DOES RESTORING WOODLAND STRUCTURE WITH LOBLOLLY OR SLASH PINE PRODUCE DESIRED ECOSYSTEM FUNCTIONS?

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EXTENDED ABSTRACT

Restoring fire-maintained woodlands (forests with a noncontiguous canopy and herbaceous understory) has been a priority in the Southeastern United States for 4 decades. One of the major perceived challenges to restoration is the increased presence of loblolly (*Pinus taeda*) and slash (*P. elliottii*) pines, which have been widely planted throughout the region. Land managers have traditionally addressed this problem by clearcutting loblolly and slash pines and planting longleaf (*P. palustris*) or shortleaf (*P. echinata*) pines that had been historically prevalent on their respective sites prior to Euro-American settlement (Frost 1993, Mohr and Roth 1897). While effective at quickly converting overstory species composition, this approach requires many decades to produce a mature, pine-dominated woodland; meanwhile, many of the desired structural and functional attributes of older, open forests remain absent from stands across the landscape.

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An alternative restoration approach is to cut loblolly and slash pine monocultures to an open forest density (about 40–60 square feet per acre of basal area) and manage the stand as a woodland featuring the existing species, or slowly convert the stand to longleaf or shortleaf pine through underplanting after cutting (Kirkman and others 2007). This approach could accelerate the restoration process by retaining residual overstory structure, which is important for the ecological function of woodlands (fig. 1). However, frequent fire will be necessary to maintain open stand conditions and promote shortleaf and longleaf pine.

Unfortunately, little information exists describing how woodlands featuring loblolly and slash pine functionally compare to longleaf or shortleaf pine woodlands. To address this knowledge gap, we reviewed the literature to evaluate the influence of southern pine species identity on several important ecosystem attributes including forest health, fire dynamics, resistance to weather-related disturbances, hydrological integrity, carbon sequestration, wildlife habitat, and wood quantity and quality.

Our review suggests that restoring woodland structure with loblolly or slash pine will have limited impacts on most evaluated attributes. Notable exceptions include wood fiber productivity, because slash and loblolly pines possess a production advantage on most sites, and wind-induced mortality, due to the fact that longleaf pine is the most wind-resistant southern pine. Too little information exists to confidently evaluate the influence of southern pine species identity on hydrological integrity and boring insect resistance. Hence, evidence suggests that cutting loblolly and slash pine monocultures to a woodland density is likely to accelerate the development of many desirable ecosystem attributes with minimal consequences for overall woodland system integrity.

Figure 1—Example of a mature stand of planted slash pine with an underplanting of longleaf pine on The Jones Center at Ichauway. This stand is still frequently burned and will be maintained at a lower basal area to allow for a gradual transition towards longleaf pine. (USDA Forest Service photo by Don C. Bragg)

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