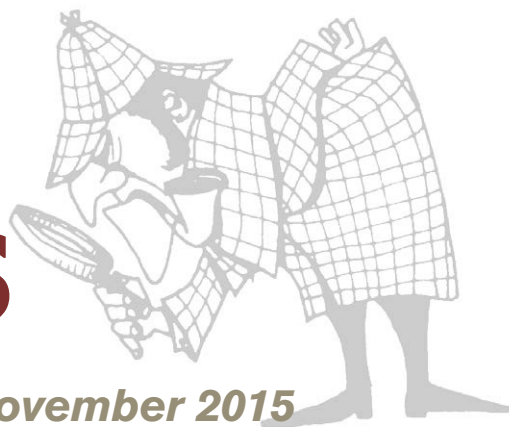


# HIGHLIGHTS



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## **Pre-fire (preemptive) Management to Decrease Fire-Induced Bunchgrass Mortality and Reduce Reliance on Post-Fire Seeding**

April Hulet, Chad S. Boyd, Kirk W. Davies, and Tony J. Svejcar

To successfully manage rangelands that are under severe threat from exotic annual grasses, we must focus on increasing resilience to disturbance and resistance to exotic annual grass invasion. We present a fuel-based model and research framework for Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) rangelands that focuses on increasing resilience to fire and resistance to exotic annual grasses through the maintenance of perennial bunchgrasses. We suggest potential research objectives that evaluate the interactions between biotic and abiotic factors that influence fire-induced bunchgrass mortality. The goal is to ultimately decrease our reliance on marginally successful post-fire restoration practices through preemptive management strategies.

## **Long-Term Effects of Phosphorus on Dynamics of an Overseeded Natural Grassland in Brazil**

Leandro B. Oliveira, Emerson M. Soares, Felipe Jochims, Tales Tiecher, Anderson R. Marques, Bruno C. Kuinchtner, Danilo S. Rheinheimer, and Fernando L. F. de Quadros

Low phosphorus availability on soil of South Brazil natural grasslands is a common feature and limits the

success of overseeding cool season species to enhance forage productivity throughout the year. We evaluated annual vegetation dynamics on a natural grassland 16 years after an initial fertilization with triple superphosphate or Gafsa rock phosphate and annual ryegrass introduction. Phosphate fertilization along with annual ryegrass overseeding increased cool season forage production, changed biomass contribution by the main species, but did not affect plant diversity. Overseeding and phosphorus fertilization could increase animal production on natural grasslands and help conserve this natural environment.

## **Ranch Owner Perceptions and Planned Actions in Response to a Proposed Endangered Species Act Listing**

Corrine N. Knapp, F. Stuart Chapin III, and James O. Cochran

The Gunnison sage-grouse (*Centrocercus minimus*) is an iconic species recently proposed for protection under the Endangered Species Act. This project interviewed 41 landowners, who manage important Gunnison sage-grouse habitat, to document how they perceive and plan to respond to the proposed listing. When comparing a listed to non-listed scenario, there was a significant increase in landowners who considered selling land and water and a decrease in adoption of conservation actions. In order to avoid these unintended consequences, we suggest increased collaboration and transparent communication about potential implications with grouse listing for improved conservation outcomes.

## **A Temporal Analysis of Elephant-Induced Thicket Degradation in Addo Elephant National Park, South Africa**

V. Kakembo, J. Smith, and G. Kerley

Elephant induced thicket degradation was investigated in the Addo Elephant National Park, Eastern Cape, South Africa. Satellite imagery from 1973, 1986, 1999, 2002 and 2010 was used to analyze changes in thicket condition in relation to the park's expansion. Thicket degradation increased as the park expanded. Therefore, park expansion per se is not the panacea for elephant impacts on vegetation; establishing botanical reserves in new areas of expansion prior to being populated by elephants is recommended.

## **Managing Mixed-grass Prairies for Songbirds Using Variable Cattle Stocking Rates**

M. S. Sliwinski and N. Koper

Managing songbird habitat with livestock grazing in the northern mixed-grass prairies is not well understood. We examined prairie songbird population response to a range of stocking rates in continuous, season-long grazing. Sprague's pipit (*Anthus spragueii*) and Baird's sparrow (*Ammodramus bairdii*) declined with any grazing. Savannah sparrow (*Passerculus sandwichensis*) increased only with moderate stocking rates, and chestnut-collared longspur (*Calcarius ornatus*) increased only with grazing above the recommended rate. Managing for the full diversity of prairie songbirds will require that some pastures are grazed at higher than recommended rates, and other at lower than recommended rates, which differs from management geared towards livestock-production goals.

## **Behavioral Responses at Distribution Extremes: How Artificial Surface Water Can Affect Quail Movement Patterns**

Evan P. Tanner, R. Dwayne Elmore, Samuel D. Fuhlendorf, Craig A. Davis, Eric T. Thacker, and David K. Dahlgren

The efficacy of providing supplementary water sources for wildlife during times of limitation is uncertain. We examined the influence of artificial surface water on the ecology of northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*) during periods of drought in a semi-arid rangeland. Both quail species were attracted towards water sources across seasons. However, quail survival and nest success did not improve with greater water sources. This study does not support water supplementation to increase or sustain quail populations on semi-arid rangelands. Because quail can often obtain sufficient water through their diet, managing conditions that increase vegetation cover and arthropod abundance may be more effective.

## **Contrasting Mechanisms of Recovery from Defoliation in Two Intermountain-Native Bunchgrasses**

Jayanti Ray Mukherjee, Thomas A. Jones, Peter B. Adler, and Thomas A. Monaco

Late-spring grazing reduces native, cool-season perennial bunchgrasses in the Intermountain West. We compared plant response to defoliation by relatively grazing intolerant bluebunch wheatgrass (*Pseudoroegneria spicata*) with more tolerant Snake River wheatgrass (*Elymus wawawaiensis*). Snake River wheatgrass produced more tillers with greater mass following defoliation than did bluebunch wheatgrass. Specific leaf area (leaf area per biomass) following defoliation was not a good indicator of grazing tolerance in either species. The ability to produce more tillers with greater mass following defoliation may be a mechanism that increases defoliation tolerance. These findings suggest that an understanding of tiller demography may provide direction for characterizing plant materials for grazing tolerance.

## **Evaluating Winter/Spring Seeding of a Native Perennial Bunchgrass in the Sagebrush Steppe**

Chad S. Boyd and Jarod A. Lemos

Post-fire restoration of native perennial grasses is key to preventing invasion of exotic annual grasses in sagebrush steppe plant communities. We evaluated the feasibility of winter/spring seeding of bluebunch wheatgrass (*Pseudoroegneria spicata*) as an alternative to fall seeding. We found seed germination and seedling emergence were correlated strongly with seasonal precipitation, regardless of timing of planting, and that winter/spring-planted seedlings had higher survival relative to fall planting. Our results indicate winter/spring seeding of bluebunch wheatgrass is practical in years approaching average precipitation, but additional research is needed to determine environmental factors driving within-year variation in demographics of winter/spring planted seedlings.

## **Germination and Seedling Emergence of Three Semi-Arid Western North American Legumes**

B. Shaun Bushman, Douglas A. Johnson, Kevin J. Connors, and Thomas A. Jones

Germination methods for legumes native to semi-arid western North America are necessary to produce stands for seed production and rangeland restoration. We tested the effect of seed scarification, planting depth, and soil composition on seedling emergence of western prairie clover (*Dalea ornate*), Searls' prairie clover (*Dalea searlsiae*), and basalt milkvetch (*Astragalus filipes*). Scarification increased germination and seedling emergence of all three species. All species had slower emergence at 0.75-inch than 0.24-inch planting depth, but total seedling emergence was only reduced for milkvetch. Prairie clover emergence was higher in sandy than clay soils, while milkvetch did better in clay than sandy soil.

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