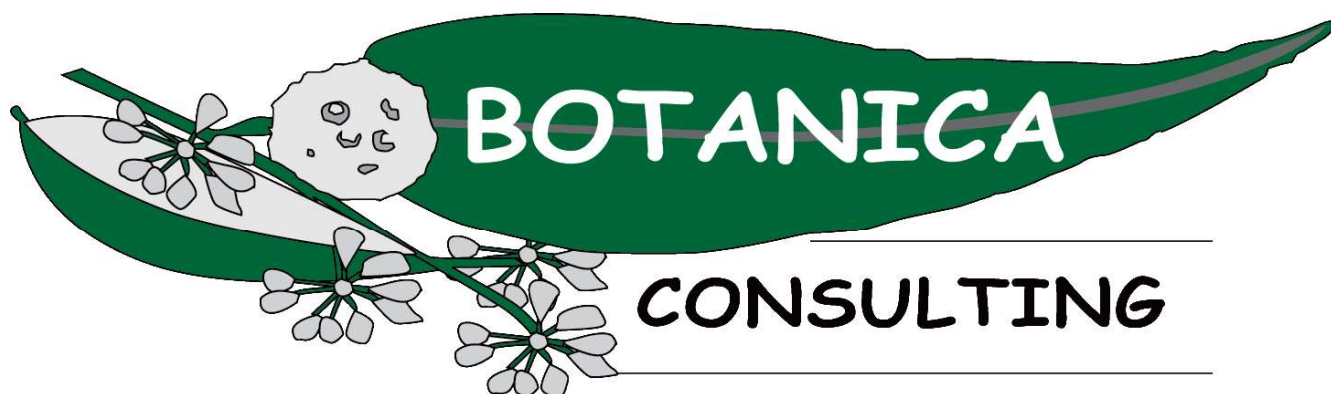




Sibeliuss Area
Level 1 Flora and Vegetation Survey
Tenements: M77/545, M 77/585 &M 77/912

Prepared For Western Areas NL

July 2010
FINAL



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Executive summary

Botanica Consulting (BC) was commissioned by Western Area NL (WSA) to undertake a flora and vegetation survey of the Sibelius area which covers an area of 345 hectares. The survey was conducted from 27th to the 28th May 2010 in accordance with the Environmental Protection Authority's (EPA) Guidance for the Assessment of Environmental Factors No. 51 (EPA, 2004).

Four vegetation groups were identified within the survey area: Mallee Woodland, Mallee Woodland over *Acacia* shrubland, *Allocasuarina* shrubland and Mallee Woodland over *Melaleuca*. These vegetation groups comprised a total of 21 Families, 41 Genera and 78 Species (including subspecies and variants).

The results of the combined search of the Department of Environment and Conservation's (DEC) Declared Rare and Priority Flora databases (DEC, 2009) revealed that five Declared Rare Flora (DRF) species and 69 priority species occur in the area (Appendix 2).

Two Priority Flora species, *Microcorys* sp. Forrestania (V. English 2004) (P4) and *Eremophila racemosa* (P4) were recorded by BC in three of the four vegetation groups within the survey area.

No Declared Rare Flora (DRF), pursuant to Subsection 2 of Section 23F of the *WC Act 1950* and listed by the DEC (Atkins, 2010) was identified within the survey area. No weed species or species classified as Declared Plants by the Department of Agriculture and Food Western Australia were located in the survey area (DAFWA, 2010).

None of the four vegetation groups contain threatened communities or flora species which are listed as Matters of National Environmental Significance as defined by the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*. There were no Threatened Ecological Communities (TEC) as listed by the DEC recorded within the survey area (DEC, 2010). The area is however located within both the Northern Ironcap and Middle Ironcap region of the Ironcap Hills vegetation complex Priority 3 Ecological Community (PEC). The entire survey area is also located inside the south western corner of the Lake Cronin Environmentally Sensitive Area (ESA). According to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), the Lake Cronin area is listed on the Register of the National Estate (RNE). The Lake Cronin RNE does not provide the area with formal protection under the *EPBC Act 1999* as it is not on either the National Heritage List or the Commonwealth Heritage List.

Based on Keighery (1994), the health condition of the four vegetation groups in the area were classified as being in a "very good" health condition.

1 Introduction

1.1 Project Description

Western Areas NL (WSA) commissioned Botanica Consulting (BC) to conduct a Level 1 flora and vegetation survey within the Sibelius area (Tenement's M77/545, M77/585 and M 77/912). The survey area was located approximately 140km south of Southern Cross, 198km west of Norseman and approximately 7km south-west of the intersection of the Hyden Norseman Road and the Forrestania Southern Cross Road. The survey covered an area of 345 hectares. BC conducted this survey on the 27th-28th May 2010. Figure 1 shows a regional map of the Sibelius survey area.

The aim of the survey was to produce a vegetation map and species list for WSA as well as documenting the occurrence of any threatened ecological communities and Declared Rare (DRF) or Priority listed flora species within the survey area.

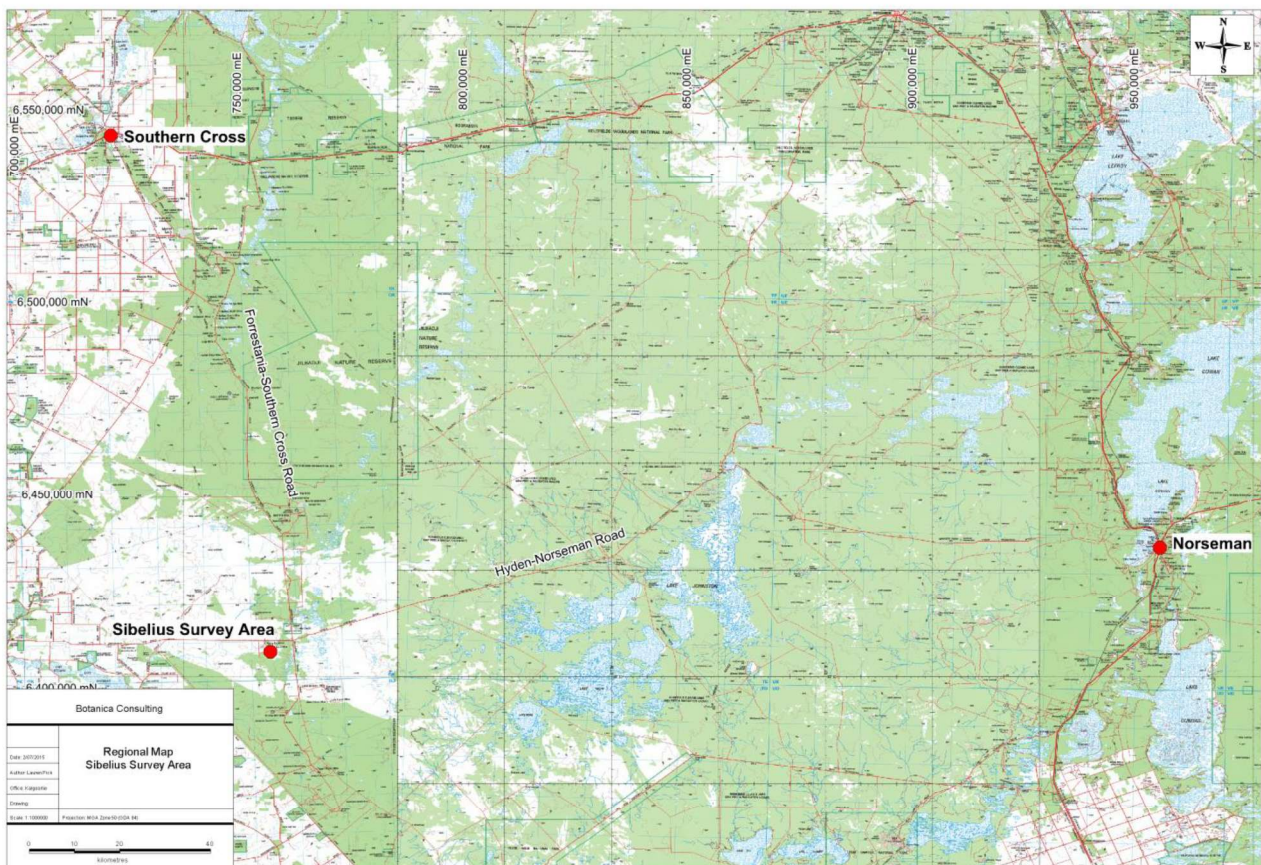


Figure 1: Regional map of the Sibelius survey area.

1.2 Previous relevant flora surveys

- **Flora and Vegetation Survey within the Greater Flying Fox Area (Tenements M77/545, M77/911 & M77/582): Nov., 2007**

BC was commissioned on 8th October 2007 by WSA to conduct flora and vegetation surveys of 3 different sites in the Flying Fox area.

Three vegetation groups were encountered within the survey area, *Eucalyptus* Mallee woodland, Sandplain Heath and Rehabilitation vegetation. The vegetation condition of the *Eucalyptus* Mallee Woodland and the Sandplain Heath vegetation groups were classed as being in a “very good” health condition, where as the Rehabilitation vegetation group was classed as being in a “degraded” health condition (Keighery, 1994).

One Priority species, *Microcorys* sp Forresteria (P4), was recorded during the survey. No DRF was identified in the survey area. There were no TECS as listed under the EPBC Act 1999 or by the DEC in the survey area. There were no PECs as listed by the DEC in the survey area.

- **Flora and Vegetation Survey within the Lounge Lizard/Flying Fox Area Proposed Gravel Pit (M77/545 and M77/912): Jan., 2009**

BC was commissioned by WSA on the 1st October 2008 to undertake a flora and vegetation survey of a proposed gravel pit area.

Two vegetation groups were identified within the gravel pit survey area; *Eucalyptus* mallee woodland and Sandplain heath. These groups were represented by a total of 29 Families, 56 Genera and 135 Species. Based on Keighery (1994), the health condition of the vegetation groups is classed as being “very good”.

One threatened species (*Eucalyptus steedmanii*) which is listed as a Matter of National Environmental Significance under the EPBC Act 1999 was located within the survey area. One Priority Flora species as listed by the DEC (*Microcorys* sp. Forresteria) was located within the survey area. There were no TECS as listed under the EPBC Act 1999 or by the DEC in the survey area. There were no PECs as listed by the DEC in the survey area. No weed species were located within the survey area.

- **Flora and Vegetation Surveys Spotted Quoll Area: October 2007 - May 2009**

Three flora and vegetation surveys have been conducted by BC within the Spotted Quoll area. These occurred on the 8th and 9th October 2007, 8th November 2007 and 17th to 18th April 2008. The final Spotted Quoll flora and vegetation survey conducted by BC occurred on 11th and 12th May 2009, which specifically aimed at producing plot based survey results.

The first flora survey BC were commissioned to conduct was a scoping study into development of a new mine within the New Morning/Spotted Quoll area. The area surveyed included 88.4ha within which the mine site will be located, 25.18ha for proposed pipeline/access routes and 503.1ha which is proposed for exploration. The total area surveyed was 616.7ha (BC, 2007).

Six vegetation groups were encountered within the survey area; *Eucalyptus* woodland, *Eucalyptus* Mallee Woodland, *Eucalyptus salmonophloia* Woodland, Sand Plain Heath, *Allocasuarina* shrubland and a Rocky Outcrop (BC, 2007).

One DRF; *Eucalyptus steedmanii* and two Priority Flora species; *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4) were encountered during the survey (BC, 2007). *Eucalyptus steedmanii* is listed as a Matter of National Environmental Significance under the EPBC Act 1999. There were no TECS as listed under the EPBC Act 1999 or by the DEC in the survey area. There were no PECs as listed by the DEC in the survey area. Additionally, 12.35ha of the total survey area was within the Lake Cronin ESA.

The second flora and vegetation survey was conducted to provide a map of a possible access route which did not encroach or affect any *Eucalyptus steedmanii* (DRF) populations. The map was produced from the collation of previous year's field work which recorded GPS coordinates of the extent and geospatial size of *E. steedmanii* populations 2 and 3A. The survey covered a 1.92km track directly south of the Spotted Quoll area (BC, 2008), as well as extension to the east and west of the southernmost section of the survey area.

The final Spotted Quoll flora and vegetation survey conducted by BC on the 11th and 12th May 2009 was aimed at providing plot based results from the vegetation groups already revealed in past reports.

Three of the six vegetation groups included the threatened species *Eucalyptus steedmanii* which is listed as a Matter of National Environmental Significance under the EPBC Act 1999. There were no TECS as listed under the EPBC Act 1999 or by the DEC in the survey area. There were no PECs as listed by the DEC in the survey area.

- **New Morning Flora Survey: September 2009**

BC was commissioned by WSA to undertake a flora and vegetation survey of 130 hectares of the New Morning area. The survey was conducted on the 10th of September 2009.

Three vegetation groups were identified within the survey area: Mallee Woodland, *Acacia steedmanii* subsp. *steedmanii* Shrubland and *Allocasuarina* Shrubland. These vegetation groups comprised a total of 20 Families, 33 Genera and 66 Species (including subspecies and variants). One DRF species (*Eucalyptus steedmanii*), pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (WC Act 1950)* and listed by the DEC (Atkins, 2008) was identified within the survey area. This population covers 43ha and is the eighth population identified within the WSA tenements. There were no Priority Flora species as listed by the DEC located within the survey area.

Eucalyptus steedmanii is listed as a Matter of National Environmental Significance under the EPBC Act 1999. There were no TECS as listed under the EPBC Act 1999 or by the DEC in the survey area. There were no PECs as listed by the DEC in the survey area. The northeast corner of the survey area was inside the Lake Cronin ESA.

Based on Keighery (1994), the health condition of the three vegetation groups in the area were classified as being in a “very good” health condition.

2 Regional Biophysical Environment

2.1 Topography & Soils

The survey area is located within the Coolgardie Interim Biogeographical subregion (IBRA) and the Southern Cross IBRA subregion (CALM, 2002; IBRA, 2010). The Southern Cross subregion is described as being comprised of gently undulating uplands dissected by broad valleys with bands of low greenstone hills. Valleys within the subregion have Quaternary duplex and gradational soils along with chains of saline lakes. The uplands are the eroded remnants of a lateritic duricrust which yields yellow sand plains, gravelly sand plains and laterite breakaways (CALM, 2002).

2.2 Climate

The climate for the Southern Cross subregion is characterised as an arid to semi-arid warm Mediterranean climate with annual rainfall totals of 250-300 mm (Beard, 1990; CALM, 2002). Figure 2 shows the annual rainfall for the Lake Carmody weather station which is approximately 35 km west of the survey area. Average annual rainfall for Lake Carmody is 313.4mm (BOM, 2010).

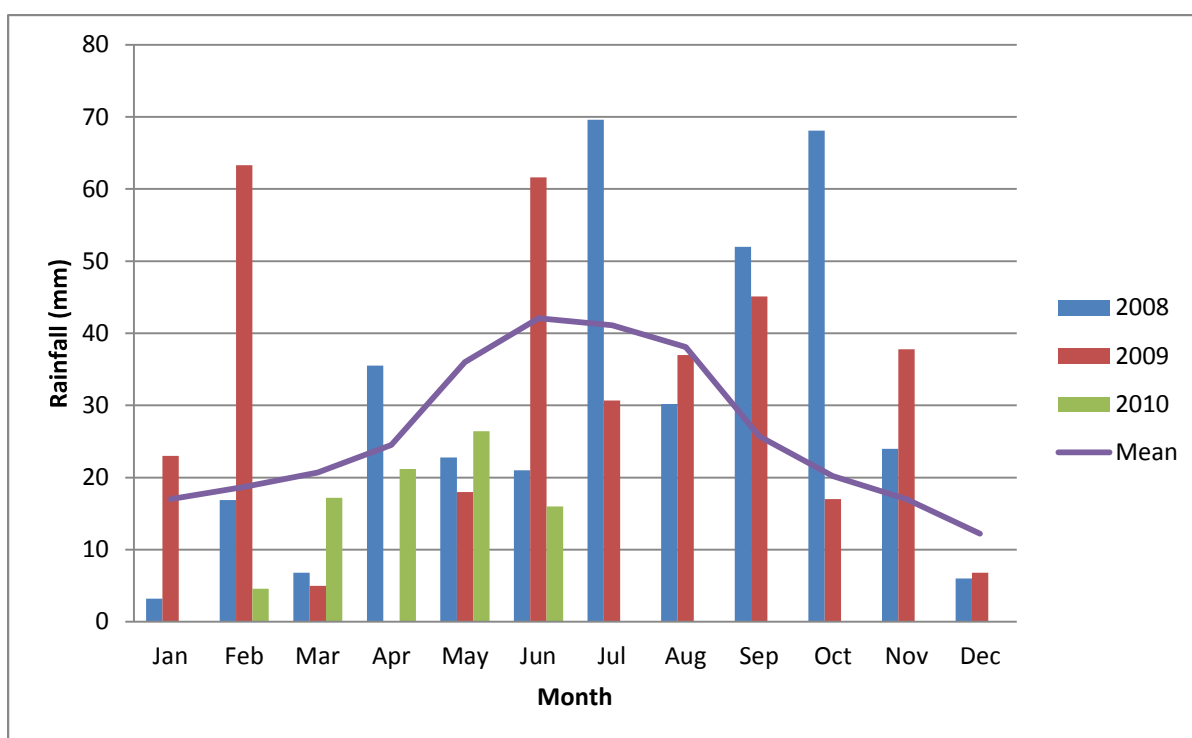


Figure 2: Mean annual rainfall (January 1906 - June 2010) and the rainfall amounts from 2008, 2009 and Jan to May 2010 for the Lake Carmody weather station (#10670) (BOM, 2010).

2.3 Vegetation Groups

Beard (1990) locates the survey area within the Coolgardie Botanical District. The Coolgardie Botanical District is predominantly Eucalypt woodlands which become open and with saltbush-bluebush understorey on calcareous soils, patches of scrub heath adjoining the Great Victoria Desert and scrub-heath and *Casuarina* on sandplains (Beard, 1990). Beeston et. al., (2002) place the survey area within the Pre-European Beard vegetation association 511 (Table 1).

Table 1: Pre-European Beard Vegetation Association within the Sibelius survey area (Beeston, et. al., 2002).

Beard Vegetation Association	Current Extent (ha)	Pre-European extent (ha)	Remaining (%)	Description
511	227,738	440,916	51.65	Medium woodland; salmon gum & morrel.

2.4 Land Use

The dominant land uses of the Southern Cross subregion (COO2) are native pastures (17%), unoccupied crown land and crown reserves (66.74%), dryland cultivation (2.27%) and conservation reserves (11.53%) (CALM, 2002).

2.5 Survey Objectives

1. Prepare a vegetation map and species list for the survey areas.
2. Review flora considered to be rare, threatened, or geographically restricted in surrounding areas, and target these species in the survey area.
3. Assess the status of introduced plant species within the survey area.
4. Assess the regional and local conservation status of plant species and ecological communities within the survey area.
5. Assess the potential impact of exploration and possible future mining activities on the flora of the area.

3 **Survey Methodology**

3.1 Desktop Assessment

Prior to the field survey, the results of the combined search of the DEC's Declared Rare and Priority Flora databases (DEC, 2009) were obtained by BC. These significant flora species were examined on the Western Australian Herbarium's web page (WAHERB, 2010) before fieldwork to familiarise staff with their appearance. Locations of DRF and Priority Flora species revealed in the databases search were overlaid on aerial photography of the area. Vegetation descriptions of locations and available pictures of the Priority Flora were obtained from Florabase.

Table 2 lists the definitions of Declared Rare and Priority ratings under the *WC Act 1950* as extracted from Florabase (WAHERB, 2010).

Table 2: Definitions of Rare and Priority Flora Species (WAHERB, 2010).

R: Declared Rare Flora – Extant Taxa Taxa 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.
X: Declared Rare flora – Presumed Extinct Taxa Taxa 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.
1: 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 populations size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc, or the plants are under threat, e.g. From disease, grazing by feral animals, etc. May include taxa with threatened populations in protected lands. Such taxa are under consideration for declaration as "rare flora", but are in urgent need of further survey.
2: Priority Two – Poorly Known Taxa Taxa which are known from one of 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 are in urgent need of further survey.
3: 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 are in need of further survey.
4: 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

3.2 Sampling and Analysis Methods

The survey area was traversed via four wheel drive and by foot where appropriate. Prior to the field work, aerial images were analysed in order to determine the existing vegetation groups. These different vegetation groups were then visited during the field survey to assess their validity. A handheld Global Positioning System (GPS) was used to obtain the co-ordinates of the boundaries between existing vegetation groups.

While traversing each vegetation group the survey team observed and collected specimens from the entire extent of the vegetation group in order to create a species list. Photographs were taken within each vegetation group. Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Consulting Herbarium and the Western Australian Herbarium.

DRF and Priority Flora and their respective vegetation types were targeted in the survey area and all areas of occurrence were traversed on foot specifically looking for the threatened flora associated with that vegetation description. Coordinates of the species found were recorded by handheld GPS.

3.3 Personnel involved

Jim Williams- Environmental Consultant/Botanist (Diploma of Horticulture)

Lauren Pick- Environmental Consultant (BSc- Conservation Biology)

Helen McLaren- Environmental Consultant (BSc- Environmental Conservation)

Monique Toubia- Environmental Consultant (MSc- Natural Resource Management)

3.4 Flora survey limitations and constraints

It is important to note that there are limitations involved with conducting flora surveys, despite the careful planning that is put into their design. Such limitations that can occur are listed in Table 3 below.

Table 3: Limitations and constraints associated with the flora and vegetation survey.

Variable	Impact on Survey outcomes
Access problems	Access was not a problem as the survey was conducted via 4wd and on foot.
Experience levels	The BC personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Botanist: Jim Williams Field Staff: Lauren Pick, Helen McLaren and Monique Toubia Data Interpretation: Monique Toubia and Helen McLaren
Timing of survey, weather & season	Fieldwork was completed outside the EPA's recommended time period (i.e., Spring) for detecting most ephemeral flora and the majority of species were not in flower. BC however have conducted a number of vegetation surveys within the Sibeliuss area during Spring in the past and species samples/identifications made during these previous surveys were used to aid in the identification of species during the current survey. BC staff are familiar with species located within the region and have studied the vegetation during a variety of seasons. The rainfall for the Lake Carmody weather station (located 35km to the west of the area) was below average for the three months preceding the survey.
Completeness	In the opinion of BC the survey area was covered sufficiently. BC estimate that approximately 90% of the flora species in the survey area were recorded. This estimation takes into account the timing of the survey and the experience of the botanists undertaking the work. The vegetation groups for this study were based on visual descriptions of locations in the field and there have been flora surveys conducted within the surrounding areas of the New Morning/Sibeliuss region which have shown that these vegetation groups occur within the surrounding area. Vegetation groups identified were categorized via comparison to vegetation distributions throughout WA given on Australian Natural Resources Atlas (ANRA, 2010).

4 Results

4.1 Summary

The survey area was made up of four vegetation groups. These groups were classified as being in a “very good” health condition indicating that vegetation is altered due to obvious signs of disturbance (Keighery, 1994).

Two Priority Flora species, *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4), were recorded within the survey area. There were no Threatened Ecological Communities as defined by the DEC or the *EPBC Act 1999* within or near to the survey area (DEC, 2010b; DSEWPaC, 2010). The survey area is however located within the Ironcap Hills vegetation complex which is listed by the DEC as a Priority 3 Ecological Community. No weed species were recorded in the survey area (DAFWA, 2010). The entire survey area is located within the Lake Cronin ESA. The Lake Cronin area is listed by the DSEWPaC on the RNE. The Lake Cronin RNE is not formally protected under the *EPBC Act 1999*.

4.2 Desktop Assessment

The results of the combined search of the DEC Declared Rare and Priority Flora databases (DEC, 2009) revealed many Priority Flora species near the area (Appendix 1) but only two species, *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4) have been confirmed by BC to be present within the survey area boundaries. Table 4 lists the species that have the potential to occur within the survey area including a species description. Appendix 2 provides the results of the DEC database search (DEC, 2009).

Table 4: Flora of Conservation Significance with the potential to occur within the survey area (DEC, 2009).

Species	Conservation Code	Description (WAHERB, 2010)
<i>Acacia asepala</i>	2	Diffuse, much-branched shrub, 0.5–1.5 m high. Fl. yellow, Aug. Red-brown sandy loam. Undulating plains, along drainage lines.
<i>Baeckea</i> sp. Blue Haze Mine (P. Armstrong 06/910)	1	No description available.
<i>Baeckea</i> sp. Lake Cronin (K.R. Newbey 9191)	1	Upright, spreading, moderately open shrub. Fl. white, pink, Oct. Well-drained, gravelly sand. Moderately exposed, gently undulating plain.
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	2	Erect, open shrub, to 0.4 m high. Fl. white, pink, Oct. Red clay. Gently undulating sandplains
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i>	DRF	Lignotuberous shrub, 1–3 m high. Fl. yellow, orange, Mar–May. Lateritic gravel, grey sand
<i>Bentleya diminuta</i>	2	Rosetted rhizomatous, perennial, herb or shrub, 0.02–0.05 m high, growing in small colonies. Fl. white, yellow, green, Sep–Nov. Sandy clay or loam with calcareous nodules
<i>Boronia westringioides</i>	2	Erect shrub, 0.2–0.75 m high. Fl. pink, Jul–Sep. Flat sandplain. Well-drained cream sand.
<i>Calamphoreus inflatus</i>	4	Erect, spreading shrub, 0.4–1.6 m high, to 2 m wide. Fl. blue, purple, green, Oct–Mar. Clay loam with ironstone gravel. Flats, disturbed sites.

Species	Conservation Code	Description (WAHERB, 2010)
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	3	Mat-forming or upright shrub, 0.1–0.7 m high. Fl. white, cream, Jan–May/Aug–Oct. Sand. Sandplains.
<i>Dampiera scaevolina</i>	1	Erect to ascending perennial, herb or shrub, 0.2–0.5 m high. Fl. blue, white, Sep–Nov. Sandy & gravelly soils
<i>Daviesia elongata</i> subsp. <i>implexa</i>	3	Spreading or sprawling shrub, 0.4–1 m high. Fl. yellow, orange, red, Sep. Sand & laterite.
<i>Dillwynia acerosa</i>	3	Shrub, to 0.5 m high. Fl. yellow, red, Sep. Gravelly clay with laterite.
<i>Eremophila biserrata</i>	4	Prostrate shrub, to 3 m wide. Fl. green, yellow, Sep–Nov/Mar. Sandy or sandy clay soils. Alluvial flats, salt flats & lakes
<i>Eremophila racemosa</i>	4	Erect shrub, 0.5–1.7 m high. Fl. purple, pink, red, white, Mar/Aug–Dec. Sandy or stony loam, clay loam. Undulating plains, roadsides.
<i>Eucalyptus steedmanii</i>	DRF	Tree, 2–8(–12) m high, bark smooth. Fl. white, Jan–Mar. Well-drained clayey sand. Moderately exposed, gentle undulating plain.
<i>Eutaxia acanthoclada</i>	3	Compact, mat-forming, prostrate shrub, to 0.3 m high. Fl. yellow, orange, red, Oct–Nov. Light brown sandy clay, shallow sandy loam, red clay over banded ironstone, gravel. Gently undulating plains.
<i>Eutaxia lasiocalyx</i>	2	Low, spreading, multi-stemmed shrub, to 0.15 m high. Fl. yellow, Nov. Red sandy loam, laterite and quartz gravel. Gentle lower slopes.
<i>Eutaxia nanophylla</i>	3	Straggly, rounded shrub, to 0.35 m high. Fl. yellow, orange, red, Oct–Nov. Clayey sand, red clay, stoney clayey loam. Low-lying areas, damp flats, slopes, undulating plains, low stony ridges.
<i>Eutaxia rubricarina</i>	3	Straggling shrub, to 0.5 m high. Fl. orange, yellow, brown, Aug–Oct. Gravelly sand, grey to pinkish-white sandy clay, red loam. Flats, slopes, valley floors, road verges.
<i>Grevillea pilosa</i> subsp. <i>redacta</i>	3	Spreading to prostrate, non-lignotuberous shrub, 0.4–1.2 m high. Fl. red, Feb/Oct–Dec. Sand, laterite.
<i>Microcorys</i> sp. <i>Forrestania</i>	4	Prostrate or erect shrub, 0.35–0.4 m high. Fl. white, purple, Jan/Apr. Yellow sandy clay or red-brown clay. Open woodland or cleared areas.
<i>Muelleranthus crenulatus</i>	DRF	Perennial, herb. Fl. yellow, brown, Jul–Aug. Stony red loam
<i>Pityrodia</i> sp. Yilgarn (A.P. Brown 2679)	3	No description available.
<i>Stylidium sejunctum</i>	2	Caespitose perennial, herb, 0.25–0.45 m high, Leaves tufted, linear to narrowly oblanceolate. Fl. white, pink, purple, Sep–Nov. Clayey sand or loam, laterite. Outcrops, upper slopes, breakaways.
<i>Verticordia gracilis</i>	3	Low, slender shrub, 0.15–0.6 m high. Fl. pink, Oct–Nov. Yellow sand, gravelly sand, sandy loam
<i>Verticordia stenopetala</i>	3	Shrub, 0.2–0.6(–1.3) m high. Fl. pink, purple, red, Oct–Jan. Yellow sand, sometimes with gravel. Undulating plains

4.3 Flora of Conservation Significance

4.3.1 *Eremophila racemosa* (P4)

According to the DEC's Declared Rare and Priority Flora databases, *Eremophila racemosa* is defined as a Priority 4 species. The DEC lists 'Priority' flora species which are under consideration for declaration as Rare Flora. Species classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 species only require monitoring every 5-10yrs.

This priority species is an erect shrub growing 0.5-1.7 m high. It can produce purple, pink, red and white flowers from March/August to December. It inhabits sandy or stony loam, clay loam and favours undulating plains and roadsides (WAHERB, 2010). This species was identified along road verges within the Mallee Woodland and *Allocasuarina* shrubland vegetation groups. One DEC known location of this species is located within the survey area. This DEC location was identified and confirmed by BC during the survey. GPS locations and population size recorded by BC of this species are provided in Appendix 3.



Figure 3: *Eremophila racemosa* within the survey area (May 2010).

4.3.2 *Microcorys* sp. Forrestania (V. English 2004) (P4)

According to the DEC's Declared Rare and Priority Flora databases, *Microcorys* sp. Forrestania (V. English 2004) is defined as a Priority 4 species. The DEC lists 'Priority' flora species which are under consideration for declaration as Rare Flora. Species classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 species only require monitoring every 5-10yrs.

Microcorys sp. Forrestania (V. English 2004) is a prostrate or erect shrub, which grows between 0.35 – 0.4 m high. It produces white and purple flowers from January to April. This species inhabits open woodland and cleared areas (WAHERB, 2010). This species was identified in the Mallee Woodland, *Allocasuarina* shrubland and Mallee Woodland over *Melaleuca* vegetation groups. GPS locations and population size of this species are provided in Appendix 3.



Figure 4: *Microcorys* sp. Forrestania (V. English 2004) in the survey area (May 2010).

4.4 Vegetation Groups

Four vegetation groups were identified within the survey area. These were:

- 1) Mallee Woodland;
- 2) Mallee Woodland over *Acacia* shrubland;
- 3) *Allocasuarina* shrubland; and
- 4) Mallee Woodland over *Melaleuca*

These groups were represented by a total of 21 Families, 41 Genera and 78 Species (including subspecies and variants). The map showing the vegetation groups and BC recorded locations of Priority Flora present in the survey area is located in Appendix 5.

4.5 Mallee Woodland

4.5.1 Flora

Flora recorded in this vegetation group was represented by 19 Families, 37 Genera and 64 Species (Appendix 4). No DRF species pursuant to subsection (2) of section 23F of the *WC Act (1950)* were found during the survey, however two Priority Flora species, *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4) were identified within this vegetation group. No weed species were recorded in this vegetation group.

4.5.2 Vegetation

The flora recorded in this vegetation group was representative of Mallee Woodland. The over-storey contained *Eucalyptus eremophila* subsp. *eremophila* with some occurrences of *Eucalyptus gracilis*, *Eucalyptus polita* and *Eucalyptus calycogona*. The mid-storey consisted of *Melaleuca hamata*, *Melaleuca adnata*, *Acacia assimilis*, *Santalum acuminatum* and *Hakea multilineata*. The understorey was represented by *Dodonaea bursariifolia*, *Acacia deficiens*, *Daviesia lancifolia*, *Dianella revoluta*, *Westringia cephalantha* var. *caterva*, *Wilsonia humilis*, *Daviesia nematophylla* and *Baeckea crispiflora*. Dominant species from the vegetation assemblage according to Muir (1977) is shown in Table 5. The Muir Life Form and Height Class sheet is located in Appendix 6.

Table 5: Vegetation assemblage for Mallee Woodland within the survey area (Muir, 1977).

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i> <i>Eucalyptus gracilis</i>
Shrubs >2 m	2-10%	<i>Melaleuca adnata</i> <i>Melaleuca lateriflora</i> subsp. <i>lateriflora</i> <i>Melaleuca pauperiflora</i>
Shrub 0.5-1m	10-30%	<i>Exocarpos aphyllus</i> <i>Daviesia benthamii</i>

No broad scale clearing has occurred for agricultural purposes in this vegetation group within the survey area. This vegetation group is best represented by the Mallee woodlands and shrublands vegetation group according to Australian Natural Resources Atlas (ANRA), which covers 3.6% of the State of Western Australia (ANRA, 2010).



Figure 5: Mallee Woodland within the survey area.

4.6 Mallee Woodland over *Allocasuarina*/*Acacia* shrubland

4.6.1 Flora

Flora recorded in this vegetation group was represented by 15 Families, 23 Genera and 41 Species (Appendix 4). No DRF species or Priority Flora pursuant to subsection (2) of section 23F of the *WC Act 1950* and as listed by the DEC (Atkins, 2010) were identified in this vegetation group during the survey. No weed species were recorded in this vegetation group.

4.6.2 Vegetation

The flora recorded in this vegetation group was representative of Mallee Woodland over *Acacia* shrubland. The upper canopy species included *Eucalyptus eremophila* subsp. *eremophila* and *Eucalyptus flocktonia* subsp. *flocktonia*. The mid-storey consisted of *Acacia steedmanii* subsp. *steedmanii*, *Allocasuarina campestris*, *Acacia hemiteles*, *Acacia intricate* and *Acacia fragilis*. The understorey species included *Gompholobium gompholobioides* and *Drosera andersoniana* and *Lepidosperma drummondii*. Dominant species from the vegetation assemblage according to Muir (1977) is shown in Table 6.

Table 6: Vegetation assemblage for Mallee over *Acacia* shrubland within the survey area (Muir, 1977).

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>
Shrubs >2m	30-70%	<i>Acacia fragilis</i> <i>Allocasuarina campestris</i> <i>Allocasuarina corniculata</i>
Shrub 0.5-1m	10-30%	<i>Hibbertia pungens</i> <i>Verticordia chrysantha</i>
Sedges <0.5m	10-30%	<i>Lepidosperma brunonianum</i> <i>Lepidosperma drummondii</i>

No broad scale clearing has occurred for agricultural purposes in this vegetation group within the survey area. This vegetation group is best represented by the Mallee woodlands and shrublands vegetation group, which covers 3.6% of the State of Western Australia (ANRA, 2010).



Figure 6: Mallee Woodland over *Acacia* shrubland within the survey area.

4.7 *Allocasuarina* shrubland

4.7.1 Flora

Flora recorded in this vegetation group was represented by 11 Families, 17 Genera and 29 Species (Appendix 4). No DRF species pursuant to subsection (2) of section 23F of the *WC Act 1950* were found during the survey; however two Priority Flora species, *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4) were identified within this vegetation group. No weed species were recorded in this vegetation group.

4.7.2 Vegetation

The flora recorded in this vegetation group was representative of an *Allocasuarina* shrubland. The upper storey contained *Eucalyptus eremophila* subsp. *eremophila* and *Eucalyptus gracilis*. The mid storey contained *Allocasuarina campestris*, *Santalum acuminatum*, *Melaleuca pauperiflora* subsp. *pauperiflora* and *Melaleuca hamata*. The understorey contained *Acacia acanthoclada* subsp. *acanthoclada*, *Phebalium filifolium*, *Dodonaea bursariifolia*, and *Dodonaea stenozyga*. Dominant species from the vegetation assemblage according to Muir (1977) is shown in Table 7.

Table 7: Vegetation assemblage for *Allocasuarina* shrubland within the survey area (Muir, 1977).

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>
Shrubs >2m	30-70%	<i>Allocasuarina campestris</i> <i>Allocasuarina corniculata</i>
Shrubs 0.5-1.5	10-30%	<i>Darwinia</i> sp. Lake Cobham (K. Newbey 3262)

No broad scale clearing has occurred for agricultural purposes in this vegetation group within the survey area. This vegetation group is best represented by the *Casuarina* forests and woodlands vegetation group, which covers 0.1% of the State of Western Australia (ANRA, 2010).



Figure 7: *Allocasuarina* shrubland within the survey area.

4.8 Mallee Woodland over *Melaleuca*

4.8.1 Flora

Flora recorded in this vegetation group was represented by 9 Families, 12 Genera and 23 Species (Appendix 4). No DRF species pursuant to subsection (2) of section 23F of the *WC Act 1950* were found during the survey; however two Priority Flora species, *Microcorys* sp. Forrestania (V. English 2004) (P4) was identified within this vegetation group. No weed species were recorded in this vegetation group.

4.8.2 Vegetation

The flora recorded in this vegetation group was representative of Mallee Woodland over *Melaleuca*. The over-storey contained *Eucalyptus eremophila* subsp. *eremophila* with some occurrences of *Eucalyptus polita*. The mid storey contained *Melaleuca hamata*, *Melaleuca adnata*, *Melaleuca eleuterostachya*, *Melaleuca lateriflora* subsp. *lateriflora*, *Melaleuca pungens* var. *pungens* and *Santalum acuminatum*. The lower storey contained *Lepidosperma drummondii* and *Dodonaea bursariifolia*. Dominant species from the vegetation assemblage according to Muir (1977) is shown in Table 8.

Table 8: Vegetation assemblage for Mallee Woodland over *Melaleuca* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>
Shrubs >2m	30-70%	<i>Melaleuca hamata</i>

No broad scale clearing has occurred for agricultural purposes in this vegetation group within the survey area. This vegetation group is best represented by the Mallee woodlands and shrubland vegetation group, which covers 3.6% of the State of Western Australia (ANRA, 2010).



Figure 8: Mallee Woodland over *Melaleuca* within the survey area.

4.9 Vegetation of Conservation Significance

No vegetation groups in the survey area are listed as Threatened Ecological Communities (and hence Matters of National Environmental Significance) under the EPBC Act 1999. There were no Threatened Ecological Communities as defined by the DEC found within the survey area (DEC, 2010). The survey area is however located within the Ironcap Hills vegetation complex, which is listed by the DEC as a Priority 3 Ecological Community (Appendix 1). The entire survey area is also located within the Lake Cronin ESA. According to the DSEWPaC the Lake Cronin area is listed on the RNE. The Lake Cronin RNE is not formally protected under the *EPBC Act 1999*. Two Priority Flora species, *Microcorys* sp. Forrestania (V. English 2004) (P4) and *Eremophila racemosa* (P4), were identified in the Mallee Woodland, *Allocasuarina* shrubland and Mallee Woodland over *Melaleuca* vegetation groups within the survey area.

4.10 Vegetation condition

Based on Keighery (1994), the health conditions of the vegetation groups within the Sibelius survey area were classed as “very good”. A very good health condition is defined as altered due to obvious signs of disturbance. Disturbances included pre-existing tracks and drill lines. These definitions can be provided in Appendix 7.

5 Introduced Plant Species

No weed species were recorded during the survey (WAHERB, 2010).

6 Relevant Legislation and Compliance with Recognised Standards

6.1 Commonwealth Legislation

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The aim of this Act is to protect matters of national environmental significance and is used by the Commonwealth DSEWPaC to list threatened species and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance.

The entire survey area is located within the Lake Cronin region which according to the DSEWPaC is listed on the RNE.

A description of the Lake Cronin RNE according to the DSEWPaC is provided below:

The Lake Cronin area is one of a number of areas in the Wheatbelt region that are significant for rare species, due to widespread clearing in the surrounding landscape, and to the high diversity and level of local endemism. Lake Cronin Area has a high number of species that are disjunct. Disjunct populations are those that have become physically separated, resulting in minimal or no gene flow between them, and they are an important precursor to the development of new species.

A number of species in Australia have separate eastern and western populations, and some have formed sub-species, reflecting important broader long-term processes such as sea level changes and climatic fluctuations. It also supports a number of species reaching the limit of their distribution range. The number of species at the edge of their range reflects the convergence in the area of the Avon, Mallee and Coolgardie Biogeographic regions.

The Lake Cronin RNE is not formally protected under the *EPBC Act 1999*.

6.2 State Legislation

Clearing of Native Vegetation

The *Environmental Protection (Clearing of Native Vegetation) Regulations WA 2004* dictate that any clearing of native vegetation in Western Australia requires a permit from the DEC. Native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent (*Environmental Protection Act WA-Section 51A, 1986*). The *Environmental Protection Act WA 1986* Section 51A, defines clearing as: "the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage

to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above".

Under the *Environmental Protection (Clearing of Native Vegetation) Regulations WA 2004* - Regulation 6 –Environmentally Sensitive Areas are “the area covered by vegetation within 50 m of *Rare Flora*, to the extent to which the vegetation is continuous with the vegetation in which the *Rare Flora* is located”. The area covered by a TEC is also considered an ESA. A Clearing Permit is required for any clearing within an ESA of any type.

Exploration Activities are exempt from requiring clearing permits when undertaken via a Mining Act approval process such as “Programme of Work” provided the area does not occur in an ESA.

The entire survey area is located within the Lake Cronin ESA and will therefore require a clearing permit.

Wildlife Conservation Act WA 1950

This Act is used by the Western Australian DEC to list flora taxa as being protected and the level of protection needed for such flora. Flora species are classified as ‘Declared Rare Flora’ when their populations are geographically restricted or are threatened by local processes. Under this Act all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) are protected throughout the State. Financial penalties are enforced under this Act if threatened plant species are collected without an appropriate licence.

DEC Priority lists

The DEC lists ‘Priority’ flora species which are under consideration for declaration as Rare Flora. Species classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 species only require monitoring every 5-10yrs.

The DEC also lists PEC’s which identifies those communities that may need monitoring before possible nomination for TEC’s status. These priority species and communities have no formal legal protection until they are endorsed by the Minister as being DRF and TEC’s respectively.

Results of the DEC data bases search found a total of 5 Declared Rare Flora species and 69 priority species that occur in the area. Two Priority Flora were recorded in the survey area. The survey contained no TEC’s. The survey area is however located within the Ironcap Hills vegetation complex which is listed by the DEC as a Priority 3 Ecological Community. Consultation with the DEC is required prior to any clearing within the area.

6.3 EPA Position Statements

The Environmental Protection Authority (EPA) develops Position Statements to inform the public about environmental issues facing Western Australia and the plans for the future to ensure protection and ecological sustainability of environmentally important ecosystems. It provides a set of principles to assist the public and decision-makers on their responsibilities for managing land with care.

These principles also provide the basis for the EPA to evaluate and report upon achieving environmental and ecological sustainability and the protection of natural resources.

Position Statement No. 2 *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000) outlines EPA policy on the protection of native vegetation in Western Australia, particularly in the agricultural area. It identifies basic elements that the EPA should consider when assessing proposals that impact on biological diversity.

These include the following: comparison of all proposal options; avoidance of species and community extinctions; an expectation that implementing the proposal will not take a vegetation type below the "threshold level" of 30%; and that proponents should demonstrate that on- and off-site impacts can be managed.

The survey area does not contain any TEC's or DRF suggesting that clearing within the project area will meet the EPA standards outlined in Position statement no. 2, however will still be subjected to relevant State legislation mentioned in Section 6.2 above.

Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection* outlines that the EPA adopted the definition of Biological Diversity and the Principles as defined in the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia 1996); that the quality of information and scope of field surveys should meet standards, requirements and protocols as determined and published by the EPA; and the Interim Biogeographic Regionalisation of Australia (IBRA) should be used as the largest unit for EIA decision-making in relation to the conservation of biodiversity. The IBRA has identified 26 bioregions in the State which are affected by a range of different threatening processes and have varying levels of sensitivity to impact. Terrestrial biological surveys should provide sufficient information to address both biodiversity conservation and ecological function values within the context of proposals and the results of surveys should be publicly available.

The flora survey was planned and implemented as far as practicable according to the EPA Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004). Also as suggested in the above Position Statement, the IBRA was

used in preparing the report to identify the Conservation status of the area and identify the main threats to the biodiversity of plant species in the region.

Position Statement No. 5 *Environmental Protection and Ecological Sustainability of the Rangelands in WA* outlines that the EPA recognize WA rangelands are geologically unique, containing a wealth of diverse native plants and animals. They also provide an important resource for grazing, mining, tourism and conservation and are currently being severely degraded by accelerated soil erosion, increased numbers and distribution of weeds, reduced water quality and the decline and changes to native plant communities.

The EPA have developed the following operational objectives for protecting the WA rangelands; 1) protection of biodiversity hot spots by developing reserves, 2) setting rehabilitation and regeneration requirements for landholders, 3) protection of air quality and water resources, 4) effective monitoring of biodiversity, ecological processes and ecological function.

7 Conclusions and Recommendations

7.1 Conclusions

The Sibeliuss flora and vegetation survey contained the four vegetation groups Mallee Woodland, Mallee Woodland over *Acacia* shrubland, *Allocasuarina* shrubland and Mallee Woodland over *Melaleuca*. These vegetation groups comprised a total of 21 Families, 41 Genera and 78 Species (including subspecies and variants).

Two Priority Flora species, *Microcorys* sp. Forrestania (V. English 2004) (P4) and *Eremophila racemosa* (P4) were recorded in the Mallee Woodland, *Allocasuarina* shrubland and Mallee Woodland over *Melaleuca* vegetation groups within the survey area. No DRF or weed species were identified within the survey area.

The survey area does include threatened species or communities listed as Matters of National Environmental Significance on the EPBC Act 1999. No TEC's listed by DEC are known to occur in the survey area. The survey area is however located within a Priority 3 Ecological Community; Ironcap Hills Vegetation Complex listed by the DEC.

The Lake Cronin area in which the survey occurs is listed by the DSEWPac on the RNE. The Lake Cronin RNE does not have formal protection under the *EPBC Act 1999*.

7.2 Recommendations

- A clearing permit will be required from the DEC due to the area being within the Lake Cronin Nature Reserve buffer zone, which is an Environmentally Sensitive Area.
- Where Priority Flora are recognised in this report BC recommends that these areas are avoided where possible.

- If disturbance in these areas is unavoidable, further consultation with the DEC is recommended.
- All proposed clearing sites within the survey region should undergo targeted priority searches conducted by qualified botanists prior to clearing to identify all populations and flag them where necessary.
- Consultation with the DEC in regards to the Priority 3 Ecological Communities identified within the survey area is recommended prior to any clearing.
- For the purpose of this vegetation survey BC submits the following comments regarding the clearing principles specifically related to native vegetation:

a. **Native vegetation should not be cleared if it comprises a high level of biological diversity.**

This survey revealed diverse flora that are not restricted to the survey area and occur across this and other regions.

b. **Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.**

No DRF protected under the *WC Act 1950* were located in the survey area.

c. **Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of a Threatened Ecological Community (TEC).**

No TEC's listed by the DEC (2010) occur in the survey area.

d. **Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

No vegetation considered as a significant remnant of extensively cleared vegetation was recorded in the survey area.

e. **Native vegetation should not be cleared if it is growing, in, or in association with, an environment associated with a watercourse or wetland**

No vegetation growing in, or in association with a watercourse or wetland occurs in the survey area.

f. **Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

The Lake Cronin Nature Reserve is located 6 km to the north east of the survey area. The Lake Cronin Nature Reserve contains a significant number of rare species, high diversity and high levels of endemism (DSEWPac, 2010) therefore this Nature Reserve is encompassed by a 10km radius buffer categorised as an ESA. The entire survey area lies within this ESA (Appendix 1). The localised nature of proposed disturbance within the survey area is unlikely

impact on the conservation values of this area, however a clearing permit is required from the DEC due to the area being within an ESA. Further consultation with the DEC is recommended before conducting any activity within this ESA.

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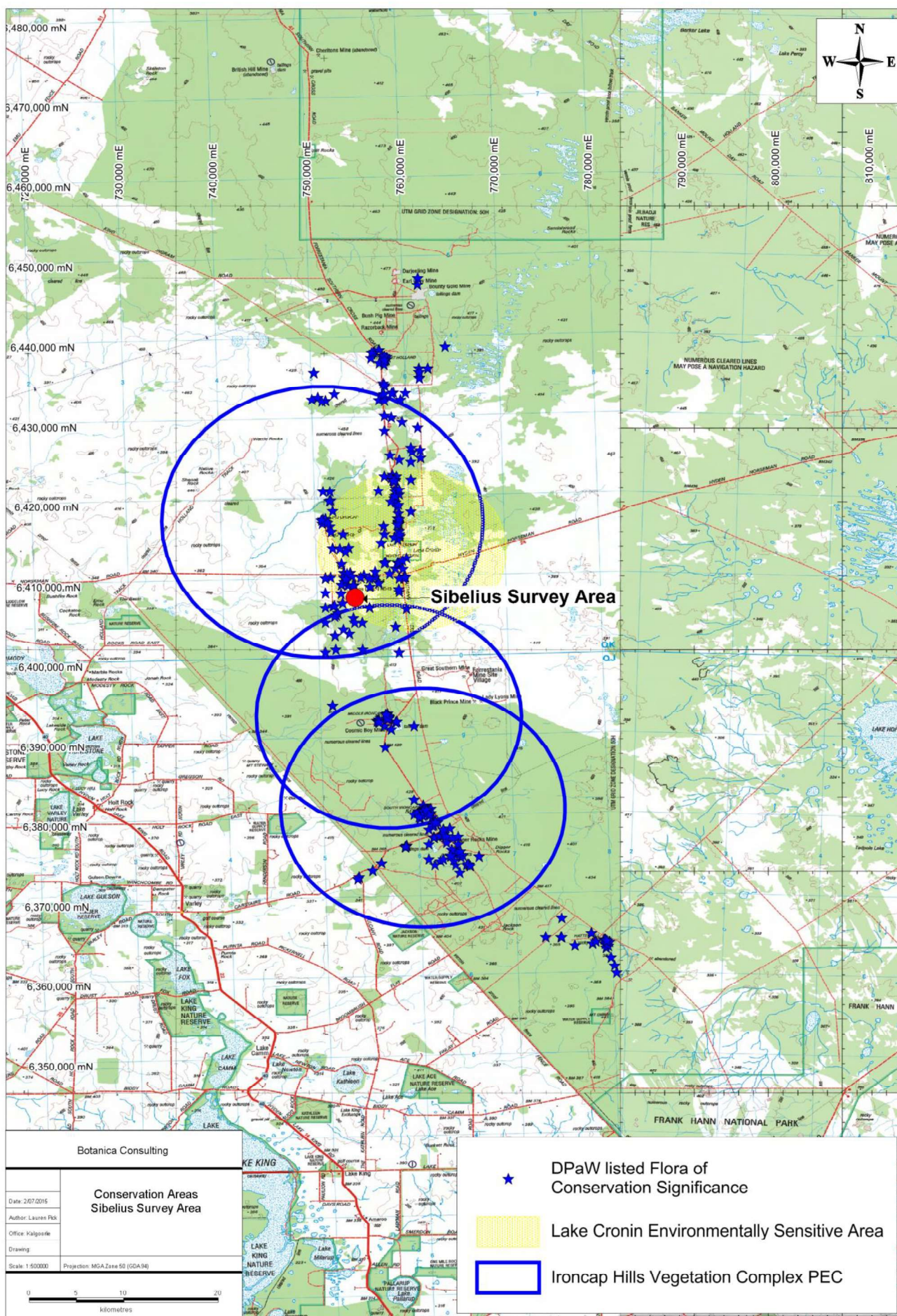
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Appendix 1: Regional map of the Sibelius survey area including DEC known Flora of Conservation Significance, Environmentally Sensitive Areas and Priority Ecological Communities



Appendix 2: Results from the DEC database search for Rare and Priority species in the project area (DEC, 2009a).

Genus	Species	Conservation Code
<i>Acacia</i>	<i>asepala</i>	P2
<i>Acacia</i>	<i>heterochroa</i> subsp. <i>robertii</i>	P2
<i>Acacia</i>	<i>kerryana</i>	P2
<i>Acacia</i>	<i>lanuginophylla</i>	R
<i>Acacia</i>	<i>singula</i>	P3
<i>Acacia</i>	<i>tetraneura</i>	P1
<i>Baeckea</i>	sp. Blue Haze Mine (P. Armstrong 06/910)	P1
<i>Baeckea</i>	sp. Crossroads (B.L. Rye & M.E. Trudgen 241186)	P1
<i>Baeckea</i>	sp. Hatter Hill (K.R. Newbey 3284)	P3
<i>Baeckea</i>	sp. Hyden (J.M. Brown 141)	P3
<i>Baeckea</i>	sp. Lake Cronin (K.R. Newbey 9191)	P1
<i>Baeckea</i>	sp. North Ironcap (R.J. Cranfield 10580)	P2
<i>Baeckea</i>	sp. Parker Range (M. Hislop & F. Hort MH 2968)	P1
<i>Banksia</i>	<i>sphaerocarpa</i> var. <i>dolichostyla</i>	R
<i>Banksia</i>	<i>viscida</i>	P3
<i>Bentleya</i>	<i>diminuta</i>	P2
<i>Boronia</i>	<i>revoluta</i>	R
<i>Boronia</i>	<i>westringioides</i>	P2
<i>Calamphoreus</i>	<i>inflatus</i>	P4
<i>Calytrix</i>	<i>nematoclada</i>	P3
<i>Comesperma</i>	<i>calcicola</i>	P3
<i>Conospermum</i>	<i>sigmoideum</i>	P2
<i>Cryptandra</i>	<i>exserta</i>	P1
<i>Cryptandra</i>	<i>polyclada</i> subsp. <i>polyclada</i>	P3
<i>Dampiera</i>	<i>orchardii</i>	P2
<i>Dampiera</i>	<i>scaevolina</i>	P1
<i>Daviesia</i>	<i>elongata</i> subsp. <i>implexa</i>	P3
<i>Daviesia</i>	<i>newbeyi</i>	P2
<i>Dicrastylis</i>	<i>capitellata</i>	P1
<i>Dillwynia</i>	<i>acerosa</i>	P1
<i>Eremophila</i>	<i>biserrata</i>	P4
<i>Eremophila</i>	<i>racemosa</i>	P4
<i>Eucalyptus</i>	<i>deflexa</i>	P4
<i>Eucalyptus</i>	<i>exigua</i>	P3
<i>Eucalyptus</i>	<i>georgei</i> subsp. <i>fulgida</i>	P4
<i>Eucalyptus</i>	<i>myriadena</i> subsp. <i>parviflora</i>	P1
<i>Eucalyptus</i>	<i>rugulata</i>	P4
<i>Eucalyptus</i>	<i>steadmanii</i>	R
<i>Euryomyrtus</i>	<i>leptospermoides</i>	P3
<i>Eutaxia</i>	<i>acanthoclada</i>	P3
<i>Eutaxia</i>	<i>lasiocalyx</i>	P2
<i>Eutaxia</i>	<i>nanophylla</i>	P3
<i>Eutaxia</i>	<i>rubricarina</i>	P3
<i>Gnephosis</i>	<i>intonsa</i>	P1
<i>Goodenia</i>	<i>trichophylla</i>	P3
<i>Grevillea</i>	<i>dissecta</i>	P4
<i>Grevillea</i>	<i>insignis</i> subsp. <i>elliottii</i>	P3

Genus	Species	Conservation Code
<i>Grevillea</i>	<i>lullfitzii</i>	P1
<i>Grevillea</i>	<i>marriottii</i>	P1
<i>Grevillea</i>	<i>pilosa</i> subsp. <i>redacta</i>	P3
<i>Grevillea</i>	<i>prostrata</i>	P4
<i>Gyrostemon</i>	<i>ditrigynus</i>	P4
<i>Hibbertia</i>	<i>axillibarba</i>	P1
<i>Hibbertia</i>	<i>carinata</i>	P1
<i>Keraudrenia</i>	<i>adenogyna</i>	P2
<i>Lepidosperma</i>	<i>amantiferrum</i>	P1
<i>Lepidosperma</i>	<i>ferriculmen</i>	P1
<i>Leucopogon</i>	sp. <i>Ironcaps</i>	P3
<i>Logania</i>	<i>exilis</i>	P2
<i>Melaleuca</i>	<i>agathosmoides</i>	P1
<i>Microcorys</i>	sp. <i>Forrestania</i> (V. English, 2004)	P4
<i>Microcybe</i>	<i>pauciflora</i> subsp. <i>grandis</i>	P3
<i>Monotoca</i>	<i>leucantha</i>	P3
<i>Muelleranthus</i>	<i>crenulatus</i>	R
<i>Olearia</i>	<i>laciniifolia</i>	P2
<i>Persoonia</i>	<i>cymbifolia</i>	P3
<i>Phebalium</i>	<i>brachycalyx</i>	P3
<i>Pityrodia</i>	sp. <i>Yilgarn</i> (A.P. Brown 2679)	P3
<i>Pultenaea</i>	<i>daena</i>	P3
<i>Stenanthemum</i>	<i>liberum</i>	P1
<i>Stylidium</i>	<i>sejunctum</i>	P2
<i>Thomasia</i>	<i>gardneri</i>	X
<i>Verticordia</i>	<i>gracilis</i>	P3
<i>Verticordia</i>	<i>stenopetala</i>	P3

Appendix 3: Priority species and locations recorded during the survey.

Species	Population count*	Zone	Easting	Northing
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	10	50 H	753696	6406045
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	50	50 H	753285	6406451
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	20	50 H	753674	6406370
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	1	50 H	753686	6406343
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	5	50 H	753676	6406523
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	300	50 H	754349	6408472
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	300	50 H	753760	6408472
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	400	50 H	752970	6408129
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	1000+	50 H	753082	6408074
<i>Eremophila racemosa</i> (P4)	2	50 H	754212	6406897
<i>Eremophila racemosa</i> (P4)	1	50 H	753719	6406668
<i>Eremophila racemosa</i> (P4)	5	50 H	753939	6406407
<i>Eremophila racemosa</i> (P4)	1	50 H	753719	6406382
<i>Eremophila racemosa</i> (P4)	6	50 H	753725	6406313
<i>Eremophila racemosa</i> (P4)	25	50 H	753741	6406026

*Population sizes were estimated on field based observations

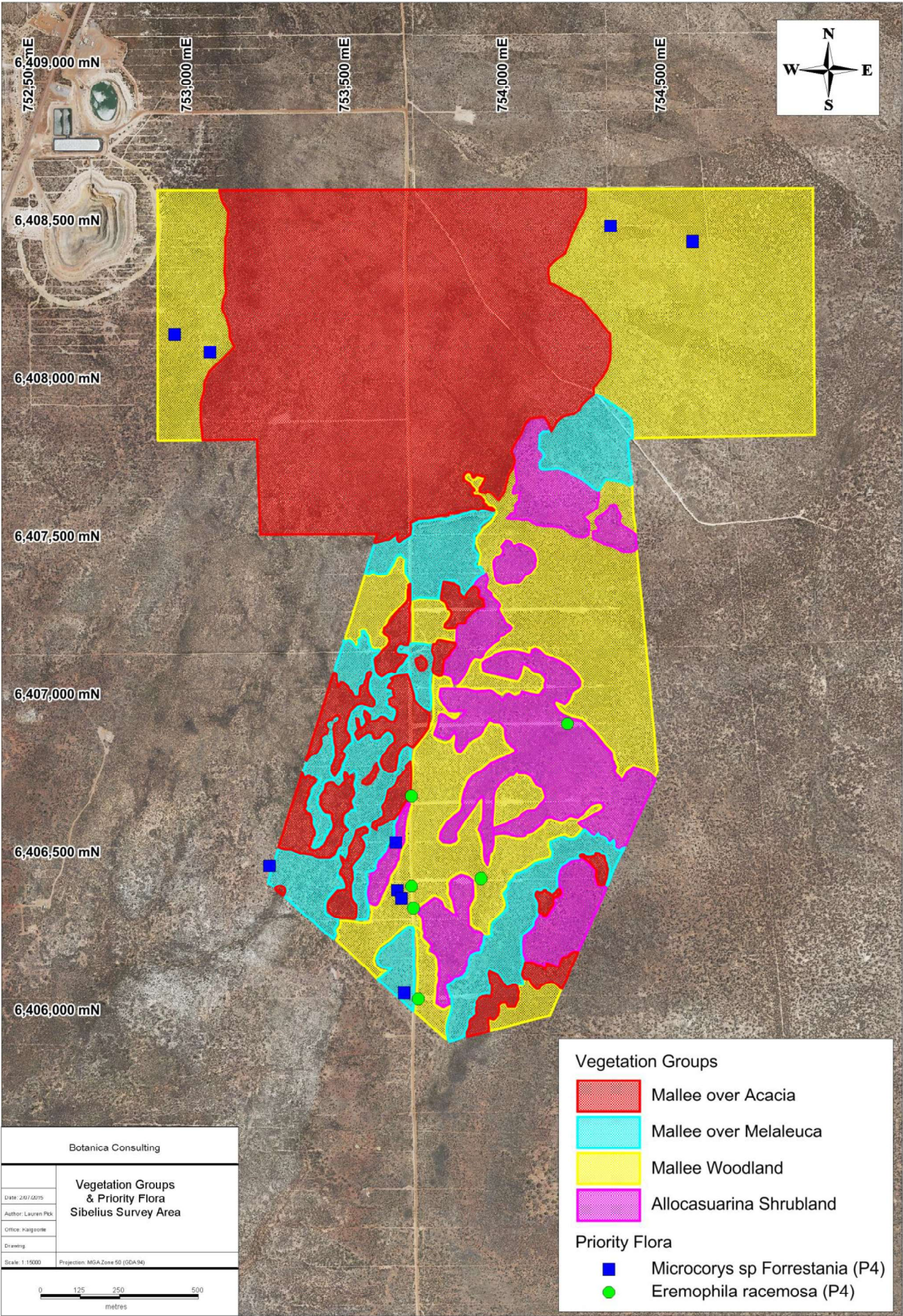
Appendix 4: Species list per vegetation group for the Sibelius survey area.

Family	Genus	Species	Mallee woodland	Mallee Woodland over Acacia shrubland	<i>Allocasuarina</i> Shrubland	Mallee Woodland over <i>Melaleuca</i>
Asteraceae	<i>Olearia</i>	<i>muelleri</i>	*			
Casuarinaceae	<i>Allocasuarina</i>	<i>campestris</i>		*	*	*
Casuarinaceae	<i>Allocasuarina</i>	<i>corniculata</i>		*	*	*
Convolvulaceae	<i>Wilsonia</i>	<i>humilis</i>	*	*		
Cupressaceae	<i>Callitris</i>	<i>preissii</i>	*			
Cyperaceae	<i>Lepidosperma</i>	<i>drummondii</i>	*	*	*	*
Dilleniaceae	<i>Hibbertia</i>	<i>pungens</i>	*	*	*	*
Droseraceae	<i>Drosera</i>	<i>andersoniana</i>	*	*		
Ericaceae	<i>Leucopogon</i>	<i>cuneifolius</i>	*	*		
Fabaceae	<i>Acacia</i>	<i>acanthoclada</i> subsp. <i>acanthoclada</i>	*	*	*	*
Fabaceae	<i>Acacia</i>	<i>assimilis</i>		*	*	*
Fabaceae	<i>Acacia</i>	<i>deficiens</i>	*			
Fabaceae	<i>Acacia</i>	<i>erinacea</i>	*	*		
Fabaceae	<i>Acacia</i>	<i>fragilis</i>	*	*	*	
Fabaceae	<i>Acacia</i>	<i>hemiteles</i>	*	*		
Fabaceae	<i>Acacia</i>	<i>intricata</i>	*	*		
Fabaceae	<i>Acacia</i>	<i>neurophylla</i> subsp. <i>neurophylla</i>			*	*
Fabaceae	<i>Acacia</i>	<i>poliochroa</i>	*			*
Fabaceae	<i>Acacia</i>	<i>steadmanii</i> subsp. <i>steadmanii</i>		*	*	*
Fabaceae	<i>Acacia</i>	<i>uncinella</i>	*			
Fabaceae	<i>Daviesia</i>	<i>benthamii</i> ssp <i>acanthoclona</i>	*	*		
Fabaceae	<i>Daviesia</i>	<i>lancifolia</i>	*			
Fabaceae	<i>Daviesia</i>	<i>nematophylla</i>	*			
Fabaceae	<i>Gastrolobium</i>	<i>spinosum</i>	*			
Fabaceae	<i>Gompholobium</i>	<i>gompholobioides</i>	*	*		
Fabaceae	<i>Pultenaea</i>	<i>arida</i>	*			
Fabaceae	<i>Senna</i>	<i>artemisioides</i> ssp <i>filifolia</i>	*			
Fabaceae	<i>Templetonia</i>	<i>sulcata</i>	*			
Goodeniaceae	<i>Cooperhookia</i>	<i>strophiolata</i>	*			
Goodeniaceae	<i>Dampiera</i>	<i>angulata</i>	*			

Family	Genus	Species	Mallee woodland	Mallee Woodland over Acacia shrubland	<i>Allocasuarina</i> Shrubland	Mallee Woodland over <i>Melaleuca</i>
Goodeniaceae	<i>Goodenia</i>	<i>viscida</i>	*			
Hemerocallidaceae	<i>Dianella</i>	<i>revoluta</i>	*			
Lamiaceae	<i>Microcorys</i>	<i>sp. Forrestania (P4)</i>	*		*	*
Lamiaceae	<i>Westringia</i>	<i>cephalantha</i> var. <i>caterva</i>	*	*		
Lauraceae	<i>Cassytha</i>	<i>melantha</i>	*	*	*	*
Myrtaceae	<i>Baeckea</i>	<i>crispiflora</i>		*	*	
Myrtaceae	<i>Cyathostemon</i>	<i>sp.</i>	*			*
Myrtaceae	<i>Darwinia</i>	<i>sp. Lake Cobham</i>			*	
Myrtaceae	<i>Eucalyptus</i>	<i>calycogona</i>	*			
Myrtaceae	<i>Eucalyptus</i>	<i>eremophila</i> ssp <i>eremophila</i>	*	*	*	*
Myrtaceae	<i>Eucalyptus</i>	<i>flocktonia</i> subsp. <i>flocktonia</i>	*	*	*	
Myrtaceae	<i>Eucalyptus</i>	<i>gracilis</i>	*			
Myrtaceae	<i>Eucalyptus</i>	<i>polita</i>	*			*
Myrtaceae	<i>Leptospermum</i>	<i>erubescens</i>	*			
Myrtaceae	<i>Melaleuca</i>	<i>adnata</i>	*	*		*
Myrtaceae	<i>Melaleuca</i>	<i>cucullata</i>	*			
Myrtaceae	<i>Melaleuca</i>	<i>eleuterostachya</i>	*	*		*
Myrtaceae	<i>Melaleuca</i>	<i>hamata</i>	*	*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>lateriflora</i> subsp. <i>lateriflora</i>	*	*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>laxiflora</i>		*		
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>pauperiflora</i>	*		*	
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>fastigiata</i>	*			
Myrtaceae	<i>Melaleuca</i>	<i>pungens</i> var. <i>pungens</i>		*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>urceolaris</i>	*		*	
Myrtaceae	<i>Thryptomene</i>	<i>kochii</i>	*	*	*	
Proteaceae	<i>Banksia</i>	<i>cirsoides</i>	*			
Proteaceae	<i>Grevillea</i>	<i>acuaria</i>	*	*		
Proteaceae	<i>Grevillea</i>	<i>decipiens</i>		*	*	
Proteaceae	<i>Hakea</i>	<i>multilineata</i>	*	*	*	*
Proteaceae	<i>Hakea</i>	<i>scoparia</i> subsp. <i>scoparia</i>		*		*
Proteaceae	<i>Persoonia</i>	<i>coriaceae</i>		*		
Rhamnaceae	<i>Cryptandra</i>	<i>minutifolia</i> subsp. <i>brevistyla</i>	*	*		

Family	Genus	Species	Mallee woodland	Mallee Woodland over Acacia shrubland	<i>Allocasuarina</i> Shrubland	Mallee Woodland over <i>Melaleuca</i>
Rutaceae	<i>Boronia</i>	<i>inornata</i> subsp. <i>inornata</i>	*		*	
Rutaceae	<i>Drummondita</i>	<i>hassellii</i>	*			
Rutaceae	<i>Phebalium</i>	<i>filifolium</i>	*	*	*	
Rutaceae	<i>Phebalium</i>	<i>megaphyllum</i>		*		
Rutaceae	<i>Phebalium</i>	<i>tuberculosum</i>	*			
Santalaceae	<i>Exocarpus</i>	<i>aphyllus</i>	*	*		
Santalaceae	<i>Santalum</i>	<i>acuminatum</i>	*	*	*	*
Sapindaceae	<i>Dodonaea</i>	<i>bursariifolia</i>	*	*	*	*
Sapindaceae	<i>Dodonaea</i>	<i>microzyga</i> var. <i>acrolobata</i>	*	*	*	
Sapindaceae	<i>Dodonaea</i>	<i>stenozyga</i>	*	*	*	
Scrophulariaceae	<i>Eremophila</i>	<i>decipiens</i> subsp. <i>decipiens</i>	*			*
Scrophulariaceae	<i>Eremophila</i>	<i>densifolia</i> ssp <i>pubiflora</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>drummondii</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>racemosa</i> (P4)	*		*	
Scrophulariaceae	<i>Eremophila</i>	<i>densifolia</i> subsp. <i>pubiflora</i>	*			
Violaceae	<i>Hybanthus</i>	<i>floribundus</i> subsp. <i>floribundus</i>			*	

Appendix 5: Vegetation map of Sibelius survey area and priority locations recorded by BC.



Appendix 6: Muir Life Form/Height Class (Muir, 1977).

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70% -100%	MID DENSE 30% - 70%	SPARSE 10% -30%	VERY SPARSE 2% - 10%
Trees > 30m Trees 15 – 30m Trees 5 – 15m Trees < 5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
Mallee Tree Form Mallee Shrub Form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs > 2m Shrubs 1.5 – 2m Shrubs 1 – 1.5m Shrubs 0.5 – 1m Shrubs 0 – 0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
Mat Plants Hummock Grass Bunch grass >0.5m Bunch grass < 0.5m Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-dense Hummock Grass Tall Grass Low Grass Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
Sedges > 0.5m Sedges < 0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
Ferns Mosses, liverworts	Dense ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

Appendix 7: Keighery (1994) Health Ratings.

Health Rating	Health Description	Definition
6	Pristine	No obvious signs of disturbance
5	Excellent	Vegetation intact despite disturbance affect, weeds are non-aggressive individual species
4	Very Good	Vegetation altered due to obvious signs of disturbance
3	Good	Structure affected, multiple disturbances. Retains basic structure, has ability to regenerate
2	Degraded	Structure severely disturbed. Can regeneration to good condition, but requires intensive management
1	Completely Degraded	Completely bare no native species

Appendix 3

Risk rankings and their descriptions

Status	Condition	Trend	Reliability	Threatening Processes
(V) Vulnerable	(i) Degraded (Recovery unlikely in medium term)	(i) Extinction e.g. targeted research has not observed species in recent times or no record in last 20 years	(i) Anecdotal	(i) Broad scale vegetation clearing
(E) Endangered	(ii) Fair (Recovery requires significant management intervention)	(ii) Status/condition rapidly declining e.g. < 10 year time frame	(ii) Qualitative	(ii) Increasing fragmentation, loss of remnants and lack of recruitment
(SP) Specially Protected	(iii) Good (Recovery would occur in short term with minimum intervention)	(iii) Status/condition declining	(iii) Quantitative and qualitative	(iii) Firewood collection
	(iv) Near pristine	(iv) Status/condition static	(iv) Quantitative	iv) Grazing pressure
		(v) Status/condition improving		(v) Feral animals - list in order of significance
		(vi) Unknown		(vi) Exotic weeds - list in order of significance
				(vii) Changed fire regimes
				(viii) Pathogens
				(ix) Changed hydrology- Salinity
				(x) Changed hydrology- other, e.g. altered flow regimes affecting riparian vegetation
				(xi) Pollution
				(xii) Other – describe

Appendix 4

FNO Ground Disturbance Procedure



Forrestania Nickel Operation

Ground Disturbance Procedure

FNO-ENV-PRO-013

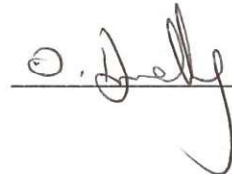
3	Ground Disturbance Procedure	AH	DS; JD; OD; CM; NM; SW	PK	13 th January 2015	12 th January 2016
Rev	Description	Author	Checked by	Approved by	Date	Next Review Date

Document Authorised:

Jonathon Doig. Spotted Quoll U/G Manger:

 Date: 27/1/15

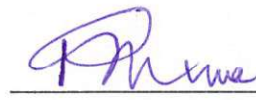
Owen Donnelly. Safety & Compliance Manager:

 Date: 27/1/15

Chris Munro. Mill Manager.

 Date: 27/1/15

Noah Muzuva. Geology Manager:

 Date: 27/01/15

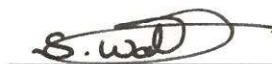
Phil Knapton. Environmental Manager:

 Date: 27/01/2015

Duncan Sutherland. General Manager:

 Date: 27/01/2015

Simon Waters. Flying Fox U/G Manager:

 Date: 27-1-15

Distribution Level		Instructions
WSA Managers		Read and Endorse
WSA Supervisors		Read and Understand
WSA Environmental Staff		Read and Understand
WSA All Staff		
Contractor Managers		

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1. PURPOSE

This procedure provides a process for ground disturbance at the Forrestania Nickel Operation (FNO). The aim of the process is environmental protection and compliance.

2. SCOPE

This procedure applies to any work on Western Areas Ltd and Joint Venture tenements where ground disturbance is required.

3. DEFINITIONS

- a) *Desktop Survey – reviewing available data (historical and current) to make an informed decision. Data includes monitoring data, scientific journals, maps and GIS datasets.*
- b) *Environmental Impacts – the indirect and direct effects on the natural environment through human actions.*
- c) *Site Inspection – a field survey for flora or fauna or another environmental variable.*
- d) *Ground Disturbance – any activity that disturbs and alters the land from its current state to another (generally to a more degraded state).*
- e) *Natural Resource – a naturally occurring material that can be exploited by people.*
- f) *Principle Employer – having most control and influence over the workplace.*
- g) *Sustainable Management – exploiting natural resources without destroying the ecological balance of an area.*

4. TRAINING AND COMPETENCY

The Environmental Adviser requires an academic degree in environmental studies from a nationally recognised organisation.

5. PROCEDURE

Western Areas Ltd (WSA) considers compliance with environmental and mining law in Western Australia as a priority. Environmental law in Australia applies to both private and public sectors and is designed to express policies of the government in relation to sustainable management of natural resources (Bates, 2010). As the principle employer, WSA has a duty to comply with Environmental law in Australia. WSA acts in accordance with the following legislation for ground disturbance activities:

- Environmental Protection Act 1986
- Environment Protection and Biodiversity Conservation Act 1999
- Aboriginal Heritage Act 1972
- Mining Act 1978
- Wildlife Conservation Act 1950

5.1. GROUND DISTURBANCE

WSA controls disturbance through the Ground Disturbance Permit (GDP) (Appendix 1). All planned works should aim to minimise disturbance and consider environmental and cultural values of the area (DEC, n.d.). Serious environmental impacts such as unauthorised clearing can attract administrative, civil and criminal sanctions from the government regulators (Bates, 2010).

5.2. GOVERNMENT APPROVALS

All works require some form of external approval. The permitting authority may either be central government (such as permits to clear native vegetation) or local government (such as development consent). Various aspects of the proposal may require several permits from different regulatory authorities (Bates, 2010). Approval is commonly required when developing land, emitting pollution, taking native and endangered wildlife, taking commercial quantities of water, and removing significant quantities of native vegetation.

It is common in all natural resource management and environmental protection legislation to allow a competent authority to permit by licence to activities that the law would otherwise make unlawful (Bates, 2010). The authority may then impose conditions under certain activities to ensure environmental protection. Any breach of a licence or carrying out an activity without a permit where one is required is a criminal offence. The regulatory authorities also have the powers to modify,

suspend or cancel licences where the improper management of the resources makes that necessary (Department of Mines and Petroleum, n.d.).

Before the regulator issues a permit, some form of assessment of environmental impacts must be done. Environmental assessment may take place at a number of levels with varying degrees of detail. The responsibility for choosing an appropriate standard of assessment for a particular project lies with the decision-maker responsible for determining the application (Bates, 2010).

It is important to consider external application-to-approval timeframes for project scheduling. Please contact the Environmental Department on ext. 2204 or 2240 during the initial project planning stage.

5.3. GROUND DISTURBANCE PERMIT

The Ground Disturbance Permit (GDP) is an internally controlled WSA document. It ensures all necessary approvals are in place for the nominated project works and set conditions to ensure compliance and minimise environmental impacts.

The GDP consists of three sections. Section one is completed by the Nominated Supervisor or the Environmental Adviser (EA) must be given sufficient project details which include:

- Project area e.g. Spotted Quoll
- Location e.g. co-ordinates (Australia GDA94), DXF or shapefiles;
- Project description;
- Contractor undertaking works;
- Start date and estimated schedule;
- Approval reference numbers if any.

The EA completes section two and stipulates conditions to ensure compliance and sustainable mining and exploration practices. If an application is inadequate or there is a liability of conformity for WSA, then the application is declined. The third section is signing the permit by all parties (Environmental Adviser, Nominated Supervisor and Contractor) thereby agreeing to the GDP conditions.

5.4. ENVIRONMENTAL CHECKS

The EA undertakes a desktop assessment using ArcGIS software, the SLIP portal (Landgate, 2007) and nature map (Department of Parks and Wildlife, 2004). A map is created using raster files (aerial imagery) and spatial data which can include:

- Declared Rare Flora (DRF) populations with 50m buffer;
- Priority flora locations and 10m buffer;
- Environmentally Sensitive Areas (ESA) e.g. Lake Cronin Red Brook Area 1.1;
- Clearing Permits (purpose and area);
- Vegetation complexes;
- Conservation reserves and Schedule 1 areas;
- WSA tenements and Joint Venture tenements;
- Contours;
- Roads and tracks;
- Mining Infrastructure;
- Aboriginal heritage areas; and
- Protected fauna habitat.

5.5. PERMIT CONDITIONS & SITE INSPECTION

The desktop assessment highlights any potential conflicts with environmental policies, management plans, procedures, tenement and licence or approval conditions, as well as any other landholder agreements. The EA then addresses all conflicts during the site inspection to incorporate management actions and permit conditions.

5.6. APPROVAL

Once the EA reasonably accepts the GDP, it can be approved. The EA records the GDP using a unique code (YY-GD-XXX) where the first two digits denote the last two digits of the calendar year, and the last three digits provide the calendar years consecutive permit number.

All parties (Environmental Adviser, Nominated Supervisor and Contractor) must sign the GDP for official approval, thereby agreeing to abide by all conditions set by the GDP. The EA then files all relevant paperwork in the GDP folder.

6. RESPONSIBILITY

Western Areas Managers & Supervisors
Environmental Department

7. REFERENCES

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APPENDIX 1 – GROUND DISTURBANCE PERMIT (GDP)



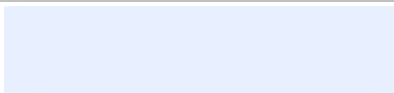
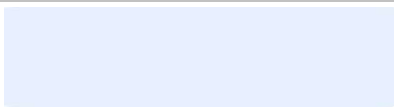
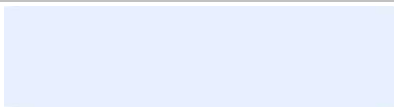
GROUND DISTURBANCE PERMIT

USED IN CONJUNCTION WITH GROUND DISTURBANCE PROCEDURE WSA-ENV-PRO-013

ID: Click here to enter year (YY).-**GD-**Click here to enter GDP ID number.

PART 1: PROJECT DESCRIPTION (completed by WSA-nominated supervisor)	
Location e.g. Flying Fox: Click here to enter text.	Project Name: Click here to enter text.
Tenement code/s: Click here to enter text.	Today's Date: Click here to enter date.
Area to be disturbed: Click here to enter text. m ²	Tonnage to be disturbed: Click here to enter text. m ³
*Tonnage disturbance is calculated when cut & fill methods required &/or borrow pits **Exploration licenses have a limit of 1000 tons per tenement and is not reduced or removed as a result of rehabilitation activities	
Start Date: Click here to enter date.	Completion Date: Click here to enter date.
PART 2: DESCRIPTION OF DISTURBANCE (completed by WSA-nominated supervisor)	
What is the purpose of proposed clearing? Click here to enter text.	
Please provide drill hole co-ordinates if exploration drilling: Click here to enter text.	
Undisturbed or disturbed land to be impacted? Click here to enter text.	
Please provide PoW approval identification number if exploration drilling: Click here to enter text.	
Is a work plan attached? Click here to enter text.	
Please organize area to be flagged for easy identification; please state flagging colour: Click here to enter text.	
PART 3: ENVIRONMENTAL CHECKS (completed by WSA-environmental advisor)	
Is the area within/near an ESA or Schedule 1 area? Click here to enter text.	
Is proposed clearing within/near a road reserve or nature reserve? Click here to enter text.	
Is proposed clearing within/near riparian vegetation of a wetland or watercourse? Click here to enter text.	
Is proposed clearing within/near Indigenous Heritage areas? Click here to enter text.	
If a clearing permit is required, is it fully within the permit boundary? Click here to enter text.	
If PF is within/near the proposed clearing area; name species: Click here to enter text.	
If DRF is within/near the proposed area; name species: Click here to enter text.	
Is further approval required from external stakeholders to take PF or DRF? Click here to enter text.	
If areas is weed infested; name species: Click here to enter text.	
If fauna habitat is within/near the proposed clearing area; provide details: Click here to enter text.	
If protected fauna species utilize the area; name species: Click here to enter text.	
Please state if desktop and field survey as per procedure has been completed: Click here to enter text.	
PART 4: GOVERNMENT APPROVALS SUMMARY (completed by WSA-environmental advisor)	
Program of Works #: Click here to enter text. Mining Proposal #: Click here to enter text.	
Clearing Permit #: Click here to enter text. Excess Tonnage (exploration): Click here to enter text.	
Other: Click here to enter text.	
PART 5: COMMENTS & CONDITIONS OF PROPOSED CLEARING (completed by WSA-environmental advisor)	
☐ Keep disturbance to a minimum	
☐ Demarcate area to be cleared with flagging tape	
☐ Earth-moving machinery should be cleaned and inspected prior to and post clearing	
☐ Stockpile topsoil & subsoil separately (maximum height 1.5m)	
☐ Clearing to be done in dry conditions	
☐ Surface water flow and drainage to be maintained	
☐ Local fill and rehab materials to be used only	
☐ Dieback areas to be avoided or vehicles to be quarantined	
☐ Large trees and major root zones to be avoided	
☐ Priority Flora to be avoided Click here to enter text.	
☐ DRF and 50m buffer zone to be avoided Click here to enter text.	



☐ Fauna habitat tree and 50m buffer zone to be avoided Click here to enter text. ☐ Fauna habitat mound and 50m buffer zone to be avoided Click here to enter text. ☐ All surface holes to be capped, filled or otherwise made safe immediately after completion ☐ Backfilling of sumps & rehab to be completed within 6 months ☐ All waste materials, sample bags, equipment and temporary buildings to be removed at completion ☐ Hydrocarbon spill greater than 20L to be reported ☐ Environmental Adviser to be present during clearing ☐ Tenement conditions attached ☐ Other additional license and/or permit conditions: Click here to enter text.	
AGREEING PARTIES (completed by WSA-nominated supervisor and contractor)	
<i>Approval is subject to conditions set out in this document.</i> <i>Signing this document means you agree and will abide to the conditions stated above.</i>	
WSA-nominated contractor: Click here to enter name.	
Signature: 	Date: Click here to enter a date.
WSA-nominated supervisor: Click here to enter name.	
Signature: 	Date: Click here to enter a date.
WSA ENVIRONMENTAL REVIEW AND SIGN-OFF (completed by WSA-environmental advisor)	
WSA-environmental adviser: Click here to enter name.	
Signature: 	Date: Click here to enter a date.

ORIGINAL TO FILE (RETURN TO ENVIRO DEPARTMENT)

DOCUMENT READ CONFIRMATION

I confirm that I have read the above document.

Name: _____

Company: _____

Department: _____

Date: _____

Signature: _____

Remove this page and return it to you supervisor / or manager who will ensure that it is passed on to the WSA OHS Department.

Failure to complete and return this Read Confirmation will result in a non-conformance report.

Appendix 5

Western Areas Ltd Environmental Policy



ENVIRONMENTAL POLICY

Western Areas NL (WSA) is committed to environmental sustainability. Our mining and exploration activities are undertaken with a responsibility to balance our economical and operational requirements with a responsibility to minimise our impact on the environment and local communities.

This commitment is communicated to our staff, contractors, customers and the local communities through training, statutory reporting and public relations.

WSA strives for continuous improvement of our environmental management systems. These systems are designed to prevent activities and/or conditions that negatively impact the environment.

To achieve these goals, Western Areas NL Environmental Policy includes the following key principles:

- Western Areas NL decision making process at Board and Management level must take into account environmental issues as a high priority;
- The Board and Management ensure the availability of resources and management systems to enable compliance with statutory obligations and our own internal standards;
- The company will report regularly on environmental performance and take remedial action where performance does not meet expectation;
- Western Areas will actively promote a culture of ethical environmental practise and behaviour including respect for cultural and community values.

The responsibility for the company's environmental performance lies with the Board and Management as well as all staff, contractors and customers actively working toward environmental sustainability.

Dan Lougher
Managing Director