

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister's delegate approved this conservation advice on 01/10/2015

Conservation Advice

Nyctophilus corbeni

south-eastern long-eared bat

Conservation Status

Nyctophilus corbeni (south-eastern long-eared bat) is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species is eligible for listing as Vulnerable under criterion 1 of the EPBC Act as it has undergone, is suspected to have undergone or is likely to undergo in the immediate future a substantial reduction in numbers. The species was listed under the EPBC Act in 2001 under the name *Nyctophilus timoriensis* (south-eastern form). The scientific name was updated under the EPBC Act on 1 August 2011.

Description

Until recently the south-eastern long-eared bat was included as a distinct form of the greater long-eared bat (*Nyctophilus timoriensis*) complex and was listed as such under the EPBC Act. In 2009 it was formally described as a separate species, *Nyctophilus corbeni* (south-eastern long-eared bat), by Parnaby (2009). There are no recognised subspecies (Woinarski et al. 2014).

The south-eastern long-eared bat is a member of the *Vespertilionidae* family. It is a relatively large solid bat with a broad, robust skull (Parnaby 2009; Schulz and Lumsden 2010). It has a head and body length of 50–75 mm, a forearm length of 40–50 mm and a tail length of 35–50 mm (Reardon 2012; Department of the Environment 2013). The species weighs between 11–21 g with females (14–21 g) typically heavier than males (11–15 g) (Department of the Environment 2013). As the name suggests, the species has long ears, approximately 30 mm in length, which are erect when the bat is alert but fold back when at rest (Reardon 2012). The species' fur is a light brown to a dark grey-brown (Reardon 2012). The species is sympatric in part of its range with the morphologically similar Gould's long-eared bat (*Nyctophilus gouldi*). The echolocation calls of the south-eastern long-eared bat cannot be reliably distinguished from those of the Gould's long-eared bat using common methods (Schulz and Lumsden 2010).

Distribution

The south-eastern long-eared bat was originally considered to be found across temperate southern Australia, however this is most likely incorrect due to the separation of the taxon into three different species; therefore the historic distribution is unclear (Duncan et al., 1999; Parnaby 2009).

The south-eastern long-eared bat is found in southern central Queensland, central western New South Wales, north-western Victoria and eastern South Australia, where it is patchily distributed, with most of its range in the Murray Darling Basin (Duncan et al., 1999; Turbill and Ellis 2006). Most records are from inland of the Great Dividing Range (Parnaby 2009). The species is uncommon within this distribution and is rarely recorded (Department of the Environment 2013), except in some areas including the Nandewar and Brigalow Belt South bioregions in New South Wales and Queensland. The species occurs in a number of national parks (NP) and nature reserves (NR) across its range, including

Hattah-Kulkyne NP and Murray Sunset NP in Victoria, Danggali Conservation Park in South Australia and the Goulburn River NP, Monabalai NR, Yathong NR, Budigower NR, Woggon NR, Mungo NP, Cocoparra NP, Ben Halls Gap NP, Pilliga NR, Gooban NP, Warrumbungle NP and the Rocks NR in New South Wales (Department of the Environment 2013).

Approximately 30% of the total distribution of the species occurs in Queensland, although there are records from fewer than 30 localities, mainly from within the Brigalow Belt South bioregion (Reardon 2012). The species occurs throughout much of inland New South Wales with at least 50% of the species' known distribution occurring in this state (Parnaby et al., 2011). New South Wales Office of Environment and Heritage (NSW OEH) (2012) state that the Pilliga scrub region is a distinct stronghold for this species. There are very few records for the species in Victoria, which are from widely scattered locations in the Northern Plains and the Mallee regions (Lumsden 1994; Schulz and Lumsden 2010). In South Australia the species occurs in the far east of the state, with records north of the Murray River, east of Canegrass Station and south of the Barrier Highway, but the northern range limit is unclear (Duncan et al., 1999). The species occurs primarily within the Riverland Biosphere Reserve, including Danggali Conservation Park and the Birds Australia Gluepot Reserve.

There is little information currently available regarding population numbers and structure for the south-eastern long-eared bat. Currently all population information is based on trapping results and no detailed demographic studies have been conducted (Schulz and Lumsden 2010).

Habitat

The south-eastern long-eared bat is found in a wide range of inland woodland vegetation types. These include box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee (Duncan et al., 1999; Schulz and Lumsden 2010; Woinarski et al., 2014)

In Queensland and New South Wales it inhabits a variety of vegetation types but it is distinctly more common in box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland (NSW OEH 2012). In Victoria most records are from *Eucalyptus gracilis* mallee, Buloke and black box woodlands (Lumsden 1994) while in South Australia it is confined to tall mallee shrublands (Duncan et al., 1999).

The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches (Turbill and Ellis 2006), suggesting its home range is probably large (Lumsden et al., 2008). It appears that old-growth vegetation is a critical habitat component in the Victorian distribution (Lumsden et al., 2008). The species has also been found to be much more abundant in habitats that have a distinct tree canopy and a dense, cluttered understorey layer (Turbill and Ellis 2006).

Relevant Biology / Ecology

The south-eastern long-eared bat is an insectivorous bat that hunts by taking flying prey or by foliage-gleaning in flight or by foraging on the ground (Lumsden and Bennett 2000; Schulz and Lumsden 2010). When hunting in flight it generally consumes beetles, bugs and moths (Lumsden and Bennett 2000), however it has also been recorded feeding on grasshoppers and crickets (Department of the Environment 2013). Foraging appears to be concentrated around patches of trees in the landscape, with many individuals from different species of bat sharing the same foraging area (Department of the Environment 2013).

Studies have found that the south-eastern long-eared bat roosts solitarily, mainly in dead trees or dead spouts of live trees. In studies of roosting behaviour in Victoria most bats were found roosting individually in mallee eucalypts in areas of long-unburnt mallee, with some under bark or in fissures of dead Buloke (*Allocasuarina leuhmannii*) or Belah (*Casuarina cristata*) trees (Lumsden et al., 2008). A study in New South Wales found maternity colonies, consisting of 10-20 individuals, roosting in dead trees including ironbarks, cypress and buloke (Schulz and Lumsden 2010). It appears that most roost sites are used just for a single day and large distances are travelled at night, with consecutive roost sites generally within four km (Lumsden et al., 2008).

There is little available information on the species' reproductive biology. Breeding is likely to be seasonal, with pregnant and lactating females having been trapped in Queensland and New South Wales in November (Schulz and Lumsden 2010).

Threats

Due to the lack of data available to assess the population decline of the south-eastern long-eared bat, providing a detailed assessment of the current threats to the survival of this species is difficult. However it is likely that area of occupancy is declining due to habitat loss, particularly in New South Wales and Queensland, and to habitat degradation associated with altered fire regimes, timber extraction, mining and other factors (Woinarski et al., 2014). Habitat loss and fragmentation are considered here as known threats, with potential threats discussed following these known threats.

Habitat loss and fragmentation

Extensive clearing of woodland and mallee vegetation is likely to have been a major factor in the decline of the south-eastern long-eared bat. Both the Action Plan for Australian Bats and the Action Plan for Australian Mammals identify habitat loss and fragmentation as a past and current threat to the species (Duncan et al., 1999; Woinarski et al., 2014). This habitat loss is greater in New South Wales and Queensland (Woinarski et al., 2014); 75% of the eastern part of the species' range has been cleared in New South Wales (Duncan et al., 1999). Agriculture has been the greatest cause of land clearing in the mallee and woodland habitats, however increasingly extractive industries are targeting the remaining areas (Schulz and Lumsden 2010). Habitat loss threatens the species by reducing habitat availability, such as important roosting sites (Schulz and Lumsden 2010). Given the species' requirements for large areas of land, smaller fragments may not provide viable habitat for the species (Woinarski et al., 2014), leaving bats more vulnerable to local extinction and reductions in fitness (Schulz and Lumsden 2010). Fragmentation of habitat may also exacerbate other threats to the species.

Fire

Bushfires are suspected to be a threat in the remaining uncleared areas of the south-eastern long-eared bat's habitat (Duncan et al., 1999). Bushfires pose a threat to the conservation of the species by both causing direct mortality during bushfire events and through the loss of foraging habitat and roosting sites, which take a long time to develop (Schulz and Lumsden 2010). Given the level of habitat loss that has occurred across the species' range, further habitat loss through natural processes such as normal fire regimes are more significant than they would have been in the past.

Schulz and Lumsden (2010) suggest that bushfires, fuel reduction burns and frequent burning regimes for increased productivity in New South Wales and Queensland have an unknown but likely detrimental impact on the species. The species is believed to prefer long-unburnt mallee habitat in Victoria (Lumsden et al., 2008) and therefore frequent fires are likely to threaten

the species in that state. It is important to clarify the impact and requirements of fire for this species across its entire range and to determine optimal fire regimes.

Reduction in hollow availability

The availability of suitable roosting habitats is essential for the conservation of the south-eastern long-eared bat. This species mainly roosts in tree hollows and so a reduction in hollow availability would likely put pressure on the species. Hollows can be lost through general habitat loss and either purposely or incidentally during routine forestry practices (Schulz and Lumsden 2010). The loss of hollows is a threat on its own to the species; however habitat loss also leads to increased competition for remaining hollows from other animals (Reardon 2012). Bats have been recorded, or suspected of being, evicted from tree hollows by introduced species including the common starling (*Sturnus vulgaris*), common myna (*Acridotheres tristis*) and the introduced honeybee (*Apis mellifera*) (Schulz and Lumsden 2010). Although this is also possible for this species, it has not yet been demonstrated and it assumes that hollows are limiting (Woinarski et al., 2014). The potential impacts of both the loss of roosting hollows and competition for hollows with introduced species needs to be quantified.

Exposure to agrichemicals

As an insectivorous species and a species that occurs in habitat in, or adjacent to, agricultural areas, the south-eastern long-eared bat may be susceptible to exposure from insecticides. This can occur by direct application or spray drift in agricultural areas, or through bio-accumulation of some chemicals through the ingestion of prey that has been exposed to agrichemicals (Schulz and Lumsden 2010). NSW OEH (2012) notes that the application of agrichemicals in or adjacent to the species' foraging habitats may be a threat to the species. More research needs to be undertaken to clarify the level of threat posed by these agrichemicals.

Grazing

Grazing in the habitat of the south-eastern long-eared bat is a suspected threat in the uncleared areas of habitat (Duncan et al., 1999) as it may reduce foraging habitat through the removal of shrubs and by limiting regeneration, as well as potentially causing significant changes to the structure and diversity of such habitats (Schulz and Lumsden 2010). The relative impact of grazing as a threat to the species is unknown however and requires further investigation.

Predation by feral animals

Predation of south-eastern long-eared bat by introduced species, such as the feral cat or red fox, has not been demonstrated (Woinarski et al., 2014) and therefore the risk to the species is unknown. Schulz and Lumsden (2010) note that predation is a possible threat for the sympatric lesser long-eared bat. The impact of predation by feral animals needs to be assessed for this species.

Conservation Actions

Conservation and Management Actions

Habitat loss disturbance and modifications

- Protect known and potential habitat of key populations, including within conservation reserves, from habitat loss and fragmentation.
- Provide relevant state government land management agencies, CMA/NRM regional bodies and local shires with the location of key populations under their jurisdiction to incorporate these into planning mechanisms to assist in habitat protection.
- Incorporate findings of research into the impact of forestry practices into forest management to protect key populations.

- Where feasible, undertake habitat renewal actions to link habitat supporting known populations or potential habitat.
- Retain hollow-bearing trees and provide for hollow tree recruitment where possible.
- Incorporate key population locations into the planning and decision-making process for major infrastructure projects, such as the development of new roads and pipeline routes, and extractive industries.

Invasive species

- Implement control programmes of feral species identified as having a known or potential impact on key populations.

Impacts of domestic species

- If grazing is assessed as posing a threat to the species, ensure relevant land owners/managers use an appropriate management regime and stock density that does not detrimentally affect this species (does not reduce foraging habitat). If required, manage total grazing pressure at areas that have been identified as important sites through exclusion fencing or other barriers.

Fire

- As a precautionary approach, while detailed information is being collected on the appropriate fire regimes for this species, map all areas of old growth mallee within the range of this species, and take these into consideration when planning fuel reduction burns.
- Once investigations into impact of fire frequency and intensity are complete, incorporate this information into fire management plans across the species' range.

Stakeholder Engagement

- Encourage landholders on private property or leaseholders on crown land supporting key populations to minimise habitat loss and fragmentation, and enhance habitat values by participating in voluntary conservation and incentive programmes.
- As a precautionary approach, while information is being collected on impacts of agrichemicals on this species, constrain the use of agrichemicals, especially in and around areas that have been identified as important populations.
- Identify opportunities for community involvement in the conservation of the south-eastern long-eared bat.

Survey and Monitoring priorities

- More precisely assess population size, distribution, demographics, ecological requirements by targeted surveys and surveys of poorly known areas.
- Design and implement a long term monitoring programme.

Information and research priorities

- Identify important populations based on both the genetic qualities of the species across its range and by high densities as indicated by high records of incidence.
- Identify populations that occur in discontinuous forest habitat across the species' range and assess the possibility of linking and enhancing isolated populations.
- Investigate if there are more effective field techniques, particularly ultrasonic detection, to survey for the south-eastern long-eared bat and determine detection probability using conventional trapping techniques.
- Undertake survey work in suitable habitat and potential habitat to locate any additional populations / occurrences / remnants.
- Assess the species' ecological requirements relevant to the persistence of the species including diet (with special reference to susceptibility to poisoning through agrichemicals), the roosting requirements in both the breeding and non-breeding seasons and the extent to which hollows are limiting.

- Investigate and assess the relative impacts of the following known and potential threats:
 - habitat fragmentation and degradation;
 - fire frequency and intensity, including control burns and bushfires;
 - forestry practices;
 - grazing;
 - feral animals;
 - commonly-used agrichemicals; and
 - explorative and extractive industries such as coal seam gas developments.
- Investigate approaches to minimising the impacts of identified threats.

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