Protected areas of the ACT 2018

Bush Blitz expedition report

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Contributors

Bush Blitz is coordinated by the Australian Biological Resources Study (ABRS), which is part of the Australian Government Department of Agriculture, Water and the Environment. The program is a partnership between the Australian Government, BHP and Earthwatch Australia.

Research agencies involved in this Bush Blitz were the Australian National Herbarium, Australian National Insect Collection, Australian Museum, Australian National University, Centre for Australian National Biodiversity Research, Museum and Art Gallery of the Northern Territory, Queensland Museum, Royal Botanic Gardens Victoria, University of Adelaide, University of New South Wales and the Western Australian Museum.

Photo credits

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Front cover images: (from top left, clockwise) Peron's Tree Frog (*Litoria peronii*), a moss (*Polytrichum commune*), a true bug (Heteroptera sp.), Namadgi National Park © Copyright, David Paul.

Acknowledgements

The ABRS acknowledges the traditional owners of country throughout Australia and their continuing connection to land, sea and community. We pay our respects to them and their cultures and to their elders both past and present.

Bush Blitz would like to thank the expedition team, and staff from ACT Parks and Conservation Service, the Australian National Botanic Gardens and Parliament House who provided invaluable advice and assistance both before and during the expedition. They would also like to thank staff at Birrigai Outdoor School for their hospitality, and the helicopter pilots who used their expert knowledge of the area to safely transport scientists to and from remote sites.

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From 26 November to 6 December 2018, Bush Blitz led an expedition to protected areas in and around the ACT. Survey efforts were largely focused in remote areas of Namadgi National Park (Namadgi) which, like most of the protected areas visited, is managed by ACT Parks and Conservation Service.

Despite an extended dry period before the expedition, surveys and collections allowed knowledge gaps to be filled, important material for future genetic and taxonomic studies to be obtained, and the known ranges of species to be extended, including several new records for the ACT.

At least 978 species were recorded during the Bush Blitz and 22 of those may be completely new to science (4 wasps, 3 flies, 2 treehoppers, 12 jumping plant lice and 1 spider). Many unnamed or not formalised invertebrate taxa were collected. These may assist scientists to revise, compare and describe species in the future.

Two species of threatened fish were recorded – Twospine Blackfish (*Gadopsis bispinosus*) and Macquarie Perch (*Macquaria australiasica*). While not listed in Australia, the 2 species of spiny crayfish recorded – Alpine Spiny Crayfish (*Euastacus crassus*) and Riek's Crayfish (*Euastacus rieki*) – are considered Endangered under the IUCN Red List.

Seventeen introduced and pest animal species were recorded along with 42 introduced plant species, including 5 that are declared pest plants under ACT legislation. A survey of non-indigenous plant species indicated that most are only observed in degraded areas, away from high-quality habitats found in the remote parts of Namadgi.

Other significant findings included:

- genetic material taken from 21 reptile species is important for the understanding of reptile diversity in Australia and several specimens collected may belong to an as-yet-unnamed species of water skink (*Eulamprus* sp.)
- voucher specimens collected from 24 individual frogs, all with associated tissue samples and many with call recordings, will be significant in resolving the systematics and taxonomy of frogs in eastern Australia
- new site records and important extant refuge populations documented for Mountain Galaxias (*Galaxias olidus*), Alpine Spiny Crayfish (*Euastacus crassus*) and Riek's Crayfish (*Euastacus rieki*)
- the rediscovery of a jumping plant lice species (*Trioza banksiae*) that had not been collected since its description in 1903 and the collection of 2 species of jumping plant lice from host genera previously unrecorded for the group
- valuable location and abundance information for vascular plant species that had not been collected nor observed in 30 years.

Introduction

About Bush Blitz

The Bush Blitz program documents plants and animals in selected properties across Australia to support the discovery of new species, complement and complete existing collections, and provide information to support land management and conservation.

Bush Blitz is an initiative of the Australian Government, through the Australian Biological Resources Study (ABRS), in partnership with BHP and Earthwatch Australia. This innovative partnership harnesses the expertise of many of Australia's top scientists from museums, herbaria, universities, and other institutions and organisations across the country.

An estimated 580,000–680,000 species are found in Australia (Chapman 2009), but three-quarters of this biodiversity is yet to be identified. Around 45% of continental Australia and over 90% of our marine area have never been comprehensively surveyed by scientists. Increasing our understanding of Australia's biodiversity is critical for conservation, biosecurity, agriculture, human and animal health and many other activities.

Since the Bush Blitz program began in 2010, more than 1,700 species have been discovered during Bush Blitz expeditions across Australia.

In addition to species discovery, Bush Blitz objectives include raising public awareness of biodiversity, and improving environmental, social and educational outcomes for local and Indigenous communities. While some of these objectives are met during expeditions – through Bush Blitz TeachLive, teacher workshops and community days – they are out of scope for this report.

About this report

This report summarises the initial scientific findings of an expedition to protected areas of the ACT. Information in this report has been extracted from the scientific reports provided by expedition members. Locational data for all flora and fauna records are provided to reserve managers and are publicly available through the Atlas of Living Australia (ALA).

Protected areas of the ACT Bush Blitz

Bush Blitz led an expedition in protected areas of the ACT from 26 November 2018 to 6 December 2018. While the ACT has generally been well sampled, several areas are hard to access and have been little studied. Effort was largely focused on remote areas of Namadgi and a helicopter was made available for part of the expedition.

A 2013 Bush Blitz expedition to alpine areas along the border of the ACT and NSW included the only significant surveys for groups such as terrestrial molluscs and provided baseline data for the 2018 expedition. During the 2013 expedition, 71 putative new species were recorded. This was the seventh highest number of new species recorded on a Bush Blitz and suggested that more new species awaited discovery.

It was expected that the expedition would improve the Australian National Insect Collection (ANIC) holdings in many poorly studied insect groups and, for insects such as butterflies, moths

and beetles that had already been well surveyed in the ACT, it would expand on this foundation. The expedition also provided an opportunity for intensive sampling of ACT galaxias to help map remaining refuge habitats and to collect material for taxonomic assessment from remote locations. It also enabled reptiles to be collected from an under sampled region where few specimens with tissues exist in national collections.

Study area

Namadgi National Park was gazetted in 1984 and today covers approximately 46% (106,095 hectares) of the ACT (ACT Government 2010). The Bimberi Wilderness Area, the only designated wilderness area within the ACT, comprises 27% (28,900 hectares) of Namadgi.

Namadgi is managed by the ACT Parks and Conservation Service under a cooperative agreement with the traditional owners, the Ngunnawal people. The park includes the rugged mountain ranges and broad grassy valleys in the western and southern parts of the ACT.

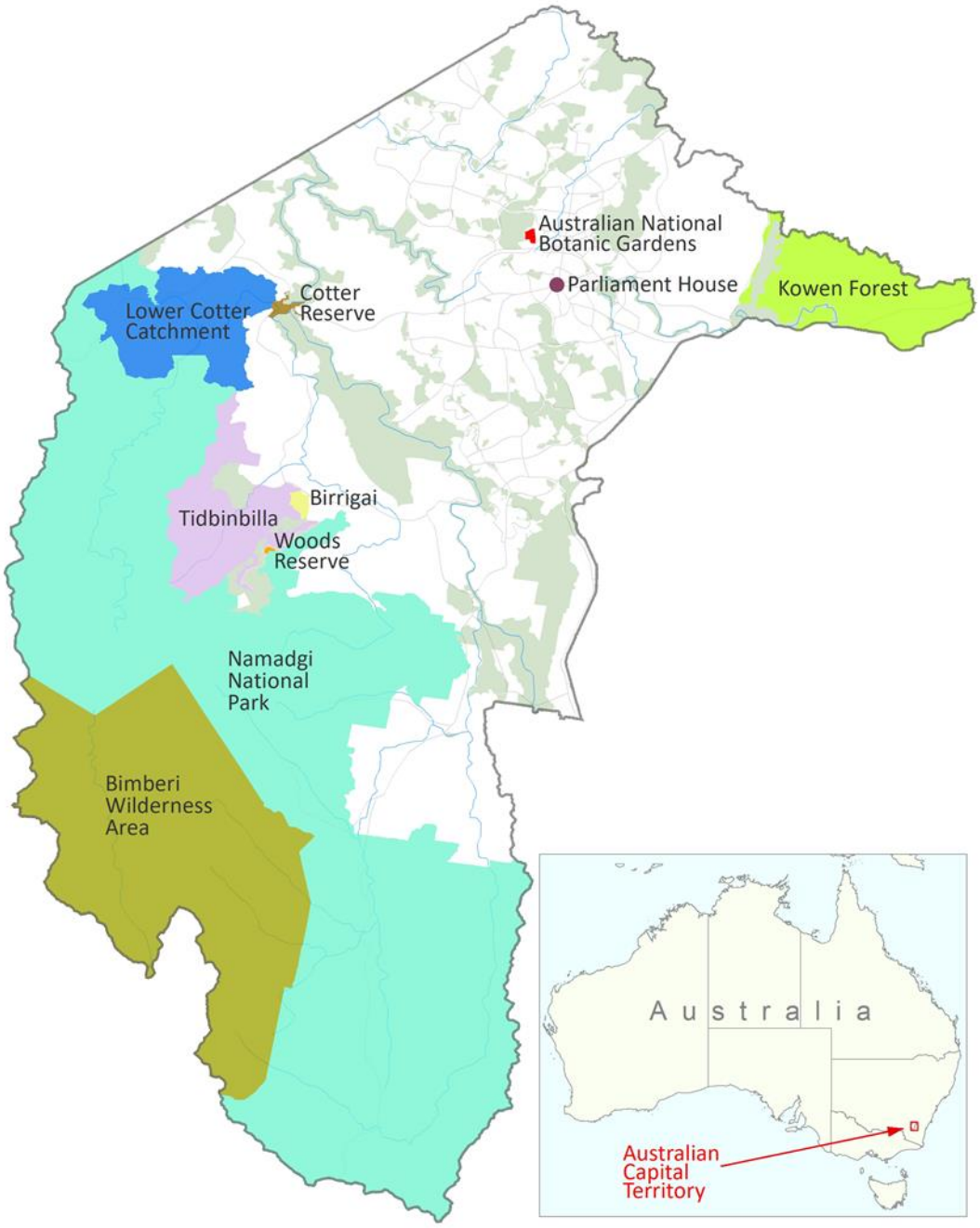
Namadgi is important for conserving biodiversity. The park's snow gum woodlands, subalpine fens and bogs, grasslands and montane forest communities provide habitat for a diverse range of species. Namadgi also has a rich heritage of human history with evidence of Indigenous use of the land and remnants of early European pastoral activity.

Some scientists also visited other protected areas that they felt had potential to lead to interesting discoveries, including Tidbinbilla Nature Reserve (Tidbinbilla), Lower Cotter Catchment, Cotter Reserve, Kowen Forest, Birrigai and Woods Reserve.

Holding an expedition near the nation's capital provided Bush Blitz with an opportunity to promote the importance of biodiversity and taxonomic research to our government and the Canberra community. Consequently, some scientists visited the Australian National Botanic Gardens (ANBG) and the courtyards of Parliament House.

Map 1 shows the 10 locations visited during the expedition.

Map 1 Locations visited 26 November, 6 December 2018



Note: For a map of collection sites see Appendix B.

Expedition team

Logistics

Bush Blitz provided the logistical coordination and overall leadership for the expedition. The Bush Blitz team consisted of Kate Gillespie, Jo Harding, Kate Grarock, Haylee Weaver and Paula Banks.

Scientific

ANIC and the Australian National Herbarium were the host institutions for this Bush Blitz, providing the core group of personnel and accessioning the specimens into their collections. Experts from several other organisations also conducted the field and laboratory work and are included in Table 1.

Bush Blitz TeachLive

Six teachers from around Australia participated in Bush Blitz TeachLive, a collaborative program between the Bush Blitz partners and the Australian Science Teachers Association. Working alongside scientists, the teachers reinvigorated their love for science, generated new ideas and learned new skills to take back to their schools. Teachers taught 'live' to their classrooms across Australia via the TeachLive website and Skype sessions, taking their students on a virtual expedition and inspiring the next generation. Sandra McCullough and Cassandra Nichols from Earthwatch Australia coordinated the TeachLive activities. TeachLive participants were Michelle Allen (ACT), Jane Brandenburg (WA), Alyce Brownlie (Tas), Cara Bulger (NT), Oliver Lintott (Qld) and Adriana Sardoni (Qld).

Photography

David Paul (DP Images) was the scientific photographer.

Figure 1 Some members of the expedition team

Methods

Taxonomic groups studied and personnel

A number of taxonomic groups were selected as targets for study. Table 1 lists the groups surveyed and the personnel who undertook the fieldwork, made identifications and reported on the findings.

Table 1 Taxonomic groups surveyed and personnel

Group	Common name	Personnel and affiliation
Reptilia	Reptiles	Christiana McDonald-Spicer (ANU) Damien Esquerre (ANU) Ian Brennan (ANU) Jessica Fenker (ANU)
Amphibia	Frogs	Jodi Rowley (AM & UNSW) Christopher Portway (AM) Renee Catullo (ANU & AM)
Actinopterygii	Freshwater fishes	Michael Hammer (MAGNT) Matthew Beitzel (ACT Government)
Hymenoptera	Bees and wasps	Juanita Rodriguez (ANIC)
Lepidoptera	Moths and butterflies	Michael Braby (ANIC)
Hemiptera	Planthoppers, leafhoppers and treehoppers	Olivia Evangelista (ANIC)
	True bugs (Heteroptera)	Ryan Shofner (UNSW) Nikolai Tatarnic (WAM)
	Jumping plant lice (Psylloidea)	Gary S. Taylor (Uni. of Adelaide)
Orthoptera	Grasshoppers, crickets and katydids	You Ning Su (ANIC)
Mollusca	Slugs and snails	Luisa Teasdale (ANIC)
Arachnida	Spiders	Robert Raven (QM) Eamon Amsters (QM)
Decapoda	Crayfish	Matthew Beitzel (ACT Government)
Vascular flora	Flowering plants	Dave Albrecht (ANBG CANBR)
Cryptogams	Bryophytes	Chris Cargill (ANBG CANBR) Nimal Karunajeewa (RBG Victoria)

Ecologists Greg Baines, Mark Jekabsons and Zohara Lucas (Conservation Research, ACT Government) and horticulturalist Leanne Clarke (Landscape Services, Australian Parliament House) also assisted with fieldwork. Personnel who were not involved with fieldwork but assisted the scientific team in other ways (for example, identification of specimens) are mentioned in the scientific reports.

Site selection and collection methods

All scientists surveyed 2 standard survey sites selected by Bush Blitz. Each standard survey site was centred on a point (permanently marked), but the actual area surveyed varied between taxa. Standard methodologies were used to sample these sites. There was no water at either of the 2 standard survey sites.

The use of standard survey sites provides a unique opportunity to examine broad-spectrum biodiversity. Among other benefits, it allows land managers to use these sites for ongoing monitoring and generates a national dataset that can be used to underpin conservation and land management decisions.

Apart from standard survey sites, site selection and collection methods were left to the discretion of the individual scientist. When selecting sites, scientists prioritised areas that were undersurveyed and had high potential for new or significant discoveries. They also considered the suitability of the site based on access, collection technique, habitat type, bushfire history and time available. Site locations were recorded using global positioning systems. Specific details about site selection and collection methods can be found in the scientific reports.

Identification and curation

The specimens taken will be identified using the holdings of museums and herbaria and available literature (references are provided in the scientific reports).

Vertebrate specimens will be deposited at the Australian National Wildlife Collection, with some additional frog tissue samples deposited at the AM. Invertebrate specimens will be accessioned into the ANIC, with the exception of Heteroptera that will be accessioned into the UNSW collection. Plant and cryptogam specimens will be accessioned into the Australian National Herbarium (CANBR) and the National Herbarium of Victoria (RBG Victoria).

Results

Summary of records

Preliminary results indicate that at least 978 species were recorded during the Bush Blitz, including approximately 22 putative new species – these await formal identification. In addition, several hundred moth specimens are waiting to be formally identified and are excluded from these results. Two threatened animal species, 17 introduced and pest animal species and 42 weed species were also recorded.

Table 2 provides a summary of the flora and fauna records made on the expedition.

Table 2 Summary of flora and fauna records

Group	Common name	Total species recorded	Putative new species	Threatened species	Introduced and pest species
Mammalia	Mammals	1	0	0	1
Reptilia	Reptiles	22	0	0	0
Amphibia	Frogs	9	0	0	0
Pisces	Fishes	7	0	2	4
Hymenoptera	Ants	8	0	0	0
	Bees	28	0	0	1
	Wasps	83	4	0	1
	Sawflies	3	0	0	0
Lepidoptera	Butterflies and moths	14	0	0	1
Diptera	Flies	101	3	0	0
Coleoptera	Beetles	22	0	0	0
Hemiptera	Planthoppers, leafhoppers and treehoppers	32	2	0	0
	Cicadas	1	0	0	0
	Aphids	1	0	0	0
	Scale insects	1	0	0	0
	Jumping plant lice	44	12	0	0
	True bugs	94	0	0	0
Strepsiptera	Twisted-wing parasites	1	0	0	0
Neuroptera	Lacewings	1	0	0	0
Psocoptera	Booklice	3	0	0	0
Dermaptera	Earwigs	1	0	0	0
Orthoptera	Grasshoppers, crickets, katydids	19	0	0	0
Embioptera	Web-spinners	1	0	0	0
Blattodea	Cockroaches	1	0	0	0
Odonata	Dragonflies and damselflies	3	0	0	0
Onychophora	Velvet worms	1	0	0	0
Arachnida	Spiders	90	1	0	4

Group	Common name	Total species recorded	Putative new species	Threatened species	Introduced and pest species
Decapoda	Shrimps, prawns, freshwater crayfish	5	0	0	0
Gastropoda	Snails and slugs	14	0	0	5
Vascular plants	Vascular plants	183	0	0	42
Bryophytes	Liverworts and mosses	82	0	0	0
Lichens	Lichens	102	0	0	0
Total		**978**	**22**	**2**	**59**

Note: Threatened species include those listed as threatened under the Commonwealth EPBC Act or an equivalent listing under the Nature Conservation Act 2014 (ACT). Introduced and pest species may include species that are native to Australia.

Species lists

Lists of all species recorded during the expedition (Appendix A) were compiled using data from participating institutions.

Some specimens were only able to be identified to family or genus level. This is partly because identification of specimens is very time-consuming, with detailed microscopic examination needed in many cases. Also, some groups are 'orphans' – currently no experts are working on them or are available to work on them and the taxonomic literature is out of date. Species-level identification is not possible for these groups.

For cryptogams, and in particular lichens, only a portion of the specimens had been identified to the species level at the time of reporting. Cryptogam identification is a long process that involves morpho-anatomical observations, compound microscopy, chemical analyses (thin layer chromatography) and molecular analyses.

Unidentified Bush Blitz specimens are held in institutional collections where they are available for future study. Collections hold many such specimens, among them species not yet described (that is, unnamed species) as well as described species that have not been identified. For example, ANIC holds tens of thousands of unidentified specimens. Specimens often wait decades before the resources become available for their study. A key component of Bush Blitz is the funding of studies of specimens collected on Bush Blitz expeditions.

Several insect species in the ACT region still await formal recognition. This is particularly the case for groups of insects that had no local specialists until more recently (including spider wasps, treehoppers, leafhoppers and planthoppers) and megadiverse groups that can be easily overlooked due to their small size, such as flies.

Nomenclature and taxonomic concepts used in this report are consistent with the Australian Faunal Directory, Australian Plant Name Index and Australian Plant Census, AusMoss, and the Catalogue of Australian Liverworts and Hornworts.

Discussion

Putative new species

Here we use the term 'putative new species' to mean an unnamed species that, as far as can be ascertained, was identified as a new species as a direct result of this Bush Blitz. A putative new species is confirmed as a new species once it is named and its description is published.

Approximately 22 putative new species were discovered during the expedition. Further research may reveal additional new species in the material collected. For example, genetic research on different Mountain Galaxias forms found during the expedition may reveal new species.

Figure 2 Aquarium photo of Mountain Galaxias

Wasps

Four putative new species of spider wasp (Pompilidae) were collected. Spider wasps have venom that could be useful for treating Alzheimer's disease and epilepsy, but most Australian spider wasp species are unknown to science.

One species is from the cosmopolitan genus, *Epipompilus*, that comprises 36 Australian species. Unlike most pompilids, which dig nests to store their prey, females of *Epipompilus* lay their eggs directly into their spider host when they are hunting, a behaviour considered more ancestral within the family. Graduate student David Yuan (ANU, CSIRO) is currently working on the *Epipompilus* species of the ACT region. After the ANIC report was submitted, David Yuan and Juanita Rodriguez described 3 new species for the genus, including the species discovered during this expedition (Yuan & Rodriguez 2020). The holotype of *E. namadgi* is a specimen collected during the expedition. The area where the species was discovered was badly impacted by the 2019/20 bushfires and the fate of this newly described species is not known.

Three additional pompilid species are represented only from males – 1 from the ANBG and 2 from Tidbinbilla. They are likely to belong to the following genera described by Haupt: *Alococurgus*, *Dolichocurgus*, *Eremocurgus*, *Mimocurgus, Pachycurgus*, *Poecilocurgus* or *Xenocurgus*. These groups have not been studied since their original description and were all described based on female specimens. Due to the strong sexual dimorphism in these pompilids, it is not possible to associate male specimens with their corresponding females based only on morphology. Molecular data from the specimens will be included in an evolutionary study of

Australian pompilids. This project is currently being developed by Juanita Rodriguez in collaboration with James Pitts from Utah State University.

Flies

Three putative new fly species, from the genera *Cryptochetum*, *Paramyia* and *Auster*, were collected in Namadgi.

Species of the genus *Cryptochetum* are scale parasitoids and are rarely collected other than by rearing the hosts. Three species are known from Australia. The new species is much smaller and more pruinose than other known species.

No described species of *Paramyia* are known from Australia, but some undescribed species are in collections from QLD and coastal NSW. Species in the Northern Hemisphere are associated with tree sap and fallen logs; they can be very common in bogs and adults steal from spider webs (kleptoparasitism). The biology of Australian species is unknown.

Only 1 species of *Auster* is described but there are dozens of undescribed species in eastern Australia. They are associated with ferns, generally with a tight host species relationship. The species collected during Bush Blitz lives on tree ferns.

Treehoppers

The 2 putative new species of treehopper collected are from the genera *Ceraon* and *Eufrenchia*, which currently comprise 5 and 1 species respectively. These charismatic sap-feeding treehoppers are quite robust and both bear peculiar thoracic ornaments, in the shape of a long pair of horns, which are sexually dimorphic and quite distinct from other recognised species. No taxonomic studies have been conducted since the description of the *Eufrenchia* genus in the early 1900s. The appearance of the thoracic horns of this species, much thicker and more curved than other species, indicates this species is new to science.

Figure 3 Putative new species of treehopper *Eufrenchia* sp.

Olivia Evangelista © Copyright, CSIRO

Jumping plant lice

Twelve putative new species of jumping plant lice, from 3 genera – *Acizzia*, *Creiis* and *Ctenarytaina* – were collected from various species of *Acacia*, *Grevillea* and *Banksia*. The *Acizzia* represent the least known of the jumping plant lice and at least 6 new species from this genus were represented in the material collected.

Spiders

A putative new species of Desidae was taken in Parliament House gardens, not far from native bushland. It is likely to have ballooned into the gardens as no females were recorded. This species is related to the Black House Spider (*Badumna* sp.) but belongs to a new genus and species. It was unknown to Robert Raven prior to the Bush Blitz but will require several months' work to establish whether it existed in museum collections previously.

Threatened species

Approximately 92% of Australian plants, 87% of mammals, 93% of reptiles and 45% of birds are endemic (Chapman 2009). Changes to the landscape resulting from human activity have put many of these unique species at risk. Over the last 200 years, many species have gone extinct; many others are considered to be threatened – that is, at risk of extinction.

Fishes

Two species of threatened fishes were recorded when targeting riffle habitat for galaxias on the Cotter River. Twospine Blackfish (*Gadopsis bispinosus*) were all released at the point of capture and Macquarie Perch (*Macquaria australiasica*) juveniles were recorded opportunistically and photographed. The populations of both species in the Cotter are regionally and nationally significant and receive active consideration in regional management. The frog team also reported observing Twospine Blackfish, in abundance, in the Cotter River upstream from Bendora Dam.

Freshwater crayfish

Although not listed under threatened species legislation in the ACT or Australia, the 2 species of spiny crayfish recorded – Alpine Spiny Crayfish (*Euastacus crassus*) and Riek's Crayfish (*Euastacus rieki*) – are considered Endangered under the IUCN Red List and are protected under the *ACT Fisheries Act 2000*.

Figure 4 Alpine Spiny Crayfish

Table 3 Threatened fauna species – fishes

Family	Species	Common name	Status	Comments
Percichthyidae	*Gadopsis bispinosus*	Twospine Blackfish	Vulnerable (ACT)	Cotter River above Cotter Dam; moderate abundance
Percichthyidae	*Macquaria australiasica*	Macquarie Perch	Endangered (ACT); Endangered (EPBC)	Cotter River, Vanity's Crossing; rare

Introduced and pest species

Conservation reserves help to protect Australia's rare and threatened ecosystems and provide refuge for species at risk. Invasive species can have a major impact on already vulnerable species and ecosystems, as well as economic, environmental and social impacts. The inclusion of introduced and pest species records as part of this report is designed to provide land managers with baseline information to assist with further pest management programs.

Table 4 lists the introduced and pest vertebrate species that were collected or observed in the study area.

Mammals

Sambar Deer (*Cervus unicolor*) were observed by the frog team. The fishes/crayfish team also observed limited heavy-hooved animal damage at sensitive high elevation swamp sites and noted that larger numbers of feral horses or pigs could impact the condition and quality of this refuge habitat for fishes and spiny crayfish.

Fishes

Four introduced fishes were recorded at the targeted stream sites surveyed. Three were fairly restricted in more lowland habitat, with Rainbow Trout (*Oncorhynchus mykiss*) widespread in mid to high elevation sites.

European Carp (*Cyprinus carpio*) and Eastern Gambusia (*Gambusia holbrooki*) were only recorded below Cotter Dam, and this artificial barrier appears to have limited upstream dispersal into habitat containing threatened Twospine Blackfish and Macquarie Perch. Proactive management to prevent upstream illegal translocation is a key management recommendation. Oriental Weatherloach (*Misgurnus anguillicaudatus*) has breached this barrier, apparently translocated as a bait bucket introduction for recreational trout fishing.

Rainbow Trout is a large predatory species and a nearly mutually exclusive pattern of distribution was observed with Mountain Galaxias, either at a system scale, site level, or in the 1 case of co-occurrence, by habitat diversity – adult galaxias in riffles and trout in pools at Blue Gum Creek. Similarly, Alpine Spiny Crayfish were not recorded, or were found in low abundance, at otherwise suitable sites where Rainbow Trout occurred. One site found to contain Mountain Galaxias in March 2002, Gibraltar Creek above Gibraltar Falls, has been lost due to the recent introduction of Rainbow Trout; a small pocket of Mountain Galaxias was found in the very upper reaches of the system. This small sub-catchment would be an ideal area to undertake invasive species control. Lees Creek, another small stream site where trout control has previously been undertaken, retains a strong population of Mountain Galaxias.

Table 4 Introduced and pest vertebrate species – mammals and fishes

Family	Species	Common name	Comments
Mammals			
Cervidae	*Cervus unicolor*	Sambar Deer	Namadgi (Cotter River, upstream from Bendora Dam); several adults and wallows; habitat disturbance
Fishes			
Cobitidae	*Misgurnus anguillicaudatus*	Oriental Weatherloach	Cotter River, immediately above and below Cotter Dam; common; in shallow edges
Cyprinidae	*Cyprinus carpio*	European Carp	Cotter River, below Cotter Dam; common; main channel
Poeciliidae	*Gambusia holbrooki*	Eastern Gambusia	Cotter River, below Cotter Dam; common; in shallow off-channel pools
Salmonidae	*Oncorhynchus mykiss*	Rainbow Trout	Gibraltar Creek, Rendezvous Creek, Rotten Swamp, Blue Gum Creek, Cotter River; common to abundant (up to 30 individuals per site)

Spiders

Of the 4 introduced spider species recorded, 2 are native to Australia. The Australian Redback (*Latrodectus hasseltii*) is considered native to South Australia and south-western Western Australia; elsewhere it is considered an introduced pest and voracious predator of trapdoor and funnelweb spiders as well as skinks, frogs and even small snakes. The spider is favoured by hot dry summers and is known to be very adaptable and invasive.

Snails and slugs

Five introduced species of terrestrial molluscs were found in areas of human and horticultural activity – Parliament House, the ANBG, the Sanctuary at Tidbinbilla, and Birrigai – and 4 of these are anecdotally common in the ACT but are rarely formally collected. The Hedgehog Slug (*Arion intermedius*) had not previously been recorded in the ACT (at least not on ALA), but its occurrence in the ACT is not surprising given they are found through Victoria and around Sydney. It is difficult to know how long the species has been in the ACT. Given the lack of records, this is likely due to a lack of survey effort rather than its absence. While most introduced snails and slugs are strongly associated with human activity, the Hedgehog Slug is known to invade natural habitats; however, its impact on the environment is not well understood.

Table 5 lists the introduced and pest invertebrate species that were collected or observed in the study area.

Table 5 Introduced and pest invertebrate species – bees, wasps, butterflies, spiders, snails and slugs

Family	Species	Common name	Comments
Bees			
Apidae	*Apis mellifera*	European Honey Bee	Recorded in all areas surveyed; highly abundant
Wasps			
Vespidae	*Vespula germanica*	European Wasp	Moderately abundant

Family	Species	Common name	Comments
Butterflies			
Pieridae	*Pieris rapae*	Cabbage White	Originates from Europe; agricultural pest
Spiders			
Idiopidae	*Arbanitis* ACTsp43	na	ANBG; arrived on tree ferns
Pholcidae	*Pholcus phalangioides*	Daddy-long-legs	Originates from Europe
Theridiidae	*Latrodectus hasseltii*	Redback Spider	Considered a pest outside its home range
Theridiidae	*Steatoda capensis*	Black Cobweb Spider	Originates from southern Africa
Snails and slugs			
Agriolimacidae	*Deroceras reticulatum*	Grey Field Slug	Parliament House; highly abundant
Arionidae	*Arion intermedius*	Hedgehog Slug	ANBG; 4 individuals; first record for ACT
Helicidae	*Cornu aspersum*	European Garden Snail	Parliament House and ANBG; highly abundant
Limacidae	*Lehmannia nyctelia*	Striped Field Slug	Parliament House and Birrigai; highly abundant
Zonitidae	*Oxychilus alliarius*	Garlic Snail	Parliament House; Tidbinbilla and ANBG; highly abundant

na Not available.

Vascular plants

Botanists recorded the location and abundance of non-indigenous vascular plants to inform weed management programs. They recorded 42 introduced and pest plant species; however, most were only observed in degraded areas, away from high-quality habitats found in the remote parts of Namadgi.

The 5 vascular plants listed in Table 6 are declared pest plants under ACT legislation.

Blue Periwinkle (*Vinca major*), a prohibited pest plant, was the only pest plant recorded at both Namadgi and Birrigai. It can be highly competitive and form dense patches in native vegetation. Destruction of both patches is recommended.

African Lovegrass (*Eragrostis curvula*) is another highly invasive and competitive species that must be contained under ACT legislation and should be eradicated if feasible.

Under ACT legislation, the Slender Thistles (*Carduus pycnocephalus* and *Carduus tenuiflorus*) must be contained, and Bathurst Burr (*Xanthium spinosum*) must be suppressed. Control action is recommended for all 3 of these species due to the potential for seed to be dispersed into Namadgi and Tidbinbilla.

Table 6 Gazetted weeds

Family	Species	Common name	Location
Apocynaceae	*Vinca major*	Blue Periwinkle	Namadgi and Birrigai; localised patches; disturbed areas
Asteraceae	*Carduus pycnocephalus*	Slender Thistle	Birrigai; rare; disturbed areas
Asteraceae	*Carduus tenuiflorus*	Slender Thistle	Birrigai; occasional; disturbed areas
Asteraceae	*Xanthium spinosum*	Bathurst Burr	Birrigai; occasional; highly disturbed areas;
Poaceae	*Eragrostis curvula*	African Lovegrass	Birrigai; rare; highly disturbed areas

Many of the other pest plants recorded (Table 7) are unlikely to be a priority for control due to factors such as current abundance, ecological impact and difficulty of control. Notable species are:

- Maltese Cockspur (*Centaurea melitensis*): Last collected in the ACT in 1956, this was no longer considered part of the ACT flora, although there are several contemporary records on Canberra Nature Map. Destruction is recommended.
- Common Mouse-eared Chickweed (*Cerastium vulgare*): Last collected in the ACT in 1984, however there are several contemporary records on Canberra Nature Map and it is likely to be more common than records indicate.
- Brown Sedge (*Carex disticha*): Few records for the ACT. Further investigation is required to determine whether a control program is warranted.
- Shamrock Oxalis (*Oxalis articulata*): Although possibly not a great threat to native vegetation, treatment should be considered due to the location within Namadgi and the small size of the patch.

Table 7 Non-gazetted weeds

Family	Species	Common name	Location
Adoxaceae	*Sambucus nigra*	Black Elder	Namadgi; disturbed area
Amaranthaceae	*Amaranthus albus*	Tumbleweed	Birrigai; highly disturbed areas
Asteraceae	*Centaurea melitensis*	Maltese Cockspur	Birrigai; disturbed areas
Asteraceae	*Crepis capillaris*	Smooth Hawksbeard	Namadgi; disturbed margin of reservoir
Asteraceae	*Gamochaeta calviceps*	Grey Cudweed	Birrigai; highly disturbed areas
Asteraceae	*Leontodon saxatilis*	Hairy Hawkbit	Birrigai; derived grassland and highly disturbed areas
Asteraceae	*Sonchus asper*	Rough Sowthistle	Namadgi; highly disturbed areas
Asteraceae	*Tragopogon dubius*	Goat's Beard	Namadgi; Snow Gum woodland
Boraginaceae	*Myosotis discolor*	Yellow and Blue Forget-me-not	Namadgi; montane grassland and wet heathland
Boraginaceae	*Myosotis laxa* subsp. *caespitosa*	Water Forget-me-not	Namadgi; rocky riparian habitat
Brassicaceae	*Cardamine hirsuta*	Common Bittercress	Birrigai; highly disturbed areas
Caryophyllaceae	*Cerastium vulgare*	Common Mouse-eared Chickweed	Namadgi; wet montane grassland in remote area
Caryophyllaceae	*Polycarpon tetraphyllum*	Four-leaved Allseed	Birrigai; highly disturbed areas
Cyperaceae	*Carex buxbaumii*	Buxbaum's Sedge	Origin status in Australia is uncertain; Namadgi (Rotten Swamp); found in a single fen however area not searched extensively
Cyperaceae	*Carex disticha*	Brown Sedge	Namadgi; sedgeland where it was forming dense patches
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	Birrigai; highly disturbed areas
Euphorbiaceae	*Euphorbia peplus*	Petty Spurge	Birrigai; highly disturbed areas
Fabaceae	*Trifolium glomeratum*	Clustered Clover	Birrigai; derived grassland and high disturbed areas

Family	Species	Common name	Location
Malvaceae	*Malva parviflora*	Small-flowered Mallow	Birrigai; derived grassland and high disturbed areas
Onagraceae	*Epilobium ciliatum*	Glandular Willowherb	Namadgi; only seen on disturbed margin of reservoir
Oxalidaceae	*Oxalis articulata*	Shamrock Oxalis	Namadgi; highly disturbed area
Papaveraceae	*Argemone ochroleuca* subsp. *ochroleuca*	Mexican Poppy	Birrigai; only seen in highly disturbed areas; ruderal species; nuisance due to prickly nature; remove before seeding
Papaveraceae	*Papaver somniferum*	Opium Poppy	Birrigai; highly disturbed areas
Pinaceae	*Pinus sylvestris*	Scots Pine	Namadgi; first collection for ACT; wet heathland and margins of plantation near Pryor's Hut; control needed
Plantaginaceae	*Veronica anagallis-aquatica*	Blue Water Speedwell	Namadgi; riparian habitat
Poaceae	*Aira caryophyllea*	Silvery Hairgrass	Namadgi; rocky Snow Gum woodland
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	Namadgi; Snow Gum woodland to elevation of 1732 m; of concern due to invasiveness and ability to outcompete native species; treatment of plants on Mt Gingera is warranted but may not be feasible
Poaceae	*Bromus diandrus*	Great Brome	Namadgi; rocky riparian habitat
Poaceae	*Cynodon dactylon* var. *dactylon*	Couch	Birrigai; derived grassland; potential to cause issues in Namadgi wetlands, however too well established at Birrigai to contemplate treatment
Poaceae	*Holcus lanatus*	Yorkshire Fog	Namadgi; montane grassland-heathland mosaic; highly competitive species in moist sites; unlikely to be a priority for control due to abundance and difficulty of control
Resedaceae	*Reseda luteola*	Cut-leaved Mignonette	Birrigai; highly disturbed areas
Rosaceae	*Sanguisorba minor*	Sheep's Burnet	Namadgi; along a roadside through open forest
Rubiaceae	*Galium divaricatum*	Slender Bedstraw	Birrigai; highly disturbed areas and derived grassland
Rubiaceae	*Sherardia arvensis*	Field Madder	Birrigai; disturbed riparian habitat
Scrophulariaceae	*Verbascum thapsus* subsp. *thapsus*	Great Mullein	Birrigai; weedy derived grassland
Scrophulariaceae	*Verbascum virgatum*	Twiggy Mullein	Birrigai; weedy derived grassland
Solanaceae	*Solanum triflorum*	Three-flowered Nightshade	Birrigai; highly disturbed areas

Range extensions

The known ranges of many species were extended, including several new records for the ACT. The most notable range extensions are listed in Table 8.

Table 8 Range extensions

Family	Species	Comments
Fishes		
Galaxiidae	*Galaxias olidus*	Important extant refuge populations documented at Cotter River, Top Flat; Little Creamy Swamp; McKeahnie Creek; Sawpit Creek
Wasps		
Pompilidae	*Auplopus cornelia*	First record for ACT; previously known from QLD
Pompilidae	*Auplopus novarae*	First record for ACT; previously known from NSW, QLD and VIC
Pompilidae	*Dolichocurgus* spp.	First record for ACT; previously known from SA and WA
Pompilidae	*Epipompilus semitinctus*	First record for ACT; previously known from QLD
Pompilidae	*Psoropempula tuma*	First record for ACT; previously known from QLD
Pompilidae	*Sphictostethus geevestoni*	First record for ACT; previously known from TAS
Butterflies		
Lycaenidae	*Pseudalmenus chlorinda zephyrus*	New record for southern ACT; previously known only from northern montane areas of ACT and all previous sites were eliminated by 2003 firestorm
Jumping plant lice		
Triozidae	*Trioza banksiae*	First record for ACT; rediscovered in Namadgi, having not been collected since its description in 1903 from Sydney, 250 km
Spiders		
Miturgidae	*Miturga* ACTsp24NKing	First record for ACT; previously known only from Kinglake National Park (Vic) which was badly burnt in 2009
Crayfish		
Parastacidae	Alpine Spiny Crayfish *(Euastacus crassus)*	Ginini Creek; first record of this species in this drainage and at this elevation (1544 m)
Parastacidae	Riek's Crayfish *(Euastacus rieki)*	Rendezvous Creek; first record for this species in this creek
Slugs		
Arionidae	*Arion intermedius*	ANBG; first record for ACT
Vascular plants		
Asteraceae	*Senecio lageniformis*	First record for ACT
Caryophyllaceae	*Stellaria angustifolia* subsp. *tenella*	First record for ACT
Cyperaceae	*Carex buxbaumii*	First record for ACT and 7th record for Australia
Myrtaceae	*Eucalyptus moorei* subsp. *moorei*	First record for ACT
Bryophytes		
Andreaeaceae	*Andreaea subulata*	First record for ACT; nearest records from NSW are Kosciuszko area at Charlottes Pass and Thredbo

Family	Species	Comments
Grimmiaceae	*Schistidium flexifolium*	First record for ACT; nearest record from NSW is at Currambene Creek, all other Australian records are from southern VIC
Lophocoleaceae	*Clasmatocolea inflexispina*	First record for ACT; only known in NSW from 1 collection but more common in E. VIC and TAS
Pallaviciniaceae	*Pallavicinia xiphoides*	First record for ACT; only known in NSW from 5 locations; common in TAS
Ptychomitriaceae	*Ptychomitrium mittenii*	First record for ACT; endemic to SE Australia; nearest records from NSW are Majors Creek S of Braidwood
Scapaniaceae	*Diplophyllum domesticum*	First record for ACT; genus is under-collected and poorly represented in most Australian herbaria; nearest occurrences in NSW are Kosciuszko area.

Other significant findings

Although drought, and suboptimal conditions during the expedition, impacted the diversity and abundance of many groups, a number of other significant findings were made. The expedition provided an opportunity for scientists to collect additional data and obtain specimens important for future research.

Reptiles

The southern part of the ACT, including Namadgi, is very under sampled for reptiles so, even with cold and cloudy or rainy conditions during the first week, the collections made filled a large sampling gap. Genetic samples, a combination of tail tips and livers, were taken from 80 individuals across 21 species. With many cryptic species, the analysis of this genetic material is necessary for the evaluation and confirmation of the species sampled, and important for the understanding of reptile diversity in Australia. Several specimens of *Eulamprus tympanum* were collected which may belong to a potential unnamed species of *Eulamprus*.

Although elapid snakes were not targeted, 3 individuals of Highland Copperhead (*Austrelaps ramsayi*) were observed on different Namadgi sites. Collecting Blackish Blind Snake (*Anilios nigrescens*) was unexpected – although not rare, it is rarely observed, with only 35 records across the ACT, and only 7 in the last 20 years.

Frogs

The ACT is relatively well-studied for frogs but there are few recent specimens, particularly from remote areas of Namadgi. Voucher specimens were collected from 24 individual frogs, comprising 5 species from 3 families. These specimens, all with associated tissue samples for molecular analysis and many with male advertisement call recordings, will be significant in resolving the systematics and taxonomy of frogs in eastern Australia. Several of the species collected are likely to be part of species complexes and the specimens, tissues and call recordings collected may contribute towards new taxa descriptions in the future.

The Cotter River upstream of Bendora Dam was selected as a site as it is the only area known in the ACT to have the Southern Green Stream Frog (*Litoria nudidigita*) and it is unknown whether this 'Cotter River Frog' is an unusual colour form of the Southern Green Stream Frog or an undescribed taxon. The species was not detected and further efforts to locate the species, during more suitable weather conditions, particularly in spring, are recommended. Tissue samples and recordings of the male advertisement call (plus a small number of voucher specimens if the

species is locally abundant) are needed to confirm its specific identity, evolutionary relationships and conservation status.

Fishes and crayfish

A diversity of habitat types was sampled, including remote high altitude areas, to help better map and understand the regional fish and decapod crustacean fauna. These surveys provided a snapshot of the ecology and health of the regional Mountain Galaxias and spiny crayfish populations, with important material for future genetic and taxonomic studies obtained.

Mountain Galaxias and spiny crayfish exhibited a largely mutually exclusive distribution with Rainbow Trout, with several important isolated refuges noted for native species in small streams or above natural barriers.

Length frequency information was gathered for 224 Mountain Galaxias, ranging from 22 to 114 mm total length. Only 7 of the specimens were in reproductive condition, either as running ripe males or gravid females, mostly from higher elevation sites. Recruitment was detected at most sites, with one exception being the Blue Gum Creek site where the species co-occurs with trout in different microhabitats.

Leafhoppers, treehoppers and planthoppers

Although this group includes many species of economic significance, the community of specialists in Australia is very small and aged. For this reason, the ANIC holdings do not include a good representation of these specimens, and many tribes/genera are in great need of revision. The specimens added to the ANIC collection as a result of this Bush Blitz will hopefully foster future taxonomic studies. For example, the leafhopper *Austrolopa brunensis*, collected at Namadgi, is from a genus endemic to Australia and while only 2 species are recognised, a taxonomic revision would certainly yield multiple new species. A single previous record for this species is known for the ACT area, in the Brindabella range.

True bugs

Of particular interest were 2 specimens of Thaumastocoridae sp. – 1 collected from Namadgi and 1 from Parliament House. These very small and unusual true bugs are associated with *Eucalyptus*, *Banksia* and *Acacia*, but until very recently little was known of their biology. Although some of the 22 species known from Australia may be common, the ANIC collection has very few representatives of this group.

A subset of true bug specimens has been placed in 100% ethanol in the freezers at the WA Museum and at UNSW for long-term storage and future molecular study.

Flies

A number of significant fly specimens were collected – all from Namadgi except for the *Cardiacera* sp., which was collected from Tidbinbilla:

- *Pentachaeta pinguis*, *Trixoleria maculipennis* and *Austroleria extensa* (Heteromyzidae) are rarely collected. They occur in montane rainforests from Tasmania to Northern NSW. They indicate a well-preserved forest ecosystem.
- *Dasyomma tonnoiri* (Athericidae) larvae are predators in fast-flowing pristine montane streams. Their distribution is patchy, and this was a fortunate collection.

- *Microdon* sp. (Syrphidae) larvae are parasites or inquilines in ant nests. They are highly modified and have been accidentally described as molluscs. Adults are rarely encountered.
- *Ogcodes* sp. (Acroceridae) is another rare parasitoid fly. The larvae attack spiders.
- *Cardiacera* sp. and *Osa* sp. (Pyrgotidae) are both parasites of scarab beetles. They are rarely encountered as the adults are nocturnal but they sometimes come to light traps.
- *Fergusonina* sp. (Fergusoninidae) are restricted to Australasia, where there are likely to be thousands of species. They have symbiotic nematodes which live inside females. The female deposits both eggs and nematodes into the myrtaceous host plant, and the nematodes form a gall in which the larva lives. While easy to rear from galls, free living adults are hard to find.
- Hippoboscidae sp., commonly known as 'louse flies' or 'keds', are external parasites on birds and mammals. One of the common species is a kangaroo parasite but the species collected during the Bush Blitz is more likely a parasite of birds.
- *Boreoides* sp. (Stratiomyidae) are strange soldier flies with wingless females. Several species are in Australia, mainly in pristine montane environments.
- Chamaemyiidae sp. are parasites of various Sternorrhyncha (aphids, whiteflies, and scale insects) and are not very commonly collected in Australia.

Moths

The zygaenid *Hestiochora* sp. was collected feeding on flowers of *Epacris*. The species resembles *H. furcata* but is likely to be an undescribed species based on material in the ANIC in which a few other specimens (mainly from Tallaganda) have been sorted and separated from this species. *H. furcata* itself is known from only limited material, including a few specimens in the ACT and adjacent areas.

The life history of the limacodid *Doratifera pinguis* was previously unknown, but a freshly emerged female was collected at the light sheet. The female was enclosed in a container with several males overnight and she mated with one of them. The mated female then laid a number of fertile eggs from which the larvae hatched and were reared in captivity on leaves of *Eucalyptus*.

Jumping plant lice

A remarkable diversity of jumping plant lice was recorded. Jumping plant lice are highly host specific and host association data were also recorded. Notably, 2 species collected were from host genera previously unrecorded for the group – a species of *Acizzia* from *Banksia* and a species of *Ctenarytaina* from *Leptospermum*. Both these species will be described to establish these new putative host records.

Spiders

Despite the presence of ample microhabitats (under logs and rocks), areas deep within the reserves had unexpectedly very low incidence of long-lived burrowing mygalomorph spiders (*Atrax sutherlandi*, Idiopidae, *Paraembolides brindabella*). This presumably reflects slow recovery from the fires of 2003 but collection for pets may be further reducing the recovery.

Vascular plants and cryptogams

The vascular and cryptogam floras have been relatively well studied in most parts of ACT, including Namadgi and Tidbinbilla. However, searches of the Australian Virtual Herbarium (AVH) highlighted several areas with no or very few collections or observations. Brief visits to 2 of these under-explored remote sites (Orroral Hill and Ginnini Falls) revealed high-quality habitats with interesting species and, for cryptogams in particular, a potential for new records and species discovery. AVH records also highlighted knowledge gaps for several vascular plant species, which had not been collected nor observed in 30 years. Localisation and abundance information for 18 of these data-deficient vascular plants was collected, filling in some of the current knowledge gaps.

Many sites had been burnt 10–20 years ago. The impact on the cryptogam flora was barely noticeable, as many species had time to grow back. One consequence of these bushfires was the large number of dead trees and logs available for colonisation by cryptogams. As a result, lignicolous (wood-colonising) species, including from the lichen genera *Cyphelium* and *Chaenotheca*, were particularly abundant at several sites, including Tidbinbilla.

The diversity of habitats in terms of substrates, sun exposure, and humidity positively influences the diversity of cryptogam species. As such, the wetter part of Tidbinbilla (for example, Cascades Trail and Sanctuary Loop), although highly frequented by the public, harboured an interesting assemblage of cryptogam species, including the moss Ptychomitrium mittenii (new record for ACT) and the hornwort *Megaceros gracilis*. For cryptograms, Birrigai stood out by the presence of 5 species of *Riccia*, a small rosette-forming genus of liverworts found mostly on soils.

Appendix A: Species lists

Table A1 List of fauna species recorded

Family	Species	Common name
Mammals		
Cervidae	*Cervus unicolor* [b]	Sambar
Reptiles		
Agamidae	*Amphibolurus muricatus*	Jacky Lizard
Agamidae	*Pogona barbata*	Bearded Dragon
Agamidae	*Rankinia diemensis*	Mountain Dragon
Elapidae	*Austrelaps ramsayi*	Highland Copperhead
Scincidae	*Acritoscincus duperreyi*	Eastern Three-Lined Skink
Scincidae	*Acritoscincus platynotus*	Red-Throated Skink
Scincidae	*Anepischetosia maccoyi*	Highlands Forest-Skink
Scincidae	*Carinascincus coventryi*	Southern forest cool-skink
Scincidae	*Ctenotus taeniolatus*	Copper-Tailed Skink
Scincidae	*Egernia cunninghami*	Cunningham's Skink
Scincidae	*Egernia saxatilis*	Black Rock Skink
Scincidae	*Eulamprus tympanum*	Southern Water-Skink
Scincidae	*Hemiergis talbingoensis*	Eastern Three-toed Earless Skink
Scincidae	*Lampropholis delicata*	Dark-Flecked Garden Sunskink
Scincidae	*Lampropholis guichenoti*	Pale-Flecked Garden Sunskink
Scincidae	*Liopholis whitii*	White's Skink
Scincidae	*Pseudemoia entrecasteauxii*	Tussock Cool-Skink
Scincidae	*Pseudemoia rawlinsoni*	Glossy Grass Skink
Scincidae	*Pseudemoia spenceri*	Trunk-Climbing Cool-Skink
Scincidae	*Tiliqua nigrolutea*	Blotched Blue-Tongue
Typhlopidae	*Anilios nigrescens*	Blackish Blind Snake
Varanidae	*Varanus rosenbergi*	Heath Monitor
Frogs		
Hylidae	*Litoria lesueurii*	Lesueur's Frog
Hylidae	*Litoria peronii*	Peron's Tree Frog
Hylidae	*Litoria verreauxii*	Whistling Tree Frog
Limnodynastidae	*Limnodynastes dumerilii*	Eastern Banjo Frog
Limnodynastidae	*Limnodynastes peronii*	Striped Marsh Frog
Limnodynastidae	*Limnodynastes tasmaniensis*	Spotted Marsh Frog
Myobatrachidae	*Crinia parinsignifera*	Eastern Sign-bearing Froglet
Myobatrachidae	*Crinia signifera*	Common Eastern Froglet
Myobatrachidae	*Uperoleia laevigata*	Smooth Toadlet
Fishes		
Cobitidae	*Misgurnus anguillicaudatus* [b]	Oriental Weatherloach

Family	Species	Common name
Cyprinidae	*Cyprinus carpio* [b]	European Carp
Galaxiidae	*Galaxias olidus*	Mountain Galaxias
Percichthyidae	*Gadopsis bispinosus* [d]	Twospine Blackfish
Percichthyidae	*Macquaria australasica* [c d]	Macquarie Perch
Poeciliidae	*Gambusia holbrooki* [b]	Eastern Gambusia
Salmonidae	*Oncorhynchus mykiss* [b]	Rainbow Trout
Ants		
Formicidae	Formicidae sp.1	na
Formicidae	Formicidae sp.2	na
Formicidae	Formicidae sp.3	na
Formicidae	Formicidae sp.4	na
Formicidae	Formicidae sp.5	na
Formicidae	Formicidae sp.6	na
Formicidae	Formicidae sp.7	na
Formicidae	Formicidae sp.8	na
Bees		
Apidae	Apidae sp.1	na
Apidae	*Apis mellifera* [b]	European Honey Bee
Apidae	*Exoneura (Exoneura)* sp.1	na
Colletidae	*Euryglossa* sp.1	na
Colletidae	Hylaeinae sp.1	na
Colletidae	*Leioproctus* sp.1	na
Colletidae	*Trichocolletes* sp.1	na
Halictidae	Halictinae sp.1	na
Halictidae	*Homalictus* sp.1	na
Halictidae	*Homalictus* sp.2	na
Halictidae	*Homalictus* sp.3	na
Halictidae	*Lasioglossum (Parasphecodes)* sp.1	na
Halictidae	*Lasioglossum (Parasphecodes)* sp.2	na
Halictidae	*Lasioglossum (Parasphecodes)* sp.3	na
Halictidae	*Lasioglossum* sp.1	na
Halictidae	*Lasioglossum* sp.2	na
Halictidae	*Lasioglossum* sp.3	na
Halictidae	*Lasioglossum* sp.4	na
Halictidae	*Lasioglossum* sp.5	na
Halictidae	*Lasioglossum* sp.5	na
Halictidae	*Lasioglossum* sp.6	na
Halictidae	*Lasioglossum* sp.7	na
Halictidae	*Lipotriches* sp.1	na
Halictidae	*Lipotriches* sp.2	na
Megachilidae	*Megachile* sp.1	na

Family	Species	Common name
Megachilidae	*Megachile* sp.2	na
Megachilidae	*Megachile* sp.3	na
Megachilidae	*Megachile* sp.4	na
Wasps		
Aphelinidae	Aphelinidae sp.1	na
Bethylidae	Bethylidae sp.1	na
Braconidae	Braconidae sp.1	na
Braconidae	Braconidae sp.2	na
Braconidae	Braconidae sp.3	na
Braconidae	Braconidae sp.4	na
Braconidae	Braconidae sp.5	na
[Superfamily Ceraphronoidea]	Ceraphronoidea sp.1	na
[Superfamily Ceraphronoidea]	Ceraphronoidea sp.2	na
[Superfamily Ceraphronoidea]	Ceraphronoidea sp.3	na
[Superfamily Ceraphronoidea]	Ceraphronoidea sp.4	na
Chalcididae	Chalcididae sp.1	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.1	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.10	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.11	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.12	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.13	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.14	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.15	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.2	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.3	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.4	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.5	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.6	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.7	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.8	na
[Superfamily Chalcidoidea]	Chalcidoidea sp.9	na
Chrysididae	Chrysididae sp.1	na
Chrysididae	Chrysididae sp.2	na
Chrysididae	Chrysididae sp.3	na
Diapriidae	Diapriidae sp.1	na
Diapriidae	Diapriidae sp.2	na
Diapriidae	Diapriidae sp.3	na
Diapriidae	Diapriidae sp.4	na
Diapriidae	Diapriidae sp.5	na
Diapriidae	Diapriidae sp.6	na
Encyrtidae	Encyrtidae sp.1	na

Family	Species	Common name
Encyrtidae	Encyrtidae sp.2	na
Eupelmidae	Eupelmidae sp.1	na
Eurytomidae	Eurytomidae sp.1	na
Evaniidae	Evaniidae sp.1	na
Evaniidae	Evaniidae sp.2	na
Evaniidae	Evaniidae sp.3	na
Evaniidae	Evaniidae sp.4	na
Evaniidae	Evaniidae sp.5	na
Evaniidae	Evaniidae sp.6	na
Figitidae	Figitidae sp.1	na
Gasteruptiidae	*Gasteruption* sp.	na
Ichneumonidae	Ichneumonidae sp.1	na
Ichneumonidae	Ichneumonidae sp.2	na
Ichneumonidae	Ichneumonidae sp.3	na
Ichneumonidae	Ichneumonidae sp.4	na
Ichneumonidae	Ichneumonidae sp.5	na
Ichneumonidae	Ichneumonidae sp.6	na
Mutillidae	Mutillidae sp.1	na
Mutillidae	Mutillidae sp.2	na
Mutillidae	Mutillidae sp.3	na
Mutillidae	Mutillidae sp.4	na
Mutillidae	Mutillidae sp.5	na
Mutillidae	Mutillidae sp.6	na
Pompilidae	*Auplopus cornelia* cf.	na
Pompilidae	*Auplopus novarae* cf.	na
Pompilidae	*Ctenostegus* sp.1	na
Pompilidae	*Dolichocurgus* sp.1	na
Pompilidae	*Dolichocurgus* sp.2	na
Pompilidae	*Epipompilus collessi*	na
Pompilidae	*Epipompilus semitinctus*	na
Pompilidae	*Epipompilus* sp.	na
Pompilidae	*Epipompilus turneri*	na
Pompilidae	*Epipompilus namadgi* [a]	na
Pompilidae	Pompilidae n. sp. 1 [BB-ACT-18-ANIC-07] [a]	na
Pompilidae	Pompilidae n. sp. 2 [BB-ACT-18-ANIC-08] [a]	na
Pompilidae	Pompilidae n. sp. 3 [BB-ACT-18-ANIC-09] [a]	na
Pompilidae	*Pompilus cinereus*	na
Pompilidae	*Psoropempula tuma*	na
Pompilidae	*Sphictostethus geevestoni*	na
Scelionidae	Scelionidae sp.1	na
Scelionidae	Scelionidae sp.2	na

Family	Species	Common name
Tiphiidae	*Diamma bicolor*	na
Torymidae	Torymidae sp.1	na
Trichogrammatidae	Trichogrammatidae sp.1	na
Vespidae	Eumeninae sp. 1	na
Vespidae	*Vespula germanica* [b]	European Wasp
Sawflies		
Pergidae	Pergidae sp.1	na
Pergidae	Pergidae sp.2	na
Pergidae	Pergidae sp.3	na
Butterflies and moths		
Hesperiidae	*Pasma tasmanica*	Two-spotted Grass-skipper
Limacodidae	*Doratifera casta*	Black Slug Cup Moth
Limacodidae	*Doratifera pinguis*	Painted Cup Moth
Limacodidae	*Pseudanapaea transvestita*	na
Lycaenidae	*Paralucia aurifera*	Bright Copper
Lycaenidae	*Pseudalmenus chlorinda zephyrus*	Silky Hairstreak
Noctuidae	*Agaristodes feisthamelii*	na
Noctuidae	*Phalaenoides tristifica*	na
Nymphalidae	*Heteronympha merope merope*	Common Brown
Nymphalidae	*Vanessa itea*	Yellow Admiral
Nymphalidae	*Vanessa kershawi*	Australian Painted Lady
Pieridae	*Pieris rapae* [b]	Cabbage White
Zygaenidae	*Hestiochora* sp. *(furcata)*	na
Zygaenidae	*Pollanisus viridipulverulenta*	na
Flies		
[Higher Taxon Acalyptratae]	Acalyptratae sp.	na
Acroceridae	*Ogcodes* sp.	na
Agromyzidae	Agromyzidae sp.1	na
Athericidae	*Dasyomma tonnoiri*	na
Bibionidae	Bibionidae sp. 1	na
Bombyliidae	*Australiphthiria* sp.	na
Bombyliidae	*Geron* sp.	na
Bombyliidae	*Marmasoma sumptuosum*	na
Bombyliidae	*Thraxan* sp.	na
Cecidomyiidae	Cecidomyiidae sp.1	na
Cecidomyiidae	Cecidomyiidae sp.2	na
Cecidomyiidae	Cecidomyiidae sp.3	na
Cecidomyiidae	Cecidomyiidae sp.4	na
Cecidomyiidae	Cecidomyiidae sp.5	na
Cecidomyiidae	Cecidomyiidae sp.6	na
Ceratopogonidae	Ceratopogonidae sp.1	na

Family	Species	Common name
Chamaemyiidae	Chamaemyiidae sp.	na
Chironomidae	Chironomidae sp.1	na
Chironomidae	Chironomidae sp.2	na
Chironomidae	Chironomidae sp.3	na
Chironomidae	Chironomidae sp.4	na
Chironomidae	Chironomidae sp.5	na
Chironomidae	Chironomidae sp.6	na
Chironomidae	Chironomidae sp.7	na
Chironomidae	Chironomidae sp.8	na
Chloropidae	Chloropidae sp.1	na
Chloropidae	Chloropidae sp.2	na
Chloropidae	Chloropidae sp.3	na
Chloropidae	Chloropidae sp.4	na
Chloropidae	Chloropidae sp.5	na
Chloropidae	Chloropidae sp.6	na
Chloropidae	Chloropidae sp.7	na
Cryptochetidae	*Cryptochetum* n.sp. [BB-ACT-18-ANIC-03] [a]	na
Culicidae	Culicidae sp.1	na
Dolichopodidae	Dolichopodidae sp.1	na
Dolichopodidae	Dolichopodidae sp.2	na
Dolichopodidae	Dolichopodidae sp.3	na
Dolichopodidae	Dolichopodidae sp.4	na
Dolichopodidae	Dolichopodidae sp.5	na
Dolichopodidae	Dolichopodidae sp.6	na
Dolichopodidae	Dolichopodidae sp.7	na
Drosophilidae	Drosophilidae sp.1	na
Drosophilidae	Drosophilidae sp.2	na
Drosophilidae	Drosophilidae sp.3	na
Drosophilidae	Drosophilidae sp.4	na
Drosophilidae	Drosophilidae sp.5	na
Ephydridae	Ephydridae sp.1	na
Fergusoninidae	*Fergusonina* sp.1	na
Fergusoninidae	*Fergusonina* sp.2	na
Heteromyzidae	*Austroleria extensa*	na
Heteromyzidae	*Pentachaeta pinguis*	na
Heteromyzidae	*Trixoleria maculata*	na
Hippoboscidae	Hippoboscidae sp.	na
Hybotidae	Hybotidae sp.1	na
Lauxaniidae	Lauxaniidae sp.1	na
Milichiidae	*Paramyia* n.sp. [BB-ACT-18-ANIC-06] [a]	na
Mycetophilidae	Mycetophilidae sp.1	na

Family	Species	Common name
Mycetophilidae	Mycetophilidae sp.2	na
Mycetophilidae	Mycetophilidae sp.3	na
Phoridae	Phoridae sp.1	na
Phoridae	Phoridae sp.10	na
Phoridae	Phoridae sp.2	na
Phoridae	Phoridae sp.3	na
Phoridae	Phoridae sp.4	na
Phoridae	Phoridae sp.5	na
Phoridae	Phoridae sp.6	na
Phoridae	Phoridae sp.7	na
Phoridae	Phoridae sp.8	na
Phoridae	Phoridae sp.9	na
Platypezidae	Platypezidae sp.1	na
Platystomatidae	Platystomatidae sp.1	na
Psychodidae	Psychodidae sp.1	na
Psychodidae	Psychodidae sp.2	na
Psychodidae	Psychodidae sp.3	na
Psychodidae	Psychodidae sp.4	na
Psychodidae	Psychodidae sp.5	na
Pyrgotidae	*Cardiacera* sp.	na
Pyrgotidae	*Osa* sp.	na
Rhagionidae	*Atherimorpha* sp.	na
Sciaridae	Sciaridae sp.1	na
Sciaridae	Sciaridae sp.2	na
Sciaridae	Sciaridae sp.3	na
Sciaridae	Sciaridae sp.4	na
Sciaridae	Sciaridae sp.5	na
Sciaridae	Sciaridae sp.6	na
Sciaridae	Sciaridae sp.7	na
Sciaridae	Sciaridae sp.8	na
Sciaridae	Sciaridae sp.9	na
Sphaeroceridae	Sphaeroceridae sp.1	na
Sphaeroceridae	Sphaeroceridae sp.2	na
Sphaeroceridae	Sphaeroceridae sp.3	na
Sphaeroceridae	Sphaeroceridae sp.4	na
Stratiomyidae	*Boreoides* sp.	na
Stratiomyidae	Stratiomyidae sp. 1	na
Stratiomyidae	Stratiomyidae sp.1	na
Syrphidae	*Microdon* sp.	na
Syrphidae	Syrphidae sp.1	na
Teratomyzidae	*Auster* n.sp. [BB-ACT-18-ANIC-01] [a]	na

Family	Species	Common name
Teratomyzidae	Teratomyzidae sp.1	na
Therevidae	Therevidae sp. 1	na
Therevidae	Therevidae sp. 2	na
Beetles		
Anthribidae	Anthribidae sp.1	na
Chrysomelidae	Chrysomelidae sp.1	na
Chrysomelidae	Chrysomelidae sp.2	na
Cleridae	Cleridae sp.1	na
Cleridae	Cleridae sp.2	na
Coccinellidae	Coccinellidae sp.1	na
Coccinellidae	Coccinellidae sp.2	na
Coccinellidae	Coccinellidae sp.3	na
Coccinellidae	Coccinellidae sp.4	na
Coccinellidae	Coccinellidae sp.5	na
Coccinellidae	Coccinellidae sp.6	na
Curculionidae	Curculionidae sp.1	na
Curculionidae	Curculionidae sp.2	na
Curculionidae	Curculionidae sp.3	na
Curculionidae	Curculionidae sp.4	na
Latridiidae	Latridiidae sp.1	na
Melyridae	Melyridae sp.1	na
Mordellidae	Mordellidae sp.1	na
Scarabaeidae	Scarabaeidae sp.1	na
Staphylinidae	Staphylinidae sp.1	na
Staphylinidae	Staphylinidae sp.2	na
Tenebrionidae	Tenebrionidae sp.1	na
Planthoppers, leafhoppers, treehoppers		
Achilidae	Achilidae sp. 1	na
Achilidae	Achilidae sp. 2	na
Cicadellidae	*Austrolopa brunensis*	na
Cicadellidae	Cicadellidae sp.1	na
Cicadellidae	Cicadellidae sp.2	na
Cicadellidae	Cicadellidae sp.3	na
Cicadellidae	Cicadellidae sp.4	na
Cicadellidae	Cicadellidae sp.5	na
Cicadellidae	Cicadellidae sp.6	na
Cicadellidae	Cicadellidae sp.10	na
Cicadellidae	Cicadellidae sp.11	na
Cicadellidae	Cicadellidae sp.12	na
Cicadellidae	Cicadellidae sp.13	na
Cicadellidae	Cicadellidae sp.14	na

Family	Species	Common name
Cicadellidae	Cicadellidae sp.15	na
Cicadellidae	Cicadellidae sp.16	na
Cicadellidae	Cicadellidae sp.17	na
Cicadellidae	Cicadellidae sp.18	na
Cicadellidae	Cicadellidae sp.19	na
Cicadellidae	Cicadellidae sp.20	na
Cicadellidae	Cicadellidae sp.7	na
Cicadellidae	Cicadellidae sp.8	na
Cicadellidae	Cicadellidae sp.9	na
Derbidae	Derbidae sp.1	na
Eurybrachidae	*Platybrachys* sp.	na
Flatidae	Flatidae sp.1	na
Flatidae	Flatidae sp.2	na
Flatidae	Flatidae sp.3	na
Membracidae	*Ceraon* n.sp. [BB-ACT-18-ANIC-02] [a]	na
Membracidae	*Eufrenchia* n.sp. [BB-ACT-18-ANIC-05] [a]	na
Membracidae	*Pogonella* sp	na
Membracidae	*Sextius virescens*	na
Cicadas		
Cicadidae	*Pauropsalta* sp.	na
Aphids		
Aphididae	Aphididae sp.1	na
Scale insects		
Coccidae	Coccidae sp.1	na
Jumping plantlice		
Aphalaridae	*Anoeconeossa assimilis*	na
Aphalaridae	*Anoeconeossa* cf. *secreta*	na
Aphalaridae	*Anoeconeossa copodiformis*	na
Aphalaridae	*Anoeconeossa nigripennis*	na
Aphalaridae	*Anoeconeossa* unplaced sp. A	na
Aphalaridae	*Anoeconeossa* unplaced sp. B	na
Aphalaridae	*Blastopsylla* cf. *adnatariae*	na
Aphalaridae	*Blastopsylla* sp. 1	na
Aphalaridae	*Blastopsylla* sp. 2	na
Aphalaridae	*Blastopsylla* sp. 3	na
Aphalaridae	*Blepharocosta marmorata*	na
Aphalaridae	*Creiis* sp. 1 [a]	na
Aphalaridae	*Creiis* sp. 2 [a]	na
Aphalaridae	*Creiis* sp. 3 [a]	na
Aphalaridae	*Creiis* sp. 4 [a]	na
Aphalaridae	*Creiis* sp. 5 [a]	na

Family	Species	Common name
Aphalaridae	*Cryptoneossa vulgaris*	na
Aphalaridae	*Ctenarytaina* sp. 1	na
Aphalaridae	*Ctenarytaina* sp. 2	na
Aphalaridae	*Ctenarytaina* sp. 3 [a]	na
Aphalaridae	*Glycaspis* sp. 1	na
Aphalaridae	*Glycaspis* sp. 2	na
Aphalaridae	*Glycaspis* sp. 3	na
Aphalaridae	*Glycaspis* sp. 4	na
Aphalaridae	*Glycaspis* sp. 5	na
Aphalaridae	*Hyalinaspis* sp. 1	na
Aphalaridae	*Phellopsylla* sp. 1	na
Aphalaridae	*Platyobria lewisi*	na
Psyllidae	*Acizzia* sp. 1	na
Psyllidae	*Acizzia* sp. 2 [a]	na
Psyllidae	*Acizzia* sp. 3 [a]	na
Psyllidae	*Acizzia* sp. 4	na
Psyllidae	*Acizzia* sp. 5	na
Psyllidae	*Acizzia* sp. 6	na
Psyllidae	*Acizzia* sp. 7 [a]	na
Psyllidae	*Acizzia* sp. 8	na
Psyllidae	*Acizzia* sp. 9 [a]	na
Psyllidae	*Acizzia* sp. 10 [a]	na
Psyllidae	*Acizzia* sp. 11 [a]	na
Psyllidae	*Acizzia* sp. 12	na
Triozidae	*Schedotrioza eucalypti*	na
Triozidae	*Schedotrioza marginata*	na
Triozidae	*Schedotrioza multitudinea*	na
Triozidae	*Trioza banksiae*	na
True bugs		
Acanthosomatidae	*Amphaces* sp_BBACT18_msp_022	na
Acanthosomatidae	*Amphaces* sp_BBACT18_msp_049	na
Acanthosomatidae	*Eupolemus insularis*	na
Acanthosomatidae	*Eupolemus* sp_BBACT18_msp_045	na
Acanthosomatidae	*Eupolemus* sp_BBACT18_msp_046	na
Acanthosomatidae	*Eupolemus venustulus*	na
Acanthosomatidae	*Panaetius lobulatus*	na
Acanthosomatidae	*Stauralia* sp_BBACT18_msp_005	na
Acanthosomatidae	*Stauralia* sp_BBACT18_msp_051	na
Alydidae	*Melanacanthus* sp_BBACT18_msp_081	na
Alydidae	*Mutusca brevicornis*	na
Anthocoridae	Gn_Anthocoridae sp_BBACT18_msp_100	na

Family	Species	Common name
Artheneidae	*Dilompus* sp_BBACT18_msp_034	na
Berytidae	Gn_Berytidae sp_BBACT18_msp_032	na
Blissidae	*Iphicrates* sp_BBACT18_msp_021	na
Coreidae	*Agriopocoris* sp.	na
Coreidae	*Gelonus* sp_BBACT18_msp_076	na
Coreidae	*Gelonus tasmanicus*	na
Cryptorhamphidae	*Cryptorhamphus* sp_BBACT18_msp_073	na
Gelastocoridae	*Nerthra* sp_BBACT18_msp_083	na
Geocoridae	*Germalus* sp_BBACT18_msp_063	na
Lygaeidae	*Crompus opacus*	na
Lygaeidae	*Crompus* sp_BBACT18_msp_035	na
Lygaeidae	*Nysius* sp_BBACT18_msp_004	na
Miridae	*Austroloxops* sp_BBACT18_msp_087	na
Miridae	*Ausejanus* sp_BBACT18_msp_028	na
Miridae	*Austrocapsus* sp_BBACT18_msp_031	na
Miridae	*Austrocapsus* sp_BBACT18_msp_050	na
Miridae	*Austromiris* sp_BBACT18_msp_025	na
Miridae	*Coridromius* sp_BBACT18_msp_016	na
Miridae	Gn_Cremnorrhinina sp_BBACT18_msp_006	na
Miridae	Gn_Cremnorrhinina sp_BBACT18_msp_026	na
Miridae	Gn_Cremnorrhinina sp_BBACT18_msp_078	na
Miridae	Gn_Orthotylini sp_BBACT18_msp_012	na
Miridae	Gn_Orthotylini sp_BBACT18_msp_029	na
Miridae	Gn_Orthotylini sp_BBACT18_msp_040	na
Miridae	Gn_Orthotylini sp_BBACT18_msp_080	na
Miridae	Gn_Phylinae sp_BBACT18_msp_039	na
Miridae	Gn_Phylinae sp_BBACT18_msp_041	na
Miridae	Gn_Phylini sp_BBACT18_msp_042	na
Miridae	Gn_Phylini sp_BBACT18_msp_091	na
Miridae	*Kirkaldyella* sp_BBACT18_msp_030	na
Miridae	*Palassocoris* sp_BBACT18_msp_033	na
Miridae	*Pseudopantilius australis*	na
Miridae	*Rayieria* sp_BBACT18_msp_085	na
Miridae	*Trilaccus* sp_BBACT18_msp_043	na
Nabidae	*Nabis* sp_BBACT18_msp_070	na
Oxycarenidae	*Oxycarenus* sp_BBACT18_msp_064	na
Pachygronthidae	*Stenophyella macreta*	na
Pentatomidae	*Commius elegans*	na
Pentatomidae	*Cuspicona apothoracica*	na
Pentatomidae	*Cuspicona simplex*	na
Pentatomidae	*Cuspicona* sp_BBACT18_msp_024	na

Family	Species	Common name
Pentatomidae	*Cuspicona strenuella*	na
Pentatomidae	*Dictyotus* sp_BBACT18_msp_075	na
Pentatomidae	*Diemenia* sp_BBACT18_msp_009	na
Pentatomidae	*Diemenia* sp_BBACT18_msp_055	na
Pentatomidae	Gn_Pentatominae sp_BBACT18_msp_059	na
Pentatomidae	*Notius depressus*	na
Pentatomidae	*Ocirrhoe unimaculata*	na
Pentatomidae	*Ocirrhoe wilsoni*	na
Pentatomidae	*Omyta centrolineata siccior*	na
Pentatomidae	*Oncocoris geniculatus*	na
Pentatomidae	*Oncocoris* sp_BBACT18_msp_058	na
Pentatomidae	*Poecilometis strigatus*	na
Pentatomidae	*Sciomenida* sp_BBACT18_msp_088	na
Pentatomidae	*Tepperocoris* sp_BBACT18_msp_082	na
Pentatomidae	*Tholosanus* sp_BBACT18_msp_008	na
Piesmatidae	*Mcateella* sp_BBACT18_msp_010	na
Pyrrhocoridae	*Dindymus versicolor*	na
Pyrrhocoridae	*Dysdercus* sp_BBACT18_msp_092	na
Reduviidae	*Coranus* sp_BBACT18_msp_015	na
Reduviidae	*Dicrotelus prolixus*	na
Reduviidae	Gn_Harpactorinae sp_BBACT18_msp_084	na
Reduviidae	Gn_Harpactorniae sp_BBACT18_msp_074	na
Reduviidae	Gn_Peiratinae sp_BBACT18_msp_097	na
Reduviidae	Gn_Reduviinae sp_BBACT18_msp_099	na
Reduviidae	*Ptilocnemus* sp_BBACT18_msp_094	na
Reduviidae	*Stenolemus* sp_BBACT18_msp_007	na
Rhyparochromidae	Gn_Lethaeini sp_BBACT18_msp_067	na
Rhyparochromidae	Gn_Myodochini sp_BBACT18_msp_065	na
Thaumastocoridae	*Baclozygum* sp_BBACT18_msp_077	na
Tingidae	*Engynoma* sp_BBACT18_msp_090	na
Tingidae	*Engynoma tasmaniae*	na
Tingidae	*Malandiola semota*	na
Tingidae	*Nethersia magna*	na
Tingidae	*Physatocheila* sp_BBACT18_msp_017	na
Tingidae	*Pontanus* sp_BBACT18_msp_003	na
Tingidae	*Stephanitis rhododendri*	na
Tingidae	*Ulonemia burckhardti*	na
Tingidae	*Ulonemia* sp_BBACT18_msp_001	na
Veliidae	*Microvelia oceanica*	na
Veliidae	*Nesidovelia fluvialis*	na
Veliidae	*Nesidovelia peramoena*	na

Family	Species	Common name
Twisted-wing parasites		
[Order Strepsiptera]	Strepsiptera sp.	na
Lacewings		
Chrysopidae	Chrysopidae sp.1	na
Booklice		
[Higher taxon Psocoptera]	Psocoptera sp.1	na
[Higher taxon Psocoptera]	Psocoptera sp.2	na
[Higher taxon Psocoptera]	Psocoptera sp.3	na
Earwigs		
[Order Dermaptera]	Dermaptera sp.1	na
Grasshoppers, crickets, katydids		
Acrididae	*Caledia captiva*	Caledia
Acrididae	*Coryphistes ruricola*	Bark-mimicking Grasshopper
Acrididae	*Cryptobothrus chrysophorus*	Golden Bandwing
Acrididae	*Goniaea vocans*	Slender Gumleaf Grasshopper
Acrididae	*Perala viridis*	Spring Buzzer
Acrididae	*Phaulacridium vittatum*	Wingless Grasshopper
Acrididae	*Praxibulus insolens*	Odd Praxibulus
Gryllidae	*Velarifictorus diminuens*	Diminutive Ground Cricket
Gryllidae	*Lepidogryllus comparatus*	Slow-Chirping Field Cricket
Tettigoniidae	*Acripeza reticulata*	Mountain Katydids
Tettigoniidae	*Coptaspis* Bush Blitz ACT 1	na
Tettigoniidae	*Lanciana montana*	Montana Ground Shield-back
Tettigoniidae	*Zaprochilus australis*	Australian Twig-mimicking Katydid
Trigonidiidae	*Bobilla* Bush Blitz ACT 1	na
Trigonidiidae	*Pteronemobius* Bush Blitz ACT 1	na
Trigonidiidae	*Trigonidium gidya*	Gidya Trig
Trigonidiidae	*Bobilla kindyerra*	Pale Southern Pygmy Cricket
Trigonidiidae	*Bobilla victoriae*	Dark-eyes Southern Pygmy Cricket
Trigonidiidae	*Pteronemobius truncatus*	Confusing Pygmy Cricket
Web-spinners		
Oligotomidae	Oligotomidae sp.	na
Cockroaches		
[Order Blattodea]	Blattodea sp.1	na
Dragonflies and damselflies		
Coenagrionidae	*Ischnura aurora*	Golden Dartlet, Aurora Bluetail
Lestidae	*Austrolestes cingulatus*	Metallic Ringtail
Libellulidae	*Diplacodes bipunctata*	Wandering Percher, Red Percher Dragonfly

Family	Species	Common name
Velvet worms		
Peripatopsidae	Peripatopsidae sp.	na
Spiders		
Araneidae	*Araneus* ACTsp30	na
Araneidae	*Araneus* ACTsp35	na
Araneidae	*Araneus arenaceus*	na
Araneidae	*Araneus lodicula*	na
Araneidae	*Araneus talipedatus*?	na
Araneidae	*Gea theridioides*	na
Araneidae	*Phonognatha graeffei*	na
Araneidae	*Plebs bradleyi*	na
Atracidae	*Atrax sutherlandi*	na
Cheiracanthiidae	*Cheiracanthium gracile*	Slender Sac Spider
Clubionidae	*Clubiona* ACTsp33	na
Clubionidae	*Clubiona* ACTsp8	na
Clubionidae	*Clubiona cycladata*	na
Corinnidae	*Battalus diadens*	na
Corinnidae	*Nyssus albopunctatus*	Spotted Swift Spider
Corinnidae	*Nyssus coloripes*	Orange-legged Swift Spider
Cycloctenidae	*Cycloctenus* ACTsp11	na
Desidae	*Badumna* ACTsp39	na
Desidae	*Badumna* ACTsp5small	na
Desidae	*Badumna insignis*	Black House Spider
Desidae	Desidae gen sp nov. [a]	na
Desidae	*Paramatachia* ACTsp29	na
Dictynidae	*Arangina* ACTsp12	na
Gnaphosidae	*Anzacia* ACTsp30	na
Gnaphosidae	*Eilica* ACTsp38	na
Gnaphosidae	*Encoptarthria* ACTSmGrey4	na
Gnaphosidae	*Gnaphosidae* ACTsp15	na
Gnaphosidae	*Gnaphosidae* ACTsp32	na
Gnaphosidae	*Hemicloea rogenhoferi*	Flattened Bark Spider
Gnaphosidae	*Intruda signata*	na
Hahniidae	Hahniidae ACTsp34	na
Hersiliidae	*Tamopsis fickerti*	Fickert's Two-tailed Spider
Idiopidae	*Arbanitis* ACTsp43 [b]	na
Lamponidae	*Asadipus kunderang*	na
Lamponidae	*Lampona* ACTsp36	na
Lamponidae	*Lampona* ACTsp37	na
Lycosidae	*Artoria albopilata*	na
Lycosidae	*Artoriopsis* ACTsp32	na

Family	Species	Common name
Lycosidae	*Lycosidae* ACTsp16	na
Lycosidae	*Lycosidae* ACTsp17	na
Lycosidae	*Venatrix funesta*	na
Lycosidae	*Venatrix mckayi*	na
Lycosidae	*Venonia micarioides*	na
Miturgidae	*Argoctenus pictus*	na
Miturgidae	CycGen1 Sp25	na
Miturgidae	*Mituliodon tarantulinus*	na
Miturgidae	*Miturga* ACTsp24NKing	na
Miturgidae	*Tuxoctenus gloverae*	na
Nicodamidae	Nicodamidae ACTsp42	na
Oxyopidae	*Oxyopes* ACTsp9	na
Pholcidae	*Pholcus phalangioides* [b]	Daddy-long-legs
Pisauridae	*Dolomedes ?alexandri*	na
Prodidomidae	*Myandra bicincta*	na
Pycnothelidae	*Stanwellia* ACTsp14	na
Salticidae	*Apricia jovialis*	Jovial Jumping Spider
Salticidae	*Arasia mollicoma*	Flat-white Jumping Spider
Salticidae	*Helpis minitabunda*	Australian Bronze Jumping Spider
Salticidae	*Holoplatys* ACTsp6	na
Salticidae	*Hypoblemum griseum*	na
Salticidae	*Jotus* ACTsp2	na
Salticidae	*Opisthoncus* ACTsp3	na
Salticidae	*Salt/SmBlack* ACTsp47	na
Salticidae	*Sandalodes* ACTsp13	na
Salticidae	*Simaetha* ACTsp1	na
Segestriidae	*Ariadna* ACTsp45	na
Sparassidae	*Delena cancerides*	Flat Huntsman Spider
Sparassidae	*Neosparassus diana*	Badge Huntsman Spider
Stiphidiidae	*Stiphidion facetum*	Crinoline Spider
Tetragnathidae	*Tetragnatha* ACTsp44	na
Tetragnathidae	*Tylorida* ACTsp41	na
Theridiidae	*Achaearanea* ACTsp7	na
Theridiidae	*Theridion pyramidale*	na
Theridiidae	*Cryptachaea gigantipes*	White Porch Spider
Theridiidae	*Euryopis elegans*	na
Theridiidae	*Latrodectus hasseltii* [b]	Redback Spider
Theridiidae	*Steatoda capensis* [b]	Black Cobweb Spider
Thomisidae	*Australomisidia pilula*?	na
Thomisidae	*Sidymella* ACTsp26	na
Thomisidae	*Stephanopis altifrons*	Knobbly Crab Spider

Family	Species	Common name
Thomisidae	*Tmarus* ACTsp31	na
Toxopidae	*Toxopsoides* ACTsp27	na
Trochanteriidae	*Morebilus* ACTsp46	na
Trochanteriidae	*Trachycosmus sculptilis*	na
Uloboridae	*Philoponella congregabilis*	na
Zodariidae	*Asteron grayi*	na
Zodariidae	*Habronestes* ACT9spot	na
Zodariidae	*Habronestes grahami*	na
Zodariidae	*Neostorena* ACTsp18	na
Zodariidae	*Storosa* ACTsp40	na
Zodariidae	*Subasteron daviesae*	na
Shrimps, prawns and freshwater crayfish		
Atyidae	*Paratya australiensis*	Glass Shrimp
Palaemonidae	*Macrobrachium australiense*	River Prawn
Parastacidae	*Cherax destructor*	Yabby
Parastacidae	*Euastacus crassus*	Alpine Spiny Crayfish
Parastacidae	*Euastacus rieki*	Riek's Crayfish
Snails and slugs		
Agriolimacidae	*Deroceras reticulatum* [b]	Grey Field Slug
Arionidae	*Arion intermedius* [b]	Hedgehog Slug
Camaenidae	*Austrochloritis kosciuszkoensis*	Kosciuszko Bristle Snail
Charopidae	*Diphyoropa saturni*	Sydney Copper Pinwheel Snail
Charopidae	*Discocharopa aperta*	Miniscule White Pinwheel Snail
Charopidae	*Elsothera funerea*	Grim Reaper Pinwheel Snail
Charopidae	*Gyrocochlea notiala*	Batemans Bay Pinwheel Snail
Helicarionidae	*Helicarion mastersi*	Royal Semi-slug
Helicidae	*Cornu aspersum* [b]	European Garden Snail
Limacidae	*Lehmannia nyctelia* [b]	Striped Field Slug
Punctidae	*Iotula microcosmos*	Minuscule Pinhead Snail
Punctidae	*Paralaoma* sp.	na
Rhytididae	*Austrorhytida capillacea*	Common Southern Carnivorous Snail
Zonitidae	*Oxychilus alliarius* [b]	Garlic Snail

a Putative new species. **b** Introduced and pest species. **c** Listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth). **d** Listed as threatened under the Nature Conservation Act 2014. **na** Not available.

Table A2 List of flora species recorded

Family	Species	Common name
Vascular plants		
Adoxaceae	*Sambucus nigra* [a]	Black Elder
Amaranthaceae	*Amaranthus albus* [a]	Tumbleweed
Apiaceae	*Gingidia harveyana*	Slender Aniseed
Apocynaceae	*Vinca major* [a]	Blue Periwinkle
Araliaceae	*Hydrocotyle rivularis*	Pennywort
Aspleniaceae	*Asplenium flabellifolium*	Necklace Fern
Asteraceae	*Brachyscome obovata*	Baw Baw Daisy
Asteraceae	*Brachyscome scapigera*	Tufted Daisy
Asteraceae	*Calotis scabiosifolia* var. *integrifolia*	Rough Burr Daisy
Asteraceae	*Carduus pycnocephalus* [a]	Slender Thistle
Asteraceae	*Carduus tenuiflorus* [a]	Slender Thistle
Asteraceae	*Cassinia aculeata* subsp. *aculeata*	Dollybush
Asteraceae	*Centaurea melitensis* [a]	Maltese Cockspur
Asteraceae	*Centipeda cunninghamii*	Common Sneezeweed
Asteraceae	*Centipeda elatinoides*	Spreading Sneezeweed
Asteraceae	*Cotula australis*	Common Cotula
Asteraceae	*Craspedia variabilis*	Variable Billy Buttons
Asteraceae	*Crepis capillaris* [a]	Smooth Hawksbeard
Asteraceae	*Euchiton involucratus*	Star Cudweed
Asteraceae	*Euchiton japonicus*	Creeping Cudweed
Asteraceae	*Gamochaeta calviceps* [a]	Grey Cudweed
Asteraceae	*Leontodon saxatilis* [a]	Hairy Hawkbit
Asteraceae	*Olearia algida*	Alpine Daisybush
Asteraceae	*Olearia erubescens*	Silky Daisybush
Asteraceae	*Olearia floribunda*	Heath Daisybush
Asteraceae	*Olearia megalophylla*	Large-leaved Daisybush
Asteraceae	*Olearia phlogopappa* subsp. *continentalis*	na
Asteraceae	*Ozothamnus secundiflorus*	Cascade Everlastingbush
Asteraceae	*Ozothamnus thyrsoideus*	Hairy Mountain Daisy
Asteraceae	*Podolepis decipiens*	Bright Podolepis
Asteraceae	*Pseudognaphalium luteoalbum*	Jersey Cudweed
Asteraceae	*Senecio campylocarpus*	Bulging Fireweed
Asteraceae	*Senecio hispidulus*	Hispid Fireweed
Asteraceae	*Senecio lageniformis*	na
Asteraceae	*Senecio* sp.	na
Asteraceae	*Sonchus asper* [a]	Rough Sowthistle
Asteraceae	*Tragopogon dubius* [a]	Goat's Beard
Asteraceae	*Xanthium spinosum* [a]	Bathurst Burr

Family	Species	Common name
Asteraceae	*Xerochrysum ?bracteatum*	Golden Everlasting
Blechnaceae	*Blechnum minus*	Soft Water Fern
Blechnaceae	*Blechnum nudum*	Fishbone Water Fern
Blechnaceae	*Blechnum pennamarina* subsp. *alpina*	Alpine Water Fern
Boraginaceae	*Myosotis australis*	Australian Forget-me-not
Boraginaceae	*Myosotis discolor* [a]	Yellow and Blue Forget-me-not
Boraginaceae	*Myosotis laxa subsp. caespitosa* [a]	Water Forget-me-not
Brassicaceae	*Cardamine hirsuta* [a]	Common Bittercress
Brassicaceae	*Cardamine lilacina*	Lilac Bittercress
Brassicaceae	*Cardamine papillata*	Warty Bittercress
Campanulaceae	*Isotoma fluviatilis* subsp. *australis*	Swamp Isotome
Campanulaceae	*Lobelia pedunculata*	Matted Pratia
Campanulaceae	*Lobelia surrepens*	Mud Pratia
Caryophyllaceae	*Cerastium vulgare* [a]	Common Mouse-eared Chickweed
Caryophyllaceae	*Polycarpon tetraphyllum* [a]	Four-leaved Allseed
Caryophyllaceae	*Sagina namadgi*	Mountain Pearlwort
Caryophyllaceae	*Stellaria angustifolia* subsp. *tenella*	Swamp Starwort
Caryophyllaceae	*Stellaria multiflora* subsp. *multiflora*	Rayless Starwort
Caryophyllaceae	*Stellaria pungens*	Prickly Starwort
Celastraceae	*Stackhousia monogyna*	Creamy Candles
Cyperaceae	*Carex breviculmis*	Short-stemmed Sedge
Cyperaceae	*Carex buxbaumii* [a]	Buxbaum's Sedge
Cyperaceae	*Carex disticha* [a]	Brown Sedge
Cyperaceae	*Carex fascicularis*	Tassel Sedge
Cyperaceae	*Carex gaudichaudiana*	na
Cyperaceae	*Carex incomitata*	na
Cyperaceae	*Carex rara* subsp. *capillacea*	Yellow-leaved Sedge
Cyperaceae	*Cyperus eragrostis* [a]	Umbrella Sedge
Cyperaceae	*Gahnia subaequiglumis*	Bog Sawsedge
Cyperaceae	*Isolepis subtilissima*	Dwarf Clubsedge
Cyperaceae	*Schoenus apogon*	Fluke Bogsedge
Dennstaedtiaceae	*Hypolepis rugosula*	Ruddy Ground Fern
Dicksoniaceae	*Dicksonia antarctica*	Soft Treefern
Dryopteridaceae	*Polystichum proliferum*	Mother Shield Fern
Ericaceae	*Acrothamnus hookeri*	Mountain Beardheath
Ericaceae	*Epacris breviflora*	Drumstick Heath
Ericaceae	*Epacris celata*	na
Ericaceae	*Epacris gunnii*	na
Ericaceae	*Epacris robusta*	Round-leaved Heath
Ericaceae	*Leucopogon gelidus*	Drooping Beardheath
Euphorbiaceae	*Euphorbia dallachyana*	na

Family	Species	Common name
Euphorbiaceae	*Euphorbia peplus* [a]	Petty Spurge
Fabaceae	*Acacia alpina*	Alpine Wattle
Fabaceae	*Acacia boormanii*	Snowy River Wattle
Fabaceae	*Acacia pravissima*	Oven's Wattle
Fabaceae	*Acacia siculiformis*	Dagger Wattle
Fabaceae	*Almaleea capitata*	Slender Parrotpea
Fabaceae	*Bossiaea sericea*	Silky Bossiaea
Fabaceae	*Daviesia mimosoides*	Bitterpea
Fabaceae	*Daviesia ulicifolia* subsp. ?*ruscifolia*	Gorse Bitterpea
Fabaceae	*Glycine clandestina*	Twining Glycine
Fabaceae	*Hovea asperifolia* subsp. *asperifolia*	Hovea
Fabaceae	*Pultenaea polifolia*	Dusky Bushpea
Fabaceae	*Pultenaea procumbens*	Heathy Bushpea
Fabaceae	*Swainsona behriana*	Behr's Swainson-pea
Fabaceae	*Trifolium glomeratum* [a]	Clustered Clover
Geraniaceae	*Geranium antrorsum*	Rosetted Cranesbill
Geraniaceae	*Geranium potentilloides* var. *potentilloides*	Cinquefoil Cranesbill
Goodeniaceae	*Goodenia hederacea* subsp. *alpestris*	Ivy Goodenia
Haloragaceae	*Myriophyllum lophatum*	Water Milfoil
Hemerocallidaceae	*Dianella tasmanica*	Blue Flax Lily
Juncaceae	*Juncus brevibracteus*	na
Juncaceae	*Juncus falcatus*	Sickle-leaved Rush
Juncaceae	*Juncus sarophorus*	Broom Rush
Juncaceae	*Luzula flaccida*	Pale Woodrush
Juncaceae	*Luzula modesta*	Bog Woodrush
Juncaceae	*Luzula novae-cambriae*	Coarse Woodrush
Lamiaceae	*Ajuga australis*	Austral Bugle
Lamiaceae	*Prostanthera lasianthos*	Christmas Mintbush
Malvaceae	*Malva parviflora* [a]	Small-flowered Mallow
Myrtaceae	*Callistemon pityoides*	Alpine Bottlebrush
Myrtaceae	*Eucalyptus moorei* subsp. *moorei*	Narrow-leaved Sally
Myrtaceae	*Eucalyptus pauciflora* subsp. *debeuzevillei*	Snow Gum
Myrtaceae	*Eucalyptus pauciflora* subsp. *pauciflora*	Snow Gum
Myrtaceae	*Kunzea muelleri*	Mueller's Kunzea
Myrtaceae	*Leptospermum grandifolium*	Mountain Teatree
Myrtaceae	*Leptospermum micromyrtus*	Alpine Teatree
Onagraceae	*Epilobium billardierianum* subsp. *cinereum*	Variable Willowherb
Onagraceae	*Epilobium ciliatum* [a]	Glandular Willowherb
Ophioglossaceae	*Ophioglossum lusitanicum*	Austral Adder's Tongue
Orchidaceae	*Caladenia alpina*	Mountain Caps
Orchidaceae	*Chiloglottis valida*	Large Bird Orchid

Family	Species	Common name
Oxalidaceae	*Oxalis articulata* [a]	Shamrock Oxalis
Papaveraceae	*Argemone ochroleuca* subsp. *ochroleuca* [a]	Mexican Poppy
Papaveraceae	*Papaver somniferum* [a]	Opium Poppy
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera
Pinaceae	*Pinus sylvestris* [a]	Scots Pine
Pittosporaceae	*Billardiera macrantha*	Purple Appleberry
Plantaginaceae	*Gratiola nana*	Matted Brooklime
Plantaginaceae	*Gratiola pumilo*	Dwarf Brooklime
Plantaginaceae	*Veronica anagallis-aquatica* [a]	Blue Water Speedwell
Plantaginaceae	*Veronica calycina*	Forest Speedwell
Plantaginaceae	*Veronica derwentiana* subsp. *maideniana*	Derwent Speedwell
Poaceae	*Aira caryophyllea* [a]	Silvery Hairgrass
Poaceae	*Anthoxanthum odoratum* [a]	Sweet Vernal Grass
Poaceae	*Bromus diandrus* [a]	Great Brome
Poaceae	*Cynodon dactylon* var. *dactylon* [a]	Couch
Poaceae	*Deyeuxia breviglumis*	na
Poaceae	*Deyeuxia crassiuscula*	Thick Bentgrass
Poaceae	*Deyeuxia gunniana*	Bog Bentgrass
Poaceae	*Deyeuxia monticola*	Mountain Bentgrass
Poaceae	*Eragrostis curvula* [a]	African Lovegrass
Poaceae	*Hemarthria uncinata* var. *uncinata*	Matgrass
Poaceae	*Holcus lanatus* [a]	Yorkshire Fog
Poaceae	*Koeleria macrantha*	Crested Hairgrass
Poaceae	*Lachnagrostis filiformis*	Blowngrass
Poaceae	*Poa costiniana*	Prickly Snowgrass
Poaceae	*Poa helmsii*	Broad-leaved Snowgrass
Poaceae	*Poa phillipsiana*	Blue Snowgrass
Poaceae	*Poa sieberiana* var. *cyanophylla*	Blue-leaved Snowgrass
Poaceae	*Poa sieberiana* var. *sieberiana*	Snowgrass
Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed
Polygonaceae	*Polygonum plebeium*	Small Knotweed
Portulacaceae	*Montia australasica*	White Purslane
Proteaceae	*Grevillea lanigera*	Woolly Grevillea
Proteaceae	*Hakea microcarpa*	Small-fruited Hakea
Ranunculaceae	*Clematis aristata*	Old Man's Beard
Ranunculaceae	*Ranunculus inundatus*	River Buttercup
Ranunculaceae	*Ranunculus lappaceus*	Australian Buttercup
Ranunculaceae	*Ranunculus millanii*	Dwarf Buttercup
Ranunculaceae	*Ranunculus pimpinellifolius*	Bog Buttercup
Ranunculaceae	*Ranunculus scapiger*	Mountain Buttercup
Resedaceae	*Reseda luteola* [a]	Cut-leaved Mignonette

Family	Species	Common name
Rhamnaceae	*Discaria pubescens*	Australian Anchor Plant
Rosaceae	*Sanguisorba minor* [a]	Sheep's Burnet
Rubiaceae	*Asperula gunnii*	Mountain Woodruff
Rubiaceae	*Asperula scoparia subsp. scoparia*	Prickly Woodruff
Rubiaceae	*Galium divaricatum* [a]	Slender Bedstraw
Rubiaceae	*Galium polyanthum*	na
Rubiaceae	*Sherardia arvensis* [a]	Field Madder
Rutaceae	*Asterolasia trymalioides* subsp. *villosa*	Alpine Starbush
Rutaceae	*Phebalium squamulosum* subsp. *ozothamnoides*	Phebalium
Santalaceae	*Choretrum pauciflorum*	Dwarf Sourbush
Scrophulariaceae	*Verbascum thapsus* subsp. *thapsus* [a]	Great Mullein
Scrophulariaceae	*Verbascum virgatum* [a]	Twiggy Mullein
Solanaceae	*Solanum triflorum* [a]	Three-flowered Nightshade
Stylidiaceae	*Stylidium armeria* subsp. *armeria*	Thrift-leaved Triggerplant
Thymelaeaceae	*Pimelea biflora*	Riceflower
Thymelaeaceae	*Pimelea ligustrina* subsp. *ciliata*	Kosciuszko Rose
Thymelaeaceae	*Pimelea treyvaudii*	Grey Riceflower
Urticaceae	*Australina pusilla* subsp. *muelleri*	Smooth Nettle
Violaceae	*Melicytus angustifolius* subsp. *divaricatus*	Treeviolet
Violaceae	*Viola betonicifolia*	Showy Violet
Violaceae	*Viola hederacea*	Ivy-leaved Violet
Winteraceae	*Tasmannia xerophila* subsp. *xerophila*	Alpine Pepper
Liverworts and mosses		
Amblystegiaceae	*Sanionia uncinata*	na
Andreaeaceae	*Andreaea australis*	na
Andreaeaceae	*Andreaea subulata*	na
Aneuraceae	*Aneura alterniloba*	na
Aytoniaceae	*Reboulia hemisphaerica*	na
Bartramiaceae	*Bartramia robusta*	na
Bartramiaceae	*Breutelia affinis*	na
Bartramiaceae	*Breutelia pendula*	na
Bartramiaceae	*Breutelia pseudophilonotis*	na
Bartramiaceae	*Conostomum curvirostre*	na
Bartramiaceae	*Conostomum pusillum* var. *pusillum*	na
Bartramiaceae	*Philonotis scabrifolia*	na
Bartramiaceae	*Philonotis tenuis*	na
Brachytheciaceae	*Brachythecium rivulare*	na
Brachytheciaceae	*Rhynchostegium tenuifolium*	na
Bryaceae	*Bryum subrotundifolium*	na
Bryaceae	*Gemmabryum* sp.	na
Bryaceae	*Ochiobryum blandum*	na

Family	Species	Common name
Cephaloziellaceae	*Cephaloziella exiliflora*	na
Daltoniaceae	*Achrophyllum dentatum*	na
Daltoniaceae	*Distichophyllum pulchellum*	na
Dendrocerotaceae	*Megaceros gracilis*	na
Ditrichaceae	*Ceratodon purpureus*	na
Ditrichaceae	*Ditrichum difficile*	na
Ditrichaceae	*Ditrichum punctulatum*	na
Fabroniaceae	*Fabronia australis*	na
Fissidentaceae	*Fissidens asplenioides*	na
Fissidentaceae	*Fissidens megalotis*	na
Fossombroniaceae	*Fossombronia wattsii*	na
Frullaniaceae	*Frullania pentapleura*	na
Frullaniaceae	*Frullania probosciphora*	na
Frullaniaceae	*Frullania rostrata*	na
Gigaspermaceae	*Gigaspermum repens*	na
Grimmiaceae	*Grimmia laevigata*	na
Grimmiaceae	*Grimmia macroperichaetialis*	na
Grimmiaceae	*Grimmia pulvinata* var. *africana*	na
Grimmiaceae	*Grimmia trichophylla*	na
Grimmiaceae	*Racomitrium crispulum*	na
Grimmiaceae	*Schistidium flexifolium*	na
Hedwigiaceae	*Braunia imberbis*	na
Hedwigiaceae	*Hedwigia ciliata*	na
Hypnaceae	*Hypnum cupressiforme*	na
Hypopterygiaceae	*Hypopterygium tamarisci*	na
Lejeuneaceae	*Lejeunea drummondii*	na
Lembophyllaceae	*Fallaciella gracilis*	na
Lembophyllaceae	*Lembophyllum divulsum*	na
Lepidoziaceae	*Kurzia compacta*	na
Leptostomataceae	*Leptostomum erectum*	na
Leucobryaceae	*Campylopus introflexus*	na
Lophocoleaceae	*Chiloscyphus latifolius*	na
Lophocoleaceae	*Chiloscyphus semiteres*	na
Lophocoleaceae	*Clasmatocolea inflexispina*	na
Lophocoleaceae	*Heteroscyphus coalitus*	na
Lophocoleaceae	*Heteroscyphus fissistipus*	na
Lunulariaceae	*Lunularia cruciata*	na
Marchantiaceae	*Marchantia berteroana*	na
Meesiaceae	*Meesia triquetra*	na
Mniaceae	*Pohlia nutans*	na
Mniaceae	*Pohlia wahlenbergii*	na

Family	Species	Common name
Orthotrichaceae	*Orthotrichum rupestre* var. *rupestre*	na
Pallaviciniaceae	*Pallavicinia xiphoides*	na
Pallaviciniaceae	*Symphyogyna podophylla*	na
Polytrichaceae	*Polytrichastrum alpinum*	na
Polytrichaceae	*Polytrichum commune*	na
Polytrichaceae	*Polytrichum juniperinum*	na
Pottiaceae	*Triquetrella papillata*	na
Pottiaceae	*Weissia controversa*	na
Ptychomitriaceae	*Ptychomitrium mittenii*	na
Racopilaceae	*Racopilum cuspidigerum*	na
Rhizogoniaceae	*Pyrrhobryum mnioides*	na
Ricciaceae	*Riccia cartilaginosa*	na
Ricciaceae	*Riccia crinita*	na
Ricciaceae	*Riccia lamellosa*	na
Ricciaceae	*Riccia nigrella*	na
Ricciaceae	*Riccia sorocarpa*	na
Ricciaceae	*Riccia spongiosula*	na
Scapaniaceae	*Diplophyllum domesticum*	na
Sematophyllaceae	*Rhaphidorrhynchium amoenum* var. *amoenum*	na
Solenostomataceae	*Solenostoma orbiculatum*	na
Sphagnaceae	*Sphagnum cristatum*	na
Thuidiaceae	*Thuidiopsis furfurosa*	na
Thuidiaceae	*Thuidiopsis sparsa*	na
Lichens		
Caliciaceae	*Cyphelium trachylioides*	na
Candelariaceae	*Candelariella xanthostigmoides*	na
Chrysotrichaceae	*Chrysothrix candelaris*	na
Cladoniaceae	*Cladia aggregata*	na
Cladoniaceae	*Cladonia cervicornis* subsp. *verticillata*	na
Cladoniaceae	*Cladonia corniculata*	na
Cladoniaceae	*Cladonia* cf. *enantia*	na
Cladoniaceae	*Cladonia fimbriata*	na
Cladoniaceae	*Cladonia furcata*	na
Cladoniaceae	*Cladonia merochlorophaea*	na
Cladoniaceae	*Cladonia ochrochlora*	na
Cladoniaceae	*Cladonia* cf. *paeminosa*	na
Cladoniaceae	*Cladonia pyxidata*	na
Cladoniaceae	*Cladonia rigida*	na
Cladoniaceae	*Cladonia scabriuscula*	na
Cladoniaceae	*Heterodea muelleri*	na
Cladoniaceae	*Thysanothecium scutellatum*	na

Family	Species	Common name
Collemataceae	*Collema laeve*	na
Coniocybaceae	*Chaenotheca chrysocephala*	na
Graphidaceae	*Diploschistes scruposus*	na
Graphidaceae	*Diploschistes thunbergianus*	na
Lecanoraceae	*Lecanora* cf. *marginata*	na
Lecanoraceae	*Ramboldia* cf. *plicatula*	na
Lecanoraceae	*Ramboldia laeta*	na
Lecanoraceae	*Ramboldia stuartii*	na
Lecideaceae	*Paraporpidia leptocarpa*	na
Lecideaceae	*Lecidea ochroleuca*	na
Lobariaceae	*Pseudocyphellaria crocata*	na
Lobariaceae	*Pseudocyphellaria neglecta*	na
Megalariaceae	*Megalaria grossa*	na
Megalariaceae	*Megalaria melaloma*	na
Ochrolechiaceae	*Ochrolechia pallescens*	na
Parmeliaceae	*Austroparmelina pseudorelicina*	na
Parmeliaceae	*Flavoparmelia rutidota*	na
Parmeliaceae	*Flavoparmelia haysomii*	na
Parmeliaceae	*Hypogymnia billardierei*	na
Parmeliaceae	*Hypogymnia enteromorphoides*	na
Parmeliaceae	*Hypogymnia tubularis*	na
Parmeliaceae	*Hypogymnia turgidula*	na
Parmeliaceae	*Hypogymnia lugubris*	na
Parmeliaceae	*Hypogymnia mundata*	na
Parmeliaceae	*Hypogymnia pulverata*	na
Parmeliaceae	*Hypogymnia subphysodes* var. *subphysodes*	na
Parmeliaceae	*Hypotrachyna revoluta*	na
Parmeliaceae	*Menegazzia confusa*	na
Parmeliaceae	*Menegazzia platytrema*	na
Parmeliaceae	*Neofuscelia pulla*	na
Parmeliaceae	*Neofuscelia verrucella*	na
Parmeliaceae	*Notoparmelia signifera*	na
Parmeliaceae	*Notoparmelia tenuirima*	na
Parmeliaceae	*Parmelinopsis afrorevoluta*	na
Parmeliaceae	*Parmotrema perlatum*	na
Parmeliaceae	*Pseudephebe pubescens*	na
Parmeliaceae	*Punctelia pseudocoralloidea*	na
Parmeliaceae	*Punctelia subrudecta*	na
Parmeliaceae	*Usnea inermis*	na
Parmeliaceae	*Usnea molliuscula*	na
Parmeliaceae	*Usnea scabrida*	na

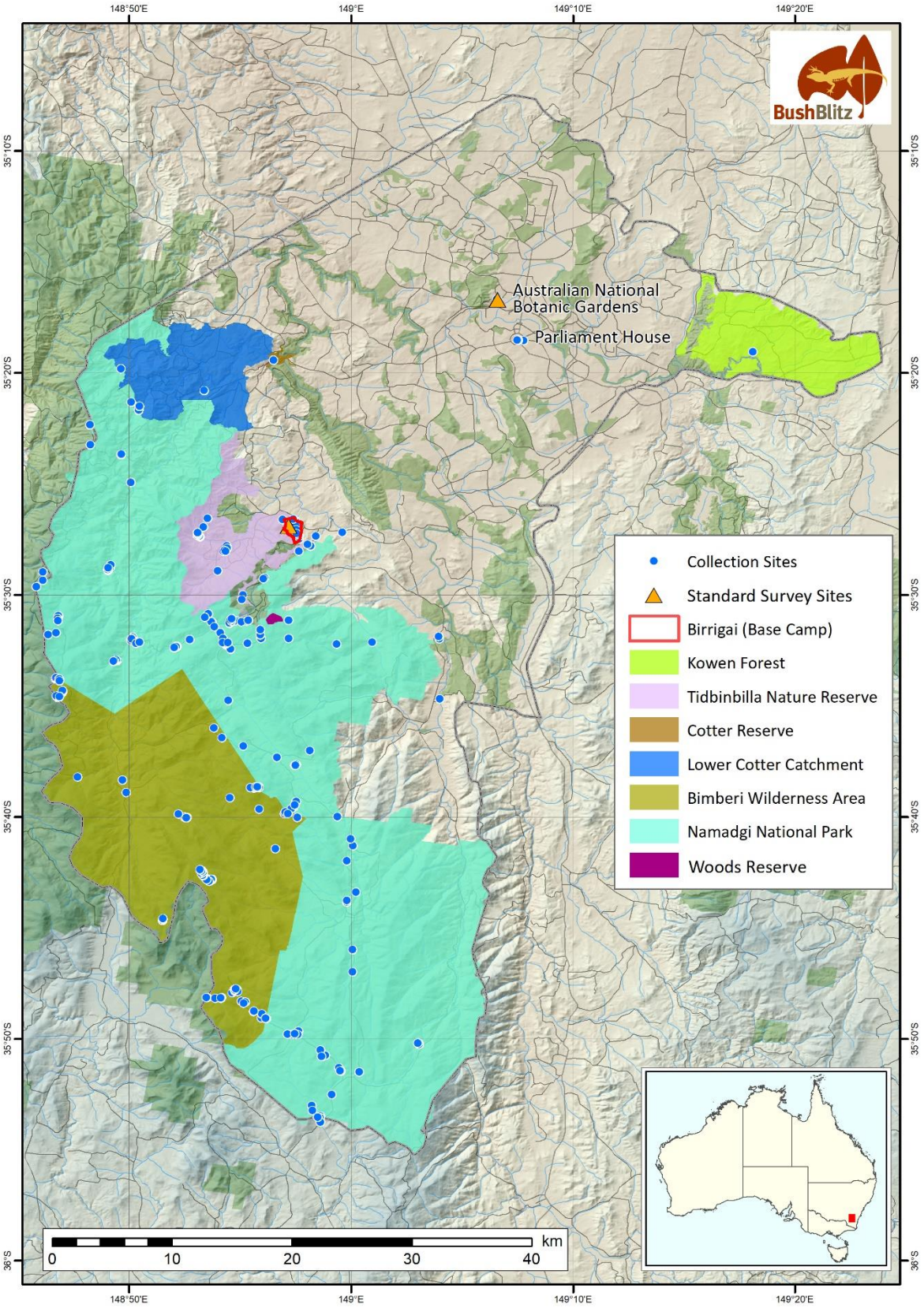
Family	Species	Common name
Parmeliaceae	*Usnea torulosa* var. *torulosa*	na
Parmeliaceae	*Usnea torulosa* var. *aurescens*	na
Parmeliaceae	*Xanthoparmelia amplexula*	na
Parmeliaceae	*Xanthoparmelia congensis*	na
Parmeliaceae	*Xanthoparmelia elixii*	na
Parmeliaceae	*Xanthoparmelia flavescentireagens*	na
Parmeliaceae	*Xanthoparmelia furcata*	na
Parmeliaceae	*Xanthoparmelia glabrans*	na
Parmeliaceae	*Xanthoparmelia hypoprotocetrarica*	na
Parmeliaceae	*Xanthoparmelia* cf. *loxodella*	na
Parmeliaceae	*Xanthoparmelia mougeotina*	na
Parmeliaceae	*Xanthoparmelia notata*	na
Parmeliaceae	*Xanthoparmelia* cf. *rubrireagens*	na
Parmeliaceae	*Xanthoparmelia* cf. *segregata*	na
Parmeliaceae	*Xanthoparmelia stygiodes*	na
Parmeliaceae	*Xanthoparmelia subnuda*	na
Parmeliaceae	*Xanthoparmelia substrigosa*	na
Parmeliaceae	*Xanthoparmelia tasmanica*	na
Parmeliaceae	*Xanthoparmelia tegeta*	na
Parmeliaceae	*Xanthoparmelia xanthomelaena*	na
Peltigeraceae	*Peltigera didactyla*	na
Peltigeraceae	*Peltigera dolichorhiza*	na
Peltigeraceae	*Peltigera polydactylon*	na
Pertusariaceae	*Pertusaria pertractata*	na
Pertusariaceae	*Pertusaria xanthoplaca*	na
Rhizocarpaceae	*Rhizocarpon badioatrum*	na
Rhizocarpaceae	*Rhizocarpon* cf. *adarense*	na
Rhizocarpaceae	*Rhizocarpon geographicum*	na
Rhizocarpaceae	*Rhizocarpon reductum*	na
Rhizocarpaceae	*Rhizocarpon vigilans*	na
Stereocaulaceae	*Stereocaulon corticatulum*	na
Stereocaulaceae	*Stereocaulon ramulosum*	na
Teloschistaceae	*Teloschistes sieberianus*	na
Teloschistaceae	*Teloschistes velifer*	na
Trapeliaceae	*Trapelia crystallifera*	na
Umbilicariaceae	*Umbilicaria cylindrica*	na
Umbilicariaceae	*Umbilicaria decussata*	na
Umbilicariaceae	*Umbilicaria nylanderiana*	na
Umbilicariaceae	*Umbilicaria polyphylla*	na
Umbilicariaceae	*Umbilicaria subglabra*	na
Umbilicariaceae	*Umbilicaria umbilicarioides*	na

Family	Species	Common name
Verrucariaceae	*Endocarpon pusillum*	na
Verrucariaceae	*Verrucaria hydrela*	na
Verrucariaceae	*Verrucaria nigrescens*	na

a Introduced and pest species. **na** Not available.

Appendix B: Collection sites

Map B1 Map of collection sites



Glossary

Term	Definition
ABRS	Australian Biological Resources Study
AM	Australian Museum
ANBG	Australian National Botanic Gardens
ANIC	Australian National Insect Collection
ANU	Australian National University
CANBR	Centre for Australian National Biodiversity Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Introduced	Not indigenous; not native to the area in which it now occurs.
Inquiline	An animal exploiting the living space of another (e.g. an insect that lays its eggs in a gall produced by another).
MAGNT	Museum and Art Gallery of the Northern Territory
Parasitoid	An insect whose larvae live as parasites which eventually kill their hosts.
Pest species	A species that has the potential to have a negative environmental, social or economic impact.
Pruinose	Covered with white powdery granules; frosted in appearance.
Putative new species	An unnamed species that, as far as can be ascertained, was identified as a new species as a direct result of this Bush Blitz.
UNSW	University of New South Wales
QM	Queensland Museum
Range extension	Increase in the known distribution or area of occurrence of a species.
RBG	Royal Botanic Gardens
Ruderal	A plant growing on waste ground or among rubbish.
Species range	The geographical area within which a particular species can be found.
Symbiotic	Involving interaction between 2 different organisms living in close physical association.
Taxon (plural taxa)	A member of any particular taxonomic group (e.g. a species, genus, family).
Taxonomy	The categorisation and naming of species. The science of identifying and naming species, as well as grouping them based on their relatedness.
Threatened	Fauna or flora that are listed under Section 178 of the EPBC Act (or equivalent State legislation) in any one of the following categories – extinct, extinct in the wild, critically endangered, endangered, vulnerable, conservation dependent.
Undescribed taxon	A taxon (usually a species) that has not yet been formally described and named.
Vascular plants	A lineage of plants that possess well-developed veins (vascular tissue) in their stems, roots and leaves. Vascular plants include the majority of familiar land plants: flowering plants, ferns, conifers, cycads and fern allies, but not mosses, liverworts or algae.
Vouchers (voucher specimens)	Any specimen, usually a dead animal or preserved plant sample, that serves as a basis of study and is retained as a reference.
WAM	Western Australian Museum

References

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