



**Landscape, Flora, and Fauna Survey and
Assessment of Molyhil Tungsten Molybdenum
Project Within ML (A) 23825
Updated to January 2007**

DRAFT



**Prepared for
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(31/12/2007)

1 SUMMARY

Thor Mining Limited plan to re-open the molybdenum and tungsten mine in ML (A) 23825 at Molyhil, within EL 22349, 240 km northeast of Alice Springs on Jervois Station. Current ore reserves indicate an expected mine life of a minimum of 2.5 years. The proposed mine lease area is approximately 1 km² and will consist of an open pit mine, waste rock dumps, primary processing plant, tailings dam, residential site and other associated infrastructure. A haul road south to the Plenty Highway exists from previous operations and will be upgraded to be suitable for all weather conditions.

The area was last mined between 1978 and 1981 by a joint venture including Petrocarb Exploration. The partially rehabilitated pit, waste rock dumps and tailings dam remain from this mining operation. Normandy Woodcutters Ltd. bought a package of mines in the late 1990's, including Molyhil, and rehabilitated the area based on recommendations from Fawcett (1998) leading to the closure of the mine lease (DME, 2000, *in lit.*). Tennant Creek Gold PL (TCG) applied for ML(A) 23825 in 2002 to undertake a feasibility study of the mine. This included an environmental assessment of the site (Leane *et al.* 2004). Thor Mining, a derivative of TCG, took over the lease application and sunk a shaft and drive to establish a more accurate assessment of the extent and quality of the ore body in 2005. An updated environmental report was prepared at the end of 2005 Low *et al.* (2006). Following the expansion of plans including accessing a new water bore field, new camp site location and altered waste rock dump and processing plant location, a reassessment of environmental impact was undertaken in December 2006 under dry conditions and in January 2007 under wet conditions. This environmental report updates and expands the previous flora and fauna report by Leane *et al.* 2004.

Molyhil Mine is located on the former Jinka Station which was first developed for pastoral production following lease issue in 1960 and incorporated into Jervois Station in about 1986. Vegetation and surface soils around and within the mine lease area have been disturbed by the concentration of livestock watering at a near by dam established in mid 1970 for Molyhil mine.

The landscape of the mine lease area comprises three landsystem types: Dinkum (LS 53), Jinka (LS 78), and Hann (LS 10) (Perry *et al.* 1962). A biological survey was conducted in December/January 2006/7 to describe the flora and fauna communities present in the mining lease area. Landscape attributes, and flora and fauna species were surveyed at 14 locations. Sites were situated in disturbed and undisturbed locations, including sites for proposed mining infrastructure. Vegetation cover, structure, and species composition were recorded at each site. Fauna species were surveyed by Elliott and pitfall trapping, and opportunistic searches. Bat species were surveyed with an ANABAT recorder.

Ninety-five plant species were recorded during the 2004 and 2006/7 surveys (Appendix 1). Vegetation cover was dominated by Georgina Gidgee (*Acacia georginae*) and Ironwood (*A. estrophiolata*) woodlands, with *Senna* and *Acacia* shrubs, Buffel Grass (*Cenchrus ciliaris*), *Calotis hispidula* and *Fimbristylis dichotoma* in the understorey. Riparian areas were dominated by Red River Gums (*Eucalyptus camaldulensis*) with Mimosa Bush (*A. farnesiana*), and a ground layer of Buffel Grass and *Zygochloa paradoxa*. Mature Gidgee (*Acacia georginae*), Bloodwood (*Corymbia opaca*), Ghost Gum (*Corymbia aparrerinja*) and River Red Gum (*Eucalyptus camaldulensis*) trees that come under the Central Land Council's (CLC) classification as culturally significant to Traditional Owners were observed within the mine lease. Required clearance of these trees were negotiated in April

2007 with Traditional Owners and the CLC. This satisfies CLC requirement for land clearance of culturally significant trees. Introduced plants such as Buffel Grass (*Cenchrus ciliaris*) and Ruby Dock (*Acetosa vesicaria*) are locally or seasonally abundant on the lease area.

Fauna surveys were conducted in October 2004, December 2006 and January 2007. A total of 84 fauna species were recorded during the surveys including 16 mammal species (of which three are feral species) (mammals include 7 bat species), 20 reptile species and 48 bird species (Appendix 2 and 3). Three fauna species currently listed under the Commonwealth ***Environmental Protection and Biodiversity Conservation Act*** (1999) or Northern Territory's ***Territory Parks and Wildlife Conservation Act*** (2000) were recorded as present or may be present in the mine lease and surrounding area. The Rainbow Bee-eater was commonly encountered in the mine lease area. The Black-footed Rock Wallaby was identified as potentially present based on its regional distribution and the availability of suitable habitat. Evidence of past occupation was recorded but no current population was observed in the mine lease area. Mulgara was also identified as potentially present in the surrounding area but the location of the nearest suitable habitat is 12km to the east of the mine site.

Complex ecosystems with varied habitat types and high biodiversity of native species were observed within the Borefields and proposed camp site compared to the immediate mining vicinity. These include spinifex sandplains and rocky ridges, riparian vegetation and open woodland. Restriction of vehicles to off-road use within the Borefields and camp site will minimise impact and degradation of habitat. Furthermore, it is important that potential developments at these site account for their high ecological value within the planning. Development of the camp site in its proposed location will require clearance of predominately undisturbed habitat that supports higher species diversity than found at previously disturbed sites and should be reconsidered. A low diversity of widespread and highly adaptable flora and fauna species were observed within the proposed tailings dam site. However, this site contains ecologically and culturally significant trees which should be avoided where possible. Recommendations have been made to minimise impact of the above developments on the environment and are provided as a separate document (Moon *et al.* 2006c).

The existing flora and fauna species rely on the remaining undisturbed or partially disturbed habitats within in the mine lease and surrounding area. Important habitats that should be retained include Gidgee and Ironwood woodlands, riparian woodland of River Red Gum, rocky ridges with caves and crevices, and spinifex dominated sandplains. Enough cleared areas should be available for installation of most mining infrastructure such as roads, waste rock dump, water tanks, tailings dam and other processing infrastructure that would minimise the need for further disturbance to habitats.

2 INTRODUCTION

Thor Mining PLC plan to develop a tungsten molybdenum open pit operation at the Molyhil Prospect northeast of Alice Springs on the former Jinka station (now Jervois Station) (Figure 1). Small scale molybdenum ore mining was conducted at the site when the first open pit mining began in 1978 by Petrocarb Exploration, until 1981 when tungsten prices dropped and the operation was no longer profitable (DME, 2000, *in lit.*). Normandy Woodcutters acquired the lease in the late 1990's in a package of leases, rehabilitating and terminating the lease in 1999. Fawcett (1998) directed the rehabilitation of the tailings dam and waste rock dumps. The tailings dam area was fenced off from cattle and seeded with *Acacia* species and fertilised. Acid producing waste rock was isolated in the centre of the northern waste rock dump. Rehabilitation was completed to the satisfaction of DME in 1999 leading to the closure of the mine lease (DME, 2000, *in lit.*).

The area was explored in the early 2000's under EL 22349. Thor Mining currently have the Molyhil ML (A) 23825 within EL 22349, under application in anticipation of reopening the mine in 2007. Exploration of the mineral reserves in the area continued in 2005 with a shaft and drive being put into the ore body to determine the quality and extent of the ore body.

The mining operation will involve open cut mining with associated infrastructure, including workshops, office, waste rock dumps, accommodation, tailings dam, with primary concentration of ore being processed onsite and secondary concentration possibly being located in Alice Springs. The Central Land Council (CLC) are interested in the potential for the waste rock overburden to be returned to the mine void at the completion of mining, and rehabilitation options will be investigated when the magnitude of the operation becomes apparent.

The 1 km² lease area is within Jervois Station which has been used for rangeland pastoral production for 50 years and is in a heavily utilised area due to stock watering at the dam less than one kilometre north of the lease. Due to a combination of dry conditions, previous mining activity, and a concentration of cattle grazing in the area, ground vegetation is sparse and the land on the ML(A) 23825 is mostly disturbed. Nevertheless there remains large stands of woodlands, particularly of the Gidgee tree (*Acacia georginae*), which have ecological and cultural significance and will need to be protected from potential impacts from the proposed mining activities. Ore extraction will involve expanding the current pit. There is a stand of approximately 500-600 mature Gidgee trees to the south of the pit which may be impacted from the pit expansion and waste rock dump.

The Molyhil sacred site is located immediately outside the mining lease perimeter (Figure 2) and has been the subject of prior negotiations with the Central Land Council and Traditional Owners. In October 2004 it was the wish of Traditional Owners to redirect the existing haul road to avoid the Molyhil sacred site and in 2005/06 the site was fenced off to their satisfaction. Further negotiations with Traditional Owners has resulted in approval to use this road and the site of the former residential area as the camp site. Field surveys were conducted to assess the suitability of the existing and potential alternative routes of the haul road, secondary access roads and the former and proposed camp sites required for the mining proposal.

Four environmental surveys have been conducted by *Low Ecological Services* within ML (A) 23825 for the mine re-opening proposal between October 2004 and January 2007. This report combines results from flora and fauna Surveys 1 and 4 conducted in October 2004 and December 2006 to January 2007. Accompanying documents to this report include recommendations for development of proposed sites surveyed in conjunction with Survey 4 (Moon *et al.* 2007c) and the results and recommendations for management of discharged hypersaline waters into the Dam Creek Tributary and potential acid drainage (Moon *et al.* 2007a).

Survey outlines for four surveys are as follows:

Survey 1 (2004): The environmental report for Tennant Creek Gold PL by Leane *et al.* (2004) presented information from a detailed environmental field survey conducted in October 2004. Recommendations were provided in Leane *et al.*, 2005b.

Survey 2 (2005): Thor Mining determined that operations during exploration of the mineral reserve, combined with good rainfalls, warranted an update of the environmental report in 2005 (Low *et al* 2006) to assess:

- managing the saline water in the pit,
- management requirement for the sites in which saline water was discharged in 2004,
- potential for acid generated by the sulphate rich ore samples,

Survey 3 (2006): Soil samples were collected in August 2006 to test for the persistence and mobility of salinity in drainage channels and the potential presence of acid drainage production of ore samples containing iron pyrite. Results of this survey are presented in a monitoring report (Moon *et al.* 2007a).

Survey 4 (2006/7): Recorded baseline flora and fauna data for proposed developments, including the borefield, new camp site, expanded waste rock dump, processing plant and realigned haul road. These field surveys were conducted during dry conditions in early December and post rain conditions in December 30, 2006 to Jan 1, 2007 (Moon *et al.* 2007b). Recommendations are provided in Moon *et al.* 2007c.

3 SCOPE

The following components of environmental investigation and reporting were required over the four surveys.

3.1 Description of the physical and biological environment

- Produce a large-scale map of the area affected by the mining program showing geographical land systems and topographical features including drainage lines.
- Identify the land systems/habitat zones present and give a qualitative report on their condition.
- Identify the major soil types present.
- List the fauna (mammal, reptile, bird, amphibian) and flora found on the mine lease area, with particular emphasis on listed threatened species.
- Identify any habitats of conservation or cultural significance.
- Provide information on groundwater resources from existing data.
- Identify issues affecting rehabilitation of the general area with a view to current and ongoing requirements.

3.2 Identification of potential impacts on the mining lease and surrounding areas

The collection of data was carried out to identify any potential adverse impacts upon the mining lease area as a result of the re-establishment and expansion of the mine. Particular areas were surveyed as determined by the mining proposal.

The areas surveyed for assessment included:

- the new turkey nest dam;
- the location of a new access road proposed by CLC and an alternative route proposed by the consultant;
- the new camp site SE of the pit;
- the proposed borefield 6km NE of the pit ;
- the existing airstrip west of the mine site;
- the southern extension area for the waste rock dump and pit, and
- the location of the proposed plant area .

The identification of potential impacts was considered for activities would have an adverse impact on:

- Natural drainage;
- Rates of soil erosion;
- Flora and Fauna species;
- Stands of large trees or mature vegetation of ecological or cultural significance, and
- Restricted or unusual habitats

Additional assessment was carried out on the following factors:

- Determine the potential impacts of acid generation from waste ore, and

- Determine the extent of impacts from previous hypersaline water discharges and assess its potential for rehabilitation.

This information is presented in a separate report (Moon et al. 2007a).

4 BACKGROUND INFORMATION

4.1 Location and Description

The proposed molybdenum-tungsten mine is located on the former Jinka Station (now part of Jervois Station), Pastoral Lease 1119 (formerly PHL 4), approximately 240 km north-east of Alice Springs, Northern Territory (Figure 1). The mine lease (under application) ML (A) 23825, will be approximately 1200 m east-west by 900 m north-south (Figure 2).

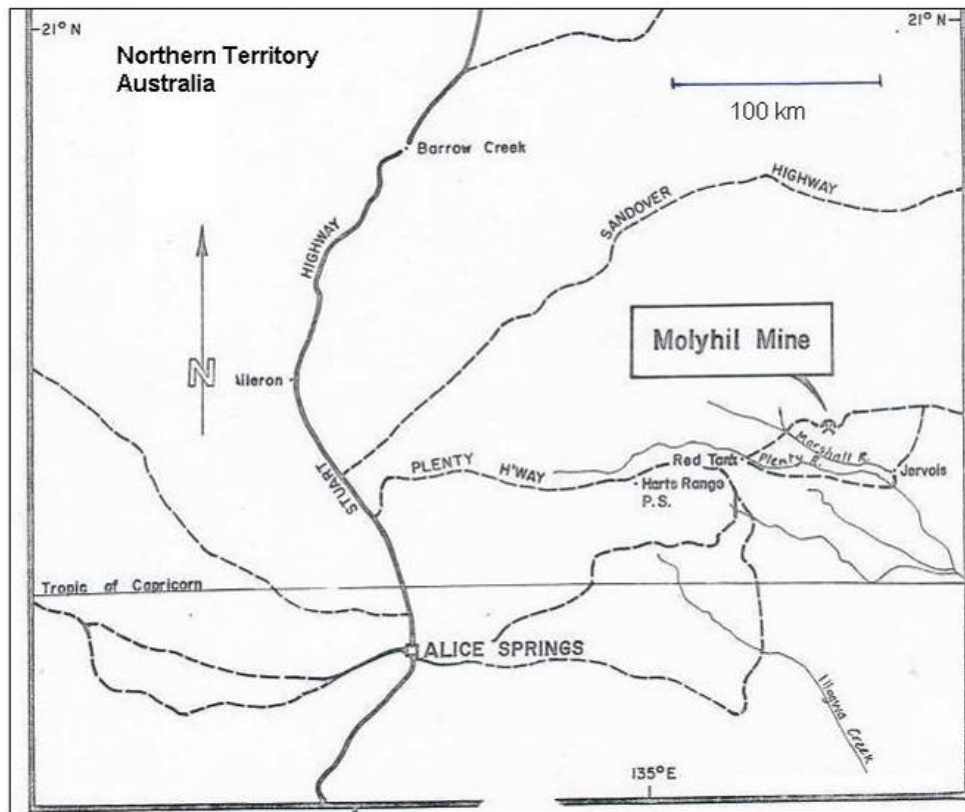


Figure 1: Location of Molyhil molybdenum tungsten mine, north of the Plenty Highway, in south-eastern NT.

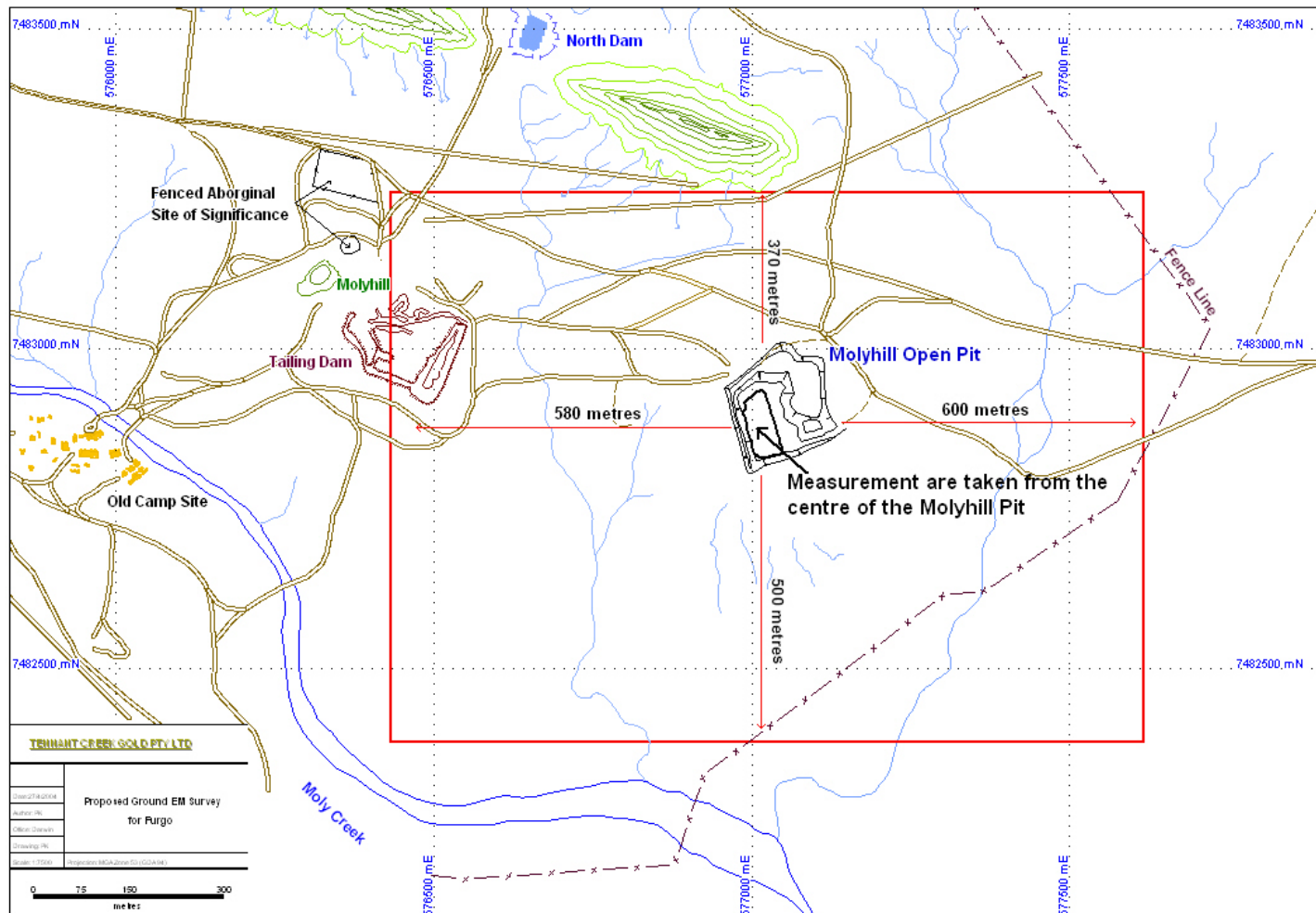


Figure 2: Molyhil mine lease application area (figure produced by Tennant Creek Gold, 2004).

4.2 Climate

The climate of the area is semi-arid with the average annual rainfall being 296.4 mm at Jervois Homestead between 1966 and 2004 (Table 1). Approximately 70% of rainfall is received between November and April, and annual evaporation averages about 3000 mm (Slatyer 1962). The strong seasonality of the rainfall may result in relatively wet humid conditions for 3-6 months of the year and progressively drier conditions through winter and spring, except for occasional winter rainfall depressions (Low and Strong 1985). Rainfall in the wet season can exceed 200 mm resulting in localised inundation. Monthly averages for temperature and rainfall between 1966 and 2003 are provided in Table 1 and Figure 3. Total monthly rainfall spanning the survey periods covered by this report are provided in Figure 4.

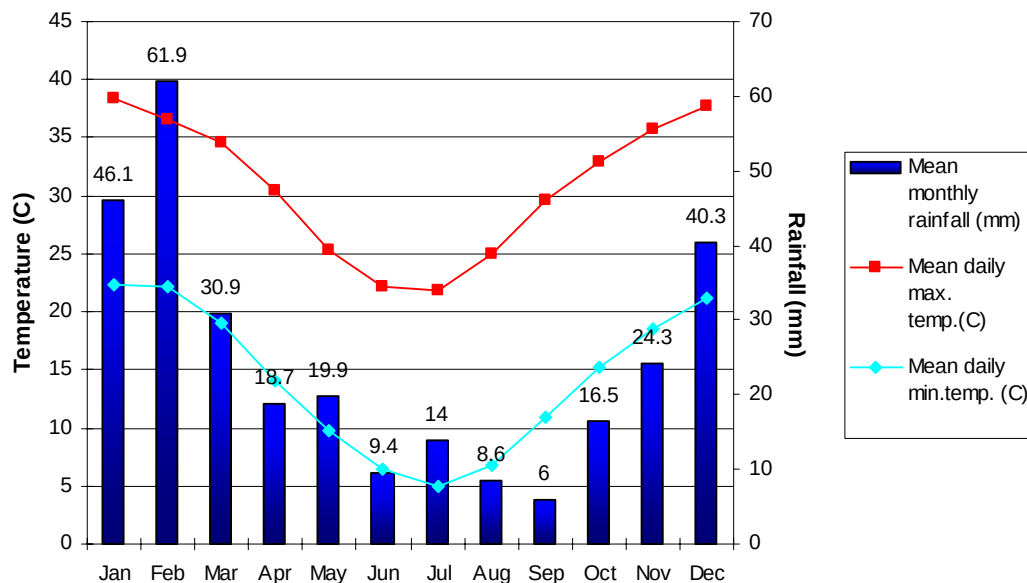


Figure 3: Average monthly rainfall and temperature data from Jervois Station between 1996 and 2004 (located 60km ESE of Molyhil mine). (Sourced from Bureau of Meteorology 2004).

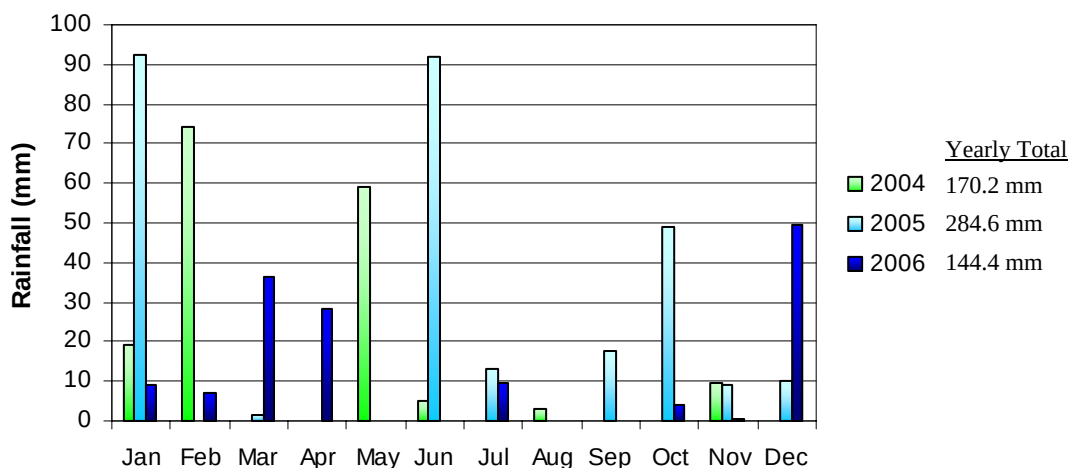


Figure 4: Total monthly rainfall data from Jervois Station between January 2004 and December 2006 (located 60km ESE of Molyhil mine). (Sourced from Bureau of Meteorology 2004-2006). This rainfall data spans the period of sampling covered by this report.

Table 1: Climatic data of Jervois station (Latitude:-22.9495 S, Longitude: 136.1444 E, Elevation: 328.0 m) from Bureau of Meteorology. Data recorded between 1966-2003.

Jervois Station Climate													
Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean daily max. temp.(C)	38.4	36.6	34.5	30.4	25.3	22.1	21.9	25	29.6	33	35.8	37.8	30.6
Mean daily min. temp. (C)	22.4	22.1	19	14	9.8	6.5	5	6.8	11	15.2	18.6	21.1	14
Mean monthly rainfall (mm)	46.1	61.9	30.9	18.7	19.9	9.4	14	8.6	6	16.5	24.3	40.3	296.4

4.3 Land Systems

Land systems (LS) are defined as an area in which there are recurring patterns of climate, geology, topography, soils and vegetation (Perry *et al.* 1962). Three landsystems are present within the lease area: Dinkum (LS 53), Jinka (LS 78), and Hann (LS 10) (Perry *et al.* 1962).

Dinkum LS (LS 53) covers the red sandy plains and small stony tracts NE of Moly Creek and south of the schist hills, approximately 80% of the mine lease. The vegetation is dominated by Georgina Gidgee (*Acacia georginae*) in the plains, River Red Gums (*Eucalyptus camaldulensis*) in the creeks with a heavily grazed Buffel grass (*Cenchrus ciliaris*) and small variety of herbaceous plants such as Bogan flea burr (*Calotis hispidula*) in the ground layer.

Jinka LS (LS 41) covers approximately 15% of the mine lease in the north, consisting of a quartz schist sandstone hill and undulating stony plains with sparse shrubs (*Senna sp.*) and low Mulga (*Acacia aneura*) and Gidgee (*Acacia georginae*) trees.

Hann LS (LS 10) covers approximately 5% of the mine lease in the NE and incorporates the Borefields, 6km NE of the existing Molyhil Pit. The Hann LS consists of sandstone and quartzite ridges and uplands with shallow soils, dominated by Spinifex (*Triodia basedowii*). The Borefields are within the alluvial fans and erosional slopes of the Hann LS and consist of red clayey sands and coarse alluvial soils.

The existing haul road passes through an additional two land systems: Singleton LS (Spinifex-Mallee) and Sandover LS (Sandhill Canegrass), as well as the Dinkum LS (Gidgee). It also intersects two river systems: the Plenty River and the Marshall River.

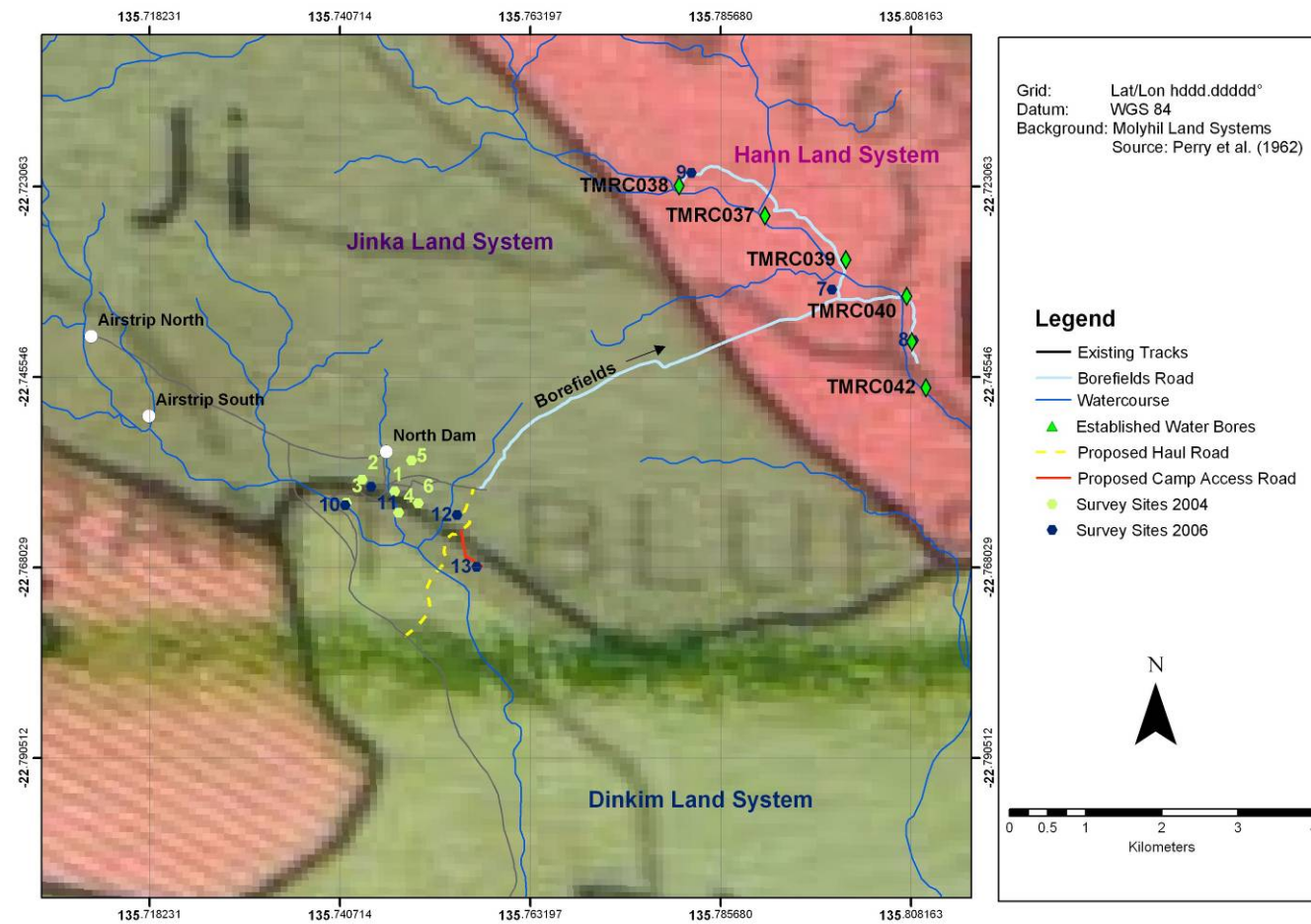


Figure 5: Land systems within the Molyhil molybdenum tungsten mine area (modified after Perry *et al.* 1962).

5 METHODS

This report covers flora and fauna Surveys 1 and 4, conducted at Molyhil Mine by *Low Ecological Services P/L*, during dry conditions in early December and post rain conditions in December 30, 2006 to Jan 1, 2007. The survey techniques used in the surveys are described below. Specific methodologies utilised for each survey are outlined where appropriate.

5.1 Survey Techniques

5.1.1 Landscape Analysis

Landscape analysis is a rapid assessment technique aimed at determining landforms, geology, drainage systems, vegetation communities and associated fauna. Landscape patterns were determined from maps (Perry et al, 1954), aerial photographs (1997) and confirmed during field survey. Areas of ecological significance, erosion potential and construction considerations were also determined from these sources.

5.1.2 Mapping

GPS readings and photos were taken at all survey sites (Appendix 4 and Plates 1-21). Tracks and waypoints were collected using a *Garmin GPS 76C Mapper* and were mapped in ArcMap (version 8.3). GPS data were set to WGS 84 and Projection Grid set to GDA 94 (location 53 K) and is mapped in Figure 6 and Figure 7.

5.1.3 Flora

Vegetation was surveyed at all trap sites by walking the length of the Elliott line (up to 300 m). The species composition, percentage cover, and vegetation structure were recorded at each survey site. Photographs were taken at all sites to provide an example of the different habitats in the area. Voucher specimens were collected when identification was uncertain and were identified by Des Nelson (local botanist) in collaboration with the Alice Springs Herbarium. Vegetation structure was categorised into four layers:

1. Emergent tree layer;
2. Upper shrub layer;
3. Lower shrub layer; and,
4. Ground layer.

Plant species or significant habitats were recorded opportunistically throughout the mining lease area. Land systems (Dinkum, Jinka and Hann) were targeted for surveying, as well as habitats within them including creeklines and riparian areas, gidgee woodlands, and rocky hill slopes.

The following additional characteristics were recorded at each of the vegetation survey sites:

- Land system type;
- Slope;
- Percentage cover of rocky outcrops, surface rock, and bare ground;
- Soil type and soil depth, and
- Soil erosion.

5.1.4 Fauna

Elliott and Pitfall Traps

Twenty-five Elliott traps (type A, 33 x 10 x 10 cm) were placed at 10 – 15 metre intervals along a transect (up to 300 m long) within each of the 15 sites. Traps were baited with an oat and peanut butter mixture. Two pitfall traps, each consisting of a 25 L bucket with a 10 m drift fence were installed at random throughout each site; sampling different habitat types where applicable. All traps were checked each morning and evening for three consecutive days. Trapped fauna were identified, photographed if necessary, details recorded (species, sex, body length, snout-vent length, tail length) and animals released at the site of capture.

Hot daytime temperatures, often in excess of 40°C, and frequent ant activity (occasioned by minor rainfalls), necessitated the following techniques for avoiding mortalities of captured animals:

- Elliott traps:
 - were checked early each morning (preferably before 7am) to avoid heat stress to trapped fauna.
 - were closed each morning following checking and re-opened during the afternoon when the pitfalls were checked.
 - were placed beneath available shade to decrease heat stress.
- Pitfall traps:
 - Pitfall traps were checked and emptied in the early morning and mid to late afternoon.
 - Soil, as well as a disc of cardboard, styrofoam or plant material, such as Spinifex (*Triodia* sp.), were placed at the bottom of each pit to provide shade for trapped animals.
 - Insect spray (such as Baygon) was sprayed around the circumference of each bucket at sites with significant ant activity each afternoon.

Indirect / opportunistic observations

Sightings and evidence (e.g. tracks, scats and traces) of fauna were opportunistically recorded at sites during inspection of traps (approximately half hour per day) and for each land unit present. Bird presence was determined by observation or call and abundance was recorded within trap sites or opportunistically across the area.

Bats were recorded during Survey 4 using the bat detector unit ANABAT Systems - version 6 and subsequently calls were identified to species by Dennis Matthews using keys to calls developed by Parks and Wildlife and Matthews. The detector was set-up each night of the survey at selected sites (Table 2). The ANABAT System (version 6) used this way can not provide abundance data of species recorded, because one bat can pass the detector many times and may be the only bat of that species in the area. Therefore, only a check list of species has been provided. However, the record does give an indication of the relative activity of different species at a particular location. A species list of bats recorded is presented in Appendix 2.

5.2 Survey methodology

Initial surveys were conducted between the 6th and 9th of October 2004. Survey sites were situated in previously disturbed locations including the rubbish dump, old residential camp, the pit, waste rock dumps, the existing dam, the rehabilitated tailings dam, and the existing haul road (Figures 6 & 7). Sites 4 and 6 were located in areas previously affected by hypersaline water discharge. Two undisturbed control sites were also surveyed (Sites 2 and 5).

Additional surveys were conducted on two occasions between 5th and 9th of December 2006 under prolonged dry conditions, and on December 30th to 1st of January 2007 following good rains. Survey sites were situated in previously disturbed locations including the borefields (Sites 7-9), the old residential camp, the rehabilitated tailings dam, the existing pit, waste rock dump, dam, and airstrip. Locations of proposed works were also surveyed including the proposed tailings dam, residential camp, pit expansion and waste rock dump areas, and all access roads. Survey site locations, the time of survey, and survey methodology is summarised in Table 3. The GPS co-ordinates of the survey sites is detailed in Appendix 4.

Table 2: Sites and dates of bat surveys during Molyhil Molybdenum Mine ML (A) 23825.

Note: Coordinates of sites are given in Appendix 4.

Site Number	Site Location	Date of Recording
Site 8	Water Bore TMRC041 Rocky spinifex hillslope with riparian vegetation.	6/12/2006
Site 9	Water Bore TMRC038 Open Ironwood Woodland	8/12/2006
Site 13	Proposed Camp Site. Spinifex rocky foothill and mallee scrub.	31/12/2006

Table 3: Site locations and survey activities at Molyhil Molybdenum Mine ML (A) 23825.

Note: Site 10 is a replicate of Site 3.

Site Name/Number	Survey Period	Survey method	Land System (Perry <i>et al</i> 1962)	Location
<i>Previously disturbed and control sites</i>				
Site 1	October 2004	Flora & Fauna (Elliott & pitfall traps)	Dinkum LS	Gidgee woodland and former Rubbish Dump: Site 1 was located mid-way between Molyhil and the old residential site, on the northern banks of Moly creek.
Site 2	October 2004	Flora & Fauna (Elliott & pitfall traps) Control site.	Dinkum LS on Schist Hill outlier	West Gneiss Ridge: Site 2 was located 300 m to the west of Molyhil along a gneiss ridge.
Site 3	October 2004	Flora & Fauna (Elliott & pitfall traps)	Dinkum LS	Old Residential Camp: Site 3 was located on the southern banks of Moly creek, 500m south of Molyhil.
Site 4	October 2004	Flora & Fauna (Elliott & pitfall traps) Tree mortality.	Dinkum LS	Dam Creek: Site 4 was located downstream of the dam, aligned north-south.
Site 5	October 2004	Flora & Fauna (Elliott & pitfall traps) Control site.	Jinka LS	North Ridge: Site 5 was located at the eastern end of the quartz sandstone schist ridge immediately to the north of the pit and waste rock dump.
Site 6	October 2004	Flora & Fauna (Elliott & pitfall traps)	Dinkum LS	Eastern Creekline: Site 6: was located east of the pit and waste dump, 1.4 km east of the old residential site and Molyhil.
Site 7	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps).	Hann LS	Water Bore TMRC039. Riparian vegetation across creekline.
Site 8	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps) ANABAT (6/12/06)	Hann LS	Water Bore TMRC041. Spinifex rocky foothill and mallee scrub.
Site 9	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps) ANABAT (8/12/06)	Hann LS	Water Bore TMRC038. Open Ironwood woodland.
Site 10 <i>Replicate of Site 3</i>	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps)	Dinkum LS	Old Residential Camp: Refer to Site 3 and Figure 6.
Site 11	October 2004 December 2006 - January 2007	Flora and opportunistic fauna observations in 2004. Flora & Fauna (Elliott & pitfall traps) in 2006.	Dinkum LS	Rehabilitated Tailings Dam: Refer to Figure 6

Pit	October 2004 December 2006 - January 2007	Flora and opportunistic fauna observations.	Dinkum LS	Refer to Figure 6.
Waste Rock Dump	October 2004 December 2006 - January 2007	Flora and opportunistic fauna observations.	Dinkum LS	Refer to Figure 6.
Dam	October 2004	Flora and opportunistic fauna observations.	Jinka LS	Refer to Figure 6.
Existing Haul Road	October 2004	Landscape assessment.	Dinkum LS, Sandover LS Singleton LS	Refer to Figure 6.
<i>Sites of proposed activity</i>				
Proposed Haul Road and camp access road	December 2006 - January 2007	Landscape assessment	Dinkum LS Jinka LS Sandover LS Singleton LS	Proposed routes (Figure 7)
Proposed Tailings Storage Facility (Site 12)	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps)	Dinkum LS	Located 1 km east of the existing pit on a plain east of the Eastern Creek.
Proposed Camp (Site 13)	December 2006 - January 2007	Flora & Fauna (Elliott & pitfall traps) ANABAT (31/12/06)	Dinkum LS	Located 1 km south-east of the existing pit at the southern foothills of a quartz sandstone rocky rise.
Proposed pit expansion and waste rock dump	December 2006 - January 2007	Landscape assessment	Dinkum LS	The proposed pit extension extends 125 m south of the existing pit wall and 225 m to the end of the proposed waste rock dump, 50 m short of the main creek. The proposed area is approximately 79200 m ² .
Airstrip	December 2006 - January 2007	Flora and opportunistic fauna observations.	Jinka LS	Refer to Figure 6.

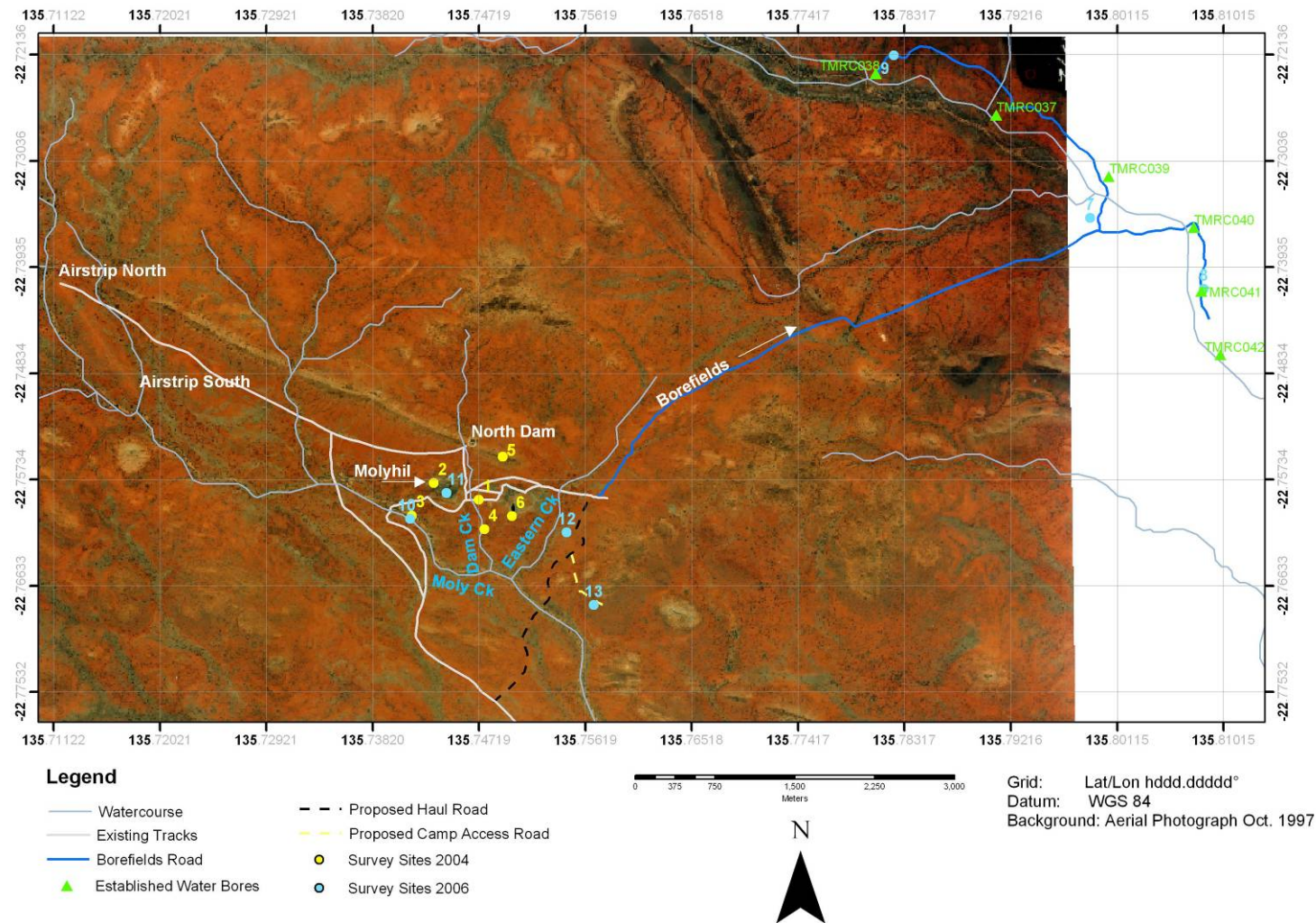


Figure 6: Locations of fauna and flora sites surveyed by *Low Ecological Services*, October 2004 and December 2006/January 2007 and creek names at Molyhil ML (A) 23825. Survey 1 (2004): Site 1: Former rubbish dump (Gidgee plain), Site 2: West Gneiss Ridge (Control), Site 3: Old camp site, Site 4: Dam Creek, Site 5: North Ridge (Control), Site 6: Eastern Creekline. Survey 4 (2006/7): Site 7: Borefields (riparian), Site 8: Borefields east (spinifex hill), Site 9: Borefields west (flat woodland), Site 10: Old camp site, Site 11: Rehabilitated tailings dam, Site 12: Proposed tailings dam, Site 13: Proposed camp site.

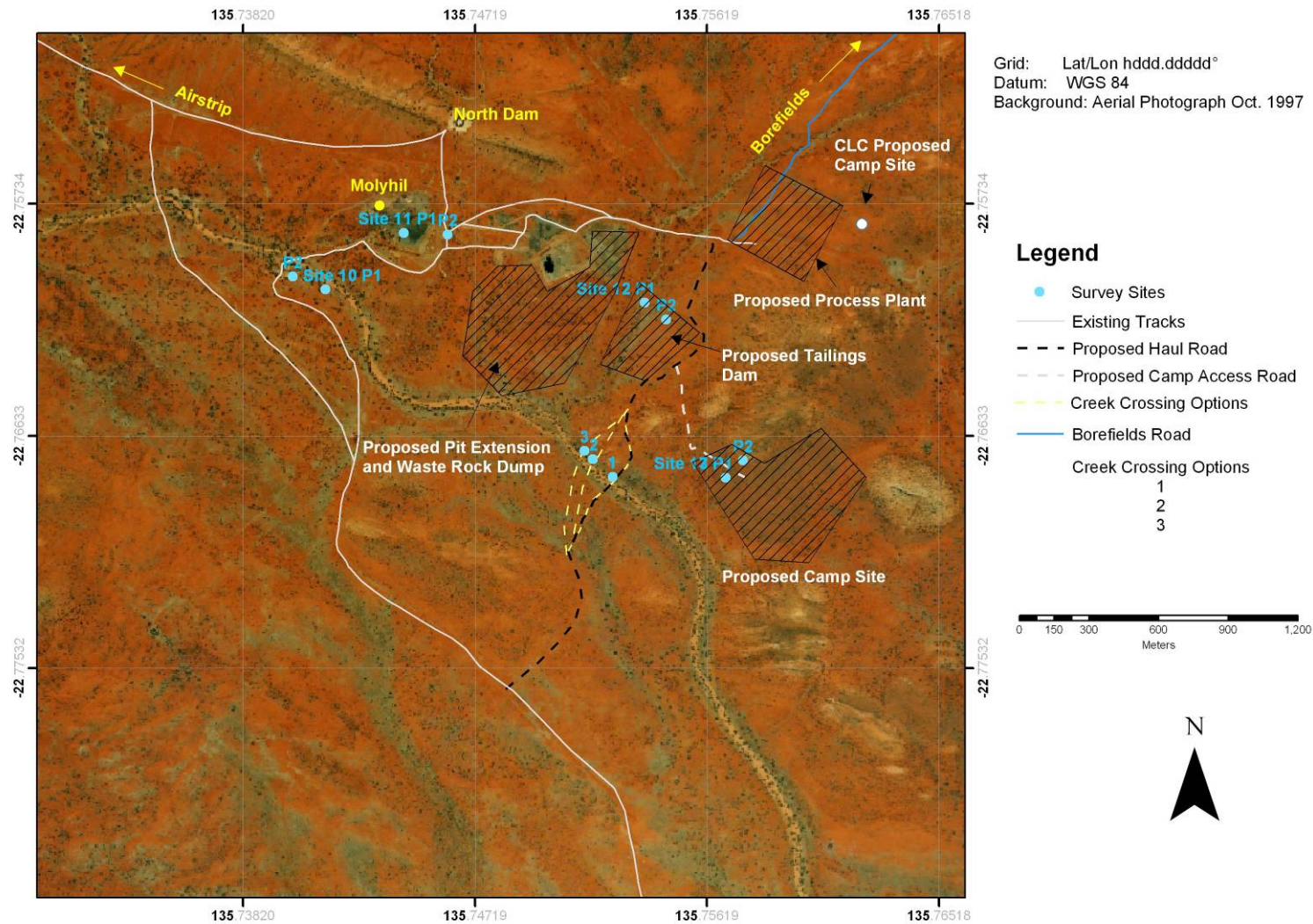


Figure 7: Proposed mining infrastructure (tailings dam, camp site, pit extension, waste rock dump, processing plant and access roads) at Molyhil ML (A) 23825 (defined areas are approximate only). Map includes creek crossing options for proposed haul road. Faunal and flora surveys were conducted in December 2005 and January 2006 by *Low Ecological Services*. Map shows pit trap locations during these surveys.

6 RESULTS

6.1 Flora

Ninety-five plant species were recorded throughout the surveys (Appendix 1). Vegetation of sites within the Dinkum and Jinka LS were dominated by Georgina Gidgee (*Acacia georginae*) and Ironwood (*A. estrophiolata*) in the overstorey, *Senna* and *Acacia* shrubs, and heavily grazed Buffel Grass (*Cenchrus ciliaris*), *Calotis hispidula* and *Fimbristylis dichotoma* in the ground layer. Riparian zones were dominated by Red River Gums (*Eucalyptus camaldulensis*) in the overstorey, a tall shrub layer of Mimosa Bush (*A. farnesiana*), and a ground layer of Buffel Grass and *Zygochloa paradoxa*. Vegetation within the Borefields was dominated by Spinifex (*Triodia basedowii* and *T. pungens*) on skeletal soils (such as rocky slopes or calcrete outcrops on flat plains), River Red Gums in creeks and open woodlands of Ironwood in the alluvial plains. Grass cover on the floodplains and alluvial fans were dominated by heavily grazed native Woollybutt (*Eragrostis eriopoda*) and Buffel grass.

No threatened plant species were recorded during the surveys or found to occur through literature searches (EPBC Act 1999; Herbarium records). Weed species present in the area include Buffel Grass and Ruby Dock (*Acetosa vesicaria*).

6.1.1 Survey site vegetation results

Previously Disturbed and Control Sites

Gidgee Woodlands and Former Rubbish Dump (Site 1): This site consisted of coarse alluvial sands in Molyhil creek (approximately 20-30m wide) and red clayey sands in the riparian zone (10m wide) and Gidgee Woodlands (*Acacia georginae*) (Plate 2). The riparian zone was dominated by River Red Gums (*Eucalyptus camaldulensis*), Mimosa Bush (*A. farnesiana*), Buffel Grass (*Cenchrus ciliaris*), *Zygochloa paradoxa* and *Calotis hispidula*. The Gidgee Woodland consisted of a dense stand of mature Gidgee trees to 5m height and juveniles to 2m height. The ground layer consisted of grazed tussocks of Buffel Grass and *Calotis hispidula*.

West Gneiss Ridge (Site 2): Site 2 is an undisturbed control site and is situated from Molyhil to a low gneiss ridge to the southwest on shallow rocky skeletal soil. Hill vegetation was dominated by Mulga (*Acacia aneura*) and Bloodwood (*Corymbia opaca*) in the overstorey, *Senna* shrubs and a groundlayer of Buffel Grass (Plate 3). Vegetation on the low ridge was similar except for having higher dominance of Georgina Gidgee in the overstorey and *Zygochloa paradoxa* and *Calotis hispidula* in the ground layer.

Old Residential Area (Site 3): This site was located within the old Molyhil residential area on the south-western side of Molyhil Creek in Open Gidgee woodland (Plate 4). The site consisted of a flat alluvial floodplain with fine red sands and coarse sands in the creek bed. Gidgee occurred in patches throughout the site, providing up to 20% canopy cover. The middle strata was sparse (<10% coverage) consisting of *Senna artemisioides* subsp. *filifolia* and scattered Mimosa Bush (*Acacia farnesiana*). The ground layer was patchy (up to 30% cover) and consisted of well-grazed Buffel Grass and two remnant garden plants, *Aloe vera* and *Bougainvillea* sp. The riparian zone consisted of River Red Gum and Mimosa Bush upperstorey with Buffel Grass understorey, and also contained one Coolabah

(*Eucalyptus coolabah* var. *arida*), a Ghost Gum (*Corymbia aparrerinja*) and an old growth Bloodwood (*C. opaca*). The vegetation is heavily impacted upon by cattle.

Molyhil Dam Creek (Site 4): This site ran along a northern tributary of Molyhil Creek draining from Molyhil Dam and was affected by hypersaline pit-water discharges (Plate 5) (refer Moon *et al.* 2006a). Most of the trees and shrubs in the riparian vegetation south of the access road to the open cut pit and Molyhil Creek have died as a result of the water discharge. In areas not affected the overstorey was dominated by Georgina Gidgee and River Red Gum, the shrub layer by *Senna artemisioides* subspecies and the ground layer by Buffel Grass and *Calotis hispidula*.

North Ridge (Site 5): Site 5 is an undisturbed control site and is the only trap site within the northern Jinka Land System and consists of a quartz sandstone schist hill and pediplain with shallow rocky soil (Plate 6). The hill was dominated by Georgina Gidgee, Rock Fushia Bush (*Eremophila freelingii*) and dispersed grasses such as *Enneapogon polyphyllus* and *Eriachne* sp. The site was less grazed due to the steep relief and so contained a healthier ground/shrub layer. The lower slopes were dominated by Mulga and *Senna artemisioides* subsp. *helmsi* shrubs. One Spinifex (*Triodia* sp.) plant was found on the pediplain along with the single *Triodia basedowii* plant on Site 2.

Eastern Creekline (Site 6): This site was located at the east end of the lease within Gidgee woodland similar to Site 1 (**Error! Reference source not found.**) but with scattered Ironwood. An eastern tributary to Molyhil Creek also intersected the trap line for which the vegetation was similar to Site 4, with a dominance of Mimosa bush.

Borefields

Sites 7-9 are situated in the Borefields area 5.5 km northeast of the mine pit in a wide valley with parallel ranges flanking the north and south. Six Water Bores are established along a west-east aligned river, adjacent to the southern ridge (Figure 6).

Water Bore TMRC039 (Site 7): This site was located within riparian open shrubland, grading into spinifex grassland along a rocky rise in the south (Plate 8). The landform is within the Unit 5 subcategory of the Hann LS. The riverbed has eroded to the calcareous bedrock which forms the river's banks. The riparian vegetation is dominated by a shrub layer (2 m height) of Cassia (*Senna artemisioides* subsp. *filifolia*) and juvenile Ironwoods (70% cover). Mature Georgina Gidgee (averaging 5 m height and 50 cm diameter) are scattered within the alluvial sediments. Recruiting Georgina Gidgee dominates the lower shrub layer (10-30% cover). The earth is exposed along the creek banks and floodout, with sparse Buffel Grass clumps (<10% cover) and dense spinifex (*Triodia basedowii*) (90% cover) along the rocky rise.

Water Bore TMRC041 (Site 8): This site was located along the slope of a spinifex covered rocky foothill adjacent to the river (Plate 9). Soils consist of deep fine red sands (<1 m) at the base of the foothill and clayey sands upslope with calcareous outcrops and rock debris covering 60% of the hill flank and crest. Tall Bloodwoods and Ironwoods (approximately 8 m height and <10% cover) occur in the deep red sands. The rocky hillslope supports a sparse cover of stunted Bloodwoods, Corkwoods (*Hakea divaricata* and *H. lorea*) and Ironwoods (averaging 2.5 m height and <10% cover). The understorey is dominated by spinifex (*Triodia basedowii*) grassland (60% cover) with scattered Cassia (*Senna artemisioides* species) and *Eremophila* (*E. freelingii* and *E. christophori*) shrubs, and scattered

Pussytails (*Ptilotus obovatus*) in the ground layer. *Acacia ligulata* shrubs (averaging 2 m height and 30% cover) dominate the hill crest.

Water Bore TMRC038 (Site 9): This site was located within Unit 5 and 6 subcategories of the Hann LS (Plate 11). The site consisted of a flat alluvial plain with dissecting tributaries (up to 2 m deep) and deep (>2 m) fine red sands. The site contains habitat common to valley, exceeding 500 ha in size. A volcanic outcrop at the east provides a source of low density scattered rock throughout the site (10-20% cover), sized between 2 to 60 cm. The site consists of open shrubland dominated by Witchetty Bush, Cassia (*Senna artemisioides* subsp. *filifolia*) and young Ironwoods. The shrub layer provides 30-70% cover and averages 2.5 m height. Scattered mature Ironwood (averaging 8 m height) composes less than 10% cover. The ground layer is dominated by heavily grazed native Woollybutt Grass (*Eragrostis eriopoda*) providing 10-30% cover with scattered Buffel Grass (<10% cover).

Rehabilitated tailings dam (Site 11): The rehabilitation of the old tailing dam from 1998 appears to have been effective with the majority of native plants appearing healthy with minimal erosion on the banks of the rehabilitated area (Plate 16). The most common tree species in the rehabilitation zone were *Acacia* species with the occasional Blue Mallee (*Eucalyptus gamophylla*). Buffel Grass was widespread in the rehabilitation enclosure. There is a low mortality rate of shrub species.

Strong growth of planted vegetation, as well as recruitment of *Acacia* shrubs was noted in the 2006/7 Surveys (Site 11) (Plate 15). Dense *Acacia ligulata* dominates the vegetation, providing up to 40 % cover and averaging 2.5 m height. Ironwood and Blue Mallee trees have become well established, averaging 5 m height (Ironwood) and 3 m height (Blue Mallee). Buffel Grass continued to be widespread throughout the site.

The pit: The existing pit is approximately 150m by 150m across between the outer bunds and up to 20m deep and is mostly exposed bedrock. Vegetation around the rim consisted of *Acacia* shrubs (*A. tetragonaphylla*, *A. estrophiolata* and *A. georginae*). Vegetation within the pit consisted of the native grasses *Cymbopogon obtectus* and *Aristida* sp. and weeds such as Paddy Melon (*Citrullus colocynthis*) and Ruby Dock (*Acetosa vesicaria*). The area occupying several hundred m² south-southeast of the pit consisted of Gidgee woodlands with scattered rocks of ore ranging in size from 10 cm to 40 cm. The origin of these rocks is unknown and may be the result of prior blasting or naturally occurring remnant ore.

Waste rock dumps: Waste rock dumps are located to the north and east of the pit. Most areas lacked soil and vegetation was patchy with no species dominating all areas. A scattered overstorey of Georgina Gidgee and Whitewood (*Atalaya hemiglaucula*) was present, Cockroach Bush (*Senna notabilis*) and Mimosa Bush were common shrubs and perennial native grasses such as *Cymbopogon obtectus* and *Aristida* sp. were common in the groundlayer. . Some acid formation was observed in the waste rock material.

The dam: The dam to the north of the mine lease consisted of calcrete compacted soil. . Mimosa bush dominated the dam banks, as well as some River Red Gums on the northern side. The understorey was virtually absent (Plate 17 and Plate 18). The salinity of the dam water was recorded at 1,060 ppm (Leane *et al.* 2005), twice the desirable salinity level for human water supply (500 ppm) but under the maximum permissible for live stock (2,500ppm) (Hunt and Gilkes, 1992). For comparison, Alice Springs town water supply is approximately 500 ppm (Power and Water 2003).

Existing Haul Road: The existing haul road was surveyed for land systems and vegetation communities. The road consists of a 25 km unsealed road from Molyhil to the Plenty Highway within the present Jervois station. The haul road transects three LS and two rivers. Beginning at the mine in red-clayey soil of the Dinkum LS at Molyhil, vegetation is dominated by Gidgee woodland merging to Ironwood-Witchetty association both over a shortgrass (small grasses and herbs) understorey. A narrow band of Sandover LS occurs just before the Marshall River, dominated by Sandhill Canegrass. After the Marshall River the haul road transects the red sandy Singleton LS of sparse Mallee trees and Spinifex. Further south the Mallee-spinifex association persists only on sand ridges and the swales are dominated by Ironwood-Witchetty just before the Plenty River. Between the Plenty River and Plenty Highway is Dinkum LS dominated by Ironwood-Witchetty over a shortgrass layer (Appendix 5).

Sites of Proposed Activity

Proposed Tailings Storage Facility (Site 12): The site consists of a flat interfluvial (or plain) with calcareous red earths. The site supports an open Woodland, dominated by sparse (10-30% cover) Witchetty Bush (*Acacia kempeana*) and scattered (<10% cover) mature Ironwoods (*A. estrophiolata*), with Ghost Gums (*Corymbia aparrrerinja*) and Bloodwoods (*C. opaca*) averaging approximately 10m in height. Stands of Georgina Gidgee (*A. georginae*) are present to the west of the site averaging 4m in height (Plate 19, Plate 21 & Plate 22). There are culturally significant trees within the tree layer of this site identified by trunk diameters greater than 15.2 cm (6 inches) by the Central Land Council. These include up to 15 Ghost Gums, between 5-10 Bloodwoods and up to 100 Gidgee trees. Two Gidgee patches containing culturally and ecologically significant trees occur at the southwest (approximately 30 mature individuals) and northwest (10 mature individuals) of the site. Recent rainfall (49.2mm between 23rd-26th Dec. 2006 (Sourced Bureau of Meteorology)) resulted in widespread growth of annual sedge, *Fimbristylis dichotoma*, (greater than 70% cover). Buffel Grass (*Cenchrus ciliaris*) occurred in sparse patches (<10% cover) but is showing signs of regrowth following the recent rain event.

Proposed Camp (Site 13): The proposed camp site is located on skeletal soils of an alluvial slope on the southern side of a quartz sandstone rocky foothill, approximately 1 km south-east of the existing pit. The site grades from the hill into a gently sloping spinifex and mallee plain, terminating at a tributary to the west of the site (Plate 23). There is approximately 1.2 km² of flat area suitable for the camp site. The site is dominated by spinifex (*Triodia pungens*) grassland (70% cover) and scattered (5-10% cover) patches of Mallee (*Eucalyptus gamophylla*) (approximately 50 individuals) and sparse Witchetty Bush towards the site's east, and dense mature stands of Witchetty Bush in the site's west. Eight mature Bloodwood (averaging 9m height) are scattered throughout the plain and 6 mature Ghost Gum (averaging 6m height) are scattered on the site's northwest. An estimated patch of 50 mature Gidgee trees (averaging 3.5m height) are located along the drainage line west of the site. The rocky hill slope supports a greater diversity of shrubs than the alluvial flat, including Curry Wattle (*Acacia spondylophylla*), Dead Finch (*A. tetragonophylla*), White Indigo (*Indigofera leucotricha*) and Cassias (*Senna artemisioides* subsp. *oligophylla* and subsp. *helmsii*).

Proposed Haul Road: The proposed route departs the existing access road 2.2 km south of the old camp site and travels east behind a quartz sandstone hill. The area is flat and contains open woodland with scattered mature Ironwood, River Red Gums, Georgina Gidgee and Witchetty Bush (Plate 25a-c). The proposed road crosses the main creek,

passing through mature River Red Gums (averaging 50 cm in diameter) which line the main creek. The topography is undulating north of the creek and travels between calcareous rocky outcrops. The vegetation north of the creek crossing is moderately dense (10-40% cover) and is comprised of the same species (Plate 26a-c). A dense scattering of calcrete rocks of up to 70 % cover and 8 cm in diameter, line the base of northern hill (refer to Figure 7).

Proposed Camp Access Road: This site is approximately 600 m in length from the proposed south road at the southeast of the tailings dam (Plate 27 & Plate 28). It travels between two calcareous rocky hills along the lower slopes of the western hill and crosses over a small creekline and passes through dense stands of Witchetty Bush, with scattered Ironwood, Beefwood (*Grevillea striata*), Bloodwood and Ghost Gums. Across the creekline the route passes through an open spinifex plain with scattered Mallee (*Eucalyptus gamophylla*) that has been affected by cattle use.

Pit Expansion and Waste Rock Dump: The proposed pit extension extends 150 m south of the existing pit wall the proposed waste rock dump extends a further 500m to within 50 m of the main Moly creek. This area contains dense Gidgee patches. The total development will remove an estimated 500 to 600 mature Gidgee trees, (Plate 29 & Plate 30a-b). The pit extension alone will remove an estimated 200 trees.

Airstrip: The airstrip is located 3.5 km north-west of Molyhil pit, with access roads north and south of Molyhil Hill (Plate 31). The site is within the Jinka LS on a raised alluvial fan. The soils consist of deep (>1m) fine red sands mixed with coarse quartz grains from the river system to the west of the site. The airstrip was last used in 1981 and vegetation has shown little recovery. Frequent cattle utilisation of the site restricts recruitment of shrubs and trees and continual abrasions reduce plant growth. The airstrip contains a low density (<10% cover) of *Senna* shrubs (*Senna artemisioides* subsp. *filifolia* and subsp. *oligophylla*) with heavily grazed Buffel Grass and *Sclerolaena* sp. (<10% cover). The vegetation surrounding the airstrip contains a greater diversity and density of vegetation species. Georgina Gidgee stands containing up to 30 mature individuals are located to the north east of the site, while scattered, sub-adult Ironwood and River Red Gums (<10% cover and averaging 5 m height) dominate the tree layer throughout the rest of the area outside of the airstrip. Scattered Corkwood (*Hakea divaricata*) and Mimosa Bush (*Acacia farnesiana*) (<10% cover) dominate the upper shrub layer.

6.2 Fauna

A total of 84 species of animals were recorded at trap sites and opportunistically during the surveys (Appendix 2 & 3). This includes 16 mammal species (of which three are feral species), 20 reptile species and 48 bird species. Cattle entering the area from the surrounding pastoral property were excluded from this survey.

Generally, more species and higher numbers of individuals were recorded during the second survey in December 2006 – January 2007 compared to the initial survey in October 2004. Results of Elliott and pitfall trapping and opportunistic searches from the initial survey recorded only 4 captures of 7 mammal species and 5 captures of 8 reptile species. Trapping in 2006/07 resulted in 10 captures of 6 mammal species, including 2 new species, and 26 captures of 16 reptile species, including 11 new species. These figures exclude results of the bat survey which was only undertaken during the second survey. The improved trapping results during the second survey may be attributed to the greater

diversity of habitats that were surveyed, a presence of more species in those habitats, or the environmental conditions prevalent at the time of survey.

One threatened species listed under the *EPBC Act* 1999, the Rainbow Bee-eater (*Merops ornatus*), was recorded during the survey. It is listed as Migratory and Marine under the Act (*EPBC Act* 1999). No threatened species listed under the *TPWC Act* and the NT Fauna Atlas records was recorded during the surveys or were found to occur through literature searches. However, two threatened species could potentially be present based on regional distribution and the availability of suitable habitat: Mulgara (*Dasycercus cristicauda*) listed as vulnerable under the *TPWC Act* and *EPBC Act* (1999), and Black-footed Rock Wallaby (*Petrogale lateralis MacDonnell Ranges race*) listed under the *EPBC Act* (1999). Old droppings identified as being from this species were found on the ridge to the north of the existing pit indicating that this species has occupied the site previously. Despite opportunistic searches no evidence of current occupation was observed during the survey.

6.2.1 Mammals

Opportunistic surveys found that Red kangaroos (*Macropus rufus*) and Euros (*Macropus robustus*) were commonly found in the mining lease and surrounding area. Scats of Euros were most frequent on the larger hills and waste rock dumps and Red Kangaroo scat, tracks or sightings were recorded throughout most of the mine lease. December 2006 rains resulted in green pick which saw high numbers of red kangaroos and euros grazing during the survey (up to 50 individuals).

Elliott and pitfall trapping found that the House Mouse (*Mus musculus*) was common in the mining lease and surrounding area. They were the only mammal species caught (four individuals) during the initial survey of disturbed and control sites (sites 1, 2, 5, and 6), and were found at the old camp site and the rehabilitated tailings dam (sites 3 (10) and 11) during the later survey.

The Sandy Inland Mouse (*Pseudomys hermannsbergensis*) was captured relatively frequently (7 captures) during the second survey at both disturbed and undisturbed sites including the borefields, the old camp site and the rehabilitated tailings dam, and the proposed camp site. A single capture of a juvenile Striped-face Dunnart (*Sminthopsis macroura*) was the only other mammal species caught during the survey. It was recorded at the proposed camp site (Site 13). The species is widespread and locally common, occurring on dune hummock grasslands, tussock grasslands and arid shrublands (Menkhorst and Knight, 2004). Field investigation found these habitats are common to the Dinkum and Jinka LS located within the mine lease.

Calls from 7 species of bats were recorded by the ANABAT recorder during three nights of surveying (Appendix 2). Calls were recorded throughout each night indicating the detector worked well. All species identified from the calls are widely distributed in Central Australia (Matthews pers. comm.). Of the three sites surveyed, Site 8 at Water Bore TMRC041 recorded the largest species diversity with 6 bat species recorded. This site was on an ecotone between a spinifex covered rocky foothill and River Red Gum riparian vegetation. Five species were recorded at the proposed camp site (Site 13) and 3 species at Site 9 (Water Bore TMRC038) within an open ironwood woodland.

6.2.2 Reptiles

Elliott and pitfall trapping recorded the presence of 12 reptile species during the surveys, predominantly from the Skink and Gecko reptile groups. Opportunistic surveys recorded

the presence of an additional 8 species including Skinks, Dragons and a Goanna (Appendix 2). Results of the survey found that Skinks were the most diverse group present with 10 species found, followed by 6 species of Gecko, 2 species of Dragons, one species of Goanna (Perentie) and snake (Orange-napped Snake). All species recorded are widespread and common.

Undisturbed sites including the proposed camp site (Site 13), proposed tailings dam (Site 12) and spinifex rocky rise in the Borefields (Site 8) recorded greater species diversity than sites proximal to the existing mining infrastructure (Appendix 2).

6.2.3 Birds

A total of 48 bird species were recorded during the surveys. A total of 30 species were recorded from the initial survey and 37 species were recorded during the second survey, including 17 new species added to the species list (Appendix 3).

Zebra Finches, Masked and Black-faced Woodswallows, Black-faced Cockoo-shrike, Willie-wagtails, White-plumed Honeyeaters and Magpie-larks were commonly observed birds during the surveys. An abundance of birds was recorded in around existing mining infrastructure due to the proximity of the dam. Zebra finches were the most abundant bird throughout the area, with flocks of over a hundred sighted around the dam. Rainbow Bee-eaters (protected under the *EPBC Act 1999*), Spinifex Pigeons, Australian Ringnecks, Azure Kingfisher and waterbirds such as Grey Teals were commonly recorded in this area. Christmas rains brought in Banded Lapwings from the north, observed at the airstrip towards Oorabra Gorge.

7 DISCUSSION

The Molyhil mine area is a disturbed site due to grazing impact and previous mining activity in the area. Cattle frequently utilize a dam (~ 20 x 20 m) positioned 100 m north of the mine lease, which has led to continuous disturbance in the local area. Previous mining activity from the 1970's to 1980's has left disturbed areas with some rehabilitation. Implementation of appropriate management practices will minimise further impact on the ecology and landscape of the Molyhil project area.

7.1 Land systems

All LS within the mine lease are represented elsewhere on Jervois station and in southern NT. In 1985, Low & Strong assessed whether land systems occurring on Jervois and Jinka Stations warranted reservation, on the basis of the extent they were reserved elsewhere (in National Parks etc), their conservation value (biodiversity, unique/threatened species) and the area they covered on the station. Land systems present on the station were given a low priority for reservation with exception of the Dulce Range area in the north of Jinka (Low & Strong, 1985). The Dinkum, Jinka and Hann LS's are widely represented elsewhere on the station and in the northeastern Alice Springs area.

7.2 Flora

7.2.1 Native plant species

No threatened plant species were recorded during the surveys or were found to occur through literature searches (*EPBC Act 1999* TPWC Act 2000; NT Fauna Atlas records).

The dominant vegetation associations found in the Molyhil mine lease are open Gidgee (*Acacia georginae*) and Ironwood (*A. estrophiolata*) woodlands over short grass. According to Perry *et al.* (1962), Gidgee communities are extensive in the north-eastern region around Jervois Station and have suffered little clearance. "Sparse low tree" communities mostly characterised by Ironwood, occur in a range of habitats and are also a widespread community. In general, dominant species for the area are widespread and their persistence is not dependent on the Molyhil mining lease area.

Generally, the vegetation within the Molyhil area is mostly disturbed by heavy grazing or from has been cleared and tree mortalities from previous mining activity. Nevertheless the remaining patches of woodland and undisturbed vegetation have ecological value for fauna communities and cultural value for Traditional Owners.

Enough cleared land should be present for installation of most mining infrastructure such as roads, water tanks, tailings dam and other processing infrastructure. However the development of the proposed camp site and access road would require removal of mostly undisturbed vegetation dominated by spinifex grassland with a Witchetty/Blue Mallee overstorey (*Acacia kempeana/Eucalyptus gamophylla*). This would also impact on fauna species recorded at this location. Advantages and disadvantages for the location of the proposed camp site should be considered further to minimise any potential adverse impacts on the plant and animal species present.

All vegetation clearance requires consultation with Traditional Owners via the Central Land Council. As a rule, clearing of old growth trees such as Georgina Gidgee, Ironwood,

River Red Gums, Bloodwood, Corkwood, Ghost Gums, and Wild Orange (*Capparis mitchelli*) should be avoided wherever possible.

Culturally significant tree species found within the Molyhil Mine Lease area are; Gidgee (*Acacia georginae*), Bloodwood (*Corymbia opaca*), Ghost Gum (*Corrymbia aparrerinja*) and River Red Gum (*Eucalyptus camaldulensis*). The CLC have defined culturally significant trees as having diameters of 15.2 cm (6 inches) or higher and may require approval by Traditional Owners for removal. Whilst other tree species, such as Ironwood and Wild Orange, are not culturally significant species, mature individuals of such species have significant ecological value and should be retained.

The saline pit water discharge into Dam Creek has caused approximately 200 tree mortalities so far and continues to impact the riparian/creekline habitats by impeding regeneration. Of the three habitats present within the lease area (sand plain, alluvial riparian and rocky hill slope) riparian habitat covers the least area within the mine lease. It also provides important ecological value to local fauna species, including the listed Rainbow Bee-eater, and therefore all attempts should be made to protect the remaining riparian vegetation (River Red Gum woodlands).

7.2.2 Introduced plant species

Currently Buffel Grass, and to a lesser extent Ruby Dock, are the main introduced species throughout the mining lease and surrounding area.

Buffel Grass is widespread throughout the mining lease and surrounding areas. Although control of this species is not feasible it will require management to reduce wildfire hazard. Buffel grass will grow rapidly in response to suitable rainfall and will generate high fuel levels that require control to reduce wildfire hazard. Hazard reduction activities should include protection of significant vegetation, *ie* stands of significant trees, as well as living areas and infrastructure.

An abundance of Ruby Dock at Molyhil Mine was observed by Mines and Energy in June 2006. This “outbreak” was a resultant climax population from significant rainfall in preceding months (36.2mm in March and 28.4mm in April recorded at Jervois Station). Although these populations were not observed during the August 2006 and December/January 2006/7 surveys they probably persist and will reappear following suitable late-summer rainfall.

There is a potential for other noxious weeds to invade the area when mining activities begin. It is essential that a weed management strategy be developed for all entering vehicles and machinery to prevent the introduction of new invasive weeds into the area.

7.2.3 Rehabilitated areas

Rehabilitation of the tailings dam from 1998, following recommendations by Fawcett (1998), has been effective and there is minimal sign of leakage from the tailings dam or gully erosion into the surrounding landscape. *Acacia* species such as *Acacia ligulata* and Ironwood were common on this site (Plate 16). Traditional owners require that the rehabilitated tailings dam is not disturbed now that it has rehabilitated. This is partly due to the proximity to the sacred site at Molyhil.

The borrow pit on the eastern side of the rehabilitated tailings area was exposed to hypersaline water in June/July 2004 from the pit and the young trees and the Buffel Grass within the inundation area died as a consequence (including River Red Gum and *A. ligulata*). Soils no longer had the flocculated appearance apparent in 2004 suggesting that hypersaline water has infiltrated into the water table or dispersed by rainwater runoff.

7.3 Fauna

The fauna species recorded during the survey have a widespread distribution (Menkhorst and Knight, 2004) and their continued persistence is not dependent on the Molyhil lease area. The surveys recorded the presence of the Rainbow Bee-eater and past evidence of the Black-footed Rock Wallaby both of which are listed under the *EPBC Act* 1999. The implications of these finds are discussed further.

The mine lease is situated upon land that has been previously disturbed by mining activities which may have influenced the diversity and abundance of species recorded during the survey. The presence of the House Mouse is indicative of previous disturbance to native animal communities. However, remaining native animal populations appear to be recolonising previously disturbed areas. Reptiles especially seemed adapted to the modified mine site environment with Long-nosed dragons (*Amphibolurus longirostris*) and Geckoes (*Gehyra variegata*) found in cast iron pipes and in an old septic tank.

Higher species diversity was recorded in less disturbed areas such as within the proposed camp site and Borefields. Development of the proposed camp site will require clearance of predominately undisturbed habitat that supports higher species diversity than found at disturbed sites. As previously indicated the implications of siting the proposed camp site should be considered further. Previous development within the Borefields does not pose concern to existing wildlife as development is contained and has resulted in minimal disturbance to habitat. It is important, however, for vehicles accessing bores to remain on existing tracks to minimise disturbance.

All bats species recorded during the survey are widely distributed in Central Australia. A review of the habitat preferences for roosting and foraging of the bat species found during the survey is summarised in Table 4. Most of the 7 species found during the survey are known to utilise woodlands for roosting and foraging (6 species) compared to those that purely utilise caves, crevices, mines, or buildings (1 species) (Appendix 2). This indicates the importance of retaining woodland environments on the site to maintain local bat populations.

Table 4: Habitat preference for bat species found at the Molyhil mine lease.

Species Name	Common Name	Habitat Preference*
		(*Thomson1989)
<i>Vespadelus finlaysoni</i>	Little Brown Bat	caves / crevices / mines
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	woodlands / watercourses / caves
<i>Chalinolobus gouldii</i>	Goulds Wattled Bat	woodlands
<i>Scotorepens greyii</i>	Little Broad-nosed Bat	woodlands
<i>Taphozous flaviventris</i>	Yellow-bellied Sheath-tail Bat	woodlands / burrows
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	woodlands / caves / buildings
<i>Mormopterus sp.</i>	Mastiff Bat	woodlands / watercourses (River Red

		Gum)
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A wildlife risk prevention management plan will be required for the proposed tailings dam which will encourage fauna to site. Birds utilising the tailings dam can be poisoned or die from becoming trapped in mud sediments. Water birds such as the White-faced Heron, seen flying over the remaining water in the pit, Australasian Grebe seen in the dam, and Banded Lapwing observed at the airport could utilise the tailings dam.

Cattle frequenting the dam to the north of the mine lease could become a hazard to themselves and to mining vehicles. Fencing off the mine lease area to exclude cattle will improve road safety and will assist the rehabilitation and maintenance of the natural features within the mine lease area by reducing soil erosion and improving vegetation health.

Overall, if development continues at this site, careful planning and management to minimise habitat removal and disturbance should allow the fauna species recorded during the survey to persist in surrounding areas.

7.4 Threatened species

The Rainbow Bee-eater (*Merops ornatus*) is listed as Migratory and Marine under the EPBC Act (1999). The Rainbow Bee-eater is widely distributed throughout Australia and follows a migratory distribution pattern populating southern regions of Australia during summer and migrating northwards to Northern Australia and Asia during the summer. It is commonly found in Central Australia during the warmer months of the year. Its habit of nesting in burrows built into the banks of creeklines means it is often found in riparian woodlands (such as River Red Gum forests) and is not uncommon in towns and communities. Disturbance from proposed mining activities is unlikely to have a damaging effect on local and regional populations of this species.

A review of fauna records and the habitats found in the Molyhil Lease area indicate that an additional two threatened species could potentially inhabit the area: the Black-footed Rock Wallaby (*Petrogale lateralis MacDonnell Ranges race*) listed under the EPBC Act (1999) and the Mulgara (*Dasyercus cristicauda*) listed as vulnerable under the TPWC Act and EPBC Act (1999).

The Black-footed Rock Wallaby have a strong preference for rocky hill habitats (Paltridge and McAlpin, 2002) and it is expected that they may occur in nearby ranges (Table 5). Although evidence was found of prior occupation within the mine lease area no evidence of current activity or an existing population was found. Ongoing monitoring for evidence of occupation should take place to identify whether this species recolonises rocky habitats in the mine lease area. Mulgara are known to occur in Spinifex dominated sand plains and dune fields as well as lateritic plains (Paltridge and McAlpin, 2002) of which the closest were on the haul road in the Singleton land system approximately 12 km away from Moly Hill. There is no record of the Black-footed Rock Wallaby or Mulgara in the surrounding Jervois Station (Low and Strong 1985) and it is unlikely that these species are present within the mine lease or close surrounds.

Table 5: Habitat preference for selected threatened species that occur or may occur on the Molyhil mine lease.

Species name	Common Name	Habitat Preference
<i>Merops ornatus</i>	Rainbow Bee-eater	Open forest, woodlands & shrublands including cleared habitats in close proximity to water (DEH website).
<i>Petrogale lateralis lateralis</i>	Black-footed Rock Wallaby (MacDonnell ranges race)	Rocky hills and ranges with rock caves and crevices (Paltridge and McAlpin, 2002).
<i>Dasycercus cristicauda</i>	Mulgara	Spinifex dominated sand plains and dune fields (Paltridge and McAlpin, 2002).

7.5 Heritage

In the area surrounding the lease application area, several pieces of old equipment have been left on site. These items could be viewed as historic artifacts of the previous mining era, or as unwanted debris. Since the artifacts are outside the lease application area, they are not of concern on the lease. It would be useful to have the value of the old materials assessed by the NT Heritage Section.

8 CONCLUSIONS

The Molyhil mine lease area is largely in a disturbed condition due to previous mining activity and current grazing activity. The flora and fauna species recorded during the survey have a widespread distribution (Menkhorst and Knight, 2004) and their continued persistence is not dependent on this site.

The persistence of plant and animal species within the mine lease area is conditional on retaining the existing undisturbed habitat, particularly woodland areas. Enough cleared land should be available for installation of most mining infrastructure such as roads, water tanks, tailings dam and other processing infrastructure that would minimise the need for further disturbance. Development of the camp site in its proposed location will require clearance of predominately undisturbed habitat that supports higher species diversity than found at disturbed sites which should be reconsidered.

All vegetation clearance will require consultation with Traditional Owners via the Central Land Council. Regardless the clearing of old growth trees such as Georgina Gidgee, Ironwood, River Red Gums, Bloodwood, Corkwood, Ghost Gums, and Wild Orange (*Capparis mitchelli*) should be avoided wherever possible based on their ecological value.

A weed management strategy should be developed to manage the existing weed populations and prevent the introduction of new weeds into the area. Buffel grass will require control to reduce wildfire hazard and the Ruby Dock population should be controlled following suitable late-summer rainfall.

Regular monitoring for evidence of occupation by threatened species such as the Rainbow Bee-eater, the Black-footed Rock Wallaby, and the Mulgara should take place to identify whether these species enter or recolonise habitats in the mine lease area. Disturbance to the habitats of these species should also be avoided.

Fencing off the mine lease area to exclude cattle will improve the rehabilitation and maintenance of the natural features within the mine lease area by reducing soil erosion and improving vegetation health.

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10 REFERENCES

Albrecht, D., Duguid, A.W., Latz, P.K., Coulson, H. and Barritt, M.J. (1997) Vascular Plant Checklist for the Southern Bioregions of the Northern Territory: Nomenclature, Distribution and Conservation Status. Parks and Wildlife Commission of the Northern Territory, Alice Springs.

Baxter, J (2003a) Notice of Intent to Mine Harts Range Garnet Project, Northern Territory. Unpublished document.

Baxter, J. (2003b) Olympia Resources LTD Harts Range Garnetblende Project Mining Management Plan (MMP)

Bird Usage of Tailings Storage Facilities Coordinating Group (1998) Best Practice Guidelines-reducing impacts of tailings storage facilities on avian wildlife in the Northern Territory, Australia.

Environmental Protection and Biodiversity Conservation (EPBC) Act, 1999.

Web Site: www.ea.gov.au/epbc

Fawcett, M. (1998) Molyhill Site Assessment Report, July 1998. Fawcett Mine Rehabilitation Services, Pty. Ltd.

Hunt, N. and Gilkes, Bob. 1992. Farm Monitoring Handbook; A practical down to earth manual for farmers and other land users. Publication by The University of Western Australia.

Leane T, Reilly T and Low WA. (2004) Environmental Assessment of Molyhil Molybdenum Project Within ML (A) 23825 . Prepared for Tennant Creek Gold P/L by Low Ecological Services Pty Ltd.

Leane T, Reilly T and Low WA. (2005a) Molyhil Saline Water Discharge Report for DIPE. Prepared for Tennant Creek Gold P/L by Low Ecological Services Pty Ltd.

Leane T, Reilly T and Low WA. (2005b) Recommendations For Inclusion In Mining Management Plan For Molyhil Molybdenum Project Within ML(A) 23825. Prepared for Tennant Creek Gold P/L by Low Ecological Services Pty Ltd.

Low WA., Leane T, and Reilly T. (2006) Environmental Assessment of Molyhil Molybdenum Project Within ML (A) 23825 - Update to 2005 . Prepared for Thor Mining P/L by Low Ecological Services Pty Ltd.

Low, W.A. and Strong, B. (1985) Resource Appraisal of Jervois Station Pastoral Leases 813. Report prepared for the Conservation Commission of Northern Territory, Alice Springs.

Menkhorst, P.W. and Knight, F. (2004) A field guide to mammals of Australia, 2nd Ed. *Oxford University Press*, Melbourne.

Moon, E., Vinter, A. and Low, W.A. (2006)a, Environmental Assessment Recommendations for the Molyhil Molybdenum Project Within ML (A) 23825. Prepared for Thor Mining P/L by Low Ecological Services Pty Ltd.

Moon, E., Newsome, T. and Low, W.A. (2006)c, Environmental monitoring of impacts from the 2004 hypersaline water discharge, and potential acid drainage at Molyhil Molybdenum Project Within ML (A) 23825. Prepared for Thor Mining P/L by Low Ecological Services Pty Ltd.

Smith, K.G. 1963. Huckitta, N.T. Sheet SF/53 – 11, 1:250 000 Geological Series – Explanatory Notes. Dept of National Development, Bur. Min Res., Geology and Geophysics, Govt Printer, Canberra.

Strahler, A. and Strahler, A. (2000) *Introducing Physical Geography*, John Wiley and Sons Inc, United States of America.

Paltridge, R. and McAlpin, S. (2002) *A Guide to Rare and Threatened Animals in Central Australia*. WWF, Sydney.

Perry, R.A., Mabbutt, J.A., Litchfield, W.H. and Quinlan, T. (1962) *Land Systems of the Alice Springs Area, Northern Territory, Australia*. CSIRO, Canberra.

Slayter, R.O. (1962) *Climate of the Alice Springs Area. Part III* in Perry et al. 1962. q.v.

Strong, B.W. (1987) *Checklist of Preferred Common Names of Plants of the Northern Territory*. Conservation Commission of the Northern Territory, Alice Springs.

Walker, J. and Hopkins, M.S. (1984) *Vegetation*. In: *Australian Soil and Land Survey Field Handbook* (McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. and Hopkins, M.S.), Inkata Press, Melbourne.

11 APPENDICES

11.1 APPENDIX 1 - Plant list for survey sites and points of interest Surveys 1 (2004) and 4 (2006/7)

(Nomenclature follows Albrecht *et al.* (1997) or Australian Plant Name Index (www.anbg.gov.au); * indicates introduced to southern region of Northern Territory (Albrecht *et al.* 1997), common names according to Strong, 1987)

Species Name	Common Name	Survey 1 (Oct 2004)									Survey 2 (Dec/Jan 2006/7)							
		1	2	3	4	5	6	Pit	Dam	WRD	7	8	9	10	11	12	13	Airstrip
<i>Acacia aneura</i>	Mulga			*	*	*	*										*	
<i>Acacia estrophiolata</i>	Ironwood	*	*	*	*		*	*		*	*	*	*	*	*	*		*
<i>Acacia farnesiana</i>	Mimosa bush	*	*		*		*		*	*		*		*	*			*
<i>Acacia georginae</i>	Gidgee	*	*	*	*	*	*	*	*	*	*			*	*	*		*
<i>Acacia kempeana</i>	Witchetty Bush										*		*		*	*	*	
<i>Acacia ligulata</i>	Umbrella bush									*		*			*			
<i>Acacia spondylophylla</i>	Curry Wattle																*	
<i>Acacia stowardii</i>	Bastard Mulga			*	*	*		*										
<i>Acacia tetragonophylla</i>	Dead Finish					*		*	*							*	*	
<i>Acacia victoriae</i>	Victory Wattle						*			*								
<i>Acetosa vesicaria</i> *	Ruby Dock			*				*		*								
<i>Aloe vera</i> *			*															
<i>Amyema quandang</i>	Grey Mistletoe			*		*		*										
<i>Aristida contorta</i>	Bunched Kerosene grass				*		*	*		*								
<i>Aristida holathera</i>	Erect Kerosene grass									*								
<i>Aristida strigosa</i>	Rough Threeawn						*			*								
<i>Atalaya hemiglauca</i>	Whitewood	*				*	*			*								
<i>Atriplex elachophylla</i>		*	*		*		*										*	
<i>Calotis hispidula</i>	Bogan flea	*	*	*	*	*	*											
<i>Carissa lanceolata</i>	Conkerberry											*						
<i>Cenchrus ciliaris</i> *	Buffel grass	*	*	*	*	*	*	*	*	*	*			*	*	*		*
<i>Capparis lasiantha</i>	Nipan											*						
<i>Capparis loranthifolia</i>	Narrow-leaf Bumble										*							
<i>Capparis mitchelli</i>	Wild Orange		*		*									*				*
<i>Capparis spinosa</i> var. <i>numularia</i>	Wild Passion fruit					*			*					*				
<i>Capparis umbonata</i>	Northern Wild Orange														*			
<i>Cheilanthes lasiophylla</i>	Wooly Cloak fern			*		*												
<i>Chrysopogon fallax</i>	Golden Beard Grass												*					
<i>Citrullus colocynth</i> *	Colocynth melon							*		*								
<i>Cleome viscosa</i>	Tickweed							*		*								
<i>Corymbia aparrrerinja</i>	Ghost Gum		*		*								*			*	*	*
<i>Corymbia opaca</i>	Bloodwood		*	*	*						*	*			*	*	*	
<i>Cymbopogon obtectus</i>	Silkyheads					*		*		*								
<i>Dodanea viscosa</i>	Sticky hopbush						*									*		
<i>Enneapogon polyphyllus</i>	Leafy Nineawn	*		*		*	*	*		*								
<i>Enneapogon</i> sp.										*								
<i>Enteropogon accicularis</i>	Curly Windmill grass	*				*				*								

Appendix 1 cont.

Species Name	Common Name	Survey 1 (Oct 2004)									Survey 2 (Dec/Jan 2006/7)							
		1	2	3	4	5	6	Pit	Dam	WRD	7	8	9	10	11	12	13	Airstrip
<i>Eragrostis eriopoda</i>	Woollybutt grass	*	*				*						*					
<i>Eragrostis setifolia</i>	Narrow-leaf Neverfail							*										
<i>Eremophila christophori</i>	Christopher's Desert Fuchsia											*	*					
<i>Eremophila freelingii</i>	Rock Fuschia bush			*		*						*	*					
<i>Eremophila latrobei</i>	Native Fuschia			*	*	*	*					*		*				
<i>Eremophila longifolia</i>	Weeping Emu Bush								*									
<i>Eriachne mucronata</i>	Mountain Wanderrie					*												
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass												*					
<i>Eucalyptus camaldulensis</i>	River Red gum		*		*				*					*				
<i>Eucalyptus coolabah ssp. arida</i>	Coolibah		*															
<i>Eucalyptus gamophylla</i>	Blue Mallee																*	
<i>Eucalyptus intertexta</i>	Bastard Coolibah			*														
<i>Eulalia aurea</i>		*					*											
<i>Euphorbia drummondii</i>	Caustic Weed		*		*					*								
<i>Fimbristylis dichotoma</i>	Eight day Grass															*		
<i>Fimbristylis sp.</i>		*	*		*		*											
<i>Gnephosis skirrophora</i>	Woolly Yellow-heads						*											
<i>Grevillia striata</i>	Beefwood	*			*	*	*			*						*		
<i>Hakea divaricata</i>	Forked-leaved Corkwood											*				*		*
<i>Hakea lorea</i>	Long-leaved Corkwood			*	*	*	*					*				*		
<i>Haloragis uncatipila</i>															*			
<i>Indigofera leucotricha</i>	White Indigo																*	
<i>Lepidium phlebopetalum</i>	Veined Peppergrass			*		*	*											
<i>Lysiana exocarpi</i>	Harlequin Mistletoe												*	*		*		
<i>Maireana sp.</i>						*							*					
<i>Malvastrum spicatum</i>										*								
<i>Prostanthera striatiflora</i>	Striped Mintbush					*												
<i>Ptilotus obovatus</i>	Silvertails					*		*		*		*						
<i>Ptilotus macrocephalus</i>	Large Green Pushtail			*														
<i>Rhodanthe floribunda</i>	White Paper Daisy		*	*	*	*	*											
<i>Rhagodia eremea</i>					*	*							*					
<i>Salsola tragus</i>	Prickly Saltwort	*	*	*	*	*	*	*	*	*								
<i>Sclerolaena convexula</i>	Tall Copper Burr												*					
<i>Sclerolaena costata</i>						*												
<i>Sclerolaena cornishiana</i>	Cartwheel burr				*		*	*		*								*
<i>Senna artemisioides ssp. artemisioides</i>	Cassia				*							*	*	*				
<i>Senna artemisioides ssp. filifolia</i>	Cassia	*	*				*					*	*	*	*	*	*	*
<i>Senna artemisioides ssp. helmsii</i>	Cassia			*	*	*	*			*		*	*				*	
<i>Senna artemisioides ssp. nemophila</i>	Cassia						*											
<i>Senna artemisioides ssp. oligophylla</i>	Cassia	*		*	*	*	*		*	*		*			*	*	*	*
<i>Senna artemisioides ssp. quadrifolia</i>												*		*				
<i>Senna artemisioides ssp. sturtii</i>	Cassia															*		

Appendix 1 cont.

		Survey 1 (Oct 2004)									Survey 2 (Dec/Jan 2006/7)								
Species Name	Common Name	1	2	3	4	5	6	Pit	Dam	WRD	7	8	9	10	11	12	13	Airstrip	
<i>Senna glutinosa</i>						*													
<i>Senna notabilis</i>	Cockroach bush									*									
<i>Senna pleurocarpa</i>	Chocolate Cassia						*												
<i>Sida sp.</i>				*		*				*			*						
<i>Solanum ellipticum</i>	Potato bush	*																	
<i>Solanum quadriloculatum</i>	Wild Tomato					*	*			*									
<i>Solanum sp.</i>			*	*									*						
<i>Stenopetalum sp.</i>						*													
<i>Themeda triandra</i>	Kangaroo Grass	*																	
<i>Tribulus angustifolia</i>			*																
<i>Trichodesma zeylanicum</i>	Cattle bush							*											
<i>Triodia basedowii</i>	Lobed Spinifex			*							*	*					*		
<i>Triodia pungens</i>	Gummy Spinifex												*				*		
<i>Triraphis mollis</i>	Purple Plume Grass							*		*									
<i>Ventilago viminalis</i>	Supplejack									*									
<i>Zygochloa paradoxa</i>	Sandhill Canegrass	*	*	*			*			*									
95		19	21	25	25	32	31	18	9	31	14	15	17	9	11	16	13	10	

11.2 APPENDIX 2: Mammal and reptile species recorded within the proposed Molyhil mine lease area and close surrounds.

Mammals		Survey 1 (October 2004)										Survey 2 (December/January 2006/7)									
Species Name	Common Name	1	2	3	4	5	6	Pit	Dam	Other	Evidence	7	8	9	10	11	12	13	Pit	Evidence	
<i>Canis familiaris</i>	Dingo							*			tracks, scull	*		*						Tracks	
<i>Felis catus</i>	Cat			*							track										
<i>Macropus robustus</i>	Euro					*		*		*	droppings & carcasses		*							Droppings	
<i>Macropus rufus</i>	Red Kangaroo				*		*		*	*	carcass, sightings				*		4			tracks, sightings	
<i>Petrogale lateralis</i>	Black-footed Rock-Wallaby									*	Very old droppings										
<i>Mus musculus</i>	Mouse	1	1			1	1				capture				1	1				capture	
<i>Oryctolagus cuniculus</i>	Rabbit	*	*								scats										
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse											2	1		1	2		1		capture	
<i>Sminthopsis macroura</i>	Striped-face dunnart																	1		capture	
Total no. mammal species (exc. bats) per site:		2	2	1	1	2	2	2	1	3		2	2	1	3	2	1	1			

Bats Species Recorded by ANABAT		Dates and Sites of Recordings		
Species Name	Common Name	6/12/2006	8/12/2006	31/12/2006
		Site 8	Site 9	Site 13
<i>Vespadelus finlaysoni</i>	Little Brown Bat	*		
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	*		
<i>Chalinolobus gouldii</i>	Goulds Wattled Bat	*	*	*
<i>Scotorepens greyii</i>	Little Broad-nosed Bat	*		*
<i>Taphozous flaviventris</i>	Yellow-bellied Sheath-tail Bat	*		*
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	*	*	*

Mormopterus sp.	Mastiff Bat							*		*												
Reptiles		Survey 1 (October 2004)											Survey 2 (December/January 2006/7)									
Species Name	Common Name	1	2	3	4	5	6	Pit	Dam	Other	Evidence	7	8	9	10	11	12	13	Pit	Evidence		
Amphibolurus gilbertii	Gilbert's Dragon				1						sighting											
Amphibolurus longirostris	Long-nosed Dragon		1	1	2					*	sighting						1			sighting		
Ctenotus alacer	Lively Ctenotus					1					sighting											
Ctenotus helenae																		1		sighting		
Ctenotus leonhardii	Leonhardi's ctenotus																3	1		capture & sighting		
Ctenotus pantherinus	Leopard Skink											1	1							capture		
Ctenotus saxatilis	Rock Ctenotus												1							capture		
Ctenotus schomburgkii	Schomburgk's Ctenotus					1					sighting											
Diplodactylus conspicillatus	Fat-tailed Gecko													1						capture		
Diplodactylus stenodactylus	Sand-plain Gecko				1						capture						1			capture		
Egernia striata	Night Skink		1								sighting											
Furina ornata	Orange-naped Snake													2						capture		
Gehyra variegata	Variegated Gecko		1		1					2	capture		1		2	1				capture		
Heteronotia binoei	Bynoe's Gecko														1		1			capture		
Menetia greyii														1						capture		
Morethia ruficauda	Fire Tailed Skink						1				sighting	1								sighting		
Rhybchoedura ornata	Beaked Gecko											1	2				3			capture		
Strophurus ciliaris	Northern Spiny-tailed Gecko																	1		capture		
Tiliqua multifasciata	Centralian Blue-tongue																	1		capture		
Varanus giganteus	Perentie							1							1				1	sighting & fresh tracks		
Total no. reptile species per site:		0	3	1	4	2	1	1	0	2		2	4	3	2	1	5	4	1			

11.3 APPENDIX 3: Bird species recorded within the proposed Molyhil mine lease area and close surrounds.

Common Name	Survey 1 (October 2004)								Survey 2 (December/January 2006/7)									
	1	2	3	4	5	6	Pit	Dam	7	8	9	10	11	12	13	Pit	Dam	Airstrip
Australian Owllet-nightjar																*		
Azure Kingfisher										*								
Grey Teal								*									*	
Richard's Pipit														*				
Southern Whiteface														*				
Banded Whiteface																*		
Black-faced Woodswallow	*			*		*	*		*	*	*	*						
Masked Woodswallow												*		*	*	*		
Australian Ringneck										*		*				*		
Major Mitchell's Cockatoo	*																	
Galah	*			*	*			*					*			*		
Little Corella	*		*		*													
Black Honeyeater									*				*					
Pied Honeyeater														*				
Grey Shrike-thrush										*								
Black-faced Cuckoo-shrike				*	*	*	*							*	*	*		
Little Crow	*		*	*									*	*		*	*	
Pallid Cuckoo			*															
Mistletoebird													*	*				
White-faced Heron				*														
Brown Falcon	*	*	*														*	
Spinifex Pigeon							*	*		*							*	
Magpie-lark	*			*		*		*		*								
White Winged Thriller			*											*				
Grey-headed Honeyeater						*										*		
White-plumed Honeyeater	*	*	*						*	*		*	*			*		
Singing Honeyeater														*	*	*		
Brown Honeyeater	*																	
Fairywren									*									
Yellow-throated Miner	*		*			*									*	*		
Hooded Robin	*					*												
Yellow Fronted Honey Eater																		
Budgerigah				*			*	*										
Rainbow Bee-eater				*		*					*	*	*			*		
Jackie Winter						*												
Crested Pigeon				*			*	*				*	*	*		*		
Crested Bellbird	*		*			*					*	*	*	*	*	*		
Rufous Whistler	*																	
Red-Browed Pardalote						*					*	*	*		*	*		
Fairy Martin										*								
Bronzewing					*										*			
Grey-crowned Babbler			*										*	*				
Willie Wagtail	*		*			*	*	*	*		*	*		*				
Australasian Grebe								*										
Zebra Finch	*	*		*	*	*	*	*	*			*	*	*		*		
Red-backed Kingfisher										*		*						
Little Button-quail															*			
Banded Lapwing																		*
Total =	15	3	10	10	5	12	7	9	6	9	5	11	11	14	8	16	4	1

11.4 Appendix 4: GPS co-ordinates for fauna and flora sites surveyed within the proposed Molyhil mine lease area and close surrounds (2004-2007).

Note: elevation is only approximate, generally within 5 – 10 m accuracy.

Location	Easting	Northing	Elev. (m)	Location in lease, land form	
Survey 1: 2004					
Trap Line 1	576000	7482646	413	South end, Molyhil Creek	
	576065	7482817	416	North end, Gidgee woodland	
Trap Line 2	576192	7482948	430	East end, Molyhil	
	575981	7482819	414	West end, Pit trap Hill	
Trap Line 3	575850	7482735	411	SE end in Old residential area	
	575672	7482764	408	NW end on fenceline	
Trap Line 4	576543	7482798	412	North end up creek	
	576599	7482582	408	South end down creek	
Trap Line 5	576791	7483194	451	North end, Hill top	
	576777	7482945	415	South end, pediplain	
Trap Line 6	577136	7482651	411	West end in Gidgee woodland	
	577484	7482685	411	East end Gidgee woodland	
Survey 4: 2006/7 (coordinates of pitfall traps provided)					
Trap Line 7	P1	582030	7485572	399	Bore TMRC039, Gidgee riparian
	P2	581983	7485526	409	Bore TMRC039, Spinifex hillslope
Trap Line 8	P1	583015	7484903	403	Bore TMRC041, bottom spinifex hillslope
	P2	583026	7484942	405	Bore TMRC041, hill top
Trap Line 9	P1	580332	7487106	415	Bore TMRC038, Flat Ironwood woodland
	P2	580449	7487204	412	Bore TMRC038, Flat Ironwood woodland
Trap Line 10	P1	576113	7482784	411	Old Camp Site, west end, Gidgee woodland
	P2	575985	7482841	411	Old Camp Site, east end, Gidgee woodland
Trap Line 11	P1	576428	7483025	416	Rehabilitated tailings dam, West end
	P2	576603	7483017	408	East end, "Dam Creek"
Trap Line 12	P1	577385	7482721	411	Proposed tailings dam, west end, Gidgee/Ironwood woodland
	P2	577469	7482649	411	Proposed tailings dam, east end, Gidgee/Ironwood woodland
Trap Line 13	P1	577703	7481969	412	Proposed Camp Site, Wichetty Bush/Mallee woodland
	P2	577773	7482041	416	Proposed Camp Site, Spinifex hilltop.

11.5 APPENDIX 5 – Landscape assessment of existing haul road at the Molyhil Mine Lease.

Summary table of land systems, rivers and distances from Molyhil mine site to the Plenty Highway along the North-South Haul Road, surveyed in October 2004.

Distance from MH	Description	Land System	Soil	Vegetation		Layer	Comment
0	Molly Hill	Dinkum	Red Clayey sand	<i>Acacia georginae</i>	Gidgee	Dominant, upper layer	Gidgee Open Woodland
		Dinkum	Red Clayey sand	<i>Acacia estrophiolata</i>	Ironwood	Co-dominant, upper layer	Gidgee Open woodland interspersed with Ironwood-Witchetty
5.5	Intersect E-W Road			<i>Acacia kempeana</i>	Witchetty bush	Co-ominant, tall shrub layer	
6.3	Dam with diversion bank			<i>Grevillia striata</i>	Beefwood	consistently scattered upper layer	Adjacent gidgee woodland
				<i>Santalum lanceolatum</i>	Wild plum	consistently scattered upper layer	
				<i>Hakea divaricata</i>	Fork-leafed Corkwood	consistently scattered upper layer	
7.1	Road Jctn			<i>Capparis mitchelli</i> <i>Acacia estrophiolata</i>	Wild Orange Ironwood	consistently scattered upper layer	Open ironwood woodland adjacent Moly Ck
9.5		Sandover	coarse textured	<i>Zygochloa paradoxa</i>	Sandhill Canegrass	Dominant, grass layer	Sparse Gidgees over canegrass
9. 10.9	Marshall Bore			<i>Acacia georginae</i>	Gidgee	Dominant but sparse	Proposed turn-off for CLC proposed haul road.
11.2	Marshall River		Coarse sands/gravel				
		Singleton	red sand	<i>Eucalyptus gamophylla</i>	Blue Mallee	Dominant, but sparse upper layer	Sparse Mallee over spinifex
				<i>Triodia sp.</i>	Spinifex	Dominant in grass layer	
				<i>Corymbia papuana</i>	Ghost Gum	consistently scattered upper layer	
12.5				<i>Acacia aneura</i>	Mulga	Co-dominant in upper layer	Mulga-Malle patch over spinifex, will be slippery in wet and may need upgrading for all-weather access
13		Singleton	red sand	<i>Eucalyptus gamophylla</i>	Blue Mallee	Dominant, but sparse upper layer	dominant on sand ridges
				<i>Triodia sp.</i>	Spinifex	Dominant in grass layer	
				<i>Acacia estrophiolata</i>	Ironwood	Co-dominant, upper layer	dominant in swale
				<i>Acacia kempeana</i>	Witchetty bush	Co-ominant, tall shrub layer	
21.5	Plenty River	Sandover	Coarse sands/gravel				
		Dinkum	Red Clayey sand	<i>Acacia estrophiolata</i>	Ironwood	dominant	Ironwood woodland merging to Witchetty over shortgrass
25.4	Plenty Hwy			<i>Acacia kempeana</i>	Witchetty bush	dominant	

PLATES

11.6 Flora and fauna survey sites

Survey 1 (2004)



Plate 1: View from Molyhil over the previous tailings dam area to the pit in the backcentre of photo. Jinka Land System represented by hills at left, Dinkum LS by gidgee plains. Large cleared areas remain in the mine lease area. Photo taken 8/10/04 before site declared off limits and fenced. (L04/10/4-24A)



Plate 2: Trap line 1 (2004) began in Molyhil Creek riparian habitat dominated by River Red Gums (*Eucalyptus camuldulensis*), Buffel Grass (*Cenchrus ciliaris*) and Mimosa bush (*Acacia farnesiana*) and extended into the adjacent Gidgee (*Acacia georginae*) woodland. (8/10/04, L04/10/4-21)

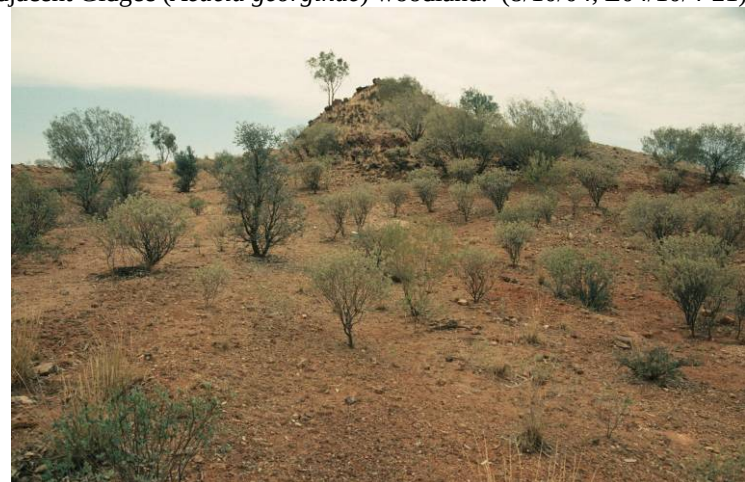


Plate 3: Trap line 2 (2004) was located on a ridge running between Molyhil (background) and a hill to the south east (foreground). Vegetation was dominated by Gidgee (*Acacia georginae*) and Cassia bushes (*Senna artemisioides*). (8/10/04, L04/10/3-8)



Plate 4: Trap line 3 (2004) included some riparian habitat on Molyhil creek and the old residential area (pictured above). The residential area was located in Gidgee (*Acacia georginae*) woodland with a grazed understorey of various grasses dominated by Buffel Grass. (8/10/04, L04/10/3-12)



Plate 5: Trap line 4 (2004). Photo shows Gidgee trees (*Acacia georginae*), in the sandy floodout plain to the south of the pit killed by saline pit water discharged from two points on the sandy floodout area. 25 mature Gidgee tree mortalities were counted. (7/10/04, L04/10/2-20A).



Plate 6: Trap line 5 (2004) was located on a rocky hill north of the pit within the Jinka land system. Vegetation consisted of Cassia bushes (*Senna artemisioides*), Gidgees (*Acacia georginae*) on the upper slope and Mulga (*Acacia aneura*) at the bottom. (7/10/04, L04/10/1-16)



Plate 7: Trap line 6 (2004) was located in Gidgee (*Acacia georginae*) woodland (Dinkum LS) on the eastern extent of the mine lease. (7/10/04, L04/10/2-4)

Survey 4 (2006/7)

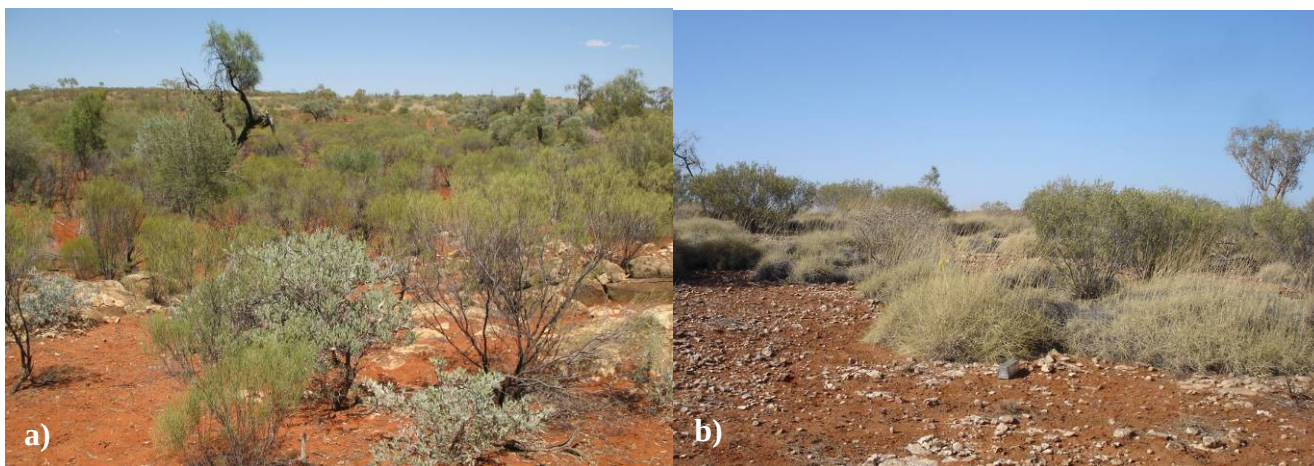


Plate 8a-b: Trap line 7 was located within riparian Gidgee (*Acacia georginae*) woodland and *Senna* sp. shrubland (Hann LS) approximately 5.5 km north-east of the pit within the western arm of the Borefields. a) perspective south over Gidgee and *Senna* sp. shrubland; b) perspective south-west over Ironwood (*A. estrophiolata*) woodland and spinifex (*Triodia basedowii*) grassland (7/12/06: IMG_1215 & IMG_1217).

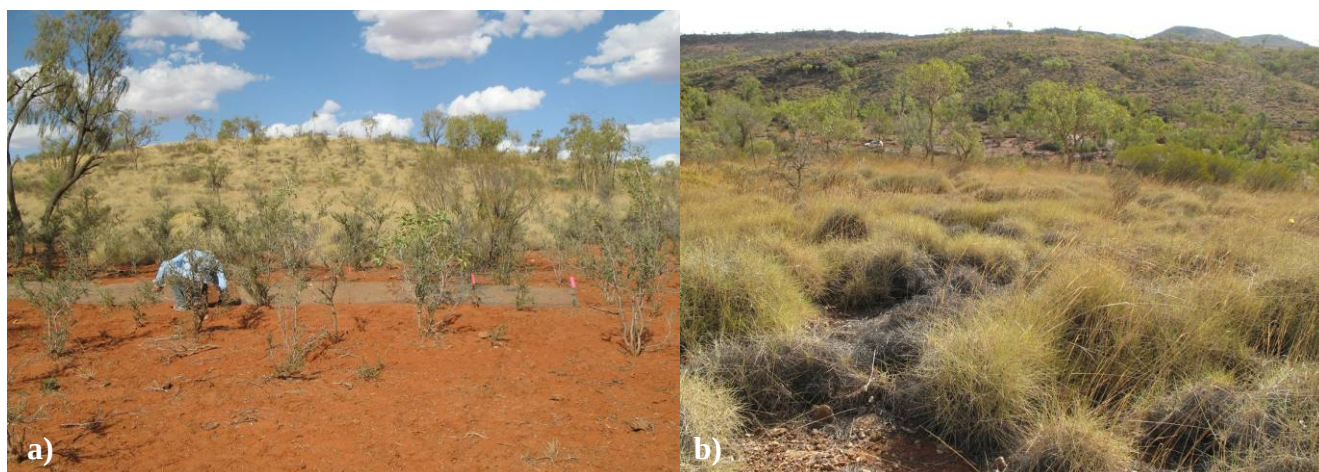


Plate 9a-b: Trap line 8 was located along the slope of a spinifex (*Triodia basedowii*) foothill (Hann LS) approximately 6 km north-east of the pit within the eastern arm of the Borefields. a) perspective east over pitfall line 1 b) perspective east down calcrete rocky hill (8/12/06: IMG_1219 & IMG_1222).



Plate 10a-b: Examples of fauna captured at the above sites; a) mature Leopard Skink (*Ctenotus pantherinus*) captured Site 7 b) mature Rock Ctenotus (*Ctenotus saxatilis*), Site 8 (8/12/06: DSC03702)





Plate 11: Trap line 9 was located within open Ironwood (*Acacia estrophilolata*) woodland and sparse Witchetty Bush (*Acacia kempeana*) and *Senna* sp. shrubland (Hann LS) on the north eastern extent of the mine lease within the western arm of the Borefields (8/12/06: IMG_1225).

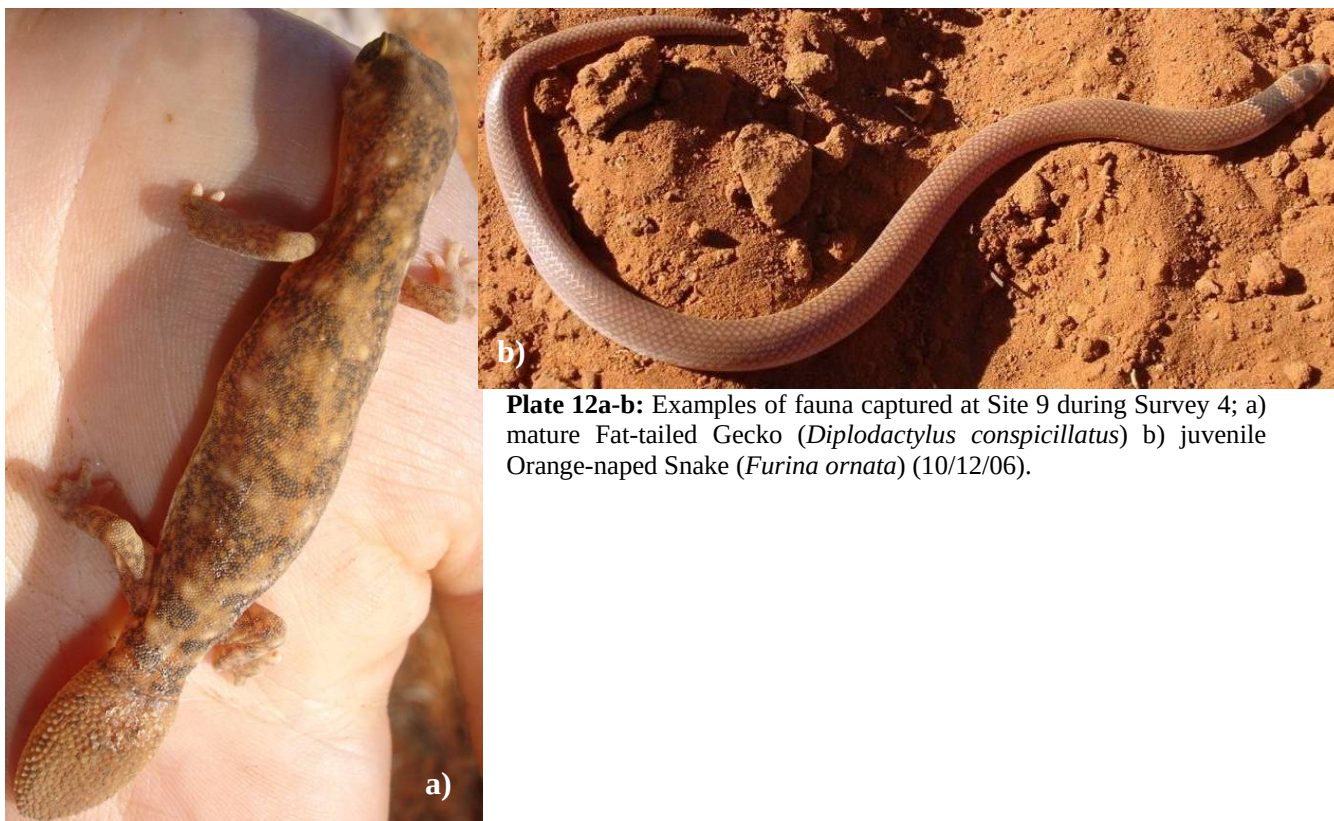


Plate 12a-b: Examples of fauna captured at Site 9 during Survey 4; a) mature Fat-tailed Gecko (*Diplodactylus conspicillatus*) b) juvenile Orange-naped Snake (*Furina ornata*) (10/12/06).



Plate 13a-b: Trap line 10 was located within the old residential camp and replicates Site 3 from Survey 1 (2004). The residential area was located in Gidgee (*Acacia georginae*) woodland with a grazed understorey of various grasses dominated by Buffel Grass. a) perspective east; b) perspective west (9/12/06: IMG_1293 & IMG_1292).



Plate 14a-c: Examples of fauna captured at Site 10, the former residential camp site; a) adult Bynoe's Gecko (*Heteronotia binoei*) b) male adult Sandy Inland Mouse (*Pseudomys hermannsburgensis*) c) Variegated Gecko (*Gehyra variegata*). Fauna remaining at disturbed sites appear to be species capable of adapting to a more disturbed or artificial environment.

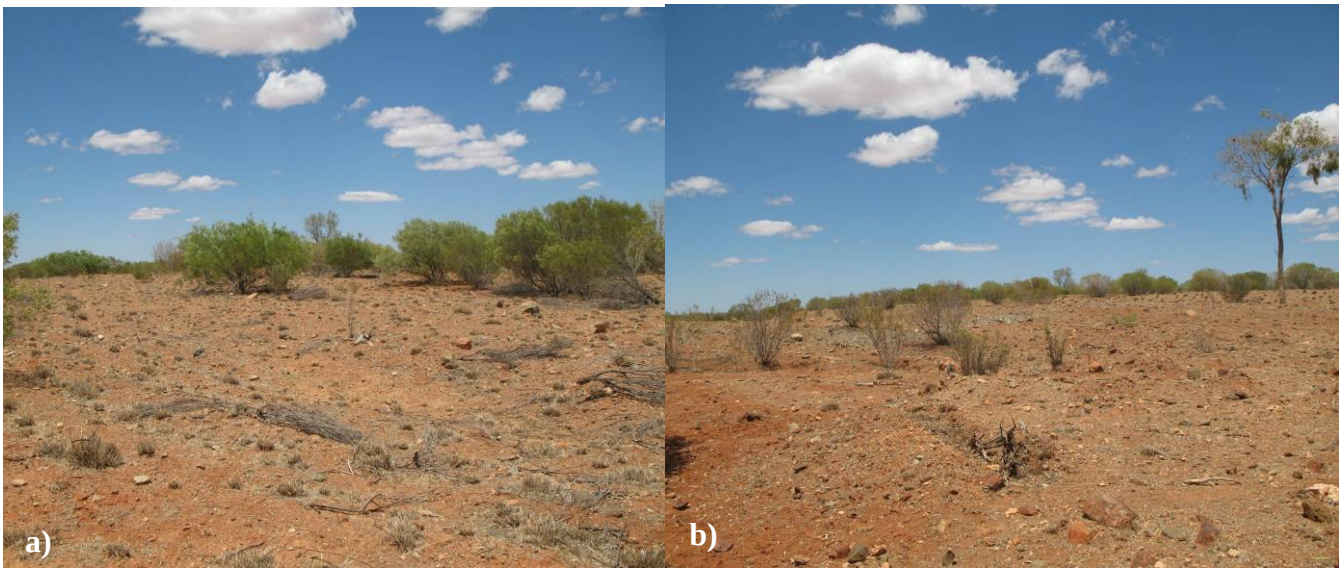


Plate 15a-b: Trap line 11 was located along the rehabilitated tailings storage facility and into Dam Creek at the east of the site. a) Perspective east over rehabilitated vegetation along the dam. This included several *Acacia* sp. which appeared healthy along with a rapid growth rate (i.e. these Acacias are eight years old). There are scattered shrubs that did not survive, which indicates a low mortality of species. Grasses are dominated by Buffel Grass, an introduced species with pastoral benefits and conservation detriments; b) perspective west towards rehabilitated tailings dam from Dam Creek. Earth has been reworked revealing scattered rocks. Vegetation is sparse with scattered Ironwoods (*A. estrophiolata*) and heavily grazed Buffel Grass (8/12/06: IMG_1266 & IMG_1267).



Plate 16: Perspective east over rehabilitated tailings storage facility taken during Survey 1, 2004. Flora continues to show strong growth with minimal mortalities in December 2006 despite long drought conditions (7/10/04).



Plate 17: Molyhil dam photographed October 2004. Molyhil dam to the north of the mine lease is highly used by cattle with consequent heavy use of the surrounding area. There is some possibility of dam water being used for mining purposes if the area was fenced and an acceptable water quality could be attained. (8/10/04, L04/10/4-18)



Plate 18: Molyhil dam photographed in January 2007. The station owner had recently excavated, removing up to 1200m³ of silt from the dam. The dam has been fenced off to cattle and a small 0.5m deep dam has been constructed against the southern wall and is fed by pump from the main dam (1/1/07: IMG_1638).



Plate 19: Trap line 12 marks the location of the proposed tailings storage facility. It was located within an open Gidgee (*Acacia georginae*) and Ironwood (*A. estrophiolata*) plain. Ground cover is dominated by heavily grazed Buffel grass and an annual sedge, Eight Day Grass (*Fimbristylis dichotoma*), which was triggered by recent rains (30/12/06; IMG_1606 & IMG_1607).



Plate 20a-d: Examples of fauna captured at Site 12, the selected site for the proposed tailings storage facility a) Beaked Gecko (*Rhynchoedura ornata*), b) large scorpion (*Urodachus yaschenkoi*), c) Long-nosed Dragon (*Amphibolurus longirostris*) and d) Sand-plain Gecko (*Diplodactylus stenodactylus*).

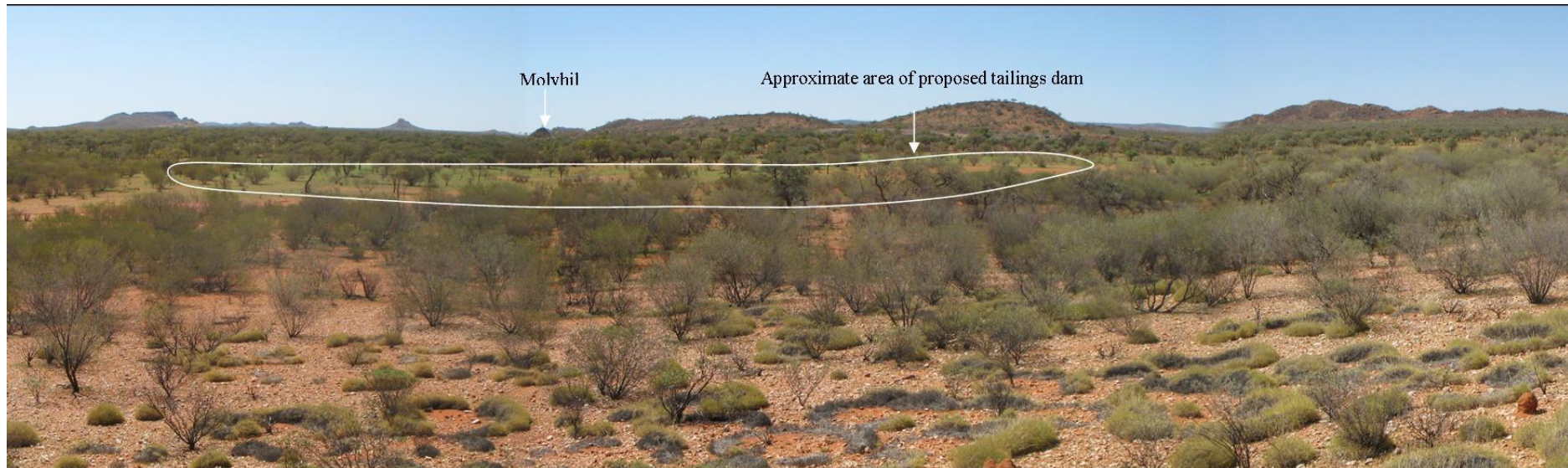


Plate 21: Approximate area of proposed tailings dam. Photograph faces northwest (30/12/06: IMG_1547-1549).



Plate 22: Perspective southeast over proposed tailings storage facility. The site contains open Woodland dominated by sparse Witchetty Bush (*A. kempeana*) and scattered mature Ironwoods (*A. estrophiolata*), Ghost Gums (*Corymbia aparrerinja*) and Gidgee (to the west of the site). The proposed site contains traditional economically useful trees which may require Traditional Owner approval for removal. These include up to 15 Ghost Gums, between 5-10 Bloodwood (*Corymbia opaca*) and up to 100 Gidgee. Note two Gidgee patches shown here contain trees of significant size (30/12/06: IMG_1605-1608).



Plate 23a-b: Trap line 13 marks the site for the proposed residential camp, 1 km south-east of the pit. It was located on the southern alluvial slope of a rocky foothill within a mallee (*Eucalyptus gamophylla*) and spinifex plain (*Triodia pungens* and *T. basedowii*); a) perspective east up rocky hill; b) perspective west along plain towards a north/south aligned creekline flanking the west of the site (30/12/06: IMG_1600 & IMG_1603).



Plate 24a-d: Examples of fauna captured at Site 13, the selected site for the proposed residential camp site; a) mature Northern Spiny-tailed Gecko (*Strophurus ciliaris*), b) juvenile female Sandy Inland Mouse (*Pseudomys hermannsburgensis*), c) mature Centralian Blue Tongue Lizard (*Tiliqua multifasciata*) and d) juvenile female Striped-face Dunnart (*Sminthopsis macroura*).



Plate 25a-c: Proposed area for the Haul Road, south of Moly Creek; a) perspective north, b) perspective south, c) perspective north (31/1/07: IMG_1661, 1664 & 1662).



Plate 26a-c: Perspective south along the proposed Haul road, north of Moly Creek (31/1/07: IMG_1624, 1629, 1628).

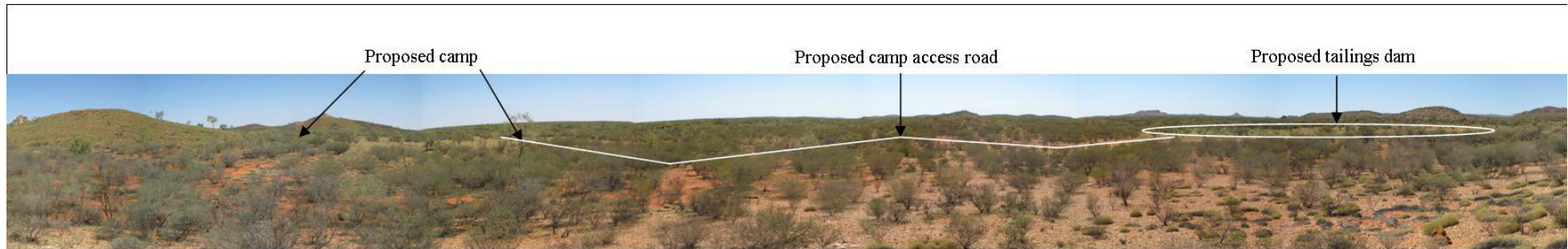


Plate 27: Perspective south over proposed camp site, access road and west to proposed tailings dam. Access road is approximately 600m between the proposed camp site and tailings dam (30/12/06: IMG_1547-1553).

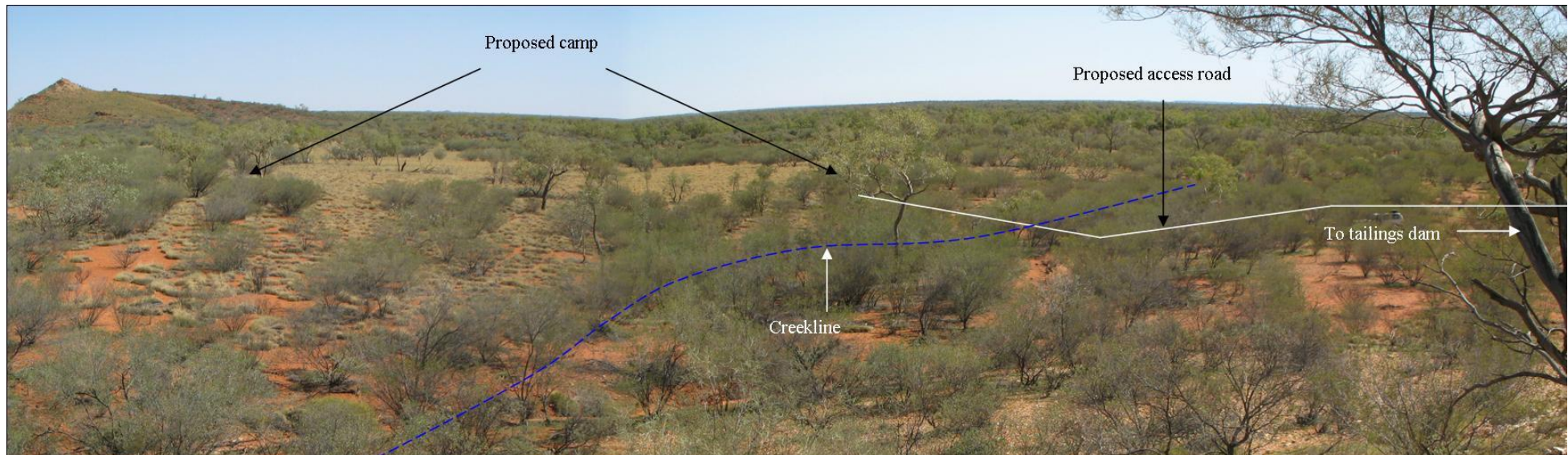


Plate 28: Perspective south-west over proposed camp access road. Proposed road travels between two calcrete rocky rises and over a creekline. The proposed camp access road is approximately 600m long (30/12/06: IMG_1553-1551).



Plate 29: Perspective south over proposed pit extension and waste rock dump. The proposed area contains an estimated 500 to 600 mature Gidgee trees (*Acacia georginae*) (1/1/07: IMG_1686-1689).

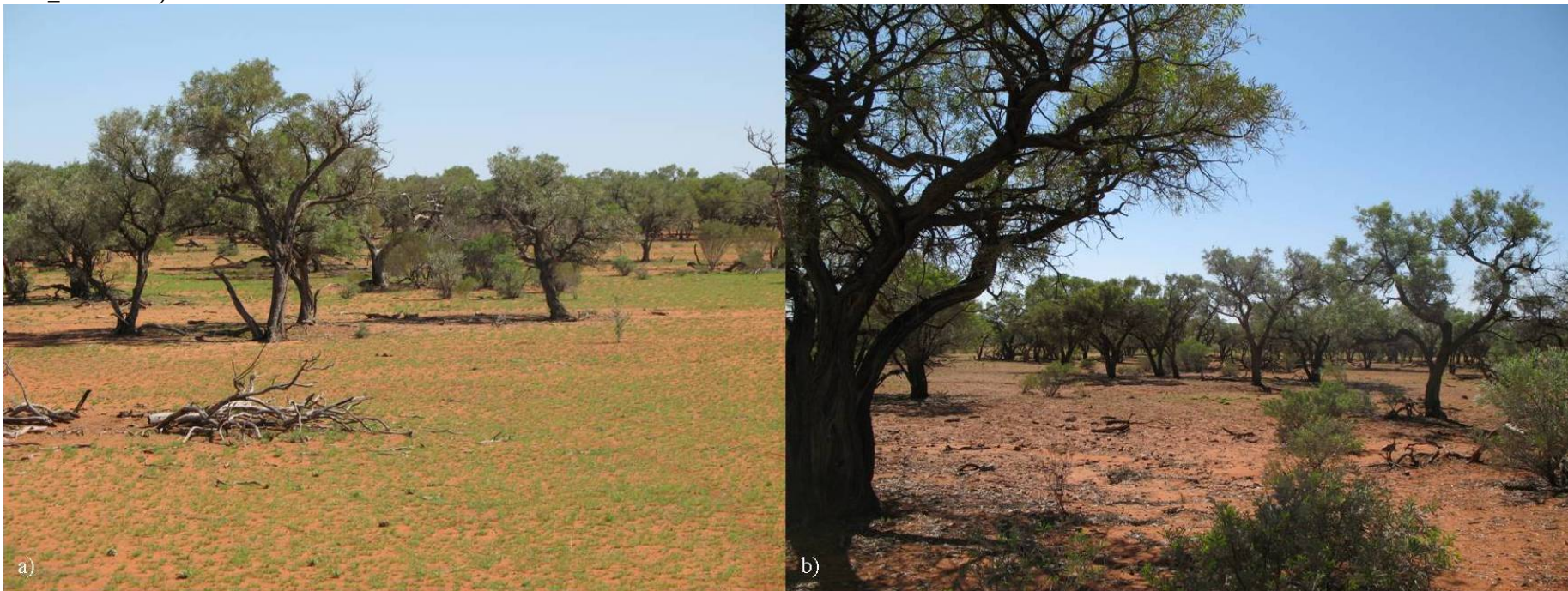


Plate 30a-b: Gidgee patch within the proposed waste rock dump; a) perspective north, b) perspective south (1/1/07: IMG_1696 & 1696).

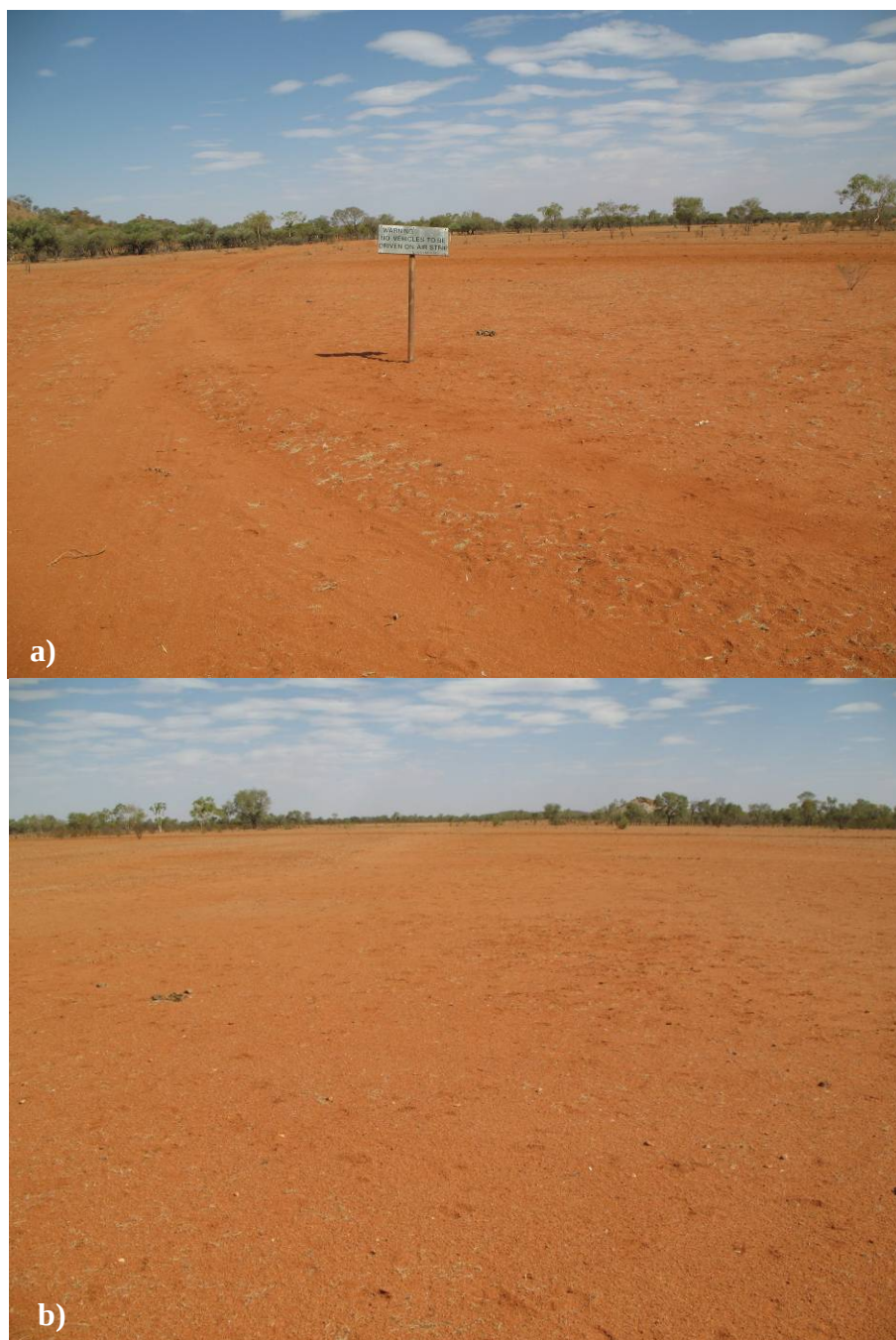


Plate 31a-b: Photographs of the airstrip probably constructed for the previous mining era in the 1970s/80s. The airstrip remains open and flat. Frequent cattle utilisation of the site restricts recruitment of shrubs and trees and continual wind blown sand abrasion inhibits plant growth. The airstrip contains a low density (<10% cover) of *Senna* shrubs (*Senna artemisioides* subsp. *filifolia* and subsp. *oligophylla*) with heavily grazed Buffel Grass and *Sclerolaena* sp. (<10% cover); a) perspective east showing previously used signage b) perspective south along former runway (7/12/06 IMG_1198 & IMG_1199).



Plate 32: Molyhil has a long mining history, both recent (Petrocarb Exploration, 1978-81) and historical mining such as this remaining pit which was hand mined (8/10/04, L04/10/4-14a).