



# Wilinggin Country, Western Australia 2022: Bush Blitz expedition report



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### Contributors

Bush Blitz is coordinated by Parks Australia, which is part of the Australian Government Department of Climate Change, Energy, the Environment and Water. The program is a partnership between the Australian Government, BHP and Earthwatch Australia.

Research agencies involved in this Bush Blitz were the Western Australian Museum, the Western Australian Herbarium, the Museum and Art Gallery of the Northern Territory, the South Australian Museum, the University of Adelaide and the University of New South Wales.

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### Acknowledgements

Bush Blitz 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. We thank the Ngarinyin People, for welcoming us onto their Country and sharing their knowledge and culture, Rachel Treacy and the Wilinggin Aboriginal Corporation, for facilitating the participation of Ngarinyin People (including Wunggurr Rangers), and Operations Manager John Massingham and staff of Charnley River–Artesian Range (Australian Wildlife Conservancy) and the Department of Biodiversity, Conservation and Attractions (WA) Kimberley region, who provided advice and assistance before and during the expedition. Thanks also to the expedition team, Natalie Davey from Wangki Radio, caterer Robbie Bayliss, and pilot Sam Stuart from United Aero Helicopters.

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# Summary

From 18 to 29 July 2022, Bush Blitz led an expedition to Wilinggin Country in the south-western area of Western Australia's central Kimberley plateau region. Properties visited included Charnley River–Artesian Range, Wunaamin Conservation Park and parts of the Wilinggin Indigenous Protected Area.

Surveys and collections filled knowledge gaps, provided important material for future genetic and taxonomic studies, and extended the known ranges of species, adding some new records for Western Australia.

At least 674 species were recorded during the Bush Blitz and 31 of those may be completely new to science (11 wasps, 8 true bugs, 7 spiders, 4 pseudoscorpions and 1 land snail). Many unnamed or informal invertebrate taxa were collected. These may assist scientists to revise, compare and describe species in the future.

Although none of the species recorded are listed as threatened, several are of conservation significance, including 6 narrow range endemic fish species and 4 vascular plant species that may be threatened but are poorly known.

Six introduced or pest animal species were recorded, along with 5 introduced plant species.

Highlights of the expedition include:

- the discovery that very different reptile and frog species live on the Artesian Range compared to the rest of the study area.
- the mapping of 6 narrow range endemic fish species, including 2 notable range extensions.
- the collection of wasp specimens that will be extremely valuable to future taxonomic revisions. Some are new records for WA and many others are likely to be new to science.
- the collection of 3 butterfly species not previously represented in the WA Museum entomological collection.
- the collection of 99 true bug species, including 8 that are probably new to science, and one that is a new record for WA.
- the discovery of 4 new pseudoscorpion species, 7 new spider species, and vine thickets that contain several endemic arachnids.
- the rediscovery of the Australian endemic freshwater limpet *Stimulator consetti*, not sampled near the type locality since it was first described in 1944.
- recording 30 plants that were either new records for the region or range extensions of more than 20 km, and significantly adding to botanical collections from the region, with 520 specimen vouchers collected and lodged at the WA Herbarium.

# 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 Parks Australia, 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 to 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 1,900 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 Wilinggin Country in the Kimberley region of Western Australia. Information in this report has been extracted from the [scientific reports](#) provided by expedition members. Locational data for all flora and fauna records have been provided to land managers. Unless these data are considered sensitive, they will be publicly available through the [Atlas of Living Australia](#) (ALA).

## Wilinggin Country Bush Blitz

Bush Blitz led an expedition to Wilinggin Country from 18 to 29 July 2022, to collect and record plants and animals living in terrestrial and aquatic environments.

The expedition visited 3 adjacent properties in the south-western area of the central Kimberley plateau region. All of the properties are on Wilinggin Country, the traditional lands of the Ngarinyin people.

Western Australia's Kimberley region is one of the oldest and largest wilderness areas remaining in the world. It is a major biodiversity hotspot, and home to many species found nowhere else on Earth.



Base Camp was at [Charnley River–Artesian Range](#), a wildlife sanctuary 510 km (by road) north-east of Broome. Covering 300,059 hectares in size, the property occupies a former cattle station. Now managed by Australian Wildlife Conservancy (AWC), a small part of the property is still stocked with cattle to meet pastoral lease requirements. The remainder of the property is managed for conservation. Sitting within the biodiverse North Kimberley Bioregion, the sanctuary supports a rich variety of habitats including rainforest pockets, savannah woodlands, semi-deciduous vine-thickets, mangroves, salt flats and inland wetlands (AWC 2024).

Scientists also visited parts of the [Wilinggin Indigenous Protected Area](#) (IPA) that wrap around the western, northern and eastern boundaries of Charnley River–Artesian Range. The IPA, which covers a total of 2.4 million hectares, is managed by Wilinggin Aboriginal Corporation in partnership with AWC. The Wunggurr Rangers look after the unique natural and cultural values of Wilinggin Country, using a combination of traditional and contemporary management.

The third property visited was [Wunaamin Conservation Park](#), which is managed by WA Parks and Wildlife Service, part of the WA Department of Biodiversity, Conservation and Attractions (DBCA).

Access to most sites was by 4WD vehicles. A helicopter was used to transport participants to more isolated and remote sites. The Kimberley has a tropical monsoon climate, receiving about 90% of its rainfall between November and April. The expedition took place in the dry season and, while most scientists still found a good diversity of species, the dry conditions provided a challenge for others. For example, it was difficult to locate live land snails.

### **Previous surveys and pre-trip expectations**

While some parts of the Kimberley region have been surveyed for reptiles and frogs since the 1970s, the central and southern regions, including the area visited on this expedition, have been less well surveyed. AWC run extensive surveys, but they do not collect voucher specimens. On this expedition, vouchering was encouraged to provide a permanent record of reptiles and frogs for the area.

There has been patchy scientific sampling of freshwater fishes in the region, but only along accessible vehicle tracks. Large parts of the area have no previous fish records. The remoteness of the region, across multiple isolated catchments and a series of waterfalls, presented a high chance of recording important range extensions or discovering species new to western science. This expedition provided the opportunity to obtain valuable information on range-restricted species, engage in two-way learning with Traditional Owners and Wunggurr Rangers, and to collect genetic samples with associated vouchers for broader review of the Australian freshwater fish fauna. The findings also build on fish data and research from previous Bush Blitz expeditions across northern Australia.

Ants, bees and wasps (Hymenoptera) are critical components of all ecosystems, providing pollination, predation, decomposition and parasitoid services. The focus of Hymenoptera surveys on this expedition was wasps. Wasps are vastly understudied in Australia and the expedition location has particularly sparse information on the diversity of wasps. Given the time of year and the reported dryness of the area, with minimal flowering resources, it was expected there would be wasps present but that they would be in low numbers and that a large collecting effort would be needed to sample the fauna properly. However, with so few records publicly

available before the survey, all data would greatly enhance the amount of material available for researchers from a remote and generally inaccessible location.

Until recently, the butterfly and day-flying moth fauna of the region was not well known due to its remoteness, relative inaccessibility, and extreme climate. Butterflies are among the best-known fauna worldwide, so the rate of new species discovery is slowing down considerably, even in remote places. The expedition provided an opportunity to expand our knowledge of taxa in the Western Kimberley, hopefully to fill in some blanks in spatial and temporal distributions and maybe add some new records for Western Australia or even new species. As the expedition took place at the peak of the dry season, large numbers or high species diversity were not expected.

There are more than 2,500 species of true bugs (Heteroptera) in Australia and nearly 500 new species have been described in the past 20 years. There are likely to be many more undescribed true bugs, particular plant bugs (Miridae) and lace bugs (Tingidae), which feed on a broad range of host plants. This expedition provided a significant opportunity to collect in an area which has had limited sampling for true bugs.

The arachnid (spiders, harvestmen, scorpions, pseudoscorpions, ticks and mites) and myriapod (centipedes and millipedes) fauna of the Kimberley region remains relatively unknown due to its isolation and a lack of expertise in some taxa. The most thoroughly studied component of the terrestrial invertebrate fauna are those found in the numerous vine thickets of the region, which were collected during a series of expeditions in the late 1980s. During these surveys, spiders, harvestmen, pseudoscorpions and other arachnids were documented, but very few species have since been described from the material collected. One of the sites visited by the 1980s survey was revisited and it proved to be an interesting site for arachnids. This expedition was an opportunity to obtain new samples, search for new species, and obtain fresh samples for molecular sequencing.

Mollusc surveys had an emphasis on freshwater molluscs in gorges, gullies and streams. Land snails have been the focus of a number of mollusc-collecting expeditions over the last several decades. The lack of a comprehensive baseline for freshwater molluscs is especially relevant given a drying climate. This expedition represented an excellent opportunity to achieve a more comprehensive understanding of the total mollusc fauna, to discover new species, report on new records and infill distributional records for existing species, and to monitor for pest species.

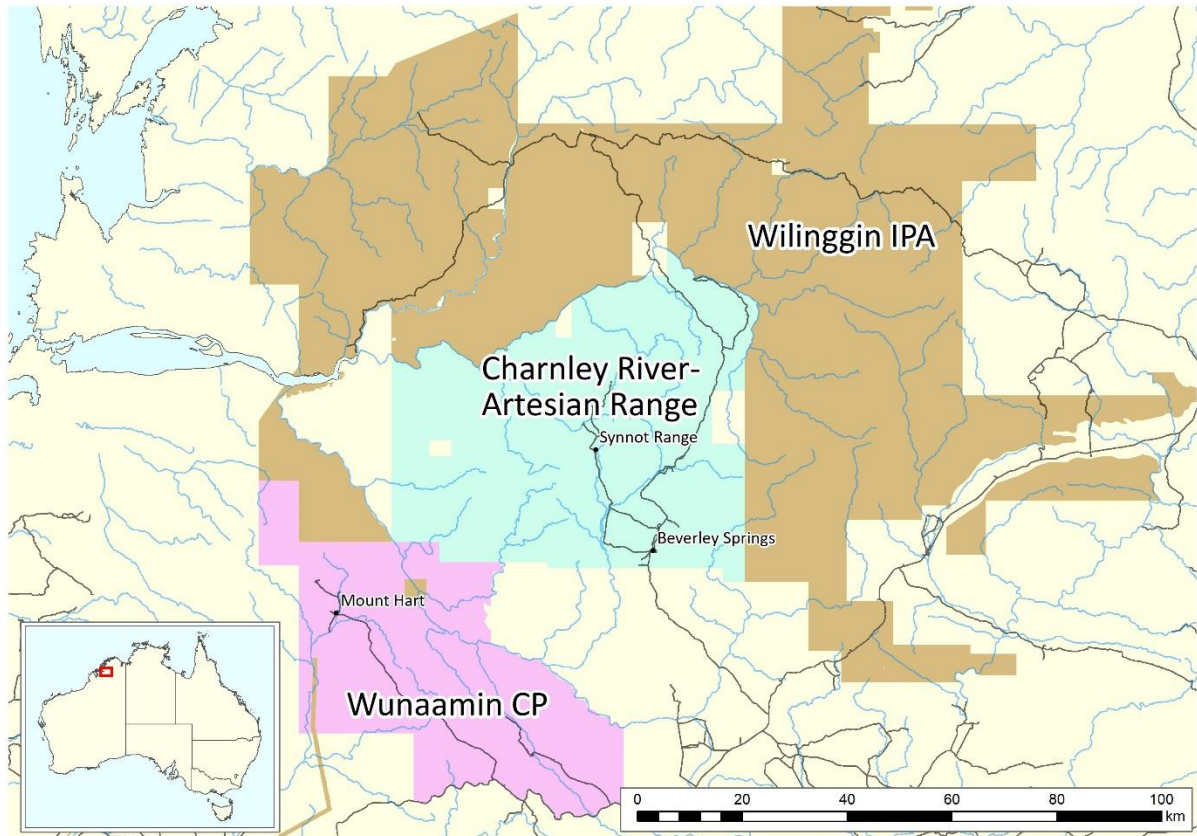
The Central and West Kimberley are considered under-surveyed for plants. The study area has been poorly and infrequently surveyed, with the most recent collections being made about 10 years ago. Of the 13 sites selected for the expedition, 4 had no previous plant collection within at least 50 km. Considering the timing of the survey, during the dry season, sites that have a moderate supply of moisture through the growing season, and permanently wet sites, were targeted.

## **Study area**

The study area included Charnley River–Artesian Range, parts of Wilinggin IPA and Wunaamin Conservation Park. Map 1 shows these 3 properties and some places in the region, including Beverley Springs, Mount Hart and Synnot Range.



**Map 1 Locations visited, 18 to 29 July 2022**



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 Helen Cross, Courtney Webber, Kate Gillespie and Ben Harvey.

### **Scientific**

The Western Australian Museum (WA Museum) and the Western Australian Herbarium (WA Herbarium) were the host institutions for this Bush Blitz, providing the core group of personnel and accessioning the specimens into their collections. Experts from the Museum and Art Gallery of the Northern Territory (MAGNT), the South Australian Museum (SA Museum), the University of Adelaide (Adelaide Uni), the University of New South Wales (UNSW), the University of WA, DBCA and AWC also took part and are included in Table 1.

### **Field assistants**

Sabrina Trocini and Scott Wilson (Earthwatch Australia) coordinated 5 teachers and 2 BHP employees who assisted scientists in the field.

[Bush Blitz TeachLive](#) is a collaborative program between the Bush Blitz partners and the Australian Science Teachers Association. Teachers from 5 Western Australian schools worked alongside scientists, reinvigorated their love for science, generated new ideas and learned new skills to take back to their schools. Teachers also taught 'live' to their classrooms via the TeachLive website and videoconferencing, taking their students on a virtual expedition and inspiring the next generation.

BHP environmental specialists worked alongside the scientific team to share knowledge and improve linkages between botanical and zoological experts and BHP.

In addition, 12 local people (including Wilinggin Traditional Owners, staff from Wilinggin Aboriginal Corporation and Wunggurr Rangers), Nicole Godfrey (Operations Officer Conservation, DBCA Broome), Hayley Ricardo (Fauna Conservation Officer, DBCA Broome), Tom Sayers (Wildlife Ecologist, AWC) and Karen Young (Wildlife Ecologist, AWC) assisted with fieldwork.

**Figure 1** Some members of the expedition team



Photograph: © Copyright, Bush Blitz.

# 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 and Amphibia	Reptiles and frogs	Paul Doughty (WA Museum) Mark Hutchinson (SA Museum) Joe Porter (AWC)
Actinopterygii	Fish	Glenn Moore (WA Museum) Michael Hammer (MAGNT)
Lepidoptera	Butterflies	Rod Eastwood (WA Museum)
Heteroptera	True bugs	Nikolai Tatarnic (WA Museum) Zoe Bloesch (UNSW)
Mollusca	Molluscs	Lisa Kirkendale (WA Museum)
Arachnida and Myriapoda	Arachnids and myriapods	Mark Harvey (WA Museum) Jeremy Wilson (University of WA)
Hymenoptera	Wasps	Erinn Fagan-Jeffries (Adelaide Uni)
Vascular flora	Vascular plants	Shelley James (WA Herbarium) Adrienne Markey (DBCA) Ben Anderson (WA Herbarium) Annika Spiridis (DBCA – Kununurra)

Other personnel, including but not limited to Gerry Cassis (UNSW), assisted with making identifications and reporting. These personnel and their roles are mentioned in the scientific reports.

Additional (non-target) taxa were recorded opportunistically. For example, day-flying moths were collected with butterflies, and decapod crustaceans were sampled with freshwater fish.

## Site selection and collection methods

All scientific teams surveyed 3 standard survey sites, selected to represent different habitat types. 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.

Following consultation with Traditional Owners, AWC staff and rangers, the standard survey sites were established in locations that were easy to access during and after the expedition. 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.

Apart from standard survey sites, site selection and collection methods were left to the discretion of the individual scientific teams, with guidance from AWC and DBCA staff. When selecting sites, they usually prioritised areas that were under-surveyed and had high potential for new or significant discoveries. They also considered the suitability of the site based on access, physical features, habitat type and condition, and the presence of flowering plants and water.

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 were identified using the holdings of museums and herbaria and available literature (references are provided in the scientific reports).

Fauna specimens were deposited at the WA Museum, with the exception of some Heteroptera specimens that were deposited in the UNSW entomology collection. Vascular plant specimens were lodged at the WA Herbarium.

# Results

## Summary of records

Preliminary results indicate that at least 674 species were recorded during the Bush Blitz, including approximately 31 putative new species – these await formal identification. Six introduced and pest animal species and 5 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
Reptilia	Reptiles	44	0	0	0
Amphibia	Frogs and toads	15	0	0	1
Actinopterygii	Fish	18	0	0	0
Hymenoptera	Ants	1	0	0	0
	Bees	6	0	0	0
	Wasps	47	11	0	0
Lepidoptera	Butterflies	36	0	0	1
	Moths	4	0	0	0
Heteroptera	True bugs	99	8	0	3
Arachnida	Harvestmen	1	0	0	0
	Pseudoscorpions	9	4	0	0
	Scorpions	3	0	0	0
	Spiders	69	7	0	1
	Ticks and mites	2	0	0	0
Myriapoda	Centipedes	4	0	0	0
Crustacea	Crustaceans	4	0	0	0
Mollusca	Freshwater bivalves	4	0	0	0
	Freshwater snails	9	0	0	0
	Land snails	15	1	0	0
Plantae	Vascular plants	283	0	0	5
	Algae	1	0	0	0
<b>Total</b>		<b>674</b>	<b>31</b>	<b>0</b>	<b>11</b>

Note: Threatened species include those listed as threatened under the Commonwealth EPBC Act or an equivalent listing under the *Biodiversity Conservation Act 2016* (WA). 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. Additionally, some molluscs were only collected as shell fragments, with key characters missing. Some groups are also '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 therefore not possible for these groups.

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 (unnamed species) as well as described species that have not yet been identified. A key component of Bush Blitz is the funding of taxonomic work on specimens collected during Bush Blitz expeditions.

Nomenclature and taxonomic concepts used in this report are consistent with the [Australian Faunal Directory](#), [World Spider Catalog](#), [Australian Plant Name Index](#), [Australian Plant Census](#) and the [Lucid Key to Australian Freshwater Molluscs](#).



# 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 31 putative new species were discovered during the expedition. Further research may reveal additional new species in the material collected. For example, 8 collections were made of undescribed plant taxa. These taxa have likely been collected before, but further taxonomic research is needed to confirm that.

## Wasps

It is highly likely that many of the wasps collected are new to science, as the area had not been surveyed extensively before. It is difficult to confirm how many are new until experts on each of the different families have access to the specimens. However, just from the small group of specimens identified to species level and DNA barcoded, 11 putative new species of parasitoid wasps have been identified. Although they have not yet been compared to type specimens, molecular data studies confirm that none are recently described species. Also, due to the remote location, and because most of these species were described from NSW and Victoria, it is highly likely they are undescribed. The new species include 4 *Dolichogenidea*, 2 *Diolcogaster*, and one each of *Apanteles*, *Coccygidium*, *Cotesia*, *Gasteruption*, and *Microplitis*.

## True bugs

At least 8 of the 99 true bug species collected during the expedition are probably new to science. The new species include a stink bug (*Birna*), assassin bugs (*Gorareduvius*, *Poecilosphodrus* and a new genus of Harpactorinae), a plant bug (*Singhalesia*), a spiny-legged bug (*Valleriola*) and 2 lace bugs that are closely related to *Nethersia*.

*Gorareduvius* SP001 is currently being described. It represents a unique lineage of assassin bugs which use sticky plant resin for prey capture and maternal care. Such behaviour has not been formally documented in the Australian fauna.

One of the most interesting true bugs collected was the new species of spiny-legged bug, shown in Figure 2. Experts are confident this is a new species because, before this expedition, *Valleriola* was known only from Queensland and the species collected on Wilinggin Country is not the same as either of the 2 described species. It belongs to the family Leptopodidae, which is rarely found in Australia. Not only are these species rare, but they are also very difficult to catch, being active and lightning-fast predators.

**Figure 2 Putative new species of spiny-legged bug *Valleriola***



Photograph: © Nikolai Tatarnic, Copyright, WA Museum

### **Pseudoscorpions**

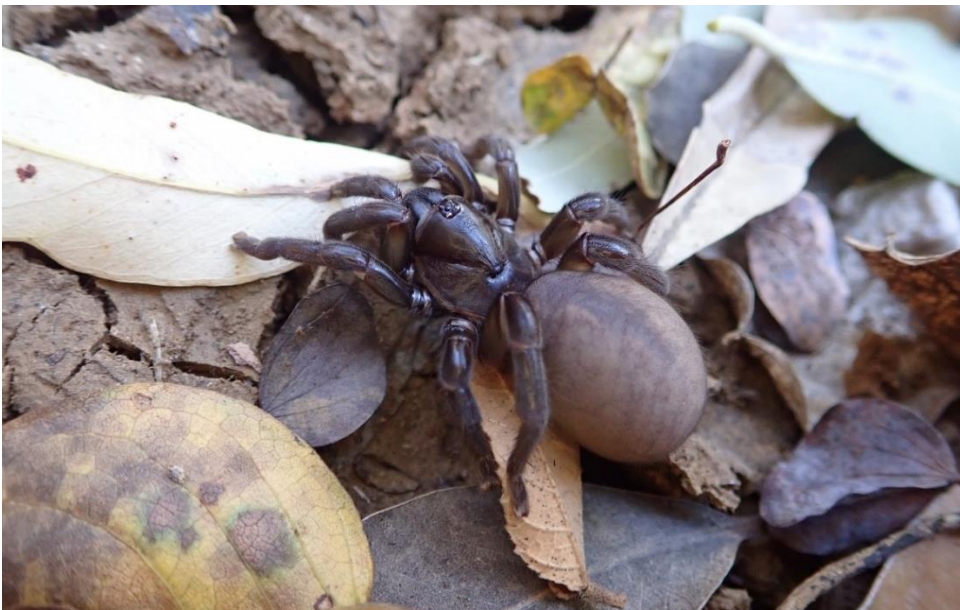
Pseudoscorpions, also known as false scorpions or book scorpions, resemble tiny scorpions.

There are thought to be 4 new pseudoscorpion species among the specimens collected. *Austrochthonius* sp. and *Indohya* 'PSE232' were found in small vine thickets in Salvodi Gorge. *Synsphyronus* sp. was collected from the bark of *Corymbia* trees at Silent Grove and *Afrosterphorus* sp. was found under *Corymbia* bark at several Charnley River–Artesian Range sites.

### **Spiders**

Around 7 new spiders were discovered during this expedition. All are mygalomorphs – a group of large spiders that include tarantulas, trapdoor spiders and funnel-web spiders. They are likely to be undescribed short-range endemic species.

**Figure 3 Putative new species of brush-footed trapdoor spider *Barychelidae* sp.**



Photographs: © Jeremy Wilson, Copyright, University of WA.

The new species include open-holed trapdoor spiders (2 *Aname* sp. and 1 *Kwonkan* sp.), a brush-footed trapdoor spider (family Barychelidae, shown in Figure 3), a curtain-web spider (*Cethegus* sp.), a cork-lid trapdoor spider (*Conothele* sp.) and a tarantula (*Selenocosmia* sp.).

## Molluscs

One land snail, from the genus *Rhagada*, could not be confidently identified as any named species. Very few records of *Rhagada* exist within the area and, given the short-range endemism of this group, the species is probably new to science.

## 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.

Although none of the species identified during the expedition are listed as threatened, several are of conservation significance. In Western Australia, species that may be threatened, but do not meet the criteria for listing because they are poorly-known, are added to priority lists under priorities 1, 2 or 3. The 3 categories are ranked in order of priority for survey and evaluation of conservation status, so that consideration can be given to their declaration as threatened. The listings mentioned in this report were taken from the April 2024 versions of the [Threatened and Priority Flora and Fauna Lists](#).

## Frogs

The Small Toadlet (*Uperoleia minima*) is listed as a Priority 3 species on the Priority Fauna List. However, this species, which used to be considered a Mitchell Plateau endemic with a tiny distribution, has been redefined to the former *U. lithomoda*, which is widespread in the Kimberley and unlikely to be threatened.

## Fish

As a remote region, without the major threats of river regulation and alien fishes, the West Kimberley has high conservation value as a stronghold for narrow range endemic species.

The Kimberley Spangled Perch (*Leiopotherapon macrolepis*), shown in Figure 4, is known only from the Prince Regent and Roe rivers and is listed as a Priority 2 species on the Priority Fauna List.

**Figure 4 Kimberley Spangled Perch**



Photographs: © Michael Hammer, Copyright, MAGNT.

Another 5 narrow range endemic fish species were recorded – Dillie Grunter (*Syncomistes dilliensis*), Tiger Grunter (*Amniataba* sp. tiger), Winton’s Grunter (*Hannia wintoni*), Bachsten Gudgeon (*Hypseleotris garawudjirri*) and Slender Carp Gudgeon (*Hypseleotris ejuncida*). Of these, 2 are on the IUCN Red List – Dillie Grunter (Vulnerable) and Slender Carp Gudgeon (Critically Endangered).

Mapping and monitoring these species, and keeping rivers free of pest fish species, are among the management recommendations made by the fish team.

### **Vascular plants**

The botanists recorded 4 plant species that are listed as Priority 3 on the Priority Flora List.

- A new population of *Hibiscus marenitensis* was found in the steep sides of a sandstone gorge, around 10 km south of a known population at Walcott Inlet. This is the most inland record of the species. With more collections in the area, it is possible to assess variation within this species and the possibility that there could be further taxa recognised within this group.
- A small population of *Solanum cataphractum*, an uncommon and distinctive bush tomato, was found on steep, rocky sandstone walls of the gorge through which the Isdell River runs within the Wilinggin IPA – shown in Figure 5. The collected material requires further detailed investigation since most previous collections are from the Kimberley islands and the leaves are slightly different. This plant appears more similar to one collected in the Artesian Range, 90 km to the east.



**Figure 5 Habit, habitat and flower (inset) of bush tomato *Solanum cataphractum***



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- *Tephrosia* aff. sp. Mistake Creek (A.C. Beaglehole 54424) has leaves with smooth upper surfaces that in typical *Tephrosia* sp. Mistake Creek are hairy. It is possible the specimen represents a morphological variant or that it is a different, undescribed, species.
- The tiny bladderwort *Utricularia muelleri* was found growing both as a floating plant and on damp peaty substrates around Lake Gilbert. This is a new record for the wetland. The species is known from 7 other locations in Western Australia, with the closest site at Brolga Swamp near Charnley River homestead.

## 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.

### Vertebrates

The Cane Toad (*Rhinella marina*) was the only introduced or pest vertebrate species recorded during the expedition (Table 3). However, teams reported that most areas surveyed were impacted either by human activity or cattle grazing and are at risk of degradation and species invasion. In their report, the botanists recommend removal of non-native animals or fencing of wetland areas, such as Lake Gilbert, that are significantly impacted by trampling and grazing.

**Table 3 Introduced and pest vertebrate species – amphibians**

Family	Species	Common name	Comments
Bufonidae	<i>Rhinella marina</i>	Cane Toad	Most habitats; relatively common; invaded the area several years prior to the expedition

## Invertebrates

Table 4 lists the introduced and pest invertebrate species that were collected or observed in the study area. None of these are currently of concern. The Tawny Coster butterfly (*Acraea terpsicore*) has recently expanded its distribution from South Asia to South-East Asia and Australia, possibly prompted by deforestation. Rutherglen Bug (*Nysius vinitor*) and Green Stink Bug (*Plautia affinis*) are native insects that are pests of crops. Tomato Mirid (*Nesidiocoris tenuis*) is a predatory bug available as a pest control agent. Tailed Daddy Longlegs (*Crossopriza lyoni*) is broadly distributed in northern Australia, usually near human dwellings and other buildings.

**Table 4 Introduced and pest invertebrate species – butterflies, true bugs and spiders**

Group	Family	Species	Common name	Comments
Butterflies	Nymphalidae	<i>Acraea terpsicore</i>	Tawny Coster	Recently arrived in Australia; recorded at several localities at Charnley River
	Lygaeidae	<i>Nysius vinitor</i>	Rutherglen Bug	Native; a pest of crops
	Miridae	<i>Nesidiocoris tenuis</i>	Tomato Mirid	Naturalised; feeds on pests
True bugs	Pentatomidae	<i>Plautia affinis</i>	Green Stink Bug	Native; a minor pest of crops
	Pholcidae	<i>Crossopriza lyoni</i>	Tailed Daddy Longlegs	Homestead, moderate abundance

## Vascular plants

In general, sites surveyed were free from introduced plants and only 5 weed species were recorded (Table 5). There were 2 sightings of Emilia (*Emilia sonchifolia* var. *sonchifolia*), which had not previously been recorded from the area, along with 4 other introduced species.

**Table 5 Non-gazetted weeds**

Family	Species	Common name	Location
Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>	Emilia	200 km range extension; Charnley River (1 plant) and Wilinggin IPA (2 plants); previously only recorded from outside managed areas
Cucurbitaceae	<i>Citrullus amarus</i>	na	Wilinggin IPA; 1 plant; a common weed
Fabaceae	<i>Albizia lebeck</i>	Indian Siris	Charnley Homestead; scattered few, would need survey to determine extent of spread into surrounding riparian vegetation; the cultivated biotype has been planted at the homestead, and the native biotype was collected at field sites
Fabaceae	<i>Stylosanthes scabra</i>	na	Charnley River, SSS2; already known from Charnley
Passifloraceae	<i>Passiflora foetida</i>	Stinking Passion Flower	Wunaamin CP, Silent Grove spring; common in riparian vegetation; a common and significant invasive weed in the Kimberley; dispersed by birds; requires ongoing management

na Not available.

## Range extensions

The known ranges of many species were extended, including several new records for Western Australia. The most notable range extensions are listed in Table 6, with the size of the range extension included under Comments, where provided.

The distribution of Kimberley fishes has recently been reviewed and mapped, helping informed assessment of range extensions. However, the distribution of invertebrates is not so well known. For example, for wasp specimens identified to family, subfamily and genus level, the records from this expedition are some of the first formal records for the area. There may be additional new state records for wasp species tentatively identified using DNA barcoding. Butterfly distributions are better known and almost all those collected were within their known range.

During the expedition, 30 plants were either new records for the region or range extensions of more than 20 km. For plants, only range extensions of more than 100 km have been listed here.

**Table 6 Range extensions**

Group	Family	Species	Comments
<b>Reptiles</b>	Agamidae	Superb Two-lined Dragon ( <i>Diporiphora superba</i> )	Artesian Range; 50–100 km
	Diplodactylidae	Fringe-toed Velvet Gecko ( <i>Oedura filicipoda</i> )	Artesian Range; 50–100 km
	Diplodactylidae	Western Giant Cave Gecko ( <i>Pseudothecadactylus cavaticus</i> )	Artesian Range; 65 km
	Pythonidae	Rough-scaled Python ( <i>Morelia carinata</i> )	Artesian Range; 52 km
<b>Fish</b>	Eleotridae	Bachsten Gudgeon ( <i>Hypseleotris garawudjirri</i> )	Upper Sale River; 10 km (200 km aquatic distance); new record for catchment
	Eleotridae	Black-banded Gudgeon ( <i>Oxyeleotris selheimi</i> )	Isdell River catchment; 100 km (400 km aquatic distance); new record for catchment
	Terapontidae	Tiger Grunter ( <i>Amniataba</i> sp.)	Isdell River, lower gorge; 20 km (50 km aquatic distance); new record for catchment
	Terapontidae	Spangled Perch ( <i>Leiopotherapon unicolor</i> )	Upper Prince Regent River waterfall; 10 km (250 km aquatic distance); new record for catchment
<b>Bees</b>	Colletidae (Hylaeinae)	<i>Hylaeus husela</i>	190 km from nearest record on ALA but it is likely there are other non-databased records
<b>Wasps</b>	Braconidae (Microgastrinae)	<i>Glyptapanteles goodwinnoakes</i>	2,052 km; described in 2022 from records in QLD and NSW, this is the first formal record for WA, and dramatically expands the distribution
	Gasteruptiidae (Gasteruptiinae)	<i>Gasteruption angusticeps</i>	~680 km; until recently, when it was collected near Darwin, the species was only known from QLD; first formal record of the species in WA
<b>Butterflies</b>	Hesperiidae	Bright-orange Darter ( <i>Telicota augias krefftii</i> )	Charnley River Cottage site; 200 km SW; breeding at the cottage site
	Lycaenidae	Fiery Jewel ( <i>Hypochrysops ignitus erythrina</i> )	Forbes Hill; 370 km ENE and 250 km S; breeding on <i>Planchonia</i> sp.
	Pieridae	Small Pearl-white ( <i>Elodina walkeri</i> )	Charnley River vine thicket; 130 km S



Group	Family	Species	Comments
<b>True bugs</b>	Coreidae	<i>Pomponatus typicus</i>	First record for WA
<b>Pseudoscorpions</b>	Chernetidae	<i>Barbaraella mainae</i>	Homestead and SSS1; 244 km; previously known from 3 localities in the Kimberley region
<b>Freshwater bivalves</b>	Cyrenidae	<i>Corbicula australis</i>	New record for Charnley River
	Hyriidae	<i>Lortiella froggatti</i>	New record for Isdell River; recorded previously from Lennard and Fitzroy rivers
<b>Vascular plants</b>	Eriocaulaceae	<i>Eriocaulon spectabile</i>	Charnley River, 200 km; southern range extension within the Kimberley
	Hydrocharitaceae	<i>Vallisneria triptera</i>	Charnley River; 150 km; southern range extension
	Lentibulariaceae	<i>Utricularia nivea</i>	Wilinggin IPA; 500 km; new record for WA
	Phrymaceae	<i>Mimulus gracilis</i>	Charnley River; 150 km; western range extension
	Poaceae	<i>Pseudopogonatherum irritans</i>	Charnley River; 130 km; southern range extension
	Poaceae	<i>Whiteochloa airoides</i>	Charnley River; 110 km infill between collections

## Other significant findings

The expedition provided an opportunity for scientists to collect other data and materials important for future research. For most of the species collected, this includes material preserved for future DNA or other tissue analysis.

### Reptiles and frogs

An especially interesting discovery was that very different reptile and frog species live on the Artesian Range compared to the rest of the study area. The Artesian Range extends the rugged sandstone escarpments of the north-west Kimberley. It is home to many of the iconic large-bodied frog and reptile species from the north-west Kimberley and was clearly different from the lowland sites elsewhere. Paul Doughty is preparing a paper about the significance of this.

### Fish

In addition to baseline information on species distribution, the fish surveys provided several ecological insights. Waterfalls appeared to have a significant two-way filtering effect, with different species richness and composition above and below these natural barriers. Other landscape features seemed important too. For example, where water flowed over basalt, rather than the usual sandstone, water was more saline and alkaline, and there was a high abundance of Greenway's Grunter (*Hannia greenwayi*).

Purplespotted gudgeons are known to be taxonomically problematic, including high rates of cryptic speciation. Several distinct lineages are known in the Kimberley Purplespotted Gudgeon (*Mogurnda oligolepis*). Genetic samples of the species taken from different river systems will contribute to future understanding of cryptic species and help with broader revision of the genus.

### Wasps

This was one of the first extensive wasp surveys of the area. Whilst most specimens have not been identified past family level, they will be extremely valuable to many researchers completing taxonomic revisions in coming years. Bycatch of other types of insects, particularly

from the Malaise traps (for example, flies and beetles) are also available for other researchers into the future.

The location known to AWC staff as Sundew Spring was particularly impressive in terms of the abundance and diversity of insect life, with many insects near the water seeps and the neighbouring flowering vegetation. It was one of the few sites with multiple different species of plant still in flower and had a very large number of bees and wasps foraging.

## Butterflies

Almost half of the 88 butterfly species known from the Kimberley were collected during the expedition. Given that some species are restricted to coastal areas, or specific habitats not present in the study area, the total of 36 adult butterfly species may be typical for the dry season at Charnley River. Species diversity was greatest at the relict rainforest site, while butterfly numbers were highest at the hilltop site.

**Figure 6 Wunggurr Ranger Logan Umbagai (right) helped Rod Eastwood (left) collect butterfly specimens**



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Some of the butterfly species collected were not previously represented in the WA Museum entomological collection – Fiery Jewel (*Hypochrysops ignitus erythrina*), Scarlet Jezebel (*Delias argenthona fragalactea*) and Northern Pencilled-blue (*Eirmocides margarita gilberti*).

## True bugs

Considering the short collection period, during the dry season, a surprising number of species, from a large number of families, were identified from the 566 specimens collected. Of particular interest are:

- *Aphylum* SP001. This stink bug is the most northerly collected species of Aphylidae, a rare and endemic family of Australian true bugs. Its identity requires additional investigation, which may shed light on the status of the family.
- *Setocoris* SP\_MONT. This bug is widespread in the Australian Monsoonal Tropics, from Queensland to the Kimberley. It steals prey from carnivorous plants and has feet adapted to avoid being caught by the host plant. This species is about to be described and the expedition provided additional records for this fascinating insect.
- nr *Nethersia* SP001 and SP002. These species are closely related to the genus *Nethersia*, which is recognised within a complex of genera and species. A PhD student at UNSW is revising this complex and will determine the generic and species boundaries of these 2 species in his thesis.

True bugs were recorded on 22 plant species and host plant association records were made for some species. The most significant host plants were Kimberley Heather (*Calytrix exstipulata*), *Pandanus* sp., Bunu Bunu (*Stemodia lythrifolia*), *Triodia* sp. and the carnivorous plants that harboured numerous specimens of *Setocoris* SP\_MONT.

## Spiders and pseudoscorpions

Of particular interest were the specialised arachnids that occurred in vine thickets or rocky gorges. This is not unexpected, due to their patchy occurrence and long-term isolation in refugia that are relatively buffered from past climatic cycles. The vine thickets contain several endemic arachnid species, including pseudoscorpions, that represent significant taxa. The arachnologists recommend that these sites are protected from fire and cattle to retain their biodiversity values.

## Molluscs

There were many significant mollusc collections, especially for freshwater species. Even if a species was already known from the general area, it might not have been collected for decades, and some may have never been collected live before. These new live records are highly important, as they indicate the species lived in the exact location where the record was found. This is a different type of record from empty shells, which may have been transported by birds or water. Live records also enable genetic studies that are not possible with dry shells.

Highlights include rediscovery of the Australian endemic freshwater limpet *Stimulator consetti*, not sampled near the type locality since it was first described in 1944. Nothing is known of its biology or life history, so samples from 3 populations will enable redescription of the species and genetic and morphological comparison with another Australian limpet in the genus *Ferrissia*.

Sampling of 2 live specimens of 2 species of northern Australian freshwater mussel *Velesunio* cf. *wilsonii* and *V. cf. angasi* was also notable. These mussels can be especially difficult to sample live as they can be cryptic and difficult to locate in freshwater river and creek systems.

Collecting leaf litter in the dry season at vine thicket sites gave insight into wet season biodiversity. Post-survey processing of leaf litter samples collected from one site revealed many tiny, live-collected land snail species, as well as juveniles of larger bodied species. Land snail biodiversity at one site totalled 13 species – an excellent outcome given the dry conditions.

## Plants

This expedition significantly added to botanical collections from the region, with 520 specimen vouchers collected and lodged at the WA Herbarium. One of the most significant collections was *Utricularia nivea* (Figure 7), a small terrestrial bladderwort which was collected at the base of a spring flowing out of the sandstone walls of a gorge through which the Isdell River passes. This is only the second collection of this carnivorous plant made in the study area.

**Figure 7** The distinctive white flowers of bladderwort *Utricularia nivea*



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# Appendix A: Species lists

**Table A1 List of fauna species recorded**

Group	Family	Species	Common name
Reptiles	Agamidae	<i>Diporiphora bennettii</i>	Kimberley Sandstone Dragon
	Agamidae	<i>Diporiphora perplexa</i>	Kimberley Rock Dragon
	Agamidae	<i>Diporiphora superba</i>	Superb Two-lined Dragon
	Agamidae	<i>Lophognathus horneri</i>	Northern Ta-ta Dragon
	Carphodactylidae	<i>Nephrurus sheai</i>	Kimberley Knob-tailed Gecko
	Chelidae	<i>Chelodina burrungandjii</i>	Sandstone Snake-necked Turtle
	Chelidae	<i>Emydura australis</i>	Northern Red-faced Turtle
	Colubridae	<i>Boiga irregularis</i>	Brown Tree Snake
	Colubridae	<i>Dendrelaphis punctulatus</i>	Green Tree Snake
	Diplodactylidae	<i>Amalosia obscura</i>	Slim Velvet Gecko
	Diplodactylidae	<i>Oedura filicipoda</i>	Fringe-toed Velvet Gecko
	Diplodactylidae	<i>Pseudothecadactylus cavaticus</i>	Western Giant Cave Gecko
	Diplodactylidae	<i>Strophurus ciliaris ciliaris</i>	Northern Spiny-tailed Gecko
	Elapidae	<i>Cryptophis pallidiceps</i>	Northern Small-eyed Snake
	Elapidae	<i>Demansia papuensis</i>	Greater Black Whipsnake
	Elapidae	<i>Pseudechis australis</i>	Mulga Snake
	Elapidae	<i>Suta punctata</i>	Little Spotted Snake
	Gekkonidae	<i>Gehyra nana</i>	Northern Spotted Rock Gecko
	Gekkonidae	<i>Gehyra occidentalis</i>	Kimberley Plateau Gehyra
	Gekkonidae	<i>Gehyra spheniscus</i>	Small Wedge-toed Gecko
	Gekkonidae	<i>Gehyra xenopus</i>	Crocodile-faced Dtella
	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko
	Gekkonidae	<i>Heteronotia planiceps</i>	Kimberley Prickly Gecko
	Pygopodiae	<i>Delma tincta</i>	Excitable Delma
	Pygopodiae	<i>Lialis burtonis</i>	Burton's Legless Gecko
	Pythonidae	<i>Antaresia childreni</i>	Children's Python
	Pythonidae	<i>Aspidites melanocephalus</i>	Black-headed Python
	Pythonidae	<i>Liasis olivaceus</i>	Olive Python
	Pythonidae	<i>Morelia carinata</i>	Rough-scaled Python
	Scincidae	<i>Carlia amax</i>	Bauxite Rainbow Skink
	Scincidae	<i>Carlia gracilis</i>	Slender Rainbow Skink
	Scincidae	<i>Carlia johnstonei</i>	Rough Rainbow Skink
	Scincidae	<i>Carlia munda</i>	Shaded-litter Rainbow Skink
	Scincidae	<i>Cryptoblepharus metallicus</i>	Metallic Snake-eyed Skink
	Scincidae	<i>Ctenotus ehmanni</i>	Brown-tailed Finesnout Ctenotus
	Scincidae	<i>Ctenotus robustus</i>	Robust Ctenotus

Group	Family	Species	Common name
	Scincidae	<i>Lerista borealis</i>	Inland Kimberley Lerista
	Scincidae	<i>Menetia greyii</i>	Common Dwarf Skink
	Scincidae	<i>Morethia ruficauda ruficauda</i>	Lined Firetail Skink
	Scincidae	<i>Notoscincus ornatus wotjulum</i>	Ornate Soil-crevice Skink
	Varanidae	<i>Varanus acanthurus</i>	Spiny-tailed Monitor
	Varanidae	<i>Varanus mertensi</i>	Mertens' Water Monitor
	Varanidae	<i>Varanus scalaris</i>	Banded Tree Monitor
	Varanidae	<i>Varanus tristus</i>	Black-headed Monitor
<b>Frogs and toads</b>	Bufonidae	<i>Rhinella marina</i> <sup>b</sup>	Cane Toad
	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	Marbled Frog
	Limnodynastidae	<i>Platyplectrum ornatum</i>	Ornate Burrowing Frog
	Myobatrachidae	<i>Crinia bilinea</i>	Bilingual Frog
	Myobatrachidae	<i>Uperoleia borealis</i>	Northern Toadlet
	Myobatrachidae	<i>Uperoleia minima</i>	Small Toadlet
	Pelodyadidae	<i>Litoria bicolor</i>	Northern Dwarf Tree Frog
	Pelodyadidae	<i>Litoria caerulea</i>	Green Tree Frog
	Pelodyadidae	<i>Litoria coplandi</i>	Common Rock Frog
	Pelodyadidae	<i>Litoria meiriana</i>	Rockhole Frog
	Pelodyadidae	<i>Litoria nasuta</i>	Striped Rocket Frog
	Pelodyadidae	<i>Litoria ridibunda</i>	Western Laughing Tree Frog
	Pelodyadidae	<i>Litoria rubella</i>	Little Red Tree Frog
	Pelodyadidae	<i>Litoria splendida</i>	Splendid Tree Frog
	Pelodyadidae	<i>Litoria watjulumensis</i>	Wotjulum Frog
<b>Fish</b>	Clupeidae	<i>Nematalosa erebi</i>	Bony Bream
	Eleotridae	<i>Hypseleotris ejuncida</i>	Slender Carp Gudgeon
	Eleotridae	<i>Hypseleotris garawudjirri</i>	Bachsten Gudgeon
	Eleotridae	<i>Mogurnda oligolepis</i>	Kimberley Purplepsotted Gudgeon
	Eleotridae	<i>Oxyeleotris selheimi</i>	Black-banded Gudgeon
	Gobiidae	<i>Glossogobius giuris</i>	Tank Goby
	Melanotaeniidae	<i>Melanotaenia australis</i>	Western Rainbowfish
	Plotosidae	<i>Neosilurus hyrtlui</i>	Hyrtl's Catfish
	Plotosidae	<i>Neosilurus pseudospinosus</i>	Falsespine Catfish
	Terapontidae	<i>Amniataba percoides</i>	Barred Grunter
	Terapontidae	<i>Amniataba</i> sp.	Tiger Grunter
	Terapontidae	<i>Hannia greenwayi</i>	Greenway's Grunter
	Terapontidae	<i>Hannia wintoni</i>	Winton's Grunter
	Terapontidae	<i>Hephaestus jenkinsi</i>	Jenkins' Grunter
	Terapontidae	<i>Leiopotherapon macrolepis</i>	Kimberley Spangled Perch
	Terapontidae	<i>Leiopotherapon unicolor</i>	Spangled Perch
	Terapontidae	<i>Syncomistes dilliensis</i>	Dillie Grunter

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Group	Family	Species	Common name
	Toxotidae	<i>Toxotes kimberleyensis</i>	Kimberley Archerfish
<b>Ants</b>	Formicidae (Formicinae)	<i>Polyrhachis_BBCR_sp01</i>	na
<b>Bees</b>	Colletidae (Euryglossinae)	<i>Euryglossula_BBCR_sp01</i>	na
	Colletidae (Hylaeinae)	<i>Hylaeus</i> ( <i>Rhodohylaeus</i> )_BBCR_sp01	na
	Colletidae (Hylaeinae)	<i>Hylaeus husela</i>	na
	Colletidae (Hylaeinae)	<i>Hylaeus_BBCR_sp01</i>	na
	Colletidae (Hylaeinae)	<i>Meroglossa_BBCR_sp01</i>	na
	Megachilidae (Megachilinae)	<i>Megachile_BBCR_sp01</i>	na
<b>Wasps</b>	Braconidae (Agathidinae)	<i>Coccygidium_BBCR_sp01</i> <sup>a</sup>	na
	Braconidae (Agathidinae)	<i>Therophilus_BBCR_sp01</i>	na
	Braconidae (Braconinae)	<i>Bracon_BBCR_sp01</i>	na
	Braconidae (Braconinae)	<i>Bracon_BBCR_sp02</i>	na
	Braconidae (Braconinae)	<i>Bracon_BBCR_sp03</i>	na
	Braconidae (Braconinae)	<i>Bracon_BBCR_sp04</i>	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp01	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp02	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp03	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp04	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp05	na
	Braconidae (Braconinae)	Braconinae_BBCR_sp06	na
	Braconidae (Braconinae)	<i>Pycnobraconoides ?mutator</i>	na
	Braconidae (Cheloninae)	<i>Chelonus ?blackburni</i>	na
	Braconidae (Cheloninae)	<i>Chelonus_BBCR_sp01</i>	na
	Braconidae (Cheloninae)	<i>Phanerotoma_BBCR_sp01</i>	na
	Braconidae (Cheloninae)	<i>Phanerotoma_BBCR_sp02</i>	na



Group	Family	Species	Common name
	Braconidae (Cheloninae)	<i>Phanerotoma</i> _BBCR_sp03	na
	Braconidae (Cheloninae)	<i>Phanerotoma</i> _BBCR_sp04	na
	Braconidae (Doryctinae)	Doryctinae_BBCR_sp01	na
	Braconidae (Doryctinae)	Doryctinae_BBCR_sp02	na
	Braconidae (Doryctinae)	Doryctinae_BBCR_sp03	na
	Braconidae (Doryctinae)	Doryctinae_BBCR_sp04	na
	Braconidae (Doryctinae)	<i>Spathius</i> _BBCR_sp01	na
	Braconidae (Euphorinae)	<i>Meteorus</i> _BBCR_sp01	na
	Braconidae (Euphorinae)	<i>Microctonus</i> _BBCR_sp01	na
	Braconidae (Gnamptodontinae)	Gnamptodontinae_BBCR_sp01	na
	Braconidae (Gnamptodontinae)	Gnamptodontinae_BBCR_sp02	na
	Braconidae (Gnamptodontinae)	Gnamptodontinae_BBCR_sp03	na
	Braconidae (Ichneutinae)	Ichneutinae_BBCR_sp01	na
	Braconidae (Microgastrinae)	<i>Apanteles</i> _BBCR_sp01 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Cotesia</i> _BBCR_sp01 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Diolcogaster</i> _BBCR_sp01 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Diolcogaster</i> _BBCR_sp02 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Dolichogenidea</i> _BBCR_sp01 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Dolichogenidea</i> _BBCR_sp02 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Dolichogenidea</i> _BBCR_sp03 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Dolichogenidea</i> _BBCR_sp04 <sup>a</sup>	na
	Braconidae (Microgastrinae)	<i>Glyptapanteles goodwinnoakes</i>	na
	Braconidae (Microgastrinae)	<i>Microplitis</i> _BBCR_sp01 <sup>a</sup>	na
	Braconidae (Opiinae)	Opiinae_BBCR_sp01	na

Group	Family	Species	Common name
	Gasteruptiidae (Gasteruptiinae)	<i>Gasteruption angusticeps</i>	na
	Gasteruptiidae (Gasteruptiinae)	<i>Gasteruption_BBCR_sp01</i> <sup>a</sup>	na
	Ichneumonidae (Cryptinae)	<i>Paraphylax</i> sp. BFS-2018 / <i>Paraphylax</i> sp. Oz423	na
	Ichneumonidae (Cremastinae)	Cremastinae_BBCR_sp01	na
	Ichneumonidae (Cryptinae)	<i>Ceratomansa_BBCR_sp01</i>	na
	Ichneumonidae (Pimplinae)	<i>Xanthopimpla_BBCR_sp01</i>	na
<b>Butterflies</b>	Hesperiidae	<i>Ocybadistes hypomeloma</i>	White-margined Grass-dart
	Hesperiidae	<i>Pelopidas lyelii lyelii</i>	Lyell's Swift
	Hesperiidae	<i>Telicota augias krefftii</i>	Bright-orange Darter
	Lycaenidae	<i>Arhopala eupolis asopus</i>	Purple Oak-blue
	Lycaenidae	<i>Catochrysops panormus platissa</i>	Pale Pea-blue
	Lycaenidae	<i>Catopyrops florinda estrella</i>	Speckled Line-blue
	Lycaenidae	<i>Eirmocides margarita gilberti</i>	Northern Pencilled-blue
	Lycaenidae	<i>Erina erina erina</i>	Small Dusky-blue
	Lycaenidae	<i>Euchrysops cnejus cnidus</i>	Spotted Pea-blue
	Lycaenidae	<i>Famegana nisa</i>	Black-spotted Grass-blue
	Lycaenidae	<i>Freyeria putli putli</i>	Jewelled Grass-blue
	Lycaenidae	<i>Hypochrysops ignitus erythrina</i>	Fiery Jewel
	Lycaenidae	<i>Jamides phaseli</i>	Purple Cerulean
	Lycaenidae	<i>Lampides boeticus</i>	Long-tailed Pea-blue
	Lycaenidae	<i>Nacaduba biocellata biocellata</i>	Two-spotted Line-blue
	Lycaenidae	<i>Theclinesthes miskini miskini</i>	Wattle Blue
	Lycaenidae	<i>Zizina otis labradus</i>	Common Grass-blue
	Nymphalidae	<i>Acraea andromacha andromacha</i>	Glasswing
	Nymphalidae	<i>Acraea terpsicore</i> <sup>b</sup>	Tawny Coster
	Nymphalidae	<i>Charaxes sempronius sempronius</i>	Tailed Emperor
	Nymphalidae	<i>Danaus petilia</i>	Lesser Wanderer
	Nymphalidae	<i>Euploea corinna</i>	Common Crow
	Nymphalidae	<i>Hypocysta adiante antirius</i>	Orange Ringlet
	Nymphalidae	<i>Hypolimnas bolina nerina</i>	Varied Eggfly
	Nymphalidae	<i>Junonia orithya albicincta</i>	Blue Argus
	Nymphalidae	<i>Junonia villida villida</i>	Meadow Argus
	Nymphalidae	<i>Ypthima arctous</i>	Dusky Knight
	Papilionidae	<i>Papilio demoleus sthenelus</i>	Chequered Swallowtail
	Pieridae	<i>Catopsilia pomona</i>	Lemon Migrant

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Group	Family	Species	Common name
	Pieridae	<i>Cepora perimale</i>	Caper Gull
	Pieridae	<i>Delias argenthona fragalactea</i>	Scarlet Jezebel
	Pieridae	<i>Elodina padusa</i>	Narrow-winged Pearl-white
	Pieridae	<i>Elodina walkeri</i>	Small Pearl-white
	Pieridae	<i>Eurema hecabe</i>	Large Grass-yellow
	Pieridae	<i>Eurema herla</i>	Macleay's Grass-yellow
	Pieridae	<i>Eurema smilax</i>	Small Grass-yellow
<b>Moths</b>	Erebidae	<i>Amata humeralis</i>	Orange Shoulder Wasp Moth
	Erebidae	<i>Argina astraea</i>	Crotalaria Podborer
	Erebidae	<i>Utetheisa lotrix</i>	Salt-and-pepper Moth
	Sphingidae	<i>Agrius convolvuli</i>	Convolvulus Hawk-moth
<b>True bugs</b>	Alydidae	<i>Leptocoris acuta</i>	na
	Alydidae	<i>Riptortus</i> SP001	na
	Aphylidae	<i>Aphylum</i> SP001	na
	Berytidae	BERY GN001 SP001	na
	Berytidae	<i>Metacanthus pertener vittatus</i>	na
	Blissidae	<i>Heinsius</i> SP001	na
	Blissidae	<i>Heinsius</i> SP002	na
	Coreidae	<i>Amorbus</i> SP001	na
	Coreidae	<i>Pomponatus typicus</i>	na
	Coreidae	AGRI GN001 SP001	na
	Coreidae	<i>Mictis profana</i>	na
	Cydnidae	Cydnidae SP001	na
	Cydnidae	Cydnidae SP002	na
	Gelastocoridae	<i>Nerthra</i> SP001	na
	Geocoridae	<i>Germalus</i> SP001	na
	Gerridae	GERR GN001 SP001	na
	Hydrometridae	<i>Hydrometra papuana</i>	na
	Leptopodidae	<i>Valleriola</i> SP001 <sup>a</sup>	na
	Lygaeidae	<i>Crompus</i> SP001	na
	Lygaeidae	<i>Graptostethus servus</i>	na
	Lygaeidae	<i>Nysius vinitor</i> <sup>b</sup>	Rutherglen Bug
	Lygaeidae	<i>Spilostethus</i> SP001	na
	Meschiidae	<i>Meschia</i> SP001	na
	Mesoveliidae	<i>Mesovelia horvathi</i>	na
	Mesoveliidae	<i>Mesovelia hungerfordi</i>	na
	Miridae	CREM GN001 SP001	na
	Miridae	<i>Eurystylus</i> SP001	na
	Miridae	nr <i>Campylomma</i> SP003	na
	Miridae	nr <i>Campylomma</i> SP004	na

Group	Family	Species	Common name
	Miridae	nr <i>Eurystylus</i> SP001	na
	Miridae	<i>Oecophyllodes</i> SP001	na
	Miridae	ORTH GN001 SP001	na
	Miridae	ORTH GN001 SP002	na
	Miridae	PHYL GN001 SP001	na
	Miridae	PHYL GN001 SP003	na
	Miridae	<i>Pseudoloxops</i> SP001	na
	Miridae	<i>Setocoris</i> SP_MONT	na
	Miridae	<i>Singhalesia</i> SP001 <sup>a</sup>	na
	Miridae	<i>Sthenaridea</i> SP001	na
	Miridae	<i>Campylomma</i> SP001	na
	Miridae	<i>Frontimiris</i> SP001	na
	Miridae	MIRI GN001 SP001	na
	Miridae	<i>Nesidiocoris tenuis</i> <sup>b</sup>	Tomato Mirid
	Miridae	nr <i>Campylomma</i> SP002	na
	Miridae	ORTH GN001 SP003	na
	Miridae	ORTH GN001 SP004	na
	Miridae	PHYL GN001 SP002	na
	Nepidae	<i>Goondnomdanepa</i> SP001	na
	Nepidae	<i>Laccotrephes</i> sp.	na
	Ochteridae	<i>Ochterus</i> SP001	na
	Oxycarenidae	<i>Oxycarenum arctatus</i>	na
	Pachygronthidae	<i>Opistostenus</i> SP001	na
	Pachygronthidae	<i>Pachygrontha</i> SP001	na
	Pachygronthidae	<i>Stenophyella macreta</i>	na
	Pentatomidae	<i>Anchises parvulus</i>	na
	Pentatomidae	<i>Antestiopsis cederwaldi</i>	na
	Pentatomidae	<i>Aspideurus flavescens</i>	na
	Pentatomidae	<i>Birna</i> SP001 <sup>a</sup>	na
	Pentatomidae	<i>Eysarcoris</i> SP001	na
	Pentatomidae	<i>Eysarcoris</i> SP002	na
	Pentatomidae	<i>Ocirrhoe</i> SP001	na
	Pentatomidae	<i>Piezodorus oceanicus</i>	na
	Pentatomidae	<i>Plautia affinis</i> <sup>b</sup>	Green Stink Bug
	Pentatomidae	<i>Poecilometis calidus</i>	na
	Pentatomidae	<i>Poecilometis nigriventris</i>	na
	Pentatomidae	<i>Cephaloplatus</i> SP001	na
	Pentatomidae	<i>Menida spectabilis</i>	na
	Pentatomidae	<i>Novatilla</i> SP001	na
	Pleidae	<i>Paraplea</i> SP001	na

Group	Family	Species	Common name
	Pyrrhocoridae	<i>Dysdercus (Paradysdercus)</i> SP001	na
	Reduviidae	<i>Gorareduvius</i> SP001 <sup>a</sup>	na
	Reduviidae	HARP GN001 SP001 <sup>a</sup>	na
	Reduviidae	<i>Havinthus</i> SP001	na
	Reduviidae	<i>Oncocephalus</i> SP001	na
	Reduviidae	Peiratinae SP001	na
	Reduviidae	<i>Ploiaria</i> SP001	na
	Reduviidae	<i>Poecilosphodrus</i> SP001 <sup>a</sup>	na
	Reduviidae	<i>Poecilosphodrus</i> SP002	na
	Rhyparochromidae	<i>Plinthisus</i> SP001	na
	Rhyparochromidae	<i>Remaudiereana</i> SP001	na
	Rhyparochromidae	RHYP GN001 SP001	na
	Rhyparochromidae	RHYP GN001 SP005	na
	Rhyparochromidae	RHYP GN001 SP006	na
	Rhyparochromidae	RHYP GN001 SP002	na
	Rhyparochromidae	RHYP GN001 SP003	na
	Rhyparochromidae	RHYP GN001 SP004	na
	Scutelleridae	<i>Choerocoris paganus</i>	Ground Shield Bug, Red Jewel Bug
	Scutelleridae	<i>Lampromicra senator</i>	na
	Stenocephalidae	<i>Dicranocephalus aroonanus</i>	na
	Tingidae	<i>Agramma</i> SP001	na
	Tingidae	<i>Malandiola</i> SP001	na
	Tingidae	<i>Nethersia</i> SP001	na
	Tingidae	nr <i>Epimixia</i> SP001	na
	Tingidae	nr <i>Nethersia</i> SP001 <sup>a</sup>	na
	Tingidae	nr <i>Nethersia</i> SP002	na
	Tingidae	nr <i>Nethersia</i> SP003 <sup>a</sup>	na
	Tingidae	<i>Ulonemia</i> SP001	na
	Tingidae	<i>Ulonemia</i> SP002	na
	Veliidae	<i>Microvelia (Picaultia)</i> SP001	na
<b>Harvestmen</b>	Assamiidae	<i>Dampetrus</i> sp. (?)	na
<b>Pseudoscorpions</b>	Chernetidae	Chernetidae New genus PSEAAF, sp. 1	na
	Chernetidae	<i>Barbaraella mainae</i>	na
	Chthoniidae	<i>Austrochthonius</i> sp. <sup>a</sup>	na
	Feaellidae	<i>Feaella</i> `PSE218`	na
	Garypidae	<i>Synsphyronus</i> sp. <sup>a</sup>	na
	Hyidae	<i>Indohya typhlops</i>	na
	Hyidae	<i>Indohya</i> `PSE232` <sup>a</sup>	na

Group	Family	Species	Common name
	Olpiidae	<i>Euryolpium</i> sp.	na
	Sternophoridae	<i>Afrosterophorus</i> sp. <sup>a</sup>	na
<b>Scorpions</b>	Buthidae	<i>Lychas</i> sp. 1	na
	Buthidae	<i>Lychas</i> sp. 2	na
	Buthidae	<i>Lychas</i> sp. 3	na
<b>Spiders</b>	Anamidae	<i>Aname</i> `MYG784` <sup>a</sup>	na
	Anamidae	<i>Aname</i> `MYG785` <sup>a</sup>	na
	Anamidae	<i>Kwonkan</i> `MYG787` <sup>a</sup>	na
	Araneidae	<i>Argiope aetherea</i>	na
	Araneidae	<i>Argiope dietrichae</i>	na
	Araneidae	<i>Argiope ocyaloides</i>	na
	Araneidae	<i>Argiope radon</i>	na
	Araneidae	<i>Cyrtophora cylindroides</i>	Cylindroid Tentweb Weaver
	Araneidae	<i>Cyrtophora hirta</i> (?)	na
	Araneidae	<i>Cyrtophora moluccensis</i> (?)	na
	Araneidae	<i>Dolophones</i> sp.	na
	Araneidae	<i>Larinia</i> sp.	na
	Araneidae	<i>Phonognatha</i> sp.	na
	Araneidae	<i>Poltys milledgei</i> (?)	na
	Araneidae	<i>Poltys</i> sp. 2	na
	Araneidae	<i>Trichonephila edulis</i>	Golden orb-weaving spider
	Barychelidae	Barychelidae sp. nov. <sup>a</sup>	na
	Cheiracanthiidae	<i>Cheiracanthium</i> sp.	na
	Clubionidae	<i>Clubiona</i> sp. 1	na
	Clubionidae	<i>Clubiona</i> sp. 2	na
	Corinnidae	<i>Nyssus albopunctatus</i> (?)	na
	Deinopidae	<i>Asianopsis</i> sp.	na
	Desidae	<i>Phryganoporus</i> sp.	na
	Dictynidae	Dictynidae sp.	na
	Euagridae	<i>Cethegus</i> sp. <sup>a</sup>	na
	Gnaphosidae	Gnaphosidae sp.	na
	Halonoproctidae	<i>Conothele</i> sp. <sup>a</sup>	na
	Hersiliidae	<i>Hersilia</i> sp.	na
	Hersiliidae	<i>Tamopsis</i> sp.	na
	Lycosidae	<i>Hogna crispipes</i>	na
	Miturgidae	Miturgidae sp.	na
	Oonopidae	<i>Opopaea</i> sp.	na
	Oxyopidae	<i>Oxyopes</i> sp.	na
	Pholcidae	<i>Crossopriza lyoni</i> <sup>b</sup>	Tailed Daddy Longlegs
	Pholcidae	<i>Pholcitrichocyclus arabana</i>	na

Group	Family	Species	Common name
	Pisauridae	<i>Dendrolycosa</i> sp.	na
	Pisauridae	Pisauridae sp.	na
	Prodidomidae	<i>Prodidomus beattyi</i>	na
	Salticidae	<i>Cytaea</i> sp. (?)	na
	Salticidae	<i>Holoplatys</i> cf. <i>planissima</i>	na
	Salticidae	<i>Lycidas</i> sp. (?)	na
	Salticidae	<i>Megaloastia mainae</i>	na
	Salticidae	<i>Mopsus mormon</i>	na
	Salticidae	<i>Myrmarachne</i> sp.	na
	Salticidae	<i>Tara</i> sp. (?)	na
	Salticidae	<i>Zebraplatys</i> sp. (?)	na
	Salticidae	<i>Zebraplatys</i> sp. 1	na
	Salticidae	<i>Zenodorus metallescens</i>	na
	Salticidae	<i>Zenodorus orbiculatus</i> (?)	na
	Selenopidae	<i>Karaops</i> sp.	na
	Sparassidae	<i>Heteropoda renibulbis</i>	na
	Sparassidae	<i>Neosparassus</i> Charnley sp. 1	na
	Sparassidae	<i>Neosparassus</i> Charnley sp. 2	na
	Sparassidae	<i>Neosparassus</i> Charnley sp. 3	na
	Sparassidae	<i>Pediana longbottomi</i> (?)	na
	Tetrablemmidae	<i>Tetrablemma</i> sp.	na
	Tetragnathidae	<i>Tetragnatha</i> sp. 1	na
	Tetragnathidae	<i>Tetragnatha</i> sp. 2	na
	Theraphosidae	<i>Selenocosmia</i> sp. <sup>a</sup>	na
	Theridiidae	<i>Ariamnes</i> sp.	na
	Theridiidae	<i>Emertonella</i> sp.	na
	Thomisidae	<i>Amyciaea</i> sp.	na
	Thomisidae	<i>Porropis</i> sp. (?)	na
	Thomisidae	<i>Stephanopis</i> sp.	na
	Trochanteriidae	<i>Hemicloea</i> sp.	na
	Uloboridae	<i>Philoponella</i> sp.	na
	Uloboridae	<i>Uloborus</i> sp.	na
	Zodariidae	<i>Euasteron</i> sp.	na
	Zodariidae	<i>Neostorena</i> sp.	na
<b>Ticks and mites</b>	Ixodidae	<i>Amblyomma</i> sp.	na
	Limnocharidae	<i>Limnochares</i> sp.	na
<b>Centipedes</b>	Mecistocephalidae	<i>Mecistocephalus</i> sp. 1	na
	Mecistocephalidae	<i>Mecistocephalus</i> sp. 2	na
	Scolopendrida	<i>Scolopendra morsitans</i>	na
	Scutigerae	<i>Thereuopoda</i> sp.	na



Group	Family	Species	Common name
<b>Crustaceans</b>	Atyidae	<i>Caridina</i> spp.	na
	Gecarcinucidae	<i>Austrothelphusa transversa</i>	Freshwater Crab
	Palaemonidae	<i>Macrobrachium bullatum</i>	Northwest Australian River Prawn
	Palaemonidae	<i>Macrobrachium spinipes</i>	Cherabin, Giant River Prawn
<b>Freshwater bivalves</b>	Cyrenidae	<i>Corbicula</i> cf. <i>australis</i>	na
	Hyriidae	<i>Lortiella froggatti</i>	na
	Hyriidae	<i>Velesunio</i> cf. <i>angasi</i>	na
	Hyriidae	<i>Velesunio</i> cf. <i>wilsonii</i>	na
<b>Freshwater snails</b>	Lymnaeidae	<i>Bullastra vinosa</i>	na
	Planorbidae	<i>Bayardella johni</i>	na
	Planorbidae	<i>Bayardella</i> sp.	na
	Planorbidae	<i>Ferrissia petterdi</i>	na
	Planorbidae	<i>Glyptophysa novaehollandica</i>	na
	Planorbidae	<i>Gyraulus</i> sp.	na
	Planorbidae	<i>Stimulator consetti</i>	na
	Thiaridae	<i>Thiara australis</i>	na
	Viviparidae	<i>Notopala ampullaroides</i>	na
<b>Land snails</b>	Achatinidae	<i>Erelopeas interioris</i>	Outback Awlsnail
	Camaenidae	<i>Amplirhagada</i> cf. <i>carinata</i>	na
	Camaenidae	cf. <i>Globorhagada</i> sp.	na
	Camaenidae	cf. <i>Rhagada</i> sp. <sup>a</sup>	na
	Camaenidae	cf. <i>Setobaudinia</i> sp.	na
	Chronidae	<i>Kaliella microconus</i>	Keeled Beehive Snail
	Gastrocoptidae	<i>Gastrocopta</i> cf. <i>macdonnelli</i>	na
	Gastrocoptidae	<i>Gastrocopta</i> cf. <i>pediculus</i>	na
	Gastrocoptidae	<i>Gastrocopta</i> sp.	na
	Gastrocoptidae	<i>Pumilicopta kessneri</i>	Kessner's Pupasnail
	Helicarionidae	<i>Westracystis lissus</i>	na
	Helicinidae	<i>Pleuropoma walkeri</i>	na
	Helicodiscidae	<i>Stenopylis coarctata</i>	White Microdisc Snail
	Pupillidae	<i>Pupoides pacificus</i>	na
	Valloniidae	<i>Pupisoma</i> sp.	na

**a** Putative new species. **b** Introduced and/or pest species. **na** Not available.

**Table A2 List of flora species recorded**

Group	Family	Species	Common name
Vascular plants	Acanthaceae	<i>Dicliptera armata</i>	na
	Acanthaceae	<i>Nelsonia campestris</i>	na
	Alismataceae	<i>Albidella oligococca</i>	na
	Amaranthaceae	<i>Ptilotus corymbosus</i>	na
	Anacardiaceae	<i>Buchanania oblongifolia</i>	na
	Anacardiaceae	<i>Buchanania obovata</i>	Wild Mango
	Apocynaceae	<i>Gymnanthera oblonga</i>	na
	Apocynaceae	<i>Tabernaemontana orientalis</i>	na
	Araliaceae	<i>Trachymene dendrothrix</i>	na
	Asparagaceae	<i>Lomandra tropica</i>	na
	Asparagaceae	<i>Thysanotus chinensis</i>	na
	Asteraceae	<i>Blumea diffusa</i>	na
	Asteraceae	<i>Blumea integrifolia</i>	na
	Asteraceae	<i>Blumea psammophila</i>	na
	Asteraceae	<i>Blumea tenella</i>	na
	Asteraceae	<i>Centipeda borealis</i>	na
	Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i> <sup>b</sup>	Emilia
	Asteraceae	<i>Olearia arguta</i>	na
	Asteraceae	<i>Pluchea rubelliflora</i>	na
	Asteraceae	<i>Pterocaulon paradoxum</i>	na
	Asteraceae	<i>Pterocaulon sphacelatum</i>	Apple Bush
	Asteraceae	<i>Pterocaulon tricholobum</i>	na
	Asteraceae	<i>Pterocaulon verbascifolium</i>	na
	Bixaceae	<i>Cochlospermum fraseri</i>	Kapok Bush
	Boraginaceae	<i>Euploca</i> aff. <i>leptalea</i>	na
	Boraginaceae	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	Camel Bush
	Burseraceae	<i>Canarium australianum</i> var. <i>velutinum</i>	Jalkay
	Campanulaceae	<i>Lobelia douglasiana</i>	na
	Campanulaceae	<i>Wahlenbergia queenslandica</i>	na
	Cannabaceae	<i>Celtis strychnoides</i>	na
	Cannabaceae	<i>Trema tomentosa</i> var. <i>aspera</i>	Peach Leaf Poison Bush
	Capparaceae	<i>Capparis jacobsii</i>	na
	Celastraceae	<i>Stackhousia intermedia</i>	na
	Centrolepidaceae	<i>Centrolepis exserta</i>	na
	Cleomaceae	<i>Arivela viscosa</i>	na
	Combretaceae	<i>Terminalia bursarina</i>	Bendee
	Combretaceae	<i>Terminalia hadleyana</i>	na
	Convolvulaceae	<i>Ipomoea eriocarpa</i>	na

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Group	Family	Species	Common name
	Convolvulaceae	<i>Xenostegia tridentata</i>	na
	Cucurbitaceae	<i>Citrullus amarus</i> <sup>b</sup>	na
	Cupressaceae	<i>Callitris columellaris</i>	White Cypress Pine
	Cyperaceae	<i>Cyperus</i> aff. <i>sexflorus</i>	na
	Cyperaceae	<i>Cyperus cunninghamii</i> subsp. <i>uniflorus</i>	na
	Cyperaceae	<i>Cyperus microcephalus</i> subsp. <i>saxicola</i>	na
	Cyperaceae	<i>Eleocharis rivalis</i>	na
	Cyperaceae	<i>Eleocharis sundaica</i>	na
	Cyperaceae	<i>Fimbristylis cephalophora</i>	na
	Cyperaceae	<i>Fimbristylis cinnamometorum</i>	na
	Cyperaceae	<i>Fimbristylis microcarya</i>	na
	Cyperaceae	<i>Fimbristylis pauciflora</i>	na
	Cyperaceae	<i>Fimbristylis rhyticarya</i>	na
	Cyperaceae	<i>Fimbristylis tetragona</i>	na
	Cyperaceae	<i>Fuirena ciliaris</i>	na
	Cyperaceae	<i>Fuirena</i> sp.	na
	Cyperaceae	<i>Fuirena umbellata</i>	na
	Dilleniaceae	<i>Hibbertia oblongata</i> subsp. <i>brevifolia</i>	na
	Droseraceae	<i>Drosera aurantiaca</i>	na
	Droseraceae	<i>Drosera burmanni</i>	Tropical Sundew
	Droseraceae	<i>Drosera</i> cf. <i>dilatatopetiolaris</i>	na
	Droseraceae	<i>Drosera fragrans</i>	na
	Droseraceae	<i>Drosera hartmeyerorum</i>	na
	Droseraceae	<i>Drosera serpens</i>	na
	Elatinaceae	<i>Bergia pedicellaris</i>	na
	Eriocaulaceae	<i>Eriocaulon cinereum</i>	na
	Eriocaulaceae	<i>Eriocaulon concretum</i>	na
	Eriocaulaceae	<i>Eriocaulon setaceum</i>	na
	Eriocaulaceae	<i>Eriocaulon spectabile</i>	na
	Eriocaulaceae	<i>Eriocaulon tortuosum</i>	na
	Euphorbiaceae	<i>Euphorbia armstrongiana</i> var. <i>distans</i>	na
	Euphorbiaceae	<i>Homalanthus novo-guineensis</i>	na
	Euphorbiaceae	<i>Microstachys chamaelea</i>	na
	Fabaceae	<i>Abrus precatorius</i> subsp. <i>precatorius</i>	na
	Fabaceae	<i>Acacia delibrata</i>	na
	Fabaceae	<i>Acacia holosericea</i>	Candelabra Wattle
	Fabaceae	<i>Acacia neurocarpa</i>	na
	Fabaceae	<i>Acacia nuperrima</i>	na
	Fabaceae	<i>Acacia platycarpa</i>	Pindan Wattle
	Fabaceae	<i>Acacia plectocarpa</i> subsp. <i>plectocarpa</i>	na

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Group	Family	Species	Common name
	Fabaceae	<i>Acacia sericata</i>	na
	Fabaceae	<i>Acacia stellaticeps</i>	na
	Fabaceae	<i>Acacia translucens</i>	Poverty Bush
	Fabaceae	<i>Acacia tumida</i>	na
	Fabaceae	<i>Acacia tumida</i> var. <i>tumida</i>	Pindan Wattle
	Fabaceae	<i>Acacia gardneri</i>	na
	Fabaceae	<i>Aeschynomene indica</i>	Budda Pea
	Fabaceae	<i>Albizia lebbbeck</i> <sup>b</sup>	Indian Siris
	Fabaceae	<i>Albizia procera</i>	na
	Fabaceae	<i>Bossiaea bossiaeooides</i>	Bossiaea
	Fabaceae	<i>Crotalaria alata</i>	na
	Fabaceae	<i>Crotalaria montana</i>	na
	Fabaceae	<i>Crotalaria novae-hollandiae</i> subsp. <i>crassipes</i>	New Holland Rattlepod
	Fabaceae	<i>Crotalaria ramosissima</i>	na
	Fabaceae	<i>Cullen badocanum</i>	na
	Fabaceae	<i>Daviesia reclinata</i>	na
	Fabaceae	<i>Erythrophleum chlorostachys</i>	Ironwood
	Fabaceae	<i>Jacksonia forrestii</i>	na
	Fabaceae	<i>Lysiphyllum cunninghamii</i>	Bauhinia
	Fabaceae	<i>Sesbania formosa</i>	White Dragon Tree
	Fabaceae	<i>Stylosanthes scabra</i> <sup>b</sup>	na
	Fabaceae	<i>Tephrosia</i> aff. sp. Mistake Creek (A.C. Beaglehole 54424)	na
	Fabaceae	<i>Tephrosia oblongata</i>	na
	Fabaceae	<i>Tephrosia rosea</i>	Flinders River Poison
	Fabaceae	<i>Tephrosia</i> sp. E Kimberley Flora (C.A. Gardner 9937)	na
	Fabaceae	<i>Vachellia pachyphloia</i> subsp. <i>pachyphloia</i>	na
	Fabaceae	<i>Vachellia suberosa</i>	Corkybark Wattle
	Gentianaceae	<i>Canscora diffusa</i>	na
	Goodeniaceae	<i>Goodenia</i> aff. <i>heppleana</i>	na
	Goodeniaceae	<i>Goodenia bicolor</i>	na
	Goodeniaceae	<i>Goodenia heppleana</i>	na
	Goodeniaceae	<i>Goodenia lamprosperma</i>	na
	Goodeniaceae	<i>Goodenia sepalosa</i> var. <i>sepalosa</i>	na
	Haloragaceae	<i>Gonocarpus chinensis</i> subsp. <i>chinensis</i>	na
	Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>longifolia</i>	Blue Flax-lily
	Hemerocallidaceae	<i>Tricoryne</i> sp. Kimberley (K.F.Kenneally 4857)	na
	Hydrocharitaceae	<i>Blyxa aubertii</i>	na
	Hydrocharitaceae	<i>Blyxa octandra</i>	na

Group	Family	Species	Common name
	Hydrocharitaceae	<i>Vallisneria spirata</i>	na
	Lamiaceae	<i>Anisomeles farinacea</i>	na
	Lamiaceae	<i>Clerodendrum floribundum</i> var. <i>coriaceum</i>	na
	Lamiaceae	<i>Clerodendrum floribundum</i> var. <i>ovatum</i>	na
	Lamiaceae	<i>Clerodendrum tomentosum</i> var. <i>tomentosum</i>	na
	Lamiaceae	<i>Coleus scutellarioides</i>	na
	Lamiaceae	<i>Pogostemon stellatus</i>	na
	Lamiaceae	<i>Premna acuminata</i>	Ngalinginkal
	Lauraceae	<i>Cassytha capillaris</i>	na
	Lauraceae	<i>Cassytha filiformis</i>	Love Vine
	Lecythidaceae	<i>Planchonia careya</i>	Mangaloo
	Lentibulariaceae	<i>Utricularia chrysantha</i>	Sun Bladderwort
	Lentibulariaceae	<i>Utricularia muelleri</i>	na
	Lentibulariaceae	<i>Utricularia nivea</i>	na
	Lentibulariaceae	<i>Utricularia lasiocaulis</i>	na
	Linderniaceae	<i>Lindernia tectanthera</i>	na
	Loganiaceae	<i>Mitrasacme galbina</i>	na
	Loganiaceae	<i>Mitrasacme nummularia</i>	na
	Loganiaceae	<i>Strychnos lucida</i>	Strychnine Bush
	Loranthaceae	<i>Lysiana spathulata</i> subsp. <i>spathulata</i>	na
	Lygodiaceae	<i>Lygodium microphyllum</i>	Climbing Maidenhair
	Lythraceae	<i>Rotala occultiflora</i>	na
	Malvaceae	<i>Adansonia gregorii</i>	Boab
	Malvaceae	<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
	Malvaceae	<i>Brachychiton viscidulus</i>	na
	Malvaceae	<i>Decaschistia occidentalis</i>	na
	Malvaceae	<i>Grewia breviflora</i>	na
	Malvaceae	<i>Grewia savannicola</i>	na
	Malvaceae	<i>Helicteres</i> cf. <i>rhynchoarpa</i>	na
	Malvaceae	<i>Helicteres rhynchoarpa</i>	na
	Malvaceae	<i>Hibiscus austrinus</i> var. <i>austrinus</i>	na
	Malvaceae	<i>Hibiscus geranioides</i>	na
	Malvaceae	<i>Hibiscus marenitensis</i>	na
	Malvaceae	<i>Hibiscus meraukensis</i>	Merauke Hibiscus
	Malvaceae	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	na
	Malvaceae	<i>Triumfetta albida</i>	na
	Malvaceae	<i>Triumfetta aquila</i>	na
	Malvaceae	<i>Triumfetta reflexa</i>	na
	Malvaceae	<i>Triumfetta ryeae</i>	na
	Malvaceae	<i>Triumfetta</i> sp.	na

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Group	Family	Species	Common name
	Malvaceae	<i>Triumfetta triandra</i>	na
	Malvaceae	<i>Waltheria indica</i>	na
	Melastomataceae	<i>Melastoma affine</i>	na
	Melastomataceae	<i>Osbeckia australiana</i>	na
	Meliaceae	<i>Owenia vernicosa</i>	Emu Apple
	Menyanthaceae	<i>Nymphoides aurantiaca</i>	Marshwort
	Menyanthaceae	<i>Nymphoides indica</i>	na
	Menyanthaceae	<i>Nymphoides minima</i>	na
	Menyanthaceae	<i>Nymphoides quadriloba</i>	na
	Montiaceae	<i>Calandrinia uniflora</i>	na
	Moraceae	<i>Ficus aculeata</i> var. <i>indecora</i>	Ranji
	Moraceae	<i>Ficus atricha</i>	na
	Moraceae	<i>Ficus congesta</i> var. <i>congesta</i>	na
	Moraceae	<i>Ficus hispida</i> var. <i>hispida</i>	na
	Moraceae	<i>Ficus platypoda</i> or <i>Ficus cerasicarpa</i>	na
	Moraceae	<i>Ficus virens</i> var. <i>virens</i>	Albayi
	Myrtaceae	<i>Calytrix achaeta</i>	na
	Myrtaceae	<i>Calytrix brownii</i>	na
	Myrtaceae	<i>Calytrix exstipulata</i>	Kimberley Heather
	Myrtaceae	<i>Corymbia polycarpa</i>	na
	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i>	Blunt-budded River Red Gum
	Myrtaceae	<i>Eucalyptus houseana</i>	Kimberley White Gum
	Myrtaceae	<i>Eucalyptus tetradonta</i>	Darwin Stringybark
	Myrtaceae	<i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>	na
	Myrtaceae	<i>Melaleuca argentea</i>	Silver Cadjeput
	Myrtaceae	<i>Melaleuca leucadendra</i>	na
	Myrtaceae	<i>Melaleuca minutifolia</i>	Tea Tree
	Myrtaceae	<i>Melaleuca viridiflora</i>	Broadleaf Paperbark
	Myrtaceae	<i>Verticordia cunninghamii</i>	Tree Featherflower
	Myrtaceae	<i>Verticordia verticillata</i>	Featherflower
	Nephrolepidaceae	<i>Nephrolepis biserrata</i>	na
	Nymphaeaceae	<i>Nymphaea lukei</i>	na
	Nymphaeaceae	<i>Nymphaea violacea</i>	na
	Oleaceae	<i>Jasminum didymum</i> subsp. <i>didymum</i>	na
	Onagraceae	<i>Ludwigia octovalvis</i>	Willow Primrose
	Orchidaceae	<i>Cymbidium canaliculatum</i>	Channel-leaf Cymbidium
	Orobanchaceae	<i>Buchnera asperata</i>	na
	Orobanchaceae	<i>Buchnera urticifolia</i>	na
	Pandanaceae	<i>Pandanus spiralis</i>	Screwpine

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Group	Family	Species	Common name
	Pandanaceae	<i>Pandanus spiralis</i> var. <i>spiralis</i>	Screwpine
	Passifloraceae	<i>Passiflora foetida</i> <sup>b</sup>	Stinking Passion Flower
	Philydraceae	<i>Philydrum lanuginosum</i>	Frogsmouth
	Phrymaceae	<i>Mimulus gracilis</i>	na
	Phrymaceae	<i>Uvedalia linearis</i> var. <i>linearis</i>	na
	Phyllanthaceae	<i>Breynia cernua</i>	na
	Phyllanthaceae	<i>Cathetus virgatus</i>	na
	Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Dogwood
	Phyllanthaceae	<i>Glochidion disparipes</i>	na
	Phyllanthaceae	<i>Lysiandra arida</i>	na
	Picrodendraceae	<i>Petalostigma pubescens</i>	na
	Plantaginaceae	<i>Limnophila australis</i>	na
	Plantaginaceae	<i>Limnophila fragrans</i>	na
	Plantaginaceae	<i>Limnophila</i> sp.	na
	Plantaginaceae	<i>Stemodia lythrifolia</i>	Bunu Bunu
	Plumbaginaceae	<i>Plumbago zeylanica</i>	Native Plumbago
	Poaceae	<i>Alloteropsis semialata</i>	Cockatoo Grass
	Poaceae	<i>Aristida holathera</i>	na
	Poaceae	<i>Arundinella nepalensis</i>	Reedgrass
	Poaceae	<i>Cenchrus elymoides</i>	na
	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>polystachyum</i>	na
	Poaceae	<i>Dimeria ornithopoda</i>	na
	Poaceae	<i>Elytrophorus spicatus</i>	Spikegrass
	Poaceae	<i>Eragrostis ? leporina</i>	na
	Poaceae	<i>Eragrostis fallax</i>	na
	Poaceae	<i>Eragrostis leporina</i>	Hare's-foot Grass
	Poaceae	<i>Eragrostis potamophila</i>	na
	Poaceae	<i>Eriachne festucea</i>	Plains Wandarrie Grass
	Poaceae	<i>Eriachne nodosa</i>	na
	Poaceae	<i>Eriachne obtusa</i>	Northern Wandarrie Grass
	Poaceae	<i>Eriachne pauciflora</i>	na
	Poaceae	<i>Eriachne sulcata</i>	na
	Poaceae	<i>Eulalia aurea</i>	na
	Poaceae	<i>Germainia truncatiglumis</i>	na
	Poaceae	<i>Heteropogon contortus</i>	Bunch Speargrass
	Poaceae	<i>Ischaemum australe</i> var. <i>arundinaceum</i>	Large Bluegrass
	Poaceae	<i>Mnesithea rottboellioides</i>	na
	Poaceae	<i>Oryza rufipogon</i>	Red Rice
	Poaceae	<i>Panicum decompositum</i>	Native Millet

Group	Family	Species	Common name
	Poaceae	<i>Panicum trachyrhachis</i>	na
	Poaceae	<i>Paspalum scrobiculatum</i>	Scrobic
	Poaceae	<i>Pseudopogonatherum contortum</i>	na
	Poaceae	<i>Pseudopogonatherum irritans</i>	na
	Poaceae	<i>Pseudoraphis spinescens</i>	Spiny Mudgrass
	Poaceae	<i>Sacciolepis indica</i>	Indian Cupscale Grass
	Poaceae	<i>Sorghum plumosum</i>	Plume Canegrass
	Poaceae	<i>Sorghum stipoides</i>	Annual Sorghum
	Poaceae	<i>Themeda</i> cf. <i>triandra</i>	na
	Poaceae	<i>Themeda triandra</i>	na
	Poaceae	<i>Triodia</i> aff. <i>bynoei</i>	na
	Poaceae	<i>Triodia bitextura</i>	na
	Poaceae	<i>Triodia caelestialis</i>	na
	Poaceae	<i>Triodia epactia</i>	na
	Poaceae	<i>Triodia longiloba</i>	na
	Poaceae	<i>Whiteochloa airoides</i>	na
	Polygonaceae	<i>Persicaria attenuata</i> subsp. <i>attenuata</i>	na
	Proteaceae	<i>Banksia dentata</i>	Tropical Banksia
	Proteaceae	<i>Grevillea agrifolia</i> subsp. <i>agrifolia</i>	Blue Grevillea
	Proteaceae	<i>Grevillea parallela</i>	na
	Proteaceae	<i>Grevillea pteridifolia</i>	Silky Grevillea
	Proteaceae	<i>Grevillea refracta</i>	Silver-leaf Grevillea
	Proteaceae	<i>Hakea arborescens</i>	Common Hakea
	Pteridaceae	<i>Pteris platyzomopsis</i>	na
	Rhamnaceae	<i>Alphitonia oblata</i>	na
	Rubiaceae	<i>Aidia racemosa</i>	na
	Rubiaceae	<i>Gardenia ewartii</i> subsp. <i>fitzgeraldii</i>	na
	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt Tree
	Rubiaceae	<i>Psydrax pendulina</i>	na
	Rubiaceae	<i>Scleromitron galioides</i>	na
	Rubiaceae	<i>Scleromitron scleranthoides</i>	na
	Rubiaceae	<i>Spermacoce</i> aff. <i>lignosa/breviflora</i>	na
	Rubiaceae	<i>Timonius timon</i>	na
	Santalaceae	<i>Exocarpos latifolius</i>	Broad-leaved Cherry
	Santalaceae	<i>Santalum lanceolatum</i>	Northern Sandalwood
	Sapindaceae	<i>Atalaya variifolia</i>	Wingleaf Whitewood
	Sapindaceae	<i>Dodonaea hispidula</i> var. <i>phylloptera</i>	na
	Sapotaceae	<i>Sersalisia sericea</i>	Nangi
	Solanaceae	<i>Solanum cataphractum</i>	na
	Stylidiaceae	<i>Stylidium adenophorum</i>	na

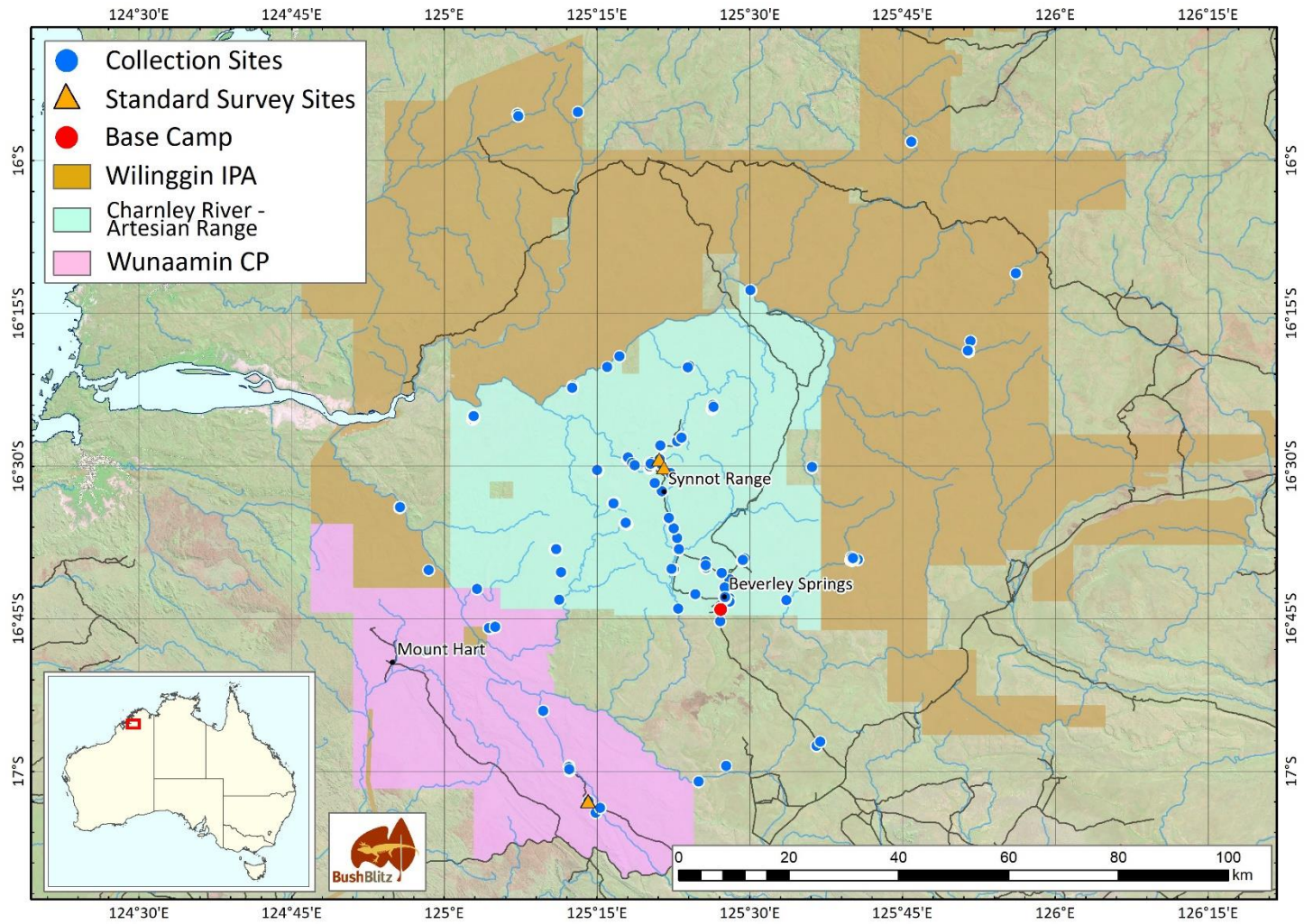


<b>Group</b>	<b>Family</b>	<b>Species</b>	<b>Common name</b>
	Stylidiaceae	<i>Stylidium</i> aff. sp. Kings Cascade (K.F. Kenneally 11173)	na
	Stylidiaceae	<i>Stylidium cordifolium</i>	na
	Stylidiaceae	<i>Stylidium floribundum</i>	na
	Stylidiaceae	<i>Stylidium irriguum</i>	na
	Stylidiaceae	<i>Stylidium mucronatum</i>	na
	Stylidiaceae	<i>Stylidium rotundifolium</i>	na
	Stylidiaceae	<i>Stylidium</i> sp. (aff. H.I. Aston 2553)	na
	Xyridaceae	<i>Xyris complanata</i>	na
	Xyridaceae	<i>Xyris indica</i>	na
<b>Algae</b>	Characeae	<i>Nitella</i> sp.	na

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

# Appendix B: Collection sites

Map B1 Map of collection sites



# Glossary

<b>Term</b>	<b>Definition</b>
ALA	Atlas of Living Australia
AWC	Australian Wildlife Conservancy
Cryptic species (cryptospecies)	Species that are physically similar but genetically different and reproductively isolated from each other.
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
Genus (plural genera)	A taxonomic category that ranks between family and species, consisting of related species (e.g. <i>Acacia</i> ).
Introduced	Not indigenous; not native to the area in which it now occurs.
Lineage	A sequence of species each of which is considered to have evolved from its predecessor.
Parasitoid	An organism whose young develop either on or within another organism (the host), eventually killing it.
Pest species	A species that has the potential to have a negative environmental, social or economic impact.
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.
Range extension	Increase in the known distribution or area of occurrence of a species.
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.
Type specimen(s)	The specimen (or set of specimens) on which the description and name of a new species is based.
Undescribed taxon	A taxon (usually a species) that has not yet been formally described and named.
UNSW	University of New South Wales
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.

# References

AWC 2024, [Charnley River-Artesian Range](#), accessed 22 February 2024.

Chapman, AD 2009, [Numbers of Living Species in Australia and the World](#) 2<sup>nd</sup> edn, Australian Biological Resources Study, Canberra.