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Poster Presentation – Abstract

Disturbance and resilience of floodplain woodlands in a production landscape

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Anthropogenic disturbance regimes can have significant impacts on the diversity and dynamics of remnant ecosystems in highly modified agricultural landscapes. Such ecosystems frequently function close to ecological thresholds, and their study can make important contributions to our understanding of how ecological systems respond to change. Insight into ecosystem response to novel and multiple disturbances enables more robust modeling of major over-arching disruptions such as climate change, and provides a stronger foundation for management decisions intended to limit loss of biodiversity and ecosystem services.

The upper Condamine River, at the headwaters of the Murray-Darling basin, drains one of the most intensively-farmed landscapes in Australia. Woodland remnants on the floodplain are in poor condition, with significant dieback and limited recruitment of canopy species, as well as widespread invasion by the introduced perennial herb *Phyla canescens* (lippia). Mechanisms of ecological change in this complex landscape are not well-understood and management efforts to address these issues over recent decades have led to little marked improvement.

Results of research investigating the state of *Eucalyptus camaldulensis*/*E. tereticornis* floodplain communities indicate that, while observed condition is an integrated response to the range of disturbances tested (e.g. climate variability, altered land- and water-use, arboreal herbivory, invasive weeds), certain changes (e.g. groundwater decline due to over-extraction in combination with extended drought) may be critical to the long-term persistence and function of these remnants. The multi-faceted approach taken in this study draws on State-and-Transition and Bayesian Belief Network methods to conceptualise and model how key drivers of ecosystem change integrate to influence observed condition in this environment. Systems models such as these establish a strong basis for adaptive management of ecosystems at risk of exceeding thresholds and undergoing fundamental regime shifts.

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