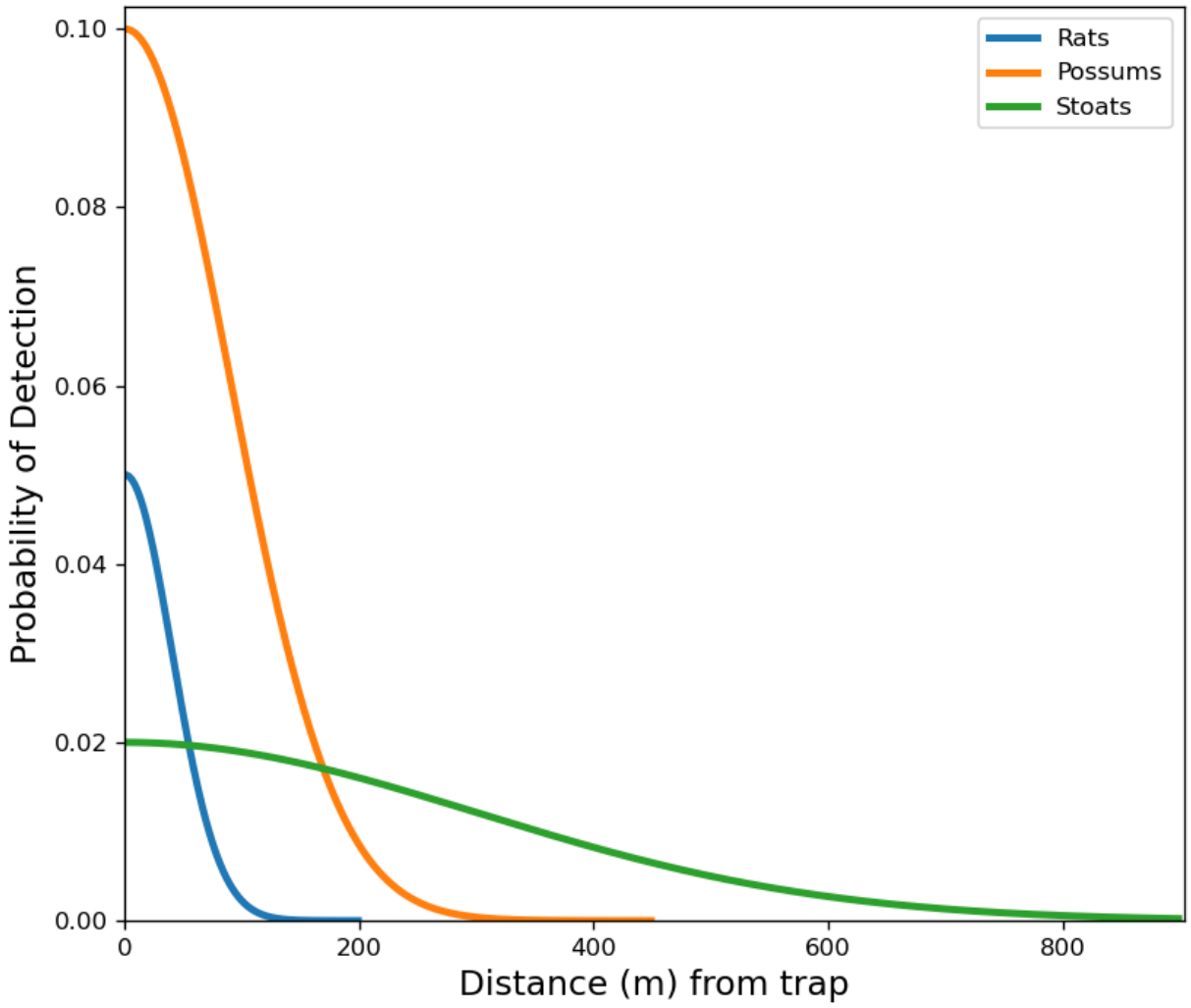
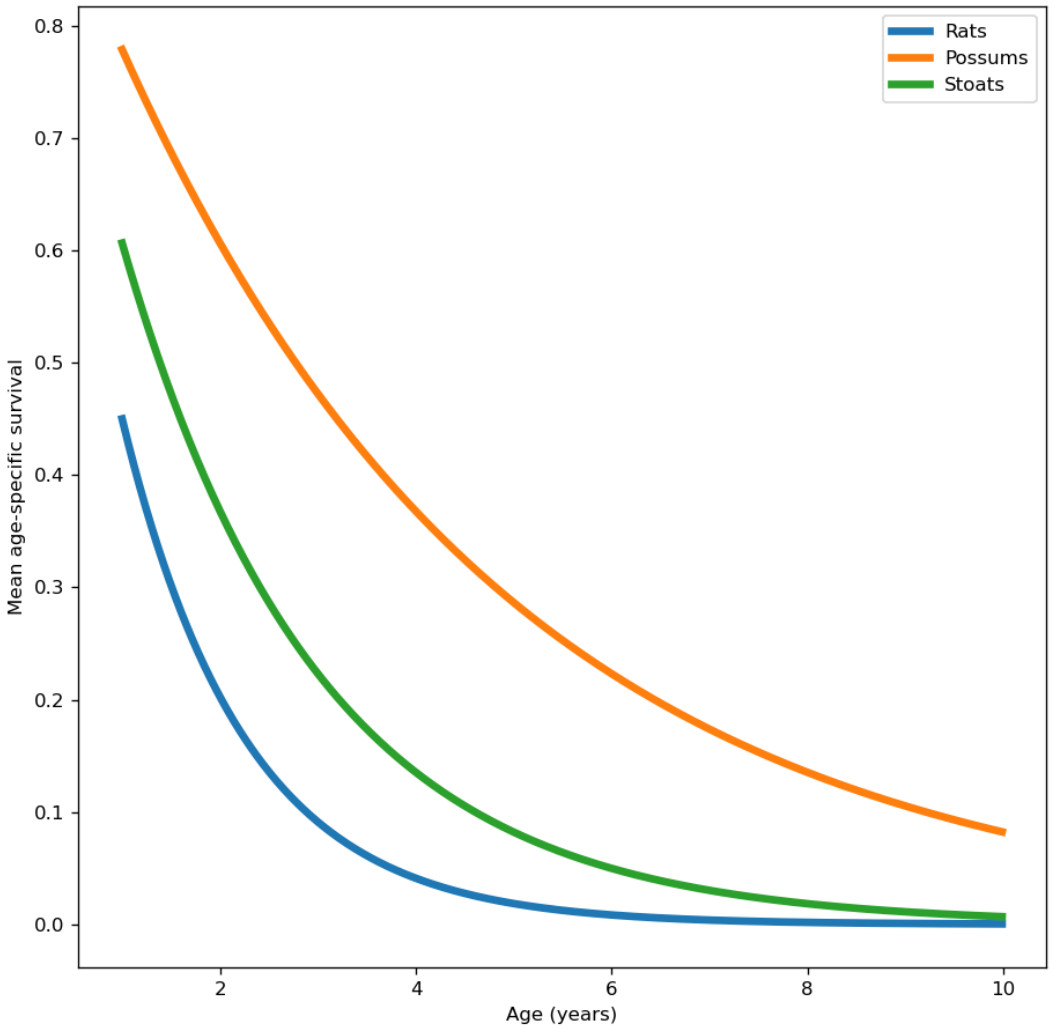
## Supplementary material

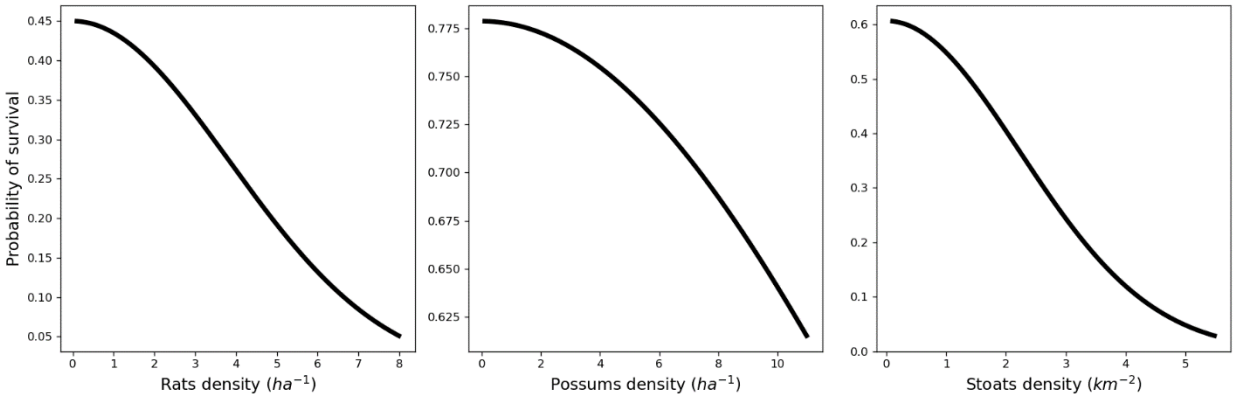
The graphs presented here demonstrate the relationship between input parameter values and the probability of detection, survival, recruitment, population density, and dispersal. Parameter values and source literature are listed in Table 1. Also included are analysis results of low and high carrying-capacity landscapes.



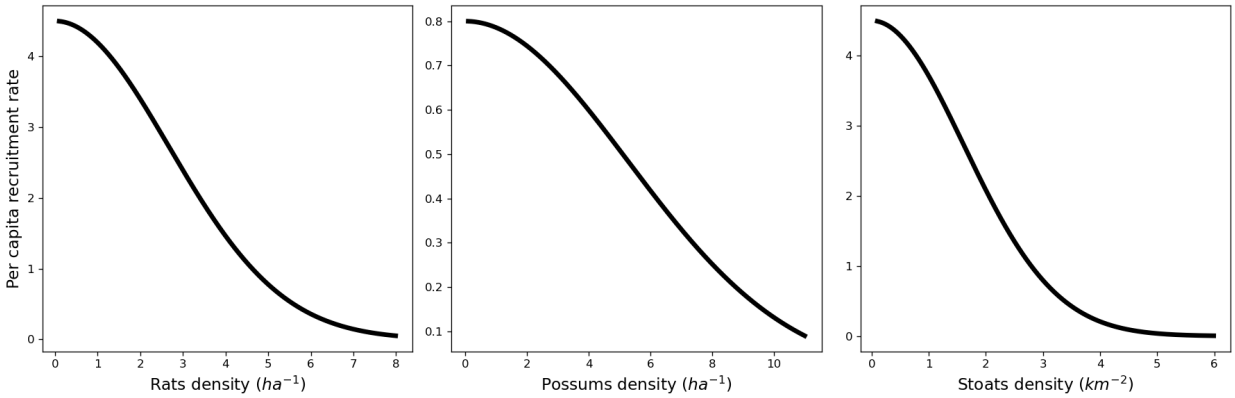

**Appendix S1.** Probability of detection or trapping decreases with increasing distance from a trap as a function of $\sigma_j$ for each species.



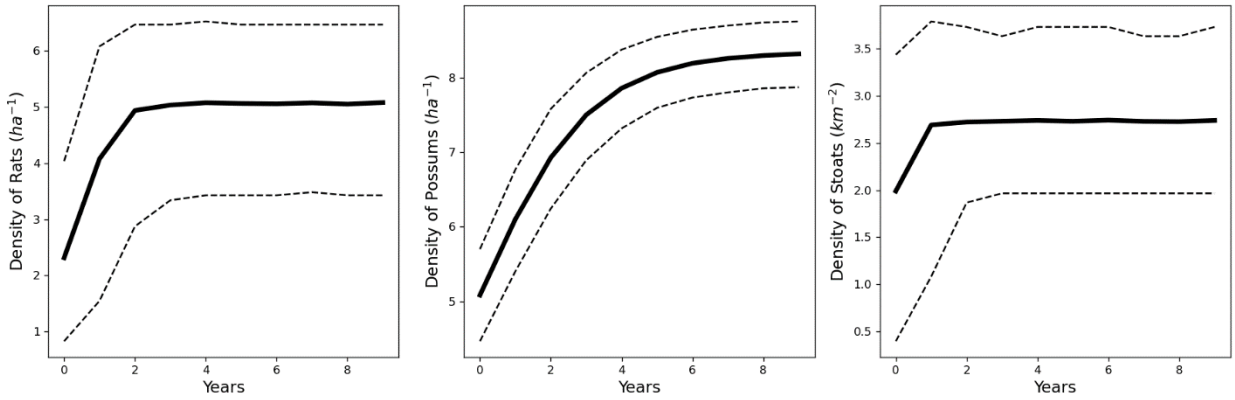

**Appendix S2.** Mean age specific survival for the three species.



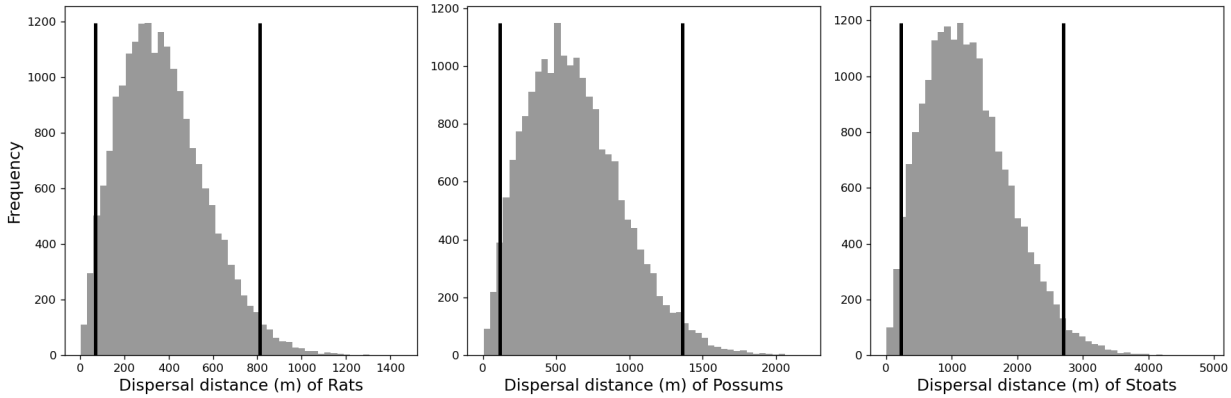

**Appendix S3.** Density dependent annual probability of survival for the three species.



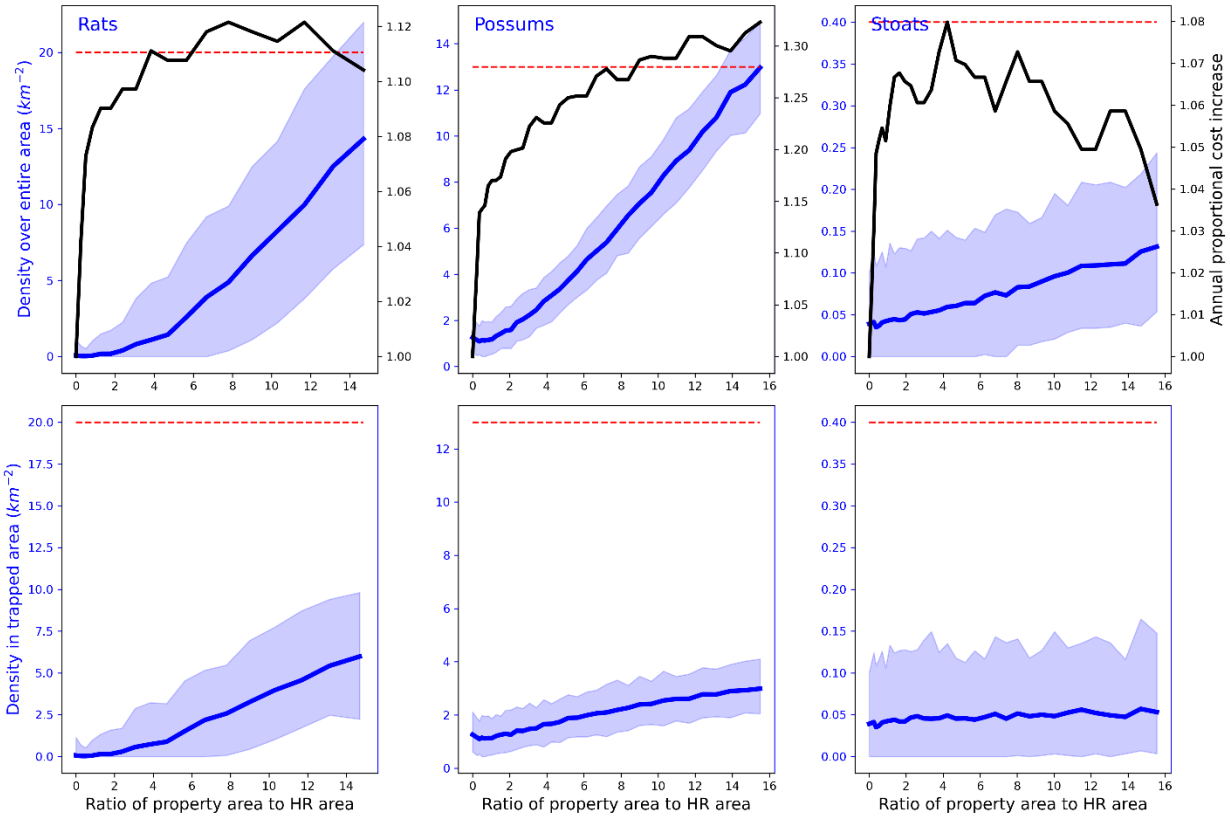

**Appendix S4.** Density dependent per-capita recruitment rate for each species.



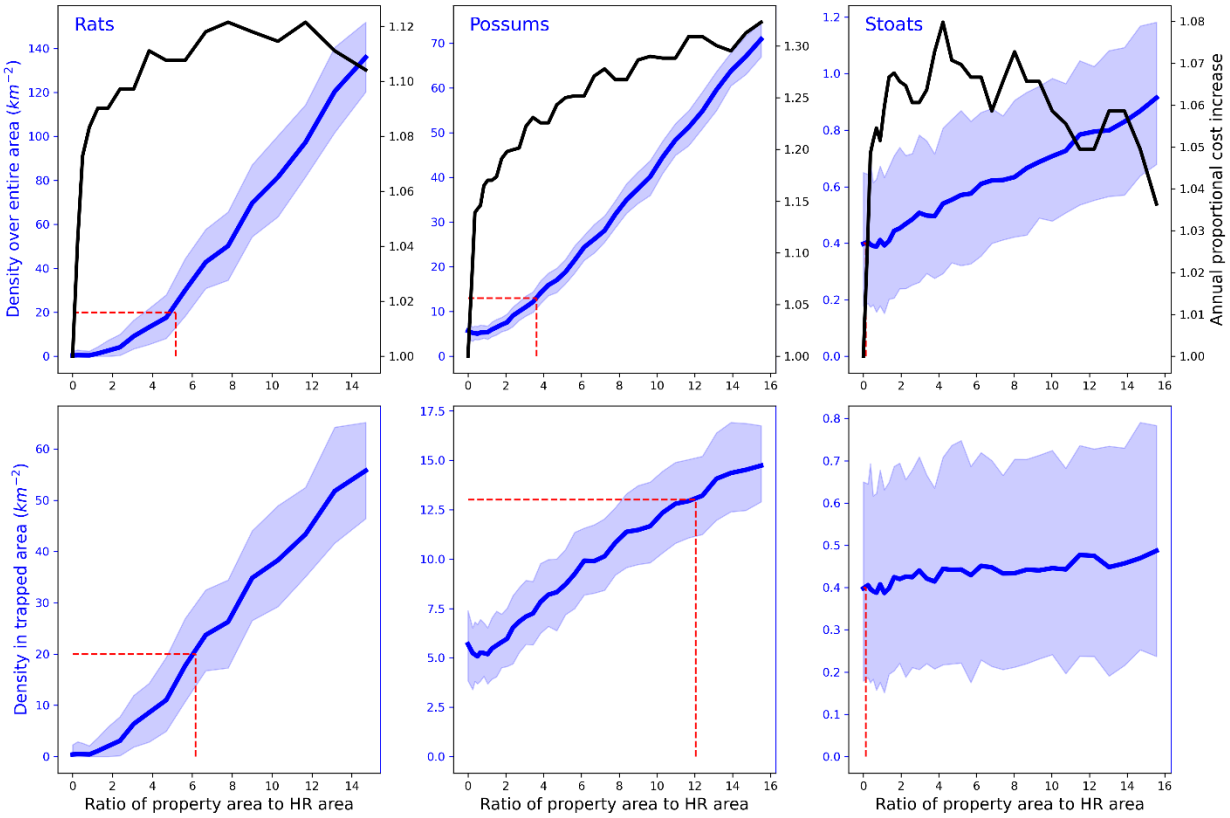

**Appendix S5.** Simulated non-trapped population growth for each species, which stabilises at the carrying capacity.




**Appendix S6.** Frequency distributions of dispersing juveniles for each species, with 95% confidence intervals (vertical black lines).




**Appendix S7.** Population density ($km^{-2}$; blue line and left y axis) in a low carrying-capacity landscape (e.g. dryland shrublands), and cost results for rats (left column), possums (middle column), and stoats (right column). The top row of graphs shows the mean density (blue line) across the entire area at the end of four years of trapping across a range of property to home range area ratios. The light blue area represents the 95% confidence intervals. The black line in the top row shows the annual proportional cost increase over baseline costs (100% landowner compliance). The bottom row shows the mean and 95% confidence intervals of population density only in the trapped area (i.e. excluding the non-participating property). The horizontal dashed red line shows the population density that should result in a 5% tracking rate of detection devices with the species specific $g_0$ and $\sigma$ used in this study. The vertical dashed red line demonstrates the ratio of non-participating property to home range area that will on average result in a population density that will exceed a 5% tracking rate and density impact threshold.




**Appendix S8.** Population density ($km^{-2}$; blue line and left y axis) in a high carrying capacity landscape (e.g. podocarp forest), and cost results for rats (left column), possums (middle column), and stoats (right column). The top row of graphs shows the mean density (blue line) across the entire area at the end of four years of trapping across a range of property to home range area ratios. The light blue area represents the 95% confidence intervals. The black line in the top row shows the annual proportional cost increase over baseline costs (100% landowner compliance). The bottom row shows the mean and 95% confidence intervals of population density only in the trapped area (i.e. excluding the non-participating property). The horizontal dashed red line shows the population density that should result in a 5% tracking rate of detection devices with the species specific $g_0$ and $\sigma$ used in this study. The vertical dashed red line demonstrates the ratio of non-participating property to home range area that will on average result in a population density that will exceed a 5% tracking rate and density impact threshold.