

Leveraging sharing of camera-trap data to inform biodiversity conservation at large scales

While the spatio-temporal impact of anthropogenic activities on biodiversity has considerably increased in the last few decades, our ability to assess the impact of these activities on species at such large scales has lagged behind. However, advancements in technology and statistical methods, and new initiatives that promote data sharing are making it possible to fill this gap. Occupancy is one of the main criteria to assign species to IUCN Red List Categories, but too often trends in occupancy at large scales are only established qualitatively. We present an approach that allows a statistically-based and robust assessment of population and species status at large spatial scales.

We leverage camera trap data shared by different organizations through the recently established platform Wildlife Insights to assess which are the main types of human disturbance that drive range-wide trends in occupancy in several species of mammals and birds. Pooling data across projects, we created species-specific datasets containing information collected in different areas within the range of each species and over multiple years. We then applied single-species Bayesian hierarchical occupancy models to estimate local and range-wide trends in occupancy as a function of different proxies of human disturbance, including changes in forest cover and human population density. We accounted for the structure of the data (e.g. camera-trap sites within projects) using nested random effects. Finally, we used these estimates to assess which species were most affected and what were the traits that characterized them.

Our results can inform the management and conservation of many species at a scale beyond the single protected area, network, or political jurisdiction. We emphasize that this advancement in understanding trends at large scales can be made possible only by researchers and organizations willing to share their data and by initiatives, such as Wildlife Insights, that work to facilitate data sharing. Our modelling exercise is, thus, also an example of what collaboration among scientists can achieve for preserving global biodiversity.