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Ecology and Conservation of Great Plains Vertebrates

With 59 illustrations



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Preface

The frontier images of America embrace endless horizons, majestic herds of native ungulates, and romanticized life-styles of nomadic peoples. The images were mere reflections of vertebrates living in harmony in an ecosystem driven by the unpredictable local and regional effects of drought, fire, and grazing. Those effects, often referred to as ecological “disturbances,” are rather the driving forces on which species depended to create the spatial and temporal heterogeneity that favored ecological prerequisites for survival. A landscape viewed by European descendants as monotony interrupted only by extremes in weather and commonly referred to as the “Great American Desert,” this country was to be rushed through and cursed, a barrier that hindered access to the deep soils of the Oregon country, the rich minerals of California and Colorado, and the religious freedom sought in Utah. Those who stayed (for lack of resources or stamina) spent a century trying to moderate the ecological dynamics of Great Plains prairies by suppressing fires, planting trees and exotic grasses, poisoning rodents, diverting waters, and homogenizing the dynamics of grazing with endless fences—all creating boundaries in an otherwise boundless vista.

Historically, travelers and settlers referred to the area of tallgrasses along the western edge of the deciduous forest and extending midway across Kansas as the “True Prairie.” The grasses thinned and became shorter to the west, an area known then as the Great Plains. Today, the entire region labeled the Great Plains encompasses tallgrass prairies on the east and shortgrass prairies on the west and a band of interspersed, mixed grasses through the central states.

In 1994, we coauthored a paper in *BioScience* arguing that the North American prairie, the largest biological province on the continent, remains its most significantly threatened ecosystem. Despite numerous volumes on the ecology and physiological ecology of grasses, however, there has been little attempt to evaluate major changes in Great Plains ecosystems as they relate to the ecology of endemic vertebrates. Nowhere is there a volume that specifically focuses on the distribution and basic ecology of the native vertebrates. This volume includes chapters prepared by currently active, leading authorities with long-term research programs on the Great Plains.

The volume is divided into three sections. The first presents three overview chapters addressing the vegetative template of vertebrate habitats: the grasslands, wetlands, and streamside woodlands. The grassland chapter evaluates the roles of fire, grazing, and drought in the patterning of grasslands on different spatial and temporal scales; the wetland chapter synthesizes information on the dynamics of wetland ecology as vertebrate habitats; and the streamside forest chapter addresses the ecological succession that has occurred along prairie rivers with water management and fire suppression. A fourth chapter in this section discusses the comparative ecology of the historical native and contemporary introduced ungulates.

The second section begins with a summary of a recent field effort to document 100-year changes in landscapes and the vertebrate fauna along the Niobrara River of northern Nebraska. Subsequent chapters present original data and topical syntheses of the ecology of fishes indigenous to the western Great Plains, avian assemblage responses to grassland management activities in the tallgrass prairie of Kansas and mixed prairie of North Dakota, and the ecology of small mammal assemblages in prairie landscapes. A final chapter in this section reminds us that highly mobile species require conservation actions on the Great Plains to incorporate regional or larger perspectives to accommodate unique ecological requirements.

The volume concludes with a reminder that the profession of natural resource conservation in North America evolved from the specific interests of two key individuals, George Bird Grinnell and Theodore "Teddy" Roosevelt, whose friendship developed around their love for, and frontier adventures on, the Great Plains. After a discussion of their early initiatives, we close with a synthesis of presented and additional information to define a contemporary, holistic approach to conservation of prairie vertebrates. It is our hope that this volume will stimulate more inquiry into the historical ecology and future conservation of the Great Plains and its endemic biota.

Preparation of a volume such as this one requires much technical assistance. The editors thank Rob Garber and his staff at Springer-Verlag for the invitation to assemble this volume and for their oversight of its production. Barbara A. Knopf edited all original manuscripts for style, diction, and usage and provided assistance in reading proofs. We also thank Peter Strupp and his staff at Princeton Editorial Associates for their exemplary production assistance and Dale E. Crawford for preparing the cover illustration.

Fritz L. Knopf
Fred B. Samson

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