



TASMANIAN BATS AND THEIR HABITAT – A GUIDE



Additional reading:

The Australasian Bat Society has bat fact sheets, recommended survey guidelines, a bat call group and discussion email list:

<http://www.ausbats.org.au>

A guide to Australian bats:

Churchill, S 2009, *Australasian bats*, Allen & Unwin, Sydney, Australia.

A detailed guide to methods for surveying bats:

Kunz, TH and Parsons, S 2009, *Ecological and behavioral methods for the study of bats*, John Hopkins University Press, Baltimore, MD, USA.

Selecting hollow-bearing trees for retention:

Tasmanian Forest Practices Authority 2009, *Tree hollows in Tasmania – a guide*, CRC for Forestry and the Forest Practices Authority, Hobart, Tasmania.

Tasmanian bats:

Cawthen, L 2013, 'White-striped freetail bat in Tasmania – resident, vagrant or climate change migrant?', *Australian Mammalogy*, 35 (2), pp 251–254.

Cawthen, L 2014, 'The effectiveness of the multi-spatial scale approach to forest management - a case study of Tasmanian bats, PhD thesis, University of Tasmania, Hobart.

Cawthen, L, Utesch, M, Koch, N and Munks, SA 2012, 'Insectivorous bat activity in timber production forests in the headwaters of the South Esk River, north-eastern Tasmania', *Australian Zoologist*, 36 (1) ,pp 1–4.

Driessen, M, Brereton, R, and Pauza, M 2011, 'Status and conservation of bats in Tasmania', *Australian Zoologist*, 35, pp 342–336.

Hull, CL and Cawthen, L 2013, 'Bat fatalities at two wind farms in Tasmania, Australia: bat characteristics, and spatial and temporal patterns', *New Zealand Journal of Zoology*, 40 (1), pp 5–15.

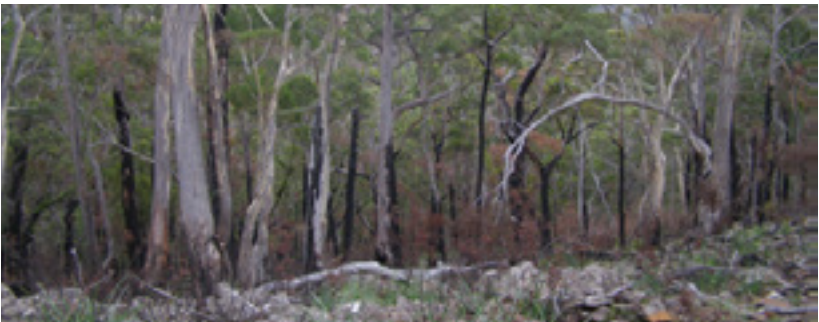
Law, BS and Law, PR 2011, 'Early responses of bats to alternative silvicultural treatments in wet eucalypt forests of Tasmania', *Pacific Conservation Biology*, 17 (1), pp 36–47.

O'Neill, MG and Taylor, RJ 1986, 'Observations on the flight patterns and foraging behavior of Tasmanian bats', *Australian Wildlife Research*, 13 (3), pp 427–432.

O'Neill, MG and Taylor, RJ 1989, 'Tasmanian bats: identification, distribution and natural history', *Papers and Proceedings – Royal Society of Tasmania*, 121, pp 109–119.



This booklet provides information on surveying, identifying and managing Tasmanian bats and their habitat.



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Zoological Society of New South Wales, Norske Skog, Forestry Tasmania, The University of Tasmania, the MA Ingram Trust and Bat Conservation International.

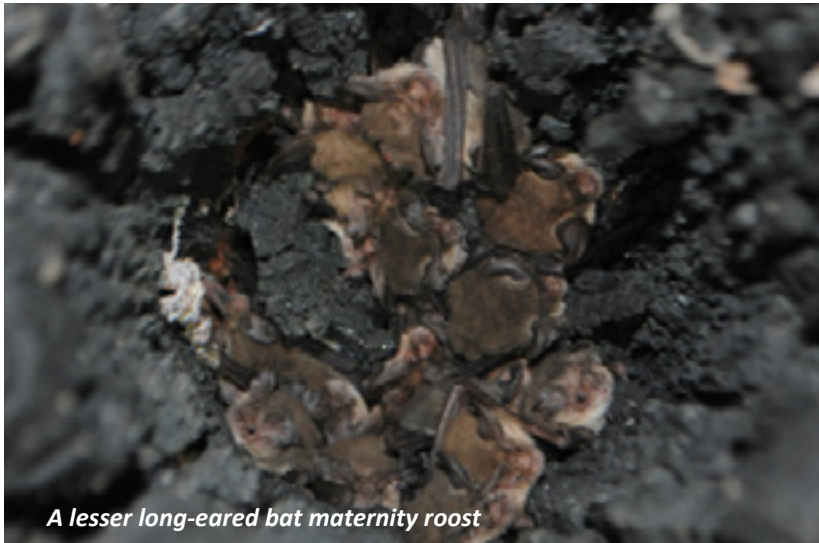
Photographs by Lisa Cawthen, Tim Cary, Julie Danby, Cathy Dorling and Antony Mould.

Disclaimers: This booklet is not intended to be a comprehensive resource and may not contain the latest information on Tasmanian bats and their habitat.

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A lesser long-eared bat maternity roost

Introduction to Tasmania's bats

Bats are one of the most widespread, diverse and abundant groups of mammals on the planet. Conserving bats is important, not only because of their intrinsic value, but also because they play an important role in forest ecosystems as insect controllers.

Tasmania is home to eight micro-bats, all of which consume vast quantities of insects each night. Unlike mainland Australia, there are no mega-bats (i.e. fruit bats) that live in Tasmania. Both mega- and micro-bats do however arrive in Tasmania as occasional visitors (vagrants).

Resident bat species can be found anywhere in Tasmania, but species vary in their habitat needs. As a result, we need to conserve a range of different types of habitat for bats, particularly roosting and breeding habitat.

When little is known about what bat species are present in an area and the importance of different types of habitat, bat surveys can be carried out to inform the development of management strategies, threat mitigation measures and increase our understanding of bats in general.

Resident bat species

- Little forest bat (*Vespadelus vulturnus*)
- Southern forest bat (*Vespadelus regulus*)
- Large forest bat (*Vespadelus darlingtoni*)
- Chocolate wattled bat (*Chalinolobus morio*)
- Goulds wattled bat (*Chalinolobus gouldii*)
- Lesser long-eared bat (*Nyctophilus geoffroyi*)
- Tasmanian long-eared bat (*Nyctophilus sherrini*)
- Eastern falsistrelle (*Falsistrellus tasmaniensis*)

Known vagrant bat species

- White-striped freetail bat (*Austronomus australis*)
- Grey-headed flying fox (*Pteropus poliocephalus*)



A large forest bat

Threats to bats

Given the value of bats as insectivores in maintaining ecosystem health, it is important to understand what natural and human-induced disturbances could affect a bat population and manage these accordingly.

Bat habitat can be lost or made unsuitable because of:

- tree removal
- tree pruning
- storms
- drought
- fire
- climate change
- disease and pests
- artificial light sources.

Bats can also be directly injured or killed by:

- felling trees
- wind turbines
- aeroplanes
- motor vehicles
- introduced predators
- disease
- heat stress
- pesticides.

Ensuring that we manage the threats to bats and their habitat will help their long-term survival.

Conservation status of Tasmanian bats

All of Tasmania's resident bats are fully protected under the *Tasmanian Nature Conservation Act 2002*. None are listed as threatened at the state or national level. The eastern falsistrelle is listed as threatened in New South Wales (*NSW Threatened Species Conservation Act 1995*) and the vagrant grey-headed flying fox is listed as a threatened at the national level (*Australian Environment Protection and Biodiversity Conservation Act 1999*, the EPBC Act).



Types of bat habitat

Bats require habitat for roosting, foraging and drinking. Bats can be found foraging almost anywhere in the Tasmanian landscape as long as there is suitable roosting and drinking habitat nearby.

Often bats will utilise forest edges, including roads and trails, to forage and commute between different habitat, sometimes travelling tens of kilometres in one night.

One of the most important habitat types for bats is old trees with hollows. Bats require multiple hollows and other cavities to shelter and breed. Unlike mainland bats, Tasmanian bats do not regularly use caves. In general, a lack of tree hollows available for bats can have a significant impact on the persistence of bats in the landscape.



Roosting habitat

Hollows

Not all bat species use the same types of hollows, and some use different types of hollows depending on the time of year.

Large hollows, like the ones shown here, are particularly important for bat maternal colonies which can comprise hundreds of individual females and young. Maternal colonies form between September and February each year, during which time females are pregnant, give birth and raise young.



A large narrow trunk hollow roost



A branch hollow roost



A basal hollow roost



A trunk hollow roost



A basal hollow roost

Fissures

Small cracks in trees and stumps, known as fissures, can be used as roost sites. The entrance to these roosts can be as small as 1 cm wide. These roosts are usually occupied by only one or two bats.



A roost in a fissure in a burnt tree



A roost in a fissure at the base of a burnt tree

Under bark

Exfoliating and lifted bark, sometimes on very young eucalypts, can be used as roost sites. Colonies of more than 30 individual bats have been located roosting under bark.



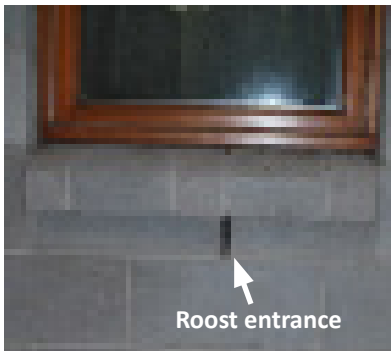
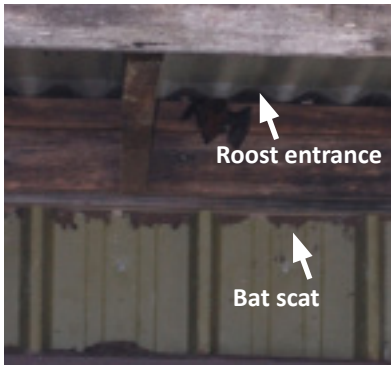
A roost under the bark of a tree stump



A roost under the bark of a young eucalypt tree

Buildings

Bats will take advantage of gaps in buildings to access roof spaces or walls for roosting. These roosts can be used by hundreds of bats, including maternal colonies.



Caves and mines

Infrequently bats have also been found to roost in sea caves, land caves with out-flowing streams and mine shafts.

Bat boxes

Artificial cavities can be created by constructing a bat box. These can provide habitat for bat species in areas where natural cavities are rare or absent.



Other types of roosting habitat

Though uncommon, bats can be found roosting in many man-made structures including umbrellas, coats, cars and under the metal caps on poles. Bats have also been found roosting in palm fronds, logs and in leaf litter on the ground. These roosts are not considered optimal, and so bats generally use them as a temporary roost or when they are injured or sick.

How to survey for bats

By surveying bats you can identify what species occur in the area, assess how important different types of habitat are for bats, and assess the impacts of disturbance on bats and the effectiveness of bat management strategies. There is a range of methods you can use to survey bats, each with its own pros and cons. The two main methods are bat call surveys and bat capture.

Bat call surveys:

- use an acoustic recorder (bat detector)
- provide data on bat activity and species presence
- do not disturb bats
- are ideal for remote long-term monitoring and investigating changes to bat communities over time and space.

Bat calls can be identified using a bat call key but not all bat calls can be identified to species level, so this approach is limited.



Bat scat found at the bottom of a basal hollow

Bat capture:

- uses mist nets or harp traps
- provides data on bat species presence and population dynamics (e.g. breeding females)
- can disturb bats
- requires an expert with a suitable permit for handling bats.



A harp trap

Another survey method is to inspect accessible hollows. The presence of live bats, or at least bat scats at the bottom of the hollow, show that it is being used at that point in time.

A quick guide to bat-call surveys

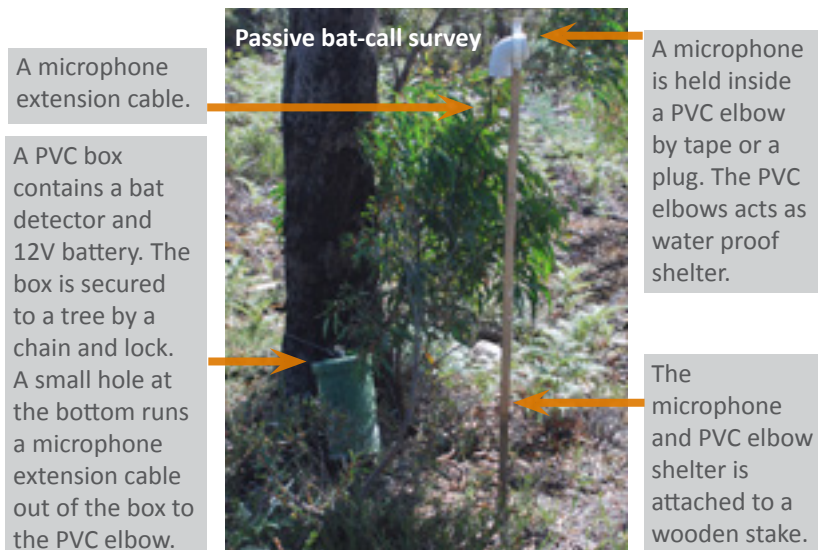
Bat call surveys can be active or passive.

- Active surveys involve walking a transect or an area of interest to record bat calls.
- Passive surveys involve setting a detector in one location for an extended period of time (days or weeks at a time).



Good places to survey bats include trails, forest edges and water sources. The survey location depends on the survey objectives.

There are many different types of bat detectors. The one used in the development of this booklet was the Anabat SD2 – a bat detector that can be used actively and passively. The diagram below shows a passive set-up of an Anabat bat detector. Technology is changing constantly so always check for the most up to date set-up information on the best approaches using different types of detectors.

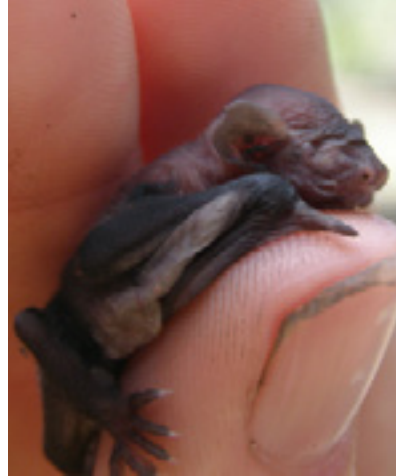


Best times to survey for bats

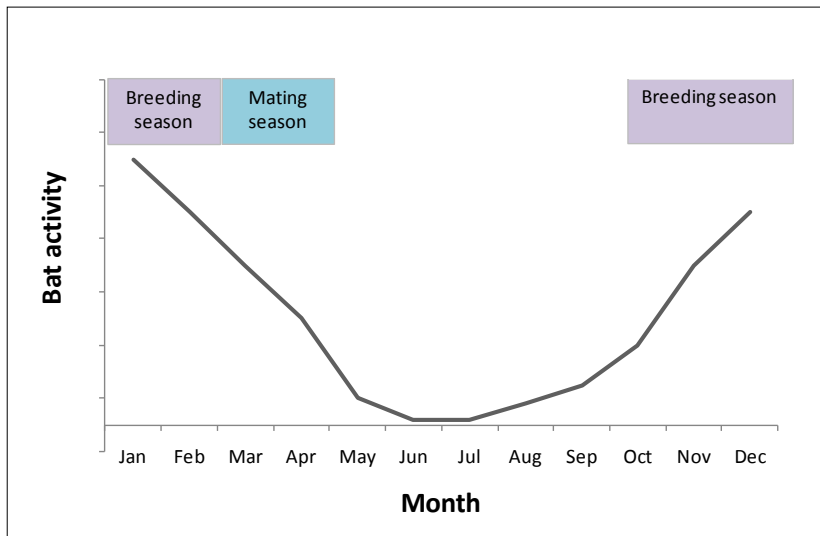
The timing of bat surveys largely depends on the objectives of the survey.

Different bats use different habitat types throughout the year but, in general, bat activity is highest during the breeding season (October to February) and lowest over winter.

Bats mate during autumn and give birth and raise young between October and February.



A chocolate wattle bat pup



A generalised graph of bat activity in Tasmania and how this relates to the breeding and mating season.

A key to identifying Tasmanian bats

This key is for identifying bats in-hand (alive or dead).



3a Adult forearm length 28–30 mm; fur is grey with a distinct lighter belly; hairs are bi-coloured; grey skin and nose; often but not always white skin (tragus) in ear; a distinct bump between nose and forehead can be felt; in males penis is swollen, pendulous with a bulbous tip

Yes

Vespadelus vulturnus

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No

3b Adults forearm length 30–32 mm; fur reddish or light brown; uniform in colour; brown skin; uniform skin colour of lower lip; no distinct bump can be felt between nose and forehead (flat); penis is swollen, pendulous with distinct lateral folds at tip

Yes

Vespadelus regulus

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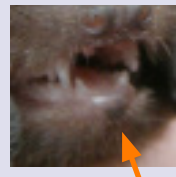
No

3c Adults forearm length 32–38 mm; brown to dark brown fur; skin is dark; distinct dark triangle on lower lip; distinct bump can be felt between nose and forehead; males have a distinctively angular penis (right angle) without a swollen tip

Yes

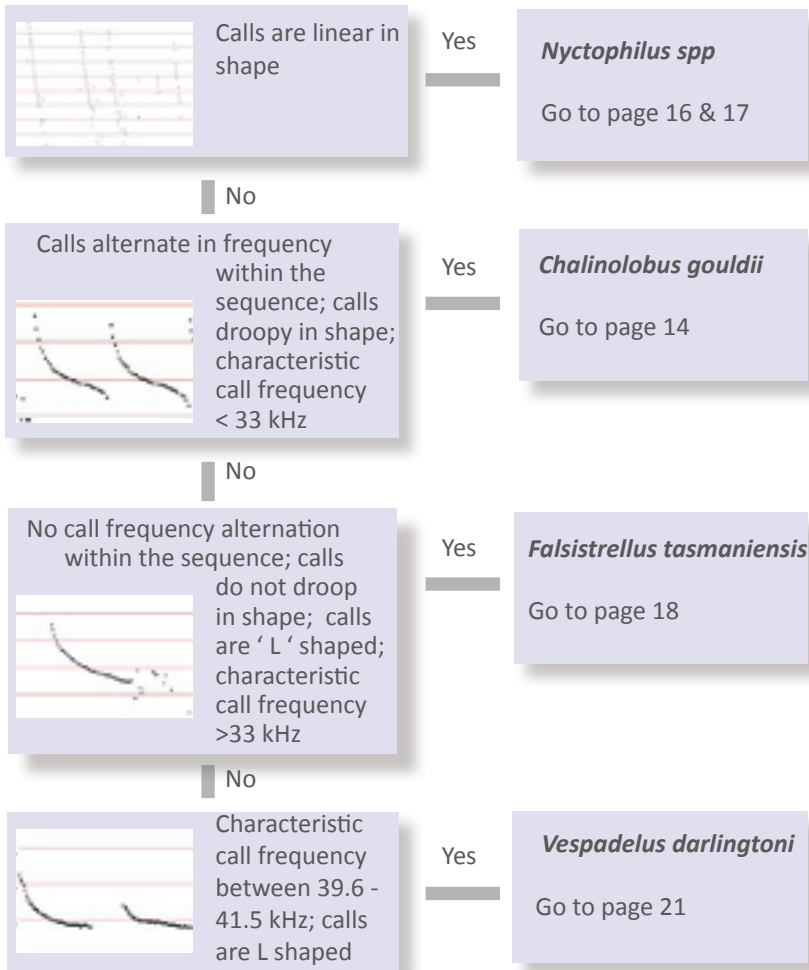
Vespadelus darlingtoni

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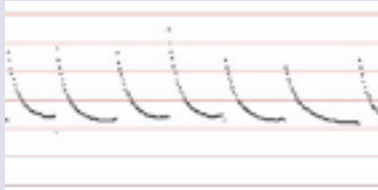


A basic key to identifying Tasmanian bat calls

This key is for quick bat call identification in the field or office. A complete bat call consists of a series of sound pulses repeated at regular intervals. For the purposes of this key, each pulse is referred to as a call, and each set of consecutive pulses made by the same bat is referred to as a sequence. Refer to the additional reading section for details of accessing the most up to date and more detailed key.



Characteristic call frequency between 41.6 - 44 kHz; calls are 'L' shaped



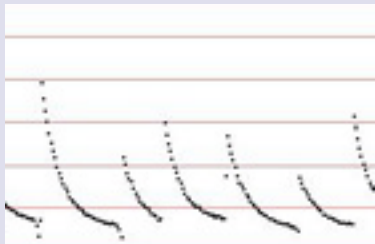
Yes

Vespadelus darlingtoni
or *Vespadelus regulus*

Go to page 20 & 21

No

Characteristic call frequency between 44.01 - 51.31 kHz; call 'L' shaped or may have a slight droop to each call

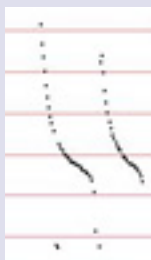


Yes

Vespadelus spp or
Chalinolobus morio

Go to page 15; 19-21

No



Characteristic call frequency between 51.32 - 56 kHz; call 'L' shaped or may have a slight droop to each call

Yes

Chalinolobus morio

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Gould's wattled bat

Chalinolobus gouldii

History: Originally described as *Scotophilus gouldii* (type locality Launceston, Tasmania) until morphological evidence supported the recognition of a single species (*C. gouldii*) throughout its range (Gray, 1841).

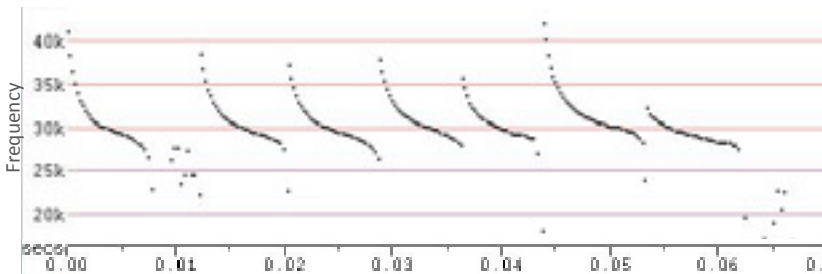


Description: Its fur is uniform chocolate brown with a contrasting dark brown to black 'hood' of fur on the head extending to the shoulders. Ears are short, round and broad. A large lobe of skin (wattle) extends from the corner of its mouth to the bottom of the ear.

Foraging behaviour: This species is crepuscular – one of the first bat species to emerge at night when there is still ambient light. It forages at canopy height along forest edges and in open spaces.

Roost habits: Old trees with hollows.

Echolocation call:



Chocolate wattled bat

Chalinolobus morio

History: Originally described as *Scotophilus morio* until morphological evidence supported the recognition of a single species (*C. morio*) throughout its range (Gray, 1841).

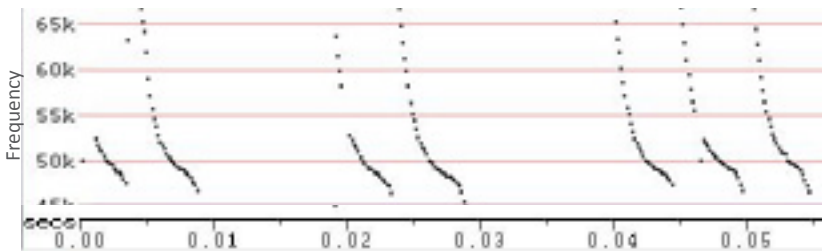
Description: This species has uniform chocolate brown fur. Head is slightly domed. Ears are short, broad and round. A lobe of skin (wattle) extends from the bottom of the ear but does not extend to the lower lip as in *C. gouldii*.



Foraging behaviour: Flies in the mid-storey, foraging around the shrub layer.

Roost habits: Old trees with hollows. Maternal colonies of over 300 individuals have been recorded.

Echolocation call:



Tasmanian long-eared bat

Nyctophilus sherrini

History: Described as *N. sherrini* until the 1970s when it was considered a sub-species of *N. timoriensis* (Thomas, 1915). In 2009 this species was described morphologically as an endemic species to Tasmania. Early descriptions of *N. gouldii* in Tasmania, which have never been verified, may have been this species.

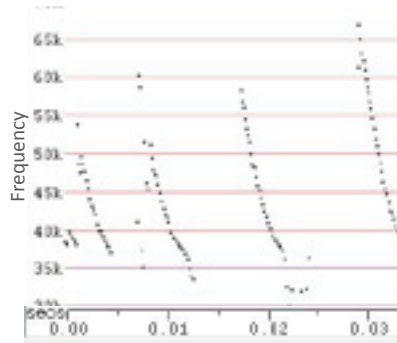
Description: A medium-sized bat that is the largest of Tasmania's two long-eared bats species. Long-eared bats are distinguished from other bats by their long, ribbed ears which can be erect or folded back. This species has dark fur on the back and slightly lighter fur on its belly. Identified from other *Nyctophilus* by its muzzle ridge.



Foraging behaviour: Flies low to the ground close to vegetation.

Roost habits: Old trees with hollows

Echolocation call:



Lesser long-eared bat

Nyctophilus geoffroyi

History: Population in south-eastern Australia is recognised as a single subspecies - *Nyctophilus geoffroyi pacificus* (Leach, 1821).

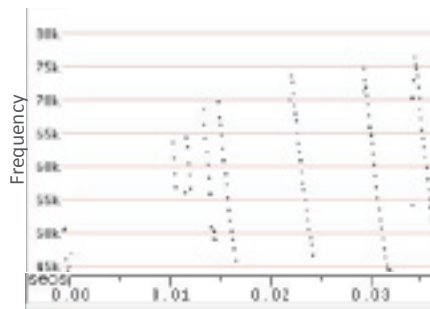
Description: A medium-sized bat that is the smaller of Tasmania's two species of long-eared bats. Long-eared bats are distinguished from other bat taxa by their long, ribbed ears which can be erect or folded back. Fur is light grey on the back and distinctively lighter on the belly. The hairs are bi-coloured and darker at the base. The species has a distinctive high muzzle ridge that is split and joined by an elastic membrane of skin, giving the ridge a distinctive Y-shaped groove that distinguishes it from all other species of *Nyctophilus*.



Foraging behaviour: Flies low to the ground close to vegetation. Found foraging in open areas more than *N. sherrini*.

Roost habits: Old trees with hollows, under bark and buildings.

Echolocation call:



Eastern falsistrelle

Falsistrellus tasmaniensis

History: Formerly known as *Pipistrellus tasmaniensis* until a taxonomic review found this species is not a *Pipistrellus* (Gould, 1858). Also known as the Eastern false pipistrelle.

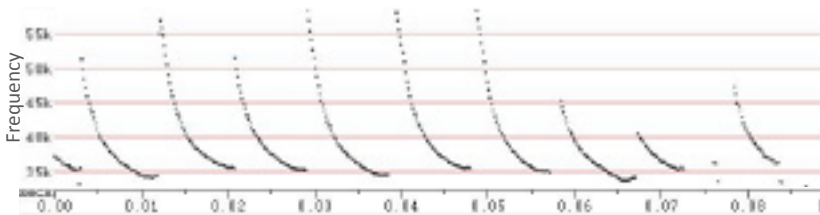


Description: This is Tasmania's largest bat. It has dark brown uniform fur and long slender ears that extend over its head. The ears have a characteristic notch on the outer margin near the tip. When held in the hand a humming sensation can sometimes be felt.

Foraging habits: A high-flying bat species that forages above the canopy, over water and in open areas.

Roost habits: Old trees with hollows. In cities, found to roost on exposed building surfaces between April and September.

Echolocation call:



Little forest bat

Vespadelus vulturnus

History: Originally described as *Eptesicus pumilus vulturnus* (Thomas, 1914).

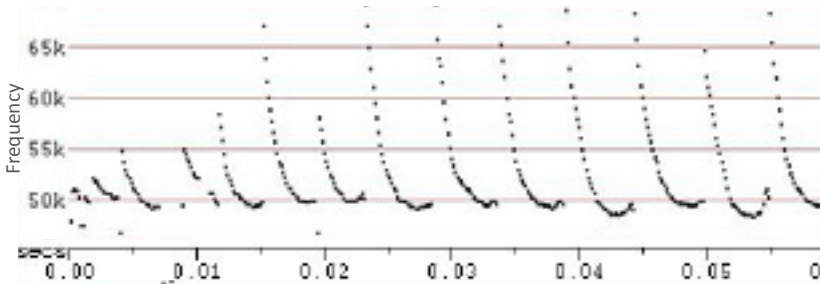
Description: The smallest bat in Tasmania. Characteristic grey fur, that is bi-coloured being darker at the base. The belly generally has lighter fur. Some individuals have a white or pale grey piece of skin in the ear called a tragus.



Foraging habits: Flies below the canopy just above the understorey or along forest edges. Can fly very low to the ground.

Roost habits: Old trees with hollows and buildings.

Echolocation call:



Southern forest bat

Vespadelus regulus

History: Originally described as *Eptesicus regulus* (Thomas, 1906).

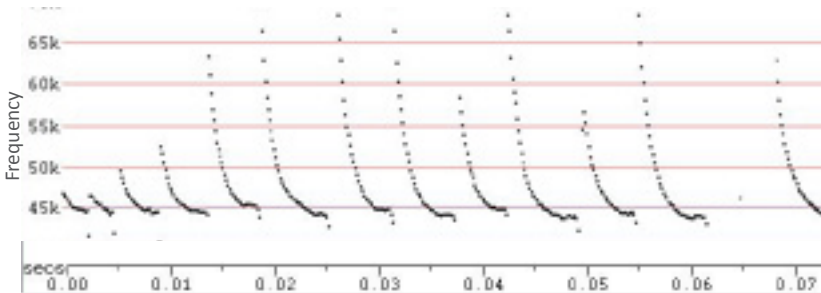
Description: The second smallest of the three forest bats in Tasmania. Fur is a warm reddish brown to grey. The penis is pendulous and has a clearly swollen tip.



Foraging habits: Flies in gaps between the understorey and mid-storey.

Roost habits: Old trees with hollows and buildings. Will co-roost in buildings with *V. darlingtoni*.

Echolocation call:



Large forest bat

Vespadelus darlingtoni

History: Originally described as *Eptesicus sagittula* (Allen, 1933).

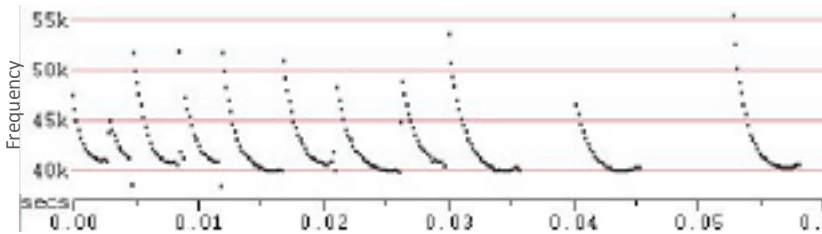
Description: The largest of Tasmania's three *Vespadelus* bat species. It has uniform dark brown fur and dark skin. Males can be readily distinguished from females of other species by penis shape – a distinctive right angular shape with the tip not enlarged like other forest bats. By running a finger lightly from the nose along the forehead to the ears a distinct bump or rise can be felt on the ridge.



Foraging habits: Flies between the canopy and understorey.

Roost habits: Old trees with hollows and buildings. Has been found to co-roost with *V. regulus* in buildings.

Echolocation call:



Vagrant bats

White-striped freetail bat

Austronomus australis

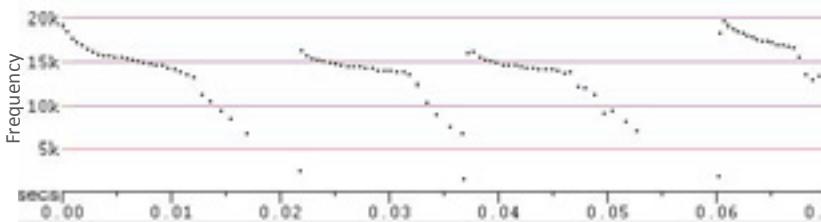
Previously known as *Tadarida australis* until a review found this species represents a unique genus to Australia.

This species has been recorded in Tasmania. It is the only bat in Australia with an echolocation call audible to the human ear. It makes characteristic 'ping-ping-ping' call.



a

Echolocation call:



Grey-headed flying fox

Pteropus poliocephalus

This species does not produce echolocation calls. It is a fruit eating mega-bat that roosts on the branches of trees. This species has been recorded in Tasmania and on the Bass Strait Islands.



Managing bat habitat

Bat habitat can be managed in many ways to retain and enhance its suitability for maintaining bats in the landscape. This can be accomplished by **RETAINING, PROTECTING AND RECRUITING**:

- large patches (>300ha) of mature forest in the landscape – while some species readily use small clumps and strips of mature forest to breed, others prefer larger patches
- a mosaic of different mature forest elements including individual trees, small patches and strips in areas where mature forest is to be cleared
- remnants of forest adjoining agricultural areas (e.g. by fencing or excluding stock by other means)
- a variety of different types of hollow-bearing trees to cater for differences in the types of hollows bats prefer – consider bat boxes if hollows are absent
- insect-attracting vegetation (e.g. heath) for foraging habitat
- natural water sources – in their absence provide ‘bat-friendly’ water sources (e.g. constructed ponds).



Retaining hollow-bearing trees



Fencing off forest patches from livestock



Maintaining heathlands



This booklet is an informative guide to Tasmania's bat biology, identification and habitat management.

