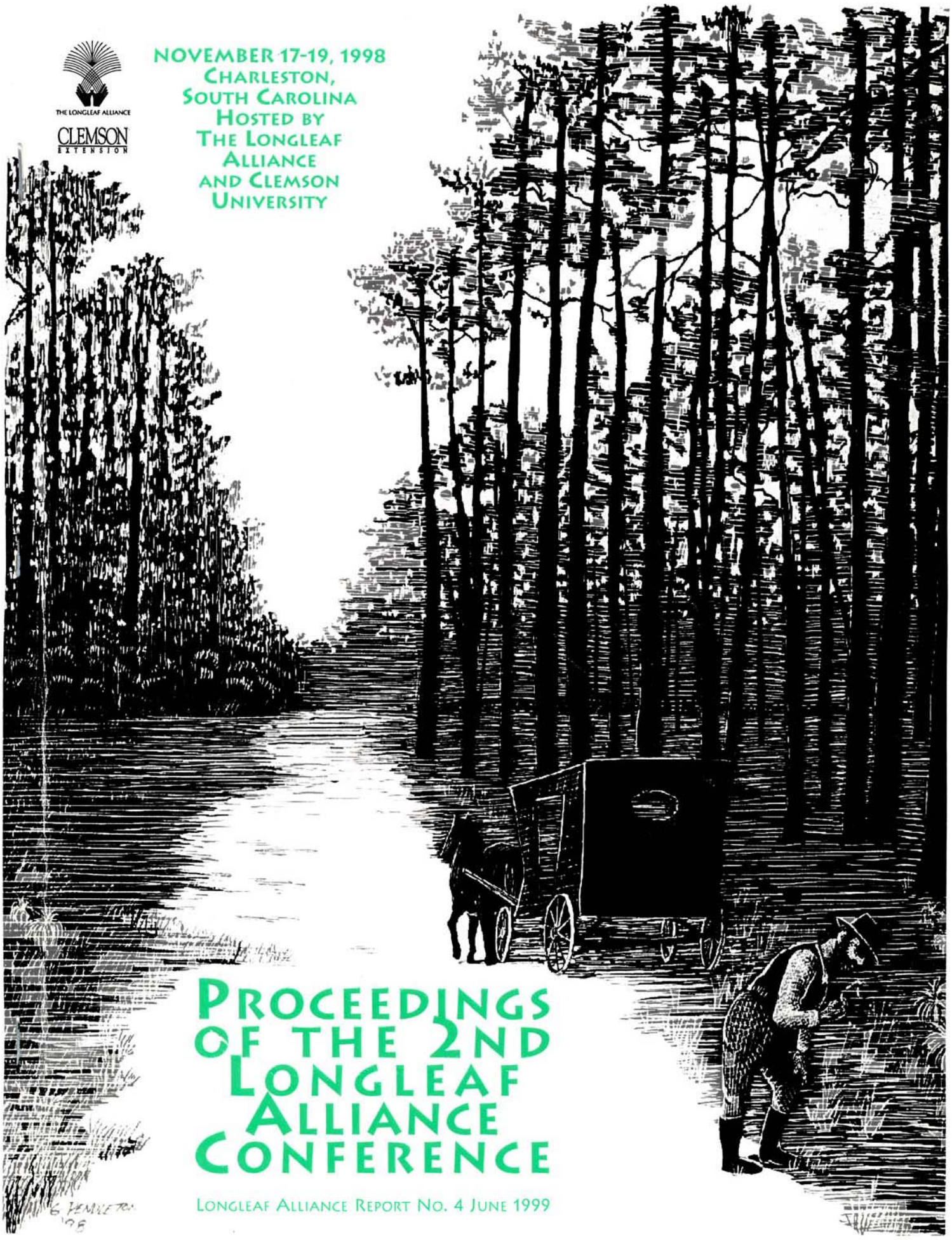

THE LONGLEAF ALLIANCE

CLEMSON EXTENSION

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CHARLESTON,
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Nitrogen Availability in Longleaf Pine-Wiregrass Woodland Over a 3-Year Burn Cycle

Carlos A. Wilson (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)
Robert J. Mitchell (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)
Joseph J. Hendricks (State University of West Georgia, Carrollton, GA, 30118)
Lindsay R. Boring (Joseph W. Jones Ecological Research Center, Route 2 Box 2324, Newton, GA 31770)

ABSTRACT: In June 1995, we initiated a study to assess the patterns and controls on N mineralization across a longleaf pine-wiregrass dominated landscape, and relate them to observed net primary productivity patterns. Xeric sites exhibited the greatest mineralization rates. Net N mineralization rates were inversely correlated with both soil moisture and aboveground NPP. The increased rates of N mineralization on the xeric site were due to higher nitrification; N flux in the intermediate and wet-mesic sites were dominated exclusively by ammonium-N. Nitrification rates declined with time since fire and net ammonium-N mineralization remained relatively stable over the same period. Thus, differences in N mineralization among sites declined with time. Data suggest soil temperature and organic matter quality differences among sites may be important drivers of both temporal and spatial patterns. Low rates of N mineralization were not sufficient to account for ANPP N demand. Greater mineralization in deeper portions of the soil may be due to edaphic characteristics of this ecosystem and the role of fire, which may disproportionately increase the importance of root turnover to the soil detritus pool. Further investigation is needed into the potential for direct organic N uptake by plants as an additional source of available N, which may account for the observed disparity in N supply and demand. A conceptual model is presented which schematically illustrates complex controls on N in ecosystem processes and suggests areas for future research.