Society for Range Management

Rangeland Ecology & Management Highlights

Volume 72, Issue 6

Written and compiled by Roger Sheley, Allison Grove, and Jocelyn Aycrigg

Synthesis Paper: Targeted Livestock Grazing: Prescription for Healthy Rangelands

Derek W. Bailey, Jeffrey C. Mosley, Richard E. Estell, Andrés F. Cibils, Marc Horney, John R. Hendrickson, John W. Walker, Karen L. Launchbaugh, and Elizabeth A. Burritt

Targeted livestock grazing is a proven tool for manipulating rangeland vegetation and our understanding of it is expanding rapidly. Targeted grazing differs from traditional grazing in that its goal is to apply defoliation or trampling to achieve specific vegetation management objectives, whereas the goal of traditional livestock grazing is to produce livestock commodities. Targeted livestock grazing provides land managers an alternative to mechanical, chemical, and prescribed fire methods of manipulating rangeland vegetation.

Dormant Season Grazing: Effect of Supplementation Strategies on Heifer Resource Utilization and Vegetation Use

Samuel A. Wyffels, Mark K. Petersen, Darrin L. Boss, Bok F. Sowell, Janice G. P. Bowman, and Lance B. McNew

Forage-based livestock production systems attempt to optimize animal productivity while using the forage base effectively. Grazing dormant forage may help reduce fuel loads in high-risk fire areas but exposes cattle to low-quality forage. We examined forage utilization by heifers grazing dormant forage and supplemented with concentrated protein (self-fed) or hand-fed cake. Resource selection among individual animals was highly variable. Pre-post differences in residual cover of litter, grass, forbs and shrubs did not differ between supplementation strategies. Using supplementation to increase use levels and reduce fuel loads on specific areas appears to be more complicated than placing supplements in those areas.

Shifting Cattle Producer Beliefs on Stocking and Invasive Forage: Implications for Grassland Conservation

Edward J. Raynor, Jaime J. Coon, Timothy M. Swartz, Lois Wright Morton, Walter H. Schacht, and James R. Miller

We sought to improve communication by conducting surveys of livestock producers in the Grand River Grasslands region of southern Iowa and northern Missouri to gain insight into factors shaping decision-making and perspectives on effective management in those areas. About 37% of cattle producers were at least moderately willing to reduce stocking rates to achieve a positive conservation outcome. There is clearly conservation receptiveness from a segment of the producer community, even at some cost to production.

Foliar Nutrient Content Mediates Grazing Effects on Species Dominance and Plant Community Biomass

Maowei Liang, Elise S. Gornish, Pierre Mariotte, Jiquan Chen, and Cunzhu Liang

To examine grazing-induced change in the relative abundance and content of foliar carbon, nitrogen, and phosphorus of dominant and subordinate plant groups, we conducted a grazing experiment using four sheep stocking rates in the steppe of Inner Mongolia, China. We found that the dominant plant groups were relatively stable with respect to foliar nutrients, but subordinate plant groups adjusted foliar nutrient content to grazing intensity. We believe that foliar nutrient content may play a key role in mediating plant community composition and biomass under grazing-managed succession.

Management Strategies of Free-Roaming Horses in Alberta Compared with Other Jurisdictions

Sanam Zomorodi and Tony R. Walker

We provide perspectives on free-roaming horse management strategies practiced in Alberta and compare them with those used in Canada and internationally to illustrate the importance of science-based and socially inclusive management strategies. We compared best management practices with four main concerns of free-roaming horse management: cultural heritage, wild horse designation, lack of scientifically-based population monitoring, and societal considerations. We recommend that lessons learned from other jurisdictions be applied in Alberta to provide a holistic framework for a feral horse management strategy.

Diagnostic Feed Values of Natural Grasslands Based on Multispectral Images Acquired by Small Unmanned Aerial Vehicle

Rui Gao, Qingming Kong, Hongguang Wang, and Zhongbin Su

We used an unmanned aerial vehicle (UAV) to capture spectral images, which enabled the acquisition of vegetation indices of various grassland sites. We found correlations between nutritional values and vegetation indices. Our results demonstrate that UAVs can be used to estimate the feed values of natural grasslands. This approach provides a rapid, flexible, and efficient method of estimating feed values.

Evaluating Domestic Sheep Survival with Different Breeds of Livestock Guardian Dogs

Daniel Kinka and Julie K. Young

Livestock guard dogs are commonly used to protect sheep, but little is known about the ability of different dog breeds to deter sheep predators. We found that each of the dog breeds used were associated with reductions in sheep depredation compared to a mixed-breed dog. The degree of protection was slightly different among dog breeds with certain ones being better at deterring specific predators. These findings will help livestock producers and wildlife managers make tailored decisions about how best to incorporate different breeds of guard dogs into sheep grazing programs.

Effects of Livestock Grazing Management on Grassland Birds in a Northern Mixed-Grass Prairie Ecosystem

Skyler T. Vold, Lorelle I. Berkeley, and Lance B McNew

Grazing management has strong implications for grassland bird conservation because most of the declining grassland bird habitat is restricted to rangelands managed for livestock production. We found associations between bird abundance and grazing management criteria, such as stocking rate, were species specific. In the northern mixed-grass prairie, widespread guidelines for livestock grazing systems may be inappropriate for grassland bird conservation efforts. High stocking rates may negatively impact populations of birds requiring dense grassland habitat.

Intake and Selection of Goats Grazing Heterogeneous Vegetation: Effect of Gastrointestinal Nematodes and Condensed Tannins

Rafael Arturo Torres-Fajardo, Jorge Augusto Navarro-Alberto, Javier Ventura-Cordero, Pedro Geraldo González-Pech, Carlos Alfredo Sandoval-Castro, José Israel Chan-Pérez, and Juan Felipe de Jesús Torres-Acosta

We evaluated the effect of gastrointestinal nematodes and condensed tannin content of plants on intake and selection of feed resources by Criollo goats in a tropical deciduous forest. Neither a gastrointestinal nematode infection nor neutralization of condensed tannins influenced intake or selection of feed resources. Selection toward grass species could be a tradeoff between optimal harvest of nutritional plants and the health risk of consuming gastrointestinal nematodes. Our results suggest that a tropical deciduous forest is a sustainable feed resource for goats.

Low-Cost Livestock Global Positioning System Collar from Commercial Off-the-Shelf Parts

Jason W. Karl and James E. Sprinkle

Our objective was to develop and test a low-cost Global Positioning System (GPS) unit using off-the-shelf components because GPS tracking devices are an important technology for studying the distribution and movement of livestock and wildlife and are expensive in the quantities needed. Our total cost per GPS unit was $54.78 and our units had an average displacement and error probability similar to other GPS units. Low-cost location trackers could encourage collection of more information to better understand livestock use on rangelands, but their limitations should be considered relative to study objectives and duration.

Landowner Perceptions of Legal Liability for Using Prescribed Fire in the Southern Plains, United States

Urs P. Kreuter, Dianne A. Stroman, Carissa L. Wonkka, John Weir, Alexandra A. Abney, and James K. Hoffman

Prescribed fire is an important component of most vegetation dynamics throughout the US, but there is landowner resistance to its use as a land management tool. We explored factors that affect perceptions of landowners in

the Southern Plains about prescribed fire liability and their willingness to use prescribed fire as a management tool. Language in state statutes pertaining to prescribed fire should be modified to reduce landowner concerns over legal liability. Prescribed Burn Areas should be more widely established. Additionally, public cost-sharing funds for woody plant management should prioritize prescribed fire.

To Insure or not to Insure? Factors Affecting Acquisition of Prescribed Burning Insurance Coverage

Rajan Parajuli, Omkar Joshi, Neelam C. Poudyal, and Urs P. Kreuter

Fires that escape from a prescribed burn accidentally may cause property damage, injuries, and even human casualties. Purchasing insurance to cover such damages may be beneficial for prescribed burn practitioners. Using survey data, we found that prescribed burn practitioners were most likely to obtain fire insurance if they are landowners themselves or have a written prescribed burn plan. They are less likely to purchase fire insurance if their land management objective was to control invasive weeds. Our information could be beneficial for promoting the acquisition of insurance among prescribed burn practitioners.

Long-Term Declining Trends in Chihuahuan Desert Forage Production in Relation to Precipitation and Ambient Temperature

Matthew M. McIntosh, Jerry L. Holechek, Sheri A. Spiegal, Andrés F. Cibils, and Richard E. Estell

Rising temperatures and more frequent droughts are posing new challenges to range livestock producers in the southwestern United States and many other parts of the world. Over a 52-yr study period, Chihuahuan Desert rangelands lost 43% of their grazing capacity based on perennial grass production. Nine drought years occurred in the second half of our study compared with 2 years in the first half. Our research supports predictions by climate scientists that higher temperatures, more frequent droughts, and lower, as well as more erratic, precipitation will adversely affect the grazing capacity of rangelands in the southwestern United States.

Grassland Degradation on the Qinghai-Tibetan Plateau: Reevaluation of Causative Factors

Jianjun Cao, Jan F. Adamowski, Ravinesh C. Deo, Xueyun Xu, Yifan Gong, and Qi Feng

Our objective was to re-evaluate the causes of grassland degradation on the Qinghai-Tibetan Plateau. We found that privatization and sedentarization, small mammals, climate change, harsh environments, fragile soils, and overgrazing contribute to grassland degradation. However, neither obsolete livestock husbandry methods nor recent conversion of rangelands to agriculture had a meaningful influence. Determining the total amount of degraded grasslands and establishing grassland degradation criteria will help manage grasslands sustainably in this region.

Plant Species Composition and Forage Production 14 Yr After Biosolids Application and Grazing Exclusion

E. Avery, M. Krzic, B. M. Wallace, R. F. Newman, G. E. Bradfield and S. M. Smukler

We examined the effects of a single surface application of biosolids on plant species composition, forage quality and quantity, and carbon stocks after 14 years of rest in rangelands of Central Interior British Columbia, Canada. Increases in aboveground biomass of grasses and percent cover of plant litter, greater uptake of macronutrients and micronutrients, but reductions in bare soil and microbiotic crust cover were found in the biosolids treatment relative to our control treatment. We found no significant difference in forage digestibility between biosolids and control treatments. Our findings indicate that biosolids application to ungrazed rangeland can increase long-term forage production and reduce bare soil. However, the biosolids application led to a plant community composition shift from bluebunch wheatgrass to non-native Kentucky bluegrass.

Inductive Approach to Build State-and-Transition Models for Uruguayan Grasslands

A. Altesor, F. Gallego, M. Ferrón, F. Pezzani, L. López-Mársico, F. Lezama, S. Baeza, M. Pereira, B. Costa, and J. M. Paruelo

We built state-and-transition models, which represent nonlinear vegetation dynamics as a group of discrete states and transitions between them, for Uruguayan grasslands using aerial photographs that are available worldwide (i.e., MODIS). Ecosystem functioning and the supply of regulating ecosystem services were estimated for each grassland state. We adjusted the models using stakeholder opinions and experiences. We found that based on stakeholder input, stocking rate, sheep/cattle ratio, and grazing methods were the primary management practices promoting the transition among model states.

Native Seeds in the Marketplace: Meeting Restoration Needs in the Intermountain West, United States

Thomas A. Jones

Largescale restoration in the Intermountain West is driven by response to accelerating ecological disturbances and government programs that divert privately owned cropland into soil, water, and wildlife conservation areas. A high demand for native seeds allows for a large and diverse product base of native grasses, shrubs, and forbs of cultivars, hand-selected germplasms, and source-identified populations. Two sister native seed industries, one based on field cultivation and another based on collection from public wildlands, are likely the largest of their kind in the world, and appear to be a potential profit-base for rural communities.