

Where Did That Tree Go?

Spatial pattern statistics as indicators of environmental status and vulnerability

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Abstract

High resolution airborne imagery of native vegetation on an urban groundwater supply catchment was analysed for environmental monitoring purposes. Our previous work (Wallace *et al*, 2008) used semiautomatic methods to detect deaths of individual trees occurring between anniversary dates. In this work, the locations of living trees are identified using techniques from morphological image analysis. Tree deaths can then be referred to the population density of living trees, permitting a more searching analysis of vegetation changes. Methods of spatial statistics yield estimates of the spatially-varying tree death risk, and show that it is significantly non-uniform. The influence of hydrological variables on tree death rate is investigated using spatial statistics (graphical exploratory methods, spatial point pattern modelling and diagnostics) including new statistical techniques.