

BushBlitz
SPECIES DISCOVERY PROGRAM



BUSH BLITZ SPECIES DISCOVERY PROGRAM



Culgoa Floodplain National Park Qld
Culgoa, Gundabooka, Mount Grenfell (proposed),
Paroo-Darling, Toorale National Parks
Gundabooka, Paroo-Darling, Toorale
State Conservation Areas
Culgoa, Ginghet, Ledknapper, Quanda Nature Reserves
Mount Grenfell Historic Site
NSW
2009–2010



Australian Government



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Australian
Biological
Resources
Study

What is Bush Blitz?

Bush Blitz is a multi-million dollar partnership between the Australian Government, BHP Billiton and Earthwatch Australia to document plants and animals in selected properties across Australia's National Reserve System.

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.

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Abbreviations

EPBC Act

*Environment Protection and Biodiversity
Conservation Act 1999 (Commonwealth)*

FMA

*Fisheries Management Act 1994
(New South Wales)*

NCA

Nature Conservation Act 1992 (Queensland)

NRS

National Reserve System

TSC Act

*Threatened Species Conservation Act 1995
(New South Wales)*



Summary

A Bush Blitz was conducted between November 2009 and May 2010 in nine reserves in north-western New South Wales and southern Queensland, targeting recent additions to the National Reserve System (NRS). Opportunistic collections were also made in another two reserves. Despite severe weather conditions that restricted survey effort, 719 species were identified representing 557 new records for the reserves. Of these, 10 are putative species new to science: 1 fly, 1 beetle, 1 cicada, 6 true bugs and 1 land snail.

Five fauna species listed under the *Threatened Species Conservation Act 1995* (TSC Act) of New South Wales were documented, namely the Kultarr (*Antechinomys laniger*), Little Pied Bat (*Chalinolobus picatus*), Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*), Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) and Brolga (*Grus rubicunda*). A shell of the River Snail (*Notopala*

sublineata sublineata) was collected at Yanda Rocks in Gundabooka National Park: it is listed as endangered under the *Fisheries Management Act 1994* (FMA) of New South Wales. No species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified during this survey.

The semi-arid Outback Awlsnail (*Eremopeas interioris*), documented in Gundabooka State Conservation Area, is a new record for New South Wales. Range extensions were documented for the Brigalow Pupasnail (*Gastrocopta hedleyi*), Black-headed Monitor (*Varanus tristis*) and Southern Sandslider (*Lerista labialis*). At some sites there appeared to be localised extinction of the Dubbo Woodland Snail (*Galadistes alleni*), notably the Coonavitra addition to Paroo-Darling National Park.



A female Wandering Percher dragonfly (*Diplacodes bipunctata*) © Copyright, Queensland Museum



Unusual looking *Cyclorana* frogs were observed in Gundabooka State Conservation Area, Toorale National Park and Toorale State Conservation Area. Research indicates that the Water-holding Frog (*Cyclorana platycephala*) may comprise two species and specimens taken during the survey support this suggestion. Additional work is being funded through the Bush Blitz program to resolve the species complex.

Exotic animals recorded included European Cattle (*Bos taurus*), Goat (*Capra hircus*), Sheep (*Ovis aries*), Fox (*Vulpes vulpes*), Rabbit (*Oryctolagus cuniculus*), Brown Hare (*Lepus capensis*), House Mouse (*Mus musculus*), Pig (*Sus scrofa*) and Indian Peafowl (*Pavo cristatus*). No exotic molluscs were recorded in the study area. The Rutherglen Bug (*Nysius vinitor*) and Brown Bean Bug (*Melanacanthus scutellaris*), both true bugs, as well as 11 native butterflies and moths that are recognised pests of

agriculture and forestry were documented. Large numbers of Spur-throated Locusts (*Austracris guttulosa*) were observed in Ledknapper Nature Reserve and Culgoa Floodplain National Park. This is an important pest of agriculture in parts of New South Wales and Queensland.

The only listed threatened plant documented was Narrow-leafed Bumble (*Capparis loranthifolia* var. *loranthifolia*) in Culgoa National Park. It is listed as endangered under the TSC Act and is a new record for the park.

Twenty-three weeds were documented in Ginghet Nature Reserve and 11 in Mount Grenfell Historic Site, all new records for these reserves. Hairy Carpet Weed (*Glinus lotoides*) was a new record for Gundabooka National Park. Four of the weeds recorded during this study are listed under the *Noxious Weeds Act 1993* of New South Wales.



Flying budgerigars (*Melopsittacus undulatus*), At A Glance Pty Ltd © Copyright, Department of the Environment





Introduction

This is a report of the Bush Blitz program, which aims to survey recent additions to the National Reserve System (NRS). Bush Blitz is an initiative of the Australian Government, through the Australian Biological Resources Study (ABRS) in partnership with BHP Billiton and Earthwatch Australia. The Bush Blitz objectives are:

- + to promote, publicise and demonstrate the importance of taxonomy through the vehicle of species discovery;
- + to undertake a national species discovery program targeted at recently acquired properties of the National Reserve System of Australia;
- + to support the science of taxonomy in Australia through training students and early career researchers, providing grants for species description and resolution of taxonomically problematic, nationally important groups;
- + to promote partnerships between science institutions, governments, industry and non-government organisations; and
- + to inform the National Reserve System, reserve managers and other stakeholders of the results of the Bush Blitz Project.

This Bush Blitz targeted recent additions to the NRS in north-western New South Wales and southern Queensland. Access to and within the properties was limited due to severe fire weather, localised heavy rain, central Queensland floodwaters and damage or inundation of roads. However, this resulted in opportunities to make collections within the older established parts of the reserves, the majority of which had never been surveyed intensively for invertebrates, as well as opportunistic collections at Nocolleche and Nombinnie Nature Reserves.

Planning and field logistics were undertaken by each participating institution. Survey teams included experts from the Australian Museum, Queensland Museum, Royal Botanic Gardens Sydney and the Forest Science Centre (New South Wales Government). Field assistance was provided to the Queensland Museum team by Andy Coward, Cheryn Kelly and Megan Simpson from the Queensland Parks and Wildlife Service; and by Bart Schiebaan, Shayne O'Sullivan and Rick Ohlsen from the New South Wales National Parks and Wildlife Service. Thanks also go to the staff and volunteers at the collection institutions, who assisted with processing the many specimens collected during the field trips.

Table 1 indicates the groups surveyed on each reserve.



Emus (*Dromaius novaehollandiae*) looking curiously at the camera
© Copyright, Queensland Museum



Table 1: Taxonomic groups surveyed in each reserve⁺

Group	Common name	Culgoa Floodplain National Park	Culgoa National Park & Nature Reserve	Ginghet Nature Reserve	Gundabooka National Park & State Conservation Area	Mt Grenfell Historic Site & proposed National Park	Paroo–Darling National Park & State Conservation Area	Ledknapper Nature Reserve	Quanda Nature Reserve	Toorale National Park & State Conservation Area
Mammalia	Mammals				X		X			X
Aves	Birds				X		X		X	X
Reptilia	Reptiles		X		X		X	X		
Amphibia	Frogs and Toads				X		X	X	X	X
Lepidoptera	Butterflies and Moths	X	X		X		X	X		
Heteroptera	True Bugs — Terrestrial	X	X					X		
Heteroptera	True Bugs — Aquatic				X					X
Odonata	Damselflies and Dragonflies	X	X		X		X	X		X
Gastropoda	Snails				X					X
Misc. Terrestrial Invertebrates	Misc. Terrestrial Invertebrates	X	X					X		
Vascular Plants	Flowering Plants and Ferns		X	X	X	X	X	X		X

⁺ Opportunistic collections were made of vascular plants from Nocoleche and Nombinnie reserves, and liverworts from Mount Grenfell Historic Site.



Reserves Overview



Culgoa Floodplain National Park¹

Queensland Parks and Wildlife Service

Date of gazettal

1994

Area

42,856 ha

Description

Culgoa Floodplain National Park is located approximately 130 km south-west of Dirranbandi on the Queensland-New South Wales border, in the Darling-Riverine Plain and Mulga Lands bioregions. The park is on the alluvial floodplains of the Culgoa

River and the Wallam, Mungallala and Nebine Creeks. Numerous clay pans are associated with the floodplains that are bordered by upland plains and low hills with a relief of less than 10 m. Red earth, stony ridges and Brigalow (*Acacia harpophylla*) scrub extend into Mulga (*Acacia aneura*) country in the north-west of the park.

National Reserve System conservation values

Culgoa Floodplain National Park conserves examples of many plant communities found in the Darling-Riverine and Mulga Lands bioregions. The park is also near the Brigalow Belt South bioregion and contains examples of plant communities that occur there as well. It is significant due to the diversity of vegetation found in a relatively small area that is largely intact in an otherwise disturbed and cleared landscape.

The Gidgee Woodlands are at the eastern limit of their distribution in Queensland. The park also contains good examples of Black Box Woodlands close to the northern limit of their distribution in Queensland. Over 150 years of grazing by stock has damaged the grassy understorey of Neverfail Grass (*Eragrostis setifolia*) and Kangaroo Grass (*Themeda* spp.) in the Coolabah and Black Box communities, and woody species such as salt bush (*Atriplex* spp.) and Lignum (*Muehlenbeckia florulenta*) are becoming dominant.

More than 150 animal species are known from Culgoa Floodplain National Park. Artificial waters have contributed to an increased density of large macropods such as Red Kangaroo (*Macropus rufus*), Eastern Grey Kangaroo (*Macropus giganteus*) and Western Grey Kangaroo (*Macropus fuliginosus*). Many bird species occupy the park during flood events and very wet periods. The park supports a range of animals, none of which are listed as threatened.



Culgoa Floodplain National Park © Copyright, Queensland Museum

¹ Information sourced from the NRS applications and assessments, and the Culgoa Floodplain National Park Management Plan (1998), State of Queensland, Department of Environment.



Culgoa National Park and Culgoa Nature Reserve²

New South Wales National Parks and Wildlife Service

Date of purchase

1996

Area

22,430 ha

Description

Culgoa National Park is located in north-western New South Wales adjacent to the Queensland border and adjoins Culgoa Floodplain National Park. It comprises three former pastoral leases: Byerawering, Cawwell and Burban Grange. The surrounding district is in the semi-arid pastoral zone of New South Wales, used primarily for sheep and cattle grazing. Some cropping occurs in floodplain areas where river water is diverted for irrigation. The park is located in the Mulga Lands and Darling-Riverine Plains bioregions.

National Reserve System conservation values

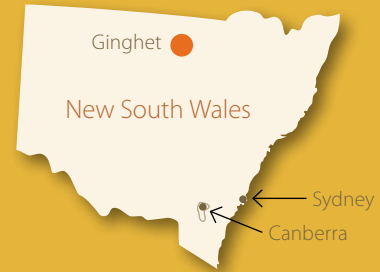
Culgoa National Park protects a section of the Culgoa River and associated floodplains. It conserves several vegetation communities that have been cleared extensively or modified by agriculture in nearby areas and are otherwise poorly represented in New South Wales reserves. A section of what is possibly the largest contiguous tract of Coolabah Woodland remaining in New South Wales and a portion of the native grasslands characteristic of northern New South Wales occurs within the park. Its western section conserves Brigalow and Gidgee Woodlands and Chenopod Shrublands. The Brigalow/Gidgee Woodland/Shrubland is a nationally listed endangered ecological community, and the Coolabah/Black Box Woodland is listed as endangered at the state level. These communities have been cleared extensively or modified through agricultural activities; they continue to be degraded through grazing.

Inland riverine woodlands and open grasslands found in Culgoa National Park are important habitats for a number of threatened species listed under the EPBC or TSC Acts. These include the Narrow-Leafed Bumble (*Capparis loranthifolia* var. *loranthifolia*), Australian Bustard (*Ardeotis australis*), Grey Falcon (*Falco hypoleucos*), Painted Honeyeater (*Grantiella picta*), Major Mitchell's Cockatoo (*Lophochroa leadbeateri*), Brolga (*Grus rubicunda*), Koala (*Phascolarctos cinereus*), Stripe-faced Dunnart (*Sminthopsis macroura*) and Little Pied Bat (*Chalinolobus picatus*). The park supports at least 10 species that either have restricted distributions or are at the limit of their ranges. Climbing Caustic (*Euphorbia sarcostemmoides*) is listed in the plan of management as occurring in the reserve; however, there are no herbarium records of the species from this area.

Culgoa National Park earned the World Wide Fund for Nature's *New Reserve of the Year Award* for the best addition to Australia's conservation reserves in 1997.

² Information sourced from the NRS applications and assessments, and the Culgoa National Park Plan of Management (2003), NSW Parks and Wildlife Service, Office of Environment and Heritage, Sydney South.





Ginghet Nature Reserve³

New South Wales National Parks and Wildlife Service

Date of purchase

2010

Area

6,239 ha

Description

Ginghet Nature Reserve is located in the Darling-Riverine Plains bioregion, mid-way between the towns of Brewarrina and Walgett.

National Reserve System conservation values

Ginghet Nature Reserve protects riparian areas, floodplains and woodlands. The main vegetation communities found in the reserve include River Red Gum/Black Box (*Eucalyptus largiflorens*) Open Forest, Poplar Box (*Eucalyptus populnea*)/Black Box/Belah Tall Woodland, Weeping Myall Open Woodland and Derived Grasslands, Poplar Box/White Cypress Pine/Wilga/Leopardwood shrubby woodlands and open woodlands. The Weeping Myall Woodland is an endangered ecological community listed under both the EPBC Act and TSC Act.⁴ Since European settlement, the extent of this community has declined by up to 94% in New South Wales due largely to clearing. Weeping Myall Woodland occurs on highly fertile and arable soils where there is considerable pressure from cropping. Other threats include overgrazing by feral and domestic animals, weed invasion and herbivory by caterpillars of the Bag-shelter Moth (*Ochrogaster lunifer*), which in large numbers can defoliate trees. Existing conservation reserves protect only a small portion of the Weeping Myall Woodland that remains in New South Wales.



Culgoa National Park © Copyright, Queensland Museum

- 3 Information sourced from the NSW National Parks and Wildlife Service Ginghet Fire Management Strategy <<http://www.environment.nsw.gov.au/firemanagement/GinghetNRfms.html>>.
- 4 Department of the Environment, Weeping Myall Woodlands EPBC Act policy statement, accessed 14 April 2014, <<http://www.environment.gov.au/epbc/publications/weeping-myall-woodlands.html>>.



Gundabooka National Park and Gundabooka State Conservation Area⁵

New South Wales National Parks and Wildlife Service

Date of purchase

1996, 2005

Area

63,903 ha (park), 28,228 ha (state conservation area)

Description

Gundabooka National Park is located between the towns of Bourke and Cobar. It consists of the former pastoral leases of Ben Lomond, Belah and Mulgowan, predominantly sheep stations that date from the early 1900s. The adjoining property of Yanda was purchased and reserved as Gundabooka State Conservation Area in 2005. The reserves are in a semi-arid environment at the northern end of the Cobar Peneplain bioregion. They are isolated from other protected areas and surrounded by pastoral lands. The Cobar Peneplain is one of the least protected bioregions in New South Wales with only around 2.6% set aside for conservation. Grazing is the dominant land use for the western part of the bioregion. The eastern-most part of the bioregion has largely been cleared for cereal cropping.

National Reserve System conservation values

Gundabooka National Park and Gundabooka State Conservation Area provide valuable remnant habitat. At least 12 animal and 4 plant species found in the reserves are listed under the TSC Act. Sweet False Galium (*Oldenlandia galioides*) is a rare annual herb in New South Wales that has only been recorded on the Gundabooka Range, but is common elsewhere. The Curly-bark Wattle (*Acacia curranii*) is a small tree with a population of approximately 150 individuals on Mount Gundabooka. This species has only been recorded in small, disjunct populations in New South Wales (near Round Hill Nature Reserve); it also occurs in Queensland.

Along with the Mount Gundabooka range, four other land systems occur in the reserves, including hills and foot slopes (Little Mountain), rolling downs and lowlands (the western portion of Belah and part of northern Yanda), alluvial plains (surrounding Yanda Creek and the Darling River) and colluvial plains (eastern and central portions of the reserve). These land systems are not reserved elsewhere in New South Wales. Gundabooka State Conservation Area is also one of only three reserves that border the Darling River.



Yanda, Gundabooka National Park © Copyright, Nick Rains Imaging

⁵ Information sourced from the NRS applications and assessments, and the Gundabooka National Park and Gundabooka State Conservation Area Plan of Management (2005), NSW National Parks and Wildlife Service, Office of Environment and Heritage, Sydney South.





Ledknapper Nature Reserve⁶

New South Wales National Parks and Wildlife Service

Date of gazettal

2002

Area

30,604 ha

Description

Ledknapper Nature Reserve is located 100 km north of Bourke in the Mulga Lands bioregion. Livestock grazing is the dominant land use in the region and this has modified most of the landscape.

National Reserve System conservation values

The landscapes in Ledknapper Nature Reserve include floodplains, dunefields, sand plains, rounded hills and ridges, pans and incised drainage lines. The reserve contains the following six broad vegetation types: Mulga Tall Open Shrublands; Gidgee Open Woodland; Buck Spinifex Woodland; Mulga/Poplar Box/White Cypress Pine Woodland; Brigalow (*Acacia harpophylla*); and Ledknapper Spinifex Complex.

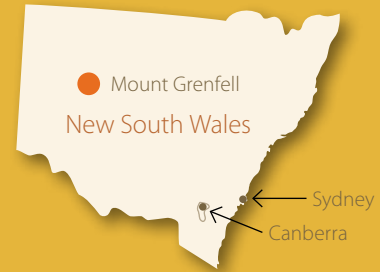
The Ledknapper Spinifex Complex is a vegetation community only found in and around Ledknapper Nature Reserve. This spinifex community is unique and supports at least 146 plant, 100 bird, 29 reptile, 20 mammal and 7 frog species. The plant community is closely similar to those found in central Australia. However, Ledknapper Nature Reserve also contains significant stands of Brigalow, an outlying population of the main Brigalow distribution within New South Wales.

Ledknapper Nature Reserve is likely to support a number of threatened species such as Major Mitchell's Cockatoo (*Lophochroa leadbeateri*), Pied Honeyeater (*Certhionyx variegatus*), Brown Treecreeper (*Climacteris picumnus*), Hooded Robin (*Melanodryas cucullata*), Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*), Little Pied Bat (*Chalinolobus picatus*) and Sandy Inland Mouse (*Pseudomys hermannsburgensis*).



Ledknapper Nature Reserve © Copyright, Queensland Museum

⁶ Information sourced from the NRS applications and assessments.



Mount Grenfell Historic Site and proposed Mount Grenfell National Park⁷

New South Wales National Parks and Wildlife Service

Date of gazettal/purchase

1979 (the proposed national park area was purchased in 2010)

Area

1,357 ha (historic site), 18,320 ha (proposed national park)

Description

Mount Grenfell Historic Site and the proposed Mount Grenfell National Park are located within the traditional land of the Ngiyampaa Wangaaypuwan people, approximately 70 km north-west of Cobar. The reserves are located in the Cobar Penepplain bioregion. Bordering properties are principally sheep grazing and feral goat harvesting enterprises.

In 1979, the NSW Government purchased 1,357 ha from Mount Grenfell Station and proclaimed the area as Mount Grenfell Historic Site to protect significant aboriginal heritage. The remainder of Mount Grenfell Station was purchased in 2010 to provide added protection for the historic site and for its significant natural values. It is proposed that the majority of this area be gazetted as Mount Grenfell National Park.

National Reserve System conservation values

The reserves protect vegetation communities that are regionally significant given their poor conservation status in the bioregion. These include Western Red Box/White Cypress Pine Open Woodland, Mulga/Grey Mallee Shrubland, River Red Gum/Poplar Box Riparian Woodland, Poplar Box/Wilga/Budda Open Woodland, Belah/Rosewood Open Woodland, and Mallee Low Woodland. Eleven plants found on the reserves are restricted or of regional significance. Among threatened species recorded in the reserves are 22 species listed under the TSC Act and 3 EPBC Act listed species. The reserves are located at the intersection of the Bassian (temperate climate) and Eyrian (semi-arid climate) zoogeographic zones, and support a range of animals that are at or near the limit of their distribution.

⁷ Information sourced from New South Wales National Parks and Wildlife Service (2013) Draft Plan of Management: Mount Grenfell Historic Site and Proposed Mount Grenfell National Park (in preparation). Office of Environment and Heritage, Sydney South.





Paroo-Darling National Park and Paroo-Darling State Conservation Area⁸

New South Wales National Parks and Wildlife Service

Date of gazettal

2002

Area

219,574 ha

Description

Paroo-Darling National Park and Paroo-Darling State Conservation Area are located near the towns of Wilcannia and White Cliffs. The reserves comprise seven former pastoral properties: Peery, Arrowbar, Mandalay, Mount Murchison, Wilga, Coonavitra and Tilpilly. Peery was the first to be acquired and gazetted as Peery National Park in 2000. Following further property acquisitions, Peery National Park was re-gazetted as Paroo-Darling National Park. The former Mount Murchison property was gazetted as Paroo-Darling State Conservation Area. The reserves are located in the arid zone in the Murray-Darling Depression and Mulga Lands bioregions. The adjoining properties are used mainly for pastoralism.

National Reserve System conservation values

Paroo-Darling National Park is one of only three reserves on the Paroo River system, the last major unregulated river system in the Murray-Darling Basin. Many different types of wetland exist in the reserves, such as overflow lakes, floodplains, river channels, clay pans and artesian mound springs.

The Peery River Overflow wetlands adjacent to the Paroo River are listed under the Ramsar Convention of Wetlands of International Importance. The large overflow lakes are highly significant for waterbirds and once filled can retain water for up to three years. Water birds from the area are subject to Japan-China Migratory Bird Agreements. To the west and north of the lakes lie stony ranges; to the east lie clay floodplains and dune fields. This combination

⁸ Information sourced from the NRS applications and assessments, and the Paroo-Darling National Park and State Conservation Area Plan of Management (2012), NSW National Parks and Wildlife Service, Office of Environment and Heritage, Sydney South.



of high stony range meeting lakebed is a unique combination in far western New South Wales.

The artesian mound springs at Peery Lake are a highly restricted landform in Australia. They are the natural discharge points from the Great Artesian Basin and support a unique community of species known as the Artesian Springs Community. It is listed as a threatened ecological community under the EPBC Act and an endangered ecological community under the TSC Act.

Nealie (*Acacia loderi*) woodland also occurs within the reserves and is listed as an endangered ecological community under the TSC Act. Listed threatened species recorded for the reserves include Salt Pipewort (*Eriocaulon carsonii*), Australian Bustard (*Ardeotis australis*), Major Mitchell's Cockatoo (*Lophochroa leadbeateri*), Red-tailed Black-cockatoo (*Calyptorhynchus banksii samueli*), Brolga (*Grus rubicunda*) and Freckled Duck (*Stictonetta naevosa*). The threatened Slender Darling Pea (*Swainsona murrayana*) is also recorded in the New South Wales Wildlife Atlas as occurring in the reserve, but there are no herbarium records for the species in this region.



Eucalypts and dry creek bed in the Paroo-Darling National Park, At A Glance Pty Ltd © Copyright, Department of the Environment





Quanda Nature Reserve⁹

New South Wales National Parks and Wildlife Service

Date of gazettal

1963 (Millyvale addition in 2003)

Area

4,784 ha (Millyvale addition 3,930 ha)

Description

Quanda Nature Reserve is located 90 km south-east of Cobar in the Cobar Penepplain bioregion. Much of the surrounding landscape has been cleared for cropping and grazing. Some small, isolated reserves of remnant vegetation occur in the area, the closest being 20 km from Quanda. The reserve was first gazetted in 1963 in a bid to preserve the remnant mallee vegetation. In 1966, a further purchase was made extending the reserve to 854 ha. In 2003, the Australian Government's National Reserve System program assisted with the purchase of 'Millyvale', an adjacent property that increased Quanda Nature Reserve to 4,784 ha.

National Reserve System conservation values

Quanda Nature Reserve protects inland mallee communities that are poorly represented in the reserve system, namely Mallee and Red Box Open Woodland and Mallee Shrubland with *Spinifex* spp. Ecosystems within the reserve are intact and highly representative of the region. Outside of the reserve they are under continued threat from clearing and grazing.

The reserve also provides habitat for the state and nationally vulnerable Superb Parrot (*Polytelis swainsonii*), the endangered Kultarr (*Antechinomys laniger*) and eight animals listed as vulnerable in New South Wales. A nationally threatened plant, the Cobar Greenhood Orchid (*Pterostylis cobarensis*), three regionally significant and seven geographically significant species also occur there.

⁹ Information sourced from the NRS applications and assessments, and the Quanda Nature Reserve Plan of Management (2012), NSW National Parks and Wildlife Service, Office of Environment and Heritage, Sydney South.



Toorale National Park and Toorale State Conservation Area¹⁰

New South Wales National Parks and Wildlife Service

Date of gazettal

2010

Area

30,866 ha (national park) and 54,385 ha (conservation area)

Description

Toorale National Park and Toorale State Conservation Area lie 60 km south-west of Bourke, upstream of the junction of the Darling and Warrego Rivers. The reserves were previously Toorale Station, an historic grazing and cropping property used primarily for growing cotton. When purchased in 2009, the property was divided into a national park and a state conservation area. Toorale Station and its water entitlements were purchased by the New South Wales Government with assistance from the Australian Government through the *Water for the Future* initiative, and from the NRS element of *Caring for our Country*.

National Reserve System conservation values

The Toorale reserves protect native habitat in two bioregions otherwise under-represented in the reserve system—the Mulga Lands and Darling-Riverine Plains. The reserves adjoin Gundabooka National Park, creating an important 180,000 hectare core conservation area. Their environmental importance is well recognised with more than half of Toorale Station gazetted as a Wildlife Refuge for over 25 years. The reserves include one of the few large intact areas of floodplain country in New South Wales—a vast expanse of open grasslands interspersed with Coolabah (*Eucalyptus coolabah*) and Black Box (*Eucalyptus largiflorens*) trees, herbland and shrubs, including saltbush and lignum. These ecosystems are important for seed-eating grassland birds such as Budgerigars (*Melopsittacus undulatus*) and Cockatiels (*Nymphicus hollandicus*). Toorale's wetlands and swamps provide habitat for a range of water birds including the White-faced Heron (*Egretta novaehollandiae*) and the vulnerable Brolga (*Grus rubicunda*). The reserves also contain riverine forests, eucalypt woodlands and acacia shrublands. Toorale is home to a great diversity of wildlife with more than 150 animal species recorded, including Major Mitchell's Cockatoo (*Lophochroa leadbeateri*), which is listed under the TSC Act.



Toorale National Park © Copyright, Queensland Museum

¹⁰ Information sourced from the NRS applications and assessments.





Methods

Collection and observation sites were selected based on land classes, supplemented by identification during the field visit of suitable microhabitats. Site selection also depended on access, suitability for trapping and time restrictions. Site locations were recorded using global positioning systems.

A number of taxonomic groups were identified as targets for study. Table 2 shows the target groups surveyed and the specialists who undertook the fieldwork.



Many dragonflies and damselflies were collected using a net from an open bore at Ledknapper National Park © Copyright, Queensland Museum

Table 2: Taxonomic groups surveyed and personnel⁺

Group	Common names	Expert	Affiliation
Vertebrates	Mammals, Birds, Reptiles and Frogs	Francis Lemckert, Traecey Brassil	Department of Industry and Investment—Primary Industries and Energy (NSW)
Lepidoptera	Butterflies and Moths	Dave Britton	Australian Museum
Odonata	Damselflies and Dragonflies	Dave Britton, Anne Noack	Australian Museum
		Gunther Theischinger	Department of Environment and Climate Change (NSW)
Heteroptera	True Bugs	Christine Lambkin, Noel Starick (collection)	Queensland Museum
		Tom Weir (identification of aquatic heteroptera)	CSIRO
		Gerry Cassis (identification of terrestrial heteroptera)	University of New South Wales
Gastropoda	Land and Freshwater Snails	Michael Shea, Janet Waterhouse, Anne Noack, Alison Miller	Australian Museum
Misc. Terrestrial Invertebrates	Misc. Terrestrial Invertebrates	Christine Lambkin, Noel Starick	Queensland Museum
		Dave Britton, Anne Noack	Australian Museum
Vascular Plants	Flowering Plants and Ferns	Andrew Orme, Seanna McCune, Barbara Wiecek	New South Wales Herbarium

⁺ The Queensland Museum team surveyed invertebrates at Culgoa Floodplain National Park (Qld), Culgoa National Park (NSW) and Ledknapper Nature Reserve (NSW). The Australian Museum team surveyed invertebrates at Gundabooka National Park, and Paroo-Darling National Park and State Conservation Area.



Table 3: Dates when field visits took place

Teams	Dates
Vertebrates	19–26 November 2009, 13–18 March 2010, 17 November 2010
Invertebrates (AM team)	19–25 March 2010
Invertebrates (QM team)	17–23 November 2009, 14–23 May 2010
Vascular Plants	23 November–10 December 2009, 19–22 April 2010

A standard suite of survey techniques was used:

- + Mammals were surveyed using pitfall traps, Elliot traps and nighttime road transects. Bats were surveyed using harp traps and trip-lines across suitable waterholes as well as analysing calls (Anabat).
- + Birds were recorded from opportunistic aural and visual surveys.
- + Frogs were surveyed using dip-nets to capture tadpoles as well as night aural and visual searches of water bodies.
- + Reptiles were surveyed using pitfall and shrimp traps to target snakes and dragons (agamid lizards). Targeted habitat searches during the day involved turning of cover and observation of active individuals. Road transects and walks were undertaken to locate individuals active after sunset.
- + Flying insects were caught using flight intercept traps, including modified Malaise traps, modified Gressitt traps with two collecting heads, and SLAM traps. Butterflies, moths, damselflies, dragonflies and flies were also collected using sweep nets. Hilltops, riparian areas near water, and flowering vegetation were targeted. Mercury vapour light traps and black light bucket traps were used at night.



A mercury vapour light trap, used to catch nocturnal flying insects
© Copyright, Queensland Museum

- + Ground active invertebrates, particularly ants, beetles and spiders, were collected using invertebrate pitfall traps.
- + Land snails were located by turning logs and rocks, and searching through leaf litter and debris. Dry shells were also collected. Vegetation litter and topsoil were sieved to various sizes and searched for minute species under magnified lamps and microscopes.
- + Aquatic invertebrates were collected using dip nets.
- + Vascular plants were collected by hand. Sampling sites were chosen based on areas that were not represented in the National Herbarium of New South Wales collection and had not been sampled in the past.¹¹

Collections were identified using available literature and the holdings of museums and herbaria. Fauna specimens collected in Queensland were deposited with the Queensland Museum and those collected in New South Wales were deposited with the Australian Museum. Flora specimens were photographed in situ and deposited with the National Herbarium of New South Wales. Final species lists were compiled by combining the results of this Bush Blitz with data provided by the state collection institutions and the Australian Natural Heritage Assessment Tool.

¹¹ Based on the Office of Environment and Heritage Atlas of New South Wales Wildlife and the National Herbarium of New South Wales collections database.





Results

The locational data of collected and observed specimens are available to reserve managers. A total of 557 species were added to those known previously across the reserves. Ten putative species new to science were discovered—these await assessment. Seven threatened animal species were identified, as well as one threatened plant, which is a new record for the reserves. Twenty-three exotic or pest fauna species and 33 weed species were also identified.

Species Lists

Appendix A provides complete and up-to-date species lists for each reserve. Names in **brown bold text** are putative new species. Species marked with an asterisk (*) have not been recorded previously. Those without an asterisk have been recorded previously and were identified again during this survey. Species known from previous records but not recorded during this survey are marked with a **blue square**. Table 4 provides a summary of the number of new records and putative new species for each reserve. Table 5 provides a summary of the number of species recorded in each reserve by taxonomic group.



Some of the hundreds of insect specimens collected during the survey © Copyright, Queensland Museum



Thousands of invertebrate specimens were collected during this study. The species lists in this report include only the core taxa collected for the Bush Blitz program as well as other taxa that have been identified to at least family level. Many specimens collected have not yet been identified below the level of order. This is because a great deal of time is required to examine and identify the many collections generated; in the majority of cases, microscopic examination of the material is necessary. Additional limitations include the lack

of experts working on particular groups, and that the taxonomic literature for some groups is not current. These collections will be studied further.

Nomenclature and taxonomy used in this report are consistent with the Australian Faunal Directory, Australian Plant Name Index, Australian Plant Census and Checklist of Australian Liverworts and Hornworts.

Table 4: Summary of new records and new species

Reserve	Species newly recorded on the reserve	Putative species new to science
Culgoa Floodplain National Park	87	4
Culgoa National Park & Nature Reserve	82	3
Ginghet Nature Reserve	175	–
Gundabooka National Park & State Conservation Area	185	1
Ledknapper Nature Reserve	71	1
Mount Grenfell Historic Site	80	–
Paroo-Darling National Park & State Conservation Area	78	–
Quanda Nature Reserve	1	–
Toorale National Park & State Conservation Area	63	–





Table 5: Number of species collected on each reserve by taxonomic group

Group	Culgoa Floodplain National Park	Culgoa National Park & Nature Reserve	Ginghet Nature Reserve	Gundabooka National Park & State Conservation Area	Ledknapper Nature Reserve	Mt Grenfell Historic Site	Paroo–Darling National Park & State Conservation Area	Quanda Nature Reserve	Toorale National Park & State Conservation Area
Mammals	–	–	–	14	–	–	9	–	20
Birds	–	–	–	19	–	–	6	–	46
Reptiles	–	2	–	17	4	–	9	1	19
Frogs and Toads	–	2	–	12	1	–	3	1	11
Butterflies and Moths	19	18	–	93	23	–	1	–	–
Flies	36	21	–	–	5	–	–	–	–
Twisted-wing Parasites	1	–	–	–	–	–	–	–	–
Beetles	10	3	–	–	5	–	–	–	–
Moth Lacewings	–	–	–	–	1	–	–	–	–
Cicadas	–	–	–	–	1	–	–	–	–
True Bugs — Terrestrial	34	24	–	–	3	–	–	–	–
True Bugs — Aquatic	–	–	–	7	–	–	–	–	2
Grasshoppers	3	3	–	–	2	–	–	–	–
Damselflies and Dragonflies	8	3	–	10	8	–	4	–	4
Snails — Terrestrial	–	–	–	9	–	–	–	–	2
Snails — Freshwater	–	–	–	6	–	–	–	–	2
Mussels	–	–	–	1	–	–	–	–	1
Flowering Plants	–	14	175	25	21	77	61	–	19
Ferns	–	–	–	–	–	1	–	–	–
Liverworts	–	–	–	–	–	2	–	–	–
Totals	111	90	175	213	74	80	93	2	126



Threatened Species

Appendix B itemises the threatened species listed under the EPBC Act, NCA and TSC Act known from the reserves. A summary of threatened species identified during the study is provided in Table 6.

Table 6: Summary of threatened species identified in each reserve

Reserve	Fauna	Flora
Culgoa Floodplain National Park	–	–
Culgoa National Park & Nature Reserve	–	1
Ginghet Nature Reserve	–	–
Gundabooka National Park & State Conservation Area	4	–
Ledknapper Nature Reserve	–	–
Mount Grenfell Historic Site	–	–
Paroo-Darling National Park & State Conservation Area	1	–
Quanda Nature Reserve	–	–
Toorale National Park & State Conservation Area	4	–

Exotic and Pest Species

Appendix C lists the exotic and pest species known from the reserves. A summary of exotic and pest species identified during the study is provided in Table 7.

A species is considered exotic where it occurs outside of its normal range. A pest is a species that has the potential to have a negative environmental, social or economic impact. Native species that are at times pests or are considered exotic to this region of New South Wales and Queensland are included in the numbers in Table 7.

Table 7: Summary of exotic and pest species identified in each reserve

Reserve	Fauna	Flora
Culgoa Floodplain National Park	2	–
Culgoa National Park & Nature Reserve	4	1
Ginghet Nature Reserve	–	23
Gundabooka National Park & State Conservation Area	15	1
Ledknapper Nature Reserve	3	–
Mount Grenfell Historic Site	–	11
Paroo-Darling National Park & State Conservation Area	2	–
Quanda Nature Reserve	–	–
Toorale National Park & State Conservation Area	9	–





Discussion

Putative New Species

A putative species new to science is one that has been recognised by an expert as never having been named or described in the scientific literature. It is confirmed as a new species once it is named and its description is published. In addition to species that are considered new to science, specimens collected during this survey include taxa that are already in museum collections, but not yet formally described and named.

Vertebrate Fauna

During this study, unusual looking *Cyclorana* frogs were observed in Gundabooka State Conservation Area, Toorale National Park and Toorale State Conservation Area. Discussions with geneticists from the South Australian Museum reveal that the taxonomy of this group is uncertain. The species currently described as the Water-holding Frog (*Cyclorana platycephala*) might actually be two species, and specimens taken during the survey support this suggestion. The Bush Blitz program has funded additional work to resolve the species that are present, develop descriptions, and define ranges and transition points for each species within New South Wales. This will enable assessment of the conservation status of the frogs based on population sizes and expected threats such as climate change, which could affect these frogs due to their need for water.

Invertebrate Fauna

The following putative new invertebrate species were documented during the study: 1 scarab beetle (*Onthophagus* n. sp. NSW1) collected from Culgoa Floodplain National Park and Ledknapper Nature Reserve; 1 cicada (*Tamasa* n. sp. BushBlitz) collected from Ledknapper Nature Reserve; 6 true



The species currently described as the Water-holding Frog (*Cyclorana platycephala*) might actually be two species, G. Schmida © Copyright, Murray-Darling Basin Authority CC-BY-NC

bugs (3 in Culgoa Floodplain National Park and 3 in Culgoa National Park); 1 snail (Camaenidae n. sp. msp WN 8) collected at two rocky gorge sites in Gundabooka National Park. A new fly species collected from Culgoa Floodplain National Park has since been described as *Palirika culgoafloodplainensis*.¹²

A breakdown of the groups in which putative new species have been discovered is given in Table 8.

Table 8: Putative new species by group

Common name	Number of putative new species
Flies	1
Beetles	1
Cicadas	1
True Bugs	6
Snails	1

12 Lambkin, C. L. & Bartlett, J. S. 2011, 'Bush Blitz aids description of three new species and a new genus of Australian beeflies (Diptera, Bombyliidae, Exoprosopini)', in Smith, V. & Penev, L. (eds) e-Infrastructures for data publishing in biodiversity science, *ZooKeys* **150**: 231–280. doi: 10.3897/zookeys.150.1881.



Threatened Species

Australia is home to around 570,000 species, most of which are yet to be described formally. Approximately 92% of Australian plants, 87% of mammals and 93% of reptiles are endemic. Changes to the landscape and native habitat resulting from human activity have put many of these unique species at risk. Over the last 200 years many species have become extinct; many others are threatened.¹³

Fauna

Kultarr (*Antechinomys laniger*) and the Little Pied Bat (*Chalinolobus picatus*) were recorded in Gundabooka National Park; these are listed respectively as endangered and vulnerable under the TSC Act. The Little Pied Bat was also recorded in the Coonavitra section of Paroo-Darling National Park. The Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*), Major Mitchell's



Kultarr (*Antechinomys laniger*), listed as endangered under the TSC Act, was identified at Gundabooka State Conservation Area © Copyright, Michael Barritt

¹³ Chapman, A. D. 2009, *Numbers of Living Species in Australia and the World*, 2nd edn, Australian Biological Resources Study, Canberra, 80pp.





Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*), listed as vulnerable under the TSC Act © Copyright shared, Department of the Environment and Brian Furby Collection

Cockatoo (*Lophochroa leadbeateri*) and Brolga (*Grus rubicunda*) were recorded in Toorale National Park; they are listed as vulnerable under the TSC Act. The Rough Frog (*Cyclorana verrucosa*) was found at Gundabooka State Conservation Area and Toorale National Park; it is listed as near threatened under the Queensland NCA Act. No species listed under the EPBC Act were identified.

A long-dead bleached shell of the main river channel species River Snail (*Notopala sublineata sublineata*) was collected on the bank of the Darling River at Yanda Rocks in Gundabooka National Park. Due to raised river levels and strong flow, it was not possible to verify whether this species still exists at the site. The River Snail

is listed as endangered under the FMA of New South Wales. Although not listed under the TSC Act, the River Snail is considered by experts to be endangered. It is probably extinct from its natural range and now only found in water supply irrigation pipelines.¹⁴

Flora

Narrow-leaved Bumble (*Capparis loranthifolia* var. *loranthifolia*) was recorded in Culgoa National Park. It is listed as endangered under the TSC Act. Although it is relatively common in western Queensland, it was previously recorded from the north-western plains of New South Wales only near Weilmoringle north of Brewarrina. Throughout its range, Narrow-leaved Bumble occurs in mixed softwood forest in fine red soil and on brown silty clay-loam near creeks. The main threats to this plant are habitat erosion from rabbit, stock and goat activities.¹⁵



Curly-bark Wattle (*Acacia curranii*), listed as vulnerable under both the EPBC Act and TSC Act © Copyright, M. Fagg, Australian National Botanic Gardens (Australian Plant Image Index www.anbg.gov.au/photo)

14 NSW Department of Primary Industries 2007, Recovery plan for the endangered river snail (*Notopala sublineata*), Threatened Species Unit, Fisheries and Aquaculture Branch, Orange.

15 NSW Department of Environment and Heritage, Threatened Species, accessed 18 September 2013, <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10144>>.



Exotic and Pest Species

Fauna

The NRS is designed to conserve and protect Australia's rare and threatened ecosystems and provide a 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 exotic and pest species records as part of this report is designed to contribute baseline information to assist land managers with their pest survey and monitoring programs.¹⁶

Exotic animals recorded in the Toorale reserves included European Cattle (*Bos taurus*), Goat (*Capra hircus*), Sheep (*Ovis aries*), Fox (*Vulpes vulpes*), Rabbit (*Oryctolagus cuniculus*), Brown Hare (*Lepus capensis*), House Mouse (*Mus musculus*),



Indian Peafowl (*Pavo cristatus*) were observed in the Coonavitra section of the Paroo-Darling National Park © Copyright, Queensland Museum

Pig (*Sus scrofa*) and Indian Peafowl (*Pavo cristatus*). Foxes and rabbits were also observed in the Coonavitra section of the Paroo-Darling National Park, while cattle, foxes, mice and pigs were observed in the Gundabooka State Conservation Area.

There was a notable absence of exotic snails despite annual weed infestation in some areas. Ten moth species were found that occur naturally in Australia but are recognised pests of agriculture and forestry. The introduced Cabbage White Butterfly (*Pieris rapae*) was abundant.

A pest species of true bug, Rutherglen Bug (*Nysius vinitor*), was found in Culgoa Floodplain and Culgoa National Parks and Ledknapper Nature Reserve. This small native sap-sucking insect, which breeds on a wide range of native and exotic plants, builds up to large numbers in inland areas following good winter and spring rainfall with subsequent vegetation growth. In spring, as the host plants start to dry off, large numbers of adults can migrate on the winds associated with storm fronts into eastern Australian cropping areas, where they can cause serious damage to fruit and vegetable crops. The Brown Bean Bug (*Melanacanthus scutellaris*) was found in Culgoa National Park. This bug feeds primarily on seed pods with a preference for pods containing well-developed seeds, but they also damage buds and flowers. Damage to young pods produces deformed and shrivelled seeds, reducing yield.¹⁷

16 Department of the Environment, accessed 14 April 2014 <<http://www.environment.gov.au/biodiversity/invasive/index.html>>.

17 Queensland Department of Agriculture, Fisheries and Forestry, accessed 18 September 2013 <<http://www.daff.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/integrated-pest-management/a-z-insect-pest-list/pod-sucking-bugs/small-brown-bean-bug>>.





Grasshoppers, including huge numbers of Spur-throated Locusts (*Austracris guttulosa*) were observed at Ledknapper Nature Reserve and Culgoa and Culgoa Floodplain National Parks, especially in the Mulga. The Spur-throated Locust is mainly a tropical species but also breeds in southern Queensland and the north-western plains and central west of New South Wales. Spur-throated Locust is an infrequent but important pest of agriculture in parts of New South Wales, Queensland and Western Australia. It feeds on all types of crops and summer crops such as sorghum, sunflowers and soybeans are particularly susceptible, being present when the locust is most

active. Damage to winter crops tends to occur in the autumn just after sowing when the locusts are immature, and at the late ripening stage in spring when the locusts mature. Extensive damage to wheat during the winter has been known to occur in crops adjacent to roosting sites.¹⁸

Flora

Twenty-three weed species were documented in Ginghet Nature Reserve and 11 in Mount Grenfell Historic Site, all new records for these reserves. Hairy Carpet Weed (*Glinus lotoides*) was a new record for Gundabooka National Park. Four of



Hairy Carpet Weed (*Glinus lotoides*) was a new record for Gundabooka National Park © Copyright, Queensland Museum

¹⁸ Department of Agriculture, Spur Throated Locust, accessed 14 April 2014 <<http://www.daff.gov.au/animal-plant-health/locusts/about/spur-throated>>.



the weeds recorded during this study are listed under the *Noxious Weeds Act 1993* (New South Wales): Scotch Thistle (*Onopordum acanthium*), Bathurst Burr (*Xanthium spinosum*), Noogoora Burr (*Xanthium strumarium*) and Horehound (*Marrubium vulgare*). By law all landholders must control declared noxious weeds.

Other Points of Interest

Vertebrate Fauna

Extreme weather conditions prevented access to large areas of the reserves. As much work as possible was done and some areas were surveyed with reasonably high intensity. However, the catastrophic fire conditions meant animals were relatively inactive during the very hot and dry conditions, significantly affecting the number of animals seen. Conversely, where access was possible floods provided very good opportunities to locate frogs and several additional species were found.



A range extension was recorded for the Southern Sandslider (*Lerista labialis*) at Toorale National Park © Copyright, Queensland Museum

Vertebrate records of significance include a range extension for the Southern Sandslider (*Lerista labialis*) recorded at Toorale National Park, and the Black-headed Monitor (*Varanus tristis*) recorded in the Yanda addition to Gundabooka National Park, which is a possible southern limit for this species. Only one animal, a blind snake (*Ramphotyphlops* sp.), was identified in the Millyvale section of Quanda Nature Reserve.

Invertebrate Fauna

Research on Australian invertebrates has increased significantly over the last 20 years, but it is estimated that less than 15% of species have been formally described. In general, about a third of the species collected in any area are found to be new to science.

Butterflies

Most of the 29 butterfly species recorded were abundant and observed across the reserves. Males of the Common Eggfly (*Hypolimnys bolina nerina*) were observed on two occasions in the Yanda addition to Gundabooka National Park, but specimens could not be obtained. Some uncommon species that were recorded include Rayed Blue (*Candalides heathi heathi*), Amethyst Hairstreak (*Jalmenus icilius*) and Spotted Grass-blue (*Zizeeria karsandra*). The Spotted Grass-blue specimen seen in Yanda Creek represents the most westerly record of this species in New South Wales, the nearest published record being from Moree over 400 km east of Gundabooka National Park. The Rayed Blue records also represent a major range extension, with the nearest published record being from the Warrumbungle Ranges over 300 km east of Gundabooka National Park. It is not clear whether the range extensions are a result of the additional





survey effort for this region or unusual seasonal conditions. These two species, as well as Amethyst Hairstreak, are broadly distributed in semi-arid habitats in Australia but are often localised within these habitats, which gives the appearance of rarity. They are not mobile, but probably form metapopulations that persist for a number of years, eventually dying out whilst new colonies establish elsewhere.

There were a number of notable absences. No skippers (family HesperIIDae) were recorded, despite there being an abundance of food plants for widespread grass-eating species such as the Greenish Grass-dart (*Ocybadistes walker*). Published distributions indicate that no skippers have been recorded from north-western New South Wales, but this may represent a lack of survey effort rather than real absences. Butterflies in the genera *Ogyris* (family Lycaenidae) were not recorded although their larval food plants were common and diverse throughout the wooded areas of the reserves. Location of *Ogyris* species requires a lot of direct effort, usually searches for larvae associated with mistletoes and the tree hosts, or for adults flying on hilltops or around mistletoe. At least four species are likely to be present in the region (*O. amaryllis*, *O. olane*, *O. genoveva* and *O. ororetis*),



Varnia implexa, a rare moth-like lacewing © Copyright, Queensland Museum

possibly more. The only other significant absence is the cosmopolitan Pea Blue (*Lampides boeticus*). This species may be more common in spring as its larvae prefer to feed on flowers and the developing pods of legumes that tend to flower in spring.

Moths

The diversity of moths was lower than expected with 91 species recorded, although many were extremely abundant. A number of factors might have contributed to this lower-than-expected diversity. Collector bias might have resulted in reduced catches. The hyper-abundance of many insects at light traps made it physically difficult to collect, and many smaller moth species might have been obscured by the presence of numerous caddisflies (order Trichoptera) and other insects. The moth species collected are active during the hotter months and there was no evidence of the large diversity of autumn specialists that are characteristic of many Australian habitats. Sampling over autumn to early winter and in early spring would probably return almost completely different sets of species, possibly with greater diversity. One of the rarer—or less often collected—species for which nothing is known of its biology, was the distinctive medium-sized geometrid moth *Gonodontis euctista*. A single specimen was collected in Gundabooka National Park.

Moth Lacewings

An exciting discovery was *Varnia implexa*, a rare moth-like lacewing (Order Neuroptera) belonging to the family Ithonidae, in Ledknapper Nature Reserve. Many specimens were collected at the light trap at night. Other specimens were collected from the base of a spinifex plant and from a sand dune site.



Grasshoppers

Five grasshopper species were found across Ledknapper Nature Reserve, Culgoa Floodplain National Park and Culgoa National Park. Many dead grasshoppers at all life stages were found attached to vegetation in Ledknapper Nature Reserve, probably killed by fungal attacks. Specimens taken for analysis were infected by an entomophthoralean fungus.¹⁹ The Blistered Pyrgomorph (*Monistria pustulifera*) was common. This quite widespread species has colour variations that have caused four races to be described. The central race occupies most of the centre of the continent from eastern New South Wales to the west coast of Australia. It has black antennae and a black body marked with yellow spots. About 15% of adults have long wings, but most have short wings. When threatened they display their bright red hind wings. Most are recorded as feeding on emu bush (*Eremophila* spp.) and are considered the most important insect for the ecology of that plant.²⁰

Damselflies and Dragonflies

Twelve species and five genera of damselflies and dragonflies were recorded from adults and larvae collected by sweep netting and dip netting; all were new records for the reserves. The Blue Skimmer (*Orthetrum caledonicum*) dragonfly and the Wandering Ringtail (*Austrolestes leda*) damselfly were the most abundant. The Aurora Bluetail (*Ischnura aurora*) damselfly and the Red and Blue Damsel (*Xanthagrion erythroneurum*) were abundant as larvae but no adults were collected. The species collected were typical of inland semi-arid environments. As they depend on water, these species are often very mobile and are able to fly long distances between temporary water sources.



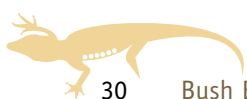
The central race of the Blistered Pyrgomorph (*Monistria pustulifera*) is one of four to be described © Copyright, Queensland Museum



Many grasshoppers were found dead attached to vegetation at Ledknapper Nature Reserve, probably due to fungal attack © Copyright, Queensland Museum

¹⁹ Pers. comm. David Holdom, Biosecurity Queensland.

²⁰ Rentz, D. 1996, *Grasshopper Country: The Abundant Orthopteroid Insects of Australia*, University of New South Wales Press, Sydney.





True Bugs — Terrestrial and Aquatic

This was the first time this region had been systematically sampled for true bugs. The taxa collected were typical of inland semi-arid environments. Fifty terrestrial true bug species were recorded, which was a good result. Additional taxa are likely to be found with more host plant sampling (beating suitable vegetation to dislodge bugs). Specimens of the lace bug *Lasiacantha spinosa* collected at Culgoa Floodplain National Park provided useful additional material that aided the description of the species.²¹

Seven species from four genera of water bugs were collected at light traps and by dip netting. The most abundant bugs were waterboatmen from the widespread genus *Micronecta* (family Corixidae). The waterboatmen could only be identified to genus, as there is currently no means of readily identifying this group to species.²²

Molluscs

The areas sampled for molluscs produced an unexpected diversity of species and significant range extensions. In total 18 mollusc species were collected: 6 freshwater snails, 10 terrestrial snails and 2 freshwater mussels. The presence of the semi-arid Outback Awlsnail (*Eremopeas interioris*) was a new record for New South Wales. A range extension was also recorded for the Brigalow Pupasnail (*Gastrocopta hedleyi*), which is generally found much further east in the wetter New England region of the state.

Western New South Wales is a hostile environment for molluscs due to the local climate, habitat alteration through land clearance and the impact of stock and feral animals. At some sites there appeared to be localised extinction of the widespread Dubbo Woodland Snail (*Galadistes alleni*), with only bleached shells eroding out of topsoil observed. This was most apparent in the Coonavitra addition to Paroo-Darling National Park. It is possible that this species still exists where intact woodland remains. The Dubbo Woodland Snail is present in Gundabooka National Park,



At some sites there appeared to be localised extinction of the widespread Dubbo Woodland Snail (*Galadistes alleni*), with only bleached shells observed © Copyright, Queensland Museum

where impacts on native woodland have not been so severe, though in low numbers at the site sampled. The reintroduction of this species into degraded areas of the Coonavitra addition to Paroo-Darling National Park is a future possibility once the area regenerates.

21 Symonds C. L. and Cassis, G. 2013, 'New species of the lace bug genus *Lasiacantha* Stål (Insecta: Hemiptera: Heteroptera: Tingidae) from Western Australia', *Australian Journal of Entomology*, **52**: 53–66.

22 Pers. comm. Tom Weir, CSIRO.



A range extension was recorded for the Brigalow Pupasnail (*Gastrocopta hedleyi*)
© Copyright, Queensland Museum

The aquatic snail species *Notopala kingi suprafasciata*, which lives in ephemeral lentic (still water) sites, was collected about a kilometre from Yanda Rocks. Some shell fragments were reasonably fresh indicating the presence of living snails. This is a relatively poorly known subspecies with just a few scattered records from inland New South Wales across the Darling drainage basin, most of which were collected in the 19th and early 20th centuries.

Vascular Flora

Collecting good quality material for the herbarium was difficult due to the prolonged drought, particularly in the Paroo-Darling National Park. Based on the greater area of groundcover, Gundabooka and Ledknapper reserves appeared to have experienced much better growing conditions. Several opportunistic collections were made from Nombinnie and Nocolleche nature reserves during the drive to western New South Wales. Eleven new vascular plant records were obtained for Nombinnie Nature Reserve and three for Nocolleche Nature Reserve. Numerous collections were also made for the New South Wales Seedbank and Millennium Seed Bank projects.



A large gall on a *Eucalyptus* tree © Copyright, Queensland Museum





Appendix A: Species Lists

Additional supplements containing the appendices for individual reserves are available to download from:

www.bushblitz.org.au

Nomenclature and taxonomy used in this appendix are consistent with that from the Australian Faunal Directory (AFD), the Australian Plant Name Index (APNI) and the Australian Plant Census (APC).

Current at March 2014



Fauna

Vertebrates

Mammals									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Acrobatidae	<i>Acrobates pygmaeus</i>	Feathertail Glider		■					
Bovidae	<i>Bos taurus</i> ^	European Cattle	X *		X *				
	<i>Capra hircus</i> ^	Goat			X				
	<i>Ovis aries</i> ^	Sheep			X *				
Canidae	<i>Vulpes vulpes</i> ^	Fox, Red Fox	X	X *	X				
Dasyuridae	<i>Antechinomys laniger</i> ~	Kultarr	X						
	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	■						
	<i>Sminthopsis macroura</i> ~	Stripe-faced Dunnart		■					
	<i>Sminthopsis murina</i>	Common Dunnart			X *				
Emballonuridae	<i>Saccolaimus flaviventris</i> ~	Yellow-bellied Sheath-tail-bat			■				
Leporidae	<i>Lepus capensis</i> ^	Brown Hare			X *				
	<i>Oryctolagus cuniculus</i> ^	Rabbit		X *	X *				
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo	X *	■	X				
	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	X	■	X				
	<i>Macropus rufus</i>	Red Kangaroo	X		X				
Molossidae	<i>Mormopterus</i> sp. 03 (little penis)	Free-tailed Bat	X *	X *	X *				
	<i>Mormopterus</i> sp. 04 (big penis)	Free-tailed Bat		X *					
Muridae	<i>Mus musculus</i> ^	House Mouse	X		X				
Phascolarctidae	<i>Phascolarctos cinereus</i> ~ #	Koala					■		
Suidae	<i>Sus scrofa</i> ^	Pig	X		X				
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	■		■				
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	X *	X *	X				
	<i>Chalinolobus picatus</i> ~	Little Pied Bat	X *	X *	■				
	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	X *	X *	X				
	<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat		X *					
	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat	X *		X *				
	<i>Scotorepens greyii</i>	Little Broad-nosed Bat	X	X *	X *				

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Red Kangaroo (*Macropus rufus*), At A Glance Pty Ltd © Copyright, Department of the Environment

Birds									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		■	■				
	<i>Acanthiza nana</i>	Yellow Thornbill			■				
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill		■	■				
	<i>Aphelocephala leucopsis</i>	Southern Whiteface	■	■	■				
	<i>Smicronis brevirostris</i>	Weebill		■					
Accipitridae	<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk		■	■				
	<i>Accipiter fasciatus</i>	Brown Goshawk		■					
	<i>Aquila audax</i>	Wedge-tailed Eagle		■	X				
	<i>Circus assimilis</i>	Spotted Harrier		■					
	<i>Elanus axillaris</i>	Black-shouldered Kite		■	X				
	<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle		■					
	<i>Haliastur sphenurus</i>	Whistling Kite	■	■	X				
	<i>Hamirostra melanosternon</i> ~	Black-breasted Buzzard		■					
	<i>Hieraaetus morphnoides</i> ~	Little Eagle		■					
	<i>Milvus migrans</i>	Black Kite	X	■	■				



Birds

Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	X *	■	■				X
Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark		■	■				
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	■	■	■				
	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher		■	■				
	<i>Todiramphus sanctus</i>	Sacred Kingfisher	■	■	X				
Anatidae	<i>Anas castanea</i>	Chestnut Teal		■	X				
	<i>Anas gracilis</i>	Grey Teal		■	X				
	<i>Anas rhynchotis</i>	Australasian Shoveler		■	■				
	<i>Anas superciliosa</i>	Pacific Black Duck	■	■	■				
	<i>Aythya australis</i>	Hardhead	■	■	■				
	<i>Biziura lobata</i>	Musk Duck		■	■				
	<i>Chenonetta jubata</i>	Australian Wood Duck, Maned Duck	■	■	X				
	<i>Cygnus atratus</i>	Black Swan	■	■	X				
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		■	X				
	<i>Oxyura australis</i> ~	Blue-billed Duck			■				
	<i>Stictonetta naevosa</i> ~	Freckled Duck		■					
	<i>Tadorna tadornoides</i>	Australian Shelduck			■	■			
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter	■	■	■				
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret		■					
	<i>Ardea modesta</i>	Eastern Great Egret		■	■				
	<i>Ardea pacifica</i>	White-necked Heron	■	X	X				
	<i>Egretta garzetta</i>	Little Egret		■					
	<i>Egretta novaehollandiae</i>	White-faced Heron	■	■	■				
	<i>Nycticorax caledonicus</i>	Nankeen Night Heron	■	■	■				
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow	X *	■	■				
	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow		■	■				
	<i>Artamus personatus</i>	Masked Woodswallow		■	■				
	<i>Artamus superciliosus</i>	White-browed Woodswallow	■	■	■				
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	X	■	■				
	<i>Cracticus tibicen</i>	Australian Magpie	X	■	X				
	<i>Cracticus torquatus</i>	Grey Butcherbird	■	■	X				

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Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) © Copyright shared, Department of the Environment and Brian Furby Collection

Birds									
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Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	■						
	<i>Cacatua sanguinea</i>	Little Corella	■	■	X				
	<i>Calyptorhynchus banksii samueli</i> ~	Red-tailed Black Cockatoo	■		X				
	<i>Eolophus roseicapillus</i>	Galah	■	X	X				
	<i>Lophochroa leadbeateri</i> ~	Major Mitchell's Cockatoo	■	■	X				
	<i>Nymphicus hollandicus</i>	Cockatiel	■	X	X				
Campephagidae	<i>Coracina maxima</i>	Ground Cuckoo-shrike	X *	■					
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	X	■	■				
	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike		■	X *				
	<i>Lalage sueurii</i>	White-winged Triller		■	■				
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar		■	■				
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu	X	■	X				
Charadriidae	<i>Charadrius australis</i>	Inland Dotterel, Inland Plover		■					
	<i>Charadrius ruficapillus</i>	Red-capped Plover		■					
	<i>Charadrius veredus</i>	Oriental Plover		■					
	<i>Eseyornis melanops</i>	Black-fronted Dotterel	■	■	■				
	<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		■					
	<i>Vanellus miles</i>	Masked Lapwing		■	X				
	<i>Vanellus tricolor</i>	Banded Lapwing		■	■				
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper	X *	■	■				
	<i>Climacteris picumnus</i>	Brown Treecreeper	■	■	■				
Columbidae	<i>Geopelia cuneata</i>	Diamond Dove		■	■				
	<i>Geopelia striata</i>	Peaceful Dove	■	■	X				
	<i>Ocyphaps lophotes</i>	Crested Pigeon	X	■	X				
	<i>Phaps chalcoptera</i>	Common Bronzewing	■	■	X				



Birds

Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Cough	■	■	■				
	<i>Struthidea cinerea</i>	Apostlebird	■	■	■				
Corvidae	<i>Corvus bennetti</i>	Little Crow	■	■	■				
	<i>Corvus coronoides</i>	Australian Raven	■	■	■				
	<i>Corvus mellori</i>	Little Raven	■						
Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo		■	■				
	<i>Chalcites basalis</i>	Horsfield's Bronze-cuckoo	■	■	■				
Estrildidae	<i>Taeniopygia bichenovii</i>	Double-barred Finch	■						
	<i>Taeniopygia guttata</i>	Zebra Finch	X	■	X				
Falconidae	<i>Falco berigora</i>	Brown Falcon	X	■	X				
	<i>Falco cenchroides</i>	Nankeen Kestrel		■	X				
	<i>Falco hypoleucos</i> ~	Grey Falcon		■					
	<i>Falco longipennis</i>	Australian Hobby		■					
	<i>Falco subniger</i>	Black Falcon		■	X *				
Glareolidae	<i>Glareola maldivarum</i>	Oriental Pratincole			X				
	<i>Stiltia isabella</i>	Australian Pratincole		■					
Gruidae	<i>Grus rubicunda</i> ~	Brolga		■	X				
Hirundinidae	<i>Cheramoeca leucosterna</i>	White-backed Swallow		■	■				
	<i>Hirundo neoxena</i>	Welcome Swallow	■	■	X				
	<i>Petrochelidon ariel</i>	Fairy Martin		■	■				
	<i>Petrochelidon nigricans</i>	Tree Martin		■	■				
Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern		■					
	<i>Chroicocephalus novaehollandiae</i>	Silver Gull		■	■				
	<i>Gelochelidon nilotica</i>	Gull-billed Tern		■					
	<i>Hydroprogne caspia</i>	Caspian Tern		■					
Maluridae	<i>Malurus lamberti</i>	Variiegated Fairy-wren	■	■	■				
	<i>Malurus leucopterus</i>	White-winged Fairy-wren		■	X *				
	<i>Malurus splendens</i>	Splendid Fairy-wren		■	■				
Megaluridae	<i>Cincloramphus cruralis</i>	Brown Songlark		■	■				
	<i>Cincloramphus mathewsi</i>	Rufous Songlark		■	■				
	<i>Megalurus gramineus</i>	Little Grassbird		■					

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Birds									
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Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	X	■	X				
	<i>Ashbyia lovensis</i>	Gibberbird		■					
	<i>Certhionyx variegatus</i> ~	Pied Honeyeater		■					
	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	■		■				
	<i>Epthianura albifrons</i>	White-fronted Chat			■				
	<i>Epthianura aurifrons</i>	Orange Chat	X	■	■				
	<i>Epthianura tricolor</i>	Crimson Chat	X*	■	X				
	<i>Gavicalis virescens</i>	Singing Honeyeater	■	■	■				
	<i>Grantiella picta</i> ~	Painted Honeyeater					■		
	<i>Manorina flavigula</i>	Yellow-throated Miner	■	■	■				
	<i>Philemon citreogularis</i>	Little Friarbird	■		■				
	<i>Plectorhyncha lanceolata</i>	Striped Honeyeater			■				
	<i>Ptilotula penicillatus</i>	White-plumed Honeyeater	■	■	■				
	<i>Purnella albifrons</i>	White-fronted Honeyeater		■					
	<i>Sugomel niger</i>	Black Honeyeater		■					
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	■	■	X				
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	■	■	X				
	<i>Myiagra inquieta</i>	Restless Flycatcher	■	■	X				
Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian Pipit, Australian Pipit		■	■				
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	■	■	■				
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole	■						
Otididae	<i>Ardeotis australis</i>	Australian Bustard		■	■				
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	■	■	■				
	<i>Oreoica gutturalis</i>	Crested Bellbird	■	■	■				
	<i>Pachycephala rufiventris</i>	Rufous Whistler		■	■				
Pardalotidae	<i>Pardalotus rubricatus</i>	Red-browed Pardalote		■					
	<i>Pardalotus striatus</i>	Striated Pardalote		■	■				
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican	■	■	■				
Petroicidae	<i>Melanodryas cucullata</i> ~	Hooded Robin		■					
	<i>Petroica goodenovii</i>	Red-capped Robin		■	■				
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	■	■	■				
	<i>Phalacrocorax carbo</i>	Great Cormorant		■	■				
	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	■	■	■				
	<i>Phalacrocorax varius</i>	Pied Cormorant		■	■				



Birds

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Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail		■					
	<i>Coturnix ypsilophora</i>	Brown Quail		■					
	<i>Pavo cristatus</i> ^	Indian Peafowl			X *				
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth	X		X *				
Podicipedidae	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		■	■				
	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	■	■					
Pomatostomidae	<i>Pomatostomus halli</i> ~	Hall's Babbler		■					
	<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler		■	■				
	<i>Pomatostomus superciliosus</i>	White-browed Babbler		■					
	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		X	■				
	<i>Pomatostomus temporalis temporalis</i> ~	Grey-crowned Babbler		■					
Psittacidae	<i>Aprosmictus erythropterus</i>	Red-winged Parrot	■		X				
	<i>Barnardius zonarius</i>	Australian Ringneck	■	■	X				
	<i>Barnardius zonarius barnardi</i>	Australian Ringneck	■	■	■				
	<i>Melopsittacus undulatus</i>	Budgerigar	X	■	X *				
	<i>Neophema chrysoptoma</i>	Blue-winged Parrot		■					
	<i>Neopsephotus bourkii</i>	Bourke's Parrot	X *	■	■				
	<i>Northiella haematogaster</i>	Blue Bonnet, Bluebonnet	■	X	X				
	<i>Psephotus haematonotus</i>	Red-rumped Parrot	■	■	■				
	<i>Psephotus varius</i>	Mulga Parrot		X	■				
Psophodidae	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush		■					
	<i>Cinclosoma castanotum</i> ~	Chestnut Quail-thrush		■					
	<i>Psophodes cristatus</i>	Chirruping Wedgebill		■					
Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	Spotted Bowerbird	■		■				
Rallidae	<i>Fulica atra</i>	Eurasian Coot		■					
	<i>Gallinula tenebrosa</i>	Dusky Moorhen		■					
	<i>Porphyrio porphyrio</i>	Purple Swamphen		■					
	<i>Porzana pusilla</i>	Baillon's Crake	■						
	<i>Tribonyx ventralis</i>	Black-tailed Native-hen	■	■	X				
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt		■	■				
	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		■	■				

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Birds									
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Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail		■					
	<i>Rhipidura leucophrys</i>	Willie Wagtail	X	■	X				
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper		■					
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		■					
	<i>Gallinago hardwickii</i>	Latham's Snipe		■					
	<i>Tringa nebularia</i>	Common Greenshank		■					
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook	■	■					
Threskiornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill	■	■	■				
	<i>Platalea regia</i>	Royal Spoonbill		■	■				
	<i>Plegadis falcinellus</i>	Glossy Ibis		■	■				
	<i>Threskiornis molucca</i>	Australian White Ibis		■	X				
	<i>Threskiornis spinicollis</i>	Straw-necked Ibis	■	■	■				
Turnicidae	<i>Turnix pyrrhothorax</i>	Red-chested Button-quail		■					
	<i>Turnix velox</i>	Little Button-quail		■					
Tytonidae	<i>Tyto javanica</i>	Eastern Barn Owl		■	X *				



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Reptiles

Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Agamidae	<i>Ctenophorus nuchalis</i>	Central Netted Dragon	X *	■					
	<i>Lophognathus burnsi</i>	Burns' Dragon				■	X		
	<i>Pogona barbata</i>	Bearded Dragon, Common Bearded Dragon, Eastern Bearded Dragon		■		■			
	<i>Pogona vitticeps</i>	Central Bearded Dragon	X *	■	X *	■		X *	
	<i>Tympanocryptis tetraporophora</i>	Eyrean Earless Dragon		■	X *				
Boidae	<i>Morelia spilota metcalfei</i>	Carpet Python, Diamond Python		■					
Carphodactylidae	<i>Nephurus levis</i>	Smooth Knob-tailed Gecko, Three-lined Knob-tail				■			
Chelidae	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle, Snake-necked Turtle			X *				
Diplodactylidae	<i>Diplodactylus conspicillatus</i> ~	Fat-tailed Diplodactylus, Fat-tailed Gecko		■					
	<i>Diplodactylus tessellatus</i>	Tessellated Gecko	X *	■	X *				
	<i>Diplodactylus vittatus</i>	Eastern Stone Gecko, Wood Gecko				■			
	<i>Rhynchoedura ormsbyi</i>	Eastern Beaked Gecko	X *	■	X				
	<i>Rhynchoedura</i> sp.	Beaked Gecko				■			
	<i>Strophurus ciliaris</i>	Northern Spiny-tailed Gecko		■					
Elapidae	<i>Brachyuropsis australis</i>	Coral Snake				■			
	<i>Denisonia devisi</i>	De Vis' Banded Snake	■						
	<i>Furina diadema</i>	Red-naped Snake		X *					
	<i>Parasuta dwyeri</i>	Dwyer's Snake	X *						
	<i>Pseudechis australis</i>	King Brown Snake, Mulga Snake	X *	X *		■			
	<i>Pseudonaja nuchalis</i>	Northern Brown Snake			X *				
	<i>Pseudonaja textilis</i>	Common Brown Snake, Eastern Brown Snake				■			
	<i>Suta suta</i>	Curl Snake, Myall Snake	X *	■	X *				
	<i>Vermicella annulata</i>	Bandy-bandy	X *						
Gekkonidae	<i>Gehyra dubia</i>	Dubious Dtella				■			
	<i>Gehyra variegata</i>	Tree Dtella	X *	■	X				
	<i>Heteronotia binoei</i>	Bynoe's Gecko	X *	X	X	■	X *	X	
	<i>Lucasium damaeum</i>	Beaded Gecko				■			

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Reptiles									
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Gekkonidae	<i>Lucasium steindachneri</i>	Box-patterned Gecko	X *	■	X				
	<i>Lucasium stenodactylum</i> ~	Crowned Gecko, Sand-plain Gecko		■					
	<i>Underwoodisaurus milii</i>	Barking Gecko, Thick-tailed Gecko		■					
Pygopodidae	<i>Delma inornata</i>	Patternless Delma				■			
	<i>Delma tincta</i>	Excitable Delma				■			
	<i>Lialis burtonis</i>	Burton's Snake-lizard	■			■			
Scincidae	<i>Cryptoblepharus</i> sp.	Snake-eyed Skink	X *		X *	■			
	<i>Ctenotus allotropis</i>	Brown-blazed Wedgesnout Ctenotus				■			
	<i>Ctenotus brooksi</i> ~	Brooks Ctenotus		■					
	<i>Ctenotus ingrami</i>	Unspotted Yellow-sided Ctenotus				■			
	<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus		X					
	<i>Ctenotus regius</i>	Pale-rumped Ctenotus, Royal Ctenotus	■	X *		■			
	<i>Ctenotus schomburgkii</i>	Barred Wedgesnout Ctenotus, Schomburgk's Ctenotus			X *	■			
	<i>Ctenotus</i> sp.	Ctenotus	X *	X *	X *				
	<i>Eremiascincus richardsonii</i>	Broad-banded Sand-swimmer		■		■			
	<i>Lerista labialis</i>	Southern Sandslider			X *				
	<i>Lerista punctatovittata</i>	Eastern Robust Slider	X	■	X *			X	
	<i>Lerista timida</i>	Timid Slider		X *	X *	■		X	
	<i>Menetia greyii</i>	Common Dwarf Skink, Grey's Menetia				■			
	<i>Morethia boulengeri</i>	Boulenger's Snake-eyed Skink, South-eastern Morethia Skink	X *	X *	X				
	<i>Proablepharus kinghorni</i>	Kinghorn's Snake-eyed Skink, Red-tailed Soil-crevice Skink				■			
	<i>Tiliqua rugosa</i>	Bobtail, Boggi, Pinecone Lizard, Shingle-back, Sleepy Lizard, Stumpy-tail	X	■	X				
<i>Tiliqua scincoides</i>	Eastern Blue-tongue	■		■					
Typhlopidae	<i>Ramphotyphlops bituberculatus</i>	Prong-snouted Blind Snake				■			
	<i>Ramphotyphlops ligatus</i>	Robust Blind Snake				■			
	<i>Ramphotyphlops</i> sp.	Blind Snake							X *
Varanidae	<i>Varanus gouldii</i>	Gould's Goanna		■	■				
	<i>Varanus tristis</i>	Black-headed Monitor	X		X *	■			
	<i>Varanus varius</i>	Lace Monitor		X *					



Frogs and Toads

Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Hylidae	<i>Cyclorana novaehollandiae</i>	New Holland Frog, Wide-mouthed Frog				■			
	<i>Cyclorana platycephala</i>	Water-holding Frog	X *	X	X *	■			
	<i>Cyclorana platycephala x verrucosa</i>	-			X				
	<i>Cyclorana verrucosa</i> ‡	Rough Frog	X *		X *	■			
	<i>Litoria caerulea</i>	Green Tree Frog	X	■	X				X
	<i>Litoria latopalmata</i>	Broad-palmed Frog, Gunther's Frog	X *						
	<i>Litoria peronii</i>	Peron's Tree Frog	X *	■	X *				
	<i>Litoria rubella</i>	Desert Tree Frog, Red Tree Frog	X	X	X	■		X *	
Myobatrachidae	<i>Crinia deserticola</i>	Desert Froglet	X *		X *				
	<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet			X *				
	<i>Limnodynastes fletcheri</i>	Barking Frog, Long-thumbed Frog, Marsh Frog	X *	■	X				
	<i>Limnodynastes salmini</i>	Salmon Striped Frog			X *				
	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog, Spotted Marsh Frog	X *	X					
	<i>Neobatrachus sudellae</i>	Sudell's Frog		■	X *	■			
	<i>Notaden bennettii</i>	Crucifix Frog, Holy Cross Frog	X *		■	■			
	<i>Platyplectrum ornatum</i>	Ornate Burrowing Frog	X *			■	X		
	<i>Uperoleia rugosa</i>	Wrinkled Toadlet	X *			■	X		

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Invertebrates

Butterflies and Moths								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Anthelidae	<i>Anthela callispila</i>	X *			X *	X *		
	<i>Anthela canescens</i>	X *						
	<i>Anthela reltoni</i>	X *						
	<i>Anthela</i> sp.	X *						
	<i>Anthela xantharcha</i>	X *						
Arctiidae	<i>Amata aperta</i>	X *						
	<i>Nyctemera amicus</i>	X *						
	<i>Utetheisa lotrix</i>	X *				X *	X *	
	<i>Utetheisa pulchelloides</i>	X *						
Cossidae	<i>Archaeoses pentasema</i>	X *						
	<i>Culama</i> sp.	X *						
	<i>Endoxyla amphiplecta</i>				X *		X *	
	<i>Xyleutes</i> sp.					X *		
Crambidae	<i>Deuterarcha xanthomela</i>	X *						
	<i>Glycythyma leonina</i>	X *						
	<i>Glyphodes microta</i>	X *						
	<i>Metallarcha eurychrysa</i>	X *						
	<i>Sceliodes cordalis</i> ^	X *						
	<i>Spoladea recurvalis</i> ^	X *			X *			
Geometridae	<i>Chlorocoma pediobates</i>	X *						
	<i>Gonodontis euctista</i>	X *						
	<i>Mixocera latilineata</i>	X *						
	<i>Oenochroma pallida</i>	X *						
	<i>Prasinocyma rhodocosma</i>	X *						
	<i>Thalaina macfarlandi</i>	X *						X *
Hepialidae	<i>Abantiades leucochiton</i>							X *
	<i>Trictena atripalpis</i>							X *
Lasiocampidae	<i>Entometa chlorosacca</i>							X *
	<i>Entometa</i> sp.	X *						
	<i>Eremaea coralliphora</i>	X *						X *
	<i>Eremaea zonospila</i>							X *
	<i>Genduara acedesta</i>				X *			
	<i>Pararguda tephropsis</i>	X *						



Butterflies and Moths

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Lycaenidae	<i>Candalides heathi</i>				X *			
	<i>Candalides heathi heathi</i>	X *						
	<i>Jalmenus icilius</i>	X *						
	<i>Nacaduba biocellata</i>				X *	X *	X *	
	<i>Nacaduba biocellata biocellata</i>	X *						
	<i>Theclinesstes miskini</i>				X *			
	<i>Theclinesstes miskini miskini</i>	X *						
	<i>Theclinesstes serpentatus serpentatus</i>	X *						
	<i>Zizeeria karsandra</i>	X *						X *
	<i>Zizina otis labradus</i>	X *				X *	X *	X *
Lymantriidae	<i>Acyphas semiochrea</i>						X *	
Noctuidae	<i>Achaea janata</i> ^	X *						
	<i>Athetis tenuis</i>	X *						
	<i>Calophasidia latens</i>	X *						
	<i>Chasmina pulchra</i>	X *						
	<i>Chrysodeixis argentifera</i> ^	X *						
	<i>Cruria nr donowani</i>				X *			
	<i>Ectopatria horologa</i>	X *						
	<i>Ectopatria nr mundoides</i>	X *						
	<i>Eudesmeola lawsoni</i>	X *						
	<i>Grammodes ocellata</i>	X *						
	<i>Grammodes pulcherrima</i>	X *						
	<i>Helicoverpa punctigera</i> ^	X *						
	<i>Heliocheilus mesoleuca</i>	X *						
	<i>Heliocheilus sp.</i>	X *						
	<i>Heliocheilus vulpinotatus</i>	X *						
	<i>Heliothis punctifera</i>	X *						
	<i>Ipanica cornigera</i>	X *				X *		
	<i>Leucania cruegeri</i>	X *						
	<i>Leucania stenographa</i> ^	X *						
	<i>Leucania uda</i>	X *						
	<i>Maliattha amorphia</i>	X *						
	<i>Mataeomera nr dubia</i>	X *						
	<i>Micrapatetis icela</i>	X *						

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Butterflies and Moths

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Noctuidae	<i>Mocis alterna</i> ^	X *						
	<i>Ophiusa disjungens</i>					X *	X *	
	<i>Ophiusa parcemacula</i>	X *						
	<i>Ophiusa tirhaca</i>					X *	X *	
	<i>Ozarba chrysaspis</i>	X *						
	<i>Ozarba punctigera</i>	X *						
	<i>Pandesma submurina</i>	X *					X *	
	<i>Pantylidia sparsa</i>	X *						
	<i>Pataeta carbo</i>	X *						
	<i>Praxis</i> sp.	X *						
	<i>Prionoptera grammatistis</i>	X *						
	<i>Prorocopis euxantha</i>	X *						
	<i>Spodoptera exigua</i> ^	X *						
	<i>Unplaced auferens</i>	X *						
	<i>Unplaced spilonota</i>	X *						
	<i>Xanthodes congenita</i>	X *						
	<i>Xenogenes gloriosa</i>	X *						
Nolidae	<i>Armactica columbina</i>	X *						
	<i>Armactica conchidia</i>	X *						
	<i>Earias chlorodes</i>	X *						
	<i>Earias huegeliana</i> ^	X *						
	<i>Earias parallella</i>	X *						
Notodontidae	<i>Trichiocercus sparshalli</i>	X *						
Nymphalidae	<i>Danaus chrysippus</i>				X *	X *	X *	
	<i>Danaus petilia</i>	X *						
	<i>Hypolimnas bolina nerina</i>	X *			X *	X *	X *	
	<i>Junonia villida</i>				X	X *		
	<i>Junonia villida calybe</i>	X *						
	<i>Vanessa kershawi</i>	X *						
Papilionidae	<i>Papilio demoleus</i>						X *	
	<i>Papilio demoleus sthenelus</i>	X *						
Pieridae	<i>Belenois java</i>				X *	X *	X *	
	<i>Belenois java teutonia</i>	X *						
	<i>Catopsilia pomona</i>				X *			
	<i>Catopsilia pyranthe</i>						X *	
	<i>Delias aganippe</i>					X *		
	<i>Delias argenthona</i>					X *		
	<i>Elodina padusa</i>	X *	X *					



Butterflies and Moths

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Pieridae	<i>Eurema hecabe</i>				X *	X *		
	<i>Eurema smilax</i>				X *	X *	X *	
	<i>Eurema smilax smilax</i>	X *						
	<i>Pieris rapae</i> ^	X *						
Pterophoridae	<i>Megalorhipida leucodactyla</i>	X *						
Pyralidae	<i>Persicoptera iochyta</i>	X *						
Sphingidae	<i>Agrius convolvuli</i>				X *			
	<i>Agrius godarti</i>	X *						
	<i>Cephonodes kingii</i>					X *		
	<i>Hippotion celerio</i> ^	X *				X *	X *	
	<i>Hippotion scrofa</i>	X *					X *	
	<i>Hopliocnema brachycera</i>	X *						
	<i>Hyles livornicoides</i>				X *	X *		
	<i>Psilogamma menephron</i>	X *						
Uraniidae	<i>Phazaca interrupta</i>	X *						

Flies

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Apioceridae	<i>Apiocera</i> sp.				X	X *	X *	
Asilidae	<i>Blepharotes coriarius</i>				■			
Bombyliidae	<i>Anthrax incomptus</i>				■	X *		
	<i>Anthrax maculatus</i>				X *	X *		
	<i>Anthrax torulus</i>					■		
	<i>Balaana abscondita</i>				X *	X *		
	<i>Balaana latelimbata</i>				■			
	<i>Balaana nr centrosa</i>					X *		
	<i>Comptosia nr acantha</i>				X *			
	<i>Comptosia nr biguttata</i>				X *			

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Flies								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Bombyliidae	<i>Comptosia</i> nr <i>microrhynchus</i> 01				X *			
	<i>Comptosia</i> nr <i>microrhynchus</i> 02				■			
	<i>Comptosia</i> nr <i>neobiguttata</i>				X *			
	<i>Comptosia</i> nr <i>prosimplex</i>				X *			
	<i>Docidomyia isla</i>					X *		
	<i>Docidomyia parva</i>					X *		
	<i>Docidomyia puellaris</i>				X *			
	<i>Kapu adalaidica</i>				X *			
	<i>Kapu corusca</i>				X *			
	<i>Kapu irwini</i>				X *	X *		
	<i>Larrpana</i> nr <i>zwicki</i>				■			
	<i>Ligyra bombylifformis</i> complex				X *	X		
	<i>Ligyra bombylifformis</i> complex - 5submarg				X *			
	<i>Ligyra calabyana</i>				X *			
	<i>Ligyra cingulata</i>				X	X *		
	<i>Ligyra cingulata</i> var. <i>incompleta</i>				X	X		
	<i>Ligyra fasciata</i>				X	X *		
	<i>Ligyra hemifusca</i>				X	X *		
	<i>Ligyra macraspis</i>				X *	X *		
	<i>Ligyra</i> nr <i>burnsi</i>				■			
	<i>Ligyra</i> nr <i>cingulata</i>				X *			
	<i>Ligyra</i> nr <i>cingulata</i> var. <i>incompleta</i>				X *			
	<i>Ligyra</i> nr <i>fasciata</i>				X *	X *		
	<i>Ligyra</i> nr <i>tenebrosa</i>				X *	X		
	<i>Ligyra orest</i>				X	X		
	<i>Ligyra robertsi</i>				X *	X *		
	<i>Ligyra septentrionis</i>					X *		
	<i>Munjua paralutea</i>				X *			
	<i>Neosardus</i> nr <i>danielsi</i>					X *		
	<i>Palirika culgoafloodplainensis</i> n. sp.					○		
	<i>Pseudopenthes fenestrata</i>					X *		
	<i>Wurda emu</i>					X		X *
	<i>Wurda</i> nr <i>windorah</i>					X *		X *
<i>Wurda windorah</i>					X *	X *	X *	
Conopidae	<i>Australoconops uncinctus</i>						X *	
	<i>Pleurocerina longicornis</i>				X *			
Syrphidae	<i>Ceriana opuntiae</i>				X *			
	<i>Ceriana ornata</i>				X *			
Tabanidae	<i>Lilaea fuliginosa</i>				X *			



Twisted-wing Parasites

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Corioxenidae	<i>Triozocera curvimaxillaria</i>				X *			

Beetles

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Cleridae	<i>Notopilo culgoensis</i> n. gen. n. sp.				■			
	<i>Notopilo emmotti</i> n. gen. n. sp.					X *		
	<i>Notopilo</i> n. gen. n. sp. 01				X *	X *		
	<i>Notopilo</i> n. gen. n. sp. 02				X *	X *		
Scarabaeidae	<i>Digitonthophagus gazella</i>				X		X *	
	<i>Euoniticellus intermedius</i>				X *			
	<i>Onitis alexis</i>				X *		X *	
	<i>Onthophagus consentaneus</i>				X *			
	<i>Onthophagus</i> n. sp. NSW1				○		X *	
	<i>Onthophagus</i> nr <i>dandalu</i>						X *	
	<i>Onthophagus subocelliger</i>				X *		X *	
	<i>Onthophagus worooa</i>				X *			
	<i>Semanopterus</i> sp.				X *			

Moth Lacewings

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Ithonidae	<i>Varnia implexa</i>						X *	

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Cicadas								
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Cicadidae	Tamasa n. sp. BushBlitz						○	

True Bugs — Terrestrial								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Alydidae	<i>Melanacanthus scutellaris</i> ^				■	X *		
	<i>Melanacanthus</i> sp. BBCULG/Msp. 31				X *			
Coreidae	<i>Aulacosternum nigrorubrum</i>				X *	X *		
	<i>Cletus similis</i>				X	X *		
Cydnidae	<i>Cydnidae</i> sp. BBCULG/Msp. 26				■			
	<i>Cydnidae</i> sp. BBCULG/Msp. 27				■			
Enicocephalidae	<i>Oncyclocotis</i> sp. BBCULG/Msp. 34				X *			
	<i>Systelloderes</i> n. sp. BBCULG/Msp. 32				○			
	<i>Systelloderes</i> n. sp. BBCULG/Msp. 33				○			
Geocoridae	<i>Germalus</i> sp. BBCULG/Msp. 11				X *			
Lygaeidae	nr <i>Koscocrompus</i> sp. BBCULG/Msp. 13					X *		
	<i>Nysius vinitor</i> ^				X	X *	X *	
Miridae	<i>Ausejanus</i> sp. BBCULG/Msp. 51				■	X *		
	<i>Chimsunchartella schwartzi</i>					X *		
	<i>Creontiades</i> sp. BBCULG/Msp. 44				X *			
	<i>Deraeocorini</i> sp. BBCULG/Msp. 48				■			
	<i>Kirkaldyella</i> nr <i>anasilloi</i> BBCULG/Msp. 54				■			
	Miridae n. gen. n. sp. BBCULG/Msp. 43				○			
	Miridae n. gen. n. sp. BBCULG/Msp. 58					○		
	Miridae n. gen. n. sp. BBCULG/Msp. 59					○		
	Miridae n. gen. n. sp. BBCULG/Msp. 60					○		
	<i>Mirini</i> sp. BBCULG/Msp. 46				X			
	nr <i>Ommatodema</i> sp. BBCULG/Msp. 45					X *		
	<i>Orthotylini</i> sp. BBCULG/Msp. 55					X *		
	<i>Orthotylini</i> sp. BBCULG/Msp. 56					X *		
	<i>Orthotylini</i> sp. BBCULG/Msp. 57					X *		
<i>Orthotylini</i> sp. BBCULG/Msp. 58					X *			



True Bugs — Terrestrial

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Miridae	<i>Peritropis</i> sp. 01 BBCULG/Msp. 42				X			
	<i>Peritropis</i> sp. 02 BBCULG/Msp. 42				X *			
	<i>Phylini</i> sp. BBCULG/Msp. 49				X	X *		
	<i>Phylini</i> sp. BBCULG/Msp. 50				■			
	<i>Phylini</i> sp. BBCULG/Msp. 52				X *			
	<i>Phylini</i> sp. BBCULG/Msp. 53				X			
	<i>Watarrkamiris</i> sp. BBCULG/Msp. 61				X			
Nabidae	<i>Nabis kinbergii</i>				X *			
Oxycarenidae	<i>Oxycarenum westraliense</i>				■			
Pachygronthidae	<i>Opistostenus vulturnus</i>				X *			
	<i>Stenophylla macreta</i>				X	X *		
Pentatomidae	<i>Dictyotus</i> nr <i>roei</i> BBCULG/Msp. 22				X *			
	<i>Kapunda trougtoni</i>				X *	X *		
	<i>Macrocarenoides scutellatus</i>				X			
	<i>Menida</i> sp. BBCULG/Msp. 21				X *			
	nr <i>Neosurenum</i> sp. BBCULG/Msp. 19				■			
	<i>Parapoecilometis campbelli</i>				■			
	<i>Poecilometis fuscescens</i>				X *			
	<i>Poecilometis punctiventris</i>						X *	
Reduviidae	<i>Peirates</i> sp. BBCULG/Msp. 40				X *			
	Reduviidae sp. BBCULG/Msp. 41					X *		
Rhyparochromidae	<i>Euander</i> sp. BBCULG/Msp. 08				■			
	<i>Fontejus</i> sp. BBCULG/Msp. 10				X *			
	<i>Lethaeini</i> sp. BBCULG/Msp. 06				X *	X *		
	<i>Plinthisus australiensis</i>				X	X *		
	<i>Plinthisus woodwardi</i>				X *			
	Rhyparochrominae sp. BBCULG/Msp. 04				X *			
	Rhyparochrominae sp. BBCULG/Msp. 05				X *			
	Rhyparochromini sp. BBCULG/Msp. 07				X			
	<i>Udeocoris scudderi</i>				X *	X *		
Schizopteridae	Schizopteridae sp. BBCULG/Msp. 35				■			
Scutelleridae	<i>Morbora schoutedeni</i>					X *	X *	
Tingidae	<i>Eritingis</i> sp. BBCULG/Msp. 38					X *		
	<i>Lasiacantha spinosa</i>				X *			
	<i>Urentius sarinae</i>				■	X *		

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True Bugs — Aquatic								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Belostomatidae	<i>Lethocerus insulanus</i>	X *						
Corixidae	<i>Agraptocorixa parvipunctata</i>	X *		X *				
	<i>Micronecta</i> sp.	X *						
Nepidae	<i>Ranatra dispar</i>	X *						
Notonectidae	<i>Anisops</i> sp.	X *						
	<i>Anisops stali</i>	X *		X *				
	<i>Anisops thienemanni</i>	X *						

Grasshoppers								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Acrididae	<i>Austracris guttulosa</i> ^				X *	X *	X *	
	<i>Goniaea australasiae</i>				X *			
	<i>Goniaea vocans</i>				X *	X *		
	<i>Stropis maculosa</i>				■	X *		
Pyrgomorphidae	<i>Monistria pustulifera</i>						X *	

Damselflies and Dragonflies								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Aeshnidae	<i>Anax papuensis</i>	X *			X *		X *	
	<i>Austrogynacantha heterogena</i>	X *						
Coenagrionidae	<i>Ischnura aurora</i>	X *	X *	X *	X	X *	X *	
	<i>Ischnura heterosticta</i>				X			
	<i>Xanthagrion erythronerum</i>	X *			X		X *	
Corduliidae	<i>Hemicordulia tau</i>	X *			X *		X *	



Damselflies and Dragonflies

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Lestidae	<i>Austrolestes aridus</i>	X *		X *			X *	
	<i>Austrolestes leda</i>	X *			X *			
Libellulidae	<i>Diplacodes bipunctata</i>	X *	X *	X *	X *	X *	X *	
	<i>Diplacodes haematodes</i>	X *						
	<i>Orthetrum caledonicum</i>	X *	X *	X *	X	X *	X *	
	<i>Pantala flavescens</i>		X *				X *	

Spiders

Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Filistatidae	<i>Pritha</i> sp.				■			
Hersiliidae	<i>Tamopsis</i> sp.				■			
Lycosidae	<i>Agalenocosa fallax</i>				■	■		
	<i>Hogna crispipes</i>				■			
	<i>Lycosa godeffroyi</i>				■			
	<i>Lycosa</i> sp. 1 "bigeyes"				■			
	<i>Lycosa</i> sp. 2 "spinyymb"				■			
Miturgidae	<i>Miturgopelma</i> n. gen n. sp. "21merigol"				■	■		
	<i>Miturgopelma</i> n. gen n. sp. "bogantungan"				■			
	<i>Miturgopelma</i> n. gen n. sp. "dulacca"				■			
Oonopidae	<i>Opopaea</i> sp.				■			
Oxyopidae	<i>Oxyopes</i> sp.				■			
Prodidomidae	Molycriniinae sp.				■			
	Prodidomidae sp.				■	■		
Trochanteriidae	<i>Pyrnus</i> sp.				■			
Zodariidae	<i>Habronestes</i> sp.				■	■		
	Zodariidae sp.				■			
Zoridae	<i>Argoctenus</i> sp.				■			
	<i>Tuxoctenus</i> sp.				■	■		

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Snails — Terrestrial								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Camaenidae	Camaenidae msp WN 8	○						
	<i>Galadistes alleni</i>	X *						
Punctidae	<i>Paralaoma caputspinulae</i>	X *						
Pupillidae	<i>Gastrocopta hedleyi</i>	X *						
	<i>Gastrocopta larapinta</i>	X *						
	<i>Gastrocopta margaretae</i>			X *				
	<i>Gastrocopta pediculus</i>	X *						
	<i>Pupoides pacificus</i>	X *		X *				
Subulinidae	<i>Eremopeas interioris</i>	X *						
Succineidae	<i>Austrosuccinea macgillivrayi</i>	X *						

Snails — Freshwater								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Bithyniidae	<i>Gabbia campicola</i>	X *						
Planorbidae	<i>Glyptophysa gibbosa</i>	X *	■	X *				
	<i>Isidorella newcombi</i>	X *		X *				
Thiaridae	<i>Thiara balonnensis</i>	X						
Viviparidae	<i>Notopala kingi suprafasciata</i>	X *						
	<i>Notopala sublineata sublineata</i> †	X						

Mussels								
Family	Species	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Hyriidae	<i>Alathyria jacksoni</i>	X *						
	<i>Velesunio ambiguus</i>			X *				



Flora

Flowering Plants										
Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Acanthaceae	<i>Rostellularia adscendens</i> subsp. <i>adscendens</i>						X *			
	<i>Rostellularia adscendens</i> var. <i>pogonanthera</i>							X *		
Aizoaceae	<i>Tetragonia moorei</i>		■							
Alismataceae	<i>Damasonium minus</i>						X *			
Amaranthaceae	<i>Alternanthera denticulata</i>						X *	X *		
	<i>Alternanthera nodiflora</i>			■						
	<i>Amaranthus macrocarpus</i> var. <i>macrocarpus</i>						X *	X *		
	<i>Ptilotus nobilis</i>						X *			
	<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>		X *							
	<i>Ptilotus obovatus</i>		X *							
	<i>Ptilotus obovatus</i> var. <i>obovatus</i>						X *			
	<i>Ptilotus polystachyus</i>		■							
	<i>Ptilotus sessilifolius</i>		X *				X *			
	<i>Ptilotus sessilifolius</i> var. <i>sessilifolius</i>		X *							
	<i>Ptilotus</i> sp.		X *							
Amaryllidaceae	<i>Calostemma purpureum</i>		■							
Apiaceae	<i>Daucus glochidiatus</i> (form F)						X *			
	<i>Eryngium</i> cf. <i>paludosum</i>			X *						
Apocynaceae	<i>Alstonia constricta</i>	X *						X *		
	<i>Marsdenia australis</i>		X *							
	<i>Sarcostemma</i> sp.		X *							
Asparagaceae	<i>Thysanotus baueri</i>			■						
Asteraceae	<i>Actinobole uliginosum</i>			■						
	Asteraceae sp.		X *							
	<i>Brachyscome ciliaris</i> var. <i>subintegrifolia</i>							X *		
	<i>Brachyscome melanocarpa</i>			■			X *			
	<i>Calendula arvensis</i> ^						X *			
	<i>Calotis cuneata</i>							X *		

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Flowering Plants

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Asteraceae	<i>Calotis cuneifolia</i>						X *	X *		
	<i>Calotis hispidula</i>						X *			
	<i>Calotis lappulacea</i>							X *		
	<i>Calotis plumulifera</i>		■							
	<i>Calotis scabiosifolia</i> var. <i>scabiosifolia</i>						X *			
	<i>Centaurea melitensis</i> ^						X *			
	<i>Centipeda crateriformis</i>		■							
	<i>Centipeda cunninghamii</i>	X *								
	<i>Centipeda minima</i>	X *						X *		
	<i>Chrysocephalum apiculatum</i>							X *		
	<i>Eclipta platyglossa</i>							X *		
	<i>Epaltes cunninghamii</i>						X *			
	<i>Flaveria trinervia</i>							X *		
	<i>Gnephosis arachnoidea</i>	■						X *		
	<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i> ^								X *	
	<i>Hyalosperma semisterile</i>	■								



Flowering Plants

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Asteraceae	<i>Leiocarpa leptolepis</i>	■								
	<i>Leiocarpa tomentosa</i>						X *			
	<i>Leiocarpa websteri</i>	■								
	<i>Leptorhynchos baileyi</i>			■						
	<i>Minuria integerrima</i>		X *			X *	X *			
	<i>Minuria</i> sp.							X *		
	<i>Olearia pimeleoides</i>		■							
	<i>Onopordum acanthium</i> subsp. <i>acanthium</i> ^						X *			
	<i>Podolepis</i> sp.					X *				
	<i>Pseudognaphalium luteoalbum</i>						X *			
	<i>Pycnosorus globosus</i>						X *			
	<i>Rhodanthe corymbiflora</i>			■						
	<i>Rhodanthe floribunda</i>						X *			
	<i>Rhodanthe stricta</i>						X *			
	<i>Rhodanthe uniflora</i>	■								
	<i>Rutidosis helichrysoides</i>		■							
	<i>Senecio lanibracteus</i>		■							
	<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>						X *			
	<i>Silybum marianum</i> ^								X *	
	<i>Sonchus oleraceus</i> ^						X *			
	<i>Vittadinia cuneata</i> var. <i>cuneata</i>						X *			
	<i>Vittadinia cuneata</i> var. <i>hirsuta</i>						X *			
	<i>Vittadinia eremaea</i>				■					
	<i>Vittadinia sulcata</i>								X *	
	<i>Xanthium spinosum</i> ^						X *			
	<i>Xanthium strumarium</i> ^						X *			
Boraginaceae	<i>Halgania cyanea</i>									X *
	<i>Heliotropium curassavicum</i>		X *							
Brassicaceae	<i>Lepidium africanum</i> ^							X *		
	<i>Lepidium fasciculatum</i>						X *			
	<i>Lepidium oxytrichum</i>	X *								
	<i>Lepidium phlebopetalum</i>	X *								
	<i>Lepidium pseudohyssopifolium</i>						X *			
	<i>Lepidium sagittulatum</i>	X *								

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Flowering Plants

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Brassicaceae	<i>Menkea australis</i>						X *			
	<i>Sisymbrium erysimoides</i> ^						X *			
	<i>Sisymbrium irio</i> ^							X *		
Campanulaceae	<i>Wahlenbergia fluminalis</i>							X *		
	<i>Wahlenbergia stricta</i> subsp. <i>alterna</i>							X *		
Capparaceae	<i>Apophyllum anomalum</i>		X *				X *			
	<i>Capparis lasiantha</i>						X *			
	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i> ~				X *					
	<i>Capparis mitchellii</i>			X *			X *	X *		
Caryophyllaceae	<i>Petrorhagia nanteuilii</i> ^						X *			
	<i>Spergularia marina</i>		X *							
	<i>Stellaria angustifolia</i>						X *			
Casuarinaceae	<i>Casuarina cristata</i>		X *				X *			
	<i>Casuarina pauper</i>		X *							
Chenopodiaceae	<i>Atriplex eardleyae</i>			■			X *			
	<i>Atriplex leptocarpa</i>						X *			
	<i>Atriplex lindleyi</i>						X *			
	<i>Atriplex muelleri</i>						X *			
	<i>Atriplex nessorhina</i>		■							
	<i>Atriplex pseudocampanulata</i>			■						
	<i>Atriplex spongiosa</i>		■							
	<i>Atriplex stipitata</i>	X *	X *							
	<i>Atriplex suberecta</i>		■							
	<i>Chenopodium curvispicatum</i>			X *	X *					
	<i>Chenopodium desertorum</i> subsp. <i>desertorum</i>						X *	X *		
	<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>		X *							
	<i>Chenopodium nitrariaceum</i>						X *			
	<i>Dissocarpus paradoxus</i>		X *							
	<i>Dysphania littoralis</i>	■					X *			
	<i>Dysphania melanocarpa</i>	■								
	<i>Dysphania pumilio</i>						X *			
	<i>Einadia hastata</i>							X *		
	<i>Einadia nutans</i> subsp. <i>eremaea</i>						X *			
	<i>Einadia nutans</i> subsp. <i>linifolia</i>		X *				X *			
<i>Einadia nutans</i> subsp. <i>nutans</i>		X *	X *			X *	X *			
<i>Einadia nutans</i> subsp. <i>oxycarpa</i>						X *				
<i>Einadia polygonoides</i>						X *				



Flowering Plants

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Chenopodiaceae	<i>Enchylaena tomentosa</i>		X *				X *			
	<i>Maireana aphylla</i>						X *			
	<i>Maireana coronata</i>						X *			
	<i>Maireana decalvans</i>		■				X *			
	<i>Maireana enchylaenoides</i>							X *		
	<i>Maireana microphylla</i>						X *			
	<i>Maireana tomentosa</i>		■							
	<i>Malacocera tricornis</i>						X *			
	<i>Rhagodia spinescens</i>						X *			
	<i>Salsola australis</i>						X *			
	<i>Scleroblitum atriplicinum</i>						X *			
	<i>Sclerolaena bicornis</i>								X *	
	<i>Sclerolaena bicornis</i> var. <i>horrida</i>						X *			
	<i>Sclerolaena birchii</i>	X *					X *			
	<i>Sclerolaena calcarata</i>						X *			
	<i>Sclerolaena convexula</i>	X							X *	
	<i>Sclerolaena decurrens</i>						X *			
	<i>Sclerolaena diacantha</i>	■					X *			
	<i>Sclerolaena divaricata</i>						X *			
	<i>Sclerolaena eriacantha</i>			■			X *			
	<i>Sclerolaena lanicuspis</i>	■								
	<i>Sclerolaena muricata</i>			X *						
	<i>Sclerolaena muricata</i> var. <i>semiglabra</i>							X *		
	<i>Sclerolaena muricata</i> var. <i>villosa</i>							X *		
	<i>Sclerolaena</i> sp.			X *						
<i>Sclerolaena stelligera</i>							X *			
<i>Sclerolaena tricuspis</i>							X *			
<i>Sclerolaena ventricosa</i>							X *			
Convolvulaceae	<i>Evolvulus alsinoides</i>							X *		
	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>							X *		
Cucurbitaceae	<i>Citrullus lanatus</i> ^							X *		
	<i>Cucumis myriocarpus</i> ^						X *	X *		
Cupressaceae	<i>Callitris glaucophylla</i>		X *		X *		X *	X *		

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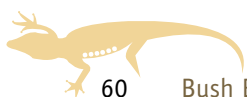
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Flowering Plants

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Cyperaceae	<i>Carex inversa</i>							X *		
	<i>Cyperus alterniflorus</i>						X *			
	<i>Cyperus bifax</i>						X *			
	<i>Cyperus difformis</i>						X *			
	<i>Cyperus gymnocaulos</i>		X *							
	<i>Cyperus rigidellus</i>						X *			
	<i>Eleocharis pallens</i>						X *			
	<i>Eleocharis pusilla</i>							X *		
	<i>Fimbristylis dichotoma</i>							X *		
Eriocaulaceae	<i>Eriocaulon carsonii</i> ~ #		■							
Euphorbiaceae	<i>Beyeria opaca</i>									X *
	<i>Beyeria viscosa</i>	X *								
	<i>Chamaesyce dallachyana</i>						X *			
	<i>Chamaesyce drummondii</i>	■					X *			
	<i>Chamaesyce</i> sp. B							X *		
	<i>Euphorbia tannensis</i>		■							
	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>		■							
Fabaceae	<i>Acacia aneura</i>	■		■	X			X *		
	<i>Acacia brachybotrya</i>					X *				X *
	<i>Acacia brachystachya</i>		X			X *		X *		
	<i>Acacia colletioides</i>		X *							
	<i>Acacia curranii</i> ~ #	■								
	<i>Acacia decora</i>						X *			
	<i>Acacia excelsa</i>	X *		X *				X *		
	<i>Acacia harpophylla</i>				■					
	<i>Acacia jennerae</i>		X *							
	<i>Acacia leiocalyx</i>					X *				
	<i>Acacia ligulata</i>		X *							
	<i>Acacia loderi</i>		X							
	<i>Acacia melvillei</i>		X *							
	<i>Acacia oswaldii</i>		X *				X *	X *		
	<i>Acacia pendula</i>						X *			
	<i>Acacia ramulosa</i>	■								
	<i>Acacia</i> sp.		X *		X *					
	<i>Acacia stenophylla</i>		■				X *			
	<i>Acacia tetragonophylla</i>	X *		X	X *					
	<i>Acacia victoriae</i>		X *							
<i>Acacia wilhelmiana</i>									X *	



Flowering Plants

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Fabaceae	<i>Caesalpinia gilliesii</i> ^				X *					
	<i>Jacksonia rhadinoclona</i>					X *				
	<i>Medicago laciniata</i> ^						X *			
	<i>Medicago polymorpha</i> ^						X *			
	<i>Petalostylis labicheoides</i>		■			X *				
	<i>Senna artemisioides</i>		X							
	<i>Senna artemisioides</i> subsp. x <i>petiolaris</i>		X *							
	<i>Senna circinnata</i>	■				X *	X *			
	<i>Sesbania cannabina</i>		■	X *						
	<i>Sesbania cannabina</i> var. <i>cannabina</i>						X *			
	<i>Swainsona affinis</i>		■							
	<i>Swainsona burkitti</i>		X *							
<i>Tephrosia sphaerospora</i>					■					
Goodeniaceae	<i>Goodenia fascicularis</i>						X *			
	<i>Scaevola depauperata</i>					X *				
	<i>Velleia glabrata</i>	X *		X *						
Haloragaceae	<i>Haloragis aspera</i>						X *	X *		
Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>longifolia</i>						X *			
Juncaceae	<i>Juncus aridicola</i>						X *			
Lamiaceae	<i>Dicrastylis lewellinii</i>					X *				
	<i>Lamium amplexicaule</i> ^						X *			
	<i>Marrubium vulgare</i> ^						X *			
	<i>Teucrium racemosum</i>			X *		X *	X *			
Lentibulariaceae	<i>Utricularia dichotoma</i>		■							
Loranthaceae	<i>Amyema lucasii</i>		X *				X *			
	<i>Amyema maidenii</i>							X *		
	<i>Amyema maidenii</i> subsp. <i>maidenii</i>				X *					
	<i>Amyema miquelii</i>							X *		
	<i>Amyema miraculosa</i> subsp. <i>boormanii</i>		X *		X *			X *		
	<i>Amyema quandang</i>		X *							
	<i>Lysiana subfalcata</i>							X *		

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Flowering Plants

Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Malvaceae	<i>Abutilon leucopetalum</i>			X *			X *			
	<i>Abutilon macrum</i>						X *			
	<i>Abutilon oxycarpum</i> var. <i>subsagittatum</i>		X *				X *			
	<i>Brachychiton populneus</i>					X *				
	<i>Hannafordia bissillii</i>	X *								
	<i>Hibiscus brachysiphonius</i>						X *			
	<i>Hibiscus trionum</i>						X *			
	<i>Keraudrenia integrifolia</i>					X *				
	<i>Malva parviflora</i> ^						X *			
	<i>Malva preissiana</i>							X *		
	<i>Malvastrum americanum</i> ^	X *					X *			
	<i>Sida corrugata</i>						X *			
	<i>Sida fibulifera</i>	X *					X *			
	<i>Sida filiformis</i>					X *				
	<i>Sida</i> sp. A						X *			
<i>Sida trichopoda</i>						X *				
Marsileaceae	<i>Marsilea drummondii</i>						X *	X *		
Meliaceae	<i>Owenia acidula</i>						X *			
Molluginaceae	<i>Glinus lotoides</i> ^	X *								
	<i>Glinus orygioides</i>		■							
Myrtaceae	<i>Angophora melanoxydon</i>	X *								
	<i>Calytrix longiflora</i>					X *				
	<i>Eucalyptus camaldulensis</i>		■	■			X *			
	<i>Eucalyptus camaldulensis</i> subsp. <i>arida</i>							X *		
	<i>Eucalyptus coolabah</i> subsp. <i>coolabah</i>			■			X *			
	<i>Eucalyptus dumosa</i>		X *					X *		X *
	<i>Eucalyptus gracilis</i>		X *							X *
	<i>Eucalyptus intertexta</i>							X *		X *
	<i>Eucalyptus largiflorens</i>			■			X *			
	<i>Eucalyptus leptophylla</i>									X *
	<i>Eucalyptus morrisii</i>							X *		
	<i>Eucalyptus populnea</i>					■				
	<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	X *	X *					X *		
	<i>Eucalyptus socialis</i>		X *							X *
	<i>Eucalyptus vicina</i>			■						
	<i>Melaleuca trichostachya</i>					X *				
<i>Micromyrtus hexamera</i>						X *				
Nitrariaceae	<i>Nitraria billardieri</i>			■		X *				



Flowering Plants

Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Nyctaginaceae	<i>Boerhavia cf. repleta</i>			X *						
	<i>Boerhavia dominii</i>						X *	X *		
Ophioglossaceae	<i>Ophioglossum polyphyllum</i>							X *		
Oxalidaceae	<i>Oxalis radicata</i>							X *		
Phrymaceae	<i>Mimulus gracilis</i>						X *			
	<i>Mimulus prostratus</i>	X *					X *			
	<i>Mimulus repens</i>		X					X *		
Phyllanthaceae	<i>Phyllanthus fuernrohrii</i>							X *		
	<i>Phyllanthus involutus</i>							X *		
	<i>Phyllanthus</i> sp.	X *								
Pittosporaceae	<i>Pittosporum angustifolium</i>		X *							
Plantaginaceae	<i>Plantago cunninghamii</i>						X *			
	<i>Plantago cunninghamii?</i>							X *		
	<i>Stemodia florulenta</i>		■							
	<i>Stemodia glabella</i>		■							
	<i>Stemodia</i> sp.	X *								
Poaceae	<i>Amphipogon caricinus</i>					X *				
	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>							X *		
	<i>Aristida latifolia</i>					X *				
	<i>Aristida latifolia?</i>			X *						
	<i>Austrostipa nodosa</i>							X *		
	<i>Austrostipa scabra</i>							X *		
	<i>Austrostipa scabra</i> subsp. <i>scabra</i>						X *			
	<i>Austrostipa</i> sp.		X *							
	<i>Austrostipa tuckeri</i>							X *		
	<i>Austrostipa verticillata</i>							X *		
	<i>Bothriochloa decipiens</i>						X *			
	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>							X *		
	<i>Cenchrus ciliaris</i> ^						X *			
	<i>Chloris truncata</i>						X *			
	<i>Cynodon dactylon</i>						X *			
	<i>Dichanthium</i> sp.							X *		
	<i>Digitaria divaricatissima</i>						X *			
<i>Eleusine tristachya</i> ^						X *				

Key

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Flowering Plants										
Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Poaceae	<i>Enteropogon acicularis</i>						X *			
	<i>Eragrostis australasica</i>						X *			
	<i>Eragrostis cilianensis</i> ^						X *	X *		
	<i>Eragrostis lacunaria</i>						X *	X *		
	<i>Eragrostis leptocarpa</i>						X *			
	<i>Eragrostis parviflora</i>						X *	X *		
	<i>Eragrostis pilosa</i> ^						X *			
	<i>Eragrostis setifolia</i>						X *			
	<i>Eragrostis</i> sp.			X *						
	<i>Eriochloa pseudoacrotricha</i>						X *			
	<i>Lachnagrostis filiformis</i>						X *			
	<i>Moorochloa eruciformis</i> ^						X *			
	<i>Panicum effusum</i>								X *	
	<i>Panicum laevinode</i>						X *			
	<i>Paspalidium constrictum</i>						X *			
	<i>Paspalidium jubiflorum</i>						X *	X *		
	<i>Rytidosperma fulvum</i>								X *	
	<i>Rytidosperma setaceum</i>								X *	
	<i>Sporobolus actinocladus</i>						X *			
	<i>Sporobolus caroli</i>						X *	X *		
	<i>Sporobolus mitchellii</i>			X *			X *			
	<i>Themeda australis</i>						X *			
	<i>Triodia scariosa</i> subsp. <i>scariosa</i>									X *
<i>Triraphis mollis</i>					X *					
<i>Urochloa praetervis</i>								X *		
Polygonaceae	<i>Muehlenbeckia florulenta</i>						X *			
	<i>Polygonum aviculare</i> ^							X *		
	<i>Rumex brownii</i> ^							X *		
Portulacaceae	<i>Calandrinia balonensis</i>					X *				
	<i>Calandrinia eremaea</i>			■						
	<i>Portulaca filifolia</i>								X *	
	<i>Portulaca oleracea</i>						X *			
Proteaceae	<i>Grevillea juncifolia</i> subsp. <i>juncifolia</i>					X *				
	<i>Grevillea striata</i>		X *							
	<i>Hakea leucoptera</i>		X *							
	<i>Hakea leucoptera</i> subsp. <i>leucoptera</i>				■					
Ranunculaceae	<i>Clematis microphylla</i> var. <i>microphylla</i>						X *			
Rhamnaceae	<i>Ventilago viminalis</i>	X *		X *			X *			



Flowering Plants

Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Rubiaceae	<i>Oldenlandia galioides</i> ~	■								
	<i>Psydrax oleifolia</i>					X *	X *			
Rutaceae	<i>Flindersia maculosa</i>		X		■		X *			
	<i>Geijera parviflora</i>		X *				X *	X *		
	<i>Phebalium glandulosum</i> subsp. <i>glandulosum</i>	■								
	<i>Philotheca linearis</i>							X *		
Santalaceae	<i>Santalum lanceolatum</i>								X *	
Sapindaceae	<i>Alectryon oleifolius</i>		X *							
	<i>Alectryon oleifolius</i> subsp. <i>canescens</i>						X *			
	<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>						X *			
	<i>Atalaya hemiglauc</i>			X			X *			
	<i>Dodonaea boroniifolia</i>					X *				
	<i>Dodonaea petiolaris</i>		■							
	<i>Dodonaea viscosa</i>		X *	X *						
	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>				■					
Scrophulariaceae	<i>Eremophila bignoniiflora</i>						X *			
	<i>Eremophila deserti</i>						X *			
	<i>Eremophila glabra</i>						X *			
	<i>Eremophila goodwinii</i>	X *		X *						
	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>			X *						
	<i>Eremophila longifolia</i>						X *			
	<i>Eremophila mitchellii</i>						X *			
	<i>Eremophila polyclada</i>		X *				X *			
Scrophulariaceae	<i>Eremophila serrulata</i>							X *		
	<i>Eremophila sturtii</i>		X *	X *			X *			
	<i>Myoporum montanum</i>		X *				X *			
Solanaceae	<i>Nicotiana megalosiphon</i> subsp. <i>megalosiphon</i>						X *			
	<i>Physalis lanceifolia</i> ^						X *			
	<i>Solanum ellipticum</i>		X *				X *			
	<i>Solanum esuriale</i>						X *			
	<i>Solanum ferocissimum</i>				■		X *			
	<i>Solanum nigrum</i> ^						X *	X *		
	<i>Solanum</i> sp.		X *						X *	

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Flowering Plants										
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Thymelaeaceae	<i>Pimelea ?trichostachya/simplex</i>	X *								
	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>						X *			
	<i>Pimelea trichostachya</i>		X *							X *
Typhaceae	<i>Typha orientalis</i>						X *			
Verbenaceae	<i>Verbena officinalis</i> ^						X *			
Zygophyllaceae	<i>Tribulus micrococcus</i> ^			■						
	<i>Tribulus terrestris</i> ^	■						X *		
	<i>Zygophyllum apiculatum</i>						X *			
	<i>Zygophyllum eremaeum</i>		X *							



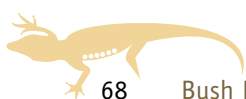
Paroo-Darling National Park © Copyright, Peter Taylor



Ferns										
Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Pteridaceae	<i>Cheilanthes sieberi</i>							X*		

Liverworts										
Family	Species	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Ricciaceae	<i>Riccia</i> sp. 01							X*		
	<i>Riccia</i> sp. 02							X*		

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Appendix B: Threatened Species

Additional supplements containing the appendices for individual reserves are available to download from:

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Nomenclature and taxonomy used in this appendix are consistent with that from the Australian Faunal Directory (AFD), the Australian Plant Name Index (APNI) and the Australian Plant Census (APC).

Current at March 2014

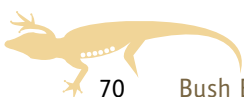


Fauna

Vertebrates

Mammals										
Family	Species	Common name	Status	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr	TSC—Endangered	X						
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	TSC — Vulnerable		■					
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	TSC — Vulnerable			■				
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	EPBC—Vulnerable TSC — Vulnerable					■		
Vespertilionidae	<i>Chalinolobus picatus</i>	Little Pied Bat	TSC — Vulnerable NCA — Near Threatened	X *	X *	■				

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 - TSC = Refers to the *Threatened Species Conservation Act 1995* (NSW)
 - FMA = Refers to the *Fisheries Management Act 1994* (NSW)
 - NCA = Refers to the *Nature Conservation Act 1992* (Qld)





Birds										
Family	Species	Common name	Status	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Tooral NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Accipitridae	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	TSC — Vulnerable		■					
	<i>Hieraaetus morphnoides</i>	Little Eagle	TSC — Vulnerable		■					
Anatidae	<i>Oxyura australis</i>	Blue-billed Duck	TSC — Vulnerable			■				
	<i>Stictonetta naevosa</i>	Freckled Duck	TSC — Vulnerable		■					
Cacatuidae	<i>Calyptrorhynchus banksii samueli</i>	Red-tailed Black Cockatoo	TSC — Vulnerable	■		X				
	<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	TSC — Vulnerable NCA—Vulnerable	■	■	X				
Falconidae	<i>Falco hypoleucos</i>	Grey Falcon	TSC — Endangered NCA — Near Threatened		■					
Gruidae	<i>Grus rubicunda</i>	Brolga	TSC — Vulnerable		■	X				
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater	TSC — Vulnerable		■					
	<i>Grantiella picta</i>	Painted Honeyeater	TSC — Vulnerable					■		
Otididae	<i>Ardeotis australis</i>	Australian Bustard	TSC—Endangered		■	■				
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin	TSC — Vulnerable		■					
Pomatostomidae	<i>Pomatostomus halli</i>	Hall's Babbler	TSC — Vulnerable		■					
	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	TSC — Vulnerable		■					
Psophodidae	<i>Cinclosoma castanotum</i>	Chestnut Quail-thrush	TSC — Vulnerable		■					

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Frogs and Toads

Family	Species	Common name	Status	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Hylidae	<i>Cyclorana verrucosa</i>	Rough Frog	NCA — Near Threatened	X *		X *	■			

Reptiles

Family	Species	Common name	Status	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Diplodactylidae	<i>Diplodactylus conspicillatus</i>	Fat-tailed Diplodactylus, Fat-tailed Gecko	TSC — Endangered		■					
Gekkonidae	<i>Lucasium stenodactylum</i>	Crowned Gecko, Sand-plain Gecko	TSC — Vulnerable		■					
Scincidae	<i>Ctenotus brooksi</i>	Brooks Ctenotus	TSC — Vulnerable		■					

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 - NCA = Refers to the *Nature Conservation Act 1992* (Qld)





Invertebrates

Snails—Freshwater										
Family	Species	Common name	Status	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Viviparidae	<i>Notopala sublineata sublineata</i>	River Snail	FMA — Endangered	X						

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Flora

Flowering Plants												
Family	Species	Common name	Status	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW	Nocoleche Nature Reserve, NSW	Nobbinnie Nature Reserve, NSW
Capparaceae	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i>	Narrow-leafed Bumble	TSC — Endangered				X *					
Eriocaulaceae	<i>Eriocaulon carsonii</i>	Salt Pipewort, Button Grass	EPBC — Endangered TSC — Endangered		■							
Fabaceae	<i>Acacia curranii</i>	Curly-bark Wattle	EPBC — Vulnerable TSC — Vulnerable	■								
Rubiaceae	<i>Oldenlandia galioides</i>	Sweet False Galium	TSC — Endangered	■								

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Appendix C: Exotic and Pest Species

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Current at March 2014



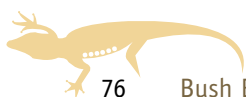
Fauna

Vertebrates

Mammals									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Bovidae	<i>Bos taurus</i>	European Cattle	X *		X *				
	<i>Capra hircus</i>	Goat			X				
	<i>Ovis aries</i>	Sheep			X *				
Canidae	<i>Vulpes vulpes</i>	Fox, Red Fox	X	X *	X				
Leporidae	<i>Lepus capensis</i>	Brown Hare			X *				
	<i>Oryctolagus cuniculus</i>	Rabbit		X *	X *				
Muridae	<i>Mus musculus</i>	House Mouse	X		X				
Suidae	<i>Sus scrofa</i>	Pig	X		X				

Birds									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl			X *				

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Invertebrates

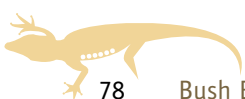
Butterflies and Moths									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Crambidae	<i>Sceliodes cordalis</i>	Eggfruit Caterpillar	X *						
	<i>Spoladea recurvalis</i>	Beet Webworm	X *			X *			
Noctuidae	<i>Achaea janata</i>	Castor Oil Semi-looper Moth	X *						
	<i>Chrysodeixis argentifera</i>	Tobacco Looper	X *						
	<i>Helicoverpa punctigera</i>	Native Budworm	X *						
	<i>Leucania stenographa</i>	Sugar Cane Armyworm	X *						
	<i>Mocis alterna</i>	Bean Looper	X *						
	<i>Spodoptera exigua</i>	Lesser Armyworm	X *						
Nolidae	<i>Earias huegeliana</i>	Rough Bollworm	X *						
Pieridae	<i>Pieris rapae</i>	Cabbage White Butterfly	X *						
Sphingidae	<i>Hippotion celerio</i>	Grapevine Hawk Moth	X *				X *	X *	

True Bugs—Terrestrial									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Alydidae	<i>Melanacanthus scutellaris</i>	Brown Bean Bug, Podsucking Bug				■	X *		
Lygaeidae	<i>Nysius vinitor</i>	Rutherglen Bug				X	X *	X *	



Grasshoppers									
Family	Species	Common name	Gundabooka State Conservation Area, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa Floodplain NP, Qld	Culgoa NP, NSW	Ledknapper NR, NSW	Quanda Nature Reserve, NSW
Acrididae	<i>Austracris guttulosa</i>	Spur-throated Locust				X *	X *	X *	

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Flora

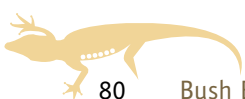
Flowering Plants									
Family	Species	Common name	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW
Asteraceae	<i>Calendula arvensis</i>	Field Marigold						X *	
	<i>Centaurea melitensis</i>	Maltese Cockspur, Cockspur Thistle						X *	
	<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed							X *
	<i>Onopordum acanthium</i> subsp. <i>acanthium</i>	Scotch Thistle						X *	
	<i>Silybum marianum</i>	Variiegated Thistle							X *
	<i>Sonchus oleraceus</i>	Common Sowthistle						X *	
	<i>Xanthium spinosum</i>	Bathurst Burr						X *	
	<i>Xanthium strumarium</i>	Noogoora Burr						X *	
Brassicaceae	<i>Lepidium africanum</i>	Rubble Peppercross, Common Peppercross							X *
	<i>Sisymbrium erysimoides</i>	Smooth Mustard						X *	
	<i>Sisymbrium irio</i>	London Rocket							X *
Caryophyllaceae	<i>Petrorhagia nanteuilii</i>	Proliferous Pink, Childing Pink						X *	
Cucurbitaceae	<i>Citrullus lanatus</i>	Watermelon, Wild Melon, Camel Melon, Bitter Melon							X *
	<i>Cucumis myriocarpus</i>	Paddy Melon						X *	X *
Fabaceae	<i>Caesalpinia gilliesii</i>	Bird-of-paradise Shrub				X *			
	<i>Medicago laciniata</i>	Cut-leaved Medic						X *	
	<i>Medicago polymorpha</i>	Burr Medic						X *	
Lamiaceae	<i>Lamium amplexicaule</i>	Henbit, Dead Nettle						X *	
	<i>Marrubium vulgare</i>	Horehound						X *	
Malvaceae	<i>Malva parviflora</i>	Small-flowered Mallow						X *	
	<i>Malvastrum americanum</i>	Spiked Malvastrum						X *	
Molluginaceae	<i>Glinus lotoides</i>	Hairy Carpet Weed	X *						
Poaceae	<i>Cenchrus ciliaris</i>	Buffel Grass						X *	
	<i>Eleusine tristachya</i>	Goose Grass, Crab Grass						X *	
	<i>Eragrostis cilianensis</i>	Stinkgrass						X *	X *
	<i>Eragrostis pilosa</i>	Soft Lovegrass						X *	
	<i>Moorochloa eruciformis</i>	Sweet Signal Grass						X *	
Polygonaceae	<i>Polygonum aviculare</i>	Wireweed							X *
	<i>Rumex brownii</i>	Swamp Dock							X *



Flowering Plants

Family	Species	Common name	Gundabooka NP, NSW	Paroo Darling NP, NSW	Toorale NP, NSW	Culgoa NP, NSW	Ledknapper Nature Reserve, NSW	Ginghet Nature Reserve, NSW	Mt Grenfell Historic Site, NSW
Solanaceae	<i>Physalis lanceifolia</i>	Lance-leaved Ground-cherry						X *	
	<i>Solanum nigrum</i>	Black Berry Nightshade						X *	X *
Verbenaceae	<i>Verbena officinalis</i>	Common Verbena, Vervain						X *	
Zygophyllaceae	<i>Tribulus micrococcus</i>	Yellow Vine			■				
	<i>Tribulus terrestris</i>	Cathead, Caltrop	■						X *

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Glossary



E

Entomophthoralean fungus

Fungi species belonging to the Entomophthorales order, most of which are pathogens of insects.

G

Gilgais

Small, ephemeral pools of water or lakes formed by a shallow depression in the soil surface.

M

Metapopulation

A group of populations consisting of the same species that are separated by space. These populations interact as individual members move from one population to another.

P

Paripinnate leaves

Having an even number of pinnae (leaflets) on either side of the central stalk (feather-like) and a pair in the terminal position.

Putative new species

A species that has been recognised by an expert as never having been named or described in the scientific literature. Note that specimens may already be in museum or herbarium collections.

S

Species range

The geographical area within which a particular species can be found.

T

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.

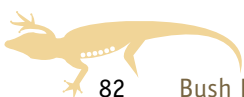
U

Undescribed taxon

A taxon (usually a species) that has not yet been formally described or named.



Wedge-tailed Eagle (*Aquila audax*), At A Glance Pty Ltd © Copyright, Department of the Environment





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- + Culgoa Floodplain National Park Qld
- + Culgoa National Park and Culgoa Nature Reserve NSW
- + Gundabooka National Park and Gundabooka State Conservation Area NSW
- + Paroo-Darling National Park and Paroo-Darling State Conservation Area NSW
- + Toorale National Park and Toorale State Conservation Area NSW
- + Mount Grenfell Historic Site and proposed Mount Grenfell National Park NSW
- + Ginghet Nature Reserve NSW
- + Ledknapper Nature Reserve NSW
- + Quanda, Nombinnie and Nocolche Nature Reserves NSW

Contributors

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Research agencies involved in this Bush Blitz were the Australian Museum, Queensland Museum, Royal Botanic Gardens Sydney, Queensland Parks and Wildlife Service, New South Wales National Parks and Wildlife Service, Department of Environment and Climate Change (NSW), Commonwealth Scientific and Industrial Research Organisation, Department of Industry and Investment—Primary Industries and Energy (NSW) and the University of New South Wales.

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FRONT COVER White-breasted Woodswallow (*Artamus leucorhynchus*), At A Glance Pty Ltd
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North-western NSW and southern Qld + 2009–2010



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