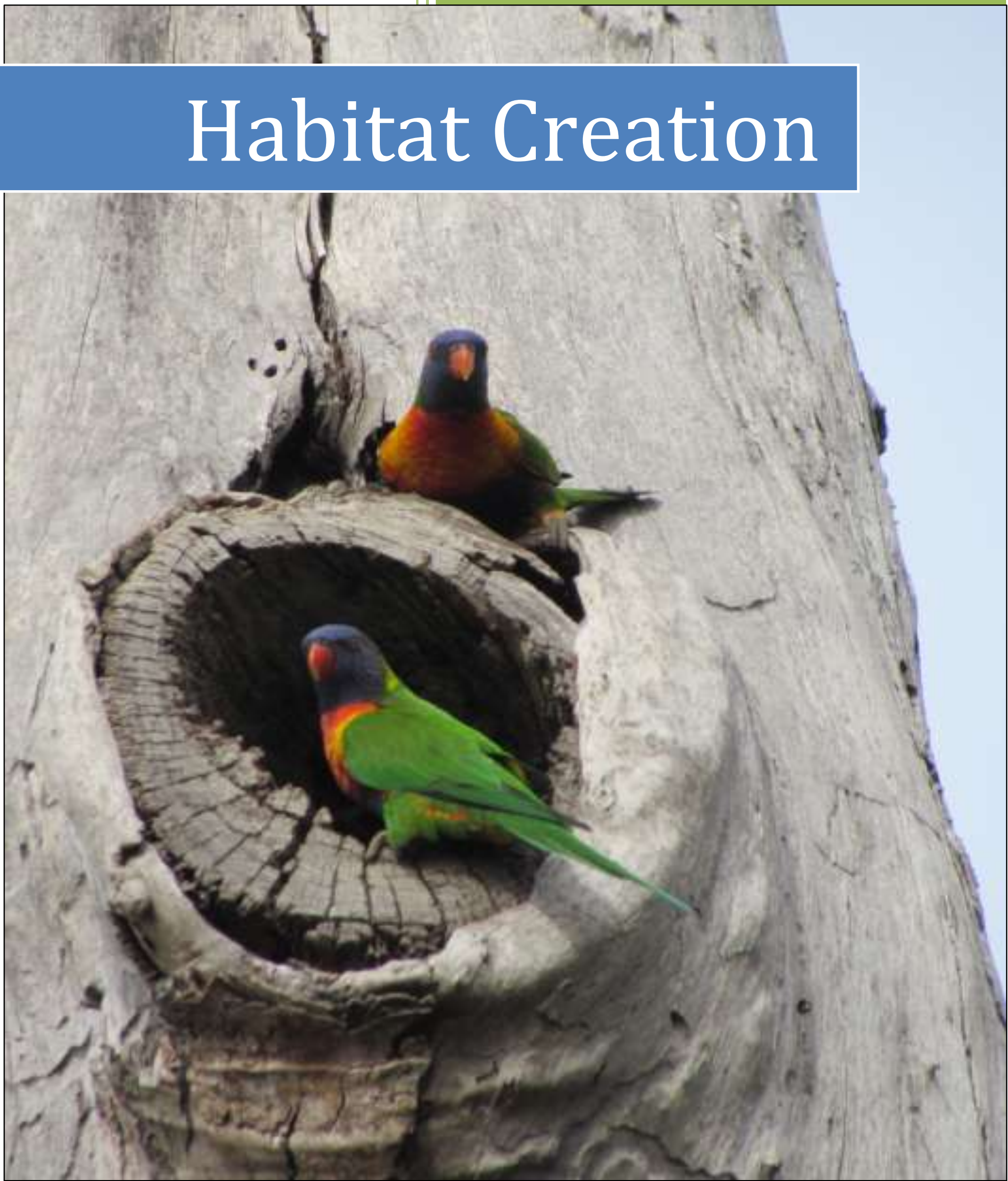
Habitat Creation



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Introduction

In the modern age, trees are usually viewed in terms of amenity and safety, with unsafe trees being removed entirely. What is generally overlooked is which aspects of the tree could be retained for the benefit of local wildlife and biodiversity. Urban communities have a preoccupation with sanitation, which is often to the detriment of the critters we share our environment with. Dead and decaying wood is a food source for insects and other invertebrates, which are in turn food for reptiles and mammals and birds. Trees – alive or dead – which contain hollows are habitat for all manner of organisms. Unfortunately, many trees with hollows are deemed too hazardous for urban situations, and end up being cut down. In many circumstances this is necessary, but it is time to re-think to what extent they are removed, and what could remain as habitat.

Cavities in trees can take decades or even centuries to develop into a large enough space for birds and animals to live in (Gibbons & Lindenmayer, 2002). In urban scenarios, it is often the older trees that are removed for reasons of safety – because they contain decay and cavities, and because older trees are more likely to succumb to the pressures of development. This results in a massive shortfall in cavities required by the local wildlife (NSW Environment & Heritage, 2014). It is estimated that 15% of Australian vertebrate species use natural tree hollows for nesting, raising young and housing (Gibbons & Lindenmayer, 2002). In NSW alone, over 150 species of wildlife use cavities, and are referred to as obligate hollow users. Around 40 of these species are listed as vulnerable or endangered (NSW Environment & Heritage, 2014). While most species have very specific requirements for the dimensions of hollows they will inhabit, some overlap and this causes competition between species, which adds to the struggle these species already face (Gibbons & Lindenmayer, 2002).

The opportunity to create habitat in urban situations does not rely solely on standing trees. Logs on the ground are also important sources of food and shelter – mainly for reptiles and invertebrates – and the longer they are left to decay, the more valuable they become in this sense. Logs can also be used for the construction of aquatic habitat, partially or wholly submerged, for birds, amphibians, fish and crustaceans. Our obsession with sanitation leads to all timber from removed trees being turned into wood chip.

Although dead trees and logs are not aesthetically pleasing to many people, with time and education this could change, and the arboriculture industry is ideally placed to play a large part in this. As people come to a greater understanding of the importance of urban wildlife, and the supporting role that trees – dead as well as living – play, hopefully dead trees and logs will come to be seen as a thing of beauty or at least a necessity.

As long as habitat creation practices will not exacerbate any safety fears, it should be a consideration during any tree removal process. In the author's opinion, any negative aspects of the 'ugliness' of dead trees and logs are far outweighed by the benefits of having native birds and animals present on your property.

Types of habitat

Habitat can be developed within standing trees, whether dead or alive – as long as no hazards are created in the process. This can be as simple as using pruning techniques and other methods to deliberately enhance the spread of decay, or the selection of which deadwood to retain.

Figure 1 - Tear cuts leave a large surface area of exposed timber for decay to move into

Figure 2 - Boring into old wounds promotes decay, as well as providing space for small invertebrates to inhabit

Or it can be as elaborate as actively cutting cavities into stems and branches, purposefully creating hollows with dimensions specifically required to attract the desired wildlife.

Figure 3 - A habitat box intended for parrots

Figure 4 - A 'bat maze' for the use of microbats

Logs can be sculpted and positioned to provide habitat on land and in water. Some logs are already sufficiently decayed that any further cutting is unnecessary.

Figure 5 - A 'trench cut' has been sculpted into what will be the underside of a log, intended as shelter for reptiles and to enhance decay

Figure 6 - An example of a log that wouldn't even need any sculpting, as natural decay has already formed extensive habitat

Specific cutting can provide shelter for reptiles and amphibians, fish and crustaceans, and all cutting provides opportunity for decay to develop.

Figure 7 - A log that has been sculpted for aquatic habitat, that is to be rolled over and positioned in a river

Figure 8 - A log being positioned by crane into a lake, designed as a bird and amphibian perch above water, and a fish and crustacean shelter below

Creating habitat in standing trees

The assessment of trees for safety purposes, or the process of quoting for tree removal, is a perfect opportunity to recognise any qualities the tree may have that would enable the creation of habitat.

Habitat creation in live trees is probably preferable to the use of dead trees, as the live canopy offers protection from predators and reduces exposure to the elements, as well as providing a food source that is close to home. In live trees, stubs from broken limbs are excellent candidates. Likewise, the ends of limbs that are to be pruned off can be retained for this purpose.

The deadwood present in a live tree's canopy should also be considered for retention, depending on its size and potential to cause harm if it falls. Deadwood of small diameter or that is likely to fall is of no use.

Figure 9 - The stub left from a failed branch is an ideal candidate for habitat creation, particularly if decay was the cause of failure

Figure 10 - Dead stubs that don't pose a hazard to safety should be retained. In this example termites have already begun the hollowing process

Obviously, all considerations of habitat creation should focus firstly on any potential hazards that would be created in the process. For example, cavities should not be cut into live stems or branches, as their structural strength would be drastically reduced.

In many cases, the tree will die during the process of making it safe, as the end-weight of branches needs to be removed. Figures 13 & 14 below are examples of how a tree, (in this case a mature *Eucalyptus saligna* up for removal due to repeated dropping of large limbs next to a playground), should be made safe through end-weight reduction.

Figure 11 - Before

Figure 12 - After

Efforts should be made to restrict the remaining timber from sprouting epicormic regrowth, as epicormic shoots are poorly attached and fail regularly (Urban, 2008). This can be achieved by ring-barking the stem or branch just outside its main union. Girdling is effective in killing branches to create stubs. In instances where the now bare tree is overly exposed, epicormic regrowth may be required to provide some shelter, however this will require on-going risk management.

Figure 13 - Girdling a branch with wire or rope cuts off the transport networks and, over time, will kill the branch

Figure 14 - Ring-barking a limb will eventually kill it. On-going management of epicormic regrowth will be required

In branch stubs – alive or dead – cavities can be created in several ways. One such technique involves removing a face plate from the end of the stub, then boring downwards into the end of the limb, before drilling an entrance hole and reattaching the face plate. Configurations and dimensions can be tailored to attract specific animals.

Figure 15 - A branch stub which has been bored out and had an entrance hole drilled from below

Figure 16 - The same branch stub with the face plate reattached

Cavities can also be cut into the sides of branch stubs or main stems by removing a face plate, boring out the desired dimensions, drilling an entrance hole and reattaching the face plate.

Figure 17 - The face plate has been removed and bore cuts done. After the blocks are broken out and an entrance hole is drilled, the face plate will be reattached

Figure 18 - All that is visible from the other side is the entrance hole

Deadwood can also be utilised for creating cavities. In some ways it is preferable. It often has decay present already, and looks more natural. It is created in much the same way as the examples for live wood already presented.

Figure 19 - Boring through the end of a dead stub forms a more natural entrance hole

Figure 20 - The hollow is created using the same process as described for live wood

Microbats are particularly vulnerable to habitat loss in urban areas. 'Bat mazes' contain much tighter cavities that other hollows, as microbats prefer close quarters – probably to aid in the exclusion of predators. The process is very similar to the techniques already described, differing only in that much less boring is required. After the face plate is removed, shallow trenches are cut which join up to a small entrance hole. Creativity can be used here, and areas of the maze can differ in depth, as long as the area adjoining the entrance hole remains shallow enough to prohibit predator access.

Figure 21 - A 'bat maze' designed with areas of differing depth, but with restricted access

Figure 22 - Showing the small entrance hole after the face plate is reattached

Below is an example of a tree which has been retained for the purpose of habitat creation. Viewed from this side, there is little visible evidence that any habitat cutting has been done. While the skeleton of the tree will be seen as an eyesore by many, the presence of wildlife and the opportunity to use it as an educational tool are of benefit to the community.

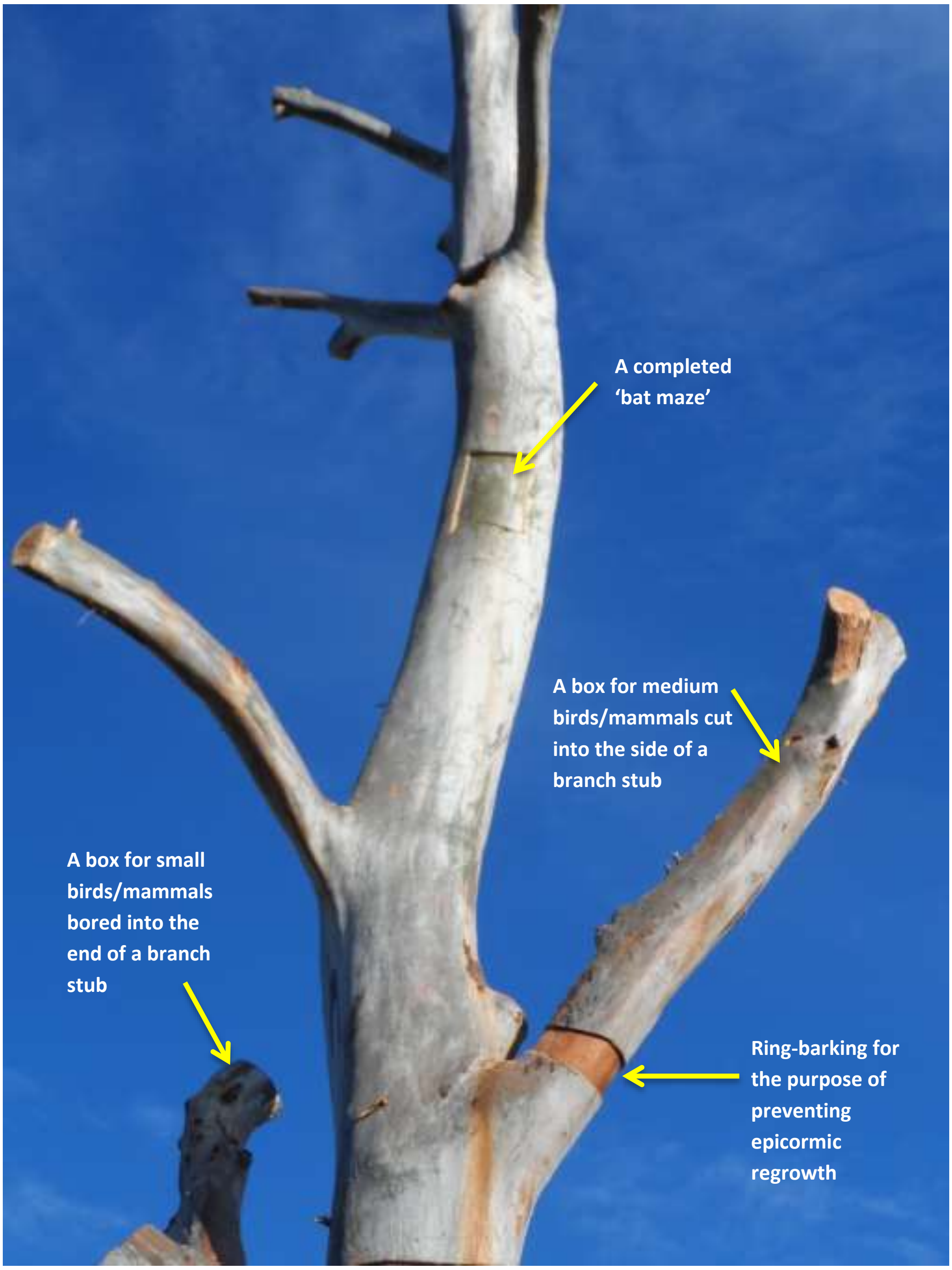

Figure 23 - Dead trees and the stems of trees up for removal provide excellent opportunities for habitat creation

Creating terrestrial habitat with logs

Dead and decaying logs are used as a food source and habitat by many organisms, but are more often than not removed from urban settings. As already mentioned, the aesthetics of a dead log would not appeal to many, but the benefits to biodiversity and animal populations are considerable. In the author's opinion, however, logs are useful items for landscaping in that they offer a natural alternative to the usual products. This is particularly useful when creating bushland parks, with logs only adding to their authenticity.

The largest problem with using logs for habitat purposes is their suitable positioning within the landscape, which often requires the assistance of heavy lifting machinery such as cranes, and their associated access restrictions.

If access and machinery are available, little other work is required save for some fairly simple sculpting. In cases where decay is already extensive enough, no further sculpting is necessary.

Figure 24 - An example of a log that is decayed enough that no further cutting is required

Figure 25 – The same log after it was placed into a bushland park adding to the site's authenticity and, hopefully, it's biodiversity

The sculpting of logs for the benefit of terrestrial animals – particularly reptiles and invertebrates – is fairly straight forward. Boring into the ends of logs is used to create hollows, but also to promote decay. “Trench cuts” along the underside of logs are made for the shelter of animals in spaces that predators cannot reach, and also allow for the introduction of decay.

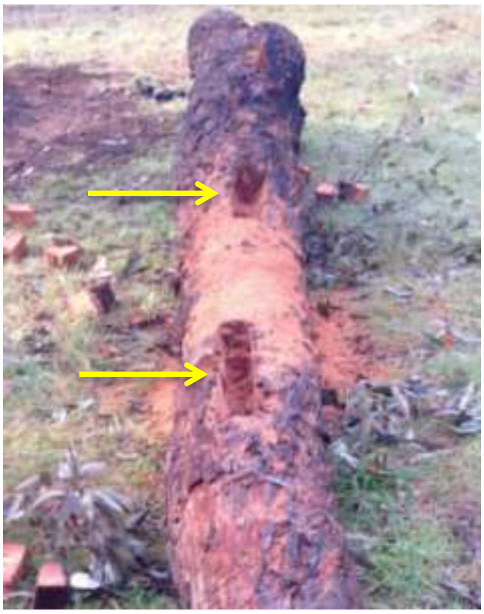

Figure 26 - "Trench cuts" have been made to what will be the underside of this log

Figure 27 - Boring into the end of logs creates shelter and promotes decay

Deliberately making cuts that overlap and form rough edges creates small nooks for invertebrates, and produces a larger surface area for decay to enter via.

Figure 28 - Try to make sculpting as rugged as possible by overlapping the cuts

Figure 29 - The finished product, waiting to be rolled over and positioned

In the right circumstances, a full tree can be used as a landscaping feature – just fell it, isolate it, landscape the surrounds and watch the critters come.

Figure 30 – Before

Figure 31 - After

Creating aquatic habitat with logs

Logs and snags are essential shelter for any underwater inhabitants, as well as perches for amphibians and birds that also use the area. However, there are more obstacles to overcome than with the use of logs on land. Firstly, more cutting is generally involved, and logs may need to be anchored or otherwise fixed so they do not move with currents or water levels. The greatest challenge however lies in the positioning of the logs, without actually getting in the water yourself.

Figure 32 - Heavy lifting machinery is usually necessary for the creation of aquatic habitat

Figure 33 - Extensive sculpting can be applied to logs, for both above- and below-water sections

Positioning logs atop one another creates ideal underwater protection, however this can be trickier than you would imagine. Constructing the desired structure on land and lifting it into the water in one piece is a way around this.

Figure 34 - The crude construction of a 'fish crate'

Figure 35 - A 'fish crate' in position

Below is an example of a large log that is intended for use as below- and above-water habitat in a lake. Sculpting includes turtle rests, bore cuts, slits for crustaceans, extended existing decay and a duck hollow (not visible).

Figure 36 - A log sculpted for above- and below-water habitat.

Creating structures on land before lifting into position saves a lot of time. Timber that would normally be turned into wood chip has been used to construct ‘fish crates’. These are assembled easily and require minimal sculpting other than boring into the ends of logs and creating ‘shrimp slots’.

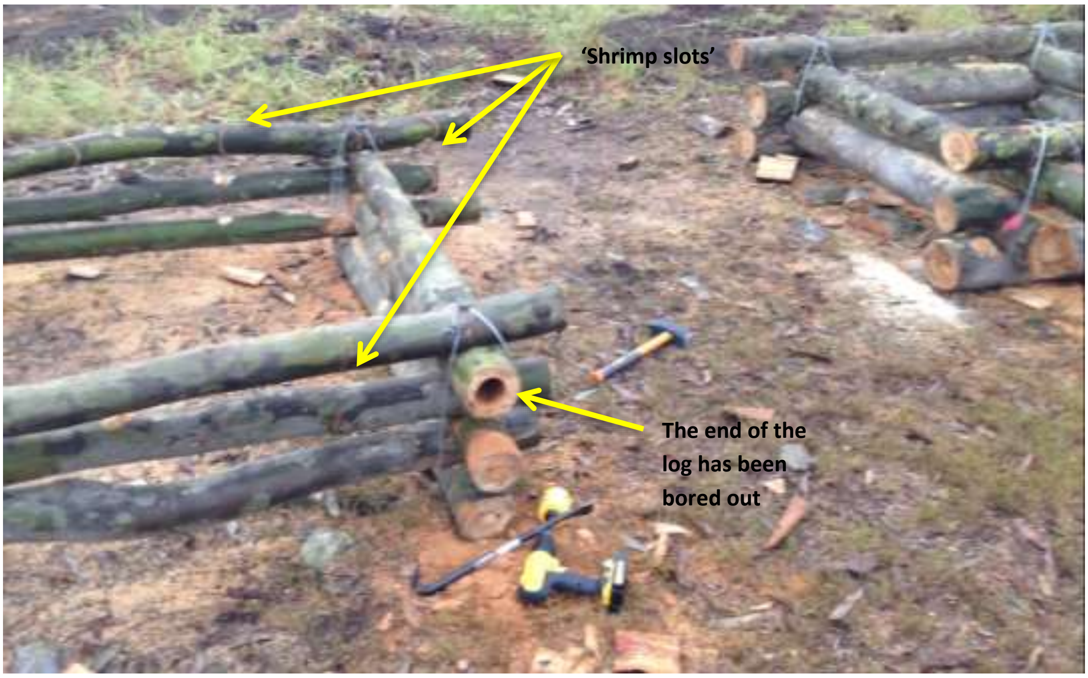

Figure 37 - 'Fish crates'

Slightly more involved is the process of utilising dead trees and logs as standing aquatic habitat. It is only a possibility when wetlands or water bodies are being initially created or drained for rejuvenation. It involves the 'planting' of dead tree or logs in an upright position, using heavy lifting and excavation machinery, to create an effect similar to what is pictured below.

Nesting boxes and platforms are then installed as desired.

Figure 38 - An example of standing aquatic habitat

Species requirements

Certain animals have requirements when selecting habitat, driven by evolutionary necessities such as accessing food sources, raising young and avoiding predation. These requirements include the height above ground, the aspect and orientation, the entrance hole size and internal dimensions. This is handy for us, as it means we can create habitat with an exact species in mind.

Below is a table of the requirements of some obligate hollow-using species from the Sydney region, any of which would – in the author's opinion – make great tenants on your property.

Table 1 - Species requirements.

Animal	Height above ground (m)	Aspect	Orientation	Entrance hole size (mm)	Width (mm)	Depth (mm)	Height (mm)	Notes
Powerful Owl	15-20	NE-S	Vertical	200	550	550	800	Leave interior rough as access ladder
Southern Boobook Owl	15-20	NE-S	Vertical	100	200	250	450	
Cockatoos	10+	NE-S	Vertical	180	400	300	1000	
Yellow Bellied Glider	8+	NE-S	Vertical	80	300	300	500	
Greater Glider	8+	NE-S	Vertical	80	300	300	500	
Barn Owl	6+	NE-S	Horizontal	250 x 150	400	900	400	
Galah	6	NE-S	Vertical	120	200	200	750	
Crimson Rosella	5+	NE-S	Vertical	100	200	200	550	
Rainbow Lorikeet	5+	NE-S	Vertical	100	200	200	550	
Sugar Glider	5+	NE-S	Vertical	30	200	200	500	
Tree Creepers	5	NE-S		60	150	150	150	
Eastern Rosella	5+	NE-S		70	150	150	150	
Owlet Nightjar	5+	NE-S		70	150	150	150	
Kookaburra	4+	NE-S	Horizontal	120 x 180	300	500	300	
Brushtail Possum	4+	NE-S	Vertical	100	300	250	450	
Tuan (Brushtail Phascogale)	4	NE-S	Vertical	40	180	180	500	
Microbats	4+	NW-NNE	Vertical	10-15	30	30	300	Create 'bat maze', clear flight path and landing platform required
Ringtail Possum	3-5	NE-S	Vertical	70	200	200	450	
Grey Strike Thrush	2-5	NE-S	Vertical	90 x 90	180	180	250	
Teal	1.5-2	NE-S	Vertical	100	350	350	450	
Pygmy Possum	1.5+	NE-S	Vertical	30	150	150	450	
Feathertail Glider	1.5+	NE-S	Vertical	30	150	150	450	
Pacific Black Duck	1.5-2	NE-S	Horizontal	120	350	450	350	
Pardalotes	1+	NE-S	Horizontal	30	100	130	100	Entry 30mm wide by 100mm long
Small Mammals	1.5-5	NE-S	Vertical	30	150	150	300	
Small Birds	4+	NE-S	Vertical	40-80	150	150	500	
Small Ducks	2+	NE-S	Vertical	100-150	350	350	450	
Medium Mammals	4+	NE-S	Vertical	40-80	200	200	450	
Medium Birds	4+	NE-S	Vertical	70	200	200	550	

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