

Supplementary Material

Pirra Jungku and Pirra Warlu: using traditional fire-practice knowledge and contemporary science to guide fire-management goals for desert animals

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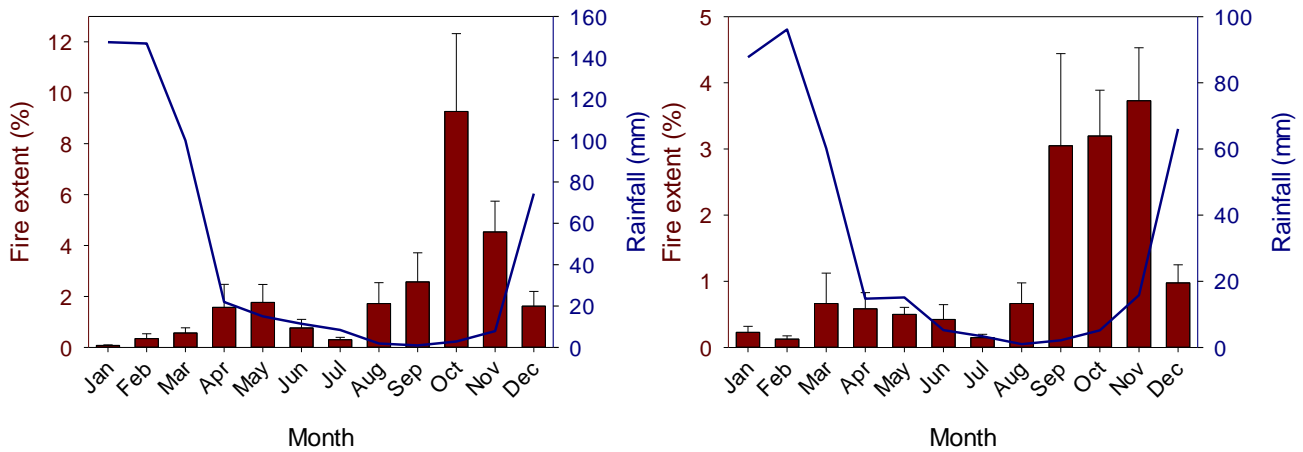


Fig. S1. Mean monthly rainfall and fire extent (mean plus SE) for Karajarri (left) and Ngurrara (right). Fire extent data (2000-2023) is derived from MODIS imagery downloaded from North Australia Fire Information (<https://www.firenorth.org.au/nafi3/>). Rainfall data is downloaded for a point in the middle of each place from SILO (<https://www.longpaddock.qld.gov.au/silo/point-data/>). The average annual fire extent for Karajarri is 19%, making a mean fire return interval of 5.2 years. The average annual fire extent for Ngurrara is 14%, making a mean fire return interval of 7.1 years.

Fig. S2. Photographs of habitat and the four seral stages at the four locations: Kulgara and Yilpi on Karajarri Country; Kuduarra and Kurlku on Ngurrara Country.

Kulgara

Wuntara: Site 8, 2020



Parrawa: Site 3, 2019



Nyirrinyanu: Site 6, 2020



Yurnara: Site 8, 2019



Yilpi

Wuntara: Site7, 2020



Parrawa: Site 2, 2020



Nyirrinyanu: Site 6, 2020



Yurnara: Site 5, 2019



Kuduarra

Wuntara: Site 7; 2020



Parrawa: Site 8 2021



Nyirrinyanu: Site 6 2021



Yurnara: Site 4 2021



Kurlku

Parrawa: Site 7, 2021



Parrawa: Site 6, 2022



Fig. S2. Photographs of habitat and the four seral stages at the four locations: Yilpi and Kulgara on Karajarri Country; Kuduarra and Kurlku on Ngurrara Country.

Table S1a. List of mammal species with their total captures, and the captures for each of four seral stages. Where the captures for a species are high enough, the results of a Chi-square heterogeneity test are shown. The expected values in each case were calculated by allocating the total captures for the species across the four seral stages in the same proportions as the total sample of seral stage (i.e., 0.12, 0.48, 0.23, 0.16 for 81 site-surveys).

Species	Common Name	total captures	Recently burnt (0-1 years since fire)	Recovering (2-4/5 years since fire)	Mature (4-5-7/8 years since fire)	Long-unburnt (>7/>8 years since fire)	Chi-square	p
<i>Dasykaluta rosamondae</i>	Kaluta	4						
<i>Lagorchestes conspicillatus</i>	Spectacled Hare-wallaby	1						
<i>Leggadina lakedownensis</i>	Tropical Short-tailed Mouse	10						
<i>Notomys alexis</i>	Spinifex Hopping Mouse	73	1	67	5	0	40.7	<0.0001
<i>Planigale maculata</i>	Common Planigale	3						
<i>Pseudomys desertor</i>	Desert Mouse	13	0	4	9	0	8.79	0.032
<i>Pseudomys hermannsburgensis/pilbarensis</i> sp. nov.	Sandy Inland Mouse/Western delicate Mouse	180	10	82	53	35	6.68	0.083
<i>Pseudomys</i> sp	native mouse	13						
<i>Sminthopsis macroura</i>	Striped-face Dunnart	2						
<i>Sminthopsis</i> sp	Unidentified Dunnart	8						
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart	20	0	10	8	2	4.62	0.202
<i>Sminthopsis</i> spp	Dunnart	30	0	13	13	4	7.1	0.069
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	1						
native mouse	native mouse	39						
Unidentified mammal	Unidentified mammal	11						

Table S1b. List of reptile species with their total captures, and the captures for each of four seral stages. Where the captures for a species are high enough, the results of a Chi-square heterogeneity test are shown. The expected values in each case were calculated by allocating the total captures for the species across the four seral stages in the same proportions as the total sample of seral stage (i.e., 0.12, 0.48, 0.23, 0.16 for 81 site-surveys). For species marked with an asterisk, the heterogeneity test was carried out using the sample total minus the Kurlku sites, as Kurlku is outside the known distribution of the species (i.e., 0.15, 0.37, 0.28, 0.19 for 67 site-surveys).

Species	Common Name	total captures	Recently burnt (0-1 years since fire)	Recovering (2-4/5 years since fire)	Mature (4-5-7/8 years since fire)	Long-unburnt (>7/>8 years since fire)	Chi-square	p
<i>Anilius diversus</i>	Northern Blind Snake	20	1	8	9	2	2.46	0.482
<i>Anilius endoterus</i>	Interior Blind Snake	13	0	8	5	0	5.84	0.12
<i>Anilius grypous</i>	Long Beaked Blind Snake	21	0	19	0	2	13.5	0.0036
<i>Brachyurophis roperi</i>	Northern Shovel-nosed Snake	11	3	3	1	4	2.83	0.418
<i>Carlia triacantha</i>	Desert Rainbow Skink	15	1	10	2	2	1.19	0.755
<i>Ctenophorus isolepis</i>	Central Military Dragon	570	44	359	109	58	2706	<0.0001
<i>Ctenophorus nuchalis</i>	Central Netted Dragon	68	50	12	6	0	57.2	<0.0001
<i>Ctenophorus slateri</i>	Ring Tailed Dragon	17	0	0	1	16	26.7	<0.0001
<i>Ctenotus ariadnae</i>	Ariadne's Ctenotus	3	0	1	1	1		
<i>Ctenotus brooksi</i>	Wedgesnout Ctenotus	2	0	2	0	0		
<i>Ctenotus calurus</i>	Blue-tailed Finesnout Ctenotus	2	0	2	0	0		
<i>Ctenotus grandis</i>	Giant Desert Ctenotus	36	0	24	10	2	9.26	0.026

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<i>Ctenotus greeri</i>	Spotted-necked Ctenotus	32	2	17	5	8	1.91	0.59
<i>Ctenotus hanloni</i>	Nimble Ctenotus	4	0	3	1	0		
<i>Ctenotus helenae</i>	Clay Soil Ctenotus	23	2	14	0	7	8.99	0.0294
<i>Ctenotus inornatus</i>	Bar-shouldered Ctenotus	123	1	19	40	63	62.3	<0.0001
<i>Ctenotus pantherinus</i>	Leopard Ctenotus	202	3	94	53	52	24.6	<0.0001
<i>Ctenotus piankai</i>	Pianka's Ctenotus	57	0	49	8	0	29.9	<0.0001
<i>Ctenotus quattuordecimlineatus</i>	Fourteen-Lined Ctenotus	26	4	5	14	3	6.8	0.79
<i>Ctenotus saxatilis</i>	Rock Ctenotus	4	0	0	1	3		
<i>Ctenotus schomburgkii</i> *	Schomburg's Skink	10	0	9	1	0	7.88	0.049
<i>Delma borea</i>	Northern Delma	3	0	0	1	2		
<i>Delma butleri</i>	Unbanded Delma	4	0	2	2	0		
<i>Delma desmosa</i>	Desert Delma	6	0	3	3	0		
<i>Delma nasuta</i>	Sharp-snouted Delma	5	0	3	0	2		
<i>Delma tincta</i>	Black-necked Delma	4	0	2	2	0		
<i>Demansia angusticeps</i>	Narrow-headed Whipsnake	13	0	9	1	3	3.9	0.27
<i>Diplodactylus laevis</i>	Desert Fat-tailed Gecko	230	51	78	70	31	14.8	0.023
<i>Diporiphora pindan</i>	Pindan Two-lined Dragon	41	1	23	10	7	3.29	0.349
<i>Diporiphora vescus</i>	Northern Pilbara Tree Dragon	1	0	1	0	0		
<i>Eremiascincus musivus</i> *	Mosaic Desert Skink	81	8	50	17	6	11.2	0.011
<i>Eremiascincus pallidus</i>	Western Narrow-banded Skink	1	0	1	0	0		
<i>Furina ornata</i>	Moon Snake	5	0	1	3	1		
<i>Gehyra aff. variegata</i>	Tree Dtella	2	1	1	0	0		
<i>Gehyra kimberleyi</i>	Robust Termitaria Dtella	9	1	2	1	5	4.88	0.229
<i>Gehyra purpurescens</i>	Purplish Dtella	10	2	5	3	0	2.52	0.472
<i>Gehyra kimberleyi/purpurescens</i>	Robust Termitaria Dtella/ Purplish Dtella	44	8	18	8	10	1.55	0.67
<i>Gowidon longirostris</i>	Long-nosed Dragon	1	0	1	0	0		
<i>Heteronotia binoei</i>	Prickly Gecko	35	2	21	9	3	2.14	0.544
<i>Lerista bipes</i>	Western Two-toed Slider	887	56	592	192	47	95.4	<0.0001
<i>Lerista labialis</i>	Southern Two-toed Slider	4	0	0	4	0		
<i>Lerista separanda</i>	Dampierland Plain Slider	21	1	9	11	0	7.92	0.048
<i>Lerista vermicularis</i>	Slender Duneslider	7	2	3	2	0		
<i>Lialis burtonis</i>	Burton's Legless Lizard	13	2	5	5	1	1.1	0.77
<i>Lucasium stenodactylum</i>	Sandplain Gecko	166	21	114	23	8	20.7	0.0001
<i>Menetia greyii</i>	Common Dwarf Skink	36	2	30	3	1	10.8	0.013
<i>Moloch horridus</i>	Thorny Devil	1	0	1	0	0		
<i>Morethia ruficauda</i>	Lined Firetailed Skink	55	2	24	26	3	10.4	0.016
<i>Notoscincus ornatus</i>	Ornate Soil-crevice Skink	82	1	81	0	0	69.2	<0.0001
<i>Pogona minor</i>	Dwarf Beared Dragon	14	2	4	2	6	2.87	0.413
<i>Proablepharus reginae</i>	Western Soil-crevice Skink	7	0	0	0	7	16.5	0.0009
<i>Proablepharus tenuis</i>	Northern Soil-crevice Skink	1	0	0	1	1		
<i>Proablepharus reginae/tenuis</i>	Soil-crevice Skink	9	0	0	1	8	13	0.0046
<i>Pseudechis australis</i>	King Brown Snake	4	1	3	0	0		
<i>Pseudonaja mengdeni</i>	Western Brown Snake	4	1	0	1	2		
<i>Pygopus nigriceps</i>	Western Hooded Scalyfoot	9	3	5	1	0	3.31	0.347
<i>Rhynchoedura ornata</i>	Western Beaked Gecko	105	65	27	8	5	60.8	<0.0001

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<i>Simoselaps anomalus</i>	Desert Banded Snake	17	1	14	2	0	6.36	0.096
<i>Strophurus ciliaris</i>	Northern Spiny-Tailed Gecko	15	1	8	5	1	1.19	0.75
<i>Strophurus elderi</i>	Jewelled Gecko	2	0	0	1	1		
<i>Tiliqua multifasciata</i>	Centralian Bluetongue Lizard	6	0	4	1	1		
<i>Varanus acanthurus</i>	Spiny-Tailed Monitor	10	2	4	0	4	4.53	0.21
<i>Varanus brevicauda</i>	Short-Tailed Monitor	32	2	17	8	5	0.776	0.855
<i>Varanus eremius</i>	Pygmy Desert Monitor	58	1	23	21	13	7.97	0.047
<i>Varanus gilleni</i>	Pygmy Mulga Monitor	3	1	2	0	0		
<i>Varanus gouldii</i>	Gould's Monitor	27	0	23	4	0	13.9	0.003
<i>Varanus panoptes</i>	Yellow-spotted Monitor	4	1	1	1	1		

Supplementary Material – Project video

Pirra Jungku/Pirra Warlu: Using traditional fire practice knowledge and contemporary science to guide fire management goals for desert animals

Video link:

<https://www.nespthreatenedspecies.edu.au/video-gallery/how-does-fire-affect-karajarri-country>