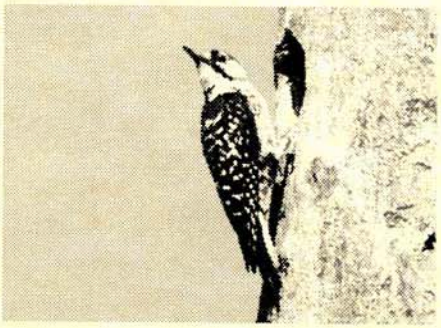
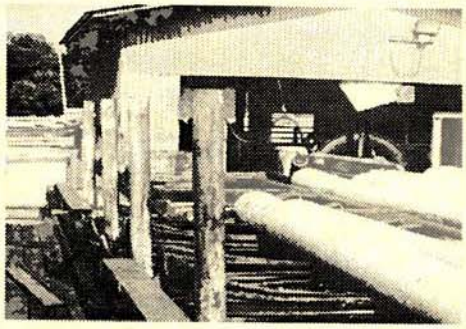
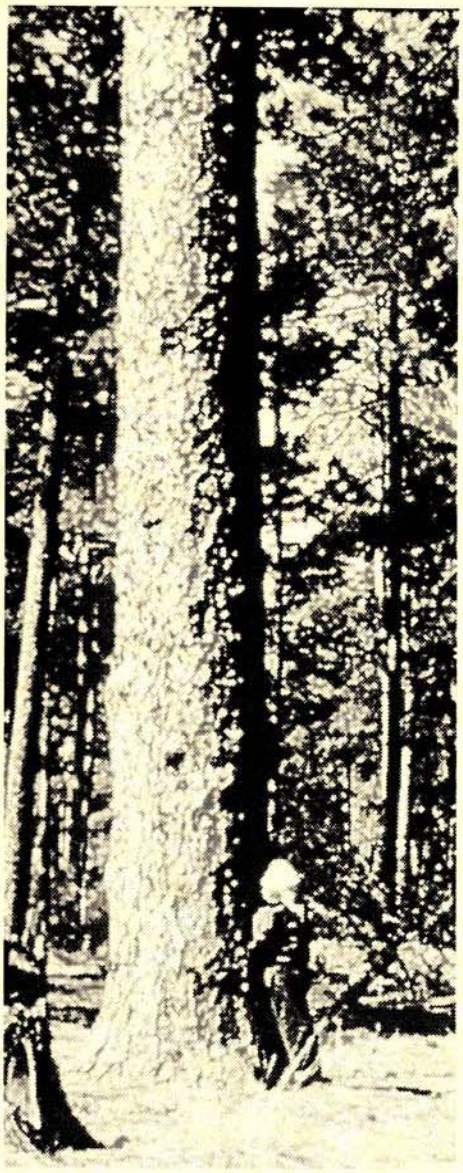




PROCEEDINGS

First Longleaf Alliance Conference



LONGLEAF PINE: A REGIONAL PERSPECTIVE OF CHALLENGES AND OPPORTUNITIES

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THE LONGLEAF ALLIANCE

Complex Ecological Gradients in Longleaf Pine Wiregrass Savannas: Patterns and Controls on Productivity and Plant Species Richness

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ABSTRACT - Longleaf pine wiregrass savannas occupy a wide ecological gradient. It is thought that the diversity of sites that are dominated by this ecosystem, in part, explains the great biodiversity characteristic of these ecosystems. Also, gradients have been invoked in explaining differences in productivity that might relate to differential fire behavior across the landscape. Yet no data has been published in the literature that describes how edaphic variation across the landscape influences resource availability. Furthermore, productivity differences among sites, particularly as they are regulated by sites' ability to supply resources, have not been adequately studied. Lastly, longleaf pine is thought to be less productive than slash or loblolly pine on all but the driest sites in the Coastal Plain. However, data from Eugene Shoulders casts some doubt on conventional thought. Dynamic simulation modeling has proven to be a valuable tool in exploring the mechanisms by which productivity of slash and loblolly pine is regulated. Before such models can be constructed for longleaf, basic research is needed that quantifies resource availability and patterns in productivity throughout representative landscape units.

In March of 1995, we initiated such a study at the Jones Ecological Research Center at Ichauway. The study encompasses three site types: 1) xeric sand ridges, 2) wet-mesic savannas (that border depressional wetlands, and 3) sites intermediate to the previously mentioned extremes. Overstory and understory productivity and species richness of understory communities have been quantified. In addition, soil resources (moisture, N and P) have been measured through time.

A number of surprising patterns have emerged. Xeric sites tend to have the greatest N-mineralization, extractable P levels in the soil, and standing crop of fine roots, while exhibiting the least soil moisture and above ground productivity of the three sites. Productivity of longleaf pine and wiregrass were much more strongly influenced across the gradient than was total above ground productivity, due to the fact that oak productivity was significant only for xeric sites. Patterns suggest that disturbance and resource availability may be the most important factors regulating productivity. Similarly, species richness patterns of the understory flora indicate that disturbance and resources are factors that maintain high species diversity. The data presented in the poster represents a preliminary analysis of an ongoing study; however, we believe that data sets like this may be used to guide restoration efforts by providing information of structural and functional characteristics of the ecosystem by which restored communities can be evaluated. Also, understanding the controls on productivity may allow for expansion of longleaf management from the most dry sandy sites to others, if growth potential meets landowner objectives. This can only be evaluated if we can more precisely predict productivity by understanding regulatory controls.