

Comparative analysis of elk-landscape relationships using resource selection and resource utilization functions.

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Resource selection functions (RSF) employing a “used versus available” design have been applied extensively to examine environmental factors that influence animal use of landscapes. While this approach has successfully identified influential landscape factors and the scale of influence of these factors, it suffers from high sensitivity to the definition of resource availability and the lack of independence among location points. Recently, resource utilization functions (RUF), based on utilization distributions, have been used to relate the use of space to available resources. We analyzed GPS telemetry data collected on 40 elk in Wisconsin, Yellowstone National Park, and in Alberta, Canada to explicitly compare RSF and RUF approaches to analyzing elk-landscape relationships. Analysis of the data from Wisconsin indicates that the RSF approach detected that the elk were sensitive to landcover type, and distance from wolves and roads. The continuous probabilistic measure of space use in the RUF approach detected the influence of wolves and roads, but landcover type was important only when the smoothing parameter was set to 80% of the least squares cross validation estimate. While the RSF approach is sensitive to the definition of available resources and the handling of autocorrelated data, the RUF approach is sensitive to the interaction between the scale of pattern on the landscape and the selection of the smoothing parameter.

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