Land for Wildlife, Alice Springs

Biodiversity Surveys

2010

Spencers Burrowing Frog (*Limnodynastes spenceri*)

PowerWater

Northern Territory Government

Alice Springs Town Council

Garden for Wildlife

Low Ecological Services

Contents

1. Introduction

1.1 Land For Wildlife

Land for Wildlife is a voluntary conservation 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 2010, a total of 139 properties have registered with Land for Wildlife, with several properties in pastoral and Aboriginal lands beyond the Alice Springs municipal area. Covering a total land area of 12 152.6ha, this has increased from 11 995.1ha since December 2009. 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 of 149 residences, covering an area of 80 711sq. m.

Alcoota School, north of Alice Springs – new Land for Wildlife members in 2010

1.2 Biodiversity Surveys

Land for Wildlife has conducted biodiversity surveys annually since 2007. They are an important tool in determining the success of land management activities carried out and to create better understanding of species population dynamics in areas of mixed land use.

The Land for Wildlife program encourages the involvement of property owners and other volunteers during the surveys. This teaches a valuable set of skills to the participants as well as enhancing knowledge of flora, fauna and their interactions within an ecosystem. Through participation, property owners can learn the skills necessary to monitor plant and animal communities, creating the ability of land owners to assess population dynamics of species into the future.

The information gathered from the surveys adds to the knowledge of species distributions in areas that may otherwise pose access issues to do with land tenure and ownership.

In late 2009, four properties in the racecourse/winery region were surveyed. The survey aimed to draw comparisons between the diversity of floodplains and sandy rises. The year had seen exceedingly low rainfall (77mm in total) and poor trapping rates were recorded, although other evidence of animal activity was found. There was a low diversity of grasses and annual ground cover plants present, and most animal activity was found on properties where amounts of other cover, such as dead logs and leaf litter occurred. The majority of animals trapped were lizards.

In 2010, properties surveyed were in the Ross Highway/Emily Hills area. All four are situated on drainage features at the southern base of the hills. All but one property bordered onto the range. However, this land unit was not surveyed. All trap lines and vegetation transects were set along the drainage features and colluvial fans found on the properties. On two properties, trap lines were set across rocky colluvial fans and over drainage floors and depressions at the final two sites, comparing the diversity between these land unit types.

2. Background Information

The Ross Highway/Emily Hills area currently has 89 Land for Wildlife members. Many of the properties adjoin one another, creating a corridor of land managed for conservation along the base of the Emily Hills. Four Land for Wildlife properties were surveyed from this area.

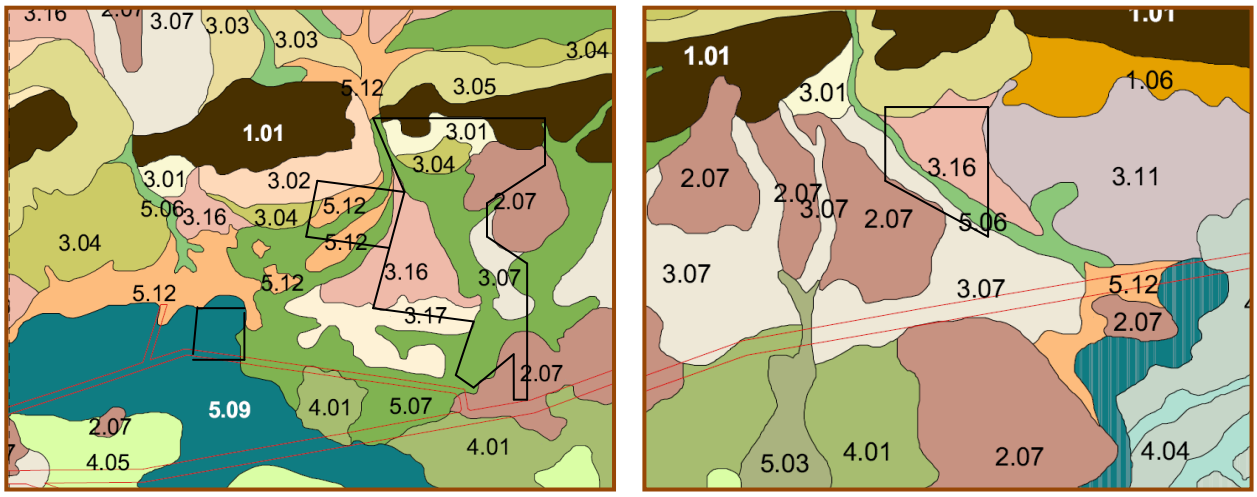
- Kaye Kessing, Bob Kessing, Ruth Jones and Eleanor Hooke of Heenan Road
- Mal and Merita Crowley of Heenan Road
- Bernie Nethery and Amanda Lucas of Baldissera Drive
- Carmel and Brendan Ryan of Minahan Road

Image: Google Earth 2010

Map of the four surveyed properties

Of these properties, the Kessings joined the program in 2002, Mal and Merita in 2004, Bernie and Amanda in 2006 and the Ryan's have been registered since 2007.

2.1 Land Units Present



Land Unit Map of Areas Surveyed, Alice Springs. Heenan Rd & Baldissera Dve sites (left), Minahan Rd site (right)
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

1.01 – Heavitree Quartzite Ridges. This land unit is composed of steep to very steep ridges, generally rising to >300m with slopes ranging from 40 – 58%. The quartzite rock offers rapid drainage due to low permeability, causing rapid runoff. An upper stratum is usually absent, but can include species such as White Cypress (*Callitris glaucophylla*) and Beefwood (*Grevillea striata*) over a mid-stratum of isolated Mulga (*Acacia aneura*) and Witchetty (*Acacia Kempeana*) shrubs. Dominant vegetation is open hummock grassland composed of the Spinifex *Triodia brizoides* and the introduced Buffel Grass (*Cenchrus ciliaris*).

2.07 – Silcrete Rises at the Base of Quartzite Ridges. Steep rises of silcrete fragments interspersed with widely spaced stream channels. Low permeability and rapid runoff leads to rapid drainage occurring. Isolated clumps of Mulga occur over a mid-stratum of species such as Rock Fuchsia Bush (*Eremophila freelingii*) and *Senna artemisioides nothosubsp. coriacea*. Buffel Grass and the pussy tail *Ptilotus parvifolius* are dominant lower stratum plants.

3.01 – Siliceous Upper Wash Slopes. Moderately inclined slopes formed by the continual erosion of upper ridges. Naturally a relatively stable landform, however disturbance of the soil structure can lead to the rapid development of erosion channels. Natural drainage is in sheet flows. Mulga is the dominant tree species, with Witchetty Bush, Silver Cassia (*Senna artemisioides*) and Native Fuchsia (*Eremophila latrobei*) common in the mid-stratum. Isolated clumps of tussock grasses dominate the lower stratum. Species include Oatgrass (*Enneapogon avenaceus*), Woolly Butt Grass (*Eragrostis eriopoda*) and Buffel Grass.

3.02 – Gravelly Mid-wash Slopes. A gently inclined slope formed by the continual erosion of the upper ridges. This land unit is very active due to sheet wash, creep and occasional rockfalls. Natural drainage occurs as sheet flows, however disturbed areas develop rapidly into erosion channels. Upper stratum vegetation is absent, but Witchetty bush grows over Bogan Flea

(*Calotis hispidula*), Desert Chinese Lantern (*Abutilon otocarpum*), Kerosene Grass (*Aristida contorta*) and Woollyoat Grass (*Enneapogon polyphyllus*).

3.04 – Gravelly Lower Wash Slope. Gently inclined slopes, generally to 5%, rising to 10m above the surrounding lower areas. Clay can form up to 30% of the soil, allowing rapid runoff with moderate permeability and drainage. Erosion channels result where the soil structure has been disturbed. Isolated upper stratum species such as Ironwood (*Acacia estrophiolata*) and Fork Leaved Corkwood (*Hakea divaricata*) grow over Mulga, Witchetty and Dead Finish (*Acacia tetragonophylla*). Bogan Flea (*Calotis hispidula*), Purple Plumegrass (*Triraphus mollis*) and Variable Daisy (*Brachycome ciliaris*) are some of the common lower stratum vegetation.

3.07 – Rocky Silcrete Lower Wash Slopes. Gently inclined slopes, generally to 5%, rising to 10m above the surrounding lower areas. The rocky, course soil with low clay content enables moderately rapid runoff with moderate drainage and permeability. Erosion channelling can occur where the soil surface has been disturbed. The vegetation communities present generally lack an upper stratum, although isolated Mulga trees occur. Mulga also makes up the mid stratum along with Rock Fuchsia Bush and Silver Cassia. Small sub-shrubs such as *Ptilotus parvifolius*, Woolly Copper Burr (*Sclerolaena lanicuspis*) comprise the lower stratum.

3.16 – Rocky Colluvial Fan. Very gentle slope with a low relief originating from an erosion gully at a higher elevation. Internal drainage channels occur and range from narrow (0.5m wide, 0.3m deep) to broad (2.0m wide, 0.8m deep). Mulga is the dominant upper stratum vegetation, growing over Witchetty Bush, Woolly Oat Grass (*Enneapogon avanaceus*), Munyeroo (*Portulaca oleracea*) and Goathead Burr (*Sclerolaena bicornis*).

3.17 – Sandy/Gravel Lower Wash Slope. Slopes with a very gentle incline of 2.5%, with a maximum relief to 10m above surrounding low lying areas. Moderate permeability and slow runoff are characteristic. Erosion gullies form readily where the surface layer is disturbed. This land unit is typically vegetated with Mulga, Whitewood (*Atalaya hemiglauca*) and Bloodwood (*Corymbia opaca*), over Dead Finnish, Desert Cassia (*Senna artemisioides subsp. artemisioides*) and cotton Panic (*Digitaria Brownii*)

5.06 – Confined Drainage Floors (10m – 20m wide). A broad tributary drainage floor, characterised by frequently active erosion by channelled or overbank stream flow. It is generally restricted to narrow valley floors. Tis land unit is generally 10-20m wide and up to 7km in meandering length. River Red Gum (*Eucalyptus camaldulensis*), Ghost Gum (*Corymbia apererinja*) and Ironwood occurs in an open woodland above Silver Cassia, Ruby Saltbush, Desert Chinese Lantern (*Abutilon otocarpum*) and Sticky Hop Bush (*Dodonaea viscosa*).

5.07 – Moderately Confined Drainage Floors (20m – 40m wide). Within a broader flood plain or drainage system, this land unit is characterised by frequently active erosion in depressions into which runoff water is channelled. Beefwood, Ironwood and Bastard Coolabah (*Eucalyptus intertexta*) form an upper stratum, over a middle layer of Acacia Bush (*Acacia Victoriae*), Dead Finish and Plum Bush (*Santalum Lanceolatum*). The lower stratum is made up of grassland comprising dominant species such as Buffel Grass.

5.09 – Relic Drainage Depression. These depressions are part of the flood-out system of drainage channels that flow infrequently during larger flood episodes. They are within a broader drainage system. Usually isolated from the regular flow depressions, they are most likely remnants of prior channels and as such, retain an underlying palaeochannel drainage system. These palaeochannels allow a good cover of vegetation to be retained. Dominant species here include Coolabah (*Eucalyptus coolabah*) and Ironwood over Ruby Saltbush (*Enchylaena*

tomentosa), Weeping Emu bush (*Eremophila longifolia*), Oat Kangaroo Grass (Themeda australis) and Buffel.

5.12 – Scaldy Clay/Sand Drainage Floors. A broad drainage depression that is inundated seasonally. This unit is roughly fan shaped and can be up to 600m wide and 800m long with a very shallow slope of 2%. A high level of scouring erosion, due to sheet flow characterises this land unit. These are possibly flood scar areas stripped during past extreme flood events. The scalded areas are generally barren of vegetation. Other areas have a thin sandy/gravel surface layer that supports a sparse forbland, comprised of species such as Goathead Burr, Bunched Kerosene Grass (*Aristida contorta*), Bogan Flea and Small Yellow Daisy (*Rhodanthe charsleyae*)

Property	1.01	2.07	3.01	3.02	3.04	3.07	3.16	3.17	5.06	5.07	5.09	5.12
Heenan Rd (Kessing)	X	X	X		X	X	X	X		X		
Heenan Rd (Crowley)										X	X	
Minahan Rd						X	X		X			
Baldissera Dve				X						X		X

2.2 Vegetation Communities Present

6. Mulga on rocky or stony slopes of quartzite, sandstone or silcrete.

7. *Ptilotus parvifolius* on stony, eroding slopes associated with silcrete outcrops.

8. Whitewood and Senna on gravelly rises associated with silcrete rises

16. Mulga in valleys with red earths

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

23. Drainage depressions with Coolabah, Bastard Coolabah or Ironwood.

For lists of plant species common to each of these vegetation types, visit http://www.lowecol.com.au/lfw

Property	Vegetation Type					
	6	7	8	16	17	23
Heenan Rd (Kessing)	X	X		X		
Heenan Rd (Crowley)					X	X
Minahan Rd	X		X			
Baldissera Dve	X			X		

2.3 Property Management

All the property owners concerned carryout, or have carried out, management activities to control Buffel Grass (*Cenchris cilliaris*) on their properties. This ranges from control across the entire property, to concentrated efforts on specific sites. Methods of control also vary, although hand pulling has been the main control method used, particularly on the smaller properties. For example, the Kessing property on Heenan Rd is a large property and efforts to control the weed have been applied in specific sites. In one example, fire was used to eradicate Buffel from a site, with a follow-up procedure of hand pulling any regrowth. This area was almost completely free of the weed during the survey.

The other Heenan Rd property, owned by the Crowleys, has had buffel almost completely removed in the past, mainly by hand pulling, and the pulled plants then taken off site for disposal. Buffel still occurs as isolated plants, germinating particularly along drainage channels on the northern and eastern boundaries of the property. Two areas of new Buffel infestations in these locations had grown after this year's heavy rains.

Conversations with the property owners indicate that native grasses and wildflowers are much more varied in areas where Buffel has been removed than in the past, although this may also be due to the exceptional rainfall that occurred in the months leading up to the survey.

On the Baldiserra Dve property, a rock bund has been built to direct sheet flooding away from the living envelope. A large creek bisects the property from the ranges to the north to the southern neighbours. Major erosion has occurred along the creek, cutting a gully up to 1.5m deep, with channels draining into the creek from the surrounding plain. These channels are well vegetated with grasses and there are some larger acacia and cassia shrubs growing in the main channel, indicating that the main erosion occurred some time ago and that the system has begun to stabilise. However, it can be seen where fresh flows have occurred.

Two sites of Buffel Grass management. Crowley's (left) and Kessing's (above).

3. Methods and Materials

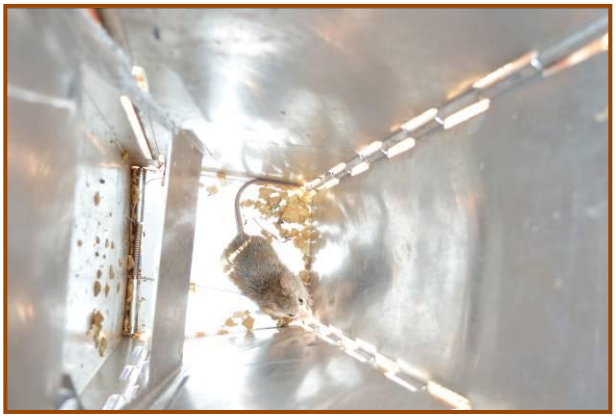
Three trapping methods were used during the fauna survey. This was combined with observations of animal presence such as tracks, scats, burrows and other signs. Information from the property owners about their own observations was also collected.
Elliott traps, funnel traps and pitfall traps were used over a period of three nights and placed along transects. During the first week of surveying, traps were left open for the duration of the four days due to cool weather. However, for the remainder of the survey, traps were closed during the day to prevent heat stress of any animals.
Bird observations were made each time the traps were checked by recording birds either sighted or heard along the transects. Birds seen on the boundaries of the property and past sightings by the owners were also noted.
Vegetation along each trap line was recorded.
Site descriptions were undertaken for each site.

3.1 Elliott Traps

An Elliott trap is a small, aluminium box with a trap door at one end. The door is operated by a trigger system inside the box. A mixture of peanut butter and oats is used as bait for small mammals and placed at the closed end of the box. As an animal enters the trap, it steps on the trigger as it moves to the bait, closing the door and trapping itself. The bait provides the animal with enough food for the duration of the night.
Traps are placed in the shade where possible and checked early in the morning during hot weather, to minimise stress on the animal. Placing traps under cover also obscures them from predators – raptors and crows have been known to open traps for the bait or animals caught inside.

A typical Elliott trap

These traps are mainly used to catch small mammals such as rodents and marsupials like dunnarts. A captured animal can easily be removed from the trap for closer inspection by upending the box into a calico bag. 25 Elliott traps were placed along the transect at each survey site, spaced between 5m and 10m apart.



Two captures in Elliott traps. The house mouse (Left) entered for the bait. Small mammals such as this are typical captures in these traps. The Ctenotus skink (right) likely entered the trap for shelter, but was heavy enough to trigger the door mechanism.

3.2 Funnel Traps

Checking a funnel trap

Funnel traps consist of shade cloth or similar material stretched over a wire frame. This creates a tunnel in which animals can hide. At each end of the tunnel is a funnel shape entrance, with a wide outer opening that tapers inwards. When placed along a pitfall line, they are effective in catching reptiles, commonly smaller species such as geckos and skinks, but have been known to catch monitor lizards and even snakes. The pitfall fence directs the animals towards the funnel as they run along the barrier. Debris is placed over the bottom of the entrance so the animals can't see or feel the unnatural material.

Smaller animals and invertebrates often find hiding places in creases and folds of the trap. They must be checked carefully to ensure none of these animals avoid detection. A zipper runs along the length of the tunnel, allowing animals to be easily removed for closer inspection and release.

3.3 Pitfall Traps

Pitfall traps are pits dug into the soil, into which a 20L bucket is inserted. The pit is backfilled around the bucket so that it sits flush with the soil surface. A small fence is then run over the pit and for 5 – 10m either side. The fence is dug into the soil surface so that no gaps are present underneath the barrier.

When small animals encounter this barrier, they run along it, searching for a way through. When they encounter the pit, they jump or fall in and are unable to climb out of the smooth sided bucket. Soil, leaf litter and other debris is placed in the bottom of the pit to provide some cover for any trapped animals.

These traps are successful for catching any type of small, ground frequenting animal including invertebrates, reptiles and mammals such as mice. However, in stony or rocky substrate, they are difficult to set. Small animals often bury themselves in the soil at the bottom of the pit, so traps must be checked thoroughly to ensure no captures are missed.

Lids can be placed over the buckets in hot or excessively wet weather to prevent animals from over heating or being flooded.

Spencer's Burrowing Frog encountering a pitfall fence (above left). Checking a pit for captures (below left). A wolf spider and Sand Plain Gecko caught in a pit (above).

3.4 Bird Observations

Each morning when traps were checked, bird observations were recorded along each trap line. Birds both seen and heard (if calls could be positively identified) were noted. Observations were made again in the afternoon when traps were re-opened. Birds seen on the property, but not on the trap line were noted as incidental species on the data sheets. In addition, past observations made by property owners were also recorded.

The trapping method for birds is a mist net, a net of exceedingly fine thread strung between poles across an observed flight path. For the purposes of this survey, bird trapping was not necessary and would only have placed unnecessary stress on any birds captured. However, two birds were caught incidentally using other trapping methods, as discussed later in this report.

3.5 Vegetation

Vegetation was recorded using a transect method. Transects of 100m were measured along trap lines and the plant species present at each metre on the transect identified and recorded. Plants seen that were not recorded on the transect were noted as incidental species on the data sheets.

Recording plant species on a vegetation transect

4. Weather Conditions

After the driest year on record for Alice Springs in 2009, with only 76mm recorded, conditions throughout 2010 were excessively wet, with heavy falls of rain experienced throughout the year up to the commencement of the surveys. The surveys took place over October and November, with one property surveyed mid-October, and the remaining three early in November. By October, 569mm of rain had been recorded at Alice Springs Airport, with a further 70.2mm falling in October.

4.1 Week 1, 12-15 October

In the first week of October, heavy rain had fallen. Soil moisture was still present and creeklines on the property were damp. Days were overcast with below average temperatures for October recorded, while night temperatures were slightly above average, with the exception of the final trapping night, where the temperature dropped. The fall in the temperature coincided with a rain event that occurred over the final night of trapping. The following day was markedly cooler with heavy cloud.

The rain that fell was enough to cause sheet flooding in low lying parts of the survey site and made access to the trap lines on the final day difficult. Open Pitfall traps also filled with water, although not enough to affect animals caught overnight.

We expect the cooler, damp weather affected captures, particularly rendering small reptiles inactive during cool, wet nights. Due to the mild, overcast conditions, traps were left open during the days.

Weather October 12-15			
Date	Temperature		Rainfall
	Minimum	Maximum	
12	15.9	30.2	0
13	17.1	27.4	0
14	18.4	23.9	15.2
15	9.8	17.6	0
October Mean	14.8	30.9	

4.2 Week 2, 2-5 November

This week was warm and sunny during the days (from 23-28^{0}C), but temperatures were well below average over night, with the lowest temperature of 7.2^{0}C occurring on the first night of trapping. No rainfall was recorded, although moisture was present in creekline vegetation and in the soil. Heavy due was evident each morning.
Traps were left open during the day, and several captures were made in pitfall and funnel traps in daylight hours. The cool nights likely limited reptile activity, with the only lizards captured during the day.

Weather November 2-5			
Date	Temperature		Rainfall
	Minimum	Maximum	
2	7.2	23.6	0
3	7.8	26.7	0
4	9.3	27.1	0
5	9.6	28.6	0
November Mean	17.8	33.6	

4.3 Week 3, 9-12 November

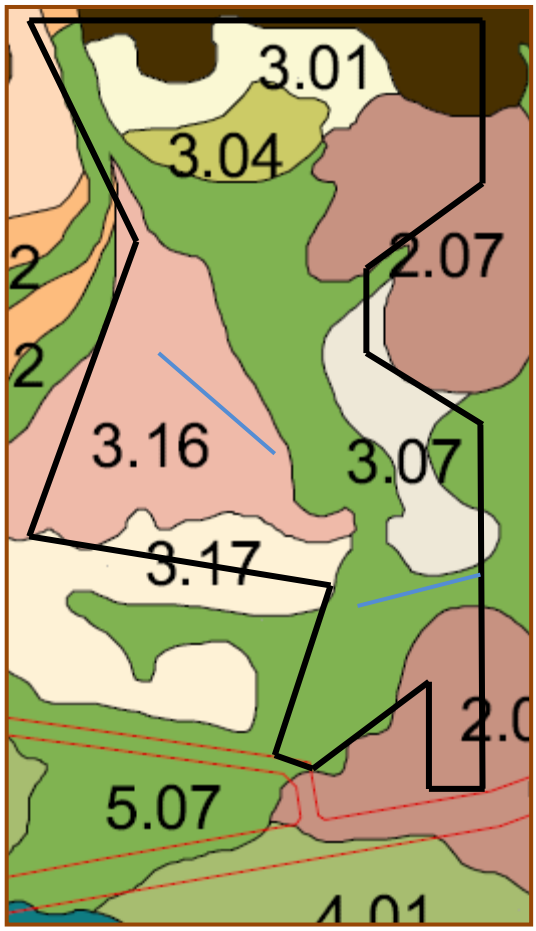
The warmest week of surveys, with average to above average temperatures recorded both during the day and overnight. No rain had fallen since the end of October, and the hot, sunny temperatures had already begun to dry the topsoil. Some subsoil moisture was still present however, and enough moisture was still present in sheltered sites to enable animals such as frogs to still be active, and one of these animals was captured. Bird activity was noticeably reduced compared to other sites, particularly in the afternoons, and while other factors may be involved, we expect the warmer temperatures were at least partly responsible for this. Traps were closed during the day due to the higher temperatures.

Weather November 9-12			
Date	Temperature		Rainfall
	Minimum	Maximum	
9	15.4	32.7	0
10	14.1	33.9	0
11	15.8	35.5	0
12	23.5	33.1	0
October Mean	17.8	33.6	

5. Site Survey Results

5.1 Lots 5441, 9164 Heenan Rd

The owners of this site maintain continual Buffel control on parts of the property. In one area, Buffel had been removed and had not regrown in the recent run of wet weather. As a result, we chose to split our traps into two trap lines, one line being across the area free of Buffel, a moderately confined drainage floor. The second was set across a rocky colluvial fan vegetated with mulga and a mixture of native and introduced grasses. Two pitfall and funnel traps were set on each line with 12 Elliott traps set on the first line and the remaining 13 on the other.



Approximate positions of trap lines, Lot 5441, 9164 Heenan Rd.

Property boundary
Roads
Trap lines

Map source: *Land Resources of the Alice Springs Area* CDROM (2001) Dept. of Infrastructure Planning & Environment

Reptiles and Frogs			
Common Name	**Scientific Name**	**Trap***	**Comments**
Sand Plain Gecko	*Lucasium stenodactylum*	P	
Spencer's Burrowing Frog	*Limnodynastes spenceri*	P F	7 individuals caught, including on the dry nights of the survey.
*E = Elliott trap, P = pitfall, F = Funnel,) = Observed			

Sand Plain Gecko (left). Spencer's Burrowing Frog (right)

Birds			
Common Name	**Scientific Name**	**Heard (H)/Seen (S)**	**Comments**
White Winged Triller	*Lalage sueurii*	S	Several males with defined territories courting females observed
Rufous Whistler	*Pachycephala rufiventris*	S	
Spiny Cheeked Honeyeater	*Acanthagenys rufogularis*	S	
Peaceful Dove	*Geopelia placida*	H	Not observed, but distinctive call heard on two occasions
Splendid Fairy Wren	*Malurus splendens*	S	
Nankeen Kestrel	*Falco cenchroides*	S	
Black Shouldered Kite	*Elanus axillaris*	S	Rarely observed in central Australia, a single bird was present on the first day of the survey
Pallid Cuckoo	*Cuculus pallidus*	S	
Grey Shrike Thrush	*Colluricincla harmonica*	S	
Budgerigar	*Melopsitticus undulates*	S	Adults feeding juveniles observed
Black-faced Woodswallow	*Artamus cinereus*	S	
Little Button Quail	*Turnix velox*	S	
White Plumed Honeyeater	*Lichenostomus ornatus*	S	
White-faced Heron	*Ardea novaehollandiae*	S	No wetland habitat exists on survey site. The single bird observed was seen flying over the property.
Diamond Dove	*Geopelia cuneata*	S	
Crested Pigeon	*Ocyphaps lophotes*	S	
Black Kite	*Milvus migrans*	S	
Red-capped Robin	*Petroica goodenovii*	S	A single pair seen
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	S	
Zebra Finch	*Taeniopygia guttata*	S	Very common, with nests found in thick Mulga and Dead Finish
Red Backed Kingfisher	*Todiramphus pyrrhopygia*	S	
Rufous Songlark	*Cincloramphus mathewsi*	S	
Cockatiel	*Nymphicus hollandicus*	S	Adults and juveniles observed
Mulga Parrot	*Psephotus varius*		
Spinifex Pigeon	*Geophaps plumifera*	S	2 birds flushed in grasses adjacent Land Unit 2.07

Splendid Fairy Wren. Female (above left) Male (below left). Feeding flock of Budgerigars (above)

Mammals			
Common Name	**Scientific Name**	**Trap***	**Comments**
House Mouse	*Mus musculus*	E P	Several caught each morning, with 8 captured in one morning.
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Invertebrates			
Common Name	**Scientific Name**	**Trap***	**Comments**
Wolf Spider	Family *Lycosidae*	P	A single wolf spider was captured on the first night of trapping
Ground beetle	Family *Carabidae*	P	
Ladybird	Family *Coccinellidae*	O	
Spur Throated Locust	*Austracis guttulosa*	O	A large (50-80mm long) locust species that can damage gardens and crops when present in large numbers
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Ladybird beetle observed on a daisy plant

Species Recorded From Scats, Tracks, Other Methods or Observed by Property Owners			
Reptiles			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Western Bluetongue	*Tiliqua occipitalis*	Reported by owners	Two species of Bluetongue occur in the area. Based on descriptions from the property owner< this is the most likely species to be present.
Bearded Dragon	*Pogona vitticeps*	Reported by owners	Seen on several occasions during the survey just beyond the property boundary. Although none were observed on the survey site, they have been seen by the property owners.
Perentie	*Varanus giganteus*	Reported by owners	Reported as only rarely being observed by the owners.
Sand Goanna	*Varanus Gouldii*	Reported by owners	Regularly seen on the property around the living envelope.
Birds			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Australian Ringneck	*Barnardius zonarius*	Reported by owners	
Red-tailed Black Cockatoo	*Calyptorhynchus banksii*	Reported by owners	

Galah	*Eolophus roseicapillus*	Reported by owners	
Pied Butcher Bird	*Cracticus nigrogularis*	Reported by owners	
Australian Magpie Lark	*Grallina cyanoleuca*	Reported by owners	
Rainbow Bee-eater	*Marops ornatus*	Reported by owners	Summer migrant
Mammals			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Euro	*Macropus robustus*	Scats, reported by owner	Old scats were observed. Owners indicated that no Euros had been seen on the property since the commencement of wet weather.
Rabbit	*Oryctolagus cuniculus*	Scats, diggings, reported by owners	
Cat	*Felis catus*	Reported by owners	Rarely observed by the owners.
Echidna	*Tachyglossus aculeatus*	Possible echidna diggings were observed at the base of a dead tree	Owners indicated that they had seen echidnas on the property in the past, but not recently

Vegetation

An upper stratum is mainly absent on this site. Ironwood (*Acacia estrophiolata*) occurs as isolated emergent trees above a mid stratum of Mulga (*Acacia aneura*), Dead Finish (*Acacia Tetragonophylla*) and Witchetty Bush (*Acacia Kempeana*). The lower stratum consists of a diversity of grasses and flowering sub-shrubs and annuals. For a full list of species recorded, see Appendix 1.

Vegetation of Lots 5441, 9164 Heffernan Rd. Mulga and Dead Finish provide a mid stratum over flowering annuals and grasses, including White Paper Daisy (below left) and Charsley Daisy (below right).

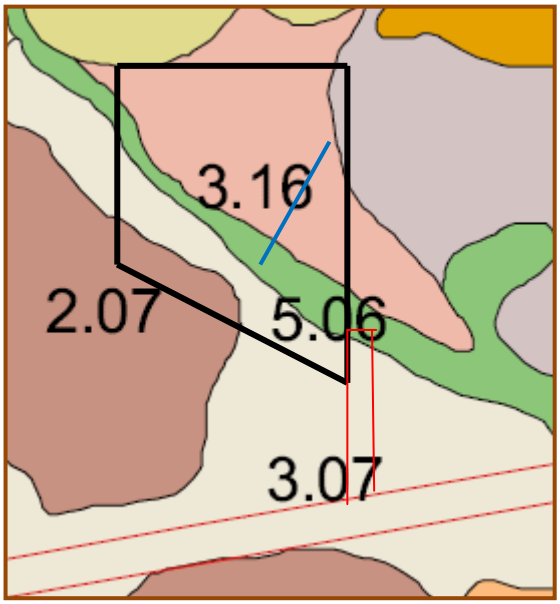
5.2 15 Minahan Rd

For the purposes of this survey, we set a trap line across Land Unit 3.16, as at the previous survey site. Unlike at the previous site, traps were not split between two lines, with a total of 25 Elliott, 4 pitfall and funnel traps set.

Approximate positions of trap lines, 15 Minahan Rd.

Property boundary
Roads
Trap lines

Map source: *Land Resources of the Alice Springs Area* CDROM (2001) Dept. of Infrastructure Planning & Environment



Reptiles and Frogs			
Common Name	**Scientific Name**	**Trap***	**Comments**
Skink	*Ctenotus leonhardii*	P F	The only reptile caught at this site. Several individuals were captured, all during daylight hours
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Birds			
Common Name	**Scientific Name**	**Heard (H)/Seen (S)**	**Comments**
White Winged Triller	*Lalage sueurii*	S	
Rufous Whistler	*Pachycephala rufiventris*	H	
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	S	
Western Gerygone	*Gerygone fusca*	S	
Spendid Fairy Wren	*Malurus splendens*	S	
Budgerigar	*Melopsitticus undulatus*	S	
Little Button Quail	*Turnix velox*	S	One individual was caught in a funnel trap
Red-chested Buttonquail	*Turnix pyrrhothorax*	S	One individual caught in a funnel trap
Diamond Dove	*Geopelia cuneata*	S	
Crested Pigeon Pigeon	*Ocyphaps lophotes*		
Black Kite	*Milvus migrans*	S	
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	S	
Zebra Finch	*Taeniopygia guttata*	S	
Rufous Songlark	*Cincloramphus mathewsi*	S H	
Cockatiel	*Nymphicus hollandicus*	S	
Magpie Lark	*Grallina cyanoleuca*	S	
Singing Honeyeater	*Lichenostomus virescens*	S	
Black-faced woodswallow	*Artamus cinereus*	S	
Willy Wagtail	*Rhipidura leucophrys*	S	
Whistling Kite	*Haliastur sphenurus*	S	
Crested Bellbird	*Oreoica gutturalis*	S H	
Brown Falcon	*Falcoberigora*	S	A pair in courtship display were observed

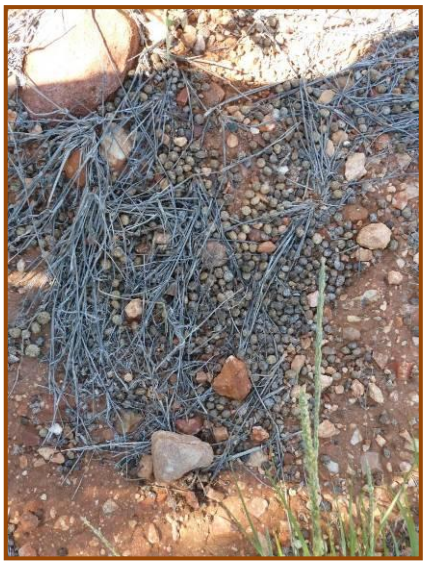
Splendid Fairy Wren in her nest (left). A female Crested Bellbird (above right). Male Zebra Finches (below right).

Mammals			
Common Name	**Scientific Name**	**Trap***	**Comments**
House Mouse	*Mus musculus*	E	A total of 13 animals captured across the three trapping nights, all in Elliott traps
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Invertebrates			
Common Name	**Scientific Name**	**Trap***	**Comments**
Toad Hopper	*Buforania crassa*	O	
Wolf spider	*Lycosa sp*	P E	
Ground beetle	Family *Caribidae*	P	
Common Black Ant	*Iridomyrmex sp*	P	
Unidentified bug	*Hemipteran*	O	
Wasp		P	
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Unidentified Hemipteran bug (left). Toadhopper (right)

Species Recorded From Scats, Tracks, Other Methods or Observed by Property Owners			
Reptiles and Frogs			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Perentie	*Varanus giganteus*	Observed by owners	Adults and juveniles seen occasionally. Including a large individual in the swimming pool
Long Nosed (Water) Dragon	*Amphibolurus longirostris*	Observed by owners	
Mulga Snake	*Pseudechis australis*	Observed by owners	Last seen October 2010
Central Netted Dragon	*Ctenophorus nuchalis*	Possible burrow found	Shape, size and position of burrow found during survey indicative of this species
Birds			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Egret		Observed by owners	One individual seen in swimming pool
Mulga Parrot	*Psephotus varius*	Observed by owners	
Ring Neck Parrot	*Barnardius zonarius*	Observed by owners	
Galah		Observed by owners	
Red Capped Robin	*Petroica*	Observed by owners	
Wedge Tailed Eagle	*Aquila audax*	Observed by owners	Seen soaring over property occasionally
Mammals			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Euro	*Macropus robustus*	Scats collected, observed by owners	Animals come to drink at garden water sources when conditions in the surrounding hills are dry.
Rabbit#		Scats and diggings observed	
#Introduced			



Rabbit scat (left). A Lizard burrow, possibly that of a Central Netted Dragon (right).

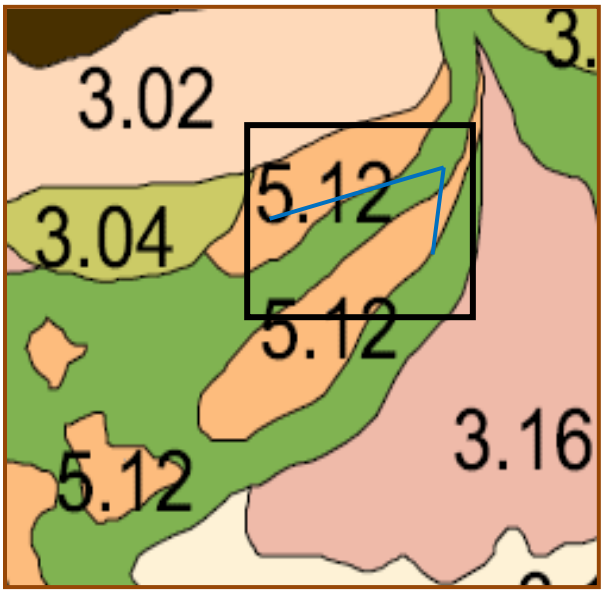
Vegetation

An upper stratum was generally absent, with the notable exception of three Supplejack trees growing together on a creekline. Mid-strata vegetation consisted primarily of Mulga and Witchetty to a height of 4m. Ground level vegetation contained a diversity of grasses, with 10 species being recorded during the survey. This was the highest number of grass species at any of the survey sites. For a full list of species, see Appendix 1.

15 Minahan Rd. Mulga over Erect Kerosene Grass and *Abutilon otocarpum*.

5.3 Lot 9392 Baldissera Dve

The final two survey sites were located in drainage floors and depressions. Two confined drainage floors run through the Baldissera site in a southwest direction. One of these has formed an erosion channel, up to 1m deep and 4m wide in places. Trap lines were set along the edges of these drainage floors.



Approximate position of trap lines, Lot 9392 Baldissera Dve

Property boundary
Trap lines

Map source: *Land Resources of the Alice Springs Area* CDROM (2001) Dept. of Infrastructure Planning & Environment

Reptiles and Frogs			
Common Name	**Scientific Name**	**Trap***	**Comments**
Skink	*Ctenotus leonhardii*	E	Likely entered the trap for shelter, a large individual (80mm snout-vent), heavy enough to trigger the door.
Long Nosed Dragon	*Amphibolurus longirostris*	O	Two individuals seen in vegetation on the banks of an erosion gully
Beaked Gecko	*Rynchoedura ornate*	P	

Spencer's Burrowing Frog	*Limnodynastes spenceri*	P	Burrows also observed
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Ctenotus leonhardii (above). A tiny specimen of a Beaked Gecko (left)

Birds			
Common Name	**Scientific Name**	**Heard (H)/Seen (S)**	**Comments**
White Winged Triller	*Lalage sueurii*	S	
Rufous Whistler	*Pachycephala rufiventris*	H	
Spiny Cheeked Honeyeater	*Acanthagenys rufogularis*	S	
Splendid Fairy Wren	*Malurus splendens*	S	
Pallid Cuckoo	*Cuculus pallidus*	S	
Budgerigar	*Melopsitticus undulatus*	S	
Little Button Quail	*Turnix velox*	S	
Diamond Dove	*Geopelia cuneata*	S	
Crested Pigeon	*Ocyphaps lophotes*	S	
Black Kite	*Milvus migrans*	S	
Zebra Finch	*Taeniopygia guttata*	S	Very common at this site, with many nests present, including in potted shrubs at the front door of the house
Rufous songlark	*Cincloramphus mathewsi*	H	A single male heard singing each morning
Cockatiel	*Nymphicus hollandicus*	S	
Magpie Lark	*Grallina cyanoleuca*	S	
Singing Honeyeater	*Lichenostomus virescens*	S	
Western Gerygone	*Gerygone fusca*	H	
Willy Wagtail	*Rhipidura leucophrys*	S	
Black Faced Woodswallow	*Artamus cinereus*	S	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*	S	
Whistling Kite	*Haliastur sphenurus*	S	

Variegated Fairy Wren	*Malurus lamberti*	S	
Mistletoe Bird	*Dicaeum hirundinaceum*	S	
Horsefield's Bronze Cuckoo	*Chalcites basalis*	S	A single bird (male?) calling from the top of a dead Ironwood.
Torresian Crow	*Corvus orru*	S	
Fairy Martin	*Petrochelidon ariel*	S	
Brown Falcon	*Falco berigora*	S	
Brown Honeyeater	*Lichmera indistinca*	H	
Little Corella	*Cacatua sanguinea*	S	
Southern Whiteface	*Aphelocephala leucopsis*	S	A group of five seen on the first morning. Calls were heard the following two days.
Australian Hobby	*Falco longipennis*	S	

Mammals			
Common Name	**Scientific Name**	**Trap***	**Comments**
House Mouse	*Mus musculus*	E P	
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

A House Mouse. 12 individuals of this species were caught at this site

Invertebrates			
Common Name	**Scientific Name**	**Trap***	**Comments**
Wolf Spider	*Lycosidae sp*	P	
Cricket	Family: *Stenopelmatidae*	P	
Ground Beetle	*Carabidae*		Two species of very similar ground beetle, one the same species as trapped at other sites. Very numerous here, with up to 25 in a single pit over a night.
Jumping spider		P	
Cricket	Family*: Gryllidae*	P	
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Clockwise from above – Wolf Spider, Cricket, Jumping Spider, Ground Beetle

Species Recorded From Scats, Tracks, Other Methods or Observed by Property Owners			
Reptiles and Frogs			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Perentie	*Varanus giganteus*	Observed by owners	
Sand goanna	*Varanus gouldii*	Observed by owners	
Bearded Dragon	*Pogona vitticeps*	Observed by owners	
Birds			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Western Bowerbird	*Chlamydera guttata*	Observed and heard by owners	
Babbler	*Pomatostomus sp*	Observed by owners	Exact species not known. Either Grey Crowned or White Browed
Mammals			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Euro	*Macropus robustus*	Observed by owners, scats collected	Animals come to drink from artificial water sources during dry weather.
Rabbit#		Scats and diggings observed	
#Introduced			

Vegetation

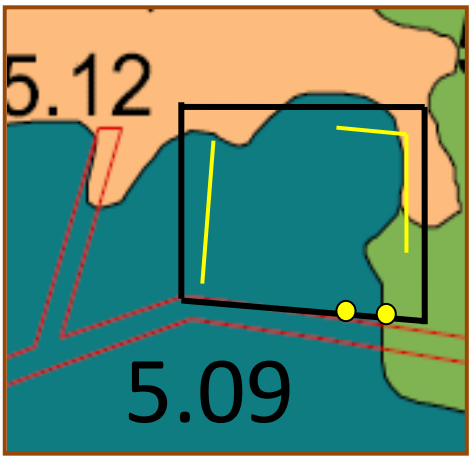
An upper stratum of isolated Ironwood and Bloodwood (*Corymbia Opaca*) occurred over isolated clumps of mid strata species that included mulga, dead finish and three species of Eremophila. Interestingly, *Eremophila freelingii* occurred along a drainage line, outside of its usual habitat of rocky hills and slopes.

A variety of native and introduced grasses, including Oat Grass (*Enneapogon avenaceus*) and Eight Day Grass (*Fimbristylis dichotoma*) occurred with sub-shrubs such as White Paper Daisy and *Abutilon otocarpum.* For a full list of species, see Appendix 1

The difference the 2010 rains have made to the vegetation was apparent on all properties. On the left is a view of the Baldiserra Dve property during the initial assessment in 2006, a year of below average rainfall. On the left is the same view during the 2010 survey.

5.4 Lot 5436 Heenan Rd

Lot 5436 is almost entirely within a relic drainage depression, with a scalded clay area on the north eastern corner. Compared to the other sites surveyed, a greater proportion of the property is utilised as the living envelope. We therefore split the trap line into two, running it on the eastern and western sides of the property in the areas managed for remnant vegetation. Several large pits had been dug for fence posts on the property and these were checked each morning of the survey, as the owners had observed several animals falling into these holes and becoming trapped.



Approximate position of trap lines, Lot 9392 Baldissera Dve

Property boundary
Trap lines
Roads
Post Holes

Map source: *Land Resources of the Alice Springs Area* CDROM (2001) Dept. of Infrastructure Planning & Environment

Reptiles and Frogs			
Common Name	**Scientific Name**	**Trap***	**Comments**
Bynoes Gecko	*Heteronotia binoei*	P O	One individual captured, two more found under debris on the ground
Long Nosed Dragon	*Amphibolurus longirostris*	O	
Bearded Dragon	*Pogona vitticeps*	O	
Red Tree Frog	*Litoria rubella*	P	A live specimen was captured during the survey. Two dead and dried specimens were removed from a hole dug for a fence post.
Spencer's Burrowing Frog	*Limnodynastes spenceri*	P	
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Bynoe's Gecko. This one has lost its tail in the past and a new section has grown. You can see the new section by the marked change in patterning.

Birds			
Common Name	**Scientific Name**	**Heard (H)/Seen (S)**	**Comments**
Magpie Lark	*Grallina cyanoleuca*	S	Nest observed
Galah	*Eolophus roseicapillus*	S	
Australian Ringneck	*Barnardius zonarius*	S	
Crested Pigeon	*Ocyphaps lophotes*	S	Nest Observed
Yellow Throated Miner	*Manorina flavigula*	S	
Zebra Finch	*Taeniopygia guttata*	S	
White Winged Triller	*Lalage sueurii*	S	
Western Gerygone	*Gerygone fusca*	H	
Cockatiel	*Nymphicus hollandicus*	S	
Diamond Dove	*Geopelia cuneata*	S	
Rufous Songlark	*Cincloramphus mathewsi*	S	
Fairy Martin	*Petrochelidon ariel*	S	Nests observed inside shed
Grey Crowned Babbler	*Pomatostomus temporalis*	H	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*	S	Repeated attempts at nesting recorded. Nest found after falling from tree.
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*	S	
Black Faced Woodswallow	*Artamus cinereus*	S	

White Plumed Honeyeater	*Lichenostomus penicillatus*	S	

Nests of several species were found on this property. They included this Fairy Martin nest (left) and the nest of a Black Faced Cuckoo Shrike that had fallen from a tree (right).

Mammals			
Common Name	**Scientific Name**	**Trap***	**Comments**
House Mouse	*Mus musculus*	E	15 individuals caught over the three nights
Rabbit		O	A dead animal was found on the 2nd day of the survey.
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Invertebrates			
Common Name	**Scientific Name**	**Trap***	**Comments**
Centipede	*Scolopendra sp*	O	Found beneath debris lifted from the ground
Ground beetle	*Carabidae*	P	
Spur Throated Locust	*Austracis guttulosa*	O	
*E = Elliott trap, P = pitfall, F = Funnel, O = Observed			

Spur Throated Locust, showing the spur between the first pair of legs (left) and the typical colouration of an adult (right)

Species Recorded From Scats, Tracks, Other Methods or Observed by Property Owners			
Reptiles and Frogs			
Common Name	**Scientific Name**	**Method of Record**	**Comments**
Sand goanna	*Varanus gouldii*	Observed by owners	
Mulga Snake	*Pseudechis australis*	Observed by owners	
Birds			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Red Tailed Black Cockatoo	*Calyptorhynchus banksii*	Observed by owners	Occasionally seen flying over property
Black Kite	*Milvus migrans*	Observed by owners	
Whistling Kite	*Haliastur sphenurus*	Observed by owners	
Mammals			
Common Name	**Scientific Name**	**Method of Report**	**Comments**
Bat species		Observed by owners	A colony of micro-bat species roosts in a shed on the property. They were not observed during the survey and species could not be identified.

Vegetation

Extensive Buffel control has been carried out on the property. The grass was almost completely removed by hand and disposed of off site. Although Buffel has recolonised some areas, particularly along drainage lines that flow onto the property from neighbouring blocks, the majority of the property remains free of the weed and a ground layer of native herbs and grasses occurs. Species here include the Native Millet (*Panicum decompositum*), Woolly Oat Grass (*Enneapogon polyphyllus*), Bogan Flea (*Calotis hispidula*) and Yellow Billy Buttons (*Calocephalus platycephalus*). A mid stratum of Dead Finish and Fork-leaved Corkwood (*Hakea divaricata*) occurred beneath Bastard Coolabah (*Eucalyptus intertexta*). For a full species list, see Appendix.

6. Conclusion

6.1 Trends and Findings

Trapping results during the surveys did not show high diversities of reptile, mammal or invertebrate fauna. However, observations made by property owners during their tenure at the sites, indicates a higher diversity exists. Below average temperatures occurred in the months leading up to the surveys and could account for a low rate of animal activity, particularly during the night when most native animals are traditionally active.

In contrast, bird and vegetation diversity was high across the four sites, with the high rainfall accounting for this. A high diversity of birds, particularly insect and seed eating species would also seem to indicate a greater diversity of invertebrates than the trapping results show.

The second week of surveys produced the greatest rate of captures, and this was also the week with the most ideal weather. Rain had only recently fallen, and although the nights were cold, the days were cool enough to leave traps open, resulting in some reptile captures during daylight hours. Rain and overcast conditions affected the first week of trapping, and by the final week, although the nights were still cool, day temperatures were such that traps had to be closed, eliminating the chance of reptile captures during the sunny weather. From talking to property owners, a variety of reptile fauna was recently observed in the day and closing the traps limited opportunities to make captures.

The highest diversity was found along trap lines set in rocky colluvial fans, where thick growths of Mulga and Dead Finish occurred over a diverse understorey of native grasses and forbs. This land unit was found at the Minahan Rd and Lot 5441/9164 Heenan Rd properties. Of these, Minahan Rd showed the greatest diversity in understorey vegetation, possibly a factor in the existence of Red Chested Button-Quail at this site.

The soil in these areas is not as suitable for weeds such as Buffel and Couch Grass, and infestations of Buffel were limited to isolated plants and small clumps beneath shrubs. This may be a contributing factor in the diversity found on this land unit. These areas are also adjacent to the slopes of the ranges and the proximity to this habitat type may also account for increased diversity, as species typical of rocky hill country may occasionally forage in nearby areas. The Spinifex Pigeon observed on one of these properties is an example of this.

6.2 Reptiles and Frogs

Although accounts from property owners indicate a diversity of reptiles occur at the survey sites, only 6 species were trapped or observed during the survey period. The weather both prior to and during the surveys may be responsible for this. Temperatures in the month leading up to the surveys were below average, with overcast and wet conditions. Nights were also cool. Reptiles require warm conditions to become active particularly at night, where both ambient temperature and residual heat in the substrate are necessary for the animal to maintain body heat.

A Red Tree Frog. Dead specimen found in a hole dug for a fence post. It is a good idea to cover deep holes or leave long sticks as exit points to avoid animals becoming trapped.

Those species that were recorded were smaller types, primarily skinks and geckos, which can respond more quickly to sudden rises in temperature. Two species of Agamid (dragon) lizard were observed, however no Varanids (goannas) were sighted, although the owners of all four sites reported several species as being present.

The most commonly recorded species was the small skink *Ctenotus leonhardii,* a common resident in most habitats in the area that provide sufficient cover for shelter and foraging. These animals are predators of small insects such as ants and termites and their presence indicates there are sufficient numbers of invertebrates to provide a food resource. It also indicates that enough undisturbed areas of vegetation are present to allow shelter from predators and breeding habitat. One individual was trapped in an area of thick Buffel infestation, so it seems that this species can utilise areas of weed growth and are not as dependant on native grasses.

Frog activity was high, particularly during the first week when wet weather was experienced. Diversity was limited to two species. Spencer's Burrowing Frog was recorded from three sites and individuals were caught in both pit and funnel traps. They were active even on dry nights, but most individuals were caught at the Heenan Rd site after rain. The second species of frog recorded was the Red Tree Frog. One live and two dead specimens were found during week three of the surveys, where trap lines ran closer to the living envelope of the property.

Burrowing frogs survive dry weather by burrowing beneath the soil and are only active either during or following rain, when the ground is still damp and surface moisture is evident. The Tree Frog however, survives in areas of permanent surface moisture. Naturally this is found in rock

crevices and near permanent waterholes and springs, but this now includes drains and wet areas of gardens and homes.

6.3 Birds

Seed eating birds such as Budgerigars were common

Birds observed were both active and diverse during the surveys, with 30 species being recorded at one site. Seed eating birds such as Zebra Finches, Diamond Doves and Cockatiels were numerous and, although actual numbers were lower, there was a diversity of insectivores also present. This correlates directly with the years' weather conditions, rainfall producing vigorous growth of seed bearing grasses and herbs, together with increases in insect populations.

A number of breeding residents, such as Pallid Cuckoos and White Winged Trillers, were observed, indicating that conditions at the survey sites were in suitable condition for breeding. For this to occur, the birds need an environment rich enough in food and nesting sites to maintain breeding territories and raise young. Nests and juveniles of several species were observed, indicating that successful breeding had already commenced for some species.

Species such as Fairy Wrens, Gerygones and Thornbills are small birds. They require sufficient growth of lower level shrubs to provide cover from predators and aggressive species. Their presence at all survey sites indicates that the properties are in sufficient condition to provide the vegetative cover necessary to support these birds.

Raptors were sighted on every day of the surveys. Common species sighted were Brown Falcon, Whistling and Black Kites. An Australian Hobby and Black Shouldered Kite were each sighted on one occasion. Black Shouldered Kites are uncommon in central Australia and its presence is generally linked to an increase in the populations of small mammals such as mice during good seasonal conditions. The Hobby is a predator of small birds and the single individual observed was pursuing flocks of Zebra Finches when sighted.

Numerous Little Button-Quail were flushed along trap lines at three of the sites, the birds seeming to be present in abnormally high numbers. Again, this seems indicative of the conditions brought about by extensive rainfall over the preceding months. A significant record was of a Red Chested Button-Quail, trapped at the Minahan Rd site. While there are a number of records of this species in the area, central Australia is well outside this species usual range. Past sightings have all coincided with events of high rainfall, creating suitable grassland habitat for the bird.

6.4 Mammals

No native mammals were trapped or observed during the survey period. Scats of the Euro were found at three of the four sites and information from property owners indicates that this species of kangaroo is a regular visitor. The Euros tend to visit artificial sources of water on the properties and it is likely that none were observed during the survey due to natural sources of

water being available away from the living envelopes. Information from the owners indicated that it had been several months since Euros had been sighted near any of the survey sites.

At Lot 5441/9164 Heenan Rd, diggings that strongly resembled that of the echidna were located at the base of a tree stump. The owners indicated that echidnas had been sighted there in the past, although not for a number of years. It should be noted that we were not able to positively identify the diggings as that of an echidna.

Pregnant female House Mouse

Trapping success was limited to the introduced House Mouse. House Mice were abundant at each survey site. Animals were trapped in Elliott and pit traps and comprised juveniles and adult males and females. One heavily pregnant female was caught. The abundance of these rodents is indicative of the climatic conditions, ie. high rainfall leading to an abundance of food resources.

It seems likely that these conditions would also benefit small native mammals in a similar way. The absence of these in our survey could indicate that House Mice are able to out-compete their native counterparts, responding more quickly to the conditions. During dry times when food resources are scarce, House Mice are able to maintain viable populations because of their ability to survive in human environments. This may provide them with an advantage over native rodents in areas within proximity to dwellings and urban areas, such as the survey sites. Scientific study of small mammals in central Australia indicate that during a run of good seasons, house mice are abundant first, followed in the 2nd or 3rd year by local mice species and then marsupial species (Newsome, Corbett, et al. ~199?)

A common native rodent that may occur within survey sites is the Sandy Inland Mouse (*Pseudomys hermannsburgensis*). In colour and form, this species is almost indistinguishable from the House Mouse. However, house mice have a pronounced musty odour and notch in the back of the front incisors, features the native mouse lacks. All mice trapped during the survey showed one or both of these traits.

Rabbits were also evident. Scats and diggings were located at sites and a recently dead animal was found at Lot 5436 Heenan Rd. This animal was not present on the first morning of the survey, so it seems clear that the animal died during the survey period. There was no evidence of marks caused by a predator and the carcass seemed in good health. Calicivirus had been recorded amongst rabbits in the Alice Springs area prior to the survey commencing, and was likely the cause of death of this animal.

6.3 Invertebrates

No standard protocol for the recording of invertebrates exists; therefore accurate data was not recorded. However, numerous invertebrates were observed or captured and have been identified to at least family level.

Large numbers of two types of ground beetle belonging to the Carabidae family were captured on all sites, although notably less during the first week of surveying. These two beetles appeared similar, except for the pattern of the animals' carapace. One species, the most often caught, displayed definite grooves along the length of the carapace, while the other's was completely

smooth. Only a few individuals of this second species were encountered. These beetles were burrowers frequently dug into the substrate on the bottom of the pit traps. Up to 25 individuals were captured in one pit overnight.

St Andrew's Cross Spider

Several grasshopper/locust species were encountered, but only two were recorded, the Spur Throated Locust and Toadhopper. Locust eggs hatch in warm weather and it is likely that increases in the populations of these insects will increase as temperatures warm in coming months. Food for these insects is plentiful due to the increased vegetative growth resulting from high rainfall.

Ants were active and numerous at all sites, invading Elliott traps when attracted by the bait, and also falling into pit traps. While no attempt was made at species identification, the dominant species was the little black ant *Iridomyrmex* sp. Ants are an essential part of a healthy system, recycling nutrients, aerating soils and distributing seeds. Termites were observed in fallen timber, but no above ground termite hills were observed.

Pit traps were also successful in capturing several wolf spiders. Although they were not identified, they appeared to be two species. A single St Andrew's Cross Spider (*Argiope sp*) was also photographed in its web at one of the sites.

No scorpions were recorded, although they are likely to occur in the areas surveyed and have been reported as present by property owners. Scorpions are more active in warm, humid weather, conditions that did not occur during the survey period. A single centipede was found under debris on the ground at Lot 5463 Heenan Rd. Again, these animals are most active on warm, humid nights. Other likely common genera to occur that were not recorded include Katydids, Mantids and Stick Insects. All these insects respond to an increase in insect prey or vegetation biomass. Warmer temperatures are also a trigger for these genera, and the cooler weather experienced during the survey period may have

6.4 Breeding Activity

Breeding activity was highly evident in the bird populations across each survey site. Nests of several species were located, including Zebra Finch, Splendid Fairy Wren, Fairy Martin, and Black Faced Cuckoo Shrike. Although nests were not apparent, breeding behaviour was also noted in other species, such as vocalising Button-Quail and courting male White Winged Trillers. Juvenile cockatiels, galahs, budgerigars and diamond doves were observed, indicating that those species had bred in the area already. Pallid cuckoos were observed vocalising in areas where populations of wrens and finches were nesting. The cuckoos are nest parasites of these smaller species.

The rainfall and the resultant condition of the vegetation is the likely cause of the breeding activity evident. An increase in the abundance of food resources and vegetative cover, providing protection from nest predators, has occurred at all four survey sites.

Breeding Activity Observed				
Species	**Lots 5441 Heenan**	**Minahan Rd**	**Baldissera Dve**	**Lot 5436 Heenan**
Zebra Finch	N	N	N	J
Splendid Fairy Wren		N		
Black Faced Cuckoo Shrike			J	N
Fairy Martin				N
Magpie Lark				N
Pallid Cuckoo	C	C	C	
Cockatiel				J
Galah				J
Budgerigar		J	N	
White Winged Triller	C		C	
Brown Falcon			C	
Diamond Dove	J		J	
N = nest observed, C = courtship behaviour, J = juvenile individuals present				

The large number of House Mice trapped also indicates breeding populations of these mammals. One female animal was captured that appeared to be heavily pregnant. These rodents are well known for responding quickly to conditions of high food availability, increasing their populations rapidly.

6.7 Weeds and Feral Animals

Only two weeds of concern were noted during the survey. All properties held populations of Buffel Grass, although management of the weed is carried out at all sites. Populations of this weed ranged from heavy infestations in some areas to isolated single plants amongst native vegetation. Couch Grass (*Cynodon dactylon*) was found on the Minahan Rd site, although it presently is contained as a lawn surrounding the house. No couch was found along trap lines or in vegetation transects.

Minor weeds that were seen, although not along transects or trap lines, were prickly lettuce (*Lactuca serriola*) and Kapok Bush (*Aerva javanica*), both seen along drive ways and disturbed areas of the living envelopes.

The only feral animals recorded during the survey were House Mice and Rabbits. House Mice were trapped during most nights of the survey at all sites, and evidence of rabbits was also found on each property. Observations of all property owners indicate that feral dogs and cats have been seen at times in the past, although rarely. No evidence of these animals was found during the survey period. Dog tracks were found on two properties, but only those where pet dogs were present. It is likely that any tracks found were from these animals, although it is possible that feral dogs occasionally still visit the areas.

6.8 Erosion and Biodiversity

Three properties showed signs of erosion in the survey areas. At Lot 9441 Heenan Rd, minor erosion scars were noticed along vehicle tracks crossing the property. This erosion was limited to where the tracks ran adjacent to low hills and ranges and fence lines where soil surface is disturbed and free of vegetation. The sheet flooding that characterises the flat, low lying areas of this property was evident after rainfall during the survey. There is potential for erosion to occur as these sheet floods are channelled into vehicular tracks, therefore altering the drainage patterns of the area. The vehicle tracks observed had not been used for some time and a soil crust was present, providing some protection from erosion.

Erosion at the Minahan Rd property was limited to creeklines that flowed across a rocky colluvial fan. These creeks are well vegetated with both shrubs and grasses and are likely to be stable. However, there is the potential for major erosion to occur in these areas were vegetation removed or these areas disturbed.

As mentioned previously in this report, major erosion occurs at the Baldissera Drive site. The broad sandy channel of this erosion gully and the steep banks have been colonised by Couch and Buffel Grass and is a major point of entry of these weeds onto the property. Surrounding vegetation communities have been affected by the presence of these weeds and plant species diversity was noticeably lower adjacent to the channel.

House Mice were trapped along the edge of the channel. Birds such as Pardalotes, Rainbow Bee Eaters and White Backed Swallows build nests by tunnelling into the banks of creeks and erosion gullies. Although we searched for signs of these on the property, none were found.

Based on the findings of the vegetation transect, it is possible that major erosion such as that on the Baldissera property adversely affects biodiversity in a number of ways. New channels caused by erosion change the hydrology of the surrounding area and allow access of weed species that require disturbed areas to become established. Both of these affect vegetation communities and the fauna that relies on them. A more extensive and in depth survey would be required to establish if this was the case on the property involved.

Given it's possible affect on biodiversity, erosion on these properties is something that needs to be monitored and controlled. When considering erosion control, remember that prevention is always better than cure. There are many prevention and control methods that can be employed, depending on the situation involved. For fact sheets on erosion prevention, control and rehabilitation, visit http://www.lowecol.com.au/lfw

6.9 Land for Wildlife Members and Monitoring

From information gleaned from members and property owners involved with this survey, it is apparent that self-monitoring and observation of properties is performed by Land for Wildlife members. It is also clear that this self monitoring by property owners is an important part of assessing the success of land management activities carried out on their blocks.

A number of species were not recorded during our survey, but from reports given by property owners, we know that these animals occur there. Participation in surveys conducted by Land for Wildlife staff allows members to improve their knowledge of surveying techniques and species identification, increasing the reliability of these observations. Skills learnt in the identification of weed and pest species also increases the effectiveness of land management and eradication programs.

Results indicate that the condition of Land for Wildlife properties varies and that there are a number of management issues effecting biodiversity that are common to each site. It could also be inferred from the results that biodiversity is linked to the size of the property and the proximity of areas to living envelopes. Although further work would be needed to substantiate this, diversity recorded was greatest on larger properties and where trap lines could be set a distance from human activity.

Condition of properties is also an indication of the weather conditions experienced over the months leading up to the survey. A diversity of annual flowering plants and grasses were

recorded that may have been absent should the year have had less rainfall. Vegetation was in fair condition across all sites with a high amount of cover, making areas suitable for less common species such as the Red Chested Button Quail. These weather conditions may have been the overbearing factor in the condition of the surveyed properties, rather than management activities carried out by the owners.

7. Appendices

7.1 Vegetation List

Vegetation						
Scientific Name	**Common Name**	**Height**	**Survey Sites Recorded**			
		(L=lower storey, M=mid, U=upper)	**1**	**2**	**3**	**4**
Abutilon otocarpum		L	x	x	x	
Acacia aneura	Mulga	M	x	x	x	
Acacia estrophiolata	Ironwood	M U	x		x	
Acacia Kempeana	Witchetty Bush	M	x	x	x	
Acacia tetragonophylla	Dead Finish	M	x	x	x	x
Amyema maidenii	Mistletoe	M U	x	x		
Aristida contorta	Bunched Kerosene Grass	L	x	x		
Aristida holithera	Erect Kerosene Grass	L		x		
Aristida inaequiglumis	Unequal Threeawn	L	x			
Boerhavia coccinea	Tar Vine	L		x		
Brachycome cilliaris	Variable Daisy	L	x		x	
Calocephalus platycephalus	Yellow Billy Button	L	x		x	x
Calotis hispidula	Bogan Flea	L	x	x	x	x
Cenchrus cilliaris	Buffel Grass	L	x	x	x	x
Convolvulus clementii	Australian Bindweed	L		x		
Corymbia Opaca	Bloodwood	U			x	
Cynodon	Couch Grass	L			x	
Dactyloctenium radulens	Button Grass	L	x			x
Digitaria brownii	Cotton Panic	L		x		
Enneapogon avenaceus	Oat Grass	L	x	x	x	
Enneapogon cylindricus	Limestone Oat Grass	L			x	
Enneapogon polyphyllus	Woolly Oat Grass	L		x	x	x
Eragrostis cumingii	Fairy Grass	L		x		
Eragrostis eriopoda	Woollybutt Grass	L		x		
Eremophila freelingii	Rock Fuchsia Bush	M	x		x	
Eremophila latrobii	Latrobe's Desert Fuchsia	M	x	x	x	x
Eremophila longifolia	Long-leaved Emu Bush	M			x	
Erodium cygnorum	Blue Storksbill	L	x	x	x	
Eucalyptus	Bastard Coolabah	U				x
Fimbristylis dichotoma	Eight Day Grass	L	x	x	x	
Hakea divaricata	Fork Leaved Corkwood	M				x
Helichrysum bracteatum	Golden Everlasting Daisy	L	x	x		
Helichrysum cassinianum	Pink Everlasting Daisy	L	x			
Helipterum charsleyae	Charsley Daisy	L	x	x	x	x
Indigofera sp		L			x	
Lepidium phlebopetalum	Veined Peppercress	L	x	x	x	
Monochather paradoxa	Bandicoot Grass	L		x	x	
Panicum decompositum	Native Millet	L				x
Portulaca oleacea	Munyeroo	L		x		
Pterocaulon sphacelatum	Apple Bush	M			x	
Ptilotus exaltatus	Tall Mulla Mulla	L		x		
Ptilotus polystachyus	Tall Green Pussy Tails	L		x		
Rhagodia spinescens	Climbing Saltbush	M		x		
Rhodanthe floribunda	White Paper Daisy	L	x	x	x	x
Senecio gregorii	Annual Yellow Tops	L		x		

Senecio magnificus	Tall Yellow Tops	M		x	x	
Senna artemisioides	Desert Cassia	M		x	x	x
Solanum quadriloculatum	Native Tomato	M		x		x
Trichodesma zeylanicum	Cattle Bush	M		x		
Tripogon lolliformis	Five Minute Grass	L		x		
Triraphis mollis	Purple Plumegrass	L	x	x		
Ventilago viminalis	Supplejack	U		x		
Wahlenbergia sp	Bluebell	L	x	x	x	x
Waitzia acuminata	Orange Immortelle	L	x	x		

7.2 Flora Profiles

Buffel Grass (*Cenchrus cilliaris*)

This introduced grass is a native of Africa and Asia and consists of many different varieties. A perennial grass that grows in tussocks, 30-90cm tall, Buffel can easily be recognised by the cylindrical seed heads that are 2.5-15cm long and green to purplish in colour.

Introduced as a pasture grass and also for erosion control purposes, Buffel has proved to be an invasive plant that is now a serious weed in central Australia. In infested areas, it forms dense stands that choke and out-compete native plants. It greatly increases the fuel load in these areas and contributes to increased fire frequency and temperature.

Buffel can be controlled using a variety of methods, including removal by hand and poisoning. For more information on control, see the April 2003 Land for Wildlife Newsletter, available at http://www.lowecol.com.au/lfw

Native Millet (*Panicum decompositum*)

Native Millet is a perennial tussock grass that can grow up to 1m high. Tussocks of this plant can resemble Buffel Grass when seed heads are not present. The seed heads of Native Millet are very open and branched, unlike the tight cylindrical heads of Buffel.

This grass grows in a variety of soils, but prefers low lying areas where there is more moisture. Often noticed after good falls rain in summer, when the seeds germinate.

The small, smooth rounded seeds were an important food for Aboriginal people in the area, who collected them and ground them into flour. They are also a favoured food of seed eating birds such as finches.

Mulga (*Acacia aneura*)

Mulga is a common species of shrub in central Australia. Although a familiar plant to many, the variety of different forms of which this species consists are poorly understood.

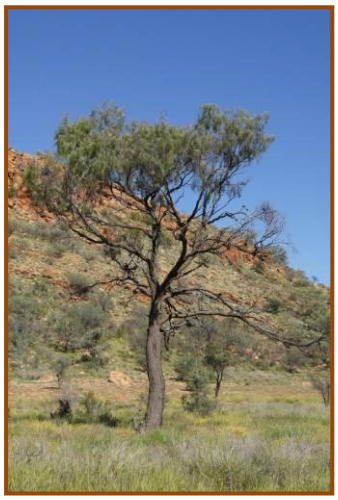
It is generally a shrub to small tree, up to 12m high and can sometimes grow in thick groves. The flowers are short, oblong and bright yellow. Flowering occurs most years, although only profusely after good rainfall.

Mulga grows in dry areas and is well adapted to lasting through periods of low rainfall and drought conditions. Essentially remaining dormant while conditions are dry, the tree revives quickly after soaking rains.

Woodlands with mulga as the dominant species occur over much of inland Australia,

providing important habitat for a variety of birds and animals. It is also an important fodder for cattle, although trees can be killed by heavy grazing. In some areas, grazing by feral camels and rabbits has also been detrimental to the tree, reducing the recruitment of seedlings and killing adult trees.

Ironwood (*Acacia estrophiolata*)



Ironwood is a weeping tree to about 15m tall and is often a noticeable tree in the shrublands around Alice Springs due to its height. It is a useful shade tree that provides a good habitat for arboreal wildlife. Old trees can develop hollows in trunks and branches that are important nesting and roosting sites for many birds.

Juvenile Ironwoods look very different to adult trees. They are upright, rather than weeping and the short, wide spiny phyllodes ('leaves') are unlike the long and narrow ones found on adult trees. Usually growing in well drained, sandy soils and floodplains, Ironwoods will sometimes retain these juvenile traits where they grow in less suitable, rocky sites.

White Paper Daisy (*Rhodanthe floribunda*)

A spreading herb to 40cm high, this daisy occurs in a variety of soils and habitats over a large part of central Australia. It was present at all survey sites, both as scattered plants and small colonies amid other species of herbs and grasses. This plant can be either an annual or short-lived perennial, depending on conditions, however profuse flowering is triggered by winter and spring rains.

7.3 Fauna Profiles

House Mouse (*Mus musculus*)

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. Although it is often difficult to distinguish native mice from House Mice by sight, House Mice are much more active than 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.

Spencer's Burrowing Frog (*Limnodynastes spenceri*)

This burrowing frog can occur in a wide range of colours and markings, as these two photographs below show.

They are typically marked with dark bands or spots on their legs and arms with a smooth white belly. Their toes are half webbed.

These frogs usually inhabit sandy soils near drainage lines and creekbeds and burrow into the sandy substrate to avoid dehydration during dry weather. During and after heavy rains, the frogs will come to the surface during the night.

Eggs are laid in temporary and permanent pools and waterholes. The foam nests float at the surface. Tadpoles can complete their development in as little as 40 days, allowing the frogs to take advantage of temporary pools before they dry up.

During the survey, these frogs were trapped even on dry nights, away from any apparent surface water sources. It seems likely that soil moisture and humid, overcast weather allows these animals to continue foraging behaviour as long as heavy rain has recently fallen. On one property, fresh diggings were observed in the mornings where the frogs had buried themselves to shelter from daylight.

Sand Plain Gecko (*Lucasium stenodactylus*)

Because of their nocturnal habits, geckos are often a common catch when surveying arid zone areas. They are a highly variable group of lizards, with many species found in both terrestrial and arboreal habitats.

The Sand Plain Gecko is a terrestrial species found in dry grasslands and woodlands, where it preys on small invertebrates, sheltering during the day in soil cracks and spider holes. They are variable in body colour, but are generally brown to reddish brown above with a prominent pale stripe along the back, dividing in two on the head to cover the eyes. The remainder of the lizard's body is patterned with irregular pale blotches or spots. This variability in body colour and pattern can make these lizards difficult to identify.

Little Button Quail (*Turnix velox*)

Button Quails are small, ground dwelling birds that resemble true quails in their appearance and habits. However, they are more closely related to shore birds like plovers than they are to quails. There are seven species in Australia. Interestingly, it is the female button quail that is the more colourful bird. She attracts a male and may mate with several during a breeding season. The male then incubates the eggs and takes care of the chicks on his own.

The Little Button Quail occurs widely across Australia, including the centre. They are a nomadic species in response to rainfall. Extensive rainfall across the Alice Springs region has produced ideal conditions for these birds in the area, resulting in the production of the seeding grasses and vegetation cover these birds require. Although always present in low numbers, the conditions have allowed new birds to enter the area and populations to increase their breeding success.

Little Button Quails feed on seeds and some insects. Although ground inhabiting, they are capable of flight and are usually observed when flushed from cover as they take off in a flurry of fast wing beats. They generally fly a few metres away from the observer before dropping back to ground. Their presence in an area is often noted by their distinctive calls, a low, deep and repeated "oom, oom". Often nocturnal, these calls can sometimes be heard throughout the night.

Identification of the Little and Red Chested Button Quails. The bird at top left is a female Little BQ. Note the plain head and pale breast and belly. The bird at top and bottom right is a female Red Chested BQ. The underside is a red-brown colour, becoming darker towards the throat, and the head is flecked with black and white. The plumage on the back of the birds is similar, although that of the Red Chested is darker than in the picture above of a Little BQ. Males of both species are paler.

Red Chested Button Quail (*Turnix pyrrhothorax*)

In contrast to the preceding species, these birds are not a common species in central Australia. They are a vagrant that has only been recorded in the area on a few occasions, but always after events of unusually high rainfall. Their normal range includes the grasslands and open woodlands of northern and eastern Australia. However, they are a nomadic and irruptive species and can appear beyond their normal range when conditions are suitable.

Their presence in central Australia is a significant record and is indicative of the good condition of the country at the time of the survey and the Land for Wildlife property where the bird was trapped.

Like the Little Button Quail, they feed mainly on the seeds of native grasses and are often active at night, rather than during the day. A cryptic bird that is difficult to observe, they can be flushed from thick grasses and ground cover, flying quickly away from the observer and dropping back to cover a few metres away. When flushed, they are difficult to distinguish from the Little Button Quail, although the little species will show white flashes either side of its tail, a feature the Red Chested lacks.

White Winged Triller (*Lalage sueurii*)

Trillers are insectivorous birds, closely related to Cuckoo-Shrikes. There are two species in Australia. The White Winged Triller is found across the continent, including central Australia. It is a resident bird in the north, however in arid and southern regions it is a migrant, arriving to breed in August and departing again in March.

The numbers of this species in central Australia are governed by rainfall and the resulting availability of insects such as grasshoppers. They may be absent from some areas for a period of years, only to return to breed when conditions are suitable. Some birds may over-winter in central Australia if climatic conditions allow.

In breeding plumage, male White Winged Trillers have a glossy black hood, neck and back. Their throat and underside is pure white, with white shoulders and edging to wing feathers. Females are pale brown above and buff below. Immature males resemble the females.

Males establish a breeding territory and display to females by performing slow song flights with spread wings and tails. During the survey, males in display were often observed and were also seen vigorously pursuing females and immature males.

Male (left) and female with chick (right) White Winged Triller. Photos: Aviceda, 2007

Centipede (*Scolopendra sp*)

There are 136 described species of centipede in Australia, from 43 genera. Their elongated body consists of many segments, with one pair of legs per segment. Centipedes can have from 20 to 300 legs, depending on the genus. All are voracious predators of small invertebrates and are often one of the most numerous types of invertebrate predator in an ecosystem.

Scolopendra is distributed across mainland Australia, including the arid zone. Unlike insects, they lack a waxy cuticle and can quickly lose body moisture. Consequently, they inhabit moist and humid micro habitats. In Central Australia, this is generally under leaf litter, debris such as fallen timber or in the soil where moisture exists.

Centipedes are often noticed on humid nights after heavy rain, when they emerge from their damp shelters. This weather also results in flights of reproductive termites, which are a common prey item for central Australian species.

Centipedes are venomous and although not fatal, their bite can cause severe pain, swelling and fever like symptoms.

7.4 Daily Weather Observations

The tables below show the daily weather observations for October and November 2010. Observations taken at Alice Springs Airport. Information from www.bom.gov.au

October 2010

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Fr	8.7	29.2	0	7.2	11.7	SE	30	13:45	19.9	29	0	NE	13	1016.4	28.9	21	1	SE	15	1012.0
2	Sa	10.5	32.7	0	7.0	11.7	N	30	10:32	23.5	22	1	N	11	1016.5	31.9	13	1	NNE	19	1012.1
3	Su	15.1	34.1	0	8.2	11.7	N	37	12:38	27.5	29	1	NNE	17	1016.6	33.6	17	1	NNW	13	1012.9
4	Mo	15.7	34.9	0	8.2	9.1	SSE	63	20:21	29.4	31	1	ENE	15	1015.9	34.4	19	6	NNE	13	1011.6
5	Tu	16.5	28.5	18.8	10.4	8.9	E	41	12:32	18.8	86	5	ESE	13	1018.0	27.6	40	4	E	24	1012.8
6	We	17.6	19.6	0.4	5.6	0.0	SE	31	00:00	18.6	93	8	WSW	13	1016.9	18.1	93	8	SW	17	1014.6
7	Th	14.7	18.0	10.6	0.0	0.0	SE	46	11:22	15.3	93	8	SE	22	1020.2	17.6	76	8	ESE	24	1018.4
8	Fr	12.7	21.1	0.8	2.6	9.4	SSE	43	11:07	15.0	52	7	ESE	20	1021.7	20.7	39	1	SE	24	1017.5
9	Sa	8.5	23.4	0	6.4	11.9	ESE	43	14:32	16.5	46	1	ESE	17	1019.6	22.8	30	0	E	20	1014.9
10	Su	7.7	26.5	0	6.6	11.9	ESE	35	10:46	18.5	45	0	E	17	1017.8	26.2	20	0	E	17	1012.8
11	Mo	11.7	30.6	0	6.6		NE	30	11:55	23.0	40	1	E	17	1015.6	29.7	26	3	SW	13	1012.4
12	Tu	15.9	30.2	0			WNW	37	14:36	24.2	43		ENE	6	1015.8	27.3	39		WNW	24	1013.7
13	We	17.1	27.4	0	11.8		SE	28	12:23	21.0	67	7	SSE	17	1015.9	27.1	50	6	ESE	9	1010.7
14	Th	18.4	23.9	15.2	5.2		NNW	52	13:13	21.2	88	7	NE	19	1007.6	21.1	87	8	WNW	24	1002.6
15	Fr	9.8	17.6	0			SSW	61	02:09	12.0	43	1	SSW	31	1016.6	17.3	35		SSE	26	1013.8
16	Sa	5.4	19.2	4.0	9.2	12.2	SE	37	08:31	13.8	48	1	SE	20	1020.3	18.8	35	1	SE	20	1015.9
17	Su	5.2	20.3	0	5.6	12.0	ESE	39	09:12	14.2	49	1	ESE	22	1019.8	19.9	28	0	ESE	20	1015.6
18	Mo	6.3	22.1	0	6.6	12.0	E	39	12:28	16.5	40	0	ESE	15	1021.1	21.2	28	1	E	17	1017.1
19	Tu	7.2	23.8	0	7.6	12.1	E	41	09:43	17.8	41	1	E	17	1021.8	22.7	27	1	ESE	24	1017.2
20	We	8.5	25.1	0	6.6	12.4	SE	41	12:29	19.3	45	0	ESE	19	1020.2	24.7	26	1	E	19	1015.1
21	Th	9.9	29.1	0	7.2	12.5	ESE	28	09:09	22.1	36	0	E	15	1017.3	28.5	17	0	WSW	7	1013.1
22	Fr	11.4	31.7	0	7.2	12.5	E	30	09:35	24.6	35	0	E	15	1016.1	31.2	20	1	S	11	1011.9
23	Sa	13.4	32.7	0	7.0	12.6	SW	30	13:18	26.3	28	1	SSE	2	1015.9	32.5	13	2	SSE	19	1012.5
24	Su	15.9	31.2	0	9.4	11.7	E	41	08:07	22.3	48	0	E	31	1018.2	30.2	32	2	E	17	1012.9
25	Mo	16.3	23.6	0	8.0	1.2	S	35	13:10	21.8	53	7	S	20	1016.4	20.4	58	7	S	20	1015.5
26	Tu	16.3	25.7	6.2	3.0	5.7	ESE	35	13:52	17.5	87	8	SE	17	1018.6	25.1	51	4	ENE	22	1015.3
27	We	13.3	28.6	0	4.0	12.5	E	37	09:16	21.7	43	0	E	26	1017.7	28.0	26	1	ESE	13	1013.1
28	Th	12.3	32.1	0	8.0	11.7	NE	28	11:07	26.3	29	6	ENE	17	1012.6	31.4	26	8	E	11	1008.1
29	Fr	18.3	30.8	0	8.0	3.9	SSW	56	20:04	28.0	28	7	NNE	24	1008.0	21.7	78	7	N	26	1008.1
30	Sa	13.3	20.2	14.2	5.2	6.5	S	48	07:40	14.3	71	8	S	26	1017.2	19.6	42	3	SSE	26	1014.9
31	Su	7.6	18.1	0	5.2	9.6	SSE	39	07:44	13.1	59	7	SE	28	1020.3	17.6	39	5	SSE	22	1017.2
Statistics for October 2010																					
	Mean	12.3	26.2		6.7	9.5				20.1	49	3		18	1017.2	25.1	37	3		18	1013.4
	Lowest	5.2	17.6	0	0.0	0.0				12.0	22	0	SSE	2	1007.6	17.3	13	0	WSW	7	1002.6
	Highest	18.4	34.9	18.8	11.8	12.6	SSE	63		29.4	93	8	#	31	1021.8	34.4	93	8	#	26	1018.4
	Total			70.2	193.6	247.4															

Survey Period

November 2010

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Mo	4.7	21.5	0	6.4	12.2	SSE	43	09:10	14.7	30	4	ESE	30	1019.9	20.1	21	5	SE	19	1015.7
2	Tu	7.2	23.6	0	7.4	11.5	E	48	11:40	17.7	32	2	ESE	30	1019.5	23.1	20	7	ESE	20	1015.6
3	We	7.8	26.7	0	8.6	11.8	E	48	13:08	19.2	37	7	E	17	1019.4	26.0	17	5	SE	24	1015.5
4	Th	9.3	27.1	0	8.4	12.9	SSE	44	11:29	21.6	29	0	ESE	17	1018.4	26.9	19	1	SSE	28	1013.2
5	Fr	9.6	28.6	0	9.6	12.9	SE	31	11:35	22.7	28	0	NE	6	1015.2	27.9	16	2	WSW	11	1010.1
6	Sa	11.7	32.0	0	7.2	12.9	SSE	30	16:35	26.4	24	0	N	11	1012.8	31.5	12	1	SSE	13	1007.7
7	Su	15.6	34.9	0	9.2	8.7	NW	57	18:16	26.4	24	4	NNE	15	1011.1	33.7	13	4	NNW	19	1007.3
8	Mo	18.9	34.1	0	10.4	5.5	SE	41	21:59	25.0	33	7	ESE	9	1012.5	32.5	15	3	NNE	20	1008.0
9	Tu	15.4	32.7	0	8.0	12.7	E	41	10:05	24.8	43	2	ENE	24	1016.8	32.1	22	4	E	26	1012.7
10	We	14.1	33.9	0	9.8	12.9	S	52	13:27	28.0	24	1	NE	17	1016.0	33.7	13	2	SSE	15	1010.7
11	Th	15.8	35.5	0	11.2	12.5	ENE	39	09:46	30.1	33	1	NE	13	1010.1	34.8	21	5	NW	15	1004.0
12	Fr	23.5	33.1	0	12.6	4.7	NNE	56	20:50	28.7	31	7	W	26	1005.6	30.0	33	7	SSW	33	1004.7
13	Sa	18.3	30.1	4.0	7.8	8.2	WSW	28	01:32	22.6	71	8	E	13	1009.7	29.4	44	5	E	11	1007.5
14	Su	18.8	30.8	0	4.8	7.1	SSW	78	13:50	26.7	53	1	NNE	13	1013.2	20.7	88	8	S	26	1012.7
15	Mo	18.0	32.4	2.6	5.2	5.6	WNW	37	16:45	23.8	66	7	SE	11	1013.2	31.8	37	3	ENE	11	1009.1
16	Tu	16.2	21.3	36.0	12.0	0.2	W	69	01:56	17.6	87	8	SE	17	1014.0	16.9	92	8	SE	11	1011.4
17	We	15.3	26.3	17.6	1.4	11.6	E	33	10:49	21.0	59	4	ESE	11	1014.4	25.2	36	5	SSE	20	1011.8
18	Th	11.1	28.0	0	7.6	13.2	ESE	37	10:35	22.2	32	0	ESE	15	1016.1	27.9	19	0	SSE	20	1013.0
19	Fr	11.8	29.6	0	8.8	12.9	E	43	11:26	23.2	33	0	E	22	1015.9	28.9	19	0	SSE	20	1012.4
20	Sa	12.7	30.6	0	9.6	12.6	ESE	41	14:39	25.2	30	1	E	22	1016.3	30.0	21	3	ENE	9	1011.7
21	Su	14.4	32.0	0	9.2	12.8	NW	70	00:19	26.5	27	2	ENE	19	1014.4	31.3	17	4	E	15	1010.3
22	Mo	15.5	33.8	0	9.8	13.2	SSE	35	13:22	27.9	28	0	E	24	1012.5	33.4	15	2	SE	17	1008.8
23	Tu	15.9	35.5	0	9.6	13.0	ESE	39	15:09	28.6	34	0	E	15	1012.5	35.3	14	0	ESE	28	1009.2
24	We	15.9	35.2	0	11.2	12.8	SE	33	17:25	28.9	35	1	NE	11	1012.7	34.8	19	1	E	13	1009.6
25	Th	19.1	35.1	0	10.4	12.1	S	59	21:31	29.8	33	2	ENE	24	1011.8	34.4	24	7	E	20	1008.4
26	Fr	18.9	30.9	1.4	11.4	7.2	S	52	21:58	23.5	68	3	ENE	17	1009.5	30.5	48	6	S	15	1005.2
27	Sa	18.8	29.6	0	5.6	10.7	S	50	18:58	23.4	63	7	SSW	22	1010.7	28.1	41	7	S	30	1008.0
28	Su	15.2	25.2	0	10.6	12.8	SSE	50	08:51	19.5	44	1	SSE	24	1015.7	24.6	29	1	S	20	1012.4
29	Mo	9.8	25.8	0	10.8	13.0				19.6	31	3	ESE	19	1015.2	25.3	20		SSE	26	1010.8
30	Tu	9.2	28.2	0	9.6	12.4	SE	39	12:23	20.8	25	1	ESE	20	1012.4	27.8	12	4	SSE	24	1007.7
Statistics for November 2010																					
Mean		14.3	30.1		8.8	10.8				23.9	39	2		17	1013.9	29.0	27	3		19	1010.2
Lowest		4.7	21.3	0	1.4	0.2				14.7	24	0	NE	6	1005.6	16.9	12	0	ENE	9	1004.0
Highest		23.5	35.5	36.0	12.6	13.2	SSW	78		30.1	87	8	ESE	30	1019.9	35.3	92	8	SSW	33	1015.7
Total				61.6	264.2	322.6															

Survey Period

8. 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.

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

Moore, P. (2005). *A Guide to Plants of Inland Australia.* New Holland Publishers, Australia

Newsome, Corbett et all. 199? Population fluctuations of small mammals. J of Mammal or CSIRO Wildlife Research

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

Pizzey, G. & Knight, F (1997). *Field Guide to the Birds of Australia*, Angus and Robertson

Purdie, P, Materne, C & Bubb, A (2008). *Plants of the Barkley Region*, NT Print Managemnet, Alice Springs.

Swanson, S (2007). *Field Guide to Australian Reptiles,* Steve Parish Publishing, Australia

Tyler, M.J. & Davies, M. (1986). *Frogs of the Northern Territory,* Government Printer of the Northern Territory

Wilson, S. & Swan, G. (2003). *A Complete Guide to Reptiles of Australia,* New Holland Publishers, Australia

Websites

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

Centipedes of Australia – Identification Key, CSIRO
http://www.ento.csiro.au/biology/centipedes/centipedeKey.html

Frogs Australia Network
http://www.frogsaustralia.net.au

Photographs

Unless otherwise credited, all photographs are courtesy of Land for Wildlife Coordinators Jesse Carpenter and Ilse Pickerd.

Acknowledgements

Thankyou to the property owners who allowed us access to their properties, volunteers who assisted, the Alice Springs Desert Park and Low Ecological Services for expert species identification.

Report prepared by Jesse Carpenter in consultation with Ilse Pickerd and Bill Low