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Supplementary material for

Scattered paddock trees and roadside vegetation can provide important habitat for koalas (*Phascolarctos cinereus*) in an agricultural landscape

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Part 1

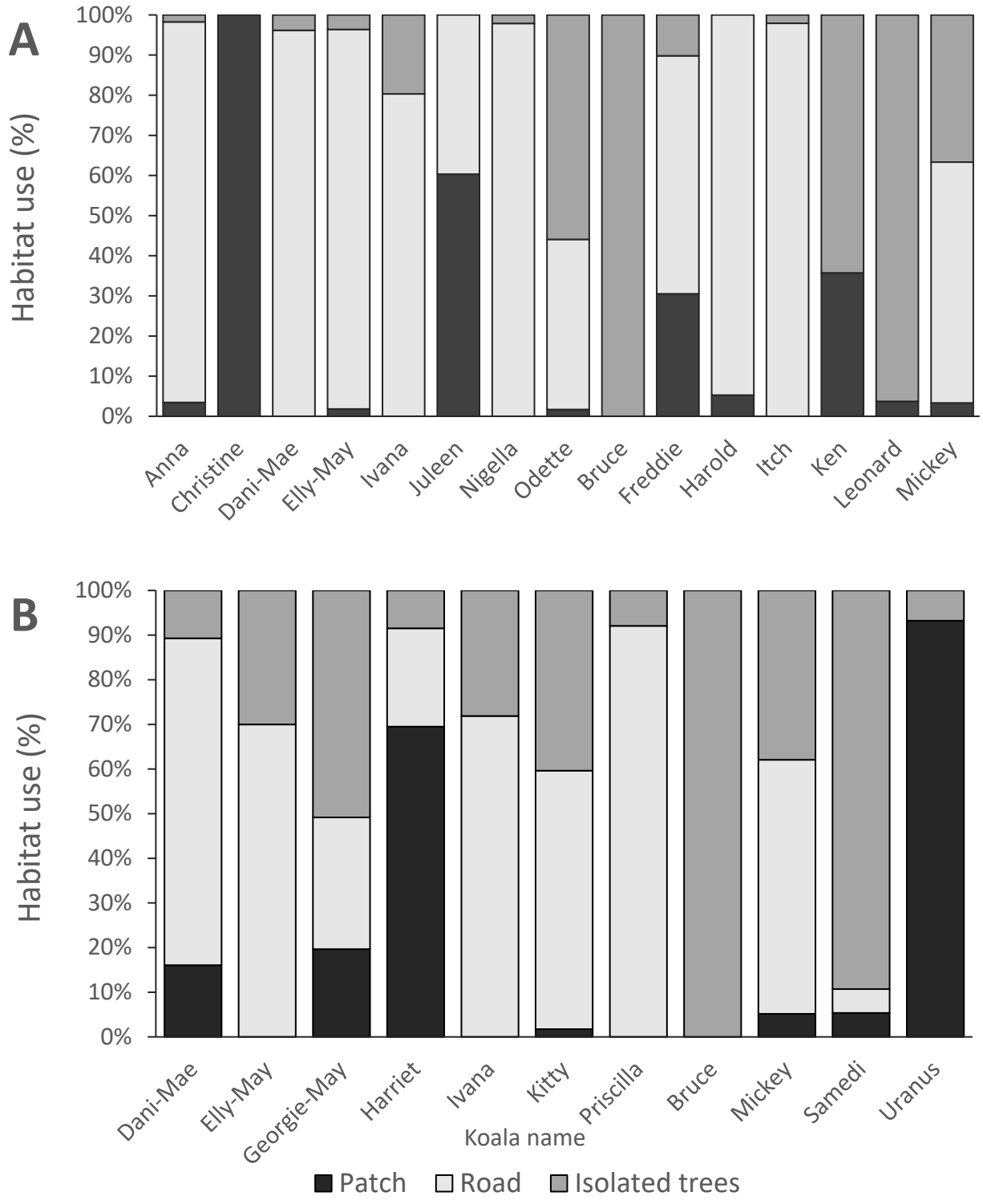


Figure S1. Habitat use of individual koalas displayed as the percent of GPS locations for each individual koala within each habitat type. Breeding season is the top graph (A) and non-breeding season is the lower graph (B).

Table S1: Analysis of turning angles within each habitat, separated by sex and season. A significant Rayleigh's test suggests there is a significant directionality in the average turning angle. This analysis was conducted on all turning angles, as opposed to the analysis in the text of the manuscript which only included turning angles that were then associated with movements over 20m. See the data analysis section in the methods for explanation

Sex	Season	Habitat	Rayleigh's test for uniformity		Mean direction	Circular variance
			Z	***P***	**Degrees**	**Degrees**
Female	Breeding	Patch	0.114	0.452	-137	102
		Road	0.162	**0.002**	-170	96
		Scattered	0.231	**0.005**	174	88
Female	Non-breeding	Patch	0.241	**0.006**	-172	87
		Road	0.208	**<0.001**	179	91
		Scattered	0.515	**<0.001**	157	56
Male	Breeding	Patch	0.312	**0.003**	179	79
		Road	0.113	0.654	161	102
		Scattered	0.294	**<0.001**	170	81
Male	Non-breeding	Patch	0.168	0.289	-179	95
		Road	0.205	**<0.001**	161	91
		Scattered	0.117	0.115	170	81

Table S2: The *G*-test of the observed and expected number of observations for each koala within each habitat type. (A) Breeding and (B) Non-breeding season. The area of habitat within each koalas 650-m buffer was used to determine the expected number of locations within that habitat type

A: Breeding season

Koala name	Habitat type	Observed number of relocations	Area of each habitat	Expected number of relocations	d.f.	*G*	*P*-value
Uranus	Scattered	4	4.26	5.58	2	13.50	0.001171
	Patch	41	37.22	48.67			
	Road	14	3.64	4.76			
Samdei	Scattered	50	5.39	7.14	2	174.88	1.06E-38
	Patch	3	32.66	43.31			
	Road	3	4.19	5.55			
Kitty	Scattered	18	5.30	6.27	2	180.07	7.91E-40
	Patch	1	38.37	45.43			
	Road	38	4.47	5.30			
Harriot	Scattered	5	3.06	3.17	2	55.15	1.06E-12
	Patch	35	51.71	53.53			
	Road	19	2.22	2.29			
Georgie may	Scattered	21	2.76	3.29	2	158.36	4.1E-35
	Patch	12	45.39	54.23			
	Road	28	2.92	3.48			
Prisilla	Scattered	5	2.49	4.51	2	289.79	1.18E-63
	Patch	0	29.69	53.68			
	Road	58	2.66	4.81			
Danny may	Scattered	5	3.19	3.32	2	266.30	1.49E-58
	Patch	5	48.62	50.61			
	Road	46	1.99	2.07			
Elly May	Scattered	18	2.29	2.33	2	288.34	2.45E-63

	Patch	0	53.45	54.41			
	Road	42	3.20	3.26			
Bruce	Scattered	33	5.26	7.16	2	170.20	1.1E-37
	Patch	0	32.79	44.59			
	Road	25	4.59	6.25			
Mickey	Scattered	13	5.46	6.48	2	176.83	3.99E-39
	Patch	3	39.04	46.30			
	Road	42	4.40	5.22			
Ivana	Scattered	12	4.90	6.40	2	233.99	1.55E-51
	Patch	0	38.71	50.63			
	Road	51	4.56	5.96			

B: Non-breeding season

Koala name	**Habitat type**	**Observed number of relocations**	**Area of each habitat**	**Expected number of relocations**	**d.f.**	***G***	***P*-value**
Anna	Scattered	1	3.16	3.75	2	330.6	1.62E-72
	Patch	2	43.63	51.89			
	Road	55	1.99	2.36			
Bruce	Scattered	7	5.39	6.92	2	171.1	6.93E-38
	Patch	0	28.94	37.19			
	Road	43	4.58	5.89			
Christine	Scattered	1	3.69	4.21	2	93.8	4.3E-21
	Patch	25	39.87	45.51			
	Road	26	2.00	2.28			
Dani-Mae	Scattered	4	4.90	5.30	2	215.9	1.33E-47
	Patch	0	38.53	41.75			
	Road	48	4.57	4.95			
Elly-May	Scattered	3	2.42	2.05	2	298.9	1.22E-65
	Patch	1	59.48	50.38			
	Road	51	3.04	2.58			
Freddie	Scattered	4	2.69	2.75	2	142.4	1.17E-31
	Patch	19	52.15	53.24			
	Road	36	2.95	3.01			
Harold	Scattered	1	2.94	3.52	2	288.0	2.83E-63
	Patch	4	42.48	50.86			
	Road	52	2.19	2.62			
Itch	Scattered	1	2.19	2.24	2	240.6	5.68E-53
	Patch	0	41.23	42.19			
	Road	47	3.49	3.57			
Ivana	Scattered	0	4.91	6.20	2	287.7	3.3E-63
	Patch	0	38.81	49.03			
	Road	61	4.57	5.77			
Juleen	Scattered	0	2.19	3.37	2	51.3	7.11E-12
	Patch	38	35.35	54.45			
	Road	25	3.36	5.18			
Ken	Scattered	26	2.48	5.63	2	72.9	1.45E-16
	Patch	20	21.10	47.95			
	Road	10	1.07	2.42			
Leonard	Scattered	3	4.94	5.77	2	199.3	5.18E-44
	Patch	2	36.63	42.79			
	Road	49	4.65	5.43			
Mickey	Scattered	7	5.45	6.59	2	232.6	3.16E-51
	Patch	1	39.86	48.21			
	Road	52	4.30	5.20			
Nigella	Scattered	1	5.40	5.13	2	217.2	6.99E-48
	Patch	0	39.72	37.68			
	Road	46	4.42	4.19			

Odette	Scattered	33	3.40	4.18	2	244.5	8.28E-54
	Patch	1	42.60	52.36			
	Road	25	2.00	2.46			

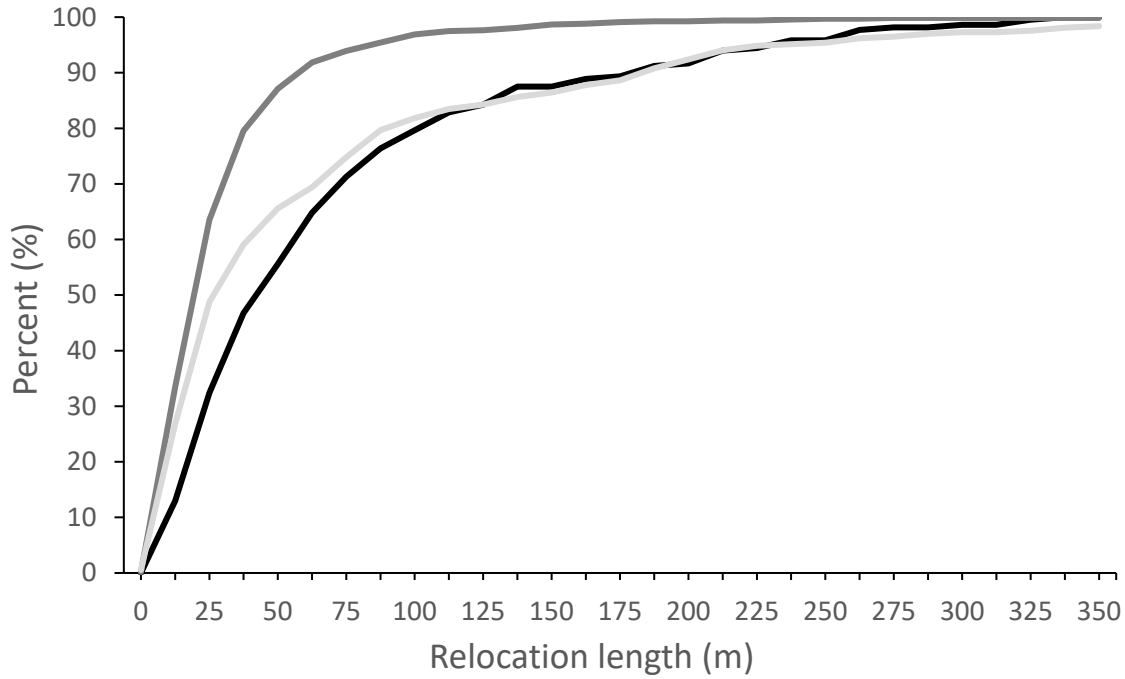


Fig. S2. Cumulative percentage of step lengths in each of the three habitat types. These data include both seasons and both sexes. A small number of step lengths >350 m were not included in the graph. Black line: patches, dark grey: roadside vegetation, Light grey: scattered trees.

Part 2

Home range estimates

The following images are the home range estimates for all koalas collared in the study. Where a koala was collared in the breeding season and the non-breeding season, the home range were calculated for each season separately. We used Brownian bridge movement model (BBMM) to estimate home range size (Horne *et al.* 2007). This method of home range estimator was used because kernel estimation using least squares cross validation method failed to converge for a number of koalas and some of the home ranges calculated using h_{ref} bandwidth estimation appeared overly large, though these home range estimates are provided along with minimum convex polygon estimates in Table S3. Home ranges were calculated using R, version 3.3.1 (R Core Team 2016) and the packages 'adehabitatHR' for MCP and Href kernal home ranges (Calenge 2006; Calenge 2017) and 'BBMM' for the calculation of BBMM home ranges (Nielson *et al.* 2015).

Table S3. Home range estimations for all koalas collared in the study. Estimators are: MCP: minimum convex polygon, Href 50 and Href 95 are the Kernal estimators for 50% and 95% kernals and BB50 and BB95 are the 50% and 95% estimations for Brownian bridge movement models

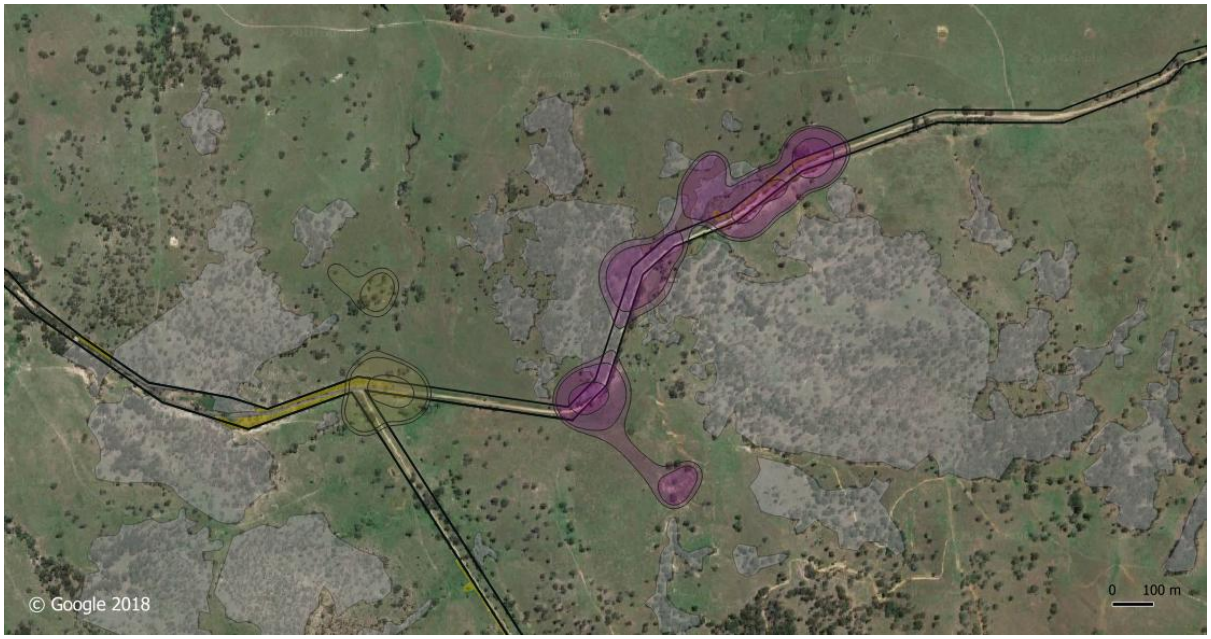
Koala	Season	Sex	Area (ha)				
			MCP	Href50	Href95	BB50	BB95
Bruce	Breeding	Male	9.30	3.39	20.69	3.04	17.51
Danny-May	Breeding	Female	21.27	16.26	77.85	1.96	14.34
Elly-May	Breeding	Female	1.87	1.08	6.98	0.71	3.78
Georgie-May	Breeding	Female	6.22	3.43	14.12	1.90	7.55
Harriet	Breeding	Female	4.52	2.94	11.58	2.08	7.98
Ivana	Breeding	Female	1.86	0.89	5.75	0.67	4.58
Kitty	Breeding	Female	2.81	1.28	6.00	1.14	5.31
Mickey	Breeding	Male	4.11	1.73	10.53	2.46	13.23
Priscilla	Breeding	Female	4.01	1.25	7.84	0.95	7.59
Samedi	Breeding	Male	12.91	2.66	21.33	1.41	19.78
Uranus	Breeding	Male	3.69	1.82	9.45	2.32	11.47
Anna	Non-breeding	Female	0.40	0.28	1.26	0.34	1.36
Bruce	Non-breeding	Male	0.81	0.59	2.44	0.62	2.45
Christine	Non-breeding	Female	0.68	0.37	1.68	0.43	1.92
Danny-May	Non-breeding	Female	0.19	0.14	0.61	0.25	1.05
Elly-May	Non-breeding	Female	0.25	0.12	0.72	0.20	1.11
Freddie	Non-breeding	Male	8.36	4.67	22.66	1.70	11.76
Harold	Non-breeding	Male	0.54	0.24	1.62	0.19	1.43
Itch	Non-breeding	Male	1.16	1.33	9.74	0.30	3.32
Ivana	Non-breeding	Female	0.52	0.40	1.59	0.44	1.68
Juleen	Non-breeding	Female	1.53	1.06	3.91	0.95	3.35
Ken	Non-breeding	Male	33.63	29.82	105.08	13.45	62.06
Leonard	Non-breeding	Male	1.30	0.92	4.83	0.34	2.67
Mickey	Non-breeding	Male	2.77	1.16	5.96	1.20	5.46
Nigella	Non-breeding	Female	0.05	0.02	0.16	0.13	0.72
Odette	Non-breeding	Female	1.32	0.91	4.20	0.38	2.32

Figures of home ranges:

Key for all maps: Shaded grey: Patches of vegetation, black solid line: property bounaries, Light yellow polygon: road-side vegetation.

Home range contours represent the 95%, 90% and 50% probability contours for each koala. The name of the koala represented in each figure is below the image.

Mickey, non-breeding season

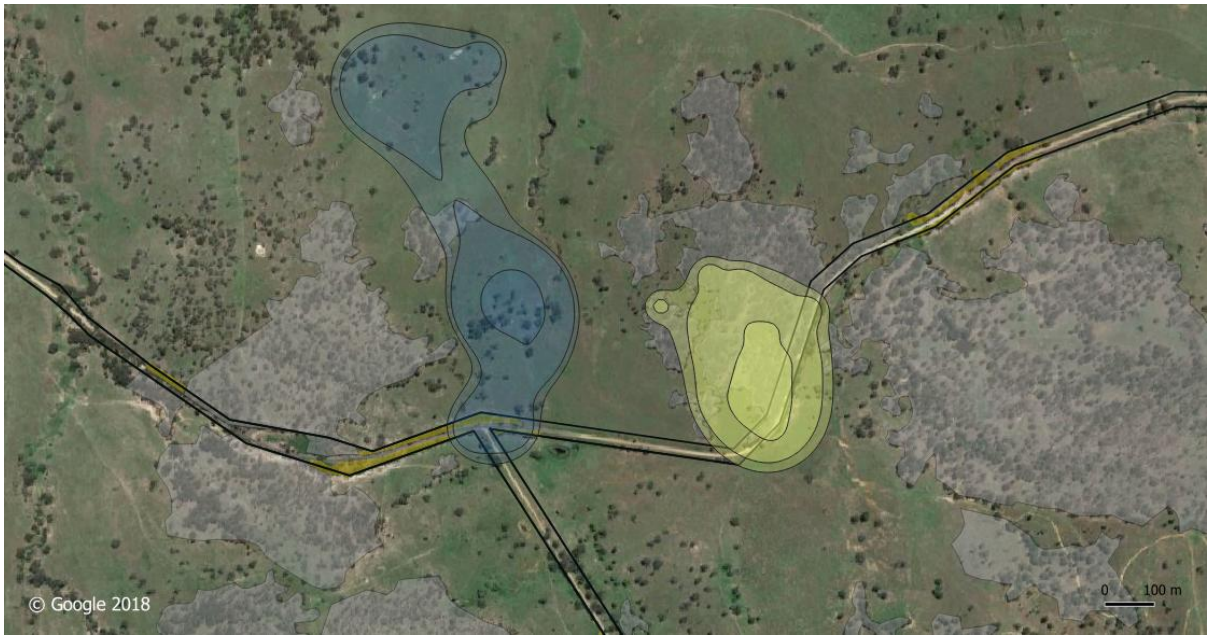


Danny-May, breeding season (Purple) and Ivana, breeding season (Yellow)

Freddie, non-breeding season

Elly-May, non-breeding season

Ken, non-breeding season (yellow), Priscilla, breeding season (green)

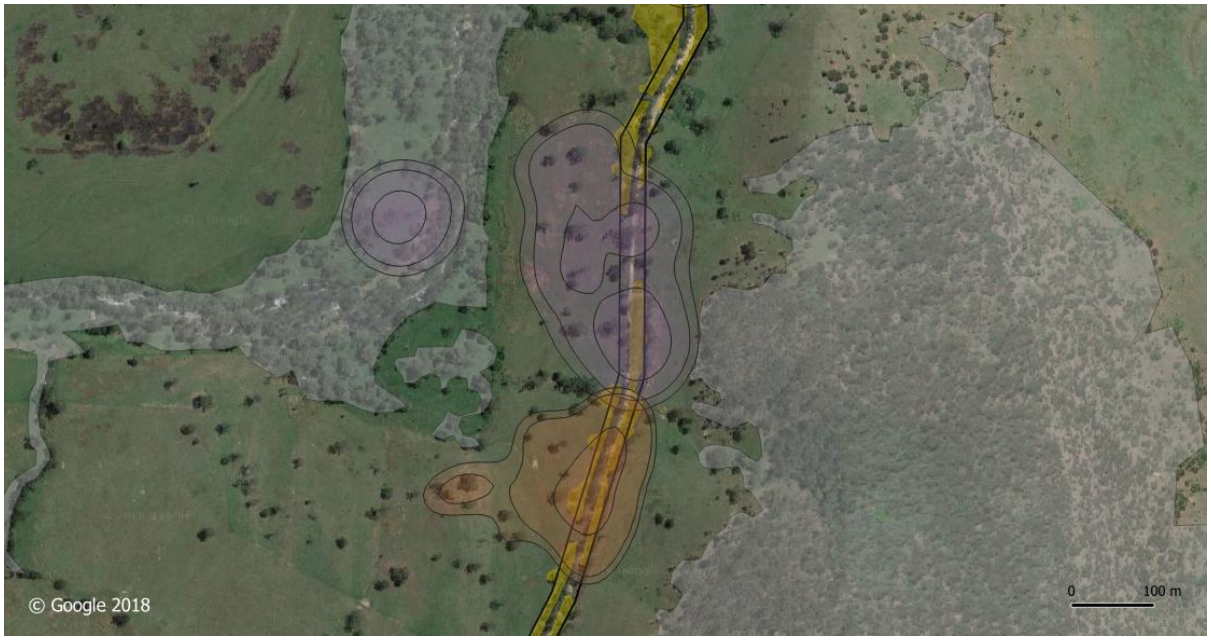


Samedi, breeding season (blue), Uranus, breeding season (yellow)

Harriot, breeding season

Odette, non-breeding season

Bruce, breeding season



Georgie-May, breeding season (purple), Elly-May, breeding season (orange), Harold, non-breeding season (yellow)

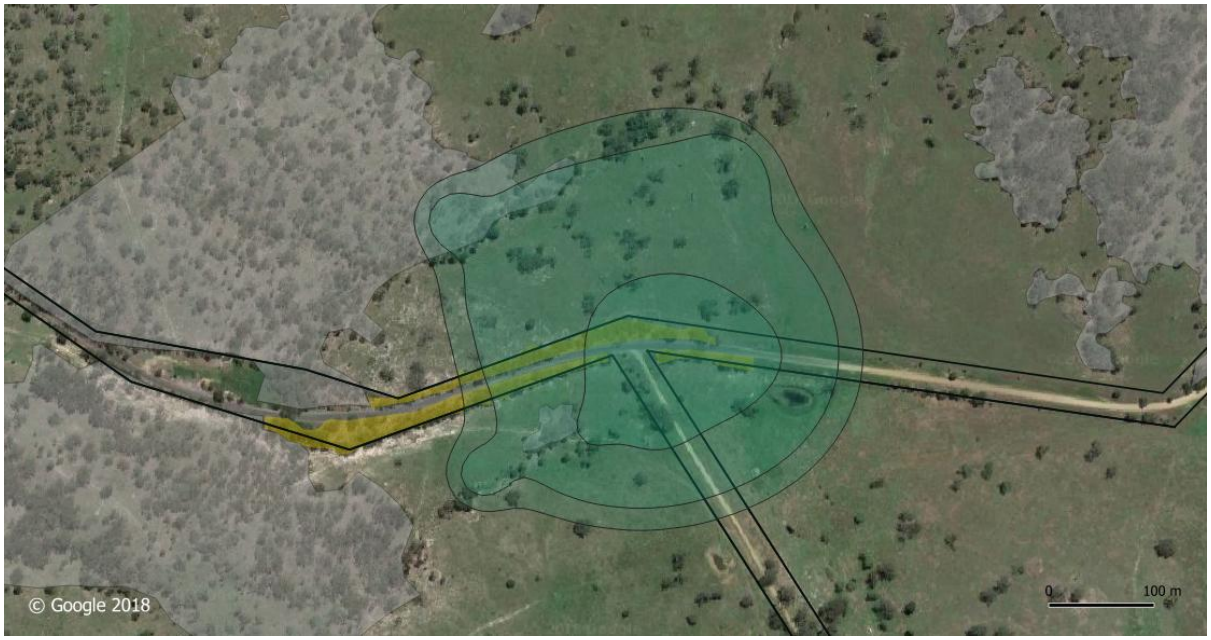
Bruce, non-breeding season (pink), Nigella, non-breeding season (yellow), Danny-may, non-breeding (purple)

Christine, non-breeding season (blue), Anna, non-breeding season (green)

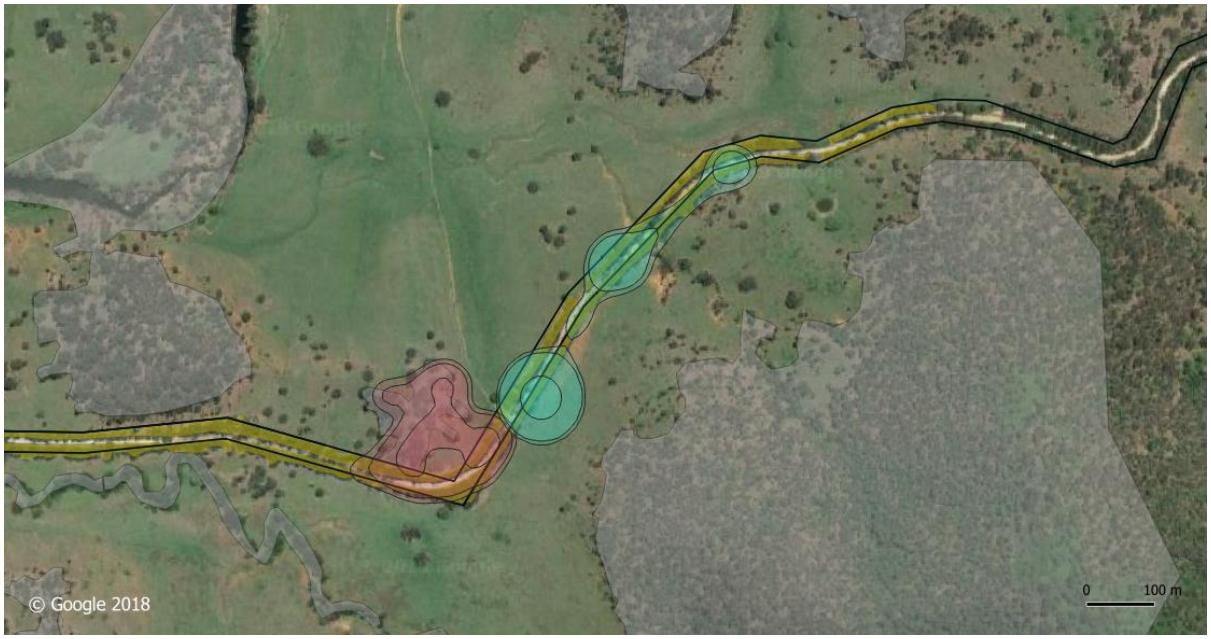
Kitty, breeding season

Leonard, non-breeding season

Ivana, non-breeding season



Mickey breeding season



Juleen, non-breeding season (red), Itch, non-breeding season (green)

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