

Shared environments and social interactions shape individual movements of Yellowstone ungulates

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Individual movements provide a lens to understand how animals use space and respond to their environments. Both spatial (e.g., resource locations) and social (e.g., group navigation) factors have been shown to drive movements. However, many community-level studies have shown that multispecies interactions can also impact individual behaviors. Multispecies interactions, nonetheless, have not been fully integrated into the field of movement ecology. Using GPS data (2016-2021) from 5 ungulates (bighorn sheep, bison, elk, mule deer, and pronghorn) in Yellowstone, we assessed the effects of spatial (forage and topographic variables) and social factors (distance to conspecifics and heterospecifics) on individual movements. We used step selection functions on GPS locations within 500m of another collared individual of any species. The results show that all species selected for areas with more forage, except for bighorn sheep that selected for steeper areas. All species selected to be closer to conspecifics and further from heterospecifics, except deer that selected to be further from both during spring. Individuals thus may benefit from interactions with conspecifics and limit their spatial overlap with heterospecifics. Linking individual movements and community interactions helps conceptualize movement ecology while providing more accurate predictions of how populations may respond to management actions, such as reintroductions.

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