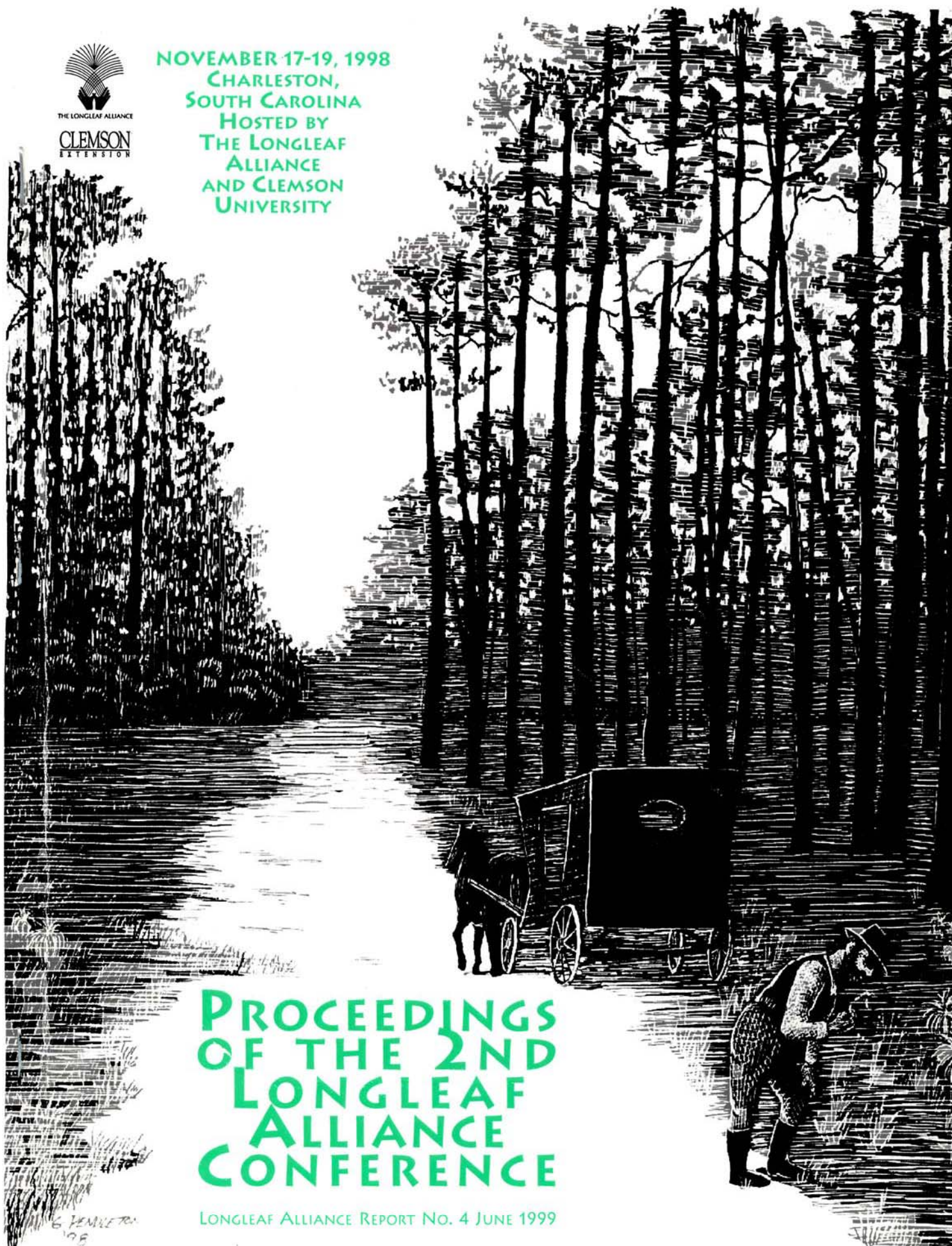




THE LONGLEAF ALLIANCE

CLEMSON  
EXTENSION

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# PROCEEDINGS OF THE 2ND LONGLEAF ALLIANCE CONFERENCE

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## Overstory structure and regeneration processes in longleaf pine-wiregrass savannas

Brian J. Palik (USDA Forest Service, Forestry Sciences Laboratory, 1831 Hwy. 169 E, Grand Rapids, MN 55744-3399)

Robert J. Mitchell (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)

S. Hurst (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)

Stephen D. Pecot (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)

M. Battaglia (Department of Forestry, Virginia Polytechnical and State University, Blacksburg, VA 24061)

Paul Mou (Department of Forestry, Virginia Polytechnical and State University, Blacksburg, VA 24061)

G. Stevens (Department of Biology, Virginia Polytechnical and State University, Blacksburg, VA 24061)

Robert H. Jones (Department of Biology, Virginia Polytechnical and State University, Blacksburg, VA 24061)

**ABSTRACT:** Silvicultural methodologies to meet objectives of ecosystem management often include green tree retention, or a reserve shelterwood, in an attempt to maintain components of mature stand structure across rotations. The competitive environments and mechanisms that influence regeneration in such systems differ substantially from those under even-aged management. We have initiated a study in a 65-year-old longleaf pine forest to address the effects of residual overstory structure and competing herbaceous vegetation on the survival and growth of longleaf pine seedlings. We predict that resources will increase rapidly only in the center of large openings and that seedling response is reflective of competitive interactions between overstory structure and resource preemption by herbaceous vegetation.

Stands were harvested to a similar residual basal area using three removal techniques: single-tree selection, small group (~0.25 ac) selection, and large group (~0.5 ac) selection. We also used an uncut control stand. 10 One-year-old containerized longleaf pine seedlings were planted at specific plots (2 x 2 ft spacing) in the stands to encompass the range of overstory levels observed in each stand. Stations received either no treatment or a glyphosate application to remove herbaceous vegetation. To date we have found that soil (available N, water) and light resources increase with decreasing overstory abundance. Seedling response to these resources followed similar patterns. The most severe drought in over 40 years enabled us to examine competitive interactions of overstory and herbaceous material on survival. Higher survival rates occurred at areas of high overstory abundance and intact herbaceous vegetation, suggesting competition for resources is muted during drought conditions by microclimate effects that increase soil and air temperature, air movement, and evapotranspiration. Future work will address the role of varying soil and light (quality and quantity) resources on the relative response of C<sub>3</sub> and C<sub>4</sub> plants, root distribution, and soil resource foraging ability.