Old Trees for Wildlife

Land for Wildlife Note No. 18 *September 1992*

Key words: Old trees, old growth, hollows, litter, invertebrates, dieback, revegetation trees - values *Area: Statewide*
W: 12-Ex-18 *Author: Doug Robinson & WB*

Old trees are an inspiring part of Victoria's landscapes and many rural properties. They are also particularly important for wildlife conservation. Dieback (rural tree decline) and clearing is taking its toll on our stock of old trees. This Note explains why they are important to wildlife and what can be done to protect these values. Stands of old trees are often referred to as 'old growth'. Old growth forest is now uncommon and so retention of all old trees is a priority for wildlife.

This Note also considers the issue of building on existing vegetation versus revegetation. Which is best for wildlife?

Why are big, old trees so valuable for the conservation of wildlife?

1. They are irreplaceable. Many of the large trees alive today are 200-800 years old or perhaps even older[1]. Such trees represent the vestiges of once-intact ecosystems and provide some sense of what the landscape was like before the arrival of Europeans. Trees planted now will need two centuries or more before they attain a similar form and position in the landscape[12]. However, estimates of rural tree decline suggest that most large trees on agricultural land will have died within 100 years [2,19], unless actions are taken to protect those trees now.

In many parts of the State the older trees needed by wildlife are now **restricted to private land, roadsides and other refuges**, having been cleared from public land many decades ago. These trees allow hollow-dependent wildlife species, such as Sugar Gliders, to persist in areas that would otherwise not support them.

2. Tree hollows only occur in mature trees. They provide essential refuge and breeding sites for many species of mammals and birds, as well as for many invertebrates, reptiles and frogs[9]. Thirty-seven per cent of Victorian mammals use hollows as nest sites or roost sites. Thirty-nine per cent of forest and woodland bird species are hollow-nesters[4,9]. Useful hollows for wildlife only begin to form in eucalypts after about 100 years [1,9,12], subsequently deepening and enlarging with age. The number of hollows per tree also increases with tree age[1,12], providing alternative roost sites for bats and arboreal mammals that use a number of different roost sites within their home range[4,11]. Hollows large enough to provide nest sites or roost sites for large possums, cockatoos and owls generally only develop in trees aged 200 years or older[12], leading to the dependence of some of these species on remnant patches of 'old-growth' forest[10,14].

3. By virtue of size, old trees provide more food resources and nesting resources than younger trees[16]. One 300 year old Grey Box (*Eucalyptus microcarpa*) with a height of 20 m and trunk diameter of 1.5 m has a bark surface area of approximately 94 square metres. A 20 year old tree with a trunk diameter of 20 cm and height of 15 m has a bark surface area of just 9 square metres. An animal can therefore forage as profitably on the one large tree as on 10 smaller trees, at the same time decreasing the risk of predation by not having to travel so often from one tree to the next. Healthy mature trees produce more nectar, foliage and fruits than young trees, which must spend much of their energy on growth in height. These highly productive nectar sources may be vital to the survival of some wildlife species, providing energy to nectar feeders (e.g. Regent Honeyeater) and species that rely on insects that are dependent on nectar (e.g. Brush-tailed Phascogale).

4. Litterfall is also positively correlated with tree size and tree age[20,3]. Litter is one of the key components of woodland and forest ecosystems [3,16,18]. The litter layer reduces the impact of water on soil, leading to more gradual run-off[7]. It gradually decomposes, providing a small, constant input of nutrients into the system [3]. It supports a huge array of invertebrates, some of which spend their whole lives in the litter layer, others of which spend their larval lives there and their adult lives in the tree canopy[13,15]. Maintenance of the litter layer accordingly provides food, not only for decomposers and insect-eating animals on the ground, but also for arboreal insectivores[18]. The litter layer provides refuge and nest sites for many species of reptile, frog and bird. Loss of the litter layer may lead to widespread declines in abundance of ground-dwelling species[18] (e.g. Antechinus, Nightjars).

5. Large trees drop large, rotten limbs. These limbs provide sustenance for decomposers, refuge for snakes, frogs, invertebrates, geckoes, lizards and mammals, cover from, and foraging areas for predators and perches for reptiles and birds that hunt by sallying and hawking.

What value do large trees have for landholders?

Large trees provide more shade, and in groups provide more protection from inclement weather, than small trees. They provide a more stable microclimate, the soil beneath large trees being relatively cooler in summer and warmer in winter.

They are often prolific nectar producers and valued by apiarists.

When growing in a linear fashion along the edges of roads or paddocks, large trees will provide a more effective windbreak for stock and crops than smaller trees, particularly if some smaller trees or shrubs are also present[6].

Large trees can provide a ready source of young plants (seedlings) of local provenance without the costs of purchase or propagation, assuming that an area is fenced off from stock. Fencing off areas may also encourage regeneration of other native plant species and greater use of the area by wildlife.

Old trees have deep root systems and can tap into underground nutrients that are beyond the reach of pasture plants. These are then released at the soil surface as flowers, leaves, twigs, branches, bark, sap, pollen, nectar and water vapour.

The stature and form of large trees are appreciated by many people as an aesthetic and recreational attribute (e.g. as a good picnic or rest spot, somewhere to relax whilst fishing).

Old eucalypts often have very limited value as timber due to extensive deterioration of the wood. They are typically

full of hollows and may contain cracked or rotten limbs. These other "attributes" outweigh their value as a source of timber which is much better provided by younger trees established as a woodlot. Young trees are of smaller diameter, can be cut green (thus reducing chainsaw wear) and will split whilst drying, qualities which make them far better suited to firewood production.

Managing old trees.

Nearly all of the benefits attributed to large trees assume that we have a functioning ecosystem in which large trees are healthy, are producing viable seed and are part of an environment that contains other species of wildlife. For example, a healthy tree drops leaves, bark and sticks that fall and become the litter layer. This is gradually decomposed by a range of organisms that, in turn, support a wide array of insectivores and fungivores. These support larger predators, and so forth. For such a system to survive, it is vital to fence off old trees to protect them from stock. Stock faeces adds to soil nutrients and this has been linked to tree decline. Stock may ringbark old trees, particularly stringybark eucalypts and their trampling can compact the soil and prevent the germination of seed. Stock trampling can cause damage to roots and alter the nature of the litter layer of leaves, twigs and branches.

Furthermore, the fenced-off area should extend beyond the canopy of the older trees, so that young plants are not competing directly with the old trees for light or water. Chemicals produced by the leaves of the mature tree may also inhibit seedling establishment beneath the tree.

In many instances, where mature trees are fenced off and protected from stock, some replanting will also be necessary to restore the understorey and ground layers of vegetation, to provide replacement young trees, or fill in gaps along streamside corridors and in remnant stands of vegetation. The most important action is the fencing off of the mature trees. Protection of these trees will increase their chances of living an extra 100 years, by which time the replacement trees will just be beginning to form their first hollow and attract their first bat or glider. Nest boxes may be used to provide temporary accommodation for wildlife in some circumstances but there are many unknown factors associated with their use (see LFW Note No. 14).

In summary, it is usually necessary to fence, revegetate (especially with understorey species) and connect.

Throughout rural Victoria many old trees are dying from 'dieback' which may result from the combined effects of increased insect predation and other pathogens (e.g. cinnamon fungus), changed soil chemistry, salinity, exposure to extremes of weather, drought, old age and other factors. Dr Jill Landsberg of the CSIRO found that stock access beneath trees is important in determining the nutrient levels of foliage and insect attack at her NSW study sites[5]. She believes that increased nutrient levels in leaves at sites with stock access probably results from dung. Fenced sites showed lower nutrient levels and less insect damage. Fencing to exclude stock is the appropriate management response, although limited grazing may still be possible.

Retention or revegetation?

Vegetation is being re-established throughout Victoria for salinity control, stock shade and shelter, erosion control and as wildlife habitat. These plantings will not provide hollows for 100-200 years.

In many parts of the Victorian countryside all the trees have been removed. In such cases replanting is the only option for the restoration of wildlife habitats and revegetation of recharge areas and creeklines.

However, in some areas remnants of the original native vegetation persist, often as scattered mature trees in paddocks. In such instances landholders have a choice between revegetation by replanting, revegetation through protection of mature trees (and seed fall from the trees), or a combination thereof. Which option will provide the best wildlife habitat?

Obviously the choice will depend partly on the aim of the landholder and the presence or absence of vegetation at the target site. For instance, many saline areas and creeklines are denuded of vegetation. In such situations, control of rising groundwater and erosion will require planting many young trees and shrubs.

Where wildlife conservation is an important aim of revegetation and mature trees are present, the protection of those mature trees should be paramount. Indeed, it has been concluded that the retention and protection of stands of old trees (the larger the stand the better) is probably the single most important conservation action that can be taken on our own land, particularly where mature trees form a natural corridor and buffer along the edges of creeks[17].

References

1. Ambrose, G. J. 1982. An ecological and behavioural study of vertebrates using hollows in eucalypt branches, Ph.D Thesis, La Trove University.
2. Anon. 1980. *Tree Decline in Rural Victoria.* Institute of Foresters of Australia, Melbourne.
3. Attiwill, P.M. & Leeper, G.W. 1987. *Forests Soils and Nutrient Cycles.* Melbourne University Press, Melbourne.
4. Australian Biological Research Group, 1985. The impacts of timber production and harvesting on native flora and fauna. Report of the Board of Inquiry into the Timber Industry in Victoria, Vol. 2. Victorian Government Printer Office, Melbourne.
5. Beckmann, R. 1990. *Rural dieback: restoring a balance.* Ecos 62, Summer 1989/90.
6. Breckwoldt, R. 1983. *Wildlife in the Home Paddock.* Angus & Robertson, Sydney.
7. Breckwoldt, R. 1986. *The Last Stand.* Aust. Govt. Publishing Service, Canberra.
8. Gilmore, A.M. 1985. The influence of vegetation structure on the density of insectivorous birds, pp. 21-31 in *Birds of Eucalypt Forest and Woodland: Ecology, Conservation, Management,* ed. by A. Keast, H.F. Recher, H. Ford & D. Saunders, RAOU and Surrey Beatty & Sons, Chipping Norton.
9. Land for Wildlife Note No. 6, December 1990, *Wildlife needs natural tree hollows,* Dep't of Conservation and Environment.
10. Loyn, R. H. 1985. Bird populations in successional forests of Mountain Ash *Eucalyptus regnans* in central Victoria. *Emu* 85: 213-25.
11. Lunney, D., Barker, J., Priddel, D. & O'Connel, M. 1988. Roost selection by Gould's Long-eared Bat, *Nyctophilus gouldi* Tomes (Chiroptera: Vespertilionidae), in logged forest on the south coast of New South Wales. *Aust. Wildl. Res.* 15: 375-84.
12. Mackowski, C.M. 1984. The ontogeny of hollows in Blackbutt (*Eucalyptus pilularis*) and its relevance to the management of forests for possums, gliders and timber, pp. 553-67 in *Possums and Gliders,* ed. by A.P. Smith and I. D. Hume, Australian Mammal Society, Sydney.
13. Mathews, E.G. & Kitching, R.L. 1984. *Insect Ecology 2nd Ed.* University of Queensland Press, Brisbane.
14. Milledge, D.R., Palmer, C.L. & Nelson, J. L. 1991. "Barometers of change": the distribution of large owls and gliders in Mountain Ash Forests of the Victorian Central Highlands and their potential as management indicators, pp. 53-65 in *Conservation of Australia's Forest Fauna,* ed. by D. Lunney, royal Zoological Society of NSW, Mosman.
15. New, T.R. 1988. *Associations between Insects and Plants.* The NSW University press, Sydney.
16. Recher, H.F. 1991. The conservation and management of eucalypt forest birds: resource requirements for nesting and foraging, pp. 25-34 in *Conservation of Australia's Forest Fauna,* ed. by D. Lunney, Royal Zoological Society of NSW, Mosman.
17. Recher, H.F. 1992. The past and future of agriculture: resolving environmental conflict. *Proc. 6th Aust. Soc. of Agronomy Conf.,* Armidale.
18. Recher, H.F. & Lim, L. 1990. A review of current ideas of the extinction, conservation and management of Australia's terrestrial vertebrate fauna. *Proc. Ecol. Soc. Aust.* 16: 287-301.
19. Saunders, D.A., Rowley, I. & Smith, G. T. 1985. The effects of clearing for agriculture on the distribution of cockatoos in the southwest of Western Australia, pp. 309-21 in *Birds of Eucalypt Forests and Woodlands: Ecology, Conservation, Management,* ed. by A. Keast, H.F. Recher, H. Ford & D. Saunders, RAOU and Surrey Beatty & Sons, Chipping Norton.
20. Turnbull, C.R.A. & Madden, J. L. 1983. Relationship of litterfall to basal area and climatic variables in cool temperate forests of southern Tasmania. *Aust. J. Ecol.* 8: 425-431.

Printed on recycled paper to help conserve wildlife habitat