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*Wildlife Research*

### **Supplementary Material**

#### **Decline in semi-arid reptile occurrence following habitat loss and fragmentation**

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Table S1. Classification of the 31 reptile species detected in this study. Classification was based on macro and microhabitat affiliations described by Greer (2022), Wilson and Swan (2021) and the Atlas of Living Australia (2023), restricted to the Murray-Darling Depression bioregion. The eight species in bold were used in analysis. Nomenclature and common names follow Wilson and Swan (2021).

Common name	Scientific name	Family	Ecological affiliations	Classification
<b>Eastern Mallee Dragon</b>	<i>Ctenophorus spinodomus</i>	Agamidae	Strong dependence on hummock grass <i>Triodia for</i> foraging, shelter, and thermoregulation as well as association with mallee woodland (Greer 2022; Wilson and Swan 2021; Sadler <i>et al.</i> 2019; Bell <i>et al.</i> 2021)	Habitat specialist
<b>Nobbi Dragon</b>	<i>Diporiphora nobbi</i>	Agamidae	<i>Triodia</i> and Mallee woodland associations (Greer 2022; ALA 2023, Wilson and Swan 2021; Edwards and Melville 2011).	Habitat specialist
Eastern Bearded Dragon	<i>Pogona barbata</i>	Agamidae	Open woodlands, dry sclerophyll forest (ALA 2023; Greer 2022; Rej and Joyner 2018; Wilson and Swan 2021) and modified landscapes such as cities (Rej and Joyner 2018) and farmlands (Greer 2022; ALA 2023).	Habitat generalist
Eastern Thick-tailed Gecko	<i>Underwoodisaurus milii</i>	Carphodactylidae	Dry sclerophyll forests, rocky outcrops, shrublands (ALA 2023; Wilson and Swan 2021) mallee woodlands (Greer 2022) and temperate forests (Wilson and Swan 2021)	Habitat generalist
Eastern Stone Gecko	<i>Diplodactylus vittatus</i>	Diplodactylidae	Occurs in semi-arid to dry habitats (Greer 2022). Forests and shrublands (ALA 2023; Wilson and Swan 2021)	Habitat specialist
Beaded Gecko	<i>Lucasium damaeum</i>	Diplodactylidae	Arid and semi-arid sandy dunes, shrublands, grasslands and woodland (Greer 2022) with <i>Triodia</i> association (ALA 2023; Wilson and Swan 2021)	Habitat specialist
Eastern Beaked Gecko	<i>Rhynchoedura ormsbyi</i>	Diplodactylidae	Occurs across arid zone in eucalypt and mulga woodlands, clay pans and sand plains (Wilson and Swan 2021)	Habitat specialist
Southern Spiny-tailed Gecko	<i>Strophurus intermedius</i>	Diplodactylidae	Arid and semi-arid shrublands (Greer 2022), mallee woodlands (ALA 2023; Wilson and Swan 2021) and <i>Triodia</i> associations (Wilson and Swan 2021).	Habitat specialist
Eastern Brown Snake	<i>Pseudonaja textilis</i>	Elapidae	Occurs in most habitats in eastern Australia including dry sclerophyll forests and open woodlands (ALA 2023; Wilson and Swan 2021), found to have high abundance in modified/cleared landscapes (Greer 2022; Wilson and Swan 2021).	Habitat generalist
Mitchell's Short-tailed Snake	<i>Suta nigriceps</i>	Elapidae	Mallee woodlands (ALA 2023; Wilson and Swan 2021) and sandplains (Wilson and Swan 2021)	Habitat specialist
Common Bandy Bandy	<i>Vermicella annulata</i>	Elapidae	Occurs in most habitats in eastern Australia (ALA 2023; Wilson and Swan 2021). Fossorial and feeds exclusively on members of the Typhlodidae family (Wilson and Swan 2021).	Habitat & dietary specialist

Variegated Dtella	<i>Gehyra versicolor</i>	Gekkonidae	Occurs in many arid and semi-arid habitats and areas of modified landscapes and urban structures (Greer 2022; Wilson and Swan 2021).	Habitat generalist
Bynoe's Gecko	<i>Heteronotia binoei</i>	Gekkonidae	Occurs in most habitats across Australia (ALA 2023; Fujita <i>et al.</i> 2010; Wilson and Swan 2021). Very wide distribution (Greer 2022).	Habitat generalist
Red-tailed Worm-lizard	<i>Aprasia inaurita</i>	Pygopodidae	Semi-arid mallee woodlands, association with <i>Triodia</i> and sandy areas (ALA 2023; Wilson and Swan 2021). Feeds mainly on ant eggs, larvae and pupae (ALA 2023; Greer 2022; Wilson and Swan 2021).	Habitat specialist
Spinifex Delma	<i>Delma butleri</i>	Pygopodidae	Arid and semi-arid areas with strong <i>Triodia</i> association (ALA 2023; Verdon <i>et al.</i> 2020; Wilson and Swan 2021)	Habitat specialist
Burton's Snake-lizard	<i>Lialis burtonis</i>	Pygopodidae	Occurs in all habitats above a certain climate threshold across Australia (ALA 2023; Wilson and Swan 2021), feeds exclusively on lizards (Wilson and Swan 2021). Very wide distribution (Greer 2022; Wilson and Swan 2021).	Habitat generalist
<b>Southern Spinifex Ctenotus</b>	<i>Ctenotus atlas</i>	Scincidae	Arid and semi-arid areas, mallee woodland and strong <i>Triodia</i> association (ALA 2023; Greer 2022; Verdon <i>et al.</i> 2020; Wilson and Swan 2021)	Habitat specialist
Short-clawed Ctenotus	<i>Ctenotus brachyonyx</i>	Scincidae	Mallee woodlands, sandy areas and association with <i>Triodia</i> (ALA 2023; Wilson and Swan 2021) also occurs in chenopod and mulga shrublands (Wilson and Swan 2021).	Habitat specialist
Royal Ctenotus	<i>Ctenotus regius</i>	Scincidae	Occurs in arid and semi-arid regions (Greer 2022), sandy woodlands and shrublands with <i>Triodia</i> association (ALA 2023; Wilson and Swan 2021).	Habitat specialist
<b>Barred Wedge-snouted Ctenotus</b>	<i>Ctenotus schomburgkii</i>	Scincidae	Occurs in arid and semi-arid areas, in sandplain, heathland, shrubland mallee woodland, mulga (Greer 2022) rocky outcrops and <i>Triodia</i> associations (ALA 2023; Wilson and Swan 2021).	Habitat specialist
Bougainville's Slider	<i>Lerista bougainvillii</i>	Scincidae	Occurs in cool temperate zones (Wilson and Swan 2021).	Habitat specialist
<b>Eastern Robust Slider</b>	<i>Lerista punctatovittata</i>	Scincidae	Occurs across a variety of semi-arid habitats (ALA 2023; Wilson and Swan 2021) often in mallee woodlands (Greer 2022).	Habitat generalist
<b>Dwarf Three-toed Slider</b>	<i>Lerista timida</i>	Scincidae	Various arid and dry woodland, shrubland and forest habitat with leaf litter, rock and log associations (Greer 2022; Wilson and Swan 2021).	Habitat generalist
Desert Skink	<i>Liopholis inornata</i>	Scincidae	Occurs in arid and semi-arid areas, with sandplain or sand ridges and <i>Triodia</i> associations (Greer 2022; Wilson and Swan 2021).	Habitat specialist
Common Dwarf Skink	<i>Menetia greyii</i>	Scincidae	Occurs in most habitats across Australia especially dry open areas (ALA 2023; Greer 2022; Wilson and Swan 2021)	Habitat generalist
Boulenger's Morethia	<i>Morethia boulengeri</i>	Scincidae	Occurs throughout many habitats including, woodlands shrublands and grasslands (Greer 2022; Wilson and Swan 2021). Widespread distribution (Greer 2022).	Habitat generalist

<b>Shrubland Pale-flecked Morethia</b>	<i>Morethia obscura</i>	Scincidae	Occurs in dry to semi-arid woodlands, heathland, shrubland (Greer 2022; Wilson and Swan 2021) and mallee woodlands (Greer 2022). Is associated with leaf litter (Greer 2022).	Habitat specialist
Shingleback	<i>Tiliqua rugosa</i>	Scincidae	Occurs in dry to semi-arid open habitats, including dry sclerophyll forests, mallee woodlands (ALA 2023), shrublands, coastal dunes (Greer 2022; Wilson and Swan 2021) grassland and heathland (Greer 2022).	Habitat generalist
Dark-spined Blind Snake	<i>Anilius bicolor</i>	Typhlopidae	Occurs in mallee woodlands, heathlands, woodlands and sandy areas (Greer 2022).	Habitat & dietary specialist
Prong-snouted Blind Snake	<i>Anilius bituberculatus</i>	Typhlopidae	Sub-humid to arid areas (Wilson and Swan 2021). Diet is primarily made up of ant larvae and pupae (Greer 2022).	Habitat & dietary specialist
<b>Sand Goanna</b>	<i>Varanus gouldii</i>	Varanidae	Dry open habitats (ALA 2023; Wilson and Swan 2021). Very widespread distribution (ALA 2023; Greer 2022; Wilson and Swan 2021), Greer (2022) cites over 28 habitats from published literature.	Habitat generalist

Table S2. Summary of detection probability for ten reptile species that met the modelling selection criteria. All p-values are modelled against active search survey method, therefore giving the probability of detecting a species via trapping (pitfall/funnel) method versus active searches. Significance values in bold.

Species	Variable	Estimate	SE	z	P(> z )
<i>Ctenophorus spinodomus</i>	(Intercept)	0.955	0.526	1.810	0.070
	Detection via trapping methods	-1.750	0.573	-3.050	<b>0.002</b>
<i>Diporiphora nobbi</i>	(Intercept)	-0.754	0.474	-1.590	0.112
	Detection via trapping methods	-1.165	0.541	-2.150	<b>0.031</b>
<i>Ctenotus atlas</i>	(Intercept)	-3.030	1.030	-2.950	0.003
	Detection via trapping methods	1.660	1.050	1.580	0.114
<i>Ctenotus schomburgkii</i>	(Intercept)	-3.210	1.030	-3.130	0.002
	Detection via trapping methods	1.510	1.050	1.440	0.149
<i>Menetia greyii</i>	(Intercept)	-3.300	0.822	-4.015	0.000
	Detection via trapping methods	0.190	0.778	0.244	0.807
<i>Morethia boulengeri</i>	(Intercept)	-1.590	0.668	-2.380	0.017
	Detection via trapping methods	-2.180	0.680	-3.200	<b>0.001</b>
<i>Morethia obscura</i>	(Intercept)	-0.966	0.491	-1.970	0.049
	Detection via trapping methods	-0.792	0.551	-1.440	0.151

<i>Lerista timida</i>	(Intercept)	-1.280	0.312	-4.110	0.000
	Detection via trapping methods	-1.160	0.379	-3.050	<b>0.002</b>
<i>Lerista punctatovittata</i>	(Intercept)	-10.680	26.900	-0.397	0.691
	Detection via trapping methods	9.160	26.900	0.341	0.733
<i>Varanus gouldii</i>	(Intercept)	-3.210	1.030	-3.130	0.002
	Detection via trapping methods	1.510	1.050	1.440	0.149

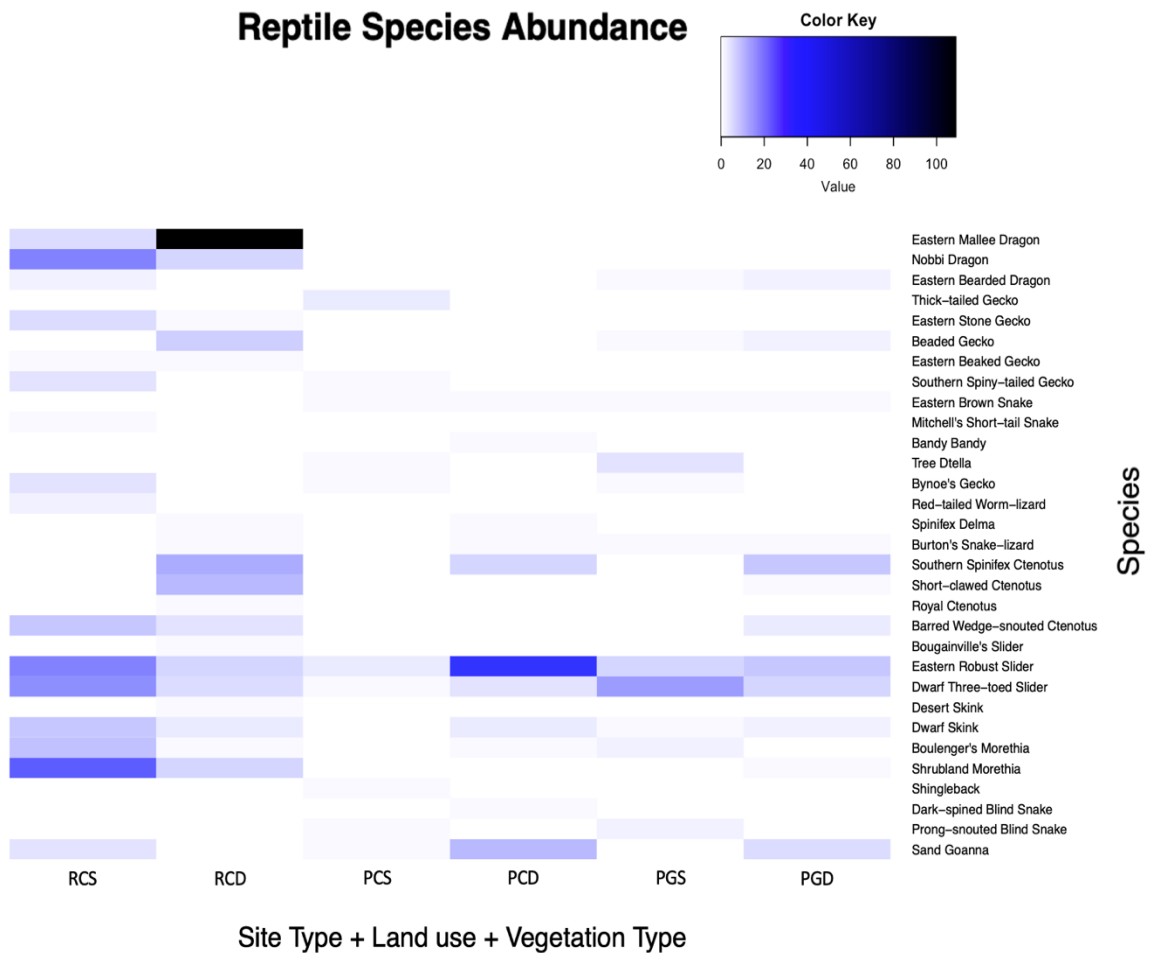


Fig. S1. Heatmap of 31 species detected in the study area representing relative abundance across six treatments (where RC = reserve continuous, PC = patch cropping, PG = patch grazing, S = sandplain and D = dune). The colour gradient ranges from white-pale blue (0 – 10 observations) to dark blue-black (75 – 100+ observations).