

East Birriliburu Project



**July - August 2018
Desert Discovery Inc.**

East Birriliburu Project- Contents

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Cover - Photograph and artwork by Maree Goods		

Introduction

Allen Hyde

This report provides details of Desert Discovery's "East Birriliburu" project held in the Little Sandy Desert in July/August 2018.

Discussions with Central Desert Native Title Services commenced soon after completion of our 2016 Project and by mid-2017 we had an in-principle agreement to hold a project in the eastern part of the Birriliburu native title determination area.

In late 2017 a reconnaissance of the proposed area of operation was conducted. Our team was accompanied by traditional owners and together the group identified the major points of interest and a suitable base camp location. This was at Eagle Hussar Bore on the Eagle Highway. This site afforded ready access to the study area and there was a good supply of water, although rather brackish.

As the bore at Eagle Hussar Bore did not have a hand pump it was decided that we would provide one. During the project we would use our submersible pump to raise water and leave the hand pump in situ when we left.

This site is close to the location of our 1998 project at Warri. This time the Warri location was used as a secondary camp. This site has an excellent water supply with hand pump.

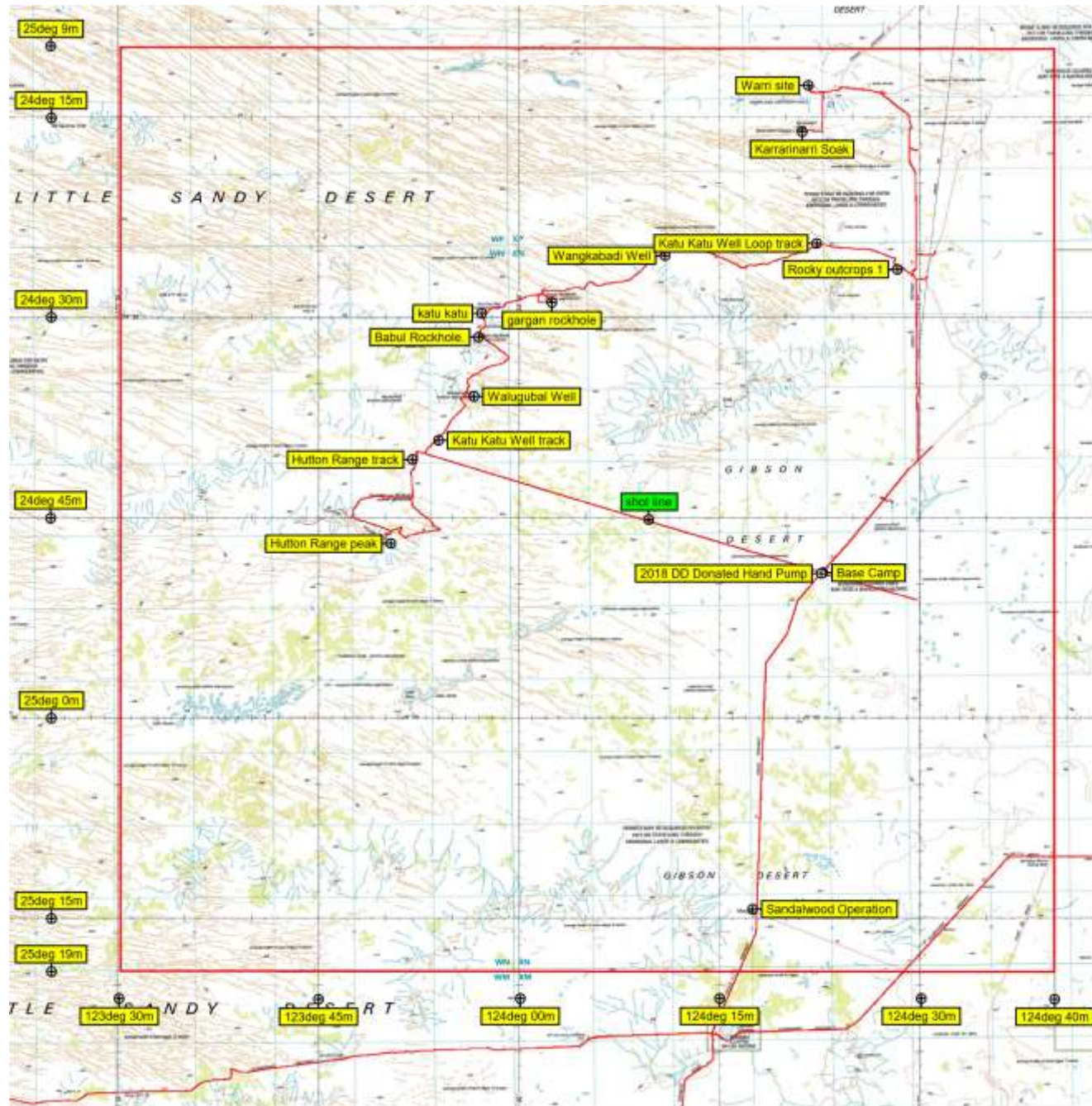
An "advance party" consisting of the Pioneers, Logistics and Management arrived at Base Camp a few days before the bulk of participants arrived. The Pioneers travelled and signposted the known tracks, and once completed, they commenced traversing the tracks that had not been travelled on during the reconnaissance trip. This included the Katu Katu Loop Track and the track to the Hutton Range. The Katu Katu Loop Track was extremely overgrown and in placed difficult to locate. With great determination the Pioneers opened this loop for other teams to follow. Although they managed to reach the Hutton Range, they deemed the track not suitable for volume traffic. They however managed to collect various samples on behalf of other teams.

Meanwhile the remainder of the advance party commenced construction of base camp and this was essentially completed prior to the arrival of the bulk of the participants. Over the next few days the project was in full swing.

As at previous projects, we invited the local school and schools that have previously attended one of our projects. The local school, Wiluna Remote Public School attended during the second week of the project, but unfortunately none of the various campuses of the Ngaanyatjarra Lands School was able to attend. This was primarily due to the very long distance they would need to travel. The opportunity to work with the Wiluna students and teachers and participate in two-way learning with them was much appreciated by all.

I trust that you will enjoy reading this report and can put the information in it to good use.

Tracks used during project – Map and Track Surveying by *Martin & Sandra Bailey*



Logistics Report

Ben Blomfield

Toward the end of June 2018, Eric Loughton and Ben picked up the DD Trailer from its storage site at Stuart Kostera's Yard in Walliston and brought it to Singleton for checking and reloading.

After much research and quotes, we were able to purchase new, a 6KVA Honda generator, a 2.8KVA Yamaha generator, an 80mm Grundfos submersible pump, a 20L electric urn, two new double ensuite, three single toilet Pop Up Toilet Tents, and some Jimmy's Thunderboxes. A new box was constructed to protect the new Pump in transport and the lot was somehow squeezed onto the trailer along with the rest of the DD gear. This new equipment provides some confidence against breakdowns in remote locations which could prove difficult.

The Royal Flying Doctor Medical Chest was picked up and thanks to Peter Macgill and Eric for transporting it and keeping it safe.

The Birriliburu advised that Eagle Hussar Bore had an existing water bore, but needed a hand pump to enable the TO's to access water when 'Out On Country' trips there. DD offered to Desert Support Services – the Facilitators of the Project, that we could install a handpump on the water bore after our project completion for the Traditional Owners. This was enthusiastically accepted by the TO's. Des Bunter of Geraldton fabricated the steel components of the handpump, and ordered the down bore pump components.

The Logistics Crew is composed of Eric and Joy Loughton, Des and Jan Bunter, Peter Macgill and Lynn Phillips, Peter Mann, Graham Young and Ben Blomfield. Unfortunately, Geoff Young and Jenny Taylor had to pull out due to health reasons.

The more locally based members met at the Bindoon Bakery on Sunday 15 July, and managed to reach Camel Camp, north of Paynes Find on the first night, and Gunbarrel Laager Travellers Rest the second night. Here we met Des and Jan, Rick Hunter and Allen Hyde.

Tuesday 17 July we met Tom Griffiths of Desert Support Services at their Wiluna base. We had ordered drums of diesel fuel to be delivered to Thomas's Earthworks premises at Gunbarrel Laager, and eight of these were loaded onto a DSS Trailer which Allen Hyde generously agreed to tow. Neither Tom nor any Birriliburu Rangers were available to travel with us, so we departed after lunch and stopped at Wongawol Station, 240Kms east of Wiluna and picked up four pre-loved grader blades which were loaded onto the fuel trailer. Many thanks to Madeline and Dillon for supplying the blades. We stopped at Mingol Camp that night beside a delightful billabong.

We were up too early for a low flying mustering helicopter to startle us before sun up, and we moved on to Carnegie Station to refuel. We met Sandra and Martin Bailey, and Helen and Neil Cocks at the Eagle Hwy turnoff as they had travelled up from Tjukayirla on the David Carnegie Rd. We camped at Eagle Hussar Bore that night. The Rangers and TO's will camp

at the shed while DD folk will create Base Camp 200m north near the Petroleum Bore and the Water Bore.

Fortunately the submersible pump fitted down the bore casing (despite a bend in the casing) and the generator was set up and pumping water was started immediately to flush the aquifer. The overhead tank and stand were erected and the donkey boiler and showers connected with reticulation piping.

Over the three preparation days the water system was completed, the toilets were set up, and thanks to extra volunteers, the marquee was erected. Also, Rick had the Communication System working ready for Day 1.

During the Project, the Logistics Team were kept busy maintaining toilet and shower tents, shifting toilets periodically, pumping up water to the overhead tank, lighting the donkey boiler, performing running repairs to participants camping equipment, dispensing fuel from the Fuel Dump, collecting firewood, and managing the campfire, urn and supper supplies. We are grateful to the many participants who also assisted with these jobs.

Three weeks later, after the BEST DD PROJECT EVER, it was time to start the dismantle and clean up. With many helping hands, this was completed quickly and the trailer was reloaded ready for the trip home.

On the last day, Dazzling Des and a band of helpers installed the stunning new hand pump with a professional sign showing DD donated it to the Birriliburu. It was a brilliant effort by Des!

Thank you so much to everyone who contributed to make the Project a great success. Many thanks to Stuart and Meg for providing safe storage for the trailer and gear.

Bird Team:

George Shevtsov
Linda Brotherton
Mark Binns
Wayne Sullivan
Allan Rose
Sandy Rose
Cheryl Gole
Martin Gole
Denzel Murfet
Graeme White

Botany Team:

Phil Bianchi
Richard House
Bevan Buirchell
Arlee McMahan
Mark Conlan
Sue Conlan
Russell Wait
Beryl Wait
Maree Goods
Graham Goods
Phil Trickett
Catriona Bate
Alan Bedggood
Wendy Bedggood

Logistics Team:

Ben Blomfield
Des Bunter Jan
Bunter
Mick Corney
Kim Knight
Eric Loughton
Joy Loughton
Peter Macgill
Lynn Phillips
Peter Mann
Geoff Young
Jenny Taylor

Mammal and Reptile Team:

Andreas Magun
Christien Magun
Mal McKinty
Judy McKinty
Nathan Johnson
Mirinda Thorpe
Bruce Hilar
Anne Hillas
John MacFarlane
Judy MacFarlane
Josh Mills
Graham Young
Libby Sakker
Lawrie Draper
Pat Draper
Bethany Lindorff
Chris Lindorff
Charlotte Lindorff
Helena Lindorff
Colleen Barnes
Peter Barnes
Denham Barnes
Iestyn Hoskins

Management Team:

Allen Hyde
Rick Hunter

Pioneer Team:

Martin Bailey
Sandra Bailey
Neil Cocks
Helen Cocks

Weather Observations

Eric Loughton

Weather observations taken with Min and Max thermometer inside Stevenson Screen.
All wind direction and speed recorded on wireless digital remote weather station at Eagle Hussar Bore, Gibson Desert.

Lack of wind speed recordings for four days due to operator absence from Base camp.

Weather recordings are very similar in range to those recorded on 2016 Bibarrd Desert Discovery Project.

Weather Observations

Day	Date	Min temp C	Max temp C	Cloud cover	Wind Direction	Gust Klms	Speed Klms
Thursday	19/07/2018		24.5	0	East		10
Friday	20/07/2018	3.5	27	0	East		10
Saturday	21/07/2018	5.5	31.3	0	NE/NW		30
Sunday	22/07/2018	11.5	30.5	4/8 > 8/8	Westerly	50	30
Monday	23/07/2018	11	27	0	SE	39.2	30
Tuesday	24/07/2018	5	27	4/8	SE		Light and variable
Wednesday	25/07/2018	4.5	29.5	0	East > N/W	27	19
Thursday	26/07/2018	9.5	26	0	SE	N/A	N/A
Friday	27/07/2018	4	24	0	SE	N/A	N/A
Saturday	28/07/2018	7.5	22.5	2/8	SE	N/A	N/A
Sunday	29/07/2018	4	25.5	0	NE	N/A	N/A
Monday	30/07/2018	3.5	28.5	0	NE		Light and variable
Tuesday	31/01/1900	9.5	29	4/8	E > SW	25.6	18.4
Wednesday	1/08/2018	5	30	1/8	N/W	51.5	30
Thursday	2/08/2018	9	25.2	4/8	SW	50	40
Friday	3/08/2018	1	24	0	SW	36	23
Saturday	4/08/2018	0	23	0	SW > W	42.8	30.6
Sunday	5/08/2018	8.5	18.5	1/8	SW > S	31.7	20
Monday	6/08/2018	-1.5	19.5	0	SW > SE	30.6	Light and variable
Tuesday	7/08/2018	-2	23.5	0	East	19.4	14.8
Wednesday	8/08/2018	1	27	0	SE > E > NE	27	19.4
Thursday	9/08/2018	1	29	0	N > NW		Windy

Bird Surveys Report

Cheryl Gole

Summary

Between 23 July and 8 August 2018, ten volunteer Desert Discovery members and invited participants undertook systematic bird surveys in the Desert Discovery East Birriliburu Project region. One hundred and eleven bird species were recorded in 370 systematic surveys and 22 incidental records and there were 1531 individual records of birds. The bird surveys have contributed significant data to the Birriluburu people and have hopefully built a legacy of survey sites that might be repeatedly surveyed in the future.

The East Birriliburu Bird Surveys

The bird survey team comprised 10 people in five vehicles: Cheryl Gole (team leader), Mark Binns, Linda Brotherton, Martin Gole, Denzel Murfet, Wayne O’Sullivan, Allan Rose, Sandy Rose, George Shevtsov and Graham White. All members contributed actively to bird surveys.

The project region in the East Birriliburu country accessed for bird surveys was very large and track access limited. Due to limited time and small numbers of observers, there no possibility that we could systematically survey the entire region. Rather, an attempt was made to thoroughly survey as many areas as possible. While some surveys were opportunistic, most were conducted at set distances along tracks. In addition, an attempt was also made to sample as many habitat types as possible. The team generally moved camp each day. Where the team was moving in vehicles, surveys were almost always conducted at one kilometre intervals. From overnight campsites, and at wetlands, members walked in different directions and surveyed off track. Most surveys were completed by 1 or 2 observers; at overnight camps



and at locations where the team stopped for a period, all team members contributed records to the survey.

Figure 1: track from Eagle Highway to Gunbarrel Highway, one of the tracks surveyed at 1km intervals for birds. Photo by Cheryl Gole

Tracks and areas travelled and surveyed by the bird survey team were:

- Eagle Highway from the sandalwood camp north to Warri;
- cutline east from the sandalwood camp from Eagle Highway to the Gunbarrel Highway;

- outline west of Eagle Hussar Bore;
- track north of the east outline to Katu Katu;
- country east of Katu Katu to Eagle Highway;
- vicinity of Warri;
- wetlands east of Eagle Highway.

Desert Discovery continues to utilise the accepted BirdLife Australia Atlas bird survey methods. These include the preferred method of surveying two hectares for birds for 20 minutes; area searches of habitat within a radius of 500 metres (preferred) or 5 kilometres; and incidental records (i.e. isolated records of interest outside systematic surveys).

Species were recorded as present on a site if identified as seen or heard within the site boundaries. Breeding records were included opportunistically, i.e., systematic surveys were not undertaken for breeding birds.



Figure 2: some members of the bird team ready to survey one of the wetlands in the project area. Photo by Cheryl Gole

Observers were asked to count all individual birds so that some assessment of abundance could be made. Observers were also asked to provide a basic vegetation description for each survey sites using some basic habitat descriptions provided to team members. Habitat descriptions included identification of vegetation type (woodland, shrubland, spinifex, grassland, mulga); landform type (sandplain, breakaway, dune, swale); and soil type (sandy, loamy, gravelly, rocky, rira). Agreed descriptors were designated for open and closed vegetation cover and whether shrubs or trees were scattered. We also attempted to record whether plants used by nectarivorous bird species were in flower. An attempt was made to find old growth spinifex, so that we could better target possible habitat for Striated Grasswren and Rufous-crowned Emu-wren. When analysed, most of these records were utilised for the annotated bird list (see Appendix); further analysis of the vegetation descriptions was not undertaken. Other survey data collected by observers included observer name, date, location name and positional data. After the close of the project, team members entered all survey data through BirdLife Australia's online *Birdata* data portal. Throughout this report, taxonomy and common and scientific names follow BirdLife Australia's Working List of Australian Birds.

Wetlands

On arrival at the project, the bird team was informed that there were a number of wetlands east of Eagle Highway. The team was able to camp nearby and use the time to explore the area a little and walk to a number of wetlands. All wetlands found were surveyed for birds as thoroughly as possible although visibility was sometimes restricted because of fringing vegetation and bird counts on the water were almost certainly undercounts. The wetlands appear to be ephemeral, filling only after good rain; they were the only wetlands in the area holding water (for example, the Mungkilli Claypan in the Mungkilli Nature Reserve, was dry).



Figure 3: This freshwater lake was fringed by melaleucas and included Coolibah growing in the water. Waterbirds such as grebes and some ducks were restricted to these deeper wetlands. Photo by Denzel Murfet

The wetlands east of the Eagle Highway are unnamed and consist of a number of claypans and deeper lakes. All were below capacity, claypans appeared to be drying. To conveniently



distinguish between locations the team called the lakes ‘muddy’, ‘middle’, ‘clear’ lakes and ‘lignum swamp’ and ‘claypan’ but it is important to know that these are not geographical place names. ‘Clear lake’ vegetation

included *Melaleuca interioris* and emergent eucalypts in the water. Claypans included emergent lignum in the water.

Other potential water sources in the project region included a number of gnamma holes and rockholes. Although those we accessed were surveyed for birds, all but Karinari Soak near Warri were dry during the project. Karinari contained a little water and the soak was being used by Zebra Finch when we visited.

Figure 4: members of the bird team surveying one of the wetlands for water birds. Photo by Allan Rose

The bird team made particular note of camel numbers around the wetlands in the 48 period that we surveyed, particularly at the claypan closest to Eagle Highway where the animals appeared to water most. Two herds of more than 100 animals were deemed by us to be separate groups because of colouring, the number of bulls and the number of young in the herds. The first group included approximately 25% young animals, the second only 10% young animals. Other herds in the same 48 hour period had fewer animals: 15, 3, and a number of lone bulls. It seems likely that this represents an undercount of camels using these water sources.

Results

Three hundred and seventy (370) full surveys were completed across the project region (Table 1). Ninety three percent of the surveys used the preferred 2-hectare survey method (344 surveys, Table 1), while seven percent (26) were contributed by area searches. There were 1531 individual bird records, 22 of which were incidental records (i.e. not contributed by a systematic survey recording all species present).

Table 1: Numbers of bird surveys conducted for the Desert Discovery 2018 East Birriliburu Project.

	All surveys	Systematic surveys	Percentage of systematic surveys
2 ha surveys	344	344	93%
Area searches	26	26	7%
Incidental surveys	22	0	0%
	524	456	100

No listed bird species of conservation significance was recorded in the project. Striated Grasswren and Rufous-crowned Emu-wren, both unlisted species of conservation interest, were each recorded once.



Figure 5: Black Honeyeater approaching *Grevillea eriostachya* to feed. Black Honeyeaters were one of the most commonly recorded species in the project area. Photo by Allan Rose

In desert regions, birds typically show significant fluctuations in abundance and species richness due to rainfall. Given relatively good rainfall in the months preceding this project, bird species and abundances were relatively high in this project, particularly as we were able to survey a number of wetlands east of the Eagle Highway. We collected 1530 individual bird records in 370 systematic surveys, an average of more than 4 birds per survey.

One hundred and eleven (111) species were recorded across the project region during the project (see the Appendix for a complete annotated species list). Of the ten most commonly recorded birds (Table 2), five were honeyeaters, reflecting at least partly the number of flowering plants attracting nectarivores. Singing Honeyeater, by far the most commonly recorded species in the project, was recorded in more than 53% of the 370 systematic surveys and almost 13% of the 1530 species records. Others of the most commonly recorded group are known to be eruptive or highly responsive to local conditions. These included Budgerigar, Zebra Finch and Masked Woodswallow.

Table 2: The ten most commonly recorded bird species in bird surveys conducted for the Desert Discovery 2018 East Birriliburu Project. Number surveys & incidental records = 392.

Species name	Number records
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Singing Honeyeater <i>Gavicalis virescens</i>	197
Zebra Finch <i>Taeniopygia guttata</i>	93
White-fronted Honeyeater <i>Purnella albifrons</i>	90
Black-faced Woodswallow <i>Artamus cinereus</i>	83
Spiny-cheeked Honeyeater <i>Acanthagenys rufogularis</i>	77
Rufous Whistler <i>Pachycephala rufiventris</i>	68
Willie Wagtail <i>Rhipidura leucophrys</i>	67
Black Honeyeater <i>Sugomel niger</i>	66
Budgerigar <i>Melopsittacus undulatus</i>	42
White-plumed Honeyeater <i>Ptilotula penicillata</i>	37

Twenty four bird species were only recorded once. These were Musk Duck, Tawny Frogmouth, Australian Owlet-nightjar, Buff-banded Rail, Australian Spotted Crake, Rednecked Avocet, Black-winged Stilt, White-faced Heron, Sacred Kingfisher, Mulga Parrot, Bourke's Parrot, Scarlet-chested Parrot, Western Bowerbird, Rufous-crowned Emu-wren,

Striated Grasswren, Grey Honeyeater, Rufous Fieldwren, Southern Whiteface, Inland Thornbill, Varied Sittella, Ground Cuckoo-shrike, White-breasted Woodswallow, Whitebacked Swallow and Welcome Swallow. Sixteen species were only recorded twice, and nine only three times; it was thus the case that 44% of all species were uncommonly recorded.

Figure 6: Red-backed Kingfisher, an arid zone species almost always in this project recorded as single birds in open vegetation. Photo by Mark Binns

Four species were recorded outside or close to normal range limits, largely because of suitable local conditions. These were Rufous Fieldwren (1 record), Grey-fronted Honeyeater (2 records), Black-chinned Honeyeater (2 records) and White-breasted Woodswallow (1 record). Rufous Fieldwren has been recorded west of this region in the Great Sandy and Gibson Deserts; it seems likely that a paucity of surveys in the past means that the species has not previously been recorded in this area.



During the project, we recorded 19 species of water dependent species in the ephemeral wetlands still holding water east of the Eagle

Highway. There were few night bird records, most of them opportunistic incidental records and no records of breeding birds.



Figure 7:
Walgooboolool Rockhole on the track from the main eastern cutline to Katu Katu. Here, the bird team found small bats and old Fairy Martin nests in caverns. Photo by Allan Rose

Figure 8: Red-kneed Dotterel, an Australian shorebird sometimes found in remote wetlands. No trans-equatorial migratory shorebirds were recorded in the wetlands surveyed in this project. Photo by Mark Binns



Bird species recorded in the project represented 41 bird families (Table 3). The most numerous species were recorded in the honeyeater and chat family (13 species), followed by eagles, hawks and goshawks (8 species). Eighteen (18) families were represented by only a single species.

Table 3: number of species in bird families recorded in bird surveys in the 2018 East Birriliburu project. Number of families = 41; number of species = 111

Family	No. species
Emu & Cassowaries	1
Ducks, Geese & Swans	7
Pheasants & Quail	1
Grebes	2
Pigeons & Doves	3
Bustards	1
Frogmouths	1
Eared Nightjars	1
Owlet-nightjars	1
Crakes, Rails & Swamphens	4
Stilts & Avocets	2
Plovers, Dotterel & Lapwings	2
Button-quail	1

Hérons, Egrets & Bitterns	2
Eagles, Kites & Goshawks	8
Masked Owls	1
Kingfishers	2
Falcons	3
Cockatoos & Corellas	2
Parrots, Lorikeets & Rosellas	5
Bowerbirds & Catbirds	1
Fairy-wrens, Emu-wrens & Grasswrens	5
Honeyeaters & Chats	13
Pardalotes	2
Thornbills & Gerygones	9
Australian Babblers	1
Sittellas	1
Cuckoo-shrikes & Trillers	3
Whistlers, Shrike-thrushes & allies	2
Australo-Papuan Bellbirds	1
Whipbills and Wedgebills	1
Woodswallows, Currawongs, Butcherbirds & Magpie	6
Fantails	2
Crows & Ravens	1
Monarch and Flycatchers	1

Table 3: continued

Family	No. species
Australian Robins	2
Flowerpeckers	1
Weaver Finches	1
Pipits & Wagtails	1
Grassbirds	3
Swallows & Martins	4

Vegetation descriptions provided by observers were included with the bird survey data. These were summarised to provide a basic assessment of the main habitat types in which birds were recorded, and included in the annotated bird species list (Appendix). Records were also assessed to determine if birds were recorded throughout the region or were more restricted in occurrence. The annotated bird list includes the number of times a species was recorded in each of the main survey types. From this it can be seen that most species were recorded in 2- hectare surveys.

A number of flowering plants were utilised by nectar-feeding birds although there were too few records for detailed analysis. Plant species used by nectar-feeders included *Grevillea wickhamii*, *G. eriostachya*, *Hakea lorea*, *Eremophila spp.*, and *Leptosema chambersii*. The base-flowering pea plant *L. chambersii* was common in some areas, particularly on the track from Katu Katu to the Eagle Highway. It appeared to be closely associated with groundfeeding flocks of Masked Woodswallow and some honeyeaters and many of the plants on survey sites were surrounded by bird footprints.



Figure 9: Spotted Harrier, one of 11 species of eagles, hawks, goshawks and falcons recorded in the project. This species flies low over open vegetation to flush prey. Photo by Mark Binns

Discussion

The East Birriliburu project region in the Gibson Desert is remote and rarely surveyed for birds. The Desert Discovery project provided the first attempt to systematically survey the extended region using a dedicated bird survey team. Despite track access limitations in some

areas, and low numbers of observers, the surveys provided a snapshot into bird distribution, species richness and abundance. It is significant that 93% of all surveys (344 of 370) were conducted using the preferred 2-hectare bird survey method. This provides the basis for repeatable surveys in the future.

When seasonal and rainfall conditions are taken into account, it is likely that most of the region's bird species were recorded. Given different seasonal and rainfall conditions recording rates and species richness may be different.

The number of species of conservation significance was, as expected, low. Few listed threatened species occur in the region and the time of the year was not suitable for recording migratory species protected under the international JAMBA, CAMBA and ROKAMBA treaties.

In summary, the project was an opportunity to undertake a significant number of systematic bird surveys in a poorly surveyed region. The completed surveys provided a valuable snapshot of the species richness and abundance of the region's bird species at a particular point of time.

Acknowledgements

The East Birriliburu Project region was very large, and the bird survey team did a wonderful job covering as large an area as practicable and completing so many surveys. Special thanks are due to Mark Binns, Linda Brotherton, Cheryl Gole, Martin Gole, Denzel Murfet, Wayne O'Sullivan, Allan Rose, Sandy Rose, George Shevtsov and Graham White for good humour, camaraderie, vehicle repair skills, and working hard at systematic bird surveys in the project region. Mark Binns, Cheryl Gole, Denzel Murfet and Allan Rose provided photographs. Tom Griffiths and Jessica Chapman from Desert Support Services provided assistance and introduced us to some of the Traditional Owners.

Desert Discovery committee members, members and participants from other teams, too many to individually name, provided information, support and encouragement. A special mention is due to Ben Blomfield, Des Bunter and Martin Bailey who made it possible to find our way. For all Desert Discovery people, our thanks for assistance and for all-important camaraderie in the desert.

Traditional Owners of the Birriliburu lands generously allowed access to this part of their country and made us feel very welcome. Working on Birriliburu country was an honour and a privilege: to all, our warm and grateful thanks.

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Figure 10: Observers doing a bird survey in old growth spinifex. Photo by Cheryl Gole



Figure 11: Grey-headed Honeyeater, one of the most commonly recorded birds in the project. Photo by Mark Binns

Appendix

Species list, Birriliburu Project

Annotated species list of bird species recorded during the Desert Discovery 2018 East Birriliburu Project. The table includes the number of times each species was recorded in 2-hectare surveys or area searches or as incidental records. Taxonomy and common and scientific names follow BirdLife Australia's Working List of

Australian Birds. Number of species = 111; total surveys = 392; number of systematic surveys = 370; number of incidental records = 22; number of individual bird records = 1531.

For more information about wetlands in the project area, see the main text in this article.

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
Emu <i>Dromaius novaehollandiae</i>	2			2	2 single birds sighted on separate occasions 1 week apart on Katu Katu track. Fresh tracks of adult & chicks at wetland east of Eagle Hwy but birds not sighted
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	6		6		Recorded at 3 wetlands; generally flocks of 12-30 but 1 flock of 350 at 'muddy' lake
Black Swan <i>Cygnus atratus</i>	2		2		2 & 3 birds at one wetland one week apart
Hardhead <i>Aythya australis</i>	8		8		Smaller flocks of 1-15 & 1 flock of 50 recorded at 4 different wetlands
Grey Teal <i>Anas gracilis</i>	8		8		Flocks of 7-24 at 4 different wetlands
Freckled Duck <i>Stictonetta naevosa</i>	2		2		1 individual at 'muddy' and 2 birds at 'clear' lake
Musk Duck <i>Biziura lobata</i>	1		1		1 record of 2 birds at 'muddy' lake
Australian Wood Duck <i>Chenonetta jubata</i>	2		2		2 records, possibly same flock of 5 & 7 birds at 'muddy' lake
Stubble Quail <i>Coturnix pectoralis</i>	2	2			2 records of 2 birds in different locations, both sites with eucalypts over shrubs & spinifex
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	4		7		1-4 birds at 'clear' & 'middle' lakes
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	7		7		3-4 birds at 'clear' lake but otherwise flocks of 14-30 at other lakes but not claypans
Common Bronzewing <i>Phaps chalcoptera</i>	7	4	3		Mostly single birds, all records but 1 in the vicinity of wetlands. 1 record on track between Katu Katu & Eagle Hwy. Records of 9 & 15 at wetlands but this may be undercounting as birds were coming in to drink
Crested Pigeon <i>Ocyphaps lophotes</i>	3		3		Records of 9, 14, 69 birds – all in vicinity of wetlands, coming in to drink
Diamond Dove <i>Geopelia cuneata</i>	7	1	6		Small flocks of 1-4 & records of 15-32. One record of 50 birds likely undercount as birds arrived at wetland constantly for water
Australian	3	1	2		Single birds seen in open vegetation/plains

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
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Bustard <i>Ardeotis australis</i>					but footprints seen in many locations. Another bird collected by Traditional Owners for food
Tawny Frogmouth <i>Podargus strigoides</i>	1		1		Single record of 1 bird in sand plain, mulga woodland over tussock grassland
Spotted Nightjar <i>Eurostopodus argus</i>	2	1		1	Single birds both in Warri area in gravelly plain & ironstone habitats
Australian Owletnightjar <i>Aegotheles cristatus</i>	1		1		Single bird heard calling from Coolibah tree in 'clear' lake
Buff-banded Rail <i>Hypotaenidia philippensis</i>	1		1		1 bird at 'clear' lake
Australian Spotted Crake <i>Porzana fluminea</i>	1		1		1 record of 3 birds at a claypan/lignum swamp
Black-tailed Native-hen <i>Tribonyx ventralis</i>	4		4		3 records of individuals at 2 lakes & 1 record of 14 birds at a claypan/lignum swamp
Eurasian Coot <i>Fulica atra</i>	3		3		Flocks of 100 birds at 'clear' lake; probably the same flock
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	1		1		2 individuals at 'muddy' lake
Black-winged Stilt <i>Himantopus leucocephalus</i>	1		1		4 individuals at 'clear' lake
Black-fronted Dotterel <i>Elseyornis melanops</i>	10	1	9		Small numbers of birds, mostly 2-4; one record of 13. Recorded at all wetlands surveyed in project
Red-kneed Dotterel <i>Erythrogonys cinctus</i>	9		9		Most records of 2-7 birds; one record of 21 at the lignum claypan
Little Button-quail <i>Turnix velox</i>	34	27	7		Most records (31) of singles or pairs, 3 records of 3 birds. Recorded in wide variety of habitats including woodland, shrubland & grassland; on rocky, gravelly & sandy substrate
White-necked Heron <i>Ardea pacifica</i>	3		3		Single birds at 'clear' lake & claypan; 1 record of 6 birds at 'clear' lake.
White-faced Heron <i>Egretta novaehollandiae</i>	1		1		7 birds at 'clear' lake
Black-shouldered Kite <i>Elanus axillaris</i>	2	1		1	Single individuals, both in open spinifex with low shrubs. At one location another individual sighted off the survey site

Black-breasted Buzzard <i>Hamirostra melanosternon</i>	3		3		All birds recorded at wetlands. 1 single record & 3 & 4 individuals on separate occasions at 'clear lake; one of these records of 3 juveniles
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Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
Wedge-tailed Eagle <i>Aquila audax</i>	3	1	2		All records of single birds. One on baseline east of Eagle Hussar bore over open shrubland; remaining two records over wetlands possibly same individual
Little Eagle <i>Hieraaetus morphnoides</i>	3		1	2	Single birds, all recorded in general vicinity of Katu Katu in open shrubland habitat. Two records may be of same individual
Spotted Harrier <i>Circus assimilis</i>	13	9	4		Mostly single birds, 1 record of 3. All records over open tall or low shrubland and spinifex
Brown Goshawk <i>Accipiter fasciatus</i>	7	2	5		One pair, otherwise single birds. One record at Warri, all other records at wetlands (possibly one or two individuals)
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	5	1	2	2	Single birds seen in flight over open mulga or shrubland; 1 record at a wetland.
Whistling Kite <i>Haliastur sphenurus</i>	9		9		Mostly single birds but single records of 2 & 3 birds; all records of birds in flight over wetlands
Barn Owl <i>Tyto alba</i>	2		2		Single birds: 1 seen flying from a tree in the water at 'clear lake', the other heard at an overnight campsite in open woodland on Eagle Highway
Sacred Kingfisher <i>Todiramphus sanctus</i>	1		1		Single record of a single bird at 'clear' lake. Telescope used to identify this species which is unusual in this general location
Red-backed Kingfisher <i>Todiramphus pyrrhopygius</i>	12	6	5	1	One pair sighted, all other records of single individuals. 3 records at wetlands, all other records in diverse range of open woodland habitats with mulga or scattered eucalypts over shrubs & grasses
Nankeen Kestrel <i>Falco cenchroides</i>	24	16	7	1	All records of single birds; 2 records at wetlands, all other records in diverse open habitats including open woodland, open shrubland, spinifex plain; burnt & unburnt areas
Australian Hobby <i>Falco longipennis</i>	7	4	3		All records of single birds; 3 records at wetlands, all other records in areas with emergent tall shrubs or trees or scattered shrubs over spinifex
Brown Falcon <i>Falco berigora</i>	24	14	10		All records of single birds except 3 records of 2 birds & 1 of 3 in a diverse range of habitats, mostly open shrubland & woodland
Cockatiel <i>Nymphicus hollandicus</i>	2	1	1		1 record of 3 birds & a flock of 22 in flight over gravelly plains, over open shrubland & woodland

Galah <i>Eolophus roseicapilla</i>	3	2	1		Pair recorded twice on Katu Katu to Eagle Hwy track possibly same birds; also a flock of 12 on the Eagle Highway. Habitat shrubs over spinifex
Mulga Parrot <i>Psephotellus varius</i>	1		1		4 birds seen by a number of observers at an overnight campsite in tall mulga shrubland / very open Eucalypt woodland over spinifex on Eagle Highway. Uncommon record in this general location.

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
Australian Ringneck <i>Barnardius zonarius</i>	3	2	1		1 single & 2 pairs, all recorded in flight over open woodland including woodland in the vicinity of one of the claypans
Bourke's Parrot <i>Neopsephotus bourkii</i>	1		1		Single record of 2 birds at a wetland site, probably coming in to water
Scarlet-chested Parrot <i>Neophema splendida</i>	1	1			Single record of a single, immature male (photographed). Recorded feeding on the ground in scattered shrubs over spinifex
Budgerigar <i>Melopsittacus undulatus</i>	42	32	7	1	Records of pairs or small flocks to larger flocks of up to 100 birds. Almost all records away from water in variable habitats including open woodland & shrubland over spinifex, often with flowering shrubs
Western Bowerbird <i>Ptilonorhynchus guttatus</i>	1		1		Single record of a single bird at an overnight campsite on the old baseline track between Eagle & Gunbarrel Highways; open mulga & eucalypts over shrubs & spinifex with extensive breakaways near the survey site
Variigated Fairywren <i>Malurus lamberti</i>	24	18	6		Most records of singles or pairs or small parties of up to 6 birds; 1 record of 12 birds. Recorded in variable habitats, always with a shrub layer
Splendid Fairywren <i>Malurus splendens</i>	6	3	3		Pairs or 3-4 birds, generally in wellvegetated areas but once in spinifex with very open acacias
White-winged Fairy-wren <i>Malurus leucopterus</i>	23	20	3		Most records of 2-3 but also parties of 5-7; recorded in diverse shrubby vegetation over spinifex, often on dunes, swales or extensive sandplain
Rufous-crowned Emu-wren <i>Stipiturus ruficeps</i>	1		1		Single record of 4 birds recorded on dune with dense spinifex & mixed dense shrubs
Striated Grasswren <i>Amytornis striatus</i>	1		1		Single bird recorded in long unburnt very open woodland over spinifex hummock grassland
Black Honeyeater <i>Sugomel niger</i>	66	60	6		Most records (43) of 1 or 2 birds, otherwise up to 10 birds in survey sites. Diverse vegetation types but often sandy or gravelly plains with flowering plants, particularly grevilleas (<i>G. wickhamii</i> , <i>G. eriostachya</i>)

Brown Honeyeater <i>Lichmera indistincta</i>	8	3	5		5 of the 6 records at wetlands or Warri area, the remaining record on the Katu Katu track in woodland or tall shrubland with flowering grevilleas etc
Black-chinned Honeyeater <i>Melithreptus gularis</i>	2	2			Single birds, both recorded in long unburnt open eucalypt woodland with flowering plants
Pied Honeyeater <i>Certhionyx variegatus</i>	12	11	1		Most records (9) singles or pairs, 3 records of 3 birds. Most recorded in vicinity of Warri or on the track from Katu Katu to Eagle Highway with extensive areas of flowering grevilleas, particularly <i>G. eriostachya</i>

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
Grey Honeyeater <i>Conopophila whitei</i>	1		1		Single record of a single bird recorded in patchily burnt and unburnt acacia over spinifex
Crimson Chat <i>Epthianura tricolor</i>	33	27	5	1	Most records (22) of singles, pairs or 3-4 birds; 11 records of 10-23 birds. Diverse range of open vegetation including open sandplain, swales & shrubland over spinifex, often but not always with flowering shrubs
Spiny-cheeked Honeyeater <i>Acanthagenys rufogularis</i>	77	66	11		Almost all records (76) of singles, pairs & small groups of up to 12 birds; 1 record of 20 birds. Recorded in diverse range of habitats with taller shrubs & trees or flowering shrubs including eremophilas & grevilleas
Singing Honeyeater <i>Gavicalis virescens</i>	197	181	16		Most commonly recorded species in project. Many records (131) of singles & pairs, most 1-10 birds; small number of records (9) of flocks of 12-30. Recorded in all vegetation types in project region including open plains, thick vegetation, shrubland, woodland & sites with flowering plants
Grey-headed Honeyeater <i>Ptilotula keartlandi</i>	22	19	3		Singles, pairs & small flocks of 3-4 birds, often associated with flowering shrubs such as grevilleas or woodland but also open spinifex plain with scattered shrubs
Grey-fronted Honeyeater <i>Ptilotula plumula</i>	2	2			One group of 3 & one of 2 in separate locations on the track between Katu Katu & the Eagle Highway, in sandplain habitat dominated by spinifex & mixed shrubs, including flowering grevilleas
White-plumed Honeyeater <i>Ptilotula penicillata</i>	37	23	14		Singles, pairs or small flocks of up to 6 birds; all but 2 records in scattered eucalypts or mulga over shrubs & spinifex. Remaining records in low shrubs over spinifex

White-fronted Honeyeater <i>Purnella albifrons</i>	90	82	8		Very commonly recorded species in project. Singles, pairs or small flocks of up to 10 birds; occasional groups of 12-20; often in vegetation with flowering grevilleas, eremophilas & <i>Leptosema chambersii</i> in mixed shrubland/woodland
Yellow-throated Miner <i>Manorina flavigula</i>	14	12	2		Mostly singles & pairs, also flocks of 8 & 22; often recorded in open woodland of eucalypts or mulga; also recorded on breakaways & open shrubland
Red-browed Pardalote <i>Pardalotus rubricatus</i>	2				Single individuals at separate locations on the Eagle Highway and Katu Katu track; vegetation open shrubs & mallee or mulga over spinifex
Striated Pardalote <i>Pardalotus striatus</i>	6	3	3		Single birds in all locations, mostly in open eucalypt or mulga woodland but 1 record in sandplain with shrubs
Western Gerygone <i>Gerygone fusca</i>	14	12	2		Mostly singles or pairs, 1 record of 4 birds. Mostly recorded in open woodland or tall shrubland with eucalypts or mulga, but also in shrubland over spinifex

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
Weebill <i>Smicrornis brevirostris</i>	13	10	2		Mostly singles or 2-3; 1 record of 20 birds. All but 1 recorded in eucalypt or mulga woodland; 1 record in open shrubland over spinifex. Two adult birds seen flying to a completed nest on several occasions but did not appear to be carrying nesting material or food
Redthroat <i>Pyrrholaemus brunneus</i>	2	2			Single individuals in open mulga with eucalypts or tall shrubland over low shrubs & spinifex
Rufous Fieldwren <i>Calamanthus campestris</i>	1			1	Single individual, sighted opportunistically, no habitat information. Photograph provided – species is out of range in this location
Southern Whiteface <i>Aphelocephala leucopsis</i>	1	1			Two individuals in open mulga woodland over mosaic of tussock and <i>Triodia</i> hummock grassland on stony plain
Banded Whiteface <i>Aphelocephala nigricincta</i>	14	10	2	2	Singles, pairs or small flocks of 3-6, recorded in open woodland & shrubland over spinifex on both sand & gravelly plains
Inland Thornbill <i>Acanthiza apicalis</i>	1	1			Two individuals in open acacia woodland with scattered <i>Corymbia</i> over spinifex & low shrubs
Slaty-backed Thornbill <i>Acanthiza robustirostris</i>	4	3	1		Mostly pairs, 1 record of a single bird, always in tall shrubland or mulga/acacia woodland over shrubs & spinifex

Chestnut-rumped Thornbill <i>Acanthiza uropygialis</i>	19	15	4		Mostly singles & pairs, also small groups of 3-4, generally in mulga or tall gidgee shrubland over mixed shrubs & spinifex
White-browed Babbler <i>Pomatostomus superciliosus</i>	7	5	2		Small groups of 2-5 or larger groups of 1012, always in sites with tall shrubs or trees, often mulga, over mixed shrubs & spinifex
Varied Sittella <i>Daphoenositta chrysoptera</i>	1		1		Single group of 5 individuals in open Corymbia/Mallee woodland/ open shrubland over Triodia hummock grassland
Ground Cuckooshrike <i>Coracina maxima</i>	1		1		4 birds in single location on the track between Eagle & Gunbarrel Highways; vegetation eucalypt and mulga over shrubs, spinifex & other grasses
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	11	4	6	1	Singles, pairs or small groups of 3-7, sometimes near wetlands but otherwise in diverse open habitats often with tall shrubs or trees
White-winged Triller <i>Lalage tricolor</i>	2	2			1 single individual & 1 pair, both recorded on or adjacent to sand dunes with shrubs over spinifex; some flowering shrubs
Rufous Whistler <i>Pachycephala rufiventris</i>	68	56	12		All records of singles or pairs; often in mulga & other tall shrubs & trees over diverse range of habitats with shrubs & spinifex
Grey Shrikethrush	12	5	7		All single birds; all recorded at wetlands or other sites with tall shrubs or trees, often

Common & Scientific Name	No. Records	2Ha	Area Search	Incidental	Comments
<i>Colluricincla harmonica</i>					mulga or eucalypts
Crested Bellbird <i>Oreoica gutturalis</i>	27	20	7		All singles except 1 record of 2 birds; recorded in diverse range of habitats including open woodland, shrubland & dense spinifex with scattered shrubs
Chiming Wedgebill <i>Psophodes occidentalis</i>	5	3	2		Single birds, recorded in open shrubland, sometimes with mulga
Australian Magpie <i>Gymnorhina tibicen</i>	4	1	1	2	Small isolated groups of 1-4, in tall shrubland or open woodland over shrubs & spinifex
Pied Butcherbird <i>Cracticus nigrogularis</i>	5	3	2		Singles & 1 pair, always in mulga or eucalypt woodland over shrubs & spinifex
Grey Butcherbird <i>Cracticus torquatus</i>	4	2	1	1	Single birds; always in tall shrubland/woodland; 3 of 4 records on stony plain

Masked Woodswallow <i>Artamus personatus</i>	25	21	3	1	Small number of records of singles, pairs or 3-9 birds; mostly flocks of 10-50; 6 records of flocks of 100-250 (larger flocks likely undercount due to constant movement of birds). Often observed feeding on flowering plants, including upside down plant <i>Leptosema chambersii</i> ; recorded in diverse vegetation with shrubs over spinifex
Black-faced Woodswallow <i>Artamus cinereus</i>	83	66	17		Commonly recorded species in project. Mostly singles, pairs & small flocks of up to 10; some flocks of 15-24 birds. Recorded in all open vegetation types but also at most wetlands east of the Eagle Highway
White-breasted Woodswallow <i>Artamus leucorhynchus</i>	1		1		Two individuals perched at 'clear' lake. Unusual record this far south
Willie Wagtail <i>Rhipidura leucophrys</i>	67	48	19		Commonly recorded species in project. Most records (61) of singles & pairs but also counts of up to 9 at larger survey areas around wetlands. Recorded in all vegetation types in the region
Grey Fantail <i>Rhipidura fuliginosa</i>	2	1	1		1 individual & 1 pair; both recorded in open mulga woodland over shrubs & spinifex, sandy or gravelly plain
Little Crow <i>Corvus bennetti</i>	10				Occasional singles, but generally flocks of 20-65. Away from wetland systems, recorded in flight over open shrubland, woodland and dune vegetation
Magpie-lark <i>Grallina cyanoleuca</i>	7		7		Singles or pairs, all recorded at wetlands east of Eagle Highway
Red-capped Robin <i>Petroica goodenovii</i>	29	21	8		Most records (28) of singles & pairs; 1 record of 4 birds. In open woodland, shrubland and vegetation in the vicinity of wetlands
Hooded Robin <i>Melanodryas</i>	11	6	5		Singles & pairs in open mulga or eucalypt woodland or scattered shrubs over spinifex;

Common & Scientific Name	No. Records	2Ha	Area Search	Incid ental	Comments
<i>cucullata</i>					also in vegetation surrounding wetlands
Mistletoebird <i>Dicaeum hirundinaceum</i>	5		5		Mostly singles or pairs; 1 record of 4 birds. Recorded only at Warri & near wetlands east of Eagle Highway, all open woodland sites with complex understorey
Zebra Finch <i>Taeniopygia guttata</i>	93	79	14		Most records (77) of singles, pairs or small flocks of up to 20 birds; remaining flocks of 25-380. Recorded in all vegetation types across the region. Some but not all of the larger flocks recorded near wetlands; wetland flocks almost certainly undercounted as flocks regularly came to water

Australasian Pipit <i>Anthus novaeseelandiae</i>	10	3	6	1	All singles; recorded near wetlands but also in very open vegetation on sandplain or gravel plain
Brown Songlark <i>Cincloramphus cruralis</i>	15	11	3	1	Singles or pairs, recorded in open vegetation with emergent shrubs or small trees; some records in wetland areas
Rufous Songlark <i>Cincloramphus mathewsi</i>	8	5	3		Singles or pairs, all recorded in sites with open eucalypt or mulga woodland over shrubs & spinifex
Spinifexbird <i>Poodytes carteri</i>	7	3	3	1	One pair but otherwise singles. 5 of the records at wetlands, including 'clear' lake & a claypan, otherwise in thick old growth mulga or scattered shrubs over spinifex
White-backed Swallow <i>Cheramoeca leucosterna</i>	1	1			Two individuals in flight over mixed vegetation on swales & dunes on the track from Katu Katu to Eagle Highway
Fairy Martin <i>Petrochelidon ariel</i>	2				3 individuals recorded in flight over 'muddy' lake & in the vicinity of wetlands off Eagle Highway (possibly the same birds); vegetation open eucalypt woodland & shrubs over spinifex. Old inactive nests found at Warri & Eagle Hussar sheds on Eagle Highway, & cavern near Walgooboolool Rockhole on track from baseline west of Eagle Hwy to Katu Katu
Tree Martin <i>Petrochelidon nigricans</i>	8	1	7		One flock of 50 & one of 17 but otherwise small flocks of 1-8 birds. 5 of 8 records over wetlands, others over open shrubland, sometimes over open mulga
Welcome Swallow <i>Hirundo neoxena</i>	1		1		Single bird foraging in flight over a claypan with water, east of the Eagle Highway

Botany

Alan Bedggood

Abstract

The East Birriliburu Project with a base camp on the Eagle Highway was in a dry season that had followed a wet early summer period. Plant growth in the Project area had been quite prolific but, in many cases, past being suitable for providing plant herbarium specimens. This was particularly so with the grass species. As less common species not recorded for the "greater" Project area were targeted, 117 herbarium specimens and eight substrate samples for potential slime mould production were provided to the Perth herbarium.

The plant presses and field books were delivered to the herbarium directly after the Project. The field book data was also provided in Excel format shortly after, along with DVDs containing high resolution coloured photographs of all plant species collected. Consequently, the herbarium provided confirmed or corrected names and highlighted that

- many specimens extended the range of distribution of the species
- three Priority species were included
- three species were previously unrecorded for the Little Sandy Desert IBRA

Preparation

The site chosen for the East Birriliburu Project was in the north east corner of the Birriliburu Indigenous Protected Area. The base camp was at the Eagle Hussar Bore and near the abandoned airstrip on the Eagle Highway, approximately 70 kms north of the Gunbarrel Highway. This location was then used as the centre point for creating track and survey maps as well as plant lists for the Project.

Google Maps satellite view enables the topography, landforms and plant communities to be seen in the Project area. The main roads of the Gunbarrel and Eagle Highways can be seen as well as the lesser shot lines created for the oil and gas exploration companies in the 1980s.

Using these images, five locations were chosen as potential survey sites prior to arriving at the base camp. These allowed the Botany Team to target plant survey sites straight away and to guide the Pioneers to confirm the accessibility of those sites more distant from the base camp.



Google satellite image of intersection of Eagle Hwy and shot line, the location of Eagle Hussar Bore and the site for the base camp, with the abandoned airstrip visible nearby. *Google incorrectly names the highway as David Carnegie Rd.*



An example of the maps showing potential plant communities for surveying

The herbaria of Australia are all rapidly filling their specimen storage capacity. The Western Australian Herbarium in Perth moved into its current premises in 2011 and is rapidly reaching capacity for storing plant specimens. The major reason is the storage of multiple copies of the same species. Examples of these large specimen numbers (as at April 2018) are *Ptilotus obovatus* 826, *Eremophila glabra* 581, *E. latrobii* 575 and *Scaevola spinescens* 568.

A full list of plant species with specimens stored in the Western Australian Herbarium was obtained via the online tool the Australasian Virtual Herbarium. A second list was generated of all specimens collected from an area around the East Birriliburu Project area (as very few were collected from the immediate Project area). This identified the common species (like those listed above) that had already been found in the nearby area so more specimens of those species from the Project area were not necessary.

Some care was made in generating these lists. Where species with less than 50 specimens from Western Australia were recorded, they were targeted in the Project area, regardless of how many times that had previously been collected there. Of the 906 plant species recorded for the wider Project area, 220 were deemed to be unnecessary to be collected.

The list of potential collectable species for the East Birriliburu area was then used in the field to help narrow down the potential species name from what would have been the full species list for WA.

Photographs were collected from the internet and from previous DD projects to create a compendium to help identify unknown specimens. Pictures of 640 species for the Project area were compiled, including those that were not to be collected but to help in identifying plants in the field. These were loaded onto an iPad for ease of use. Photographs were sorted into folders of the larger family groups; for the smaller plant families, into flower-colour folders eg red flowers, pink flowers, yellow and orange flowers, etc.

Karina Knight is the collections manager at the Perth herbarium and was our liaison for the Project. Arrangements were made for the collection of field books and plant presses to be used. Karina also sought the potential to collect Fungi and Lichens from the area as well. Mal McKinty is a fungi specialist embedded with the Mammal and Reptile team and had liaised with Karina Knight prior to the Project. Communications with Mal cooperation and little duplication.

Karina also has a personal academic interest in slime moulds and requested some samples of substrate from the Project area that might be suitable to grow slime moulds in the laboratory back in Perth.

Arrival

The east Birriliburu Project area is quite isolated and access was indirect for those participants from the eastern states. Most participants came through Wiluna and east along the Gunbarrel Highway.



Google Map image of route taken from Horsham (Home) through Wiluna to the East Birriliburu project base camp, just west of the Gibson Desert nature Reserve.

The Eagle Highway north passes the sandal wood harvesting enterprise based at the original Mungili community buildings. This was a maintained and well trafficked road to that site. However, the Eagle Highway further north became much less travelled and much narrower. The efforts of the Logistics team in clearing and "gardening" to enable an easier vehicle passage was much appreciated.



above Signage at the base camp site

left The overhead water tank, donkey water heater and shower block, just before the intersection above. What more could we want?

The country we passed through to get to the base camp was very dry. Plants had grown well over summer months, responding to the good rains between November and February. However, the continued dry weather since meant that many plant species had completed their flowering cycle and shed their seed (grasses). It did not bode well for collecting a large number of specimens from the Project area. Many of those plant species that were indeed flowering were of the common, widespread species that were not included in our target plant list.

The other observation upon arrival, and confirmed by discussion with the Pioneers, was that there were not many trafficable side roads or tracks off the Eagle Highway. This was going to limit the survey area to a fair degree. The Pioneers did push through several tracks, some that were passable to the Botany Team and others that were attempted but abandoned by the Pioneers.

Survey Trips

Day trips were initially made based upon the prepared maps with satellite imagery indicating potential plant communities. The dryness of the area meant that suitable plant specimens of target species were more restricted. The plant species were there but not with suitable material for herbarium specimens. A map showing all collection sites is in Appendix 2.

A trip to a potential survey site along a shot line off the Eagle Highway was eventually abandoned approximately six km along a 10km track. The track was overgrown with *Acacia* shrubs and required vehicles to skirt them and return to the track beyond. However, these patches were regrowth after previous fires and the risk of driving over burnt stakes off the track was high. After many harrowing off-track diversions following walkers navigating through the spinifex, the team leader pulled the pin and the convoy returned to base camp. The plant collections that day were not as great as was hoped for.

The approximately 85km trip north to the Warri bore site was more productive. Patches of vegetation had responded to either deeper soils or patches of additional rain as there were floriferous patches to be enjoyed and sampled. The convoy passed through a burnt area (patches still burning) that was being managed by the rangers. This was one of several burns

undertaken to redevelop the patchwork nature of the grasslands that had been made uniform by the widespread fires of 2012.

The Warri Bore site was within a large woodland with dry grass everywhere, a further indication that a wet summer had occurred. The fresh water bore was very much appreciated and all tanks were replenished. The Warri waterhole was a highlight, both for its historical significance as well as the additional plant species found along the way and about the site. A plant survey day trip (by foot) to rocky outcrops west of the bore



The Warri Bore

enabled more specimens to be collected as well as stretching camp site team member's legs after a lot of sitting.

Upon returning to the base camp, plans had been made for an escorted trip to a large freshwater lake north east of the base camp, well off the Eagle Highway. This entailed a four km walk both to and from the lake. A vehicle track had been pushed through to a clay pan area that still contained water. This area boosted our plant specimen count. The area further east to the large freshwater lake was a veritable oasis in very dry country. There was an abundance of plant species here, especially compared to the dry landscapes that had been travelled so far. This warranted a second collecting trip the following day.

The final trip was made west along the shot line to the track north to Mount Madley and the waterholes stretching north east from the mount. The rocky ranges traversed to get to Mount Madley were quite dry and provided a limited number of suitable plant specimens. However, the flatter area by the Katu Katu Well was much more productive for plant specimens. Travelling to Gargan Rockhole and Wankabadi Well traversed extensive patches of *Grevillea eriostachya* just coming into flower, with a copse of *G. juncifolia* in flower halting the convoy once again.

Very large numbers of Desert Plum, *Santalum lanceolatum*, were evident along this spinifex plain. These were particularly noticeable as there was no free water available to attract camels to this area. However, around the base camp and the areas surrounding the freshwater lake, there were no Desert Plum trees. Camels preferentially graze them to extinction..



Results

The dry season confronting the Project this year meant that there were less plant specimens collected than in previous projects. This was also compounded by not collecting the common species previously collected in the nearby area and with large numbers already in the Perth Herbarium.

The 117 plant specimens submitted to the Western Australian Herbarium (Appendix 1) were accompanied by three high resolution coloured photographs of the plant, closer up to the plant and of the flower. Herbarium Field Books with all voucher information were returned along with the plant specimens. Data from the field books was transcribed into an Excel spreadsheet in a format that was compatible for uploading into the Herbarium's MAX database system.

Providing all of the above meant that the plant specimens were processed by the Herbarium relatively quickly. The preliminary results were returned in November with the accompanying comments

"Many of the collections were reasonable range extensions and a few of priority taxa, *Mitrasacme katarranka* (P1), *Goodenia modesta* (P3) and *Elatine macrocalyx* (P3).

There were three specimens that were the first records for the Little Sandy Desert IBRA, namely *Centipeda pleiocephala*, *Ptilotus gomphrenoides* and *Trigonella suavissima*."



Pictures of the priority taxa found on East Birriliburu

above *Mitrasacme katarranka* (P1),

upper right *Goodenia modesta* (P3)

left *Elatine macrocalyx* (P3).





Pictures of taxa first recorded for the Little Sandy Desert IBRA

above *Centipeda pleiocephala*

upper right *Ptilotus gomphrenoides*

left *Trigonella suavissima*



Slime moulds

Substrate samples that might be suitable for the culture of slime moulds were obtained from four sites across the Project area, with two differing samples obtained from each site. As the request was for a few samples, eight was considered adequate as there was not a lot of confidence in the suitability of the substrate for the culture of slime moulds. The results obtained from these samples will provide confidence and direction for future collections.

Site survey lists

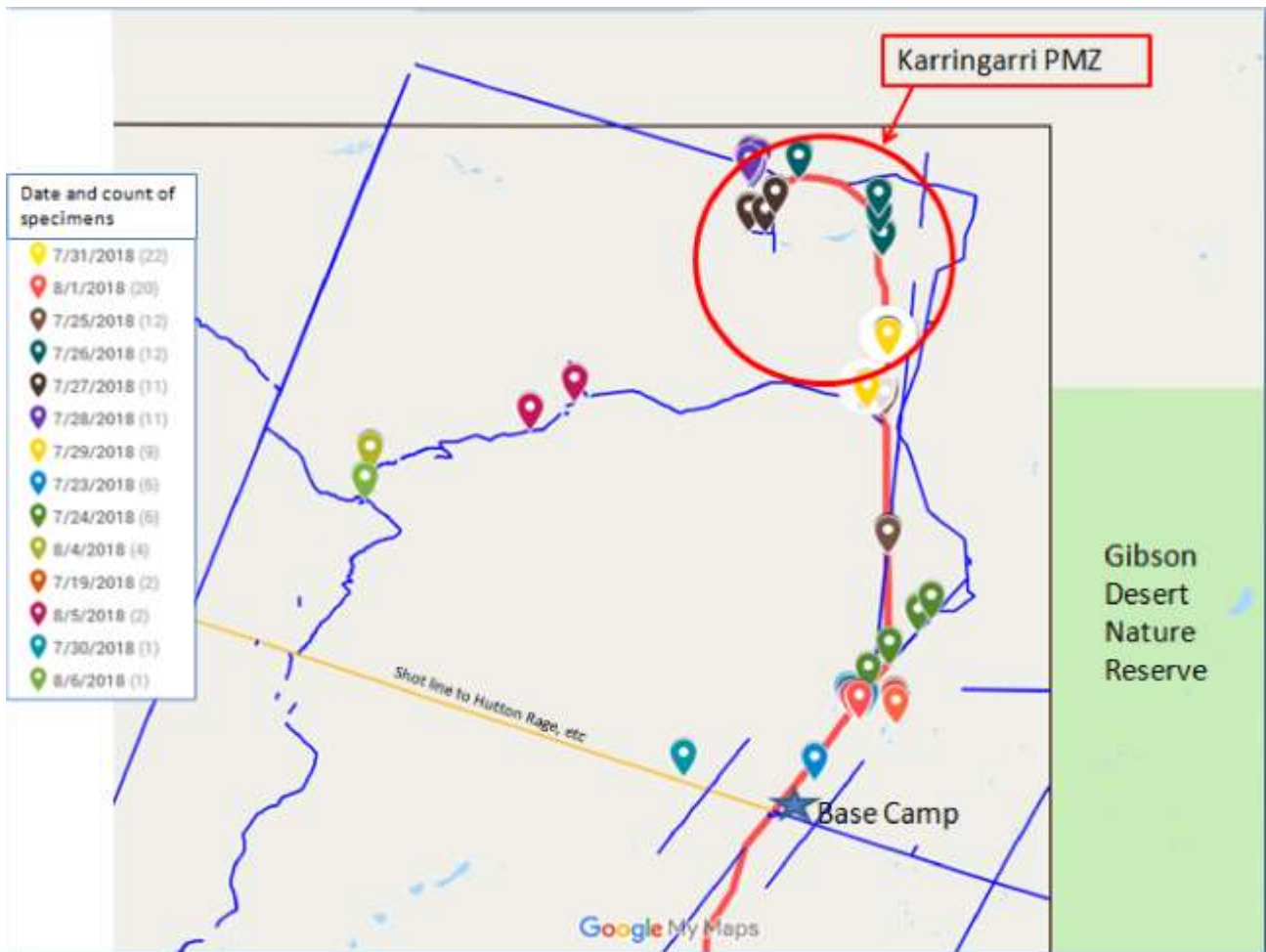
Victoria and the Northern Territory herbariums both have the ability to capture and display recorded observations of plant species without having to have a preserved specimen in the relative herbarium. However, Perth does not.

Observations of ALL known plants in a designated survey site was made to allow a measure of plant species distribution and of plant associations. There were 22 locations designated as survey sites during the survey trips, as shown in Appendix 3. These surveys included the more common species. A table of species and the sites that they were observed was provided to the Birriliburu community for their information. A table of these observations is found in Appendix 4.

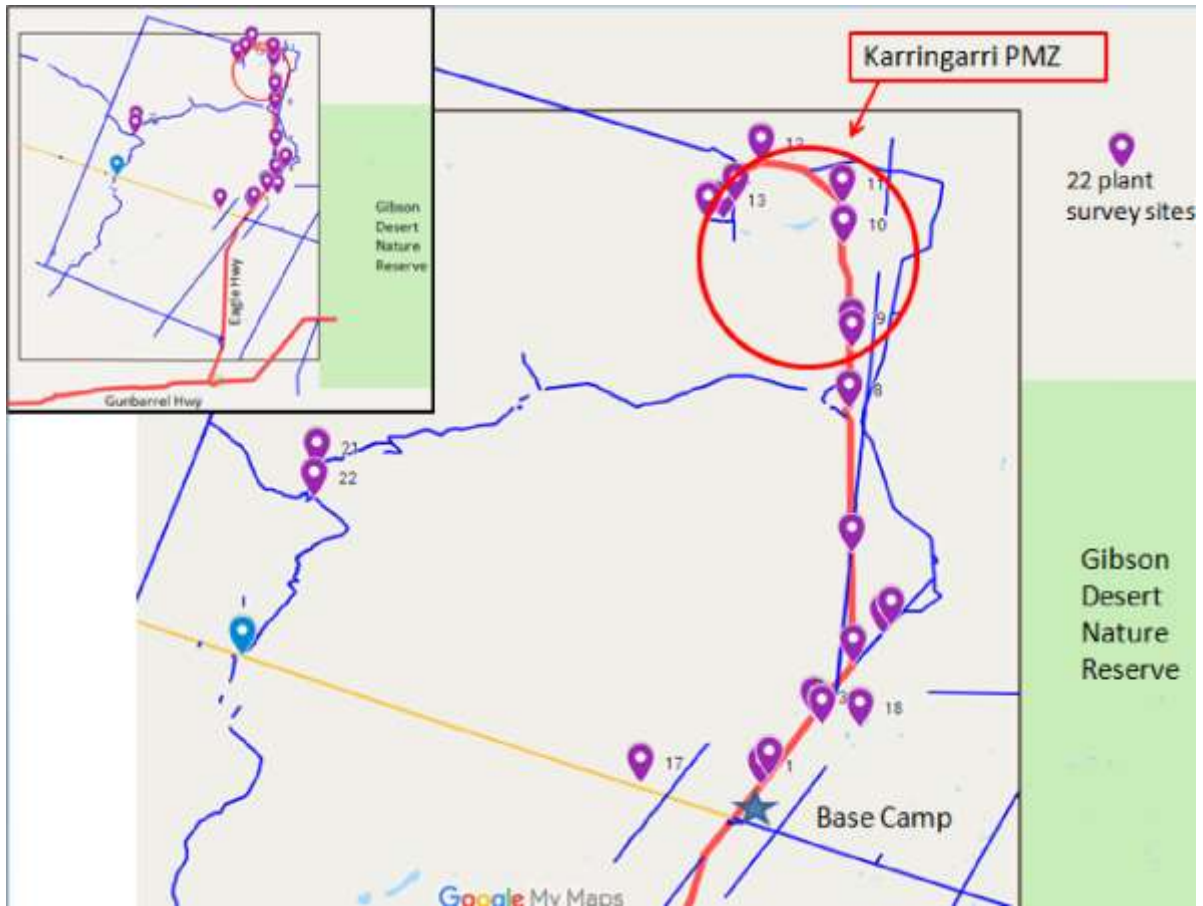
Appendix 1. A list of all plant specimens provided to the Perth Herbarium from the East Briirliburu Project. Note that the first two species were found at Lake Matilda, just south of Wiluna. Note: *The species of DD1451/A is under review.*

No	Genus	species	No	Genus	species	No	Genus	species	No	Genus	species
DD1451/A	Goodenia	modesta	DD1482	Hakea	divaricata	DD1514	Rhodanthe	stipitatum	DD1544	Eragrostis	kennedyae
DD1452/A	Goodenia	maideniana	DD1483	Mitrasacme	katarranka	DD1515	Waitzia	acuminata	DD1545	Eremophila	maculata subs brevifolia
DD1453/A	Acacia	ramulosa subs ramulosa	DD1484	Acacia	coriacea	DD1516	Dysphania	kalpari	DD1546	Cullen	cinereum
DD1454/A	Glycine	canescens	DD1485	Levenhookia	chippendalei	DD1517	Euphorbia	boophthona	DD1547	Haloragis	? Gossei
DD1455/A	Streptoglossa	cylindriceps	DD1486	Eremophila	pallida	DD1518	Aristida	inequighumis	DD1548	Aeschynomene	indica
DD1456/A	Calandrinia	ptychosperma	DD1487	Stackhousia	sp. Swollen gynophore	DD1519	Monocather	paradoxus	DD1549	Alternanthera	? Denticulata
DD1457/A	Amyema	fitzgeraldii	DD1488	Heliotropium	chrysocarpum	DD1520	Trachymene	bilata	DD1550	Eragrostis	tenulla
DD1458/A	Marsilea	hirsuta	DD1489	Swainsona	unifoliata	DD1521	Ptilotus	astrolasius	DD1551	Bergia	perennis subs obtusifolia
DD1459/A	Acacia	minutissima	DD1490	Grevillea	eristachya	DD1522	Sida	sp. Rabbit Flat	DD1552	Peplidium	aithocheilum
DD1460/A	Acacia	eriopoda	DD1491	Zygophyllum	aurantiacum	DD1523	Calotis	? Pumilifera	DD1553	Eragrostis	australasica
DD1461/A	Stylidium	desertorum	DD1492	Scaevola	collaris	DD1524	Ammannia	multiflora	DD1554	Centipedia	crateriformis
DD1462/A	Glinus	oppositifolius	DD1493	Lawrencia	cinerea	DD1525	Centipeda	pleiocephala	DD1555	Dysphania	platycarpa
DD1463/A	Trianthema	glossostigma	DD1494	Zygophyllum	compressum	DD1526	Alternanthera	nodiflora	DD1556	Calocephalus	beardii
DD1464/A	Aluta	maisonneuvei	DD1495	Eragrostis	setifolia	DD1527	Pseudognaphalium	luteoalbum	DD1557	Trianthema	triquetrum
DD1465/A	Mimulus	gracilis	DD1496	Eucalyptus	trivalva	DD1528	Duma	florulenta	DD1558	Portulaca	oleracea
DD1466/A	Calandrinia	pumila	DD1497	Velleia	connata	DD1529	Elytrophorus	spicata	DD1559	Rhodanthe	charseleyae
DD1467/A	Goodenia	modesta	DD1498	Dicrastylis	gilesii	DD1530	Schoenoplectiella	dissacantha	DD1560	Ptilotus	gomprenoides
DD1469/A	Peplidium	aithocheilum	DD1499	Euphorbia	albrechtii	DD1531	Wahlenbergia	tumidifruca	DD1561	Amyema	fitzgeraldii
DD1470/A	Stemodia	limophylla	DD1500	Ptilotus	macrocephalus	DD1532	Myriocephalus	rudallii	DD1562	Lysiana	murrayi
DD1471/A	Peplidium	sp.	DD1503	Acacia	melleodora	DD1533	Fimbristylis	dichotoma	DD1563	Trigonella	suavissima
DD1472/A	Schoenia	cassiniana	DD1504	Gompholobium	polyzygum	DD1534	Schenkia	clementii	DD1564	Triglochin	nana
DD1473/A	Bergia	henshallii	DD1505	Dodonaea	coriacea	DD1535		fresh water algae	DD1565	Halgania	sp.
DD1474/A	Nicotiana	occidentalis	DD1506	Eremophila	sp. Little Sandy Desert	DD1536	Eleocharis	pallens	DD1566	Pterocaulon	serrulatum subs velutinum
DD1475/A	Abutilon	leucopetalum	DD1507	Streptoglossa	bubakii	DD1537	Pluchea	rubelliflora	DD1567	Dysphania	rhadinostachya
DD1476/A	Calandrinia	balonensis	DD1508	Goodenia	stellata	DD1538	Drosera	finlaysoniana	DD1568	Corymbia	opaca
DD1477/A	Goodenia	mueckeana	DD1509	Indigophora	clolutea	DD1539	Elatine	macrocalyx	DD1569	Levenhookia	chippendalei
DD1478/A	Sida	sp. Western sand dunes	DD1510	Streptoglossa	macrocephala	DD1540	Peplidium	muelleri	DD1570	Triodia	basedowii
DD1479/A	Paractaenum	refractum	DD1511	Cucumis	argenteus	DD1541	Alternanthera	denticulata	DD1571	Scaevola	stobsiana
DD1480/A	Ptilotus	stipatus	DD1512	Calandrinia	pumila	DD1542	Glossostigma	drummondii			
DD1481	Heliotropium	glanduliferum	DD1513	Goodenia	iyouta	DD1543	Eragrostis	lanicaulis			

Appendix 2. Map of the East Birriliburu Project plant specimen collection sites and the Karringarri Priority Management Zone. The legend indicates the dates and numbers of specimens collected at each site



Appendix 3. Map of the East Birriliburu Project plant survey sites and the Karringarri Priority Management Zone showing the 22 plant survey sites.



Appendix 4. List of plant species found at the survey sites, with a count of sites where each species was found.

family	Name	Site number																						count
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Malvaceae	<i>Abutilon leucopetalum</i>							1	1														2	
Fabaceae	<i>Acacia adsurgens</i>				1																		1	
Fabaceae	<i>Acacia ancistrocarpa</i>																				1		1	
Fabaceae	<i>Acacia aneura</i>								1			1	1		1	1		1				1	7	
Fabaceae	<i>Acacia corriacea</i>							1	1					1									1	4
Fabaceae	<i>Acacia cuthbertsonii</i>	1		1																			1	3
Fabaceae	<i>Acacia ligulata</i>	1											1	1			1						1	5
Fabaceae	<i>Acacia maitlandii</i>		1																					1
Fabaceae	<i>Acacia melleodora</i>				1						1	1					1						1	5
Fabaceae	<i>Acacia minutissima</i>				1	1																		2
Fabaceae	<i>Acacia pachyacra</i>		1		1			1																3
Fabaceae	<i>Acacia paraneura</i>																				1	1		2
Fabaceae	<i>Acacia pruinocarpa</i>																						1	1
Fabaceae	<i>Acacia rhodophloia</i>				1				1															2
Fabaceae	<i>Acacia tetragonophylla</i>	1	1	1																		1	1	5
Myrtaceae	<i>Aluta maisonneuvei</i>										1					1							1	3
Poaceae	<i>Amphipogon caricinus</i>																						1	1
Poaceae	<i>Amphipogon sericeus</i>				1																	1	1	3
Loranthaceae	<i>Amyema fitzgeraldii</i>			1																		1		2
Malvaceae	<i>Androcalva loxophylla</i>					1	1																1	3
Santalaceae	<i>Anthobolus leptomerioides</i>								1														1	2
Poaceae	<i>Aristida contorta</i>																							1
Poaceae	<i>Aristida holathera</i>				1	1					1					1		1					1	7
Poaceae	<i>Aristida inaequiglumis</i>									1						1						1		4
Elatinaceae	<i>Bergia henshallii</i>							1	1															2
Poaceae	<i>Bothriochloa ewartii</i>																							1
Goodeniaceae	<i>Brunonia australis</i>																1							1

	Site number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
family	Name																							count	
Portulacaceae	Calandrinia polyandra								1																1
Portulacaceae	Calandrinia pumila																1								1
Asteraceae	Calotis hispidula																				1				1
Asteraceae	Calotis multicaulis																	1							1
Myrtaceae	Calytrix carinata										1														1
Asteraceae	Centipeda minima			1																1					2
Asteraceae	Chrysocephalum eremaum								1		1			1				1					1		5
Gyrostemonaceae	Codonocarpus cotinifolius													1				1							2
Fabaceae	Crotalaria cunninghamii																								1
Poaceae	Cymbopogon oblectus																						1	1	2
Poaceae	Cynodon prostratus																						1	1	2
Poaceae	Dichanthium sericeum		1																						1
Lamiaceae	Dicrastylis beveridgei																						1		1
Lamiaceae	Dicrastylis doranii	1																							1
Lamiaceae	Dicrastylis exsuccosa		1		1				1	1		1		1				1							8
Lamiaceae	Dicrastylis gilesii															1									1
Poaceae	Digitaria brownii																						1	1	2
Poaceae	Diplachne fusca																					1			1
Sapindaceae	Diplopeltis stuartii					1	1		1	1															4
Droseraceae	Drosera indica																			1					1
Polygonaceae	Duma florulenta			1																1	1				3
Chenopodiaceae	Dysphania kalpari																1								1
Chenopodiaceae	Dysphania rhadinostachya																					1			1
Chenopodiaceae	Einadia nutans			1																					1
Poaceae	Entertopogon ramosus			1																					1
Poaceae	Eragrostis australasica																					1			1
Poaceae	Eragrostis eriopoda								1	1						1	1	1					1		6
Poaceae	Eragrostis kennedyae																			1	1				2
Poaceae	Eragrostis lanicaulis	1																							1
Poaceae	Eragrostis setifolia														1					1					3
Poaceae	Eragrostis tenellula			1																					1

	Site number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
family	Name																							count	
Scrophulariaceae	Eremophila latrobei	1		1		1							1			1	1						1	1	8
Scrophulariaceae	Eremophila Little-Sandy-Desert			1																					1
Scrophulariaceae	Eremophila longifolia		1															1							2
Scrophulariaceae	Eremophila pencilus		1																						1
Scrophulariaceae	Eremophila platythamnus										1			1	1			1						1	5
Poaceae	Eriachne aristidea			1				1		1	1						1						1	1	8
Poaceae	Eriachne mucronata					1			1								1						1		5
Myrtaceae	Eucalyptus gamophylla													1	1										2
Myrtaceae	Eucalyptus victrix		1	1					1	1										1	1	1			7
Poaceae	Eulalia aurea								1								1							1	4
Euphorbiaceae	Euphorbia boophthona																						1		1
Euphorbiaceae	Euphorbia drummondii																						1		1
Fabaceae	Gompholobium polyzygum																							1	1
Fabaceae	Gompholobium simplicifolium										1					1									2
Goodeniaceae	Goodenia azurea		1		1		1						1			1								1	6
Goodeniaceae	Goodenia mueckeana										1													1	2
Goodeniaceae	Goodenia stobbsiana		1																						1
Goodeniaceae	Goodenia triodiophila								1				1			1									3
Goodeniaceae	Goodenia vilmoriniae															1									1
Proteaceae	Grevillea eriostachya		1							1	1			1	1									1	6
Proteaceae	Grevillea juncifolia														1			1							2
Proteaceae	Grevillea nematophyla	1		1																				1	3
Proteaceae	Grevillea stenobotrya										1			1	1			1						1	5
Proteaceae	Grevillea wickhamii											1											1	1	3
Gyrostemonaceae	Gyrostemon ramulosus													1											1
Gyrostemonaceae	Gyrostemon tepperi															1									1
Proteaceae	Hakea divaricata													1	1										2
Proteaceae	Hakea lorea				1		1			1		1						1						1	6
Boraginaceae	Halgania glabra																							1	1
Boraginaceae	Halgania solanacea				1		1	1					1												4
Boraginaceae	Heliotropium glanduliferum												1		1										2

Site number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	count	
family	Name																								
Fabaceae	Indigofera georgei		1		1	1				1													1	5	
Fabaceae	Isotropis atropurpurea																							1	1
Fabaceae	Kennedia prorepens					1		1	1			1													4
Myrtaceae	Lamarchea sulcata								1					1	1									1	4
Brassicaceae	Lepidium pholidogynum			1																				1	2
Fabaceae	Leptosema chambersii						1				1							1						1	4
Celastraceae	Macgregoria racemigera					1		1				1													3
Malvaceae	Malvastrum americanum			1																					1
Myrtaceae	Melaleuca glomerata			1					1	1		1								1					5
Myrtaceae	Melaleuca lasiandra									1				1											2
Poaceae	Monachather paradoxus		1	1	1													1					1		6
Asteraceae	Myriocephalus rudallii																			1					1
Lamiaceae	Newcastelia cephalantha															1									1
Lamiaceae	Newcastelia cladotricha															1								1	2
Solanaceae	Nicotiana rosulata								1																1
Poaceae	Paractaenum refractum										1														1
Poaceae	Paraneurachne muelleri		1							1	1						1						1	1	7
Poaceae	Paspalidium reflexum													1	1										2
Phrymaceae	Peplidium aithocheilum							1																	1
Phrymaceae	Peplidium muelleri																			1					1
Fabaceae	Petalostylis cassioides					1					1					1								1	4
Asteraceae	Pluchea rubelliflora																					1			1
Asteraceae	Pseudognaphalium luteoalbum																			1					1
Rubiaceae	Psydrax latifolia	1		1													1						1	1	5
Asteraceae	Pterocaulon sphacelatum			1																			1		2
Amaranthaceae	Ptilotus axillaris			1																					1
Amaranthaceae	Ptilotus clementii												1												1
Amaranthaceae	Ptilotus helipteroides			1																					1
Amaranthaceae	Ptilotus nobilis			1																					1
Amaranthaceae	Ptilotus obovatus			1																					1
Amaranthaceae	Ptilotus polystachyus			1						1	1					1	1						1		6

	Site number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
family	Name																							count
Amaranthaceae	<i>Ptilotus schwartzii</i>			1																				1
Amaranthaceae	<i>Ptilotus sessilifolius</i>				1		1			1			1	1									1	6
Asteraceae	<i>Rhodanthe charsleyae</i>																					1		1
Asteraceae	<i>Rhodanthe stipitartium</i>																1							1
Santalaceae	<i>Santalum lanceolatum</i>			1																			1	2
Goodeniaceae	<i>Scaevola collaris</i>															1								1
Goodeniaceae	<i>Scaevola parvifolia</i>				1	1			1	1	1					1							1	7
Goodeniaceae	<i>Scaevola spinescens</i>	1																					1	2
Asteraceae	<i>Schoenia ayersii</i>																1							1
Asteraceae	<i>Schoenia cassiniana</i>							1																1
Fabaceae	<i>Senna artemisioides</i>	1							1	1			1								1	1		6
Fabaceae	<i>Senna notabilis</i>									1						1	1						1	4
Malvaceae	<i>Seringia elliptica</i>		1				1	1	1														1	5
Solanaceae	<i>Solanum centrale</i>										1						1						1	3
Solanaceae	<i>Solanum lasiophyllum</i>		1	1																	1			3
Plantaginaceae	<i>Stemodia linophylla</i>							1																1
Stylidiaceae	<i>Stylidium humphreysii</i>							1																1
Surianaceae	<i>Stylobasium spathulatum</i>													1				1						2
Lamiaceae	<i>Teucrium teucriiflorum</i>																					1		1
Poaceae	<i>Themeda triandra</i>			1																				1
Zygophyllaceae	<i>Tribulus astrocarpus</i>			1																				1
Zygophyllaceae	<i>Tribulus long-styled eichlerianus</i>			1																				1
Zygophyllaceae	<i>Tribulus suberosus</i>																						1	1
Poaceae	<i>Triodia lanigera</i>													1	1									2
Poaceae	<i>Triodia schinzii</i>					1		1	1		1	1				1							1	7

Finding ant mimic mirids

Bevan Buirchell & Arlee McMah

As part of his participation with the Desert Discovery Botany team this year, Bevan Buirchell was accompanied Arlee McMah from the University of New South Wales. Arlee's study for a PhD in Entomology involves a project to study true bugs (*Hemiptera*) that mimic ants.

Members of the *Hemiptera* insect order are true bugs in that they have a piercing and sucking mouthparts that suck sap from plants but also body fluids from other insects or small invertebrates. There are a group of these insects that have adapted their behaviour to mimic ants to avoid predators. This is particularly so for visual predators such as birds.

For some time now, Bevan has taken university students (and their projects) under his wing to expose them to the interior of Western Australia. As Bevan travels extensively through WA, his expertise and knowledge greatly assist students in their field work. His knowledge on the flora of Western Australia in general and of Eremophilas and Orchids in particular make him a valuable member of the DD Botany team.

Having Arlee embedded in the Botany Team certainly gave an additional aspect to our fieldwork. Team members would be searching for plants then completing voucher information by describing/recording them into a field book. However, hovering about us was Arlee with her "butterfly" net and whacker stick, knocking insects from plants into the net for closer observation and, hopefully, collection.



Arlee McMah and Bevan Buirchell searching for mirid ant mimics in *Triodia* grassland, east Birriliburu IPA. *photo* Maree Goods

These ant mimics are members of Miridae, a large and diverse insect family that include aphids and leaf bugs that suck sap and often transmit viral plant diseases. These mirids



photo: Dacre England



photo: MF Schonitzer

arrange their antennae and legs to mimic ants as exemplified by the pictures above.

As well as using a "whacker net", Arlee also used a light in front of a white sheet at night to attract insects. This attracted a wide range of insects which also attracted a large number of DD participants



Arlee McMaha in front of the white sheet pointing out the mirid ant mimics amongst the diverse insects attracted by the light to DD participants. *photo Maree Goods*

As well as the rest of the Botany team, Arlee found that the dry conditions that we experienced over the DD project site was not conducive to high insect populations. However, there WERE ant mimic mirids and there were a couple that were new to Arlee and, perhaps, new to science.

The Botany team wish Arlee well in her endeavours to achieve her PhD.



Pictures of ant mimics that have been collected as part of Arlee McMaha's research project. They are yet to be identified and mounted as specimens to show their leg configurations.

photos Arlee McMaha

Mammals & Reptiles

Nathan Johnson

INTRODUCTION

The 'Mammal and Reptile Team' consisted of Nathan Johnson, Peter Barnes, Colleen Barnes, Denham Barnes, Elizabeth Sakker, Mirinda Thorpe, Iestyn Hosking, Josh Mills,

Graham Young, Malcom McKinty, Judy McKinty, John Macfarlane, Judy Macfarlane, Bruce Hillas, Anne Hillas, Lawrie Draper, Pat Draper, Andreas Magun and Christina Magun.

Surveys for mammals, reptiles and amphibians were conducted between 21th July and 7th August 2018. A range of survey techniques were employed around three main locations; Warri Camp, Eagle-Hassur Bore and Babool Rockhole.

While the landscape and vegetation varied widely throughout the survey area, the logistical restrictions and size of the survey area meant that only those types within a ten minute drive of the three base camps was surveyed. However, great effort was made to sample all those vegetation types in the local areas.

Incidental sightings of fauna have been included in site results tables if the animal was recorded at that site. All other incidental sightings have been recorded in a separate table.

This survey was conducted following the terms and conditions of *License to take Fauna for Scientific Purposes* No. 08-002538-1 issued by the Western Australian Department of Parks and Wildlife (DPaW). As a condition of the permit all fauna observations were added to the Fauna Survey section of the DPaW website (<https://wildlifelicensing.dpaw.wa.gov.au>).

TRAPPING METHODS

The following techniques were used at various times during the survey:

- Pitfall Traps
- Crouch Box Traps
- Elliott Traps
- Funnel Traps
- Harp Trap
- Remote Camera Traps
- Active Search

TRAPPING EFFORT

Site	Dates	Trap Nights							
		Pitfall	Crouch Box	Elliott	Funnel	Camera	Harp	Active	
Warri 1	23/7/18 – 27/7/18	30	24	24					
Warri 2			24	23					
Warri 3		15	24	24	12				
Warri 4				24					
Warri 5		30	28	33		2			
Warri 6			12	12	12				
Warri Camp and surrounds								1	4
Warri Soak							4		
Eagle Bore 1	28/7/18 - 1/8/18	40	47	40	15				
Eagle Bore 2		16	40	40	16	2		1	

Eagle Bore 3		40	40	40				1
Eagle Bore 4				60				
Base Camp and surrounds								4
Babool 1	4/8/18 - 7/8/18	30	30	30				
Babool 2		30		30				
Babool 3		30	30	30		2		
Babool 4			24	30				
Babool 5					40			
Babool Camp and surrounds						4		4
Subtotal		261	323	440	95	14	1	14
Total Trap Nights		1148						

RESULTS

Species List

<u>Species</u>	<u>Common Name</u>
Mammals	
<i>Camelus dromedarius</i>	One-humped Camel*
<i>Canis lupus dingo</i>	Dingo
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat
<i>Macropus rufus</i>	Red Kangaroo
<i>Mus musculus</i>	House Mouse*
<i>Ningauai ridei</i>	Wongai Ningauai
<i>Notomys alexis</i>	Spinifex Hopping Mouse
<i>Pseudomys desertor</i>	Brown Desert Mouse
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart
<i>Tadarida australis</i>	White-striped Free-tailed Bat
<i>Vulpes vulpes</i>	Fox*

Geckos

<i>Gehyra purpurascens</i>	Purplish Dtella
<i>Heteronotia binoei</i>	Binoe's Gecko
<i>Lucasium stenodactylum</i>	Crowned Gecko
<i>Rhynchoedura ornata</i>	Western Beaked Gecko
<i>Strophurus ciliaris</i>	Spiny-tailed Gecko
<i>Strophurus strophurus</i>	Western Spiny-tailed Gecko

Skinks

<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus
<i>Ctenotus brooksi</i>	Wedgesnout Ctenotus
<i>Ctenotus calurus</i>	Blue-tailed Finesnout Ctenotus
<i>Ctenotus greeri</i>	Spotted-necked Ctenotus
<i>Ctenotus pantherinus</i>	Leopard Skink
<i>Ctenotus quattuordecimlineatis</i>	Fourteen-lined Ctenotus
<i>Cyclodomorphus melanops</i>	Spinifex Slender Blue-tongue
<i>Lerista bipes</i>	North-western Sandslider
<i>Menetia greyii</i>	Grey's Skink
<i>Morethia ruficauda</i>	Fire-tail Skink

Dragons

<i>Ctenophorus isolepis gularis</i>	Central Military Dragon
<i>Ctenophorus reticulatus</i>	Western Netted Dragon
<i>Diporiphora winneckeii</i>	Canegrass Dragon
<i>Moloch horridus</i>	Thorny Devil
<i>Pogona minor</i>	Dwarf Bearded Dragon

Pygopods

<i>Lialis burtonis</i>	Burton's Legless Lizard
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Monitors

<i>Varanus giganteus</i>	Perentie
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Snakes

<i>Antaresia stimsoni</i>	Stimson's Python
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* = introduced species.

Warri Camp

Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 1	Spinifex Shrubland	24°12'44.2"	124°21'38.4"	Tall <i>Triodia sp.</i> plain with sparse <i>Acacia sp.</i> shrubs.



Species	Common Name	Survey Method		
		Pitfall	Box	Elliott

Mammals

<i>Mus musculus</i>	House Mouse*			
<i>Pseudomys desertor</i>	Brown Desert Mouse		2	
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse		2	
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	1		

Skinks

<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus	1		
<i>Ctenotus pantherinus</i>	Leopard Skink	1		
<i>Menetia greyii</i>	Grey's Skink	3		

Subtotal	6	4	0
Total Individuals	10		
Total Species	7		

Total Trap Nights	78
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Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 2	Spinifex Shrubland	24°12'51.4"	124°21'40.7"	Tall <i>Triodia sp.</i> plain with sparse <i>Acacia sp.</i> shrubs.



Species	Common Name	Survey Method	
		Box	Elliott

Mammals

<i>Notomys alexis</i>	Spinifex Hopping Mouse	3	2
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Subtotal	3	2
Total Individuals	5	
Total Species	1	
Total Trap Nights	47	

Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 3	Woodland	24°12'32.7"	124°21'32.6"	<i>Acacia sp.</i> woodland with grassy understory and sparse shrubs.



Species	Common Name	Survey Method			
		Pitfall	Box	Elliott	Funnel

Skinks

<i>Ctenotus pantherinus</i>	Leopard Skink	1			
<i>Morethia ruficauda</i>	Fire-tail Skink				1

Subtotal	1	0	0	1
Total Individuals	2			
Total Species	2			
Total Trap Nights	75			

Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 4	Spinifex Plain	24°12'36.7"	124°21'45"	Old-growth <i>Triodia sp.</i> plain.



Species	Common Name	Survey Method
		Elliott

Mammals

<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	3
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Subtotal	3
Total Individuals	3
Total Species	1
Total Trap Nights	24

Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 5	Dune Shrubland	24°15'50.3"	124°22'38.8"	Long continuous dune with a medium density covering of grasses and shrubs dominated by <i>Triodia sp.</i> and <i>Acacia sp.</i>



Species	Common Name	Survey Method			
		Pitfall	Box	Elliott	Camera
Mammals					
<i>Notomys alexis</i>	Spinifex Hopping Mouse		4	2	
Skinks					
<i>Ctenotus brooksi</i>	Wedgesnout Ctenotus	1			
Subtotal		1	4	2	
Total Individuals		7			
Total Species		2			

Total Trap Nights	93
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Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri 6	Gibber Plain	24°13'19.8"	124°22'43.8"	Rocky gibber plain with sparse shrubs.



Species	Common Name	Survey Method			
		Box	Elliott	Funnel	Camera

Total Individuals	0
Total Species	0
Total Trap Nights	36

Site Code	Community	Coordinates		Description
		Northing	Easting	
Warri Camp and surrounds	Woodland	24°12'43.1"	124°21'43.7"	<i>Acacia sp.</i> woodland surrounded by Spinifex plain.



Species	Common Name	Survey Method	
		Harp	Active
Mammals			
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	2	
Geckos			
<i>Gehyra purpurascens</i>	Purplish Dtella		2
<i>Heteronotia binoei</i>	Binoe's Gecko		4
Dragons			
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon		4

Snakes

<i>Antaresia stimsoni</i>	Stimson's Python		1
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Subtotal	2	11
Total Individuals	13	
Total Species	5	
Total Trap Nights	5	

Eagle-Hassur Bore

Site Code	Community	Coordinates		Description
		Northing	Easting	
Eagle 1	Spinifex Shrubland	24°49'02.5"	124°22'24.6"	Rocky rise with mainly <i>Triodia sp.</i> understory amongst medium density shrubs and sparse trees.



Species	Common Name	Survey Method			
		Pitfall	Box	Elliott	Funnel

Mammals

<i>Notomys alexis</i>	Spinifex Hopping Mouse		2	2	
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	1	4	2	

Skinks

<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus	1			
<i>Ctenotus pantherinus</i>	Leopard Skink	1			

Subtotal	3	6	4	
Total Individuals	13			
Total Species	4			
Total Trap Nights	142			

Site Code	Community	Coordinates		Description
		Northing	Easting	
Eagle 2	Woodland	24°48'41.2"	124°21'02.4"	Woodland dominated by tall <i>Acacia sp.</i> with a dense understory of grasses and shrubs.



Species	Common Name	Survey Method					
		Pitfall	Box	Elliot	Funnel	Camera	Active

Mammals

<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	1	3				
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Geckos

<i>Strophurus strophurus</i>	Western Spinytailed Gecko						1
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Skinks

<i>Ctenotus greeri</i>	Spotted-necked Ctenotus	1					
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Subtotal	2	3	0	0	0	1
Total Individuals	6					
Total Species	3					
Total Trap Nights	115					

Site Code	Community	Coordinates		Description
		Northing	Easting	
Eagle 3	Dune Shrubland	24°47'55.4 "	124°18'26.3"	Long continuous dune with a medium density covering of grasses and shrubs dominated by <i>Triodia</i> sp. and <i>Acacia</i> sp.



Species	Common Name	Survey Method			
		Pitfall	Box	Elliott	Active

Mammals

<i>Ningauia ridei</i>	Wongai Ningau	2			
<i>Notomys alexis</i>	Spinifex Hopping Mouse		7	1	
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	1			
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	1	1		

Geckos

<i>Gehyra purpurascens</i>	Purplish Dtella				1
<i>Strophurus ciliaris</i>	Spiny-tailed Gecko				2
<i>Strophurus strophurus</i>	Western Spiny-tailed Gecko				2

Skinks

<i>Lerista bipes</i>	North-western Sandslider	1			
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Dragons

<i>Moloch horridus</i>	Thorny Devil	1			
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Subtotal		6	8	1	5
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Total Individuals	20
Total Species	9
Total Trap Nights	121

Site Code	Community	Coordinates		Description
		Northing	Easting	
Eagle 4	Spinifex Plain and Shrubland	24°47'55.4"	124°18'26.3"	Spinifex Plain (<i>Triodia sp.</i>) with small patches of shrubs.



Species	Common Name	Survey Method
		Elliott

Mammals

<i>Mus musculus</i>	House Mouse*	2
<i>Notomys alexis</i>	Spinifex Hopping Mouse	3
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	13

Subtotal	18
Total Individuals	18
Total Species	3
Total Trap Nights	60

Babool Rockhole

Site Code	Community	Coordinates		Description
		Northing	Easting	
Babool 1	Dune Shrubland	24°31'17.5"	123°57'06.1"	Long continuous dune with a medium density covering of grasses and shrubs dominated by <i>Triodia sp.</i> and <i>Acacia sp.</i>



Species	Common Name	Survey Method		
		Pitfall	Box	Elliott
Mammals				
<i>Mus musculus</i>	House Mouse*	1	2	
<i>Ningai ridei</i>	Wongai Ningai	2		
<i>Notomys alexis</i>	Spinifex Hopping Mouse		5	8
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	2	3	6
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	1		
Geckos				
<i>Strophurus ciliaris</i>	Spiny-tailed Gecko	1		
Skinks				
<i>Ctenotus brooksi</i>	Wedgesnout Ctenotus	1		
<i>Ctenotus pantherinus</i>	Leopard Skink	1		
<i>Cyclodomorphus melanops</i>	Spinifex Slender Blue-tongue	1		
Dragons				
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	1		

Subtotal	11	10	14
Total Individuals	35		
Total Species	10		
Total Trap Nights	90		

Site Code	Community	Coordinates		Description
		Northing	Easting	
Babool 2	Dune Shrubland	24°31'19.5"	123°57'09"	Long continuous dune with a medium density covering of grasses and shrubs dominated by <i>Triodia</i> sp. and <i>Acacia</i> sp.



Species	Common Name	Survey Method	
		Pitfall	Elliott

Mammals

<i>Ningauai ridei</i>	Wongai Ningauai	1	
<i>Notomys alexis</i>	Spinifex Hopping Mouse		7
<i>Pseudomys desertor</i>	Brown Desert Mouse	1	
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse		1
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	2	

Geckos

<i>Lucasium stenodactylum</i>	Crowned Gecko	1	
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Skinks

<i>Ctenotus calurus</i>	Blue-tailed Finesnout Ctenotus	1	
Subtotal		6	8
Total Individuals		14	
Total Species		7	
Total Trap Nights		60	

Site Code	Community	Coordinates		Description
		Northing	Easting	
Babool 3	Dune Shrubland	24°31'23.8"	123°57'13"	Long continuous dune with a medium density covering of grasses and shrubs dominated by <i>Triodia</i> sp. and <i>Acacia</i> sp.



Species	Common Name	Survey Method			
		Pitfall	Box	Elliott	Camera

Mammals

<i>Notomys alexis</i>	Spinifex Hopping Mouse		11	7	
<i>Pseudomys desertor</i>	Brown Desert Mouse	1		1	
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	1	4	3	
<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	2			
<i>Vulpes vulpes</i>	Fox*				1

Skins

<i>Ctenotus calurus</i>	Blue-tailed Finesnout Ctenotus	5			
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<i>Ctenotus quattuordecimlineatis</i>	Fourteen-lined Ctenotus	1			
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	1			

Dragons

<i>Diporiphora winneckeii</i>	Canegrass Dragon	1			
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Subtotal	12	15	11	1
Total Individuals	39			
Total Species	9			
Total Trap Nights	92			

Site Code	Community	Coordinates		Description
		Northing	Easting	
Babool 4	Creek	24°31'34.4"	123°56'51"	Dry rocky creek (ephemeral) with a mixture of shrubs and grasses including <i>Melaleuca sp.</i> , <i>Acacia sp.</i> and <i>Triodia sp.</i> .



Species	Common Name	Survey Method	
		Box	Elliott

Mammals

<i>Notomys alexis</i>	Spinifex Hopping Mouse	5	2
<i>Pseudomys hermannsbergensis</i>	Sandy Inland Mouse	6	1

Subtotal	11	3
Total Individuals	14	
Total Species	2	
Total Trap Nights	54	

Site Code	Community	Coordinates		Description
		Northing	Easting	
Babool 5	Gibber Woodland	24°31'28.4"	123°56'56.4"	Gibber plain with sparse Acacia trees and patches of Spinifex.



Species	Common Name	Survey Method
		Funnel

Geckos

<i>Strophurus strophurus</i>	Western Spiny-tailed Gecko	1
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Subtotal	1
Total Individuals	1
Total Species	1
Total Trap Nights	40

Additional Incidental Records

Species	Common Name	Date	Northing	Easting	Number
<i>Antaresia stimsoni</i>	Stimson's Python	25/7/18	24°49'06.5"	124°22'40.5"	1
<i>Camelus dromedarius</i>	One-humped Camel*	24/7/18	24°15'50.4"	124°22'42.8"	4
<i>Camelus dromedarius</i>	One-humped Camel*	8/8/18	24°34'22.8"	123°56'33.6"	9
<i>Camelus dromedarius</i>	One-humped Camel*	8/8/18	24°46'52.3"	124°14'52.6"	10
<i>Canis lupus dingo</i>	Dingo	28/7/18	24°48'51.3"	124°21'36.3"	1
<i>Canis lupus dingo</i>	Dingo	3/8/18	24°25'32.6"	124°29'33.5"	1
<i>Canis lupus dingo</i>	Dingo	5/8/18	24°31'28.4"	123°56'56.4"	1
<i>Canis lupus dingo</i>	Dingo	6/8/18	24°31'28.4"	123°56'56.4"	4
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	22/7/18	24°21'37.1"	124°29'41.2"	1
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	23/7/18	24°12'43.1"	124°21'43.7"	1
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	24/7/18	24°12'43.1"	124°21'43.7"	1
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	29/7/18	24°47'55.4"	124°18'26.3"	2
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	31/7/18	24°47'55.4"	124°18'26.3"	1
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	4/8/18	24°31'23.8"	123°57'13"	1
<i>Ctenophorus isolepis gularis</i>	Central Military Dragon	5/8/18	24°31'17.5"	123°57'06.1"	1
<i>Ctenophorus reticulatus</i>	Western Netted Dragon	24/7/18	24°12'43.1"	124°21'43.7"	1
<i>Ctenopus pantherinus</i>	Leopard Skink	5/8/18	24°33'40"	124°29'46"	1
<i>Lialis burtonis</i>	Burton's Legless Lizard	6/8/18	24°49'06.5"	124°22'40.5"	1
<i>Macropus rufus</i>	Red Kangaroo	3/8/18	24°35'13.1"	123°56'14"	1
<i>Macropus rufus</i>	Red Kangaroo	3/8/18	24°43'34.9"	123°50'9.0"	1
<i>Pogona minor</i>	Dwarf Bearded Dragon	27/7/18	24°29'25.5"	124°29'43.8"	1
<i>Rhynchoedura ornata</i>	Western Beaked Gecko	30/7/18	24°49'06.5"	124°22'40.5"	1

<i>Tadarida australis</i>	White-striped Freetailed Bat	21/7/18	24°49'06.5"	124°22'40.5"	2
<i>Tadarida australis</i>	White-striped Freetailed Bat	24/7/18	24°12'43.1"	124°21'43.7"	2
<i>Tadarida australis</i>	White-striped Freetailed Bat	25/7/18	24°12'43.1"	124°21'43.7"	2
<i>Tadarida australis</i>	White-striped Freetailed Bat	27/7/18	24°12'43.1"	124°21'43.7"	1
<i>Tadarida australis</i>	White-striped Freetailed Bat	29/7/18	24°49'06.5"	124°22'40.5"	1

Additional Incidental Records continued

<i>Tadarida australis</i>	White-striped Freetailed Bat	30/7/18	24°49'06.5"	124°22'40.5"	2
<i>Tadarida australis</i>	White-striped Freetailed Bat	1/8/18	24°49'06.5"	124°22'40.5"	1
<i>Tadarida australis</i>	White-striped Freetailed Bat	3/8/18	24°31'28.4"	123°56'56.4"	1
<i>Tadarida australis</i>	White-striped Freetailed Bat	5/8/18	24°31'28.4"	123°56'56.4"	1
<i>Tadarida australis</i>	White-striped Freetailed Bat	6/8/18	24°31'28.4"	123°56'56.4"	1
<i>Varanus giganteus</i>	Perentie	24/7/18	24°16'02.5"	124°20'59"	1

DISCUSSION

Overall the results for this survey were very good given that the survey was conducted in winter with a total of 24 reptile species and 12 mammal species recorded for of total of 36 species.

While the total species count was low compared to other surveys the results are very good when the weather conditions are considered with many overnight lows reaching below 10°C.

The two most notable species were Stimson's Python (*Antaresia stimsoni*) and Perentie (*Varanus giganteus*) given the cold weather conditions.

The total numbers of mammals recorded was very high with mobs of 100+ camels seen and many individuals of Spinifex Hopping Mouse (*Notomys alexis*) with 72 individuals trapped, and Sandy Inland Mouse (*Pseudomys hermannsbergensis*) with 58 individuals trapped.

Several of the survey methods yielded results which may not have been made otherwise. The active search allowed us to record the only representative of the Snake family, Stimson's Python (*Antaresia stimsoni*) as well as the Purplish Dtella (Purplish Dtella) and Binoe's Gecko (*Heteronotia binoei*), and the Harp trap recorded Gould's Wattled Bat (*Chalinolobus gouldii*). These point to the importance of utilizing as many survey methods as possible.

The high numbers of House Mouse (*Mus musculus*) is also noteworthy given the survey site's distance from any permanent human habitation.

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Scats and Tracks

Mirinda Thorpe

Scats

Desert Discovery participants had another great year of collecting scats, with a total of **87 Predator scats** and **23 Macropod scats** collected. Scats were collected opportunistically by participants from all teams, while undertaking their regular field activities.

Information obtained from predator scat collections can be highly valuable, indicating the presence of species that might otherwise be unrecorded through other survey techniques. Upon scat analysis, mammal, reptile and sometimes bird species can be identified from predator scats. The majority of predator scats came from Dingoes (*Canis lupus dingo*), then Foxes (*Vulpes vulpes*), with Cat (*Felis catus*) scats generally more difficult to find due to their behaviour of burying their scats. Information obtained from scat analysis can inform the occurrence of predation on threatened species (such as Bilbies – *Macrotis lagotis*) or other species of interest (such as the Marsupial Mole – *Notoryctes typhlops* or *Notoryctes caurinus*).

Small numbers of Macropod scats were collected from rocky outcrop areas, in an attempt to identify the possible presence of the Black-footed Rock-wallaby (*Petrogale lateralis*). It is suspected that all Macropod scats collected by participants were those of Euro (*Macropus robustus*), which may also inhabit rocky outcrop areas (according to knowledge shared by one of the visiting traditional owners).

Tracks

Diverse mammal, reptile, bird and invertebrate tracks were observed throughout the Desert Discovery survey area. These were particularly visible in sandy areas and dune systems.

Species tracks observed:

- Camel (*Camelus dromedarius*)
- Dingo (*Canis lupus dingo*)
- Fox (*Vulpes vulpes*)
- Cat (*Felis catus*)
- Emu (*Dromaius novaehollandiae*)
- Bustard (*Ardeotis australis*)
- Small mammals (Spinifex Hopping Mouse – *Notomys alexis* and other rodents/marsupials)
- Small reptiles (Dragons, Skinks and Sliders)
- Snakes
- Invertebrates

Larger reptile burrows were observed, though due to low temperatures in winter, Goannas were not active and therefore not represented in survey data (no captures, sightings or tracks).

No formal fauna track survey method was employed by Desert Discovery in 2018. It is recommended that this be explored for future surveys. Organisations currently undertaking track count surveys (such as Arid Recovery) may be able to assist in developing a formal track count/survey method. Bilby plot surveys undertaken on previous Desert Discovery expeditions may also record a diversity of other species tracks (see Bilby report for more information).

The Desert Discovery fauna team were prepared to undertake Bilby (*Macrotis lagotis*) surveys during the 2018 survey expedition on Birriliburu lands, however no formal surveys were undertaken due to no appropriate Bilby habitat or signs of Bilby activity being identified throughout the Desert Discovery survey area (see fauna and flora survey site maps).

Indicators of appropriate Bilby habitat were researched prior to the expedition, including preferred food plants and typical signs of Bilby activity (tracks, scats, burrows and diggings). All other research teams (including flora, birds and pioneers) were informed of expected Bilby habitat vegetation features and signs of activity, to be reported to the fauna team if found. The flora team assisted with identification of possible Bilby habitat based on the presence of particular flora species. These species included; Bunch Panic Grass (*Yakirra australiensis*), Cockroach Bush (*Senna notabilis*), Hill's Tabletop Wattle (*Acacia hilliana*), Bush onions and other minniritchi bark *Acacia* species that host Bardi/Witchetty grubs (fed on by Bilbies).

Method:

If undertaking formal Bilby surveys, the following method would have been employed (outlined in Thorpe et al. [2018]):

The Bilby and Great Desert Skink (*Liopholis kintorei*) survey methods previously employed by Desert Discovery involved undertaking 2ha surveys, adapted from Moseby et al. (2012), modified by Rachel Paltridge from Desert Wildlife Services Alice Springs, to include certain bilby-specific items like food plants. The last two Desert Discovery expeditions (2014 & 2016) added an adjacent 2ha survey area, consistent with the standard methodology for Great Desert Skink surveys, making a 4ha survey area for Bilbies and Great Desert Skinks.

Survey plots are generally randomly placed at 5km intervals along tracks used by Desert Discovery for the project. Plots are also surveyed in places of known recent or past activity and areas of favourable habitat, as identified by local knowledge (from traditional owners or ecologists).

Surveys generally entail a line ideally of 4 or 5 people (each spaced so that all ground is visible) walking back and forth across the plot using GPS to control the spacing of each sweep. Traditional owner involvement with plot surveys often involves their searching the area within and around the plot for signs/tracks of Bilbies, Great Desert Skinks and other fauna. Information about survey plots is recorded, including climate at time of survey, habitat type and estimated time since fire (see Bilby and Great Desert Skink survey plot data sheet), with each plot photographed and mapped. Trail cameras may also be used in areas of identified Bilby activity where appropriate. Bilby and predator scats have been collected in the past for future analysis (see Tracks and Scats report for more information).

Bilby surveys involve the tracking of signs (burrows, diggings, scats, tracks and animal remains) of Bilbies and a range of other fauna. This allows observations to be made about the presence of introduced mammals (foxes, cats) and dingoes which might relate to the presence of Bilbies (including possible distribution and abundance). Observations made on the presence of other fauna (reptiles, other mammals and Bustards) are also recorded which may provide

useful information for the Desert Discovery fauna team, Traditional Owner group, ecologists and state Environment Department.

Results:

Both the flora and fauna teams reported that no large areas of associated flora species with Bilby habitat were identified throughout survey areas on the 2018 Desert Discovery survey expedition. It was confirmed by the flora team that only five scattered *Yakirra australiensis* plants were identified on the Eastern bank of the clay pan north of the Eagle Hassar bore. Four locations of *Senna notabilis* were identified, one near Warri bore, two near a Mulga patch between Eagle Hassar bore and Warri bore and the other near Katu Katu well. Small patches of minniritchi bark *Acacia* species were identified just west of Eagle Hassar bore and at rocky outcrops on the way to Ngarinarri claypan. Populations of these flora species are thought to be too small to sustain Bilby populations, with no signs of Bilby activity identified. It is for these reasons that no formal Bilby survey plots were undertaken.

If Bilbies or signs of activity were recorded on the survey expedition, data would have been reported to Jessica Chapman from Desert Support Services WA, and the National Bilby Recovery team via Rachel Paltridge. Great Desert Skink data would have been provided to Danae Moore (Australian Wildlife Conservancy). Data on these species would have been shared with these individuals/organisations with permission from the traditional owner group via Desert Support Services.

References:

Moseby, K.E., Nano, T. and Southgate, R. (2012). *Tales in the Sand; A guide to identifying Australian arid zone fauna using spoor and other signs*. Ecological Horizons, South Australia.

Thorpe M.E, reviewed by Haiblen, J. and Macdonald, T. (2018). *Desert Discovery Flora and fauna survey template for Bilby surveys*. Unpublished internal Desert Discovery document.

Bilby and Great Desert Skink survey plot data sheet (next page), adapted by Rachel , adapted by Rachel Paltridge (Desert Wildlife Services) from Moseby et al. (2012).

Observer's Name(s)		No. observers:			Site No:	
Date:		Time started:		Time finished:	Location:	
Wpt:	GPS	GPS Co-ordinates: Lat:			Long:	Datum:
Weather conditions: clear sky light cloud thick cloud			no breeze light breeze windy		Trackability: 1 (mouse tracks) 2 (cat, bilby) 3 (only >dingo detectable)	
Estimated time since strong wind or rain:			Estimated time since burnt: <1 year 1-3 years 4-8 years >10 years			
Habitat: spinifex sandplain dunefield lateritic rise rocky hill mulga woodland salt lake edge other (please list)						
Bilby Food Plants: <i>Acacia hilliona</i> <i>Senna notabilis</i> other grub shrubs <i>Yakirra australiensis</i> Bush onions						
Species	If present record estimated age of sign: 1= <2 days old, 2 = 2 days - 2 weeks, 3= 2 weeks-2months, 4 > 2 months					
	Animal (or remains)	Tracks	Diggings	Burrow	Scat	Notes
Goanna/Perentie						If bilbies are present record what they are digging for, whether different sized tracks and scats are present (draw approximate scat size), how many burrows were found. Also record whether any scats were collected, cameras set, or photographs taken.
Blue-tongue Lizard						
Great Desert Skink						
Woma/other snake						
Bustard						
Emu						
Echidna						
Bilby						
Mulgara						
Hopping mouse						

Marsupial Mole					
Red kangaroo					
Rabbit					
Cat					
Fox					
Dingo					
Camel					
Horse/donkey/cattle					

Marsupial Moles

Ben Blomfield

Mole Field Work 2018 Project

We found sand hills were in short supply near the base station this year so the team went approximately 50 kms west from Base Camp along the cut line, then travelled 13 kms north on the Katu Katu Well Track. The team consisted of Eric and Joy Loughton, Peter Mann, and Ben Blomfield.

Here we found several medium sandhills, approximately 10m high, and two to three kms long. Four mole trenches were dug in the upper half of the northern sand hill on the north face to the dimensions and procedures provided by Dr Joe Benshemesh. The sandhills there were lightly vegetated and typically running almost east west.

The first mole trench revealed 9 holes on the south face and 2 on west face. The sand inside some of the higher mole holes was reasonably free flowing, possibly indicating some recent activity. This was supported by low readings from the penetrometer.



Mole Trench Number 1

Photos J Loughton

The second mole trench had 4 mole holes on the south face and 2 on the east face. Again the sand inside some of the mole holes was quite soft.

The third mole trench had 3 mole holes on the south face and one in each of the east and west walls. One hole only was fairly free flowing.

The fourth mole trench had 7 holes on the south face and 6 on the west wall and 2 in the east wall. This indicates that there is a lot of activity moving along the length of the sand hill rather than just up and down the sand hill, which I have previously found. In some mole holes, the sand was quite soft.



Mole Trench Number 4

Photo J Loughton

The data sheets recording these figures and the positions of the holes in the trenches have been forwarded to Dr Joe Benshemesch for his information.

Fungi and Lichen

Malcolm McKinty

Background to fungi

Fungi are present throughout most of the organic material in the environment – such as wood, soil, dung and carcasses – and play important roles in the ecology of natural ecosystems. Through the processes of decay they are recyclers of organic material, releasing nutrients back into the soil. Symbiotic relationships between fungi and the roots of plants ensure the survival of both. They are critical food sources for many native mammals, reptiles and invertebrates.

Fungi are a very large group of living organisms that usually reproduce by spores – minute reproductive cells, up to 10 microns in diameter – which are dispersed by air, water, animals and sometimes the fungus itself.

Unlike green plants, fungi lack chlorophyll for photosynthesis, so must absorb their energy and nutrients from the substrates in which they grow. They comprise microscopic filaments (hyphae) which form a web-like mass (mycelium) ramifying throughout the substrate. The mycelium is the actual fungus – its vegetative structure – and, while individual hyphae are rarely seen, the mycelial mass can sometimes be seen in the substrate, such as that of *Pycnoporus coccineus* in wood (see below).

The relationship between fungi and their substrates varies with species. Saprotrophic fungi gain their energy from dead organic material by breaking down the lignin, cellulose or chitin. These species play a vital role in reducing the accumulation of dead organic material and in the recycling of essential nutrients, particularly carbon and nitrogen.

Some fungi are parasites, obtaining their nutrients from living organisms with no benefit to the respective host and, in some cases, killing it.

Other fungi have a mutually-beneficial symbiotic relationship with a living organism. Mycorrhizal fungi have a special relationship with the rootlets of trees and other plants. In return for having their energy needs met, the hyphae of these species greatly increase the volume of soil from which the plant can take up water, nutrients and trace elements. Such fungi are essential for the healthy growth of native forests in Australia's impoverished soils.

Under favourable conditions fungi produce reproductive structures (fruit-bodies) from which their spores are dispersed. Fruit-bodies take a wide range of forms according to the particular species and, for the macrofungi (in which the fruit-bodies are large enough to be seen with the unaided eye), it is largely by their fruit-bodies that fungi are identified.

The fungal kingdom is considered to comprise at least four main divisions based on microscopic characteristics. The vast majority of the macrofungi fall into two of them – the Basidiomycota, where the spores are produced on the outside of specialised club-shaped cells and the Ascomycota, in which the spores are produced inside specialised sac-like cells, called asci. All but one of the fungi described below belong to the Basidiomycota.

Depending on the fungus' species group, the spores may be produced on the surface of the fruit-body, on specialised surfaces such as gills (or lamella) that are like the leaves of a book, spines or the lining of tubes or, as for the powdery spore mass in a puffball, within the fruitbody. For the purposes of description, fungi can be placed into morphological groups - an artificial grouping of similar-shaped fungi (see Appendix 1).

FUNGI FOUND IN THE EASTERN LITTLE SANDY DESERT

This survey was undertaken between 21 July and 8 August 2018. Located within the Birriliburu Indigenous Protected Area in the eastern Little Sandy Desert region of Western Australia, the areas investigated were largely along the Eagle Highway and a low range some 50 kilometres to the west. Where possible, forays for fungi included a range of vegetation

types. The records include specimens brought in to camp by other Desert Discovery team members.

Recording fungi is similar to that for plant species. However, as well as the scientific name (if known), location in terms of latitude and longitude, locality and vegetation type, the substrate on which the fungus is growing is also recorded as well as the identity of the nearest tree/shrub - which may help in future studies of mycorrhizal fungi.

The ephemeral nature of the fruit-bodies of most species means that finding them is largely opportunistic and depends on the search coinciding with their location, their emergence and before they have deteriorated or been consumed. Nevertheless, 71 fungi were collected comprising about 30 different species and representing nine morphological groups. These are summarised in Appendix 1, grouped by their morphology. Most were species expected to be found in arid and semi-arid environments, particularly the puffballs and their allies. Some of the fungi pictured in this report are of examples found elsewhere as, in some cases, the specimens found during this study had desiccated too much to be good examples or because of technical difficulties.

BASIDIOMYCOTA

STEMLESS PUFFBALLS

Puffballs are commonly round or oval-shaped fungi in which the spores appear as a mass within an outer wall (peridium). The peridium on some species may comprise an outer layer (exoperidium) which disintegrates as the fungus matures to expose an inner layer (endoperidium). Some have a small circular opening (ostiole, pore or stoma) through which the spores are discharged when pressure (such as from rain drops) is applied to the peridium. Others crack open or disintegrate to release the spores.

***Bovista* sp.**

The stemless fruit bodies of *Bovista* tend to be oval, spherical or pear-shaped, and typically 1 to 8 cm in diameter. The white or light-coloured thin and fragile exoperidium which, in a young specimen may be smooth, granular or finely spiny - depending on the species - sloughs off at maturity to expose a smoother endoperidium.

The brown to purple-brown spores of *Bovista* are released through a single apical pore.

Six specimens of this genus, probably all of the same species, were collected.





Calvatia sp.

These saprophytic species are characterised by the irregular fragmentation of the peridium.

Three specimens of *Calvatia* were collected during this project.

Disciseda sp.
(Acorn Puffball)

Found in sandy areas, this puffball comprises a thin-walled spherical peridium (about 15 mm diameter) with a stoma at the top through which the spores are discharged. It is stemless but usually has a mycelial mass at its base which tends to retain a lump of soil.

Only one example of this species was found.

[The specimen pictured here is from a previous DD study.]





***Lycoperdon* sp.**

When young, most species of *Lycoperdon* have an exoperidium of soft warts or spines which falls away as it matures.

The spores are discharged through an apical pore when pressure (such as from rain drops) is applied to the peridium.

Pisolithus comprises a group of large puffballs in which the peridium disintegrates downwards to a persistent stump-like base. Two species of *Pisolithus* were collected.

***Pisolithus marmoratus* group**

(Horse Dung Fungus)

Three specimens of this species were collected from the study area.

Growing on a range of soil types, it is identified by its brown, shiny, mottled peridium which progressively disintegrates downwards, exposing the brown spore-mass.





***Pisolithus albus* group**

This species of *Pisolithus* is common to mallee and desert regions but only one specimen was found during this project - near the fresh-water lake east of the Eagle Highway.

It is characterised by the white, smooth peridium of younger specimens which soon darkens somewhat and irregularly cracks to expose the spore-mass. It can reach a considerable size with the author finding one specimen (outside the area) measuring 20 cm diameter.

[The specimen pictured here was found during a previous DD study.]

***Scleroderma* sp.**

These species are commonly known as 'earth balls'. They are ectomycorrhizal with trees and shrubs (meaning that their mycorrhiza form a sheath over the roots of the plant rather than penetrate them).

As they mature the peridium splits open to reveal the spore mass.



Four other puffballs were collected from the area, three of which are pictured here.

Their species is unknown.



puffball species A



puffball species C



puffball species D

STALKED PUFFBALLS

As the name of this group implies, these puffballs are raised above the ground by a stem which may be fibrous or woody.

***Phellorinia* aff**

This fungus has similarities to the genus *Phellorinia* but its identity is by no means certain.



Podaxis pistillaris (Black Powderpuff)

A common and persistent saprotrophic fungus of the semi-arid and arid areas of Australia, in the study area it was found principally on sand dunes and other sandy areas.

It was the most common species found during the study, with 12 recorded sites, some of which carried several specimens; nine samples were collected from a range of sites.

The peridium lifts and/or shreds to expose the dark-brown powdery spore-mass (right) which is held in a fragile web-like structure. The spores are dispersed by the wind.



The genus *Tulostoma* embraces a number of species of stemmed puffballs in which the spores are ejected through a stoma in the top of the thin-walled spherical peridium which acts like bellows when raindrops strike it. They are common fungi of sandy soils in arid and semi-arid regions.

Depending on the species, these fungi may range in height from 5 mm to 20 mm and have stems that may be exposed or buried (although soil movement may also play a part). It is difficult to differentiate between many of the species; eleven specimens of which were collected during the project.



***Tulostoma* sp.**

Specimens of several species of this genus were found during the project.

The specimen on the right is unusual in that it retains a mycelial 'root'.



Tulostoma aff putchellum

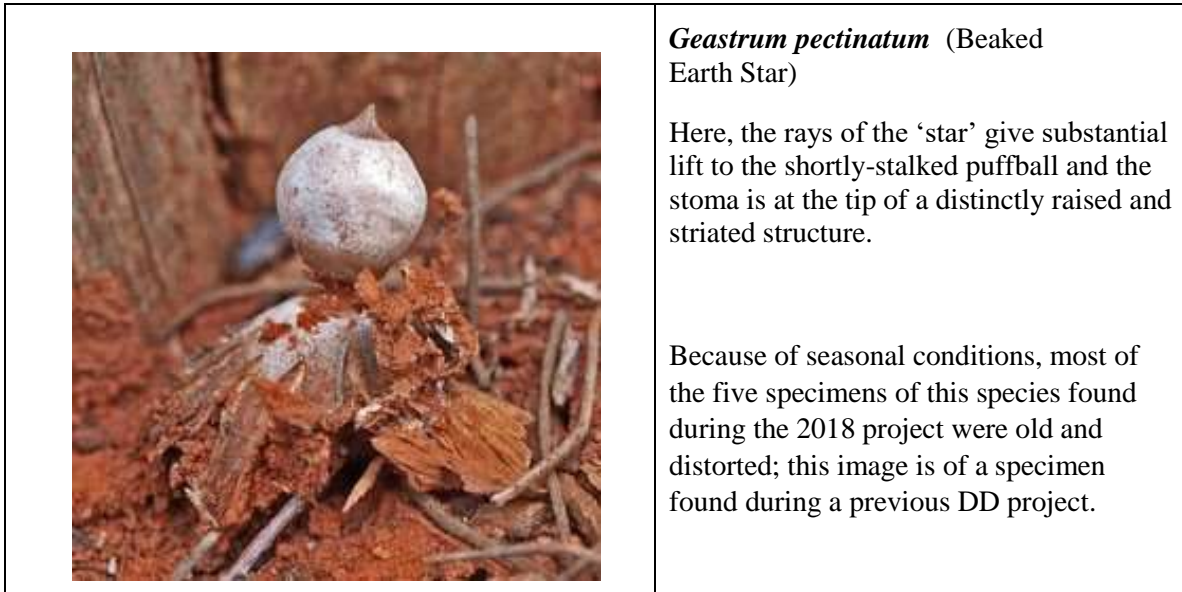
The cup supporting the puffball, relatively thick stem and bulbous base suggest this to be *Tulostoma. putchellum* but this is to be confirmed.



EARTH STARS

Geastars (earth stars) are puffballs which have a double-layered peridium enclosing the immature puffball. The outer layer splits to form a number of rays – like a star – to expose the central puffball containing the spores.

The spores of these species are also ejected through a stoma under the impact of rain. The rays of the ‘star’ can act to raise the puffball above the ground litter to better access the raindrops.



TRUFFLE-LIKE FUNGI

Truffle-like fungi differ from the bulk of the fungi in that they usually form underground or in the surface litter. The spore-bearing tissue is enclosed within the peridium and the spores are retained within a cellular structure. The spores are usually distributed via the dung of animals that eat them; rarely are they spread by wind or water - as is the case with the puffballs and their relatives. They are usually strongly-scented to attract native marsupials. Most truffle-like fungi are mycorrhizal, so the mycelia form symbiotic associations with plant roots. They derive from a range of fungal genera.



Cystangium sessile

Although quite desiccated, this truffle-like fungus retained a strong 'mushroom' odour.



truffle-like fungus; unknown species

BOLETES

Boletes are fleshy-pored fungi in which the tissue from which the spores are released comprises pores that look like a sponge below the cap.



Bolete – species unknown

The soft and spongy nature of boletes mean that they quickly deteriorate. This specimen may have been rapidly desiccated soon after its emergence.

Fungi can become infected by other fungi. In the image of the underside of the fungus, left, the pale area on the right side is a species of mould.

BRACKET POLYPORES

The polypores are a large group of fungi in which the spores are produced from tubes (which appear as pores) or gill-like structures under a cap. Most polypores are tough and leathery or woody and are almost always attached to wood. Seven of the polypore species found in this study occurred as brackets on woody substrates.



	<p><i>Gloeophyllum abietinum</i></p> <p>Although the fertile (sporeproducing) surface of this bracketfungus resembles that of an agaric it is classed as a polypore with the spores being produced on the tough gill-like plates.</p> <p>It was found on dead wood in three locations.</p> <p>Left image – upper surface Lower image – fertile (lower) surface</p>
	

Osmoporus vesparius
(previously *Hexagonia vesparia*)

The young fruit-bodies of this woodrotting polypore are whitish, becoming brownish with a woody texture when mature.

[The image (right) is of an example of this species found elsewhere.]



	<p><i>Pycnoporus coccineus</i> (Scarlet Bracket Fungus)</p> <p>This spectacularly-coloured polypore is a common wooddecaying (saprotrophic) fungus found across Australia from the deserts to moist fern gullies. It can persist for many years before decaying.</p> <p>Upper (left) and pore (right) surfaces of <i>Pycnoporus coccineus</i></p>
	<p>The bright red mycelium (left image) of <i>Pycnoporus coccineus</i> causes white rot in the woody substrate.</p> <p>When extracted, the colour from the fungus can be used as a fabric dye.</p> <p>Five occurrences of this species were recorded during this study – all on dead wood.</p>

Four other species of bracket polypores were found that could not be identified using readilyavailable references. Images of two are set out below.



bracket polypore Species A
upper surface



bracket polypore Species A
pore surface

Two specimens of the above fungus were collected. Both had erupted from the base of dead shrubs of either *Acacia* or *Grevillea* species.



bracket polypore Species B
upper surface



bracket polypore Species B
pore surface

The above specimen had erupted from the bark of a Mulga.

STEMMED POLYPORES

Two specimens of the following stemmed polypore were collected during this project. Both were located at the soil/wood interface on dead wood. One of the specimens (not pictured), was located about 1.5 metres up in a dead tree with the soil being provided by the mud of a termite gallery.



upper surface



pore surface

AGARICS

The spores of agarics are produced on gills (that look like pages in a book) under a cap. Agarics encompass the majority of fungi and include what are commonly known as ‘mushrooms’. The soft fruit-body of most agarics comprise some 90% water and they develop and deteriorate over a short time so it is uncommon to find the more delicate fungi in drier regions. The following fungus is a tough species that can survive dry conditions.

Panus fasciatus
(Hairy Trumpet)

This agaric has a thin, leather-like texture. Fresh specimens are quite bristly.

It becomes hard and brittle when dry but rehydrates after rain



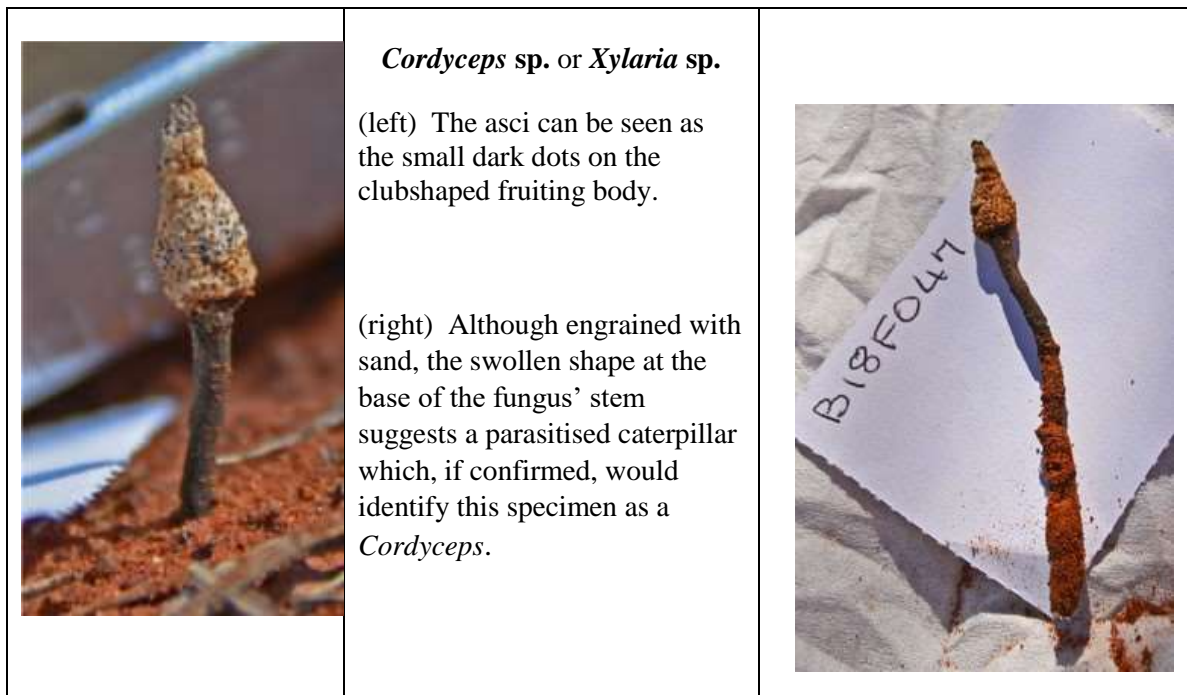
ASCOMYCOTA

Cordyceps sp. or *Xylaria* sp

Cordyceps, known as ‘vegetable caterpillars’, belong in the fungal division of Ascomycota where the spores are produced in microscopic tubes or sacs called asci.

Cordyceps is a genus of highly specialised fungi that parasitise and consume insects, usually in their larval stage. The spores of *Cordyceps* penetrate the soil where they infect caterpillars. At maturity the fungus produces the fruiting body, usually from the head of the dead caterpillar, which erupts from the soil and terminates in a club-like structure which carries the fungus’ fertile tissue.

The author tentatively identified the following specimen as a *Cordyceps*. However, in common with many species of fungi, there is uncertainty about its identification. This particular specimen is very close in appearance to an arid country ‘mystery’ fungus that is rarely collected and that the Adelaide Herbarium has been calling *Xylaria* sp. or ‘little pepper pot’. The Xylariaceae also belong to the fungal division of Ascomycota. They erupt from dead wood.



LICHEN FOUND IN THE EASTERN LITTLE SANDY DESERT

A lichen is a composite organism consisting of fungi living symbiotically with algae or cyanobacteria. The fungi component are largely ascomycetes, with very few basidiomycetes involved. The combined lichen has properties different from those of its component organisms. The properties are sometimes plant-like, but lichens are not plants.

The fungal component benefits from the carbohydrates produced by the algae or cyanobacteria via photosynthesis. The algae or cyanobacteria benefit by being protected from the environment by the filaments of the fungi, which also gather moisture and nutrients from the environment, and (usually) provide an anchor to it.










Lichens come in many colours, sizes and forms. The body (thallus) of most lichens is different from those of either the fungus or alga growing separately. Lichens may have tiny, leafless branches (fruticose), flat leaf-like structures (foliose), flakes that lie on the surface like peeling paint (crustose) or other growth forms.






Lichen-covered rock wall west of Baabool Rockhole

Twelve specimens of lichen were collected from various locations during the project. They comprised either crusts on the soil surface or were growing on rocks (epilithic). Unusually,

no lichen was found on wood although to the south-west, along the Gunbarrel Highway, such lichen was common.

		
soil crust	soil crust	soil crust
		
soil crust	soil crust	soil crust
		
epilithic	epilithic	epilithic

		
<p><i>Acarospora citrina</i> aff. (epilithic)</p>	<p>epilithic</p>	<p>epilithic (old fire-hearth)</p>

Also collected was a specimen of moss found growing on the sheltered side of the watercourse downstream of Baabool Rockhole.



Moss colony

All specimens were collected under licence number SW019432 issued by the Department of Parks and Wildlife, Western Australia and were delivered to the Western Australian Herbarium in Perth on 20th August 2018

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Appendix 1

FUNGI FROM THE EASTERN LITTLE SANDY DESERT

Numbers of fungi collected by morphological group

MORPHOLOGICAL GROUP	SPECIES	NUMBER COLLECTED
puffball (powdery spores enclosed in a sac; stem usually absent or reduced)	<i>Bovista</i> sp.	6
	<i>Calvatia</i> sp.	3
	<i>Disciseda</i> sp.	1
	<i>Lycoperdon</i> sp.	1
	<i>Pisolithus marmoratus</i>	3
	<i>Pisolithus albus</i>	1
	<i>Scleroderma</i> sp.	1
	puffballs (unknown species)	4
stalked puffball (powdery spores enclosed in a sac supported on a tough stem)	<i>Phellorinia</i> aff	1
	<i>Podaxis pistillaris</i>	9
	<i>Tulostoma</i> aff <i>putchellum</i>	1
	[The following <i>Tulostoma</i> species are separated by appearance only- the differences may be invalid for identification purposes]	
	<i>Tulostoma</i> – species A	7
	<i>Tulostoma</i> – species B	1
	<i>Tulostoma</i> – species C	1
	<i>Tulostoma</i> – species D	1
earth star (powdery spores enclosed in a sac surrounded by star-shaped rays)	<i>Geastrum pectinatum</i>	5
truffle-like (spores retained within the body of the fungus and usually distributed via the dung of animals that eat it)	<i>Cystangium sessile</i>	1
	unknown species	1
bolete (soft spongy layer of pores under a stemmed cap)	bolete (unknown species)	1
polypore – bracket (bracket-shaped with pores under a cap; tough texture)	<i>Gloeophyllum abietinum</i>	5
	<i>Osmoporus vesparius</i> (<i>Hexagonia vesparia</i>)	1
	<i>Pycnoporus coccineus</i>	5
	unknown species A	2
	unknown species B	1
	unknown species C	1
	unknown species D	1
polypore – stemmed (pores under a stemmed cap; tough texture)	unknown species A	2

agaric (gills under a cap)	<i>Panus fasciatus</i>	3
Cordyceps or Xylaria (<i>Cordyceps</i> parasitises insect larvae; <i>Xylaria</i> colonises dead wood)	<i>Cordyceps</i> sp. or <i>Xylaria</i> sp.	1
TOTAL		71

Moths

Bevan Buirchell

On successive nights, a light sheet was erected and the moths attracted to it were photographed and identified, where possible. There were three sites; one at base camp (23.7.18), a second half way to Warri (24.7.18) and the third was at the Warri Bore camp site (25.7.18).

There are around 22,000 moth species found in Australia with about half having been scientifically named (CSIRO, September 2018). Moths, along with butterflies, belong to the insect order Lepidoptera.

Put simply, butterflies are just day-flying moths. Butterflies have clubbed antennae and the habit of folding their wings vertically when at rest whereas moths sit with their wings flat. Some day-flying moths are brightly coloured and are often mistaken for butterflies

The following is the list of 72 moth species that have been identified, having been found on the three survey nights. There another 8 species still to be identified (March, 2019)

Family	Genus species	Family	Genus species
Cossidae	<i>Endoxyla tigrinus</i>	Limacodidae	<i>Pseudanapaea transvestita</i>
Crambidae	<i>Achyra affinalis</i>	Noctuidae	<i>Australothis rubescens</i>
	<i>Calamotropha dielota</i>		<i>Eremochroa thermidora</i>
	<i>Leucinodes cordalis</i>		<i>Heliocheilus flavitincta</i>
	<i>Sceliodes cordalis</i>		<i>Heliothis punctifera</i>
Depressaridae	<i>Ethmia eupostica</i>		<i>Helicoverpa armigera</i>
Erebidae	<i>Ctenosia infuscata</i>		<i>Leucania cruegeri</i>
	<i>Diatenes gerula</i>		<i>Mataeomera ligata</i>
	<i>Grammodes oculata</i>	Nolidae	<i>Austrocareia iocephala</i>
	<i>Mataeomera ligata</i>		<i>Meganola major</i>
	<i>Nyctemera amicus</i>		<i>Nola sp.1</i>
	<i>Praxis marmarinopa</i>	Notodontidae	<i>Ochrogaster lunifer</i>
	<i>Prorocopsis melanochora</i>	Oecophoridae	<i>Eochrois epidesma</i>
Geometridae	<i>Amelora belemnophora</i>		<i>Eutane terminalis</i>
	<i>Boarmia phloeopa</i>		<i>Maroga melanostigma</i>
	<i>Capusa chionopleura</i>		<i>Oecophoridae sp1?</i>
	<i>Chlorocoma assimilis</i>	Pterophoridae	<i>Leucinodes cordalis</i>
	<i>Dichromodes anelictis</i>		<i>Trichoptilus ceramodes</i>
	<i>Dichromodes sp. ANIC71</i>	Pyralidae	<i>Asclerobia flavitinctella</i>
	<i>Dichromodes sp.1</i>		<i>Assara subarcuella</i>
	<i>Dichromodes sp.2</i>		<i>Balanomis encyclia</i>
	<i>Dichromodes sp.3</i>		<i>Calguia deltophora</i>
	<i>Dichromodes sp.4</i>		<i>Ctenomeristis almella</i>
	<i>Dichromodes sp.5</i>		<i>Etiella behrii</i>
	<i>Dichromodes sp.6</i>		<i>Endotricha melanchroa</i>
	<i>Dichromodes sp.7</i>		<i>Faveria tritalis</i>
	<i>Dichromodes sp.8</i>		<i>Mimaglossa habitalis</i>
	<i>Dichromodes sp.9</i>		<i>Mimaglossa nauphialis</i>
	<i>Dithalama cosmospila</i>		<i>Nyctereutica melanophorella</i>
	<i>Hypomecis curtaria</i>		<i>Salma ebenina</i>
	<i>Hypobapta xenomorpha</i>	Tineidae	<i>Edosa fraudulens</i>
	<i>Idaea sp.</i>	Xyloryctidae	<i>Maroga melanostigma</i>
	<i>Idaea costaria</i>		
	<i>Idaea inversata</i>		
	<i>Notiosterrha sp.</i>		
	<i>Oenochroma cynoptera</i>		
	<i>Phrissogonus laticostata</i>		
	<i>Poecilasthena ischnophrica</i>		
	<i>Scopula optiva</i>		
	<i>Traminda mundissima</i>		



Endoxyla tigrinus



Chlorocoma assimilis



Dichromodes sp.

Schools Program

Judy McKinty

We took a different approach to the schools program this year. We wanted to increase the students' practical involvement in the project in a meaningful way, and give them an opportunity to direct their own learning towards aspects of the project that they found particularly interesting. This would be made possible by giving them digital cameras to use during their visit and having computers available for them to use, with editing software that children of middle primary to early secondary school ages could use, with some help from the Desert Discovery Schools Program team.

The idea was to have the students form groups and use the cameras to make a visual record of the project – how the animals are collected, the process of identification & release, what kinds of animals are caught, etc. Then they would download their recordings and edit them into digital stories of their experiences at Desert Discovery. These would become DVDs to take back to the schools to show to classmates, parents and other people in their communities.

Mick Lumb's successful grant application to the John T. Reid Charitable Trusts provided four digital cameras, two computers, video editing software and other specialist equipment for the students to use. Josh Mills and I made sure we obtained robust and reliable equipment at the best possible price, knowing the conditions in which we and the students would be working. The cameras were dust- and water-proof, and two dust-proof crates were bought to hold everything.



Early communications from Ben and others suggested that Equipment for schools program there could be up to seven schools this year, but changes in regulations concerning school transport, the terrible condition of some of the access roads and the distances involved prevented all but one school from joining us. We were very pleased to welcome a group of four Indigenous students, boys aged from 15-19, and two trainers from the Wiluna Remote Community School and Training Centre, accompanied by three Martu Traditional Owners, who joined us for five days of scientific and cultural exchange and learning. The group was led by Mac Jensen, co-ordinator of the Training Centre, who was later nominated for a WA Premier's Award for Excellence in Education. The Wiluna group set up in an established camp further back along the road, away from our Base Camp.

The Wiluna students were aiming to complete their Certificate II CALM course, as well as gain additional cultural knowledge from Stewart Long, a Martu Elder in their group. They had their own program of activities planned for the time they were with us, and these included sharing traditional Martu knowledge with us about the country in which we were working.

Although this meant that the time spend on our planned schools program was limited, it led to greater engagement and understanding between the Traditional Owners and Desert Discovery members, and left lasting memories and impressions of this special part of the country.

The part of the desert where our project was located was particularly significant for the Wiluna group – to the north is the site where the 'old people', Warri and Yatungka, were found in 1977 and brought out of the desert to live in Wiluna. Their story was recorded in the book *Last of the Nomads*, and the students spent their first day at that special site, learning about country and culture from Elder Stewart Long.

The second day was spent with the Mammals and Reptiles team, checking traps and listening to Nathan Johnson explain the process of trapping, identifying and releasing the animals. Nathan also compared the different kinds of traps used, and described the steps taken to care for the animals while they are in the traps and afterwards when they are released. Chris Lindorff showed the students a night-vision camera he had set up at the trap site, and explained how it worked. After checking the traps, the visiting group helped the team dig holes in the very stony ground and set up a new pit trap line.

During the checking of the traps, the talks and the setting up of the new trap line, the students were recording everything using the digital cameras provided to them and the school's iPad. One of the digital cameras was shared by Chris and Helene Lindorff's daughters, Charlotte and Bethany, who also took part in the schools program. It was really interesting to see the work of Desert Discovery from the students' different perspectives and to watch the way they each recorded the scientific processes, sometimes focusing on quite specific aspects of the project. The students' camera work was very good, and one innovative sequence gave a really close-up, on-the-ground view of the

long process of digging pit fall traps and setting up the line.

The students then



downloaded their recordings to the computers and started



compiling their movies. Their own program of activities meant that they



really only had one day available to record, edit and complete their movies. There wasn't

enough time spent at Base Camp for them to fully edit their work, so I completed it for them while they were engaged elsewhere. The edited movies were made into DVDs for them to take back to school. We hope the viewing of their movies will show others in their families and wider communities the work carried out by Desert Discovery, and prompt discussions about country and culture.

Checking the traps

Digging pit fall traps

Charlotte and Bethany remained with Desert Discovery for a few more days, and this meant they had enough time to keep working on their movie until they completed it. They independently edited their work, adding music and graphics, and made their own DVD. The result of all this work is a valuable record of aspects of the Desert Discovery project of 2018, seen through the eyes of the girls.

There was a special showing of all the movies to the

Photographing a fungus



Kheshaun editing his video



Charlotte & Bethany making their movie

Desert Discovery team, and Charlotte and Bethany's very accomplished and engaging DVD has been shown by several team members to others outside the group, as a way of explaining the desert environment, the kind of work carried out and some of the scientific specimens collected during the project.

The knowledge and understanding the visiting students gained about the scientific collection of ecological information sits alongside the cultural knowledge they already have about the project area. One of the most memorable and enjoyable aspects of this year's school visit was the scientific and cultural exchange that happened between DD team members and the Martu Traditional Owners who accompanied the students.

At their final campfire, the students were each given two copies of their DVD and a woven friendship band in the Aboriginal colours made by Ann Hillas from the Mammals and Reptiles team. The trainers and the Traditional Owners were also given friendship bands. The next morning, before they left to return to Wiluna, Allen presented each member of the visiting group with a Certificate of Achievement to put up on the wall as a certificates reminder of their visit and confirmation of what they had achieved during their time with Desert Discovery. We were told that they value these certificates very highly, and are proud to display them at home.

The only regret in what was a very enjoyable experience was that Colleen, Peter and Den weren't with us for the school visit. Some serious mechanical work needed to be done in Kalgoorlie, so they didn't arrive until after the school group had left. Thank you to Ben, Josh, Nathan, Mirinda and the other team members who stepped up and helped to provide a memorable experience for the students.



Friendship bands on caps



The Wiluna group with their



End of the Wiluna Remote Community School visit

Thanks

Allen Hyde

First and foremost we would like to thank the Martu people for giving us permission to visit their East Birriliburu lands. The Martu People offered us a very warm welcome and their willingness to share their knowledge and their fellowship was appreciated by all concerned.

The Martu Rangers were outstanding and we thank them for sharing their wisdom and knowledge of their country with us. They can be justifiably proud of the manner in which they are managing their lands. Their warm acceptance of us as visitors was noted by all and greatly appreciated.

Tom Griffiths, Central Desert Native Title Services Ranger co-ordinator, also warrants a special thank you for his significant input prior to the project and his wise advice on many matters,

It was a great pleasure having the Traditional Owners and Tom at the project and partaking in activities with our various teams.

The visit by the School Students is always a highlight and this project was no exception. Although only one school, Wiluna Remote Community School, was able to attend this project, the student's enthusiasm to learn and demonstrate their knowledge of their country was impressive. Elsewhere in this report are more details of this aspect of the project. Their Teachers, led by Mac Jensen, also deserve a special "thank you".

I would like to thank everyone within Desert Discovery who played a part in making the project a success. This success was due to your hard work, commitment, knowledge, skills and enthusiasm.

To the members of the reconnaissance team who visited the project site in 2017, thank you for your detailed briefing of what we could expect at the site and for your significant time and financial investment, undertaking this activity.

To the Team Leaders, thank you for organising your team efforts so well and for the manner in which you simply got on with the job! Each team seemed to enjoy the experience and you played a large part in this. To the participants, thank you for the enthusiasm and professionalism you displayed. Without you the project would not happen. I hope you can all return next time.

To Eric Loughton, who took on the role of Camp Chief in my absence when I, for family reasons, had to leave the project early, thank you. From all reports you did great job.

I would also like to thank Rick Hunter, who was attending his first Desert Discovery, for manning the communications facility he provided for the duration of the project. This added an additional level of safety to the overall operation.

I would also like to thank three people who did not attend the project:

Mick Lumb for his great work in applying for and winning a grant from the John T Reid Charitable Trusts to whom we also offer our sincere thanks. This grant enabled us to purchase laptops and cameras to support our school program and also provided financial support for our young scientists to cover some of the significant costs incurred in attending the project. Thank you Mick.

Keith Johnson, who compiled this report and who freely, gave of his experience and knowledge prior to the project. Thank you Keith.

Stuart Kostera who has provided free storage for many years for our trailer and equipment in Perth; thank you once again Stuart.

Finally I would like to thank our committee members for all their assistance leading up to and at the project.