



native vegetation and biodiversity

LandWater & Wool

Shaping the future



Australian Government
Land & Water Australia

another ^{australian wool} innovation _{limited}

Productive native pastures in the high and medium rainfall zones

Native pastures are a valuable resource on many wool growing properties. Good grazing management and careful use of fertiliser can improve the productivity of these pastures while maintaining a high level of native species cover. Learning to identify the native species present and monitoring the effectiveness of management changes are key factors in developing productive and profitable native pastures.



Case Study:



Rotational grazing improves carrying capacity and ground cover

“I was sceptical to start with, but I have been astounded and excited with the results.”
Bill Hoffman, South Australia

Bill Hoffman runs an 800 hectare property at Jamestown, north of Clare in South Australia. He is a member of the Mid-North Grassland’s Working Group that is looking at doubling or even tripling stocking rates through changes in grazing management of native pastures.

Fast Facts

- Average annual rainfall 475-500 mm
- Area of native pastures 180 ha
- Management change - Dividing large paddocks into smaller ones
- Result - Increase in stocking rates and increased ground cover.

Bill has 180 ha of rolling hill country that is grazed by crossbred ewes.

“Before the trials, we used to put the stock on to the hills in winter and take them off after harvest and put them on the stubbles,” said Bill.

The non-arable area was run as one paddock. The big change in management was to divide the paddock into small areas (10ha) with electric fences and to rotate the stock around these paddocks in a large mob.

“I was sceptical to start with,” said Bill, “but I have been astounded with the results. In the beginning I didn’t know much about native grasses because our grazing system and fertiliser program had favoured annuals. Grazing the pastures for two days and then giving them a rest for 40 days has rejuvenated the perennial component of our pastures. We also get less bare ground and less erosion because we have better control of stock.”

Contents

NATIVE PASTURES AND GRASSLANDS	2
RECOGNISING NATIVE PASTURE SYSTEMS	4
MANAGEMENT TO IMPROVE NATIVE PASTURE PRODUCTIVITY	6
KEY POINTS	11
FURTHER INFORMATION	12

CASE STUDIES:		
BILL HOFFMAN	1	
THE WRIGHTS	8	
TASMANIAN MIDLANDS	9	



Native pastures and grasslands

Native pastures and grasslands occupy significant areas of the high to medium rainfall zones of New South Wales, Tasmania and Queensland. In these areas they are an important feed base for wool production. The challenge for woolgrowers is to sustain biodiversity by having a good mix of native pasture species while enhancing their productive capacity.

Native pastures are tolerant of a wide range of conditions. Many native pastures are persistent even in adverse soil conditions such as acid soils.

Native pastures generally contain a range of native and exotic plant species. In many areas they can provide a green pick throughout the year, particularly during the summer months. This even supply of similar quality feed is important in maintaining the high tensile strength of wool.

The survival and resilience of these pasture systems depends on the preservation of a high level of diversity of species within the sward (expanse of pasture).

Traditionally most of these pasture systems have been run as low input, low output grazing operations. However opportunities exist to lift the productive capacity of these pastures through better management while sustaining the diversity of native species in these systems.



Native pastures providing an alternative on-farm income. Seed harvesting *Microlaena*, Southern Tablelands NSW.

Photo Courtesy: John Betts, Yass, NSW

DISCLAIMER: The information contained in this publication is intended for general use, to assist public knowledge and discussion and to help improve the sustainable management of land, water and vegetation. The information should not be relied upon for the purpose of a particular matter. Legal advice should be obtained before any action or decision is taken on the basis of any material in this document. The Commonwealth of Australia, Land & Water Australia, the authors, and Land, Water & Wool and its partners do not assume liability of any kind whatsoever resulting from any person's use or reliance upon the content of this document.

COPYRIGHT: Copyright of this publication, and all the information it contains, jointly vests in the Land and Water Resources Research and Development Corporation, with its brand name being Land & Water Australia, and Australian Wool Innovation Limited. Both Corporations grant permission for the general use of any or all of this information provided due acknowledgement is given to its source.



BE ALERT!

Natural temperate grasslands are considered the most threatened ecosystem in Australia (National Land Water Resources Audit - Biodiversity report 2002). In the Murrumbateman area of southern NSW, natural temperate grasslands have declined by 99.5% since European settlement.



Native grasslands near Yass, NSW. This paddock is harvested for a native seed business.

Photo courtesy: John Betts, Yass, NSW



Sheep grazing native pastures, Southern Tablelands, NSW.

Photo courtesy: John Betts, Yass, NSW



Grassy woodlands on the southern tablelands of NSW provide production and environmental benefits.

Photo courtesy: John Powell, Southern Tablelands, NSW

Native grasslands

‘Native grasslands are any area where native grasses and/or herbs are the main species present, shrubs are few, and trees are absent or there are only a few scattered individuals present (ie less than one per hectare).’ The most common grasses present are usually Wallaby Grasses, Spear Grasses, Tussock Grasses, Weeping Grass, Red Grass, Blue Grass and Kangaroo Grass. Species will vary between districts.*

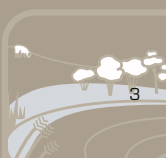
Native pastures

Native pastures have generally been stocked with sheep and/or cattle and routinely grazed. Depending on the management history, these pastures range from areas with a high diversity of native plants to those dominated by one native grass species with a low diversity of native herbs.

Grassy woodlands

‘Grassy woodlands are basically grasslands with trees.’ The trees are generally widely spaced with canopies that do not overlap. Grassy woodlands can be dominated by Red Gum, Swamp Gum, Manna White Gum, Grey Box, Yellow Box and other eucalypts.*

** Reference: Barlow T. (1998) 'Grassy Guidelines, How to Manage Native Grasslands and Grassy Woodlands on your property'. Trust for Nature, Victoria.*



Recognising native pasture systems

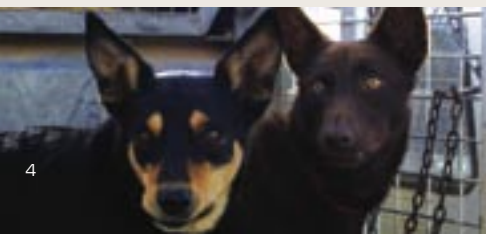


Photo courtesy: Louise Gilfedder, Tasmania

Originally much of the more fertile part of the high rainfall zone of Australia was covered in native grasslands or grassy woodlands. However, relatively unmodified native grasslands and grassy woodlands now cover only a small fraction of their original area.

While there are still relatively large areas of modified native pastures in New South Wales, Tasmania and Queensland, native grasslands and pastures have declined in most of the medium to high rainfall farming areas of Victoria, South Australia and Western Australia.

Native pastures and grasslands contain a range of plant types—grasses, sedges, rushes and forbs. The most important plants for providing quantity of feed for grazing sheep are the native grasses, of which Australia has about 1100 species. The vast majority of these native grasses are perennials. The feed quality of native grasses can be high if managed to maintain a mix so that some species are green and actively growing at all times of the year. Some native grasses such as *Microlaena* can be as nutritious as Cocksfoot or Rye. Often small amounts of high quality feed are provided by the herb and forb components as well.



"I HAVE A CUNNING PLAN (BLACKADDER)"

Have a simple, effective plan and follow it!

Case Study:



Tasmanian midlands research explores wool profit link to healthy native vegetation

Through *Land, Water & Wool* woolgrowers participate from the 'ground up' in identifying needs and issues, gaining relevant information and developing practical solutions to production issues and biodiversity conservation. In many cases, research is being trialled by woolgrowers, carried out on-farm or at demonstration sites where they can be closely involved.

One of the five *Land, Water & Wool* Native Vegetation & Biodiversity projects located in the Midlands of Tasmania, '*Biodiversity conservation integrated into sustainable grazing systems*', is responding to growers needs. This project is proving just how important native grasslands are to fine wool production.

The main trial plots for the study are situated in the Upper Macquarie Catchment area but investigations are also being carried out in other parts of the Midlands. Project Leader, University of Tasmania's Jamie Kirkpatrick, is working with local woolgrowers to conduct grazing trials (including set-stocking, rotational grazing and cell grazing systems) and to look at on-farm biodiversity throughout the region.

One of the farmers involved in the grazing trials is John Cameron of 'Charlton' at Ross. The research involves examining the impacts of a range of different grazing management strategies taking place on 'Charlton'.



Researchers Kevin Leeson (left) and Professor Jamie Kirkpatrick (right) are working with Midlands woolgrowers to investigate the potential and actual impacts on native pastures of different grazing strategies.

“A number of the world's biggest retailers of woollen garments are showing increased interest in using wool that is produced with minimal impact on the natural environment.”
Jamie Kirkpatrick, Tasmania

The Midlands is well-known for producing some of the world's most prestigious wool that can sell for record prices. Not so well-known is the fact that the wool-producing enterprises in the region use large areas of native vegetation that can be of high conservation significance. “The native grasslands are really important to fine wool production in Tasmania,” Jamie said.

“While there are many benefits of native grasslands, one of the disadvantages according to growers is that the carrying capacity of

“The native pastures are really important to fine wool production in Tasmania,” said Jamie.

“I think farmers are more environmentally aware, and want to make sure that the 'footprint of farming' on the landscape is sustainable,”

John Cameron,
Tasmania

native grasslands is low compared to improved grasslands. However, this can be offset by lower management costs.”

Furthermore, the project has found that many threatened native plant species including *Colobanthus curtisiae* (pictured below) and *Leucochrysum albicans* now rely on sheep grazing to maintain their habitat.

“One of the major priorities will be to communicate the economic and ecological value of the native vegetation to local woolgrowers,” Jamie said.

“A number of the world's biggest retailers of woollen garments are showing increased interest in using wool that is produced with minimal impact on the natural environment.”

Colobanthus curtisiae Photo courtesy: Hans and Annie Wapstra



Native Pastures: unlocking the hidden potential

Often native grasslands and pastures are found on land of low capability. Consequently they can run low levels of stock and return low levels of profit per hectare. However many of these pastures have hidden potential and some producers sustainably run higher stocking rates as a result of changes in management.

Long term productivity and sustainability of native pasture systems relies on maintaining the perennial grass component and increasing the contribution of desirable native species such as the year-long green Weeping Grass (*Microlaena*).

Few specific guidelines for the management of particular species are available because of the vast range of native grasses present in Australia and the various combinations that are found within a pasture.

There are some basic principles that apply to improving the productivity of most perennial species (native and introduced) and these principles can be applied to specific environments based on local experience.

Any change in practice will alter the balance of species in the sward. Evaluation of the impact of changed management practices will ensure long term productivity of the pasture is enhanced and maintained (refer to page 8, **Monitoring**).



Native Grasslands on the Southern Tablelands, NSW.
Photo courtesy: John Betts, Yass, NSW

"Our native pastures, when they are well managed, are by far the best pastures for producing quality superfine wool."

John Ive, "Talaheni", Yass
The Land Newspaper, 2003



What type of grazing system do I need?

Grazing systems

There are many approaches to managing stock grazing, but the most important aspects of any method are that it is based on the biology of both the pasture and the stock, is flexible, makes optimal use of the available water and prevents land degradation and loss of biodiversity.

The persistence of perennial pasture systems is largely dictated by the vigour and survival of individual plants between years. While important, seedling recruitment within a year is a minor component of resilience in a healthy perennial pasture system. It is important for plants to flower and set seed regularly to maintain a viable seed bank in the soil.

Native grasslands in their original state were grazed intermittently. Rest periods between repeat grazing of any pasture species allows root reserves to build up and increase plant vigour. Under continuous grazing at high stocking rates, there is a poor rebuilding of root reserves.

Set stocking or rotational grazing?

Over the last three years a series of trials in the Mid-North of South Australia demonstrated that it is possible to increase both the productivity and the sustainability of native pastures in that area by changing grazing management. The trials, funded by the SA Department of the Environment and the Natural Heritage Trust, have focussed on controlling grazing through increased subdivision and by rotating stock through smaller paddocks. Previously, sheep were set-stocked in paddocks most of the year.

Subdividing the paddocks removed selective grazing of species and prevented the over grazing of north facing slopes. The results of the trial (after two years) in November 2002 are shown in *Table 2*, below.

Apart from the control treatment (not stocked) the set-stocked treatment carried the least amount of stock and resulted in the largest proportion of bare ground. Rotationally grazing the paddocks for short periods of time resulted in a doubling of carrying capacity and in the least amount of bare ground. The native perennial grass component increased significantly under rotational grazing in this region.

This trial is being extended for another three years through the *Land, Water & Wool* Program and will examine both animal production and the contribution of the changed practices to farm profits. For further information about this project, order the fact sheet (product code: PF 040 787). See page 12 for details.

Table 2: High intensity, short duration grazing increases the carrying capacity and reduces the percentage of bare ground

source: Mid-North Grasslands Working Group, SA

Treatment	Average Stocking Rate (DSE/ha)	% Bare Ground
Not stocked	0	0%
Set stocked except rested in summer	2.5	42%
Set stocked except rested in summer and autumn	2.9	14%
Set stocked except rested in spring and summer	2.7	12%
High intensity, short duration rotational grazing	5.0	5%

Monitoring native pastures...

Monitoring

Because of the complexity and variation in native pasture systems, it is difficult to predict the outcome of management changes on pasture composition and productivity. It can also be difficult to separate seasonal effects from treatment effects. For this reason, a similar paddock run under current management should be used as a comparison with the paddock receiving the changed regime.



Monitor pasture composition by recording the species directly under the nail head from 50+ randomly chosen sites in a paddock.

Photo courtesy of MS&A

Steps to monitor your native pastures:

1. Seek local specialist advice to learn how to recognise desirable and undesirable species for your pasture type.
2. Establish a monitoring line (transect) in each paddock.
3. At the same time each year along the transect (at the point of least feed availability during the growing season) throw a pointed stick 50 – 100 times and record the species or the presence of bare ground at the end of the stick, each time it is thrown.
4. Compare the results with previous years to see if any changes have occurred. Look for changes in ground cover, and increases in either desirable or undesirable species.
5. Record grazing days achieved on each paddock during the year to identify the impact of management changes on productivity.
6. Modify management if necessary.

Fast Facts

Average annual rainfall: 769 mm

Area of native pastures: 3350 ha

Main enterprises: Fine wool (15.5-17.5 micron); Beef cattle

Stock numbers: 7000 Merino sheep and 650 breeding cows

Management approach: Planned grazing

Result: Quality fine wool and healthy profits

Tim and Karen Wright run the 3350 hectare 'Lana', located in the Northern Tablelands of NSW, which has a mixture of sown country that has reverted back to native species, cleared country that has been fertilised, as well as country that has had minimal development. The Wrights use a planned grazing approach based on holistic management guidelines, that involves intensive grazing with a high stock density for short graze periods, followed by long rest periods. Since introducing this approach in the early 1990's,



NO, DON'T FETCH THE STICK!

A good method of recording native species is to throw a pointed stick 50-100 times, each time recording the species at the end of the stick.

The role of soil fertility

Many native pastures have been fertilised in the past. A number of native grasses are responsive to increases in soil fertility and produce more dry matter when fertilised. Generally these responses are associated with increased feed quality and palatability but can also be associated with changes in the composition of the pasture with some loss of native species. Careful grazing management of fertilised native pastures is crucial if native grasses are to be maintained and to prevent the pasture becoming weedy and degraded.

A series of trials on native pastures in Tasmania found that the average production from native pastures more than doubled with the ongoing application of superphosphate, in combination with a once-off application of clover and molybdenum. Considerable variation in growth response was found between sites and years that was largely associated with variation in seasonal rainfall. It took three years for the fertilised treatment to break even financially with the unfertilised treatments, but over a 10 year period with normal seasons, the average gross margin per year from the fertilised paddocks were 60% higher than on the unfertilised pasture.

The encouragement of low to moderate levels of clover in many native pastures is seen by many producers as an important means of improving their native pasture productivity. The careful use of fertiliser to improve clover growth and provide nitrogen to the grasses can result in improved productivity. However, too much fertiliser can promote the growth of clover to the detriment of the native grasses. Thus professional advice needs to be sought about the correct application rates and ongoing grazing management.

Managing clover content

Maintain ground cover through to the autumn break. Sub-clover germinates best if there is bare ground at the opening rains. Sub-clover is also favoured by early breaks, so if paddocks are bared-off too early, clover dominance will be encouraged and the clover may out-compete the native species. Clovers do not like shading.

Rotationally graze

Provided pastures are grazed quickly and given sufficient time to recover, perennial components of the pasture will be favoured. Adopting a diversity of management approaches provides a diversity of habitats for native species.

Case Study:

Productive native pastures in the high and medium rainfall zones.

the Wrights have more time for family, friends and community; they are working to enhance their farm ecosystem's productivity and biodiversity; and their business profitability is improving.

Over the period 2000-2003, which included a severe drought, the gross margin figures per hectare at 'Lana' were within the range expected in NSW Agricultural budgets. By changing the management system to planned grazing, the Wrights have been able to reduce fertiliser applications by 70%, save money on supplementary feeding, and reduce

labour inputs and drenching and weed control costs. The income from wool has increased and costs of production have decreased in relative terms when compared to farm budgets during the farm's pasture improvement era in the 1980s. Tim and Karen have a large range of pasture species to work with, with native species comprising the vast bulk of the species mix.

In order to accommodate the planned grazing approach, 'Lana' has been subdivided into 240 paddocks of 10-25 ha each. Each paddock gets an average of eight days grazing

per annum, or two days grazing per season. The more paddocks, the more rest the pasture gets with added grazing flexibility. Cattle are an important component of the grazing management approach, which follows a 'leader-follower' system. By putting cattle ahead of the sheep in the grazing rotation, the cattle prepare the pasture and reduce the grass seed and parasite burden for the sheep.



CONCERNED ABOUT WATER QUALITY OR BIODIVERSITY ON YOUR FARM?

Order a copy of the River Management & Water Quality Guide or Native Vegetation & Biodiversity Guide. For details refer to page 12

Native pastures: benefits

Fire

Fire has been instrumental in the development of native grasslands and pastures. The diversity of these systems has been maintained by their intermittent burning.

No specific guidelines exist for the burning regime required by native pasture systems in the high and medium rainfall zones. Low intensity burns, where there is no risk of causing unplanned bush/grass fires, can be a useful tool to stimulate regrowth and the germination of some species. Fire should be used so that at any one time, a mosaic of burnt and unburnt areas is created.

Note that in some States, native pastures and grasslands have been legally defined and any management changes must comply with these legislative requirements. If unsure, seek local advice.

Native pastures have many benefits including:

- **good drought resistance**
- **many are summer growing, providing green pick in drier months**
- **most native grasses are perennial species which makes them ideal for areas prone to soil erosion**
- **tolerance to a range of adverse conditions including low nutrients, saline and acidic soils**
- **being 'environmental barometers' indicating changes in water tables, soil acidity, salinity and pest populations**
- **provide essential habitat for native plants and animals, many of which are in danger of extinction as their habitat has been significantly reduced**

[Envirocons Consulting 2003]

Acknowledgments

The Mid-North Grassland Working Group
Jann Williams, NRM Insights Pty Ltd
Jim Shovelton, MS&A
Triple P Program Participants
Fleur Flanery, Land & Water Australia



the wool industry making the right connections

The national Land, Water & Wool initiative is bringing woolgrowers and researchers together to help ensure viable, practical and beneficial solutions for natural resource management on farm are developed.

Land, Water & Wool is the only national initiative that addresses the productive management of land and water specifically for - and involving - woolgrowers. It is a joint investment between the wool industry's peak research and development body, Australian Wool Innovation Limited, and the nation's premier investor in natural resource management research, Land & Water Australia. The program works closely with

woolgrowers and key influencers, advisory agencies and organisations within the wool industry, to help them manage their natural resources for sustainability and profitability.

Managing Native Vegetation and Biodiversity is one of the seven sub-programs under *Land, Water & Wool* (see www.landwaterwool.gov.au for details). The sub-program recognises that native pastures and other types of vegetation are an important part of our natural environment as well as being important for wool production. For example, 17 million hectares of land is used for wool production in the high rainfall and sheep-cereal zones, which the sub-program focuses on.



KEY POINTS

- **Native pastures are a valuable resource for woolgrowers. Maintaining the perennial components in a native pasture can contribute to improved tensile strength of wool and assist in the control of acidity and dryland salinity.**
- **Strategic grazing and the careful use of fertiliser can significantly improve the profitability of these pasture systems. High rates of fertiliser or inappropriate grazing can reduce the contribution from valuable native grasses.**
- **Woolgrowers need to be aware of their legal responsibilities when modifying management on their native pastures and grasslands.**



Delivery Address
GPO Box 2182
CANBERRA ACT 2601



no postage stamp
required if posted
in Australia



Land & Water Australia
Reply Paid 2182
CANBERRA ACT 2601





Woolgrowers manage more than 85 million hectares of the Australian continent from the high rainfall areas to the wheat/sheep belt and pastoral zone.¹

More than three quarters (77 per cent) of all woolgrowers have areas of native bush, scrub or native grasslands on their properties, according to a national survey of 1500 woolgrowers².

The Land, Water & Wool³ Native Vegetation and Biodiversity sub-program aims to support these woolgrowers find the balance between production and biodiversity outcomes on their farm.

1. National Land & Water Resources Atlas

2. Land, Water & Wool Best Practice Survey 2003

Order information about other

Land, Water & Wool projects and products:



Order by telephone
Freecall 1800 776 616
or telephone (02) 6293 8383.



Order online
Search our online catalogue at www.lwa.gov.au and follow the link to 'Our Products', where you can either order online or print an order form.



or post to:
CanPrint Communications
PO Box 7456
Canberra MC
ACT 2610

³*Land, Water & Wool* is a joint investment between the wool industry's peak research and development body, Australian Wool Innovation Limited, and the nation's premier investor in natural resource management research, Land & Water Australia.

PX-030-509

Further information

The Native Vegetation and Biodiversity sub-program of *Land, Water & Wool* has five major regional projects that are bringing woolgrowers and researchers together. The contact in your State is:

SA
Kylie Nicholls
Full Bottle Media
t (08) 8842 3275
e fullbottlemedia@rbe.net.au

South East QLD
Charlie Zammit
Uni. of Southern Queensland
t (07) 4631 5578
e zammit@usq.edu.au

VIC
Jim Moll
Dept of Sustainability & Environment (DSE)
t (03) 5761 1619
e jim.moll@dse.vic.gov.au

Northern NSW
Nick Reid
Uni. of New England
t (02) 6773 2759
e nrei3@metz.une.edu.au

TAS
Jamie Kirkpatrick
Uni. of Tasmania
t (03) 6226 2460
e j.kirkpatrick@utas.edu.au

Land, Water & Wool Native Vegetation & Biodiversity National Coordinator

Jann Williams
Tel: (03) 5444 0248
Email: jann.williams@lwa.gov.au

Communication

Fleur Flanery
Tel: (02) 6263 6020
Email: fleur.flanery@lwa.gov.au

Land, Water & Wool Native Vegetation & Biodiversity is supported by:



Productive natural resource management – how to get involved

Register with Land, Water & Wool now to find out more about productive natural resource management on your farm. Once complete, please detach and mail this form to Land, Water & Wool. Postage is free.

Please send me information about the following Land, Water & Wool research priorities :

- Sustainable Grazing on Saline Lands (SGSL)
- Managing climate variability
- River management and water quality
- Native vegetation and biodiversity
- Managing pastoral country
- Benchmarking
- Future Woolscales

Please make me a FREE subscriber to the following publications:

- SALT Magazine (case studies of Australians managing dryland salinity)
- Focus on Salt (update of Salinity Program and partner research and development)
- RipRap (River management research and development newsletter)
- Climag (Climate management research and development newsletter)
- Thinking Bush (Native vegetation management research and development newsletter)

I would prefer to receive information from Land, Water & Wool in the following way/s:

- Publications
- Newsletter/updates
- CD-ROM
- E-mail
- Web-site (www.landwaterwool.gov.au)
- Workshop/seminar in your region
- Other (Please call)

my interests

my details

Name: _____
 Company/trading name: _____
 Address: _____
 Town: _____ State: _____ Postcode: _____
 Phone: _____ Fax: _____
 E-mail: _____

Are you a member of a natural resource management or production group?
 No Yes Group name: _____

my input

Land, Water & Wool is currently investing in the development of innovative R&D projects and training activities to help Australia's wool industry improve on-farm production and also the health of the land and water resources that underpin wool production businesses.

We want to hear from you! If you have an idea for cutting-edge wool management options and production systems, please contact us.

Contact Land, Water & Wool
 Communication: Fleur Flanery
 GPO Box 2182 CANBERRA ACT 2601
 Tel: (02) 6263 6020
www.landwaterwool.gov.au