



Nest Boxes for Red-tailed Phascogales

The red-tailed phascogale (*Phascogale calura*), also known as Kengoor, is Specially Protected under Western Australia's State legislation as Conservation Dependent. This means that the species requires ongoing conservation intervention to prevent them from becoming a threatened species again.

The species was once known from much of arid and semi-arid Australia but is now only found in remnant vegetation in the southern Wheatbelt. One of the current threats to the species is nest hollow shortages due to habitat loss and degradation from land clearing and fire, and competition with native and pest birds and feral European honey bees.

Nest boxes can be used to help conserve red-tailed phascogales by enabling them to breed in areas where natural hollows are limited. This information sheet provides advice on how to select an appropriate site, broad guidelines on how to design and place a nest box, and general advice on how to maintain and monitor nest boxes.

It is important to remember that the retention of both old and dead trees that have suitable hollows for red-tail phascogales is important for breeding and hence the long-term survival of the species. The installation of nest boxes should not be used to justify the removal of natural hollow-bearing trees.



Photo: Meredith Spencer/Bush Heritage Australia

When to Use Nest Boxes

Nest boxes may be useful at sites where natural hollows are limited, such as where existing hollows are degrading and not being replaced quickly enough due to lack of tree regeneration. However, red-tailed phascogales don't always use nest boxes when provided. There are ways to select sites for nest boxes that will increase the chance that they will be used by red-tailed phascogales.

Where and when do red-tailed phascogales nest?

Red-tailed phascogales are largely found in old-growth woodlands, predominantly dominated by Wandoo and York Gum and associated with Red Sheoak. Red-tailed phascogales have a preference for habitats that contain numerous tree hollows, have semi-continuous canopy and are long unburnt. Red-tailed phascogales are known to nest in hollow logs, tree hollows, and the skirts and stumps of Grass Trees.

Phascogales use nesting hollows all year round for sleeping during the day as they are a nocturnal species that is active during the night. They may use several hollows within their home range. Mating occurs during a three-week period in July, and young are born 28-30 days later. The young remain dependent on the mother from August to October.

Is my site suitable for nest boxes?

It is recommended that nest boxes be used in known nesting areas where there has been a decrease in the availability of natural nesting hollows. To decide if your site is suitable for nest boxes you need to consider the following criteria (Table 1). Protecting habitat, revegetating and controlling competitive pest species are alternative conservation actions that can also be used to complement the placement of artificial hollows.

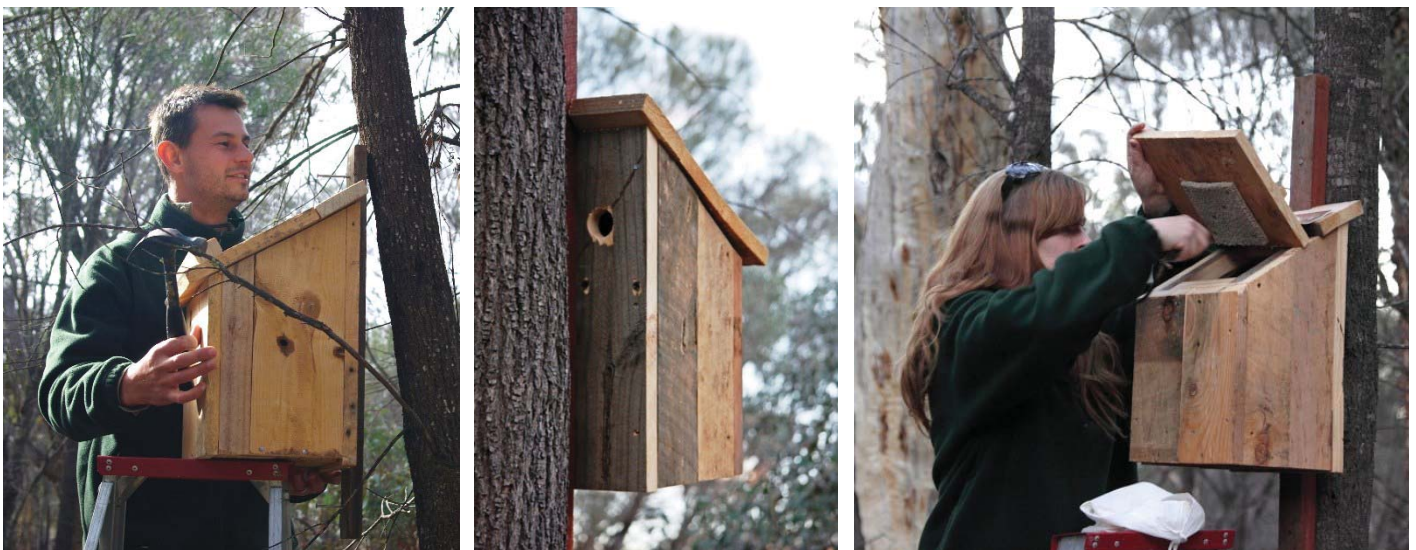
Table 1: Criteria to determine if a site is suitable for the placement of nest boxes

1.	The site contains suitable habitat within the known breeding range of the species	
	<i>Important consideration</i>	Red-tailed phascogales generally nest in woodlands dominated by Wandoo and York Gum and associated with Red Sheoak. The species is currently only known to persist in the southern Wheatbelt.
2.	The site is in an area where it is suspected or known that there is a lack of available tree hollows preventing breeding that would otherwise occur, due to the loss of suitable hollow-bearing trees (either through clearing or natural die-off).	
	<i>Important consideration</i>	Indirect evidence that may indicate a lack of available tree hollows includes sightings of red-tailed phascogales within rural buildings.
3.	The hollows are placed in secure locations and the owner/manager of these areas is supportive and willing to provide the necessary long-term security and annual maintenance for the entire time that the artificial hollow will be in place.	
	<i>Important consideration</i>	For advice on the monitoring and maintenance requirements, please refer to the section on how to monitor and maintain nest boxes.
4.	A suitable artificial hollow design is used.	
	<i>Important consideration</i>	For greatest chance of success, please refer to the section on how to design and place nest boxes

How to Design and Place Nest Boxes

There are various designs for nest boxes available but it best to tailor the design of the nest box to the specific nesting requirements of the red-tailed phascogale. This will encourage red-tailed phascogales to use the nest box while discouraging other species.

It is recommended that multiple nest boxes are placed at 50 m intervals around a site as red-tailed phascogales are known to regularly move between several nesting hollows.



Nest boxes being attached with nails (left), with a rear entrance (centre), and with a hinged lid and carpet (right).
 Photo: Angela Sanders/Bush Heritage Australia (left), DBCA (centre and right)

Nest box design

With any nest box design for red-tailed phascogales, it is important to ensure that it fits the following general specifications (Table 2). A diagram is also provided of a recommended design by Bush Heritage Australia, which they have successfully used to monitor red-tailed phascogales in Kojonup.

Table 2: General specifications for red-tailed phascogale nest boxes

Component	Specification
Material	Rough-sawn untreated Jarrah or other native Australian hard woods with > 15mm thickness ensures that it is durable enough to last > 5 years and provides adequate thermal insulation. Softwoods, like marine ply, can be used as long as they are not treated with toxic preserving chemicals like copper or arsenic. <u>DO NOT USE</u> : treated timber, chipboard, pine, interior ply, any materials under 15 mm thickness, toxic/smelly paint.
Joinery	Long, galvanised screws or nails. Make sure that there are no projecting nails or screws. Non-toxic waterproof glue can also be used. <u>DO NOT USE</u> : Toxic/smelly glues
Entrance hole	Rear entrance hole with a diameter of 30 - 40 mm
Cavity	Cavity size approximately 20 - 30 mm x 20 - 30 mm x 20 - 30 mm. Weatherproof and dark. Toe holds on inside walls enabling animals to climb out (i.e. walls should be made from rough-sawn timber or notched with a circular saw)
Base	Recessed inside walls. Three small (<10 mm) drainage holes.
Lid	Hinged lid to allow for inspection but well-secured to prevent brush-tailed possums from gaining access. A piece of carpet or perspex glued to the inside of the lid to discourage bees. Sloped from the back and overhanging the front and side by 25 mm for weather protection.
Nesting material	Weathered wood chips, shredded Jarrah bark or Paperbark, and/or untreated sheep's wool. Filled to cover the base of the internal cavity.

Mounting and placement

It is important that nest boxes are placed where they will be accessible for future monitoring and maintenance, but preferably not conspicuous to the general public.

Nest boxes should be mounted on rough-barked trees, preferably Wandoo, York Gum or Red Sheoak, with a diameter of ≥ 30 cm. DO NOT place nest boxes on trees that have existing hollows.

Nest boxes should be mounted so that that it is vertical and securely fastened to a tree at a height of 3 - 5 m above ground level. Red-tailed phascogales show no preference for aspect of nest boxes, but they should preferably be positioned to provide shelter from prevailing weather, particularly from sun and rain.

The best way to secure a nest box to a tree is by using two to four long galvanised screws or nails and securing it directly into the tree. One or two of the screws/nails should be through the pre-drilled holes at the back of the box.

Safety

Care needs to be taken when placing nest boxes to ensure human safety is considered at all times. Nest boxes are heavy and require lifting and manoeuvring into position.

How to Monitor and Maintain Nest Boxes

It is important to monitor and maintain nest boxes after they have been erected to:

- determine if the nest box is being used by red-tailed phascogales or other species (native or pest),
- determine the effectiveness of the design and placement of the nest box,
- identify any problems with pest species or maintenance requirements, and
- resolve any problems to ensure the nest box continues to be useful for nesting by red-tailed phascogale.

It is important to continue a regime of regular maintenance while the nest box is required.



Red-tailed phascogales inside a nest box.
Photo: Angela Sanders/Bush Heritage Australia

How do I monitor nest boxes?

Before undertaking monitoring of nest boxes for red-tailed phascogales, it is recommended that you seek advice from the Department of Biodiversity, Conservation and Attractions. It is also important to contact the Department's Wildlife Licensing Section to determine if a licence to disturb fauna is required (wildlifelicensing@dbca.wa.gov.au).

Monitoring nest boxes requires keen observation and naturalist skills. It is often not possible to observe direct evidence of use and therefore inferences must be made based on other observations. There are a variety of techniques available to monitor nest boxes, and a combination of several is likely to achieve the best results (Table 3).

Keep in mind that it is important to limit disturbance to any animals using the nest box, particularly during the breeding season. Animals should not be physically disturbed or handled.

When monitoring a nest box, always ensure that it is done as quickly and quietly as possible to avoid disturbing any animals that may be using it. Phascogales are nocturnal animals and therefore it is best to monitor them near sunrise or sunset. Therefore, if a phascogale is disturbed during the monitoring and leaves the nest box, the sun is not too bright, and it is not too hot.

Nest boxes can be left for long-periods of time without checking but ideally should be monitored once a year during the early mating season (July).

The information collected from the monitoring should be written down and reported. There are standard fauna report forms available on the Department's website (<https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals>) that can be used to record the details of your sighting.

Alternatively, if you are frequently monitoring a larger number of nest boxes, you can put the details into a spreadsheet. Records should be submitted to the Department by emailing fauna@dbca.wa.gov.au. The Department will put the records into the Threatened and Priority Fauna Database and it will be used to inform conservation and management decisions.

Any other opportunistic sightings of Threatened and Priority species are always appreciated and can also be reported via the same email.

Important information to record includes: observer's name and contact details, date and time, location, fauna species, description of the animal or a photo, vegetation description, and observation description (i.e. details about nest box monitoring, signs of use, animal behaviour etc.).

Table 3: Techniques for monitoring nest boxes

Technique	Description of Technique
Observation from the ground – looking for signs of use outside the nest box	<p>Look for signs of recent use from the outside, particularly noting any chew or scratch marks, and any discolouration around the entrance hole(s).</p> <p>Cobwebs covering the entrances will indicate that the nest box has not been used recently.</p> <p>A light piece of string nailed over the entrance hole is a useful way to determine if an animal is inside the nest box because animals entering the box will push the end of the string in with them.</p>
Observation from the ground – observing insect activity outside the nest box	<p>Faecal matter produced by animals attracts insects, especially flies and ants.</p> <p>Blowflies around a nest usually indicates that a death has occurred.</p>
Observation from the ground – stag watching	<p>Stag watching is when you watch the nest box for a certain period of time to see if any animals exit the nest box. The following methodology is recommended:</p> <ul style="list-style-type: none"> • Choose a place to sit within 2 -5 m of the nest box and within sight of its entrance holes • Sit quietly from at least 10 minutes before dusk until at least 30 minutes after sunset. • When movement is observed, see if you can identify the animal in any natural light available by observing its shape and size. If this is not possible, use a torch to illuminate the animal to see its distinguishing features. • Take notes of the important information (see above).
Observation via a camera – telescopic camera	<p>To avoid disturbing any animals that may be using the nest box, look inside the nest via the entrance holes with the aid of a telescopic pole and camera or mirror.</p>
Observation via a camera (long-term monitoring) – remote camera	<p>Cameras can be installed in or nearby a nest box to watch remotely to see if the nest box is used. This technique allows for monitoring/information to be gathered throughout the year, including throughout the breeding season.</p> <p>When installing a camera nearby a nest box, make sure it is in sight of the entrance holes at the rear of the nest box. If you are installing a camera inside the nest box, make sure it is prepared before the nest box is mounted to a tree so that the camera can easily be turned on and off without disturbing any animals inside the nest box.</p> <p>There are various types of nest-box camera kits with infra-red lights that can be used.</p>
Observation via a ladder – looking for signs of use inside the nest box	<p>If the nest box appears to be empty (confirmed by the use of a camera), quietly approach the nest box using a ladder and open the hinged lid slowly.</p> <p>If there is an animal in the nest box, quietly close the lid and leave the area as quietly as possible to reduce any further disturbance.</p> <p>If there are no animals in the nest box, the inside of the nest box can be checked for signs of use, particularly noting any feathers, fresh or old scats, scratch marks, discolouration, and new or disturbed nesting material.</p> <p><u>DO NOT</u> approach the nest box if there are bees present. Research has found that bees will move out by themselves and so won't have a long-term impact on nest box use, particularly if you have several nest boxes at your site.</p> <p>Watch out for spiders, ants and other insects that may be using the nest box and can inflict stings or bites when disturbed.</p>

How do I maintain nest boxes?

Nest boxes can be left for long periods of time, but they may still require maintenance to ensure they continue to have the greatest chance of being used by red-tailed phascogale. Therefore, it is best to make periodic maintenance checks at least every two years. Maintenance checks can be undertaken while monitoring, but it is preferable that they are undertaken prior to the breeding season so that any problems identified can be addressed before breeding occurs. If breeding is occurring, maintenance should be delayed if it is likely to disturb the animals. Maintenance concerns regarding the security of attachment points or the stability of the tree or pole should be addressed as a priority for safety reasons.

At a minimum, maintenance checks should assess the following:

- Condition of attachment points,
- Stability of tree or pole used to mount the nest box,
- Presence of black rats,
- Presence of feral bees,
- Presence of dead animals,
- Condition of nest box, particularly the base, and
- Condition of nesting material.

Likely maintenance includes:

- Control of black rats using rat traps (weekly if black rats are present);
- Control of feral bees with the help of an apiarist (only if bees become an issue);
- Adjustment of nest box placement (only if rains entering or excessive heat in the summer is an issue);
- Replacement of nest box due to deterioration (rarely for hard woods, occasionally for soft woods); and

Replacement of wet and mouldy nesting material (rarely if using hard woods with holes drilled into the base).

Further Reading

Bush Heritage Australia's species webpage: [Red-tailed Phascogales](#)

Acknowledgements

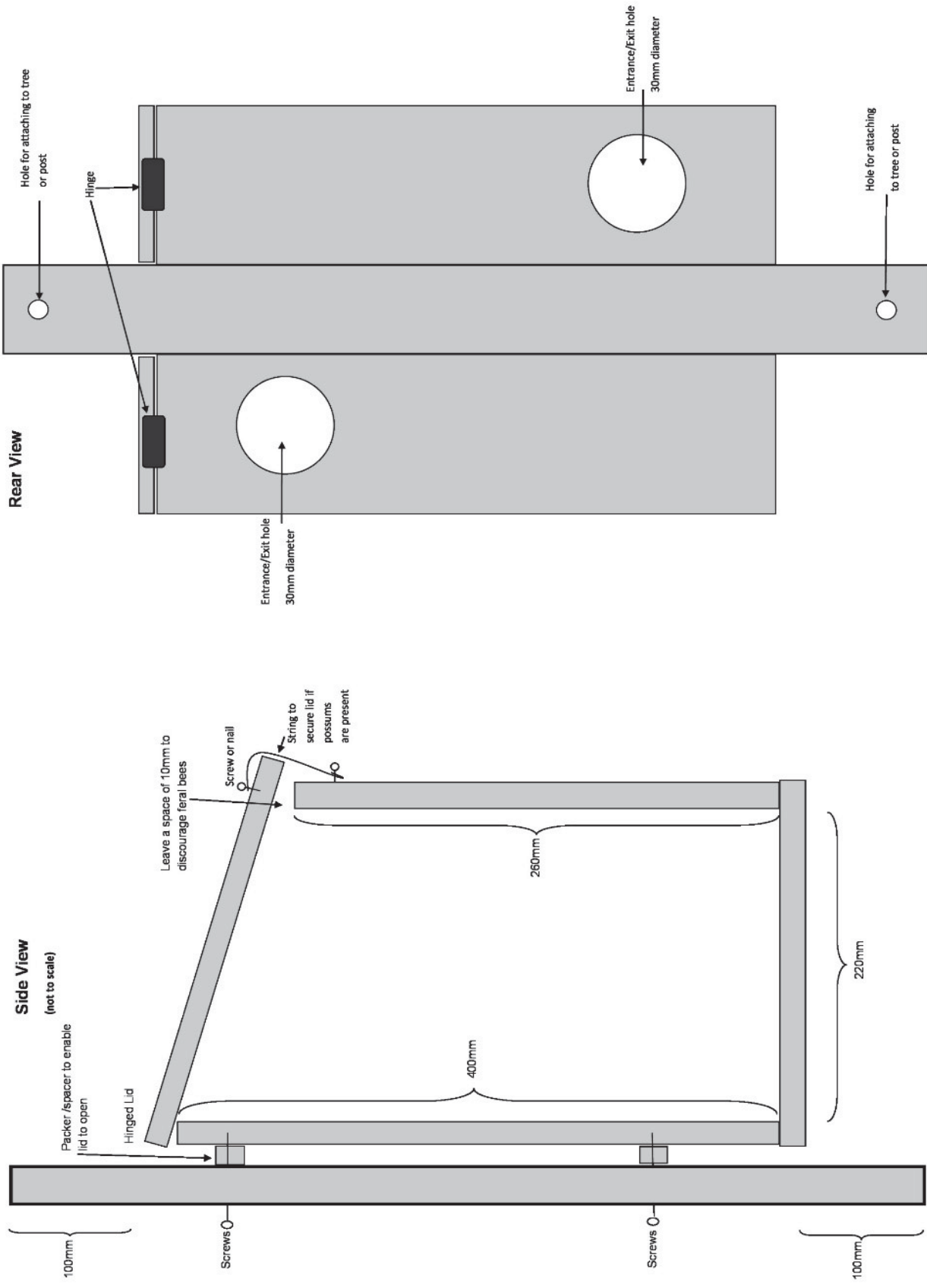
This information sheet was developed with contributions on monitoring methods and nest box design from Bush Heritage Australia.

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Side view (left) and rear view (right) of a red-tailed phascogale nest box design. Image: Bush Heritage Australia