

## *Preface to the First Edition*

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 interactions with 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.

## Preface to the Second Edition

In the two decades since publication of the first edition of this book, there has been an explosion in research in historical ecology. Google Scholar sends me notification of one or more new publications that use the term *historical ecology* every day, and the four hundred or so new references in this edition are a small sampling of recent research. New technologies and a recognition that history is an important consideration in conservation decisions have contributed both to interest in the field and to advances in our understanding of the importance of history for influencing current—and future—landscapes and ecosystems. Recent academic meetings have included sessions on historical ecology, and the Frontiers in Historical Ecology Symposium in Switzerland in 2011 featured worldwide research in historical ecology that went beyond case studies, but included these as well. Accelerated change in the global environment over the last century has also stimulated appreciation for the value of looking at the past to help understand how we have gotten to where we are today.

There continues to be a dichotomy between those who view historical ecology from an anthropological point of view and those who view it from the science of ecology. The most recent book with an anthropological perspective on historical ecology describes it as a research framework for studying the “human-environment relationship,” important for designing land management

decisions that are "effective and equitable," with a focus on specific locations.<sup>1</sup> Environmental history also focuses on the human aspect, especially how interactions with the natural world have affected human history. Most ecologists who do historical ecology, on the other hand, focus more on ecological processes, and how incorporating changing human impacts over time can help explain current processes and patterns. Many ecologists, however, especially in the United States, find it difficult to accept the importance of history to the systems that they study. I hope that the wealth of studies that I discuss in this book will show that historical ecology provides critical insights into the structure and function of ecosystems as well as conservation decisions.

With some regret, I have eliminated the chapter on lakes from this edition. Since the first edition, there have been at least two books devoted to paleolimnology, written by limnologists who understand lake systems far better than I do (two editions of J. P. Smol, *Pollution of Lakes and Rivers: A Palaeoenvironmental Perspective*, 2002, 2008; and A. S. Cohen, *Paleolimnology: The History and Evolution of Lake Systems*, 2003). The *Journal of Paleolimnology* has been publishing specifically historical studies of lakes since 1988. I have incorporated some lake studies in the other parts of the book, but have not delved into detail on lake ecology as I did in that chapter of the first edition.

Most of my research and field experience has been in northeastern North America, where the dominant vegetation is deciduous forest. This has led to much of the illustrative material in the book coming from this biome, though I include many examples of historical ecological research from other continents and other biomes. I hope that the abundance of examples will provide sufficient evidence of the importance of research in these other regions as well as an entrée into the historical ecological literature of these areas. I have focused in the chapter on sediment more on pollen than on other records in the sediment, also because that is where my experience lies. In my defense, I think that pollen is a good character to emphasize, as it gives an apparently simple representation of vegetation surrounding the sedimentary basin, while actually having a very complex relationship with that feature of the environment. The process of translating pollen data into meaningful interpretations of the contributing vegetation highlights the kind of analysis needed for using any sedimentary proxy for the environment.

I originally thought that that revising the first edition required merely updating some references in cases where work had been done on a topic since I originally referred to it. It became abundantly clear to me, though, as I considered changes in the field since the late 1990s, that the fields of historical ecology and environmental history had moved ahead to such an extent that

I would need to do a more extensive rewrite. I have learned a lot in doing the research for the second edition, and I am more convinced than ever that studying ecology without reference to history misses vital insights into the functioning of ecological systems at all scales, from population to global. Similarly, conservation decisions taken without regard to the history of a region may be unsustainable. Based on the outdated concept of "climax vegetation," they often ignore change in the past.<sup>2</sup>

This book is organized the same as the first edition, with an introduction to the field followed by chapters on methodology. Subsequent chapters deal with specific factors of human impact and the importance of history for understanding some important current ecological issues. The first four chapters set the stage for the rest of the book; the subsequent chapters to some extent can stand alone, though they do progress from the most long-running human impacts to more recent ones to give a feeling for the pervasive role of people in the environment since the evolution of *Homo sapiens*.

I hope that others will accept the challenge to add depth to their understanding by finding out more about the history of the systems that they study.