By Jeff Mosley

Browsing the Literature

This section reviews new publications available about the art and science of rangeland management. Personal copies of these publications can be obtained by contacting the respective publishers or senior authors (addresses shown in parentheses). Suggestions are welcomed and encouraged for items to include in future issues of *Browsing the Literature*. Contact Jeff Mosley, jmosley@montana.edu.

Animal Ecology

Factors affecting nest survival of greater sage-grouse in northcentral Montana. B. J. Moynahan, M. S. Lindberg, J. J. Rotella, and J. W. Thomas. 2007. *Journal of Wildlife Management* 71:1773–1783. (National Park Service, 3100 National Park Service Rd, Juneau, AK 99801, USA). In an expansive landscape where sage-grouse are abundant, shrub canopy cover (predominantly Wyoming big sagebrush) averaged 10%. Most sage-grouse nests (99%) were under shrubs, and 92% of those were under sagebrush.

Factors influencing burrowing owl reproductive performance in contiguous shortgrass prairie. R. L. Griebel. 2007. *Journal of Raptor Research* 41:212–221. (US Forest Service, PO Box 425, Wall, SD 57790, USA). Abandonment was the primary cause of nest failures of burrowing owls in shortgrass prairie of western South Dakota. Larger prairie dog colonies (> 25 acres) supported greater numbers of owl nests.

Habitat-suitability bounds for nesting cover of northern bobwhites on semiarid rangelands. J. A. Arredondo, F. Hernandez, F. C. Bryant, R. L. Bingham, and R. Howard. 2007. *Journal of Wildlife Management* 71:2592–2599. (F. Hernandez, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ, Kingsville, TX 78363, USA). Herbaceous canopy cover was at least 36.7% at bobwhite quail nest sites in southern Texas.

The effects of livestock grazing on the bog turtle [*Glyptemys* (= *Clemmys*) *muhlenbergia*]. J. Tesauro and D. Ehrenfeld. 2007. *Herpetologica* 63:293–300. (J. Tesauro, Ecological Consulting, 391 Wahl Rd, Livingston Manor, NY 12758, USA). The bog turtle inhabits subirrigated sedge meadows in the northeastern and southeastern United States. Sites grazed by cattle contained greater numbers of turtles, greater turtle density, and greater frequency of occurrence of juvenile turtles.

Grazing Management

Livestock and vegetation responses to rotational grazing in short-grass steppe. J. D. Derner and R. H. Hart. 2007. *Western North American Naturalist* 67:359–367. (USDA-ARS, 8408 Hildreth Rd, Cheyenne, WY 82009, USA). After 8 yr, neither the plant community nor cattle performance differed between a short-duration grazing system and season-long grazing at a moderate stocking rate.

Rio Grande wild turkey habitat selection in the southern Great Plains. G. I. Hall, M. C. Wallace, W. B. Ballard, D. C. Ruthven, III, M. J. Butler, R. L. Houchin, R. T. Huffman, R. S. Phillips, and R. Applegate. 2007. *Journal of Wildlife Management* 71:2583–2591. (W. Ballard, Dept of Range, Wildlife, and Fisheries Management, Texas Tech Univ, Lubbock, TX 79409, USA). Wild turkey nesting habitat will be favored by light to moderate rotational cattle grazing of uplands during the spring and in riparian zones after the breeding season.

Hydrology/Riparian

Improved grazing management increases terrestrial invertebrate inputs that feed trout in Wyoming rangeland streams. W. C. Saunders and K. D. Fausch. 2007. *Transactions of the American Fisheries Society* 136:1216–1230. (Dept of Fish, Wildlife, and Conservation Biology, Colorado State Univ, Fort Collins, CO 80523, USA). Riparian vegetation biomass, input of terrestrial invertebrates into the streams, and total trout biomass were two to three times greater in stream reaches under short-duration cattle grazing vs. season-long grazing.

Modeling soil erosion on steep sagebrush rangeland before and after prescribed fire. C. A. Moffet, F. B. Pierson, P. R. Robichaud, K. E. Spaeth, and S. P. Hardegree. 2007. *Catena* 71:218–228. (USDA-ARS, Northwest Watershed Research Center, 800 E Park Blvd, Suite 105, Boise, ID 83712, USA). Rill erosion was the dominant erosion process following fire on a steep (35% to 50% slope) sagebrush site.

Monensin is not toxic to aquatic macrophytes at environmentally relevant concentrations. E. B. McGregor, K. R. Solomon, and M. L. Hanson. 2007. *Archives of Environmental Contamination and Toxicology* 53:541–551. (M. Hanson, Dept of Environment and Geography, Univ of Manitoba, Winnipeg, MB R3T 2N2, Canada). Monensin, a common livestock feed additive, has been detected in surface waters where livestock concentrate, but results of this study indicate that monensin is unlikely to be found at concentrations toxic to aquatic lifeforms.

Predicting postfire erosion and mitigation effectiveness with a Web-based probabilistic erosion model. P. R. Robichaud, W. J. Elliott, F. B. Pierson, D. E. Hall, and C. A. Moffet. 2007. *Catena* 71:229–241. (US Forest Service, Rocky Mountain Research Station, 1221 S Main St, Moscow, ID 83843, USA). The Erosion Risk Management Tool is a Web-based model that helps resource managers estimate erosion on burned and recovering forests and rangelands with or without mitigation measures such as seeding, straw mulch application, or straw wattle placement.

Plant Ecology

Assessing plant–nutrient relationships in highly invaded California grasslands using non-normal probability distributions. G. Gea-Izquierdo, S. Gennet, and J. W. Bartolome. 2007. *Applied Vegetation Science* 10:343–350. (Ecosystem Science Division, Univ of California, Berkeley, CA 94720, USA). Low-fertility soils appear to provide refuge sites for native plants in California annual grasslands. Nonnative annuals tend to outcompete native plants on more fertile sites.

Ecological classification and monitoring model for the Wyoming big sagebrush shrubsteppe habitat type of northeastern Wyoming. L. Benkobi, D. W. Uresk, and R. D. Child. 2007. *Western North American Naturalist* 67: 347–358. (USDA Forest Service, Rocky Mountain Research Station, 3221 S Highway 16, Rapid City, SD 57702, USA). Canopy cover and frequency of sagebrush, western wheatgrass, and blue grama can be inputted into this model that enables resource managers to evaluate land management alternatives.

Genetic diversity and low reproductive success in isolated populations of Utah juniper (*Juniperus osteosperma*, Cupressaceae). L. Allphin, A. F. Hunt, and V. J. Anderson. 2007. *Western North American Naturalist* 67:323–337. (Dept of Plant and Wildlife Science, Brigham Young Univ, Provo, UT 84602, USA). Seed abortion and/or insect seed parasitism in Utah juniper was greater in isolated vs. contiguous populations.

No evidence for root-mediated allelopathy in *Centaurea solstitialis*, a species in a commonly allelopathic genus. B. Quin, J. A. Lau, J. Kopshever, R. M. Callaway, H. McGray, L. G. Perry, T. L. Weir, M. W. Paschke, J. L. Hierro, J. Yoder, J. M. Vivanco, and S. Strauss. 2007. *Biological Invasions* 9:897–907. (R. Callaway, Division of Biological Science, Univ of Montana, Missoula, MT 59812, USA). Found no evidence that the competitive ability of yellow starthistle results from allelopathic chemicals exuded from its roots.

Post-invasion evolution of native populations: a test of biological resilience. B. A. Mealor and A. L. Hild. 2007. *Oikos* 116:1493–1500. (The Nature Conservancy, 258 Main St, Suite 200, Lander, WY 82520, USA). In the past 30–70 yr, alkali sacaton has adapted to coexist with Russian knapweed, but needleandthread has not.

Seed bank responses to grazing history by invasive and native plant species in a semi-desert shrub-steppe environment. D. R. Clements, P. G. Krannitz, and S. M. Gillespie. 2007. *Northwest Science* 81:37–49. (Dept of Biology, Trinity Western Univ, 76000 Glover Rd, Langley, BC V2Y 1Y1, Canada). A survey of sites with varying

grazing histories in south-central British Columbia found that the seed bank of diffuse knapweed was largest at two of the three most heavily grazed sites, but cheatgrass had large seed banks at all sites regardless of grazing history.

Vegetative and reproductive phenology of African rue (*Peganum harmala*) in the northern Chihuahuan Desert. L. B. Abbott, D. Lepak, and D. L. Daniel. 2007. *Southwestern Naturalist* 52:209–218. (Dept of Animal and Range Sciences, New Mexico State Univ, Las Cruces, NM 88003, USA). African rue is a perennial forb native to deserts of northern Africa and southern Asia that has invaded the southwestern United States and northern Mexico. The plant is poisonous to cattle, sheep, and probably horses. This article describes the plant's biological characteristics at two sites in southern New Mexico.

Volatile compounds on the leaf surface of intact and regrowth tarbush (*Florensia cernua* DC) canopies. E. L. Frederickson, R. E. Estell, and M. D. Remmenga. 2007. *Journal of Chemical Ecology* 33:1867–1875. (R. Estell, USDA-ARS, Jornada Experimental Range, Univ Station, New Mexico State Univ, Las Cruces, NM 88003, USA). Leaves from tarbush regrowth (after cutting the previous winter) had higher concentrations of terpenes than tarbush leaves from uncut shrubs. Greater terpene concentrations reduce tarbush consumption by sheep and goats.

What makes Great Basin sagebrush ecosystems invasible by *Bromus tectorum*? J. C. Chambers, B. A. Roundy, R. R. Blank., S. E. Meyer, and A. Whittaker. 2007. *Ecological Monographs* 77:117–145. (US Forest Service, Rocky Mountain Research Station, 920 Valley Rd, Reno, NV 89512, USA). Colder temperatures limit cheatgrass invasion at higher elevations, but soil water limits invasibility at lower elevations. Excessive livestock grazing that removes herbaceous perennials increases soil water available for cheatgrass; however, burning without removal has only minor effects. Maintaining or restoring perennial herbaceous plants is necessary to limit cheatgrass expansion in low-elevation sagebrush ecosystems.

Rehabilitation/Restoration

Extended pasture forage sward responses to Canada thistle (*Cirsium arvense*) control using herbicides and fertilization. E. W. Bork, C. W. Chakul, and S. L. DeBruijn. 2007. *Crop Protection* 26:1546–1555. (Dept of Agriculture, Food and Nutrition Science, Univ of Alberta, Edmonton, AB T6G 2P5, Canada). Applied at the early bud stage, the herbicides tested (2,4-D; 2,4-D + mecoprop + dicamba; clopyralid; or picloram + 2,4-D) all controlled Canada thistle and increased grass yield but also reduced nonthistle forbs, including legumes.

Identifying weed-resistant bluebunch wheatgrass for restoration in western Montana. P. Lesica and H. E. Athowe. 2007. *Ecological Restoration* 25:191–198. (Division of Biological Sciences, Univ of Montana, Missoula, MT 59812, USA). Local cultivars can be developed that tolerate and suppress invasive weeds by selecting among local plants for vigor and productivity. In addition, a commercially available bluebunch wheatgrass cultivar ('Goldar') was very competitive with spotted knapweed.

Macronutrient and trace element leaching following biosolids application on semi-arid rangeland soils. C. M. Brenton, E. B. Fish, and R. Mata-Gonzalez. 2007. *Arid Land Research and Management* 21:143–156. (R. Mata-Gonzalez, Ciencia Ecological and Environmental Consultants, 3250 Belmont Ct, Wellington, CO 80549, USA). Application of up to 15.2 tons · acre^{-1} of biosolids on Texas rangeland did not harm subsurface water quality.

Seeding cool-season grasses to suppress white locoweed (*Oxytropis sericea*) reestablishment and increase forage production. M. H. Ralphs, T. A. Monaco, J. R. Valdez, and D. Graham. 2007. *Weed Technology* 21:661–669. (USDA-ARS, Poisonous Plant Research Lab, 1150 E 1400 N, Logan, UT 84341, USA). Whitepoint loco was controlled by seeding either 'CDII' crested wheatgrass, 'Vavilov' Siberian wheatgrass, 'Bozoisky' Russian wildrye, or 'Luna' pubescent wheatgrass.

Suppression of Caucasian Old World bluestem with split application of herbicides. K. R. Harmoney, P. W. Stahlman, and K. R. Hickman. 2007. *Weed Technology* 21:573–577. (Agricultural Research Station, 1232 240th Ave, Hays, KS 67601, USA). Glyphosate at 1.0 pound active ingredient (ai) per acre and imazapyr at 0.25 pound ai per acre at each application (4–5-leaf stage and again 8 wk later) controlled Old World bluestem that had invaded Kansas rangeland.

Socioeconomics

Economic benefit of fertility control in wild horse populations. J. Bartholow. 2007. *Journal of Wildlife Management* 71:2811–2819. (US Geological Survey, 2150 Centre Ave, Building C, Fort Collins, CO 80526, USA). Implementing currently available contraceptives would enable the Bureau of Land Management to reduce the variable operating costs of its wild horse program by 15%.

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