

# **NATIVE FAUNA OF THE GREATER BLUE MOUNTAINS WORLD HERITAGE AREA**



**UPDATE 1 – MAMMALS**

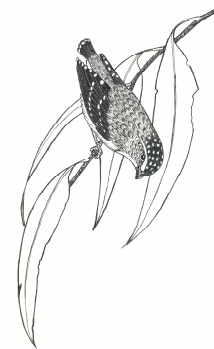
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# **NATIVE FAUNA OF THE GREATER BLUE MOUNTAINS WORLD HERITAGE AREA**

## **UPDATE 1 – MAMMALS**

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Cover illustration of Greater Glider by Kate Smith [katesmithart@gmail.com](mailto:katesmithart@gmail.com)

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### Introduction

The Greater Blue Mountains World Heritage Area comprises eight reserves: Blue Mountains, Gardens of Stone, Kanangra-Boyd, Nattai, Thirlmere Lakes, Wollemi and Yengo National Parks, and Jenolan Karst Conservation Reserve. The area was inscribed on the World Heritage List in 2000 because its natural values, including the diversity of its fauna, were considered to be outstanding at international level.

In 1998, when the nomination of the Greater Blue Mountains Area for inscription on the World Heritage List was prepared for the Australian Government, it was well known that the area provided habitat for a wide variety of mammals, birds, reptiles and frogs but the details were sketchy. The nomination indicated that about 400 native terrestrial vertebrate fauna species had been recorded in the area, including 52 mammal, 265 bird, 63 reptile and more than 30 frog species. However, these included species recorded in the vicinity but not confirmed to occur within the World Heritage Area.

We have been residents of the Blue Mountains, and have observed and kept records of its fauna, for over 40 years. As ecological consultants, we have carried out many fauna surveys in the area. In 1990, we published a book on the local fauna (J. Smith and P. Smith, 1990, *Fauna of the Blue Mountains*, Kangaroo Press, Kenthurst) and in 2019, from our own records and many other sources, we published a more comprehensive book on the fauna of the World Heritage Area (J. Smith, P. Smith and K. Smith, 2019, *Native Fauna of the Greater Blue Mountains World Heritage Area*, P & J Smith Ecological Consultants, Blaxland). Our objective in the latter book was to document the native mammals, birds, reptiles and frogs of the World Heritage Area, with details of the distribution, abundance, habitat and conservation significance of each species. The book was intended to celebrate the outstanding diversity of native fauna in the area, to promote greater appreciation of this fauna, and to provide benchmark information that would be of value for the current and future management of the World Heritage Area.

Our book listed 68 mammals, 254 birds, 74 reptiles and 36 frogs that we considered to have been reliably recorded within the Greater Blue Mountains World Heritage Area since European settlement. Sadly, nine mammal species now appear to be locally extinct, including one which is extinct at species level (White-footed Rabbit-rat *Conilurus albipes*), and one which is extinct at subspecies level (an unidentified bettong, either the Tasmanian Bettong *Bettongia gaimardi gaimardi* or the Brush-tailed Bettong *Bettongia penicillata*

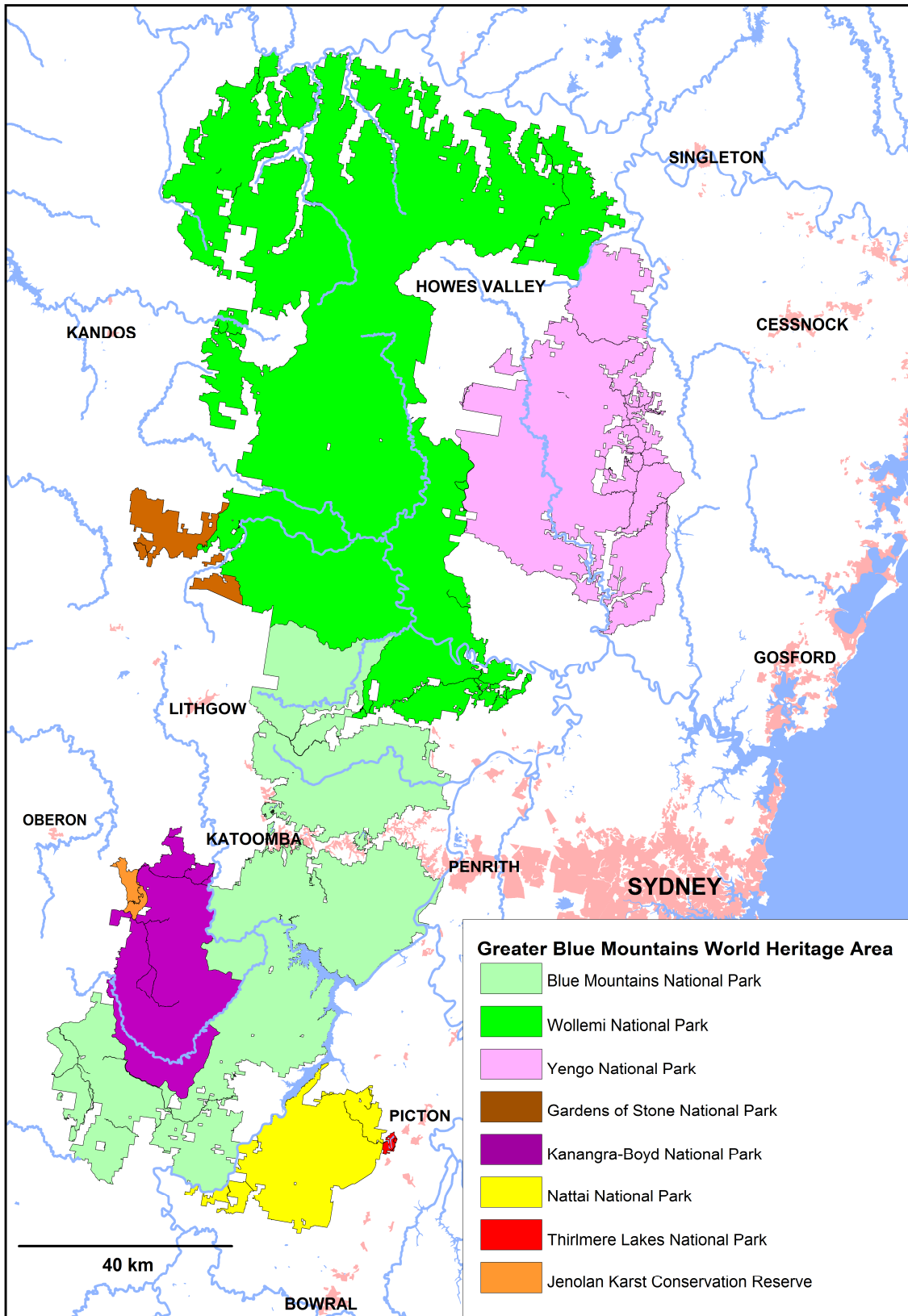
*penicillata*, both of which were recorded historically in the near vicinity of the WHA). At least one frog species, the Green and Golden Bell Frog, last recorded in 1963, may also now be extinct in the World Heritage Area.

While we were writing the book, the World Heritage Area was subject to a severe and prolonged drought accompanied by record-breaking and persistent high temperatures. These extreme conditions, which are a consequence of on-going rapid climate change, culminated in the spring and summer wildfires of 2019-20. The severity and extent of the fires were unprecedented and about 80% of the Greater Blue Mountains World Heritage Area was burnt. In early 2020, the wildfires were extinguished by deluges of rain which caused serious flooding and erosion in the World Heritage Area. The full impact on the fauna of these combined events is still to be determined, but it is clear that much more now needs to be done locally to promote the recovery and resilience of the native vegetation and fauna. In the face of the increasing impact of human-induced climate change on the World Heritage Area, it is also clear that local management initiatives will not succeed in the long term unless the issue of climate change is addressed much more seriously at state, national and global levels.

We are continuing to gather information on the Blue Mountains fauna. We intend to provide occasional updates to our book in the form of four annotated checklists (one each for the mammals, birds, reptiles and frogs), which will be made available on the Blue Mountains Nature and Researchgate websites. In this first update, there are two additions to the species list: one nomadic waterbird, the Plumed Whistling-Duck, was recorded within the WHA for the first time in the summer of 2017-18; and one mammal species, the Sugar Glider, has recently been split into three separate species, two of which occur in the WHA (Krefft's Glider and Sugar Glider in a narrower sense). Thus, the native fauna species now known from the WHA include 69 mammals, 255 birds, 74 reptiles and 36 frogs. Seventy-seven of these (28 mammals, 38 birds, 4 reptiles and 7 frogs) are listed as threatened species under either national or state legislation (as of March 2021).

This first update represents the status of the fauna prior to the events of 2019-20 and does not take account of the impact of the drought, heatwaves, wildfires and floods. It is likely that the populations and ranges of many fauna species in the area have been reduced. Many fauna species have become much more threatened and some may have become locally extinct. The changes resulting from the upheavals in 2019-20 are yet to be elucidated and documented. As more information becomes available, we hope to do further updates describing those changes. Updating the checklists is an important and on-going process. If you have additional records or other information, your feedback would be very welcome.

Judy and Peter Smith



## Native mammal species recorded in the Greater Blue Mountains World Heritage Area

Status in NSW and Commonwealth legislation: C = critically endangered, E = endangered, V = vulnerable, X = extinct

GBMWA reserves: BMNP = Blue Mountains National Park, GOSNP = Gardens of Stone National Park, JKCR = Jenolan Karst Conservation Reserve, KBNP = Kanangra-Boyd National Park, NNP = Nattai National Park, TLNP = Thirlmere Lakes National Park, WNP = Wollemi National Park, YNP = Yengo National Park

Species nomenclature follows Van Dyck *et al.* (2013) and, for *Mormopterus*, Reardon *et al.* (2014). Subspecies follow Burbidge *et al.* (2014). 'Recent' records are 2000 or later, otherwise the date of the last record is specified. Includes records from skeletal material in cave deposits at Jenolan Caves (Morris *et al.* 1997), but only if the material dates from after European settlement.

Common name	Scientific name	Family	Status		Records in Greater Blue Mountains World Heritage Area reserves							
			NSW	Aus	BMNP	GOSNP	JKCR	KBNP	NNP	TLNP	WNP	YNP
Platypus	<i>Ornithorhynchus anatinus</i>	Ornithorhynchidae			recent	recent	recent	recent	recent		recent	
Short-beaked Echidna	<i>Tachyglossus aculeatus aculeatus</i>	Tachyglossidae			recent	recent	recent	recent	recent		recent	recent
Agile Antechinus	<i>Antechinus agilis</i>	Dasyuridae			1986		recent					
Yellow-footed Antechinus	<i>Antechinus flavipes flavipes</i>	Dasyuridae			recent	recent	undated				recent	
Brown Antechinus	<i>Antechinus stuartii</i>	Dasyuridae			recent	recent	recent	recent	recent	1956	recent	recent
Dusky Antechinus	<i>Antechinus swainsonii mimetes</i>	Dasyuridae			recent		1991	recent			recent	recent
Spotted-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	Dasyuridae	V	E	recent		recent	recent	recent		recent	recent
Eastern Quoll	<i>Dasyurus viverrinus</i>	Dasyuridae	E	E			extinct					
Brush-tailed Phascogale	<i>Phascogale tapoatafa tapoatafa</i>	Dasyuridae	V				recent					undated
Common Dunnart	<i>Sminthopsis murina murina</i>	Dasyuridae			recent	recent	recent	1998	recent		recent	recent
Northern Brown Bandicoot	<i>Isodon macrourus torosus</i>	Peramelidae									recent	
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	Peramelidae	E	E			undated					
Long-nosed Bandicoot	<i>Perameles nasuta</i>	Peramelidae			recent	recent	undated				recent	recent
Koala	<i>Phascolarctos cinereus</i>	Phascolarctidae	V	V	recent	recent	recent	recent	recent		recent	recent
Common Wombat	<i>Vombatus ursinus hirsutus</i>	Vombatidae			recent	recent	recent	recent	recent	recent	recent	recent
Eastern Pygmy-possum	<i>Cercartetus nanus unicolor</i>	Burramyidae	V		recent		undated		recent		recent	
Yellow-bellied Glider	<i>Petaurus australis australis</i>	Petauridae	V		recent	recent	recent	recent	recent		recent	recent
Sugar Glider (broad sense)	<i>Petaurus breviceps sens. lat.</i>	Petauridae			recent	recent	recent	recent	recent	recent	recent	recent
Sugar Glider (narrow sense)	<i>Petaurus breviceps sens. str.</i>				recent							
Kreff's Glider	<i>Petaurus notatus</i>				recent							
Squirrel Glider	<i>Petaurus norfolcensis</i>	Petauridae	V		recent	recent	undated		recent		recent	recent
Greater Glider	<i>Petauroides volans volans</i>	Pseudocheiridae		V	recent	recent	recent	recent	recent	recent	recent	recent
Common Ringtail Possum	<i>Pseudocheirus peregrinus peregrinus/cookii</i>	Pseudocheiridae			recent	recent	recent	recent	recent	recent	recent	recent
Narrow-toed/Broad-toed Feathertail Glider	<i>Acrobates pygmaeus/frontalis</i>	Acrobatidae			recent	recent	recent	recent	recent		recent	recent

Common name	Scientific name	Family	Status		Records in Greater Blue Mountains World Heritage Area reserves								
			NSW	Aus	BMNP	GOSNP	JKCR	KBNP	NNP	TLNP	WNP	YNP	
Short-eared/Mountain Brushtail Possum	<i>Trichosurus caninus/cunninghami</i>	Phalangeridae			recent				recent			recent	
Common Brushtail Possum	<i>Trichosurus vulpecula vulpecula</i>	Phalangeridae			recent	recent	recent	recent	recent	recent	recent	recent	recent
Unidentified bettong species	<i>Bettongia</i> species	Potoroidae	X	X				extinct					
Long-nosed Potoroo	<i>Potorous tridactylus tridactylus/trisulcatus</i>	Potoroidae	V	V				undated					
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	Macropodidae			recent	recent	recent	recent	recent	recent	recent	recent	recent
Common Wallaroo	<i>Macropus robustus robustus</i>	Macropodidae			recent	recent	recent	recent	recent	recent	recent	recent	recent
Red-necked Wallaby	<i>Macropus rufogriseus banksianus</i>	Macropodidae			recent	recent	recent	recent	recent		recent	recent	recent
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	Macropodidae	E	V	recent			recent	1989	recent		recent	recent
Swamp Wallaby	<i>Wallabia bicolor</i>	Macropodidae			recent	recent	recent	recent	recent	recent	recent	recent	recent
Black Flying-fox	<i>Pteropus alecto gouldii</i>	Pteropodidae			recent								
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Pteropodidae	V	V	recent			recent				recent	recent
Little Red Flying-fox	<i>Pteropus scapulatus</i>	Pteropodidae										recent	
Eastern Horseshoe Bat	<i>Rhinolophus megaphyllus megaphyllus</i>	Rhinolophidae			recent	recent	recent	recent	recent			recent	recent
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i>	Emballonuridae	V		recent	recent						recent	
White-striped Free-tailed Bat	<i>Austronomus australis</i>	Molossidae			recent	recent	recent	recent	recent			recent	recent
East-coast Free-tailed Bat	<i>Mormopterus norfolkensis</i>	Molossidae	V		recent				recent			recent	recent
Inland Free-tailed bat	<i>Mormopterus petersi</i>	Molossidae										recent	
South-eastern Free-tailed Bat	<i>Mormopterus planiceps sens. str.</i>	Molossidae				recent						recent	recent
Ride's Free-tailed Bat	<i>Mormopterus ridei</i>	Molossidae			recent	recent	recent	recent	recent			recent	recent
Eastern Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Miniopteridae	V		recent	recent	recent	recent	recent			recent	recent
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Vespertilionidae	V	V	recent	recent	recent	recent	recent			recent	recent
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	Vespertilionidae	V		recent	recent	recent	recent				recent	recent
Large-footed Myotis	<i>Myotis macropus</i>	Vespertilionidae	V		recent				1997			recent	
South-eastern Long-eared Bat	<i>Nyctophilus corbeni</i>	Vespertilionidae	V	V								recent	
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent
Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	Vespertilionidae	V		recent	recent	recent	recent	recent			recent	recent
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	Vespertilionidae				recent						recent	
Eastern Broad-nosed Bat	<i>Scotorepens orion</i>	Vespertilionidae			recent	recent		recent	recent			recent	recent
Large Forest Bat	<i>Vespadelus darlingtoni</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent

Common name	Scientific name	Family	Status		Records in Greater Blue Mountains World Heritage Area reserves								
			NSW	Aus	BMNP	GOSNP	JKCR	KBNP	NNP	TLNP	WNP	YNP	
Eastern Forest Bat	<i>Vespadelus pumilus</i>	Vespertilionidae										recent	
Southern Forest Bat	<i>Vespadelus regulus</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	1985
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Vespertilionidae	V		recent	recent						recent	recent
Little Forest Bat	<i>Vespadelus vulturnus</i>	Vespertilionidae			recent	recent	recent	recent	recent			recent	recent
White-footed Rabbit-rat	<i>Conilurus albipes</i>	Muridae	X	X			extinct						
Water Rat	<i>Hydromys chrysogaster</i>	Muridae			recent	recent	recent		1991			recent	
Broad-toothed Rat	<i>Mastacomys fuscus mordicus</i>	Muridae	V	V			extinct						
Plains Mouse	<i>Pseudomys australis</i>	Muridae	X	V			extinct						
Smoky Mouse	<i>Pseudomys fumeus</i>	Muridae	C	E			extinct						
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	Muridae		V			undated					recent	1986
Hastings River Mouse	<i>Pseudomys oralis</i>	Muridae	E	E			extinct						
Bush Rat	<i>Rattus fuscipes assimilis</i>	Muridae			recent	1978	recent	recent	recent	recent	recent	recent	recent
Swamp Rat	<i>Rattus lutreolus lutreolus</i>	Muridae			recent							1997	recent
Dingo	<i>Canis lupus dingo</i>	Canidae			recent	recent	recent	recent	recent			recent	recent

## **Native Mammal Species Recorded in the Greater Blue Mountains World Heritage Area**

Species nomenclature follows Van Dyck *et al.* (2013) and, for *Mormopterus*, Reardon *et al.* (2014). Subspecies follow Burbidge *et al.* (2014). The reserves in which each species has been recorded are listed as: BM (Blue Mountains National Park), GOS (Gardens of Stone NP), J (Jenolan Karst Conservation Reserve), KB (Kanangra-Boyd NP), N (Nattai NP), TL (Thirlmere Lakes NP), W (Wollemi NP) and Y (Yengo NP). Unless otherwise indicated, there have been recent records (2000 or later) from each reserve listed. The date of the last record is only shown if it was before 2000. Threatened species listings under NSW and Commonwealth legislation are shown in red. Records from skeletal material in owl deposits at Jenolan Caves (Morris *et al.* 1997) have only been included if they date from after European settlement. Terminology for vegetation types follows Keith (2004).

### **Family ORNITHORHYNCHIDAE – PLATYPUS**

#### **Platypus *Ornithorhynchus anatinus***

Reserves: BM, GOS, J, KB, N, W

Uncommon, widespread resident. Aquatic species of rivers, creeks and open wetlands. Rests and breeds in riverside burrows with arch-shaped entrances, in contrast to the circular entrances of Water Rat burrows. Recent records include Abercrombie River, Coxs River, Kedumba River, Bedford Creek, Horseshoe Falls, Blue Gum Swamp Creek and Glenbrook Creek (Blue Mountains NP); Carne Creek (Gardens of Stone NP); Capertee River, Colo River, Dunns Swamp (Wollemi NP); Kowmung River (Kanangra-Boyd NP); Blue Lake (Jenolan KCR); and Nattai River (Nattai NP).

### **Family TACHYGLOSSIDAE – ECHIDNAS**

#### **Short-beaked Echidna *Tachyglossus aculeatus aculeatus***

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread resident. Found in a range of habitats but favours dry sclerophyll forest and grassy woodland. Feeds both day and night on ants and termites. Its characteristic cylindrical scats are a dense mix of ant exoskeletons and dirt, and smell of formic acid.

### **Family DASYURIDAE – DASYURIDS**

#### **Agile Antechinus *Antechinus agilis***

Reserves: BM (1986), J

Rare resident at the northern edge of its range. Found in wet and dry sclerophyll forests, grassy woodland and heathland. Recorded at Jenolan KCR from three Australian Museum specimens collected in 2010, and one animal trapped near Jenolan Caves Cottages in 2018 (Judy and Peter Smith). Recorded in Blue Mountains NP from a photograph of an animal

trapped at Blaxland in 1986 (Judy and Peter Smith). Described as a separate species from the Brown Antechinus only in 1998 (Dickman *et al.* 1998). It may be more common and widespread in the WHA than the few records suggest, since it has often been assumed that the Agile Antechinus does not occur this far north and that the animals in the WHA are all Brown Antechinus. Animals may have been identified as Brown Antechinus without checking. Bioclimatic modelling has predicted extensive overlapping of the distributions of the two species in the Blue Mountains region (Crowther 2002). The Agile Antechinus is a species to look out for in future surveys.

### **Yellow-footed Antechinus *Antechinus flavipes flavipes***

Reserves: BM, GOS, J (undated), W

Uncommon resident in western and northern parts of the WHA, where it is at the eastern edge of its range. Found in grassy woodland and sclerophyll forests. Recent records include the vicinity of Coco and Crown Creeks, and Wolgan River (Gardens of Stone NP), Widden Valley (Wollemi NP) and Victoria Falls Road (Blue Mountains NP). The only record for Jenolan KCR is skeletal material in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997).

### **Brown Antechinus *Antechinus stuartii***

Reserves: BM, GOS, J, KB, N, TL (1956), W, Y

Common, widespread resident. A ground-dwelling species that also climbs into shrubs and trees. Found in a range of vegetation types where there is dense undergrowth. Records of Brown Antechinus in the WHA may include some misidentified Agile Antechinus, since the two species are very similar (see above). The only record for Thirlmere Lakes NP is a specimen collected in 1956 and held in the Western Australian Museum.

### **Dusky Antechinus *Antechinus swainsonii mimetes***

Reserves: BM, J (1991), KB, W, Y

Uncommon resident that is possibly declining in the region. A ground-dwelling species of swamps and shrubby wet sclerophyll forests with dense, moist ground layer vegetation. It reaches the western edge of its distribution at the western edge of the WHA. The few recent records include Minnehaha Falls (Blue Mountains NP), Mount Thurat Fire Trail (Kanangra-Boyd NP), Hunter Range (Wollemi NP), and the north-eastern corner of Yengo NP. Previously considered to be moderately common in the Blue Mountains, with old records in or near Blue Mountains NP at Bowen Mountain, Tobys Glen, Murphys Glen, Kirai Swamp, Mount Hay Road, Wentworth Falls, Govetts Leap Brook and Medlow Bath (Smith and Smith 1990).

### **Spotted-tailed Quoll *Dasyurus maculatus maculatus***

Status: **vulnerable (NSW), endangered (Commonwealth)**

Reserves: BM, J, KB, N, W, Y

Uncommon resident found in rainforest and wet and dry sclerophyll forests. It is an agile climber that takes its prey both on the ground and in shrubs and trees. It retreats to hollow logs, dense undergrowth, tree hollows or rock crevices during the day. Common in the upper Blue Mountains in the late 1800s, when they were often shot or poisoned because of their raids on poultry (Bellingham 1899). Numbers have since declined, but recent records include Bells Line of Road, Linden Ridge, Govetts Track, Blue Gum Swamp Creek and Euroka Clearing (Blue Mountains NP), Jenolan Caves tourist precinct (Jenolan KCR), Kanangra Walls Road (Kanangra-Boyd NP), Wanganderry Pass Trail (Nattai NP), Dunns Swamp, Martindale Trail and D'Arcy Range Firetrail (Wollemi NP), and Milbrodale and Boree (Yengo NP).

### **Eastern Quoll *Dasyurus viverrinus***

**Status: endangered (NSW and Commonwealth).**

Reserves: J (extinct)

In 1888, the Eastern Quoll was included in a list of common game species to be obtained between Katoomba and Jenolan Caves (*Horrock's Handy Guide to the Blue Mountains and Jenolan Caves of NSW*, reproduced in Jim Smith 1984). However, the species disappeared from mainland Australia between 1900 and the mid-1960s, following the introduction and spread of the Red Fox *Vulpes vulpes* (Van Dyck and Strahan 2008). Other factors possibly contributing to the decline include disease, cats and habitat loss and degradation. The Eastern Quoll persists in Tasmania, but until recently it had been thought to be extinct on mainland Australia, with the last confirmed mainland record at Vaucluse in eastern Sydney in 1963 (Woinarski *et al.* 2014). However, a roadkill specimen from Barrington Tops in 1989 has recently been confirmed genetically as the mainland form of the species, and thus not an animal of Tasmanian origin that had escaped or been released from captivity (Frankham *et al.* 2017). This suggests that there may still be one or more remnant populations of Eastern Quolls on the mainland.

At Jenolan KCR, skeletal remains of Eastern Quolls have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). A number of old Australian Museum specimens from Springwood (1886), Lawson (1898) and Woodford (1903) would have been collected in or near what is now Blue Mountains NP.

### **Brush-tailed Phascogale *Phascogale tapoatafa tapoatafa***

**Status: vulnerable (NSW)**

Reserves: J, Y (undated)

Rare resident. An arboreal species of sclerophyll forests and grassy woodland. It typically forages on rough-barked trees, seldom on the ground. It occurs in both northern and southern NSW but is now generally absent between the Hunter Valley and the Shoalhaven. A small remnant population may persist in Jenolan KCR, where there was a sighting near Jenolan Caves Cottages in 2003 and an undated record in the Burma Road area (OEH 2012b), and a possible sighting beside Jenolan Caves Road in 2019 (Justin Wilkinson). Also recorded at Jenolan KCR from skeletal remains in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). Skeletal remains have also been found in Yengo NP under an Australian Masked Owl *Tyto novaehollandiae* roost in the vicinity of

Little Jimmys Creek, north of the Bala Range (DECC 2008c). These remains are of unknown age, possibly very old, and the species may no longer occur in Yengo NP.

### **Common Dunnart *Sminthopsis murina murina***

Reserves: BM, GOS, J, KB (1998), N, W, Y

Uncommon but widespread resident. Found in dry sclerophyll forest, grassy woodland and heath. Recent localities include Mt Werong (Blue Mountains NP), Jenolan Caves Cottages (Jenolan KCR), Burnt Flat Creek (Nattai NP), Red Rock Creek and Crown Creek (Gardens of Stone NP) and Tayan Peak (Wollemi NP).

### **Family PERAMELIDAE – BANDICOOTS**

#### **Northern Brown Bandicoot *Isodon macrourus torosus***

Reserves: W

Rare resident at the southern and western edge of its range. Recorded at Wollemi Creek (Wollemi NP) in NSW National Parks and Wildlife Service surveys in 1998 (identified from hairs in a predator scat) and 2012 (identified from remote camera photos) (BioNet Atlas). A species of northern Australia, its distribution extends south to the Hawkesbury River, beyond which it is replaced by the Southern Brown Bandicoot. Found in various habitats where there is good groundcover, either tall grass or dense shrubs, but it will venture into the open at night to feed.

#### **Southern Brown Bandicoot *Isodon obesulus obesulus***

**Status: endangered (NSW and Commonwealth)**

Reserves: J (extinct)

Inhabits sclerophyll forests and heath. It appears to be extinct in the WHA, although it survives in coastal areas east of the WHA, south of the Hawkesbury River. Once common in south-eastern Australia, the species has been decimated throughout most of its former range (Van Dyck *et al.* 2013). The only confirmed record for the WHA is skeletal remains in owl deposits from Nettle Cave at Jenolan KCR that date from after European settlement (Morris *et al.* 1997). There are unconfirmed records from the Mount Hay area, Blue Mountains NP, in February and July 1986 (hairs identified from analysis of fox and dog scats; BioNet Atlas).

#### **Long-nosed Bandicoot *Perameles nasuta***

Reserves: BM, GOS, J (undated), W, Y

Uncommon resident, most frequently recorded in Wollemi NP, Yengo NP and Blue Mountains NP. Found in heath, shrubby swamps and sclerophyll forests with dense undergrowth. Only one record from Gardens of Stone NP (OEH 2012a). Recorded at Jenolan KCR from skeletal remains in owl deposits from Nettle Cave (Morris *et al.* 1997), and from an old, undated specimen at the Australian Museum.

## Family PHASCOLARCTIDAE – KOALA

### Koala *Phascolarctos cinereus*

Status: vulnerable (NSW and Commonwealth)

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon resident with a widespread but patchy distribution in sclerophyll forests and grassy woodland. Its diet consists almost entirely of eucalypt leaves. Important local food trees include Grey Gum *Eucalyptus punctata* and Forest Red Gum *E. tereticornis*, but also other species. Regular sites for Koalas in the WHA include southern Nattai NP between High Range and Mt Jellore (DECC 2007b), southern Yengo NP extending into south-eastern Wollemi NP (DEC 2005a, DECC 2008b-c), and Black Range Road (Kanangra-Boyd NP) to Jenolan KCR (Kellie Leigh, Cale Brown). Other regular sites may be detected with further survey. Non-breeding males roam widely and probably account for most of the sporadic records of single animals well away from the main population centres. Recent records in the WHA include the junction of Gingra Creek and Kowmung River (Blue Mountains NP), Birds Rock Trail No. 2 (Gardens of Stone NP), Jenolan Caves Cottages and Burma Road (Jenolan KCR), Kanangra Walls Road and Black Range Road (Kanangra-Boyd NP), Angorawa Creek, Bob Turners Track, Culoul Range, Grassy Hill Track, Hungerford Creek, Long Wheeny Creek, Mellong Creek, Mountain Lagoon, Putty Road and Wheeny Creek (Wollemi NP), and Yengo Track and Bucketty to Bala Range (Yengo NP).

## Family VOMBATIDAE – WOMBATS

### Common Wombat *Vombatus ursinus hirsutus*

Reserves: BM, GOS, J, KB, N, TL, W, Y

Common resident found throughout the WHA in sclerophyll forests and grassy woodland where soils are suitable for burrowing. An herbivorous species that rests during the day in large burrows. Their presence is often indicated by their distinctive cube-shaped droppings, which are often encountered on top of rocks and logs in open areas such as walking tracks.

## Family BURRAMYIDAE – PYGMY-POSSUMS

### Eastern Pygmy-possum *Cercartetus nanus unicolor*

Status: vulnerable (NSW)

Reserves: BM, J (undated), N, W

Rare resident that is typically associated with stands of flowering banksias in heaths, swamps or sclerophyll forests. The species is difficult to detect and it may be more common than the few records suggest. At Jenolan KCR, the only record is from skeletal remains in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997).

## Family PETAURIDAE – WRIST-WINGED GLIDERS

### Yellow-bellied Glider *Petaurus australis australis*

Status: vulnerable (NSW)

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon, widespread resident but few records from Gardens of Stone NP and no records from Thirlmere Lakes NP. Typically found in wet sclerophyll forest in areas of higher soil fertility. Detected by sightings, by its loud gurgling calls and by its characteristic V-shaped chew-marks to obtain sap (although not all its chew-marks are V-shaped). Grey Gum *Eucalyptus punctata* and Ribbon Gum *E. viminalis* are favoured food trees but its chew-marks have also been seen on the trunks and branches of Mountain Blue Gum *E. deanei*, Mountain Grey Gum *E. cypellocarpa*, Red Bloodwood *Corymbia gummifera* and Rough-barked Apple *Angophora floribunda*. It has also been recorded feeding at the flowers of box-type eucalypts.

### Sugar Glider *Petaurus breviceps sens. lat.*

(including Sugar Glider *Petaurus breviceps sens. str.* and Krefft's Glider *Petaurus notatus*)

Reserves: BM, GOS, J, KB, N, TL, W, Y

Common, widespread resident. Found in sclerophyll forests and grassy woodland, where it is detected by sightings, by its soft dog-like yapping calls and by the horizontal chew-marks that it makes when feeding on sap. Favoured sources of sap include the Red Bloodwood *Corymbia gummifera* and pinnate wattles such as *Acacia parramattensis* and *A. parvipinnula*. Stands of pinnate wattles regenerating in former clearings often support good numbers of Sugar Gliders.

This species has recently been split into three separate species (Cremona *et al.* 2020), two of which occur in the WHA (Judy and Peter Smith). A Sugar Glider in the narrower sense, *Petaurus breviceps sens. str.*, was photographed at Blue Gum Swamp Creek in Blue Mountains NP in 2016. A Krefft's Glider *Petaurus notatus* was photographed at Machins Crater in Blue Mountains NP in 2015, and the species was seen near Blue Mountains NP at Mount Wilson and Mount Victoria in 2020-21. Further surveys are needed to clarify the relative distribution and abundance of the two species in the WHA.

### Squirrel Glider *Petaurus norfolcensis*

Status: vulnerable (NSW)

Reserves: BM, GOS, J (undated), N, W, Y

Rare resident. Records are from scattered locations, often near the perimeter of the WHA adjacent to farmland on more fertile soils. More of a habitat specialist than the ubiquitous Sugar Glider, its most favoured habitat is grassy woodland. Recent localities include Nattai Tableland (Nattai NP), Scotts Main Range and Bindook Highlands (Blue Mountains NP), Pantoneys Crown Portion and Donkey Mountain Portion (Gardens of Stone NP), Talooby, Blackwater Creek, Hungerford Valley, Kings Creek and Martindale Valley (Wollemi NP), and

Old Bulga Road (Yengo NP). The only records for Jenolan KCR are three old, undated specimens at the Australian Museum.

## **Family PSEUDOCHEIRIDAE – RINGTAIL POSSUMS AND GREATER GLIDER**

### **Greater Glider *Petauroides volans volans***

**Status: vulnerable (Commonwealth)**

Reserves: BM, GOS, J, KB, N, TL, W, Y

Moderately common resident found across the elevational range of the WHA, but more common at higher elevations. Has declined greatly at lower elevations in Blue Mountains NP in recent times, a decline that appears to be the result of increasing temperature and associated effects (Smith and Smith 2018a). Typically found in tall, mature wet sclerophyll forest in situations such as alluvial flats, shale and basalt caps and volcanic diatremes, where soil fertility is high. Also sometimes found in Peppermint-Angophora forest on less fertile soils. The diet consists almost entirely of eucalypt foliage. Favoured food trees in Blue Mountains NP include Mountain Grey Gum *Eucalyptus cypellocarpa*, Mountain Blue Gum *E. deanei*, Brown Barrel *E. fastigata*, Sydney Peppermint *E. piperita*, Narrow-leaved Peppermint *E. radiata* and Ribbon Gum *E. viminalis*. Two different colour morphs occur: dark phase and pale phase at a ratio of about 4:1, with considerable variation within each morph.

### **Common Ringtail Possum *Pseudocheirus peregrinus peregrinus/cookii***

Reserves: BM, GOS, J, KB, N, TL, W, Y

Moderately common resident. Widespread in sclerophyll forests and rainforest, favouring vegetation with a dense, tall shrub layer. Primarily a leaf-eater, but it also feeds on flowers and fruits. Two subspecies may occur in the WHA, *peregrinus* and *cookii* (Van Dyck and Strahan 2008), but no specific records were found that had been identified to subspecies.

## **Family ACROBATIDAE – FEATHERTAIL GLIDERS**

### **Narrow-toed/Broad-toed Feathertail Glider *Acrobates pygmaeus/frontalis***

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon, widespread resident, mainly found in sclerophyll forests, feeding on nectar, pollen and insects. The species is difficult to detect and may be more common than the records indicate. Recent localities include Mt Werong, Blue Gum Swamp Creek, Kedumba Valley and Scotts Main Range (Blue Mountains NP), Wolgan Valley (Gardens of Stone NP), Jenolan River valley (Jenolan KCR and Kanangra-Boyd NP), Wanganderry (Nattai NP), Glow Worm Tunnel, Grassy Hill Firetrail and Angorawa Creek (Wollemi NP) and Wrights Creek catchment and Settlers Road (Yengo NP).

Two species of Feathertail Glider are now recognised: the Narrow-toed Feathertail Glider *Acrobates pygmaeus sens. str.* and the Broad-toed Feathertail Glider *Acrobates frontalis*. The differences between the two species have been described in a recent field guide by Van Dyck *et al.* (2013), but recognition of these as separate species has not yet been formally

published. Both species could potentially occur in the WHA but no records from within the WHA were found that identify which species of Feathertail Glider was recorded. The two species can only be distinguished by examination in the hand. Recent photos and specimens of Feathertail Gliders from the vicinity of the WHA at Springwood, Wentworth Falls, Bullaburra and the Capertee Valley have all been Narrow-toed Feathertail Gliders.

## **Family PHALANGERIDAE – BRUSHTAIL POSSUMS**

### **Short-eared/Mountain Brushtail Possum *Trichosurus caninus/cunninghami***

Reserves: BM, KB, W

Rare resident of rainforest and shrubby wet sclerophyll forest. Recent localities include Leura Falls Creek, Jamison Creek, Kedumba Pass and Ruined Castle Track (Blue Mountains NP), Cronje Mt Firetrail and Kowmung River Firetrail (Kanangra-Boyd NP), and Mt Irvine (Wollemi NP). The Mountain Brushtail Possum *Trichosurus cunninghamii* and Short-eared Brushtail Possum *T. caninus sens. str.* have only been recognised as separate species since 2002 (Lindenmayer *et al.* 2002). The distributions of the more northerly Short-eared Brushtail Possum and the more southerly Mountain Brushtail Possum appear to overlap in the WHA but species boundaries in the overlap zone are unclear (Viggers and Lindenmayer 2004). The two species cannot be distinguished unless examined in the hand, and it is not yet known whether both species occur in the WHA or, if only one species, which one. No records were found that reliably identify which of the two species was recorded.

### **Common Brushtail Possum *Trichosurus vulpecula vulpecula***

Reserves: BM, GOS, J, KB, N, TL, W, Y

Common resident, widely distributed in sclerophyll forests and grassy woodland but favouring areas of higher soil fertility. Also found in townships and farmland adjoining the WHA, where the additional food resources associated with human activities support higher possum populations than the bushland.

## **Family POTOROIDAE – POTOROOS AND BETTONGS**

### **Unidentified bettong *Bettongia* species**

**Status: *Bettongia gaimardi gaimardi* and *Bettongia penicillata penicillata* both extinct (NSW and Commonwealth)**

Reserves: J (extinct)

Bettongs (also known as rat-kangaroos) were noted in several early writings about the Blue Mountains (Mackness 1950-51): William Wentworth recorded seeing a few on his journey across the Blue Mountains in 1813; Elizabeth Hawkins mentioned her boys hunting one some 18 km east of Coxs Pass in 1822; and Charles Darwin, at Hassans Walls just west of the WHA, wrote in 1836 that 'the greyhounds pursued a kangaroo rat into a hollow tree, out of which we dragged it, it is an animal as big as a rabbit, but with the figure of a kangaroo'. Sid Bellingham, a local hunting guide, noted that rat-kangaroos were occasionally seen in the vicinity of Katoomba in the late 1800s (Bellingham 1899). The species of bettong to which

these observations refer is unknown, and they may include observations of potoroos (see below).

Three bettong species were recorded in the past in the near vicinity of the WHA. The mainland subspecies of the Tasmanian Bettong *Bettongia gaimardi gaimardi* is now extinct, but was present in the past at Wombeyan Caves (Australian National Wildlife Collection specimen). The eastern subspecies of the Brush-tailed Bettong *Bettongia penicillata penicillata* is also now extinct, but was present in the past at Lithgow (Australian Museum specimen). The Rufous Bettong *Aepyprymnus rufescens* was present in the past at Wallerawang (Australian Museum specimen) and Wombeyan Caves (Australian National Wildlife Collection specimen), but now appears to be extinct in and around the WHA, although it survives in north-eastern NSW and Queensland.

The only specific bettong record within the WHA is skeletal remains of *Bettongia* (species uncertain) found in owl deposits from Nettle Cave at Jenolan KCR that date from after European settlement (Morris *et al.* 1997). These could be either *Bettongia gaimardi gaimardi* or *Bettongia penicillata penicillata*.

### **Long-nosed Potoroo *Potorous tridactylus tridactylus/trisulcatus***

**Status: vulnerable (NSW and Commonwealth)**

Reserves; J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). The absence of any subsequent records suggests that the Long-nosed Potoroo is now extinct in the WHA, although it persists in scattered locations to the east of the WHA. The nearest recent records are from Barren Grounds NR in 2010 and Mangrove Mountain in 2004 (OEH 2012b). One or both of two subspecies may have occurred in the WHA: the northern mainland subspecies *tridactylus* and the southern mainland subspecies *trisulcatus* (Frankham *et al.* 2012).

## **Family MACROPODIDAE – KANGAROOS AND WALLABIES**

### **Eastern Grey Kangaroo *Macropus giganteus***

Reserves: BM, GOS, J, KB, N, TL, W, Y

Moderately common, widespread resident recorded from every reserve. Found mainly in grassy areas, including grassy woodland, shrub/grass dry sclerophyll forest, grassy wet sclerophyll forest, grassy clearings, and also forest edges near the perimeter of the WHA adjacent to cleared agricultural land. The well known population at Euroka Clearing in Blue Mountains NP was established through the release of captive animals.

### **Common Wallaroo *Macropus robustus robustus***

Reserves: BM, GOS, J, KB, N, TL, W, Y

Moderately common resident. Occurs widely in the WHA but most frequent in Wollemi and Yengo NPs. Typically found where there are rocky escarpments and outcrops providing daytime shelter, with nearby grassy areas in which to graze.

### **Red-necked Wallaby *Macropus rufogriseus banksianus***

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread resident but no records from Thirlmere Lakes NP. Like the Eastern Grey Kangaroo, the Red-necked Wallaby is generally associated with a grassy ground layer and is rarely found in shrubby dry sclerophyll forest where grasses are scarce. It shelters by day in dense vegetation.

### **Brush-tailed Rock-wallaby *Petrogale penicillata***

**Status: endangered (NSW), vulnerable (Commonwealth)**

Reserves: BM, J, KB (1989), N, W, Y

Rare resident that is at the western edge of its current known range. Its distribution formerly extended into inland NSW (Van Dyck and Strahan 2008). Forms small colonies in steep rocky areas, typically sheltering by day in overhangs on north-facing cliffs and rocky slopes, moving out in the afternoon and evening to feed in nearby grassy areas. A stronghold for the species is northern Wollemi and Yengo NPs, where there is suitable habitat across the escarpment of the southern Hunter Valley. Here, colonies are found at widely spaced locations including Myrtle Creek, Box Hole Clearing and Red Creek (north-west Wollemi NP, DEC 2006), Turnbull Creek and Appletree Creek (north-east Wollemi NP, DEC 2005a), and Drews Creek, Portion 78 and Big Yengo (Yengo NP, DEC 2005b). Other recent locations for the species include the escarpments adjacent to the Capertee, Wolgan and Colo River valleys in southern Wollemi NP (DECC 2008b, 2009, Milo Morrison-Jones); north of Falconbridge Point Lookout in Blue Mountains NP (DECC 2008a); Wollondilly River catchment in Nattai NP (DEC 2004b); and Jenolan Caves KCR (OEH 2012b). It is uncertain if the species is still present in Kanangra-Boyd NP, where a specimen was collected near Church Creek in 1987 (Australian National Wildlife Collection), and an individual was sighted at Cathedral Rocks, near Church Creek Caves, in 1989 (DEC 2004a). There is an unconfirmed record from Gardens of Stone NP in 1998 based on scats (BioNet Atlas).

At Jenolan Caves, Sid Bellingham, a local hunting guide, noted in 1899 that the Brush-tailed Rock-wallaby was declining but was 'at one time plentiful', 'the Grand Arch and other outside caves were simply the camping place of rock wallabies' and 'afforded good lively shooting' (Bellingham 1899). Between 1964 and 1968, 35 adult rock wallabies were captured and placed in a 2.5 ha enclosure for protection. By the mid 1980s, the enclosed population numbered around 80 animals and additional animals were regularly sighted outside the enclosure. Between 1984 and 1988, all animals were released from the enclosure. However, by 1992 the population had declined dramatically, apparently as a result of predation by introduced carnivores, and the remaining seven individuals were re-captured and enclosed. By 2000, the population numbered 15-20 animals (Eldridge *et al.* 2004). The population has been supplemented with translocated animals. In 1995, a single female, the last remaining animal at nearby Wombeyan Caves Karst Conservation Reserve,

was returned to Jenolan (10 rock-wallabies had been translocated from Jenolan to Wombeyan following the local extinction of rock-wallabies at Wombeyan during the 1930s; Eldridge *et al.* 2004). Other translocations were a single animal from Yellow Rock in the 1990s and four animals from Waterfall Springs Sanctuary in 2008 (two males with Watagans genetics, a female with Pokolbin genetics and one of unknown origin). Following the implementation of an intensive fox control program, the Jenolan population now numbers about 100 animals (Michaela Jones, OEH 2019). The animals are no longer enclosed and are regularly seen around the main tourist precinct.

In the early 1870s, Brush-tailed Rock-wallabies were introduced to New Zealand from Australia and have since prospered. Recent molecular genetic studies indicate that these animals most likely originated from a population at Winmalee (probably from within what is now Blue Mountains NP). The naturalized New Zealand population represents a potentially valuable conservation resource for Australia (Eldridge *et al.* 2001).

### **Swamp Wallaby *Wallabia bicolor***

Reserves: BM, GOS, J, KB, N, TL, W, Y

Common, widespread resident. The most common macropod in the WHA, found in a variety of forest and woodland habitats with either a grassy or shrubby understorey. It generally keeps to denser vegetation but will feed in clearings and on forest edges. It browses on shrubs and low vegetation more than the other large macropods, which are primarily grazers. It also often feeds on fungi.

### **Family PTEROPODIDAE – FLYING-FOXES**

#### **Black Flying-fox *Pteropus alecto gouldii***

Reserves: BM

Rare nomadic visitor at the southern and western edges of its range. The only record is from Jamison Valley (Blue Mountains NP) in April 2015 (Atlas of Living Australia). There are no known day-time camps within the WHA, but Black Flying-foxes have occurred intermittently in small numbers in the Grey-headed Flying-fox camp at Emu Plains, just east of Blue Mountains NP, since at least 2013 (National Flying-fox Monitoring Program). This indicates that the species is likely to occur more frequently in the WHA than the single record suggests. It feeds on nectar and fruits and its nomadic movements follow the flowering and fruiting patterns of its various food plants.

#### **Grey-headed Flying-fox *Pteropus poliocephalus***

**Status: vulnerable (NSW and Commonwealth)**

Reserves: BM, J, W, Y

Uncommon visitor that is more frequent at lower elevations. It feeds mainly on eucalypt blossom, but also on a variety of other flowers and fruits, foraging up to 50 km each night from its day-time camps. Visits to the WHA often coincide with the flowering of species such as the Red Bloodwood *Corymbia gummifera* and Grey Gum *Eucalyptus punctata* in Blue

Mountains NP, and boxes and ironbarks in Wollemi NP, as well as the ripening of orchard fruits in the Bilpin area adjacent to the WHA. There are no known regular camps in the WHA. Visitors to Blue Mountains NP are likely to come from camps in Western Sydney, the closest of which are at Yarramundi, Emu Plains, Ropes Creek, Camden and Picton (National Flying-fox Monitoring Program). Visitors to Wollemi and Yengo NPs are likely to come from camps at Singleton and Cessnock. Records from elevated, more westerly parts of the WHA are rare, with a single 2011 sighting at Jenolan KCR and an unconfirmed 1986 record from Kanangra-Boyd NP based on hair analysis of dog scats.

### **Little Red Flying-fox *Pteropus scapulatus***

Reserves: W

Rare visitor. A highly nomadic species that is more common west of the Great Dividing Range than in coastal districts. It feeds mainly on blossom from a variety of tree and shrub species. Its movements follow the flowering patterns of its food plants and are also affected by droughts, which often lead to an influx of birds into coastal districts. Recorded in Wollemi NP in October 2007 and February 2009 (BioNet Atlas). No records of regular camps in the WHA but several years ago there was a temporary camp of several hundred bats in Wollemi NP in the River Oaks *Casuarina cunninghamiana* along the Capertee River at Coorongoba Campground (Marg Turton). A temporary camp containing a couple of thousand bats formed at Yarramundi Picnic Area, just east of the WHA, in March 1986 (Smith and Smith 1990).

### **Family RHINOLOPHIDAE – HORSESHOE BATS**

#### **Eastern Horseshoe Bat *Rhinolophus megaphyllus megaphyllus***

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread resident at the western edge of its range, but occurs further west in northern NSW. It roosts in natural limestone and sandstone caves and sandstone overhangs, as well as in abandoned mines and sometimes in other situations. It breeds in caves, but there are no known maternity caves in the WHA. It forages in rainforest, wet and dry sclerophyll forest, and grassy woodland. Recent records include McKeown's Valley, Paradox Cave, Devil's Coach House and Surveyors Creek Weir (Jenolan KCR); Donkey Mountain and Crown Creek (Gardens of Stone NP); and Colong Caves (Kanangra-Boyd NP). In Wollemi NP, it is most frequent in the north of the park, possibly because of the abundance of potential roost sites in mines and caves along the southern escarpment of the Hunter Valley.

### **Family EMBALLONURIDAE – SHEATH-TAILED BATS**

#### **Yellow-bellied Sheath-tailed Bat *Saccolaimus flaviventris***

Status: vulnerable (NSW)

Reserves: BM, GOS, W

Rare, possibly occurring as a summer-autumn migrant to WHA from northern Australia. Recorded in WHA from November to March. Occurs in various habitats, roosting in tree hollows and usually foraging above the canopy. It is not known if breeding occurs in WHA. Recent records (all based on calls) are from Halfway Hollow (Gardens of Stone NP), Lee Creek (Wollemi NP) and Butchers Creek Camp (Blue Mountains NP).

#### **Family MOLOSSIDAE – FREE-TAILED BATS**

##### **White-striped Free-tailed Bat *Austronomus australis***

Reserves: BM, GOS, J, KB, N, W, Y

Common, widespread resident. Found in many habitats, roosting and breeding in tree hollows in large old, live or dead eucalypts, and foraging above the canopy. Its echolocation call, a regular, slow ‘tsk tsk ....’, is audible to people with good hearing. It is the only Australian bat with an audible echolocation call.

##### **East-coast Free-tailed Bat *Mormopterus norfolkensis***

Status: vulnerable (NSW)

Reserves: BM, N, W, Y

Uncommon resident at the western edge of its range, occurring mainly east of the Great Dividing Range in dry sclerophyll forest, grassy woodland and lightly timbered rural areas. It roosts and breeds in tree hollows, and forages in forest gaps and openings. It has been trapped in the vicinity of California Trail (Wollemi NP), where it is at its western limit (DEC 2005a). Occasional calls have been recorded at scattered locations including Gungahwa, Wollemi, Wheeny and Little Wheeny Creeks (Wollemi NP); Burragorang Valley (Nattai NP); Old Bulga Road (Yengo NP); and Burrell Swamp, Kedumba Valley and Scotts Main Range (Blue Mountains NP).

##### **Inland Free-tailed Bat *Mormopterus petersi***

Corresponds to *Mormopterus* species 3 of Adams *et al.* (1988).

Reserves: W

Rare resident. An inland species at the eastern edge of its range. In the WHA, it is likely to be found in dry sclerophyll forest and grassy woodland. Roosts and breeds in tree hollows, and forages in the open. Trapped at Hungerford Creek in north-eastern Wollemi NP in October 2004 (DEC 2005a).

##### **South-eastern Free-tailed Bat *Mormopterus planiceps sens. str.***

Corresponds to *Mormopterus* species 4 of Adams *et al.* (1988). The name *M. planiceps* has been used more broadly in the past, but here refers to the narrower delimitation of the species by Reardon *et al.* (2014).

Reserves: GOS, W, Y

Uncommon resident. More typical of western New South Wales, it is found in low rainfall areas in the northern half of the WHA, where it is at the eastern edge of its range. It roosts and breeds in tree hollows in sclerophyll forests and grassy woodland. It usually forages at or above canopy height, but also sometimes on the ground. Recorded by call and trapped in Gardens of Stone NP (in open forest and woodland along creek flats in the Capertee and Wolgan River catchments; OEH 2012a), Wollemi NP (along Putty Road near Angorawa Creek, through Mellong Plateau and across to Wollemi Creek; DECC 2008b) and in Yengo NP (along Settlers Road; DEC 2005b).

#### **Ride's Free-tailed Bat *Mormopterus ridei***

Corresponds to *Mormopterus* species 2 of Adams *et al.* (1988).

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon resident. Widespread but in low numbers in various forest and woodland habitats, roosting and breeding mainly in tree hollows, and hunting mainly in the spaces between trees or just above the canopy. Most records are from ultrasonic calls but it has recently been trapped in Wollemi NP. It appears to be absent from the dry northern perimeter of Wollemi NP (DEC 2006).

### **Family MINIOPTERIDAE – BENT-WINGED BATS**

#### **Eastern Bent-winged Bat *Miniopterus orianae oceanensis***

**Status: vulnerable (NSW)**

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread species that is present all year. It roosts and breeds in caves and forages above the vegetation canopy in a variety of habitats, from rainforest to grassland. As yet, no maternity caves have been confirmed in the WHA and at least part of the population is likely to move away from the WHA to breed in maternity caves such as Bungonia. The capture of pregnant and lactating females in northern Wollemi NP suggests the presence of a maternity colony in that area, most likely in the old oil shale mines in the Baerami Valley (DEC 2005a, DEC 2006). Large, regionally important roosts are found in Jenolan KCR (including Paradox Cave and Mammoth Cave; OEH 2012b), Kanangra-Boyd NP (Colong Caves; DEC 2004a) and Wollemi NP (Starlight Canyon; DECC 2009). Smaller roosts have been recorded in Gardens of Stone NP (disused mine east of Ben Bullen; OEH 2012a), Wollemi NP (old oil shale mines along Ruebens Creek; DEC 2005a), Blue Mountains NP (abandoned coal mines in Jamison Valley; Brad Law) and in sandstone overhangs in Yengo NP (DECC 2008c).

### **Family VESPERTILIONIDAE – TYPICAL BATS**

#### **Large-eared Pied Bat *Chalinolobus dwyeri***

**Status: vulnerable (NSW and Commonwealth)**

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread resident. A cave-dependent bat that typically forages in areas of higher soil fertility such as river valleys and basalt plateaus. It roosts in the twilight areas of sandstone and limestone caves and overhangs. There are abundant potential roosts in the WHA and the species has been recorded roosting in Devil's Coach House (Jenolan KCR; OEH 2012b) and in sandstone overhangs in Doyles Range and disused oil shale mines in Baerami Valley (Wollemi NP; DEC 2005a). No maternity caves have been confirmed in the WHA, but young animals have been trapped in the Glow Worm Tunnel - Galah Mountain area (Wollemi NP), suggesting there is a maternity cave in the vicinity (DECC 2009). The northern half of the WHA, between the Hunter Valley and Colo River, appears to be a stronghold for the species.

### **Gould's Wattled Bat *Chalinolobus gouldii***

Reserves: BM, GOS, J, KB, N, W, Y

Common and widespread resident that usually roosts and breeds in tree hollows. It forages within or just below the tree canopy in a wide range of habitats, including frequent records from urban areas.

### **Chocolate Wattled Bat *Chalinolobus morio***

Reserves: BM, GOS, J, KB, N, W, Y

Common and widespread resident found in rainforest, wet and dry sclerophyll forests, and grassy woodland. It usually roosts and breeds in tree hollows and forages mostly in the open zone between the forest understorey and the canopy.

### **Eastern False Pipistrelle *Falsistrellus tasmaniensis***

Status: vulnerable (NSW)

Reserves: BM, GOS, J, KB, W, Y

Moderately common resident near the western limit of its range. Widespread but more frequent in upland areas above 600 m. It usually roosts and breeds in tree hollows but has been found roosting in caves at Jenolan KCR (OEH 2012b). It favours shrubby wet sclerophyll forests, where it forages within or just below the tree canopy. Many records are from calls, but calls of this species can be difficult to distinguish from those of a number of co-occurring species. Recent trapping records have come from Blue Mountains NP (DECC 2007b), Jenolan KCR (OEH 2012b), Kanangra-Boyd NP (DEC 2004a) and Wollemi NP (DEC 2005a, DEC 2006, DECC 2009).

### **Large-footed Myotis *Myotis macropus***

Status: vulnerable (NSW)

Reserves: BM, N (1997), W

Uncommon resident that is usually found in the vicinity of major watercourses and open wetlands. It forages over water, mainly over large, still pools rather than flowing streams,

and roosts and breeds in various situations close to water. Prey is taken from the water surface or just below. It has been trapped on the Wollondilly and Nattai Rivers in Nattai NP in 1997 (DEC 2004b), near the junction of Wollemi and Putty Creeks in Wollemi NP in 1998 (DECC 2008b), and on Cedar Creek and the Kedumba and Coxs Rivers in Blue Mountains NP in 2003-04 (DECC 2007b).

### **South-eastern Long-eared Bat *Nyctophilus corbeni***

**Status: vulnerable (NSW and Commonwealth)**

Reserves: W

Rare resident, only recorded from the north of Wollemi NP, where it is at the eastern edge of its range. It usually roosts and breeds in tree hollows and forages within or below the canopy. A favoured habitat is grassy woodland of box, ironbark and cypress pine. In the Hunter Valley, it is often recorded adjacent to watercourses. It was trapped in the Doyles Creek and Ruebens Creek valleys in north-east Wollemi NP in 2004 (DEC 2005a), and at Myrtle Creek in north-west Wollemi NP in 2005 (DEC 2006).

### **Lesser Long-eared Bat *Nyctophilus geoffroyi***

Reserves: BM, GOS, J, KB, N, W, Y

Moderately common, widespread resident found mainly in dry sclerophyll forest and grassy woodland. It usually roosts and breeds in tree hollows and forages below the tree canopy and in the shrub layer.

### **Gould's Long-eared Bat *Nyctophilus gouldi***

Reserves: BM, J, GOS, KB, N, W, Y

Common, widespread resident found in rainforest, wet and dry sclerophyll forests and grassy woodland. It usually roosts and breeds in tree hollows, but has occasionally been recorded in caves at Jenolan KCR. It forages below the tree canopy and in the shrub layer.

### **Greater Broad-nosed Bat *Scoteanax rueppellii***

**Status: vulnerable (NSW)**

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon resident that is widely but sparsely distributed across the WHA. It is at the western and elevational limit of its range on Boyd Plateau (Kanangra-Boyd NP). It occurs in various habitats but appears to favour moist gully forests (shrubby wet sclerophyll forest and rainforest). Sandstone plateaus may provide only marginal habitat. It roosts and breeds mainly in tree hollows. Beetles are the main prey but it also preys on other bats. Some old trapping records may have confused it with *Falsistrellus tasmaniensis*. Recent, more reliable trapping records include Kedumba Valley in Blue Mountains NP (DECC 2007b); Carne, Red Rock and Crown Creeks in Gardens of Stone NP (OEH 2012a); Jenolan River in Jenolan KCR (OEH 2012b); Boyd Plateau in Kanangra-Boyd NP (DEC 2004a); various sites in northern

Wollemi NP (DEC 2005a, DEC 2006); and Howes Valley Trail in Yengo NP (DEC 2005b). Records from Nattai NP are based on calls (BioNet Atlas, DEC 2004b) and should be treated with caution as calls are not a reliable means of identification for this species.

### **Inland Broad-nosed Bat *Scotorepens balstoni***

Reserves: GOS, W

Uncommon resident recorded from the northern half of the WHA, where it is at the eastern edge of its range. It occurs mainly in dry sclerophyll forest and grassy woodland, roosting and breeding in tree hollows and foraging mostly below the canopy. It has been recorded from various locations in both Gardens of Stone NP (OEH 2012a) and Wollemi NP (DEC 2005a, DEC 2006). An inland species, it overlaps with its coastal congener, *S. orion*, in eastern Wollemi NP, where the two species were trapped in the same harp trap on Hungerford Creek in 2004 (DEC 2005a).

### **Eastern Broad-nosed Bat *Scotorepens orion***

Reserves: BM, GOS, KB, N, W, Y

Moderately common, widespread resident that is at the western limit of its distribution. Found in rainforest and wet sclerophyll forest, less often in dry sclerophyll forest and grassy woodland. It roosts and breeds in tree hollows.

### **Large Forest Bat *Vespadelus darlingtoni***

Reserves: BM, GOS, J, KB, N, W, Y

Common, widespread resident found in rainforest and wet and dry sclerophyll forests, roosting and breeding in tree hollows. It appears to be better adapted to cooler, higher rainfall areas and is more common at elevations above 600 m. It is very common in Jenolan KCR and Kanangra-Boyd NP, but there is only a single record from Yengo NP.

### **Eastern Forest Bat *Vespadelus pumilus***

Reserves: W

Uncommon resident at the southern and western limits of its distribution. Typically found in rainforest and wet sclerophyll forest, it roosts and breeds mainly in tree hollows and forages in and below the tree canopy. Recorded in Wollemi NP at Wollemi Creek in 1998 (BioNet Atlas) and Wheeny Creek in 2007 (DECC 2008b).

### **Southern Forest Bat *Vespadelus regulus***

Reserves: BM, GOS, J, KB, N, W, Y (1985)

Common resident that is widespread but far more frequent in upland areas above 600 m. Found in rainforest, wet and dry sclerophyll forests and grassy woodland, roosting and breeding in tree hollows and usually foraging below the tree canopy. It is the most common

bat in Kanangra-Boyd NP, where it is particularly common on Boyd Plateau. There have been very few records from Gardens of Stone NP, and only one old (1985) record from Yengo NP.

### **Eastern Cave Bat *Vespadelus troughtoni***

**Status: vulnerable (NSW)**

Reserves: BM, GOS, W, Y

Uncommon resident at the southern limit of its distribution and restricted to the northern half of the WHA. A cave-roosting bat, it forages in wet and dry sclerophyll forests and grassy woodland near rocky escarpments. It roosts in relatively well lit areas near the cave entrance or in large overhangs and crevices. The northern WHA reserves and other reserves in the upper Hunter and Goulburn River valleys appear to be a stronghold for the species.

Recently recorded roosting in sandstone overhangs, caves and honeycomb weathering along sandstone escarpments in Wollemi NP (DEC 2005a, DEC 2006, DECC 2008b), Gardens of Stone NP (OEH 2012a) and Yengo NP (DEC 2005b). No maternity caves have been confirmed in the WHA, but a pregnant female was trapped at Carne Creek in Gardens of Stone NP in 2011 (OEH 2012a), and a post-lactating female was trapped at California Trail in Wollemi NP in 2005 (DEC 2005a), suggesting the presence of maternity caves nearby. The southernmost records in the WHA are call records from Bungleboori and Dumbano Creeks in the Wollangambe section of Blue Mountains NP in 2012 (BioNet Atlas), and four bats found roosting in a sandstone overhang near the Colo River in Wollemi NP in 2007 (DECC 2009).

### **Little Forest Bat *Vespadelus vulturnus***

Reserves: BM, GOS, J, KB, N, W, Y

Common, widespread resident that appears to be more common at lower elevations (below 600 m). It is by far the most frequently recorded bat species in the WHA. Found in wet and dry sclerophyll forests and grassy woodland, foraging in or below the tree canopy and roosting and breeding in tree hollows, typically in dead trees or in dead branches in live trees.

## **Family MURIDAE – RATS AND MICE**

### **White-footed Rabbit-rat *Conilurus albipes***

**Status: extinct (NSW and Commonwealth)**

Reserves: J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). Once considered common in south-eastern Australia, the species became extinct during the nineteenth century. It has not been recorded anywhere since the early 1860s (Van Dyck and Strahan 2008). It is the only vertebrate species recorded in the WHA since European settlement that is now totally extinct.

### **Water Rat *Hydromys chrysogaster***

Reserves: BM, GOS, J, N (1991), W

Rare resident. An aquatic species of rivers, creeks and open wetlands. There are recent records from Jenolan River (Jenolan KCR), Wollangambe River (Blue Mountains NP), Coco Creek (Gardens of Stone NP), and Wolgan River, Dunns Swamp and Ovens Creek (Wollemi NP).

### **Broad-toothed Rat *Mastacomys fuscus mordicus***

**Status: vulnerable (NSW and Commonwealth)**

Reserves: J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). The species is now presumed extinct in and around the WHA, but there are extant populations to the south in the Snowy Mountains and to the north at Barrington Tops (Van Dyck and Strahan 2008).

### **Plains Mouse *Pseudomys australis***

**Status: extinct (NSW), vulnerable (Commonwealth)**

Reserves: J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). The species is now presumed extinct in NSW, but survives in the Lake Eyre Basin in central Australia (Van Dyck and Strahan 2008).

### **Smoky Mouse *Pseudomys fumeus***

**Status: critically endangered (NSW), endangered (Commonwealth)**

Reserves: J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). The species is now presumed extinct in and around the WHA, but survives in the far south-eastern corner of NSW and in Victoria (Van Dyck and Strahan 2008).

### **New Holland Mouse *Pseudomys novaehollandiae***

**Status: vulnerable (Commonwealth)**

Reserves: J (undated), W, Y (1986)

Rare resident with a patchy distribution. It inhabits heath and dry sclerophyll forest where soils are suitable for burrowing, and is known to colonise burnt areas in the early years post-fire. Recent records in Wollemi NP are from Hungerford Valley and Baerami Valley in 2004

(BioNet Atlas, DEC 2005a). The only record for Yengo NP is an Australian Museum specimen collected in 1986. The only record for Jenolan KCR is skeletal remains found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997).

### **Hastings River Mouse *Pseudomys oralis***

**Status: endangered (NSW and Commonwealth)**

Reserves: J (extinct)

The only record for the WHA is from Jenolan KCR, where skeletal remains have been found in owl deposits from Nettle Cave that date from after European settlement (Morris *et al.* 1997). The species is now presumed extinct in southern NSW and Victoria, but persists in upland forests in north-eastern NSW and south-eastern Queensland, north from Barrington Tops (Van Dyck and Strahan 2008).

### **Bush Rat *Rattus fuscipes assimilis***

Reserves: BM, GOS (1978), J, KB, N, TL, W, Y

Common, widespread resident. It is found in a variety of vegetation types, favouring areas of friable soil with a dense undergrowth of shrubs and ferns. The only record for Gardens of Stone NP is two specimens at the Australian Museum collected in 1978.

### **Swamp Rat *Rattus lutreolus lutreolus***

Reserves: BM, W (1997), Y

Uncommon resident at the western edge of its range. The species has a patchy distribution in swamps and other moist sites with a dense layer of sedges, grasses and other ground vegetation. Recent localities include Burrellow Swamp (Blue Mountains NP) and the Mellong/Pierces area (Yengo NP).

## **Family CANIDAE – DOGS AND FOXES**

### **Dingo *Canis lupus dingo***

Reserves: BM, GOS, J, KB, N, W, Y

Uncommon but widespread resident. In 1813, as Gregory Blaxland crossed the Blue Mountains, he 'heard a most tremendous howling of Native Dogs [Dingos], which appeared to have been watching us the whole of the night' (Mackness 1950-51). Since that time, as Dingos have come into contact with Domestic Dogs *Canis lupus familiaris*, the two subspecies have interbred, resulting in increasing numbers of hybrids. In the southern Blue Mountains, about half of the wild dogs have the appearance of Dingos. Recent genetic testing has shown that while fewer than one in ten is of pure Dingo ancestry, most are at least 75% Dingo (DECC 2007b).

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### ***Online Databases***

Records from these databases were treated with caution. Any records that we considered doubtful were ignored.

NSW BioNet Atlas (formerly Atlas of NSW Wildlife) (<http://www.bionet.nsw.gov.au>). Last checked December 2018.

Atlas of Living Australia (<http://www.ala.org.au>). Incorporates records from many sources, including specimen records from Australian and international museums. Last checked December 2018.

Online Zoological Collections of Australian Museums (OZCAM) (<http://ozcam.org.au>). Mainly consulted for further information on museum records in the Atlas of Living Australia.

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