

1999

## Book Review: The Tallgrass Restoration Handbook: For Prairies, Savannas, and Woodlands

Stephen D. Hendrix

University of Iowa, [stephen-hendrix@uiowa.edu](mailto:stephen-hendrix@uiowa.edu)

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### Recommended Citation

Hendrix, Stephen D. (1999) "Book Review: The Tallgrass Restoration Handbook: For Prairies, Savannas, and Woodlands," *Journal of the Iowa Academy of Science: JIAS*, 106(2), 47-48.

Available at: <https://scholarworks.uni.edu/jias/vol106/iss2/7>

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## REVIEWS

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**The Tallgrass Restoration Handbook: For Prairies, Savannas, and Woodlands.** Stephen Packard and Cornelia F. Mutel, eds. 1997. Society for Ecological Restoration. 463 pages. ISBN 1-55963-319-0 hdbd., 1-55963-320-4 pbk. \$50.00, hdbd., \$25.00, pbk.

Prairie reconstruction has a venerable place in the history of restoration ecology with roots that go back to the 1930s. The prairie restoration efforts of Curtis, Greene, and others at the University of Wisconsin Arboretum began a tradition of reclaiming land that continues today. By the 1960s, evaluation of the efforts at Madison and other locations such as the Fermi Lab gave professional ecologists the beginnings of a solid framework of understanding of how to successfully establish and maintain the grasses and forbs of the tall grass prairie biome. At the same time, amateur naturalists began small to medium restorations in private settings, and landscaping firms specializing in prairie restorations began to appear. In a short time, a great deal of valuable practical experience was gained which was often passed on to others at meetings, small gatherings, and informal work sessions. However, for the growing cadre of average citizens who became advocates of and hopeful participants in prairie restoration of their own, obtaining practical information has often been frustratingly difficult and worse yet, advice from different sources was sometimes conflicting.

The publication of the *Tallgrass Restoration Handbook* is an enormous step in the right direction for people who have already learned to appreciate and admire the beauty and utility of prairies and who now want to roll up their sleeves and begin the restoration of their own bit of tallgrass prairie. All of this volume excluding the first two introductory chapters (Part I) is dedicated to the practical aspects of prairie restoration. The bulk of the volume starts with the process of forming goals and plans (part II), moves to the processes of seeding and planting (Part III), continues with critical aspects of managing and monitoring restorations (Part IV), and ends with an important section concerning protecting, restoring, and monitoring the animals that inhabit the prairie biome (Part V), an aspect of prairie restoration largely ignored until recently.

Each of the above sections is broken down into four to seven chapters written by different experts on prairies and prairie restoration. In part I, three of the four chapters pay particular attention to the important process of planning a restoration. Here the emphasis is on the critical process of becoming intimate with the landscape to be restored—what it was (mesic or dry prairie? oak savanna?), what it is now (abandoned agricultural field? degraded prairie?), and what it will be (showcase restoration? restoration for species conservation?)—before charging off with planting tools and expensive seeds. Kline (Chapter 3) details the factors such as soil, slope, adjacent vegetation, and the restoration's "audience", that must be considered during this planning stage. Packard (Chapter 4) discusses the problematic issue of selecting a "target" community for the completed restoration, defines a variety of terms helpful to the novice, and even introduces a dichotomous key to restoration options! For the lucky few who may have not have to start from "scratch" restoring a prairie

or savanna, but instead already have some remaining species characteristic of prairies or savannas, Chapter 5 will be particularly useful with its discussion of what Packard and Ross refer to as "restoration triage"—the process of judging the condition of a remnant and the severity of the techniques (e.g. plowing or not) that could be reasonably applied without doing harm.

Part III with its wealth of information on seeding and planting, is the portion of this volume that many readers will use time and time again to get answers to important practical questions about the restoration process. Apfelbaum et al. (Chapter 7) walk the novice through every aspect of seed collecting from finding seed sources to harvesting methods, ending with techniques for cleaning, storing, and testing seeds for viability. Beginners should carefully read the section in this chapter outlining the ethics and limits to seed collection from remnants. Additional chapters in this part detail how to properly design an appropriate seed mix (Chapter 9), prepare seeds for sowing and propagation (Chapter 10), and successfully apply interseeding methods (Chapter 11) or plowing and seeding methods (Chapter 12).

Once a prairie or savanna is planted, the work has really only just began, a point emphasized by the chapters in Part IV, Management and Monitoring. Pauly's excellent chapter (14) on conducting burns with his detailed descriptions of burn equipment, burn planning, and step-by-step instructions for conducting a burn will help prepare any volunteer for his or her first burn. Similarly, Solecki's chapter (16) on controlling invasive plants contains much practical information that will benefit the restorer faced with a project that is being overwhelmed by exotics. Lastly, Masters' chapter (17) gives the amateur the necessary basics to monitor their restoration project in a way that will produce information of value to others. Both Packard and Mutel should be commended for the emphasis they put on this largely ignored aspect of restoration by amateurs because the type of data they describe gathering advances our general understanding of the restoration process.

Once the initial restoration of prairie or savanna plants has been accomplished—or at least is well on its way—most amateurs might be satisfied that their role in preserving biodiversity is finished. However, as Part V points out, the protection, management, and monitoring of animals (insects, birds, and mammals) associated with the prairie biome is equally important and deserving of attention. Unfortunately, this aspect of restoration has been largely ignored until recently and we are just now beginning to realize the difficulties of translocating animals to new established prairies and monitoring their population health. Far too little is known about why some populations fail and others thrive. Furthermore, this section points out that some practices, such as burning, that promote one portion of prairie biodiversity—the plants—may be quite harmful to other portions, such as insects and nesting birds, if applied indiscriminately.

Throughout this volume are numerous tables and figures that contain invaluable information on prairie plants. These include faithfulness to high quality prairies (Table 5.1), seed and germination characteristics (Tables 9.2, 9.3, and 10.1), blooming periods (Table 7.1), habitat characteristics (Table 11.2), plant geographical distributions (Table A.3). Unfortunately, the scattered nature of this information is difficult to utilize to full advantage, if one is interested in pursuing in depth all that is known about one or few species.

Without a doubt, Packard and Mutel have produced a volume that will be useful for years to come. They have done a masterful job of blending together many styles and levels of information from

over 25 contributors. The time and care taken in the construction of the appendices which give valuable information on other publications, websites, and where to obtain seeds and equipment will prove well worth the effort. This volume lives up to its name—it truly is a “how-to” handbook for tallgrass restoration.—STEPHEN D. HENDRIX, *Department of Biology, University of Iowa, Iowa City, IA. 52242.*

**Iowa's Minerals: Their Occurrence, Origins, Industries, and Lore.** Paul Garvin. 1998. University of Iowa Press, Iowa City IA. vii + 260 pages. ISBN 0-87745-626-7 hdbd., ISBN 0-87745-627-5 (pbk.). \$29.95 hdbd., \$19.95 pbk.

A mineral is defined as a “naturally occurring, chemically homogeneous crystalline solid.” Every mineral has a composition, structure, and characteristics that make it uniquely different from every other mineral. In his new book, Paul Garvin, Professor of Geology at Cornell College in Mount Vernon, Iowa, presents a uniquely different discussion of Iowa's Minerals. While this book does contain the requisite discussions of mineral origins, chemistry, crystallography, and other descriptive information, Garvin enhances this information with tips for collecting minerals in Iowa, historical accounts of Iowa's mineral industry, and a series of fascinating stories about Iowa minerals that will captivate readers from professional geologists to would-be rock hounds. In his chapter on Occurrences of Iowa's Minerals, he includes an alphabetical listing of major minerals to be found in the State, how to identify them, and where to go to look for them. He further identifies most of Iowa's major mineral collecting sites, provides location maps, and descriptions of the minerals to be found (including many photographs.) Not to be limited by the scientific definition of a mineral, Garvin's book includes discussions of additional “minerals” that fall under the legal description of a mineral as a “naturally occurring substance that has sufficient economic value in its situs (natural setting) to be exploited profitably.” Therefore he includes petroleum, granite, coal, and meteorites in his discussion.

Garvin's discussion of Iowa's mineral industries begins with the pre-historic exploitation of the State's resources by Native Americans, who crafted chipped-stone from many of Iowa's chert occurrences, created grinding and pounding tools from stones carried into the state by the glaciers, extracted clays for pottery, gathered hematite, limonite, and other minerals for use as pigments, and collected a variety of other minerals for many uses. He goes on to describe the various mineral industries that arose with the settlement of the State by Euro-Americans and other immigrant groups. Accounts of the coal and gypsum industries in Iowa are especially interesting. He reviews Iowa's colorful coal industry with discussions of mining

methods, mining life, mine safety, the environmental effects of coal mining, and the future of Iowa coal mining.

The life of Iowa coal miners and their families around the turn of the century was hard. Many lived in poorly-maintained company towns and were paid in script, redeemable only in company stores. They worked in dark, damp, poorly ventilated mines and paid for their own tools and transportation to the mines. Because the coal seams averaged only a meter in thickness the miners could generally not stand to work. In many mines the seams were even thinner and coal had to be dug out with picks and shovels while the miners were lying on their sides. In many of these mines the floors were lowered to allow clearance for mine cars to haul the coal, but the miners were still forced to crouch to push the cars to the mine face. Iowa's early coal miners also faced the constant threat of death or injury from collapsing roof rock, runaway pit cars, or toxic gasses. Garvin also provides a thorough discussion of Iowa's colorful gypsum mining industry, the short-lived iron mining industry in northeast Iowa, and the State's earliest mineral industry, lead and zinc mining along the upper Mississippi River valley by the French as early as 1650.

Among the many interesting Iowa mineral-related stories recounted by on the book is the tale of the Cardiff Giant Hoax. The story began in the summer of 1868 when George Hull, New York farmer, traveled to the north-central Iowa town of Fort Dodge where he purchased a 10,000-pound block of gypsum. The block was shipped to Chicago, carved into the form of a giant man, shipped to the farm of Hull's brother-in-law near the town of Cardiff in central New York, and secretly buried. A year later, the “giant petrified man” was “discovered,” and the men made a small fortune showing the discovery to visitors and providing them with refreshments. Although the hoax was quickly debunked by experts, it continued to be a great attraction, even drawing the interest of showman P.T. Barnum. Garvin also retells some of the interesting stories relating to meteorite impacts in Iowa. Although only a handful of meteorites have been observed to land in the state, the stories related to these impacts are numerous and colorful. Other Iowa mineral stories in the book include the Ottumwa Coal Palace, how the geode became Iowa's State Rock, the Lost Creek Coal Mine disaster, the sand painter of McGregor, and the story of Iowa's own mineral, Iowite.

Garvin ends his book with an Appendix that provides tips for identifying Iowa's minerals, a Glossary defining words that may be confusing, and a bibliography that provides references for further investigation of topic of interest. *Iowa's Minerals* is an informative and entertaining book that provides a comprehensive discussion of the minerals that can be found in Iowa, *Their Occurrence, Origins, Industries' and Lore*. This book will be a valuable addition to anyone's library and a must for those with special interest in the rocks and minerals of the State.—RAYMOND R. ANDERSON, *Iowa Department of Natural Resources Iowa Geological Survey Bureau, Iowa City, IA. 52242.*