MANAGING NATURAL ASSETS ON FARMS:

Remnant Woodland and Paddock Trees



Across agricultural landscapes, native woodland mainly exists as small remnant patches, roadside corridors and paddock trees. This management guide details key management actions, based on decades of scientific research, that can help to restore woodland habitat for biodiversity, while also having benefits for sustainable agricultural production.

SUSTAINABLE FARMS

The sheep-wheat belt of south-eastern Australia was once blanketed by woodland ecosystems that supported a rich diversity of plants and animals. However, these woodlands are now some of the most heavily modified environments in Australia due to their occurrence on fertile soils suited to agriculture.

Across agricultural landscapes, woodland now occurs as remnant patches, often on rocky hilltops or in the corner of paddocks, as corridors along roads or waterways, or as scattered paddock trees. The magnificent old paddock trees that characterise our farming regions are some of the oldest relics of the original, pre-clearing woodland vegetation.

As a result of extensive habitat loss and degradation, hundreds of species of woodland plants and animals are now classified as threatened.

In little more than two centuries the landscape has been transformed into an agricultural matrix scattered with small remnants of woodland. Urgent action is needed to protect and restore woodland habitat to prevent further biodiversity loss and extinctions.



A typical agricultural landscape in the Riverina region of NSW, with small patches of remnant woodland, planted shelterbelts, scattered paddock trees and roadside corridors.

Taking action

With support from community groups, government agencies and scientists, there are many ways that landholders can take action to restore native woodland and help conserve woodland biodiversity. These approaches are detailed further in the following pages.

1. **Protect** patches of remnant woodland and paddock trees.
2. **Enhance** the condition of remnant woodland to improve habitat value.
3. **Increase** the area of native woodland through revegetation.

Biodiversity in the woodlands

Despite their heavily altered state, well-managed woodlands still support a remarkable diversity of wildlife, bursting with delicate wildflowers in Spring and filled with birdsong. The canopy will be busy with small woodland birds such as pardalotes, thornbills and silvereyes, gleaning insects from leaves and bark. When the eucalypts flower, flocks of honeyeaters will appear. The diverse variety of ground layer plants will host an abundance of insects, including pollinators like butterflies and native bees, and fallen timber provides habitat for wildlife such as reptiles, antechinus and echidnas.

However, as a result of widespread habitat loss and degradation, many species are in decline.

- Around one in five woodland bird species are now threatened due to habitat loss and fragmentation.
- Loss of large old paddock trees is contributing to the decline of threatened species that rely on tree hollows, such as the Squirrel Glider, Brush-tailed Phascogale and Barking Owl.
- Trampling by livestock, removal of fallen timber and introduced predators are impacting ground-dwelling species such as the Bush Stone-curlew, Pink-tailed Worm-lizard and Grassland Earless Dragon.

As populations of threatened species continue to decline, it is critical that we take action now to restore woodland ecosystems and enhance habitat for threatened species.



Striated Pardalote (Damian Michael), Common Fringe-lily (Ken Griffiths), Boulenger's Skink (Damien Esquerre).



Photo: Amber Parkinson

Box-Gum Grassy Woodland – An endangered ecosystem

So familiar along our country roadsides, Box-Gum Grassy Woodland is the essence of the quintessential Australian bush. Vast expanses of this woodland community once extended across inland south-eastern Australia over an area of more than five million hectares. Today it is one of the most poorly conserved ecosystems in Australia.

An estimated 92% of the original extent of Box-Gum Grassy Woodland has been cleared and around half of what remains in such poor condition that it is no longer a functional woodland ecosystem.[1] This means that less than 5% of the original Box-Gum Grassy Woodland remains – this ecological community is now listed as 'critically endangered' nationally in Australia. (Note: In Victoria, NSW, ACT and Queensland, Box-Gum Grassy Woodland encompasses a number of different community types that are listed as threatened under State legislation.)

Over three-quarters of all remaining Box-Gum Grassy Woodland occurs on private land.[2] Therefore farmers and landholders play a vital role in conserving and restoring this unique ecosystem.

Benefits of native vegetation for agricultural production


Photo: Mikla Lewis

Shade & shelter for livestock

Shade provided by remnant woodland, shelterbelts and paddock trees can mitigate the effects of excessive heat on stock welfare and productivity.[3, 4] Vegetation corridors are also effective windbreaks, reducing windchill for stock, leading to improved weight gain, increased wool growth, and reduced lamb mortality.[5, 6]


Photo: Suzannah Macbeth

Increased crop & pasture yields

Corridors of remnant woodland along property boundaries, as well as planted shelterbelts, can increase crop yields by slowing wind speeds, which reduces evapotranspiration and helps to retain soil moisture. Yield increases of up to 100% have been recorded for a range of crops.[7] Similarly, windbreaks can increase pasture biomass.


Photo: Dave Smith

Natural pest control

Native vegetation supports populations of beneficial predators and parasites – including invertebrates (beetles, wasps, spiders, etc.), birds, bats and other animals – that can help to control agricultural pests in nearby paddocks.


Photo: Mason Crane

Pollination

Native vegetation supports a diversity of native and non-native insect pollinators that are important to the yield and quality of many crops. Pollinators are also important for pasture production because of their role in the pollination of nitrogen fixing plants such as legumes.


Photo: Dan Florance

Improved hydrology

Trees can prevent the rising water tables that bring salt towards the surface, causing loss of productive land through dryland salinity. Areas of native vegetation also improve soil structure, enhancing water infiltration and reducing erosion.


Photo: Suzannah Macbeth

Carbon & biodiversity markets

Market-based approaches to reducing greenhouse gas emissions and protecting the natural environment have the potential to financially compensate landholders for management activities that protect and restore areas of native vegetation.

The multiple benefits of remnant woodland

Continuing a family legacy spanning four generations, Tim Walpole has a deep appreciation for nature and for the value of protecting the remnant woodland on his mixed-enterprise farm. With around one-third of the property retaining native vegetation, Tim and his family have observed a remarkable abundance of native animals, including threatened Greater Gliders and more than 120 species of birds. The fenced woodland areas also give Tim much greater flexibility in how he manages his stock during extreme weather events.

"Today, a lot of people realise how important the remnant bush is for production ... As it turns out, it is great having land with trees on it for stock protection and shelter for lambing ewes. There is a significant increase in lamb survival."

— Tim Walpole, 'Taworri', Whorouly South VIC


Photo: Amber Parkinson

Taking action: **Protect**

The unique attributes of remnant vegetation cannot be replaced in our lifetimes, so the first step in the long-term conservation of our woodlands is to protect the precious remnants that remain.

Research demonstrates that remnant woodland typically supports more species, and a different suite of species, than plantings.[8, 9] This is due to the increased habitat complexity of remnant woodland – different vegetation layers, variety of plant species, mature trees with hollows, large flowering tree canopies, fallen timber, and other 'old growth' features.

Fencing

The simple action of fencing a patch of remnant woodland to control livestock grazing can lead to significant improvement in the condition of the vegetation and its habitat value for wildlife.

- With reduced trampling and nutrient inputs from stock urine and faeces, soil health will improve and native grasses and leaf litter will gradually establish.
- Removing livestock grazing allows seedlings to grow, so natural regeneration can occur to secure the long-term future of these patches.
- Leaving fallen timber on the ground provides important habitat for insects, reptiles, small mammals such as antechinus and dunnarts, and birds such as Brown Treecreepers and Bush Stone-curlews.
- Avoid using barbed wire in the top strand of fencing wherever possible, to reduce the likelihood of birds, gliders and bats getting entangled.



Photo: Penny Raleigh

Conservation covenants

Conservation covenants provide the opportunity for landholders to protect areas of remnant woodland in perpetuity.

- A conservation covenant is a voluntary legal agreement between a landholder and a government authority to permanently protect and conserve a specific area of private land with natural, cultural or scientific values.
- A covenant restricts activities that may damage the native habitat on the land, such as clearing, intensive farming or subdivision.
- A covenant is attached to the land title, ensuring that conservation efforts continue even if the property changes ownership. It allows landowners to leave a lasting legacy of environmental stewardship, protecting the land for future generations.
- Concessions such as rate rebates or land tax exemptions may apply to land protected by a conservation covenant, and in some cases landholders may receive payments.

Contact the **Biodiversity Conservation Trust** in NSW or **Trust for Nature** in Victoria to learn more about conservation covenants.



Photo: Suzannah Macbeth


Photo: Angelina Siegrist



Protect paddock trees

The large old paddock trees that are an iconic feature of our farming landscapes are some of the oldest living entities in Australia – solitary remnants of the forests and woodlands that once covered the land.

Paddock trees act as 'stepping stones' in agricultural landscapes, creating vital habitat connectivity for wildlife.[10] Additionally, the unique features of these old trees, along with large mature trees in remnant vegetation, also provide resources that many species depend on.[11]

Large old trees develop hollows over time – often taking more than 100 years to form – which offer nesting, roosting, or denning habitat for around 300 native animal species, including birds, mammals, and reptiles. Their expansive canopies produce abundant food resources such as pollen, nectar, insects, and lerp (the sugary coating produced by psyllid insects). These trees also shed limbs over time, creating fallen timber that adds another important layer of habitat.

Planting new paddock trees now is a long-term investment in the future. Within a decade or two these trees will provide new 'stepping stones' for wildlife, though it may take a century or more before they offer all the benefits of an old growth tree.

Supporting Squirrel Gliders

After discovering there were Squirrel Gliders present on their farm, Cindy and Steve Scott have put great effort into restoring woodland habitat for this threatened species, fencing patches of paddock trees and planting new trees to increase connectivity. They have also installed more than 40 nest boxes in trees and been delighted to discover gliders are now happily occupying some of these.

"It certainly heightened our awareness about the importance of paddock trees as stepping stones in the environment for the Squirrel Gliders, as well as other animals."

— Cindy & Steve Scott, Scotts Angus, Henty NSW

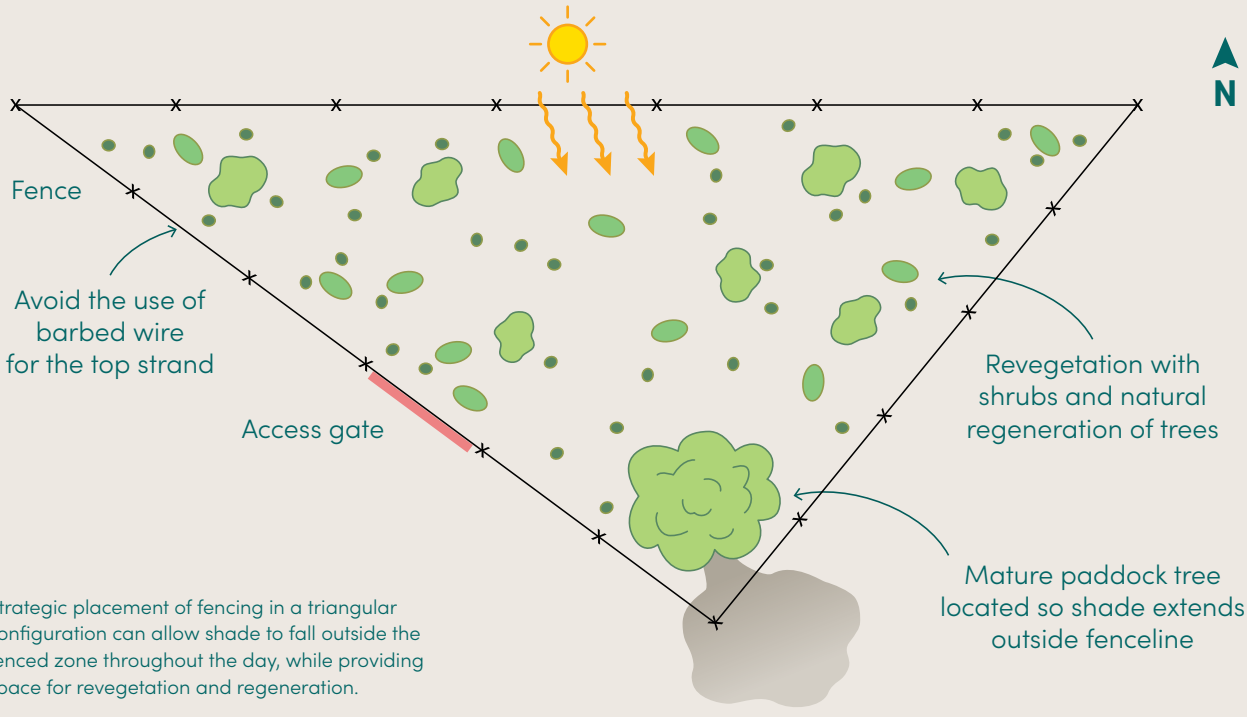

Photo: Lynne Sealie


Photo: Suzannah Macbeth


Photo: Amber Parkinson

Actions to improve tree health

- Fence around trees to keep livestock from congregating beneath them. This reduces soil compaction, allowing better water infiltration, and also limits the build-up of excess nutrients from stock urine and faeces, which can harm tree health over time.
- Aim to strategically position fencing so the canopy of the tree is fully within the fenced area but the shade falls outside this zone – this ensures that livestock still have access to shade.
- Ideally, allow enough space within the fenced zone to plant a range of shrubs. This helps attract a range of woodland birds that can boost tree health by feeding on psyllid insects and the lerp that they produce. While a moderate amount of psyllid and lerp activity is a normal part of eucalypt woodland ecology, sustained heavy infestation can drain resources from the tree and cause dieback of foliage.
- Small woodland birds will only travel limited distances across paddocks, so aim to create connectivity or improve proximity to other paddock trees, remnants or shelterbelts.
- The fenced zone is also an area where new tree saplings can establish through natural regeneration.



Strategic placement of fencing in a triangular configuration can allow shade to fall outside the fenced zone throughout the day, while providing space for revegetation and regeneration.

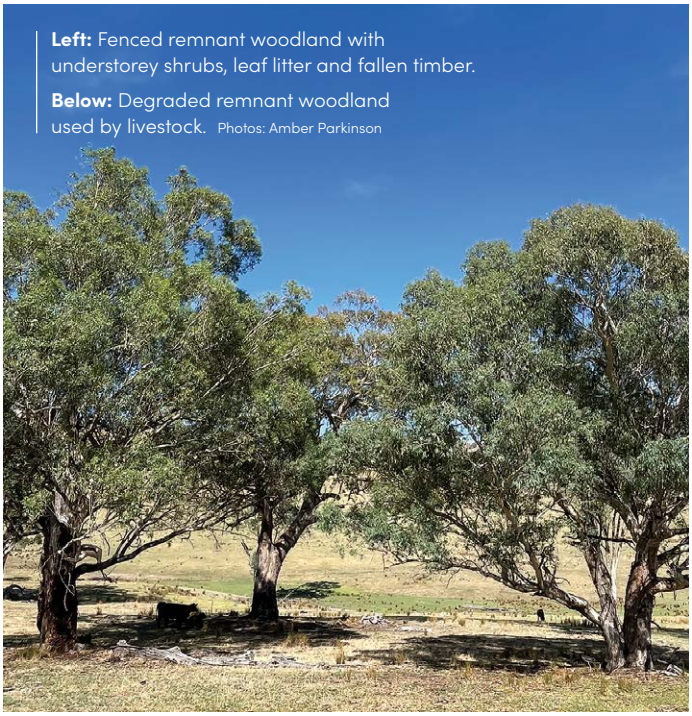
Taking action: **Enhance**

Enhancing the condition of existing areas of woodland vegetation – both remnants and plantings such as shelterbelts – will improve habitat values for different species of wildlife.

In agricultural landscapes, many areas of woodland consist of only the tree layer with very little understorey or fallen timber.

Ideally, an area of woodland will have a canopy of trees, an understorey of tall and low shrubs, and a ground layer of native grasses and forbs, as well as fallen timber and leaf litter. It may look a bit messy! But complex habitats with different structures and textures are invaluable for biodiversity. Resist the urge to 'clean it up'.





Left: Fenced remnant woodland with understorey shrubs, leaf litter and fallen timber.

Below: Degraded remnant woodland used by livestock. Photos: Amber Parkinson

Add understorey

- While fencing to control grazing can help support natural regeneration, actively planting understorey species – including ground cover species and shrubs – can hasten improvements in vegetation condition.
- Planting understorey increases both floristic diversity (the number of plant species) and structural complexity (different vegetation layers and microhabitats). These changes increase food resources, nesting resources and shelter for different animals.
- Adding a shrub layer is one of the best ways to discourage Noisy Miners, an aggressive native bird that can drive away other woodland birds and dramatically reduce bird diversity in a patch of vegetation, and more broadly in the local landscape.[12, 13]
- Choose species that are characteristic of the specific woodland vegetation in your area – consult with your local Landcare network, Local Land Services (NSW), Catchment Management Authority (VIC) or native nursery.



Photo: Amber Parkinson

Retain fallen timber & dead trees

- Fallen timber is associated with an increased abundance and diversity of insects, reptiles[14] and birds.[15]
- Logs and tree hollows can provide fire refuges for small mammals such as antechinus, gliders and phascogales.[16]
- Dead trees, also known as 'stags', continue to provide valuable habitat for many decades, especially if they have hollows. Some species of microbat have been found to more commonly roost in dead trees than live trees.[17]


Photo: Suzannah Macbeth


Photo: Suzannah Macbeth


Photo: Dan Florance

Install nest boxes

- Around 300 native species rely on tree hollows for nesting, denning or shelter – including many birds (such as parrots, owls and ducks), mammals (such as possums, gliders and microbats), and reptiles (such as monitors and pythons). Loss of mature hollow-bearing trees is a significant threat to the conservation of many species.
- Well-placed nest boxes of appropriate design can help compensate for the scarcity of hollows in landscapes with few large old trees. (However, to achieve long-term conservation outcomes for hollow-dependent wildlife, planting more trees, which will produce natural hollows in the future, is also critically important.)
- Nest boxes must be carefully designed to suit the specific requirements of each target species, with entrance size, internal dimensions, depth, and mounting height all needing to closely match the natural hollow characteristics a species would normally seek out — a box built for a small parrot, for instance, will be unsuitable for a glider or an owl. Refer to species-specific design specifications (e.g. nestboxtales.com/bushfire-zone-nest-box-design-and-species-list-booklets).
- Nest boxes should be attached to mature trees at an appropriate height, oriented to avoid extreme sun or prevailing wind and rain, and appropriately spaced to reflect the species' natural territorial behaviour.
- Chainsaw-carved hollows are created by carving directly into the trunk or a large limb of a living or dead tree, producing a more natural-looking cavity than a box. These are increasingly popular because they better replicate the microclimate and structural qualities of a real hollow.[18]

Mistletoe: friend or foe?

- Mistletoes are hemi-parasitic — they photosynthesise their own carbon but tap into the host tree for water and mineral nutrients.
- In a healthy woodland ecosystem, mistletoes do not become overabundant or contribute to tree decline – in fact, they have many benefits for the broader ecosystem.[19]
- Mistletoe flowers and fruit provide food for many birds, and mistletoe foliage typically has a higher moisture content than eucalypt leaves, so dense mistletoe clumps provide a cool microclimate that is important as shelter and nesting habitat. They also produce leaf litter that is higher in nitrogen and phosphorus, enriching the soil beneath host trees.
- In agricultural landscapes, mistletoes can become over-abundant and be a burden on individual paddock trees that are already stressed, leading to premature tree mortality. In these cases, removal of mistletoes from individual trees can support the tree to recover, however mistletoes will recolonise within a few years.


Photos: Angelina Siegrist



Taking action: **Increase**

Revegetation to increase woodland vegetation cover and improve connectivity across agricultural landscapes is the most impactful action for supporting biodiversity in the long-term.

Revegetation areas can be located in the corners of paddocks, as shelterbelts along fencelines, along waterways, around farm dams, or around paddock trees.

Even small plantings can make a worthwhile contribution – on a property with a low baseline of native vegetation, increasing woodland vegetation cover from 5% to 10% can double the number of bird species present.[20]

It is best to plant species that are characteristic of the specific woodland vegetation in your area – your local Landcare network, Local Land Services (NSW), Catchment Management Authority (VIC) or native nursery can help you choose appropriate species.

Create connectivity

- Strategically position plantings to connect with other areas of native vegetation, such as remnant patches, roadside corridors or shelterbelts. Increasing connectivity in this way means that wildlife can more easily move across agricultural landscapes.
- Research shows that areas at the intersection of two corridors of vegetation, such as shelterbelts, have a higher number of bird species.[21]
- Co-locate plantings beside farm dams or creeklines – this can create 'biodiversity hotspots' on farms as these areas provide an abundance of food and habitat resources. Research shows that areas of revegetation beside farm dams attract more woodland birds and support more bird breeding than plantings away from dams.[22]
- Planting new individual paddock trees, with heavy duty guards to protect them from livestock, can help to produce the next generation of paddock trees that will provide more 'stepping stones' across agricultural landscapes in the future.

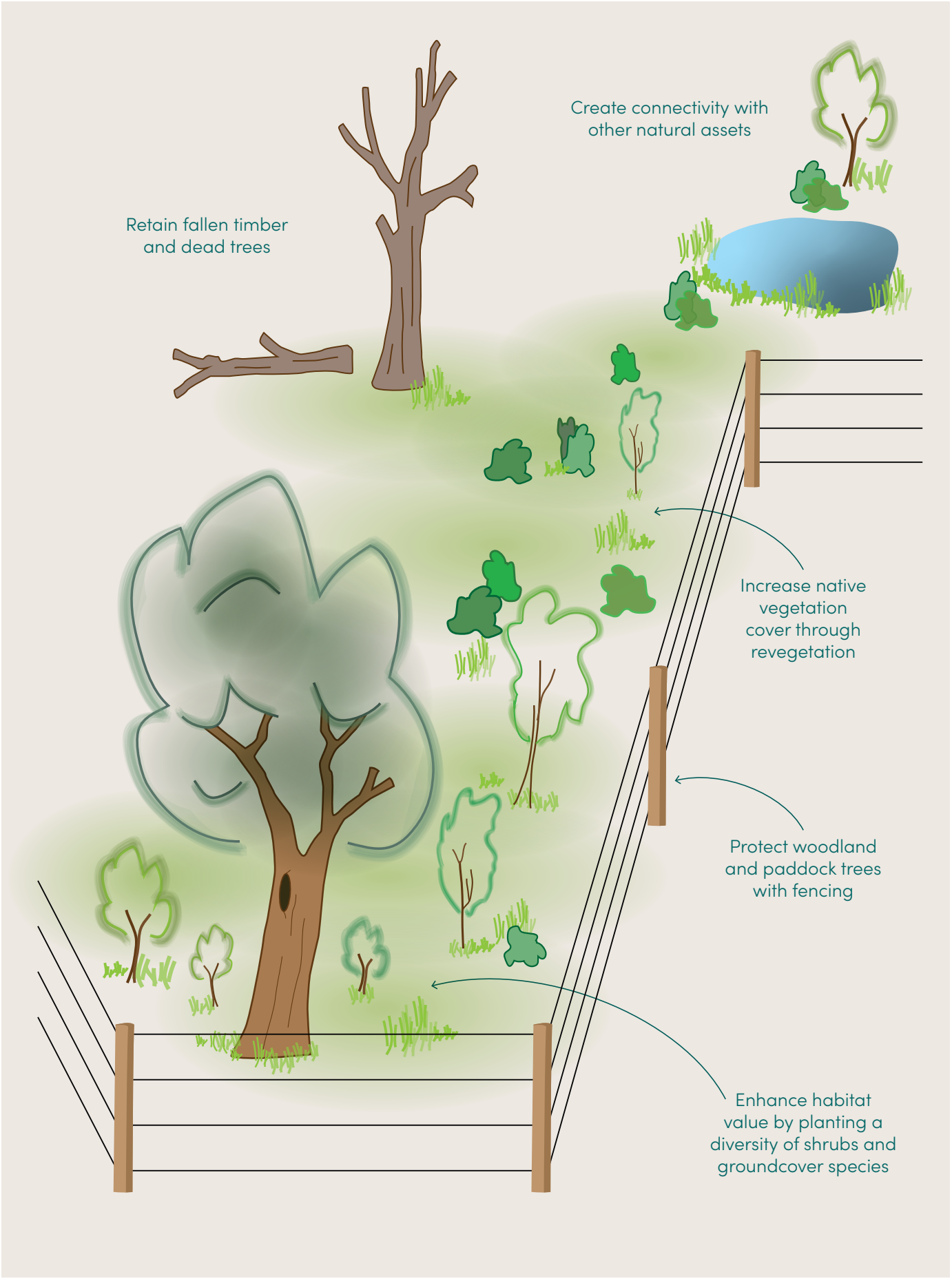

Photo: Alice Marzano


Photo: Amber Parkinson

Create complexity

- Complexity in woodland ecosystems is associated with increased biodiversity by maximising the variety of habitats and food resources available for different species.
- Incorporating mature trees into plantings, or revegetating around isolated paddock trees, gives biodiversity an ecological head start of several centuries by providing features such as hollows and fallen timber. This significantly enhances the habitat values of a planting and also helps improve the health of invaluable paddock trees.
- In addition to trees, aim to plant a diversity of species of locally-native shrubs, grasses and forbs. As a rule of thumb, plant at least three times as many shrubs as trees.
- Consider planting rare local plant species to maintain their populations.
- Plantings usually lack the fallen timber that provides important habitat for biodiversity. When a branch falls, leave it in place where possible, but if it hinders farm operations consider relocating it to a nearby planting.

Managing remnant woodland on farms



Further information

Book: *Restoring Farm Woodlands for Wildlife* by Lindenmayer, D. *et al.* (2018), CSIRO Publishing.

Book: *Paddock Trees Under Threat* by Lindenmayer, D.B., Baker, J.R. & Baker, E.A. (2026), CSIRO Publishing.

For additional information on the values and management of woodlands: **woodlands.org.au**

Nest box design: **nestboxtales.com**

For additional information on managing natural assets on farms: **SustainableFarms.org.au/resources**

SustainableFarms.org.au

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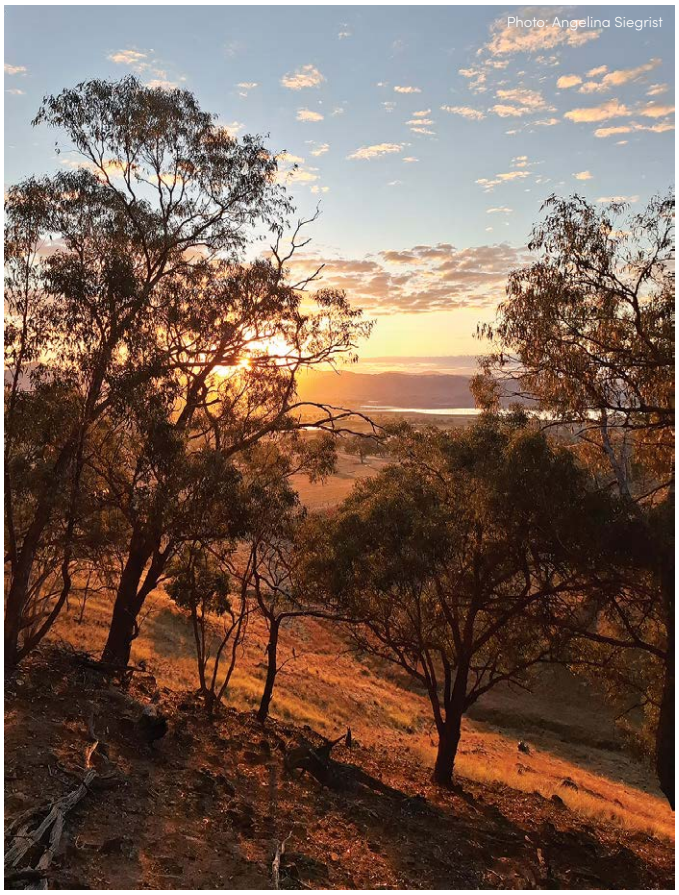

Sustainable Farms acknowledges the Traditional Custodians of the land we work on and their enduring connection to Country. We pay our respects to their Elders, past and present.

Sustainable Farms (2026). The advice in this guide should be regarded as general in nature. We recommend that you consult advisors such as Local Land Services, Catchment Management Authorities or Landcare networks for advice specific to your locality. Cover photos: Paddock trees (Amber Parkinson), Remnant woodland (Angelina Siegrist), Yellow-footed Antechinus (Dave Smith).

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