

Molecular Insights on Greater Sage-grouse Breeding Strategies in the Northwestern Great Basin

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Presenter's Title: PhD Student

Topic: Sage-grouse conservation

Proposal Type: Individual Presentation

Abstract:

Co-authors: Phillip Street, Jim Sedinger For sage-grouse, the annual breeding cycles begin on leks, areas where males produce visual and acoustic displays for females. Research using visual observations on leks suggests that a few males do most of the breeding. Intraspecific nest parasitism has also been documented in this species. Genetic analysis can reveal true parentage of resulting clutches. Using the vascularized membranes within eggshells, we extracted DNA from each egg. With the addition of adult samples, we verified maternity to determine nest parasitism, and paternity, to test for extra-pair copulations. We sampled the eggshell membranes of 350 eggs from 46 clutches from our study site in Northwestern Nevada. We used feathers collected from the incubating female as a unique genetic sample. We targeted 14 microsatellite loci developed for sage-grouse and one sex determination locus. These highly polymorphic loci are useful for parentage analyses as we can compare the alleles of the putative mother and each offspring. Using the program Cervus, we tested for matches and mismatches among each focal sample and the candidate parent. After matching the mother to her clutch, we compared the offspring genotypes to each other to determine paternity and nest parasitism. We reconstructed possible male genotypes and looked for matches among clutches to evaluate if a dominant male is doing most of the copulations, or if additional copulations are happening off of the lek. Multiple parentages in clutches may help maintain genetic diversity for the population. Females may also mate with multiple males to hedge their bets on male quality, and therefore the quality of offspring. These results provide important insights about sage grouse breeding behavior that observational studies cannot.

Greater Sage-grouse habitat and demographic response to grazing by non-native ungulates

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Topic: Sage-grouse conservation

Proposal Type: Individual Presentation

Abstract:

Within the Great Basin of the Western United States, management discussions regarding the impacts of grazing by livestock and feral horses on Greater Sage-grouse often focus on the negative habitat impacts, and how the sage-grouse populations will respond in turn. While the linkage between sage-grouse demographics and habitat is well documented, quantifying the direct impacts of non-native grazing on sage-grouse has been fraught with difficulties. These struggles include the logistical constraints and cost associated with monitoring multiple sage grouse populations across large landscapes, an adequate temporal span to detect responses, and grazing manipulations at a large enough spatial scale to affect grouse populations. We investigated the response of sage-grouse demographics, movements, and habitat to grazing of non-native ungulates in Northern Nevada and Southern Oregon. We failed to detect a difference in these metrics when grazing was analyzed at discrete treatment levels, however, we did find evidence for an effect when grazing was treated as a continuous measure of intensity. Grazing intensity during the breeding season of sage-grouse was estimated by integrating records of duration and number of livestock permitted on grazing allotments, and on the ground transect data targeting feces of both horses and livestock. Using Bayesian Hierarchical modeling to account for uncertainty in each component of our data, we found little evidence that sage-grouse are avoiding areas with high intensities of grazing by either horses or livestock. Likewise, there was little support for an effect of grazing on nest survival. We observed lower chick survival rates in areas that had higher grazing intensities of horses, livestock, and combinations both. We also found evidence for a negative effect of grazing on the habitat chicks were using during this time. These results suggest that high intensities of grazing during the breeding season of sage-grouse are negatively impacting populations, and may inform recommendations for issuing grazing permits and managing feral horses within the breeding range of sage-grouse.