

Commentary

Savanna burning: The ecology and economy of fire in tropical savannas

ALAN ANDERSEN,* GARRY COOK AND DICK WILLIAMS

CSIRO Ecosystem Sciences, Tropical Ecosystems Research Centre, PMB 44 Winnellie, Darwin 0822, Northern Territory, Australia (Email: alan.andersen@csiro.au)

Tropical savannas are the world's most fire-prone biome, making fire a key issue for the maintenance of savanna ecosystem function and for the management of savanna biodiversity. Savanna burning also makes a significant contribution to global greenhouse gas emissions, through its effects on emissions of methane and nitrous oxide, and on carbon sequestration. There is growing international interest in reducing the extent and severity of savanna fires in the context of greenhouse gas abatement.

Fire management for greenhouse gas abatement is a particularly important issue for northern Australia, where the burning of >400 000 km² each year contributes on average 3% of Australia's accountable greenhouse gas emissions. Most of these emissions are produced by relatively high-intensity wildfires that sweep through remote and unmanaged areas during the end of the dry season, and which seriously threaten iconic biodiversity values such as those of World Heritage-listed Kakadu National Park. Greenhouse gas abatement provides an economic basis for improved fire management in these remote areas. It also presents important livelihood opportunities for remote Aboriginal communities, where traditional knowledge relating to fire remains strong, as does the desire to re-establish traditional fire management practices on their homelands.

Savanna burning, therefore, sees an unprecedented meeting of interests relating to biodiversity protection, greenhouse gas abatement, and culturally appropriate economic opportunity for historically marginalized communities. This calls for an interdisciplinary understanding of fire in savanna landscapes, incorporating fuel dynamics and fire behaviour, the effects of fire on biodiversity and ecosystem function, economic analysis, and indigenous livelihood development. Such is the scope of this Special Issue.

The Special Issue begins by addressing the drivers of fire occurrence in a Neotropical savanna (Hoffmann *et al.* 2012). This is followed by papers on fire and tree dynamics in Australian savannas (Bond *et al.* 2012; Werner 2012), focussing on the peculiar ability of eucalypts to 'escape the fire trap'. There is considerable interest in the extent to which long-term fire exclusion can result in a biome shift from savanna to forest, and this issue is addressed by Scott *et al.* (2012) in a northern Australian case study. Cook (2012) addresses fire management in the context of fuel and savanna vegetation dynamics in landscapes undergoing restoration following broad-scale mining. The effects of fire on soil nitrogen are examined by Richards *et al.*

(2012b), while Andersen *et al.* (2012) and Radford and Andersen (2012) address fire in relation to fauna conservation in northern Australia. The Special Issue concludes with a spatially explicit economic analysis of fire management for greenhouse gas abatement across northern Australia (Heckbert *et al.* 2012), and a northern Australian case study integrating the ecological and economic consequences of different fire management options in the context of indigenous livelihood development (Richards *et al.* 2012a).

We are hopeful that this Special Issue will provide an enhanced understanding of the full ecological, economic and social values of fire management in savanna landscapes.

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*Corresponding author.

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