

**NOTICE OF INTENT TO MINE
JERVOIS BASE METAL PROJECT**

NORTHERN TERRITORY

**MLS16, MLS17, MLS23, HLDS19, HLDS20, HLDS21,
HLDS15, MLS10, MLS90, MLS51, MLS52, MLS54, MLS56,
MLS57, MLS61, MLS62, MLS53, MLS55, MCS17, MCS13,
MCS14, MCS15, MCS16, MCS19, MCS26, MCS23, MCS22,
MCS24, MCS25, MCS27, MCS28, MCS18, MCS20 AND MCS21**

November 2013

PREPARED FOR

KGL RESOURCES



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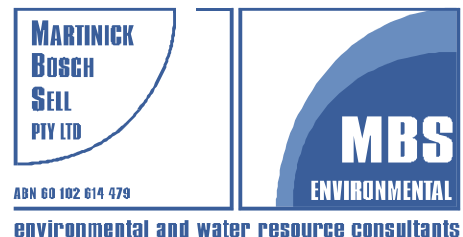


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1. BACKGROUND

1.1 PROJECT LOCATION

The Jervois Base Metal Project (Jervois Project) is located approximately 270 kilometres east-north-east of Alice Springs. The Jervois Project area falls on Jervois Pastoral Lease owned by Jervois Pastoral Company Pty Ltd. Access to the project area is via the Stuart and Plenty Highways. The location of the Jervois Project is shown in Figure 1.

There are two Aboriginal communities within 20 kilometres of the Jervois Mine. The Bonya Community is approximately 17 kilometres to the south-west and the Maperte Community is approximately 16 kilometres to the north-east. The location of the project in relation to nearby communities and pastoral lease boundaries are shown in Figure 2.

The Northern Territory Government classifies the Maperte Community as a Family Outstation (a small community of mostly Aboriginal people, usually less than 100, in permanent or semi-permanent residence with a water supply and permanent accommodation) and the Bonya Community as a Minor Community (a community of mostly Aboriginal people (usually over 100) which may have a school, health centre, store and provides resources to nearby outstations) (NTG 2012).

The next closest permanent settlement is the Atijere Aboriginal Community, 160 kilometres west by road. The closest town is Alice Springs, which is 380 kilometres by road. The major industries in the area are pastoralism, mining and tourism.

1.2 TENEMENTS

The Jervois tenements are held by Jinka Minerals Limited (Jinka Minerals) which is a wholly owned subsidiary of KGL Resources (KGL). KGL was previously known as Kentor Gold Limited. Jinka Minerals holds rights for Exploration Licence 25429 which encompasses 33 Mineral Leases as listed in Table 1 and shown in Figure 3. KGL is preparing a Mineral Lease Application to cover an additional area near the western edge of MLS62 to cover the proposed Tailings Storage Facility (TSF) and processing plant infrastructure locations.

1.3 HISTORY

Base metals were first discovered in the Jervois Range area in 1929 and intermittent small-scale mining and exploration has taken place since then. New Consolidated Goldfields undertook the first systematic exploration program in 1961 and Jervois Mining Limited operated a copper mine from 1963 – 1977. Several other companies have undertaken exploration activities including:

- Petrocarb Mineral Exploration (1969 – 1973).
- Union Corporation (1973 – 1974).
- Plenty River Mining Company Ltd (1980 – 1983).
- Anaconda in joint venture with Normandy Poseidon (1991 – 1996).
- Britannia Gold (1997 – 1999).

- Britannia Gold as a joint venture with Mt Isa Mines (1999 – 2001).

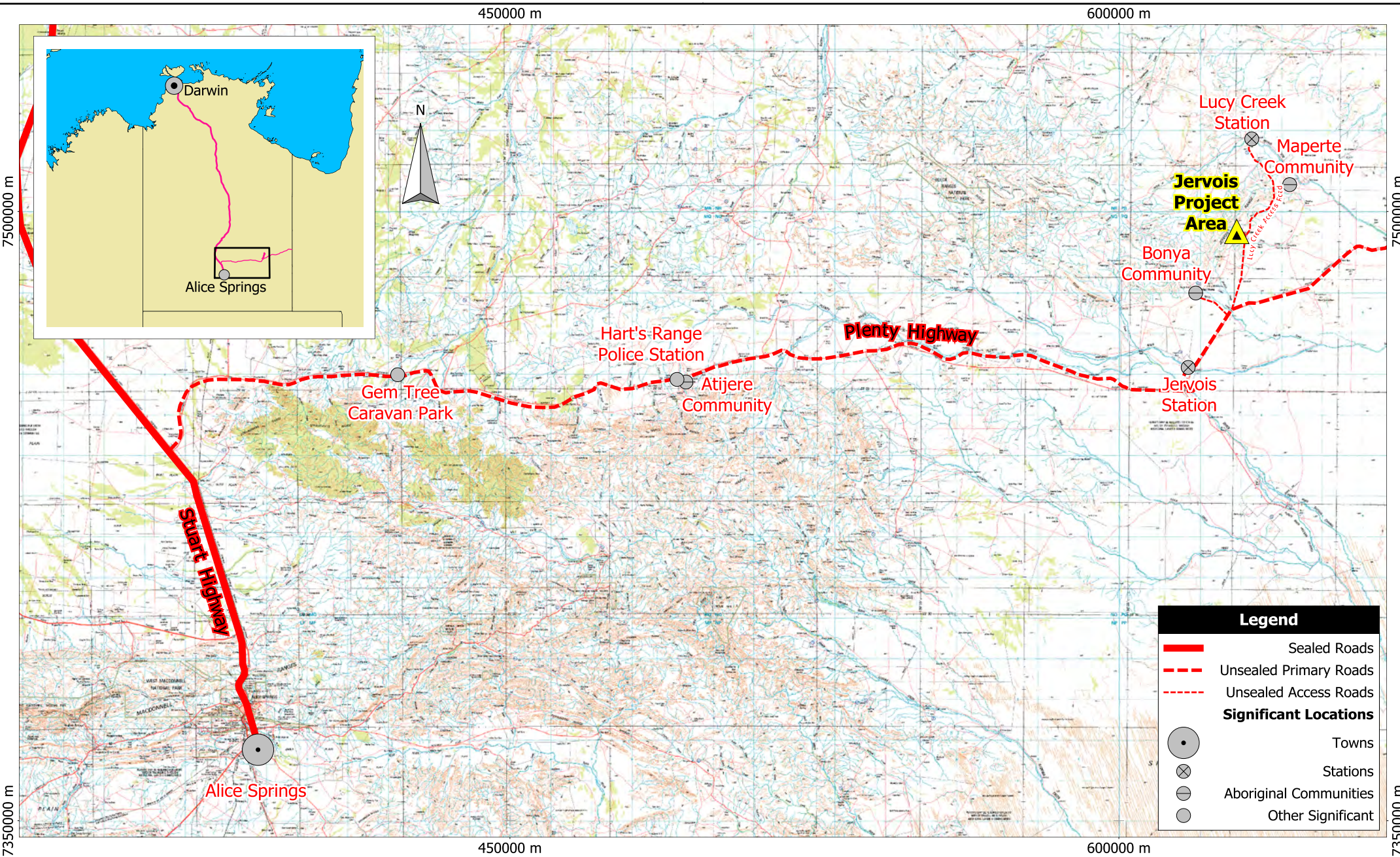
Britannia Gold sold the Jervois tenements to Reward Minerals in 2003 and Reward Minerals continued to explore the area until Jinka Minerals acquired the tenements in 2009 (Jinka Minerals 2011). KGL purchased Jinka Minerals in 2011.

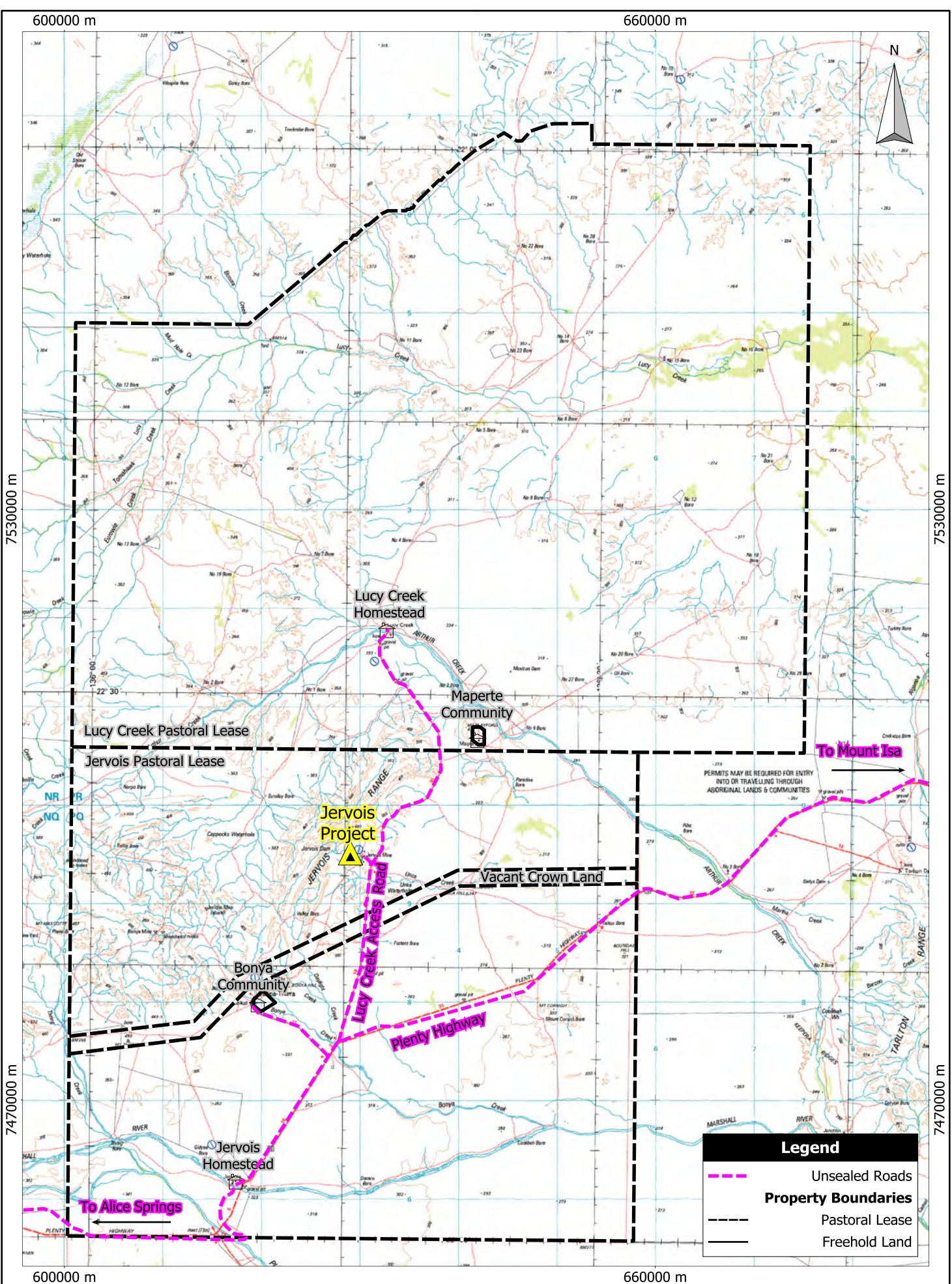
Historic mining disturbances in the area are shown in Figure 3. These include a TSF, waste rock dumps, decommissioned processing plants, pits, prospecting trenches, ROMs, water storage and evaporation ponds, an exploration camp, exploration disturbances, roads and tracks. The old underground mine entrance is located on MLS17.

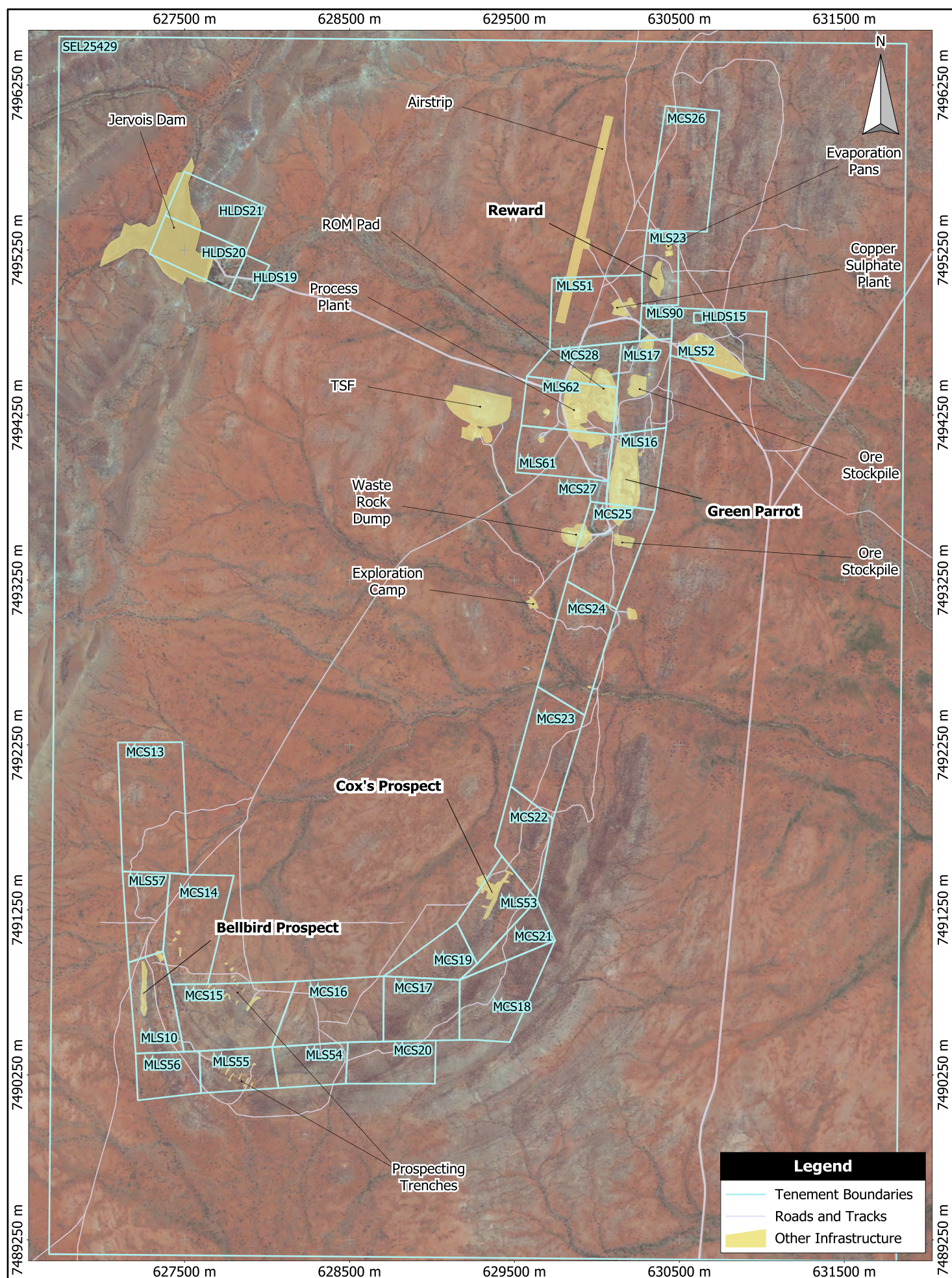
1.4 IDENTIFIED STAKEHOLDERS

To date the following stakeholders have been identified:

- KGL (proponent).
- Pastoral lease holder (Jervois pastoral lease).
- Pastoral lease holder (Lucy Creek pastoral lease).
- Bonya Aboriginal Community.
- Maperte Aboriginal Community.
- Central Land Council.
- Department of Mines and Energy.
- NT Environment Protection Authority.







Legend	
	Tenement Boundaries
	Roads and Tracks
	Other Infrastructure



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Grid: MGA94(53)

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KGL Resources
Jervois Project

Jervois Tenure and
Existing Disturbances

Figure 3

Table 1: Jervois Tenements

Tenement	Area (ha)
EL25429	3,803
MLS10	15.0
MLS16	15.86
MLS17	15.86
MLS23	8.09
MLS51	16.18
MLS52	16.18
MLS53	16.18
MLS54	16.18
MLS55	16.18
MLS56	16.18
MLS57	16.18
MLS61	16.18
MLS62	16.18
MLS90	3.67
MCS13	32.4
MCS14	32.4
MCS15	32.4
MCS16	32.4
MCS17	32.4
MCS18	32.4
MCS19	32.4
MCS20	16.19
MCS21	30.67
MCS22	18.2
MCS23	26.0
MCS24	25.9
MCS25	24.28
MCS26	32.4
MCS27	1.2
MCS28	11.7
HLDS19	2.45
HLDS20	16.17
HLDS21	16.17
Total	4,455.23

1.5 PROPONENT DETAILS

The Jervois Copper-Silver-Gold Project tenements are held by Jinka Minerals Limited (ABN: 65 131 851 404), which is a wholly-owned subsidiary of KGL Resources (ABN: 52 082 658 080). KGL Resources is a company incorporated in Australia whose shares are listed on the ASX under the symbol KGL.

The proponent's address is:

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Queries regarding environmental matters contained within the Notice of Intent should be addressed to Martinick Bosch Sell Pty Ltd, trading as MBS Environmental:

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Email: ksell@mbsenvironmental.com.au
Contact: Kristy Sell – Director Environmental Science

2. DESCRIPTION OF PROPOSAL

2.1 PROJECT OVERVIEW

KGL has undertaken a Scoping Study for the project. This determined that production of two million tonnes per annum for a seven year period is required for the project to be viable. The known resource of 13.7 million tonnes with a contained copper amount of 170,500 tonnes is just short of this requirement. As a result, KGL are actively drilling with the aim of increasing the resource to 21 million tonnes with a contained copper amount of 250,000 tonnes.

KGL are preparing a Pre-Feasibility Study (PFS) which is due to be completed by April 2014. It is anticipated that work on a Definitive Feasibility Study (DFS) will commence immediately on completion of the PFS.

Ore will be accessed via four open pits and three underground mines. Underground mines will access ore below the open pits.

Ore will be concentrated on site using standard flotation processes to produce concentrate containing copper sulphide and subordinate silver and other metals. Concentrate will be transported in truck containers off site via a haul road to the Plenty Highway and then along the Plenty Highway to the Alice Springs - Darwin railway via the existing rail terminal in Alice Springs. At a later stage, a siding may be constructed near the Plenty Highway/Stuart Highway turnoff. Concentrate will be transported by train to Darwin for export.

2.2 ORE RESERVES

Estimates of the ore reserves and grades at each location as well as the copper cut-off grade are shown in Table 2.

Table 2: Jervois Base Metal Project Indicated and Inferred Mineral Resources

Deposit	Total (Million Tonnes)	Cu (%)	Ag (ppm)	Cu (Tonnes)	Ag (Million Ounces)	Cu (cut-off %)
Reward +165 mRL	4.9	1.3	32.9	64,500	5.2	0.5
Reward -165 mRL	3.4	1.4	24.2	47,500	2.6	0.5
Bellbird +165 mRL	4.2	1.1	7.2	47,500	0.9	0.5
Bellbird -165 mRL	0.2	1.4	10.0	2,000	0.1	0.5
Green Parrott	0.7	1.0	93.5	7,000	2.1	0.3
Bellbird North	0.3	0.7	27.4	2,000	0.3	0.2
Total	13.7	1.3	25.8	170,500	11.2	

Source: H&S, 2013.

2.3 SITE LAYOUT

Figure 4 shows a conceptual project layout including preliminary locations for haul roads, TSF, open pits, ROM Pads and administrative and maintenance facilities relative to pre mining topography. Environmental issues have been taken into account during the conceptual design process, the area to be cleared has been minimised, drainage lines have been avoided wherever possible and heritage sites have been avoided.

The processing plant is proposed to be located over existing infrastructure and the existing exploration accommodation camp will be expanded to accommodate operations personnel. The TSF is proposed to be located west of the processing plant and two sediment control ponds have been proposed east and south of the processing plant.

The borefield is proposed to be located on the Jervois and Lucy Creek pastoral leases. Additional water exploration drilling and associated pump testing is required to be undertaken prior to design of the production borefield. The proposed locations for drilling of additional water exploration holes are shown in Figure 5.

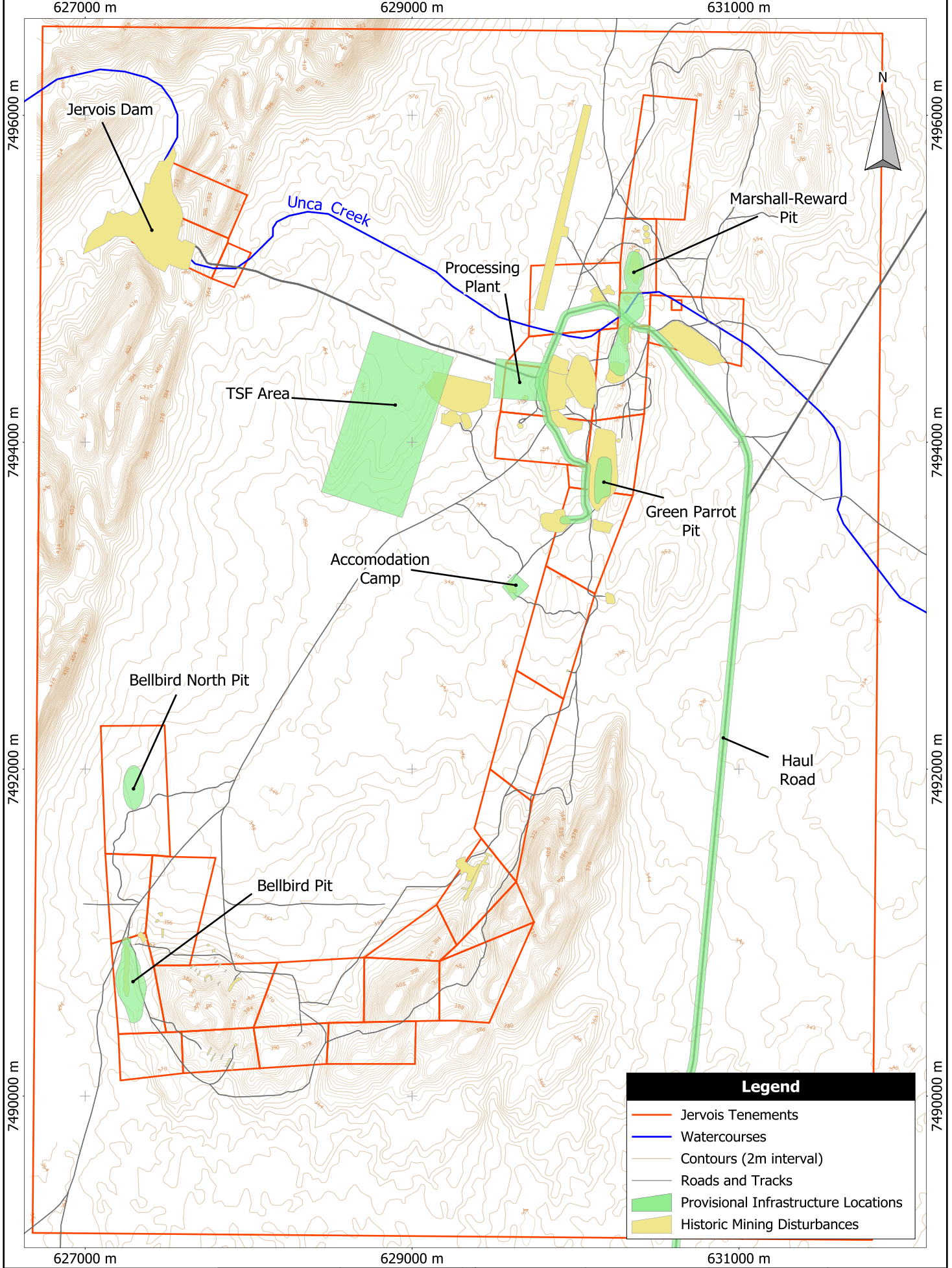
2.4 MINING

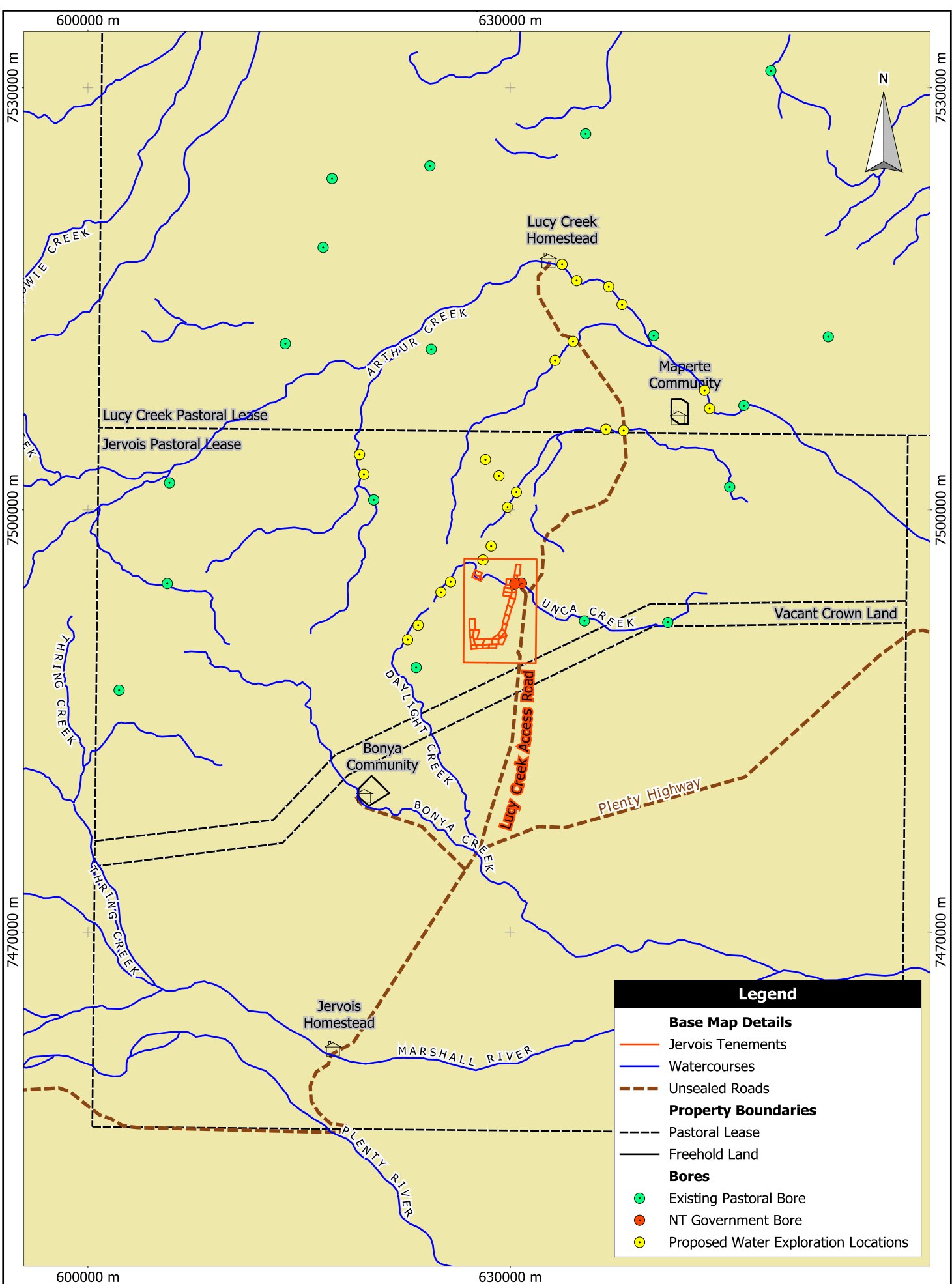
KGL proposes to mine copper reserves at Reward, Green Parrot, Bellbird and Bellbird North prospects within the Jervois Project area. It is proposed to begin mining at Reward, followed by Green Parrot and then Bellbird.

Ore bodies will be accessed initially via open pits and then later underground using sub-level, open stoping. Green Parrot will not have any underground operations.

Open cut mining will commence in Year 1 of the project and cease at the end of Year 3. Underground access will be developed from the base of the open pit.

Ore will be stockpiled at each pit area and transferred as needed to a central ROM Pad located adjacent to the ore processing facility.





2.5 ORE TREATMENT

About two million tonnes of ore will be processed per annum to produce about 250,000 tonnes of contained copper during the life of the project. Ore production will decrease in the final year of the project as ore reserves are depleted.

Treatment will involve crushing and grinding the ore into a small particle size and then passing it through a series of flotation tanks where added xanthates or similar chemicals bind to ore-containing particles and float them to the surface while waste tailings sink to the bottom. The process is outlined in more detail below.

2.5.1 Crushing and Milling

The preliminary process design involves ore being crushed after which ore with a P_{80} greater than 123 millimetres will be fed into a closed circuit SAG ball mill. A crushed ore stockpile will provide surge capacity if the grinding circuit is not operating.

Crushed ore will be mixed with recycled pebbles and process water until a density of 75% solids by weight is reached. A cyclone cluster will then transfer ore with a P_{80} of 90 micrometres to the copper flotation circuit and coarser particles will be fed back into the ball mill.

2.5.2 Flotation and Regrind

A trash screen will remove any foreign material from the cyclone overflow as it gravitates to a rougher conditioning tank. Lime will be added as required for pH modification followed by xanthate and/or a specialty collector. A series of agitator cells will be used for rougher flotation with frother added to the first cell and air pumped down the shafts to float valuable minerals out of the gangue. Rougher concentrate containing copper and silver sulphide minerals will be recovered into the froth phase and tailings will go to the copper tailings hopper.

Rougher concentrate will go through a closed ball mill circuit and ground to a P_{80} of 70 micrometres before gravitating to a copper cleaner conditioning tank where additional lime and collector chemicals will be added. Copper cleaner flotation will consist of a series of mechanically-agitated trough cells. Concentrate will be recovered into the froth phase and sent to the copper concentrate thickener while tailings will go to the tailings hopper.

2.5.3 Thickening and Filtration

A thickener will increase the density of the concentrate prior to filtration and a dilute flocculant will be added to increase the particle settling rate. Thickener overflow will be sent to a Process Water Pond for re-use and the underflow slurry will be sent to a filter feed tank before going through a pressure filter. Once the copper concentrate filter is full, the moisture content of the slurry will be reduced to 10% via a series of pressing and air blowing steps. A cake of copper concentrate will be produced and stored in the concentrate storage shed to await transport.

2.5.4 Tailings Management

In order to reduce the volume of water discharged to the TSF, tailings will be thickened before discharge to a purpose built TSF. More information about the TSF is contained in Section 6.2.2.

2.5.5 Process Water

Process water will be recycled from thickeners in the process plant and the decant water return from the TSF and topped up from raw water as required. There will be a Process Water Pond for temporary storage and duty/standby pumps will be installed to supply process water to all areas of the plant.

2.5.6 Magnetite Recovery

KGL is also considering a flow sheet option to recover magnetite from the tailings. The circuit would consist of a rougher magnetic separator, de-sliming cyclone, cleaner magnetic separator and magnetite concentrate thickener and could be added prior to the tailings thickening step.

2.5.7 Bismuth Rejection Circuit

KGL has included a capital cost allowance for a bismuth rejection circuit should the need arise to add one to the processing plant.

2.5.8 Reagents and Services

The processing circuit requires facilities for the storage, mixing and dosing of a number of reagents. These facilities include:

- Xanthate mixing/storage tank, pumps and ring main.
- A3894 storage tank and dosing pumps.
- Frother storage tanks and dosing pumps.
- Lime storage, mixing/storage tank, pumps and ring main.
- Flocculant mixing system, storage tanks and dosing pumps.
- Duty and standby low pressure blowers for air flotation.
- Air compressors, receivers, dryers and associated equipment will supply high pressure plant and instrument air.

2.6 INFRASTRUCTURE

2.6.1 Mine Infrastructure and Processing Plant

Mine infrastructure will include pits, Waste Rock Landforms, TSF, topsoil stockpiles, haul roads, heavy vehicle parking areas, Run of Mine (ROM) pads and fuel dumps. The processing plant includes a crushing and grinding circuit and a flotation circuit and associated water tanks, flotation chambers, dosing facilities, workshops and storage areas.

Other infrastructure associated with the project includes laydown areas, production and monitoring bores, a magazine and explosives store (Lycopodium 2012).

2.6.2 Buildings

Temporary, transportable style buildings will be used for the following facilities:

- Mine office and administration department.
- Process department.
- Plant control room.
- Workshop.
- Warehouse.
- Laboratory.
- Accommodation camp buildings.

Additionally, a concentrate storage shed and reagent storage shed will be constructed.

2.6.3 Accommodation Camp

The accommodation camp will be combined with the existing exploration camp and include a kitchen, mess buildings, TV room, gymnasium, laundry blocks, housing blocks, potable water tank, reticulation and a sewage treatment system (Lycopodium 2012).

2.6.4 Power Supply

The power supply will be a 12 Megawatt diesel and or gas fired station. Other power infrastructure includes a plant sub-station, step down transformers and transmission lines (Lycopodium 2012).

2.6.5 Airstrip

The existing Jervois Mine Airstrip will be refurbished and maintained to accommodate small aircraft transporting workers and some goods to and from Alice Springs.

2.7 WORKFORCE

It is estimated that the mining workforce will peak at around 110 staff during full production of underground and open cut operations. This includes three open cut crews of fourteen personnel, three underground crews of 13 personnel, three maintenance crews of three personnel and a support staff of 23 personnel including a mine manager, engineers, surveyors, geologists, technicians and administrators.

It is expected that full production will be reached approximately 16 months after the commencement of mining and will continue until around 33 months when open cut operations will cease. Open cut crews will no longer be required after this point and the workforce will be reduced accordingly to reflect the production profile.

Details of each production crew and support staff are shown in Table 3. It is anticipated that support staff will be based on a 9-5 days on to days off or 8-6 day roster, while shift positions will be based on a 14-7 day roster.

Table 3: Anticipated Peak Production Workforce for the Jervois Project

Position	Per Crew	Total
Open Cut Operators		
Shift Supervisor	1	3
Excavator Driver	1	3
Truck Driver	5	15
Dozer Driver	1	3
Water Cart Driver	1	3
Grader Operator	1	3
Drillers	2	6
Blast Crew	2	6
Total	14	42
Underground Operators		
Shift Supervisor	1	3
Drills	2	6
Long Haul Dump Loader	2	6
Truck Drivers	4	12
Longhole Operators	2	6
Service/Blast Crew	2	6
Total	13	39
Maintenance		
Fitters	2	6
Electricians	1	3
Total	3	9
Mining Staff		
Mine Manager	-	1
Mine Superintendent	-	1
Mining Engineers	-	4
Surveyors	-	4
Geologists	-	6
Geology Technicians	-	4
Administration	-	2
Maintenance Supervisor	-	1
Total	-	23
GRAND TOTAL		113

Source: Auralia (2012)

2.8 WATER

2.8.1 Dewatering

The Jervois deposit lies within what is expected to be low permeability/storativity fresh crystalline rock of the Arunta Orogenic domain. Pit inflows are therefore likely to be small and should be able to be managed by in-pit sumps sized to collect groundwater inflows and direct rainfall (Knight Piésold 2013). The proposed pits will be shallow and dewatering requirements based on knowledge from exploration drilling are anticipated to be low. Pit dewatering is anticipated to be required mainly in the wet season.

Detailed groundwater assessments will be conducted prior to commencement of mining operations and the results of these will be incorporated into the Mining Management Plan (MMP) to manage impacts on groundwater (**Commitment 2.8.1**).

Water sourced from pit dewatering will be used for dust suppression and process make up water, so it is anticipated that no discharge of water to the environment will be necessary.

All necessary groundwater licences will be acquired before the commencement of operations.

2.8.2 Raw Water Supply

It is estimated that a raw water supply of about 43 l/sec will be required for the project.

It is anticipated that raw water will be supplied from a borefield to be developed near the project area. Preliminary groundwater exploration works have been undertaken in prospective areas adjacent to the project area.

In the wet season, the possibility of sourcing water from surface runoff, specifically from ponds built for sediment control purposes in operational areas is also being considered.

Raw water will be stored in a purpose built Raw Water Pond and will supply the potable water plant, gland water, reagent mixing and fire water systems. Process water will be recycled from thickener overflow water and decant water return from the TSF and topped up with raw water when needed (Lycopodium 2012).

A water treatment plant will be constructed to treat raw water to potable standards to ensure it is fit for human consumption. Potable water will be reticulated to the kitchen, ablutions, laboratory, safety showers and elsewhere if required (Lycopodium 2012).

2.9 TIMING OF PROPOSED ACTION

KGL proposes to commence mining as soon as all approvals have been granted. The current development plan aims to allow first ship loading of product in 2016. To meet this aim the following key milestones have been established by KGL:

- PFS completed – April 2014.
- DFS completed – late 2014.
- Environmental assessment process completed –second half of 2014.

- Commencement of construction – second half of 2015.
- Commencement of open cut mining – about two months prior to commissioning.
- Commissioning – mid 2016.
- Commencement of underground mine development – 2019.

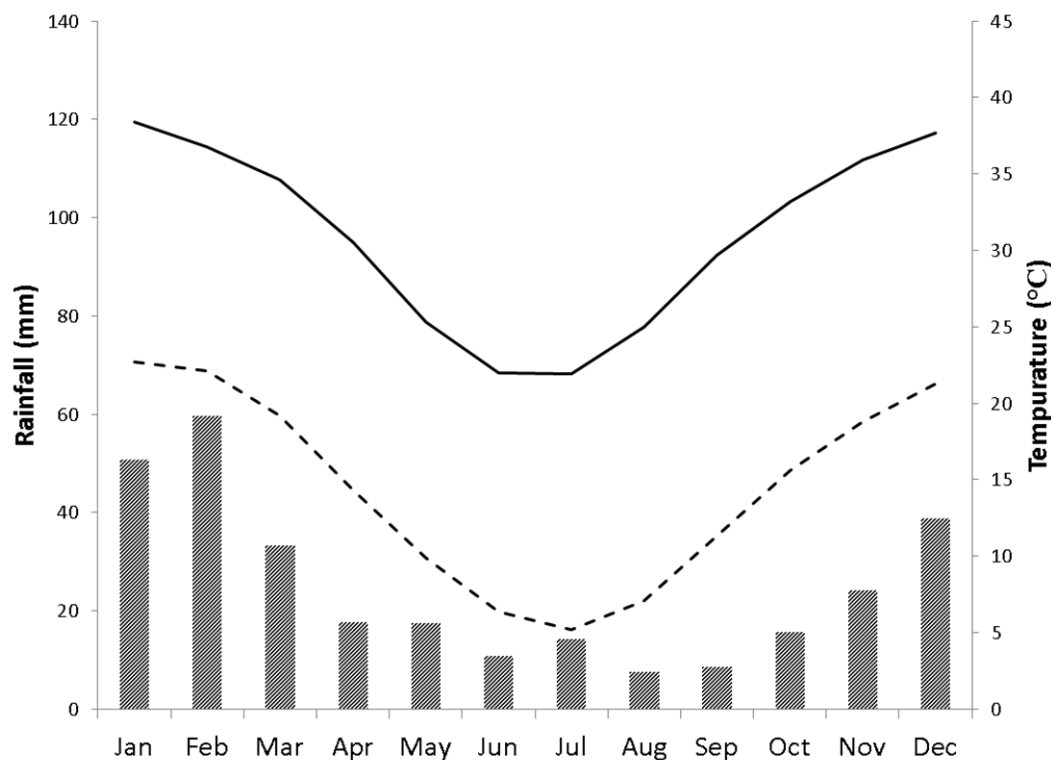
3. EXISTING SITE ENVIRONMENT

3.1 CLIMATE

The project area is arid with dry, hot summers and short, dry winters. Mean annual rainfall is 302 millimetres and falls mainly between October and March (Chart 1). Rainfall is unpredictable with a significant portion of the average annual total sometimes falling in a single day. This can result in extensive flooding, which produces considerable vegetation growth.

Summers are hot with average maxima in the high thirties reducing to low twenties at night and winters are mild with daily maxima in the mid-twenties and cooling to around 5° Celsius at night. Temperatures of over 45° Celsius have been recorded in December and January and as low as -5° Celsius in July (BOM 2012).

Chart 1: Mean Monthly Rainfall, Mean Maximum and Mean Minimum Temperature between 1966 and 2012 at Jervois Station



Key: Bars = mean monthly rainfall
Solid line = mean maximum temperature
Dashed line = mean minimum temperature

Source: BOM (2012)

3.2 BIOREGION

The Jervois Project is located within the southernmost part of the Toko Plains sub-region of the Channel Country Interim Biogeographical Regionalisation for Australia (IBRA) region, close to the northern border of the Simpson Strzelecki Dunefields sub-region of the Simpson Desert IBRA region and Burt Plain 4 sub-region of the Burt Plain region (SEWPAC 2011).

The Channel Country IBRA region is characterised by low hills and braided river systems with an arid climate and very dry, hot summers and short, dry winters. The vegetation is dominated by *Acacia* open woodlands with some *Acacia* shrublands, mallee communities, hummock grasslands and eucalypt open woodlands in the drainage depressions. The major land use is cattle grazing (SEWPAC 2011).

The Simpson Desert IBRA region consists of arid dune fields and sand plains. The vegetation is dominated by hummock grasslands with mallee woodlands and shrublands, chenopod shrublands; *Acacia* open woodlands and eucalypt open woodlands in the north. Major land uses are grazing, minimal use (Vacant Crown Land) and traditional Indigenous uses (SEWPAC 2011).

The Burt Plain IBRA region is characterised by plains and low rocky ranges with an arid climate. Vegetation is predominantly acacia shrublands and open woodlands with mallee woodlands and shrublands. Small areas of eucalypt open woodlands occur in drainage depressions. The predominant land use is cattle grazing, with some traditional indigenous uses (SEWPAC 2011).

3.3 LAND SYSTEMS

The Jervois Project is named after Jervois Range, a generally north-south trending range about 250 metres high composed of pre-Cambrian schists and gneiss which separates the shield of Central Australia from the plains to the east. Running roughly parallel to this range is a subdued outcrop of mineralisation up to about 60 metres above the surrounding plain (Hodge-Smith 1932). The topography of the Jervois Project area in relation to existing disturbances and proposed infrastructure is shown in Figure 4.

The project area is on the south-eastern edge of the Jervois Range, where the bold sandstone ranges of the Sonder Land system meet a low, undulating plain of the Bond Springs land system. This plain extends south-west into the gently undulating, stony plains of the Unca land system (Low 2000).

The land systems of the Alice Springs area have been described by Perry *et al.* (1962). The Sonder land system is described as a partially dissected, erosional, weathered land surface consisting of partially bevelled strike ranges, narrow strike valleys and transverse gorges. The Bond Springs land system is described as an erosional weathered land surface consisting of mainly hilly country with some narrow plains, and the Unca land system is described as a lightly dissected peneplain with erosional surfaces and an open branching pattern of sandy valleys.

3.4 HYDROGEOLOGY

Knight Piésold (2012) has conducted a preliminary hydrogeological assessment of the Jervois Project area. The main purpose of this assessment was to determine the potential for a borefield capable of extracting the projected process water shortfall (25 - 40 litres per second) in the vicinity of the project.

The project area is east of the Jervois fault. The geology south-east of the fault is comprised of crystalline schists granite and gabbros of the Arunta Orogenic domain, while the east and north consists of the sediments of the Georgina Basin. The likelihood of a 25 litre per second sustained extraction is considered reasonable, but not proven in the Georgina Basin Sequence, and low to very low out of the Arunta Orogenic Domain (Knight Piésold 2012).

The water yielding potential of the Georgina Basin Sequence is attested to by numerous bores and wells. Drilling logs from past exploration activities show that the water table is usually reached after 20 to 40 metres. However water inflow is highly variable in different areas with drill holes significantly deeper not intersecting water. The salinity of the camp water is variable and improves with drawdown during drilling campaigns (Jinka Minerals 2011).

3.5 SURFACE WATER

The Jervois Project area is in the upper catchment of the Hay River Basin, which ultimately feeds into Lake Eyre in the north of South Australia. The drainage lines that intersect the project area feed into the Marshall River to the south and Arthur Creek to the north, which in turn converge into the Hay River, approximately 60 kilometres south-east of the project area.

The local drainage of the Jervois Project area is incised by a number of ephemeral drainage lines that hold water during and after rainfall events. Drainage lines in the project area are shown in relation to proposed infrastructure in Figure 4.

Jervois Dam was constructed for previous mining operations and is the largest and most permanent surface water body in the Jervois Region. The dam is reported to be in excellent condition apart from a probable reduction in original capacity due to silting (Jinka Minerals 2011). A water quality analysis showed that the water in the dam was fresh and close to rainwater in quality (Knight Piésold 2012).

3.6 SOILS

The soils in the project area are in the Tenosol order of the Australian Soil Classification (CSIRO 2012a). The Tenosol order was created to include soils with weak pedologic organisation apart from the A horizons and accordingly covers a diverse range of very different soils broadly defined as not fitting into any of the other 12 orders of the classification (CSIRO 2012b). The Jervois tenure is mapped in the BA30 unit in the Digital Atlas of Australian Soils (DAFF 2012), which consists of shallow sands and loams.

Low (2000) described the soils in the general Jervois Project area as shallow and stony in the ranges with alluvial loams at the base of the hills and sandy or clayey loams in the extensive undulating plains.

3.7 VEGETATION, FLORA AND FAUNA

3.7.1 Previous Surveys

Low Ecological Services conducted a baseline landscape, flora and fauna survey of the wider Jervois area in 1999 (Low 2000). No major conservation issues were identified and the project area was generally described as being in a poor condition due to past mining activity and grazing. The habitat types and species recorded during the survey were described as being regionally common and Low (2000) concluded that future mining operations would only potentially impact individuals of territorial species.

In July 2012, KGL commissioned a more detailed dry season survey of the project area. The 2012 survey report is attached as Appendix 1.

In order to obtain cross seasonal coverage, KGL commissioned a wet season survey of the project area in March 2013. The 2013 survey report is attached as Appendix 2.

The results of the follow up surveys by Low Ecological Services will be used in the development of the Environmental Impact Assessment document to minimise impacts on vegetation, flora and fauna (**Commitment 3.7.1**).

3.7.2 Sites of Botanical Significance

The Jervois project is located within the Jervois Range Site of Botanical Significance (SOBS) which is of bioregional significance. The Jervois Range SOBS covers an area of 274 square kilometres almost entirely in the Toko Plains sub-region of the Channel Country Bioregion. This SOBS contains several species of flora which have not been recorded elsewhere in the Channel Country Bioregion (Low 2012).

3.7.3 Flora and Vegetation

Around 200 species of plants are known to occur in the Jervois region. Low (2000, 2012, 2013) recorded 42 in the 1999 survey, 91 during the 2012 survey and 50 in the 2013 survey.

Low (2000) identified three major plant associations in the Jervois area. These are:

- Hummock grasslands of *Triodia* with a low *Acacia* and scattered Eucalypt over storey on shallow calcareous soils. This community is common on hills.
- Low open shrublands dominated by *Acacia* and *Senna* species under widely scattered Eucalypt woodland with an understorey of hummock grasses (*Triodia*) as well as short grasses and forbs. This community occurs in the deeper sands of the undulating plains.
- Open Eucalypt woodlands, dominated by *Eucalyptus camaldulensis* and *Corymbia aparrerinja* over open *Acacia* shrublands with mid-height grasses occurring in the better watered drainage depressions and tributary fans of the project area.

Four invasive species, *Cenchrus ciliaris* (Buffel Grass), *Tamarix aphylla* (Athel Pine), *Cylindropuntia fulgida* (Coral Cactus) and *Vachellia farnesiana* (Prickly Mimosa) were recorded in the area by Low (2012, 2013). *Cenchrus ciliaris* is a naturalised pasture species and its control is problematic. *Tamarix aphylla* and *Cylindropuntia fulgida* are both listed as

weeds of national significance and *Tamarix aphylla* is also gazetted as a class B weed under the Northern Territory *Weed Management Act 2001* making the control of its growth and spread mandatory.

3.7.4 Flora of Conservation Significance

Seven flora species of conservation significance listed under the *Territory Parks and Wildlife Conservation Act 2000 (TPWC Act)* have potential to occur within the project area (Table 4). No Threatened flora species or vegetation communities listed under the *EPBC Act* are considered to have potential to occur within the project area.

Table 4: Conservation Significant Flora Recorded within 20 Kilometres of the Jervois Project Area

Species	Recorded in Jervois Tenure	TPWA Act Status
<i>Amaranthus centralis</i>	No	DD
<i>Bolboschoenus caldwellii</i>	No	EN
<i>Eremophila cordatisepala</i>	Yes	NT
<i>Fimbristylis velata</i>	No	DD
<i>Sauropus rigens</i>	No	NT
<i>Sida intricata</i>	No	NT
<i>Sida</i> sp. Hale River (P.K. Latz 12036)	No	DD

DD = Data Deficient

EN = Endangered

NT = Near Threatened

A single species of conservation significance, *Eremophila cordatisepala* was recorded during the 2012 and 2013 survey and is listed as Near Threatened under the *TPWC Act*. This species was found to be widely distributed on gravelly rises at one survey site in the east of EL 25429 and was recorded at two other locations during the 2013 survey. Although not common, it is likely this species was more widespread throughout the area. All other species recorded are well represented in the Jervois region.

3.7.5 Fauna

During the 1999 baseline survey, Low (2000) recorded seven mammal, seven reptile, two frog and 35 bird species within the Jervois area. Besides the Rainbow Bee-eater (*Merops ornatus*), all species were reported as being common in the greater Jervois region. The low representation of reptiles was in line with the generally degraded nature of the area, however could also have been due to the hot weather at the time of surveying. Low (2000) also noted that most of the birds were located on or around the Jervois Dam so the development of the project is not anticipated to result in habitat loss for most bird species recorded.

Seven mammal (excluding cattle), five reptile and 47 bird species were recorded in the 2012 dry season survey (Low 2012). Trapping results during this survey were poor due to cool weather and all reptile species were identified from scratch marks or from photographs taken by KGL employees.

The 2013 wet season survey recorded a total of 38 vertebrate species with six mammal species, five reptile and 27 bird species (Low 2013). This compared to a total of 59 species

recorded in July 2012. Trapping results were poor across all sites and conditions were much drier during the 2013 survey, with less food and water resources noticed (Low 2013).

3.7.6 Fauna of Conservation Significance

A search of the *EPBC Act* Protected Matters Database was undertaken by Low (2012) to determine the potential presence of conservation significant fauna species and habitats within the project area. A review of fauna species listed under the *TPWC Act* was also undertaken. A total of 17 fauna species of conservation significance *are considered to have potential to occur within the project area* (Table 5). This includes five mammal and 12 bird species.

Table 5: Database Search Results for Conservation Significant Fauna with Potential to Occur in the Project Area

Scientific Name	Common Name	Conservation Status	
		EPBC Act	TPWC Act
<i>Dasyurus cristicauda</i>	Mulgara	Vulnerable	Vulnerable
<i>Macrotis lagotis</i>	Bilby	Vulnerable	Vulnerable
<i>Isodon auratus</i>	Golden Bandicoot	Vulnerable	Endangered
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum (Southern NT)	-	Endangered
<i>Rattus villosissimus</i>	Long-haired Rat	-	Near Threatened
<i>Merops ornatus</i>	Rainbow Bee-eater	Migratory – Marine & Terrestrial	Least Concern
<i>Dromaius novaehollandiae</i>	Emu	-	Vulnerable
<i>Ardeotis australis</i>	Australian Bustard	-	
<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black Cockatoo (Central Australian subspecies)	-	Near Threatened
<i>Rostratula australis</i>	Australian Painted Snipe	Vulnerable Migratory – Marine & Wetland	Vulnerable
<i>Conopophila whitei</i>	Grey Honeyeater	-	Data Deficient
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory – Marine	Least Concern
<i>Ardea alba</i>	Great Egret, White Egret	Migratory – Marine & Wetland	Least Concern
<i>Ardea ibis</i>	Cattle Egret	Migratory – Marine & Wetland	Least Concern
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	Migratory – Marine & Wetland	Least Concern
<i>Glareola maldivarum</i>	Oriental Pratincole	Migratory – Marine & Wetland	Least Concern
<i>Stictonetta naevosa</i>	Freckled Duck	-	Near Threatened

Source: Low (2012)

Mulgaras (*Dasyercus cristicauda*) are listed as Vulnerable under the *EPBC Act* and *TPWC Act*. They were once widespread and common throughout the central deserts and are now principally found in mature mulga mixed with immature hummock grasslands (spinifex) and in palaeo-drainage systems or drainage lines in sand plain or sand dune habitats (Low 2007). Mulgaras were not found in any of the surveys and were not recorded in the Northern Territory fauna atlas records for the Jervois Project area.

The Northern Territory fauna atlas has two records of the Golden Bandicoot (*Isoodon auratus*) from 1969 and one of the Bilby (*Macrotis lagotis*) from 1930. No sign of either of these species was found during the surveys and both are believed to no longer inhabit the Jervois project area (Low 2012, 2013).

Records of the Brush-tailed Possum (*Trichosurus vulpecula vulpecula*) in the Jervois project area also date back to 1969. The project area does contain suitable habitat for this species, however it was not recorded during the surveys even though Low (2012, 2013) undertook active searches and set up a baited remote camera in suitable habitat near the Jervois Dam. Low (2012, 2013) notes that more intensive searches are required before the presence of this species in the project area can be ruled out and KGL will avoid disturbing areas of *Eucalyptus camaldulensis* woodland as far as practicable.

Observations of old burrow systems and scats during the 2012 survey indicate that a population of Long-haired Rats (*Rattus villosissimus*) was established after high rainfall in the 2010-2011 season; however none were caught in traps and no active signs were recorded. KGL employees had also not seen this species since April 2012. As Long-haired Rats are known to readily enter traps and there were no recent sightings or signs of recent activity, Low (2012) concluded that the species must have undergone a natural decline as conditions deteriorated and is no longer present in the project area which is outside their known core distribution. The presence of this species was not detected during the 2013 survey despite traps set close to burrows. It is unlikely that the development of the Jervois project will have any significant impact on the conservation status of this species.

The Rainbow Bee-eater is a common species in northern Australia that migrates south in summer to breed along creek lines. The Rainbow Bee-eater is likely to forage in lightly wooded habitats near water and may breed where there are sandy soils in which to burrow. The species is often seen around disturbed areas such as quarries, road cuttings and mines where exposed bare soil provides suitable breeding sites (Higgins 1999). It is not expected that the development of the Jervois Project would significantly impact the available habitat for this species.

The project area contains suitable habitat for the Emu (*Dromaius novaehollandiae*) and Australian Bustard (*Ardeotis australis*). However as these species are wide ranging and nomadic, the disturbance of a relatively small area of widely available habitats is not anticipated to affect either of these species (Low 2012, 2013).

Red-tailed Black Cockatoos (*Calyptorhynchus banksii samueli*) are common in riparian habitats in the Jervois area (Low 2012, 2013). As abundant suitable habitat is available adjacent to the project area, the Jervois Project is not anticipated to have any significant effect on this species. KGL will minimise disturbances to riparian habitats as far as practicable.

The Australian Painted Snipe (*Rostratula australis*) was observed at Jervois Dam in March 2012 by a KGL geologist. Although the species does use the Jervois Dam, it is not considered core habitat for Australian Painted Snipe and no significant impacts from the project on this species are anticipated.

Other birds that are listed under the *EPBC Act* and *TPWC Act* include the Grey Honeyeater and five migratory species (Fork-tailed Swift, Great Egret/White Egret, Cattle Egret, Oriental Plover and Oriental Pratincole). Previous experience with searches of this database has shown that the migratory bird species listed occur in the results of most searches. This combined with the fact that these species were also not recorded during the surveys indicates that it is unlikely that development of a mining project in the Jervois area would significantly impact on their ability to survive or their overall conservation status.

In addition to the database searches, Low (2012, 2013) identified suitable habitat for the Black-footed Rock Wallaby (*Petrogale lateralis*) around a rock hole. No signs of this species, which is listed as Vulnerable under the *TPWC Act* were recorded, however additional surveys will be undertaken to determine whether this species is absent or present in the project area.

3.7.7 Significant Sites Identified in Surveys

Jervois Dam was identified by Low (2012) as the most permanent and largest water body in the Jervois area and as a result may serve as a refuge for aquatic and migratory species including the Near Threatened Freckled Duck (*Stictonetta naevosa*). However as the dam is isolated from major river systems and wetland areas, Low (2012) concluded that it does not constitute core habitat for any of the conservation significant bird species that may potentially occur in the area.

A natural rock hole that provides an ephemeral water source was also found during the 2012 survey in MLS56. Low (2012) identified this site as potentially important habitat for a range of species. It is outside of the proposed project footprint and no significant impact is anticipated.

In the 1999 survey, Low (2000) identified a mature stand of Mulga (*Acacia aneura*) trees in the J-Range in Cox's Lease (MLS53) as a community distinctive from the surrounding grazed and degraded area. The stand is estimated to be 150 – 200 years old and avoidance was recommended where possible. This site is not anticipated to be affected by development of the Jervois project.

Low (2000) also reported a historic Burrowing Bettong (*Bettongia lesueur*) warren. The Burrowing Bettong has been extinct on mainland Australia for at least 50 years and avoidance of this artefact was recommended. The warren is outside of the Jervois tenements and is not likely to be impacted upon by the proposed project.

3.8 HERITAGE

The Jervois Project area has been sporadically explored by several companies for a variety of commodities and the regional geology is well known (DoR 2010). A small mining settlement was located at Jervois in the 1930s (Hodge-Smith 1932) and Jervois Mining Limited operated a copper mine at Jervois from 1963 to 1977.

A search of the Register of the National Estate and Northern Territory Heritage Register was undertaken for the Jervois Project area. No heritage sites are registered for the Jervois Project area or surrounds (NRETAS 2011).

Jinka Minerals (2011) identified three Registered Heritage Sites within the Jervois Project area:

- Registered Site G152-11, a Bloodwood tree around which is a 10 metre exclusion zone.
- Registered Site G152-12, a Bloodwood trees around which is a 10 metre exclusion zone.
- Registered Site G152-10, a ridge in the western sector of SEL 25429.

While it operated the tenements, Reward Minerals engaged with the Central Land Council (CLC) and held a number of discussions including a formal meeting with the Traditional Owners to discuss matters of significance and to complete Sacred Site Clearances. Sacred Site Clearances were passed on to Jinka Minerals which is now owned by KGL (Jinka Minerals 2011).

4. LEGISLATIVE REQUIREMENTS

4.1 NORTHERN TERRITORY

The NT Environmental Protection Agency (NT EPA) is responsible for administering Environment Impact Assessment (EIA) according to the NT *Environmental Assessment Act 1982* and accompanying *Environmental Assessment Administrative Procedures 1984*.

KGL will submit this NOI to the Department of Mines and Energy (DME). An NOI is evaluated to determine whether the proposed project should be referred to the EPA of the Department of Lands Planning and Environment (DLPE) for assessment under the NT *Environment Assessment Act 1982* or managed by the DME under the *Mining Management Act*. If the EPA considers that a Public Environmental Review (PER) or Environmental Impact Statement (EIS) is required under the requirements of the *Environmental Assessment Act 1982*, they must consult with the responsible Minister. If the EPA decides formal assessment is required for approval of the project, they will issue publically reviewed impact assessment guidelines to KGL. Given the location, nature and scale of the project, KGL considers that a PER is the appropriate level of assessment for the project.

Under the *Mining Management Act 2001* of the Northern Territory, before mining operations can commence, the proponent is required to submit a Mining Management Plan (MMP) to the Department of Mines and Energy. This addresses environmental management of impacts resulting from construction and operation of a mining project. KGL will prepare and submit this plan after completion of the formal environmental assessment process.

4.2 FEDERAL LEGISLATION

Commonwealth approval is required if matters of national significance as defined in the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)* are triggered. Such matters include presence of migratory birds, federally listed rare flora or fauna, Commonwealth land, nuclear actions and marine areas.

It is not anticipated that any matters of national significance will be affected by this project.

5. IDENTIFICATION OF ISSUES

5.1 LAND USE

The main land use in the area is cattle grazing, although there has been small scale mining activity in the past. The Jervois Project lies within the Jervois pastoral lease and the road to the mine also serves as the access road from Plenty Highway to Lucy Creek Station and the Maperte Community.

Past mining disturbances in the Jervois area include a TSF, Waste Rock Landforms, decommissioned processing plants, evaporation ponds, pits, prospecting trenches, ROMs, water storage and evaporation ponds, an exploration camp, exploration disturbances and roads and tracks. The entrance to the old underground mine is in MLS17. Existing mining disturbances in the area are shown over an aerial photograph in Figure 3 and in relation to the proposed site layout in Figure 4.

Tourists use the Plenty Highway to access the Hart Range area, where fossicking for gems is popular, and as an inland route through to Mount Isa. The Eldo Rocket Shelters at the Jervois and Lucy Creek homesteads are also low level tourist attractions. The Gem Tree caravan park, located 70 kilometres east of the Stuart Highway, services tourists in the area.

The proposed borefield is located on both the Jervois and Lucy Creek pastoral leases. The project will result in an increase in traffic along the Lucy Creek Access Road and the Plenty Highway. This is not anticipated to detract from the tourism value of the area or cause any significant disruption to Lucy Creek and Maperte access.

Post mining land use is addressed in Section 7.

5.2 POTENTIAL ENVIRONMENTAL IMPACTS

Potential emissions from the project include:

- *Air:* Particulates, dust, greenhouse gases.
- *Water:* Surface run-off from operational areas and seepage from water storage, product stockpiles and the TSF. Potential contaminants would include base metals, particulates, nitrogen (from explosives) and hydrocarbons.
- *Land:* Waste rock, tailings and putrescible wastes.

KGL will implement appropriate measures to prevent or minimise release of pollutants to the environment (**Commitment 5.2**).

5.2.1 Air

There is potential to generate dust from open pits, roads, the process plant and surrounding stockpiles. Dust suppression at the plant and stockpiles will be conducted using conventional wetting methods. High pressure, low volume sprays will be installed at the crusher, on conveyors and over stockpiles. Conventional spraying via dedicated water carts will treat roads and open pits (**Commitment 5.2.1**).

The bulk of Greenhouse Gas (GHG) emissions from the Jervois Project will be from the consumption of diesel in the mining fleet and in the power generation plant. At this early stage, it is estimated that approximately 45 million litres of diesel will be consumed per annum resulting in emissions of around 120,000 tonnes of carbon dioxide equivalent. This exceeds reporting thresholds under the *National Greenhouse Gas and Energy Reporting Act 2007* and KGL will register as a reporting entity from the year that operations commence.

5.2.2 Water

Groundwater and surface water management strategies will be developed during the environmental assessment process to minimise the potential for adverse environmental impacts.

A preliminary surface water management strategy has been developed for the Jervois Project by Knight Piésold (2012). The overarching objective of the strategy is to capture run-off from all disturbed areas and pass it through a series of pollution control structures before discharge to the environment.

Drainage lines will be diverted around mining structures as required and surface water will be passed through sediment ponds before leaving the site. Surface waters will be released into original drainage lines wherever practicable (Knight Piésold 2012).

A Water Discharge Licence will be sought from the EPA if necessary to address discharge of water from the site in accordance with the parameters determined through ongoing stream water monitoring. Monitoring of water quality will continue for some time after rehabilitation in accordance with the requirements of the regulatory authorities.

The surface water strategy was developed by determining the original pre-development drainage patterns and then overlaying the site development plan and positioning diversion drains to divert surface water around mine features. Two sediment control structures have been proposed with the secondary function of harvesting process water. These were located based on the following criteria:

- The interception of all run-off from disturbed areas.
- Optimal topography and distance from the pits and processing plant to reduce pumping costs.
- To maximise the catchment area to increase harvesting potential.
- To avoid any existing or proposed infrastructure and possible mining areas.

The proposed construction method for the sediment ponds is to borrow *in situ* soils from the basin area and construct low (less than four metres), homogenous embankments. The sediment ponds are designed to withstand a 1 in 50 ARI rainfall event and will have spillways for the safe discharge of excess water during storm events. Rockfill erosion protection will be provided on the spillways and batters to reduce erosion and prevent overtopping, and the return pipework will be located in corridors adjacent to existing access roads.

5.2.3 Land

Material handling of waste rock, tailings, hazardous and non-hazardous and general waste will be in accordance with statutory regulations and standard industry procedures. Management measures will be further developed during the environmental assessment process in consultation with regulatory agencies. Procedures will incorporate the principles of waste minimisation and ensure material re-use and recycling options are utilised wherever practicable.

6. ENVIRONMENTAL MANAGEMENT OF IMPACTS

An Environmental Management Plan (EMP) will be prepared as a component of the MMP. The EMP will be regularly reviewed and will be updated as required (**Commitment 6.1**).

6.1 LAND MANAGEMENT

Vegetation and habitat types will be affected by clearing and operational disturbances. KGL makes the following commitments to prevent or minimise these impacts:

- Clearing of vegetation will be minimised by restricting clearing to the minimum necessary for operations (**Commitment 6.1a**).
- Wherever possible, operations will be located on areas already disturbed by previous mining operations (**Commitment 6.1b**).
- The perimeter boundary of all areas approved to be cleared will be clearly delineated before clearing works commence (**Commitment 6.1c**).

The Environmental Officer will be trained to recognise potential weed species as part of its weed management plan. KGL will conduct regular surveys following growth periods to remove newly arrived or spreading invasive species before they become a problem (**Commitment 6.1d**).

KGL will plan the project to avoid disturbing heritage sites wherever possible (**Commitment 6.1e**).

KGL will engage with pastoral leaseholders and the communities at Bonya and Maperte to avoid or minimise impacts to pastoral or other activities. KGL will engage with nearby Aboriginal communities for opportunities for indigenous employment (**Commitment 6.1f**).

6.2 MANAGEMENT OF WASTE PRODUCTS

Waste generated from mining and processing operations will include:

- Waste rock (circa 11.3 million tonnes over the life of the project).
- Tailings.
- Water from pit and underground dewatering and surface drainage in operational areas.
- Sewage from ablution facilities.
- General rubbish and garbage.

6.2.1 Waste Rock

Waste Rock Landforms will be developed adjacent to each open pit. Waste rock from underground mining will be disposed of preferentially in underground voids rather than disposed of on the surface.

For the purpose of mine waste management, there are three main lithologies on the basis of weathering including oxidised, transitional and fresh waste rock. In addition, massive sulphides are present, most of which will be classified as ore.

Waste characterisation studies will be undertaken as part of the environmental assessment and project planning process. Review of the regional geology for the Jervois project indicates that the geology of the waste rock is likely to be fairly consistent with micaceous schist, the dominant lithology for all resource areas. Therefore geochemical variability is likely to be controlled more by the degree of mineralisation and oxidation than rock type. Samples have been selected for waste characterisation studies which are broadly representative of the lithologies displayed on site to include both oxide and fresh material.

The waste characterisation is intended to provide an indication of the risk of acid generation, metal leaching and supernatant water quality issues. The results of these studies will be documented in the environmental assessment document and EMP to formulate a range of mitigation commitments aimed at reducing the potential impacts of waste associated with construction, operation and decommissioning phases of the project (**Commitment 6.2.1**).

Waste rock where suitable will be used for construction purposes such as construction of embankments for the TSF. Waste rock with favourable characteristics will be separately stockpiled for use in project closure related activities.

All Waste Rock Landforms will be progressively rehabilitated. Further details of rehabilitation are given in Section 7.

6.2.2 Tailings

A preliminary TSF has been designed by Knight Piésold (2012) according to the following criteria:

- Compliance with Northern Territory requirements.
- Permanent and secure containment of all solid waste materials.
- Maximisation of tailings densities using sub aerial deposition.
- Removal and re-use of free water.
- Minimisation of seepage.
- Excess storage capacity to cope with a one in 100 year average recurrence interval and a 24 hour duration storm event of one in 100 year recurrence interval annual rainfall sequence.
- Ease of operation.
- Rapid and effective rehabilitation.

The proposed TSF will have a capacity of 15 million tonnes with a throughput of 1.5 million tonnes per annum. It will have two cells and be constructed partly from mine waste. The basin area will have a soil lining below the operating supernatant pond to limit seepage. Tailings will enter the facility sub-aerially via banks of spigots spaced regularly off all embankments to position the supernatant pond centrally round the decant tower. To promote de-watering, the active tailings beach will be regularly rotated.

The TSF will also have a basin underdrainage system installed that will further reduce seepage, increase the density of the tailings and improve the geotechnical stability of the facility. This will drain by gravity to a collection sump at the lowest point in the TSF basin. Water in the sump will be pumped back into the supernatant pond. A tower abstraction system will remove supernatant from the TSF to be pumped back to the plant for re-use as process water.

The TSF has been designed to withstand a 1 in 100 year 24 hour storm event in addition to maximum operating volumes. Waste characterisation studies will be undertaken during development of the project.

6.2.3 Hazardous Waste

Hazardous wastes associated with the project include chemicals, hydrocarbons and explosives. KGL make the following commitments in respect to management of hazardous wastes:

- Hazardous waste management will be conducted in accordance with statutory regulations, standard industry structures and procedures (**Commitment 6.2.3a**).
- Fuel will be stored in transportable tanks placed within appropriate containment bunds to control accidental spillage (**Commitment 6.2.3b**).
- Explosives will be stored in a magazine of an approved design and strict procedures will be adopted to ensure adequate records are maintained of delivery and use to ensure earliest possible detection of losses and to avoid site contamination (**Commitment 6.2.3c**).

6.2.4 Non-hazardous Waste

Non-hazardous waste generated by the project will include sewage, biodegradable domestic rubbish, and non-biodegradable domestic rubbish.

An on-site landfill facility will be constructed to dispose of all putrescible and construction wastes. This facility will not be available to the public. Statutory landfill requirements will be observed for the construction and operation of this facility.

6.2.5 Sewage

Sewage will be collected from all ablution facilities and directed to septic tank systems that will comply with health requirements of the Northern Territory Department of Health and Community Services.

Excess water from the sewage system will be irrigated to an area suitably downwind from the accommodation camp.

6.3 ENVIRONMENTAL MONITORING

Environmental monitoring programs will be developed as part of the EMP (**Commitment 6.3**). These will be designed to detect any adverse impacts of the project so that corrective action can be implemented as early as possible.

Water monitoring will be focused on groundwater and surface water leaving the site. Water diverted around mining pits and leaving the stockpile and plant sites will be regularly sampled both above and below any sediment ponds.

A groundwater study will be undertaken before commencement of the project. The outcomes of this will assist in determining the monitoring requirements with respect to potable groundwater extraction, dewatering, or potential TSF seepage.

Regular site inspections will be undertaken to monitor for erosion and the occurrence of weeds to enable appropriate and timely intervention.

7. PROJECT CLOSURE AND REHABILITATION

7.1 CLOSURE PLANNING

KGL will prepare a Closure Plan as part of the MMP (**Commitment 7.1a**). The Closure Plan will be a dynamic document that is reviewed regularly to ensure the plan remains relevant to the activities being undertaken and planned to be undertaken.

On final decommissioning, plant and infrastructure will be dismantled, made safe, and unless requested otherwise by project stakeholders, removed from the site (**Commitment 7.1b**).

7.2 REHABILITATION

Areas disturbed by mining and associated activities will be rehabilitated progressively wherever possible. Waste rock will be retained within underground voids and pits where possible to minimise the operational footprint requiring rehabilitation.

Rehabilitation will be performed in accordance with contemporary accepted industry best practice and conducted in accordance with an approved MMP (**Commitment 7.2**).

Rehabilitation objectives will broadly include:

- Restoring disturbed areas to a safe and stable landform that blends in with the surrounding landscape.
- Revegetating disturbed areas, including the Waste Rock Landforms, using best practice technology, with a suite of locally occurring species.

Rehabilitation of specific disturbance areas is described in more detail in the sections below.

7.2.1 Open Pits

Closure of the pit voids will involve:

- Construction of abandonment bunds around the completed pits.

7.2.2 Underground Operations

Measures taken before the underground mines are abandoned will include:

- Removal of all internal infrastructure including electrics, pumps, pipes and ventilation.
- Removal of chemicals and wastes such as explosives and hydrocarbon contaminated soils.
- Entrances will be appropriately closed and signed to prevent the entry of people and fauna.

7.2.3 Waste Rock Landforms

The overburden and Waste Rock Landforms for each pit and underground mine will be rehabilitated. This will involve:

- Shaping of dump slopes (batters) to shallow angles to control erosion, and appropriate drainage control measures. The exact slopes, top surface profile and drainage measures will be determined at the design stage taking into account waste characterisation, material availability and climatic conditions.
- Re-spreading of topsoil on shaped surfaces.
- Construction of low bunds at the crest of each batter to assist with surface water control on batters.
- Deep ripping on the contour to assist with water management and minimisation of erosion.
- Application of seed of local species.

7.2.4 Tailings Storage Facility

The TSF will be progressively rehabilitated. Embankments will be vegetated to minimise erosion of the walls during operation. The deposition area will not be rehabilitated until completion of deposition. On closure of the facility, the tailings will be allowed to dry out and consolidate prior to rehabilitation of the top surface.

Rehabilitation of the upper surface will involve:

- Covering the tailings surface with inert waste rock or overburden.
- Shaping the upper surface to most appropriately manage surface water.
- Spreading of growth material on shaped surface.
- Deep ripping on the contour to assist with water adsorption and surface water control.
- Application of local seed to ripped surfaces.

8. ENVIRONMENTAL COMMITMENTS

Commitments that can be made at this early stage of the planning process include:

- Detailed groundwater assessments will be conducted prior to commencement of mining operations and the results of these will be incorporated into the Mining Management Plan (MMP) to manage impacts on groundwater (**Commitment 2.8.1**).
- The results of the follow up survey by Low Ecological Services will be used in the development of the Environmental Impact Assessment document to minimise impacts on vegetation, flora and fauna (**Commitment 3.7.1**).
- KGL will implement appropriate measures to prevent or minimise release of pollutants to the environment (**Commitment 5.2**).
- High pressure, low volume sprays will be installed at the crusher, on conveyors and over stockpiles. Conventional spraying via dedicated water carts will treat roads and open pits (**Commitment 5.2.1**).
- An Environmental Management Plan (EMP) will be prepared as a component of the MMP. The EMP will be regularly reviewed and will be updated as required (**Commitment 6**).
- Clearing of vegetation will be minimised by restricting clearing of vegetation to the minimum necessary for operations (**Commitment 6.1a**).
- Wherever possible, operations will be located on areas already disturbed by previous mining operations (**Commitment 6.1b**).
- The perimeter boundary of all areas approved to be cleared will be clearly delineated before clearing works commence (**Commitment 6.1c**).
- KGL will conduct regular surveys following growth periods to remove newly arrived or spreading invasive species before they become a problem (**Commitment 6.1d**).
- KGL will avoid disturbing registered heritage sites (**Commitment 6.1e**).
- KGL will engage with pastoral leaseholders and the communities at Bonya and Maperte to avoid or minimise impacts to pastoral or other activities. KGL will engage with nearby Aboriginal communities for opportunities for indigenous employment (**Commitment 6.1f**).
- The waste characterisation is intended to provide an indication of the risk of acid generation, metal leaching and supernatant water quality issues. The results of these studies will be documented in the environmental assessment document and EMP to formulate a range of mitigation commitments aimed at reducing the potential impacts of waste associated with construction, operation and decommissioning phases of the project (**Commitment 6.2.1**).
- Hazardous waste management will be conducted in accordance with statutory regulations, standard industry structures and procedures (**Commitment 6.2.3a**).
- Fuel will be stored in transportable tanks placed within appropriate containment bunds to control accidental spillage (**Commitment 6.2.3b**).
- Explosives will be stored in a magazine of an approved design and strict procedures will be adopted to ensure adequate records are maintained of delivery and use to ensure

earliest possible detection of losses and to avoid site contamination (**Commitment 6.2.3c**).

- Environmental monitoring programs will be developed as part of the EMP (**Commitment 6.3**).
- KGL will prepare a Closure Plan as part of the MMP (**Commitment 7.1a**).
- On final decommissioning, plant and infrastructure will be dismantled, made safe, and unless requested otherwise by project stakeholders, removed from the site (**Commitment 7.1b**).
- Rehabilitation will be performed in accordance with contemporary accepted industry best practice and conducted in accordance with an approved MMP (**Commitment 7.2**).

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APPENDICES

APPENDIX 1:
**REPORT ON A DRY SEASON BASELINE FLORA, FAUNA AND
LANDSCAPE SURVEY, JERVOIS MINE (LOW 2012)**

Kentor Gold Ltd



Report on a Dry Season Baseline Flora, Fauna & Landscape Survey, Jervois Mine

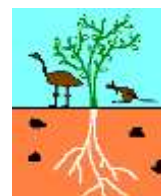
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EXECUTIVE SUMMARY

A landscape, flora and fauna survey of Kentor Gold Ltd (Kentor) tenements in the Jervois Mine area (Map 1) was undertaken by Low Ecological Services (LES) in July 2012. The area is located approximately 400km north-east of Alice Springs within the Jervois Range site of botanical significance (White M., Albrecht D., Duguid A., Latz P. & Hamilton M., 2000). The survey was commissioned for the purpose of identifying threatened flora and fauna present, or likely to be present in the project area, to map vegetation and habitat communities and examine the potential for Kentor's activities to significantly impact on these species.

Existing data was used to compile preliminary species lists for the project area and provide a regional perspective of the geology, landforms, soils and vegetation communities. This was followed by a landscape, flora and fauna survey, undertaken from the 18th to the 21st of July, 2012.

The project area falls within the Channel Country bioregion (Department of Sustainability, Environment, Water, Population and Communities (SEWPAC), 2012). Three Land Systems occur, the Sonder, Unca and Bond Springs systems (Perry et al, 1962). These broad systems can be further broken into nine land units reflecting local variations in landform and vegetation.

A search of the NT Parks and Wildlife Flora Atlas within a 20 km radius of the project area did not identify any plant species of conservation significance listed under the *Environment Protection and Biodiversity Conservation Act 2007* (EPBC Act). Seven species (Table 7) were identified under the *Territory Parks and Wildlife Conservation Act 2007* (TPWC Act) as conservation significant. Only one of these species has a threatened status, with the remainder listed as Data Deficient or Near Threatened. One of these species was recorded during the survey; the Near Threatened *Eremophila cordatisepala*. Records of this species in the project area are significant, as they represent the western limit of the plant's distribution.

A search of the NT Parks and Wildlife Fauna Atlas of the 20km radius area identified ten species of conservation significance, listed under the EPBC and/or TPWC Acts. Five of these species have a threatened status, others are listed as Near Threatened or Data Deficient (Table 9). Records of the two species listed as threatened under the EPBC Act (Table 9) are old; from the 1930s and 1960s and are thought to be locally extinct. None of the threatened species listed in Table 9 were recorded during the July survey. However areas of suitable habitat exists within the project area for

Ardeotis australis (Australian Bustard), *Dromaius novaehollandiae* (Emu), *Trichosurus vulpecula vulpecula* (Brush-tailed Possum) and *Macrotis lagotis* (Bilby).

Of these species, the Emu and Australian Bustard are nomadic and wide ranging and although they are likely to occur in the project area at times, they do not rely on the area for habitat. Although records of the Bilby and Brush-tailed Possum are from 1930 and 1969 respectively, future surveys should continue to monitor for existent populations within the project area.

A report generated by the Commonwealth Government's Protected Matters Search Tool (Appendix 1) identified habitat appropriate to three threatened, nine migratory and seven marine species as occurring or likely to occur within 20km of the project area. These are shown in Appendix 1. Of the threatened species listed in the Protected Matters report, two do not occur in NT fauna atlas records for the search area. These are *Rostratula australis* (Australian Painted Snipe) and *Dasycercus cristicauda* (Mulgara). However, a recent sighting of a single Australian Painted Snipe was recorded at Jervois Dam in March 2012. This sighting was made by Michael Green, a Kentor geologist and the record published on a website forum (Eremaea Birds, 2012).

Whilst the short duration of the survey, in association with climatic seasonality, may have decreased the ability to determine the presence of some species, particularly reptiles, the results indicate that no threatened species are likely to be at direct risk from exploration activities. However, possible impacts of mining activities include:

- colonisation by introduced plants and weeds along new tracks and work areas,
- erosion caused by new tracks, particularly where vehicles on wet ground have created deep ruts on sloping terrain,
- disturbance to natural water flow along drainage features and ephemeral water sources by track works; and,
- Increased access into remote areas for feral animals such as foxes (*Vulpes vulpes*) and cats (*Felis catus*), is facilitated by establishment of vehicle tracks which are easy pathways for movement.

These threats are discussed further in Section 5 of this report.

To account for survey limitations discussed above and continue to minimise the risk of harm to threatened species, it is strongly recommended that further surveys take place. Future survey efforts should take place in the wet season (March or April) to target species that may not have been active under cold, dry climatic conditions experienced in July. These surveys should also carry out active targeted searches for populations of the Brush-tailed Possum.

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DISCLAIMER

This document has been prepared by Low Ecological Services (LES) for Kentor Gold Limited (Kentor) in accordance with an agreement with Kentor. LES has prepared this document using the skill and care expected from professional scientists to provide factual and technical information and reasonable solutions to identified risks. It does not constitute legal advice.

Document Control

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Date	Revision	Reviewer	Comments
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FRONTISPIECE

Ghost Gum (*Corymbia apperrerinja*) framed with copper ore. These trees are common in the woodlands surrounding Jervois Mine.

1. INTRODUCTION

1.1. PROJECT AREA

The project area is located in the Jervois Range, approximately 400km by road, north east of Alice Springs. Access from Alice Springs is via the Plenty Highway and Lucy Creek Road (Map 1). Kentor Gold Ltd (Kentor) currently holds tenure over 34 tenements that fall within Exploration Lease EL25429 that cover but are not restricted to former extraction sites and prospects of the Jervois Mine, including the Reward, Green Parrot, Marshall and Bellbird prospects. These tenements are shown in Table 1 below.

Table 1; Kentor tenements, Jervois Mine.

Tenement	Area (Hectares)
MLS 16	14.11
MLS 17	17.01
MLS 23	9.56
HLDS 19	3.58
HLDS 20	14.02
HLDS 21	15.51
HLDS 15	0.37
MLS 10	15.18
MLS 90	3.98
MLS 51	22.78
MLS 52	20
MLS 54	10.88
MLS 56	10.37
MLS 57	12.77
MLS 61	16.04
MLS 62	16.36
MLS 53	14.84
MLS 55	11.5
MCS 17	17.53
MCS 13	31.08
MCS 14	21.79
MCS 15	25.85
MCS 16	23.48
MCS 19	9.82
MCS 26	25.87
MCS 23	20.07

Tenement	Area (Hectares)
MCS 22	13.59
MCS 24	22.04
MCS 25	20.74
MCS 27	1.45
MCS 28	10.77
MCS 18	20.04
MCS 20	13.76
MCS 21	8.11

The survey took place within MLS tenements in the south and north of the Jervois Mine leases.

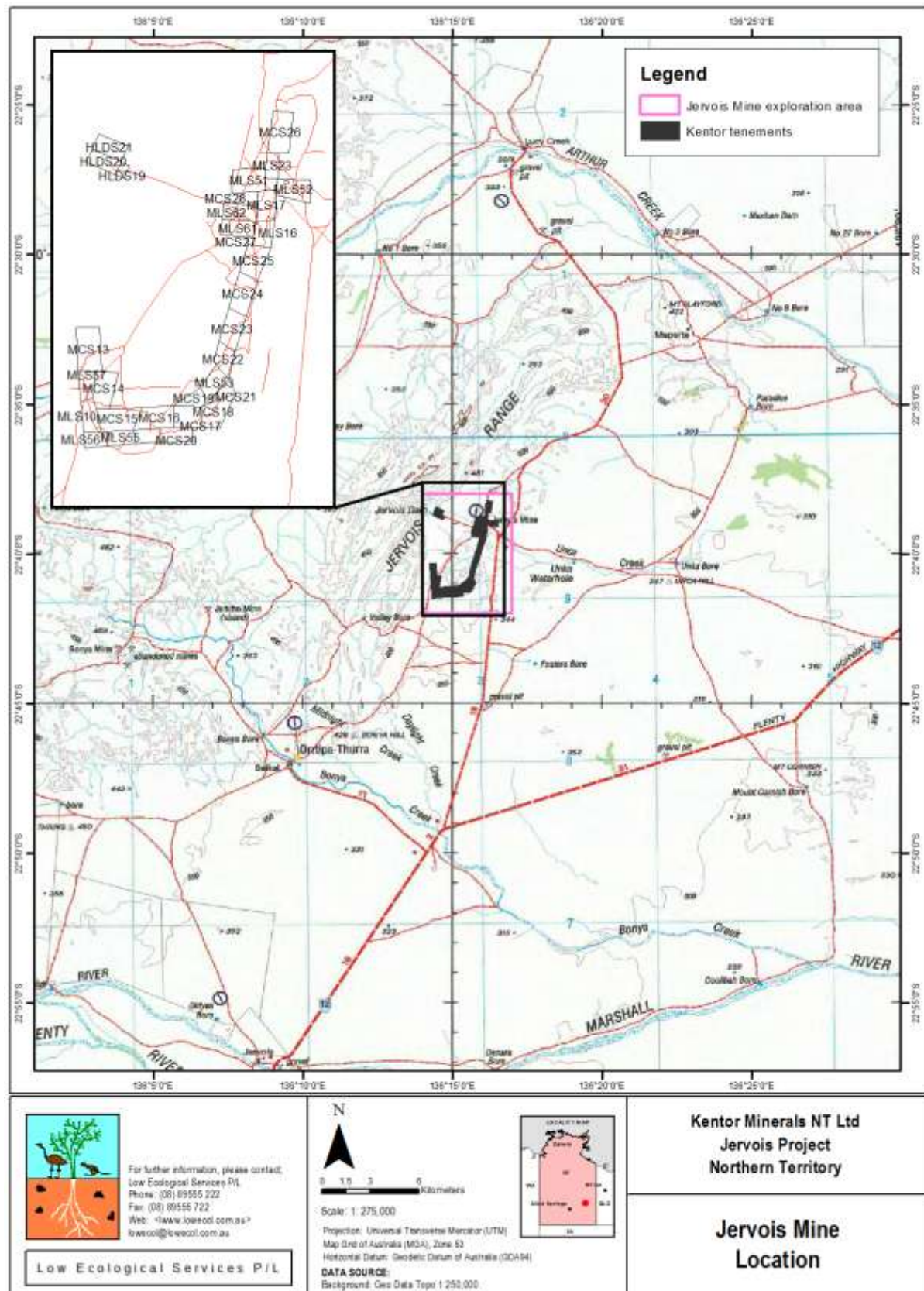
1.2. PURPOSE AND SCOPE OF WORKS

It is likely that the Jervois Project will require submission of a Public Environmental Report (PER) to the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) for formal assessment under the *Environmental Assessment Act 1982*.

As such, a flora, fauna and landscape survey was undertaken within the project area with the aims of;

- Observing and recording of terrestrial fauna species within the project area,
- Sampling and recording flora species present,
- Mapping and describing vegetation communities and
- Identifying potential impacts to flora, fauna and vegetation communities.

The survey took place from the 18th – 21st July, 2012.



Map 1; Location of Jervois Mine and Kentor tenements.

2. DESCRIPTION OF PROJECT AREA

2.1. CLIMATE

The climate of the Jervois area has been described as semi-arid, with predominantly summer rainfall occurring between November and April (Slatyer, 1962). Climate records measured at Jervois Station since 1966 show a mean annual rainfall of 298.3mm. Actual rainfall fluctuates widely, with a range of 97.8mm – 933.4mm (Bureau of Meteorology, 2012).

The survey followed two years of above average rainfall, with 2010 recording the highest rainfall on record at Jervois of 933.4mm. 2011 was also well above average, with 503.6mm recorded. In contrast, 2012 had returned to average rainfall conditions, with 105.2mm having fallen in the six months prior to the survey, with the last fall being 1.2mm recorded on 14th July. Rainfall statistics for all recorded years are shown in Figure 1.

Temperatures at Jervois range from hot days and warm nights in summer months to warm days and cold nights in the winter. Maximum temperatures during the summer may exceed 40°C, while occasional frosts may occur in winter. At the time of the survey, temperatures were cool to cold, with a maximum temperature of 19.8°C and minimum of 2.2°C recorded during the survey period. Average monthly temperatures for Jervois are shown in Figure (Bureau of Meteorology, 2012).

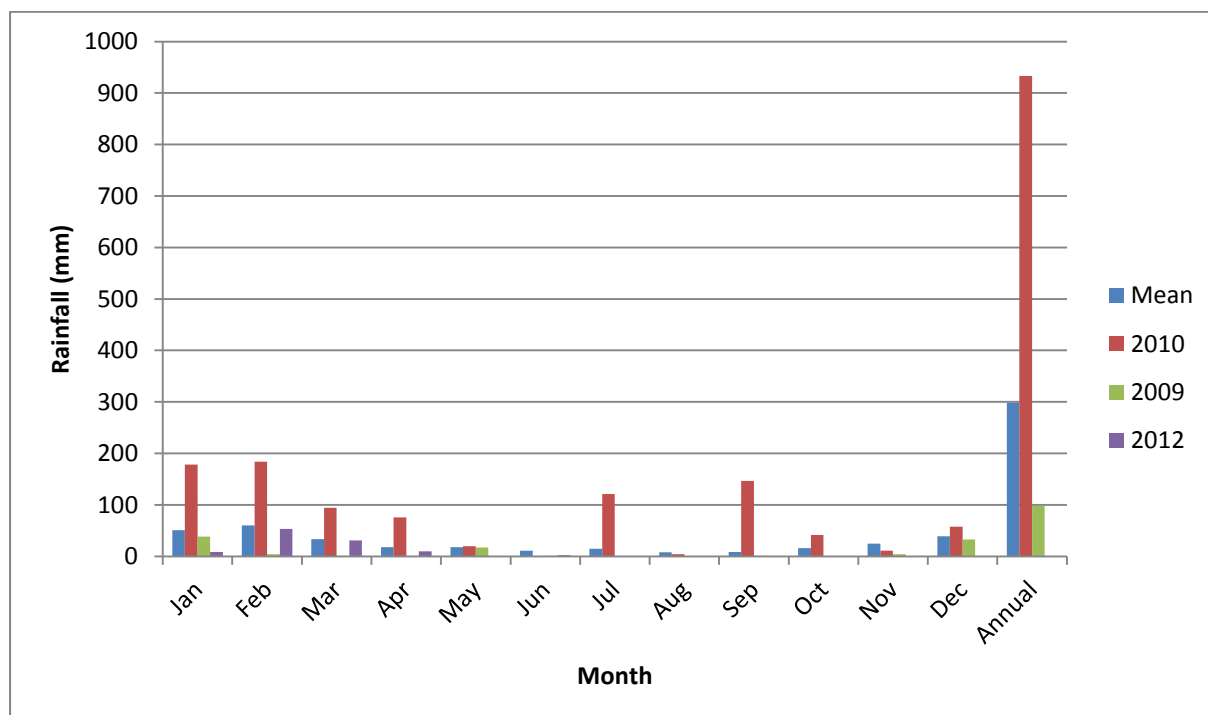


Figure 1; Rainfall statistics for Jervois Station, showing monthly average from 1966 - 2011, wettest (2010) and driest (2009) years on record and 2012 to date (Bureau of Meteorology, 2012). 2012 total is not shown.

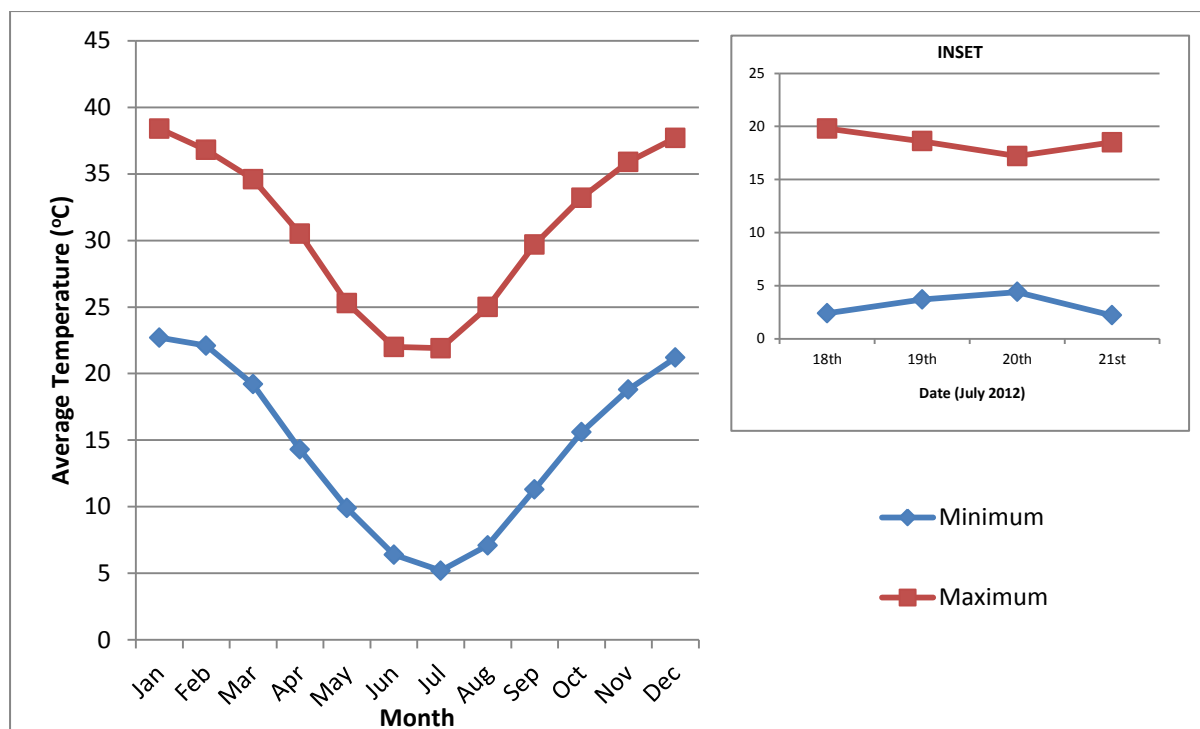


Figure 2; Average maximum and minimum temperatures recorded at Jervois Station, 1966 – 2011. Inset: maximum and minimum temperatures recorded during the survey period (Bureau of Meteorology, 2012).

2.2. FIRE HISTORY

Information about the fire history of the region is provided by the North Australian Fire Information (NAFI) web site (Northern Territory Government, Charles Darwin University, 2012). Fire histories have been mapped to the nearest 1km (for years 1997 – 2010) and 250m (Years 2004 onwards).

The southern half of the Jervois area has only been burnt once since 1997. These fires occurred in 2002. Recent fires that burnt much of central Australia in 2011 and the beginning of 2012 did not penetrate the Jervois project area, although they reached areas to the east. However, an isolated fire occurred near Jervois dam during that period.

The northern half of the project area has not experienced any fires since 1997. Fire history from 1997 until the present is shown in Map 2.

2.3. GEOLOGY

The geology of the area has been mapped by the Bureau of Rural Sciences, 1991. The north western portions of Jervois are made up of sedimentary sandstone, limestone and conglomerate of the Jervois range, while the remaining area overlies felsic and mafic intrusives such as schist and granites (Map 4). Table 2 describes the geology of the project area and can be used as a key to interpret Map 4. Generally, areas of interest to exploration and mining activities are those in unit A5.

Table 2; Gology of the project area (Bureau of Rural Sciences after Australian Geological Survey Organisation, 1991).

Map Code	Description	Age	Extent Within Project Area
-C1	Sedimentary sandstone and conglomerates.	543 – 509 Ma	North west of area. Outside project area.
-P103	Sedimentary sandstone, limestone and dolostone	1000 – 545 Ma	North west 1/3.
A5	Metamorphic felsic and mafic rocks.	1850 – 1800 Ma	Eastern and southern 2/3.
d9	Plutonic igneous intrusions.	1600 – 1000 Ma	South east of project area. Outside project area.

2.4. SOILS

Map 5 shows the soils of the project area and surrounding country, as mapped by the Digital Atlas of Australian Soils (Bureau of Rural Sciences, 1991). All Kentor tenements are within the BA30 unit, as defined in Table 3 below.

Table 3; Soils of the project area, adapted from the Digital Atlas of Australian Soils (Bureau of Rural Sciences, 1991).

Map Code	Landscape	Soil Description
BA27	Ranges, ridges, cuestas and hills on sandstones and quartzites; extensive areas of bare rock.	Shallow stony sands and with small areas of sandy red earths, red siliceous sands and deep red sands.
BA30	Low rocky hills on gneiss and schist with intervening valley plains.	Shallow sands and loams.
BA43	Gently undulating stony plains on granite, schist and gneiss with some low hills.	Shallow stony sands and sandy red earths on sedimentary plains.
My106	Outwash plains and fans.	Red earths and red earthy sands. Some yellow earths on less well-drained sites.

2.5. LAND SYSTEMS AND LAND UNITS

The broad land systems of the southern NT and Alice Springs region have been mapped by Perry et al, 1962. Three of these land systems are present within Kentor's tenements in the Jervois Mine project area (Map 6). Each of these broad land systems can further be split into land units at a finer, more local scale, as defined in Table 4.

All three land systems were surveyed during this project, with those land units defined below mapped. This is discussed in Sections 3.2 and 4.1 of this report.

Table 4; Land systems and land units of the project area, adapted from Perry et al, 1962.

Land System	General Description	Land Units	Soil	Vegetation
Bond Springs (BS)	Bold rocky hills, low rugged country and narrow plains.	BS1 – Gneiss ridges and hills; rocky slopes, 35-60% with minor gullies; narrow joint controlled valleys.	Outcrop with pockets of shallow, stony or gritty soil.	Sparse shrubs or low trees including <i>Acacia kempeana</i> (Witchetty Bush) and <i>Senna</i> species. Also <i>Acacia aneura</i> (Mulga) over sparse forbs and grasses.
		BS2 – Schist ridges forming closely dissected tracts; short, rocky hill slopes, 10-35%, with basal colluvial aprons.		
		BS3 – Erosional slopes at the foot of BS1; 1-5%. Rock outcrops in upper sectors, shallow gulling down slope.	Range of shallow soils including red clayey sands, red earths and calcerous earths.	Mulga and <i>Acacia georginae</i> (Gidgee) or sparse low trees over short grasses and forbs. Sparse shrubs and low trees over <i>Triodia basedowii</i> (Hard Spinifex) on sandier soils.
		BS4 – Discontinuous drainage flats and basins with minor tributary fans.	Alluvial soils, red earths and texture contrast soils.	Absent, sparse low trees or occasional Mulga over short grasses and forbs.
		BS5 – Channels up to 30m wide and 1.5m deep.	Coarse grit bed-loads.	<i>Eucalyptus camaldulensis</i> (River Red Gum) – <i>Acacia estrophiolata</i> (Ironwood) over sparse grasses.
Sonder (So)	Bold east-west trending sandstone ranges.	So1 – Cuestas; on moderately to steeply dipping strata; slightly bevelled, weathered crests. Rock faces and structural benches; gullied escarpments and dip slopes dissected by parallel V-shaped valleys.	Outcrop: very little shallow stony soil.	Sparse shrubs and low trees. Witchetty Bush and <i>Senna</i> species or Mulga over <i>Triodia</i> (Spinifex) or sparse grasses and forbs.
		So2 – Single or multiple ridges on very steeply dipping or vertical strata. Steeper slopes than So1.		

Land System	General Description	Land Units	Soil	Vegetation
		So3 – Gentler lower slopes passing into units So1 and So2.		
		So4 – Strike valleys between So1 and So2.		
		So5 – Major channels up to 3m deep with adjacent narrow sandy flats.	Bed loads range from sand to boulders.	River Red Gum –Ironwood over sparse grasses.
		So6 – Minor channels. Narrow and deeply incised with rocky beds.	Undefined.	
Unca (Uc)	Gently undulating stony plains.	Uc1 – Interfluvies up to 1km wide; slightly rounded stony crests and steeper margins with rounded valley heads.	Not recorded	Absent, sparse low trees or Witchetty Bush over short grasses and forbs.
		Uc2 – Valley plains without linear drainage.	Coarse textured soils including red clayey sands and red earths.	As Uc1 or sparse low trees over Hard Spinifex.
		Uc3 – Tributary valley floors: flat, unchannelled central drainage zones with some scalding.		Sparse shrubs and low trees over Hard Spinifex
		Uc4 – Low hills.	Outcrops with patches of shallow, gritty or stony soil.	Sparse shrubs and low trees over sparse forbs and grasses.

2.6. PAST ENVIRONMENTAL SURVEYS

In general, the Jervois Range area is seldom visited and poorly surveyed (White et al, 2000). Most flora and fauna records are from localities within the corridors of main roads and sites close to population centres.

In 1985, Low Ecological Services carried out a resource appraisal of Jervois Station. This project was commissioned by the then Conservation Commission of the Northern Territory and documented land systems, flora, fauna and historical and cultural aspects. While the Jervois Mine area was included within this project, it was not the focus of survey efforts. In total, 114 plant, two reptile, fifty-three bird and sixteen mammal species were recorded throughout the wider Jervois Station area (Low Ecological Services, 1985).

In 2000, Hamilton and Low conducted an environmental appraisal of Britannia Gold's mineral leases that included Jervois Mine and Kentor's tenements in the area. This survey recorded forty-two plant, 6 reptile, 35 bird and 7 mammal species.

2.7. BIOREGIONS

The Interim Biogeographic Regionalisation for Australia (IBRA) version 7 (SEWPAC, 2012) divides Australia into 89 regions of broadly similar geology, landform and biodiversity. IBRA regions for the south eastern NT and neighbouring states are shown in Map 3.

The Jervois project area occurs within the Channel Country bioregion. This region extends across the Georgina Basin into Queensland and is characterised by red earths and shallow sandy soils over Cambrian sedimentary rocks. The region is typified by plains and low, rolling hills. Higher relief is provided by isolated ranges such as the Jervois and Toko Ranges (Baker et al, 2005).

The climate is arid to semi-arid, with hot summers and mild winters and a predominantly summer rainfall (300-400mm average). Vegetation communities generally consist of *Triodia* grasslands and tall *Acacia* open-shrubland and are shown in Table 5. In the Northern Territory part of the bioregion, extensive shrublands dominated by *Acacia georginae* (Gidgee) occur (Baker et al, 2005).

Table 5; Vegetation of the Channel Country bioregion (Baker et al, 2005).

Vegetation Community	Area in Bioregion (km ²)
Eucalyptus low woodland with tussock grass understorey	597
Eucalyptus woodland with hummock grass understorey	31
Acacia woodland	16893
Hummock grassland	5258
Tussock grassland	432

Land use is predominantly pastoral, with some Aboriginal freehold land present. No protected areas or national parks occur within the bioregion.

2.8. FLORA AND VEGETATION CLASSES

2.8.1. Vegetation Classes

Two broad vegetation classes occur across the project area according to Wilson et al, 1994 (Map 6). These vegetation types closely correspond to land system boundaries, with Class 74 occurring within the Sonder land system, while Class 71 covers the remainder of the project area. These two vegetation classes are defined in Table 6.

Table 6; Vegetation classes of the project area (Wilson et al, 1994).

Vegetation Class	Description
71	<i>Acacia aneura</i> (Mulga) tall sparse shrubland with grassland understorey.
74	<i>Acacia stowardii</i> (Bastard Mulga), <i>Senna</i> , <i>Eremophila</i> sparse shrubland.

These vegetation classes were mapped at a broad scale using aerial photography. On ground survey methods such as those carried out during this project can further divided these classes into finer vegetation types according to land unit, as discussed in Sections 3.2 and 4.1 of this report.

2.8.2. Threatened Species

A search of the Northern Territory's flora atlas database showed records of seven conservation significant species (as listed by the *Territory Parks and Wildlife Conservation Act* (TPWC Act), 2007) from an area within 20km of Jervois Mine (NRETAS, 2012). These records are shown in Table 7 and their locations are shown on Map 7 and Map 8. None of these species are classified as threatened under Commonwealth legislation (*Environment Protection and Biodiversity Protection Act* (EPBC Act), 2007).

Table 7; Records of conservation significant flora from within 20km of Jervois Mine, as listed by Commonwealth and Northern Territory legislation.

Species Name	Common Name	TPWC Act Status*	EPBC Act Status*
<i>Amaranthus centralis</i>		DD	Not listed
<i>Bolboschoenus caldwellii</i>	Sea Club Sedge	EN	Not listed
<i>Eremophila cordatisepala</i>	Turpentine Bush	NT	Not listed
<i>Fimbristylis velata</i>	Veiled Fringe-rush	DD	Not listed
<i>Sauropus rigens</i>	Stiff Spurge	NT	Not listed
<i>Sida intricata</i>	Sida	NT	Not listed
<i>Sida</i> sp. Hale River (P.K. Latz 12036)	Sida	DD	Not listed
*DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered			

A report generated by the Commonwealth Governments Protected Matters Search Tool (Appendix 1) identified no threatened flora or communities as occurring or likely to occur within the same 20km search area.

2.8.3. Sites of Botanical Significance

The Jervois area exists almost entirely within the Jervois Range site of botanical significance (SOBS), as recognised by White et al, 2000 (Map 7 and Map 8). The area is of bioregional significance, with several species of flora only recorded in the Channel Country bioregion from this site. These species are listed in Table 8. It encompasses the isolated sandstone and siltstone Jervois Range and surrounding footslopes, an area of approximately 274km² (Wilson et al, 2000).

Table 8; Flora only known in the Channel Country bioregion from the Jervois Range SOBS (Wilson et al, 2000).

Species Name	Common Name
<i>Acacia monticola</i>	Minniritchie
<i>Acacia spondylophylla</i>	Curry Wattle
<i>Cheilanthes brownii</i>	Woolly Cloak Fern
<i>Abutilon cryptopetalum</i>	Hill Lantern Flower
<i>Cyperus cunninghamii</i>	
<i>Eragrostis cumingii</i>	Cuming's Lovegrass
<i>Eremophila duttonii</i>	Budda
<i>Eucalyptus intertexta</i>	Bastard Coolabah
<i>Eucalyptus normantonensis</i>	Normanton Box
<i>Ficus brachypoda</i>	Rock Fig
<i>Glossostigma diandrum</i>	Spoon-leaf Mud-mat
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	Holly Grevillea
<i>Lysiana subfalcata</i>	Mistletoe
<i>Olearia stuartii</i>	Stuart's Daisy
<i>Schoenoplectus litoralis</i>	Bulrush
<i>Sida ammophila</i>	Sand Sida
<i>Tribulus macrocarpus</i>	
<i>Chrysopogon pallidus</i>	Golden Beard Grass
<i>Bolboschoenus caldwellii</i>	Sea Club Sedge
<i>Fimbristylis velata</i>	Veiled Fringe-rush

2.9. FAUNA

A search of the Northern Territory's fauna atlas database showed records of ten conservation significant species, excluding those listed as Extinct (as listed by the *Northern Territory Parks and Wildlife Conservation Act (TPWC Act)*, 2007) from an area within 20km of Jervois Mine (NRETAS, 2012). These species are listed in Table 9.

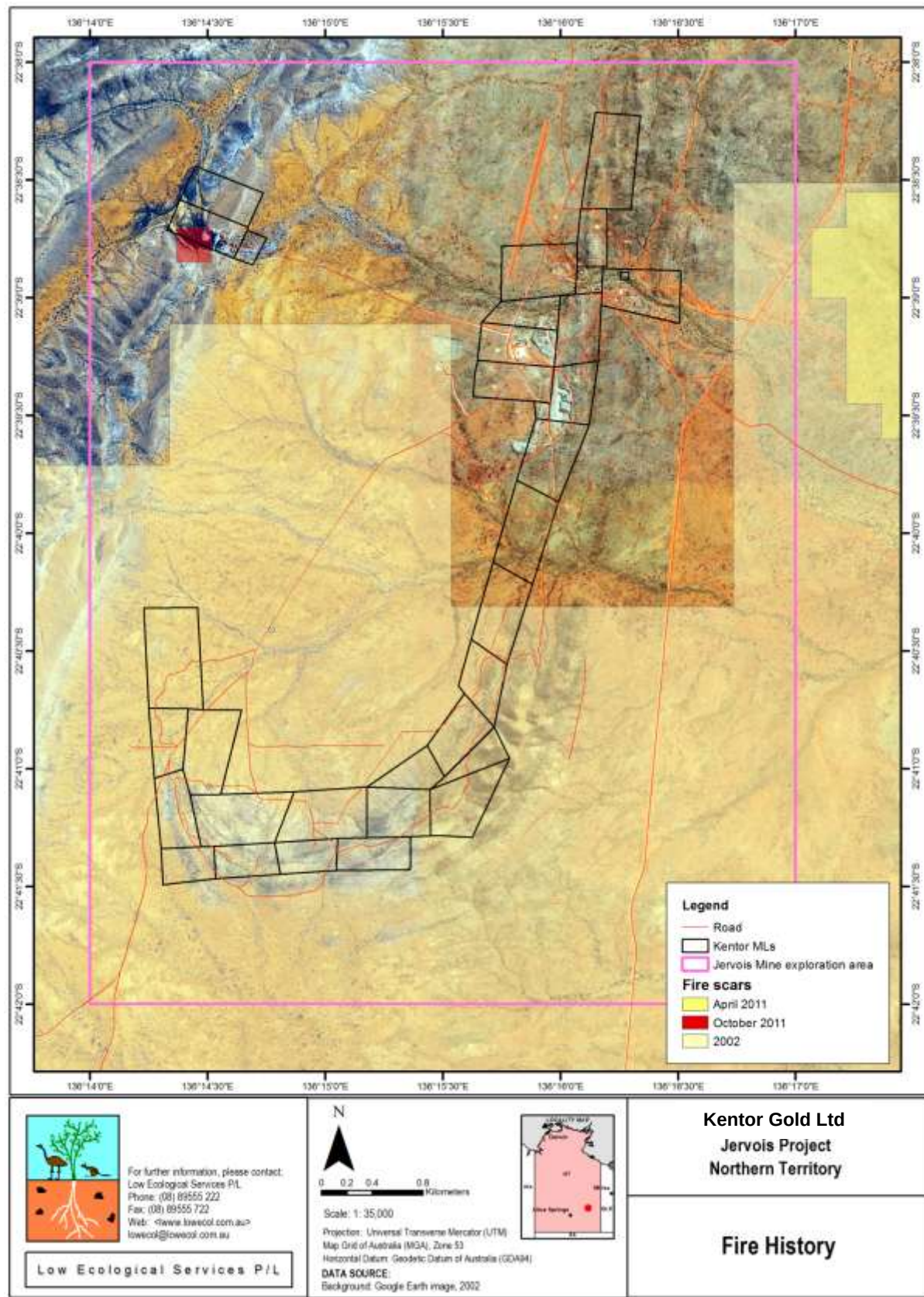
Of those species listed, *Isoodon auratus* (Golden Bandicoot) and *Macrotis lagotis* (Bilby) are known to no longer occur within the search area, with the most recent records of either species being an observation of a Bilby in 1969 (NRETAS, 2012).

Two of the species shown in Table 9 are also listed as threatened under Commonwealth legislation (*Environment Protection and Biodiversity Protection Act (EPBC Act)*, 2007).

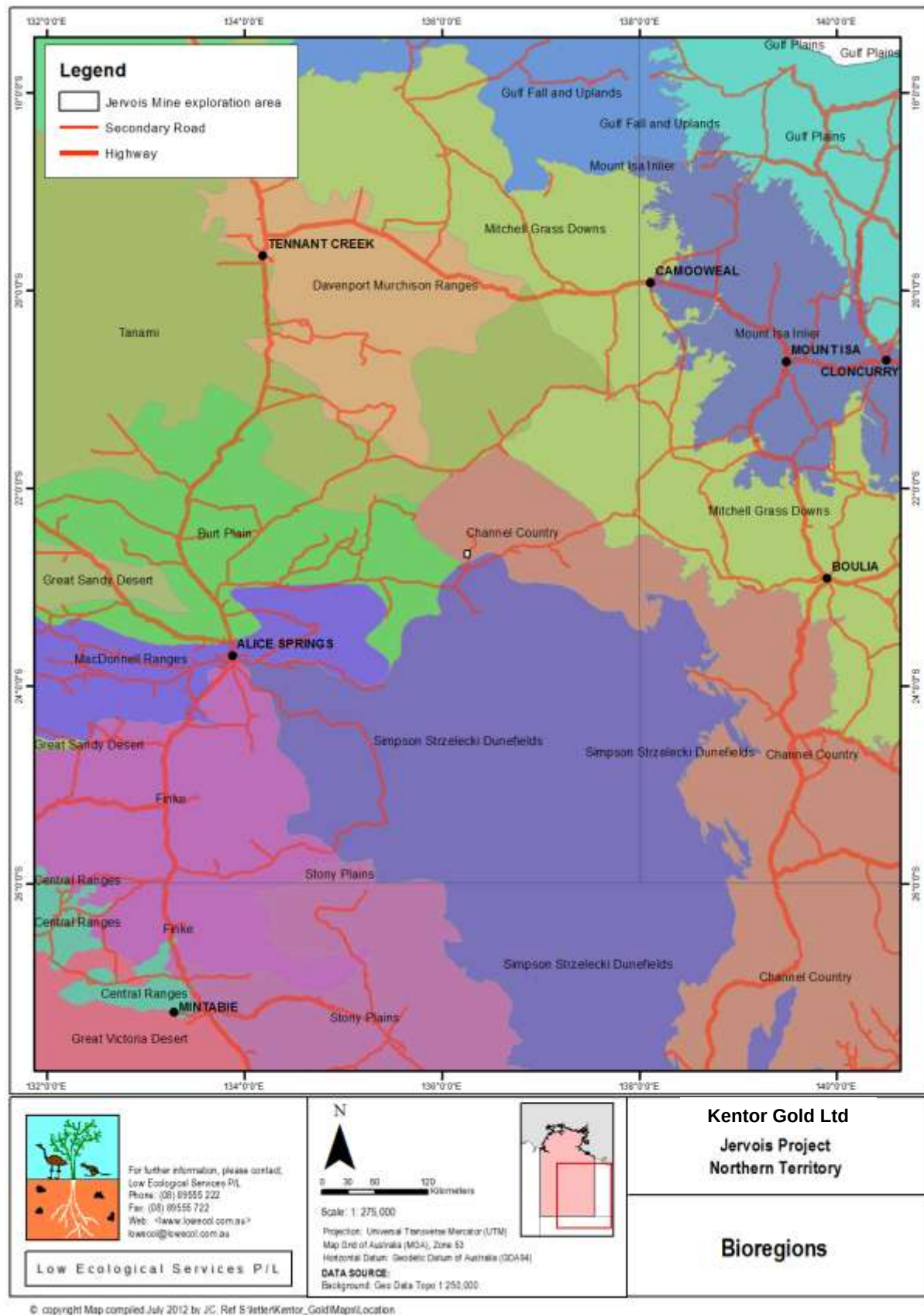
Table 9; Records of conservation significant fauna from within 20km of Jervois Mine, as listed by Commonwealth and Northern Territory legislation.

Species Name	Common Name	TPWC Act Status*	EPBC Act Status*
<i>Ardeotis australis</i>	Australian Bustard	VU	
<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black Cockatoo (Central Australian subspecies)	NT	
<i>Conopophila whitei</i>	Grey Honeyeater	DD	
<i>Dromaius novaehollandiae</i>	Emu	VU	
<i>Isodon auratus</i>	Golden Bandicoot	EN	VU
<i>Rattus villosissimus</i>	Long-haired Rat	NT	
<i>Sticonetta naevosa</i>	Freckled Duck	NT	
<i>Macrotis lagotis</i>	Bilby	VU	VU
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum (Southern NT)	EN	
<i>Lagorchestes conspicillatus</i>	Spectacled Hare Wallaby	NT	
*DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered			

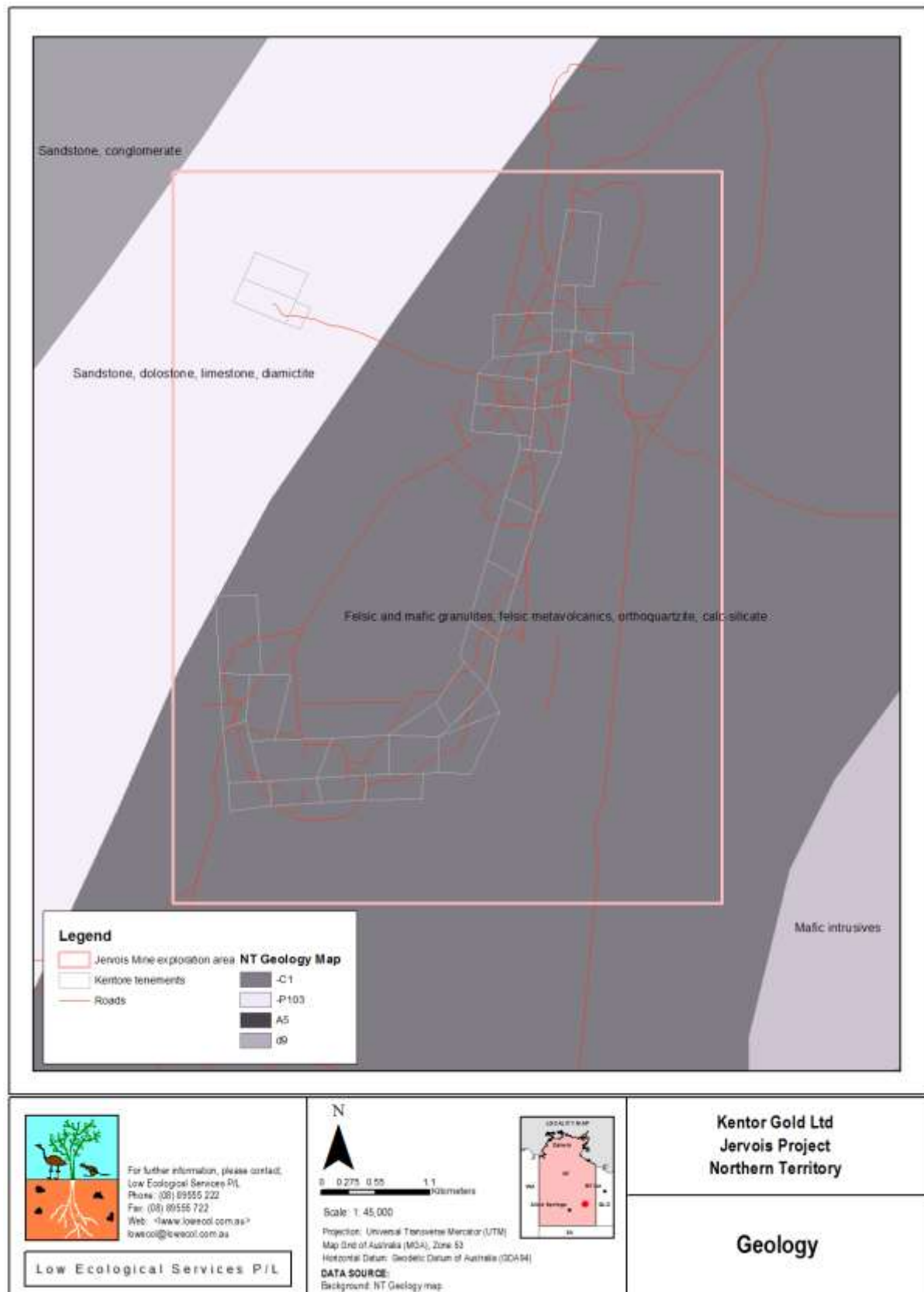
A report generated by the Commonwealth Government's Protected Matters Search Tool (Appendix 1) identified three threatened, nine migratory and seven marine species as occurring or likely to occur within the same 20km search area. These are shown in Appendix 1. Of the threatened species listed in the Protected Matters report, two do not occur in NT fauna atlas records for the search area. These are *Rostratula australis* (Australian Painted Snipe) and *Dasyercus cristicauda* (Mulgara). However, a recent sighting of a single Australian Painted Snipe was recorded at Jervois Dam in March 2012. This sighting was made by Michael Green, a Kentor geologist and the record published on a website forum (Eremaea Birds, 2012).



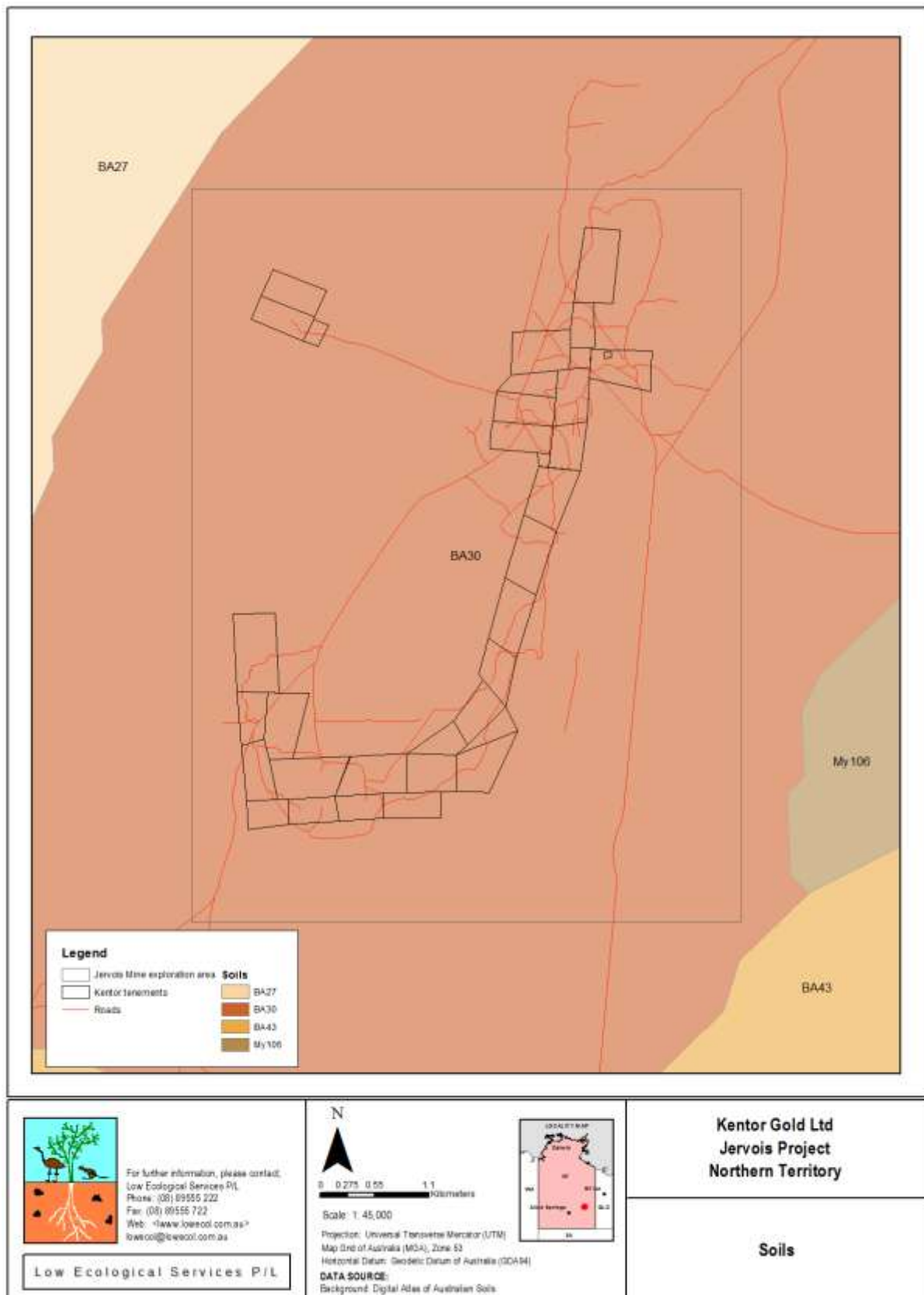
Map 2; Fire history of the project area (Northern Territory Government, Charles Darwin University, 2012).



Map 3; IBRA regions of south eastern NT and adjoining parts of SA and QLD (SEWPAC, 2012).

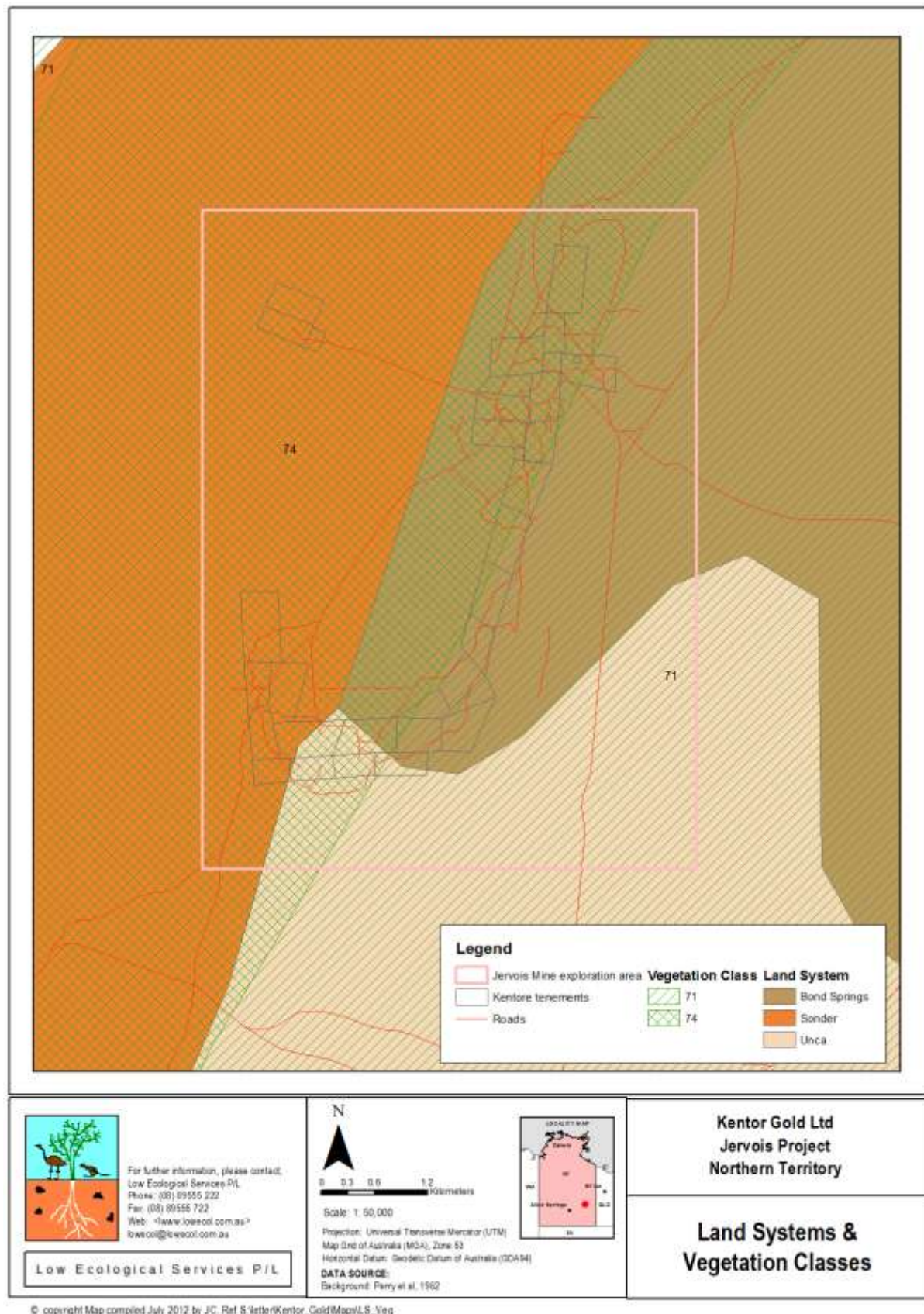


Map 4; Geology of the project area (Bureau of Rural Sciences after Australian Geological Survey Organisation, 1991).

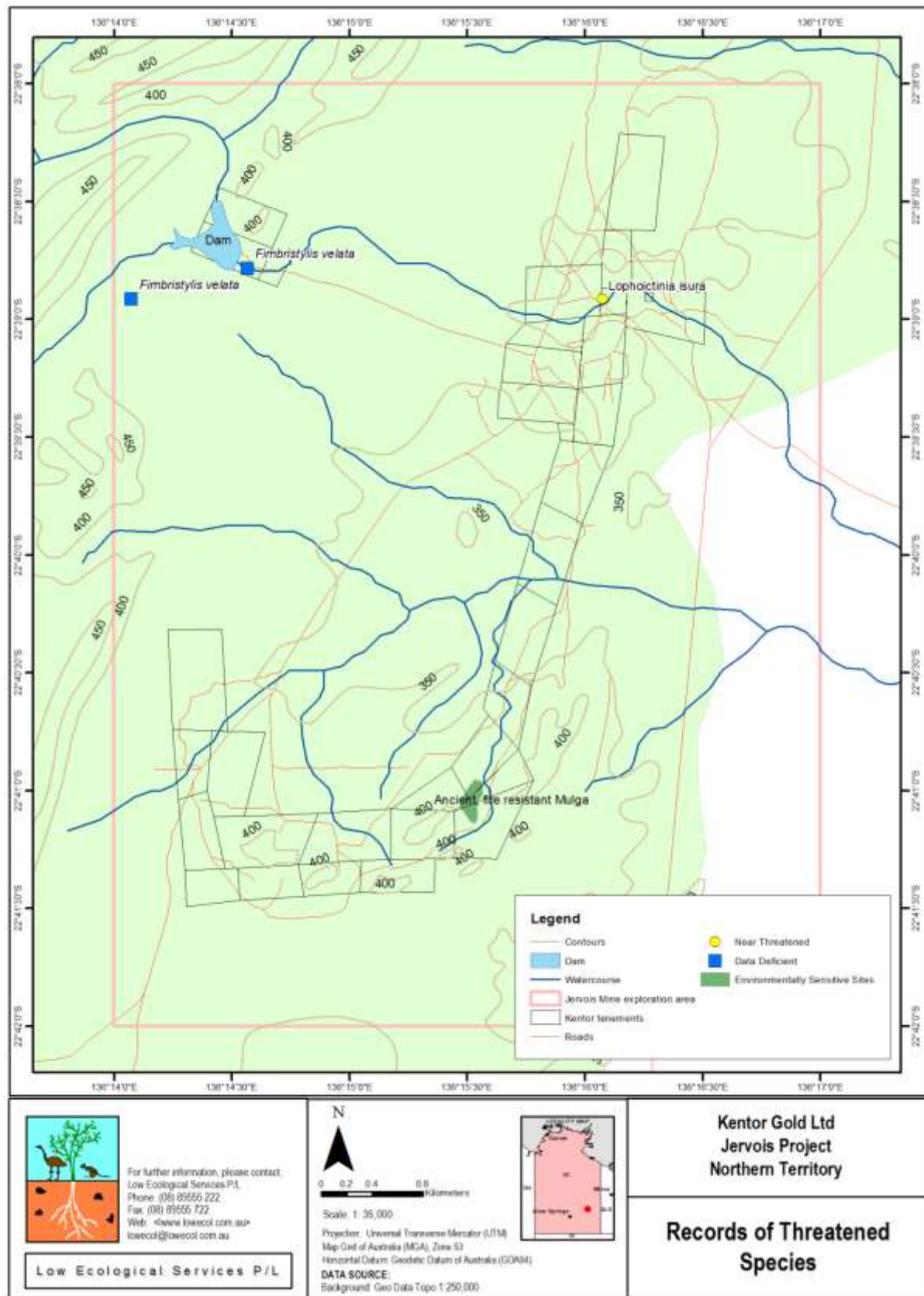


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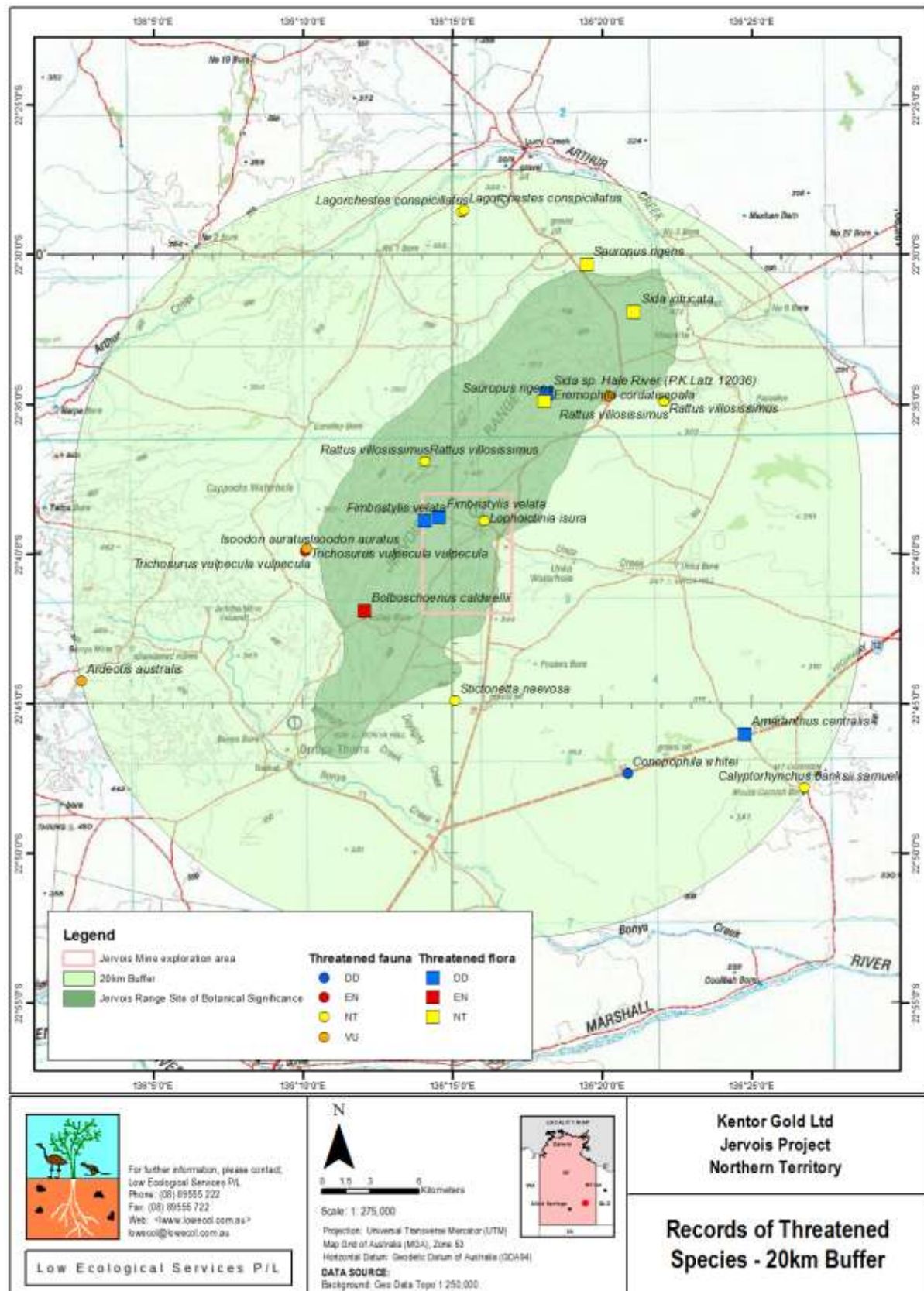
Map 5; Soils of the project area.



Map 6; Land systems (Perry et al. 1962) and vegetation classes (Wilson et al, 1994) of the project area.



Map 7; Environmentally significant sites, showing records of threatened species (NRETAS, 2012), sites of botanical significance (White et al, 2000) and sites identified by LES in previous surveys (Hamilton & Low, 2000).



© copyright Map compiled July 2012 by JC. Ref S:\letter\Kentor_Gold\Maps\Thr_Species_20km

Map 8; Records of threatened species from within 20km of the Jervois mine (NRETAS, 2012).

3. METHODS

3.1. SURVEY OVERVIEW AND LIMITATIONS

A flora, fauna and landscape survey was carried out by Low Ecological Services from the 18th until the 21st of July, 2012. Weather was dry with mild days and cold nights. Conditions were too cold at night to allow small mammals and reptiles to be active, although larger mammals continued to be observed.

The high rainfall that fell in 2010 and the beginning of 2011 had led to significant growth of vegetation, particularly grasses. Rank growth of *Aristida* and *Enneapogon* species occurred at most sites, however dry, cold weather over winter months had impacted on short grass-forb understoreys of woodland communities. Many of these species were in the final stage of their life cycle. A dry autumn and winter period also meant that few forb species were present.

Grasses had passed the seeding stage of their life cycle, meaning that significant resources for fauna such as seed eating birds and rodents were available on the ground but green grasses were uncommon. Evidence of a recent period of high resources was present from various fauna signs, such as burrows of *Rattus villosissimus* (Long-haired Rat), as is discussed in Section 4.4.8. Few plants were flowering during the survey period.

Bushfires that burnt large areas of Central Australia in 2011 had not reached the survey area, and sites showed little evidence of recent burning. However fire scar mapping (Map 2) and observed signs of disturbance shows that the area does experience fires at times.

Five sites were chosen for detailed surveying and establishment of trapping lines. These sites were chosen to represent the major land units occurring within the area, according to Perry et al, 1962. These land units were further divided into local land units by a drive over survey of the project area and more detailed survey methods as discussed further in this Section. In addition to these five sites, site descriptions at points of interest or habitat changes were undertaken during drive over surveys to provide a broad overview of the habitats that occur. The five sites allowed us to focus on specific habitats within the relative uniformity of plant species over the general area.

The survey was limited due to cool weather conditions, short survey duration and seasonality. Species that require warmer conditions to promote activity, such as reptiles, were not observed.

Also, migratory or nomadic species that may utilise the area during summer or after rain events were not present. Additional fauna and flora surveying undertaken, especially towards March or April 2013 would account for these limitations.

3.2. LAND UNIT MAPPING

Three broad land systems occur across the Jervois area, as discussed in Section 2.6 (Perry et al, 1962). However, these land systems can further be divided into smaller land units based on local topography, soils and vegetation types.

Land units were mapped during this project by comparing survey observations of landscape and vegetation communities with satellite imagery from Google Earth and aerial photography.

3.3. SITE DESCRIPTION SUMMARIES

Site descriptions were carried out at each of the five trapping sites, detailing landscape characteristics and vegetation dominance. In addition to the five survey sites, further site descriptions were undertaken over accessible parts of the lease area where communities appeared sufficiently different from the trap sites.

Location of site descriptions is shown in Appendix 7 and description summaries are provided in Appendix 4.

3.4. FLORA

Flora was sampled in detail at each of five survey sites. A 100m point transect method was used, with species recorded at one metre intervals. Site J05 was situated in a montane valley and ridge. In this instance, two transects were used to sample vegetation communities from each habitat. In all cases, species that were present at the site but did not occur on the transect were recorded as incidental species.

Plants that could not be identified in the field were collected as voucher specimens. These were compared with Northern Territory Herbarium material at a later date for identification.

The location of vegetation transects is shown in Appendix 7.

3.5. FAUNA

Traps for reptiles and small mammals were set at each of the five survey sites. Each trap line consisted of 25 Elliott style box traps. Two pit traps were used at three sites; however rocky outcrop soils prevented their use on the remaining trap lines (**Error! Reference source not found.**). Where pit traps were employed, funnel traps were also used. Trapping took place over three nights at all sites.

Elliott traps were set at approximately 10 m intervals, estimated by pacing the distance, while pit traps were placed at 50m intervals. Each pit trap consisted of a 25L bucket with a drift fence extending approximately 5 m either side. At each pit, a funnel trap was placed at either end of the drift fence. Where possible, track beds of various dimensions were prepared by scraping the ground with a boot or shovel.

Trap lines were checked each morning during the survey period and left open during the day, as the weather conditions were cool. Captured animals were identified, photographed and measured, then released promptly. Animals that could not be identified in the field were photographed, concentrating on diagnostic features such as foot pads, for later identification.

Birds were recorded while walking trap lines each morning. Birds were identified by sight and call. Ground dwelling birds such as button quails have been caught in funnel traps during previous surveys, but were not targeted by the placement of traps during this survey.

Incidental sightings of tracks, scats and other traces of fauna were also recorded, both at survey sites and when travelling throughout other areas of the tenements. Spotlighting was carried by vehicle on the first night of the survey period. Where possible, track beds were smoothed in front of traps, buckets and along tracks to increase potential for recording fauna using the area.

Three remote cameras were used to sample for larger fauna. Two were set at watering points and were unbaited. A third was set in *Eucalyptus camaldulensis* (River Red Gum) woodland upstream of Jervois Dam. This camera was baited and situated in an area to target *Trichosurus vulpecula vulpecula* (Brush-tailed Possum).

Invertebrates were not sampled during this survey.

Locations of fauna survey sites are shown in Appendix 7.

Table 10; Trapping methods employed by survey site.

Survey Site	Trapping Methods
J01	25 Elliott, 2 Pit, 4 Funnel traps
J02	25 Elliott, 2 Pit, 4 Funnel traps
J03	25 Elliott traps
J04	25 Elliott, 2 Pit, 4 Funnel traps
J05	25 Elliot traps

4. RESULTS

4.1. LAND UNIT AND VEGETATION MAPPING

Based on results of this survey, past surveys (Low Ecological Services, 1985 & Hamilton & Low, 2000) and the use of satellite and aerial imagery, nine of the land units listed in Table 4 were identified as occurring within the project area. Observations and survey results also indicated that boundaries of the land systems mapped by Perry et al, 1962 should be used as a guide only and that adjustments are necessary to reflect local variations.

The survey indicates that the majority of the Jervois area falls within the Bond Springs (Bs) land system, consisting mainly of unit Bs4; a unit of undulating plains and drainage flats at the base of other Bs units. This system is dissected by numerous drainage lines and tributary channels that make up the Bs5 land unit. Ore bearing schists and other felsic and mafic rocks that occur as ranges and low hills at the Marshall, Green Parrot, Reward and Bellbird prospects represent the remaining Bs land units shown in Table 11.

The Sonder (So) and Unca (Uc) land systems occupy the north western and southern portions of the project area respectively. The So system shows distinct differences in landscape and geology, being composed of sedimentary sandstone and quartzite in the form of steep, benched cuestas and ridges. The survey has shown that three land units exist within this system and that while structure of vegetation communities resemble those in land units Bs2 and Bs3, species assemblages differ (Table 11).

Two land units exist within the Uc system, with the low hills of Uc4 occurring close to Bs3. The stony interfluvies of Uc1 occur at the base of these hills and the numerous drainage channels that occur within this unit show a distinct vegetation type from the drainage channels of Bs5 (Table 11).

Map 9 shows the extent of the land units mapped during the survey.

Results of flora surveys (Section 4.3) also indicate that while structure of vegetation communities listed in Table 4 are accurate, species assemblages may differ from those listed by Perry et al, 1962 due to the broad nature of the original mapping. Eight vegetation types were differentiated based on results, as shown in Table 12 and Map 12.

Table 11; Land units present in the project area. Units are based on Perry et al, 1962, with vegetation communities as observed during this survey.

Land System	Land Unit	Vegetation Community	Dominant Species
Bond Springs	Bs2	1	<i>Triodia basedowii</i> <i>Enneapogon oblongus</i> <i>Acacia spondylophylla</i> <i>Corymbia apparrerinja</i>
		4	<i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Senna artemisioides</i> subsp. <i>helmsii</i> <i>Enneapogon polyphyllus</i> <i>Aristida holathera</i>
		2	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
	Bs3	2	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
		1	<i>Triodia basedowii</i> <i>Enneapogon oblongus</i> <i>Acacia spondylophylla</i> <i>Corymbia apparrerinja</i>
		5	<i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Enneapogon polyphyllus</i>
	Bs4	5	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauc</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i> <i>Eragrostis eriopoda</i>
		2	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
		3	<i>Acacia estrophiolata</i> <i>Acacia aneura</i>

Land System	Land Unit	Vegetation Community	Dominant Species
			<i>Acacia tetragonophylla</i> <i>Pterocaulon sphacelatum</i> <i>Cenchrus ciliaris</i> <i>Themeda triandra</i>
		7	<i>E. camaldulensis</i> <i>Acacia estrophiolata</i> <i>Themeda triandra</i> <i>Cenchrus ciliaris</i> <i>Eulalia auria</i>
		8	<i>Acacia georginae</i> <i>Enneapogon polyphyllus</i> <i>Sclerolaena bicornis</i>
	Bs5	7	<i>E. camaldulensis</i> <i>Themeda triandra</i> <i>Cymbopogon ambiguous</i> <i>Triodia longiceps</i>
		5	<i>Corymbia apparrerinja</i> <i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Aristida holathera</i>
Sonder	So1	1	<i>Triodia pungens</i> <i>Acacia spondylophylla</i> <i>Acacia monticola</i> <i>Grevillea wickhamii</i> <i>Eremophila latrobei</i>
	So3	1	<i>Triodia pungens</i> <i>Acacia aneura</i> <i>Senna artemisioides helmsii</i>
	So5	6	<i>Acacia aneura</i> <i>Acacia kempeana</i> <i>Corymbia opaca</i> <i>Triodia pungens</i>
		7	<i>Eucalyptus camaldulensis</i> <i>Euphorbia drummondii</i>
Unca	Uc1	2.	<i>Acacia aneura</i> <i>Senna artemisioides oligophylla</i> <i>Atalaya hemiglauca</i> <i>Aristida holathera</i> <i>Enneapogon polyphyllus</i>
		3	<i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Acacia tetragonophylla</i> <i>Pterocaulon sphacelatum</i> <i>Cenchrus ciliaris</i> <i>Themeda triandra</i>
		5	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauca</i> <i>Senna artemisioides subsp. oligophylla</i> <i>Aristida holathera</i> <i>Eragrostis eriopoda</i>
	Uc4	2	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauca</i> <i>Enneapogon polyphyllus</i> <i>Aristida holathera</i>

Land System	Land Unit	Vegetation Community	Dominant Species
		5	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauca</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i> <i>Eragrostis eriopoda</i>

Table 12: Vegetation types of the Jervois project area.

Vegetation Community	Description
1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees.
2	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs.
3	<i>Acacia estrophiolata</i> tall, open woodland over short grasses with sparse shrubs.
4	Tall <i>Acacia aneura</i> woodland over short grasses in fire protected valleys and upper reaches of drainage lines.
5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges.
6	Sparse low <i>Acacia</i> woodland over hummock grasses.
7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds.
8	<i>Acacia georginae</i> (Gidgee) dominated woodland. Sparse grass and forb understorey.



Figure 3; Land unit Bs2 (foreground) and Bs3 (mid-ground). Looking south west towards the Unca and Sonder land systems.



Figure 4; Headwaters of drainage lines within steeper valleys of the Bs2 land unit contain fire sensitive communities such as the old growth *Acacia aneura* (Mulga) shown here.



Figure 5; Land unit Bs4. Sparse *Acacia* or *Corymbia* woodlands and shrublands.



Figure 6; Land unit Bs5; tall *Eucalyptus camaldulensis obtuse* (River Red Gum) woodland. This land unit is grazed heavily.



Figure 7; Bold sandstone ridges of land unit So1.



Figure 8; Land unit So3, on the lower slopes below So1.



Figure 9; Land unit So5 (middle of picture) - channels between mountainous So units with sandy flats alongside the channels. This area has been altered by the construction of Jervois Dam, with the build-up of clayey sediments in the valley behind the dam wall.



Figure 10; Low hills of land unit Uc4 in the south of the Jervois area.



Figure 11; Land unit Uc1. The stony soil of the interfluvial areas that define this unit is displayed in this old costean.

4.2. SITE DESCRIPTION SUMMARIES

Site descriptions show that the project area is predominately a system of undulating alluvial plains at the base of low hills and ridges. These plains are dissected by numerous drainage channels, particularly in the centre of the area (Map 7). Where they abut hills and ranges, these plains have stony soils and are characterised by low shrublands dominated by *Acacia sibirica* (Bastard Mulga) over *Aristida holathera* (Erect Kerosene Grass). Elsewhere, red earth soils predominate and sparse woodlands of *Corymbia opaca* (Bloodwood), *C. apperrerinja* (Ghost Gum) or *Acacia estrophiolata* (Ironwood) occur. This is replaced by tall *Eucalyptus camaldulensis* (River Red Gum) woodland over sparse grasses along drainage channels.

In the northwest within the mountainous Sonder land system, steep sedimentary ranges occur. This is characterised by ridge tops of outcrop and skeletal soils with *Triodia pungens* (Soft Spinifex) grassland and sparse, low shrubs and stony footslopes of sparse *Acacia aneura* (Mulga) woodland over Soft Spinifex. Drainage lines within this area are also vegetated with tall River Red Gum woodland.

Ranges and low hills in the east and south of the project area are distinct from the above, with igneous and metamorphic geology and distinct vegetation communities. Higher relief areas here are dominated by a sparse shrubland of *Acacia spondylophylla* (Curry Wattle) over *Triodia basedowii* (Hard Spinifex) on skeletal soils. Associated low hills and footslopes with shallow, stony soils are vegetated with sparse shrubland of *Senna* sp. and Bastard Mulga over *Enneapogon polyphyllus* (Woolly Oat Grass). Drainage channels within these hills contain tall woodlands of mature Mulga and other fire sensitive species such as *Psydrax latifolia* (Native Currant).

Plains along the southern boundary of the project area are composed of various interfluvies of the Unca land system. The stony soils are vegetated with a sparse shrubland of mixed *Acacia* species over short grasses. Drainage lines here are distinct from those elsewhere in the project area, with a tall woodland of Ironwood and Mulga replacing River Red Gum communities.

Site description data for all sites is provided in Appendix 4.

4.3. FLORA

4.3.1. Site J01

Site J01 was located within MLS 51 in the north of the project area and within the Bond Springs land system (Map 10). The site was situated on the floodplain and adjacent channel of Unca Creek, in Land Units Bs4 and Bs5. Vegetation at this site ranged from sparse tall woodland of *Corymbia apparrerinja* (Ghost Gum) and *Acacia estrophiolata* (Ironwood) over a short grass-forb community on the floodplain. Along the channel of Unca Creek, a tall woodland of *Eucalyptus camaldulensis obtusa* (River Red Gum) over sparse grasses occurred. Grasses in this community included the introduced *Cenchrus ciliaris* (Buffel Grass). A small area of alluvial gravelly and stony soil near the river channel had an understorey dominated by *Triodia longiceps* (Giant Grey Spinifex).

Thirty-eight species were recorded here. They are listed in Appendix 5. Many forbs and grasses had died off after the dry, cold winter period and could not be identified. It is likely that further species would be recorded from this site if surveys were carried out during a wet season.

No species with a status above Least Concern under the *TPWC* Act or the *EPBC* Act were recorded at this site.

4.3.2. Site J02

Site J02 was located adjacent to MLS 52 and MLS 47 in the north of the project area and near the site of the former mine township (Map 10). The site was positioned on the eastern lower to upper slopes of a range of low schist hills in the Bond Springs land system and within Land unit Bs3. Mid to upper slopes at this site were dominated by a shrubland of *Acacia sibirica* (Bastard Mulga) over *Senna artemisioides* subsp. *oligophylla* (Blunt-leaf Cassia) and *Enneapogon polyphyllus* (Woolly Oat Grass). This graded into tall sparse woodland of Ironwood and *Atalaya hemiglauca* (Whitewood) over *Aristida holathera* (Erect Kerosene Grass) towards the lower slopes and adjacent undulating plains.

The site was characterised by the rank growth of *Aristida* grasses and sapling Ironwood groves. As at site J01 however, much of the forb-grassland understorey had died off due to seasonality and weather conditions. Seventeen species were recorded, but it is likely further species would occur at other times of the year and under different climatic conditions.

No species with a status above Least Concern under the *TPWC* Act or the *EPBC* Act were recorded at this site. A list of species recorded at this site is provided in Appendix 5.

4.3.3. Site J03

This site was located on the steep lower to upper slopes of the Sonder land system of the Jervois Range, in HLDS 20 and HLDS 21 (Map 10). The site showed a distinct flora community from the schist ranges and hills elsewhere in the project area. Species such as *Acacia monticola* (Red Wattle), *Eremophila freelingii* (Rock Fuchsia) and *Grevillea wickhamii* (Holly Grevillea) were only recorded at this site. Populations of Holly Grevillea in the Jervois Range constitute the only records of this species in the Channel Country bioregion, although this is not the eastern distribution limit of the species.

Vegetation structure consisted of hummock grassland dominated by *Triodia pungens* (Soft Spinifex) with sparse shrubs of Red Wattle and Holly Grevillea. On lower slopes, taller Whitewood occurred and isolated groves of *Acacia aneura* (Mulga) grew on upper slopes. It is representative of Land Units So1 and So3.

The Data Deficient *Fimbristylis velata* (Veiled Fringe Rush) was formerly recorded near this site. Despite searches of the area and several specimens of *Fimbristylis* species sent to the herbarium for identification, *F. velata* was not recorded during the survey.

Twenty-six species were recorded here. These species are listed in Appendix 5.

4.3.4. Site J04

This site was situated within Land Unit Bs4 in MCS 13 (Map 10). Tall open woodland dominated by Ironwood and *Corymbia opaca* (Bloodwood) typified this site, over *Senna artemisioides* subsp. *helmsii* (Blunt-leaved Cassia) and rank Erect Kerosene Grass. A small drainage channel crossed the transect, vegetated with low Mulga woodland.

As at site J02, this site was typified by the rank growth of grasses, most of which had died off due to climatic conditions and seasonality. Few forbs were present.

Eremophila cordatisepala was recorded at the site (Map 10). This species is listed as Near Threatened under the *TPWCA* and is restricted to the Channel Country bioregion. The species is described as being rare, although not currently threatened, with small populations distributed

throughout the Channel Country bioregion (White et al, 2000). The record is significant as the population within the Jervois area constitutes the western limit of the species distribution.

No other significant or threatened species were recorded at this site. A total of twenty-two species were found here. They are listed in Appendix 5.

4.3.5. Site J05a and J05b

This site was located within the schist hills and ridges of MLS 55, being part of the Bs2 and Bs3 land units and bordering the Unca land system (Map 10). The site ranged from a drainage channel, through lower and mid slopes to the upper slopes of schist ridges. Two distinct vegetation communities were represented within the site. Vegetation transects were carried out in each community, with J05a conducted within the drainage line and lower slopes, while J05b took place on mid-upper slopes.

J05a was dominated by tall, old growth Mulga with an understorey of three *Senna artemisioides* variants; *helmsii*, *oligophylla* and *quadrifolia*. Rank growth of Erect Kerosene Grass and Woolly Oat Grass occurred on the lower slopes, while grasses within the drainage channel included *Themeda triandra* (Kangaroo Grass). This fire sensitive community was distinct from others surveyed, and was observed to be largely restricted to similar areas within the project area.

J05b resembled site J03 in community structure, however species differed. The hummock grassland was dominated by *Triodia basedowii* (Hard Spinifex) with some *Enneapogon oblongus*. A sparse low shrub layer of *Acacia spodylophylla* (Curry Wattle) was present. Although not occurring along the transect, isolated emergent Ghost Gums were present within similar habitat nearby.

In total, twenty-seven species were recorded at J05a and twenty-six at J05b. No species with a threatened status under the *TPWC* Act or the *EPBC* Act were recorded.

4.3.6. Incidental Records

Surveyed sites were representative of vegetation communities that occur across the project area. As such, only ten species (including two introduced) were recorded as incidental species that did not occur at any survey site. Due to the seasonality and climatic conditions present, it is likely that more species are present under more favourable conditions. Further surveying during a wet season would likely increase the species list shown in Appendix 5.

4.3.7. Introduced Flora and Weeds

Four species of introduced flora were recorded during the survey. These are shown in Appendix 8. Of these, *Cenchrus ciliaris* (Buffel Grass) and *Tamarix aphylla* (Athel Pine) are identified by the Protected Matters Report (Appendix 1) (SEWPAC, 2012) as invasive species and a threat to biodiversity.

Buffel Grass is now naturalised in the southern Northern Territory and is widely used as fodder by pastoralists in the vicinity of Jervois. Athel Pine is a woody weed that is recognised as a severe threat to biodiversity where naturalised populations occur. Those observed during this survey are the result of plantings by pastoralists and the species does not appear to be naturalised.

Athel Pine and plants in the *Cylindropuntia* genus (Coral Cactus) are included on the Weeds of National Significance (WoNS) list (Thorp, J.R., Wilson, M., 1998 onwards). Athel Pine is the only species listed as a declared weed under the Northern Territory's *Weed Management Act*, 2001. This species is listed as a class B/C weed. Control of the growth and spread of Class B weeds is required under the *Weed Management Act*, 2001.

Buffel Grass, Athel Pine and Coral Cactus were restricted to disturbed sites such as former mine facilities (eg. the village site) and areas more heavily grazed by cattle. While Buffel Grass was widespread across the project area, occurring at four of the survey sites, other species were limited to areas close to probable sites of introduction. These locations are shown in Appendix 8 and Map 11.

Cylindropuntia cactus, probably *C. fulgida* (Coral Cactus) is a distinctive species that is unlikely to be confused with any other in the area (Appendix 8). The plant is easily spread when leaflets are broken from parent plants and transported by attaching to vehicles, livestock and people. Once naturalised, they are difficult to control (Dhanji, 2009). Seedlings are becoming widespread in the area shown on Map 11. The area of infestation occurs adjacent to a watercourse and the main access road to the Jervois Mine. Potential exists for this weed to be spread further along these dispersal corridors. Control of this species should be a priority.

Vachellia farnesiana (Prickly Mimosa) occurred as scattered plants in drainage channels and on floodplains. The origin of this species is uncertain; it is thought to be from a pre-European

introduction (Purdie et al, 2008). Although the plant can occasionally form dense thickets, this was not observed anywhere in the Jervois project area.

Further disturbance of the project area from mining activities present a significant risk of further spread of species shown in Appendix 8. Potential also exists for the introduction of additional weed species. Management obligations exist for species declared under the *Weed Management Act, 2001*. These obligations and recommendations for managing risks are discussed in Section 5.

4.3.8. Summary of Flora Results

Ninety-one species from fifty-four genera and twenty-three families were recorded in the Jervois project area. While vegetation communities were generally uniform throughout the survey area, it is apparent that local variations occur due to changing topography and geology in the survey area. Communities range from *Corymbia* (Bloodwood) and *Acacia estrophiolata* (Ironwood) open grassy woodlands on undulating plains and floodplains of watercourses to *Triodia* (Spinifex) grasslands on mid and upper slopes of steeper ranges. Lower slopes were vegetated with sparse shrublands, including tall, mature *Acacia aneura* (Mulga) in fire protected valleys, while the courses of larger drainage lines were dominated with tall *Eucalyptus camaldulensis* (River Red Gum) woodlands.

Site J01 was the most diverse, with thirty-eight species recorded. Only seventeen species were recorded at site J02, making this the least diverse of all survey sites. At all sites, stress from dry, cold climatic conditions was evident, with forbs and grasses having begun to die off. Few plants were in flower due to seasonality and climatic conditions. It is likely that given more favourable conditions during warm seasons, further species, particularly forbs and grasses, would be recorded

Vegetation on sedimentary ridges of the Jervois Range in the north west of the area was distinct, with the dominant shrub species *Acacia monticola* and *Grevillea wickhamii* (Holly Grevillea) not recorded elsewhere within the survey area. Records of Holly Grevillea within the Jervois Range constitute the only records of this species within the Channel Country bioregion.

Tall River Red Gum woodland within the vicinity of the Jervois Dam (Map 10) is also distinct and was experiencing a mass recruitment event not seen elsewhere where this vegetation community occurred (Figure 13).

Only one species of conservation significance was found during the survey. The low shrub *Eremophila cordatisepala* was found at site J04 (Map 10). This plant was identified from comparison

of a specimen collected in the field with herbarium material. Listed as Near Threatened under Northern Territory legislation, records within the vicinity of the Jervois Range are the western distribution limit of the species. Only one other record of the species within 20km of the survey area exists within the Northern Territory Government's Flora Atlas Database (Map 8). No species listed as threatened under Commonwealth legislation were recorded.

Four introduced species were found during the survey. These species are listed in Appendix 8. Of these, one species (*Tamarix aphylla*) is a declared class B weed under Northern Territory legislation. A second species (*Cylindropuntia fulgida*) is listed as a Weed of National Significance by the Commonwealth.



Figure 12; Few plants were flowering at the time of the survey. This *Trachymene glaucifolia* (Blue Parsnip) was found in a disturbed area near J05.



Figure 13; Mass germination of *Eucalyptus camaldulensis obtusa* (River Red Gum) on drainage flats and floodouts upstream of Jervois Dam.



Figure 14; *Corymbia apparrerinja* (Ghost Gum) dominated sparse woodland community at site J01.



Figure 15; Sapling *Acacia estrophiolata* (Ironwood) and rank growth of *Aristida holathera* (Erect Kerosene Grass) was characteristic of site J02.



Figure 16; *Grevillea wickhamii* (Holly Grevillea). In the Channel Country bioregion recorded only from the Jervois Range. This species was present at site J03.



Figure 17; The Near Threatened *Eremophila cordatisepala* reaches its western distribution limit near Jervois. This species was collected as a voucher specimen at site J04.



Figure 18; The low shrub *Acacia spondylophylla* (Curry Wattle) was common on mid-upper slopes of site J05b.



Figure 19; Mature Mulga community of site J05a.

4.4. FAUNA

4.4.1. Site J01

Three species of mammal and fifteen species of bird were recorded at this site. No reptiles were recorded. Trapping results were poor, with only one animal caught in a pit trap over the three night trapping period. No captures were made using any other trapping method.

From signs of disturbance evident at the site, it was evident that cattle used the area regularly. Several large reptile burrows were observed across the site. Although they were inactive, it is apparent that the area is frequented by at least *Varanus gouldii* (Sand Goanna) and possibly *Varanus giganteus* (Perentie). Observations and photographs made by Kentor employees at work sites close

to J01 indicate that the large python *Aspidites melanocephalus* (Black-headed Python) also occupies the area.

The site contains habitat that is suitable for a range of small mammal species including rodents and dasyurids, as results from previous surveys suggest. It is likely that climatic and seasonal conditions were reflected by the poor trapping results. Greater reptile diversity is also likely to occur than was recorded under prevailing conditions during the survey period.

No species of conservation concern were recorded at this site. A full list of species recorded is provided in Appendix 6.

4.4.2. Site J02

Results at site J02 were similar to those recorded at the previous site. Four species of mammal were found here, including two species caught in Elliott traps. Abandoned burrows of *Rattus Villosissimus* (Long-haired Rat) were spread throughout the site, indicating that this species had recently been common here. Inactivity at burrows, age of scat and trapping results indicate that this species is no longer present at the site.

Long-haired Rats are known to experience large population irruptions and range extensions during favourable conditions (Menkhorst, P.& Knight, F., 2004). From survey results it would seem that conditions resulting from high rainfall in 2010-2011 allowed Long-haired Rats to move to the area but that they have now experienced a natural decline as conditions have become unsuitable. The species has plagued and collapsed over much of central Australia over the last 3 years. This trend is illustrated by results of repeat surveys on Ammaroo Station, approximately 170km north-west of Jervois, between May 2011 and July 2012 (Carpenter, Stewart & Low, 2011, Carpenter & Low, 2012 and Clark, H., 2012).

No reptiles were observed or trapped at the site; however several large trees exhibited scratch marks from large Varanids.

Seventeen bird species were observed here, all common species of open woodland habitats. No threatened species were recorded. Appendix 6 lists all species that were found at this site.

4.4.3. Site J03

As this site was positioned near the permanent water of Jervois Dam, five species of aquatic birds were recorded here that are not likely to occur elsewhere in the survey area. A total of twenty-one bird species were recorded, including large flocks of seed-eating species such as *Nymphicus hollandicus* (Cockatiel) utilising the water source. Records also included three species typical of rocky *Tridonia* grasslands such as *Emblema pictum* (Painted Finch).

A single mammal species was trapped; the introduced *Mus musculus* (House Mouse) was collected in an Elliott trap. However a large amount of trap interference was recorded at this site, with traps over-turned and bait removed each day. This interference has been attributed to several crows (likely *Corvis orru*, although not positively identified) that frequented the dam area.

A remote camera trap (Camera 2) was installed at this site on the dam shore.

No threatened species were recorded at the site. No species listed as migratory birds under the EPBC Act were recorded. Results are listed in Appendix 6.

4.4.4. Site J04

A single mammal species was trapped at this site; a *Pseudomys hermannsburgensis* (Sandy Inland Mouse) collected in an Elliott trap. *Macropus rufus* (Red Kangaroo) and *Canis lupis dingo* (Dingo) were also recorded from this site by presence of tracks of these species. Inactive burrows of the Long-haired Rat were also present.

In addition to these four mammals, ten bird species were recorded. This included the only record of a nocturnal bird during the survey; a single *Tyto javanica* (Barn Owl) was seen here. No reptiles were recorded here and no species of conservation concern was found.

4.4.5. Site J05

This was the least diverse survey site, with only nine species recorded here. This included two mammal and seven bird species. No reptiles were observed. Long-haired rats had previously been resident at the site, with several old burrow complexes being present. No species of conservation significance were found here. Appendix 6 provides a complete list of fauna recorded at this site.

4.4.6. Incidental Records

Four species were recorded as incidental that did not occur at any of the survey sites. *Aspidites melanocephalus* (Black-headed Python), *Demansia psammophis* (Yellow-faced Whip Snake), *Antaresia stimsoni* (Stimson's Python) and *Pogona vitticeps* (Bearded Dragon) were all identified from photographs and accounts provided by Kentor employees.

A nest of *Aquila audax* (Wedge-tailed Eagle) was found near the southern boundary of the Jervois Mine area (Map 10) in a large Ironwood tree. Although not being used at present, the nest has been recently active with remains of prey items found below the nest tree. Wedge-tailed Eagles are known to reuse nest sites continuously and it is likely that this site will be occupied in the future. Exploration activities and travel to this area should be minimised in this area to reduce disturbance to the birds during nesting.

4.4.7. Introduced Fauna

With the exception of domestic livestock, two introduced species were recorded during the survey. Kentor employees reported seeing a single *Felis catus* (Cat) on a number of occasions at the work camp, and numerous *Mus musculus* (House Mouse) were trapped at three survey sites.

Grazing pressure from cattle was high in a number of areas, noticeably close to water sources such as Jervois Dam and the area surrounding drainage lines and water courses. Despite the presence of rabbits recorded in previous surveys, no evidence of this species was detected.

4.4.8. Summary of Fauna Results

Overall trapping results were poor across all sites. Results included only two species; *Pseudomys hermannsburgensis* (Sandy Inland Mouse) and the introduced *Mus musculus* (House Mouse). No reptile species were trapped or observed. These poor results were attributed to weather and seasonal conditions that prevailed during the survey period, with cold overnight temperatures and cool days limiting animal activity.

Old signs of reptile activity were observed, such as scratch marks on trees, at several locations throughout the survey area. Comments and observations made by Kentor employees and results of previous surveys also indicate that at least ten species of reptiles are found throughout the area, despite none being observed during this survey period. Surveys conducted during warm seasons conducive to reptile activity would be met with more success.

Seven mammal species were recorded during the survey, not including domestic livestock *Bos taurus* (cattle). From observation of old burrow systems and scats, it is apparent that conditions resulting from high rainfall in 2010-2011 allowed Long-haired Rats to move to the area and become common. Long-haired rats are known to readily enter traps and it is likely that some would have been caught if they were still present. This, together with the absence of any active signs of the animal indicates that populations have experienced a natural decline as conditions have become unsuitable. Comments from Kentor employees indicate that the species was still present in the survey area until April 2012, when a dead individual was found near the work camp. Long-haired Rats are listed as Near Threatened under Northern Territory Legislation, however the survey area is outside their known core distribution (Menkhorst, P. & Knight, F., 2004).

Areas within the vicinity of Jervois Dam contain suitable habitat for the threatened central Australian population of *Trichosurus vulpecula vulpecula* (Brush-tailed Possum). This species has been recorded from the area in the past (Map 8). Despite active searches for signs of this species in the area and the use of a baited camera trap, its presence was not detected. However, it should be noted that a more intensive survey effort is necessary to rule out the continued existence of this species.

The Jervois Dam remains one of the most permanent and largest surface water bodies in the survey area. As such, it is a refuge for aquatic and migratory bird species, including the nationally Vulnerable (*Rostratula australis*) Australian Painted Snipe (Eremaea Birds, 2012). However, the dam is isolated from any major river systems or wetland areas and does not constitute core habitat of any threatened or migratory species. One natural rock hole was found during the survey (Map 10). Although only providing an ephemeral water resource, this site is likely important habitat for a range of species. The area surrounding the rock hole contains suitable range habitat for the near threatened *Petrogale lateralis* (Black-footed Rock Wallaby), although active searches in the area failed to find any signs of this species.

Few signs of introduced species other than cattle were found during the survey. House mice were trapped at two sites and cats (*Felis catus*) have been observed by Kentor employees. Rabbits were recorded during previous surveys in the area, however no signs of rabbits were found during the current survey period.

From results of previous surveys and Northern Territory Fauna Atlas records it can be concluded that a more diverse fauna is present in the project area than has been detected in this survey. Climatic

and seasonal conditions experienced have been determined as limiting factors during this survey period.



Figure 20; Scratch marks on the trunk of a Ghost Gum at J02. The marks continued to the canopy and are likely attributable to a large *Varanus* species (possibly *V. gouldii*).



Figure 21; Old scats and disused burrow (top left) of *Rattus villosissimus* (Long-haired Rat). Signs of this species were common throughout the project area.



Figure 22; *Pseudomys hermannsburgensis* (Sandy Inland Mouse) trapped at site J04. This was one of only two species trapped during the survey.



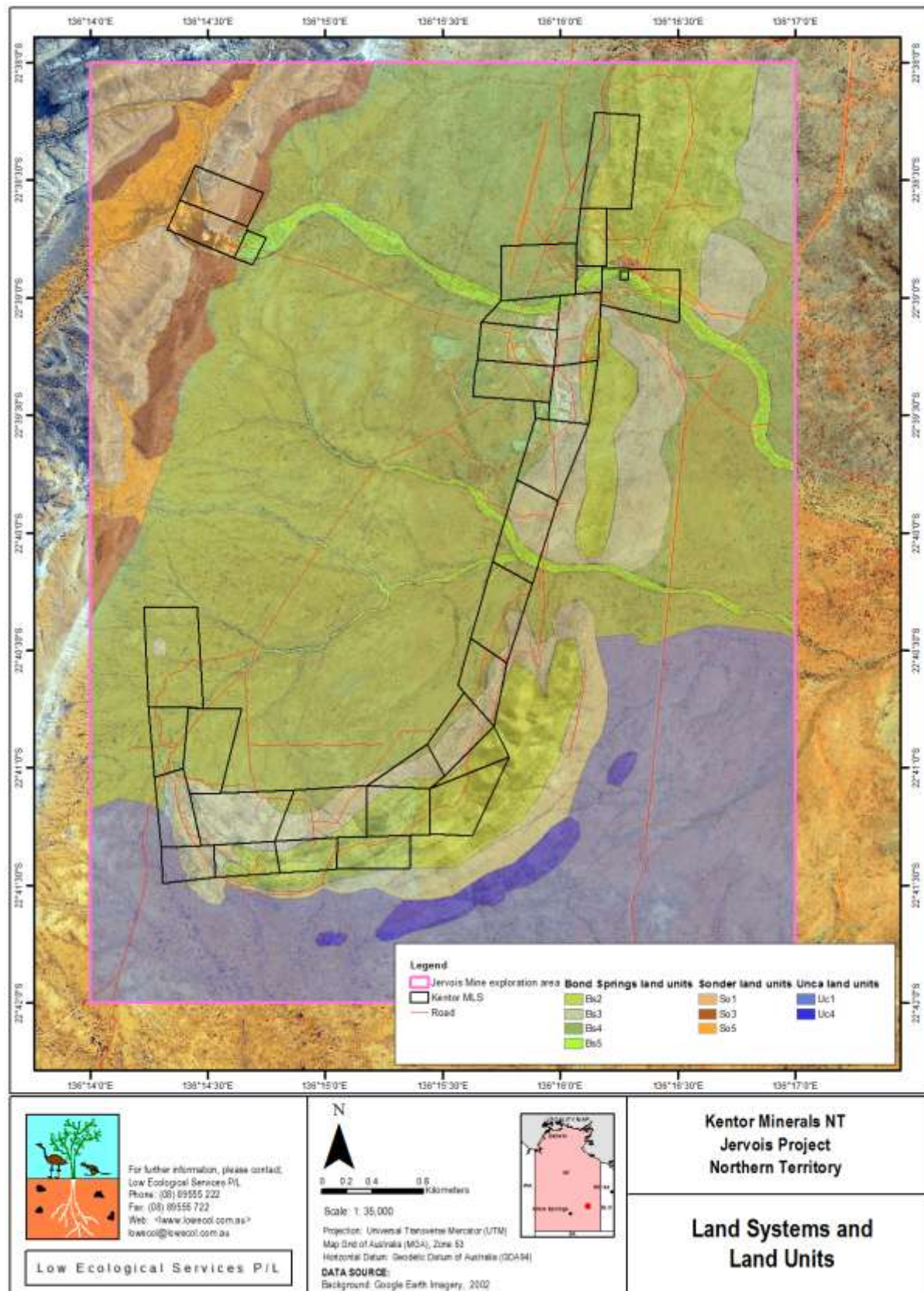
Figure 23; Surface water at Jervois Dam is an important resource for seed-eating and aquatic birds such as these Cockatiels (foreground) and Grey Teal.



Figure 24; *Canis lupus dingo* (Dingo) captured on a camera trap at site Cam1.

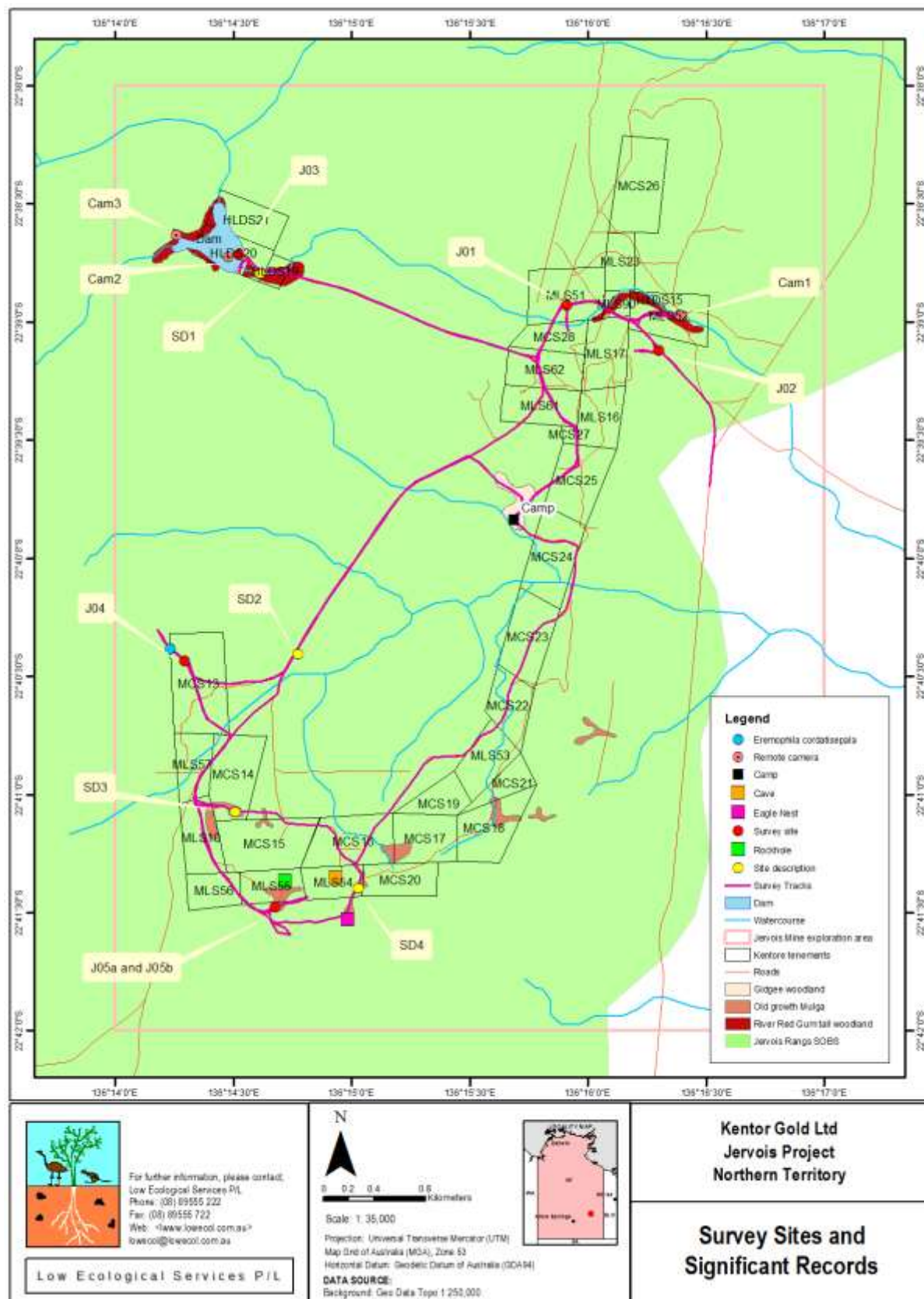


Figure 25; The camera trap at site Cam1 also captured images of *Macropus rufus* (Red Kangaroo).



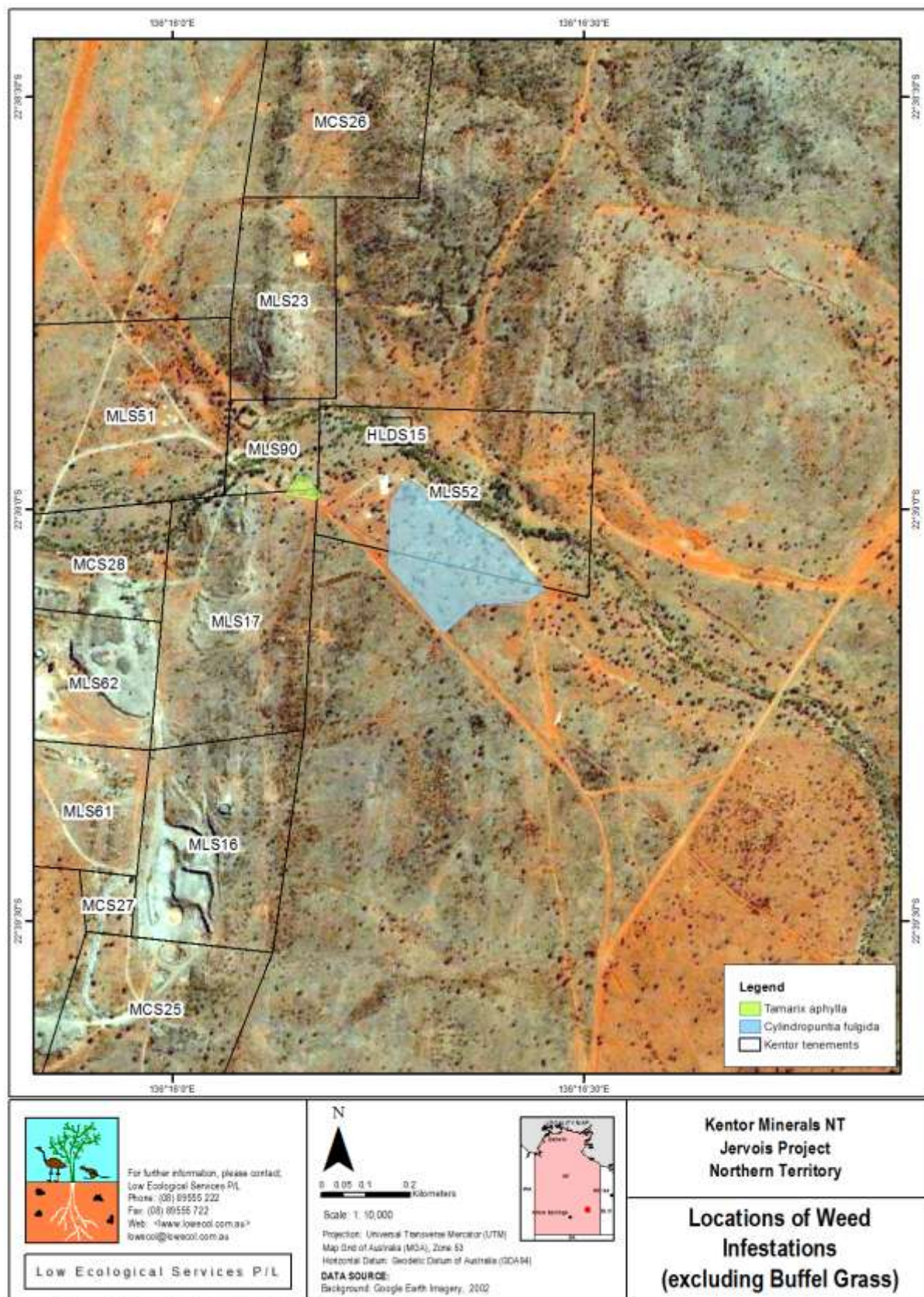
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Map 9; Land units mapped during the survey.

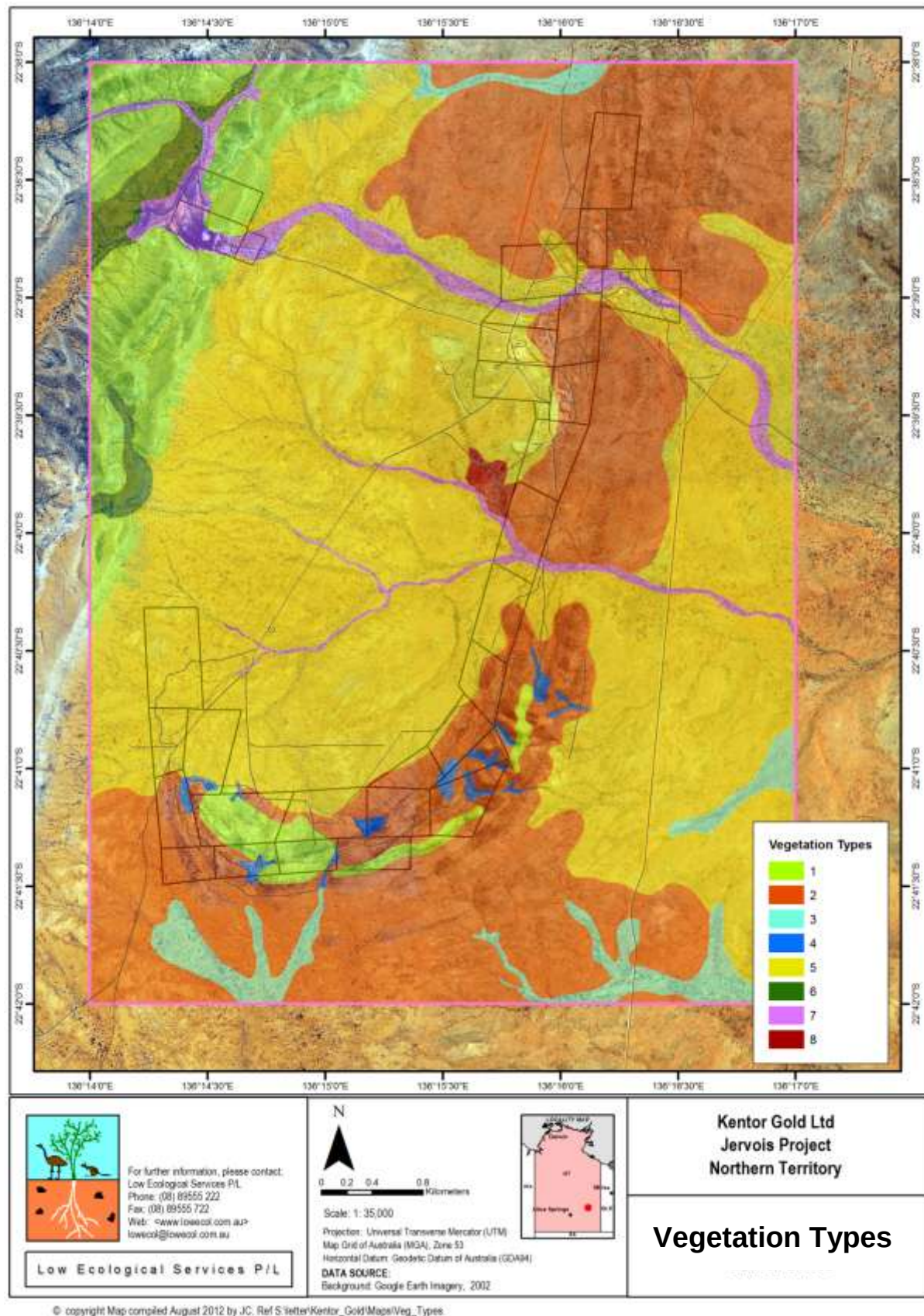


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Map 10; Sites surveyed, July 2012. The map also shows significant species recorded and environmentally sensitive sites.



Map 11; Location of WoNS and declared weeds under NT legislation.



Map 12; Vegetation types mapped based on survey results.

5. ASSESSMENT OF RISK TO THREATENED SPECIES

Seven flora species of conservation concern have been recorded from within 20km of the survey area. Of these only one species has a Threatened status under the NTPWC Act 2000. The remaining six are listed as either Data Deficient or Near Threatened as shown in Table 7. One species, *Eremophila cordatisepala*, was recorded during the survey.

Conservation significant fauna records from within 20km of the project area include ten species (Table 9), five with a threatened status under the NTPWC Act 2000. Two species, *Macrotis lagotis* (Bilby) and *Isodon auratus* (Golden Bandicoot) are also listed as threatened by EPBC Act 2000 legislation. Records of the later species are old, with a single Bilby record from 1930 and two records of Golden Bandicoot, both from 1969 (Department of Natural Resources, Environment, the Arts and Sport (NRETAS), 2012). No signs of these species were found during the survey, however future surveys should examine tracks, scats and burrows carefully for the presence of Bilby.

The Vulnerable species *Ardeotis australis* (Australian Bustard) and *Dromaius novaehollandiae* (Emu) are known to be nomadic, wide ranging species (Pizzey, G & Knight, F, 1997). Although not present during the survey period, it is reasonable to expect that both species may occur within the project area at times, although the area does not represent core habitat for either species. The status of both under Northern Territory legislation is under review with the likelihood of both species being listed as Near Threatened in the future (Department of Natural Resources, Environment, the Arts and Sport (NRETAS), 2012). They are unlikely to be at risk from mining activities.

Suitable habitat for the Endangered central Australian population of *Trichosurus vulpecula vulpecula* (Brush-tailed Possum) exists in River Red Gum woodland surrounding Jervois Dam and along several drainage channels within the area. Records of the species from within 20km of the project area are old (1969) (Department of Natural Resources, Environment, the Arts and Sport (NRETAS), 2012), however continued existence of the species is possible. No signs of the species were found during the survey despite targeted searches but future surveys should continue to search suitable areas. Limiting disturbance to drainage lines and valleys near Jervois Dam will minimise risk to any remaining possum populations. Protection of this habitat is also of benefit to Near Threatened species such as *Calyptorhynchus banksii* subsp. *samueli* (Red-tailed Black Cockatoo). This species is widespread and relatively common in riparian habitats in the Jervois area (Pizzey, G & Knight, F, 1997) and was seen on the Marshall River in transit to the project area.

The Near Threatened *Rattus villosissimus* (Long-haired Rat) utilises the project area during population irruptions during suitable high rainfall periods, evidenced by the presence of inactive burrows and old scat material. Continued presence of this species was not detected during the survey, despite traps set close to burrows and the animals' willingness to enter baited traps. The project area does not represent core habitat for this species and seems to be occupied only during temporary range expansions under favourable conditions. Exploration activities in the project area are not likely to impact on the species.

6. FUTURE SURVEYS

It is recommended that a future survey be carried out to account for limiting factors of climate and seasonal variations in flora and fauna. Wet season survey should be carried out in March or April 2013, resurveying sites already worked with additional survey efforts focussing on areas of suitable habitat for *Trichosurus vulpecula* subsp. *vulpecula* (Brush-tailed Possum) and *Petrogale lateralis* (Black-footed Rock Wallaby).

Future surveys should also aim to assess the accuracy of land units mapped as part of this project and identify further vegetation communities of significance. Targeted searches should again be carried out for flora species listed in Table 7, despite only one species being found during this survey.

7. REFERENCES

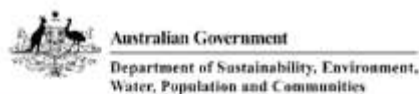
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8. APPENDICES

8.1. APPENDIX 1; PROTECTED MATTERS REPORT (SEWPAC, 2012)



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 12/07/12 12:00:02

[Summary](#)

[Details](#)

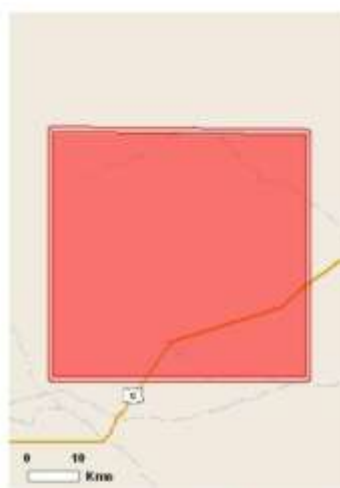
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)
[Buffer: 1.0Km](#)



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	3
Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov>.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	7
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	6
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

Threatened Species		[Resource Information]
Name	Status	Type of Presence
BIRDS		
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
MAMMALS		
Dasycercus cristicauda Mulgara [328]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Giareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Extra Information

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit,

Name	Status	Type of Presence
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Coordinates

-22.4509 136.0376,-22.4554 136.48298,-22.88212 136.48298,-22.88212 136.0376,-22.4509
136.0376

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)

- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us page](#).

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8.2. APPENDIX 2; FLORA RECORDED WITHIN 20KM OF THE PROJECT AREA (NRETAS, 2012)

Species Name	Common Name	STATUS_NT_	STATUS_COM
<i>Abutilon leucopetalum</i>	Desert Lantern Flower	LC	
<i>Acacia adsurgens</i>		LC	
<i>Acacia ancistrocarpa</i>		LC	
<i>Acacia aneura</i> var. <i>indeterminate</i>	Mulga		
<i>Acacia georginae</i>	Gidgee	LC	
<i>Acacia melleodora</i>	Waxy Wattle	LC	
<i>Acacia monticola</i>		LC	
<i>Acacia paraneura</i>		LC	
<i>Acacia sericophylla</i>		LC	
<i>Acacia sibirica</i>		LC	
<i>Acacia spondylophylla</i>	Curry Wattle	LC	
<i>Alternanthera nana</i>		LC	
<i>Alternanthera nodiflora</i>		LC	
<i>Amaranthus centralis</i>		DD	
<i>Amaranthus interruptus</i>		LC	
<i>Ammannia multiflora</i>		LC	
<i>Amphipogon sericeus</i>		LC	
<i>Amyema quandang</i> var. <i>quandang</i>	Mistletoe	LC	
<i>Aristida inaequiglumis</i>	Un-equal Three-awn	LC	
<i>Atalaya hemiglauc</i>	Whitewood	LC	
<i>Atriplex elachophylla</i>		LC	
<i>Bidens bipinnata</i>		LC	
<i>Bolboschoenus caldwellii</i>		EN	
<i>Calotis latiuscula</i>		LC	
<i>Capparis lasiantha</i>		LC	
<i>Capparis mitchellii</i>	Bush Orange	LC	
<i>Carissa lanceolata</i>	Conker Berry	LC	
<i>Cenchrus pennisetiformis</i>			
<i>Centipeda minima</i> subsp. <i>indeterminate</i>			
<i>Centipeda minima</i> subsp. <i>minima</i>		LC	
<i>Cheilanthes brownii</i>		LC	
<i>Chloris virgata</i>			
<i>Chrysopogon pallidus</i>		LC	
<i>Citrullus colocynthis</i>			
<i>Conyza bonariensis</i>			
<i>Corymbia opaca</i>	Bloodwood	LC	
<i>Corymbia terminalis</i>		LC	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	Rattlepod	LC	
<i>Crotalaria smithiana</i>	Rattlepod	LC	
<i>Cucumis maderaspatanus</i>		LC	
<i>Cullen cinereum</i>		LC	
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch Grass		

Species Name	Common Name	STATUS_NT_	STATUS_COM
<i>Cyperus cunninghamii</i> subsp. <i>indeterminate</i>			
<i>Cyperus pygmaeus</i>		LC	
<i>Dactyloctenium radulans</i>	Button Grass	LC	
<i>Datura ferox</i>			
<i>Dysphania melanocarpa</i>		LC	
<i>Einadia nutans</i> subsp. <i>indeterminate</i>			
<i>Elytrophorus spicatus</i>		LC	
<i>Enteropogon acicularis</i>		LC	
<i>Eragrostis cumingii</i>		LC	
<i>Eragrostis elongata</i>		LC	
<i>Eragrostis tenellula</i>		LC	
<i>Eremophila cordatisepala</i>		NT	
<i>Eremophila duttonii</i>		LC	
<i>Eremophila freelingii</i>	Rock Fuchsia	LC	
<i>Eremophila latrobei</i> subsp. <i>indeterminate</i>	Latrobe's Desert Fuchsia		
<i>Eremophila longifolia</i>	Long-leaved Emu Bush	LC	
<i>Eremophila obovata</i> subsp. <i>indeterminate</i>			
<i>Eriachne aristidea</i>		LC	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>			
<i>Erythrina vespertilio</i> subsp. <i>vespertilio</i>		LC	
<i>Eucalyptus camaldulensis</i> subsp. <i>indeterminate</i>	River Red Gum		
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusata</i>	River Red Gum	LC	
<i>Eucalyptus gamophylla</i>	Blue Mallee	LC	
<i>Eucalyptus intertexta</i>	Bastard Coolabah	LC	
<i>Eucalyptus normantonensis</i>	Normanton Box	LC	
<i>Eucalyptus pachyphylla</i>	Red-bud Mallee	LC	
<i>Eulalia aurea</i>	Silky Browntops	LC	
<i>Euphorbia tannensis</i> subsp. <i>indeterminate</i>			
<i>Evolvulus alsinoides</i> var. <i>alsinoides</i>		NE	
<i>Ficus brachypoda</i>	Rock Fig	LC	
<i>Fimbristylis dichotoma</i>		LC	
<i>Fimbristylis microcarya</i>		LC	
<i>Fimbristylis velata</i>		DD	
<i>Frankenia serpyllifolia</i>		LC	
<i>Glinus lotoides</i>		LC	
<i>Glinus oppositifolius</i>		LC	
<i>Glossostigma diandrum</i>		LC	
<i>Glycine canescens</i>		LC	
<i>Gnaphalium diamantinensis</i>		LC	
<i>Gomphrena lanata</i>		LC	
<i>Goodenia glabra</i>		LC	
<i>Goodenia heterochila</i>		LC	
<i>Goodenia lunata</i>		LC	

Species Name	Common Name	STATUS_NT_	STATUS_COM
<i>Gossypium australe</i>	Native Cotton	LC	
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	Holly Grevillea	LC	
<i>Hakea chordophylla</i>	Bull Hakea	LC	
<i>Hakea divaricata</i>	Fork-leaved Corkwood	LC	
<i>Hakea lorea</i> subsp. <i>lorea</i>	Long-leaved Corkwood	LC	
<i>Hakea macrocarpa</i>		LC	
<i>Heliotropium filaginoides</i>		LC	
<i>Heliotropium moorei</i>		LC	
<i>Hibiscus burtonii</i>	Burton's Hibiscus	LC	
<i>Hybanthus aurantiacus</i>	Orange Spade Flower	LC	
<i>Hypericum gramineum</i>		LC	
<i>Indigofera linnaei</i>	Birdsville Indigo	LC	
<i>Ipomoea muelleri</i>		LC	
<i>Isotropis winneckeii</i>		LC	
<i>Ixiochlamys cuneifolia</i>		LC	
<i>Lysiana subfalcata</i>		LC	
<i>Maireana campanulata</i>		LC	
<i>Maireana georgei</i>		LC	
<i>Malvastrum americanum</i>	Spiked Malvastrum		
<i>Nicotiana benthamiana</i>	Native Tobacco	LC	
<i>Nicotiana rosulata</i> subsp. <i>ingulba</i>	Native Tobacco	LC	
<i>Olearia stuartii</i>		LC	
<i>Pandorea doratoxylon</i>	Spearwood Vine	LC	
<i>Panicum decompositum</i> var. <i>indeterminate</i>	Native Millet		
<i>Petalostylis cassioides</i>		LC	
<i>Phyllanthus exilis</i>		LC	
<i>Pluchea dentex</i>		LC	
<i>Pluchea dunlopia</i>		LC	
<i>Polygonum plebeium</i>		LC	
<i>Portulaca filifolia</i>		LC	
<i>Portulaca oleracea</i> var. <i>Yuendumu</i> (T.S.Henshall 2868)	Munyeroo	LC	
<i>Pseudognaphalium luteoalbum</i>		LC	
<i>Pterocaulon serrulatum</i> var. <i>indeterminate</i>	Fruit Salad Bush		
<i>Pterocaulon sphacelatum</i>	Apple Bush	LC	
<i>Ptilotus helipteroides</i>		LC	
<i>Ptilotus obovatus</i> var. <i>indeterminate</i>			
<i>Ptilotus polystachyus</i>			
<i>Rhagodia eremaea</i>		LC	
<i>Rhagodia spinescens</i>	Spiny Saltbush	LC	
<i>Rhyncharhena linearis</i>		LC	
<i>Salsola tragus</i> subsp. <i>indeterminate</i>	Roly Poly		
<i>Sauropus rigens</i>		NT	
<i>Schoenia cassiniana</i>		LC	

Species Name	Common Name	STATUS_NT_	STATUS_COM
<i>Schoenoplectus litoralis</i>		LC	
<i>Sclerolaena bicornis</i> var. <i>bicornis</i>	Goat's Head Burr	LC	
<i>Sclerolaena convexula</i>		LC	
<i>Sclerolaena cuneata</i>		LC	
<i>Sclerolaena diacantha</i>		LC	
<i>Senecio gregorii</i>	Annual Yellowtop	LC	
<i>Senna artemisioides</i> subsp. <i>concave leaflets</i>			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>		LC	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>		LC	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>		LC	
<i>Senna notabilis</i>		LC	
<i>Senna oligoclada</i>		LC	
<i>Sida ammophila</i>		LC	
<i>Sida cordifolia</i>			
<i>Sida fibulifera</i>		LC	
<i>Sida filiformis</i>		LC	
<i>Sida intricata</i>		NT	
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>		LC	
<i>Sida</i> sp. Hale River (P.K.Latz 12036)		DD	
<i>Solanum quadriculatum</i>	Bush Tomato	LC	
<i>Sporobolus actinocladus</i>		LC	
<i>Sporobolus caroli</i>		LC	
<i>Stemodia florulenta</i>		LC	
<i>Swainsona oroboides</i>		LC	
<i>Swainsona phacoides</i>		LC	
<i>Tephrosia sphaerospora</i>		LC	
<i>Themeda avenacea</i>		LC	
<i>Trachymene glaucifolia</i>		LC	
<i>Tribulopsis angustifolia</i>		LC	
<i>Tribulus macrocarpus</i>		LC	
<i>Tribulus terrestris</i>		NE	
<i>Trichodesma zeylanicum</i> var. <i>indeterminate</i>	Cattlebush		
<i>Triodia basedowii</i>	Hard Spinifex	LC	
<i>Triodia brizoides</i>		LC	
<i>Triodia pungens</i>	Soft Spinifex	LC	
<i>Triraphis mollis</i>	Purple Plume Grass	LC	
<i>Typha domingensis</i>		LC	
<i>Urochloa gilesii</i> subsp. <i>gilesii</i>		LC	
<i>Vachellia farnesiana</i>		LC	
<i>Wedelia stirlingii</i>		LC	
*LC = Least Concern, NE = Not Evaluated, DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered, EX = Extinct			

8.3. APPENDIX 3; FAUNA RECORDED WITHIN 20KM OF THE PROJECT AREA (NRETAS, 2012)

Species Name	Common Name	TPWC Act 2007	EPBC Act 2007
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	LC	
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	LC	
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	LC	
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	LC	
<i>Accipiter fasciatus</i>	Brown Goshawk	LC	
<i>Actitis hypoleucos</i>	Common Sandpiper	LC	
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	LC	
<i>Amytornis purnelli</i>	Dusky Grasswren	LC	
<i>Anas castanea</i>	Chestnut Teal	NE	
<i>Anas gracilis</i>	Grey Teal	LC	
<i>Anas superciliosa</i>	Pacific Black Duck	LC	
<i>Anhinga novaehollandiae</i>	Australasian Darter	LC	
<i>Anthus novaeseelandiae</i>	Australasian Pipit	LC	
<i>Aphelocephala nigricincta</i>	Banded Whiteface	LC	
<i>Aquila audax</i>	Wedge-tailed Eagle	LC	
<i>Ardea pacifica</i>	White-necked Heron	LC	
<i>Ardeotis australis</i>	Australian Bustard	VU	
<i>Artamus cinereus</i>	Black-faced Woodswallow	LC	
<i>Artamus personatus</i>	Masked Woodswallow	LC	
<i>Artamus superciliosus</i>	White-browed Woodswallow	LC	
<i>Aythya australis</i>	Hardhead	LC	
<i>Barnardius zonarius</i>	Australian Ringneck	LC	
<i>Bettongia lesueur</i>	Burrowing Bettong	EX	EX
<i>Cacatua sanguinea</i>	Little Corella	LC	
<i>Cacomantis pallidus</i>	Pallid Cuckoo	LC	
<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black-cockatoo (Cental Australia)	NT	
<i>Canis lupus</i>	Dingo	LC	
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	LC	
<i>Charadrius ruficapillus</i>	Red-capped Plover	LC	
<i>Chenonetta jubata</i>	Australian Wood Duck	LC	
<i>Cheramoeca leucosterna</i>	White-backed Swallow	LC	
<i>Chlidonias hybrida</i>	Whiskered Tern	LC	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull	LC	
<i>Cincloramphus cruralis</i>	Brown Songlark	LC	
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC	
<i>Circus approximans</i>	Swamp Harrier	LC	
<i>Circus assimilis</i>	Spotted Harrier	LC	
<i>Climacteris affinis</i>	White-browed Treecreeper	LC	
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	LC	
<i>Conopophila whitei</i>	Grey Honeyeater	DD	
<i>Coracina maxima</i>	Ground Cuckoo-shrike	LC	

Species Name	Common Name	TPWC Act 2007	EPBC Act 2007
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC	
<i>Corvus bennetti</i>	Little Crow	LC	
<i>Corvus coronoides</i>	Australian Raven	LC	
<i>Corvus orru</i>	Torresian Crow	LC	
<i>Coturnix ypsilophora</i>	Brown Quail	LC	
<i>Cracticus nigrogularis</i>	Pied Butcherbird	LC	
<i>Cracticus tibicen</i>	Australian Magpie	LC	
<i>Ctenophorus nuchalis</i>	Central Netted Dragon	LC	
<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus	LC	
<i>Ctenotus olympicus</i>		NL	
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck	LC	
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC	
<i>Dromaius novaehollandiae</i>	Emu	VU	
<i>Egernia stokesii</i>	Stoke's Egernia	LC	
<i>Egretta novaehollandiae</i>	White-faced Heron	LC	
<i>Elanus axillaris</i>	Black-shouldered Kite	LC	
<i>Elseyornis melanops</i>	Black-fronted Dotterel	LC	
<i>Emblema pictum</i>	Painted Finch	LC	
<i>Epthianura aurifrons</i>	Orange Chat	LC	
<i>Epthianura tricolor</i>	Crimson Chat	LC	
<i>Erythronys cinctus</i>	Red-kneed Dotterel	LC	
<i>Eulophus roseicapilla</i>	Galah	LC	
<i>Eurostopodus argus</i>	Spotted Nightjar	LC	
<i>Falco berigora</i>	Brown Falcon	LC	
<i>Falco cenchroides</i>	Nankeen Kestrel	LC	
<i>Falco longipennis</i>	Australian Hobby	LC	
<i>Falco peregrinus</i>	Peregrine Falcon	LC	
<i>Falco subniger</i>	Black Falcon	LC	
<i>Felis catus</i>	Cat	(Int)	
<i>Fulica atra</i>	Eurasian Coot	LC	
<i>Gehyra purpurascens</i>	Purplish Dtella	LC	
<i>Gehyra variegata</i>	Tree Dtella	LC	
<i>Geopelia cuneata</i>	Diamond Dove	LC	
<i>Geopelia striata</i>	Peaceful Dove	LC	
<i>Geophaps plumifera</i>	Spinifex Pigeon	LC	
<i>Grallina cyanoleuca</i>	Magpie-lark	LC	
<i>Grus rubicunda</i>	Brolga	LC	
<i>Haliastur sphenurus</i>	Whistling Kite	LC	
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	LC	
<i>Heteronotia binoei</i>	Bynoe's Gecko	LC	
<i>Hieraaetus morphnoides</i>	Little Eagle	LC	
<i>Himantopus himantopus</i>	Black-winged Stilt	LC	
<i>Hydroprogne caspia</i>	Caspian Tern	LC	

Species Name	Common Name	TPWC Act 2007	EPBC Act 2007
<i>Isodon auratus</i>	Golden Bandicoot	EN	VU
<i>Lagorchestes conspicillatus</i>	Spectacled Hare-wallaby	NT	
<i>Lalage sueurii</i>	White-winged Triller	LC	
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater	LC	
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	LC	
<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater	LC	
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC	
<i>Lichmera indistincta</i>	Brown Honeyeater	LC	
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	LC	
<i>Lophognathus longirostris</i>	Long-nosed Water Dragon	LC	
<i>Lophoictinia isura</i>	Square-tailed Kite	NT	
<i>Macropus robustus</i>	Common Wallaroo	LC	
<i>Macropus rufus</i>	Red Kangaroo	LC	
<i>Macrotis lagotis</i>	Bilby	VU	VU
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	LC	
<i>Malurus lamberti</i>	Variegated Fairy-wren	LC	
<i>Malurus leucopterus</i>	White-winged Fairy-wren	LC	
<i>Manorina flavigula</i>	Yellow-throated Miner	LC	
<i>Melanodryas cucullata picata/westralensis</i>	Hooded Robin (Mainland)	LC	
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	LC	
<i>Melopsittacus undulatus</i>	Budgerigar	LC	
<i>Merops ornatus</i>	Rainbow Bee-eater	LC	
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	LC	
<i>Milvus migrans</i>	Black Kite	LC	
<i>Mirafra javanica</i>	Horsfield's Bushlark	LC	
<i>Mus musculus</i>	House Mouse	(Int)	
<i>Ninox novaeseelandiae</i>	Southern Boobook	LC	
<i>Notomys alexis</i>	Spinifex Hopping-mouse	LC	
<i>Nymphicus hollandicus</i>	Cockatiel	LC	
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC	
<i>Oreoica gutturalis</i>	Crested Bellbird	LC	
<i>Oryctolagus cuniculus</i>	Rabbit	(Int)	
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC	
<i>Pardalotus rubricatus</i>	Red-browed Pardalote	LC	
<i>Pelecanus conspicillatus</i>	Australian Pelican	LC	
<i>Petrochelidon ariel</i>	Fairy Martin	LC	
<i>Petrochelidon nigricans</i>	Tree Martin	LC	
<i>Petroica goodenovii</i>	Red-capped Robin	LC	
<i>Phalacrocorax carbo</i>	Great Cormorant	LC	
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	LC	
<i>Phalacrocorax varius</i>	Pied Cormorant	LC	
<i>Phaps chalcoptera</i>	Common Bronzewing	LC	
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	LC	

Species Name	Common Name	TPWC Act 2007	EPBC Act 2007
<i>Plegadis falcinellus</i>	Glossy Ibis	LC	
<i>Pogona vitticeps</i>	Central Bearded Dragon	LC	
<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe	LC	
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	LC	
<i>Pseudantechinus macdonnellensis</i>	Fat-tailed Antechinus	LC	
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	LC	
<i>Ptilonorhynchus guttatus</i>	Western Bowerbird	LC	
<i>Purnella albifrons</i>	White-fronted Honeyeater	LC	
<i>Rattus villosissimus</i>	Long-haired Rat	NT	
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC	
<i>Smicrornis brevirostris</i>	Weebill	LC	
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	LC	
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart	LC	
<i>Stictonetta naevosa</i>	Freckled Duck	NT	
<i>Sugomel niger</i>	Black Honeyeater	LC	
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	LC	
<i>Taeniopygia guttata</i>	Zebra Finch	LC	
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	LC	
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	LC	
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC	
<i>Tribonyx ventralis</i>	Black-tailed Native-hen	LC	
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum (Southern N.T.)	EN	
<i>Tringa nebularia</i>	Common Greenshank	LC	
<i>Turnix velox</i>	Little Button-quail	LC	
<i>Tympanocryptis tetraporophora</i>	Long-tailed Earless Dragon	LC	
<i>Tyto javanica</i>	Eastern Barn Owl	LC	
<i>Vanellus miles</i>	Masked Lapwing	LC	
<i>Vanellus tricolor</i>	Banded Lapwing	LC	
*LC = Least Concern, NE = Not Evaluated, NL = Not Listed, DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered, EX = Extinct, Int = Introduced			

8.4. APPENDIX 4; SITE DESCRIPTION SUMMARIES

Site No.: J01	Survey number; 1	Quad. size: 50x50
Date: 19/07/2012		Observer: JC, BL
Site description & location details: Drainage line on Unca Creek		Landform pattern: Drainage line
Coordinates:	-22.648817, 136.265177 - -22.650861, 136.265252	
Precision:	GPS level:	
Topographic position: Open depression		Photographs:
North Facing: 		East Facing: 
South Facing: 		West Facing: 
Land unit: Bond Springs	Run: on	Patch size (ha): 5-50
Edge: ecotone <i>or</i> closest distance: 300		
Perm. Water: 0.5-5km		Curr. water: 0.5-5km
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response		
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat		
Fire impact: 1	Last fire: this year last year 2+ years ago long unburnt	
Rabbit damage: 0	Introduced herbivores: 2 (Cattle)	Camels: 0

Weeds: 2 (Buffel)		Other: 2 describe: Vehicle tracks	
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Bare soil (%):	30	Vegetation Litter (%):	15	Rock type Sandstone Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other: N/A Lithology: Metamorphic
Rock cover (%):	0	Ground Vegetation (%):	55	
Outcrop: 0%	Rock / stone: 0%	Bare ground: 100%		
Pebbles (<0.6cm):	0			
Small stones (0.6-2cm):	0			
Stones (2-6cm):	0			
Small rocks (6-20cm):	0			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			

Soil texture: sandy loam	
Soil depth (cm): 10-40	Soil pH - surface: Not tested
Soil crust, termites, log habitat and vegetation strata structure	
Crust present: clear	Crust cover (%): 10 Crust pH: Not tested
Termite mounds (no.): 0	Max. ht. (m): N/A Profile: N/A
Number of fallen logs >15cm diameter in the quadrat: 2	

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia apperrerinja</i> <i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Eucalyptus camaldulensis</i>	10	<10
Upper shrub layer:	<i>Acacia estrophiolata</i> <i>Atalaya hemiglauc</i>	3	<10
Lower shrub layer:	<i>Senna artemisioides subsp. oligophylla</i> <i>Senna artemisioides subsp. helmsii</i> <i>Senna artemisioides subsp. filifolia</i>	1	<10
Ground layer:	<i>Aristida holathera</i> <i>Cenchrus ciliaris</i> <i>Triodia longiceps</i>	0.3	30-70

Site No.: J02	Survey number; 1	Quad. size: 50x50
Date: 19/07/2012	Observer: JC, BL	
Site description & location details: Jervois Mine, opposite former staff village		Landform pattern: Undulating plain to undulating low hills.
Coordinates:	-22.652030, 136.271680 - -22.652021, 136.269837	
Topographic position: Mid – upper slope	Photographs:	
North Facing:	East Facing:	
South Facing:	West Facing: 	
Land unit: Bond Springs	Run: off	Patch size (ha): 5-50
Edge: ecotone <i>or</i> closest distance: 150m		
Perm. Water: 0.5-5km		Curr. water: 0.5-5km
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response		
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat		
Fire impact: 0	Last fire: long unburnt	
Rabbit damage: 0	Introduced herbivores: 2 (Cattle)	Camels: 0
Weeds: 2 (Buffel)	Other: 1 describe:	
Bare soil (%): 10	Vegetation Litter (%): 30	Rock type Sandstone Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Rock cover (%): 10	Ground Vegetation (%): 50	
Outcrop: 30%	Rock / stone: 10% Bare ground: 60%	
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	0 <2 2-10 <2 0 0 50-70	
		Lithology: Metamorphic

Soil texture: sandy loam			
Soil depth (cm): 10-40		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: black		Crust cover (%): 5	Crust pH: Not tested
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Acacia estrophiolata</i> <i>Hakea chordophylla</i>	8	<10
Upper shrub layer:	<i>Acacia stowardii</i> <i>Atalaya hemiglauc</i>	2.5	10-30
Lower shrub layer:	<i>Senna artemisioides subsp. helmsii</i> <i>Senna artemisioides subsp. filifolia</i>		<10
Ground layer:	<i>Aristida holathera</i> <i>Eragrostis eriopoda</i> <i>Enneapogon avenaceous</i> <i>Cenchrus ciliaris</i>	0.3	30-70

Site No.: J03	Survey number; 1	Quad. size: 50x50	
Date: 19/07/2012		Observer: JC, BL	
Site description & location details: Ridge on northern shore of Jervois Dam		Landform pattern: Steep hills	
Coordinates:	-22.645283,	136.242050	
Topographic position: Mid-upper slopes, ridge		Photographs:	
North Facing: 		East Facing: 	
South Facing: 		West Facing: 	
Land unit: Sonder	Run: off	Patch size (ha): 50-500	
Edge: ecotone <i>or</i> closest distance: 250			
Perm. Water: 50-500m		Curr. water: 50-500m	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 1		Last fire: long unburnt	
Rabbit damage: 0		Introduced herbivores: 1 (Cattle)	Camels: 0
Weeds: 0		Other: 0 describe:	
Bare soil (%):	<5	Vegetation Litter (%):	10
Rock cover (%):	25	Ground Vegetation (%):	65
		Rock type Sandstone	

Outcrop: 35	Rock / stone: 60	Bare ground: 5	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	0 2-10 10-20 2-10 <2 0 20-50		Lithology: Sedimentary

Soil texture: rock			
Soil depth (cm): <10		Soil pH - surface: ____cm:	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0	Crust pH:
Termite mounds (no.): 4	Max. ht. (m): 0.2		Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia aneura</i> <i>Corymbia apperrerinja</i> <i>Atalaya hemiglauc</i>	2.5	<10
Upper shrub layer:	<i>Acacia monticola</i> <i>Grevillea wickhammii</i>	2	<10
Lower shrub layer:	<i>Acacia spondolophylla</i> <i>Eremophila latrobei</i>	0.8	10-30
Ground layer:	<i>Triodia pungens</i> <i>Fimbristylis sp</i>	0.4	30-70

Site No.: J04	Survey number; 1	Quad. size: 50x50
Date: 20/07/2012		Observer: JC
Site description & location details: North Bellbird prospect		Landform pattern: Undulating plains
Coordinates:	-22.673944 , 136.238195 - -22.671628, 136.236242	
Topographic position: Flat		Photographs:
North Facing: 		East Facing: 
South Facing: 		West Facing: 
Land unit: Sonder	Run: on	Patch size (ha): 50-500
Edge: ecotone <i>or</i> closest distance: 500m		
Perm. Water: 0.5-5km		Curr. water: 0.5-5km
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response		
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat		
Fire impact: 1	Last fire: this year last year 2+ years ago long unburnt	
Rabbit damage: 0 1 2 3 4 5	Introduced herbivores: 1 (cattle)	Camels: 0
Weeds: 1 (Buffel)	Other: 3 describe: Exploration Drill pad	
Bare soil (%):	5	Vegetation Litter (%): 15 Rock type

Rock cover (%):	10	Ground Vegetation (%):	70	Sandstone
Outcrop: 0%	Rock / stone: 10%	Bare ground: 90%		Conglomerate Other sedimentary: Metamorphic Granite
Pebbles (<0.6cm):	2-10			Quartzite
Small stones (0.6-2cm):	10-20			Limestone
Stones (2-6cm):	20-50			Basalt
Small rocks (6-20cm):	2-10			Colluvium
Rocks (20-60cm):	0			Other:
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			
	0			Lithology: Sedimentary

Soil texture: sandy loam			
Soil depth (cm): 10-40		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0%	Crust pH: N/A
Termite mounds (no.): 0	Max. ht. (m):		Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Atalaya hemiglauc</i>	8.5	<10
Upper shrub layer:	<i>Acacia aneura</i> <i>Atalaya hemiglauc</i>	2	<10
Lower shrub layer:	<i>Senna artemisioides subsp. helmsii</i>	1	10-30
Ground layer:	<i>Aristida holathera</i> <i>Aristida contorta</i> <i>Cenchrus ciliaris</i> <i>Enneapogon polyphyllus</i>		30-70

Site No.: J05a	Survey number; 1	Quad. size: 50x50	
Date: 19/07/2012		Observer: JC, BL	
Site description & location details: Range near Bellbird prospect		Landform pattern: Drainage line, lower slope	
Coordinates:	-22.691329, 136.244608		
Topographic position: lower slope, depression		Photographs:	
North Facing: 		South Facing: 	
East Facing: 		West Facing: 	
Land unit: Unca	Run: off	Patch size (ha): 1-5	
Edge: ecotone <i>or</i> closest distance: 100m			
Perm. Water: >5km		Curr. water: >5km	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 1		Last fire: this year last year 2+ years ago long unburnt	
Rabbit damage: 0		Introduced herbivores: 1 (Cattle)	Camels: 0
Weeds: 1 (Buffel)		Other: 3 describe: Exploration drill pad	
Bare soil (%):	<5	Vegetation Litter (%):	25
Rock cover (%):	5	Ground Vegetation (%):	70
		Rock type Sandstone	

Outcrop: 0%	Rock / stone: 5%	Bare ground: 95%	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	<2 50-70 20-50 0 0 0 0		Lithology: Metamorphic

Soil texture: sandy loam			
Soil depth (cm): 10-40		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0%	Crust pH:
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 3			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Corymbia opaca</i>	10	10-30
Upper shrub layer:	<i>Acacia stowardii</i> <i>Acacia estrophilata</i>	3	<10
Lower shrub layer:	<i>Senna artemisioides subsp. helmsii</i> <i>Senna artemisioides subsp. artemisioides</i>	1	<10
Ground layer:	<i>Aristida holathera</i> <i>Themeda triandra</i> <i>Cenchrus ciliaris</i>	0.3	30-70

Site No.: J05b	Survey number; 1	Quad. size: 50x50
Date: 19/07/2012		Observer: JC, BL
Site description & location details: Range near Bellbird prospect		Landform pattern: Steep low hills
Coordinates:	-22.690486, 136.247148	
Topographic position: Mid, upper slope and crest		Photographs:
North Facing: 		South Facing: 
East Facing: 		West Facing: 
Land unit: Unca	Run: off	Patch size (ha): 5-50
Edge: ecotone <i>or</i> closest distance: 100m		
Perm. Water: >5km		Curr. water: >5km
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response		
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat		
Fire impact: 1		Last fire: 2+ years ago
Rabbit damage: 0		Introduced herbivores: 0 Camels: 0
Weeds: 0		Other: 0 describe:
Bare soil (%):	5	Vegetation Litter (%): 10 Rock type

Rock cover (%):	25	Ground Vegetation (%):	60	Sandstone Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Outcrop: 15%	Rock / stone: 10%	Bare ground: 75%		
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	<2 <2 2-10 10-20 2-10 <2 50-70			
				Lithology: Metamorphic

Soil texture: rock			
Soil depth (cm): <10		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: black		Crust cover (%): <5 %	Crust pH: Not tested
Termite mounds (no.): 0	Max. ht. (m):		Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia apperrinja</i> <i>Corymbia opaca</i> <i>Acacia aneura</i>	6	<10
Upper shrub layer:	<i>Acacia stowardii</i>	2	<10
Lower shrub layer:	<i>Acacia spondolophylla</i>	0.7	10-30
Ground layer:	<i>Triodia basedowii</i> <i>Enneapogon clelandii</i>		10-30

Site No.: SD1	Survey number; 1	Quad. size: 50x50
Date: 19/07/2012		Observer: JC, BL
Site description & location details: Floodout/creekline below Jervois Dam wall		Landform pattern: Drainage line
Coordinates:	-22.646577, 136.243551	
Topographic position: Open depression		Photographs:
North Facing: 		South Facing: 
East Facing: 		West Facing: 
Land unit: Sonder	Run: off	Patch size (ha): 1-5
Edge: ecotone <i>or</i> closest distance: 50m		
Perm. Water: 50-500m		Curr. water: 50-500m
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response		
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat		
Fire impact: 1		Last fire: long unburnt
Rabbit damage: 0	Introduced herbivores: 2 (cattle)	Camels: 0
Weeds: 2 (Buffel)	Other: 2 describe: Access road	
Bare soil (%):	5	Vegetation Litter (%): 5 Rock type

Rock cover (%):	75	Ground Vegetation (%):	15	Sandstone
Outcrop: 0	Rock / stone: 75	Bare ground: 25		Conglomerate Other sedimentary: Metamorphic Granite
Pebbles (<0.6cm):	<2			Quartzite
Small stones (0.6-2cm):	2-10			Limestone
Stones (2-6cm):	2-10			Basalt
Small rocks (6-20cm):	20-50			Colluvium
Rocks (20-60cm):	10-20			Other:
Big rocks (60cm-2m):	<2			
Boulders (>2m):	0			
Outcrop / slab:				Lithology: Sedimentary

Soil texture: sand sandy loam loam clay loam clay cracking clay peat rock other:	
Soil depth (cm): 0 <10 10-40 >40	Soil pH - surface: Not Tested
Soil crust, termites, log habitat and vegetation strata structure	
Crust present: no	Crust cover (%): % Crust pH:
Termite mounds (no.): 0	Max. ht. (m): Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 4	

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Eucalyptus camaldulensis</i> <i>Acacia estrophiolata</i> <i>Corymbia appererinja</i> <i>Atalaya hemiglauc</i>	10	10-30
Upper shrub layer:	<i>Vachellia farnesiana</i>	1.6	<10
Lower shrub layer:	<i>Carissa lanceolata</i>	0.8	<10
Ground layer:	<i>Triodia pungens</i> <i>Cymbopogon ambiguous</i> <i>Eulalia auria</i> <i>Enneapogon clelandii</i>		<10

Site No.: SD2	Survey number; 1	Quad. size: 50x50	
Date: 20/07/2012		Observer: JC, BL	
Site description & location details: Plain east of Bellbird North prospect		Landform pattern: Undulating Plain	
Coordinates:	-22.673486, 136.246222		
Topographic position: flat		Photographs:	
North Facing: 		South Facing: 	
East Facing: 		West Facing: 	
Land unit: Sonder	Run: on	Patch size (ha): 5-50	
Edge: ecotone <i>or</i> closest distance: 300m			
Perm. Water: 0.5-5km		Curr. water: 0.5-5km	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 1		Last fire: 2+ years ago	
Rabbit damage: 0		Introduced herbivores: 0	Camels: 0
Weeds: 1 (Buffel)		Other: 0 describe:	
Bare soil (%):	5	Vegetation Litter (%):	30
Rock cover (%):	0	Ground Vegetation (%):	65
		Rock type Sandstone	

Outcrop: 0%	Rock / stone: 0%	Bare ground: 100%	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other: N/A
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	0 0 0 0 0 0 0		Lithology:

Soil texture: sandy loam			
Soil depth (cm): >40		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0%	Crust pH:
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> <i>Acacia aneura</i>	10	<10
Upper shrub layer:	<i>Acacia sibirica</i> <i>Hakea macrocarpa</i>	2	<10
Lower shrub layer:	<i>Senna artemisioides subsp. oliophylla</i> <i>Gossypium australis</i>	1.5	<10
Ground layer:	<i>Aristida holathera</i> <i>Aristida contorta</i> <i>Aristida inaequiglumis</i> <i>Eriachne aristidea</i> <i>Eragrostis eriopoda</i>	0.4	30-70

Site No.: SD3	Survey number; 1	Quad. size: 50x50	
Date: 20/07/2012		Observer: JC, BL	
Site description & location details: East of Bellbird, north slope of range		Landform pattern: Undulating rises	
Coordinates:	-22.684581, 136.241771		
Topographic position: lower – mid slopes		Photographs:	
North Facing:		South Facing:	
			
East Facing:		West Facing:	
			
Land unit: Unca	Run: off	Patch size (ha): 5-50	
Edge: ecotone <i>or</i> closest distance: 100m			
Perm. Water: 0.5-5km		Curr. water: 0.5-5km	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 1		Last fire: 2+ years ago	
Rabbit damage: 0		Introduced herbivores: 0	Camels: 0
Weeds: 0		Other: 0 describe:	
Bare soil (%):	<5	Vegetation Litter (%):	10
Rock cover (%):	45	Ground Vegetation (%):	45
		Rock type Sandstone	

Outcrop: 0%	Rock / stone: 45%	Bare ground: 55%	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other: Quartz
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	<2 2-10 20-50 10-20 0 0 0 0		Lithology: Metamorphic

Soil texture: sand rock			
Soil depth (cm): <10		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: black		Crust cover (%): 5 %	Crust pH: Not tested
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 0			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia aneura</i> <i>Corymbia apperrerinja</i> <i>Corymbia opaca</i>	8	<10
Upper shrub layer:	<i>Acacia sibirica</i>	2.5	<10
Lower shrub layer:	<i>Senna artemisioides subsp. helmsii</i> <i>Acacia spondylophylla</i>	1	<10
Ground layer:	<i>Aristida holathera</i> <i>Enneapogon polyphyllus</i> <i>Triodia basedowii</i>		30-70

Site No.: SD4	Survey number; 1	Quad. size: 50x50	
Date: 19/07/2012		Observer: JC, BL	
Site description & location details: High creekline, south side of Bellbird range.		Landform pattern: Drainage line	
Coordinates:	-22.689983, 136.250472		
Topographic position: Upper slope		Photographs:	
North Facing: 		South Facing: 	
East Facing: 		West Facing: 	
Land unit: Unca	Run: off	Patch size (ha): 1-5	
Edge: ecotone <i>or</i> closest distance: 50m			
Perm. Water: >5km		Curr. water: >5km	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 1		Last fire: long unburnt	
Rabbit damage: 0		Introduced herbivores: 1 (cattle)	Camels: 0
Weeds: 0		Other: 1 describe: Costeans from previous exploration activities	
Bare soil (%):	<5	Vegetation Litter (%):	5
Rock cover (%):	70	Ground Vegetation (%):	25
Rock type Sandstone			

Outcrop: 0%	Rock / stone: 70%	Bare ground: 30%	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other: Quartz
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	<2 20-50 20-50 <2 0 0 0		Lithology: Metamorphic

Soil texture: sand sandy loam loam clay loam clay cracking clay peat rock other:			
Soil depth (cm): 0 <10 10-40 >40		Soil pH - surface: Not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: black		Crust cover (%): 5%	Crust pH: not tested
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 4			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia aneura</i> <i>Atalaya hemiglauc</i>	8	10-30
Upper shrub layer:	<i>Acacia stowardii</i>	1.5	<10
Lower shrub layer:	<i>Senna artemisioides subsp. artemisioides</i> <i>Senna artemisioides subsp. oligophylla</i>	1	<10
Ground layer:	<i>Aristida contorta</i> <i>Enneapogon polyphyllus</i> <i>Aristida holathera</i> <i>Fimbristylis sp</i>	0.3	30-70

Site No.: Camera 3	Survey number; 1	Quad. size: 50x50	
Date: 19/07/2012		Observer: JC, BL	
Site description & location details: Floodout upstream of Jervois Dam		Landform pattern: Drainage line	
Coordinates:	-22.643860, 136.237625		
Topographic position: Open depression		Photographs:	
North Facing:		South Facing:	
			
East Facing:		West Facing:	
			
Land unit: Sonder	Run: on	Patch size (ha): 5-50	
Edge: ecotone <i>or</i> closest distance: 100m			
Perm. Water: 50-500m		Curr. water: 50-500m	
Climate: 1 = Dry, plant stress 2 = Dry, no plant stress 3 = Recent rain, no vegetation response 4 = Recent rain, noticeable vegetation response			
Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat			
Fire impact: 0		Last fire: long unburnt	
Rabbit damage: 0		Introduced herbivores: 3 (Cattle)	Camels: 0
Weeds: 0		Other: 0 describe:	
Bare soil (%):	10	Vegetation Litter (%):	80
Rock cover (%):	0	Ground Vegetation (%):	10
		Rock type Sandstone	

Outcrop: 0%	Rock / stone: 0%	Bare ground: 0%	Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other: N/A
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	0 0 0 0 0 0 0		Lithology: Sedimentary

Soil texture: clay loam			
Soil depth (cm): >40		Soil pH - surface: not tested	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0 %	Crust pH:
Termite mounds (no.): 0		Max. ht. (m):	Profile: tower dome underground
Number of fallen logs >15cm diameter in the quadrat: 10			

Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Eucalyptus camaldulensis</i> <i>Corymbia opaca</i>	15	30-70
Upper shrub layer:	<i>Eremophila longifolia</i> <i>Eremophila christopherei</i> <i>Senna artemisioides subsp. oligophylla</i>	1.5	<10
Lower shrub layer:	<i>Abutilon macrocarpa</i> <i>Eucalyptus camaldulensis</i> (seedlings)	0.5	<10
Ground layer:	<i>Euphorbia drummondii</i>	0.1	<10

Appendix 5; Flora Recorded During the Survey

Species Name	Common Name	J01	J02	J03	J04	J05a	J05b	Incidental	Specimen Collected
<i>Abutilon leucopetalum</i>	Desert Lantern Flower							X	
<i>Acacia aneura</i>	Mulga	X		X	X	X	X	X	X
<i>Acacia estrophiolata</i>	Ironwood	X	X		X			X	
<i>Acacia georginae</i>	Gidgee							X	
<i>Acacia monticola</i>	Hill Turpentine			X					
<i>Acacia sibirica</i>	Bastard Mulga		X			X	X	X	
<i>Acacia spondylophylla</i>	Curry Wattle			X	X		X	X	
<i>Amyema maidenii ssp maidenii</i>	Pale-leaf Mistletoe	X	X		X				
<i>Anemocarpa saxitilis</i>	Hill Sunray						X		X
<i>Aristida contorta</i>	Bunched Kerosene Grass	X			X	X		X	
<i>Acacia coriacea</i>	Dogwood						X		
<i>Aristida holothera</i>	Erect Kerosene Grass	X	X	X	X	X	X	X	
<i>Aristida inaequiglumis</i>	Unequal Threeawn	X		X			X		
<i>Atalaya hemiglauca</i>	Whitewood	X	X	X	X	X		X	
<i>Boerhavia coccinea</i>	Tar vine	X							
<i>Bonamia media</i>				X					X
<i>Bulbostylis barbata</i>	Delicate Sedge	X	X		X	X			
<i>Capparis umbonata</i>	Norther Wild Orange	X							
<i>Carissa lanceolata</i>	Conkerberry	X						X	
<i>Cenchrus ciliaris*</i>	Buffel Grass	X	X		X	X		X	
<i>Chrysopogon fallax</i>	Golden Beard Grass	X			X				
<i>Corchorus sidoides</i>	Flannel Weed			X		X	X		X
<i>Corymbia apparrerinja</i>	Ghost Gum	X	X				X	X	
<i>Corymbia opaca</i>	Bloodwood	X	X		X	X		X	
<i>Cymbopogon ambiguous</i>	Lemon-scented Grass			X					
<i>Cymbopogon obtectus</i>	Silky Heads			X					
<i>Cyperus victoriensis</i>	Flat Sedge							X	X
<i>Digitaria brownii</i>	Cotton Panic Grass					X			
<i>Enchylaena tomentosa</i>	Ruby Saltbush					X			X
<i>Enneapogon clelandii</i>				X					
<i>Enneapogon oblongus</i>							X		
<i>Enneapogon polyphyllus</i>	Oat-grass, Leafy Nine-awn	X	X		X	X	X	X	
<i>Enteropogon ramosus</i>	Creek Windmill Grass					X			
<i>Eragrostis cumingii</i>	Cumings Lovegrass			X					X
<i>Eragrostis eriopoda</i>	Woollybutt Grass	X	X	X	X	X		X	
<i>Eragrostis setifolia</i>	Narrow-leaf Neverfail	X							
<i>Eremophila cordatisepala</i>					X				X
<i>Eremophila christopheri</i>								X	
<i>Eremophila freelingii</i>	Rock Fuchsia			X					X
<i>Eremophila latrobei</i>	Native Fuchsia		X	X			X	X	
<i>Eremophila longifolia</i>	Long-leaved Emu Bush							X	
<i>Eriachne aristidea</i>	Three-awn Wanderrie		X						
<i>Eriachne helmsii</i>	Woollubutt Wandarrie Grass					X			X
<i>Eriachne pulchella</i>	Pretty Wandarrie Grass					X			
<i>Eucalyptus camaldulensis</i>	River Red Gum	X						X	
<i>Eulalia aurea</i>	Silky Browntop	X						X	
<i>Euphorbia drummondii</i>	Caustic Weed	X				X	X		

Species Name	Common Name	J01	J02	J03	J04	J05a	J05b	Incidental	Specimen Collected
<i>Euphorbia ferdinandi</i>							X		X
<i>Evolvulus alisinoides</i>	Tropical Speedwell	X							
<i>Cheilanthes brownii</i>	Woolly Cloak Fern			X					
<i>Fimbristylis dichotoma</i>	Eight-day Grass	X		X	X				X
<i>Grevillea wickhamii</i>	Holly Grevillea			X					
<i>Grevillea striata</i>	Beefwood							X	
<i>Gossypium australe</i>	Tall Native Cotton				X		X	X	X
<i>Hakea chordophylla</i>	Bootlace Oak				X		X		
<i>Hakea lorea</i> ssp. <i>lorea</i>	Long-leafed Corkwood						X		
<i>Hakea macrocarpa</i>	Dogwood Hakea		X					X	
<i>Indigofera georgei</i>				X		X			X
<i>Indigofera leucotricha</i>	Silver Indigo			X			X		
<i>Monachather paradoxus</i>	Bandicoot Grass	X							
<i>Mukia maderaspatana</i>	Headache Vine				X				
<i>Paraneurachne muelleri</i>	Spinifex Couch	X	X				X		
<i>Petalostylis cassioides</i>	Butterfly Bush			X					
<i>Prostanthera stratiflora</i>	Stripped Mintbush						X		
<i>Psyrax latifolia</i>	Native Currant								X
<i>Pterocaulon sphacelatum</i>	Fruit Salad / Apple Bush	X		X	X	X	X	X	
<i>Ptilotus obovatus</i>	Silvertails			X			X		
<i>Ptilotus schwartzii</i>	Horse Mulla Mulla						X		
<i>Ptilotus sessilifolius</i>	Crimson Foxtail	X						X	
<i>Sclerolaena cornishiana</i>	Cartwheel Burr	X	X						
<i>Senna artemisioides</i> subsp. <i>alicia</i>	Desert Senna	X							X
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	Blunt-leaved Senna		X			X	X	X	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Blunt-leaved Cassia				X	X		X	
<i>Senna artemisioides</i> subsp. <i>quadrifolia</i>	Four-leaf Desert Senna					X		X	X
<i>Senna artemisioides</i> subsp. <i>sturtii</i>	Grey Cassia	X							
<i>Senna glutinosa</i>	Sticky Senna					X	X		
<i>Sida filiformis</i>	Sida filiformis	X							
<i>Sida laevis</i>				X					X
<i>Sida rohlenae</i>	Shrub Sida	X				X			X
<i>Solanum quadriloculatum</i>	Wild Tomato	X		X				X	
<i>Tephrosia brachyodon</i>		X							X
<i>Tephrosia supina</i>						X			X
<i>Themeda triandra</i>	Kangaroo Grass	X				X		X	
<i>Trachymene glaucifolia</i>	Blue parsnip					X			
<i>Triodia basedowii</i>	Lobed Spinifex						X	X	
<i>Triodia longiceps</i>	Giant Grey Spinifex	X							
<i>Triodia pungens</i>	Soft Spinifex			X	X				
<i>Tripogon loliiformis</i>	Five-minute Grass				X				
<i>Vachellia farnesiana</i>	Prickly Mimosa	X						X	
<i>Ventilago viminalis</i>	Supplejack	X						X	
<i>Wedelia stirlingii</i>	Sunflower Daisy Bush							X	X

8.5. APPENDIX 6; FAUNA RECORDED DURING THE SURVEY

	Species	Common Name	J01	J02	J03	J04	J05	Incidental	Method*
BIRD	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		X					O
	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill					X		O
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		X					O
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill					X		O
	<i>Amytornis purnelli</i>	Dusky Grasswren			X				O
	<i>Anas gracilis</i>	Grey Teal			X				O
	<i>Aquila audax</i>	Wedge-tailed Eagle			X		X		O
	<i>Artamus cinereus</i>	Black-faced Woodswallow	X	X					O
	<i>Aythya australis</i>	Hardhead			X				O
	<i>Barnardius zonarius</i>	Australian Ringneck	X	X	X				O
	<i>Cacatua leadbeateri</i>	Pink Cockatoo	X						O
	<i>Cacatua sanguinea</i>	Little Corella	X						O
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush			X				O
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike				X			O
	<i>Corvus orru</i>	Torresian Crow	X	X	X				O
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	X			X			O
	<i>Cracticus tibicen</i>	Australian Magpie	X						O
	<i>Dicaeum hirundinaceum</i>	Mistletoebird	X			X	X		O
	<i>Elseya melanops</i>	Black-fronted Dotterel			X				O
	<i>Emblema pictum</i>	Painted Finch			X				O
	<i>Eulophus roseicapilla</i>	Galah		X					O
	<i>Falco longipennis</i>	Australian Hobby		X		X			O
	<i>Falco peregrinus</i>	Peregrine Falcon			X				O
	<i>Fulica atra</i>	Eurasian Coot			X				O
	<i>Geopelia cuneata</i>	Diamond Dove		X					O
	<i>Geophaps plumifera</i>	Spinifex Pigeon			X				O
	<i>Grallina cyanoleuca</i>	Magpie Lark			X				O
	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard			X				O
	<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater			X				O
	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	X	X	X				O
	<i>Lichenostomus virescens</i>	Singing Honeyeater		X		X	X		O
	<i>Malurus lamberti</i>	Variegated Fairy-wren		X					O
	<i>Manorina flavigula</i>	Yellow-throated Miner	X	X	X	X			O
	<i>Melanodryas cucullata picata/westralensis</i>	Hooded Robin							O
	<i>Melopsittacus undulatus</i>	Budgerigar	X		X				O

	<i>Nymphicus hollandicus</i>	Cockatiel		X	X				O
	<i>Ocyphaps lophotes</i>	Crested Pigeon	X	X					O
	<i>Oreica gutturalis</i>	Crested Bellbird		X		X			O
	<i>Petrochelidon ariel</i>	Fairy Martin		X	X				O
	<i>Petrochelidon nigricans</i>	Tree Martin			X				O
	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	X		X				O
	<i>Rhipidura</i>	Grey Fantail					X		O
	<i>Rhipidura leucophrys</i>	Willy Wagtail			X	X	X		O
	<i>Smicrornis brevirostris</i>	Weebill	X		X	X			O
	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe			X				O
	<i>Taeniopygia guttata</i>	Zebra Finch	X	X	X				O
	<i>Tyto javanica</i>	Barn Owl				X			O
MAMMAL	<i>Canis lupus dingo</i>	Dingo	X		X	X			TSO Ph
	<i>Felis catus</i>	Cat							Sk
	<i>Macropus robustus</i>	Euro		X	X		X		TSO
	<i>Macropus rufus</i>	Red Kangaroo	X			X			TSO Ph
	<i>Mus musculus</i>	House Mouse	X	X	X				EP
	<i>Psudomys hermannsburgensis</i>	Sandy Inland Mouse		X		X			E
	<i>Rattus villosissimus</i>	Long-haired Rat		X		X	X		BS
REPTILE	<i>Aspidites melanocephalus</i>	Black-headed Python						X	Ph
	<i>Varanus sp</i>	Goanna sp.		X		X		X	Sm
	<i>Demansia psammophis</i>	Yellow-faced Whip Snake						X	Ph
	<i>Antaresia stimsoni</i>	Stimpson's Python						X	Ph
	<i>Pogona vitticeps</i>	Bearded Dragon						X	Sk
*O = Observed, T = Tracks, S = Scats, B = Burrow, E = Elliott trap, P = Pit trap, Sk = Skeletal remains, Sm = Scratch marks, Ph = Identified from photography									

Demansia psammophis

8.6. APPENDIX 7; LOCATION OF SURVEY SITES AND SITE DESCRIPTIONS

Survey Site	Start trap line		End trap line		Survey Methods*
	South	East	South	East	
J01	-22.648817	136.265177	-22.650861	136.265252	F V SD
J02	-22.652030	136.271680	-22.652021	136.269837	F V SD
J03	-22.645283	136.242050	-22.643295	136.244430	F V SD
J04	-22.673944	136.238195	-22.671628	136.236242	F V SD
J05	-22.691329	136.244608	-22.690486	136.247148	F V SD
Camera 1	-22.649513	136.273153	-	-	RC
Camera 2	-22.645411	136.241309	-	-	RC
Camera 3	-22.643860	136.237625	-	-	RC SD
SD1	-22.646577	136.243551	-	-	V SD
SD2	-22.673486	136.246222	-	-	V SD
SD3	-22.684581	136.241771	-	-	V SD
SD4	-22.689983	136.250472	-	-	V SD
*F = Fauna trap line, V = Vegetation transect, SD = Site description, RC = Remote Camera					

8.7. APPENDIX 8; INTRODUCED FLORA AND WEEDS RECORDED DURING THE SURVEY

Species Name	Common Name	Location	NT Weed Class (Weeds Management Act, 2001)*	WoNS # Listed	Comments	Photograph
<i>Cenchrus ciliaris</i>	Buffel Grass	Present at most survey sites and disturbed areas such as roadsides and heavily grazed areas.	Not declared	No	Invasive species that displaces native vegetation and increases fuel loads, contributing to increased fire risk (Dhanji, 2009). However, the species is naturalised and used as fodder by the pastoral industry.	

<i>Tamarix aphylla</i>	Athel Pine		B/C	Yes	Invasive plant of riparian zones that potentially impacts on stream flow, water levels, native vegetation and soil salinity (Dhanji, 2009).		
<i>Cylindropuntia fulgida</i>	Coral Cactus	Scattered plants within township site. Isolated plant at site J02.	Not declared	Yes	Reproduces vegetatively from leaflets. Leaflets break easily from plants and can be spread by animals, water and vehicles (Dhanji, 2009).		

<i>Vachellia farnesiana</i>	Prickly Mimosa	Scattered plants in drainage channels and floodplains	Not declared	No	Thought to be a pre-European introduction . Can occasionally form dense thickets (Purdie et al, 2008)	 <i>Vachellia farnesiana</i> Photos: J. English, S.D. Hopper & E. Wajon
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*A = To be eradicated, B = Growth and spread to be controlled, C = Not to be introduced to the NT. #WoNS = Weeds of National Significance

APPENDIX 2:
**REPORT ON A WET SEASON BASELINE FLORA, FAUNA AND
LANDSCAPE SURVEY, JERVOIS MINE (LOW 2013)**

Kentor Minerals (NT) Pty Ltd



Report on a Late Wet Season Baseline Flora, Fauna & Landscape Survey EL 25429, Jervois Mine

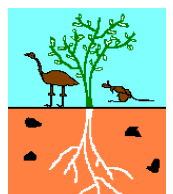
By Jesse Carpenter and Bill Low

Low Ecological Services P/L

March 2013



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EXECUTIVE SUMMARY

A landscape, flora and fauna survey of EL 25429 in the Jervois Mine area (Map 1) was undertaken by Low Ecological Services (LES) in March 2013. Carried out on behalf of Kentor Minerals (NT) Pty Ltd (Kentor), it followed a dry season survey undertaken in July 2012.

EL 25429 is located approximately 400km north-east of Alice Springs within and adjacent to the Jervois Range site of botanical significance (White M., Albrecht D., Duguid A., Latz P. & Hamilton M., 2000). The survey was commissioned for the purpose of identifying threatened flora and fauna present, or likely to be present in the project area, to map vegetation and habitat communities and examine the potential for Kentor's activities to significantly impact on these species.

The survey took place from the 5th to the 8th March 2013. Climatic conditions at the time were dry and hot, with below average rainfall experienced throughout the wet season (October 2012 – April 2013). Vegetation showed visible signs of stress due to these conditions, with few grasses and forb species recorded during the survey. Semi-permanent water sources within the area were dry.

These conditions limited the opportunity to locate threatened flora that are restricted to damp soils and ephemeral wetland communities. The endangered *Bolboschoenus caldwellii* was not recorded during the survey. Mining activities pose limited risk to this species, as it is not likely to occur in wetland areas of EL 25429.

The population of *Eremophila cordatisepala*, listed as near threatened under the *Territory Parks and Wildlife Conservation Act (TPWCA)* 2007, was re-located where recorded previously. The shrub was found to be widely distributed on gravelly rises at one survey site in the east of EL 25429. It was also recorded at two other locations during the survey. Although not common, the plant is probably more widespread throughout the area. Mining activities are likely to pose limited risk to this species, although road construction near populations should be limited to avoid disturbance.

The small shrub *Sauropus rigens* is also listed as near threatened under the *TPCWA*. This species is described as rare in the Northern Territory by White et al, 2000 and was collected on sandstone ranges in the west of EL 25429 during the survey. It is unlikely to be affected by mining due to the lack of suitable habitat in areas likely to be subjected to mining activity.

No other threatened plant species was recorded.

Capture rates during fauna surveys were poor. Only a single animal was caught; a Fat-tailed Pseudoantechinus (*Pseudoantechinus macdonellensis*) was captured in an Elliott trap in rugged ranges in the north east of EL 25429. Five reptile, seven mammal and 27 bird species were observed, with trapping success again limited by overall dry and resource poor conditions. Targeted searches were carried out for Black-footed Rock Wallaby (*Petrogale lateralis*) on the Jervois Range, however no evidence of this near threatened species was found.

No threatened fauna species was recorded.

Whilst climatic conditions may have decreased the ability to determine the presence of some species, survey results indicate that no threatened species are likely to be at direct risk from mining activities. Such activities are likely to occur in habitats not suitable for the threatened species that may potentially be present in EL25429.

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DISCLAIMER

This document has been prepared by Low Ecological Services (LES) for Kentor Minerals (NT) Limited (Kentor) in accordance with an agreement with MBS Environment (MBS) and Kentor. LES has prepared this document using the skill and care expected from professional scientists to provide factual and technical information and reasonable solutions to identified risks. It does not constitute legal advice.

Document Control

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REVISION DETAILS

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FRONTISPIECE

Looking south west towards the Jervois Range, from atop Reward Hill.

1. INTRODUCTION

1.1. PROJECT AREA

The project area is located in the Jervois Range, approximately 400km by road, north east of Alice Springs. Access from Alice Springs is via the Plenty Highway and Lucy Creek Road (Map 1). Kentor Gold Ltd (Kentor) currently holds tenure over 34 tenements that fall within Exploration Lease EL25429 that cover but are not restricted to former extraction sites and prospects of the Jervois Mine, including the Reward, Green Parrot, Marshall and Bellbird prospects. These tenements are shown in Table 1 below.

Table 1; Kentor tenements, Jervois Mine.

Tenement	Area (Hectares)
MLS 16	14.11
MLS 17	17.01
MLS 23	9.56
HLDS 19	3.58
HLDS 20	14.02
HLDS 21	15.51
HLDS 15	0.37
MLS 10	15.18
MLS 90	3.98
MLS 51	22.78
MLS 52	20
MLS 54	10.88
MLS 56	10.37
MLS 57	12.77
MLS 61	16.04
MLS 62	16.36
MLS 53	14.84
MLS 55	11.5
MCS 17	17.53
MCS 13	31.08
MCS 14	21.79
MCS 15	25.85
MCS 16	23.48
MCS 19	9.82
MCS 26	25.87
MCS 23	20.07

Tenement	Area (Hectares)
MCS 22	13.59
MCS 24	22.04
MCS 25	20.74
MCS 27	1.45
MCS 28	10.77
MCS 18	20.04
MCS 20	13.76
MCS 21	8.11

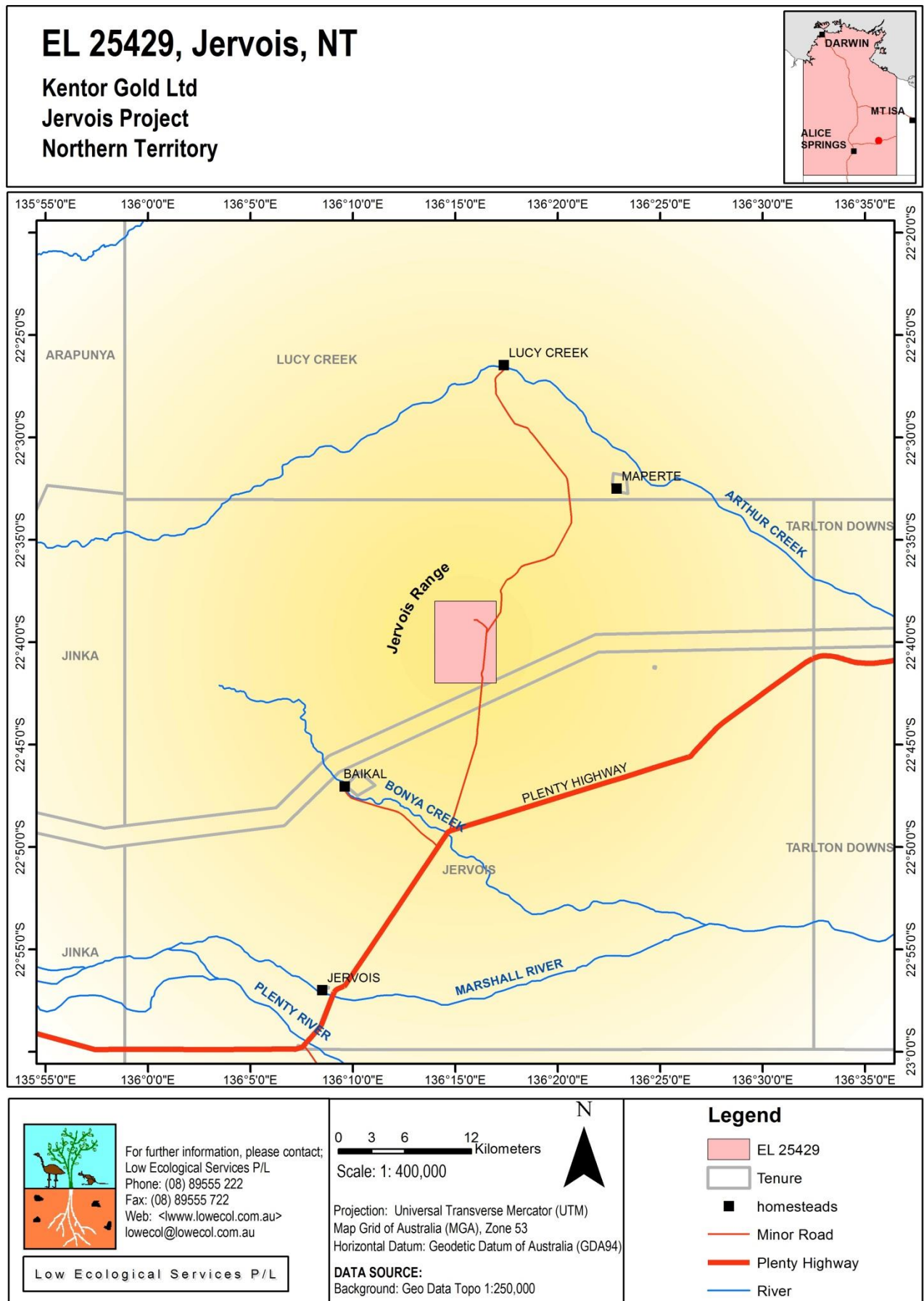
The survey included sites established in July 2012 as well as additional areas not surveyed previously on the northern and southern boundaries of EL25429.

1.2. PURPOSE AND SCOPE OF WORKS

A flora, fauna and landscape survey was undertaken within the project area with the aims of;

- Observing and recording of terrestrial fauna species within the project area,
- Sampling and recording flora species present,
- Mapping and describing vegetation communities,
- Obtaining seasonal data to complement data collected during the dry season survey in 2012 and

The survey took place from the 5th – 8th March, 2013, following a dry season survey in 2012.



Map 1; Location of EL 25429

2. DESCRIPTION OF PROJECT AREA

2.1. CLIMATE

The climate of the Jervois area has been described as semi-arid, with predominantly summer rainfall occurring between November and April (Slatyer, 1962). Climate records measured at Jervois Station since 1966 show a mean annual rainfall of 298.3mm. Actual rainfall fluctuates widely, with a range of 97.8mm – 933.4mm (Bureau of Meteorology, 2013).

After two years of above average rainfall in 2009 and 2010, Jervois has recorded below average precipitation since the end of 2010, with 179.4mm recorded for the whole of 2012. The period leading up to the survey had been dryer than average, with 12 mm of rain throughout January and February 2013; the last fall of 0.4 mm having been recorded on 18th February (Bureau of Meteorology, 2013). Rainfall statistics for the period 2009 – 2013 are shown in Figure 1.

Weather during the survey period was hot and dry with warm nights and still conditions. On the final night of the survey, a build-up of cloud resulted in slightly raised humidity levels. Day time temperatures reached a maximum of 39.5°C and were above the March average throughout the duration of the survey. Night minimums were also above average, reaching a low of 22°C (Figure 2).

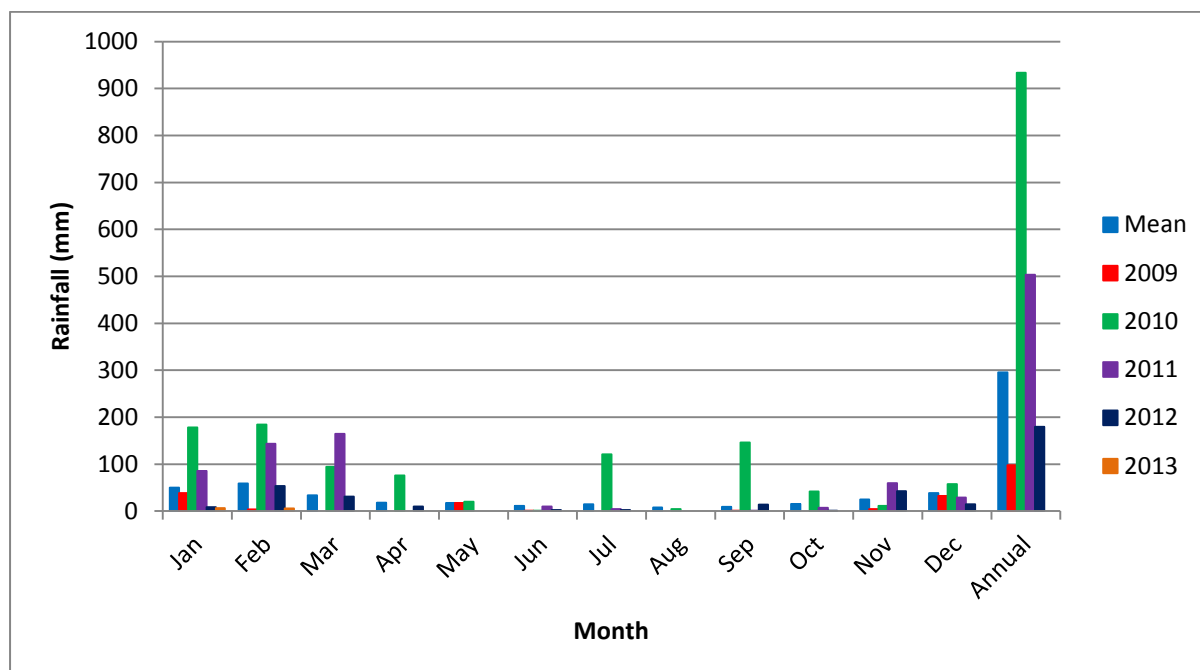


Figure 1; Rainfall statistics for Jervois Station, showing monthly rainfall for period 2009 – 2013. Mean monthly rainfall is also shown (Bureau of Meteorology, 2013)

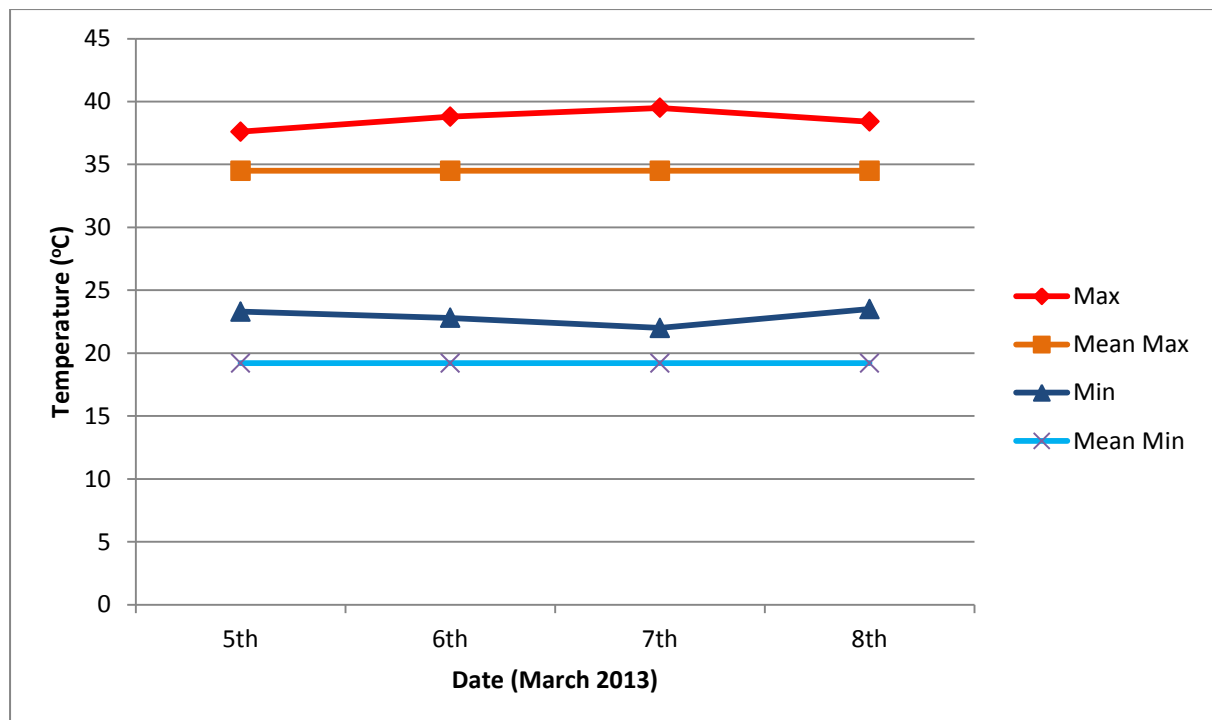


Figure 2; Maximum and minimum temperatures recorded during the survey period (Bureau of Meteorology, 2013). The March average temperatures are also shown.

2.2. FIRE HISTORY

No fires have occurred in the project area since environmental surveys were carried out in July 2012. Information about the fire history of the region is provided by the North Australian Fire Information (NAFI) web site (Northern Territory Government, Charles Darwin University, 2012). Fire histories have been mapped to the nearest 1km (for years 1997 – 2010) and 250m (Years 2004 onwards).

The southern half of the Jervois area has only been burnt once since 1997. These fires occurred in 2002. Recent fires that burnt much of central Australia in 2011 and the beginning of 2012 did not penetrate the Jervois project area, although they reached areas to the east. However, an isolated fire occurred near Jervois dam during that period.

The northern half of the project area has not experienced any fires since 1997. Fire history from 1997 until the present is shown in Map 2.

2.3. GEOLOGY

The geology of the area has been mapped by the Bureau of Rural Sciences, 1991. The north western portions of Jervois are made up of sedimentary sandstone, limestone and conglomerate of the Jervois range, while the remaining area overlies felsic and mafic intrusives such as schist and granites

(Map 3). Table 2 describes the geology of the project area and can be used as a key to interpret Map 3. Generally, areas of interest to mining activities are those in unit A5.

Table 2; Geology of the project area (Bureau of Rural Sciences after Australian Geological Survey Organisation, 1991).

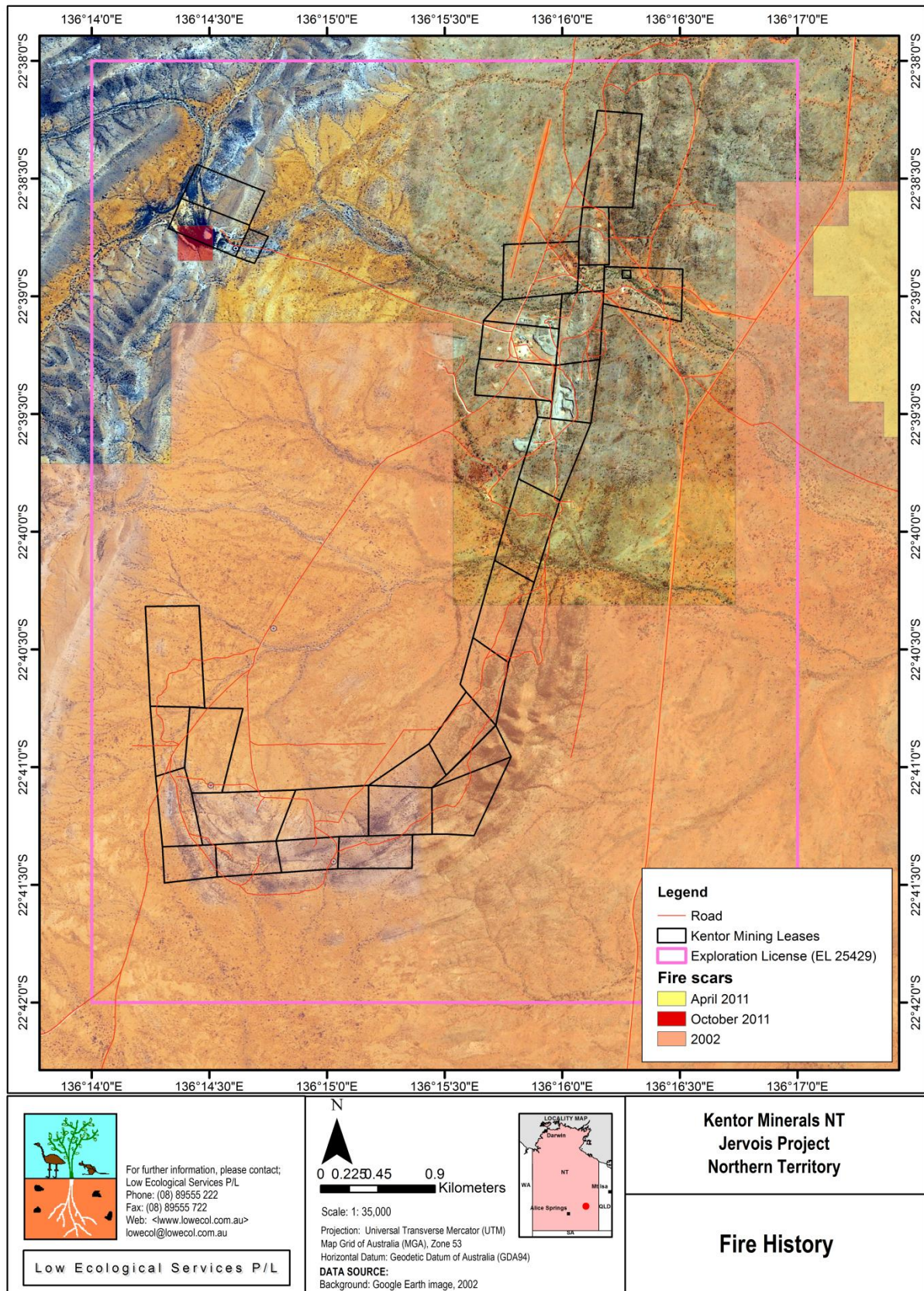
Map Code	Description	Age	Extent Within Project Area
-C1	Sedimentary sandstone and conglomerates.	543 – 509 Ma	North west of area. Outside project area.
-P103	Sedimentary sandstone, limestone and dolostone	1000 – 545 Ma	North west 1/3.
A5	Metamorphic felsic and mafic rocks.	1850 – 1800 Ma	Eastern and southern 2/3.
d9	Plutonic igneous intrusions.	1600 – 1000 Ma	South east of project area. Outside project area.

2.4. SOILS

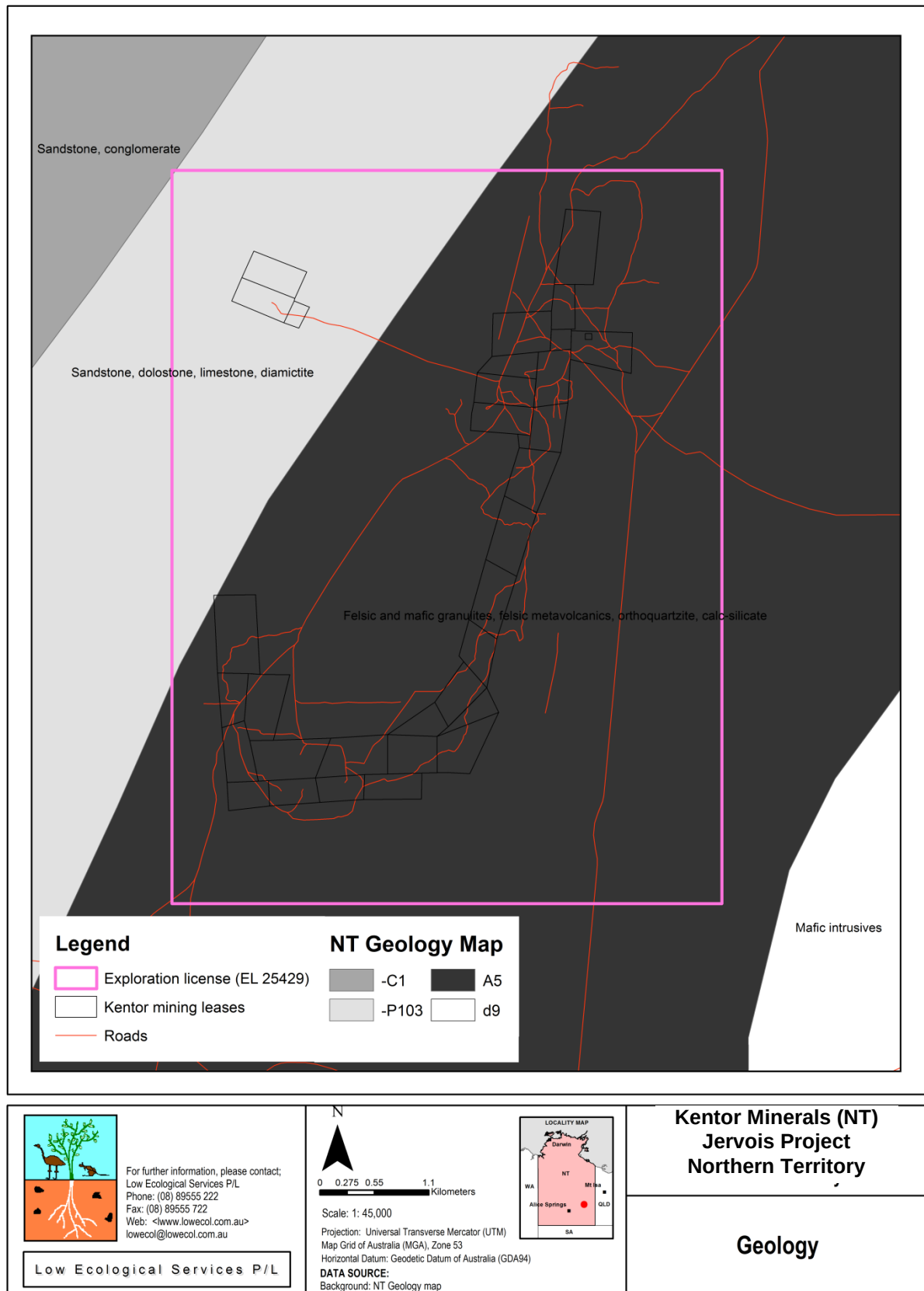
Map 4 shows the soils of the project area and surrounding country, as mapped by the Digital Atlas of Australian Soils (Bureau of Rural Sciences, 1991). All Kentor tenements are within the BA30 unit, as defined in Table 3 below.

Table 3; Soils of the project area, adapted from the Digital Atlas of Australian Soils (Bureau of Rural Sciences, 1991).

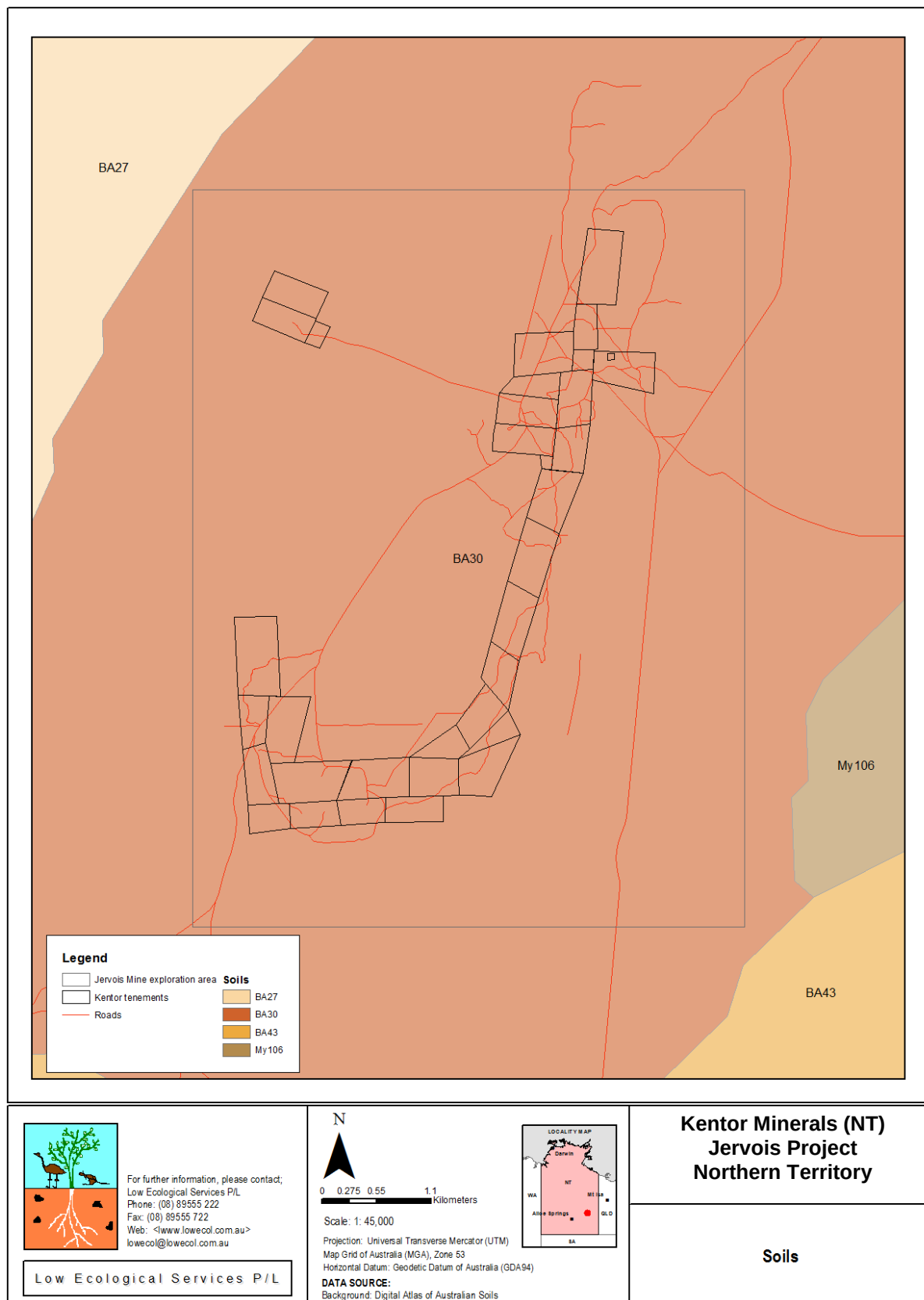
Map Code	Landscape	Soil Description
BA27	Ranges, ridges, cuernas and hills on sandstones and quartzites; extensive areas of bare rock.	Shallow stony sands and with small areas of sandy red earths, red siliceous sands and deep red sands.
BA30	Low rocky hills on gneiss and schist with intervening valley plains.	Shallow sands and loams.
BA43	Gently undulating stony plains on granite, schist and gneiss with some low hills.	Shallow stony sands and sandy red earths on sedimentary plains.
My106	Outwash plains and fans.	Red earths and red earthy sands. Some yellow earths on less well-drained sites.



Map 2; Fire history of the project area (Northern Territory Government, Charles Darwin University, 2012).



Map 3; Geology of the project area (Bureau of Rural Sciences after Australian Geological Survey Organisation, 1991).



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Map 4; Soils of the project area.

2.5. LAND SYSTEMS AND LAND UNITS

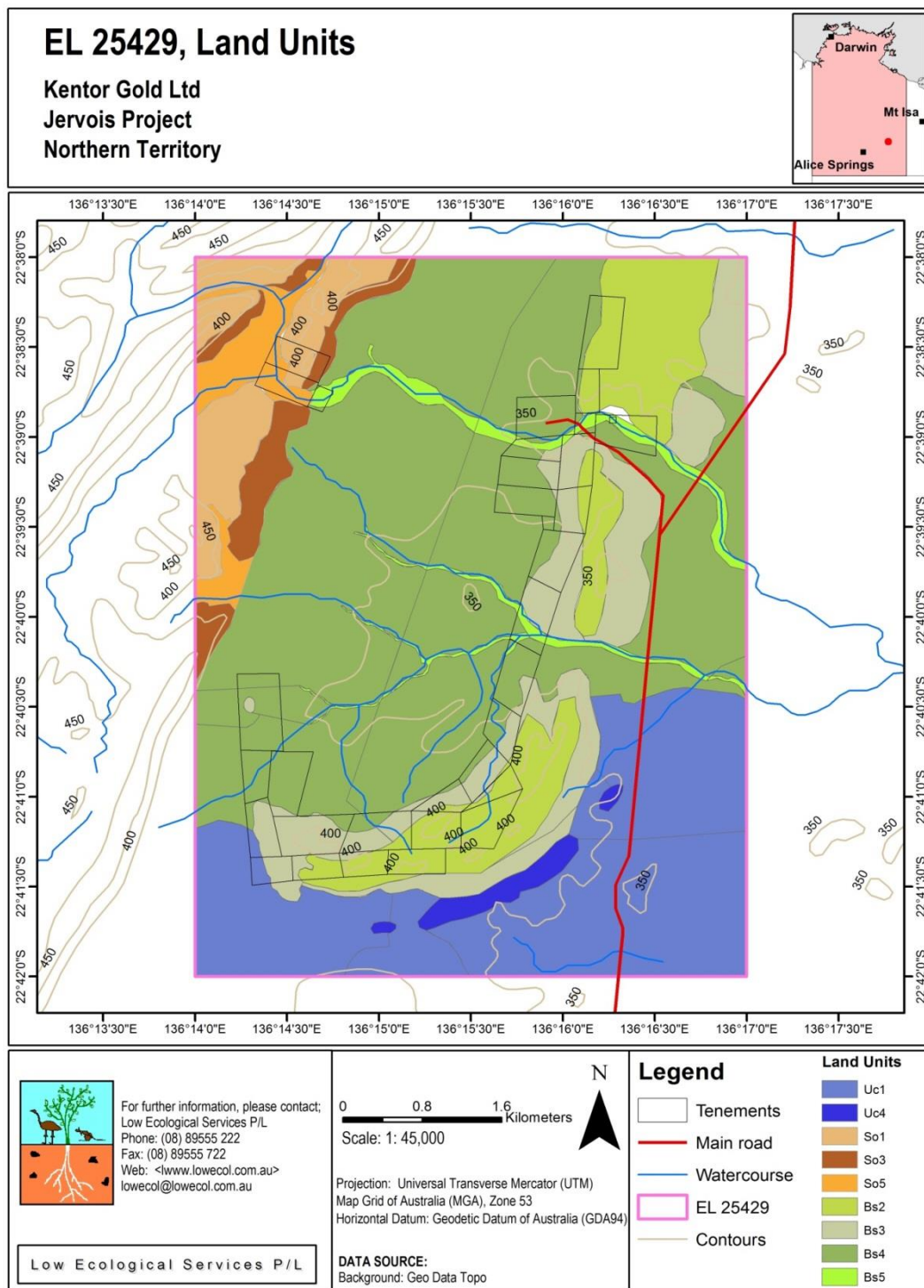
According to Perry et al, 1962, three broad land systems (Sonder, Bond Springs and Unca) occur within EL 25429. Perry further differentiated these into smaller land units, based on local topography, soils and vegetation types (Table 4).

By comparing 2012 survey results and observations with satellite imagery and aerial photography, Perry's land units were mapped by Carpenter & Low, 2012 (Map 5). Nine land units were identified as occurring within EL 25429.

Table 4; Land systems and land units of the project area, adapted from Perry et al, 1962.

Land System	General Description	Map Unit	Land Units	Soil	Vegetation
Bond Springs (BS)	Bold rocky hills, low rugged country and narrow plains.	BS 2	Schist ridges forming closely dissected tracts; short, rocky hill slopes, 10-35%, with basal colluvial aprons.	Outcrop with pockets of shallow, stony or gritty soil.	Sparse shrubs or low trees including <i>Acacia kempeana</i> (Witchetty Bush) and <i>Senna</i> species. Also <i>Acacia aneura</i> (Mulga) over sparse forbs and grasses.
		BS 3	Erosional slopes at the foot of BS1; 1-5%. Rock outcrops in upper sectors, shallow gulling down slope.	Range of shallow soils including red clayey sands, red earths and calcareous earths.	Mulga and <i>Acacia georginae</i> (Gidgee) or sparse low trees over short grasses and forbs. Sparse shrubs and low trees over <i>Triodia basedowii</i> (Hard Spinifex) on sandier soils.
		BS 4	Discontinuous drainage flats and basins with minor tributary fans.	Alluvial soils, red earths and texture contrast soils.	Absent, sparse low trees or occasional Mulga over short grasses and forbs.
		BS 5	Channels up to 30m wide and 1.5m deep.	Coarse grit bed-loads.	<i>Eucalyptus camaldulensis</i> (River Red Gum) – <i>Acacia estrophiolata</i> (Ironwood) over sparse grasses.
Sonder (So)	Bold east-west trending sandstone ranges.	So 1	Cuestas; on moderately to steeply dipping strata; slightly bevelled, weathered crests. Rock faces and structural benches; gullied escarpments and dip slopes dissected by parallel V-shaped valleys.	Outcrop: very little shallow stony soil.	Sparse shrubs and low trees. Witchetty Bush and <i>Senna</i> species or Mulga over <i>Triodia</i> (Spinifex) or sparse grasses and forbs.
		So 3	Gentler lower slopes passing into units So1 and So2.		
		So 5	Major channels up to 3m deep with adjacent narrow sandy flats.	Bed loads range from sand to boulders.	River Red Gum –Ironwood over sparse grasses.
Unca (Uc)	Gently undulating stony plains.	U c1	Interfluvies up to 1km wide; slightly rounded stony crests and steeper margins with rounded	Not recorded	Absent, sparse low trees or Witchetty Bush over short grasses and forbs.

Land System	General Description	Map Unit	Land Units	Soil	Vegetation
			valley heads.		
		Uc4	Low hills.	Outcrops with patches of shallow, gritty or stony soil.	Sparse shrubs and low trees over sparse forbs and grasses.



Map 5; Land systems and land units of the project area (based on Perry et al, 1962).

2.6. PAST ENVIRONMENTAL SURVEYS

In general, the Jervois Range area is seldom visited and poorly surveyed (White et al, 2000). Most flora and fauna records are from localities within the corridors of main roads and sites close to population centres.

In 1985, Low Ecological Services carried out a resource appraisal of Jervois Station. This project was commissioned by the then Conservation Commission of the Northern Territory and documented land systems, flora, fauna and historical and cultural aspects. While the Jervois Mine area was included within this project, it was not the focus of survey efforts. In total, 114 plant, two reptile, fifty-three bird and sixteen mammal species were recorded throughout the wider Jervois Station area (Low Ecological Services, 1985).

In 2000, Hamilton and Low conducted an environmental appraisal of Britannia Gold's mineral leases that included Jervois Mine and Kentor's tenements in the area. This survey recorded forty-two plant, 6 reptile, 35 bird and 7 mammal species. No threatened species were found.

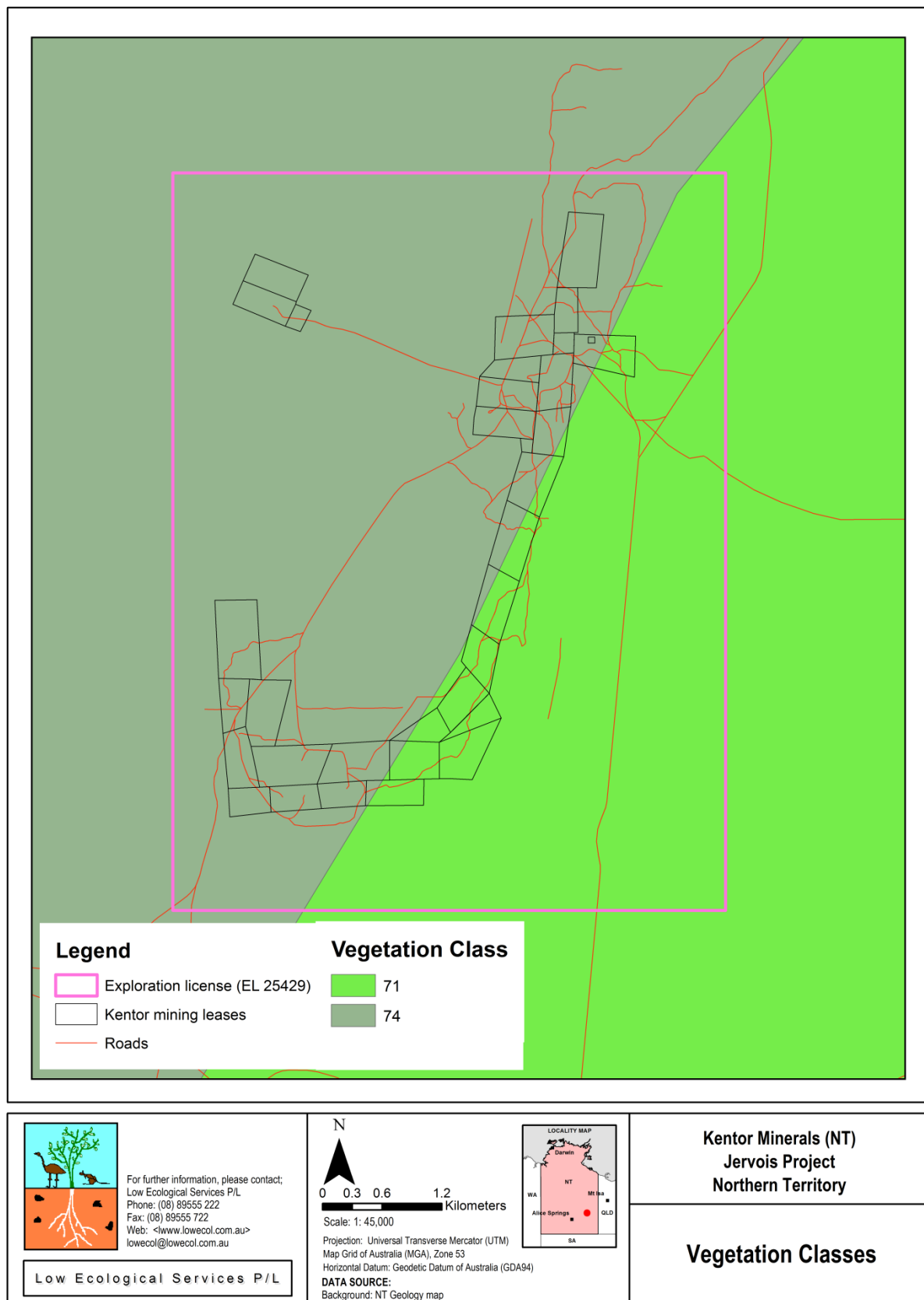
A dry season survey by Carpenter and Low was completed in July 2012. This survey recorded a comparable number of species to the 2000 work, including 5 reptile, 47 bird and 7 mammal species. This survey also mapped vegetation types across EL 25429, recording 91 species from 54 genera of plants.

2.7. FLORA AND VEGETATION CLASSES

Two broad vegetation classes occur across the project area according to Wilson et al, 1994. These vegetation types closely correspond to land system boundaries, with Class 74 occurring within the Sonder land system, while Class 71 covers the remainder of the project area. These two vegetation classes are defined in Table 5. These vegetation classes were mapped at a broad scale using aerial photography (Map 6).

Table 5; Vegetation classes of EL 25429 (Wilson et al, 1994)

Vegetation Class	Description
71	<i>Acacia aneura</i> (Mulga) tall sparse shrubland with grassland understorey.
74	<i>Acacia sibirica</i> (Bastard Mulga), <i>Senna</i> , <i>Eremophila</i> sparse shrubland.



Map 6; Vegetation classes of the project area according to Wilson et al, 1994.

2.8. THREATENED SPECIES

A search of the Northern Territory's flora atlas database showed records of seven conservation significant species (as listed by the *Territory Parks and Wildlife Conservation Act (TPWCA)*, 2007) from an area within 20km of Jervois Mine (DLRM, 2013). These species are shown in Table 6. None are classified as threatened under Commonwealth legislation (*Environment Protection and Biodiversity Protection Act (EPBCA)*, 2007).

Table 6; Threatened flora recorded from within 20km of Jervois Mine, as listed by Commonwealth (EPBCA, 2007) and Northern Territory (TPWCA, 2007) legislation.

Species Name	Common Name	TPWC Act Status*	EPBC Act Status
<i>Amaranthus centralis</i>		DD	Not listed
<i>Bolboschoenus caldwellii</i>	Sea Club Sedge	EN	Not listed
<i>Eremophila cordatisepala</i>	Turpentine Bush	NT	Not listed
<i>Fimbristylis velata</i>	Veiled Fringe-rush	DD	Not listed
<i>Sauropus rigens</i>	Stiff Spurge	NT	Not listed
<i>Sida intricata</i>	Sida	NT	Not listed
<i>Sida</i> sp. Hale River (P.K. Latz 12036)	Sida	DD	Not listed
*DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered			

A report generated by the Commonwealth Governments Protected Matters Search Tool identified no threatened flora or communities as occurring or likely to occur within the same 20km search area (Appendix 1).

2.8.1. Sites of Botanical Significance

EL 25429 area exists almost entirely within the Jervois Range site of botanical significance, as recognised by White et al, 2000. The area is of bioregional significance, with several species of flora only recorded in the Channel Country bioregion from this site. These species are listed in Table 7. It encompasses the isolated sandstone and siltstone Jervois Range and surrounding footslopes, an area of approximately 274km² (Wilson et al, 2000).

Table 7; Flora only known in the Channel Country bioregion from the Jervois Range SOBS (Wilson et al, 2000).

Species Name	Common Name
<i>Acacia monticola</i>	Minniritchie
<i>Acacia spondylophylla</i>	Curry Wattle
<i>Cheilanthes brownii</i>	Woolly Cloak Fern
<i>Abutilon cryptopetalum</i>	Hill Lantern Flower
<i>Cyperus cunninghamii</i>	
<i>Eragrostis cumingii</i>	Cuming's Lovegrass
<i>Eremophila duttonii</i>	Budda
<i>Eucalyptus intertexta</i>	Bastard Coolabah
<i>Eucalyptus normantonensis</i>	Normanton Box
<i>Ficus brachypoda</i>	Rock Fig
<i>Glossostigma diandrum</i>	Spoon-leaf Mud-mat
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	Holly Grevillea
<i>Lysiana subfalcata</i>	Mistletoe
<i>Olearia stuartii</i>	Stuart's Daisy
<i>Schoenoplectus litoralis</i>	Bulrush
<i>Sida ammophila</i>	Sand Sida
<i>Tribulus macrocarpus</i>	
<i>Chrysopogon pallidus</i>	Golden Beard Grass
<i>Bolboschoenus caldwellii</i>	Sea Club Sedge
<i>Fimbristylis velata</i>	Veiled Fringe-rush

2.9. FAUNA

A search of the Northern Territory's fauna atlas database showed records of ten conservation significant species, excluding those listed as Extinct (as listed by the *Northern Territory Parks and Wildlife Conservation Act (TPWCA)*, 2007) from an area within 20km of Jervois Mine (NRETAS, 2012). These species are listed in Table 8. The status of one species, the Australian Bustard (*Ardeotis australis*), has been changed since previous surveys. This species was previously listed as vulnerable under the *TPWCA*. It is now listed as near threatened (Department of Land Resource Management, 2012).

Of those species listed, *Isoodon auratus* (Golden Bandicoot) and *Macrotis lagotis* (Bilby) are known to no longer occur within the search area, with the most recent records of either species being an observation of a Bilby in 1969 (NRETAS, 2012). These two species shown in Table 8 are also listed as threatened under Commonwealth legislation (*Environment Protection and Biodiversity Protection Act (EPBCA)*, 2007).

Table 8; Threatened fauna recorded from within 20km of Jervois Mine, as listed by Commonwealth (EPBCA, 2007) and Northern Territory (TPWCA, 2007) legislation.

Species Name	Common Name	TPWCA Status*	EPBCA Status
<i>Ardeotis australis</i>	Australian Bustard	NT	Not Listed
<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black Cockatoo (Central Australian subspecies)	NT	Not Listed
<i>Conopophila whitei</i>	Grey Honeyeater	DD	Not Listed
<i>Dromaius novaehollandiae</i>	Emu	NT	Not Listed
<i>Isodon auratus</i>	Golden Bandicoot	EN	VU
<i>Rattus villosissimus</i>	Long-haired Rat	NT	Not Listed
<i>Sticonetta naevosa</i>	Freckled Duck	NT	Not Listed
<i>Macrotis lagotis</i>	Bilby	VU	VU
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum (Southern NT)	EN	Not Listed
<i>Lagorchestes conspicillatus</i>	Spectacled Hare Wallaby	NT	Not Listed
*DD = Data Deficient, NT = Near Threatened, VU = Vulnerable, EN = Endangered			

A report generated by the Commonwealth Government's Protected Matters search tool (Appendix 1) identified three threatened, nine migratory and seven marine species as occurring or likely to occur within the same 20km search area (Table 9). Of the threatened species listed in the Protected Matters report, two do not occur in NT fauna atlas records for the search area. These are Australian Painted Snipe (*Rostratula australis*) and Mulgara (*Dasycercus cristicauda*). A recent record of a single Australian Painted Snipe within EL 25429 was published on a website forum in 2012 (Eremaea Birds, 2012).

Table 9; Threatened, marine and migratory species from an EPBCA Protected Matters search for EP 25429. Adapted from Carpenter & Low, 2012.

Category	Species Name	Common Name	EPBCA Status*
Threatened Species	<i>Rostratula australis</i>	Australian Painted Snipe	VU
	<i>Dasycercus cristicauda</i>	Mulgara	VU
	<i>Macrotis lagotis</i>	Greater Bilby	VU
Migratory Marine /Wetland Species	<i>Apus pacificus</i>	Fork-tailed Swift	
	<i>Ardea alba</i>	Great Egret	
	<i>Ardea ibis</i>	Cattle Egret	
	<i>Charadrius veredus</i>	Oriental Plover	
	<i>Glareola maldivarum</i>	Oriental Pratincole	
	<i>Rostratula benghalensis</i>	Painted Snipe	VU
*VU = Vulnerable			

3. METHODS

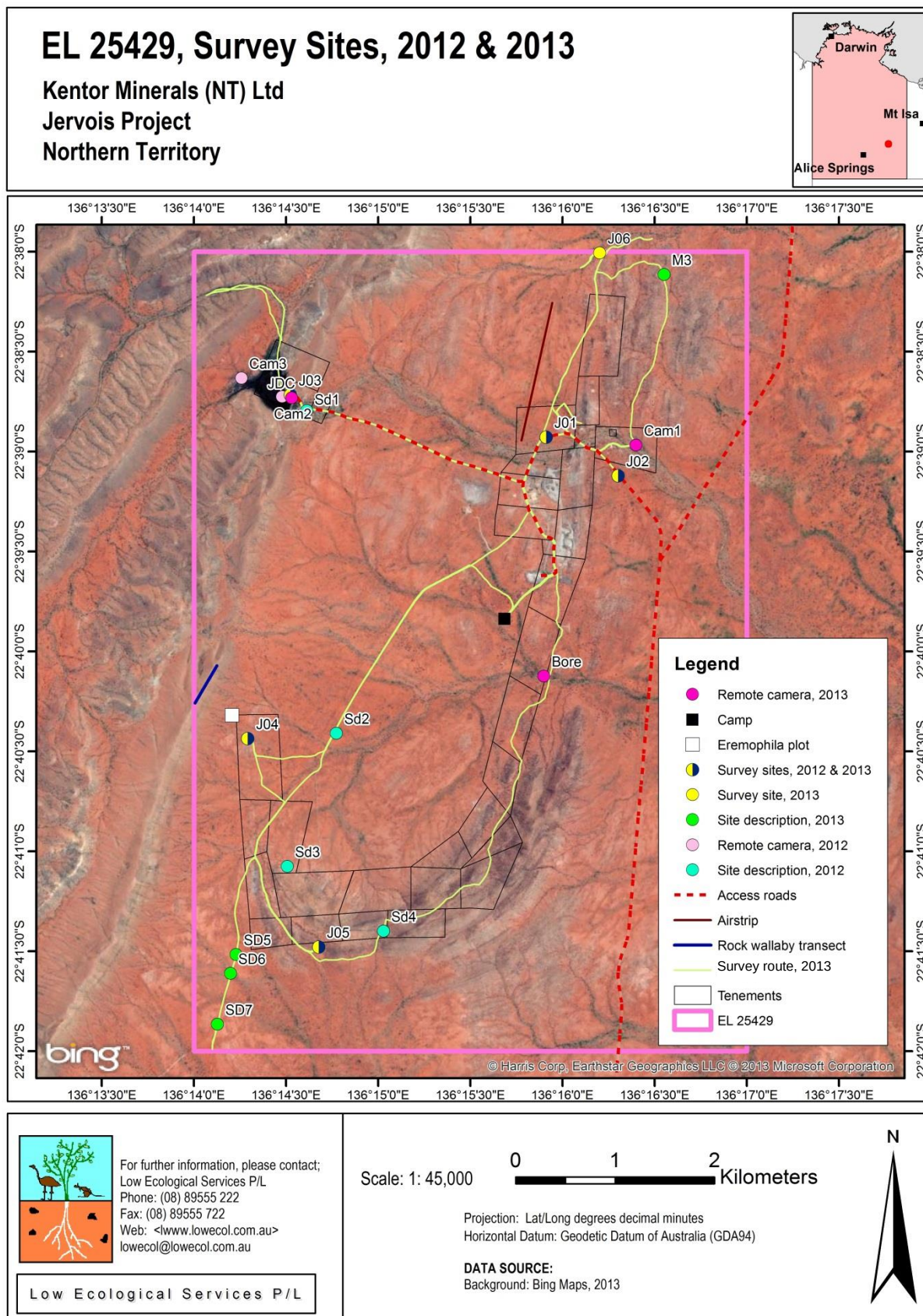
3.1. SITE SELECTION

Five sites established during the 2012 survey were re-surveyed. A sixth site was selected on a creek line at the northern boundary of EL 25429 (Table 10 and Map 7). In line with Northern Territory guidelines (NRETAS, 2011), these six sites represented the major land systems and vegetation types occurring within the area, according to Perry et al, 1962. In 2012, these land systems were further divided into local land units and vegetation types by a drive over survey of the project area and more detailed survey methods as discussed further in this Section. These were further refined by similar methods as part of the 2013 survey.

In addition to these six sites, site descriptions at points of interest or habitat changes were undertaken during drive over surveys to provide a broad overview of the habitats that occur (Table 10 and Map 7). These four sites allowed us to focus on specific habitats within the relative uniformity of plant species over the general area.

Table 10; Location and types of survey sites, March 2013.

Site	Location		Survey Period		Survey Type
	Latitude	Longitude	October 2012	March 2013	
J01	-22.648817	136.265177	X	X	Fauna trapping, vegetation transect, site description
J02	-22.652030	136.271680	X	X	Fauna trapping, vegetation transect, site description
J03	-22.645283	136.242050	X	X	Fauna trapping, vegetation transect, site description
J04	-22.673944	136.238195	X	X	Fauna trapping, vegetation transect, site description
J05	-22.691329	136.244608	X	X	Fauna trapping, vegetation transect, site description
J06	-22.633433	136.27008		X	Fauna trapping, vegetation transect, site description
M3	-22.635229	136.275855		X	Site description
SD5	-22.691927	136.237140		X	Site description
SD6	-22.693516	136.236649		X	Site description
SD7	-22.697743	136.235465		X	Site description
Bore	-22.668715	136.264978		X	Remote camera
Cam1	-22.65098	136.27191	X	X	Remote camera
JDC	-22.645465	136.242035		X	Remote camera
RW1	Start Transect			X	Active search transect for Black-footed Rock Wallaby
	-22.666964	136.235837			
	End Transect				
	-22.670949	136.233425			



Map 7; Survey site locations, March 2013.

3.2. LAND UNIT AND VEGETATION MAPPING

As discussed in Section 2.5, land units were mapped following 2012 surveys. Land units were further refined by additional survey effort in areas of EL 25429 in 2013. Results and observations collected during the 2013 survey period were again compared with satellite and aerial imagery. Land unit definition and terminology was derived from Perry et al, 1962.

Vegetation types were mapped by comparing data collected in the field with aerial imagery and descriptions of vegetation communities used by Perry et al, 1962.

3.3. SITE DESCRIPTION SUMMARIES

Site descriptions were carried out at each of the six trapping sites within a 50m x 50m quadrat, detailing landscape characteristics and vegetation dominance. In addition to these sites, a further four site descriptions were undertaken over accessible parts of EL 25429; where communities appeared sufficiently different from the trap sites (Table 10).

Site description summaries recorded information regarding landscape, soils, fire histories and vegetation associations using a format outlined under Northern Territory guidelines (NRETAS, 2011). Dominant plant species were also recorded as part of this process.

3.4. FLORA

Flora was sampled in detail at each of six trapping sites (Table 10 and Figure 3). These were chosen to represent the Sonder, Bond Springs and Unca land systems. In all cases, species that were present within the site description quadrat but did not occur on the transect were recorded as incidental species.

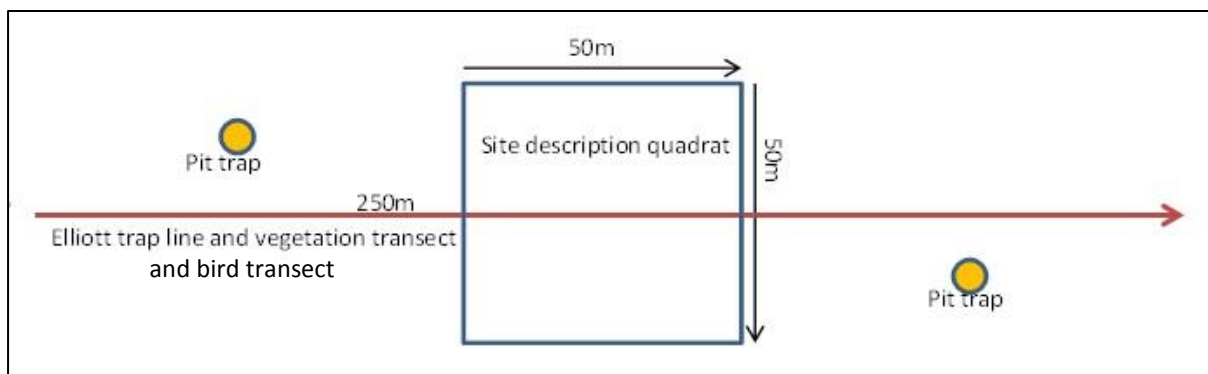


Figure 3; Trap site layout used during the survey (not drawn to scale).

Plants that could not be identified in the field were collected as voucher specimens. These were compared with Northern Territory Herbarium material at a later date for identification. Information regarding vegetation associations was also collected during site descriptions, as discussed above.

Vegetation associations surveyed were matched with land units and compared with satellite and aerial photography to produce a map of vegetation types for EL 25429.

During the 2012 survey period, the near threatened *Eremophila cordatisepala* was recorded at one survey site (J04). Efforts were made to relocate this species at the aforementioned site and other areas within EL 25429. The number of individual plants within a 20x20 m quadrat (Map 7) was counted at J04, although the species was also recorded outside this area.

3.5. VERTEBRATE FAUNA

Fauna was sampled using guidelines established by Neave et al. and included in Northern Territory government guidelines (NREATS, 2011). Traps for reptiles and small mammals were set at six trapping sites (Table 10). Each trap line consisted of 25 Elliott style box traps. Two pit traps were used at four sites; however rocky outcrop soils prevented their use on the remaining trap lines. Where pit traps were employed, funnel traps were also used. Trapping took place over three nights at all sites, constituting 450 trap nights. A combined total of 825 trap nights occurred over the 2012 and 2013 survey periods.

Elliott traps were set at approximately 10 m intervals, estimated by pacing the distance, while pit traps were placed at 50m intervals. Each pit trap consisted of a 25L bucket with a drift fence extending approximately 5 m either side. At each pit, a funnel trap was placed at either end of the drift fence. Where possible, track beds were prepared along drift fences by scraping the ground with a boot or shovel.

Trap lines were checked each morning during the survey period and closed during the day, as the weather conditions were warm to hot. Captured animals were identified, photographed and measured, then released promptly. Animals that could not be identified in the field were photographed, concentrating on diagnostic features such as foot pads, for later identification.

Birds were recorded while walking trap lines each morning. Birds were identified by sight and call. Ground dwelling birds such as button quails have been caught in funnel traps during previous surveys, but were not targeted by the placement of traps during this survey.

Incidental sightings of tracks, scats and other traces of fauna were also recorded, both at survey sites and when travelling throughout other areas of the tenements. A 500 m transect was actively searched for signs of Black-footed Rock Wallaby (*Petrogale lateralis*) in suitable habitat on the Jervois Range.

Three remote cameras were used to sample for larger fauna. Two were set at stock watering points and were unbaited. One of these was located at the same site as during the 2012 survey. A third was set at the then dry Jervois Dam (Table 10 and Map 7).

Invertebrates were not sampled during this survey.

4. RESULTS

4.1. LAND UNIT AND VEGETATION MAPPING

The survey showed that over a large proportion of EL 25429, land units mapped after previous surveys and reproduced previously in Map 5 were accurate. Additional survey effort in the north and south of the EL confirmed mapping in those areas that in 2012 had relied on aerial imagery.

Vegetation types were mapped at a local scale following 2012 surveys of EL 25429 by Carpenter & Low, 2012. Based on vegetation descriptions for land units given by Perry et al, 1962, these eight vegetation types are described in Table 11.

Table 11; Vegetation types based on land units of EL 25429.

Land System	Land Unit	Map Code	Vegetation Community	Dominant Species
Bond Springs	Bs2	1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees.	<i>Triodia basedowii</i> <i>Enneapogon oblongus</i> <i>Acacia spondylophylla</i> <i>Corymbia apparrerinja</i>
		4	Tall <i>Acacia aneura</i> woodland over short grasses in fire protected valleys and upper reaches of drainage lines.	<i>Acacia aneura</i> <i>Atalaya hemiglauca</i> <i>Senna artemisioides</i> subsp. <i>helmsii</i> <i>Enneapogon polyphyllus</i> <i>Aristida holathera</i>
		2	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauca</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
	Bs3	2	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauca</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
		1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees.	<i>Triodia basedowii</i> <i>Enneapogon oblongus</i> <i>Acacia spondylophylla</i> <i>Corymbia apparrerinja</i>
		5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges	<i>Acacia estrophilata</i> <i>Acacia aneura</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Enneapogon polyphyllus</i>
	Bs4	5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges	<i>Acacia estrophilata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauca</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i> <i>Eragrostis eriopoda</i>
		2	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs	<i>Acacia sibirica</i> <i>Acacia aneura</i>

Land System	Land Unit	Map Code	Vegetation Community	Dominant Species
				<i>Atalaya hemiglauca</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Enneapogon polyphyllus</i>
		3	<i>Acacia estrophiolata</i> tall, open woodland over short grasses with sparse shrubs.	<i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Acacia tetragonophylla</i> <i>Pterocaulon sphacelatum</i> <i>Cenchrus ciliaris</i> <i>Themeda triandra</i>
		7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds.	<i>E. camaldulensis</i> <i>Acacia estrophiolata</i> <i>Themeda triandra</i> <i>Cenchrus ciliaris</i> <i>Eulalia auria</i>
		8	<i>Acacia georginae</i> (Gidgee) dominated woodland. Sparse grass and forb understorey.	<i>Acacia georginae</i> <i>Enneapogon polyphyllus</i> <i>Sclerolaena bicornis</i>
	Bs5	7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds.	<i>E. camaldulensis</i> <i>Themeda triandra</i> <i>Cymbopogon ambiguous</i> <i>Triodia longiceps</i>
		5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges	<i>Corymbia apparrerinja</i> <i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Aristida holathera</i>
Sonder	So1	1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees.	<i>Triodia pungens</i> <i>Acacia spondylophylla</i> <i>Acacia monticola</i> <i>Grevillea wickhamii</i> <i>Eremophila latrobei</i>
	So3	1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees.	<i>Triodia pungens</i> <i>Acacia aneura</i> <i>Senna artemisioides helmsii</i>
	So5	6	Sparse low <i>Acacia</i> woodland over hummock (<i>Triodia</i>) grasses.	<i>Acacia aneura</i> <i>Acacia kempeana</i> <i>Corymbia opaca</i> <i>Triodia pungens</i>
		7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds.	<i>Eucalyptus camaldulensis</i> <i>Euphorbia drummondii</i>
Unca	Uc1	2.	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs	<i>Acacia aneura</i> <i>Senna artemisioides oligophylla</i> <i>Atalaya hemiglauca</i> <i>Aristida holathera</i> <i>Enneapogon polyphyllus</i>
		3	<i>Acacia estrophiolata</i> tall, open woodland over short grasses with sparse shrubs.	<i>Acacia estrophiolata</i> <i>Acacia aneura</i> <i>Acacia tetragonophylla</i> <i>Pterocaulon sphacelatum</i> <i>Cenchrus ciliaris</i> <i>Themeda triandra</i>
		5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauca</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i>

Land System	Land Unit	Map Code	Vegetation Community	Dominant Species
				<i>Eragrostis eriopoda</i>
	Uc4	2	Sparse, low <i>Acacia</i> shrubland over short grasses and forbs	<i>Acacia sibirica</i> <i>Acacia aneura</i> <i>Atalaya hemiglauc</i> <i>Enneapogon polyphyllus</i> <i>Aristida holathera</i>
		5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia</i> over short grasses and forbs; on floodplains and at the base of ranges	<i>Acacia estrophiolata</i> <i>Corymbia opaca</i> <i>Acacia aneura</i> <i>Corymbia apparrerinja</i> <i>Atalaya hemiglauc</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i> <i>Eragrostis eriopoda</i>

The 2013 survey showed that vegetation types mapped after previous surveys were accurate over a large proportion of the project area. Additional survey effort in the north and south of the EL produced additional information on flora for these areas. Consequently, minor changes were made to vegetation (Map 8).

Observations in montane valleys in the north east and south east of the EL also enabled the mapping of additional old growth Mulga (*Acacia aneura*) associations (vegetation type 4). Two survey sites occurred within this vegetation type, with drive over surveys able to effectively identify this association in additional areas.

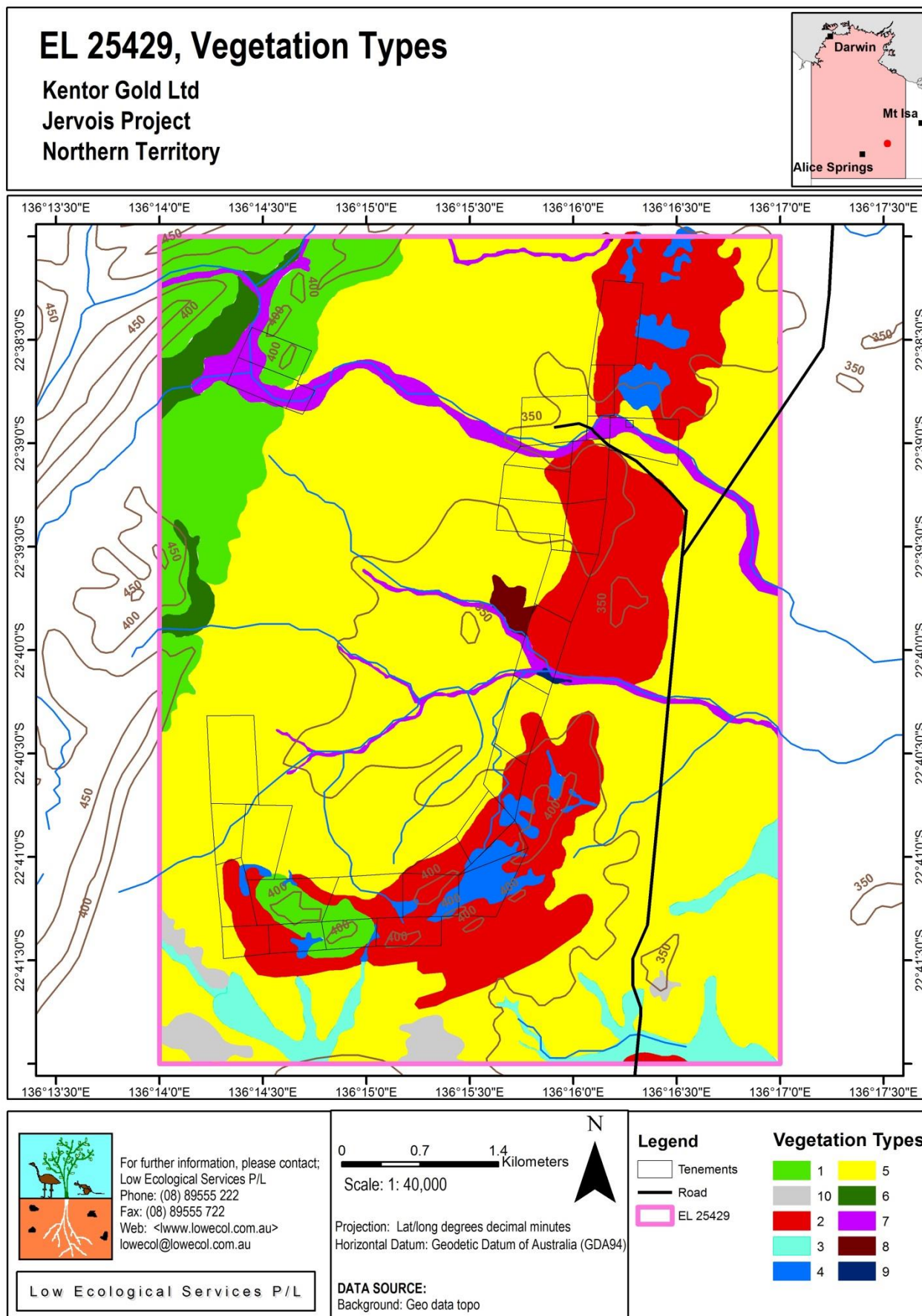
Travel by foot into the north west corner of EL 25429 confirmed that River Red Gum (*Eucalyptus camaldulensis*) woodland associations (vegetation type 7) continue up stream of Jervois Dam along Unca Creek.

Two additional vegetation types were identified during the 2013 survey. A small area of open woodland dominated by Coolibah (*Eucalyptus Coolabah*) (vegetation type 9) was located along a water course south east of Kentor's camp. Survey effort in the south of the EL also identified sparse low shrublands of *Senna* species over forbs and grasses (vegetation type 10). These two vegetation types are described in Table 12. Their extent is shown on Map 8.

Table 12; Additional vegetation types identified during 2013 surveys.

Land System	Land Unit	Map Code	Description	Dominant Species
Bond Springs	Bs4	9	Open woodland of Coolibah (<i>Eucalyptus coolabah</i>) over Buffel Grass (<i>Cenchrus ciliaris</i>) in	<i>Eucalyptus coolabah</i> <i>Cenchrus ciliaris</i> <i>Eulalia auria</i>

Land System	Land Unit	Map Code	Description	Dominant Species
			drainage depressions.	
Unca	Uc1	10	Low sparse shrubland of Senna over short grasses and forbs on sandy clay soils.	<i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Aristida holathera</i> <i>Aristida contorta</i> <i>Sclerolaena bicornis</i>



Map 8; Vegetation types of EL 25429. Descriptions of vegetation types 1 – 10 are presented in Table 11 and Table 12.

4.2. SITE DESCRIPTION SUMMARIES

Additional site descriptions carried out in 2013 confirm that EL25429 is predominately a system of undulating alluvial plains at the base of low hills and ridges. These plains are dissected by numerous drainage channels, particularly in central EL25429. Where they abut hills and ranges, these plains have stony soils and are characterised by low shrublands dominated by *Acacia sibirica* (Bastard Mulga) over *Aristida holathera* (Erect Kerosene Grass). Elsewhere, red earth soils predominate and sparse woodlands of *Corymbia opaca* (Bloodwood), *C. apperrerinja* (Ghost Gum) or *Acacia estrophiolata* (Ironwood) occur. This is replaced by tall *Eucalyptus camaldulensis* (River Red Gum) woodland over sparse grasses along drainage channels.

These undulating plains with red earth soils continue into the north of the EL, with stony alluvial deposits close to water courses. Vegetation on these plains varies from low open woodland of Mulga (*Acacia aneura*) and Gidgee (*Acacia georginae*) to tall open woodland consisting of Ironwood and Ghost Gum. Along water courses, River Red Gum tall woodlands are present.

In contrast, water courses near the southern boundary of EL 25429 are shallow with sandy clay soils rather than rocky alluvium. River Red Gums are absent from vegetation associations here. Instead, Ironwood tall woodlands follow the drainage channels. Sparse shrublands occur on undulating plains dominated by *Acacia* or *Senna* species.

Site description data for all sites is provided in Appendix 1.

4.3. FLORA

Fifty species from 30 genera and 17 families were recorded during the March 2013 survey period (Appendix 2). Diversity at survey sites ranged from ten species at two sites (J02 and J03) to 25 species at site J06 (Figure 4). The number of species recorded in total and at most survey sites were less than those recorded in July 2012 (Figure 4). The only exception was site J06; this site was not surveyed in 2012. Three species, *Tephrosia rosea*, *Gossypium bickii* and Long-leaved Emu Bush (*Eremophila longifolia*), were recorded that had not been noted in 2012.

All vegetation communities showed signs of stress from hot, low rainfall conditions. Grasses and forbs that dominate understoreys of most communities following summer rainfall were noticeably uncommon throughout the area. Rank growth of grasses recorded during the 2012 survey period had died and dried off, leaving a high percentage of litter cover on transects.

Tree and shrub species resilient to dry conditions remained in woodland and shrubland communities that dominate EL 25429. These woody species constituted the majority of species recorded at all survey sites. Bloodwoods (*Corymbia opaca*) and Ghost Gums (*Corymbia apperrerinja*) were beginning to flower at the time of the survey. Otherwise, few plants were in flower due to seasonality and climatic conditions. It is likely that given more favourable conditions during warm seasons, further species, particularly forbs and grasses, would be recorded.

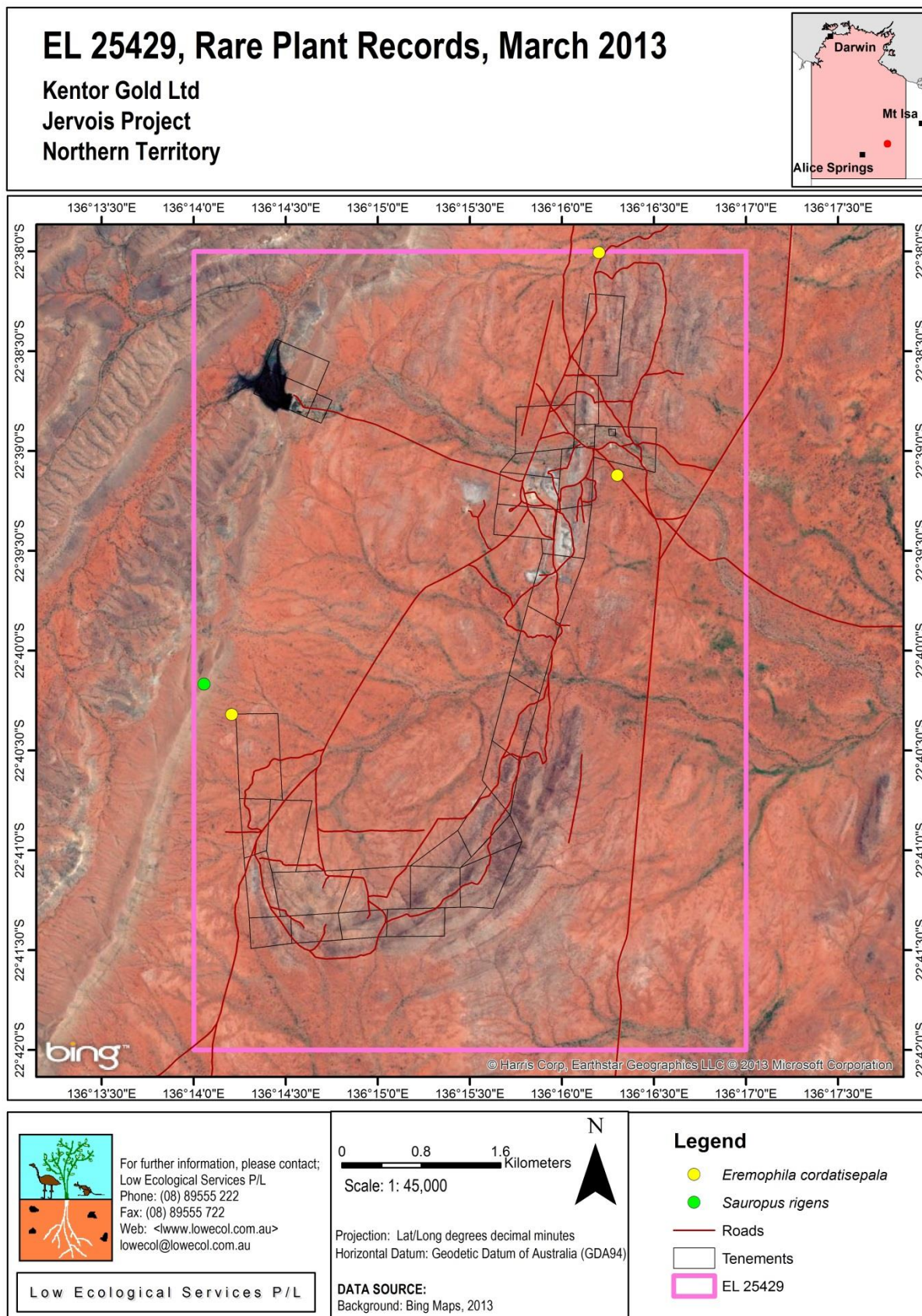
Hummock grasslands on slopes and hill tops showed similar stress to woodland communities. Spinifex (*Triodia pungens*) had not seeded, meaning species identification was difficult. *Acacia monticola* and Holly Grevillea (*Grevillea wickhamii*) sparse shrublands found on sedimentary ridges of the Jervois Range in the north west of the area were not found on low schist hills to the east of EL 25429. Extensive travel through these hills was made during the 2013 survey.

Eremophila cordatisepala (Figure 5) was again found at site J04. This species is listed as near threatened by the *TPWCA*, 2007. Records within the vicinity of the Jervois Range are the western distribution limit of this species (White et al, 2000). A 20 x 20 m quadrat within this population (Map 7) contained ten individual plants. All individuals had been grazed, although vigorous regeneration was observed on most plants. The species was also located at survey sites J02 and J06 (Map 9). It is probable that it is widespread on stony rises within woodland communities on undulating plains of EL 25429.

The low, spiny shrub *Sauropus rigens* was located while searching for rock wallabies on a rocky escarpment of the Jervois Range (Map 9). This species is listed as near threatened under the *TPWCA*. It is described as rare in the Northern Territory by White *et al*, 2000. The species occurs in skeletal soils on steep, sandstone ranges and is likely on the steep slopes of the Jervois range in the west of EL 25429. It is not likely to be found on hills in the east of the EL targeted by mining due to geological, soil and habitat differences.

No species listed as threatened under Commonwealth legislation (*EPBCA*, 2007) were recorded.

Four introduced species were found during the survey. These species are listed in Appendix 2. Of these, one species (*Tamarix aphylla*) is a declared class B weed under Northern Territory legislation. A second species (*Cylindropuntia fulgida*) is listed as a Weed of National Significance by the Commonwealth. These two species were not found in additional sites to those recorded in July 2012.



Map 9; Locations where rare plant species *Eremophila cordatisepala* and *Sauropus rigens* were collected, March 2013.

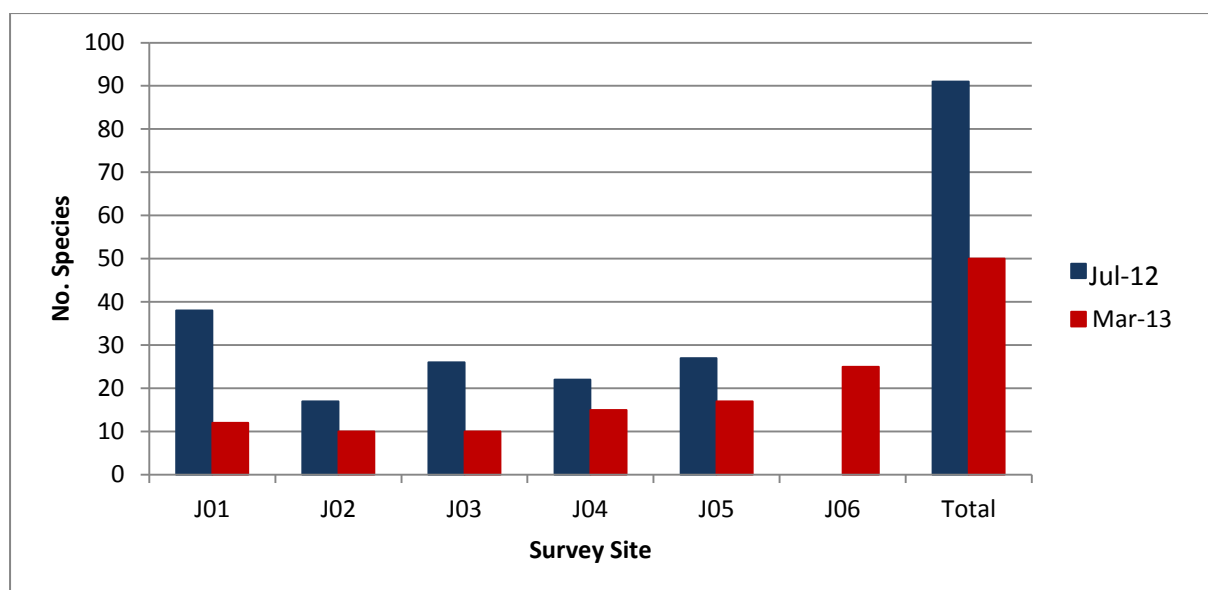


Figure 4; Number of plant species recorded by July 2012 and March 2013 surveys.



Figure 5; *Eremophila cordatisepala*.



Figure 6; A stony rise at site J04 where *Eremophila cordatisepala* occurs.



Figure 7; A Bloodwood (*Corymbia opaca*) flowering prolifically in woodland at site J06.



Figure 8; Most sites, such as SD7 (above), showed stress due to dry conditions. Few summer grasses or forbs were recorded.

4.4. VERTEBRATE FAUNA

Trapping results were poor across all sites. Only one capture was recorded over a total of 450 trap nights; a single Fat-tailed False Antechinus (*Pseudoantechinus macdonellensis*) was caught at site J03 (Figure 11). Other species were recorded by the presence of tracks, scats or other signs. Several larger species were observed and captured on remote camera.

A total of 38 vertebrate species were recorded during the survey. This included five reptile, 27 bird and six mammal species. Most species were recorded at site J02, with 16 species records, while only nine species were recorded at site J05 (Figure 9).

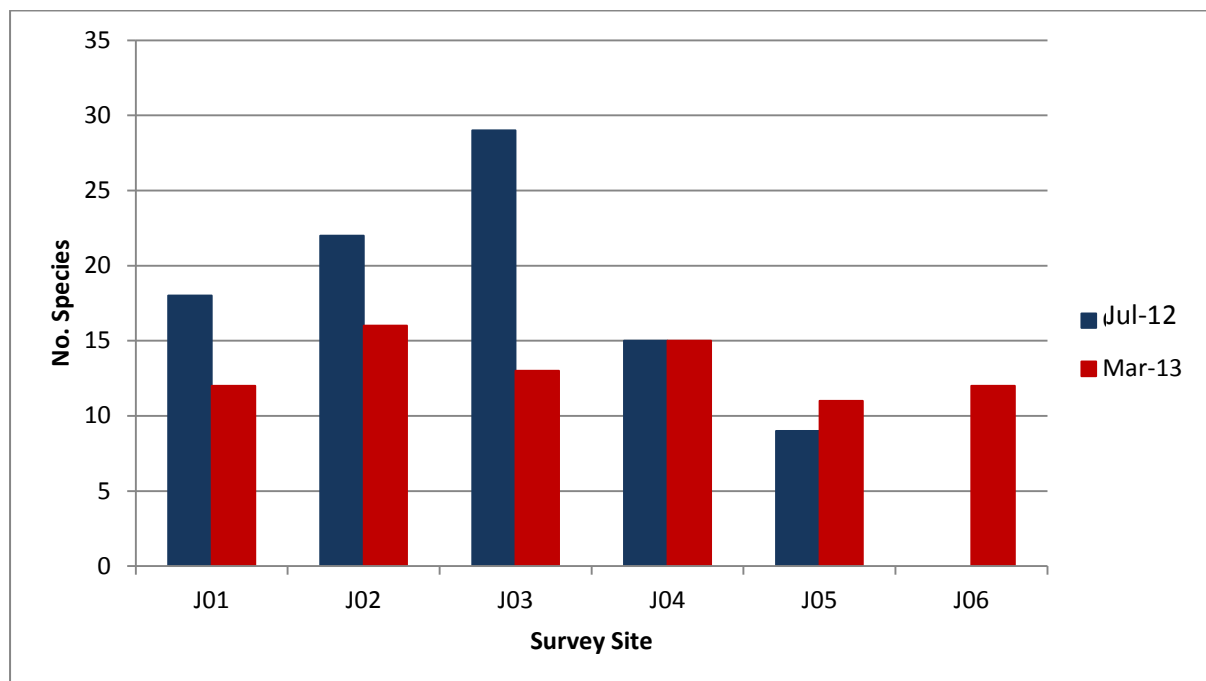


Figure 9; Number of vertebrate species recorded at survey sites, July 2012 and March 2013.

This compared with a total of 59 species in July 2012. While species numbers of reptiles and mammals were comparable across both 2012 and 2013 surveys, 20 species of birds were recorded in 2012 but not in 2013 (Figure 10). Conditions were much drier during 2013 surveys, with both food and water resources noticeably less. Water sources were limited to stock watering points and the semi-permanent Jervois Dam was dry. Nomadic or migratory species that relied upon this water source in the Jervois area were not recorded.

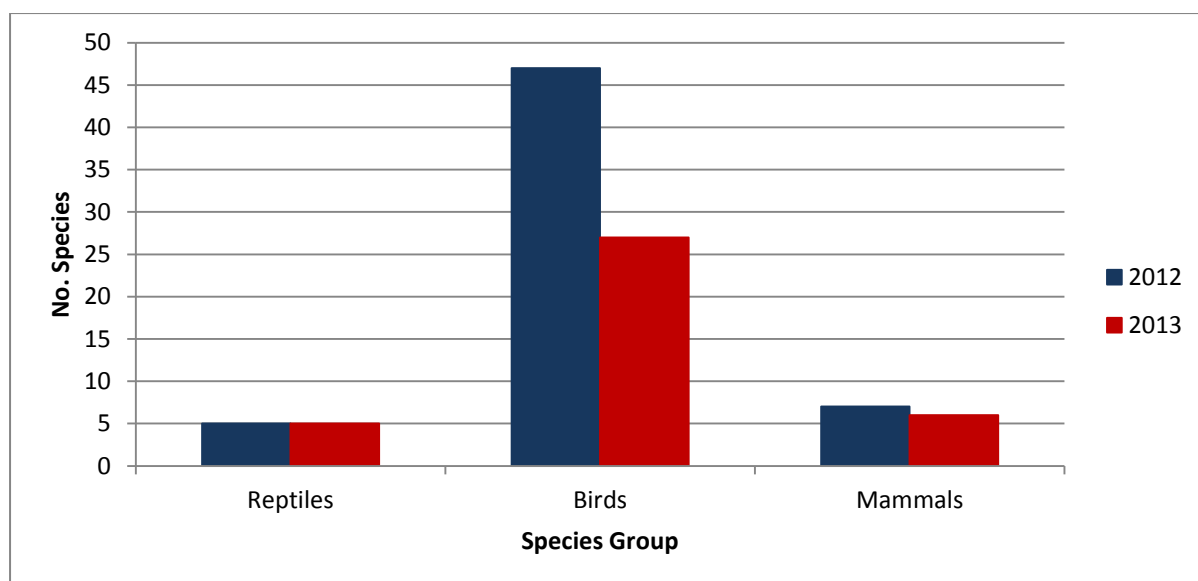


Figure 10; Species numbers of reptiles, birds and mammals recorded during July 2012 and March 2013 surveys.

The two large Macropods, Euro (*Macropus robustus*) and Red Kangaroo (*Macropus rufus*) were both observed at survey sites and elsewhere within EL 25429. Scats and tracks of these species were also noticeable. Despite actively searching a 500 m transect in suitable habitat (Map 7), no evidence of Black-footed Rock Wallaby (*Petrogale lateralis*) was found. Caves and rock ledges here were inhabited by Euros and scats of the Echidna (*Tachyglossus aculeatus*) were also found here (Figure 12).

Euros were also observed sheltering in abandoned mine tunnels in Reward Hill (Figure 13). Open pits of abandoned mine workings here and in other areas pose significant risk to fauna and stock animals. The remains of a calf were found in the bottom of one such pit at Reward Hill (Figure 14).

Areas within the vicinity of Jervois Dam contain suitable habitat for the threatened central Australian population of *Trichosurus vulpecula vulpecula* (Brush-tailed Possum). This species has been recorded from the area in the past (Carpenter and Low, 2012). Despite active searches for signs of this species in the area, its presence was not detected. However, it should be noted that a more intensive survey effort is necessary to rule out the continued existence of this species.

Cattle (*Bos taurus*) were prevalent at all survey sites. No other evidence of introduced herbivores was found, although the presence of Rabbits has been noted by previous surveys. A cat (*Felis catus*) was photographed at a watering point by remote camera (site Cam1). House Mice (*Mus musculus*)

were captured during the 2012 survey, but none during this survey period. No other introduced animals were noted.

No threatened species were recorded during the survey.

From results of previous surveys and Northern Territory Fauna Atlas records it can be concluded that a more diverse fauna is present in the project area than has been detected in this survey. Climatic conditions experienced have been determined as severely limiting factors during the March 2013 survey period.



Figure 11; A Fat-tailed Pseudoantechinus (*Pseudoantechinus macdonellensis*) captured at site J03.

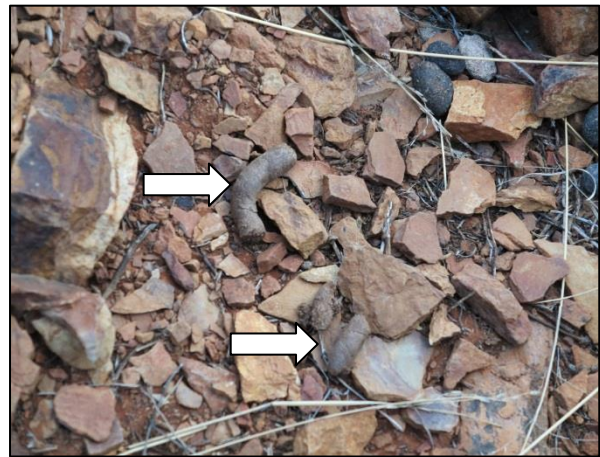


Figure 12; Echidna (*Tachyglossus aculeatus*) scats. Indicated by white arrows, they were found while actively searching for Black-footed Rock Wallabies (*Petrogale lateralis*).



Figure 13; A Euro (*Macropus robustus*) sheltering in an abandoned mine tunnel in Reward Hill.



Figure 14; The remains of a young calf in an abandoned mine shaft; Reward Hill.

5. ASSESSMENT OF RISK TO THREATENED SPECIES

5.1. RISK TO THREATENED SPECIES

Seven flora species of conservation concern have been recorded from within 20km of EL 25429 (Section 2.8). Of these, only one species has a Threatened status under the *Territory Parks and Wildlife Conservation Act (TPWCA)* 2007. The remaining six are listed as either Data Deficient or Near Threatened (Table 6). Two species, *Eremophila cordatisepala* and *Sauropus rigens*, were recorded during the survey.

Eremophila cordatisepala was found at three survey sites and may be widespread on gravelly rises throughout EL 25429. Mining activities do not pose a risk to these populations, however areas where the plant exists should be mapped to minimise the risk of disturbance. *Sauropus rigens* was collected on a steep, rocky sandstone escarpment in the west of the project area. It is unlikely to be threatened due to its occurrence in areas not targeted by mining or exploration activities.

The endangered *Bolboschoenus caldwellii* occurs in damp soils near permanent or semi-permanent water. Only a single record of this species occurs from within 20 km of EL 25429 (White et al, 2000). Climatic conditions at the time of the 2013 survey limited the possibility of locating this species. However, suitable habitat may exist within the vicinity of Jervois Dam when it contains water. *Fimbristylis velata* has been recorded from similar habitat. Climatic condition also limited the chance of locating this species. Construction of roads in or through ephemeral wetland areas and water extraction from Jervois Dam pose minor risks to these species; however their presence within EL 25429 remains to be determined.

No plant species listed as threatened under the Commonwealth's *Environment Protection and Biodiversity Conservation Act (EPBCA)* 2007 is known to occur.

Conservation significant fauna records from within 20km of the project area include ten species, five with a threatened status under the *TPWA*, 2007 (Table 8). Two species, *Macrotis lagotis* (Bilby) and *Isodon auratus* (Golden Bandicoot) are also listed as threatened by *EPBCA*, 2007 legislation. Records of these species are old, with a single Bilby record from 1930 and two records of Golden Bandicoot, both from 1969 (DLRM, 2013). No signs of the two were found during either the 2012 or 2013 surveys. It is unlikely that these species still occur in the project area.

The status of the Australian Bustard (*Ardeotis australis*) and Emu (*Dromaius novaehollandiae*), listed as vulnerable in Carpenter & Low, 2012, was under review at the time of that report. Their status has since been downgraded to near threatened under *TPWCA*, 2007. Both are nomadic, wide ranging species (Pizzey, G & Knight, F, 1997). Although not recorded during the survey period, it is reasonable to expect that they may occur within EL 25429 at times, although the area does not represent core habitat for either species. They are unlikely to be at risk from mining activities.

The area also does not represent core habitat for nomadic and migratory wetland species listed in the EPBC protected matter report (Table 9). These species are likely to occur only during times of suitable climatic conditions with limited habitat in EL 24529. These and wide ranging species such as *Conopophila whitei* (Grey Honeyeater) are unlikely to be impacted by mining activity at Jervois.

Suitable habitat for the endangered central Australian population of *Trichosurus vulpecula vulpecula* (Brush-tailed Possum) exists in River Red Gum woodland surrounding Jervois Dam and along several drainage channels within the area. Records of the species from within 20km of the project area are old (1969) (Department of Natural Resources, Environment, the Arts and Sport (NRETAS), 2012), however continued existence of the species is possible. No signs of the species were found during the survey despite targeted searches. Limiting disturbance to drainage lines and valleys near Jervois Dam will minimise risk to any remaining possum populations.

Protection of this habitat is also of benefit to near threatened species such as *Calyptorhynchus banksii* subsp. *samueli* (Red-tailed Black Cockatoo). This species is widespread and relatively common in riparian habitats in the Jervois area (Pizzey, G & Knight, F, 1997) and was seen on the Marshall River in transit to the project area in 2012.

The Near Threatened *Rattus villosissimus* (Long-haired Rat) utilises the project area during population irruptions during suitable high rainfall periods, evidenced by the presence of inactive burrows and old scat material during the 2012 survey period. Continued presence of this species was not detected during the survey, despite traps set close to burrows and the animals' willingness to enter baited traps. The project area does not represent core habitat for this species and seems to be occupied only during temporary range expansions under favourable conditions. Mining activities in the project area are not likely to impact on the species.

Steep sided pits of vertical shafts left from historic mining activities pose a risk to wildlife and livestock as shown in Figure 14, where a calf had died in a pit. These are currently uncovered and unfenced; allowing animals to fall into pits, with steep sides preventing escape.

5.2. SURVEY LIMITATIONS

Following a dry season flora, fauna and landscape survey in July 2012, the survey carried out by Low Ecological Services from the 5th until the 8th of March, 2013 was intended to be a wet season survey. However, weather was hot and dry, with lower than average rainfall recorded for the wet season period (October 2012 – March 2013).

Low rainfall and hot conditions meant that significant plant stress was evident. All growth of grasses and ground plants that had resulted from wet years in 2010 and 2011 had ceased. The rank growth of *Aristida* and *Enneapogon* species noted in the 2012 survey had died off, with little recruitment in the dry conditions. As a result, most grass species were recorded as litter during vegetation surveys. Similarly, few forb species were present in woodland communities.

Without the recruitment and seeding of summer grasses, a lack of food resources for fauna such as seed eating birds and rodents was evident. Water sources were limited to overflow from bores, two of which were visited during the survey. Jervois Dam, a significant water resource that is semi-permanent, was dry.

Bushfires that burnt large areas of Central Australia in 2011 had not reached the survey area, and sites showed little evidence of recent burning. However fire scar mapping (Carpenter & Low, 2012) and observed signs of disturbance shows that the area does experience fires at times.

The survey was severely affected by the hot and dryer than average weather. Seasonal data expected to be collected during this period was therefore lacking, with species normally active during wet seasons either absent or not common enough to be detected by trapping methods. Bird life was limited to common resident species, with nomadic or migratory wetland species absent.

6. ACKNOWLEDGEMENTS

Task	Name	Company
Project management	Freea Itzstein-Davey	MBS Environmental
	Jesse Carpenter	Low Ecological Services
Logistical Assistance	Rudy Lennartz	Kentor Gold Ltd
Field Work	Jesse Carpenter	Low Ecological Services
	Jeremy Snowdon-James	
	Jessica Burdon	
Plant Identification	Des Nelson	NT Herbarium

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8. APPENDICES

Appendix 1; Protected Matters Report (SEWPAC, 2012)



Australian Government
Department of Sustainability, Environment,
Water, Population and Communities

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 12/07/12 12:00:02

[Summary](#)

[Details](#)

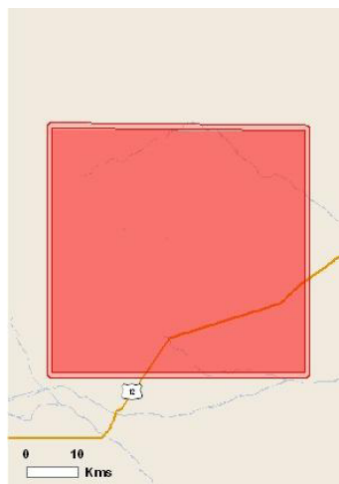
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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Buffer: 1.0Kms



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	3
Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov>.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	7
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	6
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

Threatened Species		[Resource Information]
Name	Status	Type of Presence
BIRDS		
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
MAMMALS		
Dasycercus cristicauda Mulgara [328]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit,

Name	Status	Type of Presence
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Coordinates

-22.4509 136.0376,-22.45554 136.48298,-22.88212 136.48298,-22.88212 136.0376,-22.4509
136.0376

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)

- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us page](#).

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Appendix 2; Site Description Summaries

Site No.: J01	Survey number: Survey 2	Quad. size: 50x50
Date: 06/03/13	Observer: Jesse Carpenter	
Site description & location details: Reward; open Eucalypt woodland with mid-grasses		Landform pattern: Undulating Plain
GPS: -22.648817, 136.26517		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Drainage Depression		Photo ref. no.: See Above
Land unit:	Run: off	Patch size (ha): 50-500
Edge: (ecotone <i>or</i> closest distance): 50m		Road Type in Vicinity: 1
Perm. Water: 0.5-5km		Curr. water: 0.5-5km
Climate: 1 = Dry, plant		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: Long unburnt		
Rabbit damage: 0		Introduced herbivores: 3		Camels: 0
Weeds: 2 (<i>Cenchrus ciliaris</i>)		Other: 2 Road		

Bare soil (%):	40%	Vegetation Litter (%):	35%	Rock type Sandstone Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Rock cover (%):	0%	Ground Vegetation (%):	25%	
Outcrop: 0%	Rock / stone: 0 %	Bare ground: 100%		
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	0 0 0 0 0 0 0 0			
				Lithology:

Soil texture: sandy loam			
Soil colour: Red			
Soil depth (cm): >40	Soil pH - surface: Not recorded		
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear	Crust cover (%): 5%	Crust pH:	
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 2			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Acacia estrophiolata</i>	10 m	<10
Upper shrub layer:	<i>Acacia estrophiolata</i>	1.5 m	<10
Lower shrub layer:	<i>Senna art. ssp. artemisioides</i> <i>Senna art. ssp. oligophylla</i>	1 m	<10
Ground layer:	<i>Aristida holothera</i> <i>Cenchrus ciliaris</i>	0.3 m	10 - 30

Site No.: J02	Survey number: Jervois 2	Quad. size: 50x50
Date: 06/03/13	Observer: Jesse Carpenter	
Site description & location details: Old Village; Ironwood shortgrass community?		Landform pattern: Undulating Plain
GPS: -22.652030, 136.271680		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Lower Slope		Photo ref. no.:
Land unit: Unca	Run: off	Patch size (ha): 50-500
Edge: (ecotone or closest distance): 50m		Road Type in Vicinity: 1
Perm. Water: 50 – 500m		Curr. water: 50 – 500m
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 2 (Cattle)		Camels: 0
Weeds: 2 (<i>Cenchrus ciliaris</i> , Cacti)		Other: 0		

Bare soil (%):	15%	Vegetation Litter (%):	60%	Rock type Sandstone Conglomerate Other sedimentary: Metamorphic Granite Quartzite Limestone Basalt Colluvium Other:
Rock cover (%):	0%	Ground Vegetation (%):	25%	
Outcrop: 0%	Rock / stone: 0%	Bare ground: 100%		
Pebbles (<0.6cm):	0			
Small stones (0.6-2cm):	0			
Stones (2-6cm):	0			
Small rocks (6-20cm):	0			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			Lithology:

Soil texture: Sandy loam			
Soil colour: Red			
Soil depth (cm): >40		Soil pH - surface: Not recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 5%	
Crust pH:			
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 3			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Acacia stenophylla</i>	8 m	<10
Upper shrub layer:	<i>Acacia stenophylla</i> <i>Hakea macrocarpa</i>	5 m	10 - 30
Lower shrub layer:	<i>Senna art. ssp. helmsii</i> ACAS?	1 m	<10
Ground layer:	<i>Aristida holothera</i> <i>Cenchrus ciliaris</i>	0.2 m	30 - 70

Site No.: J03	Survey number: Jervois 2	Quad. size: 50x50
Date: 07/03/13	Observer: Jesse Carpenter	
Site description & location details: Hillside dam, Hummock grassland		Landform pattern: Steep Hill
GPS AMG: -22.645283, 136.242050		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Mid Slope		Photo ref. no.: See Above
Land unit: Sonder	Run: off	Patch size (ha): 5 – 50m
Edge: (ecotone <i>or</i> closest distance): 100m		Road Type in Vicinity: 1
Perm. Water: 0.5- 5km		Curr. water: 0.5 – 5km
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 1 (Cattle)		Camels: 0
Weeds: 0		Other: 0 describe:		

Bare soil (%):	5%	Vegetation Litter (%):	10%	Rock type Quartzite
Rock cover (%):	60%	Ground Vegetation (%):	25%	
Outcrop: 20%	Rock / stone: 40%	Bare ground: 40%		
Pebbles (<0.6cm): <2 Small stones (0.6-2cm): <2 Stones (2-6cm): 10 - 20 Small rocks (6-20cm): 50 - 70 Rocks (20-60cm): 2 - 10 Big rocks (60cm-2m): 0 Boulders (>2m): 0 Outcrop / slab: 10 - 20			Lithology: Sedimentary	

Soil texture: sand			
Soil colour: Red			
Soil depth (cm): <10		Soil pH - surface: Not recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 5%	
Termite mounds (no.): 2		Max. ht. (m): 0.5m	
Profile: Dome			
Number of fallen logs >15cm diameter in the quadrat: 0			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Acacia aneura</i>	8 m	<10
Upper shrub layer:	<i>Grevillea whickhamii</i> <i>Petalostylis cassiodes</i> <i>Acacia monticola</i>	3 m	<10
Lower shrub layer:	<i>Acacia sp</i> <i>Eremophila longifolia</i>	0.6 m	<10
Ground layer:	<i>Triodia pungens</i>	0.6 m	10 - 30

Site No.: J04	Survey number: Jervois 2	Quad. size: 50x50
Date: 07/03/13	Observer: Jess Burdon	
Site description & location details: North Bellbird, open Ironwood/Corymbia woodland		Landform pattern: Undulating Plain
GPS AMG: -22.673944, 136.238195		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Plain		Photo ref. no.:
Land unit: Bond Springs	Run: Plain	Patch size (ha): 5 – 50m
Edge: (ecotone <i>or</i> closest distance): 200m		Road Type in Vicinity: 1
Perm. Water: 0.5- 5km		Curr. water: 0.5 – 5km
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 2 (Cattle)		Camels: 0
Weeds: 3 (<i>Cenchrus ciliaris</i>)		Other: 0 describe:		

Bare soil (%):	5%	Vegetation Litter (%):	55%	Rock type Quartzite
Rock cover (%):	5%	Ground Vegetation (%):	35%	
Outcrop: 20%	Rock / stone: 5%	Bare ground: 95%		
Pebbles (<0.6cm):	<2			Lithology:
Small stones (0.6-2cm):	<2			
Stones (2-6cm):	2 - 10			
Small rocks (6-20cm):	0			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			

Soil texture: sandy loam			
Soil colour: Red			
Soil depth (cm): >40		Soil pH - surface: ____cm:	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 5%	
Crust pH:			
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 2			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Acacia aneura</i> <i>Acacia estrophiolata</i>	8 m	<10
Upper shrub layer:	<i>Eremophila longifolia</i> <i>Atalaya hemiglauc</i> <i>Acacia stenophylla</i>	2 m	<10
Lower shrub layer:	<i>Senna art. ssp. helmsii</i> <i>Senna art. ssp. oligophylla</i>	1 m	10 - 30
Ground layer:	<i>Aristida holothera</i> <i>Cenchrus ciliaris</i>	0.2 m	10 - 30

Site No.: J05		Survey number: Jervois 2	Quad. size: 50x50
Date: 07/03/13		Observer: Jess Burdon	
Site description & location details: South of Bellbird, Mature Mulga patch		Landform pattern: Rolling Hills	
GPS AMG: -22.691329, 136.244608			Datum: GDA 94
North 		East 	
South 		West 	
Topographic position: Lower Slope		Photo ref. no.:	
Land unit: Bond Springs	Run: Off	Patch size (ha): 1 -5	
Edge: (ecotone <i>or</i> closest distance): 50m		Road Type in Vicinity: 1	
Perm. Water: > 5km		Curr. water: > 5km	
Climate: 1 = Dry, plant stress			

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 1		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 1 (Cattle)		Camels: 0
Weeds: 2 (<i>Cenchrus ciliaris</i>)		Other: 0		

Bare soil (%):	5%	Vegetation Litter (%):	65%	Rock type Quartzite Schist Quartz
Rock cover (%):	5%	Ground Vegetation (%):	25%	
Outcrop: 20%	Rock / stone: 5%	Bare ground: 95%		
Pebbles (<0.6cm): <2 Small stones (0.6-2cm): 20 - 50 Stones (2-6cm): 10 - 20 Small rocks (6-20cm): 20 - 50 Rocks (20-60cm): <2 Big rocks (60cm-2m): 0 Boulders (>2m): 0 Outcrop / slab: 0			Lithology: Sedimentary	

Soil texture: sandy loam			
Soil colour: Red			
Soil depth (cm): 10 - 40		Soil pH - surface: Not Recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 5%	
Crust pH:			
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 4			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Acacia aneura</i> <i>Atalaya hemiglauc</i>	10 m	10 - 30
Upper shrub layer:	<i>Acacia stenophylla</i>	3 m	<10
Lower shrub layer:	<i>Senna art. ssp. helmsii</i> <i>Senna art. ssp. oligophylla</i>	1.5 m	10 - 30
Ground layer:	<i>Aristida holothera</i> <i>Cenchrus ciliaris</i>	0.3 m	<10

Site No.: J06	Survey number: Jervois 2		Quad. size: 50x50
Date: 06/03/13		Observer: Jess Burdon	
Site description & location details: Creekline; Northern Boundary, open woodland		Landform pattern: Undulating plains	
GPS AMG: -22.633433, 136.270080			Datum: GDA 94
North 		East 	
South 		West 	
Topographic position: Drainage Depression		Photo ref. no.: See Above	
Land unit: Bond Springs	Run: On	Patch size (ha): 5 -50m	
Edge: (ecotone <i>or</i> closest distance): 80m		Road Type in Vicinity: 1	
Perm. Water: 0.5- 5km		Curr. water: 0.5- 5km	
Climate: 1 = Dry, plant stress			

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, or moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, or high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, or major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 3 (Cattle)		Camels: 0
Weeds: 1 (<i>Cenchrus ciliaris</i>)		Other: 0		

Bare soil (%):	60%	Vegetation Litter (%):	20%	Rock type Quartzite
Rock cover (%):	<5%	Ground Vegetation (%):	15%	
Outcrop: 0%	Rock / stone: <5%	Bare ground: >95%		
Pebbles (<0.6cm):	<2			
Small stones (0.6-2cm):	<2			Lithology: Sedimentary
Stones (2-6cm):	<2			
Small rocks (6-20cm):	<2			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			

Soil texture: Sandy Loam			
Soil colour: Red			
Soil depth (cm): >40	Soil pH - surface: ____cm:		
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no	Crust cover (%): 0% Crust pH:		
Termite mounds (no.): 0	Max. ht. (m): Profile: tower dome underground		
Number of fallen logs >15cm diameter in the quadrat: 3			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Corymbia opaca</i> , <i>Corymbia apparrerinja</i>	8 m	<10
Upper shrub layer:	<i>Acacia georgiana</i> <i>Acacia estrophiolata</i>	6 m	<10
Lower shrub layer:	<i>Senna art. ssp. helmsii</i> <i>Senna art. ssp. oligophylla</i>	1 m	<10
Ground layer:	<i>Aristida holothera</i> <i>Cenchrus ciliaris</i> <i>Triodia pungens</i> <i>Cymbopogon ambiguus</i>	0.3 m	<10

Site No.: M3	Survey number: Jervois 2	Quad. size: 50x50
Date: 06/03/13	Observer: Jese Carpenter	
Site description & location details: Mulga Grove; in north-western EL		Landform pattern: Rolling Hills
GPS AMG: -22.635229, 136.235465		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Mid Slope		Photo ref. no.:
Land unit: Unca	Run: Off	Patch size (ha): 1 -5
Edge: (ecotone <i>or</i> closest distance): 10m		Road Type in Vicinity: 1
Perm. Water: 0.5- 5km		Curr. water: 0.5- 5km
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 2 (Cattle)		Camels: 0
Weeds: 0		Other: 0 describe:		

Bare soil (%):	5%	Vegetation Litter (%):	15%	Rock type Schist
Rock cover (%):	50%	Ground Vegetation (%):	30%	
Outcrop: 0%	Rock / stone: 50%	Bare ground: 50%		
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	<2 20-50 20-50 10-20 0 0 0 0		Lithology:	

Soil texture: clay-loam:			
Soil colour: Red			
Soil depth (cm): <10		Soil pH - surface: Not recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 50%	
Crust pH:			
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 1			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia Aneura, Corymbia opaca</i>	8	10-30
Upper shrub layer:	<i>Acacia aneura,</i> <i>Hakea lorea ssp. lorea</i>	1.5	<10
Lower shrub layer:	<i>Hakea Macrocarpa , Senna art. ssp.</i> <i>helmsii</i>	1	<10
Ground layer:	<i>Aristida holothera</i> <i>Bonamia erecta</i>	0.3	10-30

Site No.: SD5	Survey number: Jervois 2		Quad. size: 50x50
Date: 07/03/13		Observer: Jese Carpenter	
Site description & location details: Bonya track; sparse shrubland, short grass/forb understorey			Landform pattern: Undulating plains
GPS: -22.691927, 136.237140			Datum: GDA 94
North 		East 	
South 		West 	
Topographic position: Plain		Photo ref. no.:	
Land unit: Bond Springs	Run: Plain	Patch size (ha): 5 -50	
Edge: (ecotone <i>or</i> closest distance): 300m		Road Type in Vicinity: 1	
Perm. Water: > 5km		Curr. water: > 5km	
Climate: 1 = Dry, plant stress			

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 1 (Cattle)		Camels: 0
Weeds: 0		Other: 0 describe:		

Bare soil (%):	35%	Vegetation Litter (%):	30%	Rock type Quartz
Rock cover (%):	15%	Ground Vegetation (%):	20%	
Outcrop: 0%	Rock / stone: 15%	Bare ground: 85%		
Pebbles (<0.6cm): Small stones (0.6-2cm): Stones (2-6cm): Small rocks (6-20cm): Rocks (20-60cm): Big rocks (60cm-2m): Boulders (>2m): Outcrop / slab:	2-10 2-10 50-70 2-10 0 0 0 0			
				Lithology: Igneous

Soil texture: clay-loam			
Soil colour: Red			
Soil depth (cm): 10-40		Soil pH - surface: not recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: black		Crust cover (%): 5%	
Crust pH:			
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 0			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia Aneura</i> , <i>Acacia estrophilata</i> <i>Atalaya hemiglauc</i>	8 m	<10
Upper shrub layer:	<i>Acacia aneura</i> , <i>Hakea lorea ssp. lorea</i> <i>Atalaya hemiglauc</i>	3 m	<10
Lower shrub layer:	<i>Gossypium australe</i> , <i>Senna art. ssp. helmsii</i>	0.5 m	<10

Ground layer:	<i>Aristida holothera</i> <i>Aristida contorta</i> <i>Aristida inaequiglumis</i> SEBI?	0.2 m	10-30
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Site No.: SD6	Survey number: Jervois 2	Quad. size: 50x50
Date: 07/03/13	Observer: Jesse Carpenter	
Site description & location details: Creek line on Bonya track; Ironwood tall open woodland		Landform pattern: Undulating plains
GPS: -22.693516, 136.236649		Datum: GDA 94
North	East	
 		
South	West	
 		
Topographic position: Drainage depression		Photo ref. no.:
Land unit: Bond springs	Run: Off	Patch size (ha): 5 -50
Edge: (ecotone <i>or</i> closest distance): 50m		Road Type in Vicinity: 1
Perm. Water: > 5km		Curr. water: > 5km
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 3		Camels: 0
Weeds: 4 (Buffel Grass)		Other: 0 describe:		

Bare soil (%):	5%	Vegetation Litter (%):	60%	Rock type
Rock cover (%):	0%	Ground Vegetation (%):	35%	
Outcrop: 0%	Rock / stone: 0%	Bare ground: 0%		
Pebbles (<0.6cm):	0			
Small stones (0.6-2cm):	0			
Stones (2-6cm):	0			Lithology:
Small rocks (6-20cm):	0			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			

Soil texture: sandy clay			
Soil colour: Red			
Soil depth (cm): >40		Soil pH - surface: not recorded	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: no		Crust cover (%): 0%	Crust pH:
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 1			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Acacia estrophiolata</i> <i>Atalaya hemiglauca</i> <i>Corymbia apparrerinja</i>	10 m	10-30
Upper shrub layer:	<i>Hakea macrocarpa</i>	2 m	<10
Lower shrub layer:	<i>Senna artemisioides</i> subsp. <i>helmsii</i> <i>Carissa lanceolata</i>	-	<10
Ground layer:	<i>Cenchrus ciliaris</i>	0.5 m	10-30

Site No.: SD7	Survey number: Jervois 2	Quad. size: 50x50
Date: 07/03/13	Observer: Jesse Carpenter	
Site description & location details: Bonya track; Sparse Woodland shortgrass community		Landform pattern: Undulating plains
GPS: -22.697743, 136.27191		Datum: GDA 94
North 		East 
South 		West 
Topographic position: Plain		Photo ref. no.: SD07
Land unit: Unca	Run: Plain	Patch size (ha): 1 -5
Edge: (ecotone <i>or</i> closest distance): 100m		Road Type in Vicinity: 1
Perm. Water: > 5km		Curr. water: > 5km
Climate: 1 = Dry, plant stress		

Disturbance: 0 = no visible impact 1 = disturbance present but negligible impact 2 = low level of disturbance throughout quadrat, <i>or</i> moderate level in patches in the quadrat 3 = moderate level of disturbance throughout quadrat, <i>or</i> high level in patches in the quadrat 4 = high level of disturbance throughout quadrat, <i>or</i> major level in patches in the quadrat 5 = major impact affecting all of quadrat				
Fire impact: 0		Last fire: long unburnt		
Rabbit damage: 0		Introduced herbivores: 3 (Cattle)		Camels: 0
Weeds: 0		Other: 0 describe:		

Bare soil (%):	60%	Vegetation Litter (%):	10%	Rock type Quartz Lithology: Igneous
Rock cover (%):	5%	Ground Vegetation (%):	25%	
Outcrop: 0%	Rock / stone: 5%	Bare ground: 95%		
Pebbles (<0.6cm):	<2			
Small stones (0.6-2cm):	10-20			
Stones (2-6cm):	50-70			
Small rocks (6-20cm):	<2			
Rocks (20-60cm):	0			
Big rocks (60cm-2m):	0			
Boulders (>2m):	0			
Outcrop / slab:	0			

Soil texture: clay			
Soil colour: Red			
Soil depth (cm): 10-40		Soil pH - surface: ____ cm:	
Soil crust, termites, log habitat and vegetation strata structure			
Crust present: clear		Crust cover (%): 30%	Crust pH:
Termite mounds (no.): 0	Max. ht. (m):	Profile: tower dome underground	
Number of fallen logs >15cm diameter in the quadrat: 0			
Strata	Dominant species (record in order of dominance)	Average ht. (m) of strata	Cover (%) of strata (% cover classes)
Emergent tree layer:	<i>Atalaya hemiglauc</i> <i>Corymbia opaca</i>	5 m	<10
Upper shrub layer:	<i>Acacia estrophiolata</i> <i>Hakea macrocarpa</i>	1 m	10-30
Lower shrub layer:	<i>Senna artemisioides</i> subsp. <i>helmsii</i> <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <i>Gossypium australe</i>	0.5 m	<10
Ground layer:	<i>Aristida contorta</i> <i>Aristida holathera</i>	0.2 m	10-30

Appendix 3; Plant species recorded during the March 2013 survey.

Family	Species Name	Common Name	J01	J02	J03	J04	J05	J06	Incidental
ACANTHACEAE	<i>Dipteracanthus australasicus subsp. australasicus</i>								X
AMARANTHOIDEAE	<i>Ptilotus sessilifolius</i>	Crimson Foxtail				X			
APOCYNACEAE	<i>Carissa lanceolata</i>	Conkerberry						X	
ASTERACEAE	<i>Pterocaulon sphacelatum</i>	Apple Bush	X			X	X	X	
CACTACEAE	<i>Cylindropuntia sp*</i>	Boxing Glove Cactus*		X					X
CAESALPINIOIDEAE	<i>Petalostylis cassiodes</i>	Butterfly Bush			X				
	<i>Senna art. ssp. artemisioides</i>	Silver Cassia					X	X	
	<i>Senna art. Ssp. Helmsii</i>	Blunt Leaf Cassia		X		X	X		
	<i>Senna art. ssp. oligophylla</i>	Oval-leaved Senna	X			X	X	X	
	<i>Senna glutinosa</i>						X		
CHENOPODACEAE	<i>Rhagodia spinescens</i>	Spiney Saltbush					X		
CYPERACEAE	<i>Cyperus victoriensis</i>								X
	<i>Fimbristylis dichotoma</i>	Eight Day Grass					X	X	
FABACEAE	<i>Indigofera leucotricha</i>	White Indigo					X		
	<i>Indigofera linnaei</i>							X	
	<i>Tephrosia rosea</i>							X	
	<i>Tephrosia supina</i>							X	
MALVACEAE	<i>Abutilon otocarpum</i>	Desert Chinese Lantern						X	
	<i>Gossypium australe</i>	Native Cotton				X	X		
	<i>Gossypium bickii</i>						X		
	<i>Sida rohlenae</i>	Shrub Sida			X			X	
MIMOSACEAE	<i>Acacia aneura</i>	Mulga	X	X	X	X	X	X	
	<i>Acacia coriacea</i>	Dogwood							X
	<i>Acacia estrophiolata</i>	Ironwood	X	X		X		X	
	<i>Vachellia farnesiana*</i>	Mimosa Bush*	X					X	
	<i>Acacia georgianae</i>	Georgina Gidgea						X	
	<i>Acacia monticola</i>	Hill Turpentine			X				
	<i>Acacia sibirica</i>	Bastard Mulga		X			X		
MYRTACEAE	<i>Acacia spondylophylla</i>	Curry Wattle			X				
	<i>Corymbia apparrerinja</i>	Ghost Gum	X					X	
	<i>Corymbia opaca</i>	Bloodwood	X	X	X	X	X	X	
	<i>Eucalyptus camaldulensis</i>	River Red Gum	X		X			X	
POACEAE	<i>Aristida contorta</i>	Bunched Kerosene Grass							X
	<i>Aristida holathera</i>	Erect Kerosene Grass		X		X	X		
	<i>Aristida inaequiglumis</i>	Unequal Three-awn							X
	<i>Cenchrus ciliaris*</i>	Buffel Grass*	X	X		X	X	X	
	<i>Cymbopogon ambiguous</i>	Native Lemon Grass						X	
	<i>Eragrostis eriopoda</i>	Woollybutt Grass				X			
	<i>Eulalia aurea</i>	Silky Browntop						X	
	<i>Triodia pungens</i>	Gummy Spinifex	X		X	X		X	
PROTEACEAE	<i>Grevillea striata</i>	Beefwood				X		X	
	<i>Grevillea wickhamii</i>	Holly Grevillea			X				
	<i>Hakea lorea</i>	Long-leaved Corkwood							X
	<i>Hakea macrocarpa</i>	Dogwood Hakea	X	X				X	

Family	Species Name	Common Name	J01	J02	J03	J04	J05	J06	Incidental
SAPINACEAE	<i>Atalaya hemiglauca</i>	Whitewood	X			X	X	X	
SCROPHULARIACEAE	<i>Eremophila cordatisepala</i>			X		X		X	
	<i>Eremophila Freelingii</i>	Rock Desert Fuchsia							X
	<i>Eremophila latrobei</i>	Latrobe's Desert Fuchsia			X				
	<i>Eremophila longifolia</i>	Weeping Emu Bush					X		
TAMARICACEAE	<i>Tamarix aphylla</i> *	Athel Pine*							X
* = Introduced									

Appendix 4; Fauna recorded during the survey.

	Species	Common Name	J01	J02	J03	J04	J05	J06	Incidental	Method*
REPTILES	<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon					X			O
	<i>Ctenotus leonhardii</i>			X						O
	<i>Ctenotus schomburgkii</i>							X		O
	<i>Varanus gilleni</i>	Pygmy Mulga Monitor	X							O
	<i>Varanus goludii</i>	Sand Goanna				X		X		DT
BIRDS	<i>Acanthiza apicalis</i>	Inland Thornbill					X	X		O
	<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk			X					O
	<i>Aquila audax</i>	Wedge-tailed Eagle				X				O
	<i>Artamus cinereus</i>	Black-faced Woodswallow	X							O
	<i>Barnardius zonarius</i>	Australian Ringneck	X	X		X				O
	<i>Corvus orru</i>	Torresian Crow		X	X					O
	<i>Cracticus nigrogularis</i>	Pied Butcherbird		X		X				O
	<i>Daphoenositta chrysoptera</i>	Varied Sittela	X							O
	<i>Emblema pictum</i>	Painted Finch			X					O
	<i>Eolophus roseicapillus</i>	Galah		X				X		O
	<i>Falco berigora</i>	Brown Falcon					X			O
	<i>Falco cenchroides</i>	Australian Kestrel				X				O
	<i>Geopelia cuneata</i>	Diamond Dove		X						O
	<i>Grallina cyanoleuca</i>	Magpie-lark	X	X	X					O
	<i>Lalage sueurii</i>	White-winged Triller				X				O
	<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater	X		X	X				O
	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	X	X	X					O
	<i>Lichenostomus virescens</i>	Singing Honeyeater	X		X	X	X	X		O
	<i>Manorina flavigula</i>	Yellow-throated Miner		X		X	X	X		O
	<i>Melanodryas cucullata</i>	Hooded Robin				X				O
	<i>Melopsittacus undulatus</i>	Budgerigar		X	X					O
	<i>Ocyphaps lophotes</i>	Crested Pigeon	X	X						O
	<i>Pachycephala rufiventris</i>	Rufous Whistler					X	X		
	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		X				X		O
	<i>Rhipidura leucophrys</i>	Willy Wagtail		X		X	X	X		O
	<i>Smicronis brevirostris</i>	Weebill		X		X		X		O
	<i>Taeniopygia guttata</i>	Zebra Finch	X	X	X	X	X	X		O

	Species	Common Name	J01	J02	J03	J04	J05	J06	Incidental	Method*
MAMMALS	<i>Bos tauros</i>	Cattle	X	X	X	X	X			OT S
	<i>Canis lupus dingo</i>	Dingo	X		X		X			ST
	<i>Macropus robustus</i>	Euro			X		X			OT S
	<i>Macropus rufus</i>	Red Kangaroo				X				TS
	<i>Pseudoantechinus macdonnellensis</i>	Fat-tailed False Antechinus			X					E
	<i>Tachyglossus aculeatus</i>	Echidna							X	S
*O = Observed, T = Tracks, S = Scat, E = Elliott trap capture										