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Integrating science for landscape management

Ted Lefroy, Allan Curtis, Anthony Jakeman and James McKee

In the last decade, owing partly to advances in graphical models, causality has undergone a major transformation: from a concept shrouded in mystery into a mathematical object with well-defined semantics and well founded logic ... Put simply, causality has been mathematized (Pearl 1999).

The Landscape Logic project set out with three ambitious aims as reflected in its programs: Knowledge Discovery, Knowledge Integration and Knowledge Broking. The Knowledge Discovery program had the aim of identifying causal links between past interventions in environmental management and the state of the environment in two specific areas: water quality and native vegetation extent and condition in south-eastern Australia. The intent was to improve the information available to environmental managers about the success or otherwise of past interventions. It was an attempt to close the adaptive management loop, much invoked but rarely practised (Allan and Curtis 2005; Allan *et al.* 2008; Lefroy 2008; Lindenmayer and Likens 2010). We knew this was an ambitious aim and were warned it was not only ambitious but naïve to assume we could shed light on cause and effect relationships in such a complex area as the state of the environment. Some of our studies did shed direct light on causal links, as outlined below, while others were less successful. Lack of success was primarily