140

A new modelling framework for roost count data

Parrots are one of the largest and most threatened bird families. Consequently, there is a need to accurately estimate parrots population sizes/trends to quantify population dynamics and the impacts of different threats, to identify species that require protection, and to develop effective management plans. However, parrot populations are challenging to survey as their behaviors make them difficult to detect or unavailable to count. Roost count data provides an efficient, cost-effective way to monitor parrot populations in comparison to other survey methods, such as capture-mark-recapture, removal or distance sampling as some parrots may nest in elevated cavities in trees or cliffs that are difficult to find, reach, and monitor. Roost count data consists of multiple imperfect counts of the same roost over time, with counts typically collected under different environmental conditions. Motivated by two case studies, we consider models for roost count data to estimate the underlying population size/trend over time. We account for imperfect detection and implement an efficient Bayesian variable selection approach to identify important predictors for the probability of detecting parrots at the roost. In addition, as the number of parrots at the roost are temporally correlated, we account for this temporal-autocorrelation within a parametric and non-parametric framework. We assess the performance of this new modeling framework model via a simulation study, and we also present results obtained when the new model is applied to the two case studies.