

BOOK REVIEW

California's Fading Wildflowers: Lost Legacy and Biological Invasions. 2008. Richard A. Minnich. University of California Press, Berkeley. \$49.95; 360 pages. ISBN 978-0-520-25353-7.

Richard A. Minnich, professor in the Department of Earth Sciences at the University of California, Riverside, has produced a valuable contribution to the growing body of literature attempting to capture the botanical appearance of pre-European California. The book has 5 chapters, 23 figures (maps and photos), 18 data-rich tables, and 14 pages of botanical references, which are a treasure unto themselves. The 5 chapters are arranged chronologically, starting with California's vegetation in the 16th and 17th centuries and ending with its current vegetation.

Minnich tries to make a very strong case that pre-European California was a wildflower paradise and not a bunchgrass prairie. Previous authors, such as Clements (1934) and Heady (1977), argue that pre-European California was dominated by bunchgrasses. But as Minnich points out, this hypothesis was "created by range managers and scientists influenced by the Dust Bowl tragedy of the 1930s, to a point that it became an *idée fixe* that has kept blinders on us" (page 262). Clements, for example, wrote his 1934 paper during the Dust Bowl era of politics that encouraged government influence on and interference with science. Minnich, now writing over half a century later, states that "the bunchgrass-grazing model is a classic case of too little data and too many ideas" (page 181).

However, Minnich is not the first to suggest that bunchgrasses did not dominate the early California landscape. Aptly included in the book is the botanical wisdom and insight of W.L. Jepson and E.C. Twisselmann. Jepson (1925) concluded that much of the Central Valley of California was dominated by native forbs rather than perennial bunchgrasses. Rancher-botanist Twisselmann (1967) asserted

that bunchgrasses were never a prominent component of California's vegetative cover and rejected the bunchgrass idea based on climate. Minnich quotes Twisselmann's *A Flora of Kern County, California* (1967:91–92) on page 174:

Various authorities [including Munz and Keck] conclude that this region was once covered by a perennial grassland that has been destroyed by grazing. Impressive evidence can be [marshalled] to reject this assumption; [I] doubt that the scant rainfall could ever have supported a perennial grassland . . . It is probably safe to assume that the primitive flora was largely one of native annuals that still occur but whose number has been greatly reduced by the dominance of immigrant annuals.

Minnich writes that the main goal for his book is "to assess pre-European herbaceous vegetation and its transformation to modern exotic grasslands" (page 7). Minnich tackles his goal in a methodical fashion, using a variety of investigative tools to accurately describe the botanical condition of pre-European California. He begins by examining the Quaternary period and the last glacial maximum to ascertain if his hypothesis is correct. He states that "wildflowers had long been part of California's heritage" and found that "the same genera of desert flowers, many closely related to species found along the coast, have been recorded in pack rat middens since the past Pleistocene" (page 178).

Another set of tools Minnich uses to reach into the past and provide early California botanical descriptions is the Spanish exploration journals and Spanish botanical survey efforts. He focuses especially on the Viceroy Mandate, which recorded the local resources for mission purposes, such as vegetation, pasture, timber, and fuelwood. Within these journals and survey documents, he carefully evaluates what early

Spanish explorers meant when they used words like *zacate* and *pasto* in their writings. Several English translations of Spanish journals typically dismissed these 2 terms as simply meaning “grassland” (see Brown 2001), but is this a fair translation? Minnich thinks not and applies new light to the botanical wording used in these journals. We soon learn that these words can actually mean “forbs,” “pasture,” “green food for cattle,” “herbage,” and “pasturage and grass” (page 26), which may paint a much different early-Californian floral landscape.

A very clever investigative tool Minnich uses is his analysis of mission adobe bricks, which contained plant material to prevent binding and shrinkage. Upon examination, these bricks hold an important record of the herbaceous material available to missionaries. Weeds of all kinds were used, and as a result, the bricks contain a random sample of the local flora. Interestingly, no bunchgrasses were found.

After the Spanish period, Minnich examines the numerous records and journals provided by pre- and post-Gold Rush explorers such as Brewer, Frémont, King, Hittell, Muir, Wilke, and Muñoz. The major contrast between the journaling periods is worth noting. The early Spanish journals are nonscientific and limited taxonomically, but they do provide a systematic spatial sampling between San Diego and San Francisco—a sampling unparalleled by any survey of California until the late 19th century (pages 68 and 171). On the other hand, rigorous scientific botanical surveys during the 1840s were conducted on an already contaminated landscape. Minnich believes that although these efforts are scientifically sound, they do not accurately reflect the botanical landscape of pre-European California. The intercontinental transfer of new species that would naturally occur over millions of years was instead compacted into 2 centuries, with several species reducing or displacing the indigenous flora throughout the state. This would certainly skew the botanical inventory of late-arriving botanists.

Employing his final investigative tool, Minnich critically analyzes the many popular press articles on wildflower fields and their influence on the ever-growing human population. Many newspaper accounts detailed how residents of Los Angeles, Pasadena, and other areas traveled to nearby flower fields. As the flower fields were converted to agricultural areas and urban settlements, wildflower enthusiasts

traveled to the Mojave Desert and the Antelope Valley near Lancaster to enjoy the floral displays.

At the end of chapter 4, from pages 225 to 258 (section entitled “Historical Development of Exotic Annual Grassland”), Minnich provides an excellent summary of his entire book. The summary is eloquently written and could stand alone as an exceptional essay on the topic. Chapter 5, entitled “Lessons from the Rose Parade” (pages 259–264), wraps up his treatise with a soapbox tone, urging proper management and conservation efforts to preserve what remains of the Californian native vegetation. It also recommends reimplementing spring burning, invasive species removal, and seasonal grazing, with the general goals of landscape-level conservation and revitalization of the native seeds that are banked in millions of acres of degraded California lands. He points out on page 258 that

since 1960, bromes and slender wild oats have come to dominate all of interior California, with Franciscan oats and black mustard still prevailing along the coast. . . . Tall-statured bromes and oats tend to dominate in years with high rainfall, while *Erodium*, *Schismus*, clovers, and summer mustard tend to dominate in drought. Wildflowers now persist sparingly in semiarid regions such as the Carrizo Plain, the southern San Joaquin Valley, and interior valleys of southern California, with their abundances increasing after invasive “crashes” from drought or spring fires. In the past, wildflower abundance was proportional to total annual precipitation and well-distributed rains. Today, wildflower splashes occur only rarely, in the first wet years following long-term drought.

Although Minnich successfully takes us on a journey from the wildflower paradise of pre-European California to the exotic grasslands of today, his book is a bit laborious and difficult to read. In order to prove his point about the botanical appearance of pre-European California, he makes the reader labor over page after page of quotes, tedious documentation, and descriptions of early California by explorers. His chapter on grazing alone spans more than 100 pages. Each chapter contains footnote

citations that are listed near the end of the book, making it difficult sometimes to flip back and forth between the chapter and the 12 pages of footnotes. However, Minnich's book does contain valuable information and research. Four appendixes provide additional aid in understanding the data. The most useful was Appendix 2, entitled "Spanish Plant Names for California Vegetation." For anyone interested in a well-researched manuscript on early-California flora, this book should be first on his or her list. Minnich is extremely convincing, and his book appropriately turns the tide from the often-taught bunchgrass prairie model to the wildflower model.

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