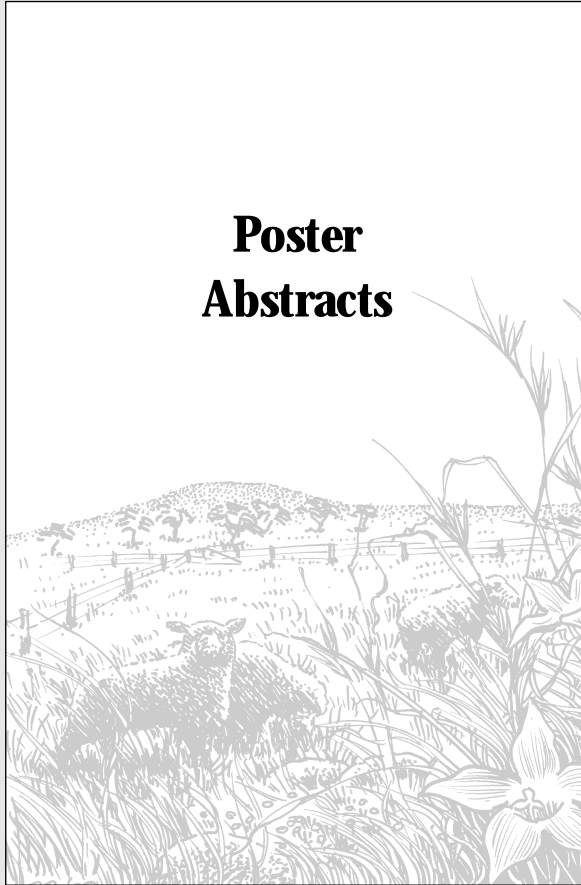


Poster Abstracts



Tasmanian grassland conservation and management

Phil Barker¹, Louise Gilfedder, Sean Cadman & Renee Nicholson

¹Resource Management and Conservation
Department of Primary Industry, Water and Environment (DPIWE)
GPO Box 44A, Hobart TAS 7001
pbarker@dpiwe.tas.gov.au

Lowland native grassland is the most depleted and degraded and, consequently, most endangered vegetation formation in Tasmania. Current use of native grasslands has a very long history and is, in almost all cases, compatible with nature conservation. Changes in ownership and economic circumstances will inevitably lead to changes in land use practices. The present trend toward increased cropping may see a second wave of grassland loss if sites are not secured by management agreements. The path toward lowland grassland conservation on private land in Tasmania must be perceived as beneficial by graziers. It must also result in a cessation of the clearance of the grassland remnants. The form of any management agreement must therefore be developed with the support and assistance of private grassland owners. This poster outlines the current status of the Grasslands Recovery Process in Tasmania and presents ideas on the role of conservation planning to identify roles for grassland remnants in the context of financially viable management of the whole farm.

Grassy ecosystems of the Victorian Plains

Tim J. Barlow¹ & Vanessa L. Craigie²

¹ Bushcare Grassy Ecosystems Project Officer
c/- Victorian National Parks Association
10 Parliament Place
East Melbourne VIC 3002
t.barlow@latrobe.edu.au

² Grassland Coordinator Flora & Fauna Program
Department of Natural Resources and Environment
4th floor, 250 Victoria Parade,
East Melbourne VIC 3002
vanessa.craigie@nre.vic.gov.au

At the time of European settlement, approximately 6,970,000 ha of tussock grassland, grassy swamps and grassy woodlands occurred in Victoria. Collectively described as the Victorian Plains, these areas supported the establishment of agriculture in Victoria to the extent that less than 1% of the original area retains native vegetation cover.

The major areas are mapped, together with data on the conservation status of grassy ecosystems in these bioregions. Examples of important vegetation types in these bioregions are presented, as is information on the threats and current conservation strategies.

Two examples of current and potential economic values of indigenous grassland flora, other than for stock grazing, are briefly discussed. It is suggested the entire community, including agriculturalists and urban people, must act to support the remnants of this ecosystem to both preserve the past and provide for the future.

Innovation in native grasses (harvesting & sowing techniques)

Andrew A. Briggs

Native Grasses Officer

Central West Department of Land and Water Conservation

P.O. Box 207, Wellington NSW 2820

The greatest problem facing the usage of native grasses in an agricultural landscape is the availability of seed and information on how to establish warm season perennial native grasses. Such information is essential for recharge control in the Central West of NSW and elsewhere throughout Australia.

To overcome this shortfall, the Department of Land and Water Conservation has instigated the Native Grasses Innovation and Development Program. This program has, in conjunction with Barney's Reef Landcare Group and Rosevale Engineering, made major breakthroughs into the development of specialised harvesting and seeding equipment. Such technological advancements now make possible the large scale harvesting and sowing of a wide range of native grasses; previously impossible with existing broadacre technology.

These breakthroughs will have enormous benefits to dryland agriculture and conservation farming, revegetation and, in particular, dryland salinity control through the reduction of groundwater recharge.

Grassland fauna – the Pygmy Bluetongue lizard

Sylvia G. Clarke

Pygmy Bluetongue Recovery Program, Natural Sciences, SA Museum

North Terrace, Adelaide SA 5000

sylvia@senet.com.au

Twelve populations of the peculiar Pygmy Bluetongue lizard (*Tiliqua adelaidensis*) survive in grazed native grassland in the Mid-North of South Australia, a remnant of their former distribution, which extended as far south as the Adelaide plains. The present populations are geographically isolated, each being surrounded by cultivated land, and within each site the lizards exhibit a clumped distribution ranging from 15 to 200 animals per hectare. Pygmy Bluetongues lead a largely sedentary life in burrows dug by wolf spiders and trapdoor spiders. Active by day, they feed on insects, supplemented by plant material. Their maximum length is about 18 cm and, from three years of age, females can have up to 4 live young every year. Their main predators are raptors and elapid snakes.

Pygmy Bluetongues only survive in native grassland that has never been cultivated, but the relationship is not simple and the largest populations are not in the most pristine grasslands. Other factors, still uncertain, must also be important in determining their abundance and distribution. All known populations are on private land and the monitored populations appear stable. The survival of the species will largely depend on landholders' willingness to ensure that potentially disruptive landuse practices (e.g. salt bush planting, spraying grasshoppers) do not impact on areas where Pygmy Bluetongues occur. Over the next year it is hoped that management agreements can be negotiated with some landholders, as recognition of the importance of their role in the survival of these distinctive lizards.

Grassy ecosystems of the NSW Southern Tablelands

David Eddy¹, Sarah Sharp² & Rainer Rehwinkel³

¹ World Wide Fund for Nature Australia,
11 Gurubun Cl, Ngunnawal ACT 2913
deddy@ozemail.com.au

² Environment ACT, Wildlife Research and Monitoring, Canberra ACT

³ NSW National Parks & Wildlife Service, Southern Zone Team, Queanbeyan NSW

The Southern Tablelands of NSW and the ACT occupy an area of about 3.5 million hectares between the Abercrombie River in the north and the Victorian border in the south. Most of the area lies between 550 and 1200 m in elevation. Treeless grasslands and grassy woodlands form the major ecosystems of the tablelands. Nearly two centuries of European settlement and development have strongly modified these ecosystems in structure, composition, native species richness and weed status. The ecosystems are generally fragmented and increasingly subject to the threat of extinction, as are several component plant and animal species. Relatively undisturbed grasslands and woodlands are now rare.

The major native grassland dominants include *Themeda*, *Poa*, *Austrostipa* and *Austrodanthonia*. Some areas are dominated by *Aristida* or *Bothriochloa*, and a significant area of native pasture is dominated by *Microlaena*. Several hundred additional native herb species have been recorded in these ecosystems. Grassy woodlands dominated by *Eucalyptus melliodora*, *E. blakelyi*, *E. bridgesiana*, *E. pauciflora* and *E. stellulata* have essentially similar flora in their herb layers. The understorey of grassy woodlands and forests on soils derived from sedimentary parent material is often dominated by *Joycea pallida*, though it rarely occurs as a grassland dominant.

Government, non-government and community organisations are working together to identify, protect and conserve the higher quality remnants within the region, and to educate agency staff and the community of the value and requirements of these ecosystems. While over the past five years there have been several grassland sites added to the reserve system in both NSW and the ACT, the major emphasis is the protection of off-reserve sites, for which management agreements are being developed and implemented. Where possible, management practices being used to maintain current landuses (such as sustainable pasture production or recreation) are retained, where they are compatible with the conservation of the threatened ecological communities and species. A major objective for conservation of grassy ecosystems is to manage for the maintenance of habitat diversity.

Agriculture and conservation: is there a conflict?

Denys L. Garden

NSW Agriculture

GPO Box 1600, Canberra ACT 2601

d.garden@pi.csiro.au

Most agricultural practices accelerate change in grassland. Changes have been so complete that it is debatable if any grassland areas remain in their pristine state. If this is the case, then one may ask whether any areas should be conserved, since they do not fully represent the original vegetation. Also, the fact that agriculture appears to alter composition so dramatically suggests that there is risk in placing conservation areas on private land where agricultural practices are continuing. Important questions are how much change has occurred, and who should be responsible for conservation in agricultural areas?

Agricultural management practices include grazing, fertiliser and disturbance by cultivation and herbicides. Unfortunately, economic pressures to remain viable force farmers to utilise their land more intensively by adopting these practices. While farmers may have ideals of preserving vegetation, unless they have sufficient land area (or alternative sources of income) to obtain a reasonable standard of living, this may not be possible. Therefore, one might conclude that agriculture and conservation are incompatible, at least on the same land area.

However, there are two aspects that are worthy of consideration. Firstly, there are areas that have undergone less change and hence are closer to the original composition. Many of these areas contain rare or threatened plants or animals and, if no action is taken, these may disappear. Secondly, although agriculture and conservation may be incompatible on the same land area, this does not mean that they cannot be carried out jointly on different areas in the rural landscape.

The setting aside of areas on private land has problems because of economic pressures and the lack of understanding of the special needs of these areas. Therefore, reservation with management by trained ecologists seems to be the only viable alternative. This must involve the wider community through government funding. If the community demands conservation, the community must be prepared to accept the cost, and not insist that farmers be financially responsible for conservation on their behalf.

Conservation of native grasslands in the Darling Downs region, south-east Queensland

Alison Goodland

Darling Downs Remnant Grasslands Project

World Wide Fund for Nature

PO Box 1306, Toowoomba Qld 4350

agoodland@telstra.easymail.com.au

This project was developed through the Queensland Herbarium and World Wide Fund for Nature to conserve native grasslands in the Darling Downs region, south-east Queensland. It is sponsored by the Bushcare Program of the Commonwealth Government's Natural Heritage Trust.

Due to extensive fragmentation of the Darling Downs area, grasslands and rare and threatened grassland flora species are now mainly restricted to road reserves, stock routes and rail easements. Thus this project aims to facilitate the coordination of all stakeholders of these 3 entities and develop management guidelines and strategies to ensure their protection.

The project comprises:

- mapping of significant sites (GIS development);
 - liaison with stakeholder groups;
 - development of site management plans and overall strategies;
 - community awareness; and
 - monitoring
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Mapping the pre-European extent of the natural grasslands of the Liverpool Plains, NSW

Des Lang

Gunnedah Research Centre
Department of Land and Water Conservation (DLWC), Gunnedah NSW 2380
dlang@dlwc.nsw.gov.au

The Liverpool Plains has been identified as one of the five significant areas of natural grasslands in New South Wales. However, the grasslands have been radically altered by the clearing of adjacent woodlands, overgrazing, changed fire regimes and cultivation for crops and improved pastures. A knowledge of the extent and nature of these grasslands is required before any responsible attempt can be made to conserve and manage presumed remnant areas. Historical records were examined for evidence that would identify the tree line and the nature of the original vegetation.

A complex of about twelve treeless 'plains' was identified from the journal of two explorers, an 1880 paper to the Royal Society of NSW, and NSW Lands Department survey plans dating from 1839. Tree lines were shown with a high level of accuracy on the survey plans, and with less accuracy in the 1880 paper. The survey plans also indicated dominant species, the nature of the vegetation and soil type.

Historical documents can provide valuable insight into the nature and condition of the original landscape and clues on the impact of human activities, which may be useful for the development of meaningful and sensible land management strategies. However, many of these historical documents are relatively inaccessible and some are in danger of being lost.

Conservation trends on the Northern Tablelands of NSW

Chris Nadolny

Department of Land and Water Conservation
PO Box U245, Armidale NSW 2351
cnadolny@dlwc.nsw.gov.au

About 70% of the Northern Tablelands consists of native/naturalised pastures or forests and woodlands with predominantly native groundcover. The area of native grassland appears to be increasing as summer-active native grasses take over degraded sown pastures. Original grasslands in good condition are rare and prominent examples have recently been destroyed. Some weeds, particularly exotic perennial grasses, are spreading. Eucalypt dieback was severe in the 1970s. It is now more localised and regeneration is prolific in some areas. The Landcare movement is strong, with landholders taking a proactive approach to natural resource planning and management.

Grassland restoration on the Western Basalt Plains

Cheryl O'Dwyer

Zoological Parks and Gardens Board
PO Box 74, Parkville VIC 3052
Codwyer@zoo.org.au

Victoria's Open Range Zoo (VORZ) is located on the western basalt plains near Werribee. The basalt plains grasslands have diminished since European settlement and are one of the most endangered ecosystems in Victoria. Grasslands are poorly represented in conservation reserves and their education potential has been little realised. A new exhibit at VORZ, 'Volcanic Plains', has been established to provide habitat for endangered plants and animals within the basalt grasslands. This display also provides both a pleasant landscaped encounter and an educational experience. Within the volcanic plains exhibit, a one acre plot has been set aside for the re-establishment of native grasses for the reintroduction of the Golden Sun Moth (*Synemon plana*). The site will be sprayed a number of times throughout the year and scraped to produce bare earth. With the assistance of Friends of the Zoos (FOTZ) and volunteers, 40,000 *Austrodanthonia* spp. plants will be planted as habitat for the Golden Sun Moth. Inter-tussock herbs and forbs will be added throughout the establishment phase, providing a complete grassland experience. There are plans to include other native endangered plants and animals, such as the Button Wrinklewort (*Rutidosis leptorhynchoides*), Double-tailed Orchid (*Diuris fragrantissime*), Eastern Barred Bandicoot (*Peremeles gunnii*) and Striped Legless Lizard (*Delmar impar*).

Bush for Wildlife

Bernadette O'Leary & Carolyn Paris

Sustainable Landscapes Branch, Environment Australia
PO Box 787, Canberra ACT 2601
bernadette.oleary@ea.gov.au or carolyn.paris@ea.gov.au

In 1998, the Commonwealth Government made a commitment to place greater emphasis on wildlife and habitat protection through the Bush for Wildlife initiative. The national approach of Bush for Wildlife further strengthens Australia's off-reserve conservation of biodiversity in both rural and urban areas. The initiative will bring together a number of existing Commonwealth Government Natural Heritage Trust programs, such as Bushcare, the Endangered Species Program and the National Reserves System Program.

Bush for Wildlife has three mechanisms for bringing about change:

National Coordination—to improve access to information about wildlife habitat management and protection by existing urban and rural conservation groups and programs throughout Australia. This will provide the opportunity for highlighting and sharing best-practice, and coordinating communication activities. One important example of national coordination is working with state based *Land for Wildlife* schemes.

Bush for Wildlife Revolving Fund(s)—to be established nationally, modelled on the Victorian Trust for Nature fund. These will be managed by organisations who will: identify and purchase land containing significant native vegetation; place a covenant on the title to the land to protect it in perpetuity; and then resell the land to sympathetic owners. Funds from property sales will be returned to the Revolving Fund(s) for further property purchases. The areas of native vegetation protected through Revolving Funds will complement and extend existing State reserves systems, including those established with the assistance of the National Reserves System Program. Revolving funds can provide an avenue for protecting significant native vegetation that fails to meet the strict criteria of more formal reservation processes.

Refocussing existing Natural Heritage Trust grant guidelines—to place a greater emphasis on wildlife and habitat protection and management within existing Natural Heritage Trust programs, including through the One-Stop-Shop grant funding process.

Regional Biodiversity Planning Program

Alison Opperma

Department of the Environment, Heritage and Aboriginal Affairs
GPO Box 1047, Adelaide SA 5001
aopperman@dehaa.sa.gov.au

In recognition of the importance of conserving biodiversity, the Government of South Australia is developing a series of regional biodiversity plans to guide priority on-ground actions for the conservation, management and rehabilitation of species and habitats. This program is being greatly assisted by the Commonwealth Government through the Natural Heritage Trust. Plans provide a focus for the conservation and management of biodiversity within a region so that a strategic approach to implementing conservation actions can be achieved. This focus also provides a framework for integrating biodiversity conservation with other regional natural resource management issues and plans.

Preparation of regional biodiversity plans includes three phases: data inventory, data analysis and community consultation. Data inventory comprises a 'desk-top' survey of existing biological data for each region from a wide variety of sources. The flora and fauna information is consolidated and distribution of vegetation communities and threatened species mapped. Gaps in existing biological information for the region are also identified. Data analysis includes identification and mapping of priority areas and plant communities/habitats and species most at risk. Conservation issues and priorities and management strategies are then determined in consultation with the community.

A Biodiversity Plan for the South East was prepared as a pilot project and will be published in the next few months. Data inventories have been completed for the Eyre Peninsula, Northern Agricultural District, Murray Darling Basin SA, Mt Lofty Ranges and Kangaroo Island and will serve as the base for the preparation of the Biodiversity Plans over the next 12 months.

Does this map show that your pastures have native grasses in them? Is it accurate?

Ann Prescott¹, Greg Wilkins² & Lee Heard²

¹ World Wide Fund for Nature, SA Temperate Grasslands Project,
120 Wakefield St, Adelaide, 5000
annpres@ozemail.com.au

² Planning SA, GPO Box 1815, Adelaide SA 5001

Native grassy woodlands and grasslands have been difficult to map through traditional methods. Mapping is useful to assist land managers and community groups to make good production and conservation decisions, and to highlight important areas for biodiversity. To overcome difficulties in distinguishing native grasslands and grassy woodlands from other vegetation types, a series of layers of information have been used. These include historic records indicating where native grasslands occurred, native grassland areas identified by specialised studies, and estimations of non-cultivated land based on slope. Local Soil Board plans indicate that 10 % slope is the upper limit for sustainable cultivation. Further work will consider using available soil landscape unit information to help identify additional areas. Local landholders are encouraged to provide further information or feedback about this map.

Growth of young eucalypt seedlings in a partly-cleared woodland on the Central Tablelands of NSW

W.S. Semple¹ and T.B. Koen²

Department of Land and Water Conservation

¹ PO Box 53, Orange NSW 2800

² PO Box 445, Cowra NSW 2794

Aim: To monitor the progress of eucalypt recruitment in a moderately high altitude (c.850 m a.s.l.) partly-cleared box (*Eucalyptus melliodora* - *E. blakelyi* - *E. bridgesiana*) woodland with a grassy (*Themeda australis*) understorey near Orange on the Central Tablelands of NSW.

The site: The paddock was burnt in spring 1994 and grazing by domestic stock was discontinued in January 1995. Seedlings first became evident amongst the high bulk (c.6 t/ha) of native pasture in early 1996. Most were of Apple Box (*E. bridgesiana*) and all had a small lignotuber when first observed.

Methods: Monitoring of seedling heights commenced in October 1996 and continued (as increasing numbers of seedlings became evident during late 1996 and early 1997) until May 1999.

Results: A comparison of Orange rainfall records with those associated with successful eucalypt recruitment in similar environments elsewhere (see Lawrence *et al.* 1998) suggested that the seedlings probably emerged in late 1994. The rate of growth (as measured by the length of the stem from the ground surface to the tip of the uppermost green leaf) was very slow: an average of 16.6 cm/year from when measurements commenced in October 1996. The pattern of growth was marked by periods of no growth during the cooler months. This appeared to be independent of rainfall as the cool season (April-September) in 1997 was dry (302 mm) whereas it was wet (880 mm) in 1998.

Conclusions: Eucalypt seedlings grew very slowly under natural conditions at moderately high altitude and no growth occurred during the cooler months. Most seedlings were not above sheep grazing height 4 years after emergence. Even during the growing period, growth was subdued—probably due to competition from the warm-season native grasses. Although higher growth rates would have been expected where competition was controlled, other work (e.g. Semple and Koen 1997) suggests that if an uncontrolled non-native pasture had been present, growth and survival of seedlings would have been negligible.

Acknowledgments: Particular thanks to David and Katherine Pfanner and family for their generous hospitality and assistance during the period of observations on 'Pinaroo'.

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The grasslands of the Lofty Block Bioregion

Meg Robertson and Peter Lang (Presented by Adrian Stokes¹)

¹ Threatened Species and Communities, Biodiversity Branch
Department of the Environment, Heritage & Aboriginal Affairs
alstokes@dehaa.sa.gov.au

Floristic analysis of vegetation survey data identified twelve distinct floristic groups of temperate native grassland and grassy woodland. Of particular interest are the *Lomandra effusa* grassland and *Lomandra multiflora* ssp. *dura* tussock grassland which may be endemic to South Australia.

The values, threats and current management of native grasslands and grassy woodlands include:

- They provide habitat for threatened flora (e.g. Small Scurf Pea *Cullen parvum*) and fauna (e.g. Pygmy Bluetongue *Tiliqua adelaidensis*).
 - There is little high quality grassland and woodland in the National Parks and Wildlife Reserve System or under Heritage Agreement in South Australia.
 - Most remaining grassland is on private land, generally with various grazing regimes and a wide range of condition. Few are high quality but there are many with potential for improvement through changes to management.
 - Small areas of grassland and grassy woodland survive by default on minor public land including cemeteries and town parklands and are also at risk from ad hoc management.
 - Main weed threats are:
 - Herbaceous species—annual grasses, wild sage, salvation jane, clovers and medics in grassland; these and bridal creeper in grassy woodland.
 - Woody species—horehound and boxthorn in grassland; olives, boneseed and topped lavender in grassy woodland.
 - Other threats: inappropriate tree planting, clearance (by overgrazing, ploughing, fertilising and/or seeding), lack of awareness and inadvertent detrimental management.
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Managing native vegetation – Learning From Farmers

Gavin Wall

Uranquinty NSW 2652
gavinwall@ozemail.com.au

This project provides an opportunity for farmers, and others, to learn from farmers who have successfully utilised native vegetation as an integral component of their overall management. The project is funded by the Commonwealth Government's Natural Heritage Trust and managed by Greening Australia & the Murray (NSW) Catchment Management Committee.

Aims:

- To encourage landholders to adopt sustainable native vegetation management practices by establishing a series of learning sites throughout the NSW Murray River Catchment.

Objectives:

- to ensure that farmers who have demonstrated sound management of native vegetation are recognised as experts in this field;
- to establish a network of farmers and learning sites across the NSW Murray Catchment;
- to facilitate educational experiences about native vegetation for other farmers;
- for the farmer network to grow over time and become a self-managing / funding operation.

Activities:

- establish a register of properties that have value as learning sites for other landholders and the wider community in native vegetation management;
- develop these sites as learning sites through production of interpretive material making information about these sites publicly available;
- promote these sites to other landholders and the wider community through a series of media stories, field days / workshops and other promotional activities;
- encourage owners of these sites to act as mentors or coaches to other landholders;
- provide incentives to the owners of the learning sites to encourage and recognise their involvement in these activities including the reimbursement of expenses and an appropriate hourly payment that recognises the value of their work and expertise.

Outcomes:

- acknowledge the work, dedication and expertise of landholders (of the 12 sites) for their conservation and management of the native vegetation on their properties;
- draw upon the landholder network as a process of peer education;
- increase the number of landholders adopting sustainable management practices for remnant vegetation;
- increase the skills and knowledge amongst landholders concerning the management of remnant vegetation;
- development of best practices for remnant vegetation within agricultural systems;
- develop a brand logo which reflects quality assured production standards, in conjunction with environmentally sustainable land management procedures incorporating native vegetation.

Statement of purpose:

We want to share our attitudes about native vegetation and fauna management and influence whole communities through awareness raising and education. We want to be seen as productive rural businesses that understand the benefits of native vegetation and fauna in balance with rural production. We want to influence the wider community to adopt best management practices of land management for sustainability, achieving production and maintenance of biodiversity together.

Effects of established trees on native temperate pasture growth

Williams, David G.1, Paul Wallace¹, Mutjinde Katjiua²,
Nick Abel³, Greg McKeon⁴

¹ Applied Ecology Research Group, University of Canberra

² Faculty of Agriculture and Natural Resources, University of Namibia

³ CSIRO Wildlife & Ecology, Canberra

⁴ Queensland Department of Natural Resources, Brisbane

The planting or retention of trees in temperate pasture systems has been advocated to address the broad environmental effects of forest clearance and pasture improvement. These effects are now seen to threaten the sustainability of pasture systems through modification to water and nutrient cycles. Native tree cover is still present in many pasture lands of Australia, especially on steeper slopes and poorer soils. The pasture in these situations is commonly rich in native grass and forb species, whose agronomic potential and response to tree cover has been poorly studied.

This study aimed to determine the effects of established tree cover on native pasture production under grazing on the Southern Tablelands of New South Wales. We made comparisons between treed (basal area 10-20 m² ha⁻¹) and open fixed plots, and also between survey plots which covered the range (0-30 m² ha⁻¹) of tree basal area within a paddock. Pasture biomass, production and offtake were measured seasonally, as well as pasture digestibility, protein content, soil nutrient status and microclimate.

Overall we found that the treed pasture had higher seasonal production, mainly seen in relatively greater winter growth, and consumption was also higher under the trees. The results suggest that trees in these pastures provide additional environmental heterogeneity that operates on the available species to influence their biomass contributions. Given the desirability of having deep-rooted perennial components in pasture lands, this study suggests that, in some places at least, tree cover can provide wider environmental services without compromising current levels of pasture production.
