

## **Supplementary material**

Table S1. Descriptive statistics for elephant poaching incidents between 2002 and 2012 within the defined blocks in the Greater Tsavo ecosystem.

Blocks	Mean	Sd	Max	Min
1	1.09	2.9	10	0
2	1.27	2.7	8	0
3	1.90	3.20	8	0
4	4.09	7.15	24	0
5	0.63	2.01	7	0
6	6.63	11.09	35	0
7	2.18	4.70	14	0
8	3.72	6.68	20	0
9	3	5.02	14	0
10	8.06	20.11	70	0
11	4.09	7.03	21	0
12	11.45	17.39	45	0
13	14.54	26.51	84	0
14	2	4.74	16	0
15	1.18	2.51	7	0
16	0.54	1.72	6	0
17	1.45	4.59	16	0
18	0.81	2.58	9	0
19	1.09	3.44	12	0
20	0.18	0.57	2	0
21	2	3.33	9	0
22	2.90	5.66	19	0
23	0	0	0	0
24	3.90	9.42	32	0
25	0	0	0	0
26	0	0	0	0

27	1.09	3.44	12	0
28	0	0	0	0
29	0	0	0	0
30	3.09	6.21	21	0
31	0.81	2.58	9	0
32	1.63	3.49	10	0
36	0	0	0	0
37	3.45	6.28	19	0

Table S2. Descriptive statistics for elephant poaching incidents in dry season between 2002 and 2012 within the defined blocks in the Greater Tsavo ecosystem.

Blocks	Mean	Sd	Max	Min
1	0.18	0.38	1	0
2	0.18	0.38	1	0
3	0.18	0.38	1	0
4	0.27	0.44	1	0
5	0.09	0.28	1	0
6	0.81	1.33	4	0
7	0.18	0.57	2	0
8	0.81	1.74	6	0
9	0.36	0.64	2	0
10	1	1.9	5	0
11	0.36	0.88	3	0
12	1.09	1.92	6	0
13	1.18	2.28	6	0
14	0.36	0.64	2	0
15	0.18	0.38	1	0
16	0.09	0.28	1	0
17	0.27	0.61	2	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0.36	0.48	1	0
22	0.45	0.89	3	0
23	0	0	0	0
24	0.36	1.14	4	0
25	0	0	0	0
26	0	0	0	0

27	0.18	0.57	2	0
28	0	0	0	0
29	0	0	0	0
30	0.36	0.64	2	0
31	0.09	0.28	1	0
32	0.18	0.38	1	0
36	0	0	0	0
37	0.45	0.78	2	0

Table S3. Descriptive statistics for elephant poaching incidents in wet season between 2002 and 2012 within the defined blocks in the Greater Tsavo ecosystem.

Blocks	Mean	Sd	Max	Min
1	0	0	0	0
2	0	0	0	0
3	0.09	0.28	1	0
4	0.27	0.61	2	0
5	0	0	0	0
6	0.18	0.38	1	0
7	0.18	0.57	2	0
8	0	0	0	0
9	0.09	0.28	1	0
10	0.45	1.15	4	0
11	0.09	0.28	1	0
12	0.54	1.15	4	0
13	1.18	1.64	4	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0.09	0.28	1	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0.09	0.28	1	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0

29	0	0	0	0
30	0.18	0.38	1	0
31	0	0	0	0
32	0	0	0	0
36	0	0	0	0
37	0.09	0.28	1	0

Table S4. Posterior summaries for  $\beta$  coefficients of the explanatory variables and precision of area-specific trends in spatio-temporal Bayesian modeling

Explanatory variables	mean $\beta$ (credible interval: 2.5%, 97.5%)
Probability of elephant poaching in wet season	0.62 (0.022, 1.237)
Probability of elephant poaching in dry season	0.55 (-0.016, 1.147)
Livestock density	1.07 (0.246, 2.211)
Waterhole density	0.77 (0.054, 1.288)
Elephant population density	0.92 (-0.331, 1.933)
Distance to road	0.55(0.004, 1.144)
Distance to rivers and streams	0.61 (-0.460, 1.408)
Standard deviation (STD) of NDVI	1.04 (-1.373, 3.495)
Distance to international border	1.49 (0.421, 2.711)
<i>Prec delta:</i> precision of area-specific trends	0.01 (0.005 – 0.017)

```

model{
  for(j in 1:Time)
  {
    t[j] <- j
  }
  m_t <- mean(t[1:Time])
  for(i in 1:N)
  {
    for(j in 1:Time)
    {
      O[i,j] ~ dpois(lambda[i,j])
      log(lambda[i,j]) <- logg_expec.e[i,j]
      + alpha + s[i] + u[i] + beta*(t[j]-m_t) + delta[i]*(t[j]-m_t)
    }
    u[i] ~ dnorm(0, prec.u)
    hotspot[i] <- step(-delta[i])
  }
  s[1:N] ~ car.normal(adj[], weights[], num[], prec.s)
  delta[1:N] ~ car.normal(adj[], weights[], num[], prec.delta)
  alpha ~ dflat()
  beta ~ dnorm(0,0.001)
  prec.s ~ dgamma(0.5,0.0005)
  prec.u ~ dgamma(0.5,0.0005)
  prec.delta ~ dgamma(0.5,0.0005)
  for(k in 1:sumNumNeigh)
  {
    weights[k] <- 1
  }
}

```

Figure S1. WinBUGS code for Model 1.1

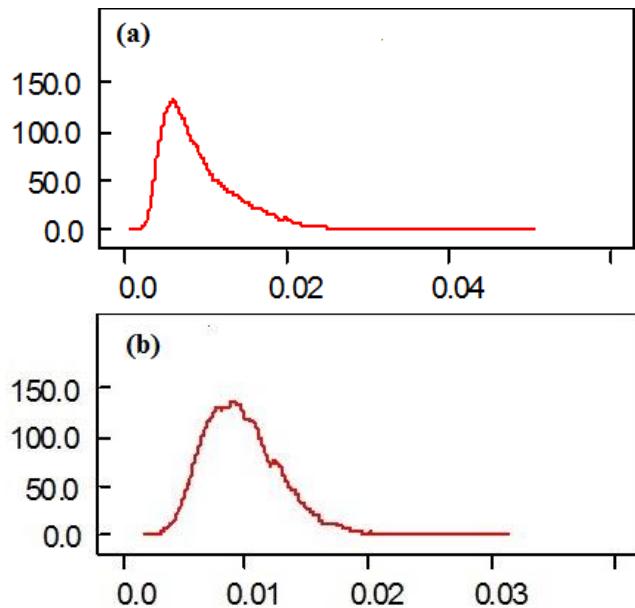


Figure S2. Density plots of the posterior distribution of the standard deviation of spatio-temporal interaction effects: (a) Model 1.1: spatio-temporal Bayesian model without accounting for the potential risk factors and (b) Model 1.2: spatio-temporal Bayesian model which includes potential risk factors.