

Determining multi-species site use outside the protected areas of the Maasai Mara, Kenya, using false positive site-occupancy modelling

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SUPPLEMENTARY MATERIAL 1 Models and model comparison statistics.

SUPPLEMENTARY TABLE 1 Abbreviations used in Supplementary Tables 2–7.

Abbreviation	Meaning
PA	Mean distance from protected area
SC	Semi-closed and closed habitat proportion
OP	Open habitat proportion
Fence	Fenced proportion
HumDist	Mean human distance
HumSum	Human density sum
HumMean	Human density mean
River	Mean distance to a river
Oc	Occupation of the interviewee
$p(\dots)$	Detection probability covariates
$\psi(\dots)$	Site use probability covariates

SUPPLEMENTARY TABLE 2 Covariate model selection for cheetahs, showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection probability					
$p(OP).\psi()$	313.00	0.00	0.93	0.93	-151.50
$p(oc).\psi()$	318.33	5.34	0.06	1.00	-153.17
$p(oc + OP).\psi()$	326.85	13.85	0.00	1.00	-156.42
$p().\psi()$	361.72	48.73	0.00	1.00	-177.86
Habitat type					
$p(OP).\psi(OP)$	313.25	0.00	0.55	0.55	-150.63
$p(OP).\psi(SC)$	313.65	0.40	0.45	1.00	-150.83
$p().\psi()$	361.72	48.47	0.00	1.00	-177.86
Human disturbance					
$p(OP).\psi(\text{HumDist})$	308.26	0.00	0.78	0.78	-148.13
$p(OP).\psi(\text{fence})$	311.55	3.29	0.15	0.93	-149.78
$p(OP).\psi(\text{HumMean})$	314.33	6.07	0.04	0.97	-151.17
$p(OP).\psi(\text{HumSum})$	314.80	6.54	0.03	1.00	-151.40
$p().\psi()$	361.72	53.46	0.00	1.00	-177.86

SUPPLEMENTARY TABLE 3 Covariate model selection for elephants showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection probability					
$p(\text{oc} + \text{OP}).\psi()$	439.88	0.00	0.95	0.95	-212.94
$p(\text{oc}).\psi()$	446.67	6.79	0.03	0.98	-217.33
$p(\text{OP}).\psi()$	447.75	7.88	0.02	1.00	-218.88
$p().\psi()$	487.18	47.31	0.00	1.00	-240.59
Habitat type					
$p(\text{oc} + \text{OP}).\psi(\text{OP})$	441.67	0.00	0.52	0.52	-212.83
$p(\text{oc} + \text{OP}).\psi(\text{SC})$	441.79	0.12	0.48	1.00	-212.89
Human disturbance					
$p(\text{oc} + \text{OP}).\psi(\text{fence})$	431.24	0.00	0.96	0.96	-207.62
$p(\text{oc} + \text{OP}).\psi(\text{HumDist})$	437.87	6.63	0.03	0.99	-210.94
$p(\text{oc} + \text{OP}).\psi(\text{HumMean})$	441.75	10.51	0.00	1.00	-212.87
$p(\text{oc} + \text{OP}).\psi(\text{HumSum})$	441.75	10.51	0.00	1.00	-212.88
$p().\psi()$	487.18	55.94	0.00	1.00	-240.59

SUPPLEMENTARY TABLE 4 Covariate model selection for hyaenas showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection probability					
$p(\text{oc}).\psi()$	245.39	0.00	0.45	0.45	-117.69
$p(\text{OP}).\psi()$	245.78	0.39	0.37	0.82	-118.89
$p(\text{oc} + \text{OP}).\psi()$	247.18	1.79	0.18	1.00	-117.59
$p().\psi()$	261.06	15.67	0.00	1.00	-127.53
Habitat type					
$p(\text{oc}).\psi(\text{OP})$	247.07	0.00	0.63	0.63	-117.53
$p(\text{oc}).\psi(\text{SC})$	248.18	1.11	0.36	1.00	-118.09
$p().\psi()$	261.06	13.99	0.00	1.00	-127.53
Human disturbance					
$p(\text{oc}).\psi(\text{HumDist})$	235.95	0.00	0.94	0.94	-111.98
$p(\text{oc}).\psi(\text{HumSum})$	242.03	6.08	0.05	0.99	-115.02
$p(\text{oc}).\psi(\text{HumMean})$	246.04	10.08	0.01	1.00	-117.02
$p(\text{oc}).\psi(\text{fence})$	246.83	10.88	0.00	1.00	-117.42
$p().\psi()$	261.06	25.11	0.00	1.00	-127.53

SUPPLEMENTARY TABLE 5 Covariate model selection for leopards showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection probability					
$p(\text{oc} + \text{OP}).\psi()$	365.55	0.00	0.47	0.47	-175.77
$p(\text{OP}).\psi()$	366.37	0.82	0.31	0.77	-178.19
$p(\text{oc}).\psi()$	367.00	1.45	0.23	1.00	-177.50
$p().\psi()$	392.44	26.89	0.00	1.00	-193.22
Habitat type					
$p(\text{oc} + \text{OP}).\psi(\text{OP})$	365.03	0.00	0.67	0.67	-174.51
$p(\text{oc} + \text{OP}).\psi(\text{SC})$	366.43	1.40	0.33	1.00	-175.21
$p().\psi()$	392.44	27.41	0.00	1.00	-193.22
Human disturbance					
$p(\text{oc} + \text{OP}).\psi(\text{HumDist})$	363.46	0.00	0.66	0.66	-173.73
$p(\text{oc} + \text{OP}).\psi(\text{fence})$	366.32	2.86	0.16	0.82	-175.16
$p(\text{oc} + \text{OP}).\psi(\text{HumMean})$	367.50	4.04	0.09	0.91	-175.75
$p(\text{oc} + \text{OP}).\psi(\text{HumSum})$	367.51	4.05	0.09	1.00	-175.75
$p().\psi()$	392.44	28.98	0.00	1.00	-193.22

SUPPLEMENTARY TABLE 6 Covariate model selection for the lions showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection Probability					
$p(\text{OP}).\psi()$	535.57	0.00	0.47	0.47	-262.78
$p(\text{oc} + \text{OP}).\psi()$	535.79	0.23	0.42	0.89	-260.90
$p(\text{oc}).\psi()$	538.38	2.81	0.11	1.00	-263.19
$p().\psi()$	588.45	52.89	0.00	1.00	-291.23
Habitat type					
$p(\text{OP}).\psi(\text{SC})$	536.90	0.00	0.52	0.52	-262.45
$p(\text{OP}).\psi(\text{OP})$	537.09	0.19	0.48	1.00	-262.55
$p().\psi()$	588.45	51.55	0.00	1.00	-291.23
Human disturbance					
$p(\text{OP}).\psi(\text{HumDist})$	527.64	0.00	0.97	0.97	-257.82
$p(\text{OP}).\psi(\text{fence})$	535.50	7.86	0.02	0.99	-261.75
$p(\text{OP}).\psi(\text{HumMean})$	537.56	9.91	0.01	0.99	-262.78
$p(\text{OP}).\psi(\text{HumSum})$	537.56	9.91	0.01	1.00	-262.78
$p().\psi()$	588.45	60.81	0.00	1.00	-291.23

SUPPLEMENTARY TABLE 7 Covariate model selection for wild dogs showing untransformed estimates.

Model	AIC	Δ AIC	AIC weight	Cumulative weight	Log-likelihood
Detection probability					
$p(OP).\psi()$	278.39	0.00	0.51	0.51	-134.19
$p(oc + OP).\psi()$	279.11	0.72	0.35	0.86	-132.56
$p(oc).\psi()$	280.92	2.53	0.14	1.00	-134.46
$p().\psi()$	357.47	79.08	0.00	1.00	-175.73
Habitat type					
$p(OP).\psi(SC)$	277.83	0.00	0.58	0.58	-132.91
$p(OP).\psi(OP)$	278.43	0.61	0.43	1.00	-133.22
$p().\psi()$	357.47	79.64	0.00	1.00	-175.73
Human disturbance					
$p(OP).\psi(HumDist)$	277.98	0.00	0.50	0.50	-132.99
$p(OP).\psi(fence)$	280.12	2.14	0.17	0.67	-134.06
$p(OP).\psi(HumMean)$	280.21	2.24	0.16	0.84	-134.11
$p(OP).\psi(HumSum)$	280.22	2.24	0.16	1.00	-134.11
$p().\psi()$	357.47	79.49	0.00	1.00	-175.73