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

Elk resource selection and implications for anthrax management in Montana. L.R. Morris, K.M. Proffitt, V. Asher, and J.K. Blackburn. 2016. *Journal of Wildlife Management* 80:235–244. (J. Blackburn, Dept of Geography, Univ of Florida, Gainesville, FL 32611, USA). More outbreaks of anthrax are probable among wild elk and bison in southwestern Montana. Wild ungulate populations, unvaccinated livestock, and people are at risk.

Greater sage-grouse apparent nest productivity and chick survival in Carbon County, Wyoming. L.A. Schreiber, C.P. Hansen, M.A. Rumble, J.J. Millspaugh, F.R. Thompson III, R.S. Gamo, J.W. Kehmeier, and N. Wojcik. 2016. *Wildlife Biology* 22:37–44. (J. Millspaugh, Dept of Fisheries and Wildlife Sciences, Univ of Missouri, Columbia, MO 65211, USA). Sage-grouse chick survival was low during drought years and years with unseasonably warm spring temperatures. Habitat management activities should try to increase the availability of forbs, arthropods, and vegetative cover to enhance survival of sage-grouse chicks.

Influence of exotic horses on the use of water by communities of native wildlife in a semi-arid environment. L.K. Hall, R.T. Larsen, M.D. Westover, C.C. Day, R.N. Knight, and B.R. McMillan. 2016. *Journal of Arid Environments* 127:100–105. (Dept of Plant and Wildlife Sciences, Brigham Young Univ, Provo, UT 84602, USA). Feral horses reduced native wildlife access to drinking water in the Great Basin Desert of western Utah.

Long-term lesser prairie-chicken nest ecology in response to grassland management. S.R. Fritts, B.A. Grisham, D.A. Haukos, C.W. Boal, M.A. Patten, D.H. Wolfe, C.E. Dixon, R.D. Cox, and W.R. Heck. 2016. *Journal of Wildlife Management* 80:527–539. (Dept of Natural Resources Management, Texas Tech Univ, Lubbock, TX 79409, USA). A 10-year study in northeastern New Mexico sand shinnery oak rangeland concluded that a tebuthiuron application rate of 0.5 pounds per acre, short-duration cattle grazing, or a combination of these practices were not detrimental to nest survival of lesser prairie-chickens.

Microhabitat selection of brood-rearing sites by greater sage-grouse in Carbon County, Wyoming. L.A. Schreiber, C.P. Hansen, M.A. Rumble, J.J. Millspaugh, R.S. Gamo, J.W. Kehmeier, and N. Wojcik. 2015. *Western North American Naturalist* 75:348–363. (J. Millspaugh, Dept of Fisheries and Wildlife Sciences, Univ of Missouri, Columbia, MO 65211, USA). Sage-grouse selected brood-rearing sites with higher numbers of arthropods in the order of Diptera and lower numbers of arthropods in the order of Coleoptera. When

broad-leaf forb cover was <20%, sage-grouse selected sites with higher numbers of Hymenoptera, but sage-grouse selected sites with lower numbers of Hymenoptera when broad-leaf forb cover was >20%.

Re-defining historical geographic range in species with sparse records: implications for the Mexican wolf reintroduction program. S.A. Hendricks, P.R.S. Clee, R.J. Harrigan, J.P. Pollinger, A.H. Freedman, R. Callas, P.J. Figura, and R.K. Wayne. 2016. *Biological Conservation* 194:48–57. (R. Wayne, Dept of Ecology and Evolutionary Biology, Univ of California-Los Angeles, Los Angeles, CA 90095, USA). New evidence indicates that the historical range of the federally endangered Mexican wolf included southern California, an area not previously recognized as part of its historic range.

Sage-grouse nesting, brood and winter habitat characteristics in Montana. J. Woodward, J. Sika, C. Wambolt, J. Newell, S. Schroff, and B. Sowell. 2016. *Environmental Management and Sustainable Development* 5(1):115–127. (B. Sowell, Dept of Animal and Range Sciences, Montana State Univ, Bozeman, MT 59717, USA). In Wyoming big sagebrush habitat of central Montana, sage-grouse nested where shrub canopy cover averaged 15%, live grass height averaged 5 inches, and residual grass height averaged 4 inches. Herbaceous and shrub characteristics did not differ between brood sites and available sites. In winter, sage-grouse used sites where total shrub canopy cover averaged 12%.

Grazing Management

Combined herbivory by targeted sheep grazing and biological control insects to suppress spotted knapweed (*Centaurea stoebe*). J.C. Mosley, R.A. Frost, B.L. Roeder, T.K. Mosley, and G. Marks. 2016. *Invasive Plant Science and Management* 9:22–32. (Dept of Animal and Range Sciences, Montana State Univ, Bozeman, MT 59717, USA). “Combined herbivory by targeted sheep grazing and biological control insects reduced adult plant density and prevented compensatory recruitment of spotted knapweed, but treatment with biological control insects alone did not.”

Sympatric cattle grazing and desert bighorn sheep foraging. K.R. Garrison, J.W. Cain III, E.M. Rominger, and E.J. Goldstein. 2016. *Journal of Wildlife Management* 80:197–207. (J. Cain, US Geological Survey, Dept of Fish, Wildlife and Conservation Ecology, New Mexico State Univ, Las Cruces, NM 88003, USA). In southern New Mexico, cattle grazing did not reduce forage biomass or foraging efficiency of desert bighorn sheep.

Winter grazing can reduce wildfire size, intensity and behavior in a shrub-grassland. K.W. Davies, C.S. Boyd, J.D. Bates, and A. Hulet. 2016. *International Journal of Wildland Fire* 25:191–199. (US Department of Agriculture-Agricultural Research Service, 67826-A Highway 205, Burns, OR 97720, USA). Winter cattle grazing decreased

fine fuel loads, increased fine fuel moisture, reduced flame height, and reduced rate of fire spread when the site burned.

Hydrology/Riparian

Cover thresholds for impacts of an exotic grass on the structure and assembly of a wet prairie community. L.A. Toth. 2016. *Wetlands Ecology and Management* 24:61–72. (South Florida Water Management District, 3301 Gun Club Rd, West Palm Beach, FL, 33406, USA). In central Florida, the invasive limpoglass began to affect the abundance of wet prairie forbs and grasses when limpoglass reached 40% to 50% canopy cover. Limpoglass recovered quickly after treatment with glyphosate herbicide.

Modeling the potential North American distribution of Russian olive, an invader of riparian ecosystems. L.K.D. Collette, and J. Pither. 2015. *Plant Ecology* 216:1371–1383. (Dept of Biology, Univ of British Columbia-Okanagan Campus, Kelowna, BC V1V 1V7, Canada). Russian olive is predicted to spread throughout much of western Canada, including along several major rivers in south-central British Columbia.

Plant Ecology

Effects of drought on forests and rangelands in the United States: a comprehensive science synthesis. J.M. Vose, J.S. Clark, C.H. Luce, and T. Patel-Weynand (Eds.). 2016. US Department of Agriculture-Forest Service General Technical Report WO-93b, 289 p. (US Department of Agriculture-Forest Service, P.O. Box 96090, Washington, DC 20090, USA). Summarizes the ecological and socioeconomic impacts of drought and discusses how management actions can either mitigate or exacerbate drought effects.

Elevated Rocky Mountain elk numbers prevent positive effects of fire on quaking aspen (*Populus tremuloides*) recruitment. D.S. Smith, S.M. Fettig, and M.A. Bowker. 2016. *Forest Ecology and Management* 362:46–54. (Dept of Biology, Denison Univ, Granville, OH 43023, USA). In central New Mexico, aspen trees protected from elk browsing were 3 times taller than aspen trees exposed to elk browsing. Aspen trees exposed to burning and protected from elk browsing were 8.5 times taller than aspen trees without burning and without protection from elk.

Rehabilitation/Restoration

Assessing the value of potential “native winners” for restoration of cheatgrass-invaded habitat. R.S. Barak, J.B. Fant, A.T. Kramer, and K.A. Skogen. 2015. *Western North American Naturalist* 75:58–69. (Program in Plant Biology and Conservation, Northwestern Univ, 633 Clark St, Evanston, IL 60208, USA). Foothill deerfretch, sand dune cryptantha, and tanseyleaf tansyaster are 3 native forb species that appear well adapted to restore cheatgrass-invaded sites.

Can biochar be used as a seed coating to improve native plant germination and growth in arid conditions? M.I. Williams, R.K. Dumroese, D.S. Page-Dumroese, and S.P.

Hardegree. 2016. *Journal of Arid Environments* 125:8–15. (2824 S. Devereaux Way, Salt Lake City, UT 84109, USA). Biochar does not appear to be an appropriate seed coating for improving establishment of native grasses and forbs in the western United States.

Consequences of pinyon and juniper woodland reduction for wildlife in North America. S. Bombaci, and L. Pejchar. 2016. *Forest Ecology and Management* 365:34–50. (Dept of Fish, Wildlife and Conservation Biology, Colorado State Univ, Fort Collins, CO 80523, USA). Authors synthesize the effects of pinyon and juniper control treatments on wildlife.

Degraded or just different? Perceptions and value judgements in restoration decisions. R.J. Hobbs. 2016. *Restoration Ecology* 24:153–158. (School of Plant Biology, Univ of Western Australia, Crawley, WA 6009, Australia). “There is likely to be little argument over highly degraded systems where damage and loss of valued characteristics are evident. But where system change is less stark and the changes have mixed benefits and disbenefits, the decision on whether the system is degraded and hence in need of restoration becomes more difficult.”

Establishment and persistence of yellow-flowered alfalfa no-till interseeded into crested wheatgrass stands. C.G. Misar, L. Xu, R.N. Gates, A. Boe, P.S. Johnson, C.S. Schauer, J.R. Rickertsen, and W.W. Stroup. 2016. *Agronomy Journal* 108:141–150. (L. Xu, Dept of Natural Resource Management, South Dakota State Univ, Brookings, SD 57007, USA). Falcata alfalfa was successfully interseeded into established stands of crested wheatgrass at only one of 4 sites in the northern Great Plains. Application of clethodim herbicide did not sufficiently reduce crested wheatgrass competition.

Grassland birds demonstrate delayed response to large-scale tree removal in central North America. S.J. Thompson, T.W. Arnold, J. Fieberg, D.A. Granfors, S. Vacek, and N. Palaia. 2016. *Journal of Applied Ecology* 53:284–294. (Dept of Fisheries, Wildlife and Conservation Biology, Univ of Minnesota, Saint Paul, MN 55108, USA). Grassland bird abundance increased slightly 4 to 6 years after removing trees from former tallgrass prairie sites in western

Minnesota. Commonly removed tree species included eastern cottonwood, eastern red cedar, box elder, and Russian olive.

Shrubland resilience varies across soil types: implications for operationalizing resilience in ecological restoration. C.L. Wonkka, D. Twidwell, J.B. West, and W.E. Rogers. 2016. *Ecological Applications* 26:128–145. (Dept of Ecosystem Science and Management, Texas A&M Univ, College Station, TX 77843, USA). In mesquite-acacia shrubland of southwestern Texas, woody plants quickly regained pre-treatment levels when brush control was applied on coarse-textured soils, but brush removal restored grass dominance on fine-textured soils.

Spring glyphosate application for selective control of downy brome (*Bromus tectorum* L.) on Great Basin rangelands. C. Morris, L.R. Morris, and C. Surface. 2016. *Weed Technology* 30:297–302. (Dept of Animal and Rangeland Sciences, Oregon State Univ, La Grande, OR 97850, USA). In northwestern Nevada, application of glyphosate herbicide during spring reduced cheatgrass without harming perennial grasses. Application of glyphosate + imazapic reduced perennial grass cover in the first year, but perennial grass cover recovered by the second year.

Socioeconomics

Plant community shifts caused by feral swine rooting devalue Florida rangeland. B. Bankovich, E. Boughton, R. Boughton, M.L. Avery, and S.M. Wisely. 2016. *Agriculture Ecosystems and Environment* 220:45–54. (S. Wisely, Dept of Wildlife Ecology and Conservation, Univ of Florida, Gainesville, FL 32611, USA). Illustrates the financial impacts of feral swine on Florida cattle ranchers.

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