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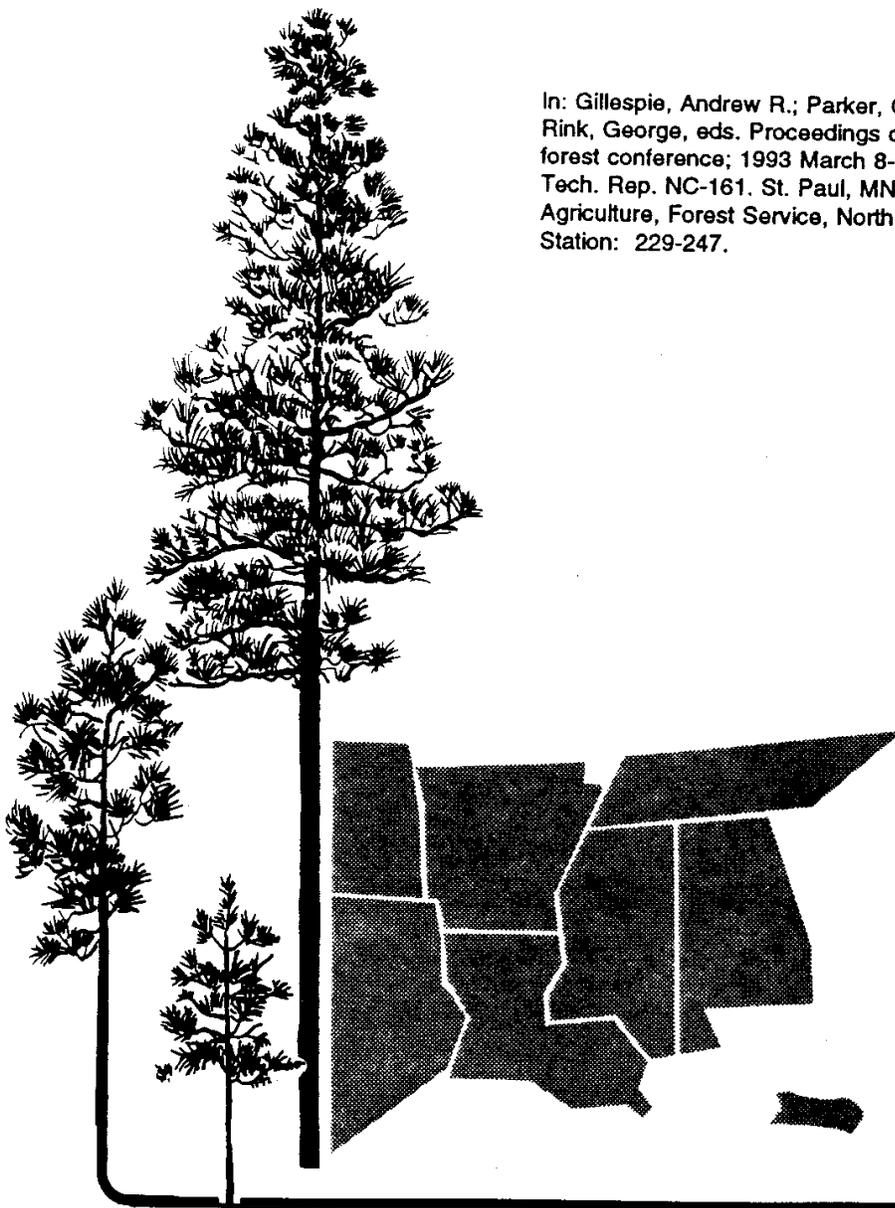
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Group Selection—Problems and Possibilities and for the More Shade-intolerant Species

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Abstract: The group selection method is a hybrid, drawing key elements from both even- and uneven-aged silviculture. It is perhaps the least used and understood of all the reproductive cutting methods, but it is gaining popularity because of the current disfavor of even-aged silviculture. The group selection method appears promising for regenerating shade-intolerant and intermediate-tolerant species. Research has shown that larger openings create conditions favorable to shade-intolerant species, while smaller openings favor the more shade-tolerant ones. Larger openings consist of a central core that is relatively unaffected by the adjoining stand and a periphery with increasing levels of suppression. Operationally, most opening widths vary around one to two times the dominant tree height in the residual stand, but research has yet to verify the long-term stand dynamics within openings. Even less is known about effective stand-regulation options available to provide sustained yields. One route is to adapt stand structure or volume control from the single-tree selection system. An alternative is to use (1) the silvical requirements of the target species to set opening size and (2) area control to determine the number of openings to create each cutting cycle. This latter approach seems to have advantages for applications in even-aged stands that are being converted to uneven-aged ones.

INTRODUCTION

Group-selection cutting has been a much debated but heretofore little used reproduction method. It has been advanced as a viable technique and vilified as impractical and difficult to maintain. Marquis (1978) described group selection as a "bastard" technique that attempts to meld an even-aged reproduction cutting method with an uneven-aged silvicultural system. Roach (1974) called it a modification of single-tree selection to favor reproduction of less shade-tolerant species. Interest in the group selection method has been revived recently because of controversies surrounding even-aged reproduction methods, especially clearcutting, and the apparent shortcomings of the single-tree selection method for regenerating certain species.

Although clearcutting is a proven, efficient reproduction method for many species, its use has been sharply curtailed because of public sensitivities to the dramatic visual impact of a recent clearcut. This criticism of clearcutting has occurred not only in the United States, but also in other countries (Bradshaw 1992). The outcry about clearcutting on public lands has resulted in its complete abandonment in some cases and a more circumspect use in others--such as reducing the size, blending the cuts with the landscape, and masking their size by employing convoluted shapes. The other even-aged methods, seed tree and shelterwood, would seemingly ameliorate the drastic perturbation of clearcutting and still provide some of its efficiencies. However, they have suffered a "guilt of association" by being even-aged methods.

The single-tree selection method has been proposed as an alternative to clearcutting, especially by environmental groups, because it appears to be the antithesis of the much despised clearcutting.

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However, it has limitations like any cutting method. If applied to even-aged stands, the smaller trees may be the same age as ones in the overstory and may not respond to release. Also, if practiced with no competition control, shade-intolerant species will be gradually replaced by shade-tolerant ones in the understory. This has been a common outcome with trials in eastern hardwoods.

The fallen reputé of even-aged cutting methods plus the limitations of single-tree selection when administrative restrictions are imposed have made group selection the choice by default for many public lands. However, operational use has been virtually nonexistent until recently, and research has focused mostly on the establishment and development of regeneration within openings. Many questions have not been studied or only fragmentary information is available: how should the residual stand be managed; the distribution, optimum size, location, and shape of openings; the need for site preparation both in openings and the residual stand; and how the stands should be regulated. Opinion differs about what constitutes the group selection system and what regulation techniques are appropriate.

In this paper, we explore these issues by examining existing literature concerning what group selection is, how it differs from single-tree selection and closely allied even-aged cutting methods, how regeneration of desirable species might be obtained by appropriate opening designs and site preparation techniques, and the alternatives for stand regulation. We also focus on the application of group selection to the more shade-intolerant species, which are usually targeted in central and southern stands. Because of this focus, a broader definition of group selection has been adopted in this paper than has been proposed elsewhere (Marquis 1989, 1992).

CONCEPTS AND DEFINITIONS

We paraphrased the following definitions from Smith (1986):

Even-aged stand—a stand that is composed of one or two age classes, and the range of tree ages in an age class does not span more than 20 percent of rotation length.

Uneven-aged stand—a stand that is made up of at least three age classes, where an age class is defined as for even-aged conditions.

Reproduction method—is how a stand is established or renewed. An uneven-aged cutting method will regenerate or create an uneven-aged stand.

Silvicultural system—the planned sequence of silvicultural activities that are designed to create and/or maintain either even- or uneven-aged stands.

Single-tree selection method—is a reproduction cutting method used to regenerate an uneven-aged stand and consists of removing mature trees as scattered individuals or as small groups at relatively short intervals.

Group selection method—is a reproduction cutting method used to regenerate an uneven-aged stand by removing groups of adjacent trees at relatively short intervals.

From these definitions, the group selection system includes the following: (1) using the group selection method to create new age classes, (2) applying appropriate site preparation, release of advance regeneration, or tending of immature trees within openings, (3) tending the remainder of the stand, and (4) employing a regulation technique to assure a balanced structure and sustained yield.

