THREATENING PROCESS NOMINATION

Nominators: Conservation Council ACT Region
Friends of Grasslands
Australian Native Plant Society Canberra Region
Canberra Ornithologists Group
Field Naturalists Association of Canberra

Address: (primary contact) Larry O'Loughlin – Executive Director
Conservation Council ACT Region
Unit 14/26 Barry Drive, Canberra ACT 2601

Phone: (02) 6229 3200

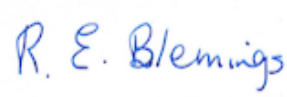
Email: director@conservationcouncil.org.au

Larry O'Loughlin, Executive Director, Conservation Council ACT Region

Ann Milligan, Friends of Grasslands

Alison Roach, Vice-president, Australian Native Plants Society Canberra Region

Jenny Bounds, Conservation Officer, Canberra Ornithologists Group



Rosemary Blemings, Field Naturalists Association of Canberra

Category of nomination: Threatening Process

Name of process: **Loss of Native Hollow-bearing Trees**

1) Description

Hollows are cavities that form in the branches or trunks of living and dead trees. They are a unique characteristic of older, mature to senescent native trees (primarily *Eucalyptus* species), and only start to form in trees more than 120 years old, but more typically 180 to 220 years old (Gibbons and Lindenmayer 2002). Hollows with dimensions large enough to cater to the nesting requirements of larger native fauna (mammals, reptiles, owls and cockatoos) typically take more than 200 years to form (Victorian Department of Sustainability and Environment undated; Martin and Green 2002; Mackowski 1984; Inions et al. 1989). The number and size of hollows increases with tree age and size (optimally measured by diameter). Larger trees support more hollows with varying entrance dimensions and characteristics compared to younger, smaller trees. Therefore, larger trees tend to be disproportionately more valuable in the short term for wildlife, offering breeding and nesting opportunities to a range of taxa. However, small and medium sized trees are also important as they ultimately replace larger mature and old-growth trees that die and are lost from the landscape through natural processes (NSW National Parks & Wildlife Service 1999).

Gibbons and Lindenmayer (2002, p. 2) state 'Hollows can only be perpetuated if existing trees with hollows are retained as well as trees that do not contain hollows, but which are likely to do so in the future. Conditions must, therefore, be created for both the periodic recruitment of trees into a stand and the long-term protection of these trees'.

Hollow formation is typically initiated by wind damage, natural branch shedding, termite galleries and other boring insect damage (e.g. longicorn beetles - Family Cerambycidae), lightning, fire damage and internal fungal and bacterial decay. In Australia, the formation of hollows tends to be an especially slow process as there are no vertebrate fauna that actively engineer hollows, such as woodpeckers (Gibbons and Lindenmayer 2002). There are four main types of hollows: rounded hollows in the main stem; rounded hollows where branches have broken off; fire scars at the base of trees (basal hollows); and fissures or cracks in branches or the main stem, with vertical entrances. Tree species differentially form hollows (Gibbons and Lindenmayer 2002). Both living and dead trees provide natural hollows. Hollows may be difficult to observe from the ground, as they may be obscured by branches or foliage, facing upwards or be small (Gibbons and Lindenmayer 2002). Therefore, it should not be assumed that a tree of a certain size or estimated age does not contain hollows.

There is a positive relationship between diameter and the presence of hollows in trees, although absolute tree diameter is not a good indicator because of the conditions that the same species may grow in, the differences in size of different species and propensity of species to form hollows. Standardised data collected from studies from Queensland, NSW and Victoria indicated that 'trees generally had a high probability of containing hollows when they reached, on average, 67% of the maximum diameter recorded in trees from proximal stands' (p. 43, Gibbons and Lindenmayer 2002).

The age of some eucalypt species can be estimated from measurements of tree diameter (Le Roux et al. 2014). Examples of the age of selected trees in the ACT are provided in Table 1 from data collected by S. Sharp and ages estimated by D. Le Roux. These trees all predate European settlement in the region.

Table 1. Age estimates of mature trees measured in several locations in ACT, based on diameter. The method is provided in Le Roux et al. (2014). Estimates were calculated by Darren Le Roux using data provided by Sarah Sharp (Friends of Grasslands).

Species	Location	Diameter at breast height	Estimated age (le Roux)
Eucalyptus melliodora	Belconnen	1.66 m	350-400 years
E. melliodora	Molonglo River Reserve	1.15 m	210 years
E. melliodora	Central Canberra	1.13 m	200 years
E. bridgesiana	Molonglo River Reserve	1.06 m	320 years
E. blakelyi	Belconnen	1.24 m	265 years
E. blakelyi	Central Canberra	1.21 m	240 years

Hollow-bearing trees provide many functions and retain values that improve the health of the land and protect biodiversity. The functions and values of hollow-bearing trees and other mature trees include (Victorian DSE undated; NSW NPWS 1999; Le Roux et al. 2014; Gibbons and Lindenmayer 2002):

- A critical resource for wildlife for nesting, nesting materials, roosting, feeding and shelter;
- "Islands" or "stepping stones" across the landscape for a large variety of species (facilitating dispersion and migration, which in turn may aid species adaptation in the face of climate change);
- The last stronghold of the genetic diversity of some vegetation communities - many landscapes contain only scattered trees;
- A contribution to soil conservation and stability, water quality, air quality, nutrient cycling and carbon sequestration;
- Pest management by providing shelter for insectivores such as insectivorous bats and birds;
- Provision of foraging and shelter sites for ground-dwelling fauna when hollow-bearing trees collapse or shed limbs;
- Heritage landscape values (e.g. Aboriginal scar trees or trees within culturally important areas);
- Provision of habitat for numerous and diverse invertebrate populations;
- Host sites for mistletoes and epiphytic species
- Other socio-economic benefits in modified landscapes (e.g. improved mental health for residents in cities, shade, mitigating against 'heat island effect', increasing residential property prices).

Utilisation of hollows by fauna

Fauna may be obligate or opportunistic users of hollows. Other species prey on fauna that use hollows (Gibbons and Lindenmayer 2002). It has been estimated that in Australia 15% of all birds, 31% of mammals and 10% of reptiles and 13% of all amphibians use hollows; the use of hollows by invertebrates is unknown (Gibbons and Lindenmayer 2002). Examples of fauna species that occur in the ACT that rely on hollow-bearing trees include possums, gliders, owls, parrots, cockatoos, pardalotes, antechinus, ducks, kingfishers as well as numerous species of bats, snakes, frogs, lizards and invertebrates (NSW NPWS 1999). These species include threatened and declining species and other currently more common species (see Attachment 1).

Species use of hollow-bearing trees may be governed by the position of the tree in the landscape. Some species travel only short distances to forage, and prefer hollows near the foraging areas. Other species are more mobile and may travel long distances to forage. The numbers of hollows of the correct dimension(s) is also important. Some species nest in colonies and require large numbers of suitable hollows in a limited area or clusters across the landscape (e.g. some parrot species, woodswallows and glider species), while others may require a local abundance of hollow-bearing trees (e.g. some cockatoo species) (NSW Scientific Committee 2007). In other cases, territorial species that do not tolerate other hollow-using species nearby require an even distribution of hollow-bearing trees across the landscape.

Many species select very specific hollows, both in the entrance hole diameter and internal cavity size. The hollows that may suit a certain species may only be a small percentage of the total number of hollows in any particular area. Frequently, the entrance to the hollow is most important, with species selecting hollow entrances proportionate to their body size. This provides extra protection by limiting access of larger hollow-using species and predatory species. Small communally-living animals or those that have larger litters (such as gliders) utilise hollows with small entrances but larger internal dimensions. The use of hollows with characteristics unsuited to the species size may impact on their survival and reproduction (Victorian DSE undated; NSW Scientific Committee 2007).

Sustaining a viable population of any vertebrate species depends on:

- the number of trees available bearing suitable size(s) and numbers of hollows;
- the number of hollow-using species at the location;
- the numbers of individuals in each hollow-using population;
- the numbers of hollows used by each individual (e.g. gliders may use a number of hollows over their territory).

The number of suitable hollows available governs the abundance and diversity of any species in any particular location. The availability of hollows available for prey species can have significant flow-on affects up the food chain. As an example, populations of species that prey on possums and gliders will be lower in areas where suitable hollows are not available or are in short supply for the prey species (Victorian Department of Sustainability and Environment undated; NSW Scientific Committee 2007). A substantial depletion of hollows impacts on populations of hollow-using fauna and reduces the number of species that an area can support.

In conservation areas where trees have been removed through previous land uses or other catastrophic events, the number and density of hollow-bearing trees should increase over time. While "natural" events such as bushfire or severe storms may still occur and impact on remaining hollow trees, the age structure and subsequent hollow formation will gradually come into a balance as these natural events also instigate hollow formation (Victorian Department of Sustainability and Environment, undated; NSW Scientific Committee 2007).

Where feral species (e.g. Common Myna, Common Starling) and unusually abundant native species (e.g. Sulphur-crested Cockatoo, Galah) occur, there is competition for hollows and this limits their availability to other native species. Escaped colonies of the introduced Honeybee (*Apis mellifera)* often use large hollows with small entrances and the bee is a widespread and growing competitor for hollows (NSW Scientific Committee 2007).

A shortage of natural hollows limits the number and density of bats, arboreal mammals and breeding birds. When nesting boxes are located in areas with a low number of natural hollows, the occupancy rate is of the boxes is high. A higher proportion of bird populations

also breed when nest boxes are provided (NSW Scientific Committee 2007). However, research has indicated that nest boxes secured to small or medium trees do not necessarily attract hollow-nesting birds (Le Roux et al., 2015) and should not be considered a viable replacement for the loss of trees containing natural hollows or potential hollows.

Hollow-bearing trees are not only of benefit to the local ecology when standing. Ground dwelling fauna benefit, especially mammals utilising the fallen trunks and branches for shelter and foraging. Trees collapsing in riparian areas provide habitat for fish and other aquatic organisms. As the trees decay they add to soil nutrient levels and soil organic components, with the fungal agents responsible for decay being used as food by various fauna species (Victorian Department of Sustainability and Environment, undated).

Decline of hollow-bearing trees

The continued decline of mature and hollow-bearing trees since European arrival has been clearly documented in a range of human modified landscapes, including in wood production forests, agricultural land and in urban landscapes (e.g. Canberra). In Victoria Bennett et al. (1994) estimated there were 17 hollow-bearing trees per hectare in remnant woodlands, but Soderqust et al. (1999) measured on average two large trees per hectare in agricultural land in similar habitat (cited in Gibbons and Lindenmayer 2002).

The actions/processes that lead to the loss of hollow-bearing trees are:

- Any form of removal of native trees (dead or alive) that currently have hollows present (mature trees) or of younger trees resulting in lack of future hollow development. The removal of large trees for agricultural purposes, logging and urban development or infrastructure result in a higher rate of large tree removal (loss) than the rate of tree replacement (gain/recruitment). Gibbons and Lindenmayer (2002) suggest there has been an 80%-90% reduction in hollow-bearing trees across the agricultural landscape. Other forms of development, firewood collection (illicit or otherwise), dieback and altered fire regimes also result in selected removal of trees;
- Actions preventing the recruitment of hollow-bearing trees, including a lack of tree replacement when mature trees die and fall over or are intentionally removed. This may be due to a lack of natural tree recruitment (e.g. elevated nutrients or stock grazing) or lack of restoration planting efforts that limit the number of regenerating seedlings. Maintaining a range of different tree sizes is essential for the continued renewal of the tree hollow resource.
- Alienation of hollows by other means (e.g. feral honeybees (*Apis mellifera*), Common Myna (*Acridotheres tristis*), Common Starling (*Sturnus vulgaris*) and occasionally by prolific native species (e.g. Galah (*Eolophus roseicapilla*) and Sulphur-crested Cockatoo (*Cacatua galerita*)). Gibbons and Lindenmayer (2002) suggest that migratory hollow-utilising species such as the Superb Parrot and Swift Parrot are most vulnerable to the loss of and alienation of hollows.

Actions required to mitigate against the loss of hollow-bearing trees include (Gibbons and Lindenmayer 2002):

- Protection of existing dead mature trees;
- Protection of trees with hollows;
- Protection of trees that have reached approximately 67% of their maximum diameter;
- Protection of replacement trees (more trees are required where trees are widely spaced);

- Maintenance of connectivity – linkages of habitats at a range of temporal and spatial scales;
- Retention and enhancement of landscape heterogeneity, that reflects patterns and gradients in environmental conditions, producing a mosaic of structural and compositional patches;
- Retention and enhancement stand structural complexity including multiple aged cohorts, living and dead trees, logs;
- Management of stock and control of feral animal grazing to reduce compaction, accumulations of nutrients under trees, to enhance recruitment and health of isolated trees; and
- Provision of buffer plantings around isolated trees.

2) Distribution in the ACT

The abundance of hollow-bearing trees generally in the ACT has been reduced and fragmented by extensive clearing of native vegetation during the past nearly two centuries, primarily for agriculture and urban development (NSW Scientific Committee 2007). Hollow-bearing trees occur throughout all treed ecosystems within the ACT, and eucalypt trees form hollows as they mature. The distribution of hollow-bearing trees depends on tree species composition, site conditions, competition, tree health and past management activities (NSW Scientific Committee 2007). Woodland, including the critically endangered White Box – Yellow Box – Blakely's Red Gum Grassy Woodland supports the highest numbers of hollow-using vertebrate species of wooded ecosystems; data suggest that open habitats result in higher dependence on hollows for shelter (Gibbons and Lindenmayer 2002). A substantial depletion of hollows impacts on populations of hollow-using fauna and reduces the number of species that an area can support. Therefore, of particular concern in the ACT is the loss of those trees that occur on foothills and plains, where vegetation clearing has occurred at a greater intensity and there is little recruitment, resulting in a landscape characterised by mature scattered trees. In turn, these scattered trees within the landscape are under considerable on-going pressure for development and agricultural clearance.

Notable species that form hollows important for species listed as threatened in the ACT include Yellow Box (*Eucalyptus melliodora*), Scribbly Gum (*E. rossii*) and Blakely's Red Gum (*E. blakelyi*) (the latter two the preferred tree species for nesting by the vulnerable Superb Parrot) and all are most commonly found on the foothills and plains. Twenty-nine percent (29%) – more than a quarter of all bird species recorded at trees of varying sizes across the Canberra region – were exclusively recorded in large trees greater than 80cm DBH (at least 100 years old) (Le Roux et al. 2014). These bird species belonged to many different functional groups (not just hollow-nesters like the threatened Superb Parrot), but also insectivores (Satin Flycatcher), nectivores (White-naped Honeyeater) and predatory raptors (Brown Falcon). On a landscape basis, dead trees often account for 20–50% of the total number of hollow-bearing trees but these are far more prone to collapse or incineration than live trees and are frequently selectively harvested for firewood (NSW Scientific Committee 2007) or removed for safety reasons.

In the rural landscapes of the ACT, hollow-bearing trees often persist as isolated mature individuals in cleared paddocks or in small fragmented copses. These trees are frequently in poor health (classic 'dieback') and may often be more susceptible to severe detrimental insect infestations (e.g. Blakely's Red Gum – *E. blakelyi*). They often have a shorter lifespan than similar trees occurring within more extensive remnants of their former ecological communities. The eventual loss of current hollow-bearing trees will result in a large decrease

in hollow availability over considerable areas of agricultural landscapes in the short and-long term, as there is a lack of recruitment of younger and medium-aged trees to replace them (NSW Scientific Committee 2007).

Some mature hollow-bearing trees are retained in urban landscapes, and persist in parks, small reserves and road corridors, although the hollow density varies greatly. While planning of new urban areas in the past has attempted to save large trees within the urban landscape, the fate of these trees is not guaranteed and frequently these trees are removed for safety reasons or for further infrastructure, especially when 'safe retention spaces' are not properly designed at the planning phase. A more considered tree retention strategy is required in urban landscapes to retain a more diverse tree size structure. Concerns over the risk to humans from falling branches and the potential for litigation have increasingly led to removal or pruning of hollow-bearing trees (NSW Scientific Committee 2007).

3) Current Protection in the ACT

Individual trees on leased and unleased land may be protected under the *Heritage Act 2004* (generally when a tree has high cultural heritage value such as a scarred tree). Clearing of trees on leased land within the urban area is restricted under the ACT *Tree Protection Act 2005* through protection of all trees (native and introduced) over 12 m tall or registration of individual trees. However, the Tree Protection Act does not apply to unleased land, including roadsides, open space and reserves.

Trees in rural areas are protected under the Nature Conservation Act 2014 (as amended 2016) chapter 6, clauses 140-146; *Trespass on Territory Land Act 1932* (Section 7 e.g. trees on unleased territory land); *Land (Planning & Environment) Act 1991* – now *Planning & Development Act 2007* (Section 147A). A license is required to fell trees on leased rural land. However, removal of planted trees or unsafe trees and use of the timber on the land do not need a license – the latter is probably the most problematic issue.

Trees can be felled under the *Emergency Services Act 2004*, replacing the (now repealed) *Bushfires Act 1936*. The Conservator of Flora & Fauna can give directions to leased rural land under "*disturbance to nests and endangered communities*".

It is considered that these legislative measures do not adequately prevent trees with hollows or other mature trees in rural leased land or unleased land such as roadsides or urban open space being destroyed at a much greater rate than they are being replaced. Legislation has not prevented widespread and significant destruction of mature and hollow-bearing trees to facilitate urban development or provision of infrastructure.

Of particular concern is the loss of 'paddock trees', particularly mature, large-crowned trees on fertile soils, and in small woodland patches; for many bird species, including the Superb Parrot, Regent Honeyeater and Swift Parrot, these patches and isolated trees provide important resources, and 'replacement of paddock trees is required to prevent continued long-term decline of habitat for these species (ACT Government 2004, p. 47).

The clearing of native vegetation, especially large remnant trees, for urban expansion and other developments, including the creation of asset protection zones against wildfire, contributes significantly to the ongoing loss of hollow-bearing trees (NSW Scientific Committee 2007). Case studies in the ACT include:

Case Study 1 – Gungahlin Drive Extension removing trees from reserve

The alignment of the Gungahlin Drive Extension in about 2004 shaved off part of the rich Black Mountain Nature Reserve and led to the loss of many hollow-bearing trees. The result was the destruction of several Boobook Owl (*Ninox novaeseelandiae*) territories and their nesting/roosting trees. This area had been a long-term study site for the owls.

Case Study 2 – Superb Parrot nesting removed for suburb of Throsby

The new suburb of Throsby in Gungahlin, currently being constructed, closely abuts one of the two known breeding colonies of the vulnerable Superb Parrot (*Polytelis swainsonii*) in the ACT. Forty-two (42) very old eucalypts (most with hollows) were felled to make way for the suburb. A very minimal 100 metre buffer was established between this new suburb, and the parrots nesting site. This was agreed to by the ACT and Commonwealth Governments under an offsets-related package, despite the fact that the listed conservation actions for this species in the ACT include: *the identification of key habitats and potential habitats, maintenance of woodland remnants and isolated paddock trees and limitation on removal of live and dead timber* (ACT Government, 2005). In spring 2015, a pair of Superb Parrots were discovered nesting in one of the trees earmarked for removal; they successfully fledged young, but that tree was subsequently removed. The outcome of this decision is that the Superb Parrot breeding group now has limited capacity to expand within this known breeding area due to the loss of potential nesting trees nearby.

Under the same agreed offsets package, hundreds of mature eucalypts will be destroyed for other new suburbs proposed in Gungahlin, e.g. Kenny and Moncrief. This example clearly illustrates that even under the highest level of biodiversity conservation protection available for threatened species (the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*) there is inadequate protection for important hollow-bearing paddock trees that are critical habitat for species on threatened species lists.

Case Study 3 – loss of hollows for development adjacent Justice Robert Hope Park

Approximately 46 mature trees (25 with hollows) were to be removed with the proposed development of housing units adjacent to Justice Sir Robert Hope Park in Watson. This is part of a larger remnant of critically endangered Yellow Box – Blakely's Red Gum grassy woodland.

Case Study 4 – loss of hollow bearing trees for solar farm at Williamsdale

About 156 mature trees have been removed for the establishment of a 34 hectare solar farm at Williamsdale (Raggart 2016). The EIS exemption documents prepared by the EPSD Directorate listed "removal of approximately 116 native trees" and the summary of comments from the Conservator of Flora and Fauna included: "many of the trees to be removed are hollow bearing and these hollows and the leaf, flower and inset resources they support are likely to be of some importance to maintaining local animal populations". These Yellow Box and Blakely's Red Gum trees were removed following use of Ministerial call-in powers.

Case Study 5 – trees retained then removed under planning for suburb of Crace

During the original planning for the Gungahlin suburb of Crace some 80-100 mature native trees were to be retained. However, solar access was deemed desirable and the trees were removed at the request of the ACT Planning Authority. These were part of the larger remnant of YB-RG woodland.

The remaining high quality woodlands of the ACT, particularly those containing mature trees and hollow-bearing trees, are a critically important asset under the forecast events of climate change. It is highly probable that the woodlands of south-western NSW will recede under the forecast impacts of climate change, increasing the need to retain, manage and even extend the woodlands ecosystems of eastern NSW and the ACT to allow for fauna migrations and provide the habitat they require (NSW Office of Environment & Heritage 2011).

4) Criterion satisfied, and the reason

***Criterion satisfied*:**

Criterion satisfied (from Nature Conservation (Key Threatening Processes Eligibility) Criteria 2016, Disallowable Instrument DI2016—256 made under the Nature Conservation Act 2014, s78 (Key threatening processes - eligibility criteria):

> Criterion C: The threatening process adversely affects two or more listed threatened species (other than the national category of conservation dependent species and the regional category of provisional) or two or more listed threatened ecological communities.

The loss of hollow-bearing trees is a direct threat to four listed threatened species (species declared threatened under the Nature Conservation Act 2014):

- Superb Parrot – *Polytelis swainsonii* (Vulnerable)
- Swift Parrot – *Lathamus discolor* (Vulnerable)
- Brown Treecreeper – *Climacteris picumnus* (Vulnerable)
- Glossy Black-Cockatoo – *Calyptorhynchus lathami* (Vulnerable)

See Attachment 1 for more information on the potential effects of loss of hollow-bearing trees on the above threatened species.

The loss of hollow-bearing trees is a direct threat to one listed threatened ecological community:

- Yellow Box – Blakely's Red Gum Grassy Woodland: the loss of hollow-bearing trees has the highest impact in lowland woodlands, and especially in Yellow Box – Blakely's Red Gum Grassy Woodland, and many species dependent on that ecosystem, including threatened or declining species (Attachment 1). There are inadequate mature trees to replace hollow-bearing trees that die naturally or are removed or destroyed. The removal of standing old and dead trees and fallen logs is identified as a threat to woodland integrity (ACT Government 2004).

Evidence:

Only mature trees can provide a diversity of habitat structures and numerous hollows that have different physical attributes and dimensions that cater to the requirements of a multitude of different animal species. Small, young trees or exotic trees cannot provide those resources and small trees take centuries to mature into trees suitable for native fauna. With the loss of large trees many fauna may experience population bottlenecks and even local extinction as their habitat requirements cannot be easily or quickly replaced. The use of nest boxes is not a viable alternative for most species.

The decline is related to direct loss of existing hollow-bearing trees, a lack of recruitment and alienation of hollows. Threats in ACT include:

- Targeted clearing of mature native vegetation for agricultural intensification, urban development or infrastructure, asset protection and public safety (people and property).
- A continuing decline of existing hollow-bearing trees as they age/senesce;
- A lack of recruitment of younger trees, especially in already disturbed lands;
- A paucity of available hollows where extensive clearing has already been conducted;
- Loss of trees in wildfire situations;
- Loss of trees under hazard reduction burns;
- Loss of trees in high wind, especially those that are scattered across the landscape;
- Alienation of hollows by feral species and abundant native species (e.g. Common Myna (*Acridotheres tristis*), Common Starling (*Sturnus vulgaris*), Honeybee (*Apis mellifera*), Galah (*Eolophus roseicapilla*), Sulphur-crested Cockatoo (*Cacatua galerita*) (Gibbons and Lindenmayer 2002);
- Changes in the composition of available trees (e.g. loss of native trees and replacement with unsuitable native and/or exotic trees; and
- Removal of dead trees and fallen deadwood.

5) References

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Attachment 1 - ACT hollow-dependent fauna species

Threatened species:

- Superb Parrot – *Polytelis swainsonii* (Vulnerable): This is a woodland dependent species highly impacted by clearing of lowland woodland and scattered paddock trees. One of the main threats to the species is stated as a serious decline in the quality or quantity of habitat. Superb Parrots prefer particular kinds of hollows, especially hollow spouts of limbs which have broken off. Favoured trees in the ACT are Scribbly Gum (*E. rossii*) and Blakely's Red Gum (*E. blakelyi*), but have been recorded nesting in other tree types such as Yellow Box (*E. melliodora*). (ACT Government 2004; Davey 2012; Davey 2013; Davey 2014).
- Brown Treecreeper – *Climacteris picumnus* (Vulnerable): This is a woodland dependent species that is highly impacted by clearing of lowland woodland and scattered paddock trees below a thousand metres altitude. There has been a serious decline in quality or quantity of habitat in the ACT, and the species has continued to decline over the past decade. The cup-like nests of grass, bark and fur are usually in a hollow limb from 3-10m from the ground. Occasionally they will build in tree stumps and hollow fence posts. (ACT Government 2004).
- Glossy Black-Cockatoo – *Calyptorhynchus lathami* (Vulnerable): This species utilises large tree hollows in woodland and open forests up to 1000 metres elevation. They nest in tree hollows and often in close proximity to each other, They need a relatively high density of suitably-sized hollows in close proximity. They utilise large, high, near vertical hollows in aging or standing dead eucalypt trees, and have been recorded nesting in Blakely's Red Gum in the ACT. The main threats to the Glossy Black-Cockatoo are the degradation, loss and fragmentation of foraging and breeding habitat. (ACT Government, undated).
- Swift Parrot – *Lathamus discolor* (Vulnerable): This species breeds only in Tasmania and over-winters mainly in the dry open eucalypt forests and woodland (usually box-ironbark communities) and Yellow Box–Red Gum woodland inland of the Great Dividing Range in NSW and Victoria. The population feeds mainly in the outer canopies on nectar from winter flowering eucalypts. Their main food is nectar, also psyllids, lerps, seeds and fruit. (ACT Government 2004).

Declining species of concern:

- Tree Martin – *Hirundo nigricans*: This species utilises woodlands and scattered paddock trees.
- Dusky Woodswallow – *Artamus cyanopterus*. This species will sometimes use hollows.

Some other hollow-using species for nesting/shelter (<u>list is indicative only</u>):

- Australian Wood Duck – *Chenonetta jubata*
- Pacific Black Duck – *Anas superciliosa*
- Australian Owlet-Nightjar – *Aegotheles cristatus*
- Southern Boobook – *Ninox novaeseelandiae*
- Yellow-tailed Black-Cockatoo – *Calyptorhynchus funereus*
- Gang-gang Cockatoo – *Callocephalon fimbriatum*

- Australian King-Parrot – *Alisterus scapularis*
- Sulphur-crested Cockatoo – *Cacatua galerita*
- Eastern Rosella – *Platycercus eximius*
- Crimson Rosella – *Platycercus elegans*
- Red-rumped Parrot – *Psephotus haematonotus*
- Galah - *Eolophus roseicapilla*
- Powerful Owl – *Ninox strenua*
- Nankeen Kestrel – *Falco cenchroides*
- Laughing Kookaburra – *Dacelo novaeguineae*
- Sacred Kingfisher – *Halcyon sancta*
- Dollarbird – *Eurystomus orientalis*
- White-throated Treecreeper – *Climacterus leucophaea*
- Spotted Pardalote - *Pardalotus punctatus*
- Striated Pardalote – *Pardalotus striatus*
- Squirrel Glider – *Petaurus norfolcensis*
- Sugar Glider - *Petaurus breviceps*
- Greater Glider – *Petauroides volans*
- Yellow-bellied Glider – *Petaurus australis*
- Common Brushtail possum – *Trichosurus vulpecula*
- Common Ringtail possum – *Pseudocheirus peregrinus*
- Peron's Tree Frog – *Litoria peronii*
- Yellow-bellied Sheath-tail Bat – *Saccolaimus flaviventris*
- White-striped Freetail-bat – *Tadarida australis*
- Lesser Long-eared Bat – *Nyctophilus geoffroyi*
- Gould's Long-eared Bat – *Nyctophilus gouldii*
- Gould's Wattled Bat – *Chalinolobus gouldii*
- Tasmanian Pipistrelle – *Falsistrellus tasmaniensis*
- Small Forest Bat – *Vespadelus vulturnus*
- Eastern Bent-wing Bat – *Miniopterus schreibersii subsp. oceanensis*
- Chocolate Wattled Bat – *Chalinolobus morio*
- Southern Free-tail Bat – *Mormopterus planiceps* sp4
- Bearded Dragon – *Pogona barbata*
- Rosenberg's Monitor – *Varanus rosenbergi*
- Various Skinks
- Various Geckos
- Various invertebrates