

HIGHLIGHTS

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Conservation Program Participation and Adaptive Rangeland Decision-Making

M. N. Lubell, B. B. Cutts, L. M. Roche, M. Hamilton, J. D. Derner, E. Kachergis, and K. W. Tate

Conservation programs are important tools for helping ranchers adapt to complex rangeland systems, and balance economic and environmental goals. Ranchers are more likely to participate in a conservation program if they have large operations and a long-range planning horizon, and are central opinion leaders in local social networks and trust involved government agencies. Lack of awareness is a major barrier to participation in less popular conservation programs, whereas communication with organizations that provide information about programs is a key driver of participation. Boundary-spanning organizations that build cooperation and connect ranchers to sponsors of conservation programs are effective at increasing participation.

Woody Cover and Grass Production in a Mesquite Savanna: Geospatial Relationships and Precipitation

R. J. Ansley, M. Mirik, C. B. Heaton, and X. B. Wu

We used remotely sensed data to investigate the consequences of the geospatial arrangement of mesquite trees (*Prosopis glandulosa*) on production of different perennial grass types in gaps between trees in a southern Great Plains (USA) savanna. The relationships between woody cover and grass production differed by grass type, amount of mesquite surrounding the gap, and precipitation amount. Warm-season midgrasses were much more sensitive to increases in mesquite cover than were other grass types. Productive stands of warm-season midgrasses may only be possible when mesquite canopy cover is maintained below 30%.

Performance of Quantitative Vegetation Sampling Methods Across Gradients of Cover in Great Basin Plant Communities

David S. Pilliod and Robert S. Arkle

Characterizing rangeland vegetation seems simple, but natural heterogeneity of these plant communities requires careful consideration of limitations of current sampling methods. We examined three methods for quantifying vegetation in 1-ha (2.47-acre) plots in the northern Great Basin: photography-based grid-point intercept, line-point intercept, and point-quarter. All three methods reasonably characterized vegetation and each has advantages depending on cover and heterogeneity of the vegetation, study goals, precision required, and efficiency needed. These results could help guide decisions for vegetation sampling, which has become increasingly important for evaluating land management actions or trends in rangeland condition.

Legumes in Chinese Natural Grasslands: Species, Biomass, and Distribution

Dongmei Jin, Jianjing Ma, Wenhong Ma, Cunzhu Liang, Yue Shi, and Jin-Sheng He

We studied species richness, biomass, and distribution of legumes in Chinese natural grasslands, and their association with climatic conditions. Ninety percent of the sites studied had at least one legume species. *Astragalus*, *Oxytropis*, and *Medicago* were dominant among the 12 legume genera recorded. In general, both legume biomass and proportion were lower than found in many other types of grasslands around the world, possibly due to low growing-season temperatures on the Tibetan Plateau and low precipitation in Inner Mongolia.

Outplanting Wyoming Big Sagebrush Following Wildfire: Stock Performance and Economics

Eva Dettweiler-Robinson, Jonathan D. Bakker, James R. Evans, Heidi Newsome, G. Matt Davies, Troy A. Wirth, David A. Pyke, Richard T. Easterly, Debra Salstrom, and Peter W. Dunwiddie

Reestablishing Wyoming big sagebrush (*Artemisia tridentata* subsp. *wyomingensis*) following large wildfires often requires

active management. We evaluated the performance and economic costs of outplanting container and bare-root sagebrush stock, and compared our plantings with other studies. Survival was maximized, and costs minimized, by planting container stock or bare-root stock with a hydrogel dip. Outplanting is an ecologically and economically effective way of establishing Wyoming big sagebrush. Testing multiple stock types and consistently reporting data about initial stock quality, site conditions, and weather would help land managers and restoration practitioners maximize the success of outplanting efforts.

Influence of Wildland Fire Along a Successional Gradient in Sagebrush Steppe and Western Juniper Woodlands

Eva K. Strand, Stephen C. Bunting, and Robert F. Keefe

Western juniper (*Juniperus occidentalis*) has been expanding into sagebrush (*Artemisia* spp.) steppe over the past 130 years, altering habitat, forage, and ecosystem function. We evaluated the effects of prefire vegetation on burn severity and ecosystem response along a successional gradient from steppe to mature woodlands, using a combination of field reconnaissance and remotely sensed data. Woodlands in late developmental phases, and sagebrush patches near developed woodlands, incurred higher burn severity than steppe and young woodlands. The results support the idea that a threshold exists for when juniper-encroached sagebrush becomes difficult to restore and our ability to predict the postdisturbance vegetation community greatly decreases.

Spring Clipping, Fire, and Simulated Increased Atmospheric Nitrogen Deposition Effects on Tallgrass Prairie Vegetation

Alexander J. Smart, Tabithia K. Scott, Sharon A. Clay, David E. Clay, Michelle Ohrtman, and Eric M. Mousel

Defoliation aimed at introduced cool-season grasses could reduce their competitiveness and improve the quality of the northern tallgrass prairie in spite of predicted increases in atmospheric nitrogen deposition. We used early-season clipping and fire in combination with simulated increased levels of atmospheric nitrogen deposition to evaluate foliar canopy cover of tallgrass prairie vegetation. Clipping was just as effective as fire in increasing native warm-season grass and decreasing introduced cool-season grass cover. Low levels of nitrogen increased introduced cool-season grass cover in the undefoliated control only. Appropriately applied management will likely trump impacts of future increases in atmospheric nitrogen deposition.

Grazing and Grazing Exclusion Along a Resource Gradient in Magellanic Meadows of Tierra del Fuego

Marta B. Collantes, Celina Escartín, Karen Braun, Ana Cingolani, and Juan Anchorena

We monitored grazed and ungrazed areas, together with climatic records, for several years. The data were used to model states and transitions for dry and wet meadows. Grazing and drought have shifted plant cover away from grass and toward dwarf dicots, sedges, and rushes. The dry meadows did not revert to their previous state with grazing exclusion; however, the wet meadows returned to a grass state in about 4 years. Kentucky bluegrass (*Poa pratensis*) was the major species to increase with grazing exclusion on wet meadows. Periodic grazing deferment could help restore these plant communities.

Comparison of Season-Long Grazing Applied Annually and a 2-Year Rotation of Intensive Early Stocking Plus Late-Season Grazing and Season-Long Grazing

Clenton E. Owensby and Lisa M. Auen

Forage quality and cattle gains decline as the growing season progresses. We compared grazing heavily in the first half of the summer grazing season on Kansas tallgrass prairie followed by grazing at the normal rate during the last half of the season. During the second year of the 2-year study the pasture was grazed season-long to promote vigor of the vegetation. The system sustained herbage production and improved steer gains, and improved net profit with the intensive early grazing followed by normal grazing compared to season-long grazing, and improved net profit.

Biomass and Defoliation Tolerance of 12 Populations of *Pseudoroegneria spicata* at Two Densities

Jayanti Ray Mukherjee, Thomas A. Jones, and Thomas A. Monaco

Bluebunch wheatgrass (*Pseudoroegneria spicata*) is widely used in the North American Intermountain West for revegetation. Because it is preferred by grazers and is sensitive to grazing, there is need for developing grazing-tolerant cultivars. We compared responses of 12 cultivars to spring defoliation at high and low plant densities in a field experiment. We found that spring defoliation reduced shoot biomass similarly at both densities, whereas it reduced root biomass, across populations, only at high density. We found considerable variation among bluebunch wheatgrass cultivars' response to defoliation, with a possible trade-off between growth and defoliation tolerance. Some cultivars are better suited for restoration purposes than others.

Stocking Rate and Fuels Reduction Effects on Beef Cattle Diet Composition and Quality

Abe Clark, Tim DelCurto, Martin Vavra, and Brian L. Dick

Overstory fuels reduction and understory burning is a current management practice encouraged on forested rangelands across the western United States. These practices will change plant diversity and phenology to reduce diet quality for cattle grazing late-summer pastures. Cattle grazing late-season grand fir (*Abies grandis*) habitat types preferred grasses regardless of treatment or stocking rate. Fuel reduction did not cause an increase in late summer/early fall shrub consumption. Late-season forage quality may be lower in fuel-reduced sites. Managers should consider grazing these sites early in the season or supplying protein supplements.

Bison Versus Cattle: Are They Ecologically Synonymous?

Michel T. Kohl, Paul R. Krausman, Kyran Kunkel, and David M. Williams

Recent conservation efforts have placed bison into landscapes previously manipulated for cattle use (i.e., with fencing and/or water). We compared behavior, movement, and resource selection of bison and cattle in the northern Great Plains. Bison spent less time foraging than cattle and selected for foraging patches much larger than those used by cattle (28,875 vs. 1,520 acres). Bison demonstrated selection for riparian areas similar to cattle. However, bison selected for areas of intermediate forage biomass, whereas cattle selected for areas of maximum forage biomass. To encourage vegetation heterogeneity, bison managers should reduce water availability and increase pasture size, whereas cattle managers should place water and minerals to reduce movement and increase time spent grazing.

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