

Guest editorial

SUSTAINABLE MANAGEMENT OF QUEENSLAND LANDSCAPES: LINKING THE SCIENCE AND ACTION

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The clearing of native forest and woodland and the cultivation of native grasslands has been central to the production of rural commodities in Australia. Since European colonisation, there has been gradual but continuous transformation of the landscape, from production exploiting the pre-existing natural resources (logging, grazing) to the replacement of natural systems with intensive production systems such as crops and improved pastures. The development of these primary industries has been critical to economic growth. However, during the last century some of the environmental costs of this development have become apparent. Perhaps the most dramatic symptom of over-development has been the expression of soil and water salinity as a result of rising watertables in southern Australia. Major concerns about the impact of over-clearing on Australia's biodiversity have also arisen in recent decades. Where these effects have been severe, efforts to restore landscapes may be ineffective. For this reason, it is vital that regions such as Queensland which still have large areas of native vegetation, avoid similar detrimental practices.

Nationally most of the native vegetation clearing activity is occurring in Queensland and northern New South Wales, with rates increasing in the Northern Territory. Defining appropriate limits to the process of converting large tracts of native vegetation to exotic crops or pastures is the subject of national debate, which has been active at various levels. Consensus is difficult to achieve although it may be reasonable to suggest that agricultural development resulting in resource degradation should be avoided. Unfortunately, the precise point where our rural landscapes reach an irreversible state of degradation is difficult to predict. The birth of the Landcare movement has sought to foster "best-practice" amongst rural landholders in order to achieve the aim of preserving and sustaining our landscapes. Despite the considerable achievements of such cooperative measures and growing national investment in re-vegetation programs, the clearing of native vegetation in northern regions has continued. To some, imposing on the pre-existing property rights of landholders within a regulatory framework has been seen as necessary, although it is not surprising that this has attracted protest from some landholders and industry groups.

It was against a background of sustained high rates of clearing that the Queensland Government in 1999 introduced the *Vegetation Management Act* regulating the clearing of native vegetation on freehold land. The *Vegetation Management Act 1999* was preceded by the *Lands Act 1994*, which provided a working framework for assessing applications to clear native vegetation on leasehold land. The original passage of legislation sought to protect threatened ecosystems pending Commonwealth financial assistance to offset the burden faced by landholders. Commonwealth assistance has not to date been forthcoming and the legislation was enacted in an amended form with a significantly lower level of protection for threatened ecosystems. The process of negotiating an arrangement for Commonwealth assistance and enhanced legislative protection is ongoing and will probably involve securing outcomes related to greenhouse gas emissions (cleared and burnt vegetation).

The process leading up to the implementation of legislative controls on freehold land included some review of the existing scientific knowledge that would be relevant to the formulation of an effective policy. However, much of the information that was compiled has not been published in scientific journals and exposed to peer review. It is against this background that this special issue of *The Rangeland Journal* was instigated. There has been a need to assemble the available science as well as creative ideas that could underpin an effective vegetation management policy in Queensland. The contributors to this volume were selected as experts in their particular fields with special emphasis on those with direct experience in Queensland. They were instructed to provide constructive review of the disciplinary basis underpinning native vegetation management policy on all land tenures, and the critical factors in effective policy implementation.

One of the strengths of the resource base in Queensland is the regional ecosystem maps developed by the Queensland Herbarium that determine the areas of remnant vegetation according to their ecosystem type, and thus determine the threatened status of the regional ecosystems. These maps are fundamentally important to implementing the legislation and monitoring outcomes. Tree clearing patterns are updated regularly by the land cover change analysis developed by the Statewide Land Cover and Trees Study that detects clearing on a tri-annual basis. The nature of these remotely sensed products, including Queensland Herbarium regional ecosystem mapping methods, summary of the status of regional ecosystems, and their role within the Queensland legislation is described in this volume by Wilson *et al.*

A key part of the new arrangements is a vegetation management advisory committee which is charged with the responsibility of providing advice to the Minister on native vegetation management in Queensland, including assessment of the quality of regional vegetation management plans. Several authors have identified the key role of these regional plans and their implementation. While the legislation sets out minimum state-wide standards for the retention of native vegetation, an allowance is made for variation between regions through the development of regional vegetation management plans, which require approval by the state. The quality of these plans and the effectiveness of their implementation will be the acid test of the legislation (Wilson *et al.*, Thorburn *et al.*).

Some authors have presented arguments for retaining overall higher percentages of native vegetation in bioregions (McAlpine *et al.*, Rolfe). These are currently set at 30% total retention but this may not protect all bioregions adequately. Of particular concern are the many bioregions that currently have large areas of native vegetation, and which are generally in environments that are marginal for agricultural development for both economic and ecological reasons. Even in less marginal agricultural areas, at 30% retention there is a real risk of losing significant amounts of regional biodiversity (McAlpine *et al.*).

The lack of specified retention levels for sub-regions and catchments in the legislation further increases the risk of local extinctions of plants and animals. Unless protected under other sustainability criteria such as salinity hazard or erosion, it is possible for sub-catchments and properties to be entirely cleared (Thorburn *et al.*, McAlpine *et al.*). It is evident from these issues that communication and the provision of information to rural communities in appropriate forms are vital. This communication needs to be both specific to the legislation and address the general issues surrounding land clearing (Siepen and Westrup).

A number of authors have highlighted the importance of understanding ecological process affecting the entire landscape, not only patches of retained native vegetation. Management of production areas can influence the health of native vegetation, soil carbon stocks (Henry *et al.*), as well as provide habitat directly for significant amounts of biodiversity (Ludwig and Tongway). Although trees can compete with the herbaceous understorey and reduce forage production (Scanlan), Schmidt and Lamble argue that savanna soils may be susceptible to nutrient leakage and that clearing trees can deplete the nitrogen capital in some situations.

There is potential to minimise the impact of trees on forage production at a landscape scale, using specific retention patterns (Scanlan), thus allowing some benefits of trees for soil health and biodiversity to be maintained in production areas.

The legislation has a performance requirement that vegetation that is cleared for productive use must be able to support that use sustainably. However, for many of the regional ecosystems in intact landscapes, the economics of development are questionable in the long-term (Rolfe), and their ability to sustain production has not been adequately explored (Schmidt and Lamble). Producers may often accept short-term gains from clearing vegetation, even though there may be losses of production in the long-term (Rolfe). These long-term declines in natural resource condition are treated as externalities, as are other factors such as declines in water quality, losses of biodiversity and increased carbon emissions (Rolfe, Henry *et al.*). The broader community must pay for these in the long-term, and for this reason, it may be beneficial for financial incentives to be provided to prevent vegetation clearance that may have a net cost to society. Rolfe considers the use of a range of options and incentives to reduce vegetation clearing. While these all require resources to establish, there are likely to be some regions (if not all) where there will be net benefits to society in establishing incentives to retain native vegetation. It is the role of governments to assess trade-offs between short-term production and social gains and long-term environmental and social costs.

The papers in this volume provide a significant contribution in summarising the current knowledge base underpinning the Queensland native vegetation management legislation. They also provide valuable insights into issues that need to be fully addressed to ensure the legislation achieves the outcomes intended, that is the sustainable use of Queensland landscapes.

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