

Thursday 2 October 2014, 1230, Ellery Room C

IDENTIFYING GROUNDWATER THRESHOLDS FOR DROUGHT RESILIENCE IN FLOODPLAIN TREE SPECIES IN THE NORTHERN MURRAY-DARLING BASIN

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Previous research identifies links between groundwater depth and canopy condition in dominant riparian and floodplain tree species associated with ephemeral river systems, particularly during drought. Chronic groundwater decline, evident in many agricultural landscapes worldwide, effectively decouples tree roots from deep soil moisture resources, increasing the susceptibility of trees to changes in precipitation. Drought may trigger loss of canopy condition and, where severe or prolonged, have long term consequences for the function and survival of trees and the composition, structure and function of ecosystems they dominate. However, critical groundwater depth identify.

This study used boosted regression trees, quantile regression and Threshold Indicator Taxa Analysis to investigate the relationship between groundwater depth and tree condition for two dominant tree species, *Eucalyptus camaldulensis* (river red gum) and *E. populnea* (poplar box). Both occur on the Upper Condamine floodplain, a region experiencing significant groundwater decline due to unsustainable groundwater extraction in the northern Murray-Darling Basin, southern Queensland. Distinct non-linear responses were found, with groundwater depth thresholds identified at 12.1 22.6 m for *E. camaldulensis* and 12.6 22.6 m for *E. populnea*, beyond which canopy condition declined abruptly.

This approach represents a repeatable method of quantifying ecological response thresholds along groundwater depth gradients, application of which may assist in identifying safe operating limits for groundwater resource management to support resilient floodplain ecosystems. It will be particularly important in regions where increasing water demand and drying climates may drive further groundwater decline.

Dr Andy Le Brocque is senior lecturer in ecology and sustainability and the University of Southern Queensland. He has been researching aspects of the biodiversity and ecology of natural systems in production landscapes over the last twenty years with a particular interest in the condition and health of remnant vegetation.