



Supplementary Material S10: Relative Root Mean Squared Error values for recovering the simulated total number of roadkills  $N_{t,D} RRMSE(\hat{\theta}_{s,v,sim,t})$  (Equation 5 in main text), where lower values indicate better model performance. This is evaluated across  $s = 9$  different scenario combinations of daily roadkill numbers ( $SD \lambda_{t,d}$ ) and daily carcass persistence variability ( $SD p_{Pd}$ ), for  $v = 10$  vertebrate groups,  $sim = 20$  simulations,  $t = 12$  months and  $D = \text{maximum days a carcass remains on the road without disappearing}$ . Each distribution represents  $N_{t,D} RRMSE(\hat{\theta}_{s,v,sim,t})$  values derived from each  $sim$  and  $t$  levels for a) Amphibians, b) Amphibians only accounting for peak abundance months, c) Reptiles G1, d) Reptiles G1 only accounting for peak abundance months, e) Reptiles G2, f) Birds/Bats G1, g) Birds G2, h) Mammals G1, i) Mammals G2, j) Mammals G3, k) Mammals G4 and l) Mammals G5 (see Table 1 in main text for description of the groups). The results are shown for 2 levels of standard error (0.05 or 0.1) for the carcass location probability ( $p_L$ ) and carcass persistence probability ( $p_P$ ) prior distributions, and for 10 or 100 road transects surveyed.

Coloured circles represent the mean, bold lines for 66% intervals, and thin lines 95% intervals. An asterisk (\*) in the distributions indicates values exceeding 4 that are part of the distribution. Note: Amphibians and Reptiles G1 vertebrate groups models that only account for peak abundance months, are excluding periods of typical absence, therefore  $t = 4$  months were considered.