People and the Land through Time

Linking Ecology and History

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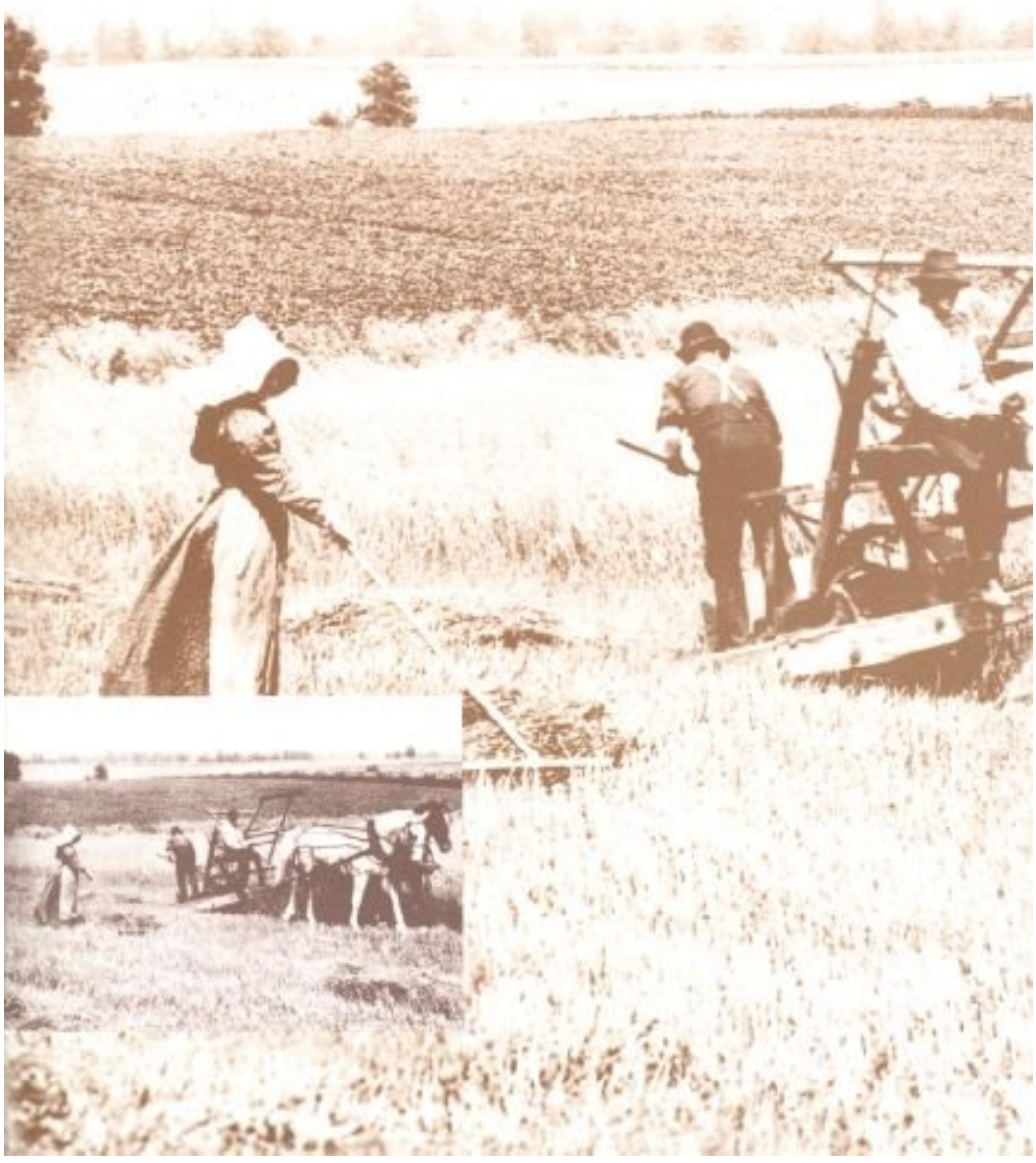

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Preface

When I started studying ecology, I hoped to be able to explain the composition of plant communities by understanding the interactions of species' physiology and population dynamics with microenvironments. Reading and research, however, have convinced me that while these interactions are important for determining what species *can* grow somewhere, the history of a site and region plays a major role in determining what species actually *do* grow there. This idea is not new, even within the discipline of ecology, but until recently ecologists have downplayed it in their efforts to discover general laws that govern species distributions, ecosystem properties, and other ecological processes, regardless of time or space. On the other hand, historians are realizing that the environment in which people live has influenced human history, so that they too must be sensitive to changing environmental conditions.

Concern about a deteriorating environment caused by human activities pervades our current view of the world. Many people are of the opinion that, unless we mend our ways, we risk disaster. Many also see scientific research, especially ecological research, as the potential source of solutions to environmental problems. In dealing with scientific research related to the environment as altered by people, however, scientists are faced with an overlay of causation that has varied over time and space with changing human culture.

I have written this book to help point to different aspects of current environments that bear the imprint of various past human activities, which must be considered in order to understand the current processes. The emphasis is on remnant effects on current communities, ecosystems, and landscapes and on how factoring these effects into ecological studies can help elucidate processes. Along the way, it should become clear how differently people have viewed, understood, and used the nonhuman environment and how these differences contribute to impacts as well as, in complex webs of feedback, to changing activities and attitudes.

In conducting historical ecological research, I have been convinced of the importance of distinguishing between time as a measurable dimension of duration, such as one day or one year, and historical time as a specific duration, such as 6 June 1952 or 1735. The partitioning of the processes that we observe between those that are based on the nonspecific unit of time and those that are historically constrained will help us tremendously in relating theoretical studies to actual responses of real ecosystems.

I have two main goals in this book, one related to research and the other to environmental management. I hope to stimulate further research on the role that history, specifically human history, has played in shaping communities, ecosystems, and landscapes and conversely, the role that changing environments have played in human history. I have tried to do this by pointing to the ubiquity of residual as well as current human impacts on the environment and by demonstrating that these impacts have changed over time, up to and continuing in the present. Second, those who plan and manage natural areas should learn that their systems are never static and that the present conditions are merely stages in a continually changing mosaic. They cannot be frozen in time.

My examples are drawn from all over the world, from a wide variety of biomes, though emphasis is placed on temperate systems, especially in the eastern United States and in western Europe, as these are the ones with which I am most familiar. They are discussed as illustrations; references are given for readers who would like more definitive discussions of the individual examples. The concepts apply, however, anywhere.

I expect this approach to be useful both as an introduction to historical ecology for professional ecologists, environmental historians, historical geographers, and historical anthropologists and as an advanced undergraduate and graduate textbook for such courses as historical ecology and environmental issues. I start with an exposition of the importance of considering the past of ecosystems and then introduce techniques that can be used for reconstructing this past. I then discuss a variety of ways in which people have

affected the environment over time, from using fire to laying out property boundaries. I conclude by discussing how a historical ecological approach contributes to an understanding of some issues of current concern: changes to lakes, biodiversity, and sustainability.

I hope that readers will carry away an excitement for including human history in ecological studies and ecology in historical studies. This integration of the disciplines has great potential for both and presents challenges that must be met if we are to deal responsibly with our role in the biosphere.

Acknowledgments

My interest in historical ecology probably began when I was a child digging up old horseshoes in our garden and finding old stone walls in the woods where I played. I owe a great debt of gratitude to my parents, who were always enthusiastic supporters of my interest in science. Many people have contributed to the development of my ideas on historical ecology in addition to those who have more recently commented on various versions of this book and have contributed technical expertise. My teachers at The Baldwin School and at Denison University required me to write and to study the humanities as well as the sciences, preventing too narrow a focus. A year's study at the University of Paris introduced me to the residual impacts of people on the forests of France and to the idea that all forests have experienced some human impact. Further studies at Duke and Rutgers universities continued this emphasis on the interplay between people and their environments. This book grew directly from a joint biology and history graduate seminar I taught at Duke University in 1990, while I was supported by a National Science Foundation Visiting Professorship for Women. The lively discussions among students with different intellectual backgrounds inspired me to begin the long process of writing a text that would build on and disseminate this enthusiasm for interdisciplinary interactions.

History Hidden in the Landscape

Introduction

Human impact on the land is ubiquitous, although it differs in kind and intensity from one place to another, from one time to another. The causes of some impacts, such as cutting forests or draining marshes, are obvious, but other causes, such as polluting the air or introducing pathogens, are more subtle. Reminders of past human activities persist even in such apparently pristine environments as the tropical forests of Africa[1] and many areas designated as wilderness in North America. Historical ecology seeks to explain many enigmatic features of present ecosystems and landscapes by deciphering the legacies of past human activities.[2]

I shall use the simple definition of an ecosystem as an assemblage of organisms and their environment that acts as a unit.[3] A landscape is an assemblage of ecosystems—for example, forest, lakes, and streams—which also interact, though less directly than the components of ecosystems. Ecologists try to understand the organization and functioning of these complex systems by asking questions like why there are more species in one ecosystem than another and how this affects the ability of the system to resist disruption. Discovery of general laws that explain such relations would allow us to predict and anticipate responses of ecosystems to future change. The scientific