Supplementary Material

Non-preferred habitat increases the activity area of the endangered northern quoll (*Dasyurus hallucatus*) in a semi-arid landscape

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Supplementary material:

Table S1. Sites where northern quolls (*Dasyurus hallucatus*) were tracked in the Pilbara region, Western Australia between 2014 and 2018.

Site	Coordinates	Site description	Land use	Year(s)
Red Rock	(-20.88, 118.59)	Large patches of rocky habitat scattered along the seasonal Turner River, with spinifex sandplain and *Acacia* stands throughout.	Pastoral	2014 2015 2018
Python Pool	(-21.34, 117.25)	Rocky habitat including deep gorges nestled within spinifex sandplain and *Acacia* stands.	National Park	2014
Cattle Gorge	(-20.55, 120.25)	Decommissioned iron ore mine tenement with rocky habitat, spinifex sandplain, *Acacia* stands, and a small amount of disturbance (e.g., roads).	Mining tenement	2016
De Grey Ridge	(-20.84, 118.59)	Rocky habitat comprising a granite ridge surrounded by spinifex sandplain and *Acacia* stands.	Pastoral	2018

Table S2. Studies of northern quoll spatial movement in the Pilbara region of Western Australia which were used to analyse habitat selection and determinants of activity area size.

Study	Motivation	GPS unit & brand	Fix interval	Quolls collared (n)	Site(s)
Hernandez-Santin et al. (2020)	To measure northern quoll activity area	CatTrack® GPS logger backpack (Catnip Technologies, South Carolina, USA).	10 mins	5	Red Rock Python Pool
Biologic (2016)	To assess northern quoll interactions with mine pits.	FLR V Micro GPS collars (Telemetry Solutions, California, USA).	30 mins	3	Cattle Gorge
Cowan et al. (2020)	To locate occupied maternal northern quoll dens using VHF.	Custom made GPS collars with i-gotU components (Mobile Action Technology, Taipei, Taiwan).	5 mins	8	De Grey Ridge
H. Moore (unpubl. data)	To investigate the fine-scale movement and habitat interactions of northern quolls.	Custom made GPS collars with i-gotU components (Mobile Action Technology, Taipei, Taiwan).	1 min	9	Red Rock

Table S3. The parameters used during kernel density estimation for the measurement of northern quoll activity areas. Parameters show the buffer size, grid output, and the UTM zone for each individual (ID) when using the *ad hoc* method ($h_{ad\ hoc}$) (Kie 2013), referred to as 'reference scaled' in the package "rhr" (Signer and Balkenhol 2015).

Contributor	ID	X buffer (ha)	Y buffer (ha)	Grid output	UTM zone
Moore	23891	232	167	100 x 100	50S
Cowan	44751	321	277	100 x 100	50S
Moore	44828	188	157	100 x 100	50S
Moore	45146	132	208	100 x 100	50S
Moore	46324	267	246	100 x 100	50S
Hernandez-Santin	98322	1042	1493	100 x 100	50S
Hernandez-Santin	99027	1018	1528	100 x 100	50S
Hernandez-Santin	99464	1587	1400	100 x 100	50S
Hernandez-Santin	99531	425	895	100 x 100	50S
Moore	953815	374	410	100 x 100	50S
Moore	961514	190	209	100 x 100	50S
Biologic	E6CA67a	335	862	100 x 100	51S
Biologic	E6CA67b	250	620	100 x 100	51S
Biologic	E6CA67c	345	791	100 x 100	51S

Table S4. The characteristics of the 14 individual northern quoll tracking events. Sex is female (♀) or male (♂), and fix nights is the number of nights with a successful fix. This also includes the short-term activity area size and percentage cover of each habitat type for each individual northern quoll tracking event.

| Site	ID	Year	Season	Sex	Weight (g)	Fix nights	Fixes	Short-term activity area size (ha)	Rocky habitat	Habitat cover (%) Spinifex sandplain	Acacia stands	Riverbed
Red Rock	23891	2018	Winter	♀	420	4	363	8.83	28.52	63.02	2.48	5.98
De Grey Ridge	44751	2018	Spring	♀	410	7	389	22.96	3.13	38.29	58.57	0.00
Red Rock	44828	2018	Winter	♀	540	2	84	7.25	30.12	58.73	4.54	6.60
Red Rock	45146	2018	Winter	♀	420	4	974	7.60	30.08	53.30	2.51	14.12
Red Rock	46324	2018	Winter	♀	490	4	998	14.26	25.30	67.60	3.79	3.30
Python Pool	98322	2014	Spring	♂	730	7	351	274.66	6.00	78.77	15.23	0.00
Red Rock	99027	2014	Spring	♂	673	7	366	193.39	17.12	68.68	5.87	8.33
Red Rock	99464	2014	Spring	♂	540	7	387	340.54	1.80	80.92	13.43	3.85
Red Rock	99531	2015	Winter	♂	690	7	418	53.84	28.39	61.38	4.13	6.10
Red Rock	953815	2018	Winter	♀	600	3	400	17.76	27.29	58.90	7.07	6.74
Red Rock	961514	2018	Winter	♀	450	3	615	7.51	33.56	50.20	3.22	13.02
Cattle Gorge	E6CA67a	2016	Autumn	♀	430	7	81	124.06	23.62	45.44	19.43	0.00
Cattle Gorge	E6CA67b	2016	Autumn	♀	430	7	69	89.30	38.88	33.99	18.61	0.00
Cattle Gorge	E6CA67c	2016	Autumn	♀	430	7	73	128.62	30.14	40.06	18.69	0.00
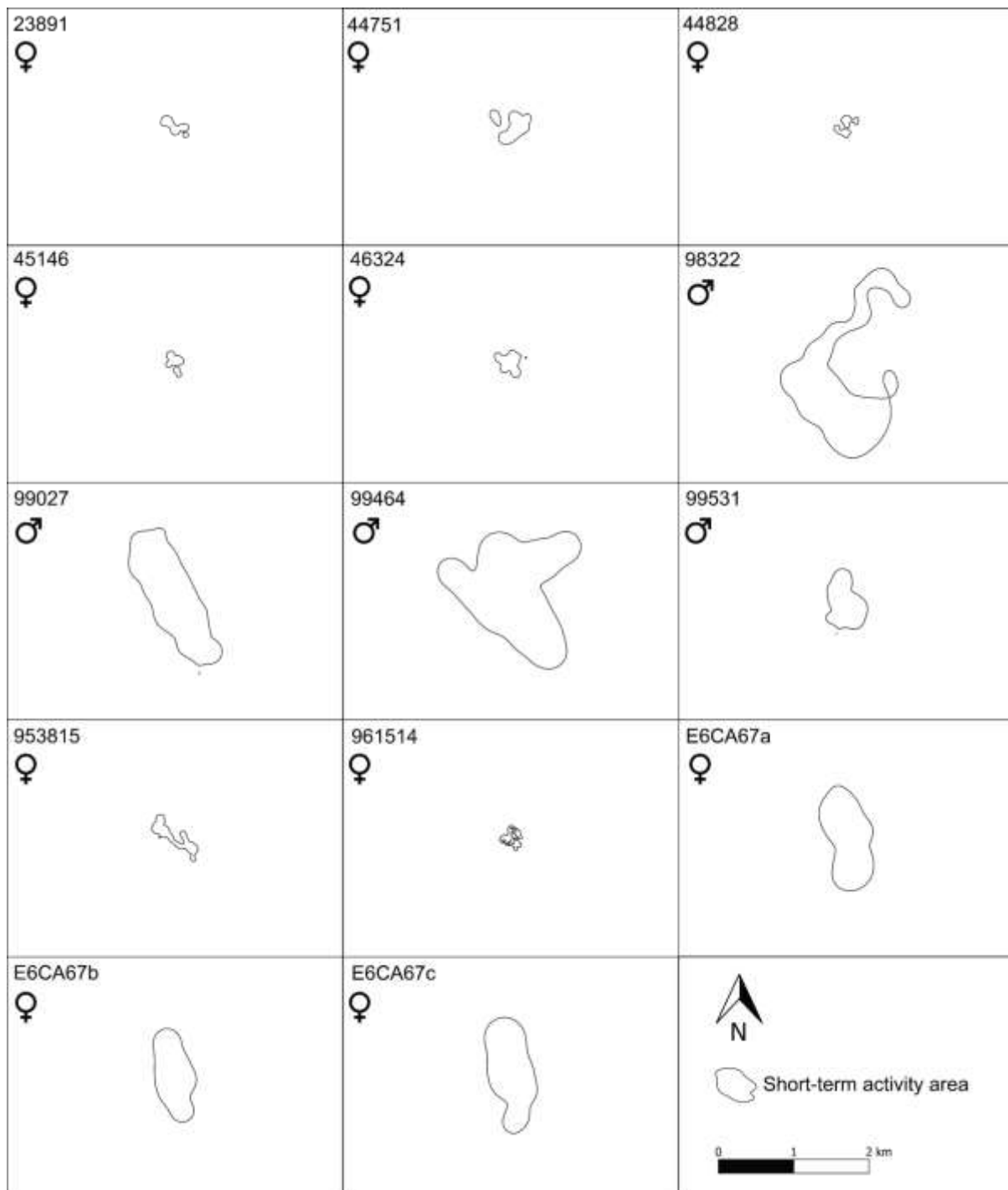
Figure S1. The used activity areas of male (♂) and female (♀) northern quolls from the Pilbara region of Western Australia, estimated using kernel density estimation. Activity areas were estimated using the *ad hoc* method. All activity areas are on the same scale, represented by the scale bar.
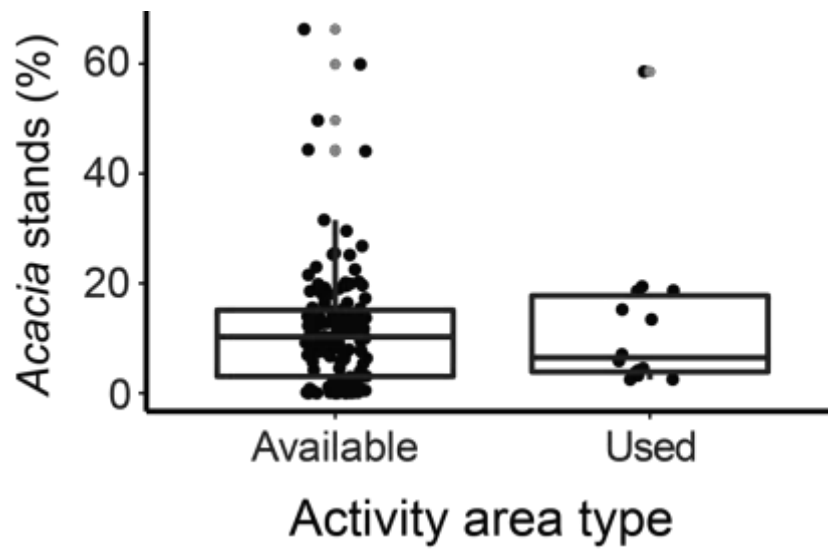
Figure S2. The proportional cover of *Acacia* stands within 'available' and 'used' northern quoll activity areas. Black points represent data values and grey points represent outliers. Boxplots show the distribution of the data for available and used activity areas.