



native vegetation
and biodiversity

LandWater & Wool

Shaping the future



Australian Government
Land & Water Australia

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Woolgrowers in the high rainfall and sheep-wheat zone protecting and improving bushland biodiversity on farm

Biodiversity (biological diversity) describes the variety of species in an environment - the diversity of life on your farm. This includes animals, plants and soil microbes such as fungi and bacteria.

We can liken biodiversity to a car. Remove some of the parts, such as the mirrors, radio etc, then the look of the car may vary but it will still run. Remove more and the chances increase exponentially that the car won't work. Biodiversity includes a range of vegetation types on farm. This guide focuses on bushland biodiversity and is complemented by another guide on native pastures and grasslands.



Photo courtesy: Richard Weatherly, 'Connewarran'

Fast Facts – 'Connewarran'

Farm size 1680 ha

Av. annual rainfall 550 mm

Soil types

Low fertility sands and clay through to basalt soils.

Business

Self replacing merino flock with a fine wool merino stud.

Case Study:



Improving animal and pasture performance with shelter and pest control

Richard and Jenny Weatherly have a life long commitment to develop a highly productive, sustainable farming system on their property 'Connewarran' located near Mortlake in Western Victoria.

Key components of Richard and Jenny's vision have been to invest simultaneously in:

- **fertility:** all tested paddocks currently showing 15-21 Olsen P
- **paddock size:** there are now 60 paddocks on 1680 ha
- **protection of wetlands:** over 50 ha now managed as wetlands at 15 locations
- **establishment of shelter belts and plantations:** over 30 km established.
- **pasture productivity:** 96% of the grazed area on the property has now been sown to improved pasture

Provision of shade and shelter has been critical to the farm and Richard can show the investment in shelter areas has been financially beneficial. "By providing shade and shelter both animal and pasture performance are improved." The temperature is generally about five degrees warmer under shelter than in the surrounding open paddocks reducing ewe feed requirements and lamb deaths through exposure.

"I can show that using shelter in this way can increase my lambing percentage by an average of 11% each year," said Richard.

One of the features at 'Connewarran' is a 30 ha shallow wetland that fills in years of good rain. Flooding of the wetland produces a habitat which is instrumental in encouraging a wide variety of birds some of which can help control pest insects in surrounding pastures e.g. scarab beetle larvae, grasshoppers and black crickets.

A keen observer, Richard has noticed a relationship between the health of the wetlands and flystrike.

"Fly-strike in our sheep is much less common in those years when the wetland fills," said Richard who notices that the huge increase in aggressive insects like dragon flies is a critical factor in controlling sheep and blowflies in areas sheltered by *Acacia* plantations.

Richard sees that there is still significant improvements in productivity to be made on 'Connewarran'. "The challenge for all farmers is to develop a sustainable ecosystem from which to harvest the excess production," said Richard.

Current species lists:

Birds	200	(including exotic species)
Mammals	45	(including exotic species)
Frogs	11	

“ The challenge for all farmers is to develop a sustainable ecosystem from which to harvest the excess production. ”

Richard Weatherly, Victoria

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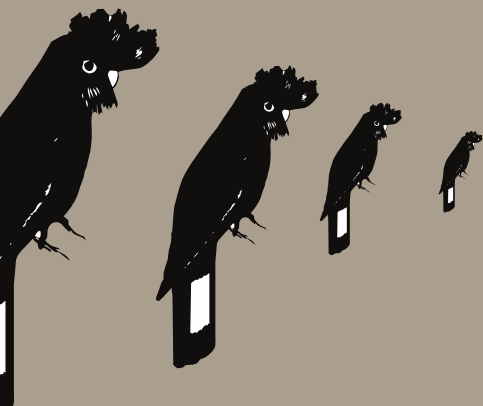


Our unique landscape

The Australian landscape has changed dramatically since European settlement and will continue to change.

Many of the icons that characterise our unique landscape – old trees, variety of birds, etc., may cease to be a part of that landscape unless there is active management to preserve the remaining diversity of our flora and fauna.

There is an increasing expectation by the community that these icons and landscapes need to be preserved. There is also a growing acceptance among woolgrowers that the retention of habitat and preservation of landscape values is an important part of their farming system.



Loss of diversity from an ecosystem will tend to make that system less stable and less resilient. Research has shown systems that contain only one species are generally more susceptible to pest attack and more influenced by seasonal conditions than systems that contain a diverse range of species.

Many of the issues about retaining and managing remnant bushland are about the quality of life and the type of landscape and environment that will be left for future generations.

There are also likely to be a number of direct benefits from the maintenance and improvement of bushland biodiversity on wool properties. These include:

- the provision of shelter for stock
- protection from insects and wind
- protection from erosion, clean water, and
- timber sources

HELPING HABITAT ON FARM

Woodlands house some 323 species of native birds (128 species must live there).

Acacia and eucalypt shrublands provide habitat for 133 species of native birds, with 12 virtually confined to this habitat.

I. G. Ried, *The Bush*, 1994

Key steps are to:

- maintain existing remnant vegetation (with all its various components) and,
- re-establish those vegetation communities that have been lost. The habitat provided by vegetation produces the food sources, shelter and nesting sites for the associated fauna.

The importance of shade

Providing access to shade aids farm productivity through increasing animal performance by reducing heat stress, maintaining fertility in breeding ewes and male breeding stock, and the effect of radiant heat on newly shorn sheep. Well placed shelter belts and the retention of existing vegetation can provide shade as well as improving and maintaining biodiversity.

Further reading: *Trees for shelter; Windbreaks for Australian Farms*, [2003] RIRDC

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DOING IT BETTER

Most woolgrowers value their environment and have undertaken activities to improve the amenity of their properties.

Land, Water & Wool, *Best Practice Survey 2003*

Advantages of retaining & enhancing bushland biodiversity

Value

Most woolgrowers value their environment and have undertaken activities to improve the amenity of their farm through establishing plantations, revegetating hills, planting windbreaks and wildlife corridors and protecting existing vegetation. Many millions of trees and shrubs have been planted by woolgrowers in recent decades. There are ways of improving the effectiveness of these activities to further enhance property amenity and help productivity as well as contributing towards the maintenance and improvement of biodiversity.

- 68% of woolgrowers with native vegetation on their farm believe it is useful for production.
- 40% of woolgrowers feel the value of native vegetation is for shelter.
- 36% see its value as feed for stock.

BEST PRACTICE SURVEY,
LAND, WATER & WOOL 2003

The economic on-farm benefits from maintaining bushland biodiversity have rarely been defined. *Land Water & Wool* aims to identify and define where these benefits occur. Some expected benefits include:

- **The provision of shelter for stock during adverse weather conditions.**
Shelter is often seen by woolgrowers as the most important reason for retaining or planting vegetation. Research trials have shown increases of around 20% in stock production resulting from the impact of shelter belts on pasture growth and animal health.
- **Reduced insect numbers**
A woolgrower in WA recorded less fly strike when the same sheep were grazed on a property with a significant area of remnant vegetation than when the sheep were grazed on an adjacent property with little remnant vegetation. The site with a high level of remnant vegetation had a high bird density. Higher predatory insect numbers have also been attributed to lowering fly strike.
- **Protection from wind erosion**
The use of vegetation on light soils can be of benefit in reducing soil loss through

wind erosion. Research near Armidale in NSW has shown reduced wind speed has retained 11 mm of water in the top soil. This moisture can extend the 'green pick' for up to a month.

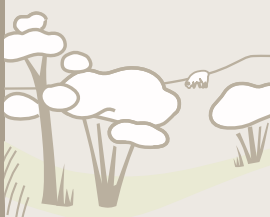
Consideration needs to be given to the correct location of tree belts so they don't cause wind tunnels.

Further details about provision of shelter and protection from wind erosion can be found in 'Trees for Shelter, A guide to using windbreaks on farms, (2003) RIRDC

- **Property values**
The aesthetic value placed on properties varies from place to place. Increasingly this aspect is a major driver of price in many most areas. Aesthetic values are also important on smaller blocks within commuting distance of large regional centres.
- **Timber sources**
Woodlots can be a valuable source of income and fencing timber. In some areas where there are large areas of remnant vegetation, selective logging of timber for sale or on-farm use can be significant.

For further information refer to Design Principles for Farm Forestry, (2000) RIRDC. www.rirdc.gov.au

As well as on-farm impacts, the retention of remnant vegetation has catchment and regional scale benefits through its effects on the water cycle. These include reducing recharge of water tables and slowing surface and subsurface water movement.



CONCERNED ABOUT DRYLAND SALINITY?

Order a copy of the Sustainable Grazing on Saline Land Guide. For details refer to page 8 of this guide.

Rating your native bushland



Photo courtesy: Louise Gilfedder, Tas

The number of bird species in an area is one indicator of the health of an ecosystem. Large numbers of native bird species usually indicates a range of nesting sites and feed sources. Count the number of native bird species seen or heard in a 20 minute period either in the evening or early in the morning.

Using Table 1, put the relevant rating for each component in the far right column of Table 2 and total to give an overall score. Use the following totals to rate your remnant vegetation and identify some of the potential reasons for the number of birds observed.



Table 1: Ratings for bird species on your farm

Number of Species	Rating
Less than 5	Low
5-10	Moderate
10-15	Good
Greater than 15	Very Good



SERIOUS RESEARCHER AT WORK

Dusk and dawn are the best time to observe birds

- 1 Cockatoo
- 2 Magpie
- 3 Swift
- 4 Wren



There are a number of factors which contribute to the value of remnant bushland areas and the diversity of the species they contain. Using *Table 2* identify the relevant rating for areas of remnant bushland for each of the factors.

Attribute	Low quality score = 1	Medium-low score = 2	Medium score = 3	Medium-high score = 4	High quality score = 5	Your score
Remnant size	1ha or less	1-5ha	5-10ha	10-20ha	>20ha (list size)	
Width	— Thin strip 20m or less wide —		Site 20-50m wide	50-200m wide	200m wide	
Ground Layer Condition	Ground layer dominated by exotic grasses and forbs Scattered trees	Mostly annual weeds with some native grasses	Mostly native grasses Some tree regrowth present 2-4m high	Mostly native grasses. Various tree sizes Few shrubs (if usually present)	Mixed size tree layer Shrubs common Native grasses dominant Native forbs and litter present	
Logs & Branches	— Remnant is very 'tidy' no fallen timber remains (rate 1) —		— Some fallen timber and dead trees, but quite a lot of big timber removed or pushed up. May only be small hollows for fauna (rate 3) —			Most dead trees and fallen timber remain. Hollows for fauna common
Management	Remnant is not fenced off from livestock; grazed for long periods every year	Remnant is not fully fenced from stock but stock rarely graze for long periods	Remnant is fenced from stock but there is some extended grazing	Remnant is fenced from stock and some strategic grazing is undertaken for production.	Remnant is fenced from stock Grazing is used strategically to control weed invasion and promote regeneration of native species	
Connectivity	No other remnant within 1km	No other remnant or corridor within several hundred metres	Adjacent remnants within several hundred metres	Adjacent remnants within several hundred metres and good connection via a corridor	Remnant well connected – either with large remnant nearby or wide corridor of vegetation to a large remnant	

Table 2 adapted from Ridley et al. (2002) Riverina Environmental Management System Package, DPI Rutherglen, VIC

YOUR TOTAL SCORE:

Habitat Condition Rating

13-18 Moderate

6-12 Low

19-24 Good

25-30 Very Good

Compare the total score for each remnant area against the Habitat Condition Rating. For remnants with low scores, the Table can be used to help identify management actions to improve their value.

Table 2: How does your bush rate? Indicators of Native Bushland Health

Improving biodiversity in your bushland

Rating the biodiversity of remnant vegetation highlights issues that need to be addressed to improve its value. Often this requires only slight changes in management but with a significant impact on the quality of the habitat.

Management issues:

Some of the issues associated with fencing out remnant vegetation relate to the potential for pest weeds and animals to build up and the fire risk associated with ungrazed pastures and grass. Some of these issues are usually only short term (one to five years) and can resolve themselves by grazing and shade from competing plants.

Weeds and pests need to be controlled and the fire risk can be reduced by targeted grazing or fuel-reduction burning prior to the fire season.

Area of natural regeneration provides shelter for stock



Photo courtesy: John Powell, Yass NSW.

- **Manage grazing:** Bushland areas usually have relatively low grazing value and contribute little to carrying capacity. Continuous grazing will result in the loss of diversity through the loss of palatable species and reduced resilience. Fencing remnant areas is essential to control the intensity and duration of grazing. If needed, grazing should be of short duration with large numbers of stock. This approach will not select against the palatable species unduly. Fencing remnant vegetation allows it to be strategically grazed at critical times of the year while still preserving and improving the value of the remnant.
- **Size does matter for birds and mammals:** Give priority to fencing off larger remnants. According to Birds Australia, bird diversity declines in patches of woodland smaller than 10 ha. When planning to revegetate areas also look for areas that meet this size criterion.
- **Shape:** Round or square patches are more valuable than long thin remnants and plantations, apart from riparian areas which make an important contribution in their own right. Thin strips have a much greater perimeter than square or round areas given the same area of remnant. The greater the ratio of perimeter to area, the more entry points there are for weeds and the less protection for vegetation and fauna.
- **Get the birds quicker - include and encourage understorey:** More birds will find suitable habitat in revegetation that includes understorey. Planting a range of trees and shrubs will provide a range of nesting sites suited to a variety of beneficial bird species. It will also provide a more constant source of nectar (if suitable nectar supplying plants are chosen) and other food sources for insects, birds and animals.

ROUNDING UP AND SQUARING OFF

Round or square patches of native vegetation are more valuable for most species than long thin strips, apart from riparian vegetation.





Tree hollows, valuable nesting sites can take at least 80 years to develop



Photo courtesy of MS&A

Glossary

Biodiversity

Biodiversity (biological diversity) describes the variety of species in an environment; the diversity of life on your farm. This includes animals, plants and soil microbes such as fungi and bacteria.

Farming systems develop their own biodiversity. At risk through most of the grazed areas of Australia is the biodiversity of native systems. The native systems include areas of remnant bush, native grasslands, wetlands and riparian zones.

- **Make connections:** Many animals will not cross open habitats. Without the ability of animals to move between patches of remnant bushland the patches can become 'islands of extinction' because there is no recruitment of individuals (e.g. if the animals in an area are killed by a fire). Plan for corridors of vegetation to link remnant patches.
- **Develop an 'untidy mind':** Resist the temptation to clean up plantations or remnant areas and burn fallen timber. Leave dead trees. These variations in habitat across a landscape create habitats for a range of native animals. Tree hollows which are important for over 20% of birds and some native animals, take at least 80 years to develop. Preservation of these habitats is critical.



KEY POINTS

- **A healthy landscape is one in which there is a diversity of species and management practices.**
- **Benefits from maintaining and protecting remnant vegetation and revegetation include stock shelter, timber production, protection from erosion and pest control.**
- **Woolgrowers need to actively manage their farm to ensure long-term productivity through the survival of native plants and animals and creating and maintaining a diversity of vegetation types on the farm.**

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Case Study:

Vegetation management boosts grazing productivity



Planting 400,000 trees over 25 years has been a key success factor for New England fine wool and beef producers Jon and Vicki Taylor, and has made them a case study for a major research project now underway in the Northern Tablelands region of New South Wales. A significant number of the world's premium fine woolgrowers operate on the Northern Tablelands, which covers 2.5 million hectares and carries four million sheep.

Over a quarter of a century, the Taylors have planted trees on more than 15 per cent of their Kentucky district property 'The Hill', to improve production capability while maintaining production capability from the 650-hectare farm. Their efforts have not only met with the approval of their livestock, but also that of native wildlife, with koalas re-colonising the farm after an absence of at least 80 years.

Leader of the Land, Water & Wool project 'Profitable Wool Production and Biodiversity', Associate Professor Nick Reid of the University of New England, said by documenting and assessing the results achieved on "The Hill", practical guidelines could be developed for other Tablelands woolgrowers wanting to encourage environmentally significant vegetation to improve compatible with wool production.

"Jon and Vicki have created the 'triple bottom line' that the rest of society is looking for," he said. "They feel good about their achievements; have a range of economic options, the farm environment is steadily improving and biodiversity has increased under their management."

Further information

The Native Vegetation and Biodiversity sub-program of LWW has five major regional projects that are bringing woolgrowers and researchers together. The contact in your State is;

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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 wool management options and production systems, please contact us.**

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