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Fire management in a new rangelands economy: making sense of research, policy and on-ground implementation

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Abstract

Savanna burning contributes between 2-4% annually to Australia's greenhouse gas emissions accounts. However, fire is a natural process and a key land management tool in the northern Australian rangelands. Fire is used to control woodland thickening, improve pasture production and quality, control weeds and manage habitat for biodiversity conservation. In recent times there has been a concerted attempt to move away from complete fire suppression and its consequence: frequent, high intensity wildfires late in the dry season. In fire-adapted vegetation types, prescribed early dry season fires have the advantages of providing an effective management tool for reducing the incidence of late season wildfires and generating less greenhouse gas emissions. However such a fire regime, in combination with grazing, may result in undesirable levels of woody vegetation thickening. The emergence of a carbon economy in Australia hints at the opportunity for pastoral land managers to diversify their enterprises by adopting fire management practices which reduce greenhouse gas emissions and increase longer term sequestration into living biomass. This opportunity comes at a time when the economic performance of the northern pastoral industry is suffering. In order to realise benefits from a new rangelands economy, we need to identify and address the gaps in scientific knowledge, current policy settings and implementation to optimise the conservation, production, emissions and economic outcomes.

Introduction

Many businesses in the northern beef industry are currently under extreme financial pressure (McCosker *et al.* 2010). In the years leading up to the global financial crisis, pastoral land values reached stratospheric heights and many producers borrowed heavily to purchase properties or upgrade their existing assets. Property values have fallen sharply since 2008 and this has eroded business equity for many. In the northern savannas, the enforcement of the 350kg weight limit for live export animals to Indonesia has also impacted on the cash flows of beef businesses reliant on this market. These realities are reflected in regions such as the Victoria River District (NT) where about 25% of properties are currently for sale in what has traditionally been a tightly-held area (D. Walsh, pers. obs.).

To improve the profitability of any business, managers need to increase turnover, increase gross margin and/or decrease overhead costs (McCosker *et al.* 2010). The types of strategies typically applied in pastoral businesses include ensuring adequate scale, optimising the enterprise mix, improving turnoff through improved husbandry and management practices, and reducing overhead costs per stock unit. For some businesses, optimising the enterprise mix through diversified land management practices may be a way of maximising returns per hectare. Enterprise diversification in the extensive pastoral industries has long been promoted, but has rarely been realised. Producers, researchers and policy makers are asking whether the emerging carbon economy may provide an opportunity to diversify traditional income streams and manage business risk (e.g. The Government of Western Australia 2009). In the grazed rangelands, the main "carbon" opportunities are reducing livestock methane

emissions, reducing emissions from savanna burning and increasing carbon sequestration in woody vegetation and soils. The Commonwealth Government's *Carbon Farming Initiative* (CFI) provides a framework for pursuing these opportunities. It is notable that all sides of politics support the CFI program.

Vegetation and fire management in northern Australia

Woodland thickening has been widely observed in the northern Australian savannas since European settlement. Such thickening appears to be occurring at greater rates in higher rainfall regions and more productive situations (e.g. alluvial flats), as opposed to more rugged inland settings (Lewis 2002; Fensham and Fairfax 2003; Lehmann *et al.* 2009). Several causes are implicated, including altered fire regimes (Liedloff and Cook 2007; Murphy *et al.* 2010), lower fuel loads on intensively grazed properties (Sharp and Whittaker 2003), increasing annual rainfall (Bureau of Meteorology 2009) and increasing atmospheric carbon dioxide (Berry and Roderick 2004). If left unmanaged, woody vegetation thickening on pastoral lands can lead to declines in pasture production, cattle performance, mustering efficiency and profitability (Dyer & Stafford Smith 2003).

The most cost effective method of managing woodland dynamics in northern Australia is burning (Dyer & Stafford Smith 2003). Several long-term research trials have been conducted to determine the optimum fire regimes to achieve particular outcomes (Russell-Smith *et al.* 2003a, Andersen *et al.* 2005, Cowley *et al.* this volume). In recent times, there has been a growing recognition of the need to move away from large, late dry season wildfires to prescribed fire regimes that incorporate early dry season burning (Dyer *et al.* 2001, Russell-Smith *et al.* 2003b). While early season burning affords various well-documented water catchment, soil and biodiversity conservation benefits, a key issue for pastoral management is to apply low severity fires strategically to reduce the risk of extensive late season wildfire. However, there is evidence that late dry season fires may sometimes need to be applied in some landscapes to achieve effective woodland management (Dyer *et al.* 2001, Cowley *et al.*, this volume).

The development of a CFI-approved savanna burning emissions abatement methodology for the high rainfall region (>1000 mm per annum: DCCEE 2012), and ongoing work in the development of allied lower rainfall (>600 mm per annum) and sequestration methodologies, provides the opportunity for northern land managers to participate in a Kyoto-compliant carbon market. Similarly, there is developing support for land managers to be paid for environmental services under stewardship and biodiversity management arrangements (Douglass *et al.* 2011). However, in order to realise these diversification opportunities, a range of land management, policy and scientific challenges will need to be addressed.

Constraints and uncertainties

Several long-term research trials have demonstrated the pastoral production, emissions abatement and biodiversity benefits of a range of recommended fire management practices. Successful participation in the emerging rangelands economy will require the following issues to be addressed.

Land management issues

- Potential conflicts between using effective fire regimes to manage for woodland thickening and the need to limit greenhouse gas emissions and sequester carbon
- Developing strategic whole-of-property planning which optimises different land use options (pastoral production, carbon management, biodiversity management)

Policy gaps

- Clarification of who owns the rights to carbon on different land tenures in respective jurisdictions across the Australian rangelands. Can pastoral lessees benefit from carbon sequestered in living vegetation or soils, given that current CFI rules¹ require permanence (i.e. stocks are maintained for 100 years)?
- Can pastoral lessees enter into commercial arrangements with respect to savanna burning abatement projects which essentially do not entail a property right—i.e. the credits generated annually from savanna burning arise from management activities and do not entail issues of permanence (DCCEE 2012).
- Can pastoral lessees undertake diversified land uses on their properties?

Scientific gaps

- Development of approved methodologies for savanna burning emissions abatement for lower rainfall zones, and associated sequestration.
- How to deal with the uncertainties in estimating carbon stocks; particularly with regards to soil carbon.
- Property-based financial modelling of diversified land use scenarios.

Conference outcomes

The fire management session at the 2012 Australian Rangeland Society conference aims to synthesise the latest science, management and policy issues related to applying fire as a land management tool in the Australian rangelands, and develop a future research agenda based on identified gaps and emerging opportunities. It is proposed that papers and ideas presented as part of the session will be developed further for inclusion in a special edition of the *Rangelands Journal*, due for publication in 2013.

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¹ Refer discussion on ‘permanence’ at

<http://www.climatechange.gov.au/government/initiatives/carbon-farming-initiative/activities-eligible-excluded/permanence-sequestration-projects-only.aspx>

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