



United States  
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Northeastern Forest  
Experiment Station

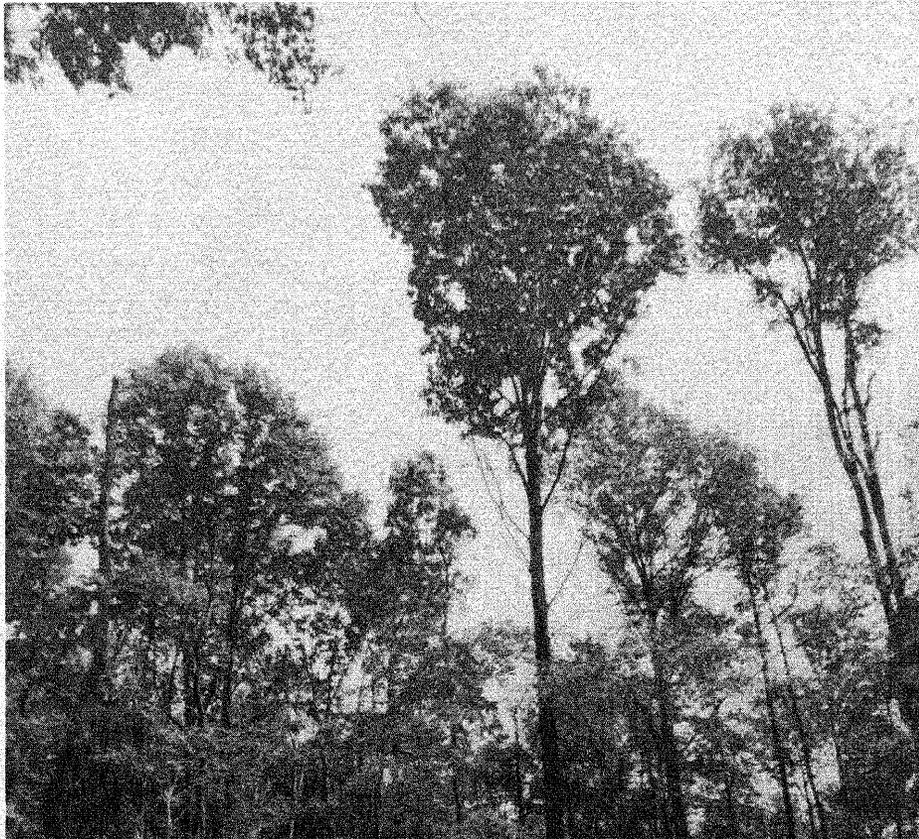
General Technical  
Report NE-148



# PROCEEDINGS

## 8th Central Hardwood Forest Conference

University Park, Pennsylvania  
March 4-6, 1991



For attending this conference, each registrant was eligible for 12 hours of Continuing Forestry Education (CFE) credit offered by the Society of American Foresters.

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## ACKNOWLEDGEMENTS

The editors would like to acknowledge and thank all of the people who served as manuscript reviewers for the Proceedings. The quality of the Proceedings has been improved due to **YOUR** efforts. We would also like to thank Dr. Mark J. Twery, David E. Fosbroke, Shirley I. Smith, and Mark A. Mitchell for their assistance in converting wordprocessing documents, proofreading, preparation of the table of contents, and layout assistance and Arlyn W. Perkey for providing the cover photograph.

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March 1991

# 8TH CENTRAL HARDWOOD FOREST CONFERENCE

Proceedings of a Meeting

Held at

The Pennsylvania State University

University Park, PA

March 3-6, 1991

Edited by

Larry H. McCormick and Kurt W. Gottschalk

## SPONSORED BY:

School of Forest Resources, Pennsylvania State University

Northeastern Forest Experiment Station, USDA Forest Service

Bureau of Forestry, Pennsylvania Department of Environmental Resources

in cooperation with the Office of Conferences and Short Courses, College of Agriculture,  
Pennsylvania State University.

## PROGRAM COMMITTEE

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Committee Members:

Kurt W. Gottschalk and Stephen B. Horsley, Northeastern Forest Experiment Station, USDA  
Forest Service, and Glen R. Stanosz, Bureau of Forestry, Pennsylvania Department of  
Environmental Resources.

## FOREWORD

This conference is the eighth in a series of biennial meetings that began in 1976 at Southern Illinois University. Other conferences have been hosted by Purdue University, University of Missouri, University of Kentucky, University of Illinois, and University of Tennessee. The purpose of these conferences has remained the same: to provide a forum for the exchange of information concerning the central hardwoods and to engender coordination among forest scientists in the central hardwood region. This purpose is evidently well-served: the last several conferences have each attracted some 45 to 65 program contributions, and the audiences have been correspondingly large.

Previous organizers have refrained from drawing precise boundaries around the "central hardwood region." We prefer to continue that policy on the grounds that to do otherwise might preclude some very worthwhile participation. Thus, while the principal focus has remained on the oak resource for reasons that are obvious, the ecological scope has broadened from oak-hickory (in the early meetings) to Appalachian oak (Knoxville and State College) and mesophytic forests. With a few exceptions, the commercially significant species are similar for all these forest types, and advancements in knowledge are of general interest.

But the central hardwood region is not merely a collection of similar forest types. It also has historical, demographic, political, and economic characteristics that tend to distinguish it from other forest regions of the United States. For example, the population is heavily rural and agricultural, primary wood markets tend to be diffuse and unorganized, wilderness values and endangered species have generally not been overriding issues, and a relatively minor proportion of the forest land is controlled by public agencies or corporate ownerships. These and related conditions play critical roles in the practice of forestry in this region, and in the aggregate they emphasize its distinction from other regions; but no single one is necessarily unique to the central hardwoods. For these reasons, the characteristics of nonindustrial private forest land owners in Massachusetts might be just as relevant to the central hardwood region as regeneration methods for white oak in Indiana.

Since these proceedings are being published in advance, we have no way of judging the ultimate success of the upcoming Eighth Conference. Of course, our earnest hope is that this meeting shall sustain the excellent reputation of the series. We believe this hope is encouraged by the quality of the papers in these proceedings.

## REVIEW PROCEDURES

Each manuscript published in these proceedings was critically reviewed by at least two scientists with expertise in disciplines closely aligned to the subject of the manuscript. Reviews were returned to the senior author, who revised the manuscript appropriately and resubmitted it in a diskette format suitable for printing by the Northeastern Forest Experiment Station, USDA Forest Service where they were edited to a uniform format and type style. Manuscript authors are responsible for the accuracy and style of their papers.

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