TEXT S1

Brownian bridge movement models (BBMMs) (Bullard 1999, Horne et al. 2007) take profit of the time-sequenced nature of GPS data and incorporate the amount of time between successive locations to model animal movement paths more efficiently. In order to obtain more accurate UD estimates (Kranstauber et al. 2012) introduced the dynamic Brownian Bridge Movement Models (dBBMM), which compute the Brownian motion variance (σ^2_m) along different parts of the movement path, which can then be used as a parameter for detecting behavioral changes within an animal's trajectory. Based on dBBMMs, (Byrne et al. 2014) developed a method to estimate UDs for each individual time step (i.e., movement from a given location to the next one), which allows to capture variations in size of resource units and link spatiotemporal variables to them, partly overcoming the arbitrariness of choosing fixed scales that could fail in detecting habitat selection processes (Byrne et al. 2014).

We fitted dynamic Brownian Bridge Movement Models (dBBMMs) to the complete movement path of each animal using the R package "move" (Kranstauber & Smolla 2016) in the R statistical computing environment (R Core Team 2013). For all models we set a window size of 7 locations and a margin size of 3 locations; depending on the collar schedule, this parameterization resulted in the detection of behavioral changes every 1 – 3 hours. Based on the average error, estimated by 40 trials with the collar placed in a known location, we set a location error of 25 m for all models. In order to obtain homogeneous sample sizes for our temporal analyses we excluded all records preceded and followed by missing fixes. The resulting models allowed us to calculate the 50% utilization distribution (UD) contours and the

2) for all the individual time steps within each movement track using the R package "moveud" (Collier 2013).

Table S1: Summary information on the monitoring of brown bears in Greece (2003 – 2013) used in the present study. Successful fixes include all received GPS locations, except those obtained using less than three satellites or 2-D locations with dilution of precision > 5 (Lewis et al. 2007).

Age-sex group	BearID	Bear-year ID	GPS fix every	Tracking days	Successful fixes	% Successful fixes
Adult female	F01	F01-2004	3 hours	89	351	49%
	F02	F02-2004	3 hours	38	189	62%
	F03	F03-2008	2 hours	10	93	78%
	F04	F04-2008	1 hour	121	1,970	68%
	F05	F05-2008	3 hours	313	1,412	56%
	F05	F05-2009	3 hours	91	399	55%
	F06	F06-2009	2 hours	111	1,037	78%
	F07	F07-2011	1 hour	289	5,926	85%
	F07	F07-2012	1 hour	362	7,910	91%
	F07	F07-2013	1 hour	110	2,580	98%
Adult male	M01	M01-2003	2 hours	297	2,882	81%
	M01	M01-2004	2 hours	38	298	65%
	M02	M02-2003	2 hours	159	1,040	55%
	M03	M03-2008	2 hours	6	65	90%
	M04	M04-2011	1 hour	23	499	90%
	M05	M05-2011	1 hour	7	144	86%
	M06	M06-2012	1 hour	74	1,671	94%
Sub-adult	S01	S01-2008	1 hour	56	1,179	88%
	S02	S02-2010	1 hour	162	3,165	81%
	S03	S03-2011	3 hours	190	981	65%
	S04	S04-2012	3 hours	248	1,701	86%
	S05	S05-2012	3 hours	278	2,007	90%

Table S2: Coefficient estimates (β), standard errors (SE), Wald test-statistics (*z*) and significance (*P*) for the best-fitting Generalized Linear Mixed Model (GLMM) for stationary and moving behaviors of brown bears in Greece. The relative importance of each variable (ΔAICc) was calculated based on the difference in AICc (Akaike Information Criterion for small sample sizes) with respect to the full model when the variable was removed. Significance levels are P < 0.001 (***), P < 0.01 (**) and P < 0.05 (*); Abbreviations: Intercept = α, Proximity to water courses = pWC, Proximity to naturalized crop = pNC, Roughness = ROU, Proximity to settlement = pHS, Proximity to unpaved road = pUR, Proximity to primary road = pPR, Proximity to secondary road = pSR, Proximity to shrubland = pSH, Proximity to intensive crop = pIC, Proximity to forest = pFR, Altitude = ALT, Proximity to grassland = pGR, Random effects (σ^2 & SD) = ID.

	Stationary						Moving					
Model terms	**ΔAIC$_c$**	**β**	**SE**	***z***	***P***	**Significance level**	**ΔAIC$_c$**	**β**	**SE**	***z***	***P***	**Significance level**
Adult female												
α		-0.2	0.2	-0.98	0.327			-0.3	0.3	-0.9	0.3	
pWC	96.6	1.21	0.12	9.9	< 0.001	***	48	0.87	0.1	8.31	< 0.001	***
pNC	64.5	1.57	0.18	8.52	< 0.001	***	59	1.19	0.2	8.11	< 0.001	***
ROU	77.3	1.36	0.15	8.84	< 0.001	***	17	0.56	0.2	3.74	< 0.001	***
pHS	44.5	-1.3	0.17	-7.43	< 0.001	***	38	-0.9	0.2	-5.8	< 0.001	***
pUR	12.5	-0.4	0.12	-3.58	< 0.001	***	58	-0.8	0.1	-7.2	< 0.001	***
pPR	1						35	-0.8	0.1	-5.6	< 0.001	***
pSR	0.4						25	0.64	0.1	4.71	< 0.001	***
pSH	7.9	-0.5	0.15	-3.15	0.002	**	7	-0.3	0.1	-2.3	0	*
pIC	1.8						9	0.68	0.2	2.89	0	**
pFR	3.9	-0.4	0.16	-2.31	0.021	*	2					
ALT	0						2					
pGR	-1.1						3					

ID		0.15	0.39					0.49	0.7			
Season		0.04	0.19					0	0			
Adult male												
α		0.02	0.28	0.06	0.953			0.17	0.2	0.78	0.4	
pPR	64.8	-1.5	0.19	-7.61	< 0.001	***	##	-2.3	0.2	-12	< 0.001	***
pUR	90.1	-1.1	0.12	-9.23	< 0.001	***	89	-1	0.1	-9.3	< 0.001	***
pNC	74.6	1.82	0.22	8.29	< 0.001	***	90	1.8	0.2	9.36	< 0.001	***
pSR	57.4	-1.5	0.2	-7.16	< 0.001	***	19	-0.7	0.2	-4.2	< 0.001	***
pSH	22.2	0.58	0.13	4.36	< 0.001	***	41	0.76	0.1	6.83	< 0.001	***
pGR	49.7	1.3	0.18	7.07	< 0.001	***	2					
ALT	33	-1.4	0.23	-6.08	< 0.001	***	2	-0.4	0.2	-2.3	0	*
pWC	22.9	0.78	0.17	4.48	< 0.001	***	10	0.51	0.2	3.36	0	***
pHS	12.8	0.64	0.18	3.57	< 0.001	***	15	0.67	0.2	4.5	< 0.001	***
ROU	24	0.74	0.14	5.13	< 0.001	***	2					
pFR	7	0.47	0.16	2.9	0.004	**	9	0.4	0.1	2.75	0	**
pIC	4.8	-0.6	0.21	-2.77	0.006	**	1					
ID		0.34	0.58					0.16	0.4			
Season		0.05	0.22					0.05	0.2			
Subadult male												
α		0	0.23	0	0.998			0.02	0.2	0.1	0.9	
pWC	137	1.37	0.13	10.57	< 0.001	***	##	1.18	0.1	10.6	< 0.001	***
ROU	130	1.54	0.14	10.78	< 0.001	***	64	1.02	0.1	7.5	< 0.001	***
pSR	112	-1.5	0.14	-10.78	< 0.001	***	75	-1.2	0.1	-8.3	< 0.001	***
pUR	71.7	-1.2	0.14	-8.54	< 0.001	***	84	-1.3	0.1	-9.7	< 0.001	***
ALT	76	-2.3	0.24	-9.54	< 0.001	***	20	-0.9	0.2	-4.2	< 0.001	***

pSH	33.5	-0.8	0.14	-5.7	< 0.001	***	50	-0.8	0.1	-6.6	< 0.001	***
pGR	40.9	-0.7	0.11	-6.29	< 0.001	***	21	-0.5	0.1	-4.6	< 0.001	***
pHS	2.7						13	0.43	0.2	2.92	0	**
pIC	5.3	-0.4	0.21	-2.03	0.042	*	10	0.4	0.2	2.45	0	*
pPR	3						12	-0.4	0.1	-2.9	0	**
pFR	5.9						4					
pNC	2.7						6					
ID		0.19	0.44					0.11	0.3			
Season		0.05	0.23					0.07	0.3			

Table S3: Coefficient estimates and model performance results based on Akaike Information Criterion for small sample sizes (AICc) for the top 5 Generalized Linear Mixed Models (GLMMs) fitted in the habitat selection analysis for brown bears in Greece, including all additive combinations of habitat variables.

	ALT	ROU	pWC	pFR	pSH	pGR	pNC	pIC	pHS	pPR	pSR	pUR	df	logLik	AICc	ΔAIC_c	weight
Adult female		1.42	1.21	-0.36	-0.46		1.53	0.47	-1.31			-0.44	11	-1285.1	2592.2	0.00	0.06
Stationary		1.33	1.25	-0.36	-0.51		1.52		-1.25	-0.23		-0.41	11	-1285.1	2592.3	0.01	0.06
		1.38	1.24	-0.35	-0.49		1.51	0.35	-1.27	-0.18		-0.43	12	-1284.1	2592.3	0.06	0.06
		1.38	1.25	-0.36	-0.48		1.54	0.42	-1.38	-0.26	0.22	-0.47	13	-1283.2	2592.5	0.28	0.05
	0.34	1.42	1.28	-0.39	-0.47		1.65	0.49	-1.24			-0.44	12	-1284.3	2592.7	0.48	0.05
Adult female		0.56	0.87		-0.29		1.19	0.68	-0.87	-0.79	0.64	-0.82	12	-1483.0	2990.1	0.00	0.24
Moving		0.59	0.84		-0.30	0.19	1.25	0.65	-0.91	-0.79	0.64	-0.83	13	-1482.3	2990.8	0.75	0.16
		0.57	0.86	-0.10	-0.27		1.21	0.67	-0.89	-0.79	0.64	-0.83	13	-1482.8	2991.7	1.61	0.11
	-0.07	0.55	0.86		-0.29		1.17	0.68	-0.89	-0.80	0.64	-0.82	13	-1482.9	2992.0	1.94	0.09
		0.61	0.83	-0.09	-0.29	0.19	1.26	0.64	-0.92	-0.79	0.65	-0.84	14	-1482.2	2992.5	2.44	0.07
Adult male	-1.37	0.74	0.78	0.47	0.58	1.30	1.82	-0.58	0.64	-1.48	-1.46	-1.14	15	-1007.2	2044.7	0.00	0.91
Stationary	-1.14	0.73	0.81	0.44	0.59	1.36	1.70		0.67	-1.46	-1.54	-1.15	14	-1011.1	2050.4	5.69	0.05
	-1.27	0.75	0.74		0.47	1.34	1.84	-0.55	0.63	-1.36	-1.62	-1.10	14	-1011.5	2051.2	6.54	0.03
	-1.43	0.74	0.66	0.47	0.58	1.45	1.91	-0.63		-1.48	-1.03	-1.09	14	-1013.7	2055.7	10.99	0.00
	-1.06	0.75	0.76		0.49	1.40	1.73		0.67	-1.35	-1.68	-1.11	13	-1014.9	2056.0	11.31	0.00
Adult male	-0.41		0.51	0.40	0.76		1.80		0.67	-2.25	-0.68	-1.01	12	-1194.4	2413.0	0.00	0.14
Moving	-0.42		0.49	0.40	0.73	0.19	1.85		0.62	-2.22	-0.66	-1.01	13	-1193.6	2413.4	0.45	0.11
	-0.36	-0.16	0.53	0.40	0.80		1.76		0.67	-2.21	-0.73	-1.00	13	-1193.7	2413.7	0.70	0.10
	-0.37	-0.17	0.51	0.40	0.76	0.20	1.80		0.62	-2.17	-0.72	-1.00	14	-1192.8	2413.9	0.95	0.09
	-0.35		0.53	0.39	0.77		1.76	0.15	0.68	-2.24	-0.69	-1.02	13	-1193.9	2414.0	1.03	0.08
Subadult	-2.18	1.59	1.40	-0.28	-0.80	-0.74		-0.42			-1.49	-1.13	12	-1344.8	2713.6	0.00	0.16
Stationary	-2.29	1.54	1.37		-0.81	-0.70		-0.43			-1.47	-1.18	11	-1346.2	2714.4	0.81	0.11

	-2.22	1.59	1.40	-0.30	-0.82	-0.73		-0.41		-0.09	-1.50	-1.15	13	-1344.6	2715.4	1.73	0.07
	-2.18	1.59	1.40	-0.28	-0.80	-0.74	-0.02	-0.41			-1.50	-1.13	13	-1344.7	2715.6	2.00	0.06
	-2.17	1.59	1.40	-0.28	-0.80	-0.74		-0.42	-0.01		-1.49	-1.13	13	-1344.7	2715.6	2.02	0.06
Subadult	-0.86	1.02	1.18		-0.84	-0.47		0.40	0.43	-0.42	-1.18	-1.25	13	-1512.0	3050.2	0.00	0.32
Moving	-0.80	1.05	1.17		-0.81	-0.45	0.15	0.37	0.42	-0.39	-1.16	-1.24	14	-1511.4	3050.9	0.64	0.23
	-0.85	1.04	1.19	-0.09	-0.83	-0.48		0.39	0.43	-0.43	-1.18	-1.22	14	-1511.9	3051.9	1.68	0.14
	-0.79	1.06	1.19	-0.08	-0.81	-0.46	0.15	0.36	0.42	-0.40	-1.16	-1.21	15	-1511.2	3052.6	2.38	0.10
	-0.98	1.02	1.11		-0.73	-0.43	0.20		0.52	-0.37	-1.15	-1.25	13	-1514.0	3054.2	3.99	0.04

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