Non-native grazers affect physiological and demographic responses of Greater Sage-grouse

Tessa Behnke[1], Phillip Street[1], Scott Davies[2], Jenny Ouyang[3], and James Sedinger[4]

[1]University of Nevada, Reno
[2]Quinnipiac University
[3]Univ Nevada
[4]University of Nevada Reno

April 15, 2022

Abstract

1. Non-native ungulate grazing has negatively impacted native species across the globe, leading to massive loss of biodiversity and ecosystem services. Despite their pervasiveness, interactions between grazers and native species are not fully understood. We often observe declines in demography or survival of these native species, but lack understanding about the mechanisms underlying these declines. Physiological stress represents one mechanism of (mal)adaptation but data are sparse. 2. We investigated glucocorticoid levels in a native avian herbivore exposed to different intensities of non-native grazing in the cold desert Great Basin ecosystem, USA. We measured corticosterone, a glucocorticoid in birds, in feathers for a large sample (n = 280) of female Greater Sage-grouse (Centrocercus urophasianus) from three study areas in Northern Nevada and Southern Oregon with different grazing regimes of livestock and feral horses. 3. We found greater feral horse density was associated with higher corticosterone levels, and this effect was exacerbated by drought conditions. Livestock grazing produced similar results; however there was more model uncertainty about the livestock effect. Subsequent nesting success was lower with increased feather corticosterone, but corticosterone levels were not predictive of other vital rates. 4. Our results indicate a physiological response by sage-grouse to grazing pressure from non-native grazers. We found substantial among-individual variation in the strength of the response. These adverse effects were intensified during unfavorable weather events, highlighting the need to reevaluate management strategies in the face of climate change.

Hosted file

`Manuscript.docx` available at https://authorea.com/users/476537/articles/565464-non-native-grazers-affect-physiological-and-demographic-responses-of-greater-sage-grouse