An Introduction to the Special Issue on Ecological Sites

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The establishment of the Rangeland Interagency Ecological Site Manual by the Natural Resources Conservation Service (NRCS), Forest Service, and the Bureau of Land Management heralds a new era of rangeland management in the United States (http://www.fs.fed.us/biology/soil/Signed_RIESM_2010.pdf). The manual promises to establish a land stratification system and approaches for describing ecosystem structures, functions, and dynamics in the form of ecological site descriptions, such that they can be applied to all rangelands, no matter their jurisdiction or ownership. The common basis for decision-making will lead to improved coordination and more consistent, transparent, and useful application of science concepts in rangeland management. NRCS has had primary responsibility for the development of ecological site descriptions in the past. This responsibility will now be shared by all three agencies. At this juncture, we summarize in this special issue the state of the art in the development of ecological site descriptions, recognizing that this art will evolve over the coming decades.

An ecological site has been defined as “a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation, and in its ability to respond to management actions and natural disturbances” (draft Interagency Ecological Site Handbook for Rangelands). Another, simpler definition is that they divide landscapes into basic units for study, evaluation, and management. By important, we mean that the differences are strong enough to influence the success or failure of a management action or affect the types of ecosystem services or benefits that are provided by a land area. These differences, in turn, create distinct expectations regarding land health and potential uses. The differences then can be used to adjust management practices and interpretations of monitoring and assessment data. Ecological sites allow us to say that our goals and expectations for land should not be the same everywhere in a landscape, and we can specify with some precision what those different expectations are. This has great benefits for private land owners, public lands users, and government regulators who might otherwise slip into “one-size-fits-all” thinking that has, in the past, led to environmental degradation and conflict.

By repeatable, we mean that landscapes are not an incomprehensible jumble of plants, animals, and soils that respond in unpredictable ways to human influences. There are patterns and organization in their relationships. As the great ecologist Robert MacArthur wrote, “to do science is to search for repeated patterns, not simply to accumulate facts, and to do the science of geographical ecology is to search for patterns in plant and animal life that can be put on a map.” The development of ecological sites clearly requires art, but it is foremost a science. In fact, it is the science of geographical ecology, with a focus on patterns at the levels of landscapes to regions and on attributes and processes that are important to land management.

How should we divide landscapes into ecological sites? That question is addressed primarily in two papers of this special issue, including an introduction to how soils are used to divide and map ecological sites (Duniway et al.) and a general approach to developing and testing ecological site concepts (Moseley et al.). Ecological site development begins with a hierarchical subdivision of land areas according to climate, landforms, and soils. The Major Land Resource Areas (MLRA) and Land Resource Units (LRU) used within the USDA Natural Resources Conservation Service are the broadest levels in this hierarchy. The MLRAs are regional divisions of the United States based on strong differences in climate, physiography, plant geography, and general land uses. They are similar to the divisions in Omernik’s “Level III ecoregions” and the “sections” of the National Hierarchy of Ecological Units. LRUs are subdivisions of MLRAs that distinguish areas of different regional climate and/or geomorphology (similar to “Level IV ecoregions” and “subsections,” but often difficult to map
say there has been slow progress in the science underpinning ecological sites. Advances in soil science, plant science, geography, and rangeland, community, and ecosystem ecology have had clear impacts that are illustrated in this special issue. But there is not yet a well-developed, interdisciplinary field of study that unifies concepts toward the development of ecological sites. There are (to our knowledge) no university courses or texts on ecological sites and no university faculty positions dedicated to the study of ecological sites. Federal agency positions that focus primarily on ecological sites only recently have been established. Ecological sites have been an important part of rangeland management for decades, but largely in the background. It is our hope that this special issue helps to bring the science and art of ecological sites to the forefront.

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References


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