HIGHLIGHTS

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Assessment of Range Planting as a Conservation Practice

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Range Planting Conservation Practice (CP) recommendations are used in the development of Natural Resources Conservation Service (NRCS) management plans for improving vegetation composition and productivity of grazed plant communities. We surveyed the scientific literature to determine if published studies support NRCS CP expectations for rangeland improvement and subsequent conservation effects. In general, CP recommendations are supported by the literature; however, weather is a principal driver of CP effectiveness. We identified knowledge gaps and made recommendations for extension and improvement of CP standards to increase cost effectiveness of management actions and to facilitate our scientific understanding of CP effects.

Disturbance History, Management, and Seeding Year Precipitation Influences Vegetation Characteristics of Crested Wheatgrass Stands

Aleta Nafus, Tony Svejcar, and Kirk W. Davies

Crested wheatgrass (*Agropyron cristatum* and *A. desertorum*), non-native bunchgrasses, has been seeded across millions of acres in the western United States. Crested wheatgrass stands are often near-monocultures; however, native vegetation composition of these stands can be variable. We evaluated correlations between vegetation characteristics of crested wheatgrass stands and seeding history and management. Conditions prior to and immediately after seeding and subsequent post-seeding management influenced vegetation characteristics of crested wheatgrass stands. Though pre-seeding disturbance history and precipitation following seeding cannot be modified, grazing may reduce monoculture characteristics of crested wheatgrass stands and fire exclusion may promote sagebrush and perennial forbs.

Long-Term Fire Effects on Native and Invasive Grasses in Protected Area Sagebrush Steppe

Claire Marie Reed-Dustin, Ricardo Mata-González,
and Thomas J. Rodhouse

Understanding long-term fire effects on native and invasive grasses in Wyoming's big sagebrush (*Artemisia tridentata wyomingensis*) communities is needed to guide management and conservation actions. We used data collected over 15 years post-burn to examine the response of bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), and cheatgrass (*Bromus tectorum*) to fire. Overall, we found bluebunch wheatgrass returned to pre-burn cover by 2 years post-burn and stabilized, whereas cheatgrass increased above pre-burn cover by 2 years post-burn and stabilized. Therefore, when managing to minimize the long-term dominance of cheatgrass caution should be exercised with prescribing fire.

Cheatgrass Percent Cover Change: Comparing Recent Estimates to Climate-Change-Driven Predictions in the Northern Great Basin

Stephen P. Boyte, Bruce K. Wylie, and
Donald J. Major

Future climate patterns are likely to change cheatgrass (*Bromus tectorum*) cover in the Northern Great Basin. However, how cheatgrass cover might change is unknown. We modified a cheatgrass model that was built with recent weather data by substituting future climate data. This helps us understand how changing climates might affect cheatgrass cover in the future. Our future climate model indicates that cheatgrass cover will remain relatively stable throughout much of the study area; however, variability will increase, making some areas of social and/or ecological importance more susceptible to increasing cheatgrass cover and, thus, more vulnerable to fire.

Assessing the Potential for Transitions from Tallgrass Prairie to Woodlands: Are We Operating Beyond Critical Fire Thresholds?

Zak Ratajczak, John M. Briggs, Doug G. Goodin, Lei Luo, Rhett L. Mohler, Jesse B. Nippert, and Brian Obermeyer

Declines in tallgrass prairie fire can allow transition to shrub- or woodland, resulting in reduced forage for grazers, more intense woodland fires, and altered biodiversity. We compared satellite measurements of fire occurrence in the Flint Hills (Central Great Plains, United States) to fire frequency thresholds that estimate when tallgrass prairie becomes susceptible to shrubland/woodland transition. Approximately 55% of prairie/grasslands (3,860,000 acres) were burned at more than 3-year intervals and are therefore susceptible to shrub/woodland transition. Increasing fire frequency might impact air quality, but unless frequent fires are reinstated in these areas soon, large-scale woody plant expansion appears likely, and difficult to reverse.

Estimating Annual Root Decomposition in Grassland Systems

Alexander John Smart, Jiyul Chang, and David E. Clay

Calculating below ground root decomposition in grassland systems is difficult. We compared the sequential soil sampling method to the buried root bag approach to determine if root degradation estimates over a season differ. The sequential core (61%) and buried bag (58%) techniques had similar root decomposition amounts; however, the sequential core technique had a lower labor requirement than the residue bag technique when the increased sampling requirement was considered.

Contingency in Defoliation and Moisture Effects on Northern Mixedgrass Prairie Composition and Diversity

Tanner S. Broadbent, Edward Bork, and Walter D. Willms

Little is known about how defoliation intensity and frequency alter northern mixed-grass prairie composition and diversity. We evaluated defoliation effects in combination with watering in dry upland and mesic lowland sites. After 3 years, defoliation was the primary determinant of composition, particularly in the lowland site, with watering effects limited to the upland. All growing season defoliation regimes altered composition relative to defoliation deferred to year-end, although defoliation frequency within growing season caused minor composition differences. Overall, this grassland's composition and associated diversity can be altered by changes in the timing, intensity,

and frequency of defoliation, independent of growing season rainfall.

Adapting the Fire-Grazing Interaction to Small Pastures in a Fragmented Landscape for Grassland Bird Conservation

Courtney Duchardt, James R. Miller, Diane M. Debinski, and David M. Engle

Patch-burn grazing mimics historic disturbance regimes by using cattle and fire to create heterogeneous grassland composition and structure, which provides habitat for a diverse suite of imperiled grassland bird species. This management technique has mainly been applied on large (>1000 acre) grasslands. We investigated if patch-burn grazing can be applied effectively to smaller (35-75 acre) fragmented grasslands with less natural variability in terrain and ecological sites than large pastures. Effect of treatment on grassland bird diversity was minimal until stocking rates were reduced to increase remaining plant biomass. Both structural heterogeneity and bird diversity increased on pastures treated with patch-burn grazing.

Meta-Analysis of Wild Horse Diet Composition and Potential Conflict with Livestock and Wild Ungulates on Western Rangelands of North America

John Derek Scasta, Jeffrey L. Beck, and Catherine J. Angwin

Potential dietary conflict of wild horses with livestock and wildlife is a management and ecological concern. Our meta-analysis of 60 North American studies using microscopic comparison of fecal plant fragments provided 392 unique animal species-season diet samples. Wild horse diet composition ranged from 77-89% grasses, 4-15% forbs, and 3-10% browse. Grass composition explained overlap of wild horses with: cattle regardless of season, elk and domestic sheep in spring, sheep in summer, and elk in fall and winter. Cattle and horses respond to regional and seasonal variation similarly—a result not observed for other herbivore:horse comparisons.

Elk Foraging Site Selection on Foothill and Mountain Rangeland in Spring

Kelly K. Crane, Jeffrey C. Mosley, Tracy K. Mosley, Rachel A. Frost, Michael A. Smith, Wendy L. Fuller, and Michael W. Tess

We studied habitat attributes' effect on spring foraging site selection by Rocky Mountain elk (*Cervus elaphus*) in Wyoming and Montana. Cattle grazing intensity exerted more influence on elk foraging site selection than any other variables, including aspect, slope, and distance to security cover and primitive or improved roads. Elk avoided foraging where cattle had not grazed the previous summer to early fall, and selected areas where cattle had grazed lightly or moderately. Managers can use

our model to predict elk grazing distribution in response to changes in security cover, roads, or cattle grazing, and use targeted cattle grazing to purposely modify elk forage conditions.

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