Treasuring wandoo – a such a marvellous tree

A tribute to Joanna Seabrook

Prepared by Liz Manning and Peter White on behalf of the Wandoo Recovery Group

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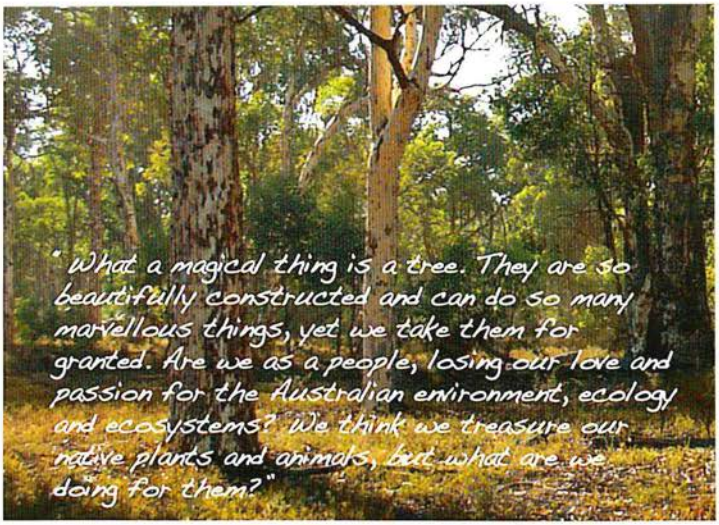


Joanna Seabrook, 2003 (courtesy Julia Seabrook).

The above quote is a sentiment often expressed by Joanna Seabrook. This paper is dedicated to her memory as a founding and honorary member of the Wandoo Recovery Group. A staunch advocate and an ambassador for Australia's native plants and animals, Joanna really loved wandoo. She left behind an inspiring legacy of knowledge, instruction, passion and determination.

Summary

Wandoo (*Eucalyptus wandoo*) is one of south-west Western Australia's most important eucalypts. It affords a wealth of cultural and economic benefits to the State and its ecological value is immeasurable. However, wandoo has rarely been given the protection and respect it deserves. Clearing has greatly diminished and fragmented the distribution of wandoo, leading to a loss of habitat for wildlife. Moreover, selective logging of wandoo, inappropriate fire regimes and agricultural practices have modified stand density and canopy cover, further damaging the associated plant and animal communities. Although clearing has effectively ceased, degradation of habitat fragments continues. Many remaining trees are dying while natural regeneration and tree planting efforts are not keeping pace with this loss.

In this paper we discuss wandoo's many virtues, drawing on the observations and opinions of local naturalists, landholders and a wide selection of published reports. Methods to safeguard wandoo's dwindling remnants are explored, such as retaining, protecting and expanding existing stands and combining conservation with commercial options. The destruction and decline of our woodlands must be reversed before more of our unique plants and animals, already vulnerable, are lost forever.

Wandoo woodland, Helena Catchment (Liz Manning).

Introducing wandoo

"Wandoo is magnificent country from the viewpoint of the trees, the aesthetic value, fauna and also the flora."
(Erik Hopkins in Gaynor, 2008)

Wandoo country stretches from the forested catchments of the Darling Scarp, east and southwards across the Wheatbelt and Great Southern regions. Wandoo can be a truly magnificent tree; tall and stately with strong limbs and a spreading crown. Its mottled bark changes colour in the light through shades of white, silver, cream and pink, accentuating the tree's appearance, making it a characteristic feature across much of Western Australia's agricultural region.

Many foresters who spend time in wandoo country view it as the gem of the forest formations. The dense timber with its superior strength and durability was used extensively for heavy construction purposes, as well as being an excellent timber for building, particularly flooring. In earlier years, sawmills such as Boyup Brook and Narrogin were almost entirely dependent on its supply. The bark is rich in tannins and the Industrial Extracts mill at Toodyay, and others, relied on wandoo for the production of tannin. Wandoo woodlands are highly prized by beekeepers for production of honey which is mild in flavour and of excellent quality. In earlier times wandoo was the mainstay of the apiary industry.

Trees play a vital role in balancing ecological and hydrological systems, assisting water to infiltrate the soil, maintaining biodiversity and protecting catchments against the risk of salinity. Wandoo dominates the Mundaring and Dale River catchments which supply the majority of surface fresh water to Perth and the Goldfields. The forests temper the climate of the Swan Coastal Plain and surrounding hills, offering excellent opportunities for recreational enjoyment. Few cities in the world can boast such an asset.

Wandoo woodlands

" One of the enduring characteristics of wandoo woodland is its variability... presenting a scene that is constantly changing."
(Roger Underwood – in Gaynor, 2008)

Wandoo is beautiful for the great variety in the form of individual trees, with trunks and crowns full of unusual twists, galls and gnarls. Old-growth wandoo country is dominated by large, old trees that are widely spaced and interspersed with scattered clumps of younger trees. However, much of the wandoo forest has been logged, regenerating to form dense stands of younger trees. Here, the understorey has changed from open grass to thick shrub.

Wandoo woodlands are wonderful places to wander through. Open and sunny all year round, they are cherished by bushwalkers, birdwatchers and wildflower enthusiasts. Wildflowers abound in spring and the vibrant colours of species such as *Hibbertia* (guinea flowers), *Verticordia* (feather flowers), *Dampiera*, *Banksia* and *Gastrolobium* (poison plants) create a vivid splash of colour. The spreading canopies of large trees offer filtered shade to understorey plants, while their root systems anchor the soil, capturing water and nutrients very efficiently. Delicate herbs such as *Lechenaultia*, *Caladenia* (orchids), *Drosera* (sundews), *Stylidium* (triggerplants) and *Helichrysum* (everlastings) carpet the ground. Tread lightly, look carefully and you will be amazed at the life within our woodlands.

A wildlife haven

Wandoo woodlands afford such generous habitat for wildlife. The trees and shrubs flower profusely at different times of the year, their nectar-rich flowers provide an almost constant food supply for birds such as honeyeaters, and for bats. Insects also feed in the canopy and are eaten by insectivorous birds such as the western yellow robin, golden whistler and the rufous treecreeper. Seeds and fruit of canopy trees are another valuable food source. Flocks of parrots and cockatoos move across the woodlands, feeding and nesting. Red-tailed phascogales, bats and birds utilise the upper branches and hollows of standing trees. Possums often rest in tree hollows during the day and come out at night to feed on the leaves. Kangaroos are also commonly seen grazing in wandoo woodlands. In wandoo country near Toodyay nearly 100 bird species, with 59 breeding, have been found, including emus and wedge-tailed eagles (Toodyay Naturalists' Club, 1986).

Wandoo sheds its bark each autumn and this, together with fallen leaves, flowers, spent buds and branches, forms a litter layer. Litter protects the soil against erosion and temperature extremes as well as providing food, shelter and protection to a myriad of invertebrates, reptiles and small mammals. Robins, button quails, yellow-rumped thornbills and white-browed babblers forage amongst it while other birds such as willie wagtails, magpies, ravens and eagles use the litter as nesting material. Bacteria and fungi feed on the litter aiding the decomposition process. Fungi, a primary food source for many native mammals, depend on the bark and moist decaying wood for nutrition. A single veteran tree can play host to many thousands of invertebrates. It's little wonder wandoo has been dubbed 'one of nature's boarding houses'.

A massive eagle nest, built high in a wandoo (Tracey Smith).

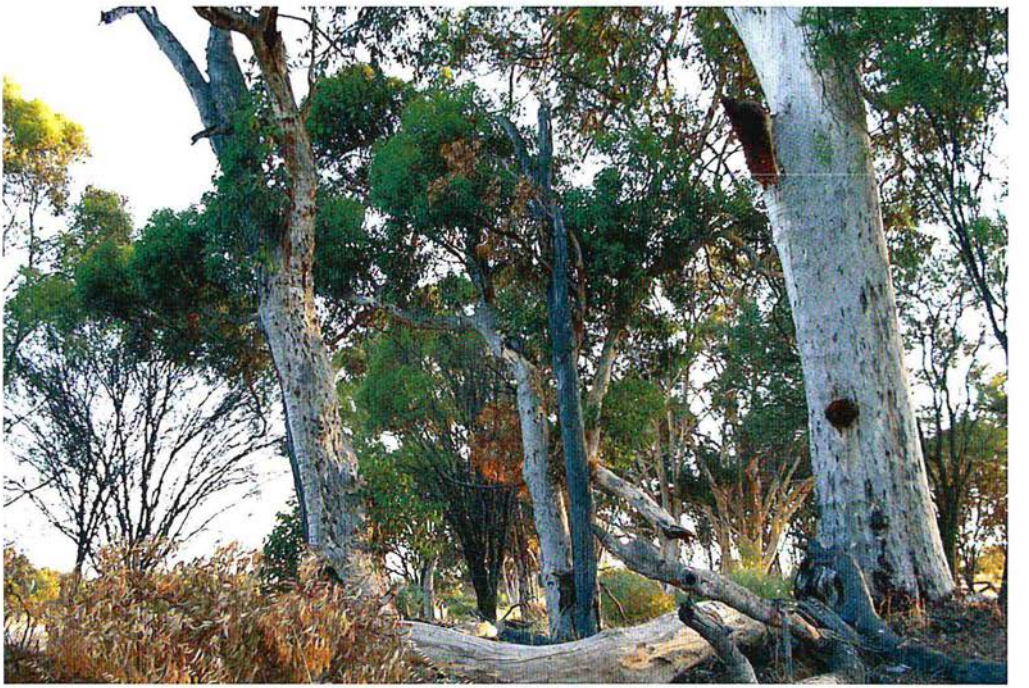
Hollows – more than just empty spaces

"Hollows that form in mature trees such as wandoo are a vital resource for Australia's fauna – around 400 different vertebrate species use hollows and of these, some 100 cannot survive without them."
(Hussey, 2005)

Hollows are created by a complex interplay between termites, borers, fire, fungi and wind shear. Research by Rose (1993) explains this process. Wandoo trees need to reach 120 to 150 years of age before hollows start to form, though slow growth rates may stretch this to 200 years. Most old trees carry the scars of bushfires. Fires can damage tree crowns and trunks making them susceptible to attack by insects and fungi. Woodborers and termites attack and eat out the heartwood. Fungi can invade the holes formed by wood-boring insects or enter the tree either through an injury site such as a fire scar or branch break, or through the roots. The fungi then attack the sapwood and heartwood, breaking down the cell structure causing decay. Wind movements to the tree compress the decayed matter within it, forming a hollow. When an infected branch breaks and crashes to the ground, the hollow created becomes accessible to wildlife.

Along with salmon gum, wandoo provides most of the hollows used by wildlife in the Wheatbelt. Striated pardalotes nest in small knot holes, with bats, reptiles and other vertebrates also using smaller hollows. Black cockatoos, parrots and larger mammals prefer larger hollows (Saunders, 1979 and Saunders et. al, 1982). Old trees provide the most hollows of varying size and afford the greatest value to hollow-dependent fauna. Dead wood is often considered by many people as useful only for burning. However, these examples and those below reveal its true value.

"Wandoo is a tremendously useful tree for the hollows... practically every bird that nests in hollows – and that's a lot – use the wandoos; it's a very, very important tree."
(Ray Garstone in Gaynor, 2008)



Top Hollows in mature wandoo trees provide habitat for many animals (Liz Manning).
Above The breaking off of part of the tree provides access to the hollow for wildlife (Liz Manning).

Dead but still standing

Many large trees have been killed or damaged by practices such as ringbarking and clearing burns. Some, relics from this previous era, are still standing. Favoured by birds for perches and roosting sites, these trees contain many hollows. They add structural diversity and complexity to the landscape, helping to modify the microclimate and protect seedlings and invertebrates from harsh, drying conditions (White and Manning, 2005). Standing dead trees have virtually no impact on the growth rate of the surrounding plants because they don't compete for light, water and nutrients. Their low biomass, low density and the small area they occupy make them essential structures in our rural landscapes.

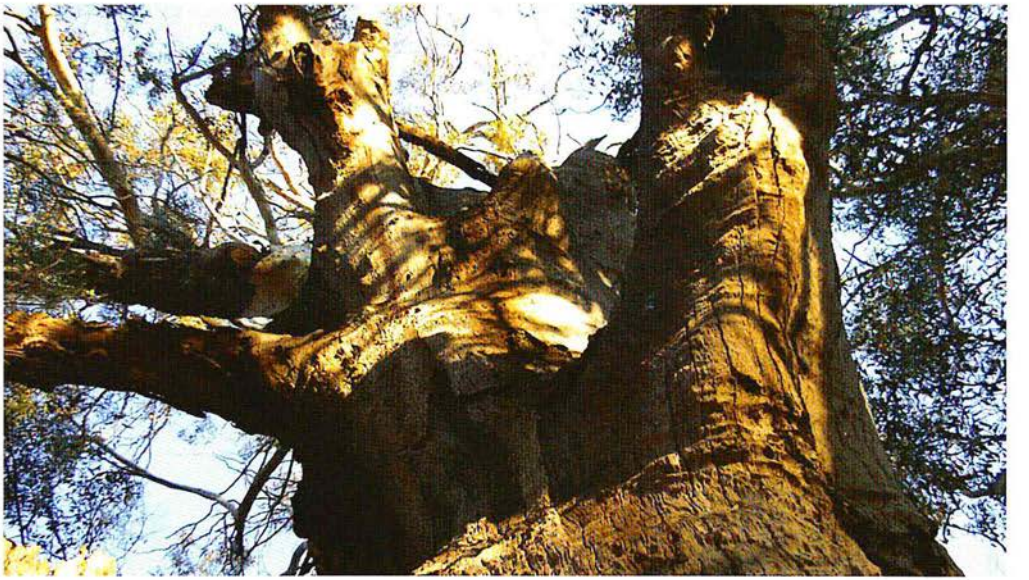
(Manning et al., 2006)

Grounded logs

Wandoo frequently drop large branches. Many are hollow, affording homes to ground-dwelling fauna such as numbats, chuditch, echidna, mardo, as well as snakes, monitors and western bearded dragons. The brush-tailed possum and pygmy possum use hollows both in trees and on the ground. Numbats are shy, elusive animals that shelter from predators and rear their young in fallen logs or in holes under them, feeding predominantly on termites. Rufous treecreepers spend a substantial amount of time foraging on the ground during winter and spring. The young are weak flyers and depend on hollow logs for refuge. Fallen trees also act as nurse logs for ferns, mosses and lichens and as a substrate for fungi that decompose wood and recycle nutrients.

Above right Striated pardalotes use small knot holes in wandoo branches (Liz Manning).

Right Grounded wandoo logs provide essential habitat for numbats (Babs and Bert Wells/DEC).



Top This veteran wandoo plays host to many animals (Liz Manning).
Above left and above A willy wagtail sits on her nest, built from twigs and leaves, in Dryandra woodland (Liz Manning).
Left Echidna disappearing into a wandoo log (Peter White).

Animals need specific habitat

Many of Australia's native fauna require specific habitat to survive and reproduce, such as suitable hollows, adequate food, shelter from inclement weather, and refuge from natural enemies and competitors. Many species have preferences for bark characteristics, growth form, chemical composition of foliage, nectar, and associated invertebrates. The structure of the canopy, together with the floristics and understorey of a woodland strongly influences where different animals choose to live within it. Wandoo's extensive range, its longevity, and its susceptibility to hollow formation make it a prime habitat resource for wildlife.

Food sources and nests

Studies at Coomallo Creek and Manmanning (Saunders, 1977) in south-west WA demonstrate why nesting sites need to be close to adequate food supplies or connected to wide vegetation corridors leading to other sources of food. These studies examined the effects of clearing on the breeding success of Carnaby's black cockatoos. Where food sources were in short supply or patchily distributed, the adult birds spent more time foraging and commuting to food sources, with less time to feed and care for the young in the nest. Hot weather restricted foraging to the cooler times of the day and the birds did not have sufficient time to satisfy their own needs and those of their chicks. Breeding success and the health of chicks were affected, resulting in lower body weights and reduced survival of young birds.

Proportion of wandoo

Studies at Dryandra (Wilson and Recher, 2001) found that the proportion of wandoo is the most important habitat variable explaining the presence or absence of yellow-plumed honeyeaters. The foraging ecology and habitat selection of this species was examined to investigate the decline of the species in fragmented landscapes and to help develop a management plan for its conservation. The birds prefer nectar, but in its absence rely on bark probing to catch insects, or take them by hawking, hovering and snatching. Results showed yellow-plumed honeyeaters preferred the more productive, undisturbed woodlands dominated by mature wandoo to those on poorer soils dominated by powderbark or brown mallet.

Above Yellow-plumed honeyeater foraging on a wandoo in Dryandra woodland (Liz Manning).

Habitat and reproduction

Studies at Dryandra and Stirling Range National Park (Rose, 1996 and Luck, 2001, 2002) found that habitat quality strongly influenced the reproductive success of the rufous treecreeper. Treecreepers are social birds that form interactive neighbourhoods and territories as a means of social organisation. These studies examined three spatial scales – landscape, woodland and territory. Treecreepers prefer wandoo woodland to powderbark, mixed jarrah-marri, and brown mallet. Within wandoo woodlands, birds like to nest in hollows, mostly in dead branches of wandoo trees, and prefer large trees and old growth wandoo woodland in which to establish their territories.

Wandoo remnants – a dwindling supply

" Where have all the plants gone? It is indeed a rhetorical question as we know what happened to them – they have fallen victim to clearing and weeds."
(Joanna Seabrook, 2004)

With up to 98 per cent of the Wheatbelt cleared, wandoo's once extensive woodlands have been largely destroyed. Except for small patches of State forest, most wandoo is confined to scattered reserves, road verges, stream banks, dotted in paddocks or around farm buildings. These remnants and scattered trees are extremely important because they act as stepping stones to help wildlife move through the landscape, provide shade and shelter for livestock and serve as a valuable plant seed source. Fragmented, isolated and frequently degraded, they are in a precarious state; many remnants are small or remote, providing fewer resources for wildlife. Agricultural pressures are pervasive; most patches of remnant vegetation are not really bush, but a stand of ancient trees; unfenced and with no understorey except grassy weeds. These patches have almost no chance of regenerating under conventional, continual livestock grazing and regular fertiliser use. They are sometimes referred to as the 'living dead' because they are the last generation. Patches of true bush remain mainly because farmers chose to fence off country to prevent livestock grazing on native poison bushes that grow prolifically under wandoo.

The felling of mature wandoo in forests and woodlands has created a much younger age class of tree which is unsuitable habitat for many species. For example, wandoo is the most important breeding habitat for Carnaby's black cockatoo, but continued degradation of habitat fragments is seriously threatening breeding populations (Stojanovic, 2009). Moreover, repeated and extensive burning of woodland and removal of dead wood has further deprived many small mammals of food supplies and protection from those devastating introduced predators, the fox and cat.

Today, plant and animal associations in the temperate woodlands are the most endangered and vulnerable in Australia. For example, of more than 100 bird species that still appear in the Avon Valley, fewer than 20 would continue to thrive if all trees and shrublands were to disappear. The rest must have timber and shrubland or large areas of protected wetlands to provide food, nesting sites and shelter (Toodyay Naturalists' Club, 1986)

Above Female Carnaby's black cockatoo at a hollow mouth in wandoo (D. Stojanovic).

Looking after what's left

"I believe we should stop trying to make Australia look like somewhere else and make full use of the wonderful Australian flora; after all it has been purpose built... Let us treasure our trees."
(Joanna Seabrook, 2004)

While clearing controls are now in place, merely protecting woodlands is not enough; they need to be carefully managed to ensure good health and sustainability. Unless management practices change, trees will continue to disappear and opportunities for natural regeneration will be lost. This will have disastrous consequences for wildlife, landscape aesthetics and function and livestock. How remnants are managed depends not only on what the landowner wants and the broader community expect from them, but also what the vegetation needs. The points below describe actions people can take in looking after what's left:

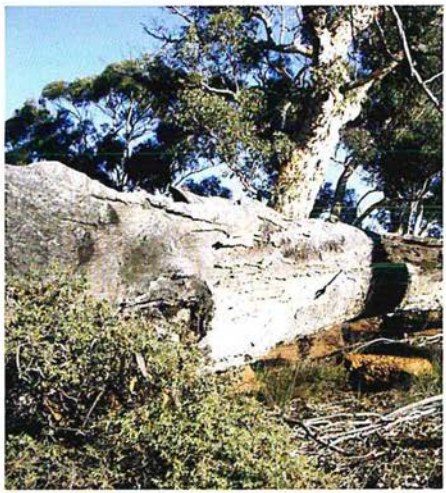
Retain: Many existing trees are dying of old age or disease. With little regeneration occurring, their loss will have a major impact in the rural landscape if they are not replaced. Retaining remnant vegetation is probably the single most important wildlife conservation action that can be taken on private land.

Protect: Fencing remnant stands will protect them against damage from stock, feral animals, disease and weeds. Plantings around the perimeter of remnants will buffer them from the effects of agricultural fertilisers and chemical spray drift and will reduce weed invasion. Minimising fertiliser use will greatly enhance conditions for natural regeneration as most native plants are intolerant of fertiliser, and grow best in low soil fertility. Any use of fire must be conducted with sensitivity and care.

Expand: There is an urgent need to maintain wide bush corridors leading out from the main reserves to connect isolated remnants and assist the movement of small birds and animals. Road reserves, rivers or creek lines can serve as effective wildlife corridors if they are fenced and planted with a mix of suitable local species. Providing a habitat for little birds will spread benefit to everything else in the local ecosystems.

Retain dead trees and logs: Dead trees and logs are essential habitat. Retaining them will protect small animals and create favourable conditions for the regeneration of young plants.

Encourage diversity: A healthy, diverse understorey is critical for the health and well-being of woodland fauna; providing food, shelter and protection. Diversity improves landscape aesthetics and values, and enhances recreational enjoyment. The plentiful use of native plants in streetscapes, public open spaces and restoration projects will create a bird haven and help save Australian flora.



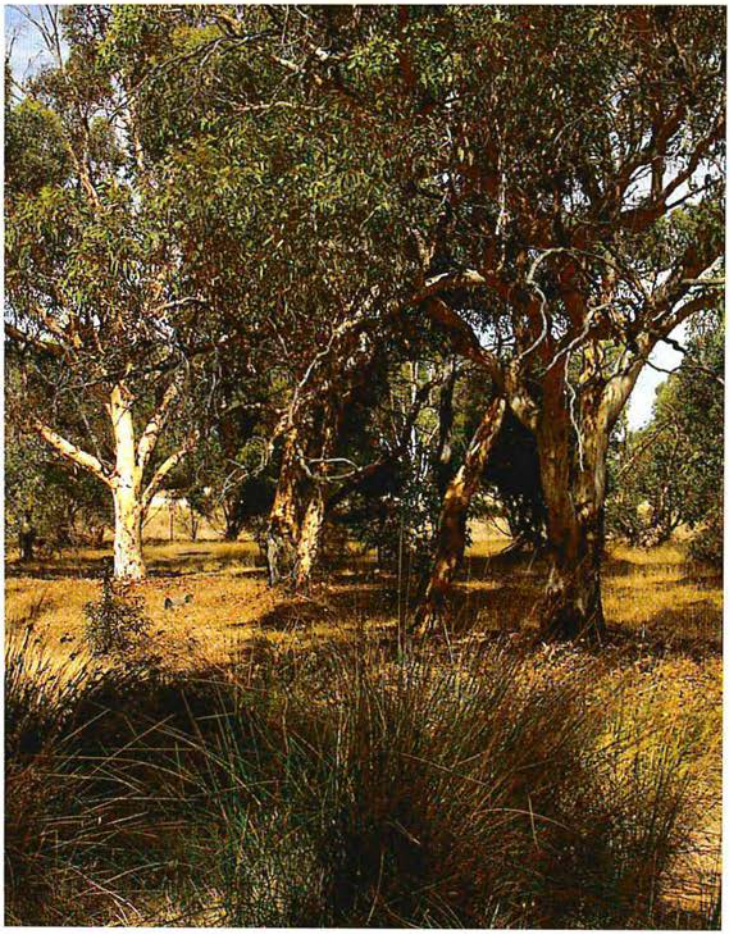
Above Fallen trees make wonderful habitat and give protection to smaller plants (Liz Manning).

Case study – combining conservation and wood production

It is possible, with careful management, to produce items of economic value from remnant vegetation without damaging the nature conservation values of the stand. However, the potential varies greatly and depends on the intensity, duration, extent, and type of use.

Julyan and Susan Sumner manage their 260-hectare wandoo woodland near Boyup Brook for conservation and wood production (Bradshaw, 2005; Julyan Sumner pers. com. 2009). The Sumner's wandoo is predominantly dense re-growth stands of small trees with sparse crowns. In the 1890s, State Government policy directed that large areas of the Upper Blackwood Valley be ring-barked as a precursor to opening up the land for selection

Above A country road reserve dominated by wandoo links a revegetated creek line to a larger patch of bushland (Liz Manning).

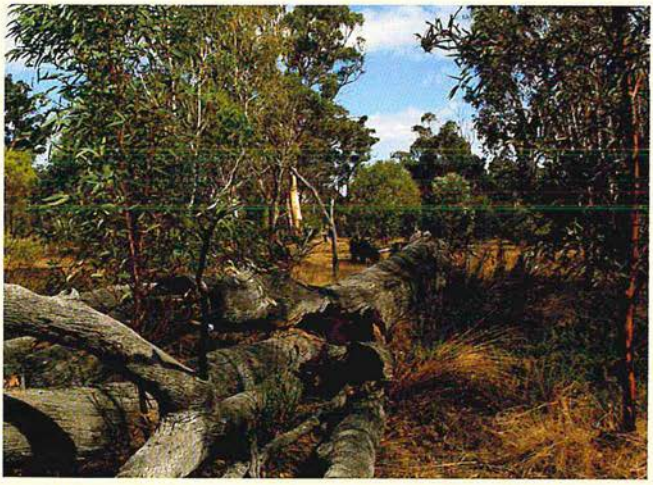


Right The creek line has been fenced and revegetated. The wandoo and jam trees are regenerating on their own (Liz Manning).

and to provide employment. Selective cutting of re-growth stands to supply sleepers occurred from 1945 until the mid 1960s. Julyan and Susan want to improve the condition and the aesthetic value of their forest, protect the wildlife habitat, and earn a sustainable income from the property. In 1981, Julyan selectively cut wandoo to build his house and provide strainer posts and struts for sale. Since then, he has been gradually developing an uneven aged structure by thinning the dense re-growth stands to provide an income from saw logs, strainer posts and firewood while keeping a sustainable number of good quality trees to grow on. The larger trees have been retained as wildlife habitat. Re-growth occurs through coppicing or encouraging seed germination on ash beds. Julyan monitors the grazing pressure by kangaroos on the understorey and young seedlings and hopes these management actions will improve the forest's ability to withstand drought and increase vigor of the canopy and the understorey. Already an increase in tree canopy spread has been observed. We praise this case study as a wonderful working example of active adaptive management that gives a sustainable economic return while enhancing the natural habitat values of remnant woodland.

"The planting of a tree, especially one of the long-lived hardwood trees, is a gift which you can make to posterity at almost no cost and with almost no trouble, and if the tree takes root it will far outlive the visible effect of any of your other actions, good or evil."
(George Orwell, 1946)

Above Julyan and Susan Sumner selectively thin their wandoo for saw logs and posts. Young healthy trees are retained along with large habitat trees and an intact understorey (Julyan Sumner).



Above This large wandoo was ringbarked more than 40 years ago. It fell down recently and will be left untouched for use by wildlife (Liz Manning).

More information

For more information about the flora and fauna of wandoo woodlands, contact your local *Land for Wildlife* officer or DEC office. Two useful books are *How to manage your wandoo woodlands* by B.M.J. Hussey and *Managing your Bushland* by B.M.J. Hussey and K. Wallace (further details below).

Copies of reports and information about wandoo, Wandoo Recovery Group (WRG) projects and research are available from DEC's website at www.dec.wa.gov.au. For more information on the WRG or to join the mailing list, contact Executive Officer Liz Manning on 0427 441 482 or email Elizabeth.Manning@bigpond.com.

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