

HIGHLIGHTS

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Understanding Landscape Use Patterns of Livestock as a Consequence of Foraging Behavior

Karen L. Launchbaugh and Larry D. Howery

Many grazing management challenges stem from poor livestock distribution, resulting in overuse of some areas and low utilization of others. Herbivores are born with a set of behavioral and physical attributes that set a foundation for foraging. As herbivores grow and mature, they learn about their foraging environment through their own experiences and from other members of their herd or flock. In this paper, we describe the basic principles that underlie how animals make decisions about where to forage and how long to stay in a particular habitat. We also suggest management practices designed to modify animal behavior and alter habitat use patterns.

Identification and Creation of Optimum Habitat Conditions for Livestock

Derek W. Bailey

Habitat attributes can affect livestock performance as well as the uniformity and, correspondingly, the sustainability of grazing. Land managers can manipulate the habitat to improve conditions for livestock so that they perform better and avoid concentrating their grazing to limited areas of available rangeland. Livestock behavior can also be managed so that animals are more adapted to their habitat and use variable rangelands more efficiently and uniformly. Numerous opportunities exist to improve the ecologic and economic sustainability of livestock grazing, but continued research is needed to verify the effectiveness of management practices on a site-by-site basis.

Management Strategies for Sustainable Beef Cattle Grazing on Forested Rangelands in the Pacific Northwest

Timothy DelCurto, Marni Porath, Cory T. Parsons, and Julie A. Morrison

Nonuniform distribution and use of forage resources are a challenge for livestock managers on western rangelands. We

have synthesized a number of research projects that have evaluated specific management strategies that may mitigate distributional problems. Our research suggests that several tools are available to manage livestock distribution and resource selection. These tools, in turn, when incorporated into a managed grazing system can provide for sustainable beef cattle production systems for western rangelands.

Livestock Grazing and Wildlife: Developing Compatibilities

Martin Vavra

Livestock grazing systems can be developed that have the potential to benefit wildlife. Specific systems can lead to changes in plant community composition, increased productivity, improved nutritional quality, or modified habitat diversity. Development of such systems requires an intimate knowledge of the landscape and plant communities to be treated, habitat requirements of targeted wildlife species, impact on livestock, and consideration of other management manipulations that may be required. The idea of using livestock as a tool for improving wildlife habitat is not new; however, knowledge related to its implementation is meager, and implementation into management practices is rare.

Diet Composition, Forage Selection, and Potential for Forage Competition Among Elk, Deer, and Livestock on Aspen-Sagebrush Summer Range

Jeffrey L. Beck and James M. Peek

Little information is available on potential for forage competition among ungulates sharing aspen-sagebrush summer range. We evaluated elk, mule deer, cattle, and domestic sheep diet composition, diet overlap, and forage selection on aspen-sagebrush summer range in northeastern Nevada over 3 years to understand potential for forage competition to provide better information for managing these communities. Our results suggest potential for forage competition is highest for forbs in aspen communities. Monitoring productivity and use of key forages, particularly forbs in aspen communi-

ties, should complement management objectives on shared aspen–sagebrush summer range.

Grazing History Affects Willow Communities in a Montane Riparian Ecosystem

Kathryn A. Holland, Wayne C. Leininger, and M.J. Trlica

There are few long-term studies that have examined effects of livestock use on willow community structure. We collected data on willow canopy cover, species diversity, height, and stem density in a montane riparian ecosystem between 1988 and 1999 from 4 grazing treatments: long-term grazing (since the early 1900s), long-term grazing exclosures built in the 1950s, recent grazing, and recent grazing exclosures. Results suggest that continued long-term grazing exclusion may lead to a closed canopy, lower willow species diversity, reduction in height growth, and reduced recruitment. This information should help resource managers to determine appropriate livestock utilization levels and to develop management plans for similar riparian ecosystems.

Predicting Nitrogen Content in the Northern Mixed-Grass Prairie

M.R. Haferkamp, M.D. MacNeil, and E.E. Grings

A technique to provide rapid estimation of forage quality would offer a tool for assisting in range livestock management decisions. An equation to predict percent forage N from proportion of dead plant tissue and accumulated growing degree days was developed from forage quality data collected in eastern Montana using multiple linear regression. The equation accounted for 76% of the variation in percent N with a prediction error variance of 0.26. The resulting correlation between predicted and actual N in a validation dataset was 0.79. This equation may prove useful for predicting forage quality in similar environments.

Brome Control and Microbial Inoculation Effects in Reclaimed Cool-Season Grasslands

M. Dean Stacy, Barry L. Perryman, Peter D. Stahl, and Michael A. Smith

Invasion of smooth brome into native cool- and warm-season grassland communities has become problematic where presence of native species is important, necessary, or mandated. This study examined the efficacy of burning, grazing, herbicide, and microbial inoculation to reduce smooth brome while minimizing coincident detrimental effects on cool-season grasses in a reclaimed surface coal mine site. Grazing and burning were most effective after 2 consecutive years of treatment. Inoculation had little effect on soil microbial biomass content and mycorrhizal infection. Smooth brome can be controlled in the short term, shifting the balance of community composition toward native grass species.

Topsoil Depth Effects on Reclaimed Coal Mine and Native Area Vegetation in Northeastern Wyoming

Brenda K. Schladweiler, George F. Vance, David E. Legg, Larry C. Munn, and Rose Haroian

Uniform topsoil replacement may hinder compliance with reclamation bond release standards involving canopy cover, aboveground production, shrub density, and plant diversity. We evaluated variable topsoil replacement depths of 15, 30, and 56 cm and short-term revegetation success. Total vegetation and number of species from canopy cover and aboveground production sampling were greatest in the 30-cm reclaimed treatment and included desirable seeded and volunteer perennial grasses and forbs. When we compared this site to a 1991 reclaimed site, we noted a consistent general pattern of species establishment. Our research suggests that a mosaic of different topsoil depths creates a broad range of vegetation responses with standard revegetation practices. The ability to use different thicknesses of topsoil should be a reclamation practice available to mine operators.

Evaluation of Native and Introduced Grasses for Reclamation and Production

Walter D. Willms, Ben H. Ellert, H. Henry Janzen, and Harriet Douwes

Crested wheatgrass and Russian wildrye are commonly used for reseeding in the Mixed Prairie but have been implicated in soil deterioration. We compared their net primary production and soil organic C between monocultures of 4 native grass species and between native monocultures and their mixtures. Monocultures of the introduced grasses were less productive than 2 native species, and monocultures of native species were equally productive as their mixtures, whereas soil organic C was not affected by the treatments. The relative merits of a species cannot be defined by its origin, and mixtures must be qualified according to their composition.

A Process for Assessing Wooded Plant Cover by Remote Sensing

Jason D. Afinowicz, Clyde L. Munster, Bradford P. Wilcox, and Ronald E. Lacey

The ability to measure the extent of woody plant cover in the rangeland environment is essential for the scientific study of rangelands and of growing importance from a management perspective. This paper documents a process using readily available data sources to quantify the amount of brush cover as well as other significant land cover types in the Guadalupe River watershed, Texas. A validation of the method showed a reasonably high success for measurement of some land cover parameters such as the density of wooded cover, and less success at distinguishing broad types of land cover class-

es. The results of the study demonstrate an opportunity for further refinement of the process into a powerful tool for characterizing rangelands.

Ranchland Ownership Dynamics in the Rocky Mountain West

Hannah Gosnell and William R. Travis

Anecdotal and demographic data suggest that an ownership transition is under way on western rangelands, but few data exist on rates of ownership change or the nature of new owners. Ranch sales data for 3 counties in the Rocky Mountain West (1990–2001) were collected and analyzed, and a typology of owners was used to classify buyers. Rates of ownership change ranged from 14% to 45%, and the majority of acres sold (54%) went to “amenity buyers.” The study concludes that a significant ranchland ownership transition to a new type of owner is ongoing in the Rockies.

Technical Note: Development of Agitators for Seeding Forages Using Air Delivery Systems

Duane McCartney, Gord Hultgreen, Allan Boyden, and Craig Stevenson

Air seeders or air drills traditionally have been used for minimum till and direct seeding of cereal, oilseed, and pulse crops. These units have not been used extensively for forage seeding because of seed bridging problems with some types of grass seed over the metering system entry points in the seed tank. This study designed and evaluated modifications to the agitation and metering systems for seeding forages using 3 different types of Canadian-built air seeders. Field-scale testing indicated that grass forages could be successfully seeded using a full-size air seeder using these modifications.

Technical Note: Evaluation of Openers for Seeding Meadow Brome Grass (*Bromus riparius*) Using Air Delivery Seeding Systems

Duane McCartney, Gord Hultgreen, Allan Boyden, and Craig Stevenson

There is interest in Canada in seeding grass seed using air seeders and air drills that were originally designed for seeding cereals and oilseeds. Various types of furrow openers (ie, spoons or knives) were evaluated for their effectiveness in

seeding meadow brome grass seed (*Bromus riparius*). Knife openers provided the best seed emergence results. Seed brakes and variable air velocities were also evaluated as a means of preventing the seed from blowing out of the seed row when using high air velocities. Acceptable seeding results were achieved without seed brakes when used at low air velocities; however, at these lower air velocities seed distribution may be less accurate.

Technical Note: Microhistological Estimation of Grass Leaf Blade Percentages in Pastures and Diets

Paola V. Sierra, M. Silvia Cid, Miguel A. Brizuela, and Carlos M. Ferri

Available procedures to quantify the relative consumption of leaf blades require the use of animals fistulated esophageally or expensive equipment. We propose an innovative, inexpensive procedure to quantify the percentages of blade in vegetation samples by the microhistological technique. To assess whether the procedure could be used to evaluate the blade percentages in herbivore diets, we evaluated its accuracy and precision in the estimation of the percentages of blade of 4 species before and after digestion. Although the procedure was tested with 4 species, it could also be used to estimate the percentage of blade of the dominant species in diets of herbivores grazing complex systems.

Technical Note: Using Geographic Information Systems to Present Nongeographical Data: An Example Using 2-Way Thermogradient Plate Data

Catherine S. Tarasoff, Mounir Louhaichi, Carol Mallory-Smith, and Daniel A. Ball

“A picture is worth a thousand words” is a familiar truism that is aptly suited to the dilemma of presenting complex research results involving multiple explanatory variables. Current methods such as tables and 3-dimensional graphs quickly become cumbersome when trying to present complex research results. Using techniques developed in the geosciences, researchers can explore alternative data presentation methods. Although somewhat unorthodox, Geographic Information Systems (GIS)-based techniques provide a powerful tool that provides a clear and visually apparent presentation of nongeographical data. ♦