Inferring habitat use, population distribution and total population size by combining individual-level and population-level data

J. Jousimo and **O. Ovaskainen**

Metapopulation Research Group
Department of Biosciences
University of Helsinki
PO Box 65, 00014, Finland
jussi.jousimo@helsinki.fi
otso.ovaskainen@helsinki.fi

Keywords: abundance; population dynamics; spatial ecology

Abstract: Winter track counting is a non-invasive population survey method developed for terrestrial mammals. We represent a spatio-temporal Bayesian smoothing model extending the classical result to convert transect crossing counts of animals to population density. The model combines population-level counts with individual-level movement activity and habitat use from GPS tracking information. We infer the movement activity from individual traits and biotic and abiotic factors, with a correction for straight-line distance bias, and the habitat use with a step selection function approach. Furthermore, we adjust the results to match with the population using removal statistics. We demonstrate use of the model with a survey of large temporal and spatial scale and verify population size estimates with assessments from independent sources.

References
Jousimo, J. and Ovaskainen, O. et al. (2014) Inferring habitat use, population distribution and total population size by combining individual-level and population-level data. (in prep.)