Winter Temperature – Not Grazing, Drought, or Breeding Season Weather - Impacts Dynamics of a Northern Great Plains Greater Sage Grouse Population

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High annual climatic variability and livestock grazing are ubiquitous across Greater sage-grouse range and may help shape population dynamics of this imperiled rangeland species. We investigated the role of annual variability in climate, vegetation productivity, grazing intensity, and conservation grazing program enrollment on the dynamics of a greater sage-grouse population occurring over a relatively intact a 1,500-km2 rangeland landscape in central Montana (2002-2022). We modeled annual population growth in a Gompertz density- dependent and found that annual dynamics were positively associated with winter temperatures, which explained 18% of the variation in annual dynamics. We did not detect evidence that annual dynamics were related to variation in the previous year's breeding seasonweather, drought indices, or remotely-sensed rangeland productivity metrics as has been documented in other parts of sage-grouse range (e.g., Great Basin). We found no compelling evidence that variation in grazing intensity or conservation grazing program enrollment impacted populations. Our results suggest that within relatively intact rangeland systems of thenorthern great plains, drought-sensitivity and grazing management may not be limiting factorsand the potential to mitigate winter severity impacts by protecting or improving winter habitatquality should be further evaluated.