



United States
Department of
Agriculture

Forest Service

Pacific Southwest
Research Station

General Technical
Report
PSW-GTR-198
December 2005

Proceedings of the Symposium on Ponderosa Pine: Issues, Trends, and Management

October 18 - 21, 2004

Klamath Falls, Oregon



Abstract

Ritchie, Martin W.; Maguire, Douglas A.; Youngblood, Andrew, Technical Coordinators. 2005. **Proceedings of the Symposium on Ponderosa Pine: Issues, Trends, and Management**. 2004 October 18-21; Klamath Falls, OR. Gen. Tech. Rep. PSW-GTR-198. Albany CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 281 p.

Ponderosa pine is one of the most widely distributed tree species in western North America. It is highly-valued as a source of lumber, but also is key to the health and social value western forests, whether growing in pure stands or in mixture with other conifer and hardwood species. In recent years, management objectives for forests containing this species have shifted from an emphasis on timber production to an emphasis on restoring ecosystem health and reducing the risk of non-characteristic wildfires. The symposium on “Ponderosa Pine: Issues, Trends, and Management” was convened to provide a venue for researchers and managers to explore the current state-of-our-knowledge, including management practices that help managers to adapt to constantly changing constraints and objectives.

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Technical Coordinators

Martin W. Ritchie, Douglas A. Maguire and Andrew Youngblood

Contents

v **Preface**

Ponderosa Pine: An Introduction

- 1 Overview of Ponderosa Pine Ecosystems
Russell T. Graham and Theresa B. Jain
- 33 An Overview of Key Silvicultural Information for Ponderosa Pine
John Fiske and John Tappeiner

Silviculture and Ecosystem Management

- 49 Silvicultural Systems for Managing Ponderosa Pine
Andrew Youngblood
- 59 Multiaged Silviculture of Ponderosa Pine
Kevin L. O'Hara
- 71 The West-Wide Ponderosa Pine Levels-of-Growing-Stock Study at Age 40
William W. Oliver
- 81 Accelerating Development of Late-Successional Features in Second-Growth Pine
Stands of the Gooseneck Adaptive Management Area
Martin W. Ritchie and Kathleen A. Harcksen
- 95 Positive Seedling-Shrub Relationships in Natural Regeneration of Ponderosa Pine
Christopher R. Keyes and Douglas A. Maguire

Soils and Productivity

- 109 Managing Ponderosa Pine Forests in Central Oregon: Who Will Speak for the Soil?
Matt D. Busse and Gregg M. Riegel
- 123 Management of Ponderosa Pine Nutrition Through Fertilization
Mariann T. Garrison-Johnston, Terry M. Shaw, Peter G. Mika and Leonard R. Johnson

Range and Wildlife Issues and Management

- 145 Ungulate Ecology of Ponderosa Pine Ecosystems in the Northwest
Martin Vavra, Kenric Walburger and Timothy DelCurto
- 159 A Comparison of Bird Species Composition and Abundance Between Late- and Mid-seral Ponderosa Pine Forests
T. Luke George, Steve Zack, and William F. Laudenslayer, Jr.
- 171 Effects of Site on the Demographics of Standing Dead Trees in Eastside Pine Forests
William F. Laudenslayer, Jr.
- 183 Woodpecker-snag Interactions: an Overview of Current Knowledge in Ponderosa Pine Systems
Kerry L. Farris and Steve Zack

Forest Disturbance

- 197 Fire Ecology of Ponderosa Pine and the Rebuilding of Fire-Resilient Ponderosa Pine Ecosystems
Stephen Fitzgerald
- 227 Diseases as Agents of Disturbance in Ponderosa Pine
Gregory M. Filip
- 233 Bugs in the System: Development of Tools to Minimize Ponderosa Pine Losses from Western Pine Beetle Infestations
Christopher J. Fettig

Project and Case Studies

- 245 Reintroducing Fire into the Blacks Mountain Research Natural Area: Effects on Fire Hazard
Carl N. Skinner
- 259 Three Studies on Ponderosa Pine Management on the Warm Springs Indian Reservation: Stocking Control in Uneven-aged Stands, Forest Products from Fire-damage Trees, and Fuels Reduction
John V. Arena
- 267 Lessons Learned on 50,000 Acres of Ponderosa Pine Plantations in Northern California
Jeff Webster

Preface

As early exploitation of standing timber yielded to intensive reforestation and active stand management, our silvicultural knowledge base has expanded tremendously. Changing public perception of timber harvesting and different societal values of forest resources, coupled with rapid expansion of the wildland/urban interface has compelled foresters to pursue multiple-resource management with less emphasis on timber production on many public and private lands. Conversely, demand for ponderosa pine wood has intensified management on other private lands, and large disturbances from fire, insects, and disease have fueled intense debates about rehabilitation efforts. The result of these debates and the accompanying information need has been a notable increase in our knowledge of ponderosa pine ecosystems and better understanding of human values and perceptions.

The presentations at the symposium were selected to cover a broad spectrum of topics and to update forest landowners, professional foresters, and forest scientists about the current issues, trends and management of ponderosa pine ecosystems. The presentations in this compilation are arranged by broad topical categories.

Two introductory papers serve to set the foundation for science-based management of ponderosa pine ecosystems. Graham and Jain first present characteristics and key functional elements of ponderosa pine systems. Fiske and Tappeiner follow with an overview of important silvicultural research findings over during the last century, findings that will remain important as we manage ponderosa pine forests for the 21st century. Their work focuses on two broad themes: timber stand improvement and stand dynamics.

Silviculturists today often are challenged to manipulate stand structures to meet an increasingly varied set of objectives. In the section dealing with silviculture and ecosystem management, Youngblood presents an overview of silvicultural systems applicable to ponderosa pine. His presentation covers traditional systems designed to produce commodities such as timber, forage, and water, as well as changes in silvicultural practices prompted by forest health and fuel reduction issues. O'Hara describes an approach for promoting and managing multi-cohort stands of ponderosa pine. Various alternative methods have been proposed for stocking control in uneven-age systems, and he compares these to one based on allocating leaf area among cohorts. Productivity is predicted to be comparable to that of even-aged silvicultural systems. Because, the fundamental tool of silviculture remains the manipulation of stand structure regardless of objectives or issues, and stand density is probably the most commonly manipulated aspect of stand structure. Oliver presents results from 40 years of research on alternative stand density regimes in

ponderosa pine, referred to as the West-wide levels-of-growing-stock study. The initial objective was to evaluate the long-term effects of density management on tree growth and mortality, but many insights have also been gained into the range of stand structures obtained by varying stand density regime. Ritchie and Harcksen describe a new large-scale interdisciplinary study designed to accelerate the development of late-successional features in pine-dominated ecosystems. Keyes and Maguire then describe the complex relationships between shrubs and natural seedling recruitment in ponderosa pine, and show that shrubs can enhance early seedling survival.

In the section on soils and productivity, Busse and Riegel describe the response of soil quality to thinning and prescribed fire, and emphasize the role that N-fixing shrubs play in offsetting losses of soil N during prescribed fire. In addressing soil amendments, Johnson and others show that response to fertilization is dependent on the soil and parent material, and note that ponderosa pine often does not show a strong growth response to N fertilization alone. Multi-nutrient fertilization, however, may provide a better growth response.

The value of ponderosa pine forests for wildlife habitat and forage production for domestic livestock is well documented. Our understanding of the role of specific species and the related structural component in these ecosystems is less complete. Vavra and others note that both domestic and native ungulates can have an impact on understory composition and structure in ponderosa pine systems, and that these changes can impact nutrient cycling, energy flow, biodiversity, stand density, and fire regimes. George and others compare species composition of birds in late- and mid-seral ponderosa pine forests. Their results are consistent with other studies suggesting that woodpeckers and bark gleaners are strongly associated with large trees and snags; however, they found no difference in overall species diversity. Snags are considered an important element for habitat suitability for some avian species. Laudenslayer describes a long-term study of snag demography demonstrating that snag longevity varies with tree species, tree size, soil characteristics, and topography. He recommends that these factors be considered when developing snag management guidelines. The means by which snags are created may also be an important factor in determining habitat suitability. Farris and Zack show that snags created by fire or bark beetles decay more rapidly than those resulting from other mortality agents, but also experience the greatest foraging and nesting use by woodpeckers.

Forest disturbance regimes strongly influence the dynamics of ponderosa pine ecosystems. Currently high fuel levels resulting from fire suppression, the attendant high risk of severe fire, and very recent extreme fire events have created an urgent

need to re-asses the role fire in ponderosa pine ecosystems. Fitzgerald discusses the importance of understanding historic fire regimes if managers are to develop effective restoration treatments. Disturbances created by disease also contribute significantly to the long-term dynamics of ponderosa pine forests. Filip describes the role of forest diseases in forest succession and in the maintenance of biological diversity, as well as their interaction with insect outbreaks and fire frequency and severity. The risk of insect outbreaks has also heightened with the disruption of historic fire regimes. Fettig describes chemical, silvicultural and semiochemical techniques for minimizing insect-induced mortality in ponderosa pine stands.

Finally, experience gleaned from operational projects and case studies can extremely valuable in developing effective management strategies for ponderosa pine. In recent years, the application of prescribed fire in reducing fuel levels and maintaining healthy, resilient stands has received greater attention. However, the paper by Skinner shows that applying prescribed fire in stands that have had many decades of fire exclusion can be difficult, and that benefits related to reducing fire danger may be very short lived under such conditions. Arena describes three ongoing studies on the Warm Springs Indian Reservation designed to evaluate the feasibility and efficacy of removing small (unmerchantable) material from dense stands, identify appropriate stocking levels for uneven-aged ponderosa pine stands, and assess the utilization potential of material typically removed in fuel reduction treatments but otherwise considered unsuitable for most forest products.. Webster and Fredrickson finish the proceedings with a set of very practical guidelines for establishing and managing young plantations of ponderosa pine.

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