

Accounting for GPS Error in Habitat-Selection Studies

Habitat-selection studies aim to understand animal behavior and resource preferences by comparing locations animals visit to locations assumed available to them. Collection of such data relies on modern biotelemetry devices (e.g., GPS collars) that allow remote monitoring of multiple individuals at relatively fine temporal scales. Although positioning technologies have been improving quickly over the last several decades, there always remains some level of measurement error associated with GPS locations. I will use an existing heuristic error correction method called Simulation Extrapolation (SIMEX) to explore the effect of measurement error on the estimates of habitat-selection parameters resulting from step-selection analyses. The SIMEX method allows us to investigate whether and how GPS error causes bias in the estimated regression parameters, and at the same time provides an approach to correct for at least part of the bias. Furthermore, SIMEX is a simple and intuitive method that does not require the formulation of an explicit error model. The use of SIMEX to tackle the issue of GPS error will be illustrated with simulations, as well as with a case study on sandhill cranes. The results suggest that GPS error introduces non-negligible bias in the resulting parameters of habitat-selection analyses, and that SIMEX is a promising method to understand this bias, even though correcting it remains a complex matter.