

****Sage-Grouse Seasons, Home Ranges and Habitats, What are They and How Many are There?**

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The greater sage-grouse (*Centrocercus urophasianus*) is a gallinaceous bird that has become a focal species in the conservation effort to preserve imperiled sagebrush ecosystems and associated organisms. Each remaining sage-grouse population across the current range-wide distribution occupies unique environments and must cope with novel combinations of stressors making it crucial to identify and understand local wildlife-habitat relationships to which management actions may be tailored. Wildlife-habitat responses are typically inferred from population-level survival or resource selection models without regard for detailed individual- or population-level movement patterns. Improved spatial generality of inferences may be gained by linking habitat response associations with specific behaviors or activity signatures (statistical behaviors) derived from movement data and expert knowledge. Our primary goal was to quantify sage-grouse space- and time-use signals relevant to management and parse variability in these signals into components due to spatial (landscape elements) and temporal (seasonality) characteristics, while accounting for individual-level variation. We attached a 22-g solar powered Global Positioning System (GPS) Platform Transmitting Terminal to 86 female sage-grouse in north-central Montana. We monitored females and analyzed movement behaviors using a combination of field observations, nonlinear-regression movement models, multivariate clustering techniques, and a time-local convex hull approach. Time-local convex hulls can be thought of as many brief-duration home ranges from which time- and space- use metrics can be calculated. We will present results from our north-central Montana sage-grouse movement ecology research including migration patterns, diversity of movement modes, seasonal space- and time-use patterns, and seasonal landscape-element associations.

