Estimating Resource Utilization Functions: Correcting for Behavior Associated with Central-Place Foraging

Brian W. Moser and Edward O. Garton, Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844

Most resource-selection models assume that space use is uniform. However, in the case of central-place foragers, the null utilization distribution (UD) is not uniform but rather a circular-normal distribution centered about the central place. Estimating resource selection without correcting for the behavior associated with central-place foraging will result in models biased towards habitats closest to the central place. We present a method for estimating a resource-utilization function (RUF) that explicitly accounts for central-place-foraging behavior and provides a more accurate picture of resource use when using UDs to measure resource use. The bias-corrected RUF uses a fixed-kernel-density estimator to calculate a UD, and then uses the difference between the surface of this UD and the surface of a circular-normal UD to calculate corrected space-use probabilities. The individual UD cell probabilities are then used as a response variable in a modeling framework to identify explanatory variables that best explain space use. We demonstrate the use of bias-corrected RUFs using telemetry data from northern goshawks (*Accipiter gentilis*) breeding in Idaho. Advantages of the bias-corrected RUF include a less-biased picture of habitat selection by central-place foragers and the ability to map habitat selection using the resulting model without first needing to know nest-site locations.