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Pacific Conservation Biology

Supplementary Material

Advancing spatial analysis of invasive species movement data to improve monitoring, control programs and decision making: feral cat home range as a case study

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Supplementary Material Table S1

Supplementary Material Table S1: Details of all feral cats captured and fitted with GPS collars across all sites between 2016 and 2019. Grey rows indicate cats that were excluded from data analysis and reasons for exclusion.

Year	Cat ID	Name	Sex	Weight (kg)	Date collared	Date died	Days collared	Cause of death	Reason for data exclusion
2016	Cat01	Bingo	M		19/5/16	4/8/16	77	BQ bait	
2016	Cat02	Toothless	M		23/5/16	12/6/16	20	QPWS bait	not enough days n=<40
2016	Cat03	Cruiser	M	3.75	9/6/16	12/9/16	95	Shot	
2016	Cat04	JA	F	3.23	12/6/16	23/9/16	103	Shot	
2016	Cat06	Jim	M	5.00	23/5/16	25/10/16	155	Shot	
2016	Cat08	Tiger	M	6.00	22/5/16	12/9/16	113	Shot	
2016	Cat09	Lucky	M	6.60	16/6/16	11/9/16	87	Shot	
2016	Cat10	Amy	F	2.75	23/6/16	10/9/16	79	Shot	
2016	Cat11	Sandy	F	3.20	26/6/16	9/9/16	75	Shot	
2016	Cat12	Griddle	F	2.80	26/6/16	8/9/16	74	Shot	
2017	Cat01	Bazza	M	2.98	24/5/17	23/6/17	30	Fell into tree cavity	not enough days n=<40
2017	Cat02	Nigel	M	4.28	24/5/17	1/9/17	100	Shot	
2017	Cat03	Tabatha	F	2.18	25/6/17	7/8/17	43	BQ bait	
2017	Cat03A	Curley	F	2.95	13/5/17	1/6/17	19	Unknown	not enough days n=<40
2017	Cat04	Larry	M	3.68	13/5/17	27/7/17	75	BQ bait	
2017	Cat05	Jack	M	5.83	13/6/17	31/7/17	48	BQ bait	
2017	Cat07	FJ	M	3.38	22/6/17	3/9/17	73	Shot	collars data only recorded up to 30/06/2017
2017	Cat08	Fenech	M	6.28	22/6/17	2/9/17	72	Shot	
2017	Cat09	River Phoenix	M	5.33	15/5/17	3/9/17	111	Shot	
2017	Cat10	Aunty	F	3.55	10/6/17	31/8/17	82	Shot	collar was shot and data lost
2017	Cat11	Black Betty	F	3.28	24/5/17	1/9/17	100	Shot	
2017	Cat12	Moe	F	4.24	12/5/17	1/9/17	112	Shot	
2017	Cat13	Unlucky	M	2.88	29/5/17	29/8/17	92	Unknown	
2017	Cat15	Popcorn	M	3.48	1/6/17	17/6/17	16	QPWS dog bait	not enough days n=<40
2017	Cat16	Colonel	M	3.48	30/5/17	3/8/17	65	BQ bait	
2018	Cat01	Dinah	F	3.45	20/4/18	17/7/18	88	Unknown	
2018	Cat03	Cleo	F	2.45	14/5/18	30/6/18	47	Unknown	trapped too many times - biased data, trapped 20 times
2018	Cat04	Jemima	F	3.55	28/4/18	22/8/18	116	Unknown	
2018	Cat05	Chaos	M	5.15	24/4/18	23/7/18	90	Eradicat baits (5)	
2018	Cat06	Demo	M	2.16	7/6/18	17/6/18	10	Unknown	not enough days n=<40
2018	Cat07	Bond	M	4.10	20/5/18	27/6/18	38	Unknown	not enough days n=<40

Supplementary Material Table S1 continued: Details of all feral cats captured and fitted with GPS collars across all sites between 2016 and 2019. Grey rows indicate cats that were excluded from data analysis and reasons for exclusion. Cats whose cause of death was undetermined, were recorded as unknown.

Year	Cat ID	Name	Sex	Weight (kg)	Date collared	Date died	Days collared	Cause of death	Reason for data exclusion
2018	Cat08	Snowball	M	5.00	17/6/18	08/9/18	83	Shot	
2018	Cat09	Scat	M	5.28	18/4/18	08/9/18	143	Shot	
2018	Cat11	Killer	M	4.15	23/6/18	07/7/18	76	Shot	
2018	Cat12	Sam	F	3.90	19/5/18	08/9/18	112	Shot	
2018	Cat13	Spook	M	3.88	22/4/18	02/6/18	41	Starvation	
2018	Cat15	Junior	M	3.45	18/6/18	30/6/18	12	Unknown	not enough days n=<40
2018	Cat16	Billy	M	4.65	15/5/18				not retrieved
2018	Cat38	Cliff	M	2.15	17/5/18	10/7/18	54	Unknown	Excluded - only Sirtrack collar used that provided sufficient data.
2018	Cat45	Tiny Tim	M	1.50	16/5/18				not retrieved
2018	Cat50	Tiny Tina	F	1.40	21/5/18	28/06/18		Unknown	GPS collar modified and could not be used for GPS
2018	Cat52	Clawdette	F	2.28	07/6/18	04/7/18	27	NA	not enough days n=<40
2019	Cat01	MaySwaisey	F	3.70	3/8/19	6/9/19	34	Shot	not enough days n=<40
2019	Cat02	Nightrider	M	5.10	3/7/19	7/9/19	66	Shot	
2019	Cat03	Fifi	F	2.70	3/7/19	9/9/19	68	Shot	
2019	Cat04	Jessie	F	3.00	4/7/19	22/8/19	49	BQ bait	only 17 points after cleaning data
2019	Cat05	Goose	M	4.30	1/7/19	7/9/19	68	Shot	
2019	Cat06	Max	M	4.55	3/8/19	10/9/19	38	BQ bait	not enough days n=<40
2019	Cat07	Toecutter	M	4.90	2/8/19	9/9/19	38	Shot	not enough days n=<40
2019	Cat08	Scuttle	M	4.50	4/7/19	8/9/19	66	Shot	
2019	Cat09	Grinner	M	3.80	31/7/19	10/9/19	41	Shot	
2019	Cat11	Mudguts	M	5.20	5/7/19	9/9/19	66	BQ bait	
2019	Cat12	Ziggy	M	4.60	1/8/19	9/12/19	130	Shot	
2019	Cat13	Girl in Chevy	F	4.10	2/8/19	7/9/19	36	BQ bait	not enough days n=<40
2019	Cat14	Bubba	M	5.10	4/7/19	8/9/19	66	BQ bait	
2019	Cat15	Nightriders Girl	F	4.10	2/8/19	9/9/19	38	BQ bait	not enough days n=<40

Supplementary Material Table S2

Supplementary Material Table S2: Review of telemetry parameters contributing to GPS collar positional errors. In total there were 46 imprecise points and 304 precise points (i.e. fix positional accuracy <50 m from true position).

Parameter	**% imprecise points removed**	**% precise points retained**
HDOP ≥ 9	34.8	98.7
HDOP ≥ 8	34.8	98.4
HDOP ≥ 7	37.0	97.0
HDOP ≥ 6	41.3	96.1
HDOP ≥ 5	45.7	91.4
HDOP ≥ 4	76.1	88.5
HDOP ≥ 3	97.8	79.3
No. of satellites ≤ 2	26.1	97.4
No. of satellites ≤ 3	93.5	89.5

Supplementary Material Table S3

Supplementary Material Table S3: Results of 90% home range estimations for all cats across all years. Figures are expressed in km^2.

Cat ID	Sex	Weight (kg)	n	α-hull 90%	a-LoCoH 90%	k-LoCoH 90%	r-LoCoH 90%	Kernel hREF 90%	Kernel LSCV 90%	MCP 90%
2016_Cat01	M		141	21.47	11.78	8.01	9.15	35.21	3.77	23.65
2016_Cat03	M	3.75	171	1.86	1.54	1.53	1.37	2.80	1.89	1.90
2016_Cat04	F	3.23	175	8.36	6.78	6.24	1.31	29.90	4.84	16.96
2016_Cat06	M	5.00	208	36.25	35.87	23.23	24.46	165.44	20.63	88.31
2016_Cat08	M	6.00	150	10.57	6.39	6.04	1.57	25.16	3.18	12.75
2016_Cat09	M	6.60	151	9.33	6.07	5.89	5.88	16.38	2.95	9.78
2016_Cat10	F	2.75	139	5.45	2.20	1.79	3.08	9.55	1.42	5.76
2016_Cat11	F	3.20	129	4.68	3.00	2.57	0.94	8.91	3.50	4.97
2016_Cat12	F	2.80	129	6.40	5.71	3.45	0.75	15.93	1.23	9.14
2017_Cat02	M	4.28	171	9.61	7.13	7.15	1.35	16.72	3.38	12.94
2017_Cat03	F	2.18	70	0.38	0.13	0.11	0.16	1.06	0.07	0.52
2017_Cat04	M	3.68	136	13.23	9.16	7.28	4.48	33.00	14.29	22.23
2017_Cat05	M	5.83	85	6.36	4.20	2.83	4.86	20.56	6.41	7.98
2017_Cat08	M	6.28	81	21.34	10.79	9.15	2.17	33.97	18.94	19.88
2017_Cat09	M	5.33	208	6.58	5.10	3.76	3.08	13.93	5.36	9.46
2017_Cat11	F	3.28	174	3.35	2.90	2.74	0.71	5.33	4.25	3.68
2017_Cat12	F	4.24	220	1.83	1.47	1.36	0.36	6.90	1.33	3.21
2017_Cat13	M	2.88	159	1.79	1.66	1.62	1.73	3.73	2.19	1.82
2017_Cat16	M	3.48	124	2.20	1.74	1.04	1.99	5.32	1.46	4.07
2018_Cat01	F	3.45	126	19.39	15.82	11.74	4.89	41.52	6.05	23.89
2018_Cat04	F	3.55	209	15.89	11.75	8.28	17.54	35.57	0.66	19.39
2018_Cat05	M	5.15	171	18.44	11.89	8.25	4.14	34.01	4.99	16.71
2018_Cat08	M	5.00	167	6.41	4.85	3.20	7.31	17.25	5.17	13.10
2018_Cat09	M	5.28	193	28.29	16.17	13.58	4.61	54.06	9.70	33.43
2018_Cat11	M	4.15	145	22.21	16.31	7.12	2.38	65.54	2.91	25.60
2018_Cat12	F	3.90	221	6.50	4.18	3.17	3.46	17.66	3.45	14.20
2018_Cat13	M	3.88	81	27.38	13.72	9.58	0.76	70.33	17.20	34.19
2019_Cat02	M	5.10	96	11.64	7.87	6.79	2.71	18.80	2.70	12.41
2019_Cat03	F	2.70	97	11.29	8.48	8.36	2.43	24.19	2.08	9.64
2019_Cat05	M	4.30	108	7.20	4.53	4.14	3.29	20.56	4.70	8.86
2019_Cat08	M	4.50	104	17.79	10.57	8.68	7.33	25.99	15.81	15.88
2019_Cat09	M	3.80	61	5.91	3.89	3.29	3.12	12.52	10.55	5.66
2019_Cat11	M	5.20	107	8.70	3.94	4.32	0.51	12.69	3.80	8.22
2019_Cat12	M	4.60	143	11.20	7.93	6.34	4.30	20.54	2.98	13.48
2019_Cat14	M	5.10	116	12.91	6.76	7.12	2.51	19.24	0.90	11.78

Supplementary Material Table S4

Supplementary Material Table S4: Results of 50% home range estimations for all cats across all years. Figures are expressed in km².

Cat ID	Sex	Weight (kg)	n	α-hull 50%	a-LoCoH 50%	k-LoCoH 50%	r-LoCoH 50%	Kernel hREF 50%	Kernel LSCV 50%	MCP 50%
2016_Cat01	M		141	0.83	4.34	0.80	4.45	9.77	0.34	5.20
2016_Cat03	M	3.75	171	0.23	0.29	0.22	0.33	0.85	0.45	0.83
2016_Cat04	F	3.23	175	0.79	1.68	0.99	0.77	9.17	0.69	8.83
2016_Cat06	M	5.00	208	2.48	5.83	2.79	8.16	41.40	2.07	25.55
2016_Cat08	M	6.00	150	0.75	1.10	0.81	0.73	8.45	0.21	6.40
2016_Cat09	M	6.60	151	0.75	1.62	0.77	1.82	4.74	0.36	4.75
2016_Cat10	F	2.75	139	0.28	0.48	0.25	0.88	2.97	0.13	2.41
2016_Cat11	F	3.20	129	0.68	0.77	0.51	0.54	2.81	0.90	2.90
2016_Cat12	F	2.80	129	0.33	0.87	0.33	0.43	3.27	0.17	1.52
2017_Cat02	M	4.28	171	1.15	2.23	1.03	0.77	4.96	0.25	3.73
2017_Cat03	F	2.18	70	0.01	0.03	0.00	0.05	0.21	0.01	0.12
2017_Cat04	M	3.68	136	2.16	3.02	2.02	2.21	11.21	3.85	8.27
2017_Cat05	M	5.83	85	0.93	1.03	0.65	1.56	5.86	1.62	3.87
2017_Cat08	M	6.28	81	2.63	4.21	2.24	1.44	12.29	5.18	7.56
2017_Cat09	M	5.33	208	0.45	1.38	0.68	0.95	4.13	0.31	3.58
2017_Cat11	F	3.28	174	0.69	1.06	0.72	0.41	1.73	1.38	1.19
2017_Cat12	F	4.24	220	0.25	0.59	0.39	0.20	2.41	0.18	1.17
2017_Cat13	M	2.88	159	0.38	0.55	0.38	0.73	1.00	0.69	0.70
2017_Cat16	M	3.48	124	0.33	0.47	0.41	0.65	1.45	0.27	0.77
2018_Cat01	F	3.45	126	2.14	4.43	1.46	2.15	13.91	0.64	8.21
2018_Cat04	F	3.55	209	0.62	1.89	0.91	9.72	7.06	0.02	3.76
2018_Cat05	M	5.15	171	0.21	1.37	0.34	1.00	7.80	0.31	5.34
2018_Cat08	M	5.00	167	0.23	1.14	0.30	1.91	4.49	0.25	3.86
2018_Cat09	M	5.28	193	1.81	4.83	2.01	2.73	16.73	0.63	18.98
2018_Cat11	M	4.15	145	1.23	3.99	1.34	1.12	21.38	0.11	10.91
2018_Cat12	F	3.90	221	0.45	1.17	0.73	1.58	5.54	0.41	2.79
2018_Cat13	M	3.88	81	0.79	4.08	0.54	0.61	19.42	0.79	8.43
2019_Cat02	M	5.10	96	0.97	1.01	0.77	1.20	4.51	0.21	2.07
2019_Cat03	F	2.70	97	0.79	1.47	0.51	1.44	5.01	0.29	2.53
2019_Cat05	M	4.30	108	0.81	1.13	0.76	1.22	3.53	1.00	1.76
2019_Cat08	M	4.50	104	2.74	4.09	2.64	2.72	9.18	4.56	7.21
2019_Cat09	M	3.80	61	1.15	1.26	0.87	1.38	3.02	3.21	1.96
2019_Cat11	M	5.20	107	0.59	0.89	0.33	0.24	3.90	0.18	2.55
2019_Cat12	M	4.60	143	1.13	2.75	1.47	1.92	7.04	0.21	4.65
2019_Cat14	M	5.10	116	0.71	1.62	1.03	1.81	5.23	0.03	2.31

Supplementary Material Table S5

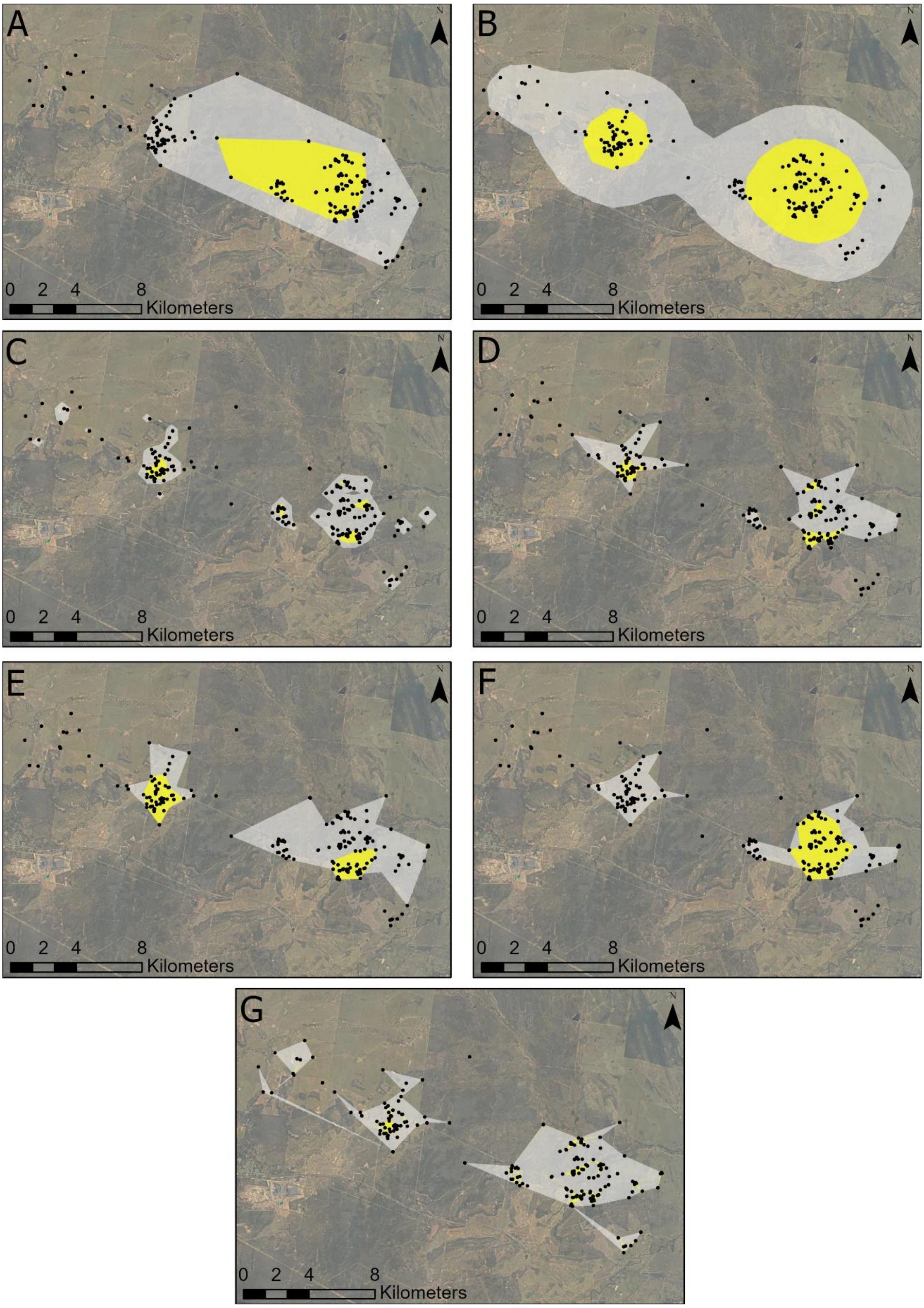
Supplementary Material Table S5: Comparison of feral cat activity range data from previous research.

STUDY	LOCATION	LANDSCAPE TYPE	HOME/ACTIVITY RANGE (KM^2)				TRACKING	SAMPLE SIZE	INFORMS MANAGEMENT STRATEGIES?
			M	F	Method	%			
Apps (1986)	Dassen Island, South Africa	mediterranean	0.44	0.19	MCP	95	Radio	8	No
Bengsen *et al.* (2016)	multiple locations	multiple locations	5.10	2.46	MCP	95			No
Bengsen *et al.* (2012)	Kangaroo Island, Australia	eucalypt woodland and mixed farmland	9.37	5.16	MCP	90-100	GPS	13	Yes
			6.83	4.16	a-LoCoH	90-100			
Bridges *et al.* (2015)	San Clemente Island, USA	maritime desert scrub	2.88	1.76	MCP	100	GPS	12	Yes
			1.68	1.92	f-KDE	95			
			0.48	0.21	f-KDE	50			
Buckmaster (2011)	Gippsland, Victoria	forest	4.55	1.05	MCP	100	GPS	8	No
			1.27	0.20	MCP	50			
			4.58	1.16	f-KDE	95			
			0.49	0.22	f-KDE	50			
Burrows *et al.* (2003)	Gibson Desert, WA	arid	12.00	7.00	MCP	100	Radio	4	Yes
Edwards *et al.* (2001)	Alice Springs, NT	arid	22.11		MCP	100	Radio	4	Yes
			22.06		f-KDE	100			
			5.79		f-KDE	50			
Goltz *et al.* (2008)	Mauna Kea, Hawai'i	sub-alpine volcanic woodland	14.18	7.72	f-KDE	95	GPS	7	Yes
			1.13	1.57	f-KDE	50			
			0.33	0.54	f-KDE	25			
Guttilla and Stapp (2010)	Catalina Island, USA	mediterranean	3.25	1.25	MCP	95	Radio	10 - 12	Yes
			7.80	1.70	f-KDE	95			
Harper (2007)	Stewart Island, NZ	temperate forest	20.83	11.09	MCP	100	Radio	7	No
			18.15	10.65	f-KDE	95		11	
(Jones and Coman 1982)	Hattah-Kulkyne NP, Victoria	semi-arid / mallee scrub	6.20	1.70	MCP	100	Radio	6	No
Konecny (1987)	Galapagos Islands	coastal/arid	3.04	0.82	MCP	100	Radio	14	No
Langham and Porter (1991)	Hastings, NZ	farmland	2.39	1.54	MCP	100	Radio	27	No
Leo *et al.* (2016)	Rota Island, USA	tropical	0.92	0.22	MCP	100	GPS	6	No
Martin *et al.* (2013)	Kerguelen Islands, France	sub-Antarctic island	0.58		m-KDE	95	GPS	3	No
McGregor *et al.* (2015)	Kimberley, WA	sub-tropical savannah	8.55	3.97	KDE	95	GPS	32	Yes

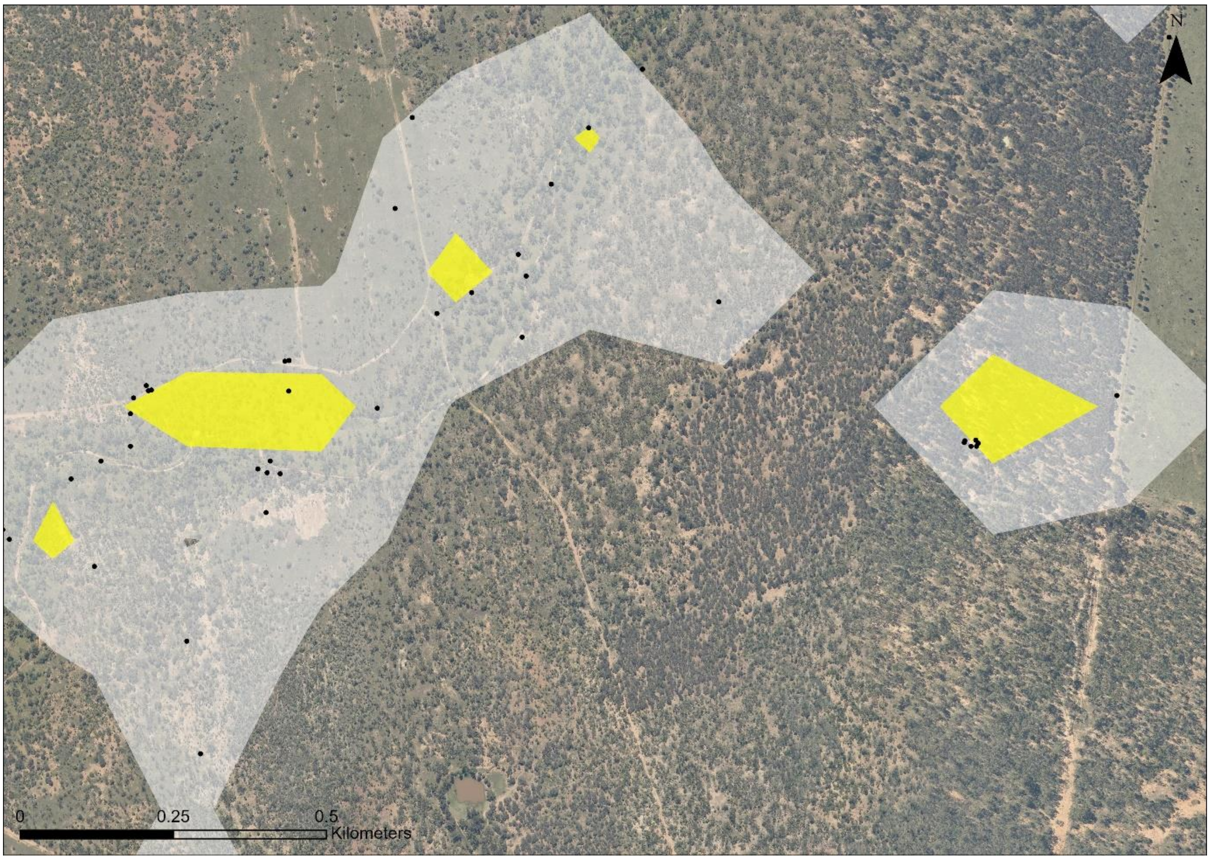
Supplementary Material Table S*5 continued:* Comparison of feral cat activity range data from previous research.

STUDY	LOCATION	LANDSCAPE TYPE	HOME/ACTIVITY RANGE (KM²)				TRACKING	SAMPLE SIZE	INFORMS MANAGEMENT STRATEGIES?
			M	F	Method	%			
Molsher *et al.* (2005)	Lake Burrendong, NSW	agricultural	4.26	1.98	MCP	100	Radio	15	No
			2.86	1.51	MCP	95			
			0.57	0.23	MCP	50			
			4.13	2.32	f-KDE	95			
			0.73	0.39	f-KDE	50			
Moseby *et al.* (2009)	Arid Recovery Reserve, SA	arid rangelands	32.32	20.78	MCP	95	GPS	10	Yes
			9.00	7.31	a-KDE	60			
Recio *et al.* (2010)	Tasman Valley, NZ	temperate, braided river system	8.76	16.07	MCP	100	GPS	5	Yes
Recio and Seddon (2013)	Godley Valley, NZ	temperate, braided river system	8.49	2.61	MCP	100	GPS	7 - 11	No
			3.98	1.63	a-LoCoH	100			
			0.30	0.15	a-LoCoH	50			
Robley *et al.* (2008)	Angelsea, Victoria	eucalypt woodland	17.50	8.00	KDE	95	GPS	7	No
Schwarz (1995)	Tasmania	open forest	1.54	0.29	MCP	100	Radio	3	No
			1.25	0.35	HMA	95			
Smucker *et al.* (2000)	Mauna Kea, Hawai'i	montane wet forest	2.78	1.69	MCP	100	Radio	5	No
			6.74	2.23	a-KDE	95			

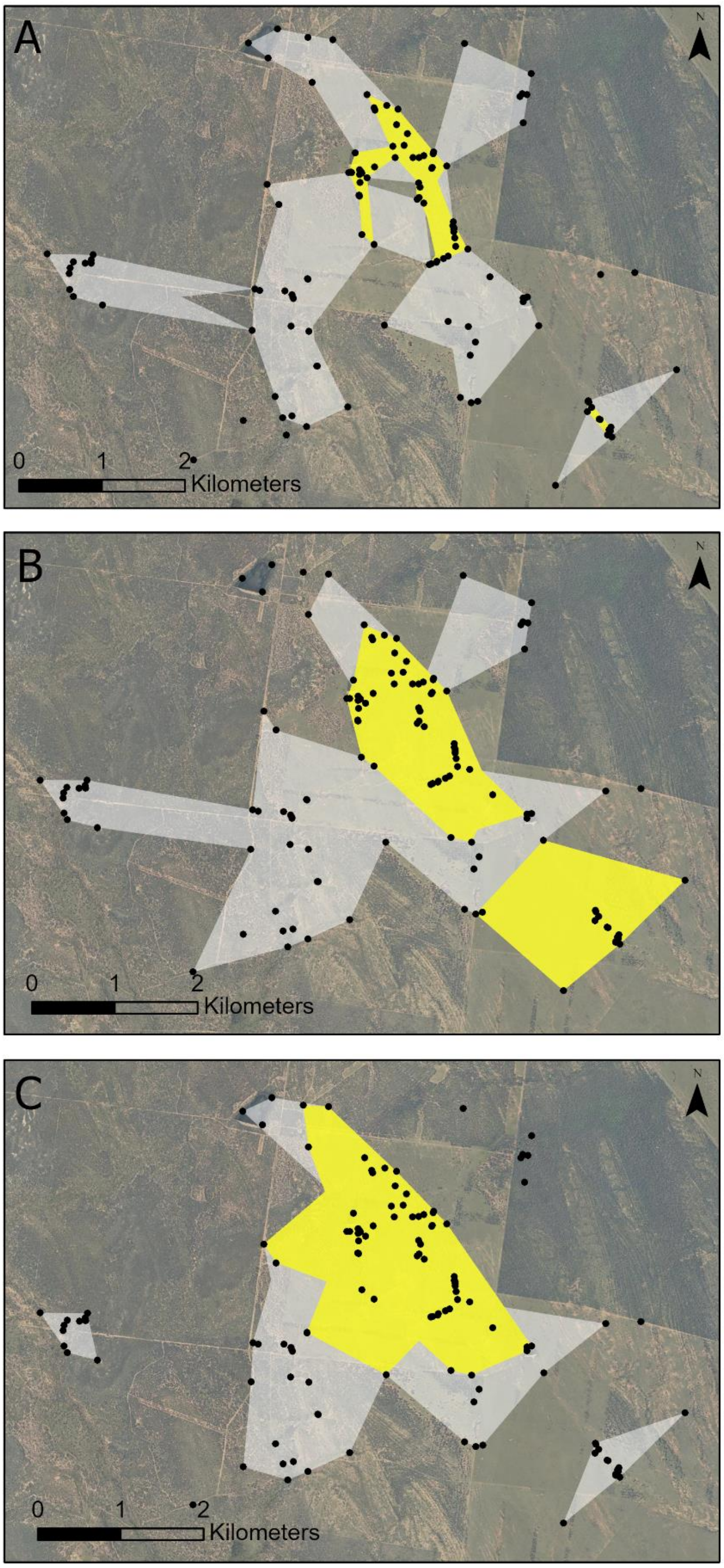
Supplementary Material figure captions and associated text



Supplementary Material Figure S1: 2016 A comparison of the 90% (white) and 50% (yellow) area estimations of all methods for an adult male cat (Cat06) at Taunton National Park in 2016. A – MCP; B – Kernel (h_{REF}); C – Kernel (LSCV); D – k-LoCoH; E – a-LoCoH; F – r-LoCoH; G – α-hull.



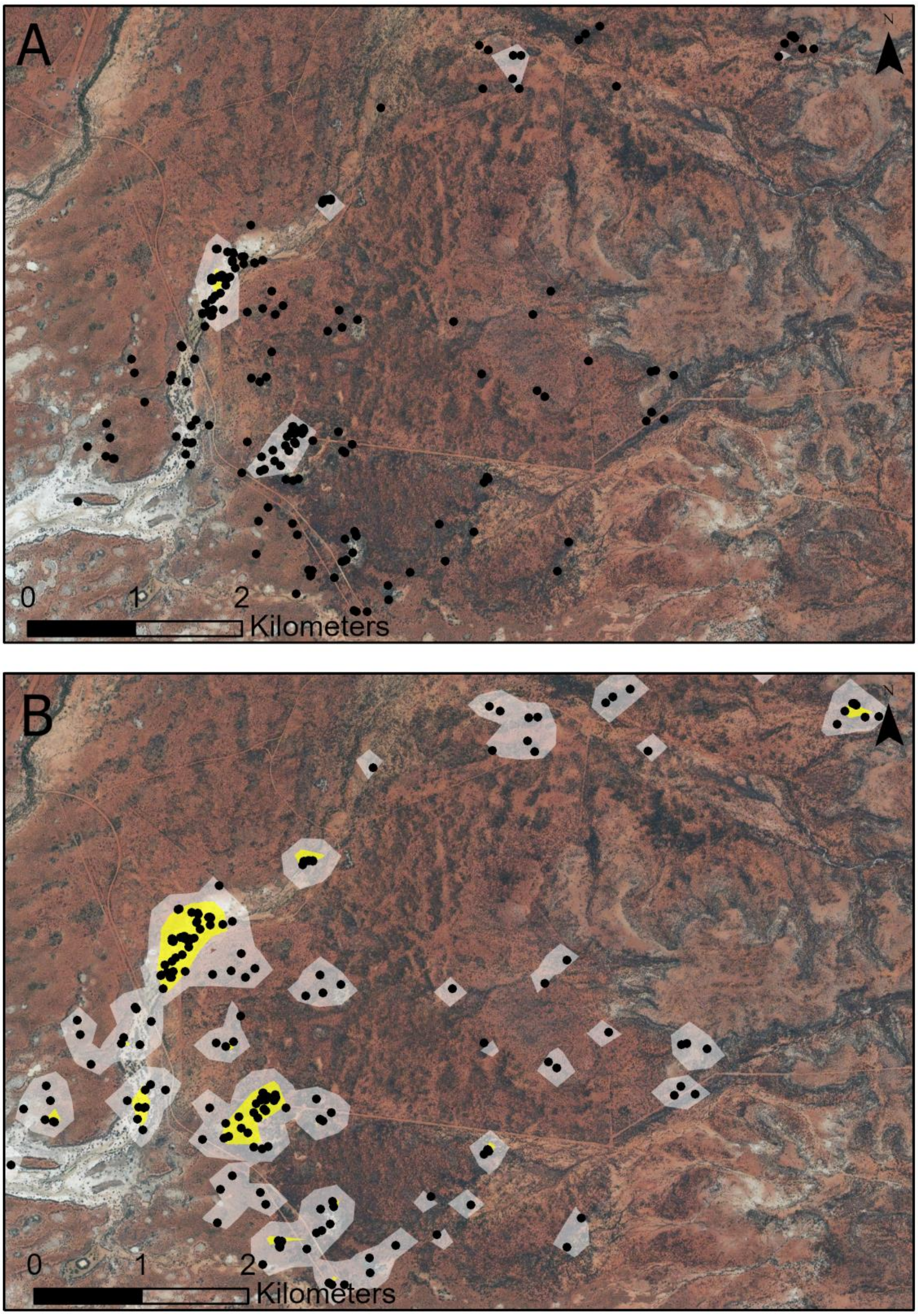
Supplementary Material Figure S2: A large male cat at Taunton National Park in 2016 showing how kernel (LSCV) polygons (50% - yellow) can sometimes be created in-between points of data, thereby placing important clusters of GPS points outside the polygon.



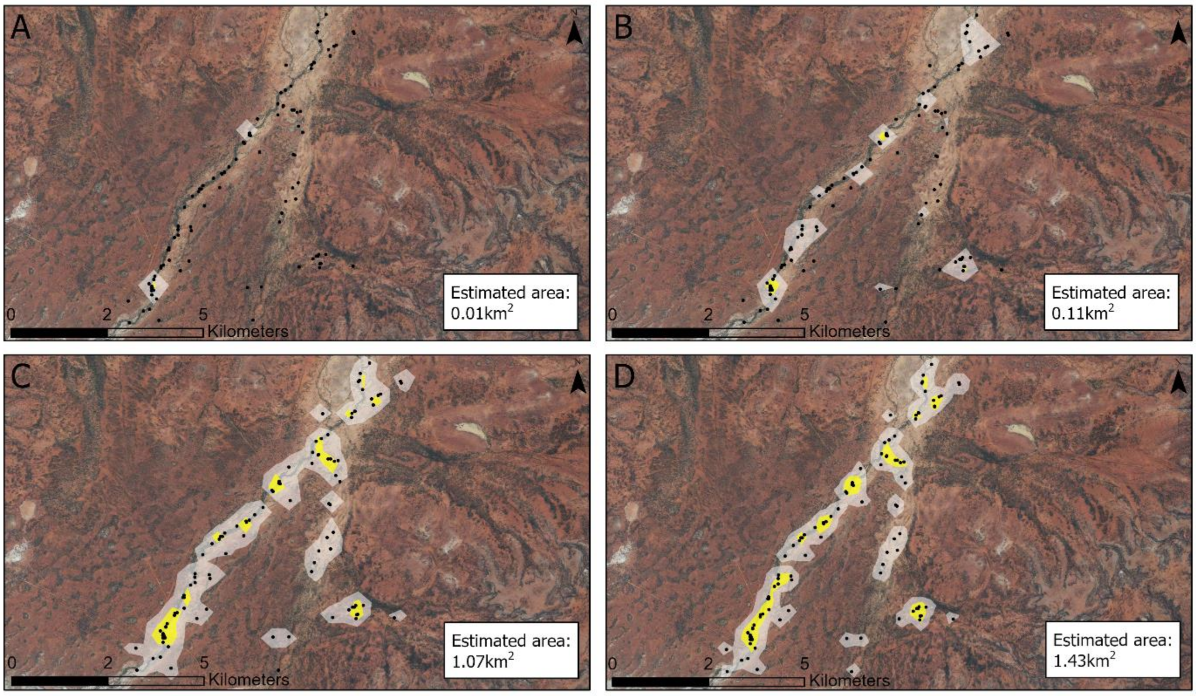
Supplementary Material Figure S3: The 90% (white) and 50% (yellow) area estimations for an adult male cat at Taunton National Park in 2016, as calculated by the LoCoH methods with heuristic parameters. A – k-LoCoH; B – a-LoCoH; C – r-LoCoH. The large inclusion of Type II errors in B and C, suggests that the heuristic parameters for these methods with this cat, are farther from the optimal value than is the heuristic parameter for A.

Supplementary Material Fig S4 – Influence of kernel parameters

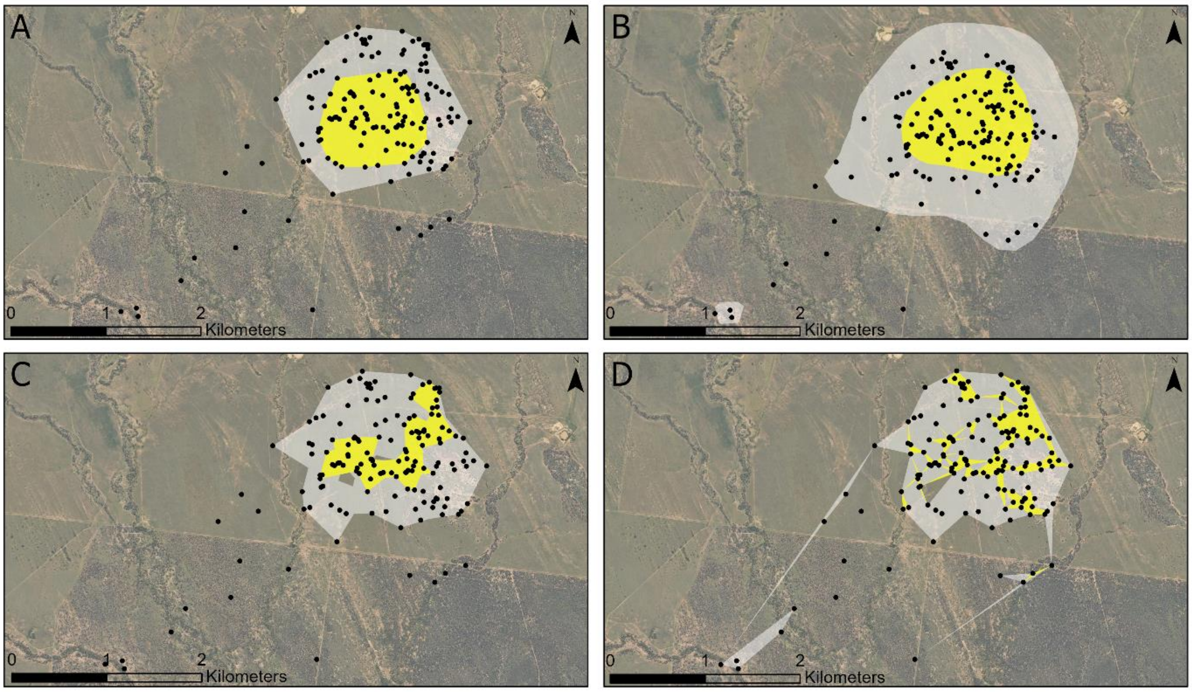
It appears that grid size and/or resolution will affect the accuracy of kernel methods depending on the distribution of data points. For example, if the density of the distribution is highly confined to an area or has very dense clusters of points, the grid size or grid resolution significantly influences the output. Supplementary Material Figure S4.1 demonstrates an example of how the grid size can affect the estimation. The change from a grid size of 100 (Supplementary Material Figure S4.1A) to a grid size of 200 (Supplementary Material Figure S4.1B) results in a change from 0.02km^2 to 0.55km^2 and a more representative polygon that generates fewer Type I errors. Seaman and Powell (1996) determine that a larger grid value can result in poorer resolution of the polygon due to increases in the mean integrated squared error (MISE) estimate when the grid extends beyond the area of distribution. Therefore, a smaller grid value will result in a better resolution of the polygon. However, it appears that in some situations, perhaps when data is tightly packed into clusters like Supplementary Material Figure S4.1, a greater grid size will provide a more accurate estimate. The resolution of the grid (extent) will also affect the outcome of the estimation (Figure S4.2). The R package adehabitatHR 0.4.16 utilises a default extent value of one. To compare the effects of different resolutions, we used data from a single cat at Currawinya National Park, and doubled the extent (Supplementary Material Figure S4.2A), used the default extent (Supplementary Material Figure S4.2B), halved the extent (Supplementary Material Figure 4.2C) and quartered the extent (Supplementary Material Figure 4.2D). Area estimations of the core area are displayed within the graphic. The grid resolution has a strong influence on the output of the estimated area. The higher grid values result in smaller estimations and the potential for Type I errors (Supplementary Material Figures S4.2A and Supplementary Material S4.2B), while lower grid values reduce Type I errors but at the cost of increased risk to Type II errors (Supplementary Material Figures S4.2C and S4.2D).



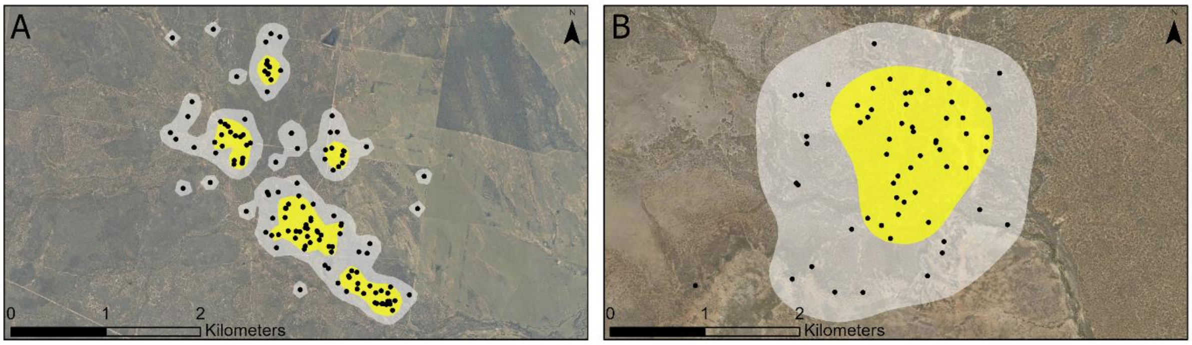
Supplementary Material Figure S4.1: An adult female cat at Currawinya National Park displaying how grid size effects the kernel (LSCV) method. A – grid size of 100. B – grid size of 200.



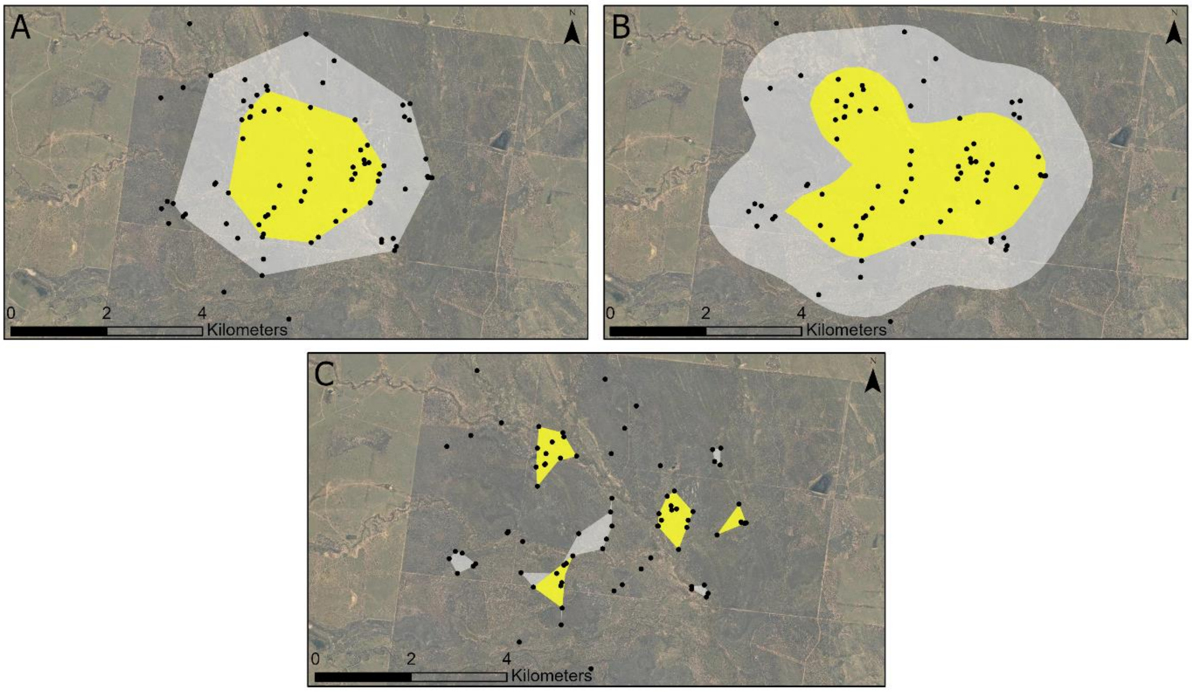
Supplementary Material Figure S4.2: An adult male cat at Currawinya National Park demonstrating the influence of grid extent (resolution) on the shape of the area estimations. Grid size was 100. A – demonstrates an extent of 2. B – demonstrates an extent of 1 (default value). C – demonstrates an extent of 0.5. D – demonstrates an extent of 0.25.



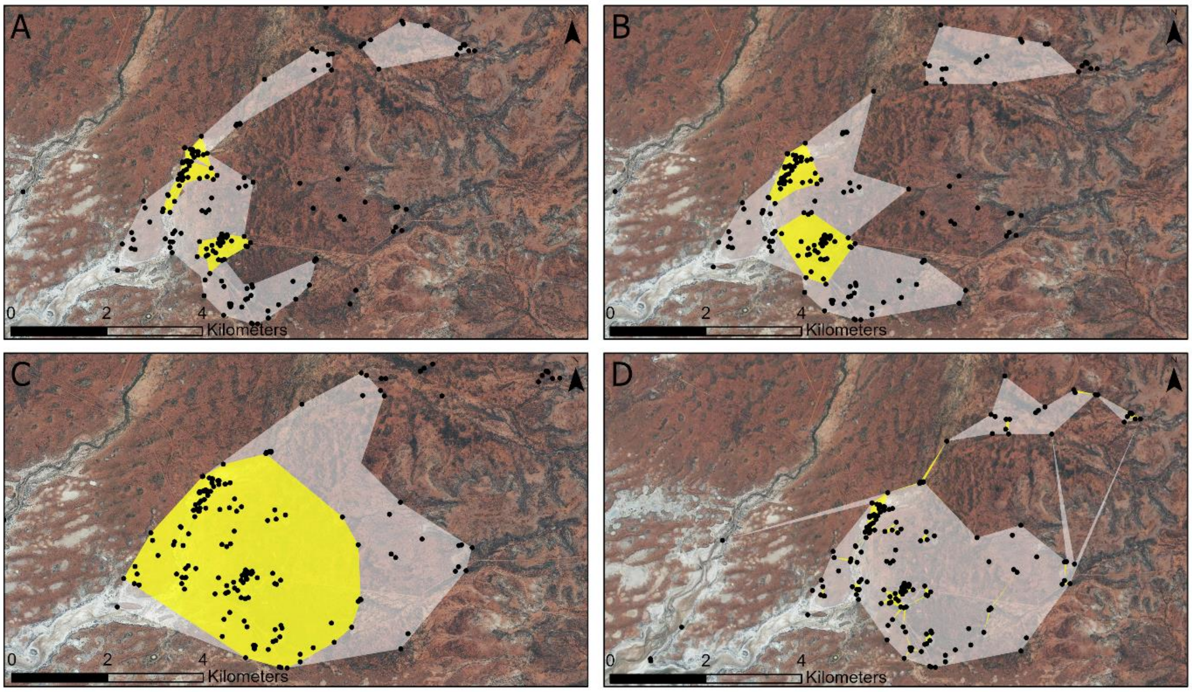
Supplementary Material Figure S5: An adult male cat at Taunton National Park in 2017 demonstrated a scattered distribution of data points, though within a relatively small area, n = 159. A – MCP; B – Kernel (h_{REF}); C– k-LoCoH; D – α-hull.



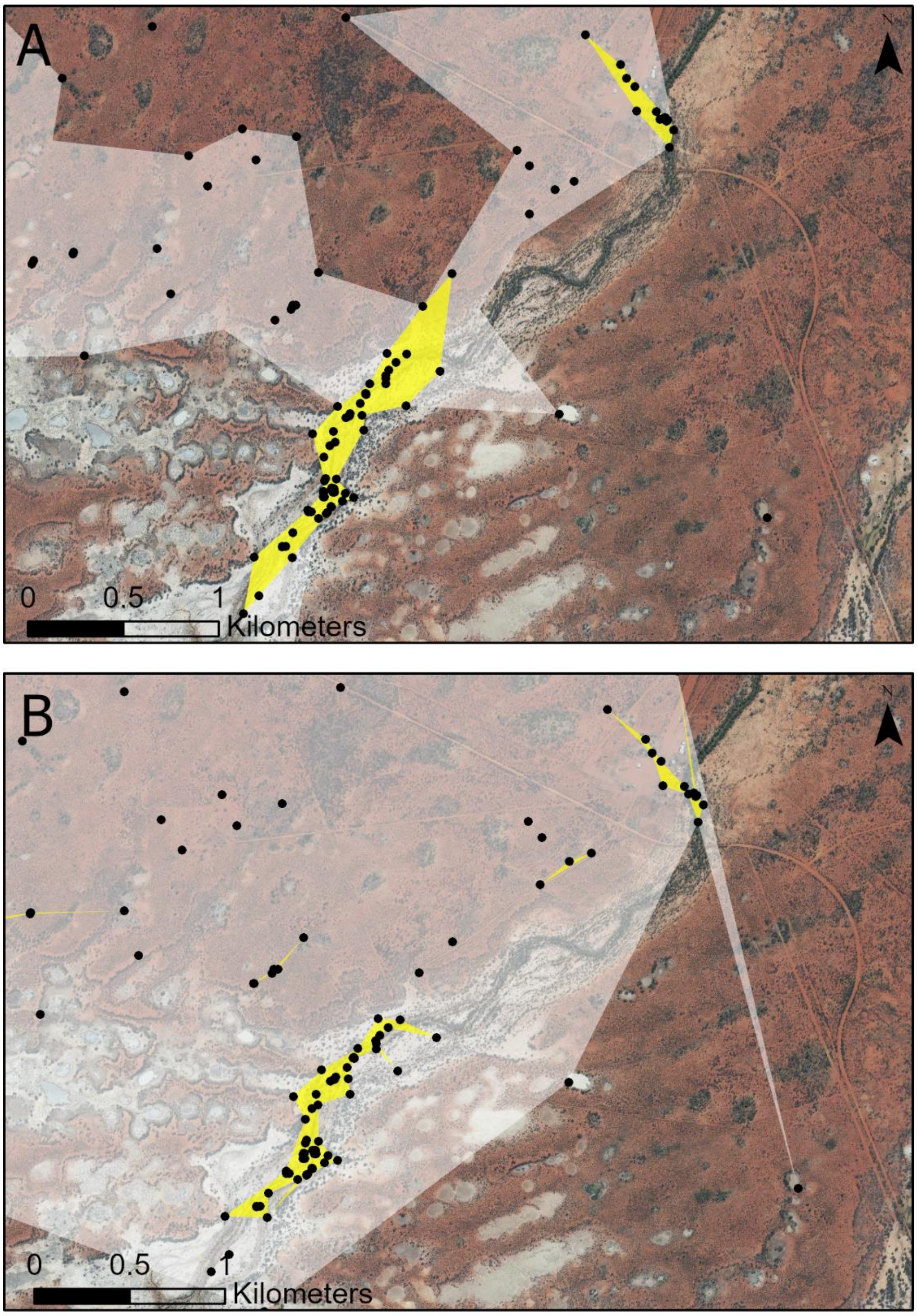
Supplementary Material Figure S6: Two cats demonstrating different results of the kernel (LSCV) method. A – demonstrates a high *n* with a mostly scattered distribution resulted in a reasonably accurate portrayal of the core range. B – demonstrates a low *n,* scattered distribution of points resulted in a singular kernel (LSCV) polygon that incorporated high levels of Type II error.



Supplementary Material Figure S7: A large male cat at Taunton National Park in 2017 demonstrating scattered use of the landscape but with a low number of data points, n = 81. A – MCP; B – Kernel (h_{REF}); C – r-LoCoH.



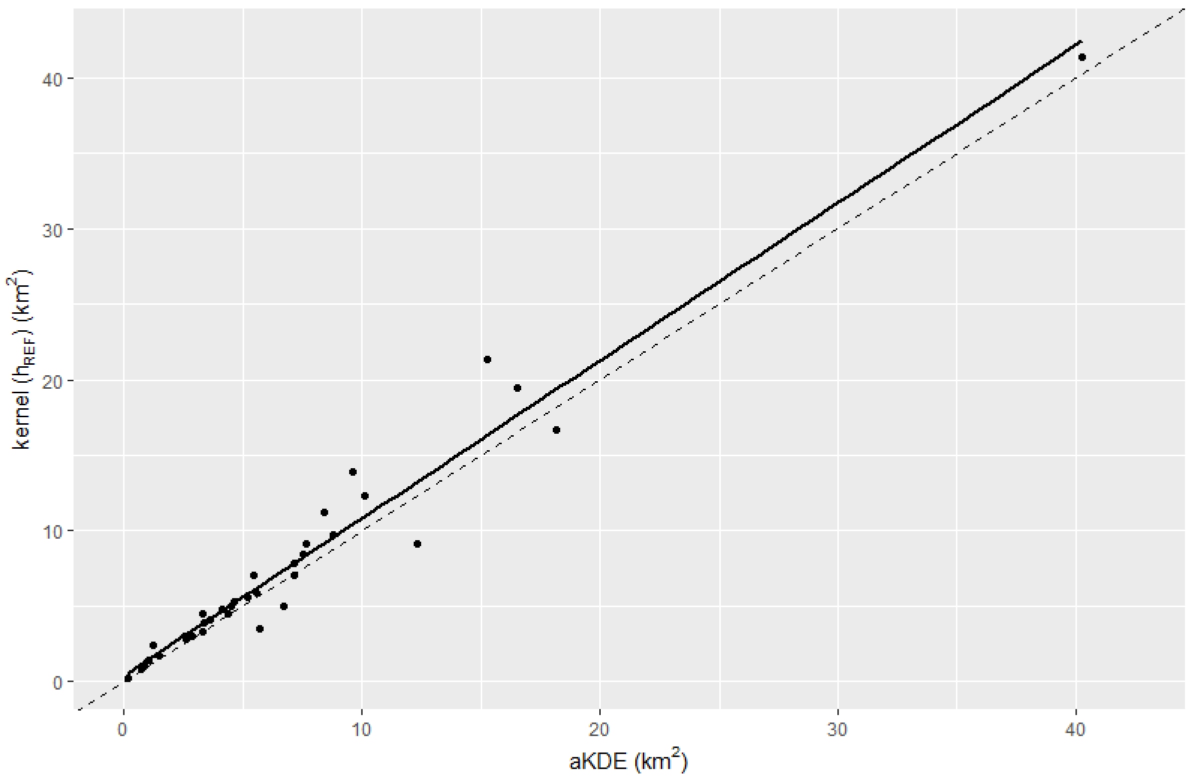
Supplementary Material Figure S8: A female cat at Currawinya National Park demonstrated considerable differences in LoCoH and α-hull estimations. A – k-LoCoH; B – a-LoCoH; C – r-LoCoH; D – α-hull.



Supplementary Material Figure S9: A Large male cat at Currawinya National Park demonstrated very high use of a waterway with some scattered points outside. Both the k-LoCoH (A) and α-hull (B) do a good job at displaying landscape feature conformity by creating well defined polygons but the α-hull displays less Type II errors.

Supplementary Material FigS10

As part of preliminary investigation into models useful for identifying core ranges of feral cats, we compared the traditional kernel (h_{REF}) method with autocorrelated kernel density estimations (aKDE). We found minimal differences between the two methods in our study (see Figure 10 below). Across all cats, the results were highly correlated (correlation coefficient = 0.98), with the methods displaying an average difference of just 1.18% in proportional comparisons of core range to home range size. Due to these similarities and the predominant use of kernel (h_{REF}) in previous feral cat studies (see Supplementary Material Table 5), we excluded aKDE from further analysis.



Supplementary Material Figure S10: Correlation scatterplot of kernel (h_{REF}) core range size (y axis) and aKDE core range size (x axis) of all feral cats in this study. The dashed line indicates a perfect line of linearity, and the solid black line indicates a linear trendline for this data.