

Supplementary material for**Genetic monitoring of southern hairy-nosed wombats over two decades reveals that individuals can live for at least 18 years in the same warrens**

Faith M. Walker^{A,B,E}, Jordyn R. Upton^{A,B}, Colin J. Sobek^{A,B}, David A. Taggart^C and Matthew D. Gaughwin^D

^ABat Ecology & Genetics Laboratory, School of Forestry, Northern Arizona University, Flagstaff, AZ 86011, USA.

^BPathogen and Microbiome Institute, Northern Arizona University, Flagstaff, AZ 86011, USA.

^CDepartment of Animal and Veterinary Science, University of Adelaide (Waite Campus), Glen Osmond, SA 5064, Australia.

^DSchool of Public Health, University of Adelaide, Adelaide, SA 5005, Australia.

^ECorresponding author. Email: faith.walker@nau.edu

Table S1. GPS coordinates of main and peripheral study warrens at Brookfield Conservation Park, South Australia

Main study warren	Latitude	Longitude
A	-34.34618298	139.48006
B	-34.34606697	139.480693
Col	-34.353881	139.481405
Eps	-34.35868802	139.483021
F	-34.34868297	139.48083
G	-34.34830603	139.480364
Gamma	-34.35650798	139.481052
H	-34.34893602	139.480143
I	-34.34855296	139.478424
J	-34.34776599	139.478591
NN	-34.35251601	139.477607
Om	-34.36175697	139.481457
Pi	-34.35759997	139.48066
PR	-34.35877603	139.480373
Psi	-34.35612802	139.481683
Q	-34.345957	139.478305
Rho	-34.35630497	139.479447
n	-34.35393398	139.480498
Suz	-34.35268298	139.480274
W	-34.35716696	139.47976
X	-34.35734298	139.481535
XX	-34.36113998	139.483467

Y	-34.36146	139.480785
YY	-34.361804	139.483225
Z	-34.35356802	139.479586
Peripheral warren	Latitude	Longitude
RR-P	-34.34685596	139.475727
SS-P	-34.34847602	139.47482
VV-P	-34.35243999	139.482192
ZZ-P	-34.35094298	139.485132
EE-P	-34.34796598	139.483312
LL-P	-34.34951998	139.473566
MM-P	-34.35249204	139.478269

Table S2. Multilocus genotypes of, and warren use by, southern hairy-nosed wombats in a 1.8 × 0.5 km² study area at Brookfield Conservation Park in April 2017

Wombats that were detected 16–18 years earlier are highlighted in gold.

MAIN WARRENS														Wombat ID from 1999- 2001 ^A	
Wombat ID	Sex	Hair sample ID	# Detections	Warrens used	6412	68CA	DR470	ELZRS	F3184	I85G2	71CA	109	LI2		Lk23
W1_F	F	G5.2.1, G5.2.2	2	G	170/170	90/118	140/140	179/179	188/196	188/208	191/195	170/178	122/144	138/140	
W2_F	F	J11.1.1, J11.2.1, J11.2.2, J11.3.2 Gamma6.1.1, Gamma6.1.2, Gamma10.1.1, Gamma11.1.1, Gamma26.1.1, Gamma26.2.1, Gamma25.4.2, Gamma26.4.1	4	J	170/174	90/90	140/140	182/182	196/200	180/188	187/199	170/176	142/142	138/138	86
W3_F	F	Gamma9.2.2, Gamma10.2.1, Gamma 10.2.2, Gamma11.2.1, Gamma11.2.2, Gamma31.2.1, Gamma31.2.2, Psi2.2.1	8	Gamma	170/174	90/104	140/140	179/179	196/196	188/188	189/189	158/170	142/142	138/140	
W4_M	M	Eps9.2.1,	8	Gamma, Psi	170/174	90/104	140/155	179/182	188/188	188/192	187/191	158/158	122/126	138/146	
W5_M	M	Eps9.2.2, Eps9.4.1, Eps9.4.2 Gamma14.1.1, Gamma17.1.1, Gamma17.1.2,	4	Eps	170/174	98/100	140/140	179/179	188/188	180/188	199/199	158/170	144/146	138/146	
W6_F	F	GammaRubSpot1.3.1, Psi7.3.1, Psi1.4.2 G2.1.1, G2.1.2, G3.1.2, G4.1.1, G4.1.2, G16.1.1, G16.2.1, G3.3.1, G3.3.2, G12.3.2, G1.4.1, G1.4.2 Gamma30.4.1, Pi2.1.1, Pi2.1.2,	6	Gamma, Psi	170/174	98/100	140/140	179/179	188/196	180/188	195/199	170/178	122/144	138/138	
W7_F	F	Pi2.4.1, Pi2.4.2 H4.3.2, I3.1.1, I5.1.1, I5.1.2, I50b.2.2, I3.3.1	12	G	170/174	98/100	140/155	179/179	188/200	188/188	195/199	170/170	144/144	138/144	
W8_M	M		5	Gamma, Pi	170/174	98/104	140/140	179/179	188/188	188/188	187/199	158/170	144/144	138/138	
W9_F	F		6	H, I	170/174	100/108	140/140	179/179	188/196	188/188	195/199	158/170	144/144	138/140	79
W11_M	M	A13.2.1, A13.2.2, A16.3.1 Col2.3.2, Col3.3.1, Col3.3.2, Gamma10.1.2, Gamma6.2.1, Gamma6.2.2, Gamma4.2.2, Gamma9.3.2	3	A	174/174	104/104	140/140	179/179	188/188	188/188	191/199	158/158	142/144	140/150	
W12_M	M	z7.1.1, z7.1.2, z10.4.1, z10.4.2, z20.4.1, z20.4.2	8	Col, Gamma	170/178	90/98	140/140	179/182	196/200	188/196	199/199	158/170	144/146	138/142	
W13_F	F	z16.1.1, z16.1.2, z16.2.1, z19.3.1, z19.3.2	6	z	170/178	90/98	140/155	179/179	188/200	180/208	189/195	158/178	122/122	138/146	
W14_F	F	Gamma25.1.2, Gamma25.2.1, Gamma25.3.2, Gamma25.1.1, Gamma25.3.1	5	z	170/178	90/108	140/140	179/179	196/196	188/188	199/199	170/176	122/144	138/138	
W15_F	F	G3.1.1, G5.1.1, G5.1.2, G20.1.1, G20.1.2, G1.2.2, G5.4.1	5	Gamma	170/178	100/104	140/155	179/179	188/196	188/188	191/199	158/158	122/146	138/138	
W16_M	M	z15.1.1, z15.1.2, z8.2.1, z8.2.2, z15.3.1, z15.3.2, z9.4.1	7	G	170/178	100/118	140/140	179/182	188/196	188/188	195/199	170/170	142/144	138/138	
W17_F	F		7	z	174/174	90/90	140/140	179/179	196/196	188/192	187/199	158/158	126/142	138/146	
W18_F	F	G15.2.2, G16.2.2, G1.3.1, H1.4.2 G6.1.1, G6.1.2, G13.1.1, G14.1.1, H2.4.2, H4.2.1, H4.2.2	4	G, H	174/174	90/90	140/140	179/185	188/188	188/188	195/199	170/170	126/144	144/150	
W20_F	F	A1.1.1, A11.1.1, A11.1.2, A15.1.1, A11.3.1, A11.3.2, A4.2.1, A4.2.2, A8c.4.2	7	G, H	174/174	90/100	140/140	179/179	196/200	188/188	187/191	158/178	122/126	138/138	
W21_M	M		9	A	174/174	98/98	140/140	179/179	188/196	188/192	187/191	158/158	140/146	138/144	

W22_M	M	EEP2.1.1, EEP3.1.1, EEP3.1.2, EEP4.1.1, EEP6.1.1, EEP6.1.2, EEP2.4.1, G12.3.1, G16.4.2, I7.3.1, I7.3.2	11	EEP, G, I	174/174	90/104	140/152	179/179	196/196	188/188	191/199	170/170	144/144	138/138
W23_F	F	A1.2.1, A50.2.1, A20.4.1 Q5.1.1, Q5.1.2, Q7.1.1, Q7.1.2, Q8.1.1, Q8.1.2, Q9.1.1, Q9.1.2, Q3.2.1	3	A	174/174	100/104	140/140	179/179	188/196	188/208	187/199	158/170	142/144	138/140
W24_F	F	G1.1.1, G14.2.1 A3.1.1, A3.1.2, A8c.1.2, A13.1.2, A6.2.1, A6.2.2, A20.2.1, A20.2.2, A3.3.1, A3.3.2, A4.3.1, A13.3.1, A16.3.2, A20.3.2, A1.4.2 A15.1.2, A16.1.1, A20.1.1,	9	Q	174/174	100/104	140/140	179/185	188/196	188/188	191/195	158/178	142/148	138/144
W25_F	F	A16.4.1, B9.1.1 G9.1.1, G14.1.2, G3.2.2, G9.2.1, G20.2.1, G20.2.2	2	G	174/174	100/108	140/152	179/179	196/196	188/196	187/191	170/170	144/144	138/144
W26_F	F	Y4.1.1, Y4.1.2 z9.1.1, z9.1.2, z10.1.1, z10.1.2, z9.3.1, z20.3.1, z20.3.2, z7.4.1 z6.2.1, z13.2.1, z13.2.2, z7.3.1, z16.3.1	15	A	174/178	96/98	140/140	179/185	188/196	188/196	199/199	170/176	144/144	138/138
W27_M	M	Suz5.1.1, Suz8.1.1, Suz8.1.2, suz8.3.2, Z6.1.1, Z6.1.2, Z7.2.1, Z7.2.2, Z6.3.1, Z6.3.2, Z6.4.2	5	A, B	174/178	104/104	140/140	179/179	188/188	188/208	191/199	158/158	144/148	140/150
W28_M	M	Rho12.2.1, Rho12.2.2 Eps7.1.1, XXB5.4.1, XXB5.4.2, YY1A.1.2, YY1B.1.2, YY1B.4.2	6	G	174/178	108/118	140/140	179/182	188/196	188/188	199/199	170/178	144/144	138/138
W30_F	F	Y4.1.1, Y4.1.2 z9.1.1, z9.1.2, z10.1.1, z10.1.2, z9.3.1, z20.3.1, z20.3.2, z7.4.1 z6.2.1, z13.2.1, z13.2.2, z7.3.1, z16.3.1	2	Y	174/178	98/98	140/140	179/182	196/200	188/188	187/199	158/178	142/144	138/138
W31_F	F	Suz5.1.1, Suz8.1.1, Suz8.1.2, suz8.3.2, Z6.1.1, Z6.1.2, Z7.2.1, Z7.2.2, Z6.3.1, Z6.3.2, Z6.4.2	8	Z	178/178	90/108	140/140	179/179	188/196	188/196	187/187	176/178	142/146	138/146
W32_M	M	Rho12.2.1, Rho12.2.2 Eps7.1.1, XXB5.4.1, XXB5.4.2, YY1A.1.2, YY1B.1.2, YY1B.4.2	5	Z	174/182	90/100	140/140	179/179	188/196	188/192	191/199	158/178	122/142	146/146
W33_M	M	YY1a.4.2, YY1c.2.1, YY1c.2.2	11	Suz, z	174/182	90/100	140/140	179/182	188/192	196/200	187/199	158/178	122/142	138/146
W34_F	F	YY1a.1.2, YY1a.2.2, YY1b.2.1, YY1b.4.1	2	Rho	174/182	90/108	140/140	179/179	188/188	180/188	187/199	158/170	122/144	140/150
W35_M	M	n3.2.2, n8.2.1, z7.3.2 I2a.1.1, I2a.1.2, I50a.2.1, I50a.2.2, I2b.4.1, I11c.3.2, I15.3.1, I12.4.1	6	Eps, XX, YY	174/178	98/100	140/140	185/185	196/200	192/196	189/195	158/170	126/144	138/138
W36_F	F	Eps3.1.1, Eps3.1.2, Eps3.2.2	3	Eps	170/174	98/108	140/152	179/179	188/188	180/188	199/199	170/170	144/144	138/138
W37_M	M	NN4.1.1, NN4.1.2	3	YY	174/174	98/98	140/140	179/182	196/196	188/188	191/199	158/158	142/144	138/138
W38_M	M	A1.1.2, A12.1.2	2	NN	174/174	96/108	140/140	179/185	188/196	188/188	195/199	170/170	112/122	138/138
W39_F	F	MMP5.1.1, MMP5.1.2, NN4.4.1 Rho2.1.1, Rho5.2.1, Rho5.2.2, Rho2.4.1, Rho10b.4.2	2	A	170/178	100/104	140/140	179/185	196/196	180/196	199/199	170/170	122/146	138/144
W40_F	F	YY1a.2.1, YY1a.2.2, YY1b.2.1, YY1b.4.1	3	MMP, NN	174/178	90/100	140/140	179/182	188/196	180/188	187/187	170/176	144/148	138/150
W41_M	M	n3.2.2, n8.2.1, z7.3.2 I2a.1.1, I2a.1.2, I50a.2.1, I50a.2.2, I2b.4.1, I11c.3.2, I15.3.1, I12.4.1	5	Rho	174/178	90/98	140/140	179/179	196/200	188/196	187/199	170/170	142/144	138/142
W42_M	M	A1.2.2, A1.3.2, A1.4.1 z3.3.1, z3.3.2, z16.4.2, NN7.1.1, NN7.1.2	4	YY	174/174	98/100	140/140	179/185	188/188	192/196	191/195	158/170	144/144	138/138
W43_M	M	H2.2.2, H2.3.1, H2.3.2, H1.3.1, H1.3.2	3	n, z	174/178	90/100	140/155	179/182	188/188	188/196	187/187	158/176	130/142	146/150
W44_M	M	A1.2.2, A1.3.2, A1.4.1 z3.3.1, z3.3.2, z16.4.2, NN7.1.1, NN7.1.2	8	I	174/178	90/118	140/152	182/182	196/200	188/188	199/199	170/178	142/142	138/144
W45_M	M	H2.2.2, H2.3.1, H2.3.2, H1.3.1, H1.3.2	3	A	170/174	100/104	140/140	179/185	196/196	180/188	199/199	170/178	146/148	138/144
W46_M	M	n3.2.1, n3.3.2	5	z, NN	174/174	108/108	140/152	179/185	196/196	188/188	187/199	170/170	122/142	118/138
W48_F	F	n3.2.1, n3.3.2	5	H	178/182	98/100	140/140	179/179	196/196	188/188	187/199	158/158	142/144	142/150
W49_F	F	n3.2.1, n3.3.2	2	n	182/182	100/104	140/152	179/179	188/188	188/196	187/199	170/170	126/146	138/146

W50_M	M	Q7.4.1, Q7.4.2	2	Q	174/174	90/100	140/152	179/185	196/196	180/188	195/199	158/158	142/148	138/144	
W51_F	F	Suz2.3.2, Suz1.3.2, Suz2.3.1, Suz9.3.1, Suz9.3.2	5	Suz	174/174	90/108	140/140	179/185	196/196	192/200	199/199	158/170	122/122	138/138	
W53_M	M	Gamma6.3.2, Gamma26.3.2, Gamma26.4.2	3	Gamma	174/178	100/104	140/152	179/179	188/188	188/188	187/195	170/178	130/144	118/138	
W54_M	M	A11.4.1, A11.4.2	2	A	174/178	100/104	140/152	182/185	196/200	188/188	187/189	170/178	122/126	138/142	
W55_F	F	G2.2.2, G2.4.1, G2.4.2, G3.4.2 Gamma9.4.1, Gamma9.4.2, Gamma10.4.1, Gamma10.4.2, Gamma22.4.1, Gamma22.4.2,	4	G	178/178	100/108	140/140	179/179	188/188	188/188	191/199	158/178	122/144	140/146	
W56_M	M	Gamma26.4.1, Eps8.4.2	8	Eps, Gamma	170/174	104/104	140/140	179/179	188/196	188/196	187/189	158/158	142/148	118/138	
W57_F	F	J10.4.1, J11.4.1, J11.4.2	3	J	170/182	90/108	140/140	179/179	188/188	180/188	187/199	170/170	142/144	144/150	
W58_M	M	Col1.4.1, Col1.4.2	2	Col	174/174	90/100	140/152	179/179	188/188	188/188	187/189	170/176	130/148	138/138	
W59_M	M	Col3.2.1, n3.3.1, n3.4.1, n3.4.2, n6.4.1, n6.4.2	6	Col, n	174/174	108/108	140/152	179/179	188/188	188/188	199/199	158/170	144/144	138/138	
W69_M	M	MMP1.4.1, MMP6.4.1, NN7.4.1	3	MMP, NN	174/174	96/108	140/140	179/185	188/196	188/188	199/199	170/176	122/144	118/138	
W71_M	M	I3.4.1, I50a.4.2	2	I	174/174	98/98	140/152	179/179	196/196	188/196	189/195	158/178	126/146	138/140	
W73_M	M	YY1a.3.1, YY1b.3.1, YY1b.3.2	3	YY	174/182	90/90	140/140	176/179	188/188	188/196	191/199	158/170	142/144	138/138	
W74_M	M	A4.1.1	1	A	174/174	104/108	140/152	179/179	188/200	188/208	199/199	158/170	144/144	138/140	38
W75_F	F	YY1a.4.1, YY1b.2.2	2	YY	174/174	96/100	140/152	179/179	188/188	180/188	191/191	158/170	144/144	138/144	
W76_F	F	n6.2.1, n7.3.1	2	n	174/178	98/100	140/140	179/185	196/200	188/196	187/195	158/170	126/144	138/150	
W77_F	F	G1.3.2, G3.4.1	2	G	178/182	98/104	140/152	179/182	196/196	188/196	189/199	158/178	142/146	138/156	
W78_M	M	Eps3.3.2, Y5.3.1	2	Eps, Y	174/178	90/104	140/152	179/179	188/188	188/188	187/199	158/170	144/144	118/138	
W90_F	F	Psi8.4.1	1	Psi	170/182	100/104	152/152	182/182	188/200	192/196	189/191	158/170	122/144	138/146	36

PERIPHERAL WARRENS

Wombat ID	Hair sample ID	# Detections	Warrens used	6412	68CA	DR470	ELZRS	F3184	I85G2	71CA	109	LI2	Lk23
W10_F	RRP6.1.1, RRP6.1.2, RRP1.4.1, RRP2.4.1, RRP8.4.1	5	RRP	170/174	100/118	140/140	179/179	188/196	180/188	195/199	158/158	126/142	138/138
W19_F	LLP9.1.2, LLP11.1.1, LLP9.4.1, LLP9.4.2, LLP12.4.2	5	LLP	174/174	90/98	140/140	179/185	188/196	180/188	191/199	170/170	126/142	138/138
W29_M	MMP1.1.1, MMP1.1.2, MMP4.4.1, MMP4.4.2, MMP6.4.2	5	MMP	174/182	90/98	140/152	179/185	196/196	188/188	187/189	170/170	142/144	138/138
W60_F	LLP7.4.1, LLP7.4.2	2	LLP	170/170	90/98	155/155	179/179	188/188	180/208	187/199	158/170	122/144	138/140
W61_M	ZZP3.4.1, ZZP3.4.2, ZZP6.4.1, ZZP6.4.2, ZZP8.4.1, ZZP8.4.2	6	ZZP	170/174	90/98	140/152	179/182	196/200	188/196	187/199	170/178	122/144	138/144
W62_M	LLP3.4.1, LLP3.4.2, LLP5.4.2	3	LLP	170/174	98/108	140/140	179/179	196/200	180/188	199/199	158/170	130/144	138/140
W63_M	LLP14.4.2, LLP50.4.1, LLP50.4.2	3	LLP	170/174	108/108	140/152	179/185	196/200	188/188	187/187	170/178	122/144	118/138
W64_M	NN9.4.1, NN9.4.2	2	NN	174/178	90/100	140/140	179/182	188/196	180/188	189/189	158/170	142/142	138/150
W65_F	LLP14.4.1, LLP17.4.1, LLP17.4.2	3	LLP	174/174	98/100	140/140	179/182	196/200	180/188	187/199	158/158	122/144	138/140

W66_F	LLP6.4.2, LLP11.4.1, LLP11.4.2	3	LLP	174/174	100/108	140/140	179/182	196/196	188/188	187/199	158/170	122/142	138/138
W67_F	ZZP8.1.1, ZZP9.4.1, ZZP9.4.2, ZZP14.4.2?	4	ZZP	174/178	90/100	140/152	179/185	196/196	180/188	187/199	158/176	130/144	144/156
W68_M	ZZP2.4.1, ZZP2.4.2	2	ZZP	174/182	90/98	140/140	179/182	188/200	188/188	191/199	158/170	142/146	138/138
W72_F	RRP9.4.1, RRP9.4.2	2	RRP	174/178	104/104	140/140	179/179	188/196	188/188	191/199	158/170	142/144	138/138

^AFrom Walker *et al.* 2006