
FIRE AND FORAGE: VARIABILITY IN ELK FORAGE ON A LANDSCAPE OF WILDFIRE AND CHANGING FIRE MANAGEMENT

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Forest management practices can modify ungulate nutritional resources through landscape-scale processes such as prescribed fire and wildfire. The resulting availability and distribution of nutritional resources can affect ungulate survival, reproduction, and distribution. Our primary goals were to evaluate how landscapes with varying post-fire successional stages influence elk summer nutritional resources and to quantify the variability of nutritional resources associated with varying fire histories and management practices during 1900–2015. Within 3 elk population ranges located in the Bitterroot Valley, Montana, we measured elk forage quality across a range of land cover types and fire histories and developed a landscape-scale forage quality model. Based on historical wildfire and prescribed fire data, we reconstructed decadal land cover models and used our forage models to predict fire-related variations in forage quality each decade within the elk summer ranges. Forage quality was predicted to decrease with successional stage. The area burned by wildfire increased 242–1,772% during 1990–2015 as compared to 1900–1990, resulting in fire-related variations of predicted nutritional resources. The area of highest forage quality varied, increasing 31.3–48.5% in 2 ranges and decreasing 2.4% in 1 range, from 1900–1990 to 1990–2015. These results highlight the important effect of wildfire on the distribution of ungulate nutritional resources and demonstrate that ungulate nutritional resources likely vary over time with variation in fire history and management practices.