APPENDIX S

Jawoyn Ecological Knowledge

CLIENTS | PEOPLE | PERFORMANCE

Vista Gold Australia Pty Ltd

Mt Todd Gold Project

Jawoyn Ecological Knowledge

June 2013

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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- *were limited to those specifically detailed in section 4 of this Report;*

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This report is not intended to be used as a foraging guide. Knowledge regarding plants and animals as food or medicine should not be taken verbatim.

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Figure Index

1. Summary and Conclusions

Vista Gold Australia Pty Ltd (Vista Gold) is proposing to re-establish and operate the Mt Todd Gold Mine, located approximately 55km north-west of Katherine, Northern Territory (NT).

The Mt Todd Gold Project (Project) will include the mining of gold from the existing Mt Todd Gold Mine - Batman Pit (previously mined and now in care and maintenance).

This report satisfies the requirements of the EIS Guidelines relating to discussion and recording of plants and animals of Aboriginal cultural significance.

A total of 126 plant, animal and fungi taxa were identified and discussed with accompanying Jawoyn knowledge recorded. These comprised:

- Sixty two animal taxa;
- Sixty three plant taxa from 31 families; and
- One fungus.

In contemporary times hunting and foraging methods have changed somewhat such that nowadays people hunt with guns and fishing lines rather than spears, throwing sticks and hand weaved line. Similarly there are many bush foods and medicines that are no longer eaten or administered. Despite this, the knowledge on how to gather and prepare these foods and medicines is still disseminated by those who hold this information.

Amongst the Jawoyn traditional owners, the mine site is not considered a notably productive environment. It was expressed by these people that the plants and animals encountered and discussed during this ecological knowledge consultation are widespread and not unique to the mine site.

2. Introduction

Vista Gold Australia Pty Ltd (Vista Gold) proposes to re-establish and operate the Mt Todd Gold Mine, located approximately 55km north-west of Katherine, Northern Territory (NT). The mine and proposed associated infrastructure are known as the Mt Todd Gold Project (Project).

The then Northern Territory Minister for Natural Resources, Environment and Heritage determined that a Draft Environmental Impact Statement (EIS) is required for the Project. The Northern Territory Environment Protection Authority (NT EPA) (formerly Department of Natural Resources, Environment, The Arts and Sport (NRETAS)) subsequently issued '*Guidelines for the Preparation of an Environmental Impact Statement – Mt Todd Gold Project Katherine Region NT, Vista Gold Australia Pty Ltd, September 2011*'. The EIS is being assessed under an accredited arrangement between the Commonwealth and Northern Territory governments.

This report addresses the point from Section 6.3 of the EIS Guidelines:

> *Identify and discuss species of traditional Aboriginal cultural significance (particularly aquatic and terrestrial fauna species), based upon consultation with traditional owners and surveys of the Project area.*

The Traditional Owners of the Mt Todd mine site are Jawoyn aboriginal people. Jawoyn traditional lands extend from Katherine, south-east to the township of Mataranka, eastward past Barunga and Beswick, then north east from Bulman in Arnhem land to the southern part of Kakadu National Park and south west Arnhem (Jawoyn AAC 2012).

The term Jawoyn is used to encompass the language, culture, and territory of the Jawoyn people. Jawoyn heritage and traditional ownership of country is passed down from a Jawoyn father and in some cases, through a Jawoyn mother. It is these kinship relationships as well as a deep understanding of all aspects of country that connect Jawoyn people to their land (Jawoyn AAC 2012).

The people who generously shared their knowledge for this report are individuals who the Jawoyn Association (JA) identified as having a kinship connection to the mine site area.

This report provides a brief overview of some of the traditional ecological knowledge the Jawoyn Traditional Owners have of the plants and animals on the mine site and surrounding area. This document is not intended to be a comprehensive ethnoecological account of the area.

3. Project Description and Study Area

3.1 Proposed Works

The Project area is in a historical mining district, and was mined for gold in the 1990s (by previous proponents). Design capacity was never achieved due to inadequacies in the crushing circuit reducing recoveries of gold. Underperformance and higher operating costs led to the mine being closed and placed in care and maintenance in 1997.

General Gold formed a joint venture with Multiplex Resources and Pegasus Gold to own, operate and explore the mine in 1999. Operations ceased in July 2000, with administrators appointed. Mining infrastructure such as tailing dams, waste rock dumps and remains of processing facilities remain on site. The mine has been in care and maintenance for the past 10 years.

Vista Gold Australia Pty Ltd (Vista Gold) proposes to re-establish and operate the Mt Todd Gold Mine (Figure 3-1). The mine and proposed associated infrastructure are known as the Mt Todd Gold Project (the Project).

The Project will expand the Batman Pit, re-establish and refurbish existing facilities, expand the existing waste rock dump and develop new associated infrastructure such as a processing plant, power station, and a second Tailings Storage Facility (TSF2) (Figure 3-2).

The proposed development will occur both within the existing disturbance footprint of the Batman Mine and in surrounding areas.

Mining will be an open-pit truck and shovel operation, using large haul trucks, hydraulic shovels and front end loaders to transport materials to the crusher, stockpiles, Run of Mine (ROM) pad and waste dump. Extracted ore, will be processed in an ore processing plant where it will be crushed, milled and then carbon in leach (CIL) leached followed by adsorption, desorption and recovery leading to gold dore (unrefined gold).

Approximately 17.8 million tonnes per annum (Mtpa) of ore will be processed. Gold dore will be transported for onward secure shipment to a refinery.

The Project, based on current known data, will have a life of around 19 years inclusive of construction, operations and closure. Construction is anticipated to commence in the first quarter of 2014 and take two years, including 6 months pre-production. The mine is scheduled to operate for a further 13 years. Closure and rehabilitation of the mine is expected to take four years.

3.2 Study Area

The Mt Todd Gold mine site is located approximately 55km north west of Katherine and 250km south of Darwin, NT, Australia (Figure 3-1). The topographical feature named Mt Todd is in the mineral leases. The mine site is accessed via Jatbula Road (restricted mine access road), approximately 10km west of the Stuart Highway (the main highway between Darwin and Adelaide).

Mining and associated operations will occur on predominantly on mineral leases MLN 1070, MLN 1071 and MLN 1127 covering approximately 5,403ha (Figure 3-3). Vista Gold also controls exploration leases EL 25576, EL 25668, EL 25669 and EL 25670 covering 117,632ha.

For the purposes of this assessment the following definitions apply:

- Mine site – areas of previous or proposed disturbance within the mineral leases;
- Mineral leases – the broader area defined by MLN 1070, MLN 1071 and MLN 1127.

Surrounding land uses immediately adjacent to the mine site include:

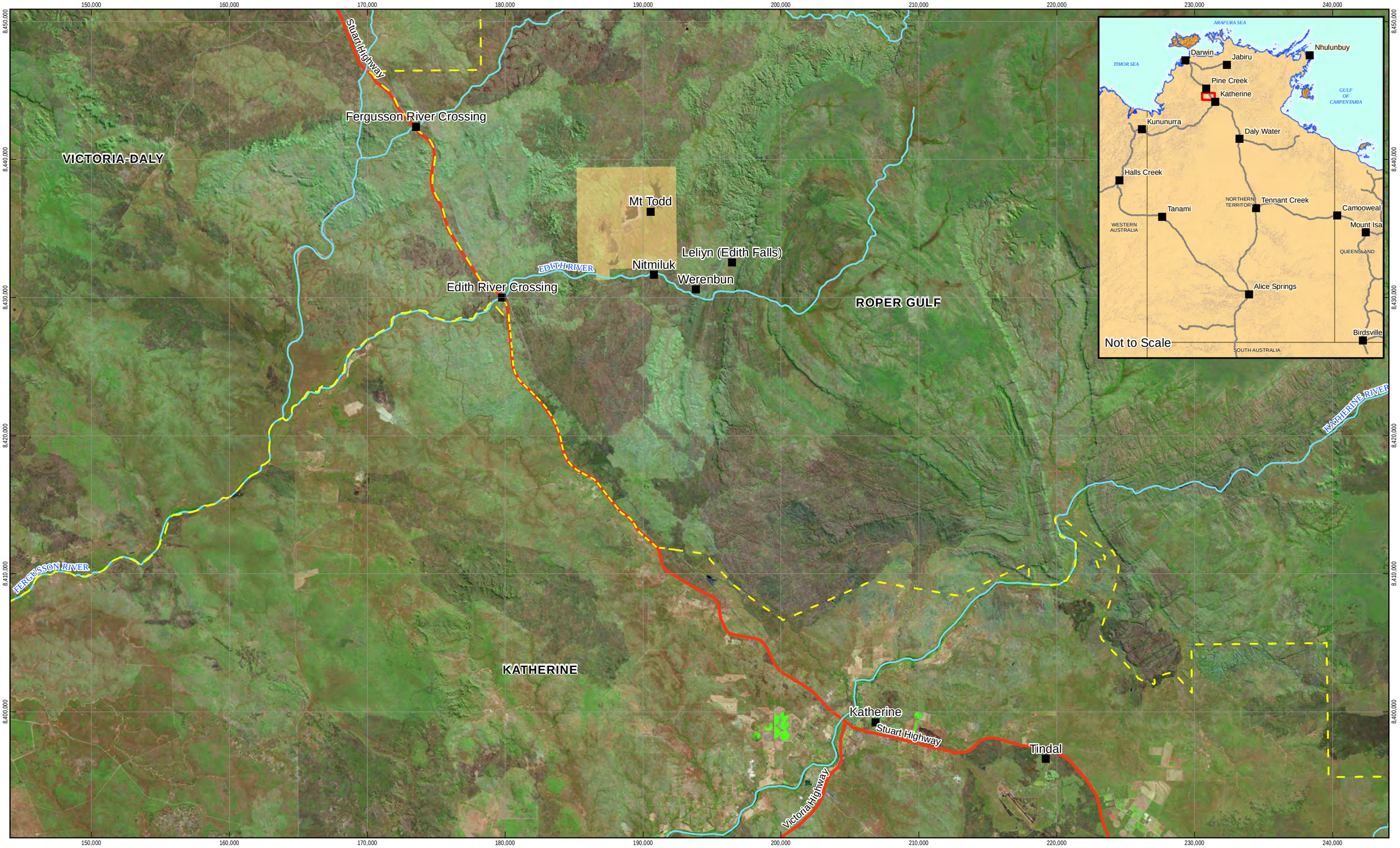
- North – Horseshoe Tin Field (no longer operational);
- East – Nitmiluk National Park;
- South – Edith River and Edith Falls Road;
- West – Yinberrie Hills (identified on the NT Government list of Sites of Conservation Significance).

The Mt Todd mine site contains a variety of landforms including hills and strike ridges on persistent Burrell Creek Greywacke, sandstone and siltstone, and undulating hills on lower Proterozoic sediments (Burrell Creek Formation). There are major creek and river drainage floors and a regular distribution of levees, back plains and depressions, dissected by erosion gullies.

Soils vary from sandy and loamy red and yellow earths to lateritic and yellow podsolic soils on the gently undulating land, often over compact clay sub-soils. Heavier textured grey soils are found on the floodplains and levees of the Daly River system while stony and skeletal soils occur in the rocky outcrops.

Key environmental feature of the site and its surrounds include:

- Mt Todd which lies in the Project area and has an elevation of 230m;
- The Yinberrie Hills located to the west of Batman Pit. The Yinberrie Hills are on an Interim List for the Register of the National Estate. They are not listed under the *Environment Protection and Biodiversity Conservation Act 1999*. The Yinberrie Hills is one of a few known major breeding sites for the nationally endangered Gouldian finch and is listed on the NT Government list of Sites of Conservation Significance; and
- The Edith River located immediately south of the mine site. The mine site is downstream of Edith Falls.



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 53

N

LEGEND

- Place Names
- Major Roads
- Rivers
- LGA Boundaries
- Mt Todd Mineral Leases

Vista Gold Australia Pty Ltd
Mt Todd Gold Project

Job Number	43-21801
Revision	1
Date	30 May 2013

Project Location

Figure 3-1

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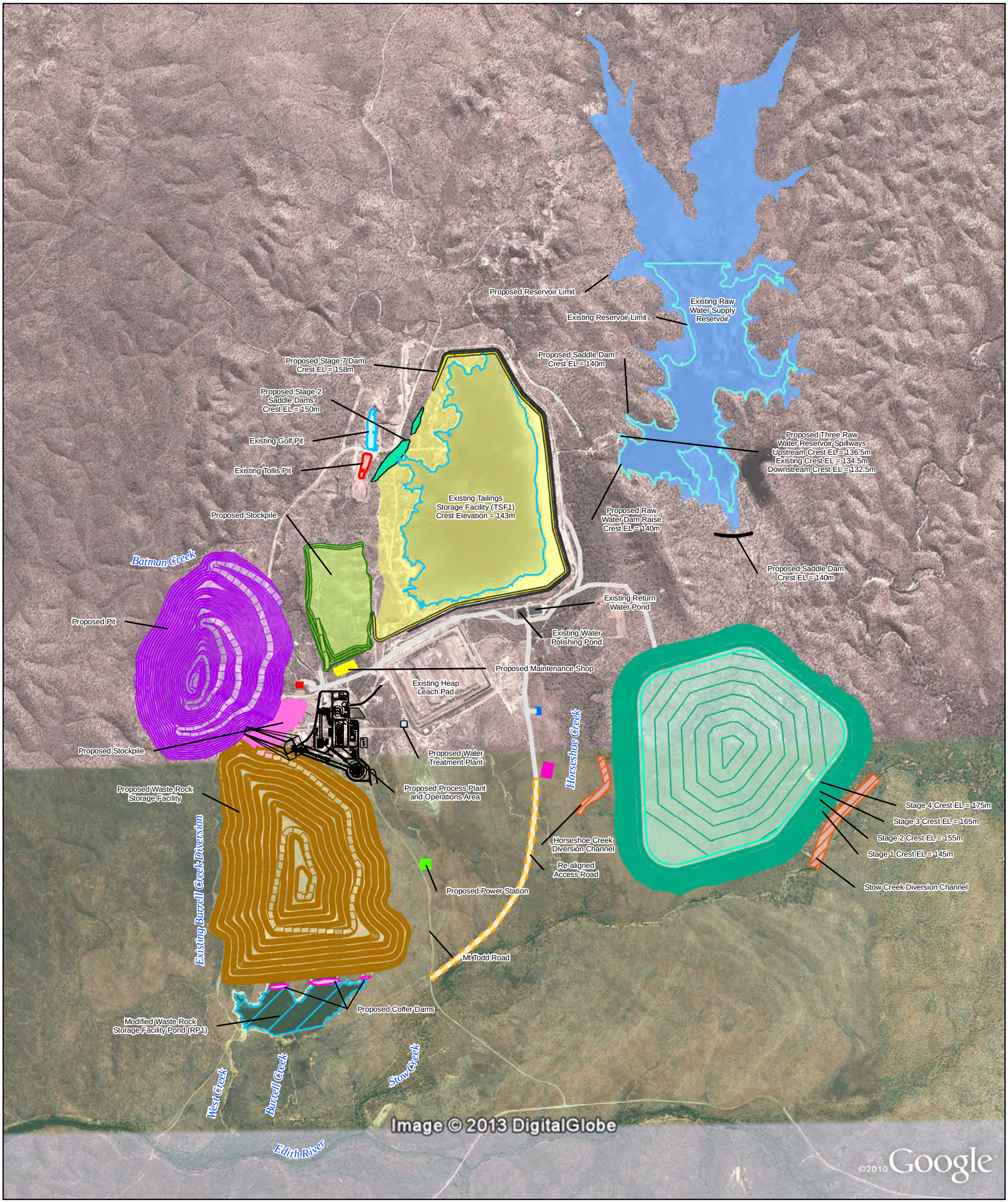
Data source: NRETAS - Drainage (2011). Vista Gold - Mt Todd Mineral Lease (2011). Geoscience Australia - Landsat Imagery (2007), Place Names, LGA Boundaries, Roads, State Boundaries, Shoreline (2008). Created by: CM

66 Smith Street Darwin NT 0800 Australia **T** 61 8 8982 0100 **F** 61 8 8981 1075 **E** drwmail@ghd.com **W** www.ghd.com.au



LEGEND

- Process Plant
- Power Plant
- Explosives Magazine
- TSF1 Existing Water Body
- TSF2 Impounded Surface Area (Year 12)
- Proposed Saddle Dam (Raw Water Dam)
- Stockpile
- Golf Pit
- Proposed Haul Road
- Diversion Channels
- Proposed Saddle Dam
- TSF2 Contours (Year 12)
- Retention Pond 1
- Tollis Pit
- Re-aligned Access Road
- Raw Water Dam Existing Water Body
- TSF1
- TSF2 Footprint (Year 12)
- Batman Pit Footprint (Year 12)
- Fuel Bays
- Coffer Dams
- Indicative Raw Water Dam
- Low Grade Ore Stockpile Contours
- Water Treatment Plant
- Waste Rock Dump Contours (Year 10)
- Proposed Maintenance Shop
- ANFO Facility
- TSF1 Contours
- Low Grade Ore Stockpile
- Batman Pit Contours (Year 12)
- Waste Rock Dump Footprint (Year 10)

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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 53

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Vista Gold Australia Pty Ltd
Mt Todd Gold Project

Job Number	43-21801
Revision	0
Date	05 Jun 2013

Mt Todd General Facilities Arrangement Figure 3-2

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66 Smith Street Darwin NT 0800 Australia T 61 8 8982 0100 F 61 8 8981 1075 E drwmail@ghd.com W www.ghd.com.au

Data source: Tetra Tech - Process Plant, Golf Pit, Tollis Pit, Fuel Bays, Proposed Maintenance Shop, Power Plant, Realigned Roads, Proposed Haul Road, Coffer Dams, ANFO Facility, Explosives, Diversion Channels, Raw Water Dam Existing Water Body, Indicative Raw Water Dam, TSF1 Contours, TSF1 Existing Water Body, Proposed Saddle Dam, TSF1, Low Grade Ore Stockpile Contours, Low Grade Ore Stockpile, TSF2 Impounded Surface Area, TSF2 Contours, TSF2 Footprint, Water Treatment Plant, Batman Pit Contours, Proposed Saddle Dam (Raw Water Dam), Retention Pond 1, Batman Pit Footprint, Waste Rock Dump Contours, Waste Rock Dump Footprint, Stockpile (2013). Google Earth Pro - Imagery (Date extracted: 17/05/2013). GHD - Creek Names (2011). Created by: CM

MLN1070

MLN1071

MLN1127

Jatbula Road

Edith Falls Road

EDITH RIVER

removed

Image © 2011 DigitalGlobe

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LEGEND

Mineral Lease Boundarys

Water bodies

Existing Mine Layout

Waterways

Access Roads

1:30,000 @ A3

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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 53

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Vista Gold Australia Pty Ltd
Mt Todd Gold Project

Job Number	43-21801
Revision	0
Date	30 May 2013

Mineral Leases

Figure 3-3

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66 Smith Street Darwin NT 0800 Australia T 61 8 8982 0100 F 61 8 8981 1075 E drwmail@ghd.com W www.ghd.com.au

Data source: NRETAS - Waterways (2011). Vista Gold - Mineral Leases, Water Bodies, Mine Layout (2011). Google Earth Pro - Imagery (Date Extracted: 28/03/2011). GHD - Access Roads (2011). Created by: CM

4. Method

4.1 Background Review

Background information on the Jawoyn people, their history, ecological knowledge and society was reviewed from available sources in the public domain.

4.2 Consultation

The Jawoyn Association (JA) was consulted to identify the appropriate people who hold traditional ecological knowledge of the Project area. The JA identified the following people as the appropriate Traditional Owners for the country on which the Project area is situated:

- Bessie Coleman;
- Bianca Balmana;
- Roy Anderson; and
- Wesley Wilika.

With the assistance of a cultural heritage specialist (Karen Martin-Stone from EarthSea Consultants) these traditional owners were contacted and agreed to accompany two GHD ecologists on a visit to the Project area with the intention of discussing plants and animals that occur in the area. It was determined to use EarthSea Consultants in the consultation group as the cultural heritage specialist (Karen Martin-Stone) had an existing relationship with the Jawoyn group on which this project could be built. This assisted in familiarisation of the consultation team to the Jawoyn people.

Fieldwork consisted of a combination of on-country walk overs and discussion sessions on the mine site over a two day period (21 and 22 February, 2012). The fieldwork participants are identified in Table 4-1.

Consultations on site were conducted in culturally appropriate, separate male and female groups.

Table 4-1 Fieldwork Days

Day	21 February	22 February
Researchers	Matthew Flower (GHD)	Matthew Flower
	Arien Quin (GHD)	Arien Quin
	Karen Martin-Stone (EarthSea)	Karen Martin-Stone
Jawoyn Participants	Bessie Coleman	Bessie Coleman
	Bianca Balmana	Bianca Balmana
	Roy Anderson	Roy Anderson
		Wesley Wilika

The GHD ecologists explained the purpose of the fieldwork at the beginning of the fieldwork. This included explaining that information provided by the participants would be presented in a report that will be on public display. The participants were informed that if information was of a personally or culturally sensitive nature it should not be shared. The briefing was repeated on the second day when an additional person joined the group.

Plants and animals were discussed in the field as they were encountered. Information was recorded and photos taken where appropriate. Discussions about plants and animals contained in the Jawoyn Plants and Animals Book (Wiynjorrotj *et al.* 2005) were also conducted in the mine site office.

Plant and animal knowledge was categorised. The categories used were:

- Ecology: Knowledge of the animal or plant's ecology i.e. behaviour, habitat, predator/prey or other relationship to other taxa (relationships between animals and plants could possibly be spiritual);
- Food: The plant or animal provided sustenance to people;
- Medicine: The plant or animal was used as a medicine for people;
- Spiritual: The plant or animal was used in ceremonies or in other spiritual ways; and
- Tool: The plant or animal was used to make tools, equipment (canoes, mattresses, etc.), dyes and other such items.

4.3 Limitations

The knowledge that has been shared in this report includes public or secular information. There is a large amount of information considered to be sacred that can only be passed on to people who have achieved a certain level of cultural status and position in Jawoyn society through their participation in various ritual and ceremonial obligations. The information contained in this report is constrained by the limited time spent on country as well as the time of year when the survey was undertaken. In this respect it is not intended to provide a comprehensive account of all plants and animals that occur in the project area but rather an overview of the types of resources that may be used.

Other factors that influenced the detail contained in this report include:

- The unfamiliarity of the GHD people to the Jawoyn people (alleviated in part by building on the existing relationship between EarthSea Consultants and the Jawoyn people);
- The cultural background of the researchers i.e. none were Jawoyn people;
- Culturally appropriate levels of public knowledge dissemination;
- Fieldwork was conducted over two days (the Jawoyn participants hold a lifetime of acquired knowledge and it is unrealistic to expect all this knowledge to be shared over the course of two days);
- Fieldwork was only conducted during the Wet season (which in 2012 was anecdotally a dry Wet season): some plants and animals of the Project area may have not been apparent or present;

- Fieldwork was not conducted during the night and did not involve animal trapping. Fauna discussion was therefore limited to incidental, physical encounter and discussion using photos and data from the Jawoyn Plants and Animals Book (Wiynjorrotj et al. 2005);
- No linguist was present and no linguistic data were collected. Plant and animal names were provided and discussed in English. This could lead to the decontextualisation of knowledge and some knowledge may be lost in translation.

5. Results

5.1 Seasonality

The Jawoyn observe an annual cycle comprised of five major seasons with minor seasons recognised in each. The timing and duration of each season is not the same each year. A different variety of plants and animals can be relied on during each season. Environmental indicators signal the transition between seasons and can include plants flowering or certain animal behaviour (Wiynjorrotj *et al.* 2005).

The Gregorian calendar months and the generalised, approximate Jawoyn equivalent are provided in Table 5-1 (Wiynjorrotj *et al.* 2005).

Table 5-1 Jawoyn Seasons and Approximate Gregorian Equivalent

Jawoyn Season	Seasonal Characteristics	Gregorian Months
Jiyowk	Heavy rain	January - February
Pangkarrang	Rain ceases; dry begins	March - May
Malapparr	Cold weather time	June - August
Jungalk	Hot time (build-up)	September - November
Kuran	First rains	December

5.2 Summary of Plant and Animal Knowledge

A total of 126 plant, animal and fungal taxa were identified, discussed and associated Jawoyn knowledge recorded.

Sixty two animal taxa were identified and discussed. A breakdown of the animal knowledge type by category and the animal groups for which knowledge was discussed is provided in Table 5-2 and Table 5-3. Some species are listed in more than one category.

Table 5-2 Animal Knowledge Type by Category

Knowledge Type	Count
Ecology	31
Food	34
Medicine	1
Spiritual	1
Tool	4

Table 5-3 Numbers of Animals Discussed by Group

Animal Type	No. Discussed
Amphibian	1
Bird	20
Fish	6
Invertebrate	8
Mammal	10
Reptile	17
Total	62

Sixty-three plant taxa from 31 families were identified and discussed. A breakdown of the knowledge type by category and the plant families discussed is provided in Table 5-4 and Table 5-5 respectively.

Table 5-4 Plant Knowledge Type by Category

Knowledge Type	Count
Ecology	16
Food	40
Medicine	4
Spiritual	2
Tool	29

Table 5-5 Numbers of Plant Taxa Discussed by Family

Plant Family	Taxa Discussed
Anacardiaceae	1
Araceae	1
Asclepiadaceae	3
Asteraceae	1
Bixaceae	1
Combretaceae	3
Commelinaceae	1
Cucurbitaceae	1
Cuppresaceae	1

Plant Family	Taxa Discussed
Cyperaceae	1
Dioscoreaceae	2
Erythroxylaceae	1
Fabaceae	5
Haemodoraceae	1
Lecythidaceae	1
Malvaceae	2
Menyanthaceae	1
Moraceae	3
Myrtaceae	7
Orchidaceae	1
Pandanaceae	2
Passifloraceae	1
Phyllanthaceae	2
Picrodendraceae	2
Poaceae	6
Rubiaceae	3
Solanaceae	2
Taccaceae	1
Tiliaceae	1
Verbenaceae	1
Vitaceae	3

5.3 Jawoyn Plant and Animal Knowledge

Scientific and common names of and knowledge about each taxon are detailed below. Animal knowledge is ordered alphabetically in English by the animal group then animal common name. Plant knowledge is ordered alphabetically in English by the plant scientific name.

5.3.1 Jawoyn Animal Knowledge

Common Name	Scientific Name	Knowledge
Amphibian		
Sand frog	*Limnodynastes ornatus*	This frog is eaten and can be used for fish bait.
Bird		
Azure kingfisher	*Alcedo azurea*	This bird fishes to catch fish to eat.
Black cockatoo	*Calyptorhynchus banksii macrorhynchus*	The presence of this bird indicates the right time to burn the country.
Brolga	*Grus rubicunda*	This bird is a good dancer.
Bush turkey	*Ardeotis australis*	This bird is good to eat around the hot time (October/November). It is widespread on the floodplains and associated woodlands. This animal feeds on the gum from the ironwood tree.
Collared sparrowhawk	*Accipiter cirrhocephalus*	This bird hunts other birds.
Common koel	*Eudynamys scolopaceae*	This bird sings out after the first rains of the year.
Crimson finch	*Neochmia phaeton*	This bird nests in pandanus trees.
Darter	*Anhinga melanogaster*	This bird is a fishing bird and eats fish. It catches fish by spearing them with its beak.
Emu	*Dromaius novaehollandiae*	This bird is cooked in a ground oven and is good eating. It used to be speared through the heart but now is shot from a car. This animal likes to live in quiet, peaceful places. It is deterred by towns. This bird is not found around the Mt Todd area.

Common Name	Scientific Name	Knowledge
Ibis	*Threskiornis spp.; Plegadis falcinellus*	This bird can be eaten after boiling it a few times. It is caught with a spear or with a short throwing stick.
Jabiru	*Ephippiorhyncus asiaticus*	This bird was eaten in a past era.
Little corella	*Cacatua sanguinea*	This bird eats grass seeds.
Little pied cormorant	*Phalacrocorax sulcirostris*	This bird fishes to catch fish to eat.
Nankeen night heron	*Nicticorax caledonicus*	This bird has excellent vision which helps it hunt at night.
Owls		Children get scared when they hear the owl calling at night. Mentioning the owls call encourages children to go to sleep early.
Pelican	*Pelecanus conspicillatus*	This bird can be eaten after boiling it a few times. It is caught with a spear or with a short throwing stick.
Peregrine falcon	*Falco peregrinus*	This bird hunts other birds.
Sulphur-crested cockatoo	*Cacatua galerita*	The presence of this bird indicates that it is not the right time to burn the country.
White-bellied sea eagle	*Haliaeetus leucogaster*	This bird eats turtles. To crack the shell open they will grab the turtle then fly to a great height and drop the shell to the ground. The turtle is then taken to the nest and fed to young eagles.
Fish		
Archerfish	*Toxotes chatareus*	This fish shoots at insects by spitting water at them. It can even shoot a spider out of its web and then eat the spider.

Common Name	Scientific Name	Knowledge
Barramundi	*Lates calcarifer*	This fish can be caught on a line from creeks like Horseshoe Creek.
Big black catfish	*Arius leptasis*	This fish is eaten. It is caught using worms or sand frogs. When caught people check their guts to identify if this fish has been eating cane toads.
Black bream	*Hephaestus fuliginosus*	This fish can be caught on a line from creeks like Horseshoe Creek. In a past era it was caught using a net.
Blue catfish	*Arius graeffei*	This fish is eaten. It is caught using worms or sand frogs.
Jewfish	*Scientific name unknown*	This fish can be caught on a line from creeks like Horseshoe Creek.
Invertebrate		
Bush cockroach	*NA*	This insect will spray liquid when threatened. It has very good aim with this liquid.
Freshwater crabs	*Holthuisana transversa*	In a past era this animal was eaten by people. This animal is food for the water rat.
Freshwater mussels	*Velesunio wilsonii*	This animal is food for the water rat. In a past era this animal was eaten by people.
Grasshopper	*NA*	This insect is used as fish bait.
Green ant	*Oecophylla smaragdina*	The queen ants can be eaten like witchetty grubs[1]. The nests are crushed and the juice of the ants can be drunk to treat coughs and colds.

[1] Information could possibly refer to the pupae and larvae.

Common Name	Scientific Name	Knowledge	
Native bees	*Trigona spp.*	There are several types of native bee that produce honey or 'sugar bag'. They can be found in a variety of trees and are highly sort after. The wax from sugarbag is used to fill holes in coolamons and to fix heads to spears and stone axe handles. They keep an edible hive which can be found in tree hollows or in the ground in the hilly country.	
Worms	*NA*	These worms live in burrows near rivers and were collected by women for use as fish bait. Pigs hunt for these worms.	
Yabbies	*Macrobrachium spp.; Caridina spp.*	This animal lives in creeks like Horseshoe Creek. It is caught by throwing in a hollow log as refuge. Yabbies crawl into the log and then the log is later pulled out of the creek.	
Mammal			
Bats	*NA*	These animals live in caves, flies at night and eat insects.	
Black wallaroo	*Macropus bernardus*	This animal has excellent camouflage.	

Common Name	Scientific Name	Knowledge
Echidna	*Tachyglossus aculeatus*	This animal lives in the hilly country in a burrow. It is caught by digging it out of its burrow and then is delivered a swift blow to the head. The spines are burned off in the coals and then scraped off. It is cooked in a ground oven and ready to eat when soft.
Little red flying-fox	*Pteropus scapulatus*	This animal was eaten in a past era but now is thought to be a carrier of disease.
Macropods	*NA*	All macropods are good eating. In a past era they were speared through the heart but now are shot from a car.
Northern brown bandicoot	*Isoodon macrourus*	This mammal nests on the ground or in a big hollow log. They are flushed out by starting a fire and then struck when they run out.
Northern brushtail possum	*Trichosurus vulpecula*	This mammal nests in a hollow log on the ground or in a hollow tree branch. They are flushed out by starting a fire and then struck when they run out.
Red-cheeked dunnart	*Smithopsis virginiae*	This small mammal lives in the hilly country.
Sugar glider	*Petaurus breviceps*	This animal nests in leaf lined hollows in stringybark trees.
Reptiles		
Black-headed python	*Aspidites melanocephalus*	This snake is considered food for the elders.
Death adder	*Acanthopsis praelongus*	This animal is very deadly. It has learnt not to touch cane toads.

Common Name	Scientific Name	Knowledge	
Emu snake	*Delma tincta*	This small, quick snake is poisonous. It bites the legs of emus and is capable of killing them[2].	
File snake	*Acrochordus arafurae*	This animal is cooked in the ground oven and is good eating.	
Freshwater crocodile	*Crocodylus johnstonii*	Some people eat this animal. They first check the guts of the animal to see if it has been eating cane toads.	
Frill-necked lizard	*Chlamydosaurus kingii*	This animal is good food.	
Geckos	*NA*	These animals have excellent camouflage.	
Green tree snake	*Dendrelaphis punctulata*	This snake has good camouflage for climbing trees and does so to kill and eat birds.	

[2] Snake could possibly have been misidentified in the field as *Delma tincta* rather than a poisonous brown snake (*Pseudonaja sp.*).

Common Name	Scientific Name	Knowledge
King brown	*Pseudechis australis*	This animal is very deadly. It has learnt not to touch cane toads.
Oenpelli python	*Morelia oenpelliensis*	This snake is capable of killing and eating a kangaroo.
Olive python	*Liasis olivaceus*	This snake is considered food for the elders.
Sand goanna	*Varanus panoptes*	This animal is good food.
Shaky paw lizard	*Diporiphora albilabris*	This lizard can change colour based on the rock colour of its environment. 
Turtle (long neck)	*Chelodina sp.*	These animals can be caught on a line and are cooked on their back in the fire. Long neck turtles inhabit billabongs and larger rivers downstream of the mine site.
Turtle (saw shell)	*Elseya latistrenum*	These animals can be caught on a line and are cooked on their back in the fire.
Turtle (short neck)	*Emydura sp.*	These animals can be caught on a line and are cooked on their back in the fire. Short neck turtles would inhabit environments such as Horseshoe Creek. Short neck turtles can be caught when the river levels are low by spearing them. They are good to eat.
Water goanna	*Varanus sp.*	This animal is good food.

5.3.2 Jawoyn Plant Knowledge

Common Name	Scientific Name	Knowledge	
	Acacia sericoflora	This plant is used as soap.	

Common Name	Scientific Name	Knowledge	
Cockatoo grass	*Alloteropsis semialata*	This grass is picked and rubbed between the hands then used as a tool to extract sugarbag.	
Bush pumpkin	*Amorphophallus paeoniifolius*	This plant has a bulbous yam which is dug up and roasted. The outer skin is removed then the yam is cut up and placed in a string bag in flowing water over night. It is then roasted and eaten.	
Wild grape	*Ampelocissus acetosa*	The fruit of this shrub/vine is eaten when black (late Wet season). The fruit of this shrub/vine is eaten by the bush turkey.	

Common Name	Scientific Name	Knowledge	
Wild grape	*Ampelocissus frutescens*	The fruit of this shrub/vine is eaten when black (late Wet season). The fruit of this shrub/vine is eaten by the bush turkey.	
Black currant	*Antidesma ghesaembilla*	The fruit from this shrub are eaten raw. When ripe they turn a dark purple, this occurs during the Wet season.	
Bamboo	*Bambusa arnhemica*	The long, hard, straight stems of bamboo are used to make spear shafts. The spears are/were used to kill buffalo, cattle, kangaroos and other mammals as well as during tribal conflict. This plant grows near the river.	

Common Name	Scientific Name	Knowledge	
Kurrajong	*Brachychiton diversifolius*	The bark from young saplings can be also used to make string for bags. When young this tree has a big yam which can be eaten.	 

Common Name	Scientific Name	Knowledge	
Kurrajong	*Brachychiton megaphyllus*	The bark from young saplings can be also used to make string for bags. The dry, strait stems and branches are used to make fire sticks. When young this tree has a big yam which can be dug up and eaten raw or roasted.	
Bush potato	*Brachystelma glabriflorum*	This vine has an edible yam which is eaten raw. The flowers point towards the other plants of this species in the area.	
Green plum	*Buchanania obovata*	This tree has a green plum which is edible. The bark of this tree is stripped and rolled in the hands to make string which is then used to fix spear heads to shafts in combination with sugarbag wax. The string is fireproof and used to bind the limbs of animals being cooked.	

Common Name	Scientific Name	Knowledge	
Cypress pine	*Callitris intratropica*	The wood of this tree was used to make digging sticks. It is considered one of the strongest woods for tools.	
Small bush yam	*Cartonema spicatum*	This small plant has an edible yam.	

Common Name	Scientific Name	Knowledge	
			

Common Name	Scientific Name	Knowledge	
NA	*Cayratia trifolia*	The fruit of this vine is ground and used as a black coloured dye for dyeing fibre for weaving.	 

Common Name	Scientific Name	Knowledge	
Kapok bush	*Cochlospermum fraseri*	This plant is a calendar plant, its flowering indicating one of the Jawoyn seasons. The taproots of young plants are roasted on hot coals, peeled and then eaten. Very young green fruit can also be eaten.	 
Bush cucumber	*Cucumis melo*	The fruit of this vine is eaten once it turns yellow.	

Common Name	Scientific Name	Knowledge	
			 
NA	*Cyclophyllum schultzii*	This tree grows in the river country and has an edible fruit.	

Common Name	Scientific Name	Knowledge	
Tree orchid	*Cymbidium canaliculatum*	The green sap that is produced from the green leaves of this orchid is used as a glue to fix spear heads and axe heads to shafts and handles. It is also rubbed on bark to stop it from cracking before being painted on.	

Common Name	Scientific Name	Knowledge	
NA	*Cymbopogon sp.*	This aromatic grass is used as a flavour to cook with fish. The aromatic leaves of this grass are used as a medicine for colds. It is also used as a medicine for babies.	
NA	*Cynanchum pedunculatum*	This plant has an edible fruit that is like the bush banana.	
Sedge	*Cyperus sp.*	The stem of this sedge is chewed and then used by men as a paint brush.	

Common Name	Scientific Name	Knowledge	
			
NA	*Dioscorea sp.*	This vine has an edible yam which is boiled, the skin scaped off and then squeezed to get the juice out.	

Common Name	Scientific Name	Knowledge	
			
Long yam	*Dioscorea transversa*	This plant has an edible tuber which is cooked. The yam is scraped using bone from Kangaroo shoulder it is then cut up, put in a dilly bag which is then placed in running water overnight before roasting.	
NA	*Eriachne ciliata*	This grass is used to start a fire. It is placed at the junction of two sticks being rubbed together.	
Bats wing coral	*Erythrina vespertilio*	The seeds from this tree are collected to make necklaces.	

Common Name	Scientific Name	Knowledge	
Ironwood	*Erythrophleum chlorostachys*	The leaves are placed on a fire green and the smoke is used for spiritual purposes to cleanse people and houses of people who have passed away. The wood of this tree was used to make digging sticks. It is considered one of the strongest woods for tools. The wood of this tree makes really good cooking coals. Children eat the gum from the ironwood as a sweet.	
Kerosene wood	*Erythroxylum ellipticum*	The wood of this tree is reliable firewood in the wet season as it is always dry. The red fruits are eaten by birds.	
Woollybutt	*Eucalyptus miniata*	Cockatoos eat the seeds and nuts of this tree.	
Stringybark	*Eucalyptus tetrodonta*	The bark of this tree is cut off in large sections then straightened and flattened on a fire and used to make	

Common Name	Scientific Name	Knowledge	
		shelter.	
Bloodwood	*Eucalyptus/Corymbia spp.*	The wood of this tree was used to make digging sticks. It is considered one of the strongest woods for tools. Big old hollow trees (esp. big salmon gums) are used for burial sites. Hollow lengths of branches are removed from the tree (or gathered from the ground) and one end sealed up with wax from the native beehive. This is then used as a water carrier. The wood of this tree makes really good cooking coals. All gums provide good firewood.	
NA	*Ficus aculeata*	This plant has a rough leaf which can be used as a woodworking tool (i.e. to smooth wood). The fruit is animal food.	

Common Name	Scientific Name	Knowledge	
River fig	*Ficus coronulata*	The fruits of this plant are eaten by turtles. The leaves of this shrub are used as a medicine for colds.	 

Common Name	Scientific Name	Knowledge	
Cluster fig	*Ficus racemosa*	The fruit of this tree are eaten once they turn yellow/brown.	
NA	*Flueggea virosa*	This shrub produces plentiful white fruit which is eaten by the handful. It grows on limestone.	

Common Name	Scientific Name	Knowledge	
			
NA	*Gardenia megasperma*	The fruit of this tree is eaten. This is more of a food of a past era.	

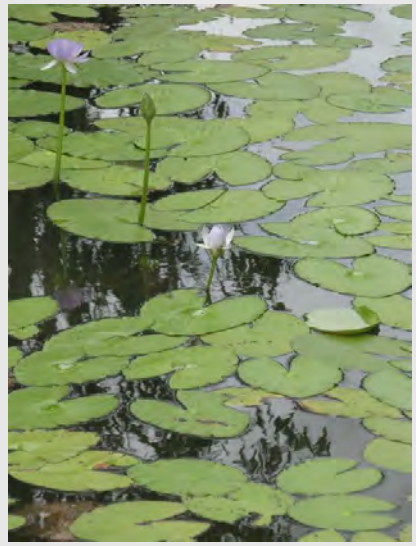
Common Name	Scientific Name	Knowledge	
NA	*Grewia retusifolia*	The fruit of this shrub is ripe in the cold weather time when it turns red. It tastes like apricot. It is eaten by bush turkeys.	
Red root	*Haemodorum coccineum*	The roots of this lily are dug up and boiled in water to produce a red/brown dye. The seeds when boiled make a red dye.	
NA	*Helicteres sp. Darwin*	The black fruits are eaten by the blue tongue lizard.	

Common Name	Scientific Name	Knowledge	
Giant speargrass	*Heteropogon triticeus*	After the Wet season the stems of this grass are chewed to extract sweet water.	 

Common Name	Scientific Name	Knowledge	
NA	*Galactia mulleri*	This plant can be used as a tool to extract sugarbag.	 
Bush banana	*Marsdenia australis*	This fruit is eaten in the cold weather time after removing the seeds.	

Common Name	Scientific Name	Knowledge	
NA	*Melaleuca minutifolia*	The flowers of this tree are food for flying foxes.	
Paperbarks	*Melaleuca spp.*	This tree has large bumps on the trunk which can be knocked off to obtain water after wet periods. The bark can be used for wrapping food to be cooked and the leaves can be used for flavour. The bark of this tree can be used to make bedding to sleep on.	

Common Name	Scientific Name	Knowledge	
Leichhardt Tree	*Nauclea orientalis*	The fruit from this tree can be eaten. The stems from this tree can be made into dug-out canoes.	

Common Name	Scientific Name	Knowledge	
Water lily	*Nymphoides crenata*	This plant produces tubers which can be roasted on coals then eaten. The flower stalks can be eaten raw "like a salad".	

Common Name	Scientific Name	Knowledge	
Pandanus	*Pandanus aquaticus*	The large fruit of this tree contains nuts that are extracted after cutting the fruit in half. The fruit of this tree is eaten by turtles and fishes.	

Common Name	Scientific Name	Knowledge	
Pandanus	*Pandanus spiralis*	The fruit of this tree is roasted and eaten. The leaves of these trees are woven into mats and baskets.	
Stinking passionfruit	*Passiflora foetida*	The fruit of this vine is eaten by black and white cockatoos.	
Quinine tree	*Petalostigma pubescens*	The fruits of this tree are eaten by birds (especially emus).	

Common Name	Scientific Name	Knowledge	
NA	*Petalostigma quadriloculare*	This little shrub is not eaten. It is related to the quinine tree.	
Gooseberry	*Physalis minima*	The fruit of this shrub was eaten.	
Cocky apple	*Planchonia careya*	In a past era this tree was used for fibre out of which string bags were made.	
Cocky apple	*Planchonia careya*	The fruits of this tree are eaten by kangaroos.	

Common Name	Scientific Name	Knowledge	
NA	*Pterocaulon serrulatum*	The leaves of this aromatic plant can be dried and smoked. The leaves of this plant can be crushed and then boiled and used as a skin wash.	
Bush tomato	*Solanum echinatum*	This plant has a fruit which is eaten after removing the spikey parts on the fruit.	
Bush apple	*Syzygium sp.*	This tree has edible white fruit.	
Red bush apple	*Syzygium suborbiculare*	This tree has edible red fruit.	

Common Name	Scientific Name	Knowledge	
Tacca	*Tacca leontopetaloides*	The fruit of this shrub is eaten when ripe (yellow).	

Common Name	Scientific Name	Knowledge	
			
Billy goat plum	*Terminalia ferdinandiana*	The fruits of this tree are eaten.	

Common Name	Scientific Name	Knowledge	
Nut tree	*Terminalia grandiflora*	Once the fruit of this tree is dry the seeds are eaten. It is similar to a peanut is size and taste. The timber may be used to make digging sticks.	 
NA	*Terminalia sp.*	These trees have edible fruit.	

Common Name	Scientific Name	Knowledge	
Spinifex	*Triodia bitextura*	Resin from this grass is used to attach spear heads. It is heated to soften then moulded, when it cools it sets very hard.	
NA	*Vigna vexillata*	This twining vine has an edible yam.	
Black plum	*Vitex glabrata*	The black fruits of this tree are eaten during the cold weather time.	

5.3.3 Jawoyn Fungi Knowledge

The growth on the bark of the ironwood tree is picked off, heated and applied to the knees of young babies to make them walk strong.

6. Discussion

Australian indigenous culture is recognised as one of the cultures of the world that remained isolated and relatively unchanged for an exceptionally long time, with evidence of occupation of the continent dating back over 60,000 years.

To the Jawoyn people their presence on the land extends back to a time called Buwurr or Burr. Simplified, Buwurr is what is often referred to as the Dreamtime, a time during which the features of the earth (the hills, rocks, trees, gorges and rivers) were formed. The Buwurr is also the time when the Jawoyn people and all living creatures came into being. During the time of Buwurr the 'Law' was given to the Jawoyn. This Law is central to all aspects of Jawoyn life and culture as it sets out the rules for proper behaviour, kinship relations, relationships to country and relations to neighbouring and often distant language groups (NRETAS 2012).

The land to the Jawoyn encompasses all aspects of life, it is a supermarket, a hospital, a hardware, a map and a church. It is important to recognise when aiming to understand the connection that Jawoyn people have to their land that its components cannot be separated into individual elements and that the plants, animals, gullies, ridges, rocks, rivers, water holes and the past, present and future are all intrinsically intertwined through the Buwurr (Jawoyn AAC 2012).

All Jawoyn people have cultural responsibilities to look after their land. This includes continuing traditional cultural practices such as hunting, gathering and performing ceremony to manage country (Jawoyn AAC 2012).

Cultural knowledge is traditionally passed down orally. Young people are educated through the course of their everyday lives by talking about country and being actively involved in cultural activities such as hunting, painting, collecting plant materials, weaving and ceremonies (NRETAS 2012).

When Europeans arrived in the Katherine region in the late 19th century life for Jawoyn was significantly disrupted. Pastoral and mining leases were established which forced Jawoyn people from their lands. This has an impact on the local subsistence economy as people were excluded from traditional hunting and fishing areas. This era also brought about regional destruction of bush foods due to the introduction of cattle and buffalo whose hard hooves cause significant amounts of environmental damage (NRETAS 2012).

By the late 1950s many Jawoyn people were forced from their traditional homes and instead lived in bush camps scattered around the edges of Katherine. Many people were forced into government settlements. It was from this time that government control over people's lives increased and as a consequence use of 'bush tucker' began to diminish due to the inability to access traditional land coupled with increased dependence on European foods such as flour, sugar and tinned meats.

Despite these significant disruptions to Jawoyn life, Jawoyn culture has remained strong and traditional ecological knowledge is still held and passed on through the generations. The *Lands Right Act 1976* which allowed for some traditional lands to be returned to the Jawoyn has helped with the passing on of knowledge as people have been able to spend time on country, a vital element of being able to pass on traditional ecological knowledge.

6.1 Landscape Ecology

Three broad landscape units were identified in the mine site area during consultation: woodlands, hills and riparian (including aquatic) environments. Their characteristics and the Jawoyn knowledge about the environments are described below. Additional environments of Jawoyn country are mentioned but as they are not represented in the mineral leases. These are not discussed in detail.

This section documents the resources known from the various landscape groups.

Woodlands

These environments are widespread across the mineral leases and cover the majority of the area. They are mostly low, open eucalyptus forests with a sparse shrub layer and a ground layer dominated by annual grasses and herbs during the Wet season. During the Pangkarrang, Malapparr and Jungalk (Dry season) the ground layer of the woodland becomes dry and the plants senescent. Widespread fires burn across the woodlands, reducing the ground layer to bare ground.

Animal food resources of importance in the woodland environments include the frill-necked lizard. Some foods are eaten by the elders or are considered food for the 'old people'. It is unclear if this means they were foods of a past era and young people don't eat them or are foods that are reserved for the elders. This includes the black-headed python.

Plant food resources of importance in the woodland environments include wild grape (*Ampelocissus acetosa* and *A. frutescens*), black currant (*Antidesma ghesaembilla*), *Gardenia megasperma*, bush banana (*Marsdenia australis*), pandanus (*Pandanus spiralis*), tacca (*Tacca leontopetaloides*) and nut tree (*Terminalia grandiflora*).

Useful plants of importance in the woodland environments include, *Acacia spp,* tree orchid (*Cymbidium canaliculatum*), bats wing coral tree (*Erythrina vespertilio*) and pandanus (P*andanus spiralis*).

Hills

These environments occur on Mt Todd and the hills in the eastern and western parts of the mineral leases. Like the woodlands they are characterised by eucalyptus forests with a sparse shrub layer and a ground layer dominated by annual grasses and herbs during the Wet season. During the Pangkarrang, Malapparr and Jungalk (Dry season) the ground layer of the hills becomes dry and the plants senescent. Widespread fires burn across the hills, reducing the ground layer to bare ground. The ground surface is notably rocky, separating this landscape type from the woodlands.

The hilly environments were used by people during the Wet season as they were environments free from flooding. People also knew that several animal resources moved to the hilly country in the wet season to escape the flooding. It was recognised that hunting was easier on the hills in the Wet season due to the greater visibility afforded by shorter speargrasses compared to the woodlands of the lower country where the speargrasses often grew to well above head height.

Animal food resources of significance include the echidna, northern brown bandicoot and the northern brushtail possum.

Plants with utility value from these environments include *Ficus aculeata*.

Riparian

These environments occur across the mineral leases as taller eucalyptus woodlands in drainage lines and riparian forests of paperbarks and pandanus. Included in this landscape group are the resources that may be available in the waters of the streams, creeks and pools. Across the mineral leases they exist along and in the Edith River and its tributaries (Stow Creek, Horseshoe Creek, Batman Creek, Burrel Creek and West Creek) and ephemeral drainage lines. Some of these aquatic environments are ephemeral, occurring only during the Wet season as a response to the surface water runoff from monsoonal rain before receding to chains of pools and drying out late in the Wet season and others have sufficient base flow to remain as flowing watercourses throughout the Dry season.

Based on the Jawoyn ecological information recorded during this study, they contain the most resources of all the landscape groups in the mineral leases. These environments are particularly significant as fishing is still practiced by a large number of people.

Animal food resources of importance include the sand frog, bush turkey (associated with riparian environments as it is found in the open floodplains), ibis, pelican, barramundi, big black catfish, black bream, blue catfish, jewfish, file snake, turtle (long neck), turtle (saw shell), turtle (short neck) and water goanna.

Food resources eaten in a former time and no longer eaten by people include the jabiru, freshwater crabs, freshwater mussels, black flying-fox, little red flying-fox and freshwater crocodile. Some foods are eaten by the elders or are considered food for the ‘old people’ (it is unclear if this means they were foods of a past era and young people don’t eat them or are foods that are reserved for the elders). This includes the olive python.

Plant food resources of these environments include bush potato (*Brachystelma glabriflorum*), bush cucumber (*Cucumis melo*), *Cyclophyllum schultzii*, *Dioscorea* sp., long yam (*Dioscorea transversa*), cluster fig (*Ficus racemosa*), paperbarks (*Melaleuca* spp.), Leichhardt Tree (*Nauclea orientalis*), water lily (*Nymphoides crenata*), pandanus (*Pandanus aquaticus*), gooseberry (*Physalis minima*), bush tomato (*Solanum echinatum*), bush apple (*Syzygium* sp.), red bush apple (*Syzygium suborbiculare*) and black plum (*Vitex glabrata*).

Plant medicine resources of importance include the river fig (*Ficus coronulata*).

Useful plants of importance include bamboo (*Bambusa arnhemica*), sedges (*Cyperus* sp.), kerosene wood (*Erythroxylum ellipticum*), Paperbarks (*Melaleuca* spp.) and Leichhardt Tree (*Nauclea orientalis*).

Widespread

Many plants and animals do not specifically occur in any one vegetation type.

Animal food resources of importance and of widespread occurrence include the emu, green ant, native bees, macropods and sand goanna.

Animal medicine resources of importance include the green ant nest.

Plant food resources of importance include kurrajong (*Brachychiton diversifolius* and *B. megaphyllus*), green plum (*Buchanania obovata*), *Cartonema spicatum*, kapok bush (*Cochlospermum fraseri*), *Cymbopogon* sp., ironwood (*Erythrophleum chlorostachys*), *Grewia retusifolia*, giant speargrass (*Heteropogon triticeus*), billy goat plum (*Terminalia ferdinandiana*), *Terminalia* sp. and *Vigna vexillata*.

Useful plants of importance include cockatoo grass (*Alloteropsis semialata*), kurrajong (*Brachychiton diversifolius* and *B. megaphyllus*), green plum (*Buchanania obovata*), Cypress pine (*Callitris intratropica*), *Cayratia trifolia*, *Eriachne ciliata*, ironwood (*Erythrophleum chlorostachys*), stringybark (*Eucalyptus tetrodonta*), bloodwood (*Eucalyptus/Corymbia* spp.), purple pea (*Galactia muelleri*), red root (*Haemodorum coccineum*), cocky apple (*Planchonia careya*), *Pterocaulon serrulatum* and spinifex (*Triodia bitextura*).

Two widespread trees have spiritual importance for ceremonial uses: large, hollow gums (such as the salmon gums) and the ironwood (*Erythrophleum chlorostachys*).

Escarpment and Outcrop

These environments occur in Jawoyn country along in the Arnhem Escarpment and its outliers but not within the mineral leases. The knowledge shared of animals inhabiting these environments was ecological in nature and not regarding resources of utility.

Plant food resources of importance include *Cynanchum pedunculatum* and *Flueggea virosa*.

Monsoon Vine Forest

These environments are within Jawoyn country but not within the mineral leases. The only plant knowledge shared relating to these environments was that of one edible plant: bush pumpkin (*Amorphophallus paeoniifolius*).

7. Conclusion

In contemporary times hunting and foraging methods have changed somewhat such that nowadays people hunt with guns and fishing lines rather than spears, throwing sticks and hand weaved line. Similarly there are many bush foods and medicines that are no longer eaten or administered. Despite this the knowledge on how to gather and prepare these foods and medicines is still disseminated by those who hold this information.

Amongst the Jawoyn traditional owners, the mine site is not considered a notably productive environment. It was expressed by these people that the plants and animals encountered and discussed during this ecological knowledge consultation are widespread and not unique to the mine site.

8. References

Fisher I. (2000). Jawoyn People, Land and Country. People's Health Assembly – December 2000. People's Health Movement.

http://www.jawoyn.org/jawoyn-land Accessed: 19 March 2012; Updated: unknown.

http://www.phmovement.org/pha2000/stories/jawoyn.html Accessed: 23 April 2012

Jawoyn Association Aboriginal Corporation (AAC) (2012). Jawoyn Land.

NRETAS (2012) *Nitmiluk National Park Tour Guide Handbook, Section 3 Jawoyn Culture.*

http://www.nretas.nt.gov.au/national-parks-and-reserves/manage/tour/nnpguide Accessed: 19 March 2012; Updated: 2007.

Wiynjorrotj P, Flora S (dec.), Brown ND (dec.), Jatbula P (dec.), Galmur J, Katherine M, Merlan F and Wightman G. Jawoyn Plants and Animals: Aboriginal flora and fauna knowledge from Nitmiluk National Park and the Katherine area, northern Australia. Northern Territory Botanical Bulletin No. 29. Ethnobiology Project (NRETA) and Jawoyn Association, Darwin.

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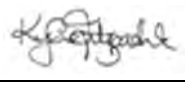
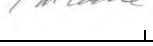
1	A Quin	K Fitzpatrick		I McCardle		15/5/13