

Tropicana Gold Project

Regional Threatened Flora Survey

July 2009



**Prepared by AngloGold Ashanti Australia
For the Tropicana Joint Venture**



TABLE OF CONTENTS

Executive Summary.....	ii
1 Introduction.....	1
2 Purpose of Report	4
3 Legal Requirements	4
4 Regional Context	4
4.1 Climate.....	4
4.2 Geology and Landforms.....	5
4.3 Land Use.....	5
4.4 Biogeographic Region.....	5
4.5 Vegetation and flora.....	7
5 Survey Methodology	7
6 Conservation Status Definitions	10
7 Survey Limitations.....	11
8 Study Team	11
9 Results.....	12
9.1 50km south of the TGP Operational Area.....	12
9.2 Queen Victoria Spring Nature Reserve.....	15
9.3 Plumridge Lakes Nature Reserve	17
10 Discussion and Conclusion	19

Figures

Figure 1	Tropicana Gold Project – General Location
Figure 2	Survey Areas
Figure 3	Biogeographic Regions and Sub-regions
Figure 4	Conservation Significant Flora Recorded in Survey Area 1
Figure 5	Conservation Significant Flora Recorded in Survey Area 2
Figure 6	Conservation Significant Flora Recorded in Survey Area 3

Appendices

Appendix 1	Vegetation Communities Description (<i>ecologia</i> 2009)
Appendix 2	Species Data for Survey 1 (50km South of the TGP)
Appendix 3	Species Data for Survey 2 (Queen Victoria Spring Nature Reserve
Appendix 4	Species Data for Survey 3 (Plumridge Lakes Nature Reserve and Adjacent Vacant Crown land)
Appendix 5	Scientific Licences

Executive Summary

The Tropicana Gold Project (TGP) is a proposed new open pit gold mine located approximately 330km east-north-east of Kalgoorlie on the western edge of the Great Victoria Desert. The Tropicana Joint Venture (AngloGold Ashanti Australia 70% and Independence Group NL 30%) has referred the TGP to the State and Federal Governments for environmental approval through the environmental impact assessment process.

As part of this assessment process, a number of vegetation and targeted threatened flora surveys have been conducted in and around the proposed TGP footprint. A total of 230,000ha has been mapped and 19 conservation significant flora species have been recorded (see Table 1). Some of the populations of conservation significant species may be directly affected by the proposed TGP and others will not.

Due to a lack of regional data on the location and distribution of the identified conservation significant species, AngloGold Ashanti Australia on behalf of the Tropicana JV conducted three targeted surveys within the Great Victoria Desert Biogeographic region. The survey areas included parts of the Queen Victoria Spring Nature Reserve and Plumridge Lakes nature Reserve and adjacent Vacant Crown Land as well as an area 50-80km south of the proposed TGP operational area including Vacant Crown Land and exploration tenements held by the Tropicana JV.

The primary purpose of the surveys was to demonstrate that the distribution of the 19 identified conservation significant flora species were not restricted to the TGP footprint.

The surveys were conducted in December 2008 and January 2009 and involved foot traverse within habitat suitable for the 19 identified species. Survey effort was however limited within the two nature reserves by the Regulation 4 Permit which restricted access to existing tracks and areas immediately adjacent. This restriction prevented access into key areas within the reserves which potentially contained suitable habitat.

As a result of the survey, 11 of the 19 targeted species were located outside of the proposed TGP area. The survey team's inability to locate populations of eight of the targeted species is most likely a result of not being able to access potential suitable habitat (due to permitting restrictions) rather than these species not occurring elsewhere in the region.

This report documents the methodology and results of the three targeted flora surveys.

1 Introduction

The Tropicana Joint Venture (Tropicana JV) has referred the proposed Tropicana Gold Project (TGP) to the Western Australian Environmental Protection Authority and the Federal Department of Environment, Water, Heritage and Arts for assessment under the WA *Environmental Protection Act 1986* and the Federal *Environment Protection and Biodiversity Conservation Act 1999* respectively.

The proposed TGP is located approximately 330 km east north-east of Kalgoorlie, and 15km west of the Plumridge Lakes Nature Reserve, on the western edge of the Great Victoria Desert (GVD) biogeographic region of Western Australia (Figure1). The TGP is a joint venture between AngloGold Ashanti Australia Limited (70% stakeholder and Manager; AngloGold) and the Independence Group NL (30% stakeholder).

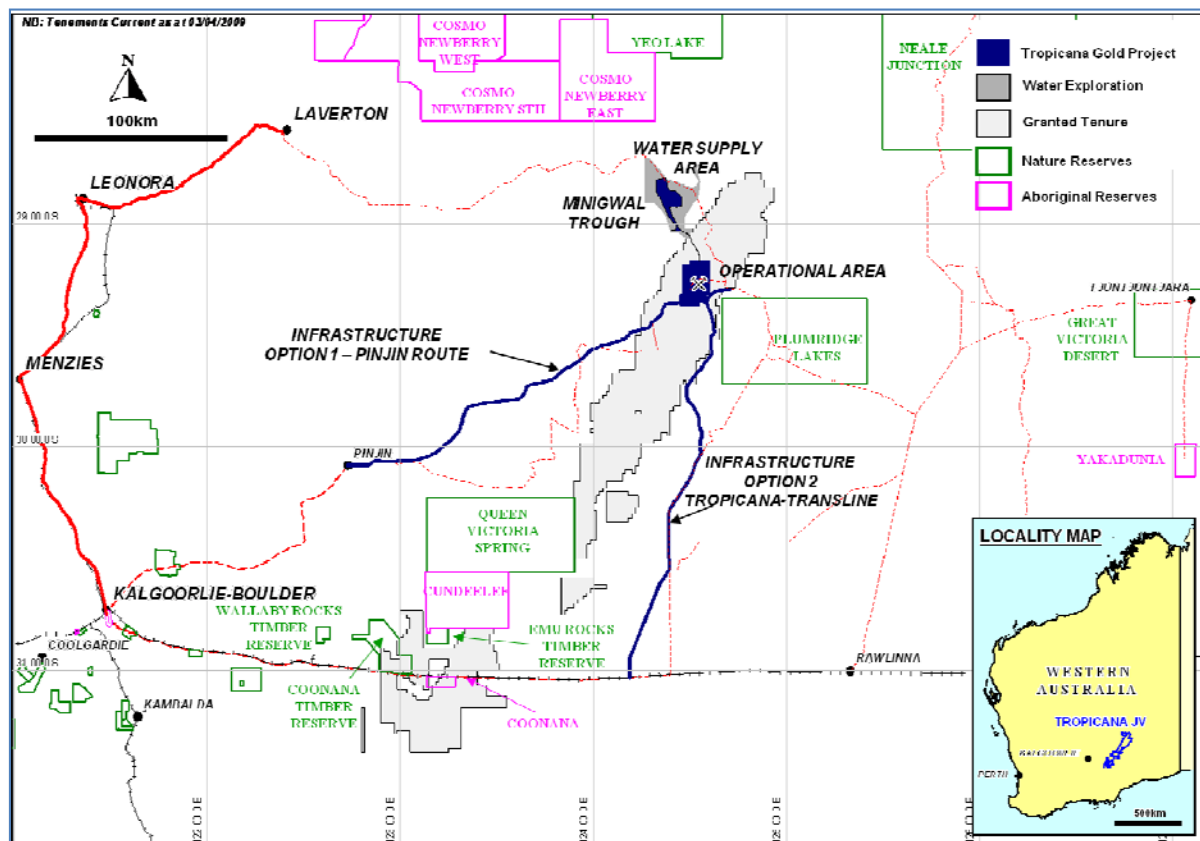


Figure 1. Tropicana Gold Project General Location

The TGP consists of three main components (Figure1):

- Operational Area - This area contains the mine, processing plant, aerodrome, village and other associated infrastructure;
- Water Supply Area - Two basins have been investigated, the Minigwal Trough and Officer Basin, Minigwal Trough is option that will be developed and
- Infrastructure Corridors - Two options are under consideration (Tropicana-Transline and Pinjin options).

As part of the assessment process a number of vegetation and targeted threatened flora surveys have been undertaken within the proposed project area and its surrounds. A total of 230,000ha of vegetation has been mapped.

These targeted surveys include:

- *ecologia* (2009) – Assessment of the Flora and Vegetation of the Proposed Tropicana Gold Project Operational Area;
- *ecologia* (2009) - Operational Area Threatened Flora Survey;
- *ecologia* (2009) – Infrastructure Corridor– Cable Haul Road Option – Flora and Vegetation Survey;
- Matiske Consulting (2009) – Flora and Vegetation Survey of Proposed Mine Access Road and Infrastructure Corridor – Pinjin Option Matiske Threatened Species Assessment of area adjacent to the TGP report;
- Botanica Consulting (2009) – Minigwal Trough Water Supply Area and Pipeline Corridor Vegetation and Flora Survey; and
- MBS Environmental (2009) - Tropicana Gold Project Threatened Species Review.

The flora surveys conducted as part of the assessment process have identified 19 conservation significant species including Declared Rare, Priority flora, range extensions and species new to science. Some of these species will be directly impacted by the proposed Project while others will not. To demonstrate that threatened and conservation significant species are not restricted to the TGP survey area, AngloGold, on behalf of the Tropicana JV, conducted a series of targeted surveys within the region surrounding the proposed TGP. The 19 species targeted in the recent surveys are listed in Table 1.

Table 1: Conservation Significant Flora Species included in Survey

Species	Conservation Status
<i>Conospermum toddii</i>	R
<i>Baeckea sp. Sandstone</i>	P1
<i>Caesia rigidifolia</i>	P1
<i>Baeckea sp. Great Victoria Desert</i>	P2
<i>Dicrastylis cundeeleensis</i>	P2
<i>Dicrastylis nicholasii</i>	P2
<i>Grevillea secunda</i>	P2
<i>Malleostemon sp. Officer Basin</i>	P2
<i>Micromyrtus serrulata</i>	P2
<i>Olearia arida</i>	P2
<i>Thryptomene eremaea</i>	P2
<i>Acacia eremophila var variabilis</i>	P3
<i>Acacia eremophila</i> ssp. numerous nerved variant	P3
<i>Microcorys macredieana</i>	P3
<i>Micromyrtus stenocalyx</i>	P3
<i>Comesperma viscidulum</i>	P4
<i>Lepidobolus deserti</i>	P4
<i>Davesia purpurascens</i>	P4
<i>Caesia talinyka?</i>	Currently unclassified

The regional locations targeted for this survey are shown on Figure 2 and include two conservation reserves currently managed by the Department of Environment and Conservation (DEC), Plumridge Lakes Nature Reserve and Queen Victoria Spring Nature Reserve, an area over which the Tropicana JV currently holds exploration tenements and areas of Vacant Crown Land approximately 50-80km south west of the Operational Area. All three sites are located entirely within the Great Victoria Desert Biogeographic Region.

This report describes the methodology and results of the additional threatened flora surveys within the three regional areas.

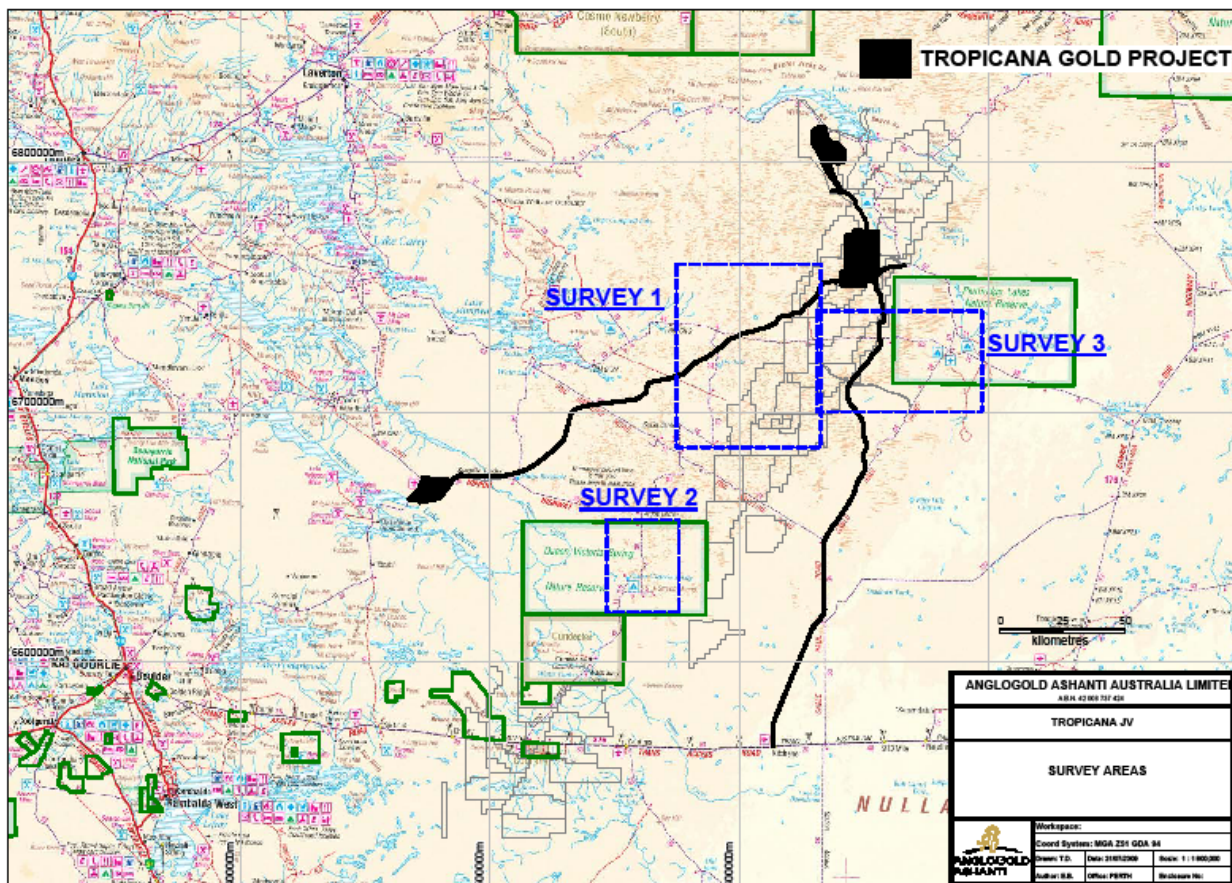


Figure 2: Survey Areas

2 Purpose of Report

The primary purpose of this survey was to locate populations of conservation significant species listed in Table 1 outside the proposed TGP. The area surveyed lies wholly within the Great Victoria Desert Biogeographic Region as this is the region in which the TGP Operational Area also lies. The information obtained from these surveys will provide a more robust regional context to enable the potential impacts of the TGP on these species to be assessed. A secondary aim was to provide the Western Australian Herbarium with additional voucher specimens of the conservation significant species recorded in the region as they currently have very few specimens.

Minimal data on the frequency and size of the conservation significant species recorded in the TGP is currently available due primarily to the lack of surveys historically being undertaken within the region surrounding the TGP. By acquiring additional information on distribution and size of the populations AngloGold will be contributing substantially to the State's knowledge on the threatened flora species included in these surveys. As a result, it may also be possible that some of the conservation significant species may be able to be removed from the Priority species list or to have their conservation status re-assessed.

3 Legal Requirements

As required by law in Western Australia, each participant that collects plant material during field surveys must be licensed to do so with the appropriate licences obtained from the DEC.

A Regulation 4 Permit; Application to Enter Department of Conservation Lands and or Waters for the Purpose of Undertaking Research, is also required from DEC for any flora surveys within designated conservation reserves.

Licences obtained for this survey are listed in Table 2.

Table 2: Flora Survey Licences

Licence Type	Licence Number	
Licence for Scientific or Other Purposes to Take Protected Flora From Crown Land For Non Commercial Purposes	SL008381	SL008379
	SL008382	SL008184
	SL008383	SL008380
	SL008384	
Permit to Take Declared Rare Flora For Scientific Purposes	175-0809	
	174-0809	
Authority to Enter Department of Environment and Conservation Land – Regulation 4 Entry Permit	CE002304	

Note : Further details on licences is provided in Appendix 5

4 Regional Context

4.1 CLIMATE

The south-west of the Great Victoria Desert experiences an arid climate with summer and winter rainfall ranging from 150 to 190 mm per year (Beard, 1974; Beard, 1975; Barton & Cowan, 2001). The TGP area falls between the 178 and 203 mm rainfall isohyet range on the Bureau of Meteorology (BOM) rainfall map of this region, receiving approximately 200 mm annually (Beard, 1974). Temperatures may range between -3°C and 48°C, with the highest temperatures in January and February and the lowest in July and August. The mean annual rainfall for Balgair is 277.8 mm, and for Laverton 233.4 mm. The majority of rainfall

for these stations occurs during the late summer months and early winter. Summer rainfall is generally associated with cyclonic rainfall extending into the interior, and this may result in heavy rainfall between January and April (Laverton received 233.6 mm in February 1995). Conversely, the region may not receive any significant rainfall during any months of the year. The lowest annual rainfall received in the area was 65.6 mm at Laverton (1928) and 140.7 mm at Balgair (1991). Rainfall between 1 July 2006 and 30 June 2007 was 236mm for Laverton, and 272mm for Balgair (BOM, 2007).

4.2 GEOLOGY AND LANDFORMS

The TGP is located in the Southern Great Victoria Desert Zone within the Gunbarrel Province of the Sandy Desert Region (Tille, 2006). This zone has an area of 87,550 km² and is located in the southern arid interior between Lake Minigwal and the South Australian border. The Great Victoria Desert (GVD) is dominated by longitudinal sand dunes with a predominant eastwest orientation and ring dunes separated by interdune corridors (or swales) and sand plains (van de Graff and Bunting, 1977).

These sandplains sit at an elevation of 350-500 m AHD30, dropping to less than 300 m in the south. They contain occasional outcrops of sandstones, laterites and silcretes, some calcareous mounds, and occasional salt pans. Other landforms present are scarpland-breakaways and residuals of various forms (cuestas, mesas, buttes, stony hillocks and hills) (Tille, 2006). These are usually surrounded by stone and gravel pavements. Shallow valleys (with lakes, claypans, salt pans, calcrete platforms, sand dunes, kopi dunes and calcareous dunes) are usually a relatively minor component of the landscape.

4.3 LAND USE

The TGP and much of the GVD is currently classified as Vacant Crown Land. The nearest conservation reserves are Plumridge Lakes Nature Reserve, an area of 308,990 ha which lies approximately 15km to the south-east of the proposed TGP operation area, and Queen Victoria Spring Nature Reserve, an area of 272,598 ha approximately 120 km to the south west-of the proposed TGP Operation Area. The largest area of Aboriginal land under native title in the vicinity is registered with the Spinifex people. This native title area is situated on the Western Australian border with South Australia, south east of the TGP.

The region surrounding the TGP has historically been salvaged for Sandalwood and has been explored for a number of minerals such as nickel, uranium, gold and mineral sands.

The Tropicana JV holds exploration tenements over an area of more than 13,000 km² along approximately 300km of the ancient collision zone between the Yilgarn Craton and the Albany-Fraser province.

4.4 BIOGEOGRAPHIC REGION

The three study areas and the proposed TGP Operational Area are located within the GVD Bioregion (Thackaway & Creswell, 2007), and is described as an active sand-ridge desert of deep Quaternary Aeolian sands with a tree steppe of *Eucalyptus gongylocarpa*, Mulga, and *Eucalyptus youngiana* over Hummock grassland dominated by *Triodia basedowii* (McKenzie et al., 2002).

More specifically the area is located on the border between the central and Shield sub-regions of the GVD as shown in Figure 3.

The Central subregion of the GVD is described as:

“Arid active sand ridge desert with extensive dune fields of deep Quaternary Aeolian sands overlying Permian strata of the Gunbarrel Basin. Landforms consist of salt lakes and major valley floors with lake derived dunes. Sand plains with extensive seif dunes running east west, occasionally outcropping (breakaways) and quartzite hills provide minor relief” (Barton & Cowan, 2001).

The Shield subregion of the GVD is described as:

“The western end of the shield covers the GVD region and is underlain by the Yilgarn Craton and has the highest proportion of sand plains in the bioregion. Landforms consist of salt lakes and major valley floors with lake derived dunes. Sand plains with patches of seif dunes running east west. Areas of moderate relief with outcropping and silcrete-capped mesas and plateaus (breakaways)” (Barton & Cowan, 2001).

A tree steppe of *Eucalyptus gongylocarpa*, *Triodia spp.*, with mallee species; *E. kingsmilli* and *E. youngiana*, over hummock grasslands that are dominated by *Triodia basedowii* occur predominately on Aeolian sands alongside *Acacia aneura*, *Eremophila spp.*, and *Santalum spp.* occurring on the colluvial and residual soils.

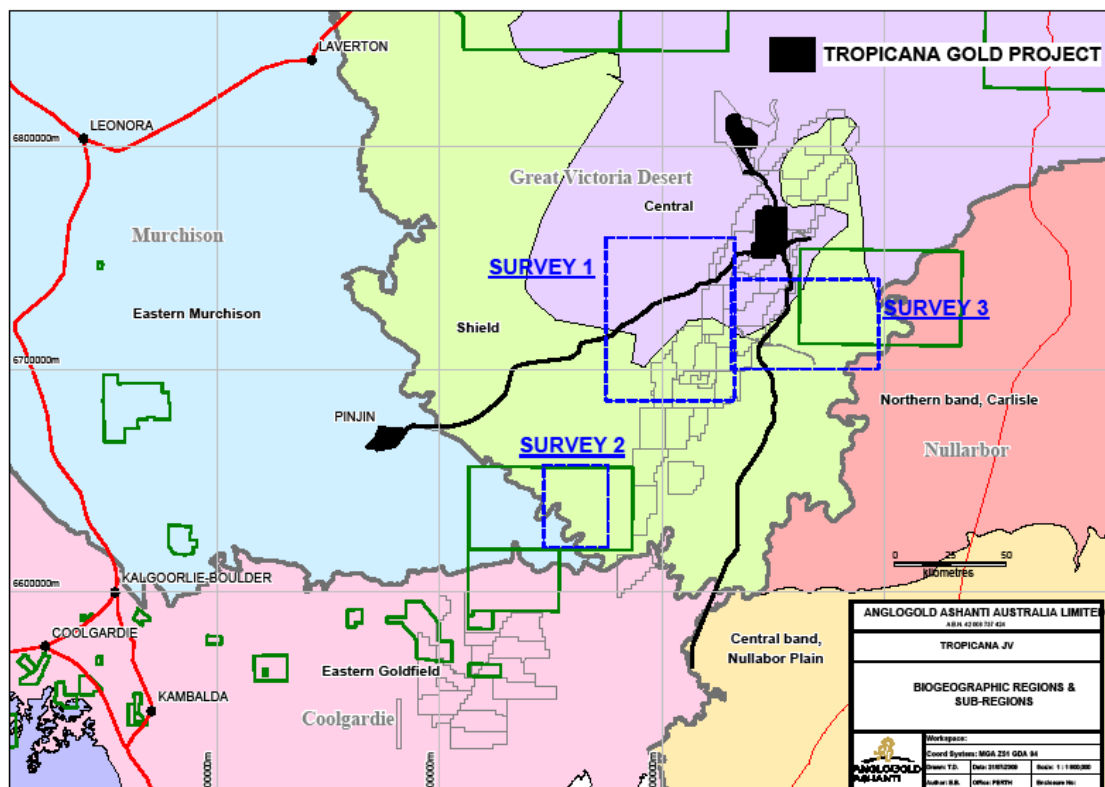


Figure 3: Biogeographic Regions and Sub-regions

Scattered marble gum (*E. gongylocarpa*) and native pine (*Callitris spp.*) occur on the deeper sands of the sand plains. Halophytes such as salt bush (*Atriplex spp.*), Bluebush (*Maireana spp.*), and Samphire (*Arthrocnemum spp.*) occur on margins of salt lakes and in saline drainage areas.

4.5 VEGETATION AND FLORA

The proposed operational area of the TGP is situated in the Helms Botanical District, within the Eremaean Botanical Province. The district is bordered to the south by the Eucla Botanical District (Nullarbor Plain) and to the north by the Giles Botanical District. Beard (1975) described five distinct vegetation units within or in close proximity to the Operation Area. These are:

1. Hummock grasslands, open low tree and mallee steppe; *Eucalyptus gongylocarpa* and *E. youngiana* over *Triodia basedowii* on sand plain ($e_{19}Mre_{20}Srt_2Hi$).
2. Hummock grasslands, open low tree and mallee steppe; *Eucalyptus gongylocarpa* and *E. youngiana* over *Triodia basedowii* between sand hills ($e_1Lre_{20}Srt_2Hi$).
3. Low woodland: *Acacia aneura* (mulga) ($a1li$)
4. Hummock grasslands, open low tree steppe; *Acacia aneura* (mulga), *Casuarina pauper* (Sheoak) [syn. *C.cristata*] over *Triodia basedowii* between sand ridges ($a_1c_2Lrt_2Hi$)
5. Succulent steppe; *Acacia aneura* (mulga) with *Atriplex spp.* (Saltbush) with *Maireana spp.* (k_1k_2Ci)

Although the sand ridges are not individually mapped, Beard describes them as "the Spinifex is generally replaced by ericoid shrubs and larger shrubs such as *Grevillea stenobotrya*, *Acacia spp.*, and small trees of *Callitris sp.* (probably *C.preissii*)" (Beard, 1975).

The vegetation and flora survey of the Operational Area of the proposed TGP conducted by *ecologia* (March 2009) provides vegetation mapping at a scale of 1:120,000 using aerial photography, ground truthing and multivariate analysis of the floristic composition and vegetation structure of quadrats. Eleven major vegetation communities, incorporating a further eighteen vegetation subtypes were mapped within the Operational area and its surrounds (*ecologia*, 2009).

5 Survey Methodology

Flora of conservation significance within the Operational Area of the proposed TGP were identified during previous surveys of the area commissioned by the Tropicana JV for the TGP. The nineteen conservation significant flora species which have been identified within the TGP area, that occur within the GVD Biogeographic region and are therefore the focus of this survey are outlined in Table 3. The sand dunes, interdune swales and sand to loamy plains vegetation communities in which these species were predominantly located within the TGP area (according to *ecologia* 2009) were targeted in the Plumridge Lakes Nature Reserve, Queen Victoria Spring Nature Reserve and the area 50km south of the Operational Area searched during this survey. A description of these key vegetation communities is provided in Appendix 1. The presence of these vegetation community types were identified through aerial photography.

Table 3. Species targeted in the regional survey and their preferred habitat

Species	Status	Preferred Habitat
<i>Acacia eremophila</i> var <i>variabilis</i>	P3	A small shrub 1-1.6m tall. Preferred habitat is sandy or sandy loam soils.
<i>Acacia eremophila</i> ssp. numerous nerved variant	P3	This species is a dense shrub with a rounded crown from 1 to 2 m high. It grows in sandy soil and on flats
<i>Baeckea</i> sp. Great Victoria Desert	P2	A shrub to 1m high with small pink to white flowers borne along the stems at the leaf axils from April to June. Habitats recorded from previous collections include red sand, yellow sandy loam undulating plains and gentle slopes. Located within white clay pans and loamy plains within the TGP (<i>ecologia</i> 2009).
<i>Baeckea</i> sp. Sandstone	P1	A low, spreading to upright shrub to 1m in height. The flowers are small and pink to white, and can often be seen in the months after good rainfall. This species occurs in low woodlands or with Mulga, or among mallee and taller shrubs with spinifex. It tends to be found on flat, red, loamy sand plains.
<i>Caesia rigidifolia</i>	P1	A grass like species to 50cm high. Grows in clumps on the crests of low and narrow, linear, parallel sand dunes.
<i>Caesia talinyka?</i>	-	This sedge like herb grows to 50cm high and 70cm in diameter. Preferred habitat is crests and slopes of sand dunes. Located within mixed open tall shrublands on longitudinal sand dunes within the TGP (<i>ecologia</i> 2009).
<i>Comesperma viscidulum</i>	P4	An upright shrub to 1m tall. Preferred habitat includes red sands on dunes and yellow to orange undulating sand plains with sparse Eucalypt woodland or mallee.
<i>Conospermum toddii</i>	R	A spreading shrub, 1.2 to 2m high with white to yellow flowers in July to October (Plate 5-1). It is consistently recorded on the crests of sand dunes, usually in yellow sand. Located within mixed open tall shrublands on longitudinal sand dunes.
<i>Davesia purpurascens</i>	P4	A prickly erect shrub under 1m in height that produces yellow-brown-red pea flowers during October. Plants occur on sandy or loamy soils over laterite on flats and ridges. Located within <i>Eucalyptus concinna</i> open mallee woodlands on undulating plains within the TGP (<i>ecologia</i> 2009).
<i>Dicrasyllis cundeeleensis</i>	P2	An upright shrub growing up to 0.5m in height, with grey-white woolly haired stems and leaves. It occurs on yellow sand dunes and the associated swales
<i>Dicrasyllis nicholasii</i>	P2	An upright shrub growing to about 0.6m in height. The stems have a grey, woolly appearance. The blue flowers occur in groups at the end of branching stems. The species has been recorded as flowering in January and April, but it possibly also flowers at other times of the year in response to good rainfall. It is often located on red, sandy loam soils on flat to slightly undulating plains in association with mallee, shrubs and spinifex. Located within numerous vegetation communities primarily associated with mixed eucalypt woodlands or tall shrublands on sandy soils (<i>ecologia</i> 2009).
<i>Grevillea secunda</i>	P2	A low, spreading shrub that grows between 0.3m to 0.8m in height, usually flowers between September and October. Typically located on red or yellow sand dunes or undulating sandplain environments in Eucalypt woodland or mallee.
<i>Lepidobolus deserti</i>	P4	A rhizomatous, caespitose perennial herb between 0.15 and 0.45m in height. It typically occurs on yellow or orange sand dunes. Located within mixed tall open shrublands on sand dunes within the TGP (<i>ecologia</i> 2009)

Species	Status	Preferred Habitat
<i>Malleostemon</i> sp. <i>Officer Basin</i>	P2	An open shrub generally to 1 m, but occasionally up to 3m height in tall shrubland. Preferred habitat is yellow sands and dune slopes.
<i>Microcorys</i> <i>macredieana</i>	P3	A wispy, broom-like, low shrub growing to between 0.2 and 1.5m in height. The plants grow in yellow sand on dunes and plains, often in small clusters. Located within open woodlands and tall open shrublands on sand dunes within the TGP (<i>ecologia</i> 2009).
<i>Micromyrtus serrulata</i>	P2	An erect shrub to 1.5m high. Typically located on granitic sand, brown sandy clay over granite, granite-laterite breakaways or sandy clay over granite.
<i>Micromyrtus</i> <i>stenocalyx</i>	P3	A slender shrub from 0.3 to 1.5m tall with tiny, creamy-yellow flowers from April to December. It usually occurs on sand dunes and undulating sandplains of yellow or rarely red soils. Located within Eucalyptus open woodlands and mixed tall open shrublands on dunes and swales within the TGP (<i>ecologia</i> 2009).
<i>Olearia arida</i>	P2	A low shrub up to 0.7m in height and is usually located on undulating low rises of red or yellow sand. Located within Eucalypt mallee woodland and mixed Eucalypt open woodlands on dunes and swales (<i>ecologia</i> 2009).
<i>Thryptomene</i> <i>eremaea</i>	P2	An erect open shrub to 1.5m high. Usually associated with red or yellow sand and sandplains.

The survey involved foot traverse of potentially suitable habitat by up to seven trained personnel. Whilst it is possible to predict the likelihood of the presence of particular species based on landform and soil type, opportunistic searches along existing tracks and on route to the preferred habitats within the survey area were also carried out to ensure an unbiased approach to the survey. This approach ensured that as many different vegetation groups and habitat types as possible were surveyed within the available time.

However, as stipulated in the Regulation 4 Permit for flora surveys within Nature Reserves, the survey area was limited to opportunistic roadside/trackside surveys to ensure minimal impact on the nature reserves.

Known locations of conservation significant species outside of the disturbance areas of the proposed TGP were visited during the survey (known locations were identified from DEC flora database search). At each known location, polygons were traversed encompassing the population. Voucher specimens from each population were collected, and an estimate of population size and density recorded. Specimens have been submitted to Karina Knight at the Western Australian Herbarium accompanied by the completed Rare Flora Report Form, and the data collated using the DEC MAX database (a species database helper for Windows).

In addition, areas considered to be ideal habitat for particular species were traversed in search of potential new populations. Further details of the three survey areas are as follows.

Survey 1: 50km South of the TGP Operational Area

The survey of this area was conducted between 7th and 11th December 2008 by seven AngloGold personnel. The area traversed encompassed approximately 60 km of tracks and adjacent areas.

This area is dominated primarily by yellow dunes with orange to red sand swales. Dunes are typically oriented east-west and are approximately 10-20 m in height. The area surveyed had been burnt in a mosaic that ranged from less than 5 to more than 20 years, and as a result displayed a range of species in various stages of growth form and therefore was a good representation of the vegetation communities found within the TGP operational area.

Survey 2: Queen Victoria Spring Nature Reserve

This survey was conducted between 14th and 18th December 2008 by five AngloGold personnel. The area traversed during this survey encompassed approximately 90km of tracks and adjacent areas.

Only the western side of the Nature Reserve was surveyed as the conservation significant species targeted in this survey are predominantly confined to deep sands and dunes. The Regulation 4 Permit obtained from DEC, to allow surveys within Nature Reserves, restricted the survey effort to existing tracks and their immediate surrounds. Existing tracks were limited on the western side of the Nature Reserve.

Survey 3: Plumridge Lakes Nature Reserve and Adjacent Vacant Crown Land

This survey was conducted between the 16th and 18th January 2009 by four qualified AngloGold personnel. The area traversed during this survey encompassed approximately 50 km of tracks and adjacent areas.

As with Queen Victoria Spring Nature Reserve survey, the survey effort was restricted by the Regulation 4 Permit to existing tracks and as a result, some areas that appeared geographically suitable for the target species were unable to be surveyed as no existing tracks were available to access these areas.

6 Conservation Status Definitions

Rare Flora species are gazetted under subsection 2 of Section 23F of the *Wildlife Conservation Act 1950* and are defined as:

- **Declared Rare Flora (DRF) - Extant** - "Plants which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such."
- **Declared Rare Flora – Presumed Extinct** – "Plants which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently and have been gazetted as such."

Where plants appear to be rare or threatened, but for which there is insufficient scientific information to make a proper evaluation of their conservation status, a Priority status is assigned. Levels of Priority are defined as follows:

- **P1 - Priority One – Poorly Known Taxa** - Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

- **P2 - Priority Two – Poorly Known Taxa** - Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
- **P3 - Priority Three – Poorly Known Taxa** - Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but need further survey.
- **P4 - Priority Four – Rare Taxa** - Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

7 Survey Limitations

According to the EPA Guidance Statement for Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia No 51, flora and vegetation surveys may be limited by factors including a lack of pre-existing information, inappropriate survey timing or intensity, or access or resource constraints. The surveys within the Nature Reserves were limited by the requirements of the Regulation 4 Permit obtained from the DEC which confined the surveys to existing tracks and their immediate surrounds only. This restriction prevented access to areas that appeared geographically suitable for the target species of this survey.

In addition, the Plumridge Lakes Nature Reserve survey (Survey 3) was cut short for safety reasons. Several unsigned animal jaw traps were located adjacent to the main track through the reserve. These traps are usually laced with poison and therefore it was deemed unsafe to continue until all trap locations were known.

8 Study Team

The study team consisted entirely of AngloGold Ashanti Australia personnel. The team members are listed in Table 4. Ms Ana Storey was the project manager and team leader and was present for each survey. Ana's formal qualification is a Bachelor of Science in Plant Biology and Earth Science.

Table 4: Survey Team

Name	Survey Area		
	Survey 1	Survey 2	Survey3
Ms Ana Storey	√	√	√
Mr Simon Tucker			√
Mr Peter Bouteloup	√	√	
Ms Marlies Kern	√	√	
Mr Harry Tucker	√		√
Mr Steve Catomore	√	√	
Mr Alex Dent	√	√	√
Mr James Summerhayes	√		

Survey 1 50km South of the TGP
 Survey 2 Queen Victoria Spring Nature Reserve
 Survey 3 Plumridge Lakes Nature Reserve

9 Results

9.1 50KM SOUTH OF THE TGP OPERATIONAL AREA

The survey area incorporates both yellow and red sand vegetation communities which lie across broad, undulating sand hills and swales and east west oriented sand dunes.

The area has been subjected to a mosaic burning regime that appears to range from more than 20 years to less than 5 years and as a result the successional recruitment of vegetation is apparent.

The most common vegetation group observed in this survey was Mixed Eucalypt woodlands over open shrublands over *Triodia basedowii* hummock grasslands (*e_xL.t₂H*) as described by *ecologia* 2009 (Vegetation Group 1 Interdune swales and plains).

The northern section of the survey (conducted around the Independence Bore) contained primarily orange to red sands where the vegetation could be classified as being sub-communities (ii) *Eucalyptus youngiana* open woodland and (iii) *Eucalyptus trivalva* mallee woodland (*ecologia* 2009 – see Appendix 1). A number of small dunes in this area were traversed and ; species located include *Microcorys macredieana* and *Lepidobolus deserti* only. Interdunal areas were found to be more diverse, perhaps as a result of the fire mosaic apparent in this area.

The southern section of the survey area (conducted on Conrad Straight) contained broad yellow sand plains that in many areas had been burned within the past ten years. The vegetation can be broadly described as Mixed Eucalypt woodlands over *Triodia basedowii* hummock grasslands and more specifically sub-community (ii) *Eucalyptus youngiana* open woodland. However, large areas were void of an upper storey. The relatively recent burning has enabled populations of *Grevillea secunda* to emerge, along with *Comesperma viscidulum*. Several areas along this survey route can be described as heath land communities. These areas are predominantly characterised by dense Myrtaceae populations including *Baeckea sp. GVD?*

Species recorded during this survey are listed below with the approximate number of individuals recorded. A complete description of findings is provided in Appendix 2. The location of the recorded species is shown on Figure 4.

Table 5: Conservation Significant Species recorded in Survey 1

Species	Approximate No. of Plants	No. of Populations
<i>Baeckea sp Great Victoria Desert</i>	15,260	15
<i>Lepidobolus deserti</i>	8,000	2
<i>Grevillea secunda</i>	875	5
<i>Microcorys macredieana</i>	1,000	3
<i>Micromyrtus stenocalyx</i>	3,000	3
<i>Comesperma viscidulum</i>	1,300	4
<i>Dicrastylis cundeeleensis</i>	2	2
<i>Olearia arida</i>	1,000	3
<i>Dicrastylis nicholasii</i>	500	3

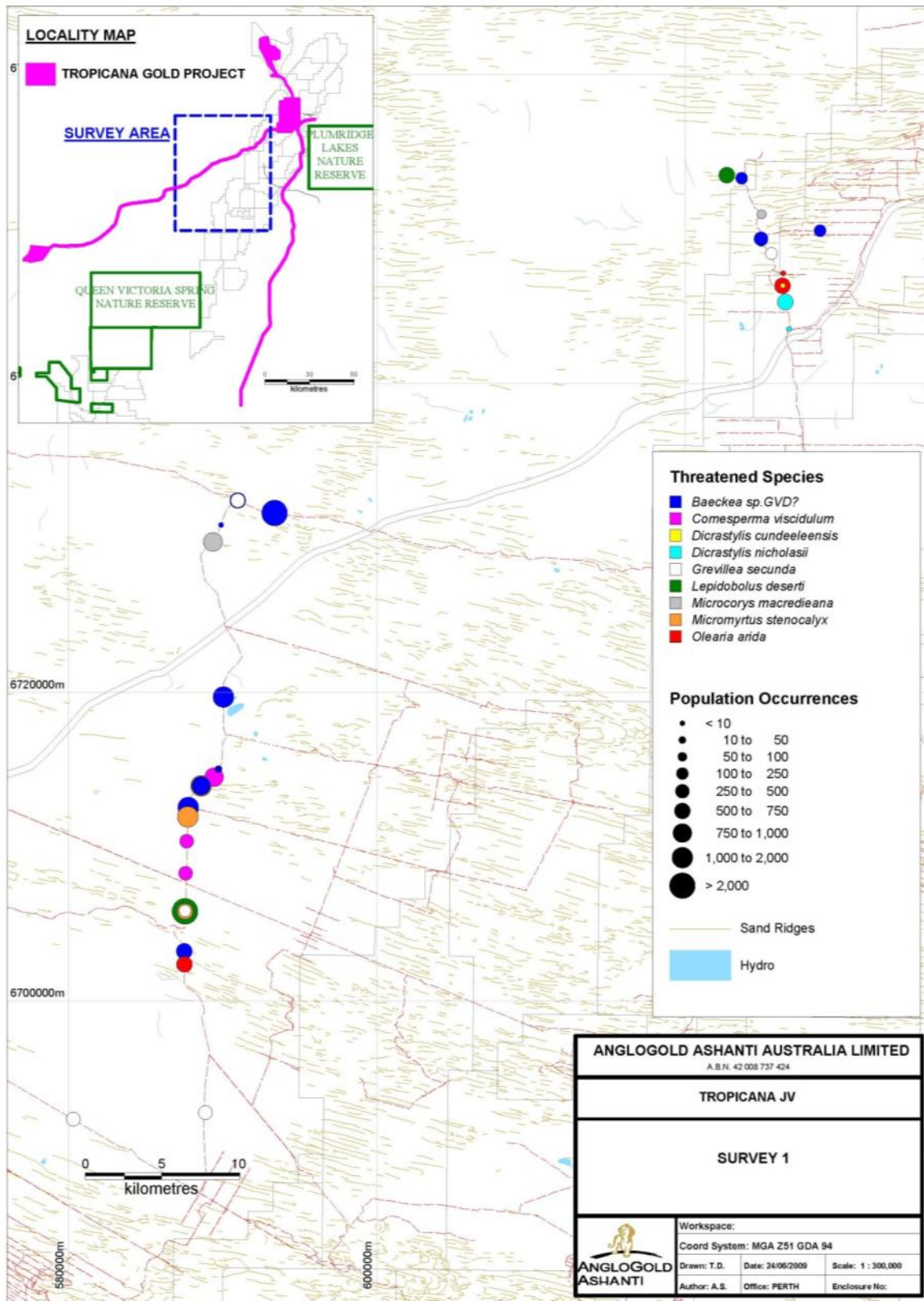


Figure 4: Conservation Significant Flora Recorded 50km South of the TGP

Plate 1. *Comesperma viscidulum*



Plate 2. *Microcorys macredieana*



Plate 3. *Grevillea secunda*

9.2 QUEEN VICTORIA SPRING NATURE RESERVE (SURVEY 2)

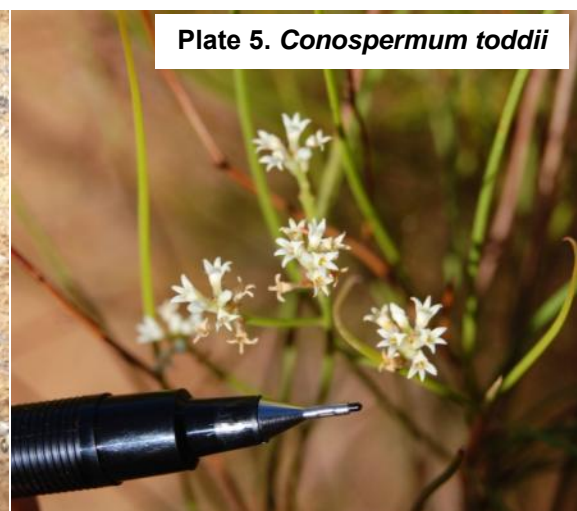
The section of the Queen Victoria Spring (QVS) Nature Reserve included in Survey 2 consists predominantly of large yellow sand dunes and broad yellow sand hills. The fire mosaic seems to suggest a history of frequent burns varying in size and intensity. As a result the recolonisation of areas by vegetation is represented by different stages of recruitment.

Much of the area surveyed can be described as Vegetation Group 3: Isolated trees of *Eucalyptus gongylocarpa* over mixed shrubs and *Triodia desertorum*, *T. basedowii* sparse hummock grassland ($xS.t_2t_7H$) as described by *ecologia* (Appendix 1). Both sub-communities (i) Mixed, open, tall shrubland and (ii) *Callitris columellaris/Grevillea juncifolia* tall open shrubland were present. Some sections could also be classified as being part of Vegetation Community 2: *Eucalyptus gongylocarpa* (marble gum) open woodland over *Triodia desertorum* or *T. basedowii* open hummock grassland ($e_{19}L.t_2t_7H$), sub-community (i) *Eucalyptus gongylocarpa* open woodland (see Appendix 1 for full description of the vegetation community).

Species recorded during this survey are listed below with a complete description of findings provided in Appendix 3. The location of the recorded species is shown on Figure 5.

Table 6: Conservation Significant Species Recorded in Survey 2

Species	Approximate No. of Plants	No. of Populations
<i>Baeckea sp Great Victoria Desert</i>	500	3
<i>Lepidobolus deserti</i>	10,000	11
<i>Grevillea secunda</i>	250	10
<i>Microcorys macredieana</i>	750	6
<i>Caesia talinyka</i>	2,575	7
<i>Conospermum toddii</i>	2,800	16
<i>Micromyrtus stenocalyx</i>	125	4



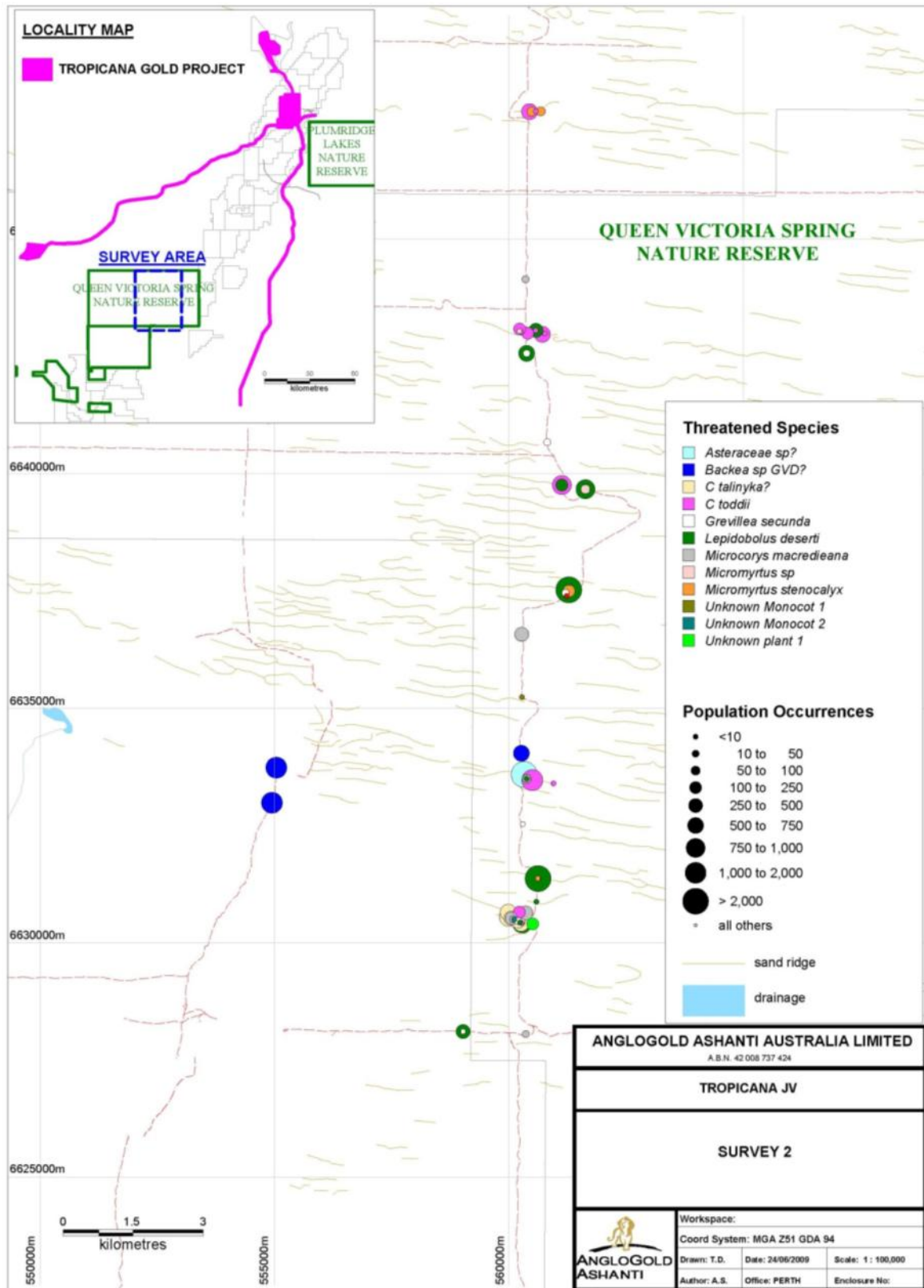


Figure 5: Conservation Significant Flora recorded in Queen Victoria Spring Nature Reserve survey area

9.3 PLUMRIDGE LAKES NATURE RESERVE (SURVEY 3)

The Plumridge Lakes Nature Reserve (PLNR) survey was restricted to the existing tracks as required by the Regulation 4 Permit. This involved two tracks, one trending south-west to north-east and the other east-west.

The south west/ north east trending track is characterised predominantly by red sands and frequently exposed lateritic horizons. As a result, some of the soils are coarse grained, and contain relatively large quantities of gravel. The vegetation communities in these areas can be classified as Vegetation Group 1: Mixed Eucalypt woodlands over open shrublands over *Triodia basedowii* hummock grasslands (*e_xL.t₂H*), sub-communities (i) *Eucalyptus youngiana*, *E. trivalva* or *E. leptopoda* open mallee woodland and (iii) *Eucalyptus trivalva* mallee woodland. In areas that appear relatively recently burnt (5 years), *Dicrastylis nicholasii* and *D. cundeeleensis* were observed. *Baeckea sp Great Victoria Desert?* is present in heathland communities in these areas that have not been recently burnt.

The east west trending track displays quite different geomorphological attributes. This area is predominantly characterised by orange to yellow sand plains and dunes. These dunes increase in elevation towards the east. It is on these elevated dunes that species such as *Caesia talinyka* and *Micromyrtus stenocalyx* appear. No *Conospermum toddii* was identified within PLNR, however, a population was recorded approximately 10 km east of the Reserve boundary on the east-west track.

Species recorded during this survey are listed below with a complete description of finding provided in Appendix 4. The location of the recorded species is shown on Figure 6.

Table 7: Conservation Significant Species recorded in Survey 3

Species	Approximate No. of Plants	No. of Populations
<i>Dicrastylis nicholasii</i>	2,125	4
<i>Baeckea sp Great Victoria Desert</i>	3,650	8
<i>Dicrastylis cundeeleensis</i>	570	3
<i>Grevillea secunda</i>	50	2
<i>Microcorys macredieana</i>	250	2
<i>Micromyrtus stenocalyx</i>	2,625	2
<i>Olearia arida</i>	1	1
<i>Conospermum toddii</i>	2,500	3
<i>Caesia talinyka</i>	2,250	5

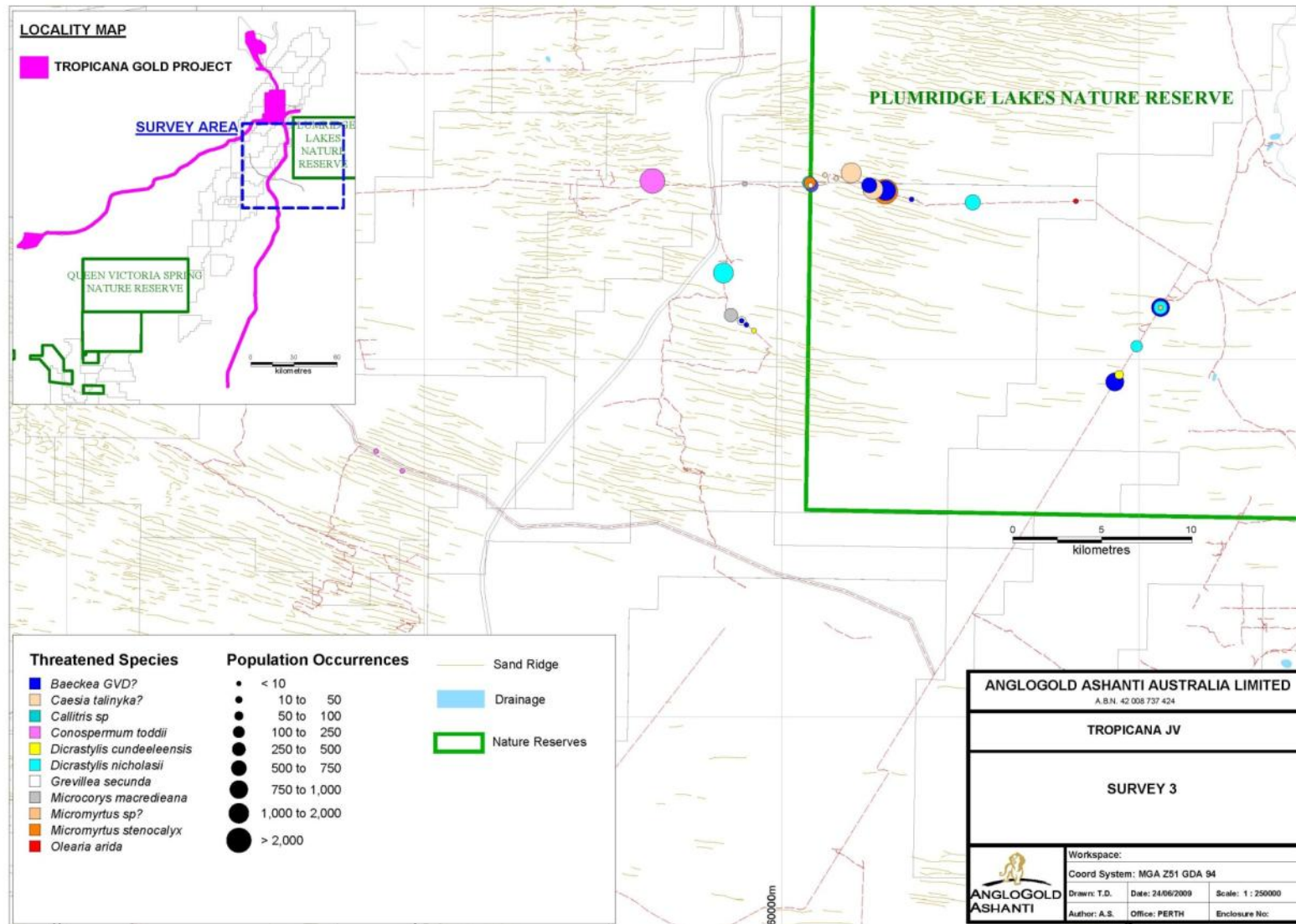


Figure 6: Conservation Significant Flora recorded in Plumridge Lakes Nature Reserve survey area



10 Discussion and Conclusion

Of the 19 conservation significant species targeted during these surveys, 11 were located both inside and outside the nearby Nature Reserves. The species observed are listed in Table 8.

Table 8: Conservation Significant Species recorded during surveys

Species	Conservation Status	Survey Area Recorded			Total (Approx) Number of Plants	Total Number of Populations
		Survey 1	Survey 2	Survey 3		
<i>Baeckea sp. Great Victoria Desert</i>	P2	√	√	√	2,760	26
<i>Caesia talinyka?</i>	N/A		√	√	4,825	12
<i>Comesperma viscidulum</i>	P4	√			1,300	4
<i>Conospermum toddii</i>	R		√	√	5,300	19
<i>Dicrastylis cundeeleensis</i>	P2	√		√	572	5
<i>Dicrastylis nicholasii</i>	P2	√		√	2,625	7
<i>Grevillea secunda</i>	P2	√	√	√	1,175	17
<i>Lepidobolus deserti</i>	P4	√	√		18,000	13
<i>Microcorys macredieana</i>	P3	√	√	√	2,000	11
<i>Micromyrtus stenocalyx</i>	P3	√	√	√	5,750	9
<i>Olearia arida</i>	P2	√		√	1,001	4

Survey 1 – 50km South of the TGP

Survey 2 – Queen Victoria Spring Nature Reserve

Survey 3 – Plumridge Lakes Nature Reserve

Species that were not located during the recent surveys are listed in Table 9. These species may occur within suitable habitat within the Nature Reserves, however due to access limitation specified by the Reg 4 license, the preferred habitat for these species was not observed and thus not surveyed.

Within Survey Area 1 (50km South of the TGP), the Priority 2 species *Grevillea secunda* appears to be strongly associated with undulating yellow and yellow-orange sand hills and in areas relatively recently burnt. It seems to prefer open areas with little or no canopy cover and a diverse herbaceous ground storey. In contrast, the Priority 2 species *Olearia arida* was found to generally prefer red sand plains with a mature *E. gongylocarpa* canopy cover and well developed hummock grasses.

Table 9: Targeted conservation significant species not recorded during surveys

Species	Conservation Status
<i>Acacia eremophila var variabilis</i>	P3
<i>Acacia eremophila</i> ssp. numerous nerved variant	P3
<i>Baeckea sp. Sandstone</i>	P1
<i>Caesia rigidifolia</i>	P1
<i>Davesia purpurascens</i>	P4
<i>Malleostemon sp. Officer Basin</i>	P2
<i>Micromyrtus serrulata</i>	P2
<i>Thryptomene eremaea</i>	P2

Dicrastylis nicholasii appears to be a primary coloniser of red to orange sand plains and broad undulating sand hills within the Survey 1 area. This species also appears to be a coloniser of recently disturbed areas. Its population density appears inversely proportional to that of *Triodia spp.*. That is to say that by the time Spinifex has become dominant, *D. nicholasii* has retreated and usually either mallee or mulga are recolonising along with other shrub species such as *Grevillea stenobotrya* and *Acacia colletioides*.

In the Queen Victoria Spring Nature Reserve survey, the DRF species *Conospermum toddii* and currently unclassified species *Caesia talinyka* are associated with the steep tall dunes. *C.toddii* has a preference for the crests of the dunes, and is seldom observed growing on the slopes. However, *C. talinyka* was observed on the slopes as well as the crests. The Priority 2 species *Grevillea secunda* was exclusively associated with undulating sand plains that had been burnt within the last 10 years. The Priority 4 species *Lepidobolus deserti* was found across a range of habitats, it's only preference being for relatively deep sands.

In the Plumridge Lakes Nature Reserve, the coarse red soils and flat topographical areas appear to exclude the presence of *Conospermum toddii*, *Caesia talinyka* and *Grevillea secunda*.

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Appendix 1. Vegetation Communities (as per *ecologia*, 2009)

Interdune swales and sand plains:

1. Mixed Eucalypt woodlands over open shrublands over *Triodia basedowii* hummock grasslands (e_xL.t₂H)

These woodlands are broadly distributed on the sandy plains of the survey area. The over storey is dominated by an open to scattered stratum of Mallee and tree form Eucalypts, usually with at least two species co-dominant. The most common species is *Eucalyptus trivalva*, however *E.concinna* and *E. youngiana* are also widespread, with *E.leptopoda subsp. elevate*, *E. effuse*, and *E. gracilis* also recorded at some locations. The coniferous tall shrub or low tree *Callitris preissii* is present in low numbers, particularly at sites in which *E. youngiana* is also present. The ground cover is dominated by open to moderately dense *Triodia basedowii*, with the exception of a small number of locations with a recent burn history, at which the density of hummock grass is reduced and soft grass such as *Eragrostis setifolia*, *Aristida contorta*, and *A. holathera* form a sparse ground cover.

A number of subtypes of this vegetation community were differentiated within the statistical analysis, although their boundaries could not be distinguished with sufficient consistency to allow mapping as discrete polygons using aerial photography. These subcommunities include:

- (i) *Eucalyptus youngiana*, *E.trivalva*, or *E.leptopoda* open mallee woodland over *Acacia murrayana* tall open shrub stratum of over *Triodia basedowii* hummock grassland. (e_xL.a₂₀S.t₂H)
A sparse mixed mallee stratum, most commonly of *Eucalyptus trivalva* but occasionally *E.youngiana* and/or *E.leptopoda* occurs above an open shrub stratum in which the tall shrub *Acacia murrayana* is dominant, above a lower stratum dominated by *Leptosema chambersii*, *Dicrastylis brunnea* and *Keraudrenia velutina subsp. elliptica*.
- (ii) *Eucalyptus youngiana* open woodland over *Callitris preissii* sparse tall shrubland over mixed open shrubland over *Triodia basedowii* open to moderately dense hummock grassland (e₂₀p₂L.xS.t₂H)
This subtype is widespread, occurring across large areas surveyed. Although there is considerable variation in the composition of the shrub strata, *Duboisia hopwoodii*, *Solanum plicatile*, *Thryptomene biseriata* and *Aluta maisonneuvii subsp.auriculata* are typically present at open coverage. *E trivalva* is also present at some locations. The presence of *Codonocarpus cotinifolius* in some areas probably reflects the frequency of bushfires through this area rather than an affiliation of this taxon with other species in this subtype. Priority taxon *Dicrastylis nicholasii* (P2) was recorded in this vegetation subtype.
- (iii) *Eucalyptus trivalva* mallee woodland over *Acacia* and *Eremophila* dominated shrubland over *Triodia basedowii* open hummock grassland (e₇₀L.a₁er_xS.t₂H)
This subtype is particularly widespread occurring throughout the entire survey area. Although *E. trivalva* is the most common species, *E. concinna*, *E. effuse* and/or *E.youngiana* are also present at some locations within the mallee overstorey. *Acacia aneura* is abundant

within the shrub stratum, with *Eremophila glabra* subsp. *glabra*, *E. alternifolia*, *Acacia colletiodes* and *A. burkittii* also widespread at sparse to open coverage above a sparse lower shrub stratum in which *Ptilotus obovatus*, *Scaevola spinescens* and *Solanum plicatile* are widespread. Priority taxon *Olearia arida* (P2) was also recorded in this vegetation subtype.

2. *Eucalyptus gongylocarpa* (marble gum) open woodland over *Triodia desertorum* or *T. basedowii* open hummock grassland (e₁₉L.t₂t₇H)

This association is broadly distributed in across the survey areas, occurring in the swales between dunes and on the lower dune slopes. Two subtypes are present:

- (i) *Eucalyptus gongylocarpa* open woodland over *Dodonaea viscosa* subsp. *angustissima*/ *Eremophila platythamnos* subsp. *platythamnos* open shrubland over *Triodia desertorum* or *T. basedowii* open hummock grassland (e₁₉L.d₃er₁S.t₂t₇H)

This subtype is widespread through the central portion of the survey area. It appears to be associated with dunal landforms which are less extreme in slope, occurring both on the slopes of low dunes and the swales and plains between the generally lower dunes in this area. *E. gongylocarpa* forms a sparse to open tree stratum above an open shrub stratum in which the shrubs

- (ii) *Eucalyptus gongylocarpa*/ *E.youngiana*/ *E.concinna* open woodland over mixed open shrubland over *Triodia desertorum* open hummock grassland (e₁₉e_xL.xS.t₇H)

This subtype occurs on the swales and basal slopes of the steeper dunes. The open tree stratum is comprised of sparse to open *E.gongylocarpa* above a mallee stratum of predominantly *E.concinna* and *E. youngiana*. The shrub stratum is more diverse than in subtype (i), however *Callitris preissii*, *Dodonaea viscosa* subsp. *angustissima* are also widespread. Other predominant species include: *Acacia jamesiana*, *A. prainii*, *Aluta maisonneuvii* subsp. *auriculata*, *Anthotroche pannosa*, *Hannafordia bissillii* subsp. *bissillii*, and *Pityroidia loricata*. Ground stratum in this subtype is dominated by *Triodia desertorum* provides open to moderate dense coverage with the tussock forming perennial herb *Lomandra leucocephala* subsp. *robusta* also consistently present on dunal slopes.

Priority flora species; *Olearia arida* (P2), *Dicrastylis nicholasii* (P2), *Micromyrtus stenocalyx* (P3), and *Grevillea secunda* (P2) were recorded in this subtype

Longitudinal Sand Dunes:

3. Isolated trees of *Eucalyptus gongylocarpa* over mixed shrubs and *Triodia desertorum*, *T. basedowii* sparse hummock grassland (xS.t₂t₇H).

An extensive systems of seif dunes trending predominantly east-west characterise the shield area of the Great Victoria Desert. These dunes are generally characterised by a gradation of vegetation species in transect across the dunes from swales to crest. Swales can be described as having the vegetation association described above in Type 2. However, Dune crests and upper slopes are characterised by a moderately dense to open shrub stratum of variable heights. Both *Triodia desertorum*

and *T. basedowii* are widespread, with no apparent geographic trend in their distribution. *Triodia desertorum* tends to have a stronger affiliation with the crests of dunes, whereas *T. basedowii* can be found on crests as well as slopes.

Most species recorded on the dunes display relatively high specificity. Approximately 25% of the species recorded were found exclusively in this habitat. Dunal vegetation communities can be separated into two subtypes.

- (i) Mixed, open, tall shrubland over *Davesia grahamii*, *Pityroidia loricata*, *Chrysocephalum puteale* low shrubland over sparse to open *Triodia desertorum* or *T. basedowii* hummock grassland and *Lomandra leucocephala* subsp. *robusta* (xS.xZ.t₇H₁)

Eucalyptus gongylocarpa is occasionally present above a variable height shrub stratum. However, middle storey shrub species such as *Thryptomene biseriata* and *Anthotroche pannosa* are consistently present. There is some variation between sites in the composition of dominant species within the tall shrub stratum. Dominant species in this stratum vary between *Grevillea stenobotrya*, *G.nematophylla* subsp. *planicosta*, *Allocasurina acutivalvis*, *Cryptandra distigma*, and *Acacia kempeana*. This may be a function of the recolonisation process after disturbance by fire. The tall shrubs *Grevillea juncifolia* subsp. *temulenta* and *Callitris preissii* may also be present in low density. The lower shrub stratum composition is more homogenous and type specific, with *Chrysocephalum puteale*, *Davesia grahamii*, *Pityroidia loricata* typical and *Dampiera eriantha*, *Bertya dimerostigma*, *Newcastelia hexarrhena*, and *Pomax sp. desert* (A.S. George 11968) also recorded at most sites. At ground level the dominant species in this subgroup are *Lomandra leucocephala* subsp. *robusta*, and *Lepidobolus deserti* (P4), however *Triodia desertorum* and *T. basedowii* are also present in sparse cover.

Priority flora associated with this vegetation community includes *Dicrastylis nicholasii* (P2), *Microcorys macredieana* (P3), *Micromyrtus stenocalyx* (P3), and *Lepidobolus deserti* (P4). The DRF species *Conospermum todii* is also found associated with this vegetation community. Also *Caesia talinyka*? (not yet priority classified) was identified in this vegetation community.

- (ii) *Callitris columellaris*/ *Grevillea juncifolia* tall open shrubland over *Acacia ligulata*, *Thryptomene biseriata*, *Anthotroche pannosa* open shrubland over *Triodia desertorum* or *Triodia basedowii* hummock grassland (p₁g₁L.xS.t₇H).

As in subtype (i) above, *Eucalyptus gongylocarpa* is occasionally present. A sparse to open tall stratum of the low trees/ shrubs consisting of *Callitris columellaris* and or *Grevillea juncifolia* is present above an open mid-level shrub stratum in which *Acacia ligulata*, *Thryptomene biseriata* and *Anthotroche pannosa* are common. Other shrubs locally present but not consistently represented in this vegetation subgroup are; *Acacia heteroneura* var. *jutsonii*, *Bertya dimerostigma*, *Eremophila platythamnos* subsp. *platythamnos*, *Hannafordia bissillii* subsp. *bissillii*, *Pityroidia loricata*, and *Cryptandra*

distigma. As in type (i) above, *Allocasuarina acutivalvis* and *Callitris preissii* comprise the tall shrub/ low tree stratum. Whilst the ground layer is typically comprised of *Triodia desertorum* and *T. basedowii*, with the tussock forming herb *Bertya dimerostigma*, and *Lepidobolus desertii* (P4) are also present.

Priority species *Dicrastylis nicholasii* (P2), *Microcorys macredieana* (P3), *Lepidobolus deserti* (P4) are associated with this vegetation subtype.

Appendix 2 : Species Data for Survey 1 (50km South of the TGP)

Appendix 2 – 50km South of the TGP Survey 1 - Results								
Population No.	Taxon	Easting	Northing	Density 50 x 50m	Plants/m	Total Area Diameter (m)	Population total area	Site/plant description
s1	<i>Baeckea sp.GVD?</i>	589	6730					Heath common/on yellow sand
s2	<i>Baeckea sp.GVD?</i>	590	6719	1250	0.5	300	1 plant per 2m ² /diam. 300m	<i>Callitris verrucosa</i> over <i>Triodia sp.</i> /thick canopy cover with <i>Eucalyptus gongylocarpa</i>
s3	<i>Lepidobolus deserti</i>	587	6705	7500	3	200	3 plant per m ² /diam. 200m	<i>Eucalyptus gongylocarpa</i> , <i>Callitris sp</i> over <i>Triodia sp.</i>
s4	<i>Baeckea sp GVD?</i>	593	6731					Large leaf, no mucron (1 plant)
s5	<i>Baeckea sp GVD?</i>	587	6712	1250	0.5	300	1 plant per 2m ² /diam. 300m	With <i>Microcorys macredieana</i> (1 plant per 10m ² /diam 50m)
s6	<i>Baeckea sp GVD?</i>	588	6713	825	0.33	300	1 plant per 3m ² /diam. 300m	<i>Comesperma viscidulum</i> , <i>Casaurina sp.</i> , <i>Baeckea sp. GVD</i> , and <i>Hakea francissiana</i> , <i>Olearia arida</i> , <i>Micromyrtus stenocalyx</i>
s7	<i>Baeckea sp GVD ?</i>	593	6731	5000	2	300	2 plant per m ² /diam. 300m	<i>E. gongylocarpa</i> over <i>Eucalyptus sp.</i> and <i>Callitris sp.</i> over <i>Acacia sp.</i> , <i>Acacia burkitti</i> , <i>Eremophila sp.</i> (<i>M. macredieana</i> , <i>O. arida</i> 1 plant per 5m ²)
s8	<i>Baeckea sp GVD?</i>	593	6731	5000	2	300	2 plant per m ² /diam. 300m	see s7
s9	<i>Baeckea sp GVD?</i>	588	6713	500	0.2	300	1 plant per 5m ² /diam. 300m	see s6
s10	<i>Grevillea secunda</i>	590	6732	250	0.1	150	1 plant per 10m ² /diam 150m	Open heath with <i>Grevillea juncifolia</i>
s11	<i>Microcorys macredieana</i>	589	6729	825	0.33	300	1 plant per 3m ² /diam. 300m	
s12	<i>Baeckea sp GVD?</i>	590	6732	500	0.2	50	1 plant per 5m ² /diam. 50m	<i>Eucalyptus sp.</i> , <i>Leptosema chambersii</i> , some <i>Comesperma viscidulum</i> over <i>Triodia sp.</i>
s13	<i>Baeckea sp.GVD?</i>	589	6719					

Population No.	Taxon	Easting	Northing	Density 50 x 50m	Plants/m	Total Area Diameter (m)	Population total area	Site/plant description
s14	<i>Micromyrtus stenocalyx</i>	588	6713	1250	0.5	300	1 plant per 2m ² /diam 300m	Open heath, <i>Eucalyptus</i> sp., <i>Baeckea</i> sp GVD?, <i>Olearia arida</i> , <i>Hakea francisiana</i> , <i>Banksia</i> sp. over <i>Triodia</i> sp
s15	<i>Comesperma viscidulum</i>	589	6715	4			4 plants in total	<i>Eucalyptus</i> sp., <i>Leptosema chambersii</i> over <i>Triodia</i> sp.
s16	<i>Comesperma viscidulum a</i>	589	6714	825	0.33	300	1 plant per 3m ² / diam 300m	
s17	<i>Comesperma viscidulum</i>	587	6708	250	0.1	150	1 plant per 10m ² /diam 150m	
s18	<i>Grevillea secunda</i>	587	6705	125	0.05	200	1 plant per 20m ² /diam. 200m	with <i>M.macredieana</i> (1 plant per 10m ² /diam 200m)
s19	<i>Baeckea</i> sp.GVD?	589	6715	10			10 plants only	
s21	<i>Micromyrtus stenocalyx</i>	587	6713	1250	0.5	500	1 plant per 2m ² /diam 500m	yellow sand plain with <i>Baeckea</i> spGVD.?(1 plant per 10m ²) <i>Acacia</i> spp., <i>E. gongylocarpa</i> over <i>Callitris</i> sp., over <i>Baeckea</i> sp GVD?. and <i>Hakea francisiana</i> , <i>M.stenocalyx</i> , over <i>Triodia</i> sp.
s22	<i>Micromyrtus macredieana</i>	587	6705	125	0.05	200	1 plant per 20m ² /diam 200m	Open heathland, <i>Eucalyptus</i> sp., <i>E. gongylocarpa</i> , yellow undulating sand ridge
s23	<i>Comesperma viscidulum</i>	587	6710	250	0.1	200	1 plant per 10m ² /diam 200m	<i>E. gongylocarpa</i> and <i>Eucalyptus</i> sp., over <i>Triodia</i> sp. on yellow-orange sand
s24	<i>Baeckea</i> sp.GVD?	587	6703	500	0.2	250	1 plant per 5m ² /diam 250m	Yellow sand plain, <i>Eucalyptus gongylocarpa</i> over <i>Grevillea juncifolia</i> , <i>Anthotroche pannosa</i> , <i>Callitris</i> sp. regeneration after fire

Population No.	Taxon	Easting	Northing	Density 50 x 50m	Plants/m	Total Area Diameter (m)	Population total area	Site/plant description
s25	<i>Grevillea secunda</i>	580	6692	250	0.1	200	1 plant per 10m2/diam 200m	Open burnt yellow sand plain, <i>Grevillea juncifolia</i> , <i>Casuarina sp.</i> juveniles
s26	<i>Dicrastylis cundeeleensis</i>	580	6692	1			1 plant	Burnt yellow sand plain, <i>Grevillea secunda</i> present (1 plant per 10m2)
s27	<i>Olearia arida</i>	587	6702	500	0.2	50	1 plant per 5m2/diam 50m	Recently burnt >5years, <i>Callitris sp.</i> and <i>Eucalyptus gongylocarpa</i> , orange sand
s28	<i>Grevillea secunda</i>	588	6692	250	0.1	200	1 plant per 10m2/diam 200m	Burnt yellow sand plain, regenerating <i>Eucalyptus sp.</i> , <i>Poaceae</i> .
s29	<i>Micromyrtus stenocalyx</i>	587	6705	500	0.2	300	1 plant per 5m2/diam 300m	Open heath with <i>Eucalyptus sp.</i> and <i>E gongylocarpa</i> , yellow undulating sand ridge
s30	<i>Dicrastylis cundeeleensis</i>	626	6746	1			1 plant	Small red sand incline, <i>Eucalyptus gongylocarpa</i> and <i>Triodia sp.</i>
s31	<i>Olearia arida</i>	626	6746	500	0.2	100	1 plant per 5m2/diam 100m	Small red sand incline, <i>Eucalyptus gongylocarpa</i> and <i>Triodia sp.</i>
s32	<i>Dicrastylis nicholasii</i>	626	6747	1			1 plant	Base of coarse red sand dune, <i>Eucalyptus spp.</i> and <i>Triodia sp.</i>
s33	<i>Dicrastylis nicholasii</i>	626	6743	5			5 plants	
s34	<i>Baeckea sp.GVD?</i>	624	6749	250	0.1	100	1 plant per 10m2/diam 100m	Flat red sand plain, <i>Callitris sp.</i> over <i>Aluta maisonneuvii</i>
s36	<i>Dicrastylis nicholasii</i>	626	6745	500	0.2	300	1 plant per 5m2/diam 300m	<i>Acacia aneura</i> and <i>Eucalyptus sp.</i> , red sand dune with <i>Triodia sp.</i>

Population No.	Genus	Easting	Northing	Density 50 x 50m	Plants/m	Total Area Diameter (m)	Population total area	Site/plant description
s37	<i>Olearia arida</i>	626	6747	1			1 plant	Base of red sand dune, <i>Eucalyptus spp.</i> and <i>Triodia sp.</i>
s38	<i>Grevillea secunda</i>	625	6748	125	0.05	400	1 plant per 20m2/diam 400m	Orange sand plain, <i>Acacia spp.</i> and <i>Triodia sp.</i>
s39	<i>Microcorys macredieana</i>	624	6749	1			1 plant	Side of small orange dune, <i>Eucalyptus gongylocarpa</i> over <i>Triodia sp.</i>
s40	<i>Lepidobolus deserti</i>	622	6753	500	0.2	200	1 plant per 5m2/diam 200m	On side of dune, juvenile <i>Hakea francisiana</i> over <i>Triodia sp.</i>
s41	<i>Baeckea sp.GVD?</i>	628	6749	125	0.05	100	1 plant per 20m2/diam 100m	Flat red sands with gravel, <i>E. gongylocarpa</i> and <i>Triodia sp.</i>
s42	<i>Microcorys macredieana</i>	624	6750	75	0.03	600	1 plant per 30m2/diam 600m	<i>Leptosema chambersii</i> , <i>Triodia sp.</i> , on red broad sand hill
s43	<i>Baeckea sp.GVD?</i>	623	6753	125	0.05	100	1 plant per 20m2/diam 100m	Flat red sand, spinifex dominant

Appendix 3. Species Data for Survey 2 (Queen Victoria Spring Nature Reserve)

Appendix 3 – Queen Victoria Spring Nature Reserve – Survey 2 – Results								
Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s44	<i>Baeckea sp GVD?</i>	559	6633	1250	0.5	200	1 plant per 2m2, diam 200m	Red sand, <i>Callitris sp.</i> with <i>Acacia sp</i> over <i>Triodia sp.</i>
s45	<i>Baeckea sp GVD?</i>	554	6632	1875	0.75	20	15 plants, diam 20m	Yellow sands, <i>Xanthorrhoea thorntonii</i> , <i>Callitris sp.</i> , <i>Eucalyptus sp.</i> over <i>Triodia sp.</i>
s46	<i>L deserti</i>	559	6628	250	0.1	300	1 plant per 10m2, diam 300m	Burnt yellow broad sand hills with <i>Eucalyptus gongylocarpa</i> adjacent to dune
s47	<i>G secunda</i>	559	6628				10 plants	Burnt yellow broad sand hills with <i>Eucalyptus gongylocarpa</i> adjacent to dune
s48	<i>M macredieana</i>	560	6628	25	0.01	500	1 per 100m2, diam 500m	Burnt yellow broad sand hills with <i>Eucalyptus gongylocarpa</i> adjacent to dune
s49	<i>G secunda</i>	560	6630					Burnt yellow broad sand hills with <i>Eucalyptus gongylocarpa</i> adjacent to dune
s50	<i>L deserti</i>	560	6630					Burnt yellow broad sand hills with <i>Eucalyptus gongylocarpa</i> adjacent to dune
s51	<i>G secunda</i>	560	6632					Unburnt yellow sand plain, with <i>Eucalyptus gongylocarpa</i> , <i>Eucalyptus sp.</i> , <i>Casuarina sp.</i> , and <i>Acacia sp.</i>
s52	<i>C talinyka?</i>	564	6628	125	0.05	100	1 plant per 20m2, diam 100m	Swale between dunes, with <i>Eucalyptus gongylocarpa</i> over <i>Triodia sp.</i>

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s54	<i>Baeckea sp</i> <i>GVD?</i>	560	6634	500	0.2	500	1 plant per 5m ² , diam 500m	Recently burnt orange sands, minimal recolonization with <i>Leptosema chambersii</i>
s56	<i>M macredieana</i>	560	6636	250	0.1	500	1 plant per 10m ² , diam 500m	Recently burnt orange sands, minimal recolonization with <i>Leptosema chambersii</i> absence of <i>Triodia sp.</i>
s57	<i>G secunda</i>	561	6637	25	0.01	500	1 plant per 100m ² , diam 500m	Extension of <i>Eucalyptus gongylocarpa</i> , <i>E.</i> <i>youngiana</i> , <i>Acacia sp.</i> over <i>Hakea</i> <i>francisiana</i> , <i>Xanthorrhoea thorntonii</i> , <i>Dianella revoluta var. divaricata</i> over <i>Triodia sp.</i> Extensive area of unburnt country adjacent to dune. Orientation north-south.
s58	<i>C toddii</i>	561	6637				20 plants	Sand dune (waypoint 358).
s59	<i>L deserti</i>	561	6637	5000	2	800	2 plants per m ² , diam 800m	Sand dune (waypoint 358).
s60	<i>Micromyrtus</i> <i>stenocalyx</i>	561	6637	125	0.5	800	1 plant per 2m ² , diam 800m	Sand dune (waypoint 358).
s61	<i>C toddii</i>	561	6639	825	0.33	500	1 plant per 3m ² , diam 500m	Top of sand dune along the crest and slope. Sand dune (waypoint 358). Photo 226,227. Photo 225 of melaleuca pod
s62	<i>L deserti</i>	561	6639	125	0.5	500	1 plant per 2m ² diam 500 m	Occurs throughout dune and slope all the way to track
s63	<i>G secunda</i>	560	6640	25	0.01	500	1 plant per 100m ² , diam 500m	Yellow orange sand plain. <i>Xanthorrhoea</i> <i>thorntonii</i> , <i>Eucalyptus gongylocarpa</i> and <i>E. youngiana</i> , <i>Casuarina sp.</i> , <i>Hakea</i> <i>francisiana</i> , <i>Grevillea juncifolia</i> , over <i>Triodia sp.</i> Unburnt.

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s64	<i>G secunda</i>	560 [REDACTED]	6642 [REDACTED]	25	0.01	500	1 plant per 100m ² , diam 500m	Low yellow undulating sands. <i>Callitris sp.</i> , <i>Eucalyptus gongylocarpa</i> , <i>Hakea francisiana</i> , over <i>Triodia sp.</i>
s65	<i>L deserti</i>	560 [REDACTED]	6642 [REDACTED]	500	0.2	500	1 plant per 5m ² , diam 500m	Low yellow undulating sands. <i>Callitris sp.</i> , <i>Eucalyptus gongylocarpa</i> , <i>Hakea francisiana</i> , over <i>Triodia sp.</i>
s66	<i>C toddii</i>	560 [REDACTED]	6642 [REDACTED]	150	0.06	100	6 plants, diam 100m	Low yellow sand dunes, <i>Callitris sp.</i> , <i>Lomandra leucocephala</i> , <i>Lepidobolus deserti</i> , <i>Eucalyptus gongylocarpa</i> , <i>E. youngiana</i> , <i>Grevillea juncifolia</i>
s67	<i>C toddii</i>	560 [REDACTED]	6643 [REDACTED]	N/A	0.83	6	5 plants, diam 6m	Extension of Low yellow sand dunes, <i>Callitris sp.</i> , <i>Lomandra leucocephala</i> , <i>Lepidobolus deserti</i> , <i>Eucalyptus gongylocarpa</i> , <i>E. youngiana</i> , <i>Grevillea juncifolia</i>
s69	<i>C toddii</i>	560 [REDACTED]	6643 [REDACTED]	125	0.05	100	5 plants in a diameter of 100m	Extension of Low yellow sand dunes, <i>Callitris sp.</i> , <i>Lomandra leucocephala</i> , <i>Lepidobolus deserti</i> , <i>Eucalyptus gongylocarpa</i> , <i>E. youngiana</i> , <i>Grevillea juncifolia</i>
s70	<i>G secunda</i>	560 [REDACTED]	6633 [REDACTED]	25	0.01	500	1 plant per 100m ² , diam 500m	Small undulating yellow-orange dune. <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp.</i> , <i>Casuarina sp.</i> over <i>Triodia sp.</i>
s71	<i>L deserti</i>	560 [REDACTED]	6633 [REDACTED]			800	1 plant per 3m ² , diam 800m	Small undulating yellow-orange dune system. <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp.</i> , <i>Casuarina sp.</i> , over <i>Triodia sp.</i> <i>L. deserti</i> across whole dune system

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
S72	<i>C.toddii</i>	560 [REDACTED]	6633 [REDACTED]	1000	0.4	500	Start of 200 plants across crest of dune (diam 500m)	Small undulating yellow-orange dune system. <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp</i> , <i>Casuarina sp</i> , over <i>Triodia sp</i> . <i>L. deserti</i> across whole dune system
s73	<i>C toddii</i>	560 [REDACTED]	6633 [REDACTED]				End of C toddii population	Small undulating yellow-orange dune system. <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp</i> , <i>Casuarina sp.</i> , over <i>Triodia sp</i> . <i>L. deserti</i> across whole dune system
s74	<i>M macredieana</i>	560 [REDACTED]	6633 [REDACTED]	50	0.02	500	1 plant per 50m2, diameter 500m	Small undulating yellow-orange dune system. <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp</i> , <i>Casuarina sp.</i> , over <i>Triodia sp</i> . <i>L. deserti</i> across whole dune system
s76	<i>L deserti</i>	561 [REDACTED]	6639 [REDACTED]	825	0.33	800	1 plant per 3m2, diam 800m	Small yellow dune. <i>Eucalyptus sp</i> . with <i>Triodia sp</i> .
s77	<i>C toddii</i>	560 [REDACTED]	6643 [REDACTED]				30 plants across top of dune	Large yellow sand dune. <i>Eucalyptus sp</i> . and <i>Callitris sp</i> . over <i>Triodia sp</i> .
s78	<i>L deserti</i>	560 [REDACTED]	6643 [REDACTED]	250	0.1	800	1 plant per 10m2, diam 800m	Large yellow sand dune. <i>Eucalyptus sp</i> . and <i>Callitris sp</i> . over <i>Triodia sp</i> .
s79	<i>C toddii</i>	560 [REDACTED]	6642 [REDACTED]	500	0.2	100	Start of 20 plant population across crest of dune (100 m)	Sand dune. <i>Casuarina sp.</i> , <i>Callitris sp.</i> , <i>Hakea francisiana</i> over <i>Triodia sp</i> .
s80	<i>C toddii</i>	560 [REDACTED]	6642 [REDACTED]				End of 20 plant population across crest of dune (100 m)	Sand dune. <i>Casuarina sp.</i> , <i>Callitris sp.</i> , <i>Hakea francisiana</i> over <i>Triodia sp</i> .

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s81	<i>M macredieana</i>	560	6644	25	0.01	500	1 plant per 100m ² , diam 500m	Undulating sand plain, burnt <> 10 years ago.
s82	<i>M stenocalyx</i>	560	6647	75	0.03	200	1 plant per 30m ² , diam 200m	Sand dune saddle. <i>Eucalyptus gongylocarpa</i> and <i>Callitris sp.</i> over <i>Triodia sp.</i>
s83	<i>C toddii</i>	560	6647	N/A	1.5	20	Isolated population. 30 plants across diam 20m	Large yellow sand dune. <i>Eucalyptus sp.</i> and <i>Callitris sp.</i> over <i>Triodia sp.</i>
s84	<i>M stenocalyx</i>	560	6647	50	0.02	800	1 plant per 50m ² , diam 800m	Large yellow sand dune. <i>Eucalyptus sp.</i> and <i>Callitris sp.</i> over <i>Triodia sp.</i>
s85	<i>C toddii</i>	560	6647	625	0.25	200	approximately 50 plants across diam 200m	Large yellow sand dune. <i>Eucalyptus sp.</i> and <i>Callitris sp.</i> over <i>Triodia sp.</i>
s87	<i>C talinyka?</i>	560	6630				2 plants	Yellow dune
s88	<i>L deserti</i>	560	6630	825	0.33	200	1 plant per 3m ² over whole dune diameter 200 m	Yellow dune
s89	<i>C toddii</i>	560	6630				4 plants	
s90	<i>C talinyka?</i>	560	6630	500	0.2	10	1 plant per 5m ² , diam 10m	
s91	<i>G secunda</i>	560	6630					Yellow dune <i>Melaleuca sp.</i> and <i>Anthotroche pannosa</i>
s92	<i>L deserti</i>	560	6630					Yellow dune <i>Melaleuca sp.</i> and <i>Anthotroche pannosa</i>
s93	<i>C talinyka?</i>	560	6630	250	0.1	100	Seedlings germinating along dune saddle 1 plant per 10 m diam 100 m	Recently burned (< 5 years) yellow broad sand dune and saddle

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s94	<i>G secunda</i>	560	6630	25	0.01	100	1 plant per 100m2 along dune diam 100 m	
s96	<i>M macredieana</i>	560	6630	25	0.01	200	1 plant per 200m2 diam 200 m	
s97	<i>M macredieana</i>	560	6630	250	0.1	300	1` plant per 10m2, diam 300m	Track towards next dune to North unburnt. <i>Eucalyptus gongylocarpa</i> over <i>E. youngiana</i> and <i>Acacia sp</i> , <i>Xanthorrhoea thorntonii</i> , <i>Casuarina sp.</i> over <i>Triodia sp.</i>
s98	<i>C talinyka?</i>	560	6630	125	0.05	300	1 plant per 20m2, diam 300m	Northern slope of dune all the way to the track
s99	<i>C toddii</i>	560	6630	125	0.05	100	1 plant per 20m2, across crest of dune 100 m	
s100	<i>C toddii</i>	559	6630	50	0.02	50	1 plant per 50m2 across dune 50 m	
s101	<i>C talinyka?</i>	559	6630	500	0.2	10	2 plants per 10m2 on southern slope of dune diam 10 m.	
s102	<i>C talinyka?</i>	560	6630	825	0.33	300	1 plant per 3 m2, diam 300m	<i>Gyrostemon ramulosus</i> on dune to north
s103	<i>G secunda</i>	560	6630	125	0.05	50	1 plant per 20m2 diam 50 m	Dune saddle
s104	<i>C talinyka?</i>	560	6630	250	0.1	100	1 plant per 10m2 diam 100 m	
s105	<i>M macredieana</i>	560	6630	125	0.05	200	1 plant per 20m2, diam 200m	Dune swale
s106	<i>C toddii</i>	560	6630				1 plant per 2m2 along crest but dead.	Dune unburnt <i>Casuarina sp.</i> over <i>Thryptomene biseriata</i> and <i>Lomandra leucocephala</i> .

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Comments
s107	<i>L deserti</i>	560 [REDACTED]	6631 [REDACTED]	2500	1	100	1 plant per 1m2 along dune diam 100 m	Dune unburnt <i>Casuarina sp.</i> over <i>Thryptomene biseriata</i> and <i>Lomandra leucocephala</i> .
s108	<i>M stenocalyx</i>	560 [REDACTED]	6631 [REDACTED]				2 plants	

Appendix 4: Species Data for Survey 3 (Plumridge Lakes Nature Reserve and Adjacent Vacant Crown Land)

Appendix 4: Plumridge Lakes Nature Reserve – Survey 3 - RESULTS								
Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Site/plant description
s109	<i>Dicrasyllis nicholasii</i>	681	6722	250	0.1		1/10m2 500m diam	Red sand <i>Eucalyptus sp.</i> over <i>Triodia sp.</i>
s110	<i>Baeckea sp.GVD?</i>	678	6718	825	0.33	50	1/3m2 50m diam	Red sand <i>Aluta maisonneuvii</i> heathland with <i>Eucalyptus sp.</i> , <i>Grevillea juncifolia</i> and <i>Eucalyptus youngiana</i>
s111	<i>Baeckea sp.GVD?</i>	681	6722	825	0.33	50	1/3m2 50m diam	
s112	<i>Dicrasyllis cundeeleensis</i>	678	6719	50	0.02	50	1/50m2	<i>Eucalyptus sp.</i> over <i>Triodia sp.</i>
s114	<i>Dicrasyllis nicholasii</i>	679	6720	125	0.05	100	1/20m2 100m diam	
s115	<i>Grevillia secunda</i>	661	6729			100	2 in 100m diam	Base of yellow-orange sand dune, <i>Acacia sp.</i> , <i>Callitris sp.</i> over <i>Triodia basedowii</i>
s116	<i>Grevillia secunda</i>	657	6722	50	0.02	100	1/50m2 100m diam	Flat yellow sand plain with gentle rise, shrubs with scattered <i>Eucalyptus gongylocarpa</i> and <i>Xanthorrhoea thorntonii</i>
s117	<i>Baeckea sp.GVD?</i>	661	6729	250	0.1	200	1/10m2 200m diam	Flat yellow sand plain with gentle rise, shrubs with scattered <i>Eucalyptus gongylocarpa</i> and <i>Xanthorrhoea thorntonii</i>
s118	<i>Microcorys macredieana</i>	657	6722	250	0.1	300	1/10m2 300m diam	Orange sand plain, shrub heath land with young <i>Eucalyptus gongylocarpa</i> and <i>E.youngiana</i> , <i>Leptosema chambersii</i> absence of <i>Triodia sp.</i>
s119	<i>Micromyrtus stenocalyx</i>	665	6729	2500	1	300	1/m2 300m diam	Low yellow sand dune, <i>Triodia sp.</i> , juvenile <i>Eucalyptus gongylocarpa</i> , dense <i>Micromyrtus stenocalyx</i> and <i>Baeckea sp GVD?</i> at base of dune

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Site/plant description
s120	<i>Baeckea sp.GVD?</i>	657	6722				1 plant	
s121	<i>Baeckea sp.GVD?</i>	665	6729	1250	0.5	300	1/ 2m2 300m diam	On orange sand dune
s123	<i>Micromyrtus stenocalyx</i>	661	6729	125	0.05	50	1/20m2 50m diam	Low yellow sand dune with dense mature <i>Triodia sp.</i>
s124	<i>Dicrasyllis nicholasii</i>	656	6724	1250	0.5	800	1/2m2 800m diam	Red sand plain some visible calcrete, <i>Eucalyptus youngiana</i> and <i>Triodia basedowii</i>
s125	<i>Baeckea sp.GVD?</i>	664	6729	500	0.2	100	1/5m2 100m diam	Flat yellow sand plain
s126	<i>Dicrasyllis cundeeleensis</i>	676	6728				~20 plants	East-west track, <i>Eucalyptus sp.</i> over <i>Triodia sp.</i>
s127	<i>Olearia arida</i>	676	6728				1 plant	<i>Eucalyptus sp.</i> over juvenile <i>Acacia aneura</i>
s128	<i>Dicrasyllis cundeeleensis</i>	658	6721					<i>Eucalyptus sp.</i> , <i>Eremophila spp.</i> , <i>Sida sp.</i> , over <i>Triodia sp.</i> on orange sand plain
s129	<i>Baeckea sp. GVD?</i>	658	6721					
s130	<i>Dicrasyllis nicholasii</i>	658	6721	500	0.2	200	1/5m2 200m diam	<i>Eucalyptus sp.</i> , <i>Dodonaea viscosa subsp. angustissima</i> and <i>Acacia aneura</i> over <i>Triodia sp.</i>
s131	<i>Baeckea sp.GVD?</i>	667	6728				1 large plant	Adjacent to dune, <i>Eucalyptus gongylocarpa</i> , <i>Callitris sp.</i> over <i>Triodia basedowii</i>
Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Site/plant description

Population #	Species	Easting	Northing	Density 50 x 50m	Plants / m	Total Area Diameter (m)	Population	Site/plant description
s132	<i>Microcorys macredieana</i>	657	6729					Yellow sand undulating plain, outside Plumridge Lakes Nature Reserve boundary
s133	<i>Conospermum todii</i>	638	6713			100	60/100 m diam	15km south west of the Plumridge Lakes Nature Reserve western boundary, on crest and slope of dune ~5% cover
s134	<i>Conospermum todii</i>	637	6714					Top and slope of dune
s135	<i>Conospermum todii</i>	652	6729	2500	1	200	200 plants/200 m diam	North of road to the west of Plumridge Lakes Nature Reserve Boundary. Plants are predominantly absent from crest but occur along slope
s136	<i>Caesia talinyka</i>	662	6730				2	On yellow sand dune within Plumridge Lakes Nature Reserve
s137	<i>Caesia talinyka</i>	663	6730	N/A	0.5	30	15/30 m diam	On yellow sand dune within Plumridge Lakes Nature Reserve
s138	<i>Caesia talinyka</i>	663	6730	1250	0.5	50	50/100 m diam	On yellow sand dune within Plumridge Lakes Nature Reserve
s139	<i>Caesia talinyka</i>	665	6729	1000	0.4	25	40/100 m diam	On yellow sand dune within Plumridge Lakes Nature Reserve, juvenile and adult plants are present.
s140	<i>Caesia talinyka</i>	648	6756				8	South west of Plumridge Lakes Nature Reserve.

Appendix 5 Scientific Licences

Peter Bouteloup

- SL008381: License to Take Flora for Scientific or Other Prescribed Purposes
Exp. 26.06.09

Marlies Kern

- SL008383: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09

Alexandra Dent

- SL008384: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09

Harry Tucker

- SL008379: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09

Simon Tucker

- SL008184: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09
- 175-0809: Permit to Take Declared Rare Flora
Exp: 31.05.10.

Steven Catomore

- SL008380: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09

Ana Storey

- SL008184: License to Take Flora for Scientific or Other Prescribed Purposes
Exp.26.06.09
- 174-0809: Permit to Take Declared Rare Flora
Exp: 31.05.10.

These surveys required AngloGold Ashanti Australia to obtain an; Authority to Enter
Department of Environment and Conservation (DEC) Land – Regulation 4 Entry Permit

- CE002304
Exp.31.01.09