

HIGHLIGHTS

Rangeland Ecology and Management, July 2008



Recommendations for Development of Resilience-Based State-and-Transition Models

D. D. Briske, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver

Conceptual modifications are recommended for incorporation in state-and-transition models (STMs) to explicitly link this framework to ecological resilience. Ecological resilience describes the amount of change or disruption that is required to transform a system from one stable state to another. Resilience-based ecosystem management provides greater opportunities to incorporate adaptive management than threshold-based management because thresholds emphasize limits of state resilience, rather than conditions that determine the probability that these limits will be surpassed. We recommend that the STM framework describe triggers, at-risk communities, feedback mechanisms, and restoration pathways and develop indicators that enable managers to identify at-risk plant communities and potential restoration pathways.

Short- and Long-Term Vegetation Change Related to Grazing Systems, Precipitation, and Mesquite Cover

Fadzayi E. Mashiri, Mitchel P. McClaran, and Jeffrey S. Fehmi

Rangeland scientists struggle with how long experiments must continue in order to detect treatment effects in semi-arid ecosystems characterized by slow responses and high spatio-temporal variability. We compared grass and shrub density and cover responses to grazing systems (yearlong vs. seasonal rotation), and covariates (precipitation and mesquite gradients) over 12 yr and 34 yr on the Santa Rita Experimental Range in Arizona. Grazing systems did not affect plant dynamics in either time period. Our results did not resolve the question of experiment length, but for

managers the results suggest that applying this seasonal grazing system is unlikely to improve vegetation.

Paddock Size and Stocking Density Affect Spatial Heterogeneity of Grazing

Matthew K. Barnes, Brien E. Norton, Motoko Maeno, and John C. Malechek

The debate over rotational grazing may be partially explained by more even use in the smaller paddocks, higher stocking densities of full-scale rotations, and even smaller research paddocks. We compared heterogeneity of utilization in paddocks representing subdivision from 2-paddock deferred rotation grazing to 16-, 32-, and 64-paddock, 2-cycle rotational grazing. Rotationally grazed paddocks after one cycle were more evenly grazed than deferred rotation paddocks, but this difference weakened after an inadequate recovery period and second grazing cycle in rotational paddocks. Grazing distribution can be improved by intensifying management, but this depends on how adaptively the system is managed.

Interspace/Undercanopy Foraging Patterns of Beef Cattle in Sagebrush Habitats

Kevin A. France, Dave C. Ganskopp, and Chad S. Boyd

Although sagebrush and accompanying undercanopy herbage are recognized as important cover for ground nesting birds, the interspace/undercanopy foraging patterns of cattle had not been studied. We monitored cattle use of interspace and undercanopy grasses and measured grazing effects on screening cover among Wyoming big sagebrush. As herbage use approached 40% by weight, about 70% of interspace and 15% of undercanopy tussocks were grazed, and horizontal screening cover was reduced similarly across all strata from ground level to the tops of sagebrush. These findings will benefit grazing managers where the well-being of ground nesting birds is an important issue.

Piñon–Juniper Woodland Use by Cattle in Relation to Weather and Animal Reproductive State

Christina M. Black Rubio, Andrés F. Cibils, Rachel L. Endecott, Mark K. Petersen, and Kenneth G. Boykin

We evaluated the role of piñon–juniper (PJ) woodlands as shelter for cattle at a site in New Mexico. We used GPS collars to track positions of 16 cows (8 nursing and 8 open) during two consecutive calving seasons. Preference for PJ woodland of all cows averaged across the study period increased with decreasing open short-grass forage availability and increasing proportion of days in which cows were subjected to short-term thermal stress. PJ woodlands with abundant understory can play an important role in providing shelter for nursing or dry cattle during winter, particularly in years when forage availability is scarce.

***Sphaeralcea angustifolia* as a Substitute for Alfalfa for Growing Goats**

Miguel Mellado, Gabriela Salas, and Wolfgang Pittroff

Sphaeralcea angustifolia (Cav.) G. Don (narrowleaf globe-mallow) occurs on rangelands in the United States and Mexico, and it constitutes an important forage for both domestic and wild herbivores. In order to determine the nutritional properties of this species, forty 2-month-old female goats were fed different levels of *S. angustifolia*. In general, nutrient composition of *S. angustifolia* was close to that of alfalfa hay. Moreover, replacing all of the alfalfa with this forage did not affect weight gain and feed intake of goats, which indicates that, if domesticated and incorporated into a crop production system, this species could serve as an economical forage for growing goats.

Assessment of Juniper Encroachment Using Satellite Imagery and Geospatial Data

Temuulen Tsagaan Sankey and Matthew J. Germino

Juniper encroachment into adjacent shrublands and grasslands is one of the most pronounced environmental changes observed in recent decades, and our ability to detect this encroachment using satellite imagery is important. Juniper cover changes in southeastern Idaho were estimated using Landsat satellite imagery from 1985 and 2005. The estimated juniper cover change varied between 22–30% with greater encroachment rates on grazed areas compared to ungrazed areas, and on intermediate and west-facing slopes compared to other areas. Land management can be adjusted to abate further unwanted increases in juniper, if further inquiry can demonstrate causality between juniper encroachment and other variables.

Precision, Repeatability, and Efficiency of Two Canopy Cover Estimate Methods in Northern Great Plains Vegetation

Amy J. Symstad, Cody L. Wienk, and Andy D. Thorstenson

Many papers compare rangeland monitoring methods, but few look at all facets that influence a method's utility. We compared canopy cover and species richness values obtained with a point-frequency and visual estimate method, as well as the methods' precision, repeatability, and efficiency, in a variety of habitats in the northern Great Plains. The two methods had similar precision and repeatability for most variables examined, but the point-frequency method was far less repeatable for species richness and cover of rarer species, and the visual estimate method required twice as much time. Information from this study will help managers charged with monitoring rangelands to determine which method is most useful in their situation.

Factors Affecting *Bromus tectorum* Seed Bank Carryover in Western Utah

Duane C. Smith, Susan E. Meyer, and V. J. Anderson

Revegetation efforts on disturbed rangelands in the Intermountain West are often unsuccessful when persistent cheatgrass seed banks are in place. We quantified the influence of climatic factors on the longevity of seed banks at four sites and found that seed banks persisted longest at the most xeric site, but that all sites experienced an exponential decline of carryover seed resulting in a seed bank life span of no more than 3 yr. Close attention to precipitation records coupled with simple seed bank quantification procedures can aid land managers in predicting the potential impact of cheatgrass competition from the seed bank when revegetating disturbed rangeland sites.

Leafy Spurge Suppression by Flea Beetles in the Little Missouri Drainage Basin, USA

Luke W. Samuel, Donald R. Kirby, Jack E. Norland, and Gerald L. Anderson

Leafy spurge infested areas doubled every decade in North Dakota until the 1990s primarily because leafy spurge has no evident natural enemies. In the most recent decade, leafy spurge has not increased in area due to increased awareness and active control efforts such as biocontrol with *Aphthona* spp. flea beetles. This study found that 4–5 yr after an *Aphthona* spp. flea beetle release, leafy spurge stem density and cover was suppressed at 91% of the sites evaluated within the Little Missouri River drainage basin. The resulting plant community after leafy spurge suppression resembled undisturbed communities (no grazing and no fire), which are characterized by an increased occurrence of native perennial grasses in xeric sites and more invasive exotic grasses such as Kentucky bluegrass in mesic areas.

Physiological and Morphological Characterization of Basalt Milkvetch (*Astragalus filipes*): Basis for Plant Improvement

Kishor Bhattarai, Douglas A. Johnson, Thomas A. Jones, Kevin J. Connors, and Dale R. Gardner

Few legumes from North America are commercially available for use on semiarid rangelands of the western United States. Basalt milkvetch (*Astragalus filipes*) is a legume that is widely distributed in western North America and holds promise for revegetation, reclamation, and restoration. Seeds from 67 locations throughout six western states were collected, seedlings were transplanted to two sites in northern Utah, and plants were evaluated for various physiological and morphological characteristics. Results provide important data for identifying basalt milkvetch collections that have the greatest potential for use on degraded rangelands.

Perceptions of Texas Landowners Regarding Fire and Its Use

Urs P. Kreuter, J. Brad Woodard, Charles A. Taylor, and W. Richard Teague

Periodic fire is a historical element of many rangelands, but landowners are frequently reluctant to burn their land because they perceive it to be a dangerous or wasteful practice. We report the results of a survey evaluating perceptions of fire use for 785 landowners in six Texas counties. Reasons respondents did not apply fire included lack of resources, assistance with burn plan development, and legal concerns, while members of the Edwards Plateau Prescribed Burning Association viewed prescribed fire more positively. Our study suggests that the application of prescribed fire on privately owned land could be increased through the formation of prescribed burning associations.

Erratum

Wooley, S. C., S. Walker, J. Vernon, and R. L. Lindroth. 2008. Aspen Decline, Aspen Chemistry, and Elk Herbivory: Are They Linked? *Rangelands* 30(1):17-21.

In this article, *r* values in Table 1 should be preceded by negative signs. The primary author regrets the error. The corrected table is shown below.

Table 1. Simple linear regression results explaining the relationship of total consumption (g) or leaf consumption (g) in relation to the foliar concentration of phenolic glycosides and condensed tannins

	Total consumption		Leaf consumption	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
Salicortin	-0.68	0.207	-0.95	0.014
Tremulacin	-0.61	0.279	-0.89	0.045
Total phenolic glycosides*	-0.65	0.235	-0.92	0.024
Condensed tannins	-0.23	0.704	-0.51	0.375

*Total phenolic glycosides are the sum of the concentration of salicortin and tremulacin.