

SWIFFT Meeting Notes - Conservation of remnant habitat trees

SWIFFT meeting notes are a summary of the video conference and not intended to be a definitive record of presentations made and issues discussed.

The third and final video conference for 2013 had a theme on Remnant Habitat Trees in the rural environment.

A total of 91 participants were connected across 13 locations; Ararat, Bairnsdale, Ballarat, Bendigo, Colac, Geelong, Hamilton, Heidelberg (Arthur Rylah Institute), Heywood, Horsham, Melbourne (Nicholson Street), Warrnambool, Wodonga/Albury.

Those attending included participants from;

Educational: Gordon TAFE (Geelong), Bendigo TAFE, Federation University, Deakin University, Riverina TAFE NSW.

Local Government: City of Greater Geelong, Colac Otway Shire, Wyndham City Council.

***Field Naturalist Clubs:** Ballarat, Geelong, Hamilton.

Community Conservation Groups: Friends of Eastern Otways, ANGAIR, Geelong Environment Council, Wombat Forestcare, Ballarat Environment Network, Windamara Aboriginal Corp.

Conservation Organisations: National Trust, BirdLife Australia, Upper Hopkins Landcare Network, Glenelg Hopkins Catchment Management Authority, Corangamite Catchment Management Authority, Sustainable Living Ballarat, Parks Victoria, Conservation Volunteers Australia, Office of Environment and Heritage NSW, Dept. of Environment and Primary Industries staff across 13 locations, inc. Nicholson Street Melbourne and Arthur Rylah Institute, Heidelberg.

Industry: Ecology Australia

SPEAKER SUMMARIES

Scattered trees and their importance: a landscape perspective

Andrew Bennett, School of Life and Environmental Sciences, Deakin University

Andrew introduced his presentation by pointing out that conservation of scattered trees is part of a much bigger global issue concerning conservation in agricultural environments and how species biodiversity can be sustained in areas where people live.

Andrew spoke about two major approaches to nature conservation in agricultural environments:

Land sparing – set aside specific areas for nature conservation and farming (e.g. Conservation reserves approach).

Land sharing – incorporate nature conservation within and across farmland (e.g. conservation of scattered trees in farmlands approach)



One by one remnant trees are being lost from the landscape - we will see a very different landscape into the future.



Scattered trees provide important connectivity for use and movement of animals through the landscape.



Scattered trees can be a nuclei for regeneration and restoration by incorporating them into revegetation.

Scattered trees can be part of the natural landscape, e.g. in areas of Savannah woodlands, they can also be part of cultural landscapes where scattered trees are managed as part of an agro-ecosystem. In Victoria most scattered trees are part of anthropogenic landscapes which are modified landscapes containing remnants of a once much broader native vegetation system. Andrew pointed out that scattered trees, small remnants and individual trees can form some of our least preserved ecosystems.

Scattered trees – a keystone structure

Taking a similar approach to a key-stone species, scatter trees can be a structural element that has an ecological value and influence disproportionately large relative to the area occupied or its abundance. Scattered trees are important because they can form several functions with the landscape.

Local function of scattered trees for biodiversity

- * Foraging sites
- * Shelter
- * Refuge (e.g. hollows, bark)
- * Ground layer (micro environments, shade, logs, litter)
- * Large old trees can provide a higher diversity and abundance of habitat including fallen logs supporting ground layer habitat.

Studies in the Gippsland Plains found that scatter trees have a high cumulative bird species richness in proportion to the number of sample points, exceeding pastures, plantations and linear vegetation. About 60% of woodland bird species known in the region were recorded in scattered tree sites. (Haslem & Bennett 2008)

Local function of scattered trees for ecosystem services

- * micro climate benefits (shelter, shade, wind flow)
- * water infiltration through macro pores in the soil associated with roots.
- * salinity reduction through lowering of groundwater
- * nutrient enrichment of soils around trees
- * seed source for restoration

Landscape function of scattered trees

- * connectivity for use and movement of animals through the landscape
- * assists the dispersal of animals
- * aids in the dispersal of plants throughout the landscape

Andrew spoke about the problem of trees being removed from the landscape creating increased gaps between them which can be detrimental to the movement of some species.

Scattered trees add to the total tree cover which has a beneficial outcome for landscape values, species diversity and resilience

Scattered trees can be a nuclei for regeneration and restoration by incorporating them into revegetation.

Scattered trees are a legacy from the past

Remnant trees show some insight into what existed prior to massive landscape change. Scatter trees also provide information on what species existed, genes, local provenance, microbial communities, soil fungi etc.

Threats to scattered trees

Andrew spoke about the gradual loss of remnant scattered trees in rural landscapes and how regeneration tends to be on a linear basis rather than maintaining and restoring scattered tree landscapes.

Threatening processes include:

- Poor tree health, disease, exposure, hydrology changes
- Lack of regeneration
- Physical disturbance to trees and root systems, compaction and loss of ground habitat through 'Tidying up'
- Increased nutrients from stock
- More efficient farming and new land uses which view trees as being in the way.

Andrew said we are still to see the full consequences of previous management actions. Over time we will see trees disappearing one by one and we will see a very different landscape into the future. Andrew said there is an enormous challenge to work out how we ensure the next generation of scattered trees are there. We need to have a complementary strategy that combines both large intact areas plus scattered trees.

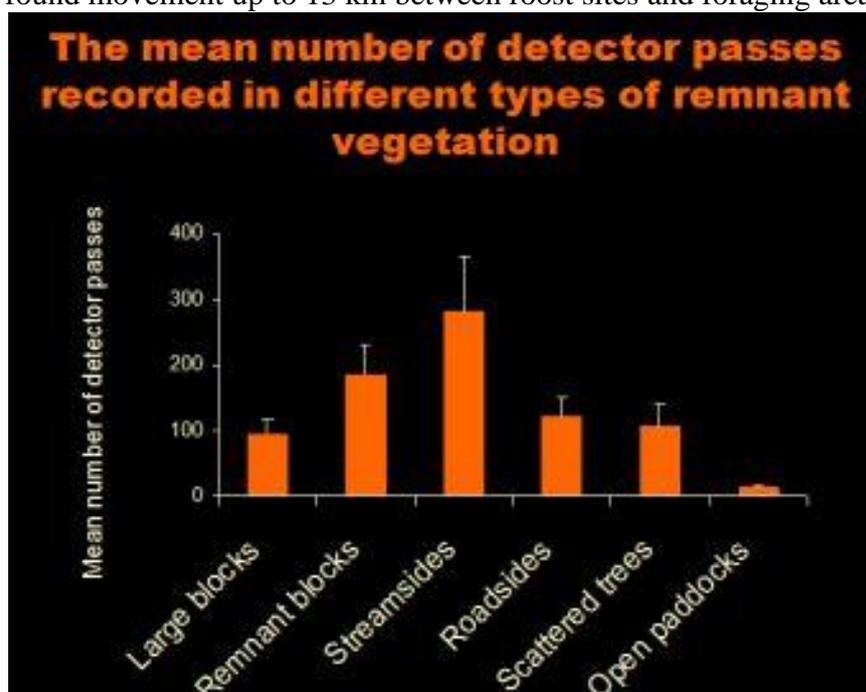
Key points from questions

- * Habitat trees can provide value to farms through shade and shelter, even up to 5-10% cover but no one was aware of any specific study to quantify economic value.
- * The loss of scattered habitat trees has been greatest in cropping areas compared to grazing. Thousands of trees have been lost in the Wimmera's cropping areas.
- * Land Sharing is more suited to grazing areas whereas Land Sparing could apply to cropping areas.
- * In England, there is a high value placed on old remnant trees which have aesthetic value, economic value and environmental value. They are protected through tight controls.
- * In Victoria the value of old remnant trees does not appear to be appreciated or supported through legislative controls.
- * There is on-going incremental loss of remnant trees and once gone these trees are not quickly replaceable, it can take hundreds of years to replace what we have lost. We need to recognise the heritage value of these trees.

Contact: Andrew Bennett;

The use of scattered trees by insectivorous bats - *Lindy Lumsden, Arthur Rylah Institute, Department of Primary Industries and Environment, Victoria.*

Lindy explained that insectivorous bats are widespread and relatively common in rural landscapes. They have been impacted upon by habitat loss but appear to be less impacted by habitat fragmentation. Insectivorous bats have high mobility which allows access to dispersed resources, including scattered trees. Tracking studies found movement up to 13 km between roost sites and foraging areas.



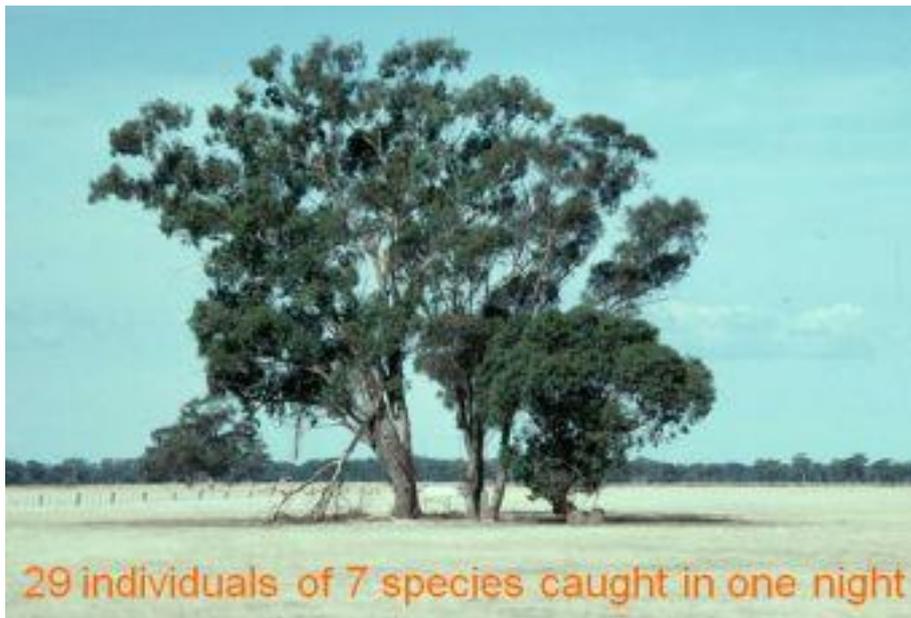
Scattered trees provide important habitat for insectivorous bats

How insectivorous bats use vegetation in the landscape

Lindy spoke about research to learn more about the types of vegetation used by bats in rural landscapes. The study was conducted in northern Victoria but applicable to other areas. The study had 195 sites sampled from range of remnant types and sizes (e.g. large and small blocks, streamsides, roadsides, scattered trees and open paddocks devoid of trees).

Bat detectors were used to record the movement of bats by detecting their high frequency echo location calls which enables the species to be identified, Examining the information collected from all 195 sites Lindy found streamsides areas had the highest level of activity. Surprisingly large forest blocks did not yield high levels of activity compared with remnant blocks, scattered trees and roadsides. Large forest blocks do not necessarily contain the large mature trees found scattered on farmlands. These large scattered farmland trees provide important habitat for insectivorous bats.

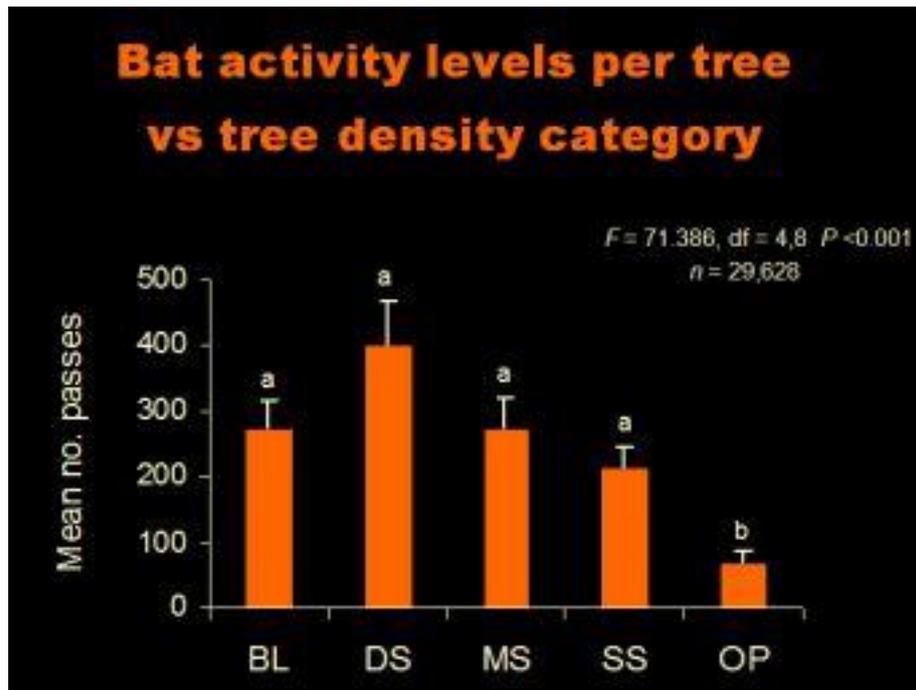
The use of scattered trees by insectivorous bats



Old paddock trees can provide important habitat for insectivorous bats

In order to learn more about how the density of scattered trees relates to bat activity a further study was set up to measure bat activity over five categories of scattered trees:

- * (BL) remnant blocks (> 35 trees/ha)
- * (DS) scattered trees - dense (11-35 trees/ha)
- * (MS) scattered trees - moderate (1-10 trees/ha)
- * (SS) scattered trees - sparse (< 1 tree/ha)
- * (OP) open paddock devoid of trees



The highest number of detections were in the scattered tree density of 25-30 large trees /ha.

Lindy sampled 30 sites with each site sampled over 4 nights. About 30,000 echo locations calls were analysed from which she was able to determine the presence of over 700 bats comprising 11 species. All of the known species for the study area were recorded in the study and bats were detected for every species in every one of the five categories of scattered trees. Lindy found that the highest number of detections were in the scattered tree density of 25-30 large trees /ha.

Lindy found there was some variation in between species and the use of various categories of scattered trees. The Little Forest Bat was detected more in higher density vegetation. The Gould's Wattled Bat is a fast flying species and did not use the dense vegetation as much as the scattered vegetation. Southern Freetail Bat is another fast flying species preferring more open areas and is a farmers friend because it is a natural insect controller on farms, consuming about half its body weight in insects per night.

The use of scattered trees as roost sites for bats

Lindy's has conducted extensive research into the Lesser Long-eared Bat and the Gould's Wattled Bat and found both species use scattered trees for roosting. No maternity roosts were detected for the Gould's Wattled Bat in scattered trees, roosting was predominantly males. The Lesser Long-eared Bats roosting in scattered trees had males, females and maternity roosts used equally. Dead trees are also important for this species roosting. At times Lindy found 20 -35 bats roosting in dead branches on live and dead trees. Lindy said bats require multiple roost trees as they alternate between roost trees quite regularly.



Key points from questions

- * Lesser Long-eared Bats can use fallen timber for roosting, though their preference is to be up off the ground.
- * There has been a reduction in observations of the Little Forest Bat in the Wombat Forest. Any loss of hollow bearing trees will impact on this species.

See also:

*[http://www.dse.vic.gov.au/__data/assets/pdf_file/0019/105436/Bats_and_Paddocks_Fact_Sheet_May_2003a.pdf Bats in Paddock Trees Fact Sheet, Arthur Rylah Institute]

*[[SWIFFT_meeting_notes_26_July_2012|Talk by Lindy Lumsden on Insectivorous Bats - SWIFFT meeting notes 26 July 2012]]

Contact: Lindy Lumsden, Arthur Rylah Institute

Paddock trees and the South eastern Red-tailed Black-Cockatoo -

Richard Hill, Senior Biodiversity Officer, Department of Primary Industries & Environment, Casterton

Richard provided a brief overview of the Red-tailed Black-Cockatoo (RTBC) program which has been going since 1998. He said the south-eastern population is estimated to be about 1500 birds with a fear that they are continuing to decline due to loss of feeding habitat. They have very specific habitat requirements such as large hollow trees for nesting and a specialised diet of seed from three species of trees for feeding (Buloke *Allocasuarina luehmannii* and two species of closely related Stringybark *Eucalyptus baxteri* and *Eucalyptus arenacea*).

Threats to South Eastern Red-tailed Black-Cockatoo

- * Habitat loss
- * Lack of hollows for nesting
- * Food shortages (this is considered the main driver for population decline)
- * Nest predation



Images of centre pivot irrigation landscape (2004) with 1963 Buloke tree cover superimposed in green (top slide) and same image of centre pivot irrigation landscape (2004) with 2004 Buloke tree cover in green (lower slide). Note the dramatic loss of habitat trees and remnants now mainly confined to roadsides.

Scattered tree resources: Buloke feeding resource

Buloke is the preferred food tree but less than 2% of this important food species remains. Large Bulokes with a >30cm DBH are the preferred source of seed. Bulokes are very slow growing and most large Buloke trees in the landscape are pre European settlement. The vast majority of these large trees occur as scattered trees on private land. Generally smaller trees from regeneration occur on roadsides. Cropping across the Buloke landscape is contributing to a decline of the large feeding trees thus directly impacting on the RTBC food source.

Richard discussed the decline of Bulokes in the RTBC range from 1963 to present, this was from work done by Martine Maron and Steffen Schultz in a study funded by the Wimmera CMA in 2009. The key numbers are a 63 % decline of Bulokes in cropping areas and a 32 % decline in grazing areas.

Category	1963	2004	Change (no trees)	% change
Cropping	13909	5375	-8534	-61.4
Grazing	11325	7661	-3664	-32.4
Conservation	36	31	-5	-13.9
Other/unknown	0	0	0	
Total trees	25270	13067	-12203	-48.3

Scattered tree resources: Nesting trees resource

Richard reiterated that Red-tails require eucalypts with large hollows which tend only to form in the old large diameter trees. The smallest diameter trees used for nesting are 60cm, with the average nesting trees 100 cm dia. He said that 90 % of the former large nesting trees have been lost, this has occurred mainly on Public Land, the majority of old large suitable nesting trees are on private land but there is minimal regeneration of scattered trees on private land, therefore the nesting resource will continue to decline.

The loss of nesting trees since 1947 has been dramatic. There has been a 39% loss on grazing landscapes and a 49% loss on in cropping areas, a 53% loss in Pivot irrigation and 69% loss in Plantation areas.

Scattered tree resources: Feeding trees resource

Richard spoke about the loss of Stringybark feeding trees across the landscape. About 54% of the Stringybark food resource has been cleared and now mainly exists in Public Land. Significant seed resources are still present in scattered trees on private land, the number of trees may be significantly reduced but the remaining trees have high seed crops making them a valuable feeding resource for RTBC. Unfortunately old large paddock trees are not being replaced at high enough rate to cater for RTBC feeding needs into the future.

Protecting habitat trees

Richard spoke about the extensive work in gaining the establishment of Environmental Significance Overlays (ESO2) in the West Wimmera Shire, which is a critical Local Government Area for Red-tailed Black-cockatoos. Due to changes in Victoria's native vegetation controls the ESO2 is the real control which covers about 70 % of the RTBC range.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) provides some degree of habitat protection but the level of tree removal undertaken without permits etc. is really not known or actively managed to the required level at present.

Key points from questions

We need to have a long term view of how to best deal with the current rate of loss and deal with the long timeframe replacement of Bulokes in the landscape. It is important to protect as many existing Bulokes as possible by a variety of means whilst at the same time undertaking regeneration in secure areas.

Contact: Richard Hill, DEPI, Casterton

Remnant habitat trees from a landholder perspective - *Steve Williams, landholder in Bendigo area*

Steve spoke about his goal as landholder to improve the production of biodiversity. He spoke about the linkage between Floristic Diversity - Invertebrate Diversity - Vertebrate Diversity.

Steve's block is 9.8ha and was mainly sheep grazing country before he undertook restoration which began 20 years ago. It is now a Land for Wildlife property with the main focus being habitat conservation.



Steve mapped the location of old growth trees and species on his property

Steve appreciated the heritage value of many old trees on his property and realized he could use these as a focal point for further habitat restoration. Old Growth Trees are an important element in the ecosystem delivering key services:

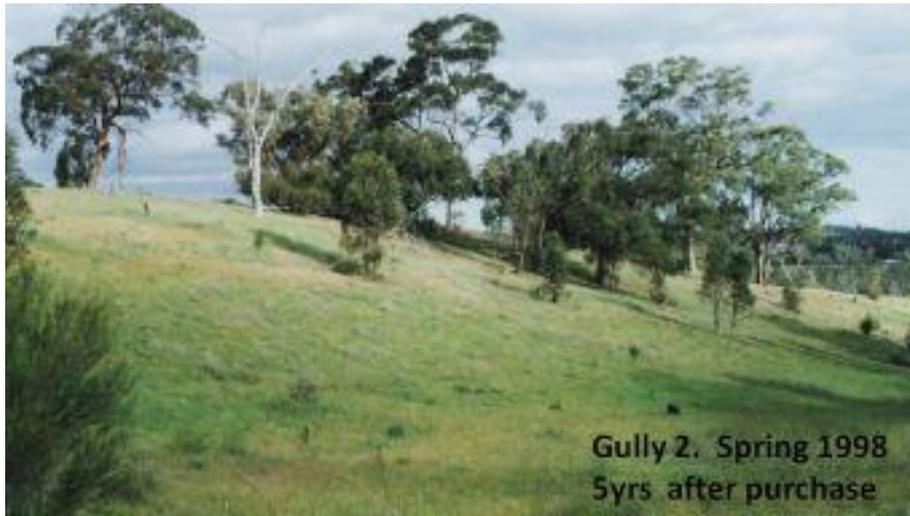
*Regeneration

*Habitat

*Minimise fire impacts

*Shade (particularly in heat wave conditions)

Steve showed a number of photos taken before and after 15 years of regeneration. He has been able to save the old growth trees and has more than doubled the volume of tree canopy. He has also observed a tremendous natural increase in floristic diversity across the property.



Part of property 5 years after purchase - remnant trees to form the nuclei for habitat restoration.



The same area as above after 15 years with established ecosystem supporting a diverse assemblage of moths, other invertebrates and vertebrate fauna.

Steve spoke the value of old growth tree services in providing a litter layer and habitat for invertebrates. Steve has monitored the humus layer around many of his old growth trees and measured the depth of this highly productive habitat for invertebrates. Steve has also studies moths in and around the humus layer of old growth trees on his property.

He found moths to be a good indicator of ecosystem health, they are very low in the food web and almost always eat living or dead plant material, fungi, lichen or algae but importantly they provide a food resource for a vast array of higher order consumers.

Steve explained the humus layer is an important component of the ecosystem. More than 80 % of the moth species on his property are reliant on the litter layer. Some pupae lay dormant for months or years and most species of moths spend a significant portion of their life cycle in the litter layer.

Steve estimates his block is now supporting more than twice the number of invertebrate species than it did 20 years ago. He said there has also been a significant increase in vertebrates.

Reptiles

Lace monitor, Olive legless lizard, Striped legless lizard, Tree dragon, Eastern bearded dragon, Robust Ctenotis, Bougainville's skink, Shingle-back.

Mammals

Koala, Sugar gliders, Tuan, Echidna, Antechinus, Brush tail possum,

Birds

Bush Stone-curlew, Barking owl, Powerful owl, Grey crowned babbler

Invertebrates



Image of moths found and photographed on Steve's block. Red dots indicate species which are dependent on humus layer/leaf litter under old growth trees or herb layer.

Key points from questions

- * Steve considers old growth trees provide vegetation systems that are probably less conducive to fire than low canopy regrowth areas.
- * Steve's property had been subject to salinity issues in the past but this has significantly reduced with changed land use and restoration.
- * Steve did not feel the need to incorporate low intensity burns on his block yet because the area is still undergoing a regenerative process. He felt the use of fire could do more harm to the biological regeneration which is evident on his block.

General discussion summary

- VicRoads has a proposal to duplicate the Western Highway beyond Ararat to Stawell. The first 10 km of works would erase large numbers of old growth Yellow Box, these trees are hundreds of years old and no amount of offsets can replace what could be lost.
- Andrew said we need to change the way we do planning to being pro-active rather than re-active. We need to get a clear picture of where we want to retain scattered trees as a highest priority areas - this is a challenge land managers/planners need to address now.
- Previous studies over many years by DPI in Victoria and similar agencies interstate have determined grazing properties can sustain 10-20 % tree cover without impacting on long term production. The situation is different in cropping areas due to mechanical/machinery issues.
- The best types of offsets for removal of old scattered trees is to ensure the offset permanently protects like for like i.e. trees of a similar stature - not revegetation.
- Farmers need to be educated about the value of old scattered trees on their properties.
- Planting for Red-tailed Black-cockatoo habitat is undertaken at 10 m intervals because it is known that the seed crop production for scattered trees is larger.
- Revegetation incorporating old habitat trees is highly desirable because it not only affords protection to the remnant tree but it provides an immediate biological sink for ecological processes in the revegetated area.

KEY POINTS SUMMARY

- Remnant scattered trees provide a range of high value landscape, biodiversity and ecosystem services.
- Old growth scattered trees are a legacy from the past - they are continuing to disappear and future generation will inherit a vastly different landscape.
- The value of old remnant trees does not appear to be appreciated or supported through adequate protection measures.
- Scattered trees are used extensively as foraging and roosting habitat by insectivorous bats
- Every old growth tree has value for bats and it is very important that we retain scattered trees in the landscape.
- Buloke trees are the preferred food tree for Red-tailed Black Cockatoos but less than 2% of this important food species remains.
- Old large paddock trees are not being replaced at high enough rate to cater for Red-tailed Black-Cockatoo feeding needs into the future.
- Old growth trees provide an important litter layer and habitat for invertebrates which can support a diversity of vertebrates.
- Old growth paddock trees have taken hundreds of years to grow. They cannot be replaced in a person's lifetime - we need to protect what remains.