

Forest Health

An Integrated Perspective

Forest Health: An Integrated Perspective is the first book to define an ecologically rational, conceptual framework that unifies and integrates the many sub-disciplines that comprise the science of forest health and protection.

This new global approach applies to boreal, temperate, tropical, natural, managed, even-aged, uneven-aged and urban forests, as well as plantations. Readers of the text can use real data sets to assess the sustainability of four forests around the world. Datasets for the case studies are available at www.cambridge.org/9780521766692, and the text provides stepwise instructions for performing the calculations in Microsoft[®] Excel[®]. Readers can follow along as the authors perform the same calculations and interpret the results.

Elevating forest health from a fuzzy concept to an ecologically sound paradigm, this is essential reading for undergraduate and graduate students and professionals interested in forest health, protection, entomology, pathology, and ecology.

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Preface

Would you be able to recognize a healthy forest if you walked through one? We begin our course in “Forest Health” every summer with this question to our students. Of course their answer almost always is no. They are surprised to learn that neither can we! The reason, we explain, is because there is no widely accepted, clear, and concise definition of a “healthy forest.” Why not? . . . is almost always the next question. Human health is a relatively easy concept. Arguably, it is the absence of disease. But is a healthy forest one without diseased or dead trees? Following about 10 years of unsuccessfully trying to answer these questions from our students, we decided to attempt to develop our own definition.

Fortunately, during the past 10 to 15 years or so, Paul Manion, Professor Emeritus of Forest Pathology at SUNY-ESF, and his students, were developing the baseline mortality concept of sustainability and forest health. The logic of this concept as the foundation for a concise definition of a healthy forest was so compelling that we adopted it for our course, and decided to write this text. So, the essential concepts that form the basis of this book are his, not ours, and we are grateful for, and readily acknowledge, his lucid thinking. Our contribution is the blending of sustainability (i.e., a sustainable diameter distribution) with productivity (i.e., meeting landowner management objectives) to create our two-part definition of a healthy forest. So, Paul, the credit for this book belongs to you and your students, and we hope you are pleased with it. It is to him that we dedicate this book.

The organization of the text is a bit unusual, and may require some explanation. We wanted the text to provide a unique, broad, integrative, and global perspective on forest health because most of our students are biologists not foresters, and they come from many different countries around the world. In addition, we wanted the text to deal with some of the more pressing current health issues facing our global forests. Therefore, Chapters 1, 2, and 3 introduce and explain the main concepts of the book, the mathematics that underlay it, and a few case studies using real datasets for students to assess sustainability. Our students have used these datasets successfully

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to determine baseline mortality, observed mortality, and sustainability. Chapters 4, 5, 6, and 7 deal with the ecological components of forest health; specifically the biotic components including invasive species, and the abiotic components including Edaptic factors, air pollution, and global climate change. Chapters 8, 9, and 10 address forest health and its human dimension including forest management, the conservation of biological diversity, and the monitoring of forest health. We tried to integrate all these components of forest health into one logical treatise, and our summary of that effort along with a look to the future is presented in the final chapter.

We acknowledge the contributions of many individuals because without them this text would not have been possible. First, we acknowledge our students in forest health and forest pathology whose curiosity and questions provided the spark to undertake this project. Second, we acknowledge the basic concepts of Paul Manion, which form the foundation of the book, and to whom the book is dedicated. Third, we acknowledge Paul Manion, SUNY-ESF for providing the New York State datasets; Rob Allen, Landcare Research, Lincoln, New Zealand for providing the New Zealand mountain beech datasets; D. Jean Lodge, Jill Thompson, Jess Zimmerman, and Nick Brokaw, of the Institute of Tropical Ecosystem Studies, University of Puerto Rico, International Institute of Tropical Forestry, and the USDA Forest Service for the Puerto Rico datasets and for help in transforming the data into usable formats. We also acknowledge financial support from the US National Science Foundation and the Mellon Foundation in support of the Luquillo Long-Term Ecological Research Program; and finally thank John Lundquist, USDA Forest Service, Anchorage, AK, USA for providing the Alaska white spruce dataset. Fourth, we appreciate the thorough reviews of the text provided by Lee Frelich, University of Minnesota; Bill MacDonald, West Virginia University; and Ed Barnard, Florida Division of Forestry. However, any mistakes in fact or in the interpretation of the facts are ours not theirs, and for which we accept full responsibility. Finally, we acknowledge the patience and understanding of our wives Marie Castello and Alison Teale, for putting up with us, and without us, while we labored on this project these past two years.

August 1, 2010

Sadly, within the past week our longtime colleague, friend, and a coauthor of Chapter 8, Professor Emeritus Allan P. Drew passed away. He never saw the finished book, but we are confident that he would have been pleased with it. Thank you, Allan, for your collegiality, friendship, and professionalism over the years, and for your contributions to the book.

March 1, 2011

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