35	I	OB	A
Black-faced woodswallow	<i>Artamus cinereus</i>	0.66	0.31	-1.46	0.00	3.57±0.41	1.27±0.3	D	36	I	LV	A
Grey butcherbird	<i>Cracticus torquatus</i>	0.12	0.18	0.54	0.19	0.28±0.08	0.27±0.07	S	90	I	HV	A
Australian magpie	<i>Gymnorhina tibicen</i>	0.21	0.13	-0.63	0.11	0.33±0.07	0.2±0.07	S	300	I	TP	A
Australian raven	<i>Corvus coronoides</i>	0.37	0.39	0.11	0.74	0.73±0.14	1.15±0.23	S	650	C	TP	A
Little crow	<i>Corvus bennetti</i>	0.01	0.11	2.67	0.00	0.01±0.01	0.24±0.09	D	400	C	TP	A
Singing bushlark	<i>Mirafra javanica</i>	0.01	0	-10.11	0.36	0.01±0.01	0±0	D	22.5	I	GV	A

Australasian pipit	<i>Anthus novaeseelandiae</i>	0.13	0.13	-0.07	0.88	0.2±0.06	0.42±0.18	S	26	I	GV	A
Zebra finch	<i>Taeniopygia guttata</i>	0.71	0.59	-0.52	0.08	4.68±0.72	5.08±0.86	S	12	G	HV	A
Mistletoe bird	<i>Dicaeum hirundinaceum</i>	0	0.01	10.36	0.19	0±0	0.02±0.02	D	9	F	HV	A
Welcome swallow	<i>Hirundo neoxena</i>	0	0.01	10.36	0.15	0±0	0.01±0.01	na	na	na	na	na
White-backed swallow	<i>Cheramoeca leucosternus</i>	0.13	0.05	-1.17	0.03	0.31±0.1	0.07±0.04	S	13	I	GT	A
Rufous songlark	<i>Cincloramphus mathewsi</i>	0	0.02	11.07	0.11	0±0	0.02±0.02	D	23	I	GV	A
Brown songlark	<i>Cincloramphus cruralis</i>	0.05	0.03	-0.46	0.59	0.14±0.06	0.04±0.03	D	33	I	GV	A

Figure A1. Indices of activity of (a) sheep, (b) cattle and (c) livestock, defined as the sum of sheep and cattle activity, inside and outside the Dingo Barrier Fence (DBF) in the Moondiepitchnie Dunefield and Strzelecki Desert in the years during, or up to two years prior to, the bird surveys conducted for this study. Error bars indicate +1 standard error.

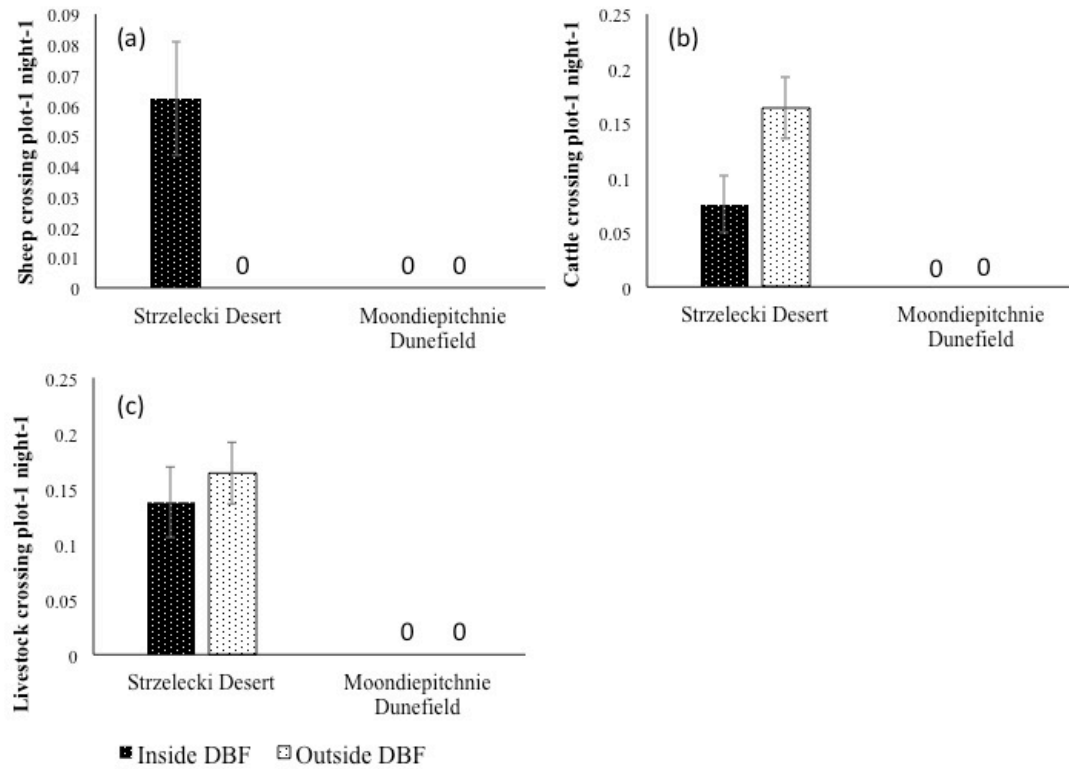


Table A3. For each species recorded in this study, the proportion of surveys in which the species was recorded for each land use treatment (Presence) and the mean abundance per survey of the species in each land-use treatment (Abundance (\bar{x})). Bold print indicates species significantly affected by land-use based on unadjusted p-values (P).

Species		Presence		Abundance			
		grazing	no grazing	Deviance	P	grazing \pm SE	no grazing \pm SE
Stubble quail	<i>Coturnix pectoralis</i>			2.33	0.19	0.03 \pm 0.04	0.12 \pm 0.10
		0.01	0.04				
Black kite	<i>Milvus migrans</i>	0.05	0.02	1.16	0.28	0.06 \pm 0.02	0.02 \pm 0.02
Whistling kite	<i>Haliastur sphenurus</i>	0.01	0	0.58	0.42	0.01 \pm 0.02	0 \pm 0
Wedge-tailed eagle	<i>Aquila audax</i>	0.11	0.26	6.33	0.01	0.13\pm0.04	0.34\pm0.09
Spotted harrier	<i>Circus assimilis</i>	0.01	0.02	0.58	0.68	0.01 \pm 0.01	0.02 \pm 0.02
Collared sparrowhawk	<i>Accipiter cirrhocephalus</i>	0.01	0	0.58	0.42	0.01 \pm 0.01	0 \pm 0
Brown goshawk	<i>Accipiter fasciatus</i>	0.01	0	0.58	0.28	0.01 \pm 0.01	0 \pm 0
Nankeen kestrel	<i>Falco cenchroides</i>	0.10	0.04	2.04	0.17	0.10 \pm 0.03	0.06 \pm 0.04
Brown falcon	<i>Falco berigora</i>	0.07	0.02	1.93	0.18	0.11 \pm 0.04	0.02 \pm 0.02
Black falcon	<i>Falco subniger</i>	0.01	0	0.58	0.39	0.01 \pm 0.01	0 \pm 0
Little button-quail	<i>Turnix velox</i>	0.01	0.02	0.58	0.71	0.01 \pm 0.02	0.02 \pm 0.02
Australian pratincole	<i>Stiltia isabellae</i>	0.01	0	0.58	0.44	0.01 \pm 0.01	0 \pm 0
Banded lapwing	<i>Vanellus tricolor</i>	0.03	0	2.34	0.18	0.05 \pm 0.03	0 \pm 0
Flock bronzewing pigeon	<i>Phaps histrionica</i>	0.01	0.02	0.58	0.71	0.06 \pm 0.07	0.22 \pm 0.22
Crested pigeon	<i>Ocyphaps lophotes</i>	0.35	0.28	0.82	0.36	1.40 \pm 0.36	0.42 \pm 0.11
Common bronzewing pigeon	<i>Phaps chalcoptera</i>	0.01	0	0.58	0.40	0.01 \pm 0.02	0 \pm 0
Diamond dove	<i>Geopelia cuneata</i>	0.07	0	5.96	0.02	0.23\pm0.13	0\pm0
Little corella	<i>Cacatua sanguinea</i>	0.13	0	12.31	0.00	3.60\pm1.45	0\pm0

Cockatiel	<i>Nymphicus hollandicus</i>	0.09	0.02	3.26	0.08	0.79±0.41	0.16±0.16
Galah	<i>Cacatua roseicapilla</i>	0.16	0.06	3.77	0.06	0.59±0.19	0.3±0.19
Mulga parrot	<i>Psephotus varius</i>	0.05	0	4.14	0.07	0.15±0.07	0±0
Blue bonnet	<i>Northiella haematogaster</i>	0.09	0	8.45	0.01	0.29±0.11	0±0
Bourke's parrot	<i>Neopsephotus bourkii</i>	0.04	0	3.53	0.06	0.12±0.07	0±0
Budgerigar	<i>Melanopsittacus undulatus</i>	0.36	0.12	11.26	0.00	5.66±1.55	1.34±0.63
Variegated fairywren	<i>Malurus lamberti</i>	0.15	0.06	3.38	0.09	0.90±0.26	0.34±0.20
White-winged fairywren	<i>Malurus leucopterus</i>	0.64	0.5	2.92	0.08	4.29±0.53	1.8±0.35
Red-browed pardalote	<i>Pardalotus rubricatus</i>	0.01	0	1.16	0.39	0.03±0.02	0±0
Rufous fieldwren	<i>Calamanthus campestris</i>	0.03	0	2.94	0.12	0.06±0.04	0±0
Yellow-rumped thornbill	<i>Acanthiza chrysorrhoa</i>	0.01	0	0.58	0.25	0.01±0.02	0±0
Chestnut-rumped thornbill	<i>Acanthiza uropygialis</i>	0.06	0.02	1.53	0.24	0.34±0.15	0.2±0.2
Inland thornbill	<i>Acanthiza apicalis</i>	0.01	0	1.16	0.26	0.08±0.08	0±0
Southern whiteface	<i>Aphelocephala leucopsis</i>	0.18	0.1	1.99	0.14	1.02±0.28	0.3±0.15
Banded whiteface	<i>Aphelocephala nigricincta</i>	0.01	0.1	9.33	0.00	0.03±0.03	0.34±0.18
Yellow-throated miner	<i>Manorina flavigula</i>	0.11	0.04	2.41	0.13	0.24±0.1	0.16±0.14
Spiny-cheeked honeyeater	<i>Acanthagenys rufogularis</i>	0.11	0	10.36	0.00	0.23±0.1	0±0
Singing honeyeater	<i>Lichenostomus virescens</i>	0.75	0.52	9.03	0.01	1.94±0.21	1.06±0.20
Black honeyeater	<i>Certhionix niger</i>	0.01	0	0.58	0.44	0.01±0.01	0±0
Pied honeyeater	<i>Certhionyx variegatus</i>	0.01	0	1.16	0.38	0.01±0.01	0±0
Crimson chat	<i>Epthianura tricolor</i>	0.16	0.32	5.48	0.03	1.38±0.58	4.1±1.61
Orange chat	<i>Epthianura aurifrons</i>	0.03	0.04	0.04	0.87	0.09±0.06	0.86±0.78
Red-capped robin	<i>Petroica goodenovii</i>	0.04	0.06	0.32	0.61	0.04±0.02	0.06±0.03
Jacky winter	<i>Microeca fascians</i>	0.00	0.02	2.78	0.10	0±0	0.02±0.02

White-browed babbler	<i>Pomatostomus superciliosus</i>	0.09	0	8.45	0.01	0.32±0.11	0±0
Chestnut-crowned babbler	<i>Pomatostomus ruficeps</i>	0.05	0.14	4.34	0.06	0.16±0.08	0.76±0.33
Chirruping wedgebill	<i>Psophodes cristatus</i>	0.50	0.54	0.28	0.61	1.77±0.26	1.94±0.40
Cinnamon quail-thrush	<i>Cinclosoma cinnamomeum</i>	0.15	0.22	1.09	0.29	0.23±0.07	0.38±0.12
Varied sitella	<i>Daphoenositta chrysoptera</i>	0.01	0	0.58	0.44	0.07±0.1	0±0
Crested bellbird	<i>Oreoica gutturalis</i>	0.09	0	7.82	0.01	0.11±0.04	0±0
Rufous whistler	<i>Pachycephala rufiventris</i>	0.01	0	0.58	0.38	0.01±0.01	0±0
Grey shrike-thrush	<i>Colluricincla harmonica</i>	0.03	0	2.34	0.13	0.03±0.02	0±0
Willie wagtail	<i>Rhipidura leucophrys</i>	0.30	0.4	1.84	0.16	0.43±0.08	0.56±0.11
Magpie lark	<i>Grallina cyanoleuca</i>	0.03	0	2.34	0.18	0.05±0.03	0±0
White-winged triller	<i>Lalage tricolor</i>	0.01	0	0.58	0.52	0.01±0.01	0±0
Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>	0.01	0	0.58	0.51	0.04±0.05	0±0
White-breasted woodswallow	<i>Artamus leucorhynchus</i>	0.00	0.04	5.59	0.00	0±0	0.2±0.14
White-browed woodswallow	<i>Artamus superciliosus</i>	0.01	0	0.58	0.50	0.03±0.03	0±0
Black-faced woodswallow	<i>Artamus cinereus</i>	0.52	0.48	0.20	0.65	2.66±0.42	2.42±0.50
Grey butcherbird	<i>Cracticus torquatus</i>	0.18	0.04	7.45	0.01	0.36±0.09	0.04±0.03
Australian magpie	<i>Gymnorhina tibicen</i>	0.21	0.08	4.84	0.03	0.32±0.08	0.14±0.08
Australian raven	<i>Corvus coronoides</i>	0.47	0.1	25.16	0.00	1.19±0.21	0.20±0.10
Little crow	<i>Corvus bennetti</i>	0.06	0.12	1.74	0.20	0.13±0.06	0.3±0.14
Singing bushlark	<i>Mirafra javanica</i>	0.01	0	0.58	0.38	0.01±0.01	0±0
Australasian pipit	<i>Anthus novaeseelandiae</i>	0.13	0.14	0.05	0.82	0.36±0.15	0.14±0.05
Zebra finch	<i>Taeniopygia guttata</i>	0.65	0.66	0.01	0.91	5.40±0.85	3.74±0.88
Mistletoe bird	<i>Dicaeum hirundinaceum</i>	0.00	0.02	2.78	0.07	0±0	0.04±0.04
White-backed swallow	<i>Cheramoeca leucosternus</i>	0.09	0.1	0.02	0.92	0.15±0.06	0.36±0.20

Rufous songlark	<i>Cincloramphus mathewsi</i>	0.00	0.04	5.59	0.01	0±0	0.04±0.03
Brown songlark	<i>Cincloramphus cruralis</i>	0.05	0.04	0.04	0.83	0.10±0.05	0.1±0.07
