Appendix S3

Matthew T. Farr, David S. Green, Kay E. Holekamp, Gary J. Roloff, and Elise F. Zipkin

Multispecies hierarchical modeling reveals variable responses of African carnivores to management alternatives

Ecological Applications

Model Results

Table S1. Summary (mean, standard deviation, 95% credible interval [CI]) of parameter estimates from hierarchical multi-species distance sampling model. μ_σ: mean of $\gamma 0_s$; τ^2_σ: variance of $\gamma 0_s$; $\mu_{\alpha 0}$: mean of $\alpha 0_s$; $\tau^2_{\alpha 0}$: variance of $\alpha 0_s$; $\mu_{\alpha 1}$: mean of $\alpha 1_s$; $\tau^2_{\alpha 1}$: variance of $\alpha 1_s$; $\mu_{\beta 1}$: mean of $\beta 1_s$; $\tau^2_{\beta 1}$: variance of $\beta 1_s$; $\gamma 0_s$: species-specific intercepts of σ_{js}; $\alpha 0_s$: species-specific intercepts of λ_{tjs}; $\alpha 1_s$: species-specific effects of management regime on λ_{tjs}; $\beta 0_s$: species-specific intercepts of μ_{tjs}; $\beta 1_s$: species-specific effects of management regime on μ_{tjs}; $\gamma 1$: effect of body size on σ_{js}; $\gamma 2$: effect of management regime on σ_{js}; $Density_{s,MT}$: species-specific density in Mara Triangle; $Density_{s,TR}$: species-specific density in the Talek region; AL: African lion; BM: banded mongoose; BEF: bat-eared fox; BBJ: black-backed jackal; CAR: caracal; CHE: cheetah; LEO: leopard; SER: serval; SSJ: side-striped jackal; SM: slender mongoose; SH: spotted hyena.

Parameter	Mean	SD	2.5% CI	97.5% CI
μ_σ	4.13	0.22	3.66	4.53
τ^2_σ	0.6	0.25	0.27	1.2
$\mu_{\alpha 0}$	-1.33	0.59	-2.55	-0.2
$\tau^2_{\alpha 0}$	1.71	0.52	0.97	2.97
$\mu_{\alpha 1}$	-0.24	0.45	-1.21	0.58
$\tau^2_{\alpha 1}$	0.95	0.42	0.35	1.98
$\mu_{\beta 1}$	-0.65	0.37	-1.48	-0.03
$\tau^2_{\beta 1}$	0.65	0.36	0.24	1.59
$\gamma 0_{AL}$	3.98	0.59	2.82	5.18
$\gamma 0_{BM}$	4.28	0.17	3.95	4.61
$\gamma 0_{BEF}$	3.88	0.17	3.55	4.21
$\gamma 0_{BBJ}$	4.62	0.14	4.34	4.9
$\gamma 0_{CAR}$	3.77	0.56	2.61	4.79
$\gamma 0_{CHE}$	4.67	0.27	4.22	5.26
$\gamma 0_{LEO}$	3.6	0.53	2.49	4.57
$\gamma 0_{SER}$	4.03	0.25	3.56	4.56
$\gamma 0_{SSJ}$	4.4	0.32	3.84	5.09
$\gamma 0_{SM}$	3.56	0.38	2.8	4.25
$\gamma 0_{SH}$	4.59	0.1	4.41	4.79
$\alpha 0_{AL}$	-0.59	0.26	-1.14	-0.13
$\alpha 0_{BM}$	0.54	0.35	-0.21	1.13
$\alpha 0_{BEF}$	-1.87	1.08	-4.2	0.04
$\alpha 0_{BBJ}$	0.03	0.35	-0.74	0.63
$\alpha 0_{CAR}$	-3.05	1.12	-5.57	-1.04

Parameter	Mean	SD	2.5% CI	97.5% CI
$\alpha 0_{CHE}$	-2.73	0.62	-4.09	-1.67
$\alpha 0_{LEO}$	-2.71	0.99	-4.81	-0.89
$\alpha 0_{SER}$	-1.36	0.54	-2.56	-0.42
$\alpha 0_{SSJ}$	-2.91	0.79	-4.64	-1.57
$\alpha 0_{SM}$	-1.06	0.71	-2.5	0.33
$\alpha 0_{SH}$	0.99	0.21	0.55	1.38
$\alpha 1_{AL}$	-1.2	0.58	-2.38	-0.1
$\alpha 1_{BM}$	-0.19	0.53	-1.24	0.89
$\alpha 1_{BEF}$	-0.48	0.97	-2.57	1.33
$\alpha 1_{BBJ}$	0.63	0.53	-0.4	1.71
$\alpha 1_{CAR}$	-0.61	1.04	-3.05	1.12
$\alpha 1_{CHE}$	0.02	0.7	-1.39	1.39
$\alpha 1_{LEO}$	-0.73	1.02	-3.18	0.93
$\alpha 1_{SER}$	-0.68	0.79	-2.45	0.68
$\alpha 1_{SSJ}$	0.18	0.8	-1.38	1.81
$\alpha 1_{SM}$	-0.27	0.72	-1.81	1.07
$\alpha 1_{SH}$	0.65	0.39	-0.13	1.43
$\beta 0_{AL}$	1.23	0.14	0.95	1.51
$\beta 0_{BM}$	2.43	0.12	2.2	2.66
$\beta 0_{BEF}$	0.92	0.17	0.58	1.27
$\beta 0_{BBJ}$	0.26	0.15	0.02	0.59
$\beta 0_{CHE}$	0.33	0.28	0.01	1.02
$\beta 0_{SM}$	0.37	0.29	0.01	1.07
$\beta 0_{SH}$	0.11	0.08	0	0.31
$\beta 1_{AL}$	-0.93	0.52	-2.07	-0.03
$\beta 1_{BM}$	-0.4	0.22	-0.82	0.04
$\beta 1_{BEF}$	-0.99	0.63	-2.45	0.03
$\beta 1_{BBJ}$	-0.7	0.28	-1.27	-0.18
$\beta 1_{CHE}$	-0.6	0.55	-1.78	0.4
$\beta 1_{SM}$	-0.97	0.77	-2.84	0.19
$\beta 1_{SH}$	0.03	0.17	-0.31	0.36
$\gamma 1$	0.52	0.07	0.39	0.65
$\gamma 2$	0.43	0.22	-0.01	0.87
$Density_{AL,MT}$	2.23	0.5	1.41	3.36
$Density_{BM,MT}$	28.21	5.21	19.17	39.65
$Density_{BEF,MT}$	7.73	1.77	4.75	11.63
$Density_{BBJ,MT}$	1.86	0.42	1.18	2.81
$Density_{SH,MT}$	3.49	0.45	2.71	4.46
$Density_{AL,TR}$	0.35	0.24	0.07	0.95
$Density_{BM,TR}$	24.37	6.4	14.06	39.1
$Density_{BEF,TR}$	0.66	0.57	0.07	2.15
$Density_{BBJ,TR}$	2.4	0.69	1.29	3.95
$Density_{SH,TR}$	10.63	1.53	7.92	13.86