

# MANAGING NATURAL ASSETS ON FARMS:

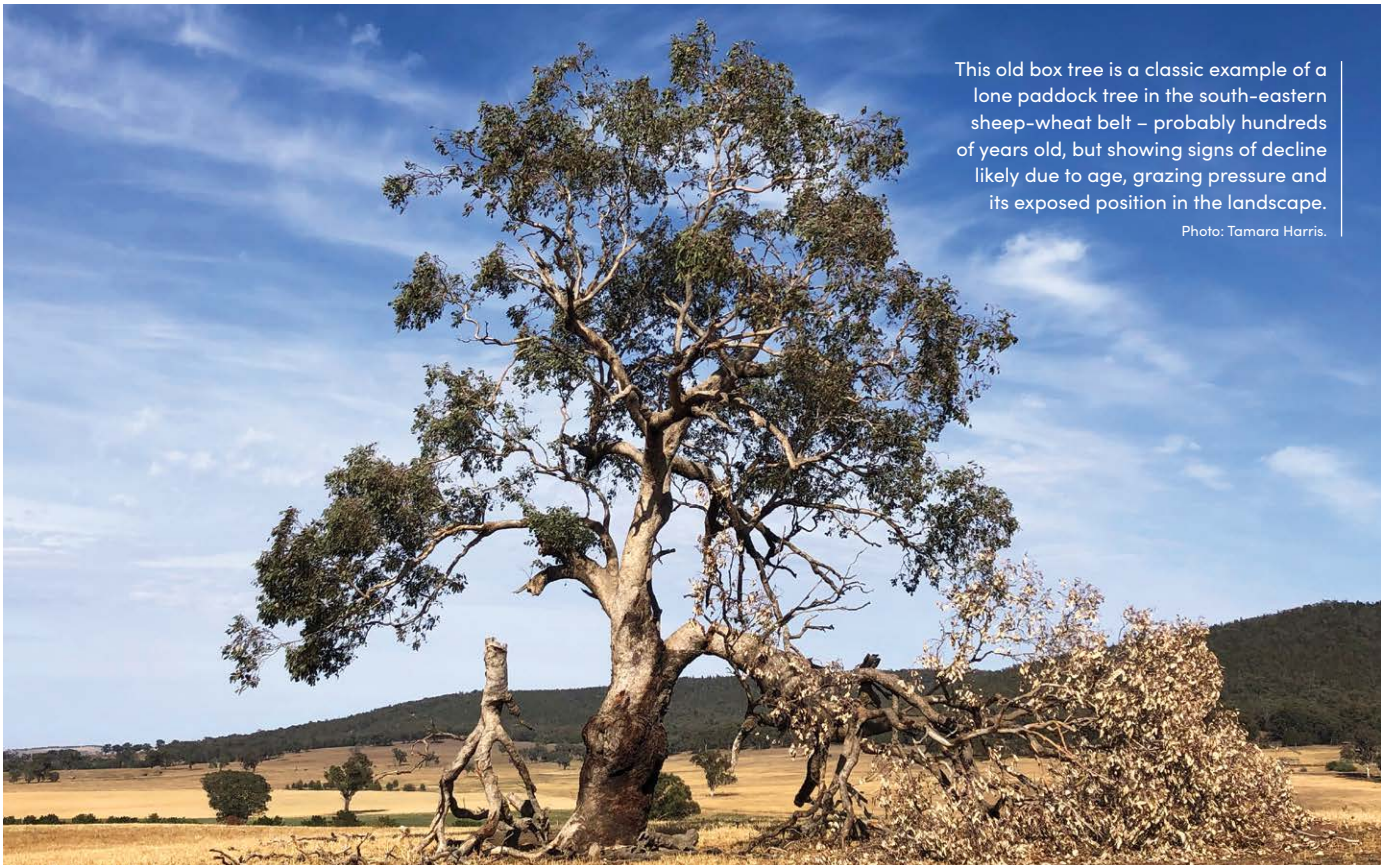
## Scattered paddock trees



SUSTAINABLE  
FARMS

This old box tree is a classic example of a lone paddock tree in the south-eastern sheep-wheat belt – probably hundreds of years old, but showing signs of decline likely due to age, grazing pressure and its exposed position in the landscape.

Photo: Tamara Harris.



Stately old trees standing alone in paddocks are a familiar feature of our rural landscapes. Aesthetically pleasing, they are also important assets supporting agricultural productivity, and are critical for wildlife.

Often the oldest, largest trees remaining after clearing, paddock trees may be hundreds of years old. However, these iconic trees are disappearing from the landscape and if this trend continues, scattered paddock trees across most of the south-eastern agricultural region may be gone in as little as 40 years.<sup>1</sup> With them will go the benefits they bring for farm productivity and biodiversity.

But all is not lost: farmers and other land managers can be instrumental in protecting and restoring these elders of the Australian landscape.

### Supporting healthy farm ecosystems

- Paddock trees can provide essential shade and shelter for livestock.
- A single large old tree can provide habitat for a great diversity of wildlife, from insects and reptiles through to birds, microbats and gliders.
- The biodiversity supported by a paddock tree is important for pollination, pest control and other ecosystem services that underpin landscape health and agricultural production.
- Large old trees on farms are immensely valuable farm assets that are difficult to replace due to their age, and should be retained.
- Farmers can play a role by protecting existing paddock trees, and by planting new trees that will become the large old trees of the future.

## Supporting farm productivity

Scattered paddock trees are valuable natural assets on farms. While planting young trees is beneficial on farms, it will take many decades before the young trees can fulfil the role played by large old trees in a farm ecosystem.

- **Shade and shelter for livestock:** Protection from sun and wind reduces heat and cold stress experienced by animals. This allows stock to thermoregulate more efficiently and optimise food metabolism. In a rapidly warming climate, effective shade will be increasingly important in summer.
- **Shelter for crops and pastures:** Shelter provided by paddock trees can increase localised growth and reduce desiccation in hot, dry periods.
- **Soil structure and quality:** Native trees on farms improve soil structure and quality, reducing wind and water erosion. Soil fertility improves as leaf litter and animal droppings beneath trees decompose, returning nutrients to the soil. (However, note that when livestock congregate under isolated trees in large numbers, this concentration of nutrients can be detrimental to tree health.)
- **Soil moisture:** Large, scattered trees reduce waterlogging and dryland salinity problems and have been shown to increase water infiltration in soils, helping retain moisture.
- **Carbon storage:** Relative to small trees, large old trees store disproportionately more carbon both in the individual tree and in the adjacent soil.<sup>2</sup> Retaining paddock trees and other large old trees helps improve long-term carbon storage, which is important both for climate change mitigation and for on-farm carbon accounting.

### Pollination and natural pest control

Paddock trees are important for biodiversity and are associated with an increase in the abundance and diversity of insect pollinators and natural pest control agents. Scattered paddock trees also provide roosting and foraging habitat for native bats, lizards, and birds, which in turn prey on common farm pests and can significantly reduce the number of insect pests. An example are freetail bats, which roost in large old trees, and feed on the agricultural pest, the Rutherglen bug.<sup>3</sup>



Paddock tree restoration.  
Photo: Sally Day, Greta Valley Landcare Group

## Supporting biodiversity

Scattered paddock trees are often the last remnants of previously widespread woodlands. In some threatened woodland communities, very little remnant vegetation remains apart from paddock trees,<sup>4</sup> making these trees disproportionately important. These trees may be hundreds of years old and are incredibly important for native wildlife. They allow many native species to persist on farms and influence biodiversity across the wider landscape.

- **Tree hollows:** Suitably sized tree hollows that shelter wildlife can take over a century to form, and are critical habitat for many animals, including threatened species such as the superb parrot, brown treecreeper and squirrel glider.
- **Connecting habitat:** Paddock trees act as “stepping stones” between patches of native vegetation or plantings. Some wildlife rely on these stepping stones to move between areas of habitat. This connectivity helps increase biodiversity, both on farms and across the landscape.
- **Microhabitat:** Loose bark, cracks and crevices provide habitat for small mammals and reptiles. Paddock trees also drop branches, which provide important habitat for animals such as antechinus and the threatened hooded robin.
- **Food source:** Large mature trees often flower more heavily and produce more nectar than other trees, providing important foraging resources for wildlife, such as honeyeaters and flying foxes. In addition, a variety of tree species across the landscape ensures that wildlife such as lorikeets, sugar gliders and other animals that depend on nectar, seed and pollen have access to foraging resources throughout the year.
- **Source of seed:** Paddock trees can be a source of natural regeneration for future large old trees, and provide a source of local seeds for collection, storage and propagation.
- **Improving other vegetation:** The presence of large old trees can have a positive influence on the biodiversity of other native vegetation on farms, such as remnant patches or tree plantings. This applies whether the tree is within the vegetation patch or located nearby.

Australian native bee, *Lipotriches australica*, on *Melaleuca armillaris*. Photo: Laurence Sanders.

# How to protect and restore paddock trees

Farmers can help reverse the decline of paddock trees in the landscape through careful management. The key is to retain and protect existing trees, and ensure there is a succession plan of younger trees to eventually replace the old trees. Management solutions will vary across different landscapes and for different production systems.

## Incorporate paddock trees into your farm plan

The first step for farmers is to identify the local factors contributing to the demise of paddock trees. These factors are varied and can include increased stress caused by stock camping under trees, spray drift, stubble burns, changes in hydrology, drought, insect attack, active removal of trees for firewood or cropping, and natural death due to old age.

The next step is to incorporate paddock trees into your farm plan. A map or aerial image of your farm will identify where paddock trees occur and their relationship to other natural assets, such as shelterbelts or remnant woodland, on the farm.

From here, identify some easily achievable options for managing existing trees, such as identifying scattered trees that could be protected by incorporating them into shelterbelts or tree plantings. Consider where establishing new paddock trees could benefit livestock production and create stepping stones for wildlife in the landscape.

Replacing paddock trees is a long-term investment but one that is relatively simple and brings positive benefits for productivity and for farm wildlife.

## Management actions

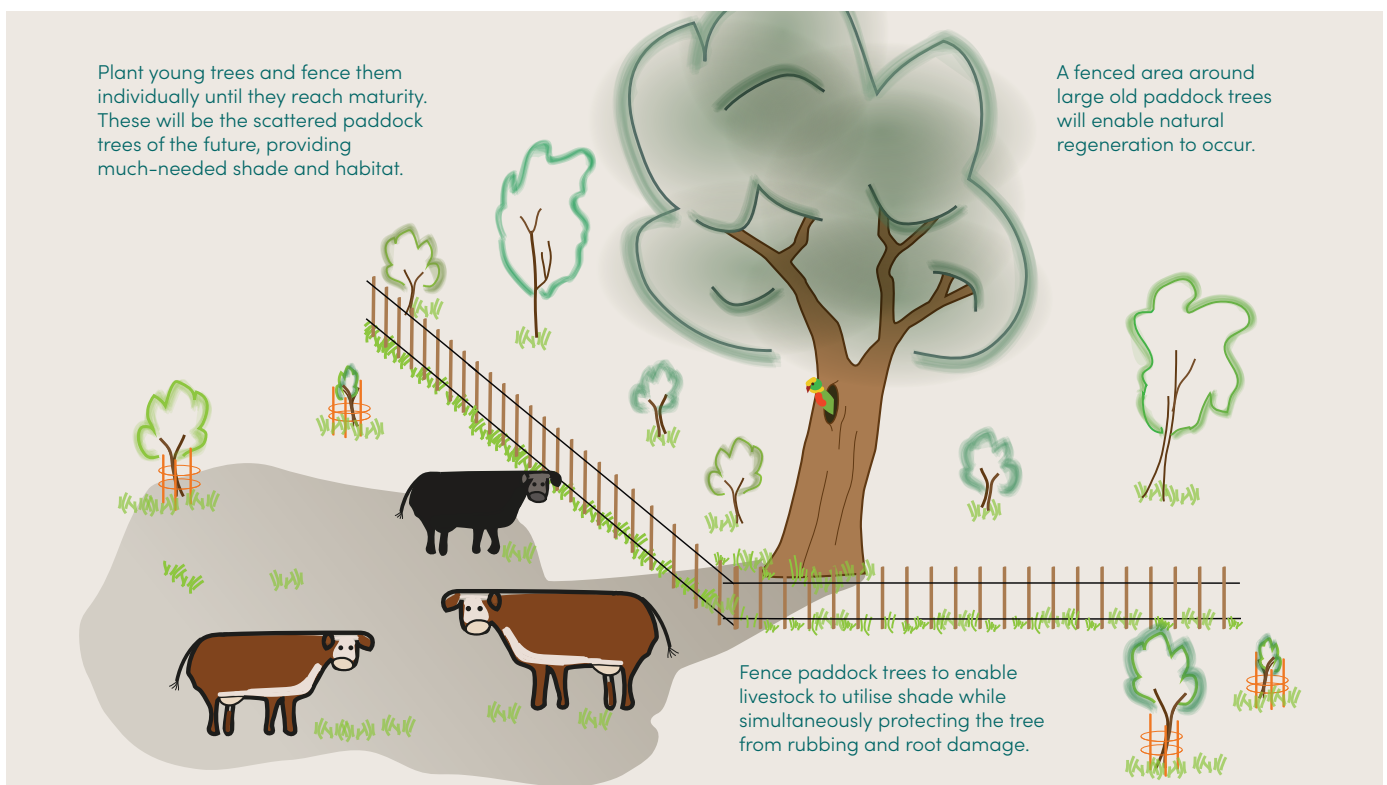
**Reduce livestock pressure on paddock trees:** Stock camps can cause major stress for scattered paddock trees. This occurs through physical damage to the root zone and tree, as well as changes in soil nutrients and pasture condition from intensive grazing. Fencing to exclude livestock from the area immediately beneath a tree or groups of trees can help reduce this impact.

**Protect paddock trees from spray drift, fertiliser, cultivation and fires:** While trees can recover from herbicides, the initial stress weakens trees and makes them more vulnerable to insect attack, disease and wind damage. Avoid exposing scattered paddock trees to fire by creating a suitable firebreak and buffer protection zones before any controlled burn. Old trees are particularly vulnerable to fire.

**Rest paddocks to allow recruitment of new trees:** Resting paddocks on a regular basis or for longer periods can promote regeneration of trees and other native plants, and help existing paddock trees to recover.

**Retain and incorporate paddock trees into new plantings:** Paddock trees are likely to remain healthier when they are close to other trees, so are an ideal focal point around which to establish shelterbelts and other plantings. A large old tree will also give the planting a 150-year “head start” in terms of benefits for wildlife, while the planting will create shelter and corridors for dispersal of woodland-dependent animals.

**Plant new paddock trees:** In areas with few paddock trees or minimal opportunities to protect those that exist, planting and fencing off young trees will help re-establish the scattered spatial patterns of paddock trees on farms. (Note that barbed wire fences can entangle mammals and large birds, and should be avoided where possible.)



## Squirrel gliders

Squirrel gliders are a threatened marsupial that feeds on sap, gums and insects. These airborne mammals rely on the shelter and denning sites that large old paddock trees provide. The loss of large old “den” trees and connective woodland habitat is a major contributing factor to declining squirrel glider numbers.<sup>5</sup>

Both living and dead large old trees, whether isolated in paddocks or within patches of remnant woodland, are important for squirrel gliders. Gliders move regularly between several hollow-bearing trees within their range,<sup>5</sup> probably to avoid predation by animals such as owls and lace monitors.

Gliders prefer to feed in scattered flowering trees in paddocks and go to great effort to reach these areas.<sup>6</sup> They have also been found feeding in plantings with younger trees, indicating that new plantings can be important food sources. However, the lack of hollow-bearing large old trees makes such areas unsuitable for denning.

Squirrel gliders are highly mobile but are generally unable to glide between tall trees more than 70m apart.<sup>7</sup> This makes connected areas of vegetation and the presence of scattered trees across paddocks very important for gliders. Relatively immature plantings can serve as corridors through landscapes, allowing the gliders to move from one patch to another.



Photo: Katherine Tuff



Nankeen kestrels are one of many bird species that can use dead trees for nesting.

### Dead trees or “stags”

Scattered paddock trees do eventually die, but their role in the landscape outlives them by many years. Large dead trees provide hollows that are essential nesting sites for wildlife. Nesting hollows are rapidly disappearing and every large dead tree, whether standing alone in a paddock or as part of a vegetated patch, is valuable. The branches that dead trees drop also provide important habitat for ground-dwelling animals.

See “Fire in farm landscapes: Keep your fallen timber and dead trees” for more information.<sup>8</sup>

### Notes and references

<sup>1</sup> Fischer J *et al.* (2010) The disproportionate value of scattered trees. *Biological Conservation* 143, 1564–1567.

Manning AD *et al.* (2013) Hollow futures? Tree decline, lag effects and hollow-dependent species. *Animal Conservation* 16, 395–403.

<sup>2</sup> Lindenmayer DB and Laurance W (2017) The ecology, distribution, conservation and management of large old trees. *Biological Reviews of the Cambridge Philosophical Society* 92, 1434–1458.

<sup>3</sup> Bennett AF and Lumsden L (2003) *Bats and paddock trees: insights from current research*, Victorian Department of Sustainability and Environment.

<sup>4</sup> Gibbons P and Boak M (2002) The importance of paddock trees for regional conservation in an agricultural landscape. *Ecological Management and Restoration* 3: 205–210

<sup>5</sup> Crane M *et al.* (2010) The use of den trees by the squirrel glider (*Petaurus norfolcensis*) in temperate Australian woodlands. *Australian Journal of Zoology* 58, 39–49.

<sup>6</sup> Crane M *et al.* (2014) The value of countryside elements in the conservation of a threatened arboreal marsupial *Petaurus norfolcensis* in agricultural landscapes of south-eastern Australia: the disproportional value of scattered trees. *PLoS One* 9, e107178.

<sup>7</sup> van der Ree R *et al.* (2004) Gap-crossing by gliding marsupials: thresholds for use of isolated woodland patches in an agricultural landscape. *Biological Conservation* 115, 241–249.

<sup>8</sup> Available at [www.sustainablefarms.org.au/info/fallen-timber](http://www.sustainablefarms.org.au/info/fallen-timber)

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