
CHALLENGES WITH SAMPLING SAGE GROUSE LEKS AND INTERPRETING POPULATION TRENDS IN CENTRAL MONTANA

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Estimating population size and monitoring trends over time is a fundamental task for management biologists. For species of conservation concern like the Greater sage-grouse (*Centrocercus urophasianus*), using robust methods to monitor populations is imperative. Biologists usually monitor sage-grouse by surveying males at breeding leks each spring. Over 1700 sage-grouse leks exist in Montana, presenting a formidable logistical challenge to census given their accessibility, timing of activity, and other constraints. Thus, not all leks get surveyed each year. In 2005, Montana Fish, Wildlife, and Parks designated 88 Adaptive Harvest Management (AHM) leks to prioritize survey efforts and undergo a more rigorous, consistent sampling protocol; these counts are considered the best indicator of sage-grouse population trends in Montana. However, AHM leks do not provide a random sample required for strong statistical inference, and may not be representative of the remaining leks in an area. I compared count data between AHM and non-AHM leks near Lewistown, Montana, finding mean males/lek is significantly higher on AHM leks than non-AHM leks. Additionally, these larger AHM leks appear to persist longer than smaller leks, which may indicate a minimum size (or potential Alee effect of sorts) at which a lek is more likely to fail. A Cox proportional hazards model indicates differences in survivability across lek size classes (i.e., the hazard of a lek failing is 11.48 times greater for the smaller leks than the larger leks). Given these observations, sampling only AHM leks may predispose us to incorrectly interpreting sage-grouse population status across the state.