Hierarchical statistical modeling for wildlife research

People involved: Ana Sanz, Jürgen Niedballa

Collaborators: Prof. Dr. Beth Gardner and many others, depending on specific projects

Wildlife survey data are fraught with challenges: often sparse, spatially and/or temporally limited or biased due to logistic constraints, and imperfectly reflecting ecological states and processes due to imperfect detection (i.e., failing to observe species or individuals even though they are present). Hierarchical statistical modeling has emerged as the prime tool to deal with these challenges, by describing separate sub-models for the underlying ecological and the detection process. We employ such models throughout our research projects. But we also modify existing and develop new hierarchical models, and make these more accessible to end users, to improve our ability to study, monitor, and ultimately, protect wildlife. Modeling approaches we work with range from occupancy models for species occurrence to N-mixture, distance sampling and other count-based models for species abundance and population dynamics, to traditional and spatial capture-recapture models for abundance, density and demographics.

Key publications

1. Ke et al. (2022). ECOL APPL. (<https://doi.org/10.1002/eap.2632>)
2. Sollmann et al. (2021). ECOL APPL. (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2249)
3. Gardner et al. (2018). ECOL EVOL (https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.4509)
4. Sollmann et al. (2016) MEE (https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/2041-210X.12518)
5. Royle et al. 2014. Spatial Capture Recapture. Academic Press, Waltham, MA.