

managing
native vegetation
and biodiversity



Insights

Case studies on how woolgrowers
are successfully managing native
vegetation and biodiversity for
profit and sustainability



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Introduction and Acknowledgements

A national survey has found that of the woolgrowers who have native vegetation on their farm, nearly 70 per cent believe it is useful for production. The main benefits identified were the provision of shelter and stock feed. Other benefits identified with native vegetation in the survey include the control of pests, erosion and salinity and providing corridors for wildlife.

The aesthetic value of native vegetation and biodiversity is harder to put a finger on, but increased property values have been reported by several farmers with native vegetation on their properties. The broad range of benefits and values associated with native vegetation and biodiversity reflects the diverse role that they play in farming systems.

This publication profiles how 10 woolgrowers in south-eastern Australia are managing their native vegetation and biodiversity for productivity, amenity and conservation. While profitability is an important aspect of the way the case study growers run their farm businesses, it is not the only consideration leading to an investment of time and resources into improving their native vegetation.

As a group, the case study growers derive a high level of satisfaction and personal pride from improving the health, productivity and visual appeal of their properties. It is inspiring what these 10 growers have done to integrate native vegetation into their farming systems, and to provide such practical leadership. The diversity of enterprises involved, and the innovative approaches taken, demonstrate that there are a number of options available. The importance of farm planning and setting goals is also apparent.

If you are interested in the management of native vegetation as part of a profitable grazing enterprise, this is a 'must read' - I was truly enlightened by their stories, and I think you will be too!

The case studies were developed as part of the Native Vegetation and Biodiversity Sub-program of Land, Water & Wool, which 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. It is the only national initiative that addresses the productive management of land and water resources specifically for woolgrowers. Native Vegetation and Biodiversity is the second largest of the seven Land, Water & Wool sub-programs and aims to support woolgrowers who utilise native vegetation as part of their wool production systems.

The Native Vegetation and Biodiversity Sub-program was established to develop, test and promote options for integrating wool production and the protection, management and restoration of native vegetation and its associated biodiversity. This is being achieved through a combination of activities that will help livestock producers better understand and manage their native vegetation:

- Improved knowledge of the impact of grazing systems on native vegetation (including native pastures and bushland) and its associated biodiversity at a number of scales;
- Development of best-practice management guidelines for managing native pastures and bushland in wool production landscapes in the high rainfall and sheep-cereal zones;
- Input into the development of accreditation schemes for 'environmentally friendly' wool growers;
- Development of incentive mechanisms to encourage public and private investment in biodiversity conservation on sheep-grazing properties; and
- Provision of authoritative data to support the environmental credentials of the wool industry.

The following partners give unstinting and ongoing support to the Native Vegetation and Biodiversity Sub-program: The University of New England, the Southern New England Landcare Committee (NSW), the Mid-North Grasslands Working Group (SA), the University of Tasmania, the Department of Primary Industries, Water and the Environment (Tasmania), the Department of Sustainability and Environment (Victoria), the University of Southern Queensland, the Traprock Wool Association and the Queensland Murray Darling Committee.

The Native Vegetation and Biodiversity Sub-program is developing a range of publications, such as Insights, to ensure this vital information about understanding and managing native vegetation is shared with the widest possible audience. It is a tribute to the enthusiasm and commitment of the case study growers that they have given their time and their stories to share with others involved with the wool industry. Many of the growers already give several days a year voluntarily to field days, meetings and conferences and they are a source of inspiration to us all. My sincere thanks goes to them all.

The case studies come from a range of sources. Four of them were collected by a project team led by Rod Safstrom and ably supported by John Powell (NSW), Darrell Brewin (Victoria), Peter Wylie (Queensland) and Bob Hall (Western Australia). The other six case studies came from the regional projects in the Native Vegetation and Biodiversity Sub-program. These projects have brought woolgrowers and researchers together to better understand the role of native vegetation and biodiversity in profitable wool production systems. Thanks to all of those people involved in these projects. Kim Mitchell and Jane Thomas from Currie Communications did a great job assisting with the editing and coordinating production of this publication, making it a pleasure to look at and read.

Dr Jann Williams
Native Vegetation and Biodiversity National Coordinator
August 2005

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Case 1

Thinking outside the square at 'Winona'

Colin and Jason Seis
'Winona' Gulgong, NSW



According to Colin Seis "costs associated with protecting remnant woody vegetation are minimal when compared to the biodiversity and stock protection gains that are achieved on it."

Photo credit: The Land Newspaper / Colin Seis

Business Profile

LOCATION: Talbragar River catchment, Central West NSW

AREA: 840 ha

MEAN ANNUAL RAINFALL: 650 mm

ENTERPRISES: Mixed grazing - fine wool Merinos, Merino stud, cereal crops

LANDFORM AND SOIL TYPES: Undulating to hilly; soils are well-structured eucrozems trending to non-calcic brown soils on basalt parent materials. Earthy sands have formed on granites with yellow sodic soils in drainage lines.

Key points

- Since developing and implementing a low-input cropping system called pasture cropping, crop harvests have been good with yields average for the district and a significant increase of yield of up to 30 per cent where the crops are sown into thicker areas of native perennial grass.
- Under a pulsed grazing method of managing sheep and without the addition of any fertilisers, the clovers and perennial native grass have become healthier and produced more leaf. It was found that the clovers were responding to an improvement in soil health by way of a large increase in soil microbes and humus.
- An independent survey estimated that their gross margin across the whole farm in 2002 was 25 per cent higher than the district average where farmers were using improved pastures and conventional cropping on similar country.

'Winona' and its history

'Winona', an 840 hectare property located in the Talbragar River catchment in Central West NSW, has been in the Seis family for five generations.

Originally the arable land on 'Winona' was lightly timbered grassland with an average tree density of three to seven stems per ha. However, by the mid 1940s, 'Winona' was almost fully cleared of trees.

"...The main benefit of native pastures is increased profitability, principally due to savings of up to \$20,000 per year on fertiliser. The owners estimate that their gross margin across the whole farm in 2002 was \$167/ha - 25 per cent higher than the district average..."

In the 1950s, sub-clover pastures formed the basis of a very profitable wool production enterprise and by 1970 all of 'Winona' had been sown to sub-clover and ryegrass. Pastures were being annually fertilised with superphosphate.

Today, 'Winona' is predominantly a grazing property, although up to 200 ha is sown to oats and cereal rye each year in an innovative pasture cropping system. Some of the crops are used to fill the winter feed gap for livestock on the property.

Jason and Colin Seis run a closed Merino stud and commercial flock comprising approximately 3500 ewes and up to 500 wethers. The ewes cut an average 6 kg fleece of less than 19 micron greasy wool.

Due to substantial pasture cultivation in the past on 'Winona', remnant woody vegetation on the property is limited. Remnant native trees include white box (*Eucalyptus albens*), yellow box (*E. melliodora*), ironbark spp., stringybark spp., Blakey's red gum (*E. blakelyi*), scribbly gum (*E. sclerophylla*), and slaty gum (*E. glaucina*). Understorey species include *Casuarina*/*Allocasuarina* spp. and *Grevillea* spp. Timbered hills have been fenced off and the balance of the property has been strategically revegetated with a mix of local eucalypt and understorey species.

Native grasses that have re-colonised over a 20-year period of careful management include red grass (*Bothriochloa macra*), wallaby grasses (*Danthonia*



The current Seis generation has developed systems that are positively impacting on the property - both financially and environmentally, thus ensuring its future.
Photo credit: Colin Seis

spp.), weeping grass (*Microlaena* spp.), *Paspalum* spp. and speargrass (*Stipa* spp.). Sub-clover and naturalised annuals comprise 20 percent of the pasture mix.

Innovative grazing management

A major bushfire in 1979 coupled with the cost-price squeeze affecting wool production on improved pastures and an emerging land degradation problem was the catalyst for development of a low-input grazing management system.

This system was based on the belief that native pastures that were not phosphate-dependent would return in time and that due to lower input costs, gross margins would improve. Native pastures would also help control salinity and the other land degradation problems.

Ten years later the Seis family found most of the desirable native grasses had returned.

In the early 1990s, Colin and Jason began to put sheep together into larger mobs and started a 'pulsed' grazing method of managing sheep.

During this time, pasture growth continued to improve, and species continued to diversify. Without the addition of any fertilisers, the native grass and clovers became healthier and produced more leaf. It was found that the clovers were responding to an improvement in soil health by way of a large increase in soil microbes and humus.

In 1992 the Seis family sowed a crop of oats into a red grass pasture, with a zero fill seeder.

Encouraged by its success, oats were then sown into pastures that consisted of a mixture of about 40 per cent red grass with the remainder comprising annual plants such as saffron thistle (*Carthamus lanatus*), *Vulpia* spp., ryegrass (*Lolium* spp.) and sub-clover. A mob of sheep was used to reduce the bulk of grass in the paddock.

The sheep also controlled weeds, opened the canopy of grasses - allowing sunlight to the ground - and importantly, mulched the grass into the ground,

feeding soil microbes whilst conserving soil moisture. Since implementing this method, crop harvests have been good with yields average for the district. Interestingly, there is a significant increase of yield of up to 30 per cent where the crops are sown into thicker areas of native perennial grass. It has been found that one of the greatest benefits of pasture cropping is the stimulation of the numbers and diversity of native perennial pastures.

Cost benefits of managing native vegetation

According to Colin and Jason the main benefit of native pastures is increased profitability, principally due to savings of up to \$20,000 per year on fertiliser. The owners estimate that their gross margin across the whole farm in 2002 was \$167/ha - 25 per cent higher than the district average where farmers were using improved pastures and conventional cropping on similar country.

Costs associated with protecting remnant woody vegetation are minimal when compared to the biodiversity and stock protection gains that are achieved on it.

Planning for the future

Present management of 'Winona' is focused on maximising the profitability of wool and stud sheep production on native pastures, while improving 'Winona's' contribution to catchment health targets set out in the Central West Catchment Blueprint.

In the short-term, the owners of 'Winona' are aiming to improve crop yields, increase sheep numbers, and increase the area cropped to accelerate the rate of native pasture development.

To date, all woody remnants have been fenced out and are managed for conservation outcomes. The overall goal is to improve the ecological health of the remnant woodlands, while improving the productivity and sustainability of the native pastures.

Farming on 'Winona' has been a 'work in progress' for five 'Seis' generations with each developing systems that best coped with Australia's low fertility soils and unreliable rainfall while generating sufficient income.

Realising the 'pasture improvement' system of expensive fertilisers that had been in place for 50 years was no longer viable, the current Seis generation has developed systems that are positively impacting on the property - both financially and environmentally - thus ensuring its future.

Colin Seis was the 2005 winner of the Central NSW Conservation Farmer of the Year Award.



Case 2

Wool's environmental renaissance at 'Stillwater'

Robert and Robyn Lance and Shirley Ford
'Stillwater' Yarra, via Goulburn, NSW



Robert Lance inspecting a silvertop ash/scribbly gum (*Eucalyptus seiberi*/*E. rossii*) remnant at "Stillwater" Collector, NSW.
Photo credit: John Powell.

Business Profile

LOCATION: Yarra, via Goulburn, New South Wales

AREA: 521 ha

MEAN ANNUAL RAINFALL: 725 mm

ENTERPRISES: Mixed grazing – Merinos and Murray Grey cattle

LANDFORM AND SOIL TYPES: Undulating with major drainage lines on either side of a central hill. Soils are fragile and typically infertile podsolic or solodic sandy loams; acidic and subject to waterlogging in winter. Small area of alluvial soils on creek flats.

Key points

- The productivity of native and sown pastures has doubled since 1984.
- Since 1983 the visual appearance of 'Stillwater' has improved dramatically with tree cover has increased from about five per cent to 25 per cent.
- The benefits of fencing off the remnant vegetation are better grazing control and the 'ecosystem services' provided to the entire property.
- The health of old remnant gums has improved after fencing.

The farm

'Stillwater', once owned by the family of Miles Franklin, is a 521 hectare grazing property located near Goulburn in NSW and has been run by Robert and Robyn Lance and Shirley Ford since 1983.

'Stillwater' was first cleared in the 1830s. Following initial clearing and development of the property, only about five per cent of the original timber remained.

As a result of the drought of the early 1900s, the farm layout changed dramatically, with the small paddocks on the creek flats giving way to extensive paddocks. The grazing pattern, which persisted for about 50 years, led to overgrazing of the hills and undergrazing of the flats.

'The productivity of native and sown pastures has improved dramatically, from an estimated five dry sheep equivalents (DSE) per hectare in 1984 to 10/DSE/ha in 2002.'

From about 1950 until the late 1970s, there was extensive cropping on 'Stillwater' due to the improved profit margins for cropping compared with livestock.

Due to the improved pasture history on 'Stillwater', in 1983 its native pasture base was limited. While some wallaby grass (*Danthonia* spp.), wiregrass (*Aristida* spp.) and small patches of weeping grass (*Microlaena* spp.) remained, weeds and naturalized annuals predominated.

On purchase of the property in 1983, the current owners classed their property in line with the NSW Agriculture land capability classification. Land classes for 'Stillwater' range from Class 4 to Class 6. Class 4 land is considered not suited to regular cropping due to poorly structured texture contrast soils and Class 6 land is considered not capable of cultivation because of shallow infertile soils, waterlogging, salinity, slope, wind or water erosion hazard, or rock.

Today 'Stillwater' runs a Merino flock of up to 2500 Hazeldean-blood sheep. A mob of elite 200 ewes is joined to high quality Hazeldean stud rams to breed commercial rams.

'Stillwater' also runs about 120 Murray Grey cattle, comprising about 60 breeders and replacement heifers and their progeny. Progeny are sold at about 12 months of age.

A plan for a healthy productive farm

On purchasing the property, Robert and Robyn Lance and Shirley Ford developed a farm plan based on fencing and land management according to land



The plan comes to life

The present owners are also committed to enhancing remnant vegetation, especially on the central hill. The hill is seen to have a major influence on pastures on either side of it, and hence they see value in the 'ecosystem services' that it provides.

Benefits and costs of managing native vegetation

Since 1983, the visual appearance and productivity of 'Stillwater' has improved dramatically, with a much better balance of healthy trees and productive pastures. Tree cover has increased from about five per cent to 25 per cent.

The productivity of native and sown pastures has also improved dramatically, from an estimated five dry sheep equivalents (DSE) per hectare in 1984 to 10/DSE/ha in 2002.

The benefits of fencing off the remnant vegetation are better grazing control and the 'ecosystem services' provided to the entire property. While the owners believe they lost up to 150 DSEs in carrying capacity due to their remnant vegetation enhancement program, this loss has been more than offset by improved carrying capacity on the remainder of the property.

Under current ownership, implementation of the farm plan was initially subsidised by off-farm income. However, in recent years, as carrying capacity and profitability have increased, the farm plan is being implemented using only income generated by the farm.

A work-in-progress

The process employed by the Lances at 'Stillwater' has meant taking a fresh look at the landscape and trying to recognise the limitations and opportunities it has to offer. It is an ongoing process that may take 50 years.

According to the Lances, previous owners of 'Stillwater' asked too much of the lighter country, and not enough of the heavier country. By recognising landscape diversity and implementing a long term plan, the present owners are taking positive steps towards the productivity and sustainability of their property.

Overview

Total area withdrawn from grazing to date	52 ha
Total area still to be withdrawn as per plan	23 ha
Area sown or about to be sown to pines	14 ha
Other regeneration areas occasionally grazed but not to be withdrawn	20 ha
Av wool cut /head 2001-2002 hoggets and above	5.9 kg
Micron adult main line	20.6
Micron hoggets	19.5

Class - the heavier Class 4 country would be used more intensively, and the lighter Class 5 and 6 country less so.

After 20 years, the owners consider the plan about 70 per cent implemented but believe it may take another 20-30 years to get the property up to a healthy productive state.

Land Class 4 on the creek flats is being progressively re-sown to a new improved pasture mix including ryegrass (*Lolium* spp.), tall fescue (*Festuca arundinacea*), cocksfoot (*Dactylis glomerata*) and phalaris (*Phalaris* spp.).

Land Class 5 areas with some desirable native grasses are sprayed with low rates of Sprayseed or Gramoxone and direct drilled with ryegrass, cocksfoot and sub-clover. This creates a good balance of native and introduced species which persist into dry summers and autumns and provide improved production for spring lambing.

Some areas of land Class 5 that have patches of regenerating timber are being progressively fenced off. They will be grazed lightly to generate some income while improving their conservation values.

The better areas of land Class 6 are being retained under native wallaby grass weeping grass pasture and sub-clover. With careful grazing management these pastures are increasing in density and providing reasonable levels of production, good ground cover to prevent erosion and generating good quality run-off water.

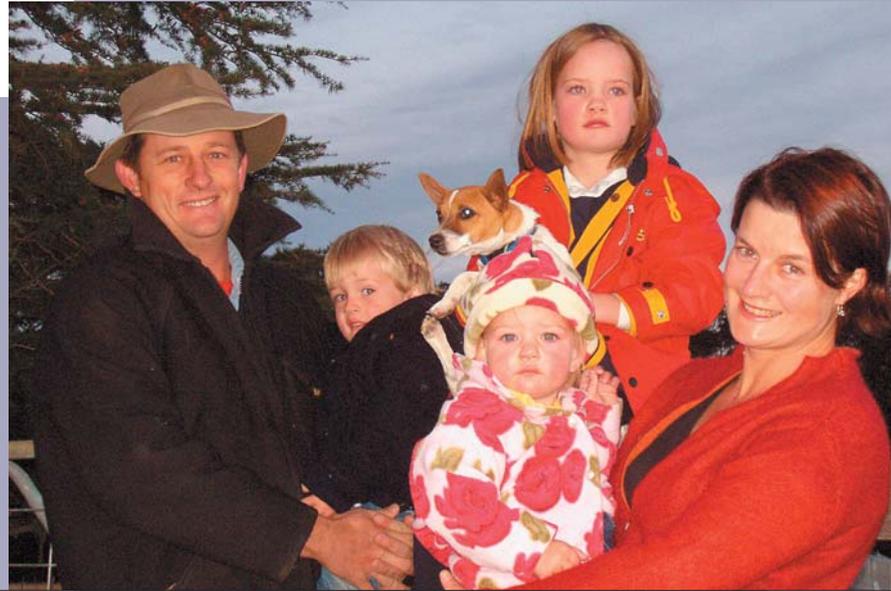
The less productive parts of land Class 6 are being left in remnant timber (predominantly silvertop ash (*Eucalyptus sieberi*), scribbly gum (*E. sclerophylla*) or broad leaved peppermint (*E. dives*), allowed to regenerate as native bush, or revegetated with native or introduced tree species. Several areas of radiata pine (*Pinus radiata*) have been established.



Case 3

The financial and environmental value of biodiversity

Rob and Annabel Dulhunty
'Nant Lodge' Glen Innes, NSW



The Dulhuntys have used a combination of improved natural resource management and productivity gains to turn their business around.
Photo credit: Kären Forge

Business Profile

LOCATION: Glen Innes, New England Tablelands, NSW

AREA: 'Nant Lodge' – 247 ha; 'Hillside' – 630 ha;
'White Rock' – 420 ha

MEAN ANNUAL RAINFALL: between 865 mm and 965 mm

ENTERPRISES: Stud and commercial fine wool Merino flock; beef cattle fattening

LANDFORM AND SOIL TYPES: 'Nant Lodge' – heavy black/brown basalt cracking clay flats with low slopes of red/brown basalt loams and ironstone ridges; 'Hillside' – red/brown stoney basalt hill country and black/brown basalt clay flats; 'White Rock' – red/brown stoney basalt hill country with black/brown clays along the gully

Key points

- Financially the Dulhuntys have turned their business around, expanded the operation and achieved a high level of productivity despite two major droughts in 10 years.
- Thirty thousand native trees and shrubs are re-creating a milder, more productive tree and shrub microenvironment which is attracting wildlife and native birds back.
- By undertaking Landcare works, the tax advantages, coupled with funding assistance, means that only 20 per cent of outlays on improvements are a real cost.

The farm

In a few short years Rob and Annabel Dulhunty have transformed their 247 ha property, 'Nant Lodge', near Glenn Innes in NSW into an award-winning profitable, biodiverse farm.

'Nant Lodge' is situated on the floor of the Furracabad Valley. Heavy black soil flats along the creek are bounded by lighter ironstone basalt and grey clay low slopes and ridges. Different parts of 'Nant Lodge' were once used for dairy, vegetables and an orchard prior to Rob's father purchasing it in 1968.

"The bottom line is that I only spend money on things that I think are going to improve my productivity."

Rob Dulhunty, 'Nant Lodge', Glen Innes.

The Dulhuntys' two other properties are located to the west of 'Nant Lodge'.

'Hillside' is 630 ha, with basalt flat-tops, rocky drop-offs, and undulating valleys and hills. Rob's father cleared 'Hillside' but left scattered trees including 35 ha of yellow box woodland, 125 ha of white gum open forest, and understory shrubs.

'White Rock' is 420 ha and well-timbered, fertile, basalt hill country. Forty-five percent is uncleared and most of the remainder is native pasture. The dominant tree species is white gum, with patches of shrubs on the steeper country.

Rob and Annabel manage an unregistered Merino stud of 500 ewes. They also have cattle with up to 600 weaner calves (150-250 kg) bought between March and June. They are sold 9-12 months later, around 200- 250 kg heavier, as new young cattle are purchased.

Rob also runs about 20 cows on 'Nant Lodge' to manage rank pasture in special areas.

Property planning

When Rob returned to 'Nant Lodge' in 1989, the pastures had not been renovated for some time, and the cropping soils had a long history of being 'farmed to death'. There was not a native tree on the property.

'Hillside' was very different. Rob's father had cleared the flatter areas but left scattered trees on the gentler slopes, with dense clumps on the flat-tops and drop-offs. Most of the timber on the steeper rocky basalt drop-offs remained.



Establishment of tree corridors throughout the property has attracted wildlife and beneficial native birds.

“‘Hillside’ demonstrated the productive capacity of a healthy resource base, providing inspiration to address resource base decline,” says Rob.

Realising a major capital works program was required to bring ‘Nant Lodge’ back into full production, Rob and Annabel took the opportunity to study property planning.

They then re-designed the infrastructure and livestock enterprises from scratch. After seven years, they have completed most of the redevelopment of ‘Nant Lodge’ and have made a start on ‘Hillside’.

On ‘Nant Lodge’, the property has been entirely re-fenced to accommodate rotational grazing, fence out the riparian zone, introduce a laneway and plant shelterbelts.

They have also implemented a soil rejuvenation program, using a cropping phase to restore soil organic matter and structure before sowing down perennial pastures.

On ‘Hillside’, the farm water supply/wetland has been constructed, and pipelines installed. Rob is currently drawing up the re-fencing plan.

Smart grazing management

The re-fencing of ‘Nant Lodge’ into 15 ha paddocks with a laneway has facilitated rotational grazing.

Where possible, Rob grazes different mobs in a short-duration, high-density grazing rotation with long rests. He avoids grazing by the calendar or to a set pattern, varying the rotation according to season, pasture growth and livestock needs.

Rotational grazing with large mobs means demand for water is high. This, coupled with two major droughts since 1994, has motivated Rob to implement water and drought strategies as part of his farm plan.

As part of this plan, a water supply and wetland has been constructed by damming and fencing out 6.5 ha of an eroding gully system. The sides have been revegetated with native trees and shrubs, and the reservoir engineered to provide multiple water levels

for aquatic fauna and flora in addition to a deep hole for farm water purposes.

Landscape repair

About 17 per cent of ‘Nant Lodge’ is managed for outcomes other than productive pasture. This area includes the riparian zone, farm water supply and wetland, aerodrome, tree corridors, block plantings, driveway, homestead, outbuildings, shearing shed and associated yards.

Rob and Annabel have planted 30,000 native trees and shrubs in 9.5 km of tree corridors in the 10 years since 1994, in an attempt to re-create a milder, more productive tree and shrub microenvironment. This environment is attracting wildlife and native birds back.

Financial sense

Business planning is one of Rob’s strengths and he looks at the economic or production value of everything and how it fits with his vision.

“Undertaking Landcare works makes financial sense. The tax advantages, coupled with funding assistance, means that only 20 per cent of outlays on improvements are a real cost. The increased capital value of the property alone means I am ahead, even assuming no production gains result,” says Rob.

“But, while it’s hard to calculate the dollar benefits, I think there are production gains from fencing off water storages and reticulating clean water to stock, subdividing paddocks, grazing rotationally, and establishing shelter belts that double as biodiversity corridors.

“The bottom line is that I only spend money on things that I think are going to improve my productivity.”

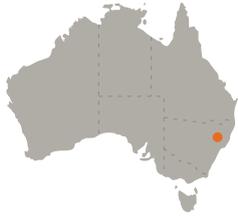
Over the years Rob and Annabel have transformed ‘Nant Lodge’ into an award-winning farm. Their ambitious redevelopment program has cost about \$400,000 in the 10 years since 1994, but the benefits are already clear to see.

Financially they have turned their business around, expanded the operation, developed a Merino stud, diversified their investments base and achieved a high level of productivity despite two major droughts in 10 years.

Environmentally they have restored shade, shelter and healthy aquatic ecosystems to ‘Nant Lodge’.

“There’s been a huge difference in productivity and efficiency, the place is a pleasure to run now,” says Rob.

‘Nant Lodge’ is part of the Land, Water & Wool NSW Northern Tablelands project.



Case 4

A holistic solution for fine wool and healthy profits

Tim and Karen Wright
'Lana' Uralla, NSW



Tim and Karen Wright are endeavouring to manage the whole ecosystem on 'Lana'.

Photo credit: Kären Forge

Business Profile

LOCATION: Uralla, New England Tablelands, NSW

AREA: 'Lana' – 3350 ha; 'Kasamanca' – 780 ha

MEAN ANNUAL RAINFALL: 769 mm

ENTERPRISES: Fine wool Merinos (15.5-17.5 micron); beef cattle

LANDFORM AND SOIL TYPES: Coarse and fine granites

Key points

- The financial success of the Wright's operation is evident in their gross margins - even in the drought year of 2002, they achieved healthy results.
- The Wrights use 'strategic rest from grazing' to enhance the environment so 95 per cent of the property is in recovery mode at any one time.
- The cost of fencing and water per acre was about the same as a hundred weight of superphosphate, with a much better return.

Management history on 'Lana'

Tim and Karen breed easy-care, low cost Merino sheep of good constitution based on fine to superfine Merryville and Lorelmo (poll) bloodlines.

"We have easy-care sheep – the ewes and wethers never get jetted – and we only drench once or twice a year. This means the cost of production is very low," says Tim.

Tim's father, Peter Wright, took over Lana in 1952. In the mid-1960s, Peter began pasture improvement. About 20 per cent of the property closest to the homestead and woolshed was cleared or thinned and sown with pasture during the 25 years to 1990.

The whole property was aerially supered and seeded from about 1960.

"We sowed fodder crops of oats under-sown with vetch or a cocktail of pasture species including sub

"Native vegetation is 100 percent important... we manage for biodiversity because it gives us a better balance - more is good."

Tim Wright, 'Lana', Uralla.

and white clover, fescue, phalaris, ryegrass and red clover," says Tim.

"Using pasture improvement like this, we lifted our stock numbers from 7000 DSE in 1980 to 20,000 DSE in 1991. We used to slowly rotate stock: two months in, two weeks rest, then back in again."

Resource issues & problems

The problem was that this form of management barely broke even over five years after 'improving' a paddock. "After the 1981 and 1994 droughts, the lowest yielding paddocks were the sown paddocks, and the land suffered," says Tim.

Under the old management regime of spring burning for green pick, wiregrass or speargrass (*Aristida ramosa*) flourished, and it continued to be a problem in the uncultivated country. Pasture problems such as pinrush (*Juncus* spp) increased in the 1980s, as the country was more intensively used. The sown country all reverted back to native species which, in retrospect, was a blessing.

By 1990, motivated to lower the cost of production and better utilise the grazing animal, Tim and Karen decided that something had to change.

A time for change

Having experimented with cell grazing between 1991 and 1993, Tim moved to planned grazing in 1995.

With planned grazing, stock numbers have been maintained, with only one-third the fertiliser inputs of the 1980s.



*Trees are important for stock shade and shelter on 'Lana'.
Photo credit: Nick Reid*

Planned grazing is based on holistic management guidelines and involves intensive grazing with a high stock density for short graze periods followed by long rest periods.

"We manage the whole ecosystem, using the livestock as 'tools'. We use 'strategic rest from grazing' to enhance the environment so 95 per cent of the property is in recovery mode at any one time," says Tim.

Their 'holistic goal' is as follows:

"We aim to develop and maintain our property as an ecologically balanced environment. We also aim for a chemical-free product. By doing this we believe our production enterprises will be healthier and more cost efficient leading to healthier profits for the future and improving human health. We endeavour to expand the horizons for both ourselves and the community."

A fencing and stock water plan

The change to planned grazing on 'Lana' involved a new fencing and stock water plan with some major outlays.

The re-fencing program was funded by reducing other costs, such as fertiliser and hay, and abandoning pasture sowing and renovation. The bulk of the fencing and installation of new stock water sources was done over six years. Tim achieved a 100 per cent return on capital over two years, through the reduction of vegetable matter in the wool. The cost of fencing and water per acre was about the same as a hundred weight of superphosphate, with a much better return.

Financial advantages

Wool income for the Wrights has increased and the costs of production have decreased when compared to costs during pasture improvement.

"We operate a low-input system now. Our main inputs are fencing and the labour involved in general maintenance," says Tim.

"We now use contract labour only two days per week, we are not drenching as much, we are not sowing pastures anymore, and we're not spraying weeds as much."

The financial success of the Wright's operation is evident in their gross margins during the past three years. Even in the drought year of 2002, they achieved healthy gross margins.

Benefits to the land

"In 2002, we had 398 mm of rain, the lowest rainfall on record, yet the stock we have been able to carry has been phenomenal. And the biggest winner has been the land. There's more groundcover in these old sown paddocks than there was after sowing them," says Tim.

"The sheep camps used to be pinrush and thistle. Now the grasses beat the weeds."

One-third of 'Lana' consists of belts of dense timber and forested hills, which is valuable for winter stock shelter and an important part of the carrying capacity of 'Lana'.

"Trees are important for stock shade and shelter. The shade is very important to reduce stress in summer, and the milder temperatures beneath trees in winter keep the grass green," says Tim.

Tim and Karen are interested in maintaining and developing timber corridors right across 'Lana'.

"Corridors are primarily important to us for shelter. They also increase the value of the land, and help the wildlife move to all parts of the property."

The Wrights have maintained the Wildlife Refuge status of 'Lana' that Tim's father obtained in the 1960s. Today the wildlife on 'Lana' includes platypus, abundant birdlife, koalas, wallabies, echidnas and the straw-necked ibis.

"The whole property is a wildlife refuge — it's basically all natural, except for an area cleared for the airstrip."

'Lana' is part of the Land, Water & Wool NSW Northern Tablelands project.



Peter Waldron in a recently established line of native trees (with established trees in the background).

Case 5

Benefits of biodiversity not just measured by improved profits

Peter and Julie Waldren
'Willandra' Melville Forest, VIC



Business Profile

LOCATION: Dundas Tablelands, Western Victoria

AREA: 426 ha

MEAN ANNUAL RAINFALL: 650 mm

ENTERPRISES: Mixed grazing - fine wool Merinos, cross-bred lambs, beef cattle

LANDFORM AND SOIL TYPES: Undulating; gravelly loams over clay on ridges and slopes; light, poorly structured soils on drainage lines

Key points

- With up to eight per cent of the previously grazed area now fenced and revegetated with trees, the property continues to produce more kilograms of wool and meat than ever before.
- Land class fencing has provided better pasture and stock management.
- Tree and understorey planting has resulted in more paddocks, and healthier remnant redgums.

The farm

Peter and Julie Waldron's family has managed their 426-hectare grazing property 'Willandra' at Melville Forest in western Victoria since 1928.

The sheep enterprise comprises a self-replacing flock of up to 1500 Merino ewes, 1000 Merino wethers and 400 crossbred lambs. The wethers are normally sold for the live-sheep export market at three to four years of age. The wool is generally 21 micron at 35-36 Newtons with 25 per cent tender.

The property also carries up to 70 beef cows with calves sold at 18 months.

Pastures consist of subterranean clover (*Trifolium subterraneum*), perennial ryegrass (*Lolium perenne*), some phalaris (*Phalaris* spp.) and the balance is mainly barley grass (*Hordeum leporinum*) and capeweed (*Arctotheca calendula*). The stock is moved regularly and Peter finds the sheep and cattle enterprise mix is very complementary in his grazing system.

"How do you value a five hundred year old river red gum? A million things depend on it... they are irreplaceable and we have 300 of them for which we feel a responsibility for their protection."

Peter Waldren, 'Willandra', Melville Forest.

A re-vegetation program

Prior to the early 1980s, native vegetation on the property consisted of 300 mature river red gums (*Eucalyptus camaldulensis*) with a few sheoaks (*Casuarina/Allocasuarina* spp.) and manna gums (*Eucalyptus viminalis*). No understorey remained with a few native grasses and forbs surviving on saline sites. The river red gums were isolated 400-500 year old trees, gradually weakening and dying. All trees had thin canopies and appeared to be under stress.

"I could see that with the gradual deaths of remnants on my farm and in the district we were going to run out of native trees which would affect production," says Peter.

"Loss of timber resources, reduced stock shelter and spread of salinity were progressing unabated and that's what prompted me to act."

In the early 1980s Peter commenced a revegetation program to provide stock shelter in all paddocks. Plantations were established on the edges of gullies to intercept groundwater recharge. In 1984 Peter joined the Potter Farmland Plan demonstration project.

Since 1980, about eight per cent of the farm has had nearly 20 kilometres of fenced native vegetation re-established using tubestock and direct seeding. Interconnecting shelterbelts cross the whole farm providing shelter, habitat and eventually some timber products.



The return of native species

Prior to 1984 the only native animals on the property were magpies, cockatoos and possums in pest proportions. However, since planting commenced, there has been a remarkable change.

As soon as Peter and Julie had established the shelterbelts, they observed small birds such as wrens, finches and chats in the long grass. Once trees reached a metre in height birds began to use them for nesting. Smaller animals such as field rats, lizards and snakes increased in the early days of the plantations with hawks and kookaburras arriving by about 1988.

By the early 1990s occasional koalas, wallabies and kangaroos and echidnas began to appear with an increase in species diversity as the plantations matured.

Improving the farm business

Even though eight per cent of the property's previous grazed area is now fenced and revegetated with trees, the property is producing more kilograms of wool and meat than ever before.

Since revegetation, the overall stocking rate has increased by 32 per cent, from 7.9 DSE/ha to 10.4 DSE/ha. This has been achieved by maintaining sheep numbers whilst keeping the 60 calves longer to 18-20 months. Peter also now rears 400 crossbred lambs for sale each year, which he did not do before the revegetation program.

Peter estimates an approximate 25 per cent increase in wool and meat production annually.

According to Peter, improved production can be linked to farm planning and the revegetation program. Because of land class fencing, there is better pasture and stock management and revegetation has resulted in more paddocks. Pasture composition has improved with the greater flexibility to rotationally graze and easier stock movement. There have also been notable improvements to stock health.

There are also real benefits to stock health from the land class fencing and more paddocks. Ryegrass (*Lolium* spp.) staggers is much easier to manage as stock can be rotated and moved more easily. Fencing of gullies and gully dams and reticulating water provides better quality water and reduces susceptibility internal parasites by controlling access to areas of infestation.

The shelter effect has been marked. The grazing habits of both sheep and cattle have been altered. When good shelter is provided, the animals spend much of the day resting behind the trees, particularly during bad weather. Peter estimates that stock graze for half the day and rest for the balance. Without shelter, they continually walk and feed, as they need greater pasture consumption to maintain energy without shelter.

The river red gum outside the fence line was once devoid of all leaves and signs of growth. However, since the re-growth and new planting on the other side of the fence, the tree has "come back to life", according to Peter.

"The animals maintain energy on less pasture consumption whereas previously without shelter they had to continually walk and feed," says Peter.

"Behind the shelter where it is warmer we get extra pasture growth, less evaporation, and a longer season. Because of the extra feed we have been able to increase stock numbers."

Peter says the benefits of his revegetation program, such as higher capital value and improved livestock performance, far outweigh the costs in time, labour and money.

Of the total cost of the revegetation program (about \$121,000), additional contributions came from the Potter Project, which contributed \$15,100, while \$1,000 came from a State government grant.

Personal rewards

Peter and Julie are very pleased to have contributed to securing the future of the remnant river red gums on their property. As well as the economic rewards of their revegetation program, the diversity of plants has made 'Willandra' a far better place to live and work with a far better chance of being sustainable.

"How do you value a five hundred year old river red gum? A million things depend on it," says Peter.

"They are irreplaceable and we have 300 of them for which we feel a responsibility for their protection.

"Farmers need to be aware of the ecological chain so they can farm with nature and gain the benefits. When everyone understands that their land is part of a bigger jigsaw, then the greatest benefits will be gained."

'Willandra' – biodiversity and the bottom line

Measure	1992	2002	% change
Grazed hectares	400	380	-5.3
Total DSE	3155	3960	+25.5
DSE/grazed ha	7.89	10.42	+32
Total wool cut kg	8608	9786	+13.7
Wool cut kg/ha	30.3	37.4	+23
No. of lambs produced	550	1000	+81
No. of steers produced	22	29	+32
Value of manager's labour/year	23,400	20,000	-14.5
Wool price \$/kg	~3.00	~6.00	+100
Gross margin \$/DSE	loss	20.46	
Gross margin \$/grazed ha	loss	214.71	



Native bush and forest is a valuable asset
for Shane Dellavedova

Case 6

Productive native vegetation management proving profitable in central Victoria

Colin and Shane Dellavedova
'Moonlight Farms' Maryborough, VIC



Business Profile

LOCATION: Maryborough, central Victoria

AREA: 850 ha

MEAN ANNUAL RAINFALL: Approx 500mm

ENTERPRISES: Fine wool Merinos, vineyard, cereal cropping

LANDFORM AND SOIL TYPES: Slightly undulating grassy woodland country, mostly cleared for cropping and pasture production. Contains scattered trees and roadside vegetation. Predominantly red clay loam, with reasonable moisture holding capacity on the lower slopes and lower lying areas. Shallow clay loams and surface rock are found on the higher areas.

Key Points

- Natural vegetation complements the sheep enterprise, providing excellent shelter and a favourable lambing environment.
- Native trees direct drilled to combat erosion in prone gullies.
- Native vegetation protects fragile soils.
- The cleared country is generally sown to improved pastures such as phalaris and sub-clover and been fertilised regularly.
- Regular soil testing has led to lime and super application.

The farm

'Moonlight Farm' is a third generation wool growing property located at Maryborough in central Victoria.

Colin Dellavedova and his son Shane manage the farm, which is home to 4000 Merino ewes (a flock DSE total of about 8000), a vineyard, and cereal cropping. The arable size of the property is 800 hectares and there is about 50 ha of natural bush or native forest that is heavily timbered with grey (*Eucalyptus microcarpa*) and yellow box (*E. melliodora*) trees.

"We are not afraid to remove the stock to protect the farm environment...being responsible and working in harmony with the environment is the key."

Shane Dellavedova, 'Moonlight Farms', Maryborough.

In recent years a return on capital of between 4-6 per cent has been achieved from the farm. Strong gross margins of over \$24/DSE have helped achieve this result.

The Merino ewes are spring lambing and it's a self-replacing flock. There are two bloodlines; a fine and medium strain with the fine-wools averaging about 5 kg of greasy wool per head and the mediums averaging about 6 kg/head. A small portion of the older ewes are joined to terminal sires for prime lamb production.

Working in harmony with the environment

Native vegetation plays a vital role in the overall performance of 'Moonlight Farm'.

The natural vegetation complements the sheep enterprise, providing excellent shelter and a favourable lambing environment.

The property has some gullies prone to erosion where the Dellavedova's have direct-drilled native trees for several years to successfully combat the problem.

According to Shane the soils in the area are quite fragile and native vegetation plays an important role in protecting them.

"It's not your typical heavy, prime fattening country, so being responsible and working in harmony with the environment is the key," he says.



As part of the Land, Water & Wool project, 'Moonlight Farm' is undergoing thorough property mapping and business analysis involving measuring a variety of parameters such as topography, soil type, financial performance and animal productivity.

While the property is above the district average in terms of stocking rate, Shane and Colin are well prepared to de-stock to ensure the sustainability of the land.

"We are not afraid to remove the stock from the farm to protect the farm environment," says Shane.

"The farm environment comes first and when it's not suitable, such as in the drought a couple of years ago, the stock comes off."

Permanent containment areas (large pens) mean the stock can be moved into these for as long as necessary to prevent long-term damage to the soil or pastures. Exit strategies exist for a variety of scenarios.

As a further support to this strategy, the Dellavedovas keep large stores of grain on property. The grain is grown on the property under minimum till and stubble retention philosophies.

Examining the role of native vegetation management

The Dellavedova property is one of nine Land, Water & Wool case study farms that are part of a Victoria-wide research project examining the role of native vegetation management as part of healthy, productive farming practices and improving wool production.

The project will help identify productive, practical solutions for native vegetation management, incorporating the commercial aspects of wool growing and sheep breeding.

As part of the project, 'Moonlight Farm' is undergoing thorough property mapping and business analysis involving measuring a variety of parameters such as topography, soil type, financial performance and animal productivity.

So far several management strategies have been identified from the research to date.

Project leader, Jim Moll, a senior agribusiness analyst with the Department of Sustainability and Environment at Benalla said: "We have identified a number of practical ways that woolgrowers can improve farm profits and at the same time, improve the quality of native vegetation on their properties.

"Strategies include rotationally grazing sheep through hill country and improvement of farm shelter trees through low-cost temporary fencing.

"The strategies we have developed are more about fine-tuning current grazing and farming practises, rather than implementing new technology.

"Preliminary findings from 250 paddocks on nine study farms analysed across central Victoria indicate that paddocks less than 30 ha in size generate higher gross margins, commonly over \$200/ha.

"This suggests that land class fencing may indeed improve both profits and native vegetation quality.

"It was also found that over 125 paddocks contained some very good quality native vegetation (important for biodiversity). About 10 per cent of these paddocks achieved at least \$200/ha gross margin, due to higher carrying capacity from more productive pastures and shelter benefits."

The future

Once the mapping of the Dellavedova's property is complete and all the relevant information has been gathered, the Dellavedova's will work closely with Jim Moll and several other project consultants to combine their goals (as a sheep enterprise) with the need to practise sustainable management of biodiversity.

"What's unique about this program is that it has to fit in with the farmer's personal, productivity and profit goals. First and foremost, the research has to consider maintaining a commercial wool growing enterprise," Jim said.

"Preliminary findings suggest that future wool profits on the farm may be lifted through investment in "wire and water" (land class fencing) as well as low cost tree establishment through natural regeneration, for more shelter across the farm. It all points to a "win-win" future for the farm."



Case 7

Back to basics approach boosts the bottom line at 'Campview'

John and Jill Neal
'Campview' Moonie via Goondiwindi, QLD



John and Jill Neal believe native pastures offer significant advantages for their business.

Business Profile

LOCATION: Moonie via Goondiwindi, Queensland

AREA: 3600 ha

MEAN ANNUAL RAINFALL: 557mm

ENTERPRISES: 5000 sheep and 200 head of beef cattle. These numbers are currently around 30 per cent below normal due to dry weather. Around 1400 ha has previously been cultivated for cropping in the past, but grazing is now the predominant enterprise.

LANDFORM AND SOIL TYPES: 2700 ha brown clay soils, supporting brigalow (*Acacia harpophylla*), belah (*Casuarina cristata*) and wilga (*Geijera parviflora*); 800 ha of red-brown clay soils with poplar box (*Eucalyptus populnea*), sandalwood (*Santalum lanceolatum*) and wilga trees and other eucalypts along the Moonie River; and 100 ha of sand ridges, with poplar box, cypress pine (*Callitris* sp.) and athel trees (*Tamarix aphylla*).

Key points

- Actively managing remnant vegetation provides drought reserves and shade and shelter for stock.
- Areas previously cultivated have been encouraged to return to native pasture, rather than implementing a costly pasture improvement program using introduced species and land clearing.
- Water quality has improved and streambank erosion minimised through fencing off the Moonie River and establishing alternative watering facilities.
- Time-controlled grazing has improved pasture production and maintenance of desirable species in the pasture.

The farm

For Queensland graziers John and Jill Neal, the quality and long-term nature of grazing offered by native pastures is a strong incentive to maintain and improve the natural resources underpinning their 3600-hectare grazing operation.

"The sustainability of native pastures versus improved species is an important consideration."

John Neal, 'Campview', Moonie via Goondiwindi

"While improved species may provide more feed in early years, the native grasses do not decline as much in the longer term, are more diverse and sustainable and suit the natural climate of the country," says John.

"There is also a faster response to storm rainfall. Further, the quality of the native pastures is better during winter than improved species, which tend to produce a big bulk of summer feed and require protein supplements in winter to maintain livestock growth."

Planning the farm environment

For the Neals, retaining around 30 per cent of woodland vegetation on the property is about right. More than one quarter of the property currently contains large areas of woodland, while the Neals are allowing smaller clumps to naturally regenerate for shade and timber belts on land previously cleared for cultivation.

Significant areas of remnant vegetation also remain along the river in the vicinity of 'Campview', although the broader region has been extensively cleared for cereal production.

Controlled grazing is employed on the property to achieve evenness of graze and as a tool to spell country for as long as possible. A parasitic lichen is actively being promoted to affect the growth of limebush - a major pest in the area.

Knowledge is power

Grazing for Profit workshops have played an important role in John's approaches to pasture and business management. Time-controlled grazing systems are gradually being established, with a grazing chart system now in place that is utilised when making assessments of the feed availability in each paddock. Detailed records of grazing and spelling are maintained.



The long-term nature of grazing offered by native pastures is a strong incentive for the Neals.

Expert advice from Greening Australia and a grant through Natural Heritage Trust and Greening Australia has also influenced the extensive fencing and stock water reticulation program to exclude stock from a large reserve of timber and waterholes along the river on their property.

The plan

Core production goals for the Neals include:

- the improvement of the sheep flock with good bloodlines;
- pasture improvement through more intensive fencing and time-controlled grazing;
- further subdivision of paddocks and installation of watering points to assist time controlled grazing (currently the farm has 29 paddocks, which are to be subdivided to end up with 69); and
- improvements to increase stock carrying capacity - while matching carrying capacity to pasture - using stock days per hectare (SDH) per 100 mm of rain. (SDH are a standard livestock unit, equivalent to around seven sheep).

Despite a run of dry seasons, progress in implementing the plan has been good. According to John pastures are improving, the subdivision is continuing and another 12 watering points were installed in 2003-04.

Wool production is moving up from 4.5 kilograms per head to 5 kg/head (average of the whole flock) with good quality 20-21 micron wool.

Cultivation areas of the farm have been returned to native pasture, which is gradually improving in quality.

The bottom line

Striking the balance between production and conservation is at the core of farming on 'Campview'. The Neals believe they will be ahead in productivity terms over the longer term by returning to a native pasture base and diverting the considerable funds that would be required for improving pastures to other areas.

"The sustainability of native pastures versus improved species is an important consideration," says John.

"The native pastures are a personal choice for our family and this business for long-term sustainability and are being encouraged in preference to introduced species, particularly for feed during the protein-deficient months of winter."

The Neals also have a commitment to retaining timber on the property and protecting water sources from stock so that good water quality is maintained and reticulated through troughs across the property.

"Livestock production would suffer if shade and shelterbelts are removed through development, and our resilience to drought - through the availability of grasses and edible shrubs in remnant timber stands - would be reduced.

"The timber is particularly important for shade in summer and providing shelter in winter. If the stocking rate is increased and these reserves are not available, then the effect of drought will be more severe."

John and Jill list their personal goals as:

- to have a profitable and sustainable property, with little or no land degradation;
- the state of the land should be in a state of ecological equilibrium, based mainly on native pastures and vegetation; and
- progress the business and profitability to help their three sons realise their goals and visions.

Costs and Benefits

The Neals have undertaken a comparison exercise to compare the direction of the present operation with a full development program.

Under a full development program the assumptions are that an additional 720 ha of standing timber on brigalow-belah soils would be cleared and sown to pasture. This would result in an increase in carrying capacity of 2.5 DSE/ha or 1800 DSE in total. In addition it is assumed that of the total farm area of 3600 ha, a further 1000 ha would be planted to improved pasture, replacing native pasture.

Conventional wisdom suggests this program may improve carrying capacity by 1.5 DSE/ha resulting in an increase in carrying capacity of 1500 DSE. Assuming the carrying capacity is increased in total by 3300 DSE, it would allow an extra 2000 sheep and an extra 100 head of cattle to be grazed.

While the outcome of the improvement program would approximately double the profitability of the farm, the Neals believe they will be ahead in productivity terms over the longer term by returning to a native pasture base and diverting the considerable funds (estimated to be \$250,000) that would be required for improving pastures to other areas.



Two of the 70 woolgrowers involved in the Traprock Wool Association, Brent and Margie Finlay, 'Cooinda', Dalveen. The Traprock Wool Association is using satellite technology to provide snapshots of their environment as a baseline for the group's own environmental management system.

Case 8

Mapping the future landscape of the Traprock

Traprock Wool Association,
South-East Queensland



Business Profile

LOCATION: Great dividing range, south-east Queensland

AREA: 300,000 ha

MEAN ANNUAL RAINFALL: 650mm

ENTERPRISES: Largely wool, some stonefruit

LANDFORM AND SOIL TYPES: Light 'traprock' granite and gammie, karangi and glenntanna soils types, carrying dense mugga ironbark and tumbledown gum woodlands in the east (toward Stanthorpe) and more open ironbark and yellowbox woodlands on the western side (Inglewood).

Key Points

- Satellite technology is being used to provide snapshots of the Traprock Wool Association's (TWA) environment as a baseline for the group's own environmental management system.
- It is hoped the system will eventually provide "eco-label" marketing advantages.
- In the short term it is being used to develop replicable production systems that best integrate the financial, social and ecological goals of TWA members; and to give the region's woolgrowers environmental creditability within their community.

Standing out from the crowd

Created in the black days following the 1991 wool price crash, the Traprock Wool Association (TWA) has developed a unique reputation for group innovation. The Traprock - named for a pale sedimentary rock which, broken down, has given the area much of its bony soils - is one of the most proactively innovative farming communities in Australia.

Over the years the TWA has written its own Quality Assurance system, which sees all its members (around 70 or so) audited annually on shearing shed practices, and a management system to record chemical use and mob movements. TWA is now five years down the track of developing its own Environmental Management System (EMS) - in this case, TIMS, or Traprock Integrated Management System.

Traprock region research

The Traprock Wool Association is the focus of new Land, Water & Wool research, embarking on a new initiative to understand the services 'mother nature' can offer their productive enterprises.

The Land, Water & Wool project *Integrating paddock and catchment planning – a wool producer-driven approach to sustainable landscape management*, led by Dr Geoff Cockfield from University of Southern Queensland, involves Traprock landholders in assessing and learning about the biodiversity on their patch, thereby developing a broader understanding about the ecological processes at play and ecosystem services offered by nature to their businesses.

Regional ecologist with the QMDC Greg Ford said the Traprock region is a highly regarded fine-wool producing area with very significant biodiversity values.

Greg is responsible for the biodiversity inventory, capacity building, biodiversity monitoring toolkit, and training of landholders and other stakeholders in its applications.

"The Traprock area is the Queensland stronghold of several woodland bird species whose populations are declining down south, and is home to a diversity of other animals and plants that are restricted to the border region of southern Queensland," he said.

"This is an exiting project in that the landholders in the area have shown strong determination to learn more about sustaining the productivity and biodiversity values of their landscape."

The toolkit will enable wool producers to reliably monitor and assess native habitats and identify biodiversity values while maintaining profitable and productive farming enterprises.



Andrew Ferrier's Merinos running on lease country near Stanthorpe. Despite extended, tough seasonal conditions, QA continues to form a very important component of the Traprock approach to wool production.

TIMS

The backbone of TIMS is high-resolution satellite imagery (Spot-5:1 pixel=2.5 metres), purchased from private geospatial mapping outfit with assistance from the Queensland Murray-Darling Committee (QMDC). The satellite images cover the nine sub-catchments (all within the Border Rivers catchment) containing the 300,000 hectares under TWA management. The imagery will be regularly updated.

The satellite maps are the basis of a series of overlays that build up an ecological picture of the Traprock, sheet by sheet. One overlay shows infrastructure like dams, buildings and fences; another vegetation coloured according to State government legislation. Another sheet maps remnant vegetation, yet another endangered species.

Understanding the ecology

TIMS operates on several levels, former TWA president Andrew Ferrier notes. The system is designed to ISO14002 - the international environmental accreditation standard - and so has the potential to be a Traprock-specific environmental management system (EMS). One day, the TWA wants the ISO14002 logo to be stamped as a marketing tool on member wool bales.

"The holy grail is that our wool goes into a market looking for an environmentally-sustainable product," Mr Ferrier says. "For the moment we'll use TIMS for production goals, but we can flip into being audited for accreditation if it becomes financially viable."

The Association's mixed experience with financial returns from its QA programs means that members aren't waiting around for the TWA ecolabel. They have other short-term ambitions for TIMS.

"We've been politically stressed by people claiming that the Traprock region is an environmental disaster," says the TWA's EMS specialist, Clive Smith

of "Malgowan". "It's not, and through TIMS we're putting together the information to prove it."

Land, Water & Wool has funded the USQ to examine biodiversity issues associated with wool production in the area. Birds Australia, which has mapped many of the region's bird populations, has already established that the Traprock is well endowed with avian fauna. The satellite updates, the TWA hopes, will also show that the region's vegetation is not only being preserved but enhanced.

Achieving ecological goals

TWA members are being encouraged to use the imagery to plan vegetation corridors that link remnant vegetation and rare species habitats. The QMDC has ecological goals for the Border Rivers catchment area, and the TWA aims to integrate those broader objectives into its own goals for each sub-catchment.

But, says Mr Smith, "people without money can't do any good for the environment: that's the bottom line". To address that equation, TIMS first role will be to enhance production systems.

"The satellite gives us the macro picture, and we check things out at the micro level," Mr Smith says. "It means that we can quickly identify healthy and productive areas of the Traprock and study them, so that we can take the lessons they provide elsewhere."

For instance, the satellite imagery shows where there are areas of good groundcover, and guides TWA members to relevant locations for grass checks that may help identify important species mixes.

"Good groundcover is good for the environment and production," Mr Smith observes. The imagery also highlights those areas where grazing management is working, and where it isn't.

Grazing management

Cell grazing has not been successful in the area, but some members are evolving variations on rotational grazing that are proving promising. The satellite will help show just how promising.

When enough information has been collected, the Association hopes to draw out patterns that will define how certain grasslands are grazed for maximum productivity and ecosystem health. "We want grazing systems that are specific to this area and our enterprises," Andrew Ferrier says.

"Through TIMS, we believe we can demonstrate that we can maintain and enhance our productivity while fulfilling our desire to manage our environment, social and financial responsibilities with due diligence."



Tom Dunbabin and Land, Water & Wool researcher Dr Kerry Bridle near exclusion trial plots on Tom's property 'The Quoin'.

Case 9

Tom, Cynthia and Matthew Dunbabin 'Bangor' and 'The Quoin'

South-East and Midlands regions,
Tasmania



Business Profile

LOCATION: Tasmania

TOTAL AREA: 8200 ha

ENTERPRISES: Superfine Merinos, prime lambs, beef cattle and agroforestry

LANDSCAPE: 1000 ha introduced pasture, 3000 ha grassy woodlands, 800 ha grazing/agroforestry, 1500 ha of forest, 1900 ha managed primarily for conservation (1600 ha in formal reserves). 'Bangor' features 30 km of coastline.

Key Points

- New research is looking to identify management strategies for total grazing pressure on native pastures.
- Native pastures are an important resource – understanding their ecology is equally as important.
- Whole Farm Planning is critical to farm management.
- Protection of bird habitat, including the endangered Swift Parrot.
- 1900 ha managed for conservation outcomes, with a formal covenant over 1600 ha of woodland and forest containing unique plant communities such as grassy blue gum and shrubby black gum forests.
- Purchase of 'The Quoin' to protect the valuable grassy forests.

The farm

With 30 kilometres of coastline and more than 8000 hectares of predominantly native vegetation landscapes to manage in two parts of the State, Tasmanian woolgrowers Tom, Cynthia and Matt Dunbabin are busy people.

But with significant heritage and conservation sites on 'Bangor', such as Aboriginal cultural sites and the presence of artefacts on the property, the landing place of Abel Tasman and habitat for the endangered

"We want to be able to better manage the native pastures so they are more productive, enabling us to grow more wool of better quality."

Tom Dunbabin, 'Bangor' and 'The Quoin', Tasmania.

Swift Parrot and other migratory birds, the Dunbabins are also managing a special landscape.

The development of a whole-farm plan for 'Bangor' has been pivotal in achieving both environmental and business goals. This plan involved developing a long-term vision for both profitability and conservation outcomes. To help meet this vision, stock carrying capacity was increased by 50 per cent and integrated pest management principles were introduced to manage pasture grubs and internal parasites of sheep, which reduced reliance on pesticides and drenches.

For the Dunbabins, fourth and fifth generation woolgrowers, the big advantage of native pastures from a farm business perspective is that they are low input, with minimal costs required to maintain them. Much of the 15,000 kilograms of wool produced on both of their properties 'Bangor' in Tasmania's south-east and 'The Quoin' in the Midlands region is dependent on the health of the significant area of native pasture under their management.

The competition is tough

But competition for feed from large populations of native and feral herbivores, including kangaroos, wallabies and wild deer, can reduce grazing capacity, which in turn affects the quantity and quality of wool production.



Native pastures account for 80 percent of grazing capacity at 'The Quoin', increasing to 100 percent in winter.

Through a Land, Water & Wool native vegetation trial project the family is endeavouring to better understand and manage overall grazing pressure on their native grasslands.

The information from the trial will help the Dunbabins design the most efficient grazing system, and provide valuable information about the effectiveness of their culling program.

"We are trying to establish just how much of the feed being grown is being consumed by the sheep and how much by the native and feral herbivores, and what effect that's having on pasture composition," Tom Dunbabin said.

"To date we only have one year's data, which isn't enough to confirm any results, but we do know there is a large amount of feed being consumed by animals other than sheep. Anecdotal evidence suggests the native and feral herbivores eat some plant species but not others and this can have an impact on the ecology of the land as well as wool quality.

"Because our business is heavily dependent on native grasslands and woodlands for grazing capacity we have always been interested to develop an understanding of their ecology.

"Having this trial on our property has given us the opportunity to have input into the experiments designed to answer some of the questions that concern us about natural resource management."

Native species are important

Both properties experience intense grazing competition from native and feral herbivores.

The major native grassland species grazed are Wallaby grass (*Danthonia spp.*), Microleana and Kangaroo grass (*Themeda triandra*). Both properties also have pastures sown with introduced species.

"The native pastures are particularly important to fill the winter feed gap when introduced pasture growth is very slow," Tom adds. "At 'Bangor', native grasses account for about 20 per cent of grazing capacity year round, but during winter support up to 50 per cent of it.

"At 'The Quoin' however, native pastures account for 80 per cent of grazing capacity, which increases to 100 per cent during winter."

The pastures are rotationally grazed, with native pastures rested during summer and grazed during winter. Under this system, the Dunbabin's run about 9000 sheep with the aim of producing 17 micron wool of high tensile strength, which is where the native grasses play a big role.

Quality is the issue

"Compared to introduced pastures - which fluctuate in quality - native pastures tend to grow feed of even quality throughout the year, which leads to good tensile strength, but the quantity of native grasses is often a problem," Tom said.

"Obviously we'd like to be able to increase stock numbers, but more importantly we want to be able to better manage the native pastures so they are more productive enabling us to grow more wool of better quality."

Tom said the trial measured the differences between no grazing at all, grazing by native and feral browsers and grazing by sheep plus natives and ferals. The technique uses exclusion cages to prevent any grazing, and this is compared to native grazing when sheep are excluded, and native plus sheep at other times.

"While this doesn't tell us directly what the sheep are eating it does tell us what the other animals are eating, and by deduction what the sheep consume," said Tom.

The results of the study will be relevant to large areas of the Tasmanian Midlands, which cover more than 400,000 ha, to better enable woolgrowers manage native pastures for long-term sustainability.

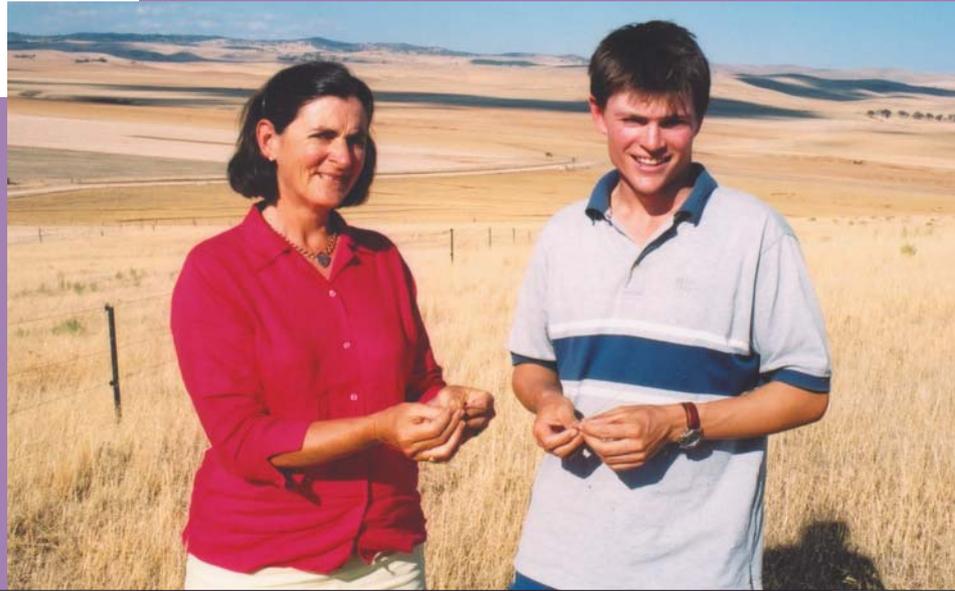
The Dunbabin's significant leadership contributions were recently recognised at the highest level, with Tom and Cynthia winning the 15th McKell Medal for Excellence in Natural Resource Management.



Case 10

Native grasses critical to profitability in the Mid North

Mid North Grasslands Working Group, South Australia



Woolgrowers in the Mid-North of SA aim to conserve and increase native pasture biodiversity and on-farm profits through improved grazing management as part of a new research project. Project investigator Millie Nicholls, from the Mid North Grasslands Working Group, is pictured with Spalding farmer Rowan Cootes, one of the woolgrowers involved in the project.

Business Profile

NATIVE PASTURES GRAZED: 500,000 ha

ANNUAL AVERAGE RAINFALL: 250-500 mm

WOOLGROWERS IN REGION: 1450

COMMON NATIVE GRASS SPECIES IN MID NORTH: Wallaby grass, Kangaroo Grass, Spear grass, Brush Wire grass, Windmill grass, Queensland Blue grass, Red grass, Blackhead grass, and Lemon grass.

Key Points

- Research funded by Land, Water & Wool aims to study the effect of grazing management of native pastures on sheep productivity, farm financial returns and native pasture biodiversity. By using existing MNGWG trial sites, previously funded by the Natural Heritage Trust, the project will generate one of the few long-term trials on the grazing management of native pastures in Australia.
- Traditionally, native pastures in the hill areas of the Mid North of South Australia are continuously grazed at the same time each year (usually from the autumn break in May until harvest in December) to fit in with the cropping program. Over time, this has reduced the population of native perennial grasses and produced pastures dominated by undesirable annual grasses such as wild oats and barley grass.
- Some growers aim to achieve significant increases in pasture utilisation rates - doubling current rates in some cases, and conserve and improve native pasture biodiversity by rotational grazing, and boost profits through increased production.

An important landscape

The Mid North Grasslands Working Group (MNGWG) was established in 1999 to provide farmers with practical information and support on the management of native pastures for increased productivity, biodiversity and conservation. The group

“In the past, native pastures have been under-valued but they are important for long-term grazing productivity and sustainability in many areas.”

Millie Nicholls, Mid North Grasslands Working Group, SA

now consists of more than 300 farmers throughout the Mid and Upper North of South Australia as well as government and non-government representatives.

“Generally native pastures in the hill areas of the Mid North are continuously grazed during winter to fit in with the cropping program,” said Project Investigator and Mid-North woolgrower Millie Nicholls, from the Mid North Grasslands Working Group.

“This has reduced the population of native perennial grasses and produced pastures dominated by undesirable annual grasses such as wild oats and barley grass.”

One of the woolgrowers involved in the project is Rowan Cootes, whose family own a 1200 hectare farm near Spalding.

The Cootes family crop about 800 ha and run a self-replacing Merino flock with a total Dry Sheep Equivalent (DSE) of 3500 (winter-grazed). The property’s annual average rainfall is 450 millimetre.

According to Rowan, he became involved in the project due to concerns about the detrimental impact set stocking was having on their grazing land in the hills on his property, which totals about 250 ha.

“Large areas of capped soil were developing, there were increased numbers of weeds such as thistles and we had poor pasture utilisation in parts of the paddock due to patch grazing by our sheep,” Rowan said.



Changes in the perennial plant population have been slow but the perennial plants are larger, healthier and producing more feed. There has also been some recruitment of new plants.

As a result of these changes, daily pasture growth rate has increased across the demonstration sites from 11 kilograms of dry matter per hectare per day up to 14 kg DM/ha/day and annual stocking rates from 2.3 dry sheep equivalents (DSE) per hectare up to 3.3 DSE/ha.

Stocking rates set the pace

A significant result from the project has been the 71 per cent increase in stocking rate achieved in the cell grazing paddock compared with the district practice. The average stocking rate of the district practice treatment is 2.5 DSE/ha while the cell grazing treatment is averaging 4.3 DSE/ha.

This increase (1.8 DSE) equates to an increase of 1.3 Merino ewes/ha. With an estimated gross margin per ewe of \$60, consultants estimate the increased stocking rate could increase farm net income by \$78/ha/year.

Not only has the cell grazing treatment increased stocking rates, it has also improved grassland health. It is the only paddock which has shown a reduction in bare ground. During the past two years of monitoring, bare ground has increased to more than 40 per cent under district grazing practice compared with only 5 per cent bare ground in the cell grazing treatment. The cell grazing treatment has also shown the greatest increase in the frequency and abundance of perennial grasses.

Change for the better

For Rowan Cootes, the demonstration site is changing the direction of grazing on the property.

“We are now rotationally grazing more paddocks according to pasture growth, working on the principle of high density, short duration grazing. For example we might run 2000 DSE in a 6 ha paddock about four times per year,” Rowan said.

“And a spin-off from increased pasture growth is the opportunity to increase sustainable stocking rates. The previous maximum stocking rate we would have achieved in our hills would have been 2.5 DSE/ha and through rotational grazing we have increased our annual stocking rate to about 3.7 DSE/ha.”

According to Millie Nicholls: “In the past, native pastures have been under-valued but they are important for long-term grazing productivity and sustainability in many areas. They are drought-tolerant, low-input, healthy and if managed correctly will be productive pastures.”

Measurements with meaning

A range of measurements are being taken throughout the Land, Water & Wool project on both the scientific and demonstration sites by Agricultural Information and Monitoring Services, Armidale, NSW. This includes stocking rate, pasture growth rate, change in native and annual pasture species, species diversity, ground cover, herbage mass, mob size and animal class, grazing period, sheep live weight and water-use efficiency.

Recent results from the trial indicate that rotational grazing according to plant growth rates can have a range of benefits. This includes increased stocking rates, healthier perennial plants, reduced bare ground and improved water infiltration.

On the demonstration farms, paddocks have been subdivided and set-stocking replaced with rotational grazing using large mobs of sheep. The emphasis is on providing sufficient recovery periods from grazing for the perennial plants. One of the significant changes has been the increase in ground cover on north-facing slopes. Typically most of the demonstration sites had an average of 30-50 per cent bare ground on the north-facing slopes but rotational grazing has reduced this figure to 0-20 per cent bare ground.

Smaller paddocks have prevented overgrazing of the north-facing slopes because sheep spend less time grazing these areas. The reduction in bare ground also means less run-off and erosion, resulting in more feed in the paddocks.

Plant composition changes

Changes in the perennial plant population have been slow but the perennial plants are larger, healthier and producing more feed. There has also been some recruitment of new plants.

Native Vegetation and Biodiversity

The *Native Vegetation* and *Biodiversity* Sub-program of Land, Water & Wool is exploring ways of managing landscapes so as to maintain enterprise profitability while meeting natural resource management objectives.

The primary aim of the Sub-program is to develop, test and promote options for integrating wool production and the protection, management and restoration of native vegetation and its associated biodiversity.

Native Vegetation and *Biodiversity* Sub-program has five regional projects in the high rainfall and sheep-cereal zones. Within these projects, more than 70 families with commercial woolgrowing enterprises are now directly involved with research projects on their properties, while a further 2750 woolgrowers are currently indirectly involved.

In order to deliver the research results to a larger group of woolgrowers, project teams are also working closely with wool initiatives such as 8x5 in Tasmania and *BestWool* in Victoria.

The *Native Vegetation* and *Biodiversity* Sub-program has a range of information resources to assist woolgrowers and their advisors with decision-making on-farm.

To view a full list of products available, visit the Land, Water & Wool website www.landwaterwool.gov.au

Order information about other *Land, Water & Wool* projects and products:



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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.

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Land, Water & Wool (LWW) 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.

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.

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Please make me a FREE subscriber to the following publications:

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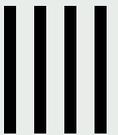
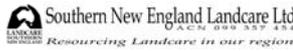
Land, Water & Wool is currently investing in the development of innovative R&D projects and training activities to help Australia's wool industry improve on-farm production and also the health of the land and water resources that underpin wool production businesses.

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

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