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Using photography to elicit grazier values and management practices relating to tree survival and recruitment

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ABSTRACT

Integrating conservation and agricultural production is a major challenge globally. The upper Lachlan catchment of Australia is dominated by livestock grazing, and is threatened because most native woodland vegetation has been cleared. A third of all remaining tree cover occurs as scattered trees in grazing pastures. These scattered trees are dying from old age and are not regenerating due to grazing pressure. Previous work has revealed management strategies that are more likely to maintain tree cover, such as low-input rotational grazing. We asked graziers to photograph significant features on their properties, and used the images as prompts in later interviews. This elicited graziers' landscape values and other drivers of their management practices related to tree cover. The targets that our 25 case landholders chose to photograph, and the ways they discussed them in later interviews, reflected the focus of past education and incentive programs, suggesting that well-designed policies, educational messages and incentives do seem to reach landholders and result in improved practices. For example, many landholders reported management activities related to the protection of large woodland patches or the maintenance of coarse woody debris. The maintenance of scattered tree cover has not been a focus of policy initiatives in the past. Despite this, the narratives elicited by photos of isolated and scattered trees showed graziers valued them and were aware of and concerned about their decline, yet lacked knowledge about how to protect and regenerate them. Graziers urgently need unambiguous advice and practical assistance to help them adapt their practices to maintain scattered trees in the long term.

Introduction

In a context of global agricultural intensification, the management decisions of individual farmers have an increasing impact on environmental conditions world-wide (Foley et al., 2005; Hoekstra et al., 2005; Tscharntke et al., 2005). While governments and corporations make the macro-level decisions that influence what gets managed and where, individual farmers make countless micro-level decisions about how it is done. Those looking to improve agricultural practices typically leverage policy settings and market drivers to change management, but landholder decision-making processes are often more complicated (Lal et al., 2001; McGuckian and Rickards, 2009). In a 1939 speech titled "The farmer as a conservationist", Aldo Leopold observed that "the landscape of any farm is the owner's portrait of himself" (Meine, 1987). Using landholder photography as a research methodology harnesses such conceptions of self to expose the complex drivers of agricultural practice.

The Southeastern Australian wheat-sheep belt (Fig. 1) is part of an internationally recognised threatened ecoregion (Hoekstra et al., 2005), and comprises critically endangered ecological communities (DEWHA, 2009). Only approximately 15% of pre-settlement tree cover remains (Dorrough and Moxham, 2005; Fischer et al., 2009a; Freudenberger et al., 2004). Following land clearing for agriculture (Benson and Redpath, 1997; Lunt et al., 2006; Ozolins et al., 2001), large patches of trees (>5 ha) are largely restricted to unproductive ridges that are least suitable for agriculture (Fischer et al., 2009a). By contrast, the actively grazed low-lying areas that comprise the majority of land are dominated by isolated or scattered trees exhibiting an aging demographic profile (Fischer et al., 2009a). These isolated and scattered trees are experiencing a passive yet inexorable form of clearing under active grazing: accelerated tree mortality and failed seedling recruitment (Dorrough and Moxham, 2005; Gibbons et al., 2008). A regional-scale collapse in tree cover is looming, threatening the sustainability of the region (Fischer et al., 2009b).

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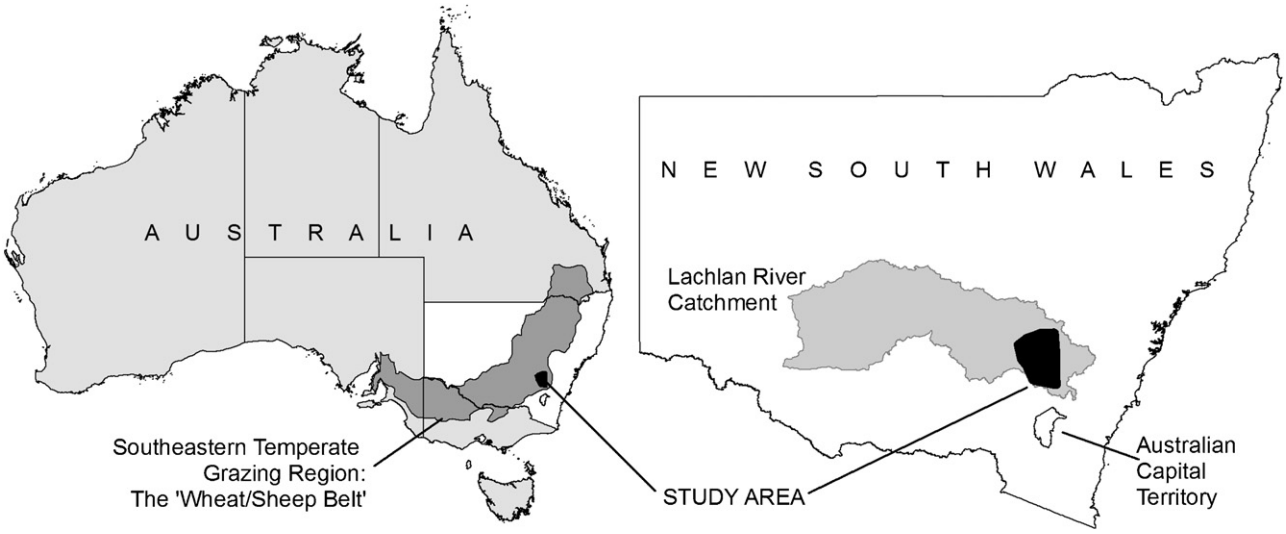

Fig. 1. Map of the study area.

Isolated and scattered trees account for approximately one third of remnant tree cover in the region (Fischer et al., 2009a), and provide valuable ecosystem services. For example, scattered trees improve pasture productivity, provide shade for livestock, enhance water infiltration, and constitute habitat for many species of bats and birds (Bird et al., 1992; Dorrough et al., 2004; Eldridge and Freudenberger, 2005; Lumsden and Bennett, 2005; Manning et al., 2006; Vesk and MacNally, 2006; Walpole, 1999). More generally, scattered trees contribute heterogeneity to an otherwise homogenous landscape matrix, thereby increasing the resilience of the ecosystem to external disturbances, including climate change (Manning et al., 2006, 2009). Despite these values, to date, agencies have addressed tree decline in the region by funding the protection of large patches (Spooner et al., 2002; Spooner and Briggs, 2008) or the planting of linear strips, typically along fences or creeks (Bennett et al., 2000; Munro et al., 2009). Large patches and linear plantings have been favoured by a sequence of government programs including the National Landcare Program (Curtis and De Lacy, 1998) and the Natural Heritage Trust (Bardsley et al., 2002), as well as by the non-governmental conservation sector, in particular Greening Australia. The perpetuation of scattered trees has recently been identified as an important complementary priority (Fischer et al., 2009a; Manning and Lindenmayer, 2009). Reversing the region's decline in scattered tree cover calls for the widespread adoption of management practices that are conducive to tree regeneration within grazed areas, rather than simply setting aside land for conservation purposes (Fischer et al., 2008).

This study is part of a larger integrative project that is seeking practical ways to integrate conservation and production in grazing (Sherren et al., in press). We began in 2007 with an ecological study to correlate grazing management histories with the probability of tree recruitment in sites of different tree density and age (Fischer et al., 2009b). That work identified a small set of recommended management practices to perpetuate scattered trees. Active management is needed where natural regeneration is unlikely, such as where there are few parent trees or where soil nutrient levels are greatly elevated. Active management options include planting scattered trees, and protecting them from grazing until established (Fischer et al., 2009b; see also Ozolins et al., 2001). Passive management options to enhance the health of seedlings and parent trees include: (1) decreasing the use of fertiliser; and, (2) using rotational grazing regimes with prolonged rest periods. In addition to enhancing tree recruitment it is considered important that existing mature trees remain as healthy as possible for as long as possible (Gibbons et al., 2008).

Private landholders control the majority (94%) of land in the region (Tonts et al., 2003), and thus the future of regional tree cover depends on their management decisions. Landholder adoption of any new practice depends, in part, on their values and beliefs (Frost, 2000; Vanclay, 2004). An increasing diversity of benefits from woody vegetation – including production, biodiversity, and aesthetics – is recognised by Australian landholders (Dettman et al., 2000; Hodgkins et al., 1999; Kirkpatrick et al., 2007; Seabrook et al., 2008). However, in a recent survey in the region landholders were less likely to recognise the benefits of scattered trees than those provided by denser and larger patches of trees, and they were less likely to make management decisions in order to protect or regenerate sparse trees (Jacki Schirmer, pers. comm.). Here, we explore how landholders value their working landscapes, and how those values may affect their farm management decisions.

Specifically, this article reports on a photo-elicitation exercise undertaken in collaboration with graziers who had also participated in the ecological study (Fischer et al., 2009b). In photo-elicitation, volunteers take photographs of features meeting pre-defined criteria, and photographs are subsequently used for guiding discussions in qualitative interviews. In this instance, graziers were asked to capture 'significant' farm features. This paper seeks to inform the design of policies to encourage management practices conducive to the long-term maintenance of scattered trees by synthesizing: (1) the landscape priorities suggested by what graziers chose to photograph; and, (2) the key themes that certain popular targets stimulated in subsequent discussions with those graziers.

Background

Environmentally significant behaviour begins with broad value orientations, for instance toward oneself (egoistic), others (altruistic), or the environment (biospheric) (de Groot and Steg, 2008; Stern, 2000). A person's value orientation influences their "beliefs about human-environment relations, their consequences [for valued objects], and the individual's responsibility for taking corrective action" (Stern, 2000). In this work, no particular position in the above causal chain of values, beliefs, and norms is targeted; what we refer to in this paper as 'landscape values' is a general term embracing all such drivers of behaviour (Gobster et al., 2007).