Factors Associated with Elk Distributions During Hunting Season in a Prairie Environment

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Hunting pressure alters habitat selection of elk (*Cervus canadensis*), and understanding responses to hunting is important for effective population and habitat management. Although elk responses to hunting are well-studied in forested and mountainous environments in the western United States, elk-habitat relationships in open prairie landscapes are less understood. Our objectives were to evaluate elk habitat selection during the archery and rifle hunting seasons and investigate relationships between individual selection patterns and risk. We used GPS location data from male and female elk in the Custer Forest and Missouri Breaks areas of eastern Montana, USA, 2021-2024 and built resource selection functions to estimate population- and individual-level selection patterns. At the population level, elk generally selected for increasing canopy cover, terrain ruggedness, and distance from motorized routes, as well as for areas with restricted hunter access. Importantly, we found consistent, strong relationships with canopy cover, highlighting the value of this feature for elk security in landscapes where cover is relatively sparse. At the individual level, elk faced with higher risk (i.e., the proportion of locations on publicly accessible lands) in the Custer Forest tended to increase selection strength for canopy cover, while in the Missouri Breaks, elk tended to increase selection for more rugged terrain but generally did not alter selection for canopy cover. Lastly, we estimated security thresholds based on where most elk use occurred and produced associated maps to provide more concrete information for elk management.