

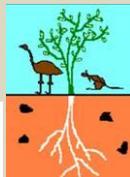


Biodiversity Surveys

2009



Northern Territory Government



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Introduction

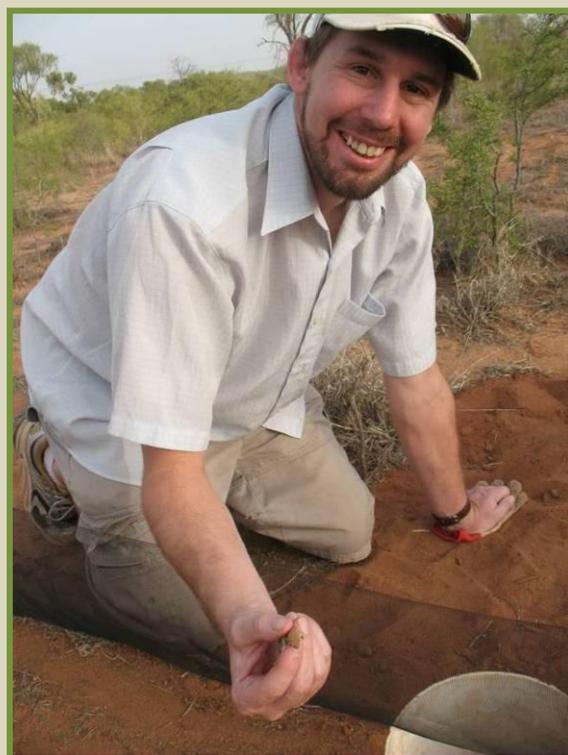
Land for Wildlife:

Land for Wildlife is a voluntary conservation extension program which began in Alice Springs in 2002. The program encourages and facilitates private landholders and groups to maintain and improve native habitat on their properties. The program builds the capacity of members through workshops, environmental assessments on properties, newsletters, advice and access to the local conservation network.

Through maintaining and improving native habitats and managing key biodiversity threatening processes on their properties, members contribute to regional biodiversity conservation, and help to establish wildlife corridors which can now be linked to the Territory Eco-links program of the NT Government (<http://www.greeningnt.nt.gov.au/ecolinks/eco.html>). Land for Wildlife members contribute to natural resource management of private land by controlling threatening processes like invasive weeds, feral animals, erosion and altered fire regimes.

Land for Wildlife was established in Victoria in 1981, and has been adopted by Queensland, Western Australia, Tasmania, New South Wales and the Northern Territory with over 11,230 properties registered. The native bushland areas of Alice Springs provide excellent opportunities for private landholders to learn about and contribute to nature conservation by managing remnant vegetation on their own property. Wildlife corridors are created or maintained between nature reserves or surrounding natural areas, allowing wildlife movement and genetic interchange between populations of plants and animals. Private landholders are encouraged to contribute to survival and promotion of remnant native vegetation upon which survival of plants and animals is dependant.

As of December 2009, there are a total of 88 properties registered with Land for Wildlife in the Alice Springs region, covering a total land area of 11995.10ha. This land area has doubled since November 2008 when the program had 5471.77ha listed as conservation protected land. In addition, the Garden for Wildlife program, a Land for Wildlife scheme focusing on urban properties as opposed to rural/peri-urban freehold lands, has a membership base of 126 members within the Alice Springs township (70433sq. m.).



Land for Wildlife member Jon Raveney taking part in a fauna survey in a regenerating Ironwood Corkwood community on sandy clay loam floodplains.

Biodiversity Surveys:

Land for Wildlife conducts Biodiversity Surveys annually. Biodiversity Surveys are an important tool to determine how successful land management activities have been, and to monitor flora & fauna population dynamics. A valuable set of skills are learnt by volunteer participants during the surveys, including survey techniques (pitfall trapping, Elliott trapping, surveying vegetation and bird species

along transect lines) and identification of plant and animal species, both native and invasive. These skills can then be used to identify and monitor plant and animal populations on their block, which will indicate how effective their land management activities are over time. The results of the surveys add to the Land for Wildlife database, and demonstrate the effects of various land management methods members use.

The 2009 surveys are Land for Wildlife's third year of surveys. In 2007, Land for Wildlife surveyed four sites within the Ilparpa Valley area and four from the Ross Highway area within the Alice Springs municipality. From the Ilparpa area, two properties had removed all buffel grass and the other two properties were in early stages of clearing or managing the spread of buffel grass but still had buffel grass present within the site. The Ross Highway properties were chosen for survey using the same criteria. The surveys proved successful in encouraging member participation in property monitoring and evaluation of biodiversity change over time.

In 2008 a corridor of Land for Wildlife properties within the Ilparpa subdivision located on Lilliecrapp Road along the Blatherskite Range were surveyed. These properties were chosen because of the relatively high biodiversity occurring on the range and the near total membership of properties on Lilliecrapp Road. Disturbance on the properties has been reasonably minimal, with invasive weeds and fire the primary impacts on the blocks. These threats have each been successfully managed over the past few years, with extensive removal of buffel grass occurring and erosion issues controlled. Previous Land for Wildlife membership visits to each of the Lilliecrapp Road properties highlighted diverse bird and reptile presence when compared to properties located in differing land unit locations. This diversity in wildlife presence has also been recorded regularly by the dedicated Land for Wildlife members themselves.

This year's surveys (2009) were conducted around the Racecourse/Winery region on four Land for Wildlife member properties. A comparison was drawn between biodiversity on properties along sandy rises with those in the floodplains. Two properties have eradicated buffel grass (*Cenchrus ciliaris*) from the remnant vegetation sites on their blocks, with the other two properties actively managing buffel which gave us the opportunity for another comparison. These properties share some of the same Land Units as the Arid Zone Research Institute (AZRI), and we can therefore draw a comparison between our results and that of a Flora, Fauna & Habitat Survey of AZRI, prepared for The Power & Water Corporation, The Department of Primary Industry, Fisheries And Mines, by Low Ecological Services in 2005.



Binoes Gecko, *Heteronotia binoei*

The primary aims of conducting the biodiversity surveys were to:

1. Improve member ability in self-assessment methods so that they can use the techniques learnt to measure the beneficial impact of their conservation activities.
2. Determine and record species richness of native flora and fauna within Land for Wildlife properties.

An advantage to the biodiversity surveys was to increase the landholder's knowledge in identification of wildlife species by observing tracks and listening to bird calls.

This year's Biodiversity Survey reports, as well as previous year's reports, are available on the website: www.lowecol.com.au

Background Information

The Racecourse/Winery region of the Alice Springs municipality is part of the Todd Flood Plain and is an area that Indigenous people would have hunted and travelled through seeking a variety of bush foods as the seasons changed. Generally, Aboriginal people extended their journeys into the more distant country when water resources allowed and retracted to permanent water points nearby when dry conditions prevailed (Dick Kimber pers. comm.). Following pastoral settlement of Undoolya Station in 1872, this area was used as an open paddock for livestock until extension of the Municipal boundaries and subdivision of the Airport in about 1940. The Arid Zone Research Institute was established in the early 1960s and this may have been the time when Billy Wright obtained the large paddock between AZRI and adjacent to Undoolya Station where he could agist race horses during the off-season. The Racecourse Estate centered on Heffernan Rd was established in the early 1970s by DD Smith on the block previously owned by Billy Wright. The Winery block was established on the next block to the east about 1971 or 72 by Dennis and Miranda Hornsby along with the adjacent block of Dave and Franca Fredrickson which was used for experimental saline water power generation.

The area has twelve Land for Wildlife members, the newest property joined this year in August and participated in the surveys. Four Land for Wildlife member properties were surveyed in this area.

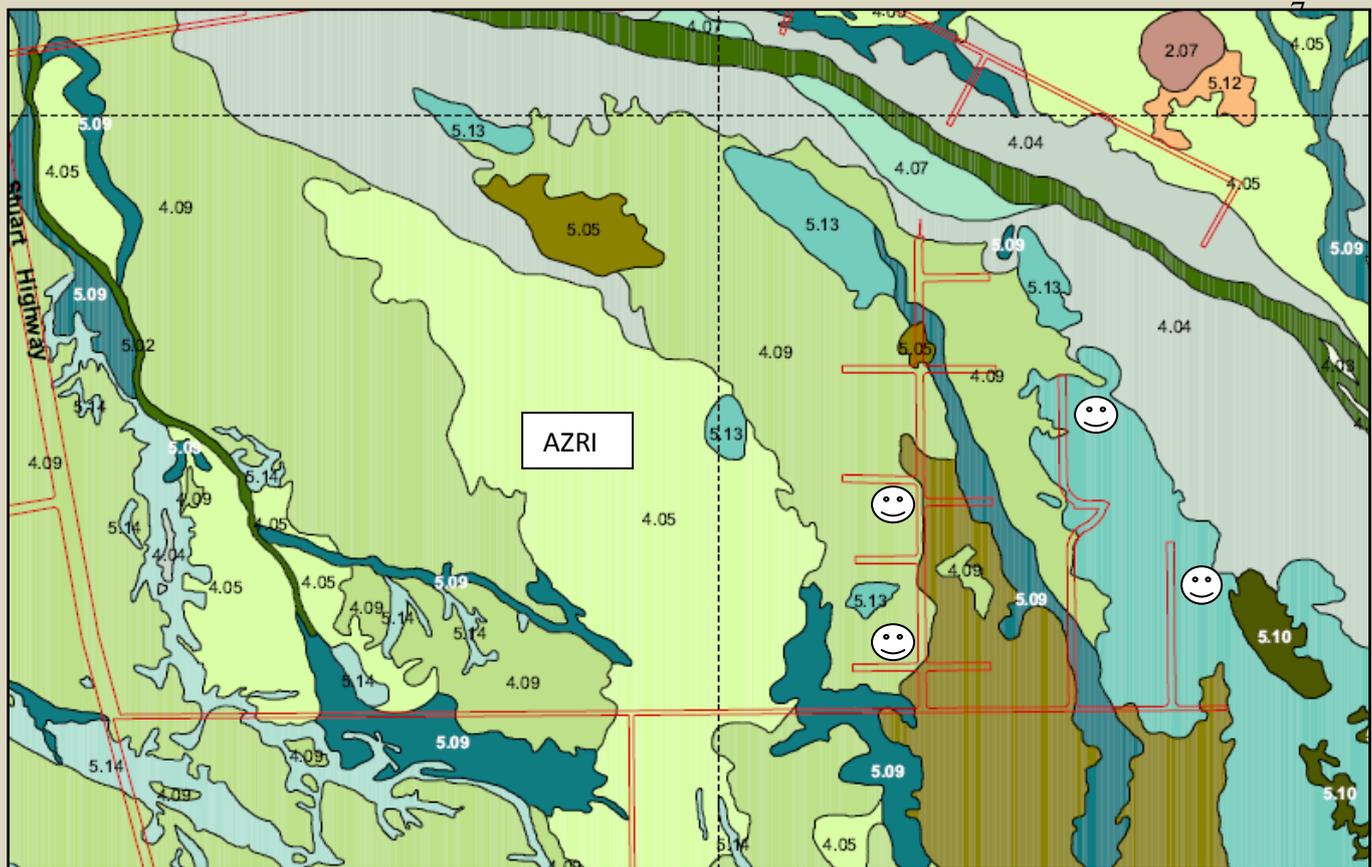
- Jon Raveney & Nicole Lee of Heffernan Rd.
- Janet Pierce & Marc Gooch of Chateau Rd.
- The Simmons on Schaber Rd.
- Trevor Shiells of Brunonia Rd.

Of the properties surveyed, the Simmon's joined the program in November 2004, Janet and Marc joined in September 2006, Trevor Shiell in September 2008, and Jon and Nicole in August 2009.

Surveys were conducted over a period of three trapping nights (four days) per property, and we surveyed for the presence and abundance of birds, reptiles, mammals, as well as vegetation and weed species. Comparisons between data collected from these surveys and surveys conducted for Power and Water on AZRI land can be made to give LfW members in the area, with similar land units, an idea of the biodiversity that could occur on their own blocks. AZRI lands are a good reference to what the 'natural environment' of this area would be like before subdivision although the land has been grazed since Undoolya Station was formed in the 1870s. The results from the AZRI survey will also give us an idea of what animals occur in the area, what landholders can work towards providing habitat for, and what to watch for across the seasons!



LfW/GfW volunteers check Elliott traps surveying a disturbed habitat site.



Land Unit Map of Area Surveyed & AZRI property, Alice Springs. Smiley faces represent properties surveyed.
 Map source: *Land Resources of the Alice Springs Area* CDROM (2001) Dept. of Infrastructure Planning & Environment

Land Units present on survey properties:

Reference: Rudy K. Lennartz, *Land Capability Assessment in the Alice Springs Area*, 2000, Dept. Lands, Planning & Environment

4.04 – Floodouts. Floodout areas adjacent to streams and rivers with Coolabah or River Red Gums over Buffel Grass. There is sediment accumulation with layering resulting from periodic flooding events. Erosion channels form rapidly after rainfall events when surface structure is disturbed. Soil is generally loose at the surface due to the majority of finer clay particles eroded by sheet wash or wind. Characteristic vegetation includes Coolabah or Ironwood with a mid stratum of Witchetty bush, Acacia Bush, Ruby & Climbing Saltbush over Buffel Grass. This unit is adjacent to Simmons and Pierce's blocks

4.09 - Broad alluvial flats. The majority of the flood plain and Shieff's and Raveney's blocks are classed as this Land Unit. Broad alluvial plains are characterised by Ironwood and Corkwood trees over Buffel Grass and native grasses. Other species typical of this Land Unit are Colony Wattle, Mulga, Witchetty Bush, Acacia Bush and Fork-leaved Corkwood, all of which are present on Trevor's and Raveney's blocks.

5.05 - Sandy floodplain bars. Elevated sandy floodplain bars with Ironwood and Witchetty Bush over annual and perennial grasses. Low elongated rises of alluvial sediments created by deposits during extreme magnitude flood events during the Holocene. Example characteristic vegetation: Ironwood over Witchetty Bush, Colony Wattle, Desert Cassia, and Whitewood with a lower stratum of Buffel Grass.

5.09 - Relic drainage depressions. This land unit is within a broader floodplain or broad drainage system. The depressions form part of the flood out system of drainage channels that flow only during infrequent larger flooding episodes. They retain good vegetation cover due to underlying

paleochannel drainage systems. Dominant vegetation includes Coolabah and Ironwood over Swayback Nardoo, Silky Browntop or Buffel Grass, with a mid stratum of Annual Saltbush, Acacia Bush, Weeping Emu-Bush, Wild Orange, and Colony Wattle.

5.10 - Relic drainage depressions. Remnant sandy and gravelly drainage depressions occurring within a broader floodplain or drainage system. It differs from Land Unit 5.09 by the sandier nature of the soil, the slight variation in vegetation cover and more frequent flooding. Dominant species are Fork-leaved Corkwood, Ironwood, Dead Finish, River Red gum and Ghost Gum over Desert Cassia, Weeping Emu-bush, Tall Saltbush, Purple Plumegrass, Colony Wattle and Acacia Bush with a lower stratum of Buffel grass.

5.13 - Remnant loamy sandy deposits. This land unit formed due to the floodout of the Todd River during infrequent major floods. The gentle undulating plains of this land unit can be up to 2km in width and can extend for 6km. The dominant vegetation is Witchetty Bush over Buffel Grass with a mid stratum of Witchetty Bush, Fork-leaved corkwood, Mulga, Ironwood, Colony Wattle and Desert Cassia.

Note: All of these land units are associated with flats, plains and drainage features. The floods of 1999-2001 extended into units 4.04 and 5.10 and the edges of 5.13 and 4.09 close to the Todd River while local drainage from the nearly 1m of rain in 2000 and 1988 flooded low lying portions of 4.09 and 4.05. Unit 5.09 carried flood waters of mostly local origin. The sandy levy and Aeolian rises of 5.05 were quickly drained with little localised flooding. The dominant lower stratum plant species is generally Buffel Grass, but other species may be present and before buffel introduction would have been more prominent. Dependant on land unit and soil type, other species may include Peppergrass sp., Woolly Butt Grass, Erect kerosene Grass, Billy buttons, Ruby Saltbush, Cattle Bush, Hogweed, Curly windmill grass, Button Grass, and certainly Caltrop and Tar Vine.

Property	Land Unit					
	4.04	4.09	5.05	5.09	5.10	5.13
Brunonia		√	√	√		√
Chateau	√	√				√
Heffernan		√	√			
Schaber	√				√	
AZRI		√		√		

Vegetation Communities present:

15 - Witchetty Bush and Ironwood on sandy-loam rises. This vegetation type comprises of 8.02% of the Alice Springs municipality. Witchetty Bush *Acacia kempeana* is generally the dominant species.

17 - Ironwood & Fork-leaved Corkwood on alluvial flats.

Property	15	17
Brunonia	√	
Chateau	√	√
Heffernan	√	√
Schaber	√	

Buffel Grass eradication:

Property	Buffel Grass eradicated from block	Buffel grass actively managed but not eradicated from block
Brunonia	√	
Chateau		√
Heffernan		√
Schaber	√	

There had been little rain in the months leading up to the surveys with vegetation exposed to dry conditions through most of the year. This resulted in a scarcity of lower stratum vegetation with a survival of Woollybutt grass and litter, Button Grass, Tar Vine, Caltrop and Pigface remaining from periodic light rains. Very little regrowth of buffel grass was visible in areas where intensive control had taken place.



LfW and GfW volunteers set a Pitfall trap and a Funnel trap.

Methods & Materials

Three active trapping methods were utilised during the fauna surveying; Elliott traps, Pitfall traps and Funnel traps were set along transects over three nights. All traps were closed during the day to prevent heat stress to the animals. We opened traps late in the afternoon for overnight trapping, and checked them very early each morning. All animals were photographed and identified on site where possible and released immediately.

Bird observations were recorded on site during the survey period, with past sightings by property owners noted, and sightings on nearby roadsides or properties recorded as 'Incidentals'. Bird presence was recorded by vocalisation and observations. Scats, tracks and signs (such as nests or diggings) were recorded.

Vegetation type and land units were recorded.

Elliott Traps



Each property was equipped with a transect line of one set of Elliott Traps (25 traps).

Elliott traps are small rectangular aluminium traps, with a trap door that closes behind an animal entering. Traps need to be baited - we use peanut butter, oats and honey rolled into little balls, as the smell is attractive and it provides trapped animals a food source should they need it during the night. The animal activates the closing of the trap's door by stepping on a pedal as it travels inside for the bait. Traps were placed in the shade where possible (and if not possible were covered with debris) to avoid unexpected early morning heat affecting animals, and facing downwards to prevent the trap from filling with water in the unlikely event of rain. Placement in shade under vegetation or covering traps with debris also obscures vision from above, so raptors are not attracted by the glint from metal in the sun.



Elliott trapping is a great method for catching small mammals. A catch is normally indicated by a closed door and animals can be removed by reaching in or by tipping the trap into a calico bag. Traps are closed during the day by triggering all doors closed. Upon setting traps it is a good idea to mark the location of each individual trap with flagging tape (see image right) or you may not be able to find them again the next morning!



The above picture shows the trigger platform released after, in this case, a Mulgara enters the trap. Mulgara once occupied survey areas in the early part of last century but have not been seen here for a long time.

Pitfall traps

Each property had at least two Pitfall traps, with Chateau Rd. and Brunonia Rd. having three.

A pitfall trap is a plastic bucket sunk in the soil so its opening is flush with the ground surface. A 'fenceline' of netting is constructed, with the aid of metal pegs, over the bucket extending approximately 5m each side of the bucket. Animals that run into the netting will drift alongside it, find the bucket and jump in. We ensured either side of the netting was swept flat daily so that any tracks could be seen of animals that may have somehow missed the bucket.



The conditions for using Pitfall traps were favourable as the ground in most areas was smooth, and in these dry times areas where vegetation would not obstruct fence lines were easily found. However Heffernan Rd. and Chateau Rd. soils were very compact making digging pit holes a very long, difficult and sweaty task in the afternoon heat! Pitfalls are particularly suited to open country, such as grasslands and sandy arid areas and are ideal for animals that live in or like to look into holes in the ground.

Pitfalls need to be carefully checked, sifting through the sand at the bottom with your *gloved* hand. Specimens trapped can be tiny and elusive and may burrow under the sand. They are closed during the day by covering the buckets tightly with a lid. Shelter needs to be provided in the pit for animals that are trapped there for many hours over night. All manner of things can be used as shelter such as Styrofoam, stubby holders, or empty toilet rolls, but we have gone for a more naturalistic approach (see image right) and used sticks, leaves and grass. It is important not to pile the shelter up too high or animals may be able to escape!



Funnel traps

Funnel traps are made from shade cloth materials stretched over a wire frame in a long tunnel shape. Each end is fitted with a funnel made of shade cloth. The traps are particularly good for trapping reptiles, such as geckos, and have often been known to catch snakes and monitors. They are effective when placed alongside a pitfall line. An animal moving along the fence line will continue through the funnel and be caught in the trap. Debris can be placed over the trap for extra camouflage, shade and protection from potential predators.



The most effective way to check these traps is to hold them up at eye level and ensure no tiny reptiles or invertebrates are hiding in corner creases. To remove animals the trap can be unzipped down its length. Traps can be compacted and clipped shut during the day.



Weather Conditions

After the heavy rainfall the year before (which coincided with last year's Biodiversity Surveys in Ilparpa), conditions have been very dry. The survey took place during early summer in the first two weeks of December.

Google Earth Image 11.30am 10/12/09 showing light rain and cloud cover over Alice.



The first week of surveys coincided with a full moon, which we expect influenced our results as many reptiles and small mammals do not like to forage during the high light levels of a full moon and risk being seen by a predator. The days averaged around 35°C and the nights were cool.

During the second week of surveys the temperature was hotter ranging between 33°C and 43°C. The first day (set up) was very hot reaching 43°C. Winds picked up on the second day and sent a lot of dust into the air. The nights were cooler, with clouds blowing in on the third day. A small amount of rainfall occurred on the last evening of the surveys, but did not pose any issues with the pitfall traps. The light rainfall increased the humidity, and cooled night temperatures further to around 27°C. The amount of rainfall was insignificant, but the catch was contrary to what we would expect after rain when animals are usually very active.

Please see Appendix 1 for a table of daily weather observations during November and December, leading up to and during the surveys, courtesy of the Australian Government, Bureau of Meteorology (www.bom.gov.au).



Clouds prior to rain forming over the Schaber Rd. property.

Site Survey Results

Week 1: 30/11/09 – 3/12/09

Site 1: Chateau Rd

Janet and Marc have been members for more than 3 years and have done a wonderful job revegetating their block. They have removed Buffel grass from large sections of the property, and in some sections have left the Buffel as a soil stabiliser. The south-east corner of the block is an area of remnant vegetation that has been left to revegetate. Janet has landscaped the west side of the block, planting numerous trees and shrubs. They own a cat and a dog.

Out of interest we set traps both in the remnant vegetation area, and in a more frequently disturbed area towards the front of the block (west side) closer to the house and road, to see if biodiversity differed between the two. There was a multitude of evidence of reptile activity on the block with varied tracks, recent diggings and active burrows. Bats have been seen on the property in the past, including flying around inside the house! See below for the survey results of Chateau Road.

Birds

Birds in **bold green** are sedentary birds (residents) that will stay in the region all year round. Those not in bold are mobile species. By surveying bird species on your property you can identify if you need to attract more mobile species to your block, or provide more habitat for the various residents!

Observed:

Common Name	Scientific Name	Number Sighted
Observed:		
Australian Ringneck Parrot (Port Lincoln)	<i>Barnardius zonaris</i>	3
Black-faced Cuckoo-Shrike	<i>Coracina novaehollandiae</i>	2
Black-faced Woodswallow	<i>Artamus cinereus</i>	2
Black Kite	<i>Milvus migrans</i>	1
Crested Pigeon	<i>Ocyphaps lophotes</i>	2
Diamond Dove	<i>Geopelia cuneata</i>	1
Galah	<i>Cacatua roseicapilla</i>	3
Grey Shrike-Thrush	<i>Colluricincla harmonica</i>	1
Inland Thornbill	<i>Acanthiza apicalis</i>	3
Little Corella	<i>Cacatua sanguinea</i>	1
Magpie Lark	<i>Gymnorhina tibicen</i>	2
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2
Red-tailed Black Cockatoo	<i>Calyptorhynchus banksii</i>	5
Singing Honeyeater	<i>Lichenostomus virescens</i>	2
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	3
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2
Willy Wagtail	<i>Rhipidura leucophrys</i>	2
White-browed Babbler	<i>Pomatostomus superciliosus</i>	Social group of 6
Yellow-Throated Minor	<i>Manorina flavigula</i>	4

Zebra Finch	<i>Taeniopygia guttata</i>	Flock of 15
Heard:		
Rainbow Bee Eater	<i>Merops ornatus</i>	2
Incidentals:		
Spotted Turtle-Dove (introduced species)	<i>Streptopelia chinensis</i>	1



Left: Black-faced Woodswallow

Centre: An Inland Thornbill (left) and a female Mistletoebird (right) perch in an Ironwood

Right: Willy Wagtail nest in Janet & Marc's shed. The same pair breed yearly in the shed, and remnants of several nests are present.

Reptiles

Common Name	Scientific Name	Number Caught	
Pitfall Trap Catch:			
Skink (no common name)	<i>Menetia greyii</i>	1	

Common Name	Scientific Name
Tracks, burrows, scats:	
Sand goanna (tracks and active burrows)	<i>Varanus gouldii</i>
Legless Lizard (tracks)	<i>Species unknown</i>
Small Dragon, likely Central Netted Dragon (burrows)	<i>Ctenophorus nuchalis</i>
Past records:	
Central Bearded Dragon	<i>Pogona vitticeps</i>
Centralian Dtella	<i>Gehyra montium</i>
Perentie	<i>Varanus giganteus</i>

Mammals

Common Name	Scientific name	Pictures
Trapped:		
Nil		
Scats & burrows:		
Rabbit (introduced species)	<i>Oryctolagus cuniculus</i>	 

Invertebrates

Common Name	Scientific name	Pictures
Pitfall trap catch:		
Nil		
Burrows, other signs & observations:		
Noctuid caterpillar (observed)	<i>Noctuid spp.</i>	
Ant (nest)	<i>Camponotus spp.</i>	
Termite or scorpion (burrow)	<i>Species unknown</i>	
Beetle (burrow)	<i>Species unknown</i>	

Chateau Rd. Photos



Top left: Property owner Marc smoothing soil along a pitfall line after much hard work digging compact soil to create a pit.

Top right: Garden for Wildlife Volunteer Sarah White flags an Elliott trap

Bottom left: A pitfall trap set near a Sand Goanna burrow.

Bottom right: A funnel trap set where Sand Goanna tracks occurred daily.





Top left: A healthy stand of Ironwood in an area of remnant vegetation on the east of the property.

Top right: Garden for Wildlife volunteer Rosalie Breen checks a pit fall trap early in the morning.

Bottom left: Rosalie checks a funnel trap.

Bottom right: An Elliott trap set under a River Red Gum seedling on the west side of the property.



Site 2: Brunonia Rd.

Trevor has been a LFW member since September 2008 (1 and a quarter years to date). He has removed a substantial amount of Buffel Grass from the block, with isolated patches remaining. A concerted effort was made to ensure Buffel was eradicated from underneath the Witchetty Bushes. This is an ideal method to prevent the spread of wildfire as Buffel provides high fuel loads and results in extremely hot fires. The east side of his block is remnant vegetation that has been left undeveloped, and this is where we focused our trapping. There are currently three dogs living on the property.



Whistling Kite

Birds

Birds in **bold green** are sedentary birds (residents) that will stay in the region all year round. Those not in bold are mobile species.

Observed:

Common Name	Scientific Name	Number Sighted
<u>Observed:</u>		
Australian Ringneck Parrot (Port Lincoln)	<i>Barnardius zonaris</i>	5
Black-faced Cuckoo-Shrike	<i>Coracina novaehollandiae</i>	2
Crested Pigeon	<i>Ocyphaps lophotes</i>	9
Diamond Dove	<i>Geopelia cuneata</i>	3
Galah	<i>Cacatua roseicapilla</i>	4
Grey Crowned Babbler	<i>Pomatostomus temporalis</i>	Family group of 5
Grey Shrike-Thrush	<i>Colluricincla harmonica</i>	1 adult, 1 juvenile
Magpie Lark	<i>Gymnorhina tibicen</i>	2
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2 (pair)
Peaceful Dove	<i>Geopelia placida</i>	2
Singing Honeyeater	<i>Lichenostomus virescens</i>	3
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	4
Splendid Fairy-Wren	<i>Malurus splendens musgravei</i>	Family group of 4
Torresian Crow	<i>Corvus orru</i>	2
Variiegated Fairy-Wren	<i>Malurus lamberti assimilis</i>	Family group, 3 observed
Willy Wagtail	<i>Rhipidura leucophrys</i>	2
White-browed Babbler	<i>Pomatostomus superciliosus</i>	Family group of 5 observed, 1 caught in Elliott trap!
<u>Heard:</u>		
Budgerigar	<i>Melopsittacus undulatus</i>	Small flock
Cockatiel	<i>Nymphicus hollandicus</i>	Small flock
Pied Butcherbird	<i>Cracticus nigrogularis</i>	1
<u>Incidentals:</u>		

Whistling Kite	<i>Haliastur sphenurus</i>	1
<u>Past Records:</u>		
Boobook Owl	<i>Ninox novaehollandiae</i>	1
Pallid Cuckoo	<i>Cuculus pallidus</i>	1
Red-capped Robin	<i>Petroica goodenovii</i>	Pair
Western Bowerbird	<i>Chlamydera guttata</i>	1
Zebra Finch	<i>Taeniopygia guttata</i>	Flock



Above and right: Male Variegated Fairy-Wren
Left: Juvenile Grey Shrike-Thrush

Reptiles

Common Name	Scientific name	Amount caught	Pictures
<u>Pitfall and Elliott Trap catch:</u>			
Tree Dtella (Gecko)	<i>Gehyra variegata</i>	1	 

Common Name	Scientific Name
<u>Tracks and burrows:</u>	
Sand Goanna (tracks and burrows)	<i>Varanus gouldii</i>
Small Dragon, likely Central Netted Dragon (burrows)	<i>Ctenophorus nuchalis</i>
<u>Past records:</u>	
Perentie	<i>Varanus giganteus</i>
Western Brown Snake	<i>Pseudonaja nuchalis</i>
Various skink species	

Mammals

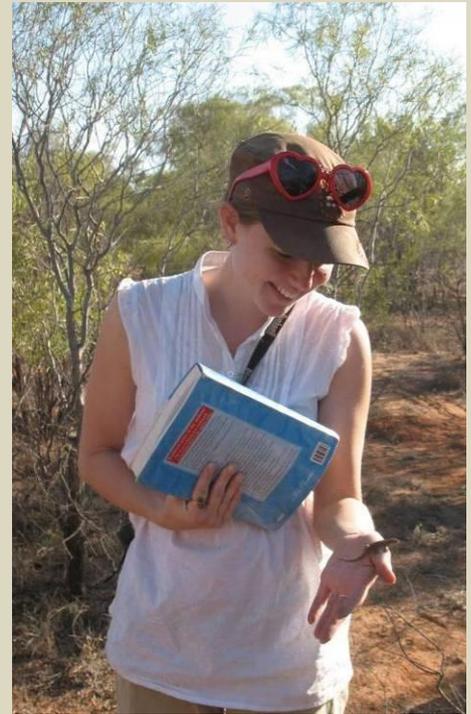
Common Name	Scientific name	Pictures
Trapped:		
Nil		
Scats & burrows:		
Rabbit (introduced species)	<i>Oryctolagus cuniculus</i>	

Invertebrates

Common Name	Scientific name	Amount Caught	Pictures
Pitfall Trap Catch:			
Campanotus ant	<i>Campanotus spp.</i>	1	

Common Name	Scientific name
Burrows, other signs & observations:	
Grass eating Termites (nest)	<i>Drepanotermes spp.</i>
Spider (burrow)	<i>Selenocosmia stirlingi</i>
Mud-dauber (nest)	<i>Sceliphron sp.</i>
Past records:	
Barking Spider holes	<i>Selenocosmia stirlingi</i>

Photos of Brunonia Rd.



Top left: Volunteer Rosalie checks a pitfall trap set near a dead tree and wood litter – ideal reptile habitat.

Top right: Volunteer Michelle inspects the Gecko caught in a pitfall trap.

Above: Volunteer Sarah checks a pitfall.

Left: Volunteers Angela & Rosalie check a pitfall trap.

Week 2: 7/12/09 – 10/12/09

Animal tracks: Rabbit in the top left, Crested Pigeon through the centre, and cat in the bottom right. This sandy patch on the Heffernan Rd. property acts as an effective track bed to monitor animal movements.

Site 3: Heffernan Rd.

Jon & Nicole are new members to the Land for Wildlife scheme, joining in September 2009. They have fenced off two thirds of their block to designate it all as remnant vegetation, and have left it to regenerate as wildlife habitat. The area has many young Ironwoods growing, and multitudes of animal tracks are visible in areas of sandy ground. They do not have any pets, except chooks, but the track beds show that there is a dog entering the property, and cat tracks have been seen in the past (see picture right).



Birds

Birds in **bold green** are sedentary birds (residents) that will stay in the region all year round. Those not in bold are mobile species.

Observed:

Common Name	Scientific Name	Number Sighted
<u>Observed:</u>		
Australian Magpie	<i>Gymnorhina tibicen</i>	1
Australian Ringneck Parrot (Port Lincoln)	<i>Barnardius zonaris</i>	14 (four families)
Black-faced Cuckoo-Shrike	<i>Coracina novaehollandiae</i>	1
Black Kite	<i>Milvus migrans</i>	1
Budgerigar	<i>Melopsittacus undulatus</i>	3 Flocks of 30+ flying over. 1 Flock of 15+ flying over
Crested Pigeon	<i>Ocyphaps lophotes</i>	5
Galah	<i>Cacatua roseicapilla</i>	Flocks of 5+
Grey Crowned Babbler	<i>Pomatostomus temporalis</i>	Social group of 6 seen twice
Magpie Lark	<i>Gymnorhina tibicen</i>	3
Mulga parrot	<i>Psephotus varius</i>	2 (pair)
Pallid Cuckoo	<i>Cuculus pallidus</i>	1 (male, vocalising – breeding behaviour)
Singing Honeyeater	<i>Lichenostomus virescens</i>	1
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	5
Torresian Crow	<i>Corvus orru</i>	2
Willy Wagtail	<i>Rhipidura leucophrys</i>	1
Whistling Kite	<i>Haliastur sphenurus</i>	1
<u>Heard:</u>		
Cockatiel	<i>Nymphicus hollandicus</i>	Flock of 5
Diamond Dove	<i>Geopelia cuneata</i>	1

Grey-Headed Honeyeater	<i>Lichenostomus keartlandi</i>	1
Mistletoebird	<i>Dicaeum hirundinaceum</i>	1
Rainbow Bee Eater	<i>Merops ornatus</i>	1
Pied Butcherbird	<i>Cracticus nigrogularis</i>	1
Fairy-Wren species	<i>Malurus spp.</i>	Family group of 4?
<u>Incidentals:</u>		
Little Corella	<i>Cacatua sanguinea</i>	1
<u>Past Records:</u>		
Peaceful Dove	<i>Geopelia placida</i>	2
Red-Tailed Black Cockatoo	<i>Calyptorhynchus banksii</i>	Flocks of 30+



Left: A Little Corella perched on power lines outside the property. Right: Crested Pigeon tracks.
Below: Red-tailed Black Cockatoos seen flying over young Ironwoods on the property in August 2009.



Reptiles



Tree Dtella

Common Name	Scientific Name	Amount caught	Pictures
Pitfall Trap Catch:			
Tree Dtella (Gecko)	<i>Gehyra variegata</i>	1	
Fat-tailed gecko	<i>Diplodactylus conspicillatus</i>	2	
Juvenile Bearded Dragon	<i>Pogona vitticeps</i>	1	
Binoes gecko	<i>Heteronotia binoei</i>	1	

Common Name	Scientific Name
<u>Tracks, Burrows & Observations:</u>	
Sand Goanna (tracks, burrows & observed)	<i>Varanus gouldii</i>
Central Netted Dragon (burrows)	<i>Ctenophorus nuchalis</i>
Legless Lizard (tracks)	<i>Delma tincta</i> or <i>Lerista spp.</i>

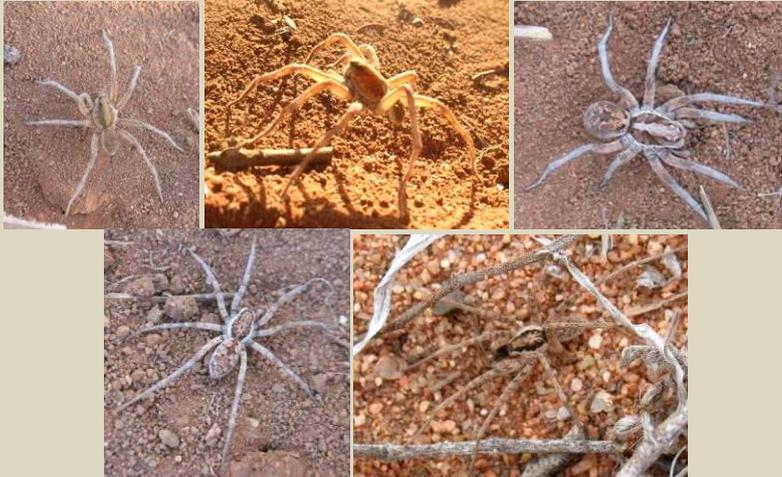


Sand Goanna.
Photo courtesy of Jon Raveney

Mammals

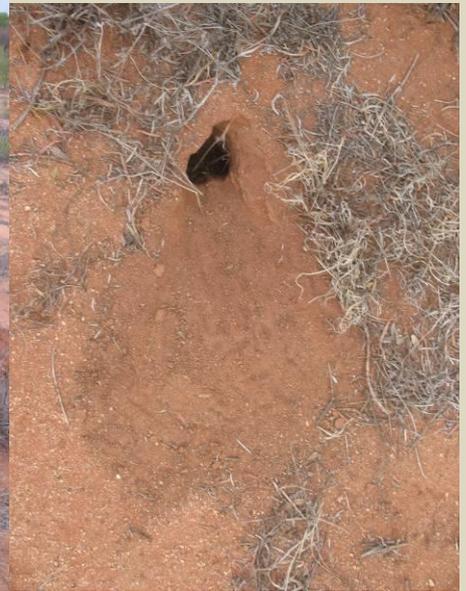
Common Name	Scientific Name
<u>Trapped:</u>	
Nil	
<u>Scats, tracks & burrows:</u>	
Rabbit (introduced species)	<i>Oryctolagus cuniculus</i>
Dog	<i>Canis lupus familiaris</i>
Cat	<i>Felis catus</i>

Invertebrates

Common Name	Scientific Name	Amount caught	Pictures
Pitfall Trap Catch:			
Stick insect	<i>Phasmatid spp.</i>	1	
Wolf Spiders	<i>Lycosa godeffroyi</i>	5	
Striped Desert Cockroach	<i>Desmozosteria cincta</i>	1	
Wood Boring Beetle		1	

Common Name	Scientific name
Tracks, burrows & observed:	
Ant	<i>Camponotus spp.</i>
Australian Tarantula (Barking Spider)	<i>Selenocosmia stirlingi</i>
Grass eating Termite (castings foraging on litter)	<i>Drepanotermes sp</i>

Photos from Heffernan Rd.



Top Left: Property owner Jon Raveney digs compact soil to sink a pitfall trap.

Top Centre: Volunteers Bill & Jon check a pitfall trap.

Top Right: A Sand Goanna has dug down into a Barking Spider burrow hoping to catch it for a meal.

Above: Jon checks a funnel trap. A juvenile Bearded Dragon is hiding in a corner.

Left: Land for Wildlife volunteer Mitch Jones sets Elliott traps.

Below Left: The **rostral scale** is the scale above the snout, bordering the mouth opening, in reptiles. The shape and size of the scale can be **used as a key to differentiate species**. *Gehyra variegata* (Tree Dtella) can be differentiated from the introduced gecko *Gehyra purpurascens* (Purple Dtella) because its rostral scale has steeply sloping upper edges, while the *G. purpurascens*' rostral scale, when viewed from above, is almost horizontal.

Site 4: Schaber Rd

The Simmons have been members since the early days of the program (2004) and have been actively managing weeds on the property since long before that. Management is done mainly through hand removal and chipping which is done at least once a month. Buffel Grass has been removed from the property, with control beginning in the early to mid 1990's, and new growth actively managed. The house is orientated to utilise natural phenomena (breezes to solar) to sustainably cool and heat. The gardens include artificial creek/track elements which form borders between the cultivated and non-cultivated areas of the block. Rabbits were eradicated after moving onto the property and they have successfully kept large numbers out using chicken wire at base of fencing. Small numbers have come and gone over the years. Occasionally cats have been sighted on the property. Euros have also been sighted on the block in the past. The Simmons own a dog.

Below: A Grey-Crowned Babbler.
Note: the lighter coloured crown of the head. White-Browed Babbler are smaller in size with a dark brown crown and long white eye-brow.



Left: A Diamond Dove (centre) roosts with a flock of Peaceful Doves. **Right:** Note the **red** eye ring of the Diamond Dove (top) and the **blue** eye ring of the Peaceful Dove (below).



Birds

Birds in **bold green** are sedentary birds (residents) that will stay in the region all year round. Those not in bold are mobile species.

Observed:

Common Name	Scientific Name	Number Sighted
Observed:		
Australian Ringneck Parrot (Port Lincoln)	<i>Barnardius zonaris</i>	A family group of 4
Black-faced Cuckoo-Shrike	<i>Coracina novaehollandiae</i>	Flock of 10+, 2 individuals
Brown Honeyeater	<i>Lichmera indistincta</i>	3
Crested Pigeon	<i>Ocyphaps lophotes</i>	Flocks 5+
Diamond Dove	<i>Geopelia cuneata</i>	1 individual, and 1 seen in a flock of Peaceful Dove
Galah	<i>Cacatua roseicapilla</i>	Flocks 12+
Grey Crowned Babbler	<i>Pomatostomus temporalis</i>	1
Magpie Lark	<i>Gymnorhina tibicen</i>	1
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2
Peaceful Dove	<i>Geopelia placida</i>	2 individuals, and a flock of 5+
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	2

Splendid Fairy-Wren	<i>Malurus splendens musgravei</i>	Family group of 5
Torresian Crow	<i>Corvus orru</i>	1
Variegated Fairy-Wren	<i>Malurus lamberti assimilis</i>	3
Willy Wagtail	<i>Rhipidura leucophrys</i>	2
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	4
Zebra Finch	<i>Taeniopygia guttata</i>	Flock of 10+
<u>Nest:</u>		
Fairy-Wren or Thornbill		1
<u>Incidentals:</u>		
Red-Tailed Black Cockatoo	<i>Calyptorhynchus banksii</i>	5
Sacred Kingfisher	<i>Todiramphus sanctus</i>	1



Left: A Sacred kingfisher seen on power lines along Schaber Road. Shortly after it dived into grass near the road verge to skewer a lizard!

Right: A Brown Honeyeater perched in Harlequin Mistletoe watches us curiously.



Above: Variegated Fairy-Wren. Note the chestnut colour on the scapulas (or upper inner wing), black chest and white belly.

Below: Splendid Fairy-Wren. Note the blue belly and black eye-stripe.



Reptiles

Common Name	Scientific Name	Amount caught	Pictures
Pitfall Trap Catch:			
Tree Dtella (Gecko)	<i>Gehyra variegata</i>	2	
Binoes gecko	<i>Heteronotia binoei</i>	2	

Common Name	Scientific name
Tracks, burrows & observations:	
Sand Goanna (tracks, burrows & observed)	<i>Varanus gouldii</i>
Small Dragons eg.: Central Netted Dragon (tracks, burrows)	<i>Ctenophorus nuchalis</i>
Legless Lizard (tracks)	<i>Delma or Leristes spp.</i>
Previous observation:	
Long-Nosed Water Dragon	<i>Lophognathus longirostris</i>
Western Brown Snake	<i>Pseudonaja nuchalis</i>



Sand Goanna in a burrow system it built under piles of building materials and debris.

Mammals

Common Name	Scientific Name
Trapped:	
House Mouse	<i>Mus domesticus</i>
Scats, Tracks or other signs:	
Euro	<i>Macropus robustus</i>

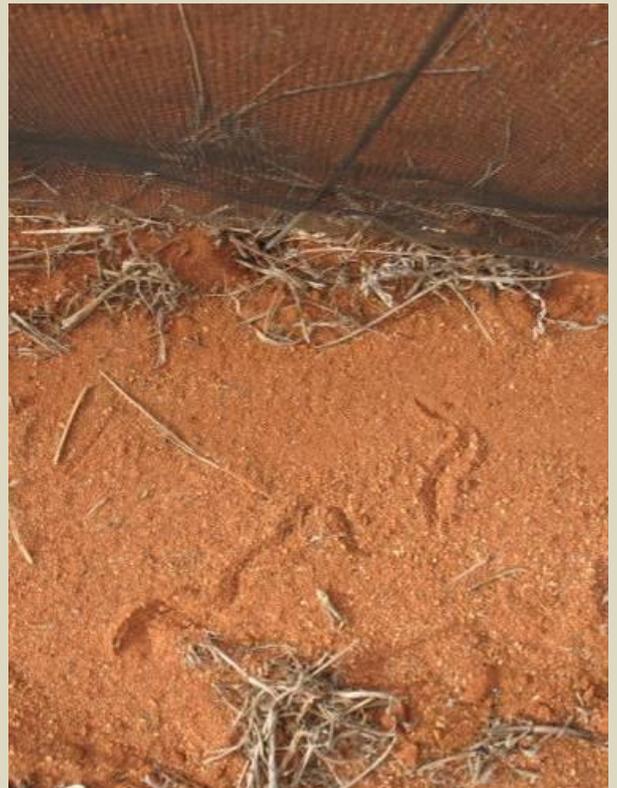
Invertebrates

Common Name	Scientific Name	Amount Caught	Pictures
Pitfall Trap Catch:			
Wolf Spider	<i>Lycosa godeffroyi</i>	2	
Huntsman Spider	<i>Isopeda aff. vasta</i>	1	

Red Honey Ant	<i>Melophorus bagoti</i>	1	
Meat Ants	<i>Iridomyrmex spp.</i>	Several daily	
Native Cockroach	<i>Species common, but difficult to identify as roach ID in Australia is limited</i>	1	

Common Name	Scientific Name
<u>Tracks, burrows & observed:</u>	
Spur-Throated Locust (observed)	<i>Austracris guttulosa</i>
Orange-red Grasshoppers (observed)	<i>Urnisa guttulosa</i>
Camponotus Ant (nest)	<i>Camponotus spp.</i>
Australian Tarantula (burrows)	<i>Selenocosmia stirlingi</i>

Photos of Schaber Rd.

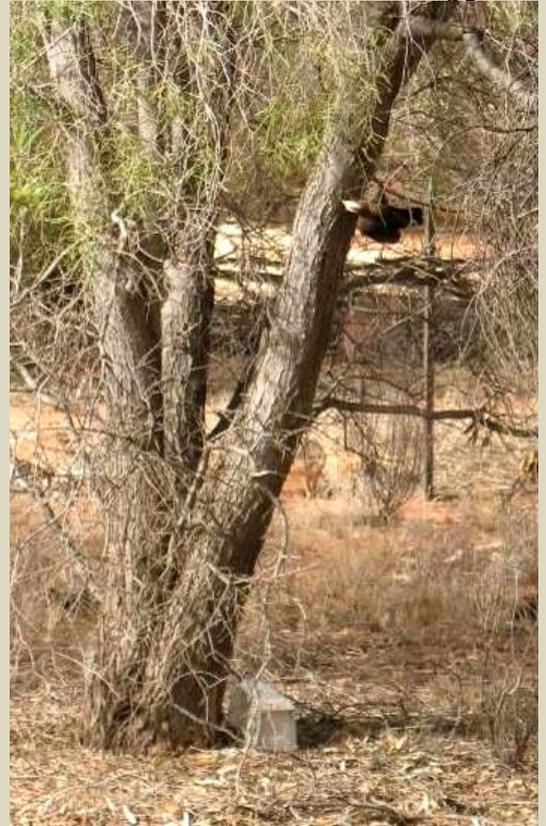


Top left: Land for Wildlife volunteer Mitch Jones digs a pitfall trap.

Top right: The Simmons' have used the dead branches from Witchetty Bush growing around the property to level out dirt bike tracks left by previous owners.

Bottom left: Mitch surveys our work, a pitfall and funnel trap set near Witchetty packing that we anticipate shelters many reptiles.

Bottom right: The one that got away!! A legless lizard track along a pitfall line, likely *Delma tinctoria*. The lizard never made it into the pit, disappearing into the loose soil or litter in search of termites or other small invertebrates for food.



Top left: Piles of construction material provide a home for a Sand Goanna. It has burrowed underneath and has several entrances.

Top right: A Grey-crowned Babbler checks out an Elliott trap. This curiosity is exactly the type of behaviour that got the White-Browed Babbler in a pickle at Brunonia Rd.! While it is not common to catch birds in Elliott traps, it can still happen, and emphasises the importance of checking traps as early as possible. Small birds have very high metabolisms and need to feed frequently. This also means body temperature is difficult to control in a metal trap once the sun comes up.

Above left: A road around the main buildings at Schaber Rd. acts as a firebreak.

Left: An Elliott trap set in Ruby saltbush with the hope of catching rodents foraging for berries and seed.

Below left: Volunteers packing up equipment, the surveys are all over.

A Comparison with the AZRI property

A four day/three-night Flora, Fauna & Habitat Survey of the Arid Zone Research Institute (AZRI) was conducted by Low Ecological Services, prepared for The Power & Water Corporation and The Department Of Primary Industry, Fisheries And Mines in October 2005. The AZRI property is also located on the Todd River flood plain, sharing some same land units as properties surveyed in the Land for Wildlife Biodiversity Surveys. The dominant vegetation type is Ironwood and Fork-leaved Corkwood on alluvial flats (vegetation type 17), although three other vegetation types occur, with Witchetty Bush & Ironwood on sandy rises (vegetation type 15) being the only other to correspond with vegetation types on the Land for Wildlife survey sites.

Many additional species were recorded during this survey of AZRI that were not found during Land for Wildlife surveys. The results from this survey can give landholders in the area, that own land falling under the same land units, an idea of the biodiversity that could occur on their blocks. AZRI lands are a good reference to what the 'natural environment' of the area should be like, or would have been like before human habitation/development. However, in general the AZRI property is relatively disturbed due to infrastructure, long-term grazing, access tracks and the wide spread distribution and cultivation of Buffel Grass. Results from this survey will also help landholders to know what animals occur in the area, what to provide habitat for and what to keep their eyes out for across the seasons.

AZRI Survey sites are listed below:

- Site 1.** Vegetation type 17: Ironwood and Fork-leaved Corkwood on alluvial flats
Land Unit: Remnant Flood Deposit Flats (LU 4.05)
- Site 2.** Vegetation Type 17: Ironwood and Fork-leaved Corkwood on alluvial flats
Land Unit: Broad Alluvial Flats (LU 4.09)
- Site 3.** Vegetation type 23: Drainage depressions with Coolabah, Bastard Coolabah or Ironwood
Land Unit: Relic Drainage Depressions (LU 5.09)
- Site 4.** Vegetation Site 17: Ironwood and Fork-leaved Corkwood on alluvial flats
Land Unit: Remnant Flood Deposit Flats (LU 4.05)

Weather conditions:

Date	Day	Temperature (°C)		Rain (mm)
		Min	Max	
10/10/05	Monday	12.4	34.4	0
11/10/05	Tuesday	15.8	26.9	0.8
12/10/05	Wednesday	10.7	31.5	0
13/10/05	Thursday	20.2	28.2	0
14/10/05	Friday	15.6	24.8	27

No threatened species were found during the survey of AZRI (or during the Land for Wildlife surveys), however the endangered Slater's Skink (*Egernia slateri*) was once a locally common inhabitant around AZRI in the late 1960s (Paltridge & Latz 2003). Fifty-eight specimens were collected from the area in 1964-65, and the skink was found mainly in open woodlands on alluvial soils close to drainage lines, with burrows often recorded under Fork-leaved Corkwoods (McAlpin 2000). It is believed that Buffel Grass has altered the habitat by changing vegetation structure and species composition enough to prevent the species from recovering from over-collecting, and the endangered species has not been recorded in Alice Springs since 1975 (Paltridge & Latz). It has since been found in several locations in the Finke River drainage through the Stuart and West MacDonnells Ranges.

The Kultarr (*Antechinomys laniger*) is a small mammal that is listed as a 'near threatened' species. It has been recorded on the southern boundary of AZRI (Colonel Rose Drive) and also on southern Airport lands, however no sign of the small mammal was recorded during the survey. The "near threatened" Red-tailed Black Cockatoo commonly occurs in the area but was not observed during the survey of AZRI as they are widely dispersed at this time of year (Parks and Wildlife database).

No plant species of conservation significance were recorded on the site.

Below are the survey results.

Birds

All birds that we recorded in the Land for Wildlife surveys were recorded during the survey of the AZRI property, along with additional bird species which are listed below. All species are native and common to the area. The site with the highest species diversity was Site 3 with Coolabah/Ironwood habitat (14 species) followed by areas with open Ironwood/Corkwood habitat. Most species listed below are regular residents or visitors to the area and are good indicators of a healthy ecosystem, so landholders keep your eyes out for them!

Birds in **bold green** are sedentary birds (residents) that will stay in the region all year round. Those not in bold are mobile species.

Black-shouldered Kite

Brown Falcon

Brown Quail

Chestnut-rumped Thornbill

Collared Sparrowhawk

Common Bronzewing

Crested Bellbird

Crimson Chat

Horsefield's Bronze-Cuckoo

(Possible) Grey Falcon

Grey Honeyeater

Jacky Winter

Little Crow

Little Eagle

Nankeen Kestrel

Major Mitchell's cockatoo

Masked Woodswallow

Red-backed Kingfisher

Elanus axillaris

Falco berigora

Coturnix ypsilophora

Acanthiza uropygialis

Accipiter cirrhocephalus

Chrysococcyx basalis

Oreoica gutturalis

Epthianura tricolor

Phaps chalcoptera

Falco, hypoleucos

Conopophila whitei

Microeca fascians

Corvus bennetti

Hieraetus morphnoides

Falco cenchroides

Cacatua leadbeateri

Artamus personatus

Todiramphus pyrrhopygia

Red-browed Pardalote	<i>Pardalotus rubricatus</i>
Richard's Pipit	<i>Anthus novaeseelandiae</i>
Rufous Songlark	<i>Cincloramphus mathewsi</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Striated Pardalote	<i>Pardalotus striatus</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
Tree Martin	<i>Hirundo nogricans</i>
Wedge-tailed Eagle	<i>Aquila audax</i>
Weebill	<i>Smicrornis brevirostris</i>
Western Gerygone	<i>Gerygone fusca</i>
White-winged Fairy-Wren	<i>Malurus leucopterus</i>
White-winged Triller	<i>Lalage sueurii</i>
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>

Reptiles

Reptiles caught or observed during the AZRI surveys are listed below. We found one species during the Land for Wildlife surveys that was not recorded during the survey of AZRI: *Gehyra Variegata*, the Variegated Gecko, a species of gecko common to Alice Springs and very similar to the Purple Dtella. This species is common and a habitat generalist, and is not an important discovery in terms of ecosystem health. Legless lizard tracks seen during Land for Wildlife surveys will most likely correspond with species found at AZRI (*Delma tincta* and *Lerista* species), though it is difficult to determine species from individual tracks.

Common name	Scientific name	Site
<u>GEKKONIDAE</u>		
Spiny-tailed Gecko	<i>Diplodactylus ciliaris</i>	1,2
Fat-tailed Gecko	<i>Diplodactylus conspicillatus</i>	1,2,4
Painted Gecko	<i>Diplodactylus stenodactylus</i>	2,4
Purple Dtella	<i>Gehyra purpurascens</i>	1,2
Bynoe's Gecko	<i>Heteronotia binoei</i>	1,2
Beaked Gecko	<i>Rhynchoedura ornata</i>	1,2
<u>PYGOPODIDAE</u>		
legless lizard	<i>Delma tincta</i>	1,2
<u>AGAMIDAE</u>		
Long-nosed Dragon	<i>Lophognathus longirostris</i>	1
Bearded Dragon	<i>Pogona vitticeps</i>	1,2,4
Central Netted Dragon	<i>Ctenophorus nuchalis</i>	2
<u>VARANIDAE</u>		
Sand Goanna	<i>Varanus gouldii</i>	1,2,3,4
Pygmy Mulga Monitor	<i>Varanus gilleni</i>	2
<u>SCINCIDAE (Skinks)</u>		
Helen's Ctenotus	<i>Ctenotus helenae</i>	1,2
Leonhardi's Ctenotus	<i>Ctenotus leonhardii</i>	1,2,4
Schomburgk's Ctenotus	<i>Ctenotus schomburgkii</i>	1
Two-toed Lerista (appears legless)	<i>Lerista bipes</i>	1
Desert Lerista (appears legless)	<i>Lerista desertorum</i>	1,2
Sand Lerista (appears legless)	<i>Lerista labialis</i>	1
Frost's Lerista	<i>Lerista frosti</i>	2

Grey's Menetia	<i>Menetia greyii</i>	1,2,4
Centralian Blue-tongue	<i>Tiliqua multifasciata</i>	1,2
<u>ELAPIDAE</u>		
Bandy Bandy	<i>Vermicella vermiformis</i>	2
Blind Snake	<i>Ramphotyphlops endoterus</i>	2
Mulga Snake	<i>Pseudechis australis</i>	4
Western Brown Snake	<i>Pseudonaja nuchalis</i>	1
small snake	<i>Simoselaps incinctus</i>	1,2

Mammals

Listed below are all mammal species found during the AZRI survey. Note that no rabbits, feral cats or feral dogs were recorded. All species listed were found in vegetation type 17 (Ironwood and Fork-leaved Corkwood on alluvial flats), Land Unit 4.05 (Remnant Flood Deposit Flats). The House Mouse and Red Kangaroo were also recorded on Land Unit 4.09, which again corresponds with vegetation type 17.

Camels (introduced)	<i>Camelus dromedarius</i>
Cattle (introduced)	<i>Bos taurus</i>
Desert Mouse	<i>Pseudomys desertor</i>
Dingo	<i>Canis lupus dingo</i>
House Mouse (introduced)	<i>Mus domesticus</i>
Red Kangaroo	<i>Macropus rufus</i>
Sandy Inland Mouse	<i>Pseudomys hermannsburgensis</i>

Introduced Plant Species

Below are some introduced plant species found on the AZRI site. Landholders within the area of this survey should be aware of them.

Common	Scientific Name	Potential	Comment
Buffel Grass	<i>Cenchrus ciliaris</i>	High	Widespread through AZRI.
Mustard weed	<i>Sisymbrium erysimoides</i>	Minor to moderate	Annual weed that can be moderately competitive.
Ruby Dock	<i>Acetosa vesicarius</i>	Moderate	Fleshy, leafed annual. Introduced from northern Africa and western Asia.
Wild Turnip	<i>Brassica tournefortii</i>	Minor to moderate	Widespread annual. Found in sandy soils and disturbed areas. Not palatable for stock.
White Cedar	<i>Melia azederach</i>	Minor	Ornamental garden tree common in Alice Springs. No threat to biodiversity on AZRI.
Paddy Melon	<i>Citrullus colocynthis</i>	Minor	Disturbed area plant from Africa and Asia.
Common prickly Sowthistle	<i>Sonchus oleraceus</i>	Minor	Occurs in floodouts, floodplains, creeklines and gardens.
-	<i>Erodium aureum</i>	Minor	Occurs commonly along access tracks and road verges.

To conclude, the species richness of the AZRI property is higher than was recorded during the 2009 survey of Land for Wildlife properties. This may be due to a number of reasons:

- Weather; Land for Wildlife surveys took place during a very dry period whereas climatic conditions during the survey at AZRI were not as harsh and therefore more optimal for animal activity. A full moon in the first week of surveys will also have had a negative impact on animal activity.
- The area of AZRI is much larger and not as fragmented or disturbed by roads or buildings, allowing for animal movement through wildlife corridors and a greater provision of habitat on site.
- Regular human habitation & disturbance (especially in relation to property size as mentioned above) is greater on Land for Wildlife properties.
- Most Land for Wildlife properties own pets, mostly dogs, which may deter wildlife from utilising nearby habitat.

Conclusion

Trends & Findings

Trapping results during the surveys did not show high levels of biodiversity on any site, however using other signs and observations as measurement techniques showed high levels of reptile, invertebrate and bird activity. Evidence of native mammals, however, was not found. The only mammals present were ferals (ie. rabbits, House Mouse, dogs and cats), which indicates displacement, or competition for food and habitat. An absence of mammals may also be due to the dry conditions, habitat disturbance or fragmentation, or the presence of humans and pets.

The second week of surveys produced better results than the first, with increased pitfall and funnel trappings of invertebrate and reptile life, as well as a House Mouse in an Elliott trap. This is may have been influenced by the full moon in the first week – animals are vulnerable and highly visible to predators in the light of a full moon, especially aerial predators (Owls, Nightjars, Tawny Frogmouths) and will therefore stay sheltered and reduce their activity. However, the major contributing factor may have been the increase in humidity during the second week with a build up of clouds and a light rain later in the week. Rain is a feeding and breeding stimulus for many creatures, and weather conditions are cooler and more favourable for feeding activity and body temperature regulation. The temperatures during the first week were very high, and conditions dry.

The highest biodiversity recorded was at Heffernan Rd where numerous young iron wood trees provide shrubby cover. Less common birds were seen on the property such as a pair of Mulga Parrots, an Australian magpie and Red-tailed Black Cockatoos. During a morning survey at Heffernan Rd. a Whistling Kite was perched high in a dead tree. This behaviour is common to many raptors, as these dead trees provide good viewing for prey below on the ground. This indicates that the property supports enough reptile, invertebrate and possibly mammal life to draw the attention of and provide food for a number of raptor species. The sighting of a Pallid Cuckoo was significant as a weather indicator and since they live in shrubby environs and particularly where nesting birds may be present for them to lay their eggs in other species nests.



Chateau Rd. had an abundance of track activity of reptiles, birds and invertebrates. Debris on the ground provides shelter for small reptiles and invertebrates, and these animals provide food for the larger sand goanna, who also had many sites available for burrowing. The presence of small birds on a property is often a good indicator of ecosystem health, as it indicates there is enough understory and middle strata vegetation to provide cover from larger birds or aggressive dominant species such as some honeyeaters. A skink was caught in an Elliott trap in the remnant vegetation zone, but apart from this there was no indication of a difference in biodiversity between the two trapping sites; the 'disturbed' area or the remnant vegetation zone. The scale of habitat extensiveness may be important to mobile species and the location of these properties adjacent to the Todd River riparian areas which are corridors for wildlife may also contribute to the diversity on these properties.

Smaller birds were also present on the Brunonia Rd. site where the vegetation provided many tall shrubs for nesting and many flowering plants (which in turn attract insects) for food. Brunonia Rd. had significant amounts of rabbit activity, although much of the diggings were old. Rabbits may have impacted the success of revegetation of lower stratum plants/grasses after the removal of Buffel Grass, especially as times are dry and food sources rarer.

Breeding activity

Conditions preceding the surveys were dry and vegetation was sparse suggesting that fauna were likely under stress. Signs of breeding activity were scarce during the survey. A Pallid Cuckoo was observed vocalising (a breeding display) at Heffernan Rd., and the freshly broken eggshell under the small Honeyeater nest at Brunonia Rd. indicates recent breeding activity of bird species. However no signs of breeding activity in reptiles were observed.

Bird surveys

Bird activity was very high during both weeks of the surveys. All properties were observed to have insectivores, seedeaters, and nectar feeding birds, indicating a variety of food sources were available

on the properties. The presence of a bird of prey on the Heffernan Rd. property indicates the remnant vegetation provides habitat for many prey species and good perching. No rare birds were seen during the surveys, although less common birds were seen in the remnant vegetation on the Heffernan property. Smaller bird species were seen on all properties (Zebra finches, Thornbills, or Fairy-Wrens) as well as their nests showing habitat is providing middle and lower strata vegetation sufficient for shelter, nesting sites and protection for these smaller birds. However, the species present are common and quite hardy, and AZRI results show that other smaller species can be present (eg. Jacky Winters, Pardalotes, Weebills, Chestnut –rumped and yellow-rumped Thornbills, Crimson Chats, and Western Gerygones), and also ground dwellers such as Brown Quail which require more open grass lands with abundant lower stratum plants (grasses, low shrubs) for cover, food and nest sites. We did not survey during the night for birds and so cannot comment on presence of nocturnal species, but Boobooks and Tawny Frogmouths are known to inhabit the area.

Reptiles

Bynoe's Gecko and Tree Dtella were the most common species found during the surveys, which is to be expected as geckos are frequently the most abundant reptiles found in any habitat. Has houses been included in the survey transects, the common Tree Dtella, *Gehyra variegata*, would have been present at every property as well. All these Geckos can tolerate habitat fragmentation and disturbance as they are generalists in their shelter and food requirements, and so are generally indicators of a healthy ecosystem even if it is broken up. This is the case for all reptile species caught during the survey, as all species have widespread distribution over a variety of habitats. For example, *Menetia greyii* is a widespread skink over a variety of soils in dry areas and open vegetation types and depends on litter of some sort being present. The presence of signs of larger reptiles, such as Central netted Dragons, Sand Goannas and Long-nosed Water Dragons indicates there are areas that are sufficiently undisturbed that these species can escape predation and produce young. The presence of Legless Lizards, confirmed by track sightings also indicates these species can take advantage of habitats associated with residences, particularly where there are undisturbed areas with an accumulation of litter or taller ground vegetation allowing them to nest and shelter.

Survey properties did not support the same reptile diversity that was present on the AZRI site, but this may be matter of the area and relative complexity of habitats over which the surveys were conducted. AZRI had 26 species in 8 major habitats on 750ha of land whereas the average LFW property surveyed had 8 species in one or two major habitats on 2 ha of land.

Competition from larger species, such as Sand goanna and Central Netted Dragons, and habitat generalists such as the Tree Dtella may result in increased/decreased number of species in the relatively resource rich but usually modified LFW properties. Reptiles would have all emerged from winter dormancy as the climate had heated up as far back as October enough to promote activity, so this is an unlikely reason for an absence of species.

It is important to realise that classification of land units and vegetation classes is necessarily dependent on the scale of mapping. It may be useful on the smaller LFW blocks to describe the habitats in more detail in order to appropriately assess the species density in relation to



habitat complexity (more commonly referred to as species diversity index).

Invertebrates

There is no standard protocol for the recording of invertebrates, therefore little data was gathered, although several encounters with insects and other invertebrates occurred during the survey, particularly while pitfall trapping.

Presence of invertebrate in pitfall traps was higher in the second week, perhaps stimulated by humidity. No scorpions were trapped although possible burrows were found. Grasshoppers were starting to increase in population size and were noticeable on the Schaber Rd. block. Native Cockroaches found were an indicator of healthy soil and presence of organic matter. Various ant species and nests were sighted during the survey. Ants are important for aerating soil and distributing seeds. Termites function similarly and although there could be 12 to 15 species of termite in the area, specialised searches are necessary to find some of the uncommon and cryptic subterranean species. Grass eating *Drepanotermes* termite mounds were present at the Heffernan Rd. and Brunonia Rd properties. The species of *Noctuidae* caterpillar found at the Chateau Rd. site will metamorphose into a moth, which provides a good food for bats and geckos. Some moths in this family have tiny organs in their ears which respond to echolocation calls of bats, allowing them to evade bats by darting erratically. Several species have larvae (caterpillars) that pupate in the soil, and most are nocturnal feeding at night, and rest in the soil or a crevice in its food plant during the day to avoid the heat and visibility to predators. Many caterpillars in the *Noctuidae* family can also feed upon poisonous plants that would kill most other insects. Apart from this individual not many caterpillars or larvae were seen during the survey, which may be due to nocturnal feeding behaviour but in this case was likely due to dry climatic conditions which had not produced much vegetation for food. Good rains during the summer would stimulate emergence of pupae as moths and there would be plentiful larvae to feed on new plant growth. The rain which occurred after the surveys in January 2010 resulted in high levels of breeding activity for moths and butterflies and grasshoppers.

Weed presence

The presence or absence of Buffel Grass on blocks did not seem to have an obvious effect on biodiversity, though trap results in general were low and results may indicate more a reduction in activity due to weather conditions as opposed to presence/absence of weed species.

Once Buffel Grass establishes it becomes a monoculture, competing with native species for space and resources so effectively that it prevents their germination. It also has implications in fire management.

In the areas on and surrounding the biodiversity survey sites once Buffel Grass has been removed it is not immediately replaced by vegetation, and bare earth may prevail until rains bring on the annual growth of species which specialise in these silt rich flood plains. Areas of the Chateau Rd. property are a good example of this, which is why the property owners have chosen to leave Buffel in some areas. A method to deal with this scenario is to slash and poison Buffel Grass, leaving its roots intact in the ground to stabilise and mulch the soil. It could take up to or more than five years to eventually eradicate the grass, but organic matter will be left in its place during the process. Focus on native ground plants which live under the shade of shrubs for additional plantings to reduce the amount of bare ground.

A comparison with AZRI

Trapping results from AZRI showed a higher level of species richness and illustrate that a greater diversity of animal species could be present on Land for Wildlife properties. Land for Wildlife properties however are putting in considerable effort to look after their land, and so these results are an indicator of possibilities yet to come – something to look forward to! The AZRI surveys took place in more favourable weather conditions, and the site is greater in area than Land for Wildlife properties with less human disturbance, which perhaps contributes to greater biodiversity results. But because it is so close to LfW properties, wildlife corridors can be created and these species should occur on the properties eventually. As discussed above, habitat complexity over a large area is important and although each LFW property may only have a small range of habitats the sum of habitats available on all the properties becomes important to providing the complete suite of habitats present in the region. Wildlife corridors is a useful concept and LFW properties working together could assist in enhancing these corridors through planned cross-boundary habitat extension or establishment.

Land for Wildlife members and Monitoring

From this biodiversity survey Land for Wildlife members have learned skills and knowledge to equip them to measure biodiversity on their properties. Species identification skills enable correct identification between invasive and native plants and wildlife. Learning the different methods of trapping to target various forms of wildlife, and how, where and when to trap empowers landowners to conduct their own biodiversity surveys (annually or more frequently if they are able – after rain is always a great time to survey). Measuring and monitoring biodiversity over time and recording results is an effective way to determine how successful land management and habitat restoration activities are. Presence and abundance of weed species, abundance and diversity of regrowth of native flora, and the presence, diversity and abundance of native fauna species all act as indicators of the degree of ecosystem health. A reduction in invasive flora and fauna species and increase in native species over time indicates land management practices are successful. Wildlife observed breeding indicates that the right resources are being provided (suitable habitat and food abundance resulting from biodiversity thriving on correctly established/conserved native vegetation).

References

Albrecht, D., Pitts, B. (2004). *The vegetation and Plant Species of the Alice Springs Municipality NT*, Greening Australia NT Inc. & the Dept Infrastructure, Planning & Environment.

Kitchener, D.J., How, R.A., Dell, J., *Biology of Oedura reticulata and Gehyra variegata (Gekkonidae) in an Isolated Woodland of Western Australia*, Journal of Herpetology, vol. 22, No. 4 (Dec., 1988), pp. 401 – 412, Society for the Study of Amphibians and Reptiles.

Henderson, A., Henderson, D., Sinclair, J. (2008). *Bugs Alive! A guide to Keeping Australian Invertebrates*, Museum Victoria.

Low, B., Reilly, T., Wright, C. (2005). *Fauna, Flora and Habitat Survey of the Arid Zone Research Institute, Alice Springs*, Low Ecological Services & Power & Water Corporation.

Menkhorst, P. & Knight, F. (2004). *A Field Guide to the Mammals of Australia*, 2nd Edition. Oxford University Press, Melbourne.

R. Lennartz (2000). *Land Resource capability Assessment in the Alice Springs Area*, Dept. Lands Planning & Environment.

Simpson & Day (2004). *Field Guide to the Birds of Australia*, Penguin Group.

Strahan, R. (1997). *A Photographic Guide to Mammals of Australia*. New Holland Ltd, London.

Swan, G., Wilson, S. (2008). *Complete guide to Reptiles of Australia*, New Holland Publishers (Australia) Pty Ltd.

Triggs, B. (1996). *Tracks, scats, and Other Traces*, Oxford University Press.

Websites:

Birds in Backyards, Birds Australia
<http://birdsinyard.net>

Northern Territory Forecasts, Bureau of Meteorology, Australian Government
<http://www.bom.gov.au>

Threatened Species Profiles, Dept of Environment & Heritage, Government of SA
<http://www.environment.sa.gov.au/biodiversity/threatened-species/threatened-fauna.html>

Threatened Species Profiles, Government of NSW (DECC)
<http://www.environment.nsw.gov.au/edresources/LINKINGDOCThreatenedSpeciesProfiles.htm>

Threatened species: Sandy Inland Mouse – profile, Department of Environment, Climate Change and Water, Government of NSW, 2009.
<http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10688>

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Fauna profiles

Tree Dtella (Gecko), *Gehyra variegata*



Gehyra variegata occurs Australia wide and is common in Alice Springs. It is very similar, however, to the introduced species Purple Dtella (*Gehyra purpurascens*) and needs to be identified correctly to monitor populations of the feral gecko in Alice Springs. *G. variegata* is a habitat generalist occurring in disturbed and undisturbed habitat, tolerating fragmented ecosystems, and therefore is not a good species to use as an indicator of ecosystem health. It can be found in woodlands,

shrublands, and rocky areas where conditions are dry for habitat, but are very common around the house and human habitation. They are arboreal and rock-inhabiting, but are often found on the ground under logs, dead trees and other debris. It is frequently the most abundant lizard where it occurs, along with Bynoe's Gecko. A nocturnal gecko, it feeds on moths and other insects. It is long-lived with a lifespan greater than 9 years. The female will begin breeding in her third year when she is 90% of her adult size. This species is not sexually dimorphic (males and females are the same in appearance).



Central Netted Dragon, *Ctenophorus nuchalis*

The Central Netted Dragon is a medium-size terrestrial lizard, robust with a blunt snout, relatively short limbs and long tail. It is reddish-brown or yellowish-brown in colour with a fine black netting pattern. It has a low crest along the top of the neck, and a narrow vertebral stripe. These dragons are typically 26-28cm from head to snout.

The Central Netted Dragon is common and widespread in semi arid to arid areas of inland Australia, with a range that extends from the Western Australian coast to western New South Wales and Queensland. It is usually found in open country on sand or loamy soils but is generally absent from rocky ranges, with a habitat preference for red sandy desert with Spinifex grass vegetation. It is often seen perched on low elevated sites, even in very high temperatures. It shelters in shallow burrows at the bases of shrubs and stumps, close to its perching site, and will retreat to the burrow when threatened. Central Netted Dragons have both a summer and



a winter burrow to which they retreat when threatened. The winter burrow is plugged with soil during winter inactivity, although they can emerge for a few hours a day to feed if the weather is warm enough. The diet consists of insects such as ants, grasshoppers, beetles, termites, and also includes plant material. Four to six eggs are usually laid at a time. Males develop a red flush over the head and throat during breeding season.

Bearded Dragon, *Pogona vitticeps*

The Inland Bearded Dragon is appropriately named because of its "beard," an expandable throat pouch with spiky scales. The 'beard' of *Pogona vitticeps* is used for mating displays and displays of aggression; the throat pouch of males inflates and turns black. Both sexes have a throat pouch, but males display more frequently, especially for courtship rituals.

The Bearded Dragon occupies a large range of habitats from the desert to dry forests, scrublands and grasslands. It is found in the interior of all eastern states to the eastern part of South Australia and the south-eastern part of the Northern Territory. It is common in the Alice Springs region. It grows up to 55 cm long, including the tail, and has a broad triangular head, round body, stout legs, and a robust tail. Colour for this species depends on the soil of the region they live in, ranging from dull brown to tan with red or gold highlights. It is a semi arboreal lizard that can be found basking or displaying on fallen branches, fence posts and picnic tables. This dragon feeds on a wide range of insects, lizards, flowers, fruits and succulent leaves. It lays up to 30 eggs at a time. Mature males often have black beards during breeding season.



Pallid Cuckoo, *Cuculus pallidus*

The Pallid Cuckoo is common to Alice Springs, and occurs throughout Australia, although it is a discreet bird and is not easily seen. It is often heard before seen, the male frequently calling notes of ascending scales with increasing intensity. It is often visible after rain, when they make themselves obvious. The individual spotted during the Land for Wildlife surveys at Heffernan Rd. was a male, sitting on the telephone wire being dive-bombed by honeyeaters. This was during the last days of the survey when it rained lightly, and the air was humid. They display seasonal migratory behaviour but may be resident year round.

It is a large bird with a long tail, and is a parasitic species. Key distinguishing features are; a yellow eye-ring, a dark grey eye-stripe, a



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broadly barred brown/black and white tail, a black bill, and the body is grey above, whitish below. It has a hawkish appearance in flight. It is insectivorous and a ground forager, often pouncing for food. It particularly likes hairy caterpillars which are shunned by many other species. Feeding behaviour indicates the type of preferred habitat is woodland (for perching) with open ground (for 'pouncing'), although it is difficult to describe the habitat of a parasitic species as they occupy areas populated by their hosts – which for the Pallid Cuckoo is highly variable. Degradation that reduces the abundance and diversity of ground invertebrates (eg. fire, development, livestock grazing, soil erosion) will likely have negative effects on populations of this species.

The Pallid Cuckoo will lay its eggs in the nests of honeyeaters, woodswallows, whistlers and flycatchers. Common host species in Alice Springs include the Willie Wagtail and the Hooded Robin. Thirty-two host species have been recorded in Australia and 21 of them are honeyeaters (Threatened Species profile, DE&H, Govt. SA). The female cuckoo will remove one of the host's eggs and lay one of her own in the nest. It is not known how many eggs a female will lay in a season. The egg mostly resembles the host egg, and unsuspecting hosts incubate it along with their own eggs. The cuckoo egg usually hatches more quickly (after 12-14 days) and the young Pallid Cuckoo will instinctively push the other eggs out of the nest 2-5 days before they hatch or will evict the chicks. The young bird rapidly outgrows its 'foster' parents, who will wear themselves out trying to find enough food to satisfy it. Young Pallid cuckoos may also be fed by other birds that are not its 'foster' parents and will fledge at around 6 weeks old – which is often weeks later than the chicks of the host parents.



A juvenile Pallid Cuckoo fed by its host a White-plumed Honeyeater.

Wolf Spider, *Lycosa spp.*

Wolf Spiders are found throughout Australia in a wide variety of habitats including both inland and coastal habitats, suburban gardens, alpine meadows, woodland, shrublands and wet coastal forest. There are many different species of Wolf Spider. Some are able to dig burrows 30cm deep using their jaws, some shelter under leaves, bark, or other debris, some utilise tunnels abandoned by other invertebrates (such as cicadas) which saves doing any extra work, but most are wanderers without permanent homes. Arid zone species construct turrets or plug their hole with leaves and pebbles during the rainy season to protect themselves from flood waters. They are generally large robust spiders growing up to 25mm in body length, grey-brown in colour with a pattern of bars on the abdomen and radiating marks on the head and thorax. However species differ in size and colour.

Wolf Spider carrying egg sac.



Photo copyright Steve Clark

They depend on camouflage for protection and have a lifespan of 2-3 years. The male has obvious bulbs on the end of his pedipalps and has a small abdomen and long legs, whereas the female has a larger abdomen than cephalothorax.

They are fast ground hunters and are so named because they chase down their prey instead of relying on a web for capture. They feed on invertebrates such as crickets, cockroaches and flies. They hunt at night, running insects down and overpowering them with unexpected bursts of speed. Night-time is a great time to try to see a Wolf Spider, using a torch or even in car headlights, as their large eyes reflect in the light.

Wolf Spiders are unique in that they carry their egg sacs (a round silken globe) around with them, which they attach to spinnerets at the end of their abdomen. The abdomen must be held in a raised position to keep the egg sac from dragging on the ground, but they are still capable of hunting while doing this. The egg sac is carried for a few days until the young spiderlings hatch and climb up the mother's legs and onto her back. They will remain here to continue to develop while she carries them around.



A Wolf Spider photographed in America carrying her young.

Wolf Spiders use venom to aid prey capture and digestion, but will only bite humans if provoked (they are not an aggressive spider). The effects of a Wolf Spider bite are usually mild and symptoms include localised pain, swelling, itching, nausea, and headaches. No antivenin is required and there have been no reported deaths from a bite. There are rumours that a bite can cause necrosis (rotting) of the tissue surrounding the bite, however recent studies have shown that it is not the spider's venom that can cause necrosis, but an *allergic reaction* to the venom (ie. A person bitten who is not allergic will not suffer necrosis).

House Mouse, *Mus musculus* (introduced)

The introduced House Mouse is the most common and widespread rodent in Australia. It is well adapted to arid country and is common in Alice Springs, where it's often found in buildings, gardens and open pasture as well as recently burnt areas and scrub. It has a compact body, a short head, large rounded ears, small eyes and a long slender, scaly tail. It can be aggressive when handled and it has a distinctive musty odour. The House Mouse can be distinguished from all native rodents by a notch on the inner surface of its upper incisors – however it must be caught to



do this! It is therefore often difficult to distinguish native mice from House Mice by sight, particularly as the House Mouse has a number of colour morphs that can look like native mice.

The House Mouse spends the day in a roughly constructed nest of any available soft materials. In rural areas population density is limited by the availability of food and sufficiently moist soil to make a nesting burrow. At night it feeds on seeds, fruit, food scraps, and occasionally insects. The female has ten teats and rears up to nine litters of four to eight young per year, which become independent after about 18 days. Breeding can occur at any time of the year but normally follows rainfall. Populations can irrupt into plagues following several years of adequate rainfall which softens soil. After bush fires the House Mouse is usually the first mammal to colonise areas of regrowth.

Sandy Inland Mouse, *Pseudomys hermannsburgensis*



The Sandy Inland Mouse is pale ginger to grey-brown; it resembles the House Mouse but is a little smaller, has larger ears and eyes, and is usually paler underneath. Its head is also blunter and it lacks a distinctive musty smell and a notch on the inner surface of its upper incisors. It has a patchy distribution across arid Australia and is frequently found in the Alice Springs region. It inhabits a wide variety of open vegetation types, including *Acacia* woodlands, tall open shrubland (especially Mulga scrub) and hummock grassland, mostly on sands (plains and dunes) and sandy loams, but also in areas of cracking earth soils and

gibber plains. It is nocturnal and gregarious; during the day it sleeps communally in a complex burrow system constructed around the base of shrubs or small trees, emerging at night to feed on seeds, shoots, roots and small tubers. It obtains most of its moisture from food and does not need access to free standing water. It breeds opportunistically following rainfall, and populations fluctuate widely. The female has four teats and usually rears three to four young, which become independent after about 30 days. Threats include heavy grazing and trampling of habitat by domestic stock and rabbits, predation by foxes and cats, poisoning from baits, competition with introduced herbivores, frequent fires, loss of habitat through clearing, and introduction of standing water which encourages potential predators and competitors.

Scorpion

Scorpions are common Arachnids found in gardens and forests throughout Australia. They are found under logs, rocks and in shallow burrows in earth banks. Scorpions are mostly nocturnal but they can be active during the day, especially during prolonged wet weather. Nocturnal hunters, they feed mainly on arthropods such as beetles, cockroaches, spiders, slaters, centipedes and millipedes. Many scorpions (e.g. *Urodacus spp.*), are lie-in-wait ambushers. The main predators of scorpions are carnivorous marsupials, rodents, lizards, nocturnal birds, centipedes and other scorpions. The Desert

Scorpion does not drink free water, but gains water from food and is capable of taking water from soil via osmosis.

Scorpions are easily distinguished by their long sting-bearing tail and a pair of pincers on long arms, known as pedipalps, at the front of the body. They have six to twelve eyes, although they do not have good eyesight. They can readily distinguish light from dark however, and appear to have excellent low light sensitivity, which helps them to both avoid harsh sunlight and to



navigate by starlight or moonlight. They sense their way around using sensory hairs which pick up vibrations and scents. Colour ranges from dark grey to light brown or gold, with lighter coloured legs. Scorpions also fluoresce under ultraviolet light, which is a good way for scientists to find them in the field using UV torches. The fluorescence is thought to serve as an ultraviolet sensitivity mechanism, perhaps allowing the scorpion to avoid damaging light levels.

Female scorpions are more heavily built than the males, and have shorter tails. They give birth to live young, which are carried on the mother's back for the first week or so before they disperse and create their own burrows, clustered around the mother's. Desert Scorpions generally mate and moult in late spring/early summer and young are born 18 months later in late summer/early autumn.

Scorpions tend to be larger and more venomous in the northern parts of Australia, and bites can be very painful but are not commonly lethal. The Desert Scorpion, *Urodacus yaschenkoi*, is found throughout Australia's interior from north western Victoria, through South Australia, NT and Western Australia. Habitat includes open sandy woodland and shrubland, but is most commonly associated with Spinifex country and Mallee Gum trees. It occupies deep spiral burrows 25cm - 1 m deep with wide, crescent-shaped openings. It is thought the spiral section of the burrow helps to trap water vapour as water is often scarce for long periods. It has a body length of 7 cm - 12 cm and reaches adulthood after 4 years. Moulting takes place during the warmer months, and scorpions block the entrance to their burrow to keep potential predators out and to help maintain a high humidity.

Vegetation profiles

Harlequin mistletoe, *Lysiana exocarpi*

Harlequin Mistletoe is common in Alice Springs, and is widely distributed throughout drier inland Australia. It is present in many vegetation communities, including both communities present on the survey sites (15 and 17).

It is a parasitic species relying on its host plant for water and mineral nutrients. It is however, capable of photosynthesis in its own leaves. Host plants include Acacia, Casuarina, Eremophila, Eucalyptus, Exocarpus, Myoporum, Santalum, and Senna. Iconic species it occurs in are Witchetty Bush, Ironwood and Fork-leaved Corkwood. Many Mistletoe plants were in flower during the surveys, and at Brunonia Rd. a few trees were overrun with it – making it a favourite with Honeyeaters and Mistletoe birds, and a reliable bird sighting spot in the mornings. Trees can tolerate two or three infestations of Mistletoe

An extremely large Mistletoe in flower weighing down its host tree. Note the Mistletoe plant is in much better condition than the host plant.



A bird's nest in amongst a flowering Harlequin Mistletoe.

plants, but more than this will effect the trees survival.

Harlequin Mistletoe flowers are red with a green tip, and grow in pairs on a common short stalk. They are tubular with six free petal ends at the top, and dab pollen on bird's heads as they lean into the tube for nectar. The fruit is small and oval, and red or black in colour. Mistletoe is spread to other host plants by the Mistletoe bird who soon after eating the fruit passes the sticky embryo/seed. The seed is so sticky that the Mistletoebird needs to wipe its backside on a branch to get rid of it - right on target for the seed to quickly attach to the branch of its newfound host. There are eight species of Mistletoe that occur in our region; four *Amyema* species and four *Lysiana* species. They all provide food and nesting sites for birds.

Fork-leaved Corkwood, *Hakea divaricata*

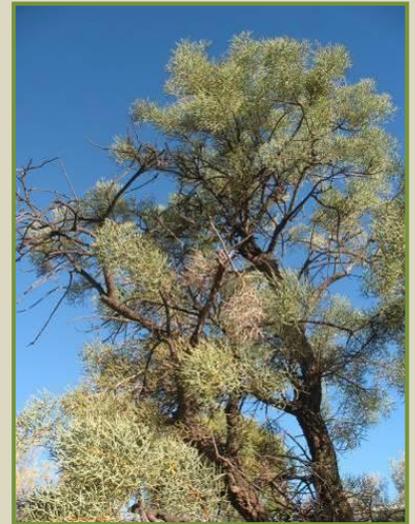


Fork-leaved Corkwood is a signature species of vegetation community 17 and is an important tree over most floodplain plant communities. It occurs in vegetation community 15 (also occurring on the survey sites), and is a culturally significant tree in the Alice Springs region. Fork-leaved



Corkwood also occurs in Western Australia, South Australia and Queensland.

It is distinctive because of its short and prickly leaves which grow out in forked bunches. It has dark furrowed gnarly trunks with thick corky bark. The flowers are yellow-green and are a strong attractant for honey-eating birds who favour their nectar. Fork-leaved Corkwoods flower after rain, and had just gone to seed on the Heffernan Rd. site. They are slow growing, growing to 4-7metres tall with a life span of more than a hundred years, and prefer loamy soils. They are drought and frost tolerant.



Wild Passionfruit/Caper Bush *Capparis spinosa* subsp. *nummularia*



Wild or Bush Passionfruit is actually a member of the Caper family (the same family as the Mediterranean capers you can buy in a jar at the supermarket).

It occurs in vegetation community 17, but not 15, and is restricted to 4 other vegetation communities (out of 26) of a variety of soils. Bush Passionfruit can tolerate a range of soils and situations, including shade. It is often found in river flats or calcareous hills, usually under trees of sheltered areas.

It is a multi-stemmed shrub with round leaves and stems with small sharp spines. It flowers between September and February, producing delicate white

flowers with four petals and lots of long stamens coming out of the middle. Flowers open up at sunset and only last a couple days. The fruit then produced is edible, turning from green to yellow when ripe, and is sweet-smelling with bitter black seeds and edible yellow pulp. The fruit attracts birds and ants and usually lasts until the winter frosts

providing a reliable food source until then.



The plant is often defoliated by caterpillars (Caper White Butterflies) in spring, but is able to recover rapidly. So don't panic if

this happens to your plants at home and start killing caterpillars! It is a fairly common occurrence for this plant, and they bounce back well. Enjoy watching the beautiful white and yellow butterflies emerge from their chrysalises.

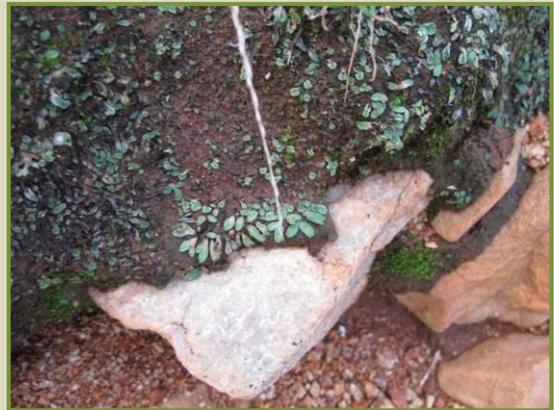
Soil Health

Soil was healthy on the survey sites, even though the area has a history of surface, mechanical disturbances, change in hydrology or increased salinity. Blocks were mainly situated on flat ground, and no erosion along drainage channels, driveways or paths was obvious.

Cryptogams (soil crusts)

Cryptogams are a specialised and diverse group that includes organisms as varied as single celled algae through to very large and complex colonies of lichens and fungi that may stretch over metres or even hectares. Cryptogams are the nonvascular plants that reproduce through the production of spores rather than seeds (Scott *et al.* 1987). Cryptogams include algae, lichens, bryophytes, liverworts (pictured above) and fungi (Scott *et al.* 1987).

Cryptogams, along with other microbial organisms, form the underlying ecological 'fabric' on which the patterns of more visible components of ecosystems are arranged. The role of cryptogams in the healthy functioning of ecosystems is fundamental to the supply of ecosystem services on which all of society depends (Scott *et al.* 1987). In other words if your property has soil crusting, then your soils are in a healthy state. The *Land for Wildlife* Newsletter (November 2007) has more information on Cryptogams <http://www.lowecol.com.au/lfw/lfwnews> .



A cryptogam: Liverwort helping to stabilise soil along a creek bed. These resurrection plants "regain" life and form after rain.

Identifying Nests, Tracks, Scats, Burrows, & Other Signs

All animals leave some sign of their presence and if you know how to see or read the country, then you can appreciate the presence of more species and monitor your efforts to improve habitat more effectively. There are many signs of life apart from tracks. However, tracks are most readily seen and interpreted. The best time to go tracking is early in the morning or late in the afternoon when the sun casts shadows across the ground. If you try to track at midday, the sun washes away any signs of prints, making tracks invisible to our eye. See below for some tips on identifying tracks, burrows, nests and other signs of life.

Birds

Nests



Above - Willie Wagtail: builds its nest from grass and woven spider web. The nest is lined with soft grass, fur or hair. The nest may be reused annually or deconstructed to provide materials for the new nest (see right image). The nest will be built on a horizontal branch or structure. The Willie Wagtail actively defends its territory, but will commonly and tolerantly nest in very close proximity to human habitation.



Above - Babbler: Grey-crowned and White-browed Babblers live and breed in communal nests and have multiple decoy nests around the breeding area, perhaps because these colonial birds do practice nest building until it is their turn to establish a real nest with eggs in it. They are a social bird, living in groups of two to fifteen birds, and most members of the group will help to build nests and rob each others nests for building materials. A roosting nest (a much larger nest for resting and

used by the whole group) and a brood nest (for the breeding female) is built, usually in the fork of a tree 4-7metres high, and will be renovated and reused every year. Nests are built with sticks and are dome shaped with a hood and landing platform for the entrance tunnel.



Above - Fairy-Wren: nests are an oval or round shaped dome, constructed of loosely woven grasses and spider web, with an entrance to one side. Nests are often placed in a low shrub close to the ground, well-concealed in thick and often thorny vegetation, such as species of *Hakea*.

OR

Small Honeyeater (e.g. White-plumed, Brown or Singing Honeyeater) – As the nest pictured does not have a side entrance, which Thornbill, Zebra finch and Fairy-Wren nests mostly do, it may be a small honeyeater nest. Male Honeyeaters defend a nesting territory by singing from tall trees during breeding season, and stand guard while the female builds the nest and lays the eggs. This nest was seen at the Brunonia Rd. property, where Singing and White-plumed Honeyeaters were observed during the surveys, and Mistletoe and Wild Passionfruit were flowering creating an abundant food source (diet consists of nectar and insects). The nest was inactive, but broken eggshell on the ground below suggests that the nest was occupied some time during the month before the surveys. Small Honeyeater nests are generally small cup-shaped constructions of fine bark, grasses and plant material, bound with spider's web. They are slung by the rim in a shrub or tree, as the nest pictured appears to be, up to 5metres from the ground and are usually very well-hidden by thick foliage. Honeyeaters are quite aggressive defenders of territory and nesting sites. Their nests may come under predation from Pied Butcherbirds, snakes and cats. Pallid Cuckoos and Horsfield's Bronze-Cuckoos occur in the area (a Pallid Cuckoo was observed at Heffernan Rd. in proximity to Brunonia Rd.) and will parasitise nests.



Above - Zebra Finch: build spherical nests from rough grass stalks and thorny twigs, lined with softer grass or feathers and wool. Nesting sites vary, but include bushes and trees and tree holes. In the Central Australia nests can be commonly found in Dead Finish. The entrance is on the side, which is protected by a short tube.

OR

Thornbill: The Yellow-rumped Thornbills nest is a large and untidy structure of grass and bark. It has two parts: an upper 'false' cup-shaped nest and a lower, domed nest-chamber with a hooded entrance. The purpose of the false nest is not known although theories include; deterring predators or parasitic cuckoos, a roosting place for males or fledglings, a 'displacement' activity for males, or a 'practice' nest for the helpers. The nest is built in dense foliage of trees, near the end of branches or in vines or mistletoe. The Inland Thornbill builds a small domed nest, like that of fairy-wrens, using bark strips and dry grasses bound with spider web and lined with feathers. The entrance hole is hooded. The nests are placed in low shrubs, in forks among low twigs or foliage.



Red-browed Pardalote: Some birds, such as Pardalotes and Rainbow Beeaters, nest in burrows. A pair of Red-browed Pardalotes have excavated the tunnels pictured above in an earthen bank. The adults have taken advantage of a disturbed site in this case (a hole dug by humans), but will also nest in tree hollows and knots and burrow in the ground or river banks. The hole in the centre is the chosen nest - you can see two grooves at the entrance that the parent's feet have made when landing or departing from the nest with food for the chicks - and the other holes show where the Pardalotes have tested the soil for suitability. The chicks, once hatched from the egg, can be heard chirping if you listen carefully. The burrows end in an enlarged lined (bark and vegetation) chamber, where the eggs are laid and incubation takes place, and the entrance tunnel may be half a metre long. A difficult task for a little bird to construct, however the advantages are stable cool temperatures out of the sun, and protection from aerial predators and (with an entrance of only 5cm in diameter) nest raiders.



Photo: Damian Pyke

Red-browed Pardalote carrying food (insect) to the nest).

Eggshell



Fairy-Wren or Small Honeyeater. This eggshell was found underneath the Fairy-Wren/Small Honeyeater nest pictured above. This was a factor in being able to identify the nest. Zebra finches

and Thornbills have white eggs, whereas Fairy-Wren eggs are speckled and small Honeyeater eggs are whitish and spotted/blotched with red-brown, brown-yellow or pale mauve.

Tracks



Bustard (Bush Turkey): These large three-toed tracks are not to be mistaken for an Emu, which has much larger feet, or a wallaby or kangaroo as the prints are not paired as they would be in a macropod stride.



Emu: The size of an Emu footprint is much larger than a Bustard - more than twice the size (unless you are looking at Emu chick tracks, then it gets confusing!) - with a longer gait. The Emu has broad toes in comparison to the length of its foot, whereas the Bustard toe is long and slender.



Crested Pigeon: These tracks probably belong to a Crested Pigeon. They meander along the ground, demonstrating the behaviour of a ground foraging bird. They can be distinguished from Galahs, also foraging on the ground for seed, because Galahs like all parrots have two toes pointing forward and two behind. Torresian Crows have much larger feet, and a greater stride to a smaller pigeon – and do not potter about in the meandering arks of a Pigeon. Magpie Larks may be another possibility for

these tracks. Other ground birds include Richard's Pipit, Cinnamon Quail-Thrush and the smaller Button Quail. It is useful to know the behaviour and preferred habitat of these species to be able to correctly identify tracks. Field Guides are useful for this.

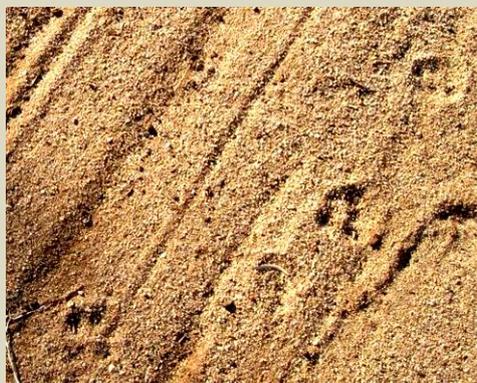
Mammals

Tracks

Tracks of mammals are often distinguished by the marks made by different shaped pads on varying feet structures, claws, footprint size and gait. It is useful to be able to read animal behaviour from the track, and know the type of habitat you are in. Identifying animals from tracks is not always easy. The best time of day is early morning or late afternoon when a shadow is cast across the track, making it more visible. At midday tracks become invisible as the sun is directly above them.



Rabbit: Pictured above is the slow gait of a European rabbit (invasive species). The heel of the hind foot is normally visible and both hind feet come to rest side by side. A bounding gait leaves only the impression of the toes on both front and hind feet, and the distance between each group of tracks increases. Rabbits have five clawed toes on all feet, though the inner toes are small and do not leave a mark.



Cat (invasive species): A cat track displays four toes on each foot with well-defined pads, as does a red fox's and a dog's. A cat's toe pads are almost arranged in a semi-circle above the central large

pad. The footprints are rounder than a dog's. Cat footprints are all similar in size, whereas a dog's front feet are larger than its back feet. The cat retracts its claws when walking, and the dog and fox do not. Track patterns will vary depending on the gait.

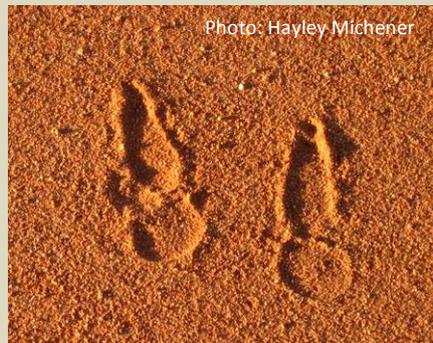


Photo: Hayley Michener



Macropod: (Kangaroo or Wallaby). Pictured above top are the hind footprints of a large Euro. All kangaroos and wallabies have five clawed toes on their front foot, pointing forward. The hind foot is elongated with a long fourth toe and large claw. The shorter fifth toe also has a strong claw and these are the only two toes to touch the ground. A macropod's slow walking gait reveals the five fingered print of the front feet, side by side, with the footprints of the elongated hind feet occurring *in front* of these, often with a tail mark (a thick straight line) in between the feet (see above). A hopping track will only consist of the hind feet (no tail as it is held high for balance), and the distance between track groups will be greater.



Echidna: with highly specialised claws for digging the echidna track is quite distinctive. The front foot has five broad claws; the claw of the front toe being shorter than the other toes. With a slow gait and rolling walk, the two legs on one side of the body move together, followed by the two legs on the other side. The front feet turn inwards and the hind feet are directed backwards. The tracks show a print (like a scrape) of all the hind claws as the foot is moved forward. Pictured right is some recent feeding activity indicated by fresh tracks in the sand and signs of digging and soil turned over by the snout.





Hopping Mouse tracks are very like miniature kangaroo tracks when they run, but normal foraging speed leaves elongated hind foot and short hand print tracks (left). Pictured below are tracks left by a running gait, note only two prints left by the hind feet.



Bilby: Below. Note the long toes. The two front feet are behind and the two back feet are parallel in front where the animal has leaped off its back feet to land on its front feet in the next group of tracks.



Scats



Macropod: Scats of kangaroos, wallabies, hare-wallabies are usually deposited as separate pellets in groups of four to eight. They can be oval, round or square depending on the species. Red kangaroo scats taper to a point at one end, while Euro scats are squared at both ends and Rock Wallaby droppings are short elongated ovals with a tip on each end. When the pellets are broken you can see they are made up of plant matter. This can be a useful way to identify the macropod, as some prefer soft grasses, or will browse on bushes and trees. The scats pictured above are likely Euro droppings from a young Euro.



Rabbit: Rabbit scats are small and round. They contain fine plant particles. Rabbits often deposit their scats on elevated patches of ground which act as territorial markers. Many scats of many individuals may accumulate in these communal latrines (as pictured above). The above image shows scats of various ages – fresh scats are darker in colour.

Dog: To left of the above image, dog scats are also present. Dog and Dingo scats are cylindrical and larger than a Cat scat and cats bury their droppings. It is difficult to tell the difference between a wild Dog and a Dingo scat in the field. Fragments of fur, bone, feathers, etc., may be found in the scat, and occasionally plant matter will be present too. Colour and size may vary. Dogs and Dingos often deposit scats on elevated places (rocks, grass tussocks), and may use the site more than once. Scats are commonly deposited near dead animals (road kill, cattle carcasses).



Echidna: Echidna scats are long cylinders approx. 2cm in diameter. When broken open you will see the scat contains shiny insect particles, mainly ants and termites but also beetles or larvae, and lots of soil. The colour of the scat varies, depending on the colour of the soil. Scats can be found anywhere, but are often found near to where the Echidna has been feeding, such as rock piles, termite mounds, and meat-ant mounds.

Other signs:

Many other signs can reveal the presence and activity of animals. For example, finding bones, fur, burrows, scrapes or diggings, and scratch posts may give you a clue as to what is around.



Rabbit: burrow (left). Often as deep as half a metre below the surface, burrows can be singular (like this one pictured) but are often a complex system with numerous entrances forming a warren. Soil dug out of the burrows may form a mound outside the entrance. Some burrows are re-dug from inside and therefore have no soil mounds at the surface.

Rabbit: scrapes (right). These are usually shallow scratchings, rounded at base with a small mound of soil at one end. The scrapes pictured above are quite old, with no fresh soil mounds visible and seed has accumulated in the holes. There are plenty of scats present here too, which are pale and dry indicating they are also old, and that this site has not been in use for a while.



Bilby: (Left) A Bilby has dug this Acacia root from the ground in to feed on a grub growing in the root.

Bilby: burrow (right). Bilbies can build extensive burrowing systems of up to 3m long and 1.8m deep. The open entrance is usually at the base of a termite mound, Spinifex tussock or small shrub.



Mammal burrows tend to be slightly oval in shape as the animal pushes the dirt out between its back legs. Lizard holes in comparison are slightly triangular with a flat(ish) bottom as the animals pushes the dirt out around the sides in a brest stroke pattern.

Reptiles

Burrows & Diggings

Sand Goanna:



Central Netted Dragon:



Tracks

Sand Goanna: Note the scrapes indicating footprints either side of the line. This is not a snake track!



Perentie: The size of these tracks indicates they were made by a Perentie. Sand Goanna and Perentie tracks are similar, but can be differentiated by their size, and also the habitat they occur in. The tracks pictured below are very large; the Perentie is a fully grown adult. Note pictured below the hind and forefoot tracks are almost overlapping, and the tail track runs through the centre.



Legless Lizard: These tracks are very small, see the rabbit scats in the left image to use as a reference. The tracks will often disappear as legless lizards burrow underground. They are not 'baby' snakes!



Gecko:

Blue Tongue Lizard: The track below is likely a blue tongue lizard since it is fairly large and shows the pug foot marks in their steady inexorable pacing.



Invertebrates

Burrows



Ant nests: all believed to be *Camponotus* species.



Termite: The left hole in the bottom image could be a scorpion burrow, while the right hole has been made by a termite. Top right: termite castings over litter to protect the termites while foraging.



Spider: Australian Tarantula (Barking Spider) burrows. The burrows are distinguishable because they are perfectly round and go straight down and are up to an inch in diameter.



Beetle: This digging was identifiable as the work of a beetle as a black beetle, species unknown, was seen digging it before disappearing. Otherwise it would be difficult to determine.

Other Signs



Mud Dauber wasp nest remains: nests are built using clay and are attached to hard surfaces. Nests encase immobilised spider or caterpillar prey into which the wasp has laid an egg which will hatch and feed on the prey.