

Preface

Simulation models of landscape disturbances have proliferated and matured. They are now applied to an extent that would have not been conceivable a few decades ago, when we began to perceive the processes that “disturb” or disrupt ecosystems as integral mechanisms that shape the spatial patterns of forest landscapes. A large proportion of the scientific papers on landscape ecology are dedicated to this topic, as are many graduate theses and dissertations. In this context, it is timely that we explore efforts to model forest landscape disturbances so that we can capture the current state of knowledge and ponder future directions. In this book, we have sought the insights of a group of ecologists who focus on a range of forest landscape disturbances and develop simulation models to study those disturbances. The topics they address include a wide variety of disturbance processes: physical disturbances such as drought, wind, and fire; biological disturbances such as defoliating insects, bark beetles, and tree pathogens; anthropogenic influences; the interactions among disturbances and climate change; and the recovery of forest landscapes from disturbances—all from a simulation modeling perspective. Their discussions and examples offer a broad synopsis of the state of this rapidly evolving subject.

This book will be relevant to those who develop and apply models or who are interested in understanding and exploring forest landscape disturbances using simulation models. As such, it will appeal to academics, researchers, and graduate students, as well as to advanced users of models in applications related to managing forest landscapes. We hope that readers will benefit from the authors’ explorations of the current state of modeling of forest landscape disturbances and their insights into where these efforts should be heading. Readers should not expect this compilation to be a comprehensive treatise on specific models, an enumeration of the available models, or an exhaustive review of the literature. Nor will they find a user manual that defines when or how to use individual models. Rather, our intent is to provide general insights into current approaches and, in doing so, highlight the gaps in knowledge to help focus future efforts to advance the modeling of forest landscape disturbances in natural ecosystems as well as in increasingly anthropogenically influenced ecosystems.

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