

The Heart of the Matter

New essential reading on parks, protected areas, and cultural sites

Climate Change in Wildlands: Pioneering Approaches to Science and Management, edited by Andrew J. Hansen, William B. Monahan, David M. Theobald, and S. Thomas Olliff. Island Press, 2016. 391 pages.

Reviewed by Stephen Woodley

“MAY YOU LIVE IN INTERESTING TIMES” is the apocryphal curse that came to mind as I read this new book from Island Press (that stalwart, non-profit environmental publisher). Hansen et al. have laid before us a rich and complicated journey into the complexities of thinking about climate change adaptation in wildland ecosystems.

The book is the end product of a five-year, NASA-funded project, the “Landscape Climate Change Vulnerability Project,” which brought together some excellent minds to grapple with the challenge of managing for ecological integrity in an era of rapid human-induced climate change. The project focus was understandably on remote sensing and remotely sensed models, and that research is the heart of the book. However, that should not put off the less technically oriented. This book is a wonderful example of the increasing utility of remote sensing approaches to real management challenges. The book is logically organized around the well-known Climate Smart conservation framework and includes chapters on identifying needs, assessing vulnerability, and evaluating and then implementing management options.

Wildlands, in this book, are a descriptor covering parks and protected areas, and other wild lands. The purported target audience is federal land managers, but this book applies equally to any larger intact tracts of private or state lands. The detailed research in the book comes primarily from two very large Landscape Conservation Cooperatives: the Great Northern (the mountains from Wyoming, Idaho, and Oregon up through Montana and Washington to Alberta and British Columbia in Canada) and the Appalachian (Alabama, Tennessee, and Kentucky through to West Virginia and Pennsylvania to New York). These areas are deemed important to focus on because of their relative intactness, their susceptibility to climate change, and the presence of a recent rapid influx of humans.

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In addition to the hard details of predicted climate and ecosystem interactions, the book contains some nice surprises. I found Chapter 3 on “Challenges and Approaches for Integrating Climate Change into Federal Land Management” especially interesting. Here we have climate scientists straying off-road into an analysis of why the uptake of their science had been, well, less than ideal. They cover issues that include climate science being new to managers, the concepts being not well understood, and the difficulty of making decisions in high-uncertainty environments. Solutions go back to the use of the Climate Smart Framework, training, and a list of techniques for science–management collaboration. This is worth a read on its own.

The middle of the book, parts 2–3, is full of richly detailed studies from the Rockies and the Appalachians. These include projections of climate change, impacts on ecosystem processes, projected vegetation changes, and changes in fish communities. These are well documented, of a high scientific standard, and are well illustrated. I only wish the book was in color, as the detailed graphics would have really benefitted.

Part 2 of the book, on “Climate and Land Use,” provides detailed analysis of both historical and projected climate to support climate adaptation in the Rockies and the Appalachians. Both temperature and precipitation trends have been increasing in recent decades and are projected to increase further to the year 2100. This provides ample evidence that significant change is upon us and will continue. It is a solid demonstration of how to cope with the magnitude and direction of climate changes to support wildland management.

Part 3 is on the “Ecological Consequences and Vulnerabilities” of observed and projected change. This is the hardest part of climate adaptation for practitioners. What will changing climate mean to the ecosystems we manage and how can we think about the complexity of the interactions? The book details potential tree, vegetation community, and fish responses at a range of spatial scales for both eastern and western species. The results are instructive and likely the best available, but still leave the reader with the realization that we are just beginning the process of accurately predicting ecosystem responses to changing climate.

After exploring climate predictions and vulnerabilities, Part 4 moves to taking this scientific understanding into management. There are sections on identifying adaptation options and how much recent progress has been made by federal agencies in this area. We then see detailed case studies from Rocky Mountain National Park, and the management of white bark pine in Yellowstone. These chapters serve to tie the book together as they have climate projections, vulnerability assessments, and management actions within a context of a real place. The next-to-last chapter brings the wealth of information on the ecological condition of Greater Yellowstone to bear on the climate question, taking a full ecosystem perspective. It takes the bold step of comparing ecological condition on private and public lands, using available data and a rating system. The authors conclude that climate change is already impacting higher elevations, snowpack and runoff are declining, and insects and disease are changing tree population dynamics.

So we indeed do live in interesting times. Climate change is upon us and we are forced to adapt the way we think about and manage our beloved wildlife ecosystems. The trail ahead is neither straightforward nor easy, but there is no likelihood of turning back. Hansen et al.

have done us a service by providing a richly detailed set of tools and approaches for moving forward. The US truly is a global leader in thinking about climate change adaptation, and the examples in this book are impressive. It should be read and used well beyond the target audience.