

# **Managing Forests As Complex Adaptive Systems Building Resilience To The Challenge Of Global Change The Earthscan Forest Library**

This book is dedicated to forest ecology and conservation on ecological and conservation aspects of forest. The book is divided into two sections: the first section "Forest Ecology" with four chapters deals with forest ecological aspects, while the second section "Forest Conservation" with two chapters looks into new techniques for conserving the forests. This book will bridge the gaps in the knowledge about some new emerging issues on forest ecology and conservation. It will be an interesting and helpful resource to all those in the field of forestry working for its sustainable use and conservation.

Mycorrhizal Mediation of Soil: Fertility, Structure, and Carbon Storage offers a better understanding of mycorrhizal mediation that will help inform earth system models and subsequently improve the accuracy of global carbon model predictions. Mycorrhizas transport tremendous quantities of plant-derived carbon below ground and are increasingly recognized for their importance in the creation, structure, and function of soils. Different global carbon models vary widely in their predictions of the dynamics of the terrestrial carbon pool, ranging from a large sink to a large source. This edited book presents a unique synthesis of the influence of environmental change on mycorrhizas across a wide range of ecosystems, as well as a clear examination of new discoveries and challenges for the future, to inform land

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management practices that preserve or increase below ground carbon storage. Synthesizes the abundance of research on the influence of environmental change on mycorrhizas across a wide range of ecosystems from a variety of leading international researchers Focuses on the specific role of mycorrhizal fungi in soil processes, with an emphasis on soil development and carbon storage, including coverage of cutting-edge methods and perspectives Includes a chapter in each section on future avenues for further study

This book examines the value of Adaptive Collaborative Management for facilitating learning and collaboration with local communities and beyond, utilising detailed studies of forest landscapes and communities. Many forest management proposals are based on top-down strategies, such as the Million Tree Initiatives, Forest Landscape Restoration (FLR) and REDD+, often neglecting local communities. In the context of the climate crisis, it is imperative that local peoples and communities are an integral part of all decisions relating to resource management. Rather than being seen as beneficiaries or people to be safeguarded, they should be seen as full partners, and Adaptive Collaborative Management is an approach which prioritises the rights and roles of communities alongside the need to address the environmental crisis. The volume presents detailed case studies and real life examples from across the globe, promoting and prioritizing the voices of women and scholars and practitioners from the Global South who are often under-represented. Providing concrete examples of ways that a bottom-up approach can function to enhance development sustainably, via its practitioners and far beyond the locale in which they initially worked, this volume demonstrates the lasting utility of approaches like Adaptive Collaborative Management that emphasize local control, inclusiveness and local creativity in management. This book will be of great interest to

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students, scholars and practitioners working in the fields of conservation, forest management, community development and natural resource management and development studies more broadly.

Forests are under tremendous pressure from human uses of all kinds, and one of the most significant threats to their sustainability comes from commercial interests. This book presents a comprehensive examination of the interactions between the forest products sector and the sustainability of forests. It captures the most current sustainability concerns within the forestry sector and various sustainability-oriented initiatives to address these. Experts from around the world analyze interconnected topics including market mechanisms, regulatory mechanisms, voluntary actions, and governance, and outline their effectiveness, potential, and limitations. By presenting a novel overview of the burgeoning field of business sustainability within the forestry sector, this book paves a way forward in understanding what is working, what is not working, and what could potentially work to ensure sustainable business practices within the forestry sector,

Forests throughout the world are undergoing rapid, far-reaching change as a result of natural and anthropogenic disturbances. The challenge is to manage these forests in ways that avoid formulaic approaches to complex issues. This book takes on the challenge of balancing local economies, wood products, and biodiversity by proposing diverse new approaches to forest management using new research from the moist coniferous forests of the Pacific Northwest. -- Forests are valued not only for their economic potential, but also for the biodiversity they contain, the ecological services they provide, and the recreational, cultural, and spiritual opportunities they provide. The Ecological Forest Management Handbook provides a

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comprehensive summary of interrelated topics in the field, including management concepts, forest models, and ecological indicators. Featuring contributions from experts on the three main forest types—boreal, temperate, and tropical—this book presents in-depth coverage of important issues in ecological forest management and includes case studies addressing ecological and socioeconomic issues. It illustrates how ecological forest management is a complex process that requires broad ecological knowledge while giving readers a deeper understanding of basic principles and applications.

The Mediterranean region has more than 25 million hectares of Mediterranean forests and about 50 million hectares of other Mediterranean wooded lands. They make crucial contributions to rural development, poverty alleviation, food security, as well as, the agricultural, water, tourism, and energy sectors. Changes in climate, societies, and lifestyles to create appropriate financial incentives and tools. in the Mediterranean region could have serious negative consequences for forests, with the potential to lead to the loss or diminution of those contributions and to a wide range of economic, social and environmental problems. In the future, Mediterranean forests will support agriculture and human wellbeing. It is therefore crucial to improve policies, practices, and to promote sustainable management to provide social and economic benefits as well as to increase the resilience of ecosystems and societies. This new edition of the State of Mediterranean Forests aims to demonstrate the importance of Mediterranean forests to implementing solutions to tackle global issues such as climate change and population increase. Part 1: The Mediterranean landscape: importance and threats. Despite the important natural capital provided by Mediterranean forests, they are under threats from climate change and population increase and other subsidiary drivers of

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forest degradation. Part 2: Mediterranean forest-based solutions. Forests and landscape restoration, adaptation of forests and adaptation using forests, climate change mitigation, and conserving biodiversity are additional and complementary approaches to address the drivers of forest degradation to the benefit of populations and the environment. Part 3: Creating an enabling environment to scale up solutions. To scale up and replicate forest-based solutions, there is a need to change the way we see the role of forests in the economy, to put in place relevant policies, more widespread participatory approaches, to recognize the economic value of the goods and services provided by forests and, ultimately, to create appropriate financial incentives and tools.

This book brings together the work of over twenty-five researchers to provide a comparative and empirically rich portrait of community forestry policy and practice in Canada. Tackling all forestry regions from Newfoundland to British Columbia, it unearths the history of community forestry across the nation, demonstrating strong regional differences tied to patterns of policy-making and cultural traditions. Case studies reveal innovative practices in governance and ecological management but also uncover challenges related to government support and market access. This book also considers the future of the sector, including the role of institutional reform, multiscale networks, and adaptive management strategies.

Mobilisation of Forest Bioenergy in the Boreal and Temperate Biomes: Challenges, Opportunities, and Case Studies features input from key international experts who identify and analyze the main opportunities and roadblocks for the implementation of sustainable forest biomass supply chains in the boreal and temperate regions. It draws from responses to surveys that were sent to specialists from different countries, compares models of bioenergy

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deployment, and discusses different types of bioenergy carriers. Efficiency and profitability of the supply chain are analyzed and the scale and level of confidence of feedstock inventory estimates are highlighted. Logistics and ecological and socio-economic footprints are also covered. This book provides a synthesis of the scientific and technical literature on specific aspects of forest biomass supply chains, and quantifies future potentials in comparison to estimates provided by other sources and the targets for bioenergy production set by various organizations (IEA, IPCC, etc.). Finally, the book proposes recommendations for practitioners, policymakers, and future research. This approach makes the book especially relevant for professionals, policymakers, researchers, and graduate students in the field of bioenergy conversion and management, as well as those interested in sustainable management of natural resources. Presents foundational theory, examples and lessons learned, drawing on scientific and technical literature, as well as surveys conducted among stakeholders from various countries of the boreal and temperate biomes Provides best practices, insights, and recommendations through an integrative framework that encompasses various aspects of forest biomass supply chain, at different scales, and looking at a broad geographical and geopolitical range Compares contrasting history, policy context, and level of forest bioenergy development in several countries through several case studies Analyzes the efficiency and profitability of the supply chain, highlighting the scale and level of confidence of feedstock inventory estimates

The 'Addressing forestry and agroforestry in National Adaptation Plans: Supplementary guidelines' provide specific guidance for national adaptation planning in the forestry sector. They are intended to be used by national planners and decision-makers working on climate

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change issues in developing countries and authorities and experts who are contributing to climate change adaptation and NAP formulation and implementation.

The Complex Forest systematically examines the theory, processes, and early outcomes of a research and management approach called adaptive collaborative management (ACM). An alternative to positivist approaches to development and conservation that assume predictability in forest management, ACM acknowledges the complexity and unpredictability inherent in any forest community and the importance of developing solutions together with the forest peoples whose lives will be most affected by the outcomes. Building on earlier work that established the importance of flexible, collaborative approaches to sustainable forest management, The Complex Forest describes the work of ACM practitioners facing a broad range of challenges in diverse settings and attempts to identify the conditions under which ACM is most effective. Case studies of ACM in 33 forest sites in 11 countries together with Colfer's systematic comparison of results at each site indicate that human and institutional capabilities have been strengthened. In Zimbabwe, for example, the number of women involved in decisionmaking soared. In Nepal, community members detected and sanctioned dishonest community elites. In Cameroon and Bolivia, learning programs resulted in better conflict management. These are early results, but a wide range of recent research supports Colfer's belief that these new capabilities will eventually contribute to higher incomes and to sustainable improvements in the health of forests and forest peoples. The Complex Forest reinforces calls for change in the way we plan conservation and development programs, away from command-and-control approaches, toward ones that require bureaucratic flexibility and responsiveness, as well as greater local participation in setting priorities and problem solving.

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Landscapes are being degraded and simplified across the globe. This book explores how forest restoration might be carried out to increase landscape heterogeneity, improve ecological functioning and restore ecosystem services in such landscapes. It focuses on large, landscape-scale reforestation because that is the scale at which restoration is needed if many of the problems that have now developed are to be addressed. It also shows how large-scale forest restoration might improve human livelihoods as well as improve conservation outcomes. A number of governments have undertaken national reforestation programs in recent years; some have been more successful than others. The author reviews these to explore what type of reforestation should be used, where this should be carried out and how much should be done. For example, are the traditional industrial forms of reforestation necessarily the best to use in all situations? How can forest restoration be reconciled with the need for food security? And, are there spatial thresholds that must be exceeded to generate economic and environmental benefits? The book also examines the policy and institutional settings needed to encourage large-scale reforestation. This includes a discussion of the place for incentives to encourage landholders to undertake particular types of reforestation and to reforest particular locations. It also considers forms of governance that are likely to lead to an equitable sharing of the costs and benefits of forest restoration.

This textbook offers a detailed overview of the current state of knowledge concerning the ecology and management of compositionally and structurally diverse forests. It provides answers to central questions such as: What are the scientific concepts used to assess the growth, dynamics and functioning of mixed-species forests, how generalizable are they, and what kind of experiments are necessary to develop them further? How do mixed-species



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stands compare with monocultures in relation to productivity, wood quality, and ecological stability in the face of stress and disturbances? How are the effects of species mixtures on ecosystem functioning influenced by the particular species composition, site conditions, and stand structure? How does any over- or underyielding at the forest-stand level emerge from the tree and organ level, and what are the main mechanisms behind mixing effects? How can our current scientific understanding of mixed-species forests be integrated into silvicultural concepts as well as practical forest management and planning? Do the ecological characteristics of mixed-species stands also translate into economic differences between mixtures and monocultures? In addition, the book addresses experimental designs and analytical approaches to study mixed-species forests and provides extensive empirical information, general concepts, models, and management approaches for mixed-species forests. As such, it offers a valuable resource for students, scientists and educators, as well as professional forest planners, managers, and consultants.

This comprehensive handbook provides a unique resource covering all aspects of forest ecology from a global perspective. It covers both natural and managed forests, from boreal, temperate, sub-tropical and tropical regions of the world. The book is divided into seven parts, addressing the following themes: forest types forest dynamics forest flora and fauna energy and nutrients forest conservation and management forests and climate change human impacts on forest ecology. While each chapter can stand alone as a suitable resource for a lecture or seminar, the complete book provides an essential reference text for a wide range of students of ecology, environmental science, forestry, geography and natural resource management. Contributors include leading authorities from all parts of the world.

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Forest land managers face the challenges of preparing their forests for the impacts of climate change. However, climate change adds a new dimension to the task of developing and testing science-based management options to deal with the effects of stressors on forest ecosystems in the southern United States. The large spatial scale and complex interactions make traditional experimental approaches difficult. Yet, the current progression of climate change science offers new insights from recent syntheses, models, and experiments, providing enough information to start planning now for a future that will likely include an increase in disturbances and rapid changes in forest conditions. *Climate Change Adaptation and Mitigation Management Options: A Guide for Natural Resource Managers in Southern Forest Ecosystems* provides a comprehensive analysis of forest management options to guide natural resource management in the face of future climate change. Topics include potential climate change impacts on wildfire, insects, diseases, and invasives, and how these in turn might affect the values of southern forests that include timber, fiber, and carbon; water quality and quantity; species and habitats; and recreation. The book also considers southern forest carbon sequestration, vulnerability to biological threats, and migration of native tree populations due to climate change. This book utilizes the most relevant science and brings together science experts and land managers from various disciplines and regions throughout the south to combine science, models, and on-the-ground experience to develop management options. Providing a link between current management actions and future management options that would anticipate a changing climate, the authors hope to ensure a broader range of options for managing southern forests and protecting their values in the future. The overarching contribution of this book is a review and assessment of the current and future

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impacts of globalization on the world's forests. The work has been developed by the "Resources for the Future" Task Force for the International Union of Forest Research Organizations (IUFRO). Four key themes are addressed: the effect of globalization on forests (including future trade flows); plantations as the primary source of forest products and its consequences, including plant breeding and forest health; the effect of new products such as bio-products and markets on forests; and the emergence of forest ecosystem services and their impact on the landscape and human communities. These four themes are examined in detail to map out the impacts of these trends for forests throughout the world and at multiple scales, and how forest research needs to be adapted to address these trends. Overall, the volume provides a major synthesis of current thinking and knowledge on the topic for advanced students, as well as policy-makers and professionals in the forest sector.

**Sustainable Forest Management** provides the necessary material to educate students about forestry and the contemporary role of forests in ecosystems and society. This comprehensive textbook on the concept and practice of sustainable forest management sets the standard for practice worldwide. Early chapters concentrate on conceptual aspects, relating sustainable forestry management to international policy. In particular, they consider the concept of criteria and indicators and how this has determined the practice of forest management, taken here to be the management of forested lands and of all ecosystems present on such lands. Later chapters are more practical in focus, concentrating on the

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management of the many values associated with forests. Overall the book provides a major new synthesis which will serve as a textbook for undergraduates of forestry as well as those from related disciplines such as ecology or geography who are taking a course in forests or natural resource management.

Globally rainforests are under threat on numerous fronts, including clearing for agriculture, harvesting for timber and urban expansion. Yet they have a crucial role in biodiversity conservation, climate change mitigation and providing other ecosystem services. Rainforests are also attractive tourist spaces and where they have been used as a tourism resource they have generated significant income for local communities. However, not all use of rainforests as a tourism resource has been sustainable. This book argues that sustainability must be the foundation on which tourism use of this complex but ultimately fragile ecosystem is built upon. It provides a multi-disciplinary perspective, incorporating rainforest science, management and tourism issues. The book is organized into four sections commencing with 'Tourism in rainforest regions', followed by 'Threats to rainforest tourism' and 'The development and management of rainforest experiences', and finally 'Wildlife and rainforest tourism'. Each major rainforest region is covered, including the Amazon, Central America, Africa, Australia and

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south-east Asia, in the context of a specific issue. For example, rainforests in Papua New Guinea are examined in the context of community-based ecotourism development, while the rainforests in Borneo are discussed in an examination of wildlife issues. Other issues covered in this manner include governance, empowerment issues for rainforest peoples and climate change.

Ecological restoration is a rapidly evolving discipline that is engaged with developing both methodologies and strategies for repairing damaged and polluted ecosystems and environments. During the last decade the rapid pace of climate change coupled with continuing habitat destruction and the spread of non-native species to new habitats has forced restoration ecologists to re-evaluate their goals and the methods they use. This comprehensive handbook brings together an internationally respected group of established and rising experts in the field. The book begins with a description of current practices and the state of knowledge in particular areas of restoration, and then identifies new directions that will help the field achieve increasing levels of future success. Part I provides basic background about ecological and environmental restoration. Part II systematically reviews restoration in key ecosystem types located throughout the world. In Part III, management and policy issues are examined in detail, offering the first comprehensive treatment of policy relevance in the field, while Part IV

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looks to the future. Ultimately, good ecological restoration depends upon a combination of good science, policy, planning and outreach – all issues that are addressed in this unrivalled volume.

Forests play an important role in resolving global challenges such as sustainable development, climate change, biodiversity loss, and food and water security. Stopping deforestation is crucial for the future of our planet. Global efforts to curb deforestation, have been partially successful, but have largely fallen short. At the same time, national level efforts to support human development, reflected in the United Nations (UN) Sustainable Development Goals, aim to increase the welfare and wellbeing of populations living in poverty. Meeting these development goals will inevitably have crosscutting effects on initiatives to address deforestation. In balancing these goals, policy makers are confronted with wicked problems – or problems where there are moral considerations and where limited information is available for policy makers. This book is focused on how wicked forest policy problems have been, and can be, addressed.

Forest management has evolved from a mercantilist view to a multi-functional one that integrates economic, social, and ecological aspects. However, the issue of sustainability is not yet resolved. Quantitative Techniques in Participatory Forest Management brings together global research in three areas of application:

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inventory of the forest variables that determine the main environmental indices, description and design of new environmental indices, and the application of sustainability indices for regional implementations. All these quantitative techniques create the basis for the development of scientific methodologies of participatory sustainable forest management.

The discipline of silviculture is at a crossroads. Silviculturists are under increasing pressure to develop practices that sustain the full function and dynamics of forested ecosystems and maintain ecosystem diversity and resilience while still providing needed wood products. *A Critique of Silviculture* offers a penetrating look at the current state of the field and provides suggestions for its future development. The book includes an overview of the historical developments of silvicultural techniques and describes how these developments are best understood in their contemporary philosophical, social, and ecological contexts. It also explains how the traditional strengths of silviculture are becoming limitations as society demands a varied set of benefits from forests and as we learn more about the importance of diversity on ecosystem functions and processes. The authors go on to explain how other fields, specifically ecology and complexity science, have developed in attempts to understand the diversity of nature and the variability and heterogeneity of ecosystems. The authors suggest that ideas and

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approaches from these fields could offer a road map to a new philosophical and practical approach that endorses managing forests as complex adaptive systems. A Critique of Silviculture bridges a gap between silviculture and ecology that has long hindered the adoption of new ideas. It breaks the mold of disciplinary thinking by directly linking new ideas and findings in ecology and complexity science to the field of silviculture. This is a critically important book that is essential reading for anyone involved with forest ecology, forestry, silviculture, or the management of forested ecosystems.

The capacity of mixed forests to mitigate climate change effects by increasing resilience and lowering risks is pinpointed as an opportunity to highlight the role of tree species rich forests as part of complex socio-ecological systems. This book updates and presents the state-of-the-art of mixed forest performance in terms of regeneration, growth, yield and delivery of ecosystem services.

Examples from more than 20 countries in Europe, North Africa and South America provide insights on the interplay between structure and functioning, stability, silviculture and optimization of management of this type of forests. The book also analyses the role of natural mixed forests and mixed plantations in the delivery of ecosystem services and the best modelling strategy to study mixed forest dynamics. The book is intended to serve as a reference tool for students,



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researchers and professionals concerned about the management of mixed forests in a context of social and environmental change.

Professor Chadwick Dearing Oliver has made major intellectual contributions to forest science and natural resources management. Over the course of his career he has actively sought to bring research and practice together through synthesis, outreach, and capacity-building. A common thread throughout his career has been complexity and how we as a society understand and manage complex systems. His work on forest stand dynamics, landscape management, and sustainability have all focused on the emergent properties of complex ecological and/or social systems. This volume celebrates a remarkable career through a diverse group of former students and colleagues who work on a wide range of subject areas related to the management of complex natural resource systems. Over the past decade there has been considerable discussion about forests as complex adaptive systems. Advances in remote sensing, social methods, and data collection and processing have enabled more detailed characterisations of complex natural systems across spatial and temporal scales than ever before. Making sense of these data, however, requires conceptual frameworks that are robust to the complexity of the systems and their inherent dynamics, particularly in the context of global change. This volume presents a collection of cutting-edge

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research on natural ecosystems and their dynamics through the lens of complex adaptive systems. It includes contributions by a wide range of authors from academia, NGOs, forest industry, and governmental organisations with diverse perspectives on forests and natural resources management. Each chapter offers new insights into how these systems can be made more resilient to ensure that they provide a diversity of ecological and social values well into the future. Together they provide a robust way of thinking about the many challenges that natural ecosystems face and how we as society may best address them. Forest landscape disturbances are a global phenomenon. Simulation models are an important tool in understanding these broad scale processes and exploring their effects on forest ecosystems. This book contains a collection of insights from a group of ecologists who address a variety of processes: physical disturbances such as drought, wind, and fire; biological disturbances such as defoliating insects and bark beetles; anthropogenic influences; interactions among disturbances; effects of climate change on disturbances; and the recovery of forest landscapes from disturbances—all from a simulation modeling perspective. These discussions and examples offer a broad synopsis of the state of this rapidly evolving subject.

This book links the emerging concepts of complexity, complex adaptive system

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(CAS) and resilience to forest ecology and management. It explores how these concepts can be applied in various forest biomes of the world with their different ecological, economic and social settings, and history. Individual chapters stress different elements of these concepts based on the specific setting and expertise of the authors. Regions and authors have been selected to cover a diversity of viewpoints and emphases, from silviculture and natural forests to forest restoration, and from boreal to tropical forests. The chapters show that there is no single generally applicable approach to forest management that applies to all settings. The first set of chapters provides a global overview of how complexity, CAS and resilience theory can benefit researchers who study forest ecosystems. A second set of chapters provides guidance for managers in understanding how these concepts can help them to facilitate forest ecosystem change and renewal (adapt or self-organize) in the face of global change while still delivering the goods and services desired by humans. The book takes a broad approach by covering a variety of forest biomes and the full range of management goals from timber production to forest restoration to promote the maintenance of biodiversity, quality of water, or carbon storage.

Classical silviculture has often emphasized timber models, fundamentally based in production agriculture. This books presents silvicultural methods based in

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natural forest models—models that emulate natural disturbances and development processes, sustain biological legacies, and allow time to take its course in shaping stands. These methods, dubbed “ecological forestry,” have been successfully implemented by foresters for decades managing a wide variety of forestlands. Ecological silvicultural strategies protect threatened and rare species, sustain biological diversity, and provide habitat for game and non-game species, all while providing timber in profitable ways.

The influence of the past, and of the future on current-time tradeoffs in the forest arena are particularly relevant given the long-term successions in forest landscapes and the hundred years’ rotations in forestry. Historically established path dependencies and conflicts determine our present situation and delimit what is possible to achieve. Similarly, future trends and desires have a large influence on decision making. Nevertheless, decisions about forest governance and management are always made in the present – in the present-time appraisal of the developed situation, future alternatives and in negotiation between different perspectives, interests, and actors. This book explores historic and future outlooks as well as current tradeoffs and methods in forest governance and management. It emphasizes the generality and complexity with empirical data from Sweden and internationally. It first investigates, from a historical

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perspective, how previous forest policies and discourses have influenced current forest governance and management. Second, it considers methods to explore alternative forest futures and how the results from such investigations may influence the present. Third, it examines current methods of balancing tradeoffs in decision-making among ecosystem services. Based on the findings the authors develop an integrated approach – Reflexive Forestry – to support exchange of knowledge and understandings to enable capacity building and the establishment of common ground. Such societal agreements, or what the authors elaborate as forest social contracts, are sets of relational commitment between involved actors that may generate mutual action and a common directionality to meet contemporary challenges.

This book links the emerging concepts of complexity, complex adaptive systems (CAS) and resilience to forest ecology and management. It explores how these concepts can be applied in various forest biomes of the world with their different ecological, economic and social settings, and histories. Individual chapters stress different elements of these concepts based on the specific setting and expertise of the authors. Regions and authors have been selected to cover a diversity of viewpoints and emphases, from silviculture and natural forests to forest restoration, and from boreal to tropical forests. The chapters show that there is

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no single generally applicable approach to forest management that applies to all settings. The first set of chapters provides a global overview of how complexity, CAS and resilience theory can benefit researchers who study forest ecosystems. A second set of chapters provides guidance for managers in understanding how these concepts can help them to facilitate forest ecosystem change and renewal (adapt or self-organize) in the face of global change while still delivering the goods and services desired by humans. The book takes a broad approach by covering a variety of forest biomes and the full range of management goals from timber production to forest restoration to promoting the maintenance of biodiversity, quality of water and carbon storage.

This book integrates the latest global developments in forestry science and practice and their relevance for the sustainable management of tropical forests. The influence of social dimensions on the development of silvicultural concepts is another spotlight. Ecology and silvicultural options form all tropical continents, and forest formations from dry to moist forests and from lowland to mountain forests are covered. Review chapters which guide readers through this complex subject integrate numerous illustrative and quantitative case studies by experts from all over the world. On the basis of a cross-sectional evaluation of the case studies presented, the authors put forward possible silvicultural contributions

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towards sustainability in a changing world. The book is addressed to a broad readership from forestry and environmental disciplines.

In Canada and around the world, new concerns with adaptive processes, feedback learning, and flexible partnerships are reshaping environmental governance. Meanwhile, ideas about collaboration and learning are converging around the idea of adaptive co-management. This book provides a comprehensive synthesis of the core concepts, strategies, and tools in this emerging field, informed by a diverse group of researchers and practitioners with over two decades of experience. It also offers a diverse set of case studies that reveal the challenges and implications of adaptive co-management thinking. *Harnessing Complexity* will be indispensable to anyone who wants to better comprehend how people and organizations can adapt effectively in the information age. This book is a step-by-step guide to understanding the processes of variation, interaction, and selection that are at work in all organizations. The authors show how to use their own paradigm of "bottom up" management, the Complex Adaptive System-whether in science, public policy, or private commerce. This simple model of how people work together will change forever how we think about getting things done in a group. "*Harnessing Complexity* distills the managerial essence of current research on complexity. "A

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very valuable contribution to the emerging theory of competition and competitive advantage."-C.K. Prahalad, University of Michigan, coauthor of Competing for the Future "A brilliant exposition that demystifies both the theory and use of Complex Adaptive Systems."-John Seely Brown, Xerox Corporation and Palo Alto Research Center

Silviculture is integral for the perpetuity and sustainability of forest stands and their yields. It encompasses several methods and techniques that make the bridge between individual trees and the stand. This book focuses on sustainable forest management with chapters on such topics as afforestation, thinning, pest control, and mitigation of climate change, among others. Forest Plans of North America presents case studies of contemporary forest management plans developed for forests owned by federal, state, county, and municipal governments, communities, families, individuals, industry, investment organizations, conservation organizations, and others in the United States, Canada, and Mexico. The book provides excellent real-life examples of contemporary forest planning processes, the various methods used, and the diversity of objectives and constraints faced by forest owners. Chapters are written by those who have developed the plans, with each contribution following a unified format and allowing a common, clear presentation of the material, along with consistent treatment of various aspects of the plans. This work complements other books published by members of the same editorial team (Forest Management and Planning, Introduction to Forestry and Natural Resource Management), which describe the planning process and the various methods one might use to develop a plan, but in general do not, as this work does,



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illustrate what has specifically been developed by landowners and land managers. This is an in-depth compilation of case studies on the development of forest management plans by the different landowner groups in North America. The book offers students, practitioners, policy makers, and the general public an opportunity to greatly improve their appreciation of forest management and, more importantly, foster an understanding of why our forests today are what they are and what forces and tools may shape their tomorrow. Forest Plans of North America provides a solid supplement to those texts that are used as learning tools for forest management courses. In addition, the work functions as a reference for the types of processes used and issues addressed in the early 21st century for managing land resources. Presents 40-50 case studies of forest plans developed for a wide variety of organizations, groups, and landowners in North America Illustrates plans that have specifically been developed by landowners and land managers Features engaging, clearly written content that is accessible rather than highly technical, while demonstrating the issues and methods involved in the development of the plans Each chapter contains color photographs, maps, and figures Fundamental changes have occurred in all aspects of forestry over the last 50 years, including the underlying science, societal expectations of forests and their management, and the evolution of a globalized economy. This textbook is an effort to comprehensively integrate this new knowledge of forest ecosystems and human concerns and needs into a management philosophy that is applicable to the vast majority of global forest lands. Ecological forest management (EFM) is focused on policies and practices that maintain the integrity of forest ecosystems while achieving environmental, economic, and cultural goals of human societies. EFM uses natural ecological models as its basis contrasting it with modern production forestry,

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which is based on agronomic models and constrained by required return-on-investment. Sections of the book consider: 1) Basic concepts related to forest ecosystems and silviculture based on natural models; 2) Social and political foundations of forestry, including law, economics, and social acceptability; 3) Important current topics including wildfire, biological diversity, and climate change; and 4) Forest planning in an uncertain world from small privately-owned lands to large public ownerships. The book concludes with an overview of how EFM can contribute to resolving major 21st century issues in forestry, including sustaining forest dependent societies.

This open access book offers a cross-sectoral reference for both managers and scientists interested in climate-smart forestry, focusing on mountain regions. It provides a comprehensive analysis on forest issues, facilitating the implementation of climate objectives. This book includes structured summaries of each chapter. Funded by the EU's Horizon 2020 programme, CLIMO has brought together scientists and experts in continental and regional focus assessments through a cross-sectoral approach, facilitating the implementation of climate objectives. CLIMO has provided scientific analysis on issues including criteria and indicators, growth dynamics, management prescriptions, long-term perspectives, monitoring technologies, economic impacts, and governance tools.

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