Impact of Land Subdivision and Sedentarization on Wildlife in Kenya’s Southern Rangelands
Rosemary J. Groom and David Western

Land subdivision and the sedentarization of pastoral communities are occurring throughout the world, particularly in the African rangelands. Such practices threaten wildlife populations and the long-term productivity of the land. This study compared ecologically matched subdivided and unsubdivided Maasai pastoral lands in southern Kenya. The regular distribution and permanence of settlements following subdivision and sedentarization greatly reduces wildlife populations through both direct displacement and a reduction of forage. Relative to mobile pastoralism on open rangelands, sedentarization leads to reduced seasonal movements of livestock, lowered grass biomass, and slower grass recovery after very dry periods.

Greater Sage-Grouse and Severe Winter Conditions: Identifying Habitat for Conservation
Matthew R. Dzialak, Stephen L. Webb, Seth M. Harju, Chad V. Olson, Jeffrey B. Winstead, and Larry D. Hayden-Wing

Identifying critical seasonal habitat for wildlife is an important component of sustainable rangeland management. We estimated a resource selection function for greater sage-grouse (*Centrocercus urophasianus*) to develop guidelines for conserving habitat that buffers grous from resource limitations under severe winter conditions. Grouse selected big sagebrush (*Artemisia tridentata* spp.) and other tall shrubs for thermal cover and avoided bare ground and human-made features or activity. Suitable habitat had a patchy distribution in variable topography and made up 7–18% of the sagebrush steppe studied. These results can guide planning of human activity in sage-grouse habitat to help minimize over-winter grouse mortality.

Plant and Small Vertebrate Composition and Diversity 36–39 Years After Root Plowing
Timothy E. Fulbright, E. Alejandro Lozano-Cavazos, Donald C. Ruthven III, and Andrea R. Litt

We compared vegetation diversity and small vertebrate abundance on sites that had been root plowed 36 to 39 years ago to nearby untreated sites. Woody vegetation on root-plowed sites was less diverse than on untreated sites, while diversity of herbaceous species did not differ between sites. Small mammal, lizard, and reptile abundance and diversity were similar on root-plowed and untreated sites, but varied with annual rainfall. Although root plowing results in long-term differences in woody vegetation diversity, succession on root-plowed sites eventually leads to plant and small vertebrate communities that are similar to those on untreated sites.

Are Droppings, Distance From Pastoralist Camps, and Pika Burrows Good Proxies for Local Grazing Pressure?
Tsechoe Dorji, Ørjan Totland, and Stein R. Moe

Indirect measures of grazing intensity are often used to estimate effects of grazing on vegetation, but little is known about their suitability across landscape elevation, aspect, and slope. We used regression models to determine whether distance from pastoral camp sites, number of yak dung patches, sheep and goat dropping piles, or pika (*Ochotona curzoniae*) burrows are suitable indicators of grazing intensity in central Tibet. None of these measures satisfactorily predicted real grazing intensity based on the number of plant stems grazed. Our results should be of concern since many studies use in-
direct measures to estimate effects of grazing on vegetation dynamics and ecosystem properties.

**Influence of Livestock Grazing Strategies on Riparian Response to Wildfire in Northern Nevada**
K. N. Dalldorf, S. R. Swanson, D. F. Kozlowski, K. M. Schmidt, R. S. Shane, and G. Fernandez

Pre- and postfire stream surveys were used to evaluate the influence of fire, grazing, and hydrologic characteristics on changes in stream bankfull width, bank cover, bank stability, dominant bottom material fining, and total riparian width. Grazing management contributed most to increased bankfull width and decreased bank stability on the northern Nevada sites studied. There was no relationship between fire and changes in stream attributes. Variation in the riparian width was attributed primarily to hydrologic characteristics, not grazing. Long-term functional recovery may be achieved through implementation of earlier season grazing, limited use during the critical growing season, and rest and rotation.

**Saw Palmetto (Serenoa repens) Flowering and Fruiting Response to Time Since Fire**
Mary E. Carrington and J. Jeffrey Mullahey

Management strategies are needed to promote flowering and fruiting of saw palmetto (Serenoa repens), a southeastern palm with fruits wild-harvested for the herbal remedies market. Because saw palmetto is fire-adapted, and prescribed burning is common in habitats where it occurs, we investigated time-since-growing-season fire (April–July) effects on saw palmetto flowering and fruiting in southwest Florida pinelands. Time-since-growing-season fire strongly influenced flowering but did not affect fruit yield, due to variable rainfall and insect predators reducing fruit yield. To promote fruit yield, we recommend burning subsections of sites on approximate 5-year burning cycles beginning in different years.

**Recovery and Viability of Sulfur Cinquefoil Seeds From the Feces of Sheep and Goats**
Rachel A. Frost, Jeffrey C. Mosley, and Brent L. Roeder

Transmission of weed seeds by grazing livestock is a concern for land managers. We tube fed sulfur cinquefoil (Potentilla recta L.) seeds to eight sheep and eight goats (5,000 seeds per animal) and collected their feces for seven consecutive days. Digestion destroyed 71% of the viable sulfur cinquefoil seeds that were ingested, and no viable seeds were recovered from either sheep or goats after the third day. Grazing livestock that consume viable sulfur cinquefoil seeds should be kept in a corral for at least three days to prevent transferring viable seeds to uninfested areas.

**Spatial Redistribution of Nitrogen by Cattle in Semiarid Rangeland**
David J. Augustine, Daniel G. Milchunas, and Justin D. Derner

Cattle management affects soil nitrogen (N) in rangelands through multiple pathways, including N redistribution from extensive grazing areas into focal areas of dung and urine deposition. For cattle on Colorado shortgrass range, 27% of dung and urine deposition occurred in pasture corners or near water tanks, which represented only 2.5% of the pasture area. We estimated that cattle removed 0.6 kg N·ha⁻¹ (0.53 lb N·acre⁻¹) in biomass gains, redistributed 0.73 kg N·ha⁻¹ (0.64 lb N·acre⁻¹) to corners/water tanks, and induced volatilization loss of 0.17 kg N·ha⁻¹ (0.15 lb N·acre⁻¹) from urine patches (total loss = 1.3 lb N·acre⁻¹·year⁻¹ or 1.5 kg N·ha⁻¹·year⁻¹). Fluxes of this magnitude can significantly affect long-term N balance in semiarid rangelands.

**Detecting Channel Riparian Vegetation Response to Best-Management-Practices Implementation in Ephemeral Streams With the Use of Spot High-Resolution Visible Imagery**
Kendall Vande Kamp, Matthew Rigge, Neils H. Troelstrup, Jr., Alexander J. Smart, and Bruce Wylie

Important physical and biological stream functions, including sediment retention and habitat quality, are compromised when riparian areas are heavily grazed. The installation of off-stream watering sources and conversion from cattle to bison grazing are both thought to reduce riparian grazing pressure. Based on high-resolution satellite imagery and ground assessment, implementation of these practices improved prairie cordgrass (Spartina pectinata) establishment in ephemeral streams of western South Dakota rangelands. Our results indicate that high-resolution remote sensing data can be used as a riparian vegetation monitoring tool.

**A Landscape Similarity Index: Multitemporal Remote Sensing to Track Changes in Big Sagebrush Ecological Sites**
Alexander J. Hernandez and R. Douglas Ramsey

Monitoring change in rangelands is critical to support and enhance state and transition models. Large and complex systems require using historic remote sensing datasets along with traditional field methods. A landscape-level similarity index was developed using multitemporal remote sensing-based vegetation indices and ordination techniques. The steady-state plots and distance metrics confirmed that different ecological states have unique spatiotemporal signatures,
and that benchmarks can be used to assess similarity to desired or undesired conditions. Our protocol can be used to assess large regions and help managers identify areas that are moving toward or away from the reference condition or ecological states of interest.

Comparing Two Ground-Cover Measurement Methodologies for Semiarid Rangelands

Keith T. Weber, Fang Chen, D. Terrance Booth, Mansoor Raza, Kindra Serr, and Bhushan Gokhale

The limited field-of-view (FOV) associated with very large scale aerial (VLSA) imagery requires users to balance FOV and resolution needs. This balance was evaluated by comparing ground cover measured in the field with similar data measured from 50-mmpp imagery of the same locations. Percent cover estimates were very different between methods indicating that 1) it is critical to accurately match ground and aerial image sample points, 2) 50-mmpp VLSA imagery does not have adequate resolution for accurate species identification or cover assessments of plant functional groups, and 3) the balance between resolution and FOV may require multiple cameras and nested, multiresolution imagery.

Understanding Variability in Adaptive Capacity on Rangelands

Nadine A. Marshall and Alex Smajgl

Resource management policies and practices are implemented on rangelands without sufficient appreciation of the capacity of resource users to effectively incorporate them into their working lives. Our aim was to understand how graziers in the northern Australian rangelands varied in their capacity to adapt to climate variability and recommended practices. We found significant variability in adaptive capacity of these graziers based on their 1) perception of risk, 2) skills in planning, learning and reorganizing, 3) financial and emotional flexibility, and 4) interest in adapting. We suggest strategies to increase graziers’ adaptive capacity to initiatives that address grazing land management practices.

Collective Action, Innovation, and Wealth Generation Among Settled Pastoral Women in Northern Kenya

D. Layne Coppock and Solomon Desta

Collective action can effectively help poverty-stricken regions, but few examples have been documented in lightly populated rangelands where pastoralists are better known for their social independence and opportunistic behavior. In remote northern Kenya we discovered pastoral women’s groups that used collective action and savings clubs to create personal wealth, diversify livelihoods, and support public services. Women’s groups have recently become common here, and success is largely attributable to visionary leadership. In a region beset by large problems it is notable that such grassroots social innovation can build human and financial capital. This provides hope and viable pathways for development.

Comparison of Bite-Count and Rumen Evacuation Techniques to Estimate Cattle Diet Quality

Daalkhajjav Damiran, Timothy DelCurto, Scott L. Findholt, Bruce K. Johnson, and Martin Vavra

The two most common approaches used for estimating nutrient intake of large ungulates are the bite-count and rumen evacuation techniques. We compared the bite-count technique of estimating forage intake and synthesized diet quality to direct estimates of diet quantity and quality using the rumen evacuation technique. Bite count gave similar results on diet quantity and digestibility estimations but was lower in protein and fiber estimations as compared with rumen evacuation technique. Therefore, investigators should calibrate bite-count technique against rumen evacuation technique to solve any accuracy problem in their specific experimental conditions whenever possible.

Heat Dosage and Oviposition Depth Influence Egg Mortality of Two Common Rangeland Grasshopper Species

David H. Branson and Lance T. Vermeire

Fire has potential for grasshopper control, but little information exists on which species may be most affected. We examined the impact of fire intensity on egg mortality of two grasshopper species. Fire killed up to 79% of *Aulocara elliotti* eggs, which are deposited 0.8 cm (0.3 inch) in the soil. In contrast, eggs of *Opeia obscura* are laid up to 2.5 cm (1 inch) deep, and few were killed by fire. Rangeland grasshoppers with an average egg depth of less than 1 cm (0.4 inch) may have their populations reduced through burning, particularly if they lay eggs near vegetation, where fire burns hotter.