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Preface from *The Changing Prairie: North American Grasslands*

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Preface

North American grasslands have figured prominently in our North American heritage. Prairies first provided significant barriers to westward expansion, and then offered both economic and sociological opportunity, as well as heartache, for settlers. Many artists have gained significant inspiration from the beauty as well as the harshness of this region and its biota. And because of ideal climate and soil conditions, these grasslands have provided the agricultural foundation of which much of the economic growth and stability of the United States has historically depended.

Yet many see North American prairies as beautiful only when manipulated or exploited: Green croplands or manicured park lawns are attractive; native grasslands are "those ugly weeds." In the past, plowing virgin prairie could be easily defended on both economic and sociological grounds. And, historically, North American prairies must have seemed threatening in both their wildness and their endlessness.

The preservation of remaining North American prairies is now an urgent need. Many existing prairie types can be considered as threatened as or more threatened than tropical forests. No tallgrass prairie was saved in the sense of maintaining widely ranging species that link patches and regions (bison, elk, wolves); only plants remain as a reasonable legacy of this past system. Midgrass prairie has been almost completely plowed. More of western shortgrass prairie remains, but present human activity is exacting great stress on this ecosystem. The California grasslands, historically dominated by perennial bunchgrasses, were nearly fully invaded by annual grasses from the Mediterranean region; exotics nearly replaced native species in about half a century, leading to a significant impact on grassland dynamics. In sum, North American grasslands are a vanishing resource.

This book has three goals: (1) to provide noneconomic arguments for the value of prairies (economic arguments are available elsewhere); (2) to present a current synthesis of prairie ecology (dynamic processes regulating species distributions and abundances as well as nutrient cycling and landscape processes) to the literate public, including advocates and managers, in order to facilitate the best possible decision making; and (3) to introduce conservation and management issues relevant to prairies, draw attention of managers to the costs and benefits of alternative

actions, inform conservationists of lessons already learned from grasslands, and highlight selected unsolved problems that we hope will stimulate future research to answer them.

The last decade and a half has been a renaissance period for research on North American prairies. Driven by as well as contributing to changing paradigms in modern evolutionary and ecosystem ecology, this research is generating a new vision of prairie structure and dynamics. Contrast the emphasis of David Costello's *The Prairie World* (1969) with that of Jim Reichman's *Konza Prairie: A Tallgrass Natural History* (1987). Both describe prairies to a general audience. Costello approaches the topic in terms of seasonal changes and the types of plants and animals that one might encounter on a leisurely walk, whereas Reichman considers the dynamics of vegetation patches, at several scales, and emphasizes the interactions among plants and animals. This shifted emphasis more accurately captures the underlying driving forces that become the prairie that we see and provides more valuable insights for devising appropriate management. We have asked our contributors, active members of the research community generating new and exciting results, to approach their chapters with this in mind. A major goal of this book is to synthesize our present ecological understanding of the grassland ecosystem in sufficient but suitably nontechnical detail so that educated citizens can understand and appreciate key ecological principles that underlie the structure and function of grasslands.

Armed with these basic principles, development of an appropriate conservation ethic toward North American prairies will be possible. Within the context of shared grassland experiences of both the present and the past, this book will provide a basis for developing sound tactics to preserve North American prairies.

Too often, important technical research results are not readily accessible except to those performing research in a given specialized area. Even more important, individual results are often not sufficiently useful except when placed in a larger context, a process that requires familiarity with a whole field. As a result, it becomes increasingly difficult for intellectually competent but otherwise nonexpert individuals to exploit important results. Prairie-preservation activities often suffer from this problem. Those individuals most actively involved in prairie preservation and restoration often need more background to guide their efforts. Unfortunately, it is very difficult to locate adequate syntheses that meet the needs of serious prairie enthusiasts. Yet it is members of this interested and educated lay public who will be the prime movers behind any rational prairie-preservation movement. Our explicit goal is to produce a synthesis compatible with these needs in a way that strips away needless jargon and any excessive detail unnecessary for understanding basic principles. We hope that our readers will gain a full appreciation of the interactive processes controlling grassland function and acquire the ecological understanding necessary to successfully promote prairie-preservation and -restoration programs. We will further provide our readers with appropriate background to develop and justify logical arguments that they must construct for initiating preservation activities and to convincingly communicate and educate legislators, donors, and funding agencies for support of prairie conservation.

We wish to personally thank other authors contributing to this book in our most heartfelt manner; we have learned much from the exchange of ideas. In addition, we thank our many colleagues at the University of Nebraska who have been extremely supportive. The multidisciplinary Center for Great Plains Study at the University of Nebraska, in particular, has shown great interest in this project, for which we are grateful. Glenn Humphress and Cathy Parde have been extremely helpful in pulling the final stages of this project together, and we extend many thanks. Finally, we thank many past colleagues, students, and staff at Cedar Point Biological Station, located in a stunning grasslands ecosystem at the nexus of sandhills and shortgrass prairie in western Nebraska, who have provided a stimulating intellectual and social environment in supporting our teaching and research activities.

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A.J.
K.H.K.