

Public Abstract

First Name:Aleshia

Middle Name:Lynn

Last Name:Fremgen

Adviser's First Name:Joshua

Adviser's Last Name:Millspaugh

Co-Adviser's First Name:Mark

Co-Adviser's Last Name:Rumble

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Title:LEK ECOLOGY OF MALE GREATER SAGE-GROUSE IN CARBON COUNTY, WYOMING

Greater sage-grouse (*Centrocercus urophasianus*, hereafter "sage-grouse") have been experiencing range-wide population declines for several decades, and as a result they are considered warranted for listing under the Endangered Species Act. Therefore, wildlife managers need to understand how sage-grouse breeding behavior influences long-term reproductive success and therefore population abundance, and managers should be able to accurately relate breeding ground (i.e. lek) count data to population abundance. Breeding behaviors, such as how frequently males visit their leks or move among leks, could relate to a male sage-grouse's ability to establish dominance at his lek and mate, so it is important to understand conditions and environments in which these behaviors may change. Additionally, some males are not seen by observers performing lek counts, and it is important to understand why the individual may not have been seen and counted to improve lek count protocols. We investigated why and when a male would attend a lek, move to a different lek, or be detected during a lek count.

A male had about a 16% to 82% chance that he would attend a lek any day, with high annual variability. This challenges our ability to use a lek count as an index to the population size because of the substantial changes from year to year in the number of males that are not detected on leks because they are not attending leks. Attendance was influenced most strongly by date and precipitation, with males less likely to attend with more precipitation. Broad time-scale precipitation and weather patterns also shifted the peak date of attendance, with males attending earlier in the season when conditions were dry and warm and later in the season when conditions were wet with high snowpack.

Males had less than a 3% chance they would move to a new lek on any given day, demonstrating high fidelity as expected for a lek-breeding bird. However, the yearly probability of moving to a new lek ranged from about 40% - 70% per year, suggesting many males may move at some point during the season. Dominant males were less likely to move to a new lek, likely because they had high attendance and established themselves at their preferred lek and therefore would be more likely to mate. Males were less likely to move during precipitation, but more likely to move following precipitation. Precipitation was also likely tied to elevation and time of season, as males moved more to higher elevation leks and at the beginning of the season when conditions were likely clearing up at higher elevation leks.

Male sage-grouse were most likely to be detected on leks with shorter sagebrush, with higher snow cover and more bare ground, and when the observer is at or below the elevation of the lek. The average detection rate across all leks was 87.0%, and there was little variation in lek-specific detection rates ranging from 77.1% - 92.8%. Detection should not vary from one lek to another to be a useful index, so the lek count may be used as an index for population estimates without concern about detection of males missed by observers during lek counts. However, when accurate population size estimates are necessary, sightability methods can be used to determine detection rates and more accurately estimate population sizes.