
Preface

Although the ultimate impetus for the book arguably had its nascence decades earlier in the Industrial Revolution, the idea for this book came in a practical sense during the lead-up to a symposium on biological responses to contemporary climate change at the 2007 international conference of The Wildlife Society in Tucson, Arizona. Dr. Erik Beever has been researching the changing distribution of an alpine mammal (*Ochotona princeps*, the American pika) in the Great Basin of western North America since 1994, and although climate was among the original suite of hypothesized determinants of the species' distribution since the beginning of the research, continuing investigation has suggested that climatic influences have played a stronger role in shaping the pattern of local extinctions in the years after 1999 compared to during the latter half of the twentieth century. In that research, as in much of the early research on biological response to contemporary climate change, the key challenge has been trying to divine the "why" and the "how" behind the "what" and "when"—that is, the *mechanisms* behind any changes in ecological systems in response to contemporary climate change.

We have consequently asked all authors to focus part of the discussion in each of their chapters on mechanisms, for two reasons. Understanding the hows and whys of these responses not only provides a more complete understanding of the dynamics associated with ecological responses, but also it is exactly that understanding that is needed to best inform strategies of mitigation, adaptation, conservation, and management of affected ecosystems and their components. Mechanisms are just beginning to be addressed rigorously, for good reason—they require much more in-depth understanding of the relevant natural history of species and ecosystem components involved, more critical thinking before beginning the fieldwork, and often more time and money than if mechanisms were ignored (i.e., simply documenting any changes). It quickly becomes apparent that much still remains to be learned, and humility in the face of so many unknowns and sources of uncertainty seems prudent. We feel that it is this focus on mechanisms—as well as our melding of empirical research, management, and conservation—that will distinguish this book from its contemporaries and perhaps even from later books on the topic.

Both editors have spent their careers working around the nexus of research and management of ecological systems, and this book clearly reflects that applied approach. We have asked authors to not only provide case studies to exemplify their messages throughout their chapter, but also to provide the "so what?" implications of their chapter for management and conservation of the systems they discuss. We feel honored and fortunate to have been able to work with such an experienced, widely respected, and capable group of authors, who fortuitously also happen to be wonderful individuals with whom to work. They hail from six different nations around the world and work not only on diverse spatial and temporal scales, but also on a vastly divergent collection of ecosystem components. Our vision was that this

heterogeneity would best exemplify the diversity of biological responses that may be expected in the coming decades (and have already begun to be observed).

Mirroring the progression of research surrounding ecological responses to contemporary climate changes, we have sought to first describe how climate is changing, then describe the basic responses of wildlife and other ecosystem components to climatic variability and change, then discuss the management strategies in response to such climatic influence, then consider implications for various scales of conservation, and then finish with a vision to the future that springs from what we know already to explore gaps in our understanding and research frontiers. We suspect that although the novelty of investigating biotic response to climate change may wane with time, climate will remain a pervasive and profound driver of ecosystem dynamics for decades to come, and likely with increasing strength. Thus, our hope is that this book initiates discussions, foments critical reviews of the ideas contained within, and informs future research, management, and conservation during this period of the worldwide natural experiment in which we currently find ourselves engaged.