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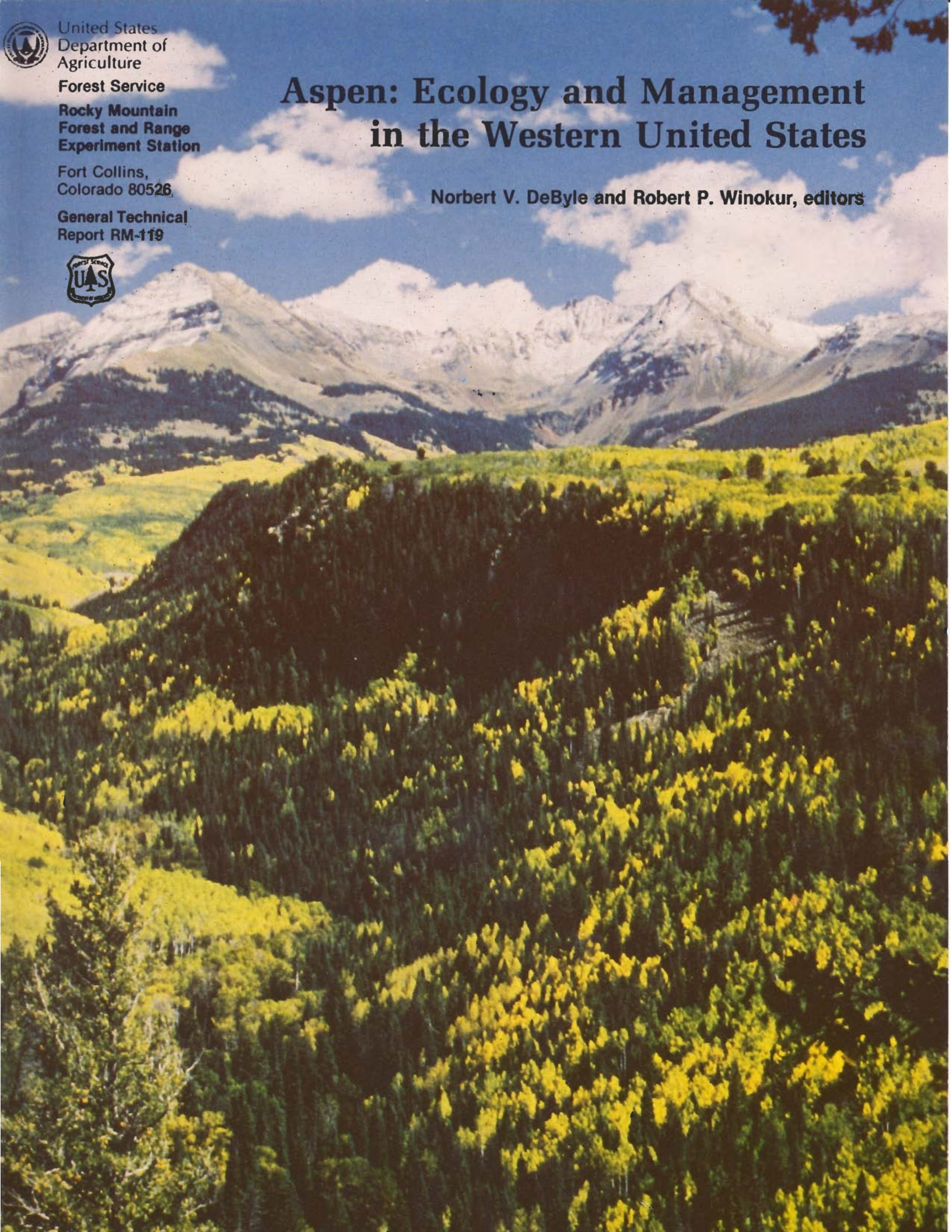
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Aspen: Ecology and Management in the Western United States

Norbert V. DeByle and Robert P. Winokur, editors



Abstract

Information about the biology, ecology, and management of quaking aspen on the mountains and plateaus of the interior western United States, and to a lesser extent, Canada, is summarized and discussed. The biology of aspen as a tree species, community relationships in the aspen ecosystem, environments, and factors affecting aspen forests are reviewed. The resources available within and from the aspen forest type, and their past and potential uses are examined. Silvicultural methods and other approaches to managing aspen for various resources and uses are presented.

FOREWORD

This book reviews the body of knowledge applicable to ecology and management of aspen on the mountains and plateaus of the interior western United States and, to a lesser extent, Canada. Alaska and Canada farther north and east are only incidentally considered. Much of the information on aspen is from other parts of North America. If something was pertinent to aspen in the West, it was included. The large volume of knowledge about aspen in the Lake States and eastern Canada is included only when it applies to the West.

This book is organized in four parts: PART I. THE TREE, reviews the biology of aspen as a species. PART II. ECOLOGY, reviews environments and community relationships. PART III. RESOURCES AND USES, considers the resources available in and from the aspen forest type. All of these provide the background for PART IV. MANAGEMENT, which discusses silvicultural methods and management approaches.

This is a reference and source book—a structured compilation and review of information. The authors have attempted to resolve contradictions in the literature, and have summarized each subject area to the best of their understanding. Gaps in knowledge are apparent as voids in this compilation; pure speculation is avoided. Because this publication will be used as a reference, each chapter is fairly self-contained. As a result, there is some repetition among chapters, with a different content and focus in each.

The latest available information has been included wherever feasible. However, as aspen research continues, new findings may differ from those presented here. Nevertheless, this book should provide a foundation upon which new research can build.

A compilation of this nature and size would not be possible without the able assistance of many people. Each of the authors deserves a special thanks for searching the literature, interpreting and summarizing it, and then writing chapter(s) that fit the style and objectives of this volume.

John R. Jones began this work several years ago, and developed the basic organization of this publication. He amassed a wealth of aspen literature and wrote the first drafts of all chapters that bear his name as an author. Later revisions, updates, and sometimes extensive rewriting of these chapters by others, as well as preparation of new chapters resulted in additional authorship credit. Thanks John, for getting us started on this needed publication!

More than 40 people technically reviewed chapters of this volume. George Schier of the Intermountain Forest and Range Experiment Station, and Burton Barnes of the University of Michigan, provided especially detailed and useful critiques of several chapters. Wayne Shepperd of the Rocky Mountain Forest and Range Experiment Sta-

tion provided valuable review and revision of most of the chapters in PART IV. MANAGEMENT, consistent with the latest available information. Dean Einspahr at the Institute of Paper Chemistry also was very helpful. Revision of each chapter after high-quality technical review markedly improved this work. We greatly appreciate the contribution of all reviewers, whether or not their names are mentioned.

Special thanks go to Delloris M. Cade, Editorial Assistant at the Rocky Mountain Forest and Range Experiment Station, who spent countless hours reviewing and researching the hundreds of literature citations, and cross-checking them with each chapter, and copy editing and proofreading the typeset galley proofs. Her diligent efforts greatly improved the quality of this book, and speeded its publication.

The authors contributing to this volume are:

Diane M. Bowers, Graduate Student, Department of Biology, Utah State University, Logan, 84322.

Thomas C. Brown, Economist, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Robert B. Campbell, Botanist, Intermountain Forest and Range Experiment Station, Forestry Sciences Laboratory, Missoula, Mont. 59806.

Norbert V. DeByle, Principal Plant Ecologist, Intermountain Forest and Range Experiment Station, Forestry Sciences Laboratory, Logan, Utah 84321.

Dennis M. Donnelly, Research Forester, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Kimball T. Harper, Professor, Botany and Range Science Department, Brigham Young University, Provo, Utah 84601.

Thoms E. Hinds, now retired, formerly Research Plant Pathologist, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Craig W. Johnson, Professor, Landscape Architecture and Environmental Planning Department, Utah State University, Logan, Utah 84322.

John R. Jones, novelist (pen name John Dalmas), formerly Principal Plant Ecologist, Rocky Mountain Forest and Range Experiment Station, Forestry Sciences Laboratory, Flagstaff, Ariz. 86001.

Merrill R. Kaufmann, Principal Plant Physiologist, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Donald C. Markstrom, Research Wood Technologist, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Walter T. McDonough, now retired, formerly Principal Plant Physiologist, Intermountain Forest and Range Experiment Station, Forestry Sciences Laboratory, Logan, Utah 84321.

Walter F. Mueggler, Principal Plant Ecologist, Intermountain Forest and Range Experiment Station, Forestry Sciences Laboratory, Logan, Utah 84321.

E. Arlo Richardson, Associate Professor Emeritus and former State Climatologist, Soil Science and Biometeorology Department, Utah State University, Logan, 84322.

George A. Schier, Principal Plant Physiologist, Northeastern Forest Experiment Station, Forestry Sciences Laboratory, Delaware, Ohio 43015.

John D. Shane, Senior Geologist, Exxon Company USA, Houston, Tex. 77001. Formerly a graduate student in the Botany and Range Science Department, Brigham Young University, Provo, Utah.

Wayne D. Shepperd, Silviculturist, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Michael L. Timmons, Associate Professor, Landscape Architecture and Environmental Planning Department, Utah State University, Logan, 84322.

Eugene M. Wengert, Extension Specialist, Department of Forest Products, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061. Formerly Research Wood Technologist at the USDA Forest Products Laboratory, Madison, Wisc., on assignment to the Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Robert P. Winokur, Supervisory Technical Publications Editor, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Harold E. Worth, now retired, formerly Principal Market Analyst, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo. 80526.

Aspen: Ecology and Management in the Western United States

Norbert V. DeByle and Robert P. Winokur, editors¹

¹*DeByle is Principal Plant Ecologist, Intermountain Forest and Range Experiment Station, at the Station's Forestry Sciences Laboratory in Logan, Utah. Station headquarters is in Ogden, Utah. Winokur is Supervisory Technical Publications Editor, Rocky Mountain Forest and Range Experiment Station. Station headquarters is in Fort Collins, in cooperation with Colorado State University.*

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INTRODUCTION

Norbert V. DeByle and Robert P. Winokur

Quaking or trembling aspen (*Populus tremuloides* Michx.) is the only aspen in western North America. Therefore, in this part of the continent, it is commonly and correctly referred to simply as "aspen". Throughout much of the interior West, it is the only upland hardwood. Aspen occupies millions of acres, and, in some states, it is the most widespread forest type.

This review begins with the description by Charles Sprague Sargent (1890):

"In the West and Southwest, Aspen grows on the high slopes of mountains and along the banks of streams, and is usually not large, although individuals a hundred feet tall sometimes occur.... A graceful tree with its slender pendulous branches, shimmering leaves, and pale bark, the aspen enlivens the spruce forests of the north, and marks steep mountain slopes with broad bands of color, light green during the summer and in autumn glowing like gold against backgrounds of dark cliffs and stunted pines."

Several major publications about aspen ecology and management predate this one. Most notable are: "Aspens: Phoenix Trees of the Great Lakes Region" by Graham et al. (1963), "Aspen: Symposium Proceedings" published by the USDA Forest Service (1972), and "Quaking Aspen: Silvics and Management in the Lake States" by Brinkman and Roe (1975). All deal specifically with the aspen east of the Great Plains. Aspen was also given major consideration in "Growth and Utilization of Poplars in Canada" by Maini and Cayford (1968). For the western United States, Frederick Baker's (1925), "Aspen in the Central Rocky Mountain Region," remains

a rich source of information, although it is clearly outdated in several respects.

The aspen-dominated forest has multiple values. It is truly a multiple-use type. In the West, it is a producer of forage for domestic livestock as well as food and cover for many wildlife species. It produces wood fiber in abundance, but has been grossly underutilized in this respect. Yields of high-quality water are greater from aspen forests than from some other forest types on similar sites in the western mountains. Esthetically, aspen is very appealing, especially when juxtaposed as groves within a mosaic of other vegetation types on the landscape. It attracts recreationists. Aspen forests also provide fire protection by acting as living firebreaks for the more flammable coniferous types.

Perhaps because aspen has not been economically appealing to wood-using industries in the West, there has been little urgency to learn the details of aspen ecology and to design effective management methods. Aspen research in the West has been somewhat piecemeal, with emphasis on specific attributes, such as forage production or water yield. However, both the utilization and research situations are changing. The sheer amount of aspen, its rapid regeneration by root sprouts after fire or logging, its rapid growth, and other characteristics that make the species distinctive are stimulating greater interest. Increasing demands are being made for the goods and services the aspen type can provide. These demands have caused forest managers and researchers, particularly in Colorado, Utah, Arizona, and New Mexico, to express a need for a synthesis of the available ecological and management information applicable to the western aspen type. This publication has been prepared in response to that increasing need.