Wildlife needs natural tree hollows.

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What is the importance of tree hollows to wildlife?

Tree hollows are a valuable, and often essential, resource for many of Victoria's wildlife species. They offer refuge from the weather and predators, and safe sites for breeding. Removal of hollow-bearing trees from an area will lead to the displacement or death of wildlife dependant on those hollows.

Recent wildlife research has highlighted the importance of remnant hollow-bearing trees on private land. Two species of bats were captured and radio-tagged at their foraging site in young forest in the Strzelecki Ranges, South Gippsland. To the amazement of the researchers, who followed the bats in a plane, females of one species returned to a large Manna Gum **on private land** some thirteen kilometres from the point of capture and over six kilometres from the forest boundary. The single tree contained hundreds of bats of several species including mothers producing milk. The young forest in which the bats were foraging did not provide suitable hollows for females to roost although males did use the younger trees. This research highlights the importance of remnant habitat, particularly large old hollow-bearing trees, on private land. Such trees may be used as bat nurseries for many generations.[7]

The Red-tailed Black Cockatoo is a hollow-nesting species which is endangered in Victoria. In a study of the species in Western Victoria[1], Leo Joseph (1989) found that of twelve nest sites located, **all were on private land** and ten were in dead trees (generally Red Gums) on cleared agricultural land close to their bushland foraging areas. Large dead trees with hollows, on private land, are clearly very important to the survival of this species where live trees with suitable hollows are no longer available.

What type of hollows do wildlife need?

Animals do not select hollows at random; factors such as entrance size and shape, depth, degree of insulation, etc. greatly affect the frequency and seasonality of hollow use.

Hollows in fallen timber are also used by wildlife. Some native fish use hollow logs in streams for shelter and egg attachment. Under-bark 'hollows' are used by bats, lizards and invertebrates.

A range of hollow sizes and shapes is necessary[2]. Large hollows are not necessarily best; hollows with an entrance diameter larger than 15 cm are probably not preferred by many species. The great majority of hollow-users prefer small entrances through which they can just fit. These range from narrow cracks for bats to larger (12-15cm) diameter holes for the Common Brushtail Possum and cockatoos. Many hollows lack suitable characteristics and so are unsuitable for use by wildlife.

One hollow may be used by more than one species in a year[3]. One individual may use several hollows. For example, individual Squirrel Gliders were found to use up to six hollows over a twelve month period[2].

Many wildlife species use hollows but are not dependent upon them. For example, echidnas may shelter in a burnt-out hollow at the base of a tree.

How do hollows form?

Young trees are usually strong and healthy. They do not contain hollows suitable for wildlife. As trees age they are subject to the natural forces of wind, fire, heat, lightning, rain and to attack from insects, fungi, bacteria, termites, beetles and so on. Although the outer living skin of the tree may remain healthy, the inner dead wood can be digested by fungi and excavated by water, be chewed up and carted away by termites or burnt out by fire. The resulting hollow branches and trunk provide the hollows used by wildlife. Many species of wildlife will further fashion the trunk using beak, teeth or claws. Some eucalypts shed their lower branches as they reach maturity (self-prune) exposing the point of branch attachment[1] and thus opening the developing hollows for use by wildlife.

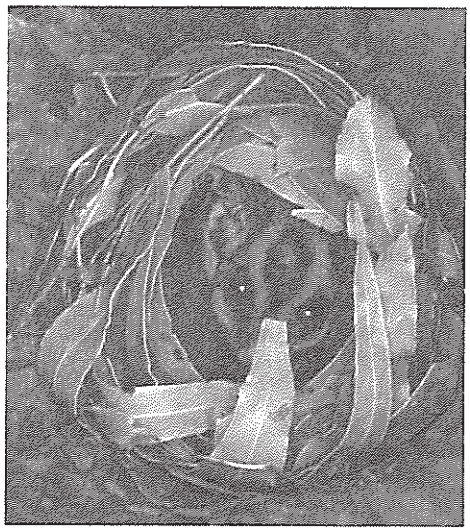
How long do hollows take to form?

The rate of hollow formation is dependent on the species of tree and its history. As a general guide, small hollows in eucalypts, suitable for wildlife such as Feathertail Gliders, will take about one hundred years to form. Medium-sized hollows, such as those used by small parrots, will form in two hundred years, whilst the very large hollows, necessary for large cockatoos and owls may take even longer[3,5]. It is important to note that hollow-bearing trees are a resource that takes a very long time to replace, if removed.

What tree species produce hollows?

Gum trees are the major hollow producers in Victorian forests[2], particularly those with 'Gum' (smooth) bark. River Red Gum is probably the best known hollow-producer. Manna Gum, Mountain Grey Gum and Swamp Gum are others. As a general rule, species of *Symphomyrtus* (a sub-genus of *Eucalyptus*) form hollows more readily than *Monocalyptus*[2] (refer to a reference such as Costermans'[4] for the names of eucalypts in this group). Other native tree and shrub species, such as *Callitris* (native pine), may also produce hollows used by wildlife.

Most introduced trees, such as willows, pines, and conifers, do not produce hollows used by Victoria's wildlife.



Sugar Glider occupying its leafy nest in a tree hollow. *(Photo: B. Golding/courtesy of Monash University)*

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How many hollow trees per hectare?

To provide for the requirements of the full range of wildlife species in an area over time there needs to be enough hollow-bearing trees to meet the current requirement for hollows and, in addition, sufficient recruitment of immature trees into the age group that provides hollows to replace those that are lost. As a general guide, three to ten hollow-bearing trees, with as many as thirty hollows, may be required per hectare to support a diverse wildlife population. This figure will vary depending on the number of wildlife species, habitat type and so on. Note that many hollow entrances are small and may not be visible from the ground.

Fewer hollow-bearing trees does not necessarily mean fewer individuals of each wildlife species surviving. As the number of hollows is reduced, larger, more aggressive hollow-users, such as Common Brushtail Possum, will take over the available hollows forcing smaller species to utilize less satisfactory shelter and consequently suffer increased exposure to weather and predation. Thus, providing a reduced number of hollows will not necessarily result in the conservation of all the species of hollow-users. It may simply allow a few large aggressive species to persist at the expense of smaller species whose conservation status is often more precarious[2].

Hollows must be considered as part of an ecosystem. If suitable food sources are not within reach of hollows their value to wildlife is clearly restricted.

What species of wildlife use hollows?

Gliders, possums, ducks, kookaburras, owls, tree martins, parrots, kestrels, falcons, kingfishers, echidnas and bats are some of the wildlife species that use tree hollows (a full list is given below).

Introduced species can also use hollows. These species, which include the Common Myna, Starling and introduced bee, should be discouraged from using hollows required by native wildlife.

What you can do.

1. Retain mature hollow-bearing trees, whether alive or dead and even if you only have a few.
2. Plant species native to your area that produce hollows.
3. Ensure that some trees are always left to grow to maturity so that the supply of hollow-bearing trees is continuously replenished. Timber use, for firewood or construction, should be planned to accommodate this.
4. Discourage introduced species from using hollows.

References

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A list of hollow-using wildlife for Victoria

(Includes conservation status (mammals & birds). Refer to LFW Note No. 5 for Conservation status categories).

Hollow dependent, + uses hollows but is not dependent on them, F Reptiles and amphibians that use small crevices, gaps under bark, standing and/or fallen timber. Fish listed here use submerged hollows for shelter & egg attachment.

Mammals

Monotremes
+ Short-beaked Echidna

Dasyurids
Yellow-footed Antechinus
Brown Antechinus
+V Tiger Quoll
#R Brush-tailed Phascogale

Brushtail Possums
Mountain Brushtail Possum
+ Common Brushtail Possum

Pygmy-possums
Feathertail Glider
+ Western Pygmy-possum
+ Eastern Pygmy-possum

Gliders and Ringtails
#E Leadbeater's Possum
Yellow-bellied Glider
Sugar Glider
#R Squirrel Glider
Greater Glider
+ Common Ringtail Possum

Sheathtail-bats
#? Yellow-bellied Sheathtail-bat

Mastiff-bats
Little Mastiff-bat
White-striped Mastiff-bat

Vesper Bats
Gould's Wattled Bat
Chocolate Wattled Bat

Eptesicus baverstocki
King River Eptesicus
Large Forest Eptesicus
Little Forest Eptesicus
+I Large-footed Myotis
Lesser Long-eared Bat
Gould's Long-eared Bat
#R Greater Long-eared Bat
Great Pipistrelle
Western Broad-nosed Bat
#I Eastern Broad-nosed Bat

Rats and Mice
#X Rabbit-eared Tree Rat - now extinct

Birds

Black-Cockatoo,	Glossy	I#
	Red-tailed	E#
	Yellow-tailed	#
Budgerigar		#
Cockatiel		#
Cockatoo,	Gang-gang	#
	Pink	I#
	Sulphur-crested	#
Corella,	Little	#
	Long-billed	#
Dollarbird		#
Duck,	Maned	#
	Pacific Black	+
Falcon,	Peregrine	+
Galah		#
Kestrel,	Australian	+
Kingfisher,	Red-backed	+
	Sacred	+
Kookaburra,	Laughing	#
Lorikeet,	Little	#
	Musk	#
	Purple-crowned	#
	Rainbow	#
Martin,	Tree	#
Myna,	Common	*+
Owl,	Barking	R#
	Barn	#
	Masked	I#
	Powerful	R#
	Sooty	R#
	Southern Boobook	#
Owlet-nightjar,	Australian	#
Pardalote,	Spotted	+
	Striated	+
	Yellow-rumped	+
Parrot,	Australian King	#
	Blue Bonnet	#
	Blue-winged	#
	Elegant	#
	Mallee Ringneck	#
	Mulga	#
	Red-rumped	#
	Regent	R#
	Superb	R#
	Turquoise	R#
Robin,	Flame	+
Rosella,	Crimson	#
	Eastern	#
	Yellow	#
Shelduck,	Australian	+
Shrike-thrush,	Grey	+
Starling,	Common	*+
Thornbill,	Buff-rumped	+
	Chestnut-rumped	#
Treecreeper,	Brown	#
	Red-browed	#
	White-browed	I#
	White-throated	#
Whiteface,	Southern	+

Fish

River Blackfish (lowland) #
Murray Cod #

Invertebrates

Invertebrates also use hollows.

Reptiles & Amphibians

Tree Frogs
F+ Green & Golden Grass Frog
F+ Growling Grass Frog
+ Blue Mountains Tree Frog
+ Southern Brown Tree Frog
+ Plains Brown Tree Frog
+ Large Brown Tree Frog
+ Spotted Tree Frog
F# Peron's Tree Frog

Southern Frogs
F+ Southern Smooth Froglet
F+ Victorian Smooth Froglet
F+ Spotted Marsh Frog
F+ Haswell's Froglet
F+ Bibron's Toadlet
F+ Dendy's Toadlet
F+ Southern Toadlet

Geckos
F+ Southern Spiny-tailed Gecko
F# Tree Dtella
F+ Marbled Gecko
+ Thick-tailed Gecko

Dragons
+ Tree Dragon
+ Nobbi Dragon
+ Norris's Dragon
+ Eastern Bearded Dragon
+ Central Bearded Dragon
+ Gippsland Water Dragon
F+ Lined Earless Dragon
+ Sand Goanna
+ Tree Goanna

Skinks
F+ Southern Rainbow Skink
F+ Carnaby's Wall Skink
+ Black Rock Skink
+ Tree Skink
F+ Three-toed Skink
F+ Delicate Skink
F+ Garden Skink
F+ Weasel Skink
F+ Coventry's Skink
F+ Grass Skink
F+ Glossy Grass Skink
F+ Metallic Skink
F+ Eastern Three-lined Skink
F+ Red-throated Skink
F+ *Lerista punctatovittata*
F+ Boulenger's Skink
F# McCoy's Skink
Spencer's Skink
+ Eastern Water Skink
+ *Spenomorphus tympanum(CT)*
+ *Spenomorphus tympanum(WT)*

Pythons
+ Diamond Python
+ Carpet Python

Front-fanged Snakes
F+ Eastern Small-eyed Snake
F+ White-lipped Snake
+ Tiger Snake

References: 2., Robertson, P. Pers Comm., 6. Koehn, J., Pers Comm.

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