HIGHLIGHTS

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Incorporating Plant Mortality and Recruitment Into Rangeland Management and Assessment

Tony Svejcar, Jeremy James, Stuart Hardegree, and Roger Sheley

Predicting future vegetation change is central to managing for healthy rangeland. We extend the idea of using mortality and recruitment as a basis for assessing trends and predicting vegetation dynamics. The literature suggests that rangeland bunchgrasses and forbs have shorter life spans than commonly assumed, which places high dependence on recruitment for plant community stability. Our synthesis indicates that recruitment might be a very sensitive measure of trends and possibly the best predictor of future vegetation dynamics, especially during restoration. A greater understanding of the role of recruitment in vegetation dynamics is warranted and could be essential for science-based rangeland management.

Season and Intensity of Burning on Two Grass Species of the Chihuahuan Desert

Miguel Luna, Carlton M. Britton, Sandra Rideout-Hanzak, Carlos Villalobos, Ronald E. Sosebeex, and David B. Wester

Broomgrass muhly (*Muhlenbergia rigida*) is a native perennial grass common in the Mexican High Plateau but also is found in parts of the Chihuahuan Desert in the southern United States and northern Mexico. Because of its invasive ecological behavior and poor forage quality, it is generally considered undesirable. We studied effects of prescribed fire on small and large broomgrass muhly and blue grama (*Bouteloua gracilis*), a common associated species, under two simulated fuel loads in winter, summer, and spring seasons. Results suggested that winter is the best season for prescribed burning to reduce broomgrass muhly with minimal impacts on blue grama.

Chihuahuan Desert Grassland Responds Similarly to Fall, Spring, and Summer Fires During Prolonged Drought

Laura M. Ladwig, Scott L. Collins, Paulette L. Ford, and Laura B. White

Prescribed burns often help maintain grassland communities and are typically scheduled to follow natural fire regimes, but burning outside the natural fire season could be equally effective and more convenient for managers. We conducted a field experiment in Chihuahuan Desert grassland to determine if fire seasonality, specifically fire during spring, summer, or fall, influenced plant community recovery. Grasslands responded to fire but not fire seasonality, and grass cover in burned plots remained lower than unburned controls for 3 years. Fire seasonality did not influence rate of community recovery, but extended drought was possibly more influential than fire on grassland dynamics.

Explaining Cattle Rancher Participation in Wildlife Conservation Technical Assistance Programs in the Southeastern United States

Adam S. Willcox and William M. Giuliano

As enrollment and acreage caps of cost-share financial assistance programs for United States cattle producers decrease, workshops and field days could become increasingly important for wildlife conservation. We investigated Alabama, Florida, Georgia, and Mississippi producers' participation in conservation workshops and field days. Most ranchers agreed that workshops were a good way for ranchers to learn about wildlife management. However, participation is limited. Workshop attendance might increase if leaders of social groups important to ranchers (e.g. friends, colleagues, and trusted agency staff) could be incorporated into the workshop or field day programs by taking lead roles as organizers, presenters, or demonstrators.

Vegetation Management Across Colorado Plateau BLM Lands: 1950–2003

Miranda D. Redmond, Elizabeth S. Golden, Neil S. Cobb, and Nichole N. Barger

Large tracts of piñon–juniper (*Pinus edulis*–*Juniperus osteosperma*) woodlands have been managed over the last century across the Colorado Plateau. Over 610,000 acres of land were treated between 1950 and 2003, corresponding to 6.6% of the piñon–juniper vegetation type on Bureau of Land Management (BLM) land. We compiled and archived treatment documentation from BLM field offices and quantified the number, spatial extent, and implementation cost of tree-reduction and seeding treatments within piñon–juniper woodlands. The land-use history reported in this study and the accompanying freely accessible online database is a useful tool to guide research and management objectives and methodology.

Ideal Free Distributions of Mobile Pastoralists in Multiple Seasonal Grazing Areas

Mark Mortiz, Ian M. Hamilton, Paul Scholte, and Yu-Jen Chen

The pastoral system in the far north region of Cameroon is best described as a system in which mobile pastoralists have open access to common-pool grazing resources. We examined whether mobile pastoralists distribute themselves over grazing resources in an ideal free distribution, in which resource use is proportion to resource availability. We mapped the distribution of resources and pastoralists in two seasonal grazing areas and found evidence of an ideal free distribution. These findings support that this is a self-organizing complex adaptive system in which pastoralists distribute themselves effectively over available grazing resources, with no evidence of a tragedy of the commons.

Can Imazapic and Seeding Be Applied Simultaneously to Rehabilitate Medusahead-Invaded Rangeland? Single vs. Multiple Entry

K. W. Davies, M. D. Madsen, A. M. Nafus, C. S. Boyd, and D. D. Johnson

Medusahead (*Taeniatherum caput-medusae*) invasion reduces livestock forage, degrades wildlife habitat, and promotes frequent wildfires. Rehabilitating medusahead-invaded rangeland can be expensive. To reduce the cost of rehabilitation, herbicide control with imazapic can be applied concurrent with seeding desired species. We compared this method to seeding desired species 1 year after imazapic application. Establishment of seeded species was more than 10 times greater when seeding occurred 1 year after imazapic application, probably due to reduced herbicide mortality of seeded species. Waiting 1 year to seed after imazapic application appears to be a better rehabilitation strategy than combining seeding and imazapic application into a single treatment.

Invasion Is Contingent on Species Assemblage and Invasive Species Identity in Experimental Rehabilitation Plots

A. Joshua Leffler, Eamonn D. Leonard, Jeremy J. James, and Thomas A. Monaco

Rangeland rehabilitation efforts often use few species, potentially reducing the effectiveness of plant diversity in suppressing invasion. We examined resistance to invasion by cheatgrass (*Bromus tectorum*) and dyer's woad (*Isatis tinctoria*) in monoculture and diverse assemblages of forbs, grasses, and shrubs commonly used in rehabilitation. Diverse assemblages of few species were not always more resistant to invasive species than monocultures, but assemblages of grasses suppressed invasion by cheatgrass, assemblages of forbs, and shrubs suppressed invasion by dyer's woad, and assemblages of all three suppressed invasion by both species. Choice of species in rehabilitation influences invasion resistance if only few species are available.

Fuel Reduction, Seeding, and Vegetation in a Juniper Woodland

B. K. Kerns and M. A. Day

Disturbed areas created from tree cutting are frequently seeded to help restore vegetation quickly and combat exotic plant invasion. We seeded plots in slash piles and skid trails after juniper (*Juniperus occidentalis*) cutting in central Oregon. Using two native seed mixes, we measured plant response for 2 years. Seeding helped establish native plants, but did not mitigate exotic annual grass species spread. In the short term, the disturbance associated with juniper cutting led to an increase in exotic grass cover, but longer-term evaluation is needed. Intensive exotic species control might be needed to limit invasion after tree cutting in low-elevation juniper woodlands.

Targeted Grazing of White Locoweed: Short-Term Effects of Herbivory Regime on Vegetation and Sheep

Laura E. Goodman, Andrés F. Cibils, Stephanie C. Lopez, Robert L. Steiner, John D. Graham, Kirk C. McDaniel, Laurie B. Abbott, Bryan L. Stegelmeier, and Dennis M. Hallford

White locoweed (*Oxytropis sericea*) is a toxic legume responsible for substantial economic losses to the livestock industry. We investigated the effects of targeted grazing by sheep on white locoweed and non-target vegetation in relation to herbicide or no treatment as well as locoweed effects on sheep. Targeted grazing reduced locoweed density, canopy cover, flowering stalks and plant size, and increased grass canopy cover. Blood constituents showed lower intoxication levels in sheep that grazed locoweed intermittently versus counterparts that grazed locoweed continuously. Intermittent grazing of locoweed-infested rangeland patches may be a viable

means of suppressing locoweed abundance without detrimentally affecting animal health.

Interactive Effects of Nitrogen Deposition and Grazing on Plant Species Composition in a Serpentine Grassland

Jae R. Pasari, Daniel L. Hernández, and Erika S. Zavaleta

In low-nutrient serpentine grasslands of the San Francisco Bay area, the fertilizing effects of nitrogen deposition from smog might promote exotic grasses. We simulated increases in nitrogen deposition, manipulated grazing with fencing, and monitored grazing intensity using camera traps to assess grazing as a tool to reduce exotic grasses. Native species diversity might increase slightly under low-level nitrogen deposition with moderate grazing. However, grazing appears to be less effective at limiting exotic grasses as nitrogen accumulates. Grazing intensity varied dramatically within the single stocking rate used to manage this ecosystem. Given this variation, more targeted management might be required to improve conservation outcomes.

Testing for Thresholds in a Semiarid Grassland: The Influence of Prairie Dogs and Plague

David J. Augustine, Justin D. Derner, and James K. Detling

Current state-and-transition models suggest that in the western Great Plains, black-tailed prairie dogs (*Cynomys ludovicianus*) create a vegetation state characterized by annual forbs,

unpalatable bunchgrasses, and increased bare soil, which requires more than 40 years following prairie dog removal to transition back to a state dominated by palatable perennial grasses. We studied how duration of prairie dog occupancy influences vegetation following prairie dog extirpation. On sites occupied for the prior 7–10 years, C₄ perennial grasses recovered after 5 years following prairie dog extirpation. Prairie dogs did not induce irreversible shifts in vegetation state; rather, their effects represent a phase shift in landscapes where prairie dogs are regulated by epizootic plague.

Animal-Driven Rotational Grazing Patterns on Seasonally Grazed New Mexico Rangeland

Mohammed N. Sawalhah, Andres F. Cibils, Chuan Hu, Huiping Cao, and Jerry L. Holechek

Early rotational grazing systems tried to reproduce ecosystem benefits promoted by ungulate migratory patterns, yet cattle can create their own smaller scale grazing systems in season-long grazed pastures. We tracked cattle over 4 years to determine: a) whether cattle establish patch-scale rotational patterns within seasonally grazed pastures, and b) which patch-related attributes influence such patterns. Cows visited grazed patches more than once during a 20-day sampling period and appeared to establish their own pattern of rotation. This pattern was influenced by forage availability, the extent of green up at the time of grazing, and patch nonforage attributes such as accessibility and distance from drinking water.

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