

## Black Mountain Symposium Background Paper No. 9

### Frogs and reptiles found at Black Mountain: fifty years of records, from museum collections to community-based photo mapping

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**Abstract.** In this paper we review all available records of reptiles and frogs of the Black Mountain area in order to describe its frog and reptile fauna, and to compare it with similar reserves in the north of the ACT. The earliest investigation conducted in 1975–1976 using pitfall traps to survey Black Mountain Reserve detected four species of frogs and eight species of reptiles. Records of a further nine reptile species were obtained from other reliable observers. Since 2009, the calls of frogs have been monitored each year at five sites in the reserve as part of the annual Frogwatch census. This has provided information on an additional four frog species not detected in 1975–1976. Because of its proximity to institutions like the Australian National University and CSIRO it was expected that other systematic surveys of frogs and reptiles would have been conducted in the Black Mountain area. Individual specimens have been lodged with museums from these institutions, and observations reported in a regional field guide, but there has been no more recent comprehensive survey. There has, however, been a substantial contribution to knowledge of the area's reptile and frog fauna from community-based records such as the ACT Wildlife Atlas, Canberra Nature Map and the Frogwatch program. Black Mountain's herpetofauna is now known to comprise eight frog species and 22 reptile species. Two species of monitor lizard, one skink and one frog previously recorded from the area no longer appear to be present. The contribution that the Black Mountain area makes to the conservation of frogs and reptiles in the ACT is significant, with the reserve supporting higher numbers of reptiles than have been reported from the Mt Ainslie – Mt Majura nature reserves (18 species) and Mulligans Flat – Gorooyarroo Nature Reserve (17 species).

#### 1. Introduction

The composition and distribution of the reptile and frog fauna of the Australian Capital Territory (ACT) is reasonably well known (see Bennett 1997 for a field guide to all species, and Rauhala 1997 for a review of the frog fauna). There are many institutions and private organisations in the ACT that have (or had) responsibility for ecological research and conservation that included herpetofauna. Examples include departments within the ACT Government (ACT Parks and Conservation Service and Conservation Planning Unit), local universities and several CSIRO Divisions (notably the former Divisions of Wildlife and Ecology and Water and Land Resources) as well as CSIRO's Australian National Wildlife Collection. These organisations have contributed considerably to resolving specific research and management issues with wildlife and to undertaking surveys of particular locations (e.g. areas proposed for urban development). A comprehensive Wildlife Atlas project<sup>1</sup> is administered by the ACT Government (through its Conservation Planning Unit) and has been storing records since the mid-1980s. However, despite these commendable efforts, there have been very few systematic, comparative surveys of frogs and reptiles that address diversity, distribution and habitat occupancy at the scale of local landscapes (e.g. a nature reserve unit) in the ACT. Notable exceptions are the surveys of vertebrate fauna in the Mt Ainslie – Mt Majura (hereafter called Ainslie–Majura) and Black Mountain nature reserves undertaken in 1975–

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<sup>1</sup> <https://www.data.act.gov.au/Environment/ACT-Wildlife-Atlas-Records/e9ux-7djy/data>

1976 by Kukolic (1990), two surveys undertaken along parts of the Murrumbidgee River Corridor Reserve by Rauhala (1993, 1995) and two comprehensive (but unpublished) ecological surveys conducted in parts of Namadgi National Park (Gilmour et al. 1987; Helman et al. 1988).

When faced with a diminished governmental capacity for undertaking wildlife surveys, it might be considered that gaps in our knowledge of fauna distributions could be addressed in part by harnessing the combined efforts of the many active volunteer groups in the ACT (particularly the ACT Herpetological Association, Field Naturalists Association of Canberra, and the Frogwatch program). These groups conduct regular activities in the ACT and region and their observations contribute to ACT Wildlife Atlas records and more recently, to the online community-based photo mapping database of Canberra Nature Map<sup>2</sup>. Frogwatch<sup>3</sup> produces a comprehensive online report and has published some of the main findings (Hoefler and Starrs 2016; Westgate et al. 2015).

Given the focus of this symposium on Black Mountain, it is timely to consider how comprehensive Kukolic's 1975–1976 survey was, by making a comparison with more recent findings. Because there has not been a systematic follow-up survey of reptiles and frogs in the reserve, the challenge is to piece together information on the fauna from the two wildlife atlas programs, Frogwatch records and other unpublished sources (e.g. bioblitz days, general observations, student projects). In this background paper we provide an update on the frog and reptile fauna of Black Mountain, including a list of the species, their relative abundance and the preferred habitat of each. We also consider the effectiveness of the reserve for the conservation of reptiles and frogs in the ACT.

## 2. Methods

### 2.1 Study area

The Black Mountain study area includes all of Black Mountain Nature Reserve (460 ha) and the undeveloped parts of the Australian National Botanic Gardens (ANBG) that still support natural vegetation (see Purdie 2018a for a map showing this area and a more detailed description of it). The geology, landforms/soils and vegetation of the area are described in detail by Finlayson (2018), Tongway (2018) and Doherty (2018) respectively. In terms of habitat for frogs and reptiles, most of the area supports open forest (dry sclerophyll forest) dominated by *Eucalyptus rossi* (Scribbly Gum), *E. mannifera* (Brittle Gum) and *E. macrorhyncha* (Red Stringybark) with some areas dominated by *E. polyanthemos* (Red Box). Other eucalypts including *E. dives* (Broad-leaved Peppermint), *E. bridgesiana* (Apple Box), *E. melliodora* (Yellow Box) and *E. blakelyi* (Blakely's Red Gum) are present at some sites, where they occur as subdominants or in small stands. Understorey vegetation is dominated by the large tussock-forming grass *Rytidosperma pallidum* (Red-anther Wallaby Grass) and a wide variety of sclerophyllous shrub species (see Purdie 2018a). Small areas of secondary grassland and low shrubland, in the process of converting to forest or to *Kunzea ericoides* (Burgan) scrub occur on the lower south-western and south-eastern slopes of Black Mountain. Surface rocks (sandstone) in the form of large rock outcrops and a mix of scattered surface rocks and gravel are widespread on the slopes and ridges throughout the reserve. The sandy soils are shallow and lithosolic.

### 2.2 Sources of information

Several different sources of data were available for this review (see Appendix 1 for full list) and are outlined in the following sections.

#### 2.2.1 Previous surveys

The comprehensive survey of the vertebrate fauna undertaken by Kukolic (1990) provided the main account of species and the baseline for comparison with later records. Kukolic's survey was undertaken during 1975 and 1976 and involved sampling with pitfall traps at 12 sites, all sites being surveyed once in summer and once in winter. The sites were well-separated and dispersed widely within the reserve, including at higher elevations. Each site had 10 pitfall buckets set at a 10 m

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<sup>2</sup> <http://canberra.naturemapr.org>

<sup>3</sup> <http://www.ginninderralandcare.org.au/frogwatch>

interval along a single 50 m drift fence. Individual sites were trapped for 14 days (separated into weekly sessions that lasted three or four consecutive days). Kukolic (1990) reported that he undertook some hand-searching for specimens at some of the sites but the results of this were not quantified in the report. No nocturnal searches were conducted, and frog calls were not recorded.

### **2.2.2 Annual Frogwatch census and Wildlife Atlas records**

Frogwatch data from five census sites within Black Mountain Nature Reserve (see Figure 5 of Purdie 2018b) were made available by the Ginninderra Catchment Group. These sites were surveyed annually from 2009 to 2017 in October by trained Frogwatch volunteers. No sites were surveyed in 2014 and 2015. Each site was visited between one and three times a year on different nights and involved the volunteers making a recording of the frog chorus and estimating the relative abundance of each species heard calling using the following categories: 0, 1–5, 6–20, 21–50, 50+ individuals. The recordings were later checked by an expert from Frogwatch.

Records from the ACT Wildlife Atlas and Canberra Nature Map were made available by the ACT Government for the study. Since 2017 all ACT Wildlife Atlas data has been included in Canberra Nature Map (Mulvaney 2017), so only pre-2017 ACT Wildlife Atlas data were used for our study and any records from 2017 were cross-checked to avoid duplication.

### **2.2.3 Museum records**

Records of frogs and reptiles from Black Mountain that are held in the Australian National Wildlife Collection and the Australian Museum were examined in August 2017. The numbers of specimens of each species and their year of collection were recorded. Any doubtful specimens or species not previously known from the reserve were checked by examination of the specimen.

### **2.2.4 General field observations**

During the period 1987–1993, one of the authors (Osborne) made repeat visits (at least one per year) to the six sites within the reserve where Kukolic had found *Pseudophryne bibronii* (Brown Toadlet). As the species breeds in autumn, the sites were checked in late March or April. At each site the nearest low-lying seepage area was located and then, at intervals of about 10 m along the seepage line for at least 100 m, loud shouts were made to stimulate threat-calling by any male *P. bibronii* present (shout-response technique: Hunter 2000; Osborne 1989).

Osborne also spent a total of 7.5 hours in the field undertaking opportunistic visual encounter searches for lizards on sunny days in spring and early summer (September–December) in 2017 at locations that comprised either open grassland or peppermint gum woodland (*E. dives*, *E. bridgesiana*) with a good cover of logs on the ground. These searches focused specifically on species of *Pseudomoia* (skinks), as this genus had previously been collected in or near Black Mountain. These observations have been tabulated as WO personal observations (pers. obs.).

In December 2017 we listened at night for calling frogs along three minor creek lines in the reserve during mild overcast conditions at times when recent rain had filled temporary pools within the drainage lines. Each site was checked on three occasions, the transects varying in length from 100 m to 250 m. These surveys were undertaken to supplement the Frogwatch surveys, which were mostly undertaken at artificial ponds (small fire dams).

In addition to the above observations, several records reported to us by other reliable observers (R Bennett, R Dencio, R Longmore and D Wong) were included in our overall dataset.

## **3. Results**

A full list of frog and reptile species recorded from Black Mountain is provided in Appendix 1, and the data analysed in more detail below. Scientific and common names used follow Cogger (2014).

### **3.1 Frogs**

Eight species of frogs have been observed in the Black Mountain area (Table 1; Appendix 1). We have not included species found within the ANBG that have been accidentally imported with horticultural materials. These include *Litoria verreauxii*, a species that occurs naturally within the

ACT but is also regularly found in imported materials, and commonly transported species such as *L. fallax*, *L. dentata*, *L. gracilentata* and *L. caerulea* which do not naturally occur in the territory. The frog fauna includes representatives of the three families found in the ACT: Hylidae (Tree Frogs), Limnodynastidae (Australian Ground Frogs) and Myobatrachidae (Australian Toadlets).

**Table 1.** List of frogs confirmed as being recorded in Black Mountain Nature Reserve

Scientific name	Common name	Source of records <sup>a</sup>		
		Kukolic	Frogwatch	Other
<b>Limnodynastidae (Australian Ground Frogs)</b>				
<i>Crinia signifera</i>	Common Eastern Froglet	KK	FW	ACTWA
<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet	-	FW	ACTWA
<i>Limnodynastes dumerilii</i>	Eastern Banjo Frog	KK	FW	ACTWA
<i>Limnodynastes peronii</i>	Brown-striped Frog	-	FW	ACTWA
<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	KK	FW	ACTWA
<b>Myobatrachidae (Australian Toadlets)</b>				
<i>Pseudophryne bibronii</i>	Brown Toadlet	KK	-	ANWC, AM
<i>Uperoleia laevigata</i>	Smooth Toadlet	-	FW	ACTWA
<b>Hylidae (Tree Frogs)</b>				
<i>Litoria peronii</i>	Peron's Tree Frog	-	FW	ACTWA

<sup>a</sup> ACTWA = ACT Wildlife Atlas (records up to 2016); AM = Australian Museum; ANWC = Australian National Wildlife Collection; FW = Frogwatch records (2009–2017); KK = Kukolic 1990.

### 3.1.1 Species of frogs detected by Kukolic in 1975–1976

Kukolic (1990) detected four species of frogs (Table 1). The numbers of individuals caught in pitfall traps were low (Table 2), reflecting the dry weather during the surveys. Of particular interest are the 13 *Pseudophryne bibronii* (Brown Toadlets) captured, some specimens of which are now lodged with the Australian National Wildlife Collection; all were correctly identified. The most recent record of this species is a specimen lodged in the Australian Museum in 1986 by Weir, Lawrence and Dressler (AM R145457). The species *Limnodynastes dumerilii* was not caught in pitfall traps but was heard calling during the day.

**Table 2.** Results of pitfall trapping of frogs at Black Mountain undertaken by Kukolic during 1975–1976 (Kukolic 1990); only species captured in pitfall traps are shown in the list

Scientific name	Common Name	No. of occupied sites	Total no. individuals across 12 sites
<i>Crinia signifera</i>	Common Eastern Froglet	5	13
<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	8	13
<i>Pseudophryne bibronii</i>	Brown Toadlet	6	13

### 3.1.2 Results of Frogwatch surveys 2009–2017

Seven species of frogs were detected in the Black Mountain area during the Frogwatch surveys

conducted between 2009 and 2017 (Table 3). The species detected most frequently were *Crinia signifera*, *C. parinsignifera*, *Limnodynastes tasmaniensis* and *Uperoleia laevis*. For further information see census summaries at the Frogwatch website<sup>4</sup>.

**Table 3.** Detection rate (number of occupied sites) and species of frogs detected at Black Mountain (2009–2013, 2016–2017) and in the ANBG (2011–2014, 2016) during annual Frogwatch surveys

Pond label	No. years surveyed	No. of surveys	Number of years and surveys (in brackets) that each species <sup>a</sup> was detected							
			Crin par	Crin sig	Uper laev	Lim tas	Lim per	Lim dum	Lit per	Lit ver
FBM1	7	15	3(8)	2(6)	3(7)	3(7)	1(1)	-	3(8)	-
FBM2	5	7	1(1)	4(5)	1(1)	1(1)	3(4)	1(2)	1(2)	-
FBM3	5	7	1(1)	2(3)	-	1(1)	2(3)	-	-	-
FBM4	6	9	5(8)	3(7)	5(7)	5(8)	-	-	5(6)	-
FBM5	6	9	1(1)	2(3)	2(3)	2(3)	-	-	2(3)	-
ANBG	5	9	-	5(7)	1(1)	1(2)	1(2)	4(7)	-	1(1)

<sup>a</sup> Species' abbreviations. Crin par = *Crinia parinsignifera*; Crin sig = *Crinia signifera*; Uper laev = *Uperoleia laevis*; Lim tas = *Limnodynastes tasmaniensis*; Lim per = *Limnodynastes peronii*; Lim dum = *Limnodynastes dumerilii*; Lit per = *Litoria peronii*; Lit ver = *Litoria verreauxii*.

### 3.1.3 Comparison with other nearby reserves in the north of Canberra

The frog fauna of the Black Mountain area was found to be similar to that recorded for the combined Ainslie–Majura and Mulligans Flat – Gorooyarroo nature reserves (Table 4). Note that *P. bibronii* was detected in the Black Mountain and Ainslie–Majura nature reserves in 1975/76.

**Table 4.** Number of individual records from ACT Wildlife Atlas (including Canberra Nature Map) for frogs observed at Black Mountain, Ainslie–Majura and Mulligans Flat – Gorooyarroo nature reserves; see Table 1 for common names

Scientific name	Black Mountain	Ainslie–Majura	Mulligan's Flat – Gorooyarroo
<i>Crinia signifera</i>	16	50	101
<i>Crinia parinsignifera</i>	9	26	137
<i>Limnodynastes dumerilii</i>	4	15	41
<i>Limnodynastes peronii</i>	4	3	5
<i>Limnodynastes tasmaniensis</i>	12	30	2
<i>Pseudophryne bibronii</i>	KK <sup>a</sup>	KK <sup>a</sup>	NR <sup>a</sup>
<i>Uperoleia laevis</i>	9	6	114
<i>Litoria peronii</i>	9	17	102
<b>Area of reserve (ha)</b>	460	1135	1686

<sup>a</sup> KK = detected by Kukolic (1990); NR = no records.

## 3.2 Reptiles

Twenty-two species of reptiles have been observed in the Black Mountain area (Table 5; Appendix 1). The reptile fauna includes representatives of the main families of Australian reptiles: Chelidae

<sup>4</sup> <http://www.ginninderrallandcare.org.au/frogwatch/frogwatch-report-files>

(freshwater turtles), Diplodactylidae (austral geckos), Gekkonidae (typical geckos), Pygopodidae (legless lizards), Scincidae (skinks), Agamidae (dragons), Varanidae (monitors), Typhlopidae (blind snakes) and Elapidae (venomous front-fanged snakes). There are no records of colubrid snakes or pythons from the ACT. A record of the coastal *Morelia spilota spilota* (Diamond Python) from the north-eastern edge of Black Mountain is believed to have been an escaped pet (Bennett 1998).

### 3.2.1 Species detected by Kukolic in 1975–1976

Kukolic (1990) detected eight species of reptiles in Black Mountain Reserve and reported that a further nine species had been reliably reported from there (Table 5). The most common species caught in pitfall traps were *Lampropholis delicata* (Delicate Skink), *Ctenotus taeniolatus* (Copper-tailed Skink) and *Morethia boulengeri* (Boulenger's Skink). These species were widely distributed within the reserve. The numbers of species trapped at Black Mountain (7) was lower than that trapped at Ainslie–Majura (9) and at Mulligans Flat (10) (Table 6).

**Table 5.** Reptiles confirmed as being recorded in Black Mountain Nature Reserve

Scientific name	Common name	Source of records <sup>a</sup>		
		1975–1976	ACTWA <sup>b</sup>	Other
<b>Chelidae (Chelid Turtles)</b>				
<i>Chelodina longicollis</i>	Eastern Long-necked Turtle	KK	-	-
<b>Diplodactylidae (Austral geckos)</b>				
<i>Diplodactylus vittatus</i>	Wood or Stone Gecko	KK	-	JB
<b>Gekkonidae (Typical Geckos)</b>				
<i>Christinus marmoratus</i>	Marbled Gecko	KK	-	JB
<b>Pygopodidae</b>				
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	KK	4	JB RD DW
<i>Delma impar</i>	Striped Legless Lizard	-	-	JB ANWC <sup>c</sup>
<i>Lialis burtonis</i>	Burton's Snake-lizard	-	-	WO <sup>d</sup>
<b>Scincidae (Skinks)</b>				
<i>Ctenotus taeniolatus</i>	Copper-tailed Skink	KK	3	JB WO
<i>Egernia cunninghami</i>	Cunningham's Rock Skink	KK	1	RL WO
<i>Hemiergis talbingoensis</i>	Eastern Three-toed Earless Skink	KK	2	-
<i>Lampropholis delicata</i>	Dark-flecked Sunskink	KK	5	JB WO
<i>Morethia boulengeri</i>	South-eastern Morethia Skink	KK	-	JB WO
<i>Pseudemoia entrecasteauxii</i>	Tussock Cool Skink	-	-	AM <sup>e</sup>
<i>Tilqua scincoides</i>	Eastern Blue-tongued Lizard	KK	3	ANWC
<b>Family Agamidae (Dragon Lizards)</b>				
<i>Amphibolurus muricatus</i>	Jacky Lizard	KK	8	WO
<i>Intellagama lesueurii</i>	Eastern Water Dragon	-	-	RB WO
<i>Pogona barbatus</i>	Eastern Bearded Dragon	KK	6	WO ANWC

<b>Family Varanidae (Monitor Lizards or Goannas)</b>				
<i>Varanus rosenbergi</i>	Rosenberg's Monitor	KK <sup>f</sup>	-	-
<i>Varanus varius</i>	Lace Monitor	KK	-	JB ANWC
<b>Typhlopidae (Blind Snakes)</b>				
<i>Ramphotyphlops nigrescens</i>	Blackish Blind Snake	KK	2	WO
<b>Elapidae (Elapid Land Snakes)</b>				
<i>Parasuta dwyeri</i>	Dwyer's Snake	-	-	JB
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	KK	-	ANWC
<i>Pseudonaja textilis</i>	Eastern Brown Snake	KK	4	ACTWA

<sup>a</sup> ACTWA = ACT Wildlife Atlas record; AM = Australian Museum; ANWC = Australian National Wildlife Collection; DW = D Wong field observation 2014; JB = Jenkins and Bartell 1980; KK = Kukolic 1990; RB = Bennett 1997; RD = R Dencio field observation 1998; RL = Richard Longmore 1960s; WO = W Osborne field observation 2017.

<sup>b</sup> Number of records in the online ACT Wildlife Atlas (see also Table 8).

<sup>c</sup> A single specimen collected by R Pengilley in 1971.

<sup>d</sup> A single individual observed by W Osborne in 1992 in open woodland 800 m NW of the summit of Black Mountain.

<sup>e</sup> Two specimens collected by R Pengilley in October 1969.

<sup>f</sup> Based on a photograph in Coyne (1969) of a dead specimen observed on the summit road.



**Fig. 1.** Two adult Pink-tailed Worm-lizards (*Aprasia parapulchella*) found towards the summit of Black Mountain in 2014. Photo: D Wong.

**Fig. 2.** A Copper-tailed Skink (*Ctenotus taeniolatus*) near the summit of Black Mountain; a common skink in rocky areas. Photo: D Wong.



**Table 6.** The number of occupied survey sites from pitfall trapping of reptiles at Black Mountain Nature Reserve and other northern ACT reserves<sup>a</sup>; see Table 5 for common names

Scientific name	Black Mountain (12 sites)	Mt Majura (11 sites)	Mt Ainslie (11 sites)	Mulligan's Flat (3 sites)
<b>Lizards</b>				
<i>Diplodactylus vittatus</i>	1	11	8	3
<i>Lialis burtonis</i>	-	1	-	-
<i>Ctenotus taeniolatus</i>	7	2	-	-
<i>Ctenotus orientalis</i>	-	-	-	2
<i>Hemiergis talbingoensis</i>	2	6	-	2
<i>Lampropholis delicata</i>	11	11	8	3
<i>Lampropholis guichenoti</i>	-	2	-	6
<i>Menetia greyii</i>	-	3	1	2
<i>Morethia boulengeri</i>	4	2	3	3
<i>Tiliqua scincoides</i>	-	1	-	2
<i>Amphibolurus muricatus</i>	-	-	-	3
<i>Pogona barbatus</i>	2	-	-	-
<b>Snakes</b>				
<i>Parasuta dwyeri</i>	-	-	-	1
<i>Pseudonaja textilis</i>	1	-	-	-
<b>Total number of species</b>	<b>7</b>	<b>9</b>	<b>4</b>	<b>10</b>
<b>Area of reserve (ha)</b>	460	495	640	950

<sup>a</sup> Data sources: Black Mountain and Ainslie–Majura, 1975–1976 (Kukolic 1990); Mulligans Flat (Kukolic 1991).

The number of ACT Wildlife Atlas records for reptiles varies considerably for each reserve (Table 7); 11 species have been recorded at Black Mountain compared to 18 at Ainslie–Majura and 17 at Mulligans Flat – Goorooyarroo. However, only 37 records of reptiles have been lodged for Black Mountain compared to 215 and 422 records for Mt Ainslie – Mt Majura and Mulligans Flat – Goorooyarroo respectively. This may indicate a sampling bias away from Black Mountain, particularly with 22 species of reptiles confirmed as occurring, or once occurring, there (Table 5). Six species detected in the Ainslie–Majura and Mulligans Flat – Goorooyarroo nature reserves have not been recorded at Black Mountain (Table 8).



**Fig. 3.** A Dark-flecked Sunskink (*Lampropholis delicata*) photographed at Black Mountain. This litter-layer species was common in 1975 and still occurs throughout the Black Mountain area. Photo: D Wong.

**Table 7.** Number of individual records of each species from ACT Wildlife Atlas (including Canberra Nature Map) for reptiles observed at Black Mountain, Ainslie–Majura and Mulligans Flat – Goorooyarroo nature reserves; see Table 5 for common names

Scientific name	Black Mountain	Ainslie–Majura	Mulligan's Flat – Goorooyarroo
<i>Chelodina longicollis</i>	-	-	119
<i>Diplodactylus vittatus</i>	-	2	2
<i>Christinus marmoratus</i>	-	1	-
<i>Aprasia parapulchella</i>	4	-	-
<i>Delma inornata</i>	-	-	19
<i>Delma impar</i>	-	-	3
<i>Lialis burtonis</i>	-	1	-
<i>Ctenotus orientalis</i>	-	-	3
<i>Ctenotus taeniolatus</i>	3	3	-
<i>Egernia cunninghami</i>	1	16	1
<i>Hemiergis talbingoensis</i>	2	4	47
<i>Lampropholis delicata</i>	5	7	84
<i>Lampropholis guichenoti</i>	-	4	15
<i>Menetia greyii</i>	-	1	53
<i>Morethia boulengeri</i>	-	5	53
<i>Tiliqua rugosa</i>	-	80	51
<i>Tiliqua scincoides</i>	3	12	6
<i>Amphibolurus muricatus</i>	8	9	9
<i>Intellagama lesueurii</i>	1	-	-
<i>Pogona barbatus</i>	6	44	1
<i>Varanus rosenbergi</i>	-	6	-
<i>Ramphotyphlops nigrescens</i>	2	2	-
<i>Parasuta dwyeri</i>	-	1	1
<i>Pseudonaja textilis</i>	2	17	8
<b>Total species</b>	<b>11</b>	<b>18</b>	<b>17</b>
<b>Total records</b>	<b>37</b>	<b>215</b>	<b>422</b>
<b>Area of reserve (ha)</b>	460	1135	1686

**Fig. 4.** Eastern Bearded Dragons (*Pogona barbata*) are regularly seen in the Black Mountain area, and in other parts of Canberra Nature Park. This large individual was observed on the eastern side of Black Mountain in 2016. Photo: R Purdie.



**Table 8.** Forest and woodland reptiles found in other reserves within Canberra Nature Park in the north of the ACT but not yet recorded from Black Mountain Nature Reserve<sup>a</sup>; see Table 5 for common names

Scientific Name	Ainslie–Majura	Mulligan's Flat – Goorooyarroo	Lower Molonglo Gorge
<i>Delma inornata</i>	-	Yes	Yes
<i>Pygopus lepidopodus</i>	Yes	-	-
<i>Lampropholis guichenoti</i>	Yes	-	-
<i>Mentia greyi</i>	Yes	Yes	-
<i>Ctenotus robustus</i>	Yes	Yes	Yes
<i>Ctenotus uber</i>	-	Yes	Yes
<i>Tiliqua rugosa</i>	Yes	Yes	-

<sup>a</sup> Data sources: ACT Wildlife Atlas records; Kukolic 1990, 1991; Barrer 1992; Longmore 2017; W Osborne personal observations.

## 4. Discussion

### 4.1 Frogs

A moderately rich frog fauna is still present at Black Mountain Nature Reserve. Only two non-riverine species that still occur in the north of the ACT (*L. verreauxii* and *N. sudelli*) appear to be absent (see discussion below). The main breeding sites for frogs in the reserve are small ephemeral pools along seepages and artificial ponds that were constructed as stock ponds, fire dams and for erosion control. Water persists in these dams and pools after wet weather for variable periods (depending on seasonal conditions) providing a more reliable breeding site than the ephemeral creek lines and depressions that drain the mountain. Although the frogs found at Black Mountain are dependent on these artificial ponds, it is likely that in wetter years most of the species would also breed in association with larger pools along the ephemeral creeks.

One species, *Limnodynastes peronii* (Brown Striped Frog), has only a marginal occurrence at Black Mountain, being found at a single site (with two ponds) near the north-western edge of the ANBG. This frog is associated with well-vegetated swamps, lagoons and flooded ditches throughout the former naturally treeless open plains of Canberra (Lintermans and Osborne 2002) and is still common in the suburbs of Lyneham and O'Connor. It is possible that it has recently colonised Black Mountain from the nearby suburbs or from the ANBG.

It is surprising that *P. bibronii* (Brown Toadlet), a species that was common and widespread at Black Mountain in the late 1970s (Kukolic 1990), is no longer found at Black Mountain (or in the Ainslie–Majura nature reserves, where it also was recorded). It is now very rare in the ACT and can only be found at a few sites to the south-east of Canberra near Uriarra and Tidbinbilla. The last record of the species at Black Mountain was in 1986 (AM R145457). This species breeds in late summer and autumn, and the breeding sites are associated with shallow pools and depressions within seepage lines, ditches and seasonally flooded low-lying areas. It is not known if *P. bibronii* ever formed breeding aggregations at the fire dams. However, given the distribution of the sites where they were found (Kukolic 1990) it is very likely that they had breeding sites along the main drainage lines and creeks as well as at some of the better vegetated ponds. The possible reasons for disappearance of this species are discussed in the following section.

#### 4.1.1 The disappearance of *Pseudophryne bibronii* (Brown Toadlet)

Breeding sites of *P. bibronii* typically are located along seepage lines and in low-lying depressions that contain water in late autumn through to early summer (Pengilley 1973). The eggs are laid in late summer and autumn in terrestrial positions (burrows, cracks in soil, under debris) that will later become flooded. Initially the tadpoles develop within the egg capsules until the nest site floods with late autumn or winter rainfall, when the tadpoles hatch and continue their development in shallow

pools and seepages (Pengilley 1973). The tadpoles have a lengthy larval duration of 17 to 26 weeks (Anstis 2002) which makes them very vulnerable to the premature drying of the shallow breeding pools.



**Fig. 5.** The last confirmed record of the Brown Toadlet (*Pseudophryne bibronii*) from Black Mountain, a specimen collected in 1986 by Weir, Lawrence and Dressler of CSIRO and now held in the Australian Museum (AM R145457). This small terrestrial frog was once common in the reserve. The reason for its disappearance is not known. Photo: J Rowley.

The reason for the disappearance of this species from the Black Mountain area is not known, but it may relate to a reduction in the suitability of breeding pools through the effects of recent warming of the ACT climate. However, it is more likely to have been a result of the introduced chytrid fungal pathogen (chytridiomycosis) that is thought to have affected other species of *Pseudophryne* in the ACT region (Hunter et al. 2010). The disappearance of *P. bibronii* in the early 1980s occurred at the same time that other species of frogs succumbed to the disease in this region (e.g. Scheele et al. 2014; Osborne et al. 1996).

Based on its former distribution and abundance in the Black Mountain and Ainslie–Majura nature reserves it is very likely that *P. bibronii* was once a very common and widespread species in the northern parts of the ACT. A high priority should be given to protecting the few remaining sites that support it.

#### **4.1.2 Frogs expected but not detected**

We expected that *Litoria verreauxii* and *Neobatrachus sudelli* would occur in the Black Mountain area, however they have never been recorded in or near the reserve (apart from a single record of the former species at an artificial pond in ANBG, Table 3). *Litoria verreauxii* is common in the Gungahlin region, including at Mulligans Flat, and still occurs in the Ainslie–Majura nature reserves (Frogwatch records). It is an easy species to detect by call (Lintermans and Osborne 2002) and should have been recorded at some stage by the Frogwatch surveys if present. In the early 1980s, it disappeared from a large part of the northern ACT, surviving at only a few sites in the far north of the territory near Oak Hill and Mulligans Flat (Sheele et al. 2014). The species has now repopulated much of the northern ACT, but it is not known if it was ever present at Black Mountain. Chytridiomycosis is strongly implicated in the species' decline (Scheele et al. 2014). By contrast, *N. sudelli* is a burrowing species that is active above ground only after heavy rain and therefore is more likely to have been missed during auditory surveys. It is possible that searches to date have not been conducted during suitable weather for detecting it. However, auditory searches conducted during December 2017, after several days of heavy rain, did not yield any records (Osborne, pers. obs.). Further surveys are required to confirm the likely absence of this uncommon species.

#### **4.1.3 Threatened species of frogs**

None of the seven species of frogs known to have occurred at Black Mountain are threatened species. However, the ACT once supported three species of bell frogs (*Litoria aurea*, *L. castanea* and *L. raniformis*) (Thomson et al. 1996; Osborne et al. 1996) that are now all highly endangered

and no longer occur in the territory. It is unlikely that they would have had breeding populations at Black Mountain due to the lack of suitable well-vegetated wetlands and ponds, except in the ANBG where there may have been suitable breeding sites associated with the artificial ponds and wetlands. The nearest records of them are from the nearby Bruce Ridge, where a well-vegetated farm dam supported a large population of bell frogs, identified as *L. aurea* but may have also included the other species (Kane 1994). This farm dam once was a collection site for bell frogs used for teaching purposes in student classes at nearby universities (Kane 1994). There are also confirmed records of bell frogs from ponds on the ANU campus (Osborne et al. 1996). Given the very close proximity of these sites to Black Mountain it is very likely that bell frogs would, at times, have occurred at Black Mountain.

## 4.2 Reptiles

The 22 species of reptiles recorded from Black Mountain represent 45% of the species known from the ACT. This is slightly higher than the number of species found in the Ainslie–Majura nature reserves (18 species) and Mulligans Flat – Goorooyarroo Nature Reserve (17 species).

### 4.2.1 Noteworthy records of reptiles

The most unusual record from Black Mountain is *Pseudemoia entrecasteauxii* (Tussock Cool-Skink), a species typically found in higher mountain areas. In 1969, Pengilley collected two individual specimens from Black Mountain that are now at the Australian Museum (AM R99296; R99297); both specimens have been correctly identified.

The present study confirms that two species of monitor lizard (goanna) once occurred at Black Mountain. The most recent, and only confirmed record of the Lace Monitor from the area is a juvenile specimen collected in 1968 (ANWC R00265). There have been other sightings of Lace Monitors on Black Mountain (Jenkins and Bartell 1980) and from nearby suburbs (Bennett 1997; see also Higgins 2017). However, it is possible that some of these records could have actually been Rosenberg's Monitors, which before 1988 were incorrectly recorded in the ACT as being Lace Monitors (Wombey 1995) and sometimes as Sand Goannas (*V. gouldii*) (Longmore 2018). Moreover, in the 1980s there were several escapes of Lace Monitors from outdoor enclosures at the Australian National University (ANU) (Barwick 2002). Some of the reports of Lace Monitors from the ANU grounds and nearby suburbs could have been from these escaped individuals. The occurrence of Rosenberg's Monitor at Black Mountain was confirmed from a photograph taken of a dead individual near the summit of the mountain (Coyne 1969).

The three species of legless lizard that have been recorded at Black Mountain are of interest. First, a single *Delma impar* (Striped Legless Lizard), a grassland species, was collected at Black Mountain in 1971 by Ross Pengilley (formerly from the Department of Zoology, ANU). This specimen is in the Australian National Wildlife Collection (ANWC R00301) and has been correctly identified. The exact location at which the specimen was collected is not recorded. More recently another legless lizard, *Aprasia parapulchella* (Pink-tailed Worm-lizard) (a vulnerable species), was found in the reserve at a single rocky site in open forest near the summit of Black Mountain (Dencio 1998; Wong 2011). This record is unusual because it is the only record of this species from a site with sedimentary geology. There is also a single record of *Lialis burtonis* (Burton's Snake-lizard) from the reserve (Osborne, pers. obs.; Table 5). This species is uncommon in the ACT.

Three species of venomous snake have been observed at Black Mountain: *Pseudonaja textilis* (Eastern Brown Snake), *Pseudechis porphyriacus* (Red-bellied Black Snake) and a smaller species *Parasuta dwyeri* (Dwyer's Snake). The most commonly encountered snake is *P. textilis*. It is relatively common in the ANBG, where it preys on small birds and reptiles, particularly on small water dragons (*Intellagama lesueurii*) (Douglass 2007). Douglass provides information from observations of marked snakes that indicates that individual snakes forage over quite large areas within the gardens (linear distances of up to 200 m).

#### **4.2.2 Reptiles expected but not detected**

Several species of reptiles that have not been found at Black Mountain have been observed in forest and woodland in nearby reserves (Table 8). Based on their distribution in the ACT it was expected that the following species would also have been found at Black Mountain: *Delma inornata* (Patternless Legless Lizard), *Lampropholis guichenoti* (Common Garden Sunskink), *Menetia greyi* (Dwarf Skink), *Tiliqua rugosus* (Shingleback), *Ctenotus orientalis* (Oriental Ctenotus) and *C. robustus* (Striped Skink). The absence of these species is surprising given their presence at many sites in the nearby Ainslie–Majura nature reserves or at Mulligans Flat. However, the geology, soils and vegetation of Black Mountain are different to that in the Ainslie–Majura nature reserves (Abell et al. 2008; Inwersen et al. 1974). The surficial geology of Black Mountain Nature Reserve is of sedimentary origin and mainly sandstone whereas the Ainslie–Majura nature reserves are primarily dacitic ignimbrite of volcanic origin. Black Mountain lacks the extensive areas of *Eucalyptus melliodora* and *E. blakelyi* grassy woodland and the more open habitats found in other nearby reserves. It is likely that the species in Table 8 favour a more open or partially cleared landscape, where grasses and forbs comprise the main ground cover (Ehmann 1992). Further surveys and habitat assessment would be required to confirm that these species are in fact absent from Black Mountain and to determine the reasons why.

#### **4.2.3 Occurrences of unusual and threatened species**

There are records of three species of threatened reptiles from Black Mountain. These are *Aprasia parapulchella* (Pink-tailed Worm-lizard) and *Delma impar* (Striped Legless Lizard), each listed as vulnerable in the ACT, and *Varanus rosenbergi* (Rosenberg's Monitor), listed as vulnerable in NSW. In addition to these species, the presence of several other species was unexpected. These records are discussed below.

There is a single record of *Delma impar* (Striped Legless Lizard), an obligatory grassland species that is listed as vulnerable in the ACT. The exact location at which the specimen (labelled as Black Mountain ACT) was collected within the reserve is not recorded. Given the presence of this uncommon species in grassland nearby at Yarramundi Reach (Kukolic 1994, and still present in 2014, Mulvaney 2017) and the fact that it is a grassland specialist (Dorrrough and Ash 1999), it is likely to have been collected from grassland on the lower slopes of Black Mountain away from our study area. The forest and woodland at Black Mountain is unsuited to this species and for this reason it is unlikely to occur within the current reserve boundary or in the ANBG. There is a possibility that it occurs in the Black Mountain area at previously cleared sites that now support secondary native grassland or exotic tussock grassland (e.g. *Phalaris*). However, these patches are quite small and are often shaded by nearby forest, making it unlikely that the species would occur within them. Further surveys using appropriate techniques for this species would be needed to confirm if it still occurs in grassland on the lower slopes of Black Mountain.

The occurrence of *Aprasia parapulchella* (Pink-tailed Worm-lizard) at Black Mountain is of considerable interest because it is the only regional record of the species at a site that has sandstone as the surface rock. Elsewhere in the ACT region the species occurs in association with rocks of volcanic and metamorphic origin (Wong et al. 2011). Moreover, the species is also considered to be an open area specialist (e.g. clearings and naturally open areas). The single Black Mountain site occurs in open forest at a high elevation. A survey is required to determine the extent of the *A. parapulchella* population at Black Mountain.

Of particular interest are two specimens of *Pseudomoia entrecasteauxii* (Woodland Tussock Skink) from Black Mountain that are held in the Australian Museum. The occurrence of this species from this part of the ACT is most unusual, although the specimens are correctly identified. Unless there was an error in the recording of location, the records should be accepted although there remains some doubt about them. Pengilley (1972), who collected the specimens, notes that *P. entrecasteauxii* does not occur in the Canberra district, but is common higher in the Brindabella Range. It is possible that the two specimens of *P. entrecasteauxii* lodged by Pengilley were incorrectly labelled and had been collected from somewhere else. Unfortunately, there are no collection details with the specimens that could confirm this (Rowley 2017). The nearest record of

*P. entrecasteauxii* is from Uriarra Village (specimen also lodged at the Australian Museum by R Pengilley) whose elevation is at about the same as Black Mountain. It is possible that a population of *P. entrecasteauxii* still occurs at Black Mountain, however searches to date have failed to find any individuals.

## 5. Management issues

### 5.1 Can reptile and frog communities be conserved in urban reserves?

#### 5.1.1 Frogs

Amphibians that are habitat generalists or do not need to disperse over long distances are better able to survive in urban and suburban landscapes (Hamer and McDonnell 2008, 2010). In a survey of urban and near-urban sites at Sydney, Schell and Burgin (2003) found that the abundance and diversity of frogs were greatest in the least urbanized areas. Similarly, in a review of the status of frogs in Sydney's urban impacted bush land reserves, White and Bergin (2004) concluded that 25–42% of the original frog fauna was still present in the urban reserves, whereas nearly 90% of the species predicted to be historically present still occurred within the single peri-urban site included in the review. The situation is not as pronounced in the ACT. A recent study of frog calling data (2002–2014) collected by the Frogwatch program in the ACT region (Westgate et al. 2015) found that there were strong negative effects of urban land cover on six of the eight species studied. However, within the 13-year study period, no species were observed to show a consistent decline within urban areas. Moreover, Westgate et al. found that faster declines have occurred in rural areas. The species that have declined markedly or become extinct in the ACT (*P. bibronii*, *L. verreauxii*, *L. aurea*, *L. raniformis* and *L. castanea*) (Osborne 1990) had already disappeared before the study by Westgate et al. (2015) had commenced, and their declines were not confined to urban areas.

#### 5.1.2 Reptiles

The present study confirms the former occurrence of two species of monitor lizard (goanna) from Black Mountain (*Varanus varius* and *V. rosenbergi*), but neither is thought to now occur in or near the reserve. This finding is important in the context of whether or not reserves are large enough to support populations of these large-bodied reptiles. One of the monitors, *V. rosenbergi*, still occurs within the Ainslie–Majura nature reserves (Higgins 2016). Unlike Black Mountain, this reserve has less than half of its edge abutting suburban areas and it is possible that the goannas could have moved into the reserve from nearby rural areas.

The problem for large-bodied lizards in reserves like Black Mountain is that the home ranges of adults will be larger than the reserve itself. This means that they are more likely to leave the reserve and to enter suburban areas where they may be killed on roads or by domestic pets. This possibility is supported by an unpublished study conducted by Ross Bennett (ACT Parks and Conservation Service, unpublished observation) who radio-tracked an adult *V. varius* that had been released within Black Mountain Nature Reserve in the early 1990's. He found that the lizard ranged over a very large part of the reserve before leaving it on at least two occasions. It was eventually found dead on Belconnen Way two years after its release (Bennett 1998).

### 5.2 A consideration of prescribed fire

Burning of dry litter and ground layer vegetation (prescribed burning) is used increasingly to reduce vegetation fuel loads in Canberra Nature Park. When combined with other techniques, e.g. herbivore grazing, and mowing and slashing, the difficulty of controlling wildfires can be reduced considerably. The herpetofauna of the ACT has evolved in the presence of fire, both of natural origin and from indigenous burning by humans. Nevertheless, the frequency and intensity of fire is likely to have considerable impact on species that rely on flammable ground cover, such as logs, litter and dense ground cover vegetation. Extensive and frequent removal of such cover is likely to increase the rates of predation on species that rely on these habitat structural elements.

Kukolic (1990) noted his concern that prescribed burning might be having a negative impact on reptiles dependent on the litter layer. Two species of reptiles that occur at Black Mountain are litter layer specialists, i.e. *Hemiergus talbingoensis* and *Lialis burtonis*. All other species use logs and

litter as foraging areas, basking sites and shelter sites. With increases in the frequency of prescribed burning beyond pre-European natural regimes and the resulting reduction of cover and simplification of habitat structure, the diversity of reptile communities could be expected to decline. Protection of the ground layer for reptile fauna at Black Mountain needs to be considered in fire management planning. A broader study of the immediate and long-term impact of prescribed burning on reptiles in ACT reserves could provide much needed information on this issue.

### **5.3 Implications for conservation of herpetofauna**

Black Mountain Nature Reserve is a relatively large reserve (460 ha), but is completely surrounded by urban infrastructure. It is expected that reserves embedded within the urban landscapes would support a lower diversity than similar-sized reserves remote from urban areas (Lindenmayer and Burgman 2005). This is because fauna living in urban reserves are exposed to greater risks, such as proximity to roads, predators, pollution, and increased fire occurrence. Moreover, the isolation of these reserves means that recolonization is unlikely for any species once they become locally extinct.

Despite the loss of three species of reptiles (the two monitor lizards and the skink *Pseudemoia entrecasteauxii*) and the disappearance of the toadlet *Pseudophryne bibronii*, a large number of species of frogs and reptiles still occur in Black Mountain Nature Reserve. With the grassland and open woodland species that do not have suitable habitat at Black Mountain excluded, the number of species recorded at Black Mountain is similar to that found in comparable forested reserves situated on the outer edge of Canberra. It is quite possible that more species will be discovered at Black Mountain (Table 8) in the future. However, what we cannot comment on is whether the density of individuals has declined—this would be expected if predators and reduced resource availability has affected populations. Further comparative surveys are needed to determine this.

It does appear very unlikely that protected areas of forest and woodland, similar in size to Black Mountain and completely surrounded by urban landscapes can support varanid (goanna) populations. Further research is required to determine why these species disappeared from Black Mountain. Likely influences would have been increased rates of predation on juveniles by feral and domestic predators, e.g. cats, foxes and dogs, and inadequate food resources, such as small vertebrates and large invertebrates.

Given the findings of this review we suggest that baseline assessment of reptile and frog populations in areas that are going to be reserved in or near the urban matrix be conducted before development occurs. This baseline information can then be used to address questions related to long-term survival of these communities and threatened species as well as to management actions, e.g. changed fire regimes, weed invasion, and pest control. In this context, Kukolic's (1990) surveys conducted during 1975–1976 provide a useful baseline for species that can be monitored with pitfall traps.

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## List of reptile and frog species recorded in the Black Mountain area, 1968 to 2017

Scientific and common names follow Cogger (2014).

**Sources of records**

ACTWA = ACT Wildlife Atlas up to 2017

AM = Australian Museum

ANWC = Australian National Wildlife  
Collection (CSIRO)

DW = David Wong

FW = ACT Frogwatch records

JB = John Wombey

KK = Kukolic 1990

RD = Ron Dencio

WO = Will Osborne

**Broad habitat codes**

CK = Creek lines and seepage areas

D = Artificial ponds and dams

DSF = Dry sclerophyll forest

GW = Grassy woodland and grassland derived  
from it

TG = Tussock grassland

RO = Rock outcrop

Scientific name	Common Name	Source of Record	Year last recorded	Broad habitat
<b>Frogs</b>				
<b>Limnodynastidae (Australian Ground Frogs)</b>				
<i>Crinia signifera</i>	Common Eastern Froglet	KK, FW, ACTWA	2017	CK, D, DSF, GW, TG
<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet	FW, ACTWA	2017	CK, D, DSF, GW, TG
<i>Limnodynastes dumerilii</i>	Eastern Banjo Frog	KK, FW, ACTWA	2017	CK, D, DSF, GW, TG
<i>Limnodynastes peronii</i>	Brown-striped Frog	FW, ACTWA	2017	D, GW, TG
<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	KK, FW, ACTWA	2017	CK, D, DSF, GW, TG
<b>Myobatrachidae (Australian Toadlets)</b>				
<i>Pseudophryne bibronii</i>	Brown Toadlet	KK, ANWC, AM	1986	CK, D, DSF, GW, TG
<i>Uperoleia laevigata</i>	Smooth Toadlet	FW, ACTWA	2017	CK, D, DSF, GW, TG
<b>Hylidae (Tree Frogs)</b>				
<i>Litoria peronii</i>	Peron's Tree Frog	FW, ACTWA	2017	CK, D, DSF, GW
<b>Reptiles</b>				
<b>Chelidae (Chelid Turtles)</b>				
<i>Chelodina longicollis</i>	Eastern Long-necked Turtle	KK, WO	2017	CK, D
<b>Diplodactylidae (Austral geckos)</b>				
<i>Diplodactylus vittatus</i>	Wood or Stone Gecko	KK, JB	1980	DSF, GW, RO
<b>Gekkonidae (Typical Geckos)</b>				
<i>Christinus marmoratus</i>	Marbled Gecko	KK, JB	1980	DSF, GW, RO

Scientific name	Common Name	Source of Record	Year last recorded	Broad habitat
<b>Pygopodidae</b>				
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	KK, ACTWA, JB, RD, DW	2016	GW, TG, RO
<i>Delma impar</i>	Striped Legless Lizard	JB, ANWC	2017	TG
<i>Lialis burtonis</i>	Burton's Snake-lizard	WO	1992	DSF, GW
<b>Scincidae (Skinks)</b>				
<i>Ctenotus taeniolatus</i>	Copper-tailed Skink	KK, ACTWA, JB, WO	2017	DSF, GW, TG, RO
<i>Egernia cunninghami</i>	Cunningham's Rock Skink	KK, ACTWA, WO	2017	DCF, GW, RO
<i>Hemiergis talbingoensis</i>	Eastern Three-toed Earless Skink	KK, ACTWA	2016	DSF, GW, TG, RO
<i>Lampropholis delicata</i>	Dark-flecked Sunskink	KK, ACTWA, JB, WO	2017	DSF, GW, TG, RO
<i>Morethia boulengeri</i>	South-eastern Morethia Skink	KK, JB, WO	2017	DSF, GW, TG, RO
<i>Pseudemoia entrecasteauxii</i>	Tussock Cool Skink	AM	1969	not known
<i>Tilqua scincoides</i>	Eastern Blue-tongued Lizard	KK, ACTWA, ANWC	2017	DSF, GW, TG, RO
<b>Family Agamidae (Dragon Lizards)</b>				
<i>Amphibolurus muricatus</i>	Jacky Lizard	KK, ACTWA, WO	2017	DSF, GW, TG, RO
<i>Intellagama lesueurii</i>	Eastern Water Dragon	RB, WO	2017	CK, D, DSF, GW
<i>Pogona barbatus</i>	Eastern Bearded Dragon	KK, ACTWA, ANW, WO	2017	DSF, GW, TG, RO
<b>Family Varanidae (Monitor Lizards or Goannas)</b>				
<i>Varanus rosenbergi</i>	Rosenberg's Monitor	KK	1969	DSF, GW, TG, RO
<i>Varanus varius</i>	Lace Monitor	KK, JB, ANWC	1968	DSF, GW, TG, RO
<b>Typhlopidae (Blind Snakes)</b>				
<i>Ramphotyphlops nigrescens</i>	Blackish Blind Snake	KK, ACTWA, WO	2017	DSF, GW, TG, RO
<b>Elapidae (Elapid Land Snakes)</b>				
<i>Parasuta dwyeri</i>	Dwyer's Snake	JB	1980	DSF, GW, TG, RO
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	KK, ANWC, WO	2017	CK, D, DSF, GW, TG
<i>Pseudonaja textilis</i>	Eastern Brown Snake	KK, ACTWA, WO	2017	CK, D, DSF, GW, TG