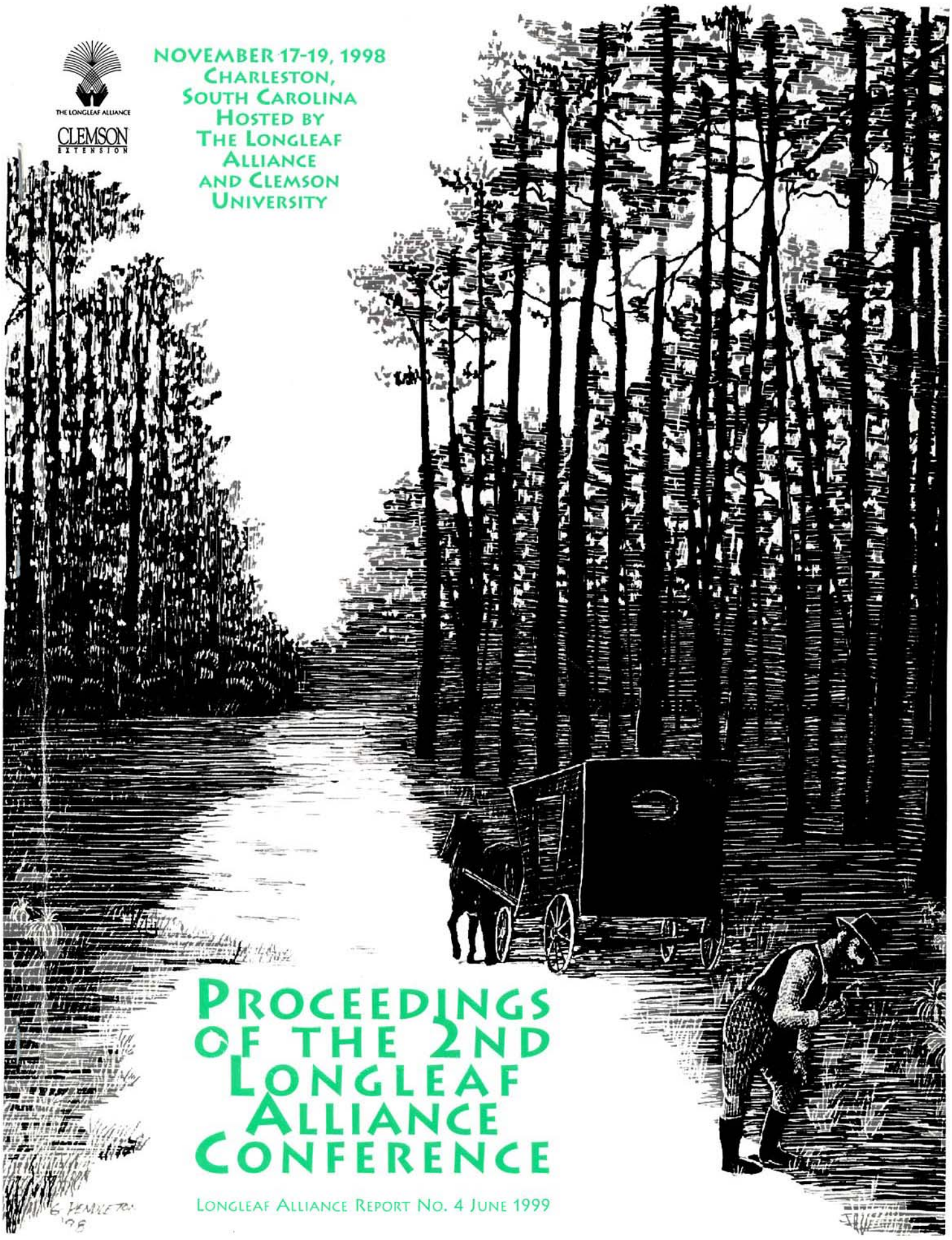

THE LONGLEAF ALLIANCE

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Assessing the patterns and controls of foliar litter decomposition in longleaf pine-wiregrass ecosystems

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ABSTRACT: Prescribed burning is an important management tool in longleaf pine-wiregrass ecosystems. This recurrent disturbance may have a substantial impact on nutrient cycles, particularly N, and thus the long-term productivity of these forests. To more accurately assess and predict burning impacts, it is important to gain an improved understanding of the factors regulating the mass and nutrient concentration of fine fuels in the understory. The primary objectives of this study were to assess the patterns and controls of biologically mediated foliar litter decomposition and develop mathematical models to predict litter mass loss and nutrient cycling dynamics in these ecosystems. In Fall 1995, freshly senesced litter from seven species, representing a broad range in tissue substrate quality, were collected, placed in mesh bags, and incubated in the field. Litter bags were placed directly on the forest floor and in elevated positions to simulate wiregrass structure. Periodically, samples were retrieved and analyzed for dry mass and chemical composition. After two years, species mass loss patterns exhibited the standard exponential decay function, and the decay constants were most strongly correlated with the initial P concentration of the tissues (R^2 = .89). Mass loss rates of the elevated litter were approximately one half of the values measured for corresponding forest floor tissues. While most tissue types initially immobilized N, all species exhibited a net N release by the end of the first year. Also, forest floor tissues exhibited significant inverse linear relationships between N concentration and percent mass remaining (R^2 values from .70 - .99). These decomposition results were coupled N flux data from associated studies to assess the potential impact of different burning regimes on the N balance of these ecosystems and to identify important questions for future research.