Note 5 — 1999

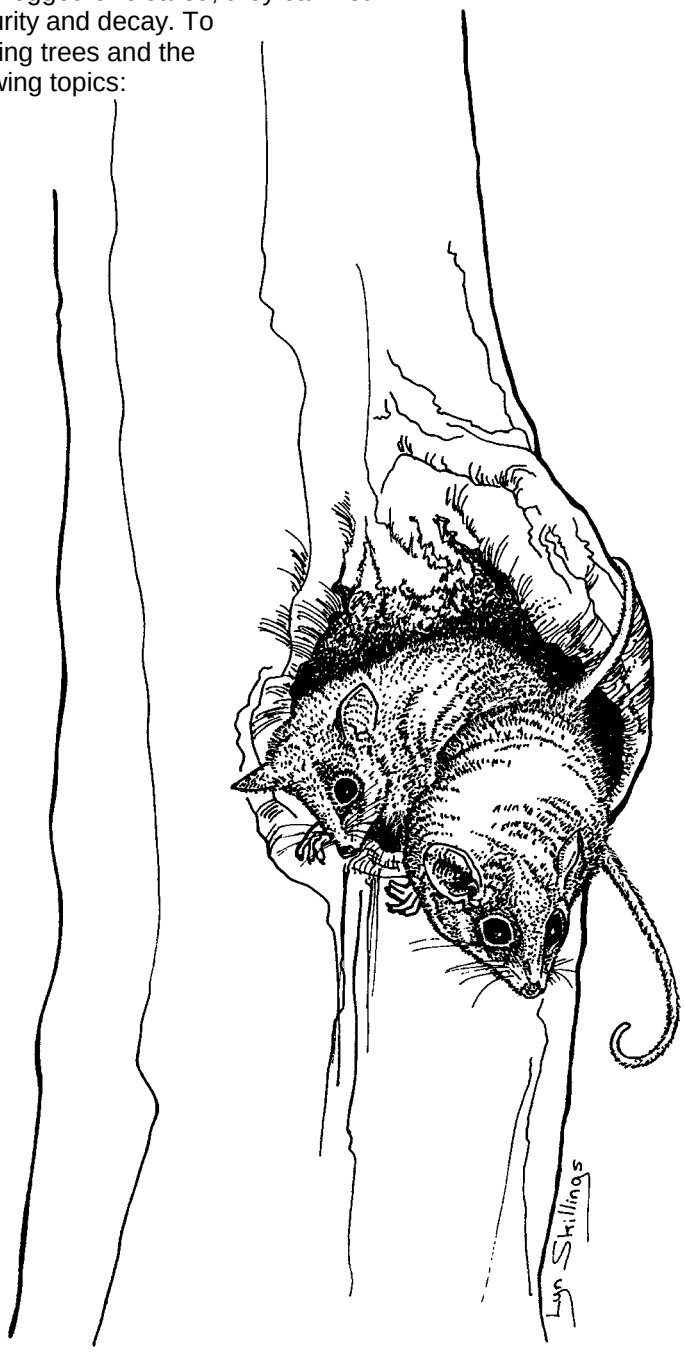
natural tree hollows

ESSENTIAL FOR WILDLIFE

This note explores some reasons for the disappearance and decline of wildlife on farmland due to the destruction of natural tree hollows. Trees with hollows and the animals that depend on them are disappearing. Natural tree hollows are valuable and often essential for many wildlife species. They provide refuge from the weather and predators, and safe sites for roosting and breeding. Destroying living or dead hollow-bearing trees displaces or kills wildlife dependant on those hollows.

Only old trees have hollows. As they fall and die or are logged or cleared, they can not be replaced without 100 or more years of growth, maturity and decay. To increase understanding and awareness of hollow-bearing trees and the urgent need to protect them, this note covers the following topics:

- what tree hollows are and how they form;
- what tree species produce hollows;
- what lives and depends on them; and,
- what you can do to retain and protect trees with natural hollows



what are tree hollows and how do they form?

Valuable hollows for wildlife are generally found in mature and dead trees. Openings range from as small as 2 cm to as large as 75 cm, with depths ranging anywhere from 10 cm to 10 metres (pers. comm. Kavanagh). Young trees do not generally contain the valuable hollows for wildlife as they are healthy and resilient to the numerous factors contributing to hollow formation. Trees with hollows occur in paddocks and amongst bushland, travelling stock routes, backyards and reserves.

As trees age over time, they are subject to various natural forces such as wind, heat, fire, lightning, rain and attack from insects such as termites and beetles, fungi, bacteria and so on (Gibbons and Lindenmayer 1997). Whilst the external, living part of the tree may remain healthy, injuries to the protective inner bark may allow the entry of fungi (which can cause wood decay) and chewing insects such as termites. Termites usually enter trees at points where fungal wood decay has already started. Fire can contribute to the initial cause of injuries and the creation of hollows in trees. An intense fire or an area that has been subject to repeated burns can lead to a shortage of hollows for wildlife but can also assist in the process of hollow formation (Gibbons and Lindenmayer 1997).

Wildlife will also renovate the hollow using beaks, teeth or claws. Eucalypts usually shed their lower branches as they grow (self prune) exposing the point of branch attachment (Joseph 1989). These openings may eventually develop into hollows.

hollows — 100 years in the making

Hollow formation is dependent on a tree's history, its species and location. Generally, small hollows with narrow entrances suitable for small animals such as the brush-tailed phascogale (*Phascogale tapoatafa*) and the eastern pygmy-possum (*Cercartetus nanus*), take about 100 years to form. Hollows of a medium size and suitable for animals such as parrots will take around 200 years to form, and the larger and deeper hollows occupied by glossy black cockatoos (*Calyptorhynchus lathami*) and other larger animals such as masked owls (*Tyto novaehollandiae*) can take a lot longer (Mackowski 1984; Menkorst 1984; and Scotts 1991).

what tree species produce hollows?

Most species of eucalypts and other long-lived trees produce hollows. In general, gums and boxes tend to produce hollows more readily than stringybarks and ashes. River red gum (*Eucalyptus camaldulensis*) is a well known hollow producer. Manna gum (*Eucalyptus viminalis*), mountain grey gum (*Eucalyptus cypellocarpa*) and yellow box (*Eucalyptus melliodora*) are others (Gibbons and Lindenmayer 1997). Other native trees and shrub species, such as brush box (*Lophostemon confertus*) and Antarctic beech (*Nothofagus moorei*) also can produce hollows used by wildlife.

Many introduced trees such as willows, pines and conifers do not produce suitable hollows used by native wildlife.

what species of wildlife use hollows?

In Australia many native vertebrate and invertebrate species utilise tree hollows. Many of these species use hollows, and in south east Australia this includes some 17 % of bird species, 42 % of mammals and 28 % of reptiles (Gibbons and Lindenmayer 1997). They include bats, possums, gliders, owls, parrots, antechinus, ducks, rosellas and kingfishers as well as numerous species of snakes, frogs and skinks. Unfortunately, some introduced species also use hollows and compete with native wildlife for tree hollows. This reduces shelter, roosting and breeding sites for many native species.

Many species of wildlife that use hollows have been listed under the *Threatened Species Conservation Act 1995*. Of the 22 species of bats that have been recorded to utilise tree hollows in NSW, 10 of these are listed as threatened (Gibbons and Lindenmayer 1997).

hollows suitable for wildlife

Some tree hollows are suitable for various species of wildlife and others are entirely unsuitable. Factors such as entrance size and shape, depth, degree of insulation and position on the tree affect how frequently, in what season and by what species a hollow is used.

A particular type of bird will require a specific nest hollow or opening and may even have a preference for a live or dead tree (Recher 1991). Importantly though, hollows must be within reach of suitable food sources to be of value. The white-throated treecreeper (*Cormobates intermedius)* and the red-browed treecreeper (*Climacteris erythrops*) have different nesting hollow requirements. The white-throated treecreeper generally nests in tree trunks (knot holes) while the red-browed treecreeper nests in sloping, hollow spouts that are dead (Recher 1991).

Many animals will choose a hollow for a nest site that will provide protection from potential predators. Mammals such as the brown antechinus (*Antechinus stuartii*) or the sugar glider (*Petaurus breviceps*) will choose a hollow with a narrow entrance that will restrict predator access (Dickman 1991). These animals place their young in hollows at a very early age when they are defenceless so it is important that only the parent can just squeeze into and out of the entrance to the hollow.

The choice of hollows can be very specific and even differ among related species of wildlife (Recher 1991). Hollows in fallen timber, tree stumps and even old fence posts are also used by wildlife. Some native fish use submerged hollow logs in streams for shelter and to attach their eggs. Crevices under bark are use by lizards, frogs and invertebrates.

Many species that are not considered hollow-dependent still utilise hollows e.g. echidnas may shelter in a burnt-out hollow at the base of a tree.

how many hollows do you need?

There needs to be enough hollow-bearing trees per hectare to meet the current wildlife requirements, as well as sufficient maturing trees to provide replacement hollows in the future. As a general guide, 3—10 hollow bearing trees, with as many as 30 hollows, may be needed per hectare to support a rich mix of species (WMB 1990). This figure will vary depending on the number of wildlife species, habitat type and so on. Note that many hollow entrances are small and difficult to see from the ground.

tree hollows on private land - essential to the survival of our threatened species

The superb parrot (*Polytelis swainsonii*) is endemic to NSW and Victoria and its current distribution extends from eastern inland NSW to north-central Victoria. It has two distinct breeding areas in NSW, one located in the Murray Riverina and the other in the South West Slopes (Ayers 1996).

The superb parrot has a preference for nesting in hollow limbs or spouts within huge healthy river red gums (*Eucalyptus camaldulensis*) in the Murray Riverina, and will also nest in hollows in dead trees. Feeding occurs in nearby box woodlands (Ayers et al. 1996). In the South West Slopes the superb parrot will nest in several eucalypt species, including river red gums and will more frequently nest in dead trees (Ayers et al. 1996).

The box woodlands (comprising black box (*Eucalyptus largiflorens*), yellow box (*Eucalyptus melliodora*) and grey box (*Eucalyptus microcarpa*) are essential not only for the superb parrots nesting but also foraging sites, particularly in the breeding season as it is important for the nest sites to be within close proximity to the food sources of the woodland areas (Ayers et al. 1996; Garnett 1992; and Webster and Ahern 1992). However, in recent years various threats have lead to the disappearance of much of these box woodlands and a follow on from this has been a dramatic decline in the number of superb parrots.

Clearing for agricultural production is a major reason for the removal of a great deal of the parrot's natural habitat. The Murray Riverina has been cleared extensively for stonefruit and citrus orchards and in the Young district clearing for firewood and fencing has been very destructive to the box woodlands (Ayers et al. 1996; Garnett 1992; and Webster and Ahern 1992). In addition, much of the remaining woodland vegetation has been destroyed or degraded by over-grazing by stock and rabbits as well as the use of inappropriate fire regimes (Ayers et al. 1996; Garnett 1992).

Large mature or dead trees on private land are very important to the survival of the superb parrot. Many of the smaller areas of remnant woodland vegetation that are essential to the survival of the parrot are now located on freehold land, and in the South West Slopes these areas now only occur along roadside reserves, travelling stock and camping reserves and other small, fragmented patches of native vegetation (Webster and Ahern 1992).

The Superb Parrot is listed as vulnerable in NSW, under the *Threatened Species Conservation Act, 1995*.

what you can do

Eliminating a particular threat to wildlife, such as the destruction of natural tree hollows, may be one goal to work towards in managing your property.

- Retain and protect remnant vegetation to ensure that there are enough trees of various species and ages to supply the needs of hollow-dependant fauna. Allow leaf litter, fallen logs and branches to accumulate in all habitat areas, including in and around farm dams. Do not clean these areas as they provide wildlife with food and shelter and provide important nutrients for the soil and therefore contribute to farm productivity.
- Fence remnant bushland, isolated trees in paddocks, stream banks and rocky areas to exclude livestock and to encourage natural regeneration.
- Hollow trees located near watercourses and riparian vegetation are very important for wildlife. Leave native vegetation along rivers, streams and between properties and any patches of bushland. These corridors of vegetation are important for wildlife habitat. They also contribute to a farm's productivity by minimising problems associated with erosion and soil loss.
- Plant local native species that produce hollows. Local native plants are likely to be better adapted to the local environment, including the soil and climatic conditions (Stelling 1997). They are more likely to establish and regenerate than those from alternate sources. Many exotic and non-local plants are more prone to local pests and diseases than the well adapted local native plants.
- Further information on what species are local in your area may be obtained from a NSW National Parks and Wildlife Service District office, a local office of Greening Australia or the Society for Growing Australian Plants. Please also refer to the Conservation Management Note No. 1 for further information on publications that are available.
- Keep all trees with hollows, even leave dead trees standing.
- Ensure some trees are always left to grow to maturity so the supply of hollow-bearing trees is continuously replenished. Plan timber use to accommodate this.

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