

RELATIONSHIPS BETWEEN ELK AND NONNATIVE WEEDS ON MONTANE WINTER RANGES IN WESTERN MONTANA

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Through physiological and competitive mechanisms, spotted knapweed has become established in many critical winter-range habitats, primarily in the northwestern United States and southwestern Canada. In areas of high density, elk (*Cervus elaphus*) may reduce the competitive ability of native grasslands through overgrazing. I predict that the benefits of weed spraying to reduce knapweed biomass are reduced in areas of high elk density and elk density and knapweed cover are positively correlated with high elk density creating high levels of weed biomass. A linear regression was calculated using vegetation data against kernel density estimates obtained from GPS telemetry locations in the North Hills Elk Herd of Missoula Valley, Montana. This analysis shows a trend for increased and decreased percent cover of knapweed and native grasses at high elk densities respectively, providing support for our overgrazing hypothesis through the mechanism of apparent competition. Fecal diet analysis further shows avoidance of knapweed and a selection for native grasses and forbs as well as invasive cheat grass. Finally, elk exclosures were constructed and will be measured annually for comparisons between forage class (native, invasive) biomass and elk densities on herbicide treatment areas using a statistical analysis of covariance. This information is essential in understanding the secondary effects of weed spraying in areas of high ungulate densities. With this understanding, management may be better informed how to spend limited resources for invasive weed control. If benefits of weed spraying are diminished at high ungulate densities, managers will need to adopt very different weed control treatments.