

## Spatially heterogeneous detection probability in spatial capture-recapture: consequences and solutions

Spatial capture-recapture (SCR) models can account for spatial heterogeneity in detection probability that are likely to occur due to various factors, such as animal movement, distance from activity centers, the underlying habitat, and characteristics of the sampling. These effects are routinely accommodated and studied in SCR analysis when the source of variation is known. However, the consequences of the misspecification of the detection process in the presence of unknown or partially known variable and spatially autocorrelated detection probability has not been systematically investigated. This is the case when, for example, covariates coding for variable effort and detection probability in general are incomplete or entirely lacking. Using simulations, first, we show that ignoring spatially autocorrelated and highly variable detection probability can seriously affect SCR estimates of population size in terms of bias, precision, and coverage probability of 95% confidence intervals. Second, we develop SCR models that specifically accommodate unknown and spatially autocorrelated heterogeneity in detection probability. We explore the efficacy of the models by comparing them with a basic single-session SCR model under both presence and absence of spatially autocorrelated detectability at different scales. We discuss the usefulness of our approaches to account for spatially autocorrelated detection probability in wildlife monitoring studies.