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Reducing contention amongst organisations dealing with commercially valuable but invasive plants: The case of buffel grass

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ABSTRACT

Policy development can fail when organisations tasked with managing contentious species for different outcomes are at odds. Buffel grass (*Cenchrus ciliaris* L. syn. *Pennisetum ciliare* L. Link) has been planted worldwide and is a valuable pasture grass but it is contentious because of its environmental impacts. Due to this contention, government agencies in Australia have been reticent about developing policy for sustainable management of buffel grass. We developed a workshop procedure in which representatives of government and non-government organisations with an interest in buffel grass could discuss impacts and management of the plant in a non-adversarial setting. Orientation of the organisations ranged from a strong pastoral production focus to a strong conservation management focus. Workshops were run in four contrasting regions, which differed in climate, predominant land use and pastoral dependence on buffel grass. The results showed that, perhaps unexpectedly, diverse organisational stakeholders had similar perceptions of the positive and negative impacts of buffel grass on production and conservation, despite differences in their orientation, and there were differences amongst regions. Objectives for managing buffel grass on conservation reserves and on grazing lands of low conservation value were also generally agreed, and the tools appropriate to the objectives were largely uncontroversial although they varied regionally. The main contention was in regard to management objectives for grazing land of high conservation value. We suggest that there is sufficient common ground amongst organisations to initiate policy development for sustainable management of buffel grass in Australia, provided the process is responsive to the needs of stakeholders and to regional differences in environmental, social and economic potential. We also suggest that this process can be a model for reducing contention over other invasive but commercially valuable species.

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1. Introduction

The use of alien plant species to improve agricultural, horticultural and timber production has a long history (Lonsdale,

1994; Richardson, 1998), but many alien plant species have created serious weed problems because of their invasiveness and detrimental impacts on biodiversity, ecosystem processes and fire regimes (Lonsdale, 1994; Richardson, 1998; Groves et al., 2005; Pimentel et al., 2005). Contentions amongst industry,

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conservation and other interests arise particularly when commercially valuable alien plant species prove to be invasive (e.g. de Wit et al., 2001). Such contentions can occur within and between several levels of stakeholders: individual landholders or producers; industry bodies and other non-government interest groups; scientists; and government agencies that service different sectors, such as livestock production and biodiversity conservation. Failure to develop a way to deal with widely established and commercially valuable alien species and their unwanted consequences can in time lead to worsening environmental outcomes and even litigation (Cullen and Delfosse, 1985; de Wit et al., 2001).

The social dimension of invasive alien species in general has been well recognised in literature (e.g. McNeely, 2001; Le Maitre et al., 2004; Norgaard, 2007; Ceddia et al., 2009; Roura-Pascual et al., 2010). Stakeholder perceptions have been examined within a single stakeholder group (e.g. environmental managers, Andreu et al., 2009; pastoralists, Marshall et al., 2010) and across multiple stakeholders (e.g. García-Llorente et al., 2008). Depending on their perceptions, stakeholders can place different values on invasive alien species and the engagement of stakeholders is therefore likely to be beneficial for fostering better management (Binimelis et al., 2007; García-Llorente et al., 2008; Ní Dhubháin et al., 2009).

Reducing social conflict in natural resource management generally, including invasive alien plant species management, has been examined through e.g. ecological–environmental modelling (Higgins et al., 1997, for biocontrol agents; Van Nes et al., 1999, for native aquatic plants; de Wit et al., 2001, for alien tree species; Ceddia et al., 2009, for an invasive insect), multiple criteria analysis (Sheppard and Meitner, 2005, for forest management; Messner et al., 2006, for water allocation; Hajkovicz, 2008, for environmental management priorities) and practical mediation (Striegnitz, 2006, for coastal protection). Some authors recommended specific actions for resolving or reducing conflicting interests surrounding invasive alien species (e.g. Bennett and Virtue, 2004, for plants; Stokes et al., 2006, for plants and animals), where contention may occur amongst a variety of stakeholders from community to industry and government.

Not much attention has been paid to the practical implementation of processes for reducing contention over invasive alien plant species that are commercially valuable. In particular, testing of processes for reducing inter-organisational contention has not been widely reported, even though these contentions create important barriers to policy development, given the key role organisations play in advocacy, policy setting and implementation of management for plants that have both commercial value and weed impact.

Buffel grass (*Cenchrus ciliaris* L.) is a drought- and grazing-tolerant perennial grass native to parts of Africa, the Middle East, northern India, and Pakistan (Tu, 2000). It has been introduced extensively world-wide and is highly valued for livestock production (Humphreys, 1967; Cox et al., 1988; Chudleigh and Bramwell, 1996), but it can be invasive. It has had substantial environmental impacts, particularly on biodiversity and fire regimes, in North and Central America and Australia (D'Antonio and Vitousek, 1992; Daehler and Carino, 1998; Arriaga et al., 2004; Clarke et al., 2005; Smyth et al., 2009) and has become dominant in regions of Africa

where it is not native (D'Antonio and Vitousek, 1992). It is a declared noxious weed in Arizona (Piggot, 1995, cited in Franks, 2002). It was inadvertently introduced into Australia as early as the 1870s (Friedel et al., 2006) and since then over 500 different accessions have been introduced intentionally (Hall, 2000). Modelling suggests it has the capacity to spread into 53% of the Mexican state of Sonora (Arriaga et al., 2004), and 68% of mainland Australia (Lawson et al., 2004).

In Australia, development of policy dealing with contentious species like buffel grass is in limbo. Land management policy is largely the responsibility of state or local governments, and the distribution and cultivation of buffel grass for production is permitted in all states except South Australia. In that state, introduction of alien plant species to pastoral leasehold land is contrary to the policy of the Pastoral Board of South Australia (Greenfield, 2007), but producers can continue to use buffel grass where it is already established. Buffel grass has been identified as a 'transformer' species (Grice, 2006; where transformers are defined as 'a sub-set of invasive plants which change the character, condition, form or nature of ecosystems over a substantial area relative to the extent of that ecosystem', Richardson et al., 2000) and appears in lists of threatening processes in several regional natural resource management plans (Friedel et al., 2006). It is not a declared pest plant in any state, nor is it listed as a Weed of National Significance (Australian Government, 2009).

In our experience in Australia (e.g. van Klinken et al., 2006), the views of stakeholders, particularly those concerned with pastoral production or conservation, are perceived to be polarised to the extent that progress toward policy development and strategic management of environmental impacts at broad scales is prevented. Potential areas of disagreement include the economic, social and environmental benefits and costs of buffel grass, the objectives for its management and the tools and strategies to be employed in achieving those objectives. While the contention is perceived to be primarily between production and conservation interests, there are other interests that are regionally important, such as those of indigenous landholders, mining companies and agencies managing transport corridors.

There is little recognition of the potential importance of tailoring policy to account for regional differences within and between jurisdictions, as discussed broadly by Dietz et al. (2003) and Nelson et al. (2008). Perspectives on buffel grass may vary regionally and, consequently, contention within and between state or national organisations may arise, although this has received little or no attention to date. An economic analysis demonstrated that the commercial benefits of buffel grass vary regionally in Australia (Chudleigh and Bramwell, 1996). The environmental threat posed by buffel grass may also vary regionally, for example with vegetation type and fire regime, influencing perceptions within natural resource management organisations. Without coherent policy across and within organisations, progress toward better management will be limited or non-existent and contention will continue.

Our aim was to develop an approach to improving management and policy directions for the sustainable use of buffel grass in Australia, by reducing contention at the organisational level. We conducted facilitated workshops in four contrasting regions to assess differences in organisational positions, or 'organisational perceptions', regarding the

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