

A.C.T. Bush Blitz

Amphibians

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Nomenclature and taxonomy used in this report is consistent with:

The Australian Faunal Directory (AFD)

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List of contributors

List of contributors to this report.			
Name	Institution/affiliation	Qualifications/area of expertise	Level/form of contribution
Dr Jodi Rowley	Australian Museum and UNSW	PhD	Principal survey participant (contract # DNP-ABRS-1819-02), report author and validated calls collected via the FrogID app
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Christopher Portway	Australian Museum	Herpetology Research Assistant	Survey participant and report author
Andrew Trevor-Jones	Australian Museum	FrogID Validator	Validated calls collected via the FrogID app

Abstract

During the A.C.T. Bush Blitz, we recorded a total of 108 individual frogs from nine species. We collected voucher specimens and associated tissue samples from 24 individual frogs, comprising five species from three families. In addition, via audio recordings submitted to the national citizen science project, FrogID, we contributed 84 records of nine frog species of three families. All frog species detected were non-threatened and were known from the survey area. The frog specimens collected, all with associated tissue samples for molecular analysis, plus many with male advertisement call recordings, will be significant in resolving the systematics and taxonomy of frogs in eastern Australia.

1. Introduction

The A.C.T. is relatively well-studied for frogs. While most of the species are common and widely distributed, there have also been historical declines in the A.C.T. associated with the amphibian chytrid fungus, which has caused the local extinction of several Bell Frog species (Osborne et al. 1996), and the decline of Bibron's Toadlet (*Pseudophryne bibronii*) (Osborne and Hoefler 2018) and the Northern Corroboree Frog (*Pseudophryne pengillyi*) (Hunter et al. 2010). The Northern Corroboree Frog is now restricted to a few sites in alpine areas.

Much of the suitable frog habitat in the A.C.T. is close to urban development and there have been long-running citizen science programs such as 'Frogwatch ACT and Region' that regularly monitor frogs (Westgate et al. 2015). Pre-survey, we therefore expected that Namadgi National Park would be the most likely site for any significant discoveries due to its remoteness, large area, and high-quality habitat. However, the surveys gave us the opportunity to collect targeted specimens with associated call recordings and genetic material, vital for frog research and conservation in Australia. Many of the species that occur in the A.C.T. are thought to be part of morphologically conserved species complexes, but few recent specimens, plus little molecular or bioacoustic data exists. The A.C.T. Bush Blitz also provided the first opportunity to collect georeferenced acoustic data on a Bush Blitz survey using the FrogID app.

2. Methods

2.1 Site selection

A large proportion of frog habitat in the A.C.T. exists in small, fragmented nature reserves or rural blocks close to urban areas where the chances of encountering new species or other new or significant findings are low. We focussed on areas of fresh water in remote sites in Namadgi National Park that are comparatively under-surveyed. Rotten Swamp was selected due to its remoteness, and the Orroral Valley was selected based on previous amphibian field work undertaken in the area by one of the survey participants, which identified several species and a variety of habitats, increasing the chances of locating frogs. The Cotter River upstream of Bendora Dam was selected as the Southern Green Stream Frog (*Litoria nudidigita*) has been reported from the area, and there is taxonomic uncertainty around this species (i.e., is it an unusual colour form of the *L. nudidigita* or an undescribed taxa?). Additional surveys, particularly using FrogID, were carried out to increase geographic coverage and increase the likelihood of detecting additional taxa.

2.2 Survey techniques

Frogs were located at night via visual encounter and acoustic surveys. Frog calls were recorded with professional recording equipment when possible, and all individuals were collected by hand. Sites were accessed by foot, car, helicopter and boat, with searches performed on foot. Frog calls were also recorded via the FrogID app. These recordings, plus associated metadata (latitude, longitude, location accuracy, time and date) were submitted to the FrogID project and all frogs calling were identified by the survey participants and/or experts at the Australian Museum. Hygiene protocols were followed at all times.

2.2.1 Methods used at standard survey sites

Frogs at the standard survey sites were located on foot during night time searches by detecting their calls or eye shine. The dry conditions decreased the likelihood of detecting frogs, especially at Birrigai, where no frogs were observed.

2.3 Identifying the collections

All amphibian species collected during this survey were identified morphologically by Dr Jodi Rowley. Specimens of *Limnodynastes dumerilii* and *Litoria verreauxii* were also genetically identified by Dr Jodi Rowley using mitochondrial DNA sequences.

Bioacoustic data collected via the FrogID app were collectively identified in the field and/or by staff engaged by the Australian Museum as part of the FrogID project (refer to the 'List of Contributors' for named individuals).

3. Results and Discussion

During the survey (26/11/18 to 3/12/18) we collected 24 specimens of five frog species. Using FrogID, we submitted an additional 84 records of nine frog species (and the Bush Blitz fish team submitted another 2 records). Appendix 1 lists all Amphibians recorded during the Bush Blitz.

We extracted genomic DNA and sequenced mitochondrial DNA from two Whistling Tree Frogs (*Litoria verreauxii*) and a single Eastern Banjo Frog (*Limnodynastes dumerilii*), two species that are expected to be species complexes. Both molecular and bioacoustic data collected will be important for the systematics, taxonomy and conservation of frogs in southeastern Australia.

3.1 Un-named or not formalised taxa

There were no un-named or taxa 'not formalised' collected during the survey. However, several of the species collected are likely to be part of species complexes and the specimens, tissues and call recordings collected during this survey may contribute towards new taxa descriptions in the future.

Table 1. Putatively un-named or not formalised taxa

Taxon	Comment
Nil	

3.2 Putative new species (new to science)

There were no putative new species collected during the survey.

Table 2. Putative new species (new to science)

Species	Comment
Nil	

3.3 Exotic and pest species

The only pest taxa observed were Sambar deer. Habitat disturbance from these deer was evident and control is recommended.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
Sambar deer (<i>Rusa unicolor</i>)	Namadgi National Park (Cotter River, upstream from Bendora dam)	Uncertain	Several adults and wallows observed

3.4 Threatened species

No threatened species were detected during the amphibian surveys.

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
Nil			

3.5 Range extensions

There were no range extensions or other significant locality records for any species collected during the survey.

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
Nil			

3.6 Genetic information

Tissue samples (liver) were collected from all individuals collected and were stored in 100% ethanol, EDTA/DMSO and/or RNA later. Tissues were deposited at both the Australian National Wildlife Collection (ANWC) and the Australian Museum (AMS).

4. Information on species lists

The species list in Appendix 1 is a complete and accurate record of the species collected. There were no issues with identification, however future research on the systematics and taxonomy of Australian frogs may result in taxonomic changes.

5. Information for land managers

Research and conservation management supporting the Northern Corroboree Frog (*Pseudophryne pengilleyi*) is the priority for A.C.T. frog conservation.

Namadgi National Park. The Cotter River upstream of Bendora Dam is an area of significance in terms of conservation, as it is the only area known in the A.C.T. to have Southern Green Stream Frog (*Litoria nudidigita*) where it is sometimes also referred to as the “Cotter River Frog”. We surveyed for the species at the site during this Bush Blitz but did not detect it, possibly due to dry conditions. We strongly recommend further efforts to locate *Litoria nudidigita* during more suitable weather conditions, particularly in spring. We recommend the collection of tissue samples and recordings of the male advertisement call of the species (plus a small number of voucher specimens if the species is locally abundant) to confirm its specific identity, evolutionary relationships and conservation status. Comparative specimens and molecular and bioacoustics data exists at the Australian Museum, as part of recent work examining the group.

6. Other significant findings

The Two-spined Blackfish (*Gadopsis bispinosus*), which is listed as a threatened species in the A.C.T., was observed in abundance during our survey of the Cotter River upstream from Bendora Dam.

7. Conclusions

We collected 24 frog specimens, which included five species from three families. All species collected were expected from the A.C.T., but there are few recent specimens from the A.C.T., particularly at the remote study sites, and few frog specimens with associated tissues suitable for genetic studies. Additional surveys under more suitable conditions (in times of higher rainfall) in Namadgi National Park should be a focus of any future survey efforts in A.C.T., as it is likely to contain the highest diversity of frogs and potentially harbour species that are locally threatened. Resolving the taxonomic status of *Litoria nudidigita* in the A.C.T is also a priority.

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Appendix 1. List of amphibians recorded in Namadgi National Park, Bimberi Wilderness Area, Tidbinbilla Nature Reserve, Australian National Botanic Gardens and other A.C.T. land

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest	Record type*	Namadgi National Park	Bimberi Wilderness Area	Tidbinbilla Nature Reserve	Australian National Botanic Gardens	Other (public)
Hylidae	<i>Litoria lesueurii</i>	Lesueur's Frog	No	No	No	No	S, G, O*	Yes	No	No	No	No
Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog	No	No	No	No	S, G, O*	No	No	Yes	Yes	Yes
Hylidae	<i>Litoria verreauxii</i>	Whistling Tree Frog	No	No	No	No	S, G, O*	Yes	No	Yes	No	No
Limnodynastidae	<i>Limnodynastes dumerilii</i>	Eastern Banjo Frog	No	No	No	No	S, G, O*	Yes	No	No	Yes	No
Limnodynastidae	<i>Limnodynastes peronii</i>	Striped Marsh Frog	No	No	No	No	O*	No	No	No	Yes	No
Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog	No	No	No	No	O*	Yes	No	No	Yes	No
Myobatrachidae	<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet	No	No	No	No	O*	No	No	Yes	No	No
Myobatrachidae	<i>Crinia signifera</i>	Common Eastern Froglet	No	No	No	No	S, G, O*	Yes	Yes	Yes	No	No
Myobatrachidae	<i>Uperoleia laevigata</i>	Smooth Toadlet	No	No	No	No	O*	No	No	No	No	Yes

*georeferenced FrogID recording of call made