10.1071/AM11041_AC

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Table S1. Summary of red fox home-range size in Australia, as determined by radio-tracking.

Location & sample size	**Home-range size** (hectares) ♂mean (range)	♀mean (range)	**Locations per fox** mean (range)	**Tracking period**[a] mean (range)	**Reference**
		Temperate agricultural			
(VIC) ♂ 1, ♀ 1	720^{MCP*} 400^{UD90}	500^{MCP*} 330^{UD90}		≤ ≈60	Coman *et al.* (1991)
(NSW) ♂ 13, ♀ 20	651^{MCP95} (200–1900) 369^{KC95} (100–1300) 189^{MCP50} 75^{KC50}	313^{MCP95} (100–1100) 216^{KC95} (<100–600) 97^{MCP50} 50^{KC50}	189 (49–454)	480 (150–1080)	Berghout (2000)
(NSW) ♂ 59, ♀ 96	[b]309–428^{MCP95} ♂|♀ [b]82–126^{MCP60}	[b]186–723^{MCP95} ♂|♀ [b]82–126^{MCP60}	100	[b]390–870	Saunders *et al.* (2002)
(SA) ♀ 1		2 420^{MCP100}	7	3	Clarke (2006)
(NSW) ♂ 3, ♀ 1	353^{MCP100} (223–471)	426^{MCP100}	48 (30–66)		Newsome (2006)
		Coastal			
(NSW) ♂ 2, ♀ 1	303^{MCP*} (130–500)	500^{MCP*}	1 009 (451–1410)	113 (60–146)	Phillips and Catling (1991)
(NSW) ♂ 9, ♀ 5	138^{MCP100} (63–270) 28^{MCP60} (10–74)	132^{MCP100} (60–210) 16^{MCP60} (9–48)	172 (37–372)		Meek (1998); Meek and Saunders (2000)
		Arid / semi-arid			
(NSW) ♂ 2, ♀ 7	667^{UD95} (642–692) 208^{UD50} (207–208)	469^{UD95} (176–850) 134^{UD50} (47–295)		[c]	Marlow (1992)
(WA) ♂ 1	2 800^{MCP95}			7	Burrows *et al.* (2003)
(SA) ♂ 1, ♀ 2	3322^{MCP95} 1743^{KC60}	829^{MCP95} (744–914) 290^{KC60} (224–355)	292 (168–396)	63 (34–93)	Moseby *et al.* (2009)
		Alpine / semi-alpine			
(NSW) ♂|♀ 17	♂|♀ [b]160–930^{MCP*} ♂|♀ [b]160–1010^{KC95} ♂|♀ [b]30–240^{KC50}	♂|♀ [b]160–930^{MCP*} ♂|♀ [b]160–1010^{KC95} ♂|♀ [b]30–240^{KC50}	29		Bubela (1995)
(ACT) ♂ 7	194^{MCP100} (91–393) 154^{KC95} (48–400)		35 (15–74)	413 (89–610)	Banks (1997)
		Semi-urban			

(VIC) ♂ 3, ♀ 1	210^{MCP*} (60–490) 100^{UD90} (20–240)	130^{MCP*} 60^{UD90}		≤ ≈60	Coman *et al.* (1991)[d]
(VIC) ♂ 6, ♀ 3	51^{MCP*} (19–153) 23^{HM95} (12–64) 6^{HM75} (3–15) 2^{HM50} (1–4)	33^{MCP*} (22–48) 25^{HM95} (18–37) 7^{HM75} (4–9) 2^{HM50} (1–3)	94 (34–204)	226 (35–520)	White *et al.* (2006)
		Urban			
(VIC) ♂ 4, ♀ 7	23^{MCP100} (6–36)	30^{MCP100} (12–46)	136 (65–277)	115 (84–140)	Marks and Bloomfield (2006)

[a] = Tracking period in days. Where tracking period was presented in weeks or months, values were multiplied by 7 and 30, respectively, to approximate tracking period in days.

[b] = No overall mean value was given; figures presented are the *range* of mean values.

[c] = Actual tracking period was not specified, but results refer to 'yearly' home ranges as distinct from 'seasonal' and 'weekly' home ranges.

[d] = Results presented here include one fox tracked in bushland on the outskirts of an urban area.

If results included multiple home ranges for individual foxes (e.g. pre- and post-breeding), the mean value of those figures is presented.

Figures given in superscript after home-range estimator abbreviations refer to isopleth values: MCP = minimum convex polygon, UD = utilisation distribution—following Anderson (1982), KC = kernel contours, HM = harmonic mean, * = isopleth value not specified.

≈ = approximate value only.

♂|♀ = sex not specified.

Table S2. Minimum Convex Polygon (100%) home-range areas (in hectares; not including a buffer to compensate for telemetry error) at 10-location increments.

The cumulative tracking period (in days) at each 10-location increment is presented in parentheses.

	Home-range size (and cumulative tracking period)						
Fox ID	10 locations	20 locations	30 locations	40 locations	50 locations	60 locations	70 locations
MA 2	69 (11)	277 (18)	277 (25)	277 (41)	277 (49)	353 (54)	377 (63)
MA 3	15 (3)	31 (17)	243 (25)	256 (34)	256 (41)	261 (48)	289 (54)
MA 4	43 (10)	126 (16)	223 (21)	229 (29)			
MA 5	20 (4)						
MA 6	197 (7)	683 (11)	1120 (16)	1133 (25)			
MA 7	51 (3)	296 (7)	995 (11)	995 (17)	2204 (19)	2497 (23)	3149 (25)
FA 1	41 (3)	131 (7)	173 (27)	221 (32)	283 (36)	304 (41)	307 (44)
FA 2	45 (3)	54 (6)					
MS 8	129 (2)	177 (5)	197 (9)	197 (13)	210 (16)	223 (24)	404 (29)
MS 9	101 (3)	101 (7)	101 (11)	116 (14)	122 (22)	344 (27)	344 (30)
MS 10	40 (3)	42 (7)	58 (10)	135 (18)	184 (21)	229 (25)	229 (27)
FS 3	304 (3)						
FS 4	69 (4)	160 (7)	530 (10)	530 (17)	755 (20)	755 (23)	839 (25)

	Home-range size (and cumulative tracking period)						
Fox ID	80 locations	90 locations	100 locations	110 locations	120 locations	130 locations	140 locations
MA 2	443 (69)	443 (74)	443 (79)	443 (101)	443 (107)	443 (112)	443 (117)
MA 3	348 (61)	379 (84)	379 (89)	382 (95)	382 (100)	382 (105)	382 (110)
MA 4							
MA 5							
MA 6							
MA 7	3149 (27)	3284 (30)	3284 (44)	3284 (45)	3284 (48)	3284 (52)	3284 (52)
FA 1	311 (48)	311 (51)	338 (55)	347 (59)	347 (63)	355 (69)	355 (75)
FA 2							
MS 8	796 (32)	930 (34)	988 (35)	1018 (37)	1038 (38)	1048 (39)	1068 (41)
MS 9	360 (32)	361 (33)	380 (34)	433 (36)	438 (37)	443 (39)	455 (40)
MS 10	303 (28)	303 (30)	383 (31)	513 (33)	537 (34)	547 (36)	547 (37)
FS 3							
FS 4	839 (27)	858 (28)	858 (30)	858 (31)	858 (33)	858 (34)	864 (36)

Fox ID	Home-range size (and cumulative tracking period)						
	150 locations	160 locations	170 locations	180 locations	190 locations	200 locations	210 locations
MA 2	443 (122)	443 (127)	443 (133)	443 (137)	443 (145)	449 (150)	449 (161)
MA 3	382 (116)	382 (121)	405 (128)	405 (133)	405 (144)	405 (150)	405 (154)
MA 4							
MA 5							
MA 6							
MA 7	3330 (59)	3331 (59)	3331 (60)				
FA 1	355 (81)	361 (91)	397 (97)	398 (101)	398 (102)	405 (104)	414 (105)
FA 2							
MS 8	1068 (42)	1068 (44)	1068 (46)	1068 (47)	1303 (48)	1303 (50)	1303 (51)
MS 9	476 (42)	476 (44)	516 (45)	516 (47)	537 (48)	537 (49)	537 (51)
MS 10	547 (39)	560 (40)	560 (42)	577 (43)	584 (45)	632 (46)	642 (48)
FS 3							
FS 4	881 (38)	881 (39)	881 (40)	881 (42)	882 (43)	882 (45)	882 (47)

Fox ID	Home-range size (and cumulative tracking period)						
	220 locations	230 locations	240 locations	250 locations	260 locations	270 locations	280 locations
MA 2	457 (167)	469 (170)	474 (172)	474 (174)	474 (175)	537 (180)	537 (181)
MA 3	405 (157)	405 (159)	411 (160)	495 (165)	714 (168)	714 (169)	714 (203)
MA 4							
MA 5							
MA 6							
MA 7							
FA 1	429 (111)	437 (113)	464 (114)	464 (150)	464 (191)	464 (201)	464 (211)
FA 2							
MS 8	1303 (53)						
MS 9	537 (53)	537 (54)	543 (56)	543 (57)	636 (59)	636 (74)	
MS 10	706 (50)	738 (51)	738 (52)	738 (57)			
FS 3							
FS 4	882 (48)	882 (49)	882 (50)	882 (53)	882 (63)		

Fox ID	Home-range size (and cumulative tracking period)			
	290 locations	300 locations	310 locations	320 locations
MA 2	537 (184)	537 (213)		
MA 3	966 (247)	1036 (257)	1036 (267)	1036 (275)
MA 4				
MA 5				
MA 6				
MA 7				
FA 1	467 (219)			
FA 2				
MS 8				
MS 9				
MS 10				
FS 3				
FS 4				

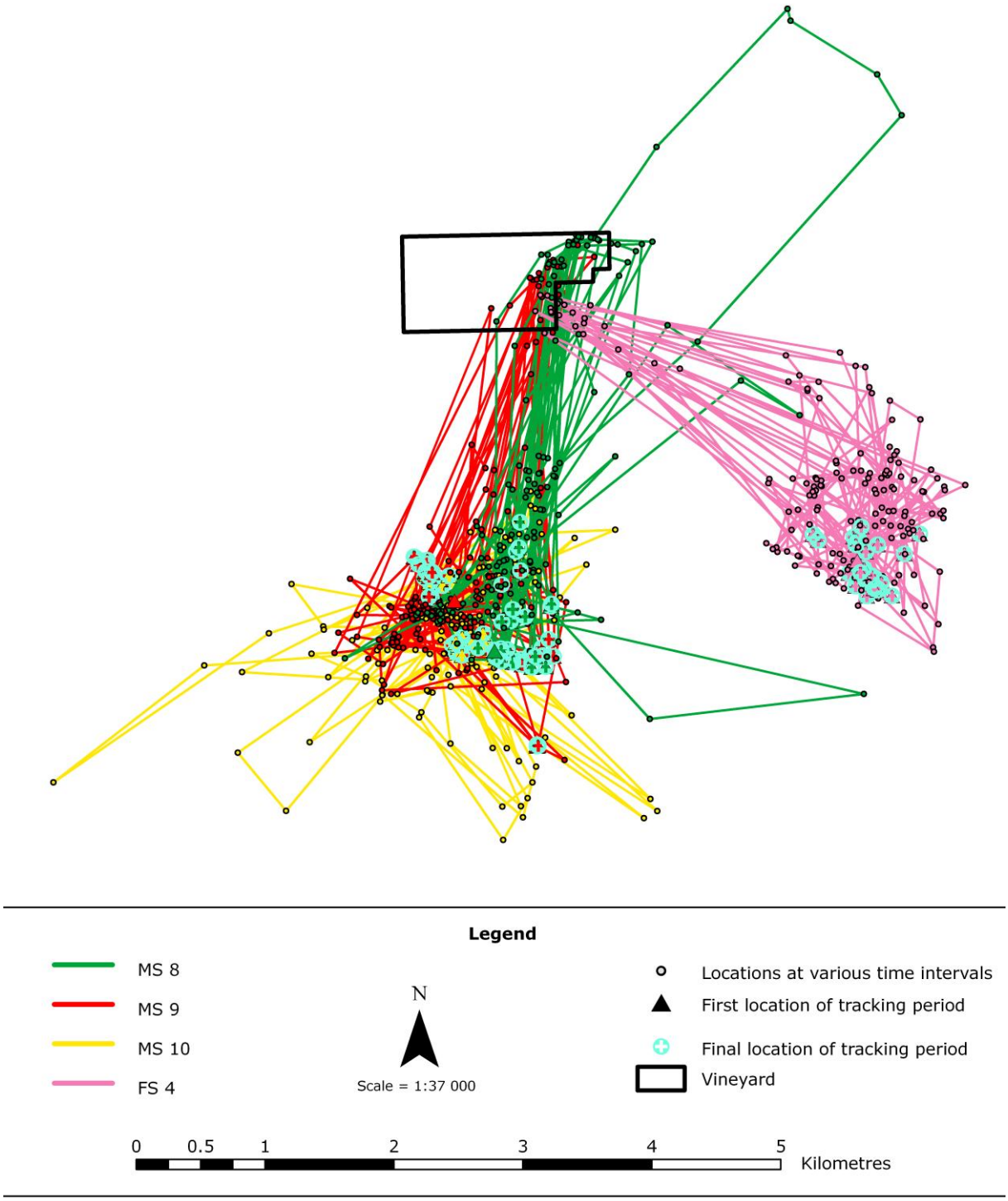
Table S3. The minimum *expected* distance travelled (km) and ranging area (ha) of four sub-adult foxes radio-tracked during 12-hour nightly periods in March 2008.

Figures in square brackets refer to the percentage of the overall 100% MCP home-range area covered.

	Min. *EXPECTED* nightly distance travelled (km)				**Min. *EXPECTED* nightly range size (ha)**		
Fox ID	Based on adult movements during present study		Based on adult:sub-adult/juvenile movement ratios from previous studies[a]		Based on adult movements during present study		
	Range	**Mean**	*Range*	**Mean**	*Range*	**Mean**	
MS 8	4.4–16.3	13.9	8.1–13.9	10.7	83–943	430	[30]
MS 9	2.5–19.9	11.1	6.5–11.1	8.5	30–697	310	[39]
MS 10	1.7–13.7	8.5	4.9–8.5	6.5	22–444	188	[23]
FS 4	3.9–17.5	11.4	6.6–11.4	8.7	60–586	313	[29]
Mean (± *SD*)		11.2 (± 2.2)		8.6 (± 1.7)		310 (± 99)	[30]

[a] Previous studies (Eguchi and Nakazono 1980; Cavallini 1992; Meia and Weber 1995; Adkins and Stott 1998) indicate the distance travelled by sub-adult/juvenile foxes (during nightly and/or 24-hour periods) is 58.1–99.9% of the distance travelled by adults (mean = 76.6%). The '*Range*' figures presented here are the range of mean nightly distances travelled based on the aforementioned studies.

Fig. S1. The nightly (straight-line) travel paths of four sub-adult foxes tracked during 28 consecutive nights in March 2008.



References

Banks, P. B. (1997). Predator–prey interactions between foxes, rabbits and native mammals of the Australian Alps. Ph.D. Thesis, University of Sydney.

Berghout, M. (2000). The ecology of the red fox (Vulpes vulpes) in the central Tablelands of New South Wales. Ph.D. Thesis, University of Canberra.

Bubela, T. M. (1995). Social effects of sterilising free-ranging vixens (*Vulpes vulpes* L.) in subalpine Australia. Ph.D. Thesis, University of Sydney.

Burrows, N. D., Algar, D., Robinson, A. D., Sinagra, J., Ward, B., and Liddelow, G. (2003). Controlling introduced predators in the Gibson Desert of Western Australia. *Journal of Arid Environments* **55**, 691–713. doi:10.1016/S0140-1963(02)00317-8

Clarke, A. A. (2006). Exploring red fox (Vulpes vulpes) movement and baiting strategy on the Eyre Peninsula of South Australia. B.App.GIS(Honours) Thesis, Flinders University, Adelaide.

Coman, B. J., Robinson, J., and Beaumont, C. (1991). Home range, dispersal and density of red foxes (Vulpes vulpes L.) in central Victoria. Wildlife Research 18, 215–223. doi:10.1071/WR9910215

Marks, C. A., and Bloomfield, T. E. (2006). Home range size and selection of natal den and diurnal shelter sites by urban red foxes (Vulpes vulpes) in Melbourne. *Wildlife Research* **33**, 339–347. doi:10.1071/WR04058

Marlow, N. J. (1992). The ecology of the introduced red fox (Vulpes vulpes) in the arid zone. Ph.D. Thesis, University of New South Wales, Sydney.

Meek, P. D. (1998). The biology of the European red fox and the free roaming dog on Bherwerre Peninsula, Jervis Bay. M.Sc. Thesis, University of Canberra.

Meek, P. D., and Saunders, G. (2000). Home range and movement of foxes (Vulpes vulpes) in coastal New South Wales. Australian Wildlife Research 27, 663–668. doi:10.1071/WR98030

Moseby, K. E., Stott, J., and Crisp, H. (2009). Movement patterns of feral predators in an arid environment – implications for control through poison baiting. Wildlife Research 36, 422–435. doi:10.1071/WR08098

Newsome, T. M. (2006). Home range shifts and density estimates of the red fox (Vulpes vulpes) in relation to a control exercise. M.App.Sc. Thesis, University of Sydney.

Phillips, M., and Catling, P. C. (1991). Home range and activity patterns of red foxes in Nadgee Nature Reserve. *Wildlife Research* **18**, 677–686. doi:10.1071/WR9910677

Saunders, G., McIlroy, J., Berghout, M., Kay, B., Gifford, E., Perry, R., and van de Ven, R. (2002). The effects of induced sterility on the territorial behaviour and survival of foxes. Journal of Applied Ecology 39, 56–66. doi:10.1046/j.1365-2664.2002.00696.x

White, J. G., Gubiani, R., Smallman, N., Snell, K., and Morton, A. (2006). Home range, habitat selection and diet of foxes (Vulpes vulpes) in a semi-urban riparian environment. Wildlife Research 33, 175–180. doi:10.1071/WR05037