

Highlights

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Historical and Modern Disturbance Regimes, Stand Structures, and Landscape Dynamics in Piñon-Juniper Vegetation of the Western United States

William H. Romme, Craig D. Allen, John D. Bailey, William L. Baker, Brandon T. Bestelmeyer, Peter M. Brown, Karen S. Eisenhart, M. Lisa Floyd, David W. Huffman, Brian F. Jacobs, Richard F. Miller, Esteban H. Muldavin, Thomas W. Swetnam, Robin J. Tausch, and Peter J. Weisberg

Management of piñon-juniper ecosystems has been hindered by inadequate understanding of 1) the variability in ecosystem structure and function across the 100 million acres of piñon-juniper vegetation in the western United States, 2) historical disturbance regimes, and 3) mechanisms driving increases in tree density in many areas during the past 150 years. Fifteen scientists came together to summarize what we know and do not know about different kinds of piñon-juniper vegetation. The intent of this synthesis is to 1) provide a source of information for managers and policy-makers and 2) stimulate researchers to address the most important unanswered questions.

Surface Fuel Sampling Strategies: Linking Fuel Measurements and Fire Effects

Dirac Twidwell, Samuel D. Fuhlendorf, David M. Engle, and Charles A. Taylor, Jr.

We assessed the effectiveness of different sampling strategies in linking fine fuel load and crown scorch of ashe (*Juniperus ashei*) and redberry juniper (*Juniperus pinchotii*) for wet- and dry-period fire treatments. Our aim was to determine if spatial and temporal variation in scorch was best predicted by estimates of fuel load sampled with spatially explicit, multiscale sampling strategies or with traditional, simple random sampling. We found multiscale sampling was more effective in predicting scorch for both fire treatments.

We use these findings to illustrate how a multiscale design can increase prediction power, thereby improving our ability to provide resource professionals with critical values to target in management prescriptions.

Primary Productivity and Precipitation Use Efficiency in Mixed-Grass Prairie: A Comparison of Northern and Southern US Sites

Lance T. Vermeire, Rod K. Heitschmidt, and Matthew J. Rinella

Precipitation-use efficiency (PUE) is a key component of aboveground net primary production (ANPP). We used long-term data sets to contrast ANPP and PUE estimates between mixed-grass prairies in Montana and Texas. Results indicate that 21% less ANPP occurred in Montana than Texas, 90% of ANPP occurred by 1 July in Montana compared to 31 August in Texas, PUE was greater in Montana than in Texas ($0.56 \text{ g} \cdot \text{m}^{-2} \cdot \text{mm}^{-1}$ vs. $0.40 \text{ g} \cdot \text{m}^{-2} \cdot \text{mm}^{-1}$), and that contributions to PUE varied among plant functional type (PFT) and location. PUE was responsive to PFT composition, precipitation amount, and seasonal distribution, so changes in ANPP and PUE are expected with shifts in precipitation patterns.

Contingent Valuation of Woodland-Owner Private Amenities in Spain, Portugal, and California

Pablo Campos, Jose L. Oviedo, Alejandro Caparrós, Lynn Huntsinger, and Inocencio Coelho

Use of private amenity income by rangeland owners has been suggested as a potential explanation for both land market prices and the persistence of rangeland enterprises given marginal cash returns. We apply a contingent valuation design to independently estimate income and capital landowner amenity values in surveys of private woodland

owners in Spain, Portugal, and California. Landowners were willing to pay more than €120 per hectare per year, and attributed more than 30% of land market price to amenities. These amenities may produce public goods jointly with private ones and could justify public investment in maintaining environmentally beneficial private land stewardship.

Intensifying Beef Production on Utah Private Land: Productivity, Profitability, and Risk

D. Layne Coppock, Donald L. Snyder, Louise D. Sainsbury, Mansi Amin, and Travis D. McNiven

We investigated the efficacy of intensification of beef production using linear programming for three size-classes of model ranches. Results indicate that intensification could be profitable, sustainable, and strategically useful under several sets of conditions. Profitability generally increases with operation size, but when public grazing is eliminated herd sizes and profitability drop. Small and medium operations respond to loss of public grazing by using more irrigated pasture and alfalfa hay, whereas the larger operation uses a wider variety of irrigated and nonirrigated forages. When drought combines with restricted access to public grazing, profitability of small and medium operations drops further whereas profitability of large operations increases.

Agreement Between Measurements of Shrub Cover Using Ground-Based Methods and Very Large Scale Aerial Imagery

Corey A. Moffet

Very large scale aerial (VLSA) photography is a remote sensing method that collects and analyzes data more efficiently than ground-based measurement methods, but agreement with ground-based measurements needs to be quantified. In this study, agreement between ground- and image-measured cover and precision, and accuracy of image locations and scale, were assessed. VLSA image-measured cover was unbiased with mean absolute differences between VLSA- and ground-based methods less than 1.3%. The degree of agreement and absence of bias between VLSA image- and ground-measured cover is satisfactory to recommend using VLSA imagery to measure shrub cover.

Response of Bluebunch Wheatgrass and Medusahead to Defoliation

Roger L. Sheley and Tony J. Svejcar

We tested whether grazing managers could stimulate bluebunch wheatgrass (*Pseudoroegneria spicata*) production by lightly defoliating the plants in midspring to remove hormonal control of tiller initiation. If increased tiller production occurred, we expected increased competitive influence on neighboring undesirable medusahead (*Taeniatherum caput-medusae*) plants. Light early-spring defoliation followed

by 50% defoliation in early summer did not stimulate tiller or biomass production, and consequently had no effect on medusahead. It is likely that lack of soil moisture after the initial defoliation limited the plants' ability to positively respond.

Dynamics of Dormancy-Status Subpopulations of Indian Ricegrass Seed Held in Dry Storage

T. A. Jones

Establishment success of Indian ricegrass (*Achnatherum hymenoides*) in rangeland seedings is limited by seed dormancy. We examined seed lots of high-dormancy and low-dormancy genotypes selected from the cultivar Rimrock. From the results of germination tests, we calculated the size of four subpopulations (inviable, prechill-nonresponsive, prechill-responsive, and nondormant) for each lot, where total dormancy is the sum of the prechill-nonresponsive and prechill-responsive subpopulations. The prechill-responsive subpopulation was depleted more quickly by room-temperature storage than the prechill-nonresponsive subpopulation for both genotypes. Neither genotype lost viability after 62 months, suggesting that long-term room-temperature storage is a useful technique to improve Indian ricegrass germinability.

Influence of Cow Age on Grazing Distribution in a Mixed-Conifer Forest

Kenric J. Walburger, Micah Wells, Marty Vavra, Timothy DelCurto, Bruce Johnson, and Pricilla Coe

Our objective was to determine if cow age influenced distribution and resource use on forested rangelands from 1991 to 2001. All age classes preferred areas with gentler slopes ($P < 0.05$), with westerly aspects ($P < 0.05$), that were farther from water ($P < 0.05$), and that had greater forage production ($P < 0.05$) than pasture averages. Cattle older than 3 years of age selected areas with less canopy closure ($P < 0.05$) than the mean value for the pasture. Young cows (<4 years old) selected lower elevations and steeper slopes than the oldest cows ($P < 0.05$). In summary, cow age and correspondingly its experience directly influences distribution patterns and forage resource use.

Chemical Composition and Ruminal Degradability of Spineless Cactus Grown in Northeastern Brazil

Ângela M. V. Batista, Agenor C. Ribeironeto, Rodrigo B. Lucena, Djalma C. Santos, José B. Dubeux, Jr., and Arif F. Mustafa

The lack of drought-resistant forages is a major constraint to animal production in arid and semiarid regions of the world. Due to its high productivity in stressful environments,

cactus can be utilized as a forage for ruminant animals. We studied the chemical composition and in situ digestibility of different cactus (*Opuntia* and *Nopalea* spp.) cultivars grown in the northeastern region of Brazil. Our results showed

little effect of cultivar on the nutritive value of cactus. We concluded that cactus can be considered an excellent source of fermentable carbohydrates for grazing and nongrazing animals.