



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 2801/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Regis Resources Limited

### 1.3. Property details

Property: Mining Lease 38/940  
Mining Lease 38/943  
Mining Lease 38/1091  
Miscellaneous Licence 38/133  
Local Government Area: Shire of Laverton  
Colloquial name: Duketon Gold Project: Moolart Well Project Area – borefield, airstrip, accommodation village, and associated infrastructure

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
233		Mechanical Removal	Mineral Production and associated infrastructure

## 2. Site Information

### 2.1. Existing environment and information

#### 2.1.1. Description of the native vegetation under application

**Vegetation Description** Vegetation within the application areas has been mapped at a 1:250,000 scale as the following Beard vegetation association: (Shepherd et al., 2001; GIS Database).

- 18: Low woodland; mulga (*Acacia aneura*).

Outback Ecology Services were commissioned by Regis Resources Limited to undertake a desktop study and a botanical field survey of the vegetation and flora of the Moolart Well, Dogbolter and Eristoun project areas, which included the vegetation within the application areas, in September 2006. In September 2007, a second round of surveying was undertaken across the proposed borefield to the north and east of the Moolart Well project area, along proposed haul road locations and across proposed disturbance footprints at each of the three project areas (Outback Ecology Services, 2007).

A total of 7 vegetation associations were identified across the two disjunct project applications areas (Outback Ecology Services, 2007).

#### 1. Undulating Plains

**P1 - Mulga Low Forest A:** *Acacia aneura* var. *aneura* and *A. aneura* var. *intermedia* were present in groves with an understorey limited to occasional plants including *Psydrax latifolia*, *Eremophila latrobei* ssp. *latrobei*, *E. forrestii* ssp. *forrestii*, *Dianella revoluta* and *Cheilanthes austrotenuifolia*.

**P2 - Mulga Open Scrub to Low Forest B over *Eremophila spectabilis* ssp. *brevis* Low Scrub B over *Eragrostis eriopoda* Open Low Grass:** Sparse to mid-dense cover of *Acacia aneura* var. *aneura*, *A. aneura* var. *?argentea* and *A. aneura* var. *intermedia*. Other shrub species present at lower densities included *Eremophila forrestii* ssp. *forrestii*, *E. youngii* ssp. *youngii* and *Senna artemisioides* ssp. *filifolia*. *Eragrostis eriopoda* dominated the mid-dense to sparse grass layer with *Monachather paradoxus*, *Aristida contorta* and *Thyridolepis multiculmis* also recorded.

**P7 - Mulga Thicket to Low Woodland A over *Triodia basedowii* Mid-dense Hummock Grass:** *Acacia aneura* var. *aneura*, *A. aneura* var. *?argentea* and *A. aneura* var. *intermedia* dominated the sparse to mid-dense upper storey. Other less common upper storey species included *Eucalyptus* sp. Mulga Rock (K.D. Hill & L.A.S. Johnson KH 2668) and *Grevillea nematophylla* ssp. *supraplana*. A very sparse shrub layer was present at some sites with species including *Eremophila forrestii* ssp. *forrestii*, *E. glabra*, *E. youngii* ssp. *youngii* and *Grevillea sarissa* recorded.

**P12 - Mulga Open Scrub to Low Woodland B over *Eragrostis eriopoda* Low Grass:** This association was located on undulating plains with a very sparse to mid-dense cover of ironstone gravel. *Acacia aneura* var. *aneura* and *A. aneura* var. *?intermedia* provide a very sparse to mid-dense upper storey. A very sparse shrub layer was present at some sites with species including *Scaevola spinescens*, *Ptilotus obovatus*, *Eremophila latrobei* ssp. *latrobei*, *Solanum lasiophyllum* and *Eremophila pungens* recorded. *Eragrostis eriopoda* cover ranged from mid-dense to dense.

#### 2. Drainage Lines

**D1 - Mulga Low Forest A over Mixed Open Scrub to Dwarf Scrub over Mixed Open Low Grasses:** This association occurred across drainage lines in the survey area and displayed a mid-dense upper storey of *Acacia aneura* var. *aneura* and *A. aneura* var. *intermedia*. Other less common *Acacia* species included *A. craspedocarpa* and *A. ramulosa* var. *linophylla*. Mid-storey shrub species varied in density and diversity across the sites with cover generally being very sparse to sparse. Dominant species included *Eremophila punctata*, *E. spectabilis* ssp. *brevis*, *E. forrestii* ssp. *forrestii*, *E. pungens* (P3) and *Sida calyxhymenia*. A very sparse to mid-dense cover of grasses was recorded with dominant species including *Eragrostis eriopoda*, *Aristida contorta*, *Eriachne pulchella* and *E. flaccida*, the latter occurring in the larger drainage lines.

### 3. Low Hills

**H3 - Senna species Open Scrub over Ptilotus obovatus Low Heath C over Enneapogon caerulescens Low Grass:** A sparse cover of *Acacia aneura* var. *aneura* and var. *?argentea* was recorded over a very sparse cover of *Senna* species. A sparse lower shrub layer was dominated by *Ptilotus obovatus* with *Solanum lasiophyllum* and *Maireana georgei* also present. *Enneapogon caerulescens* cover ranged from mid-dense to sparse with other grass species present at lower densities including *Aristida contorta* and *Eragrostis dielsii*.

**H4 - Mulga Open Scrub to Low Woodland B over Eriachne mucronata Open Low Grass to Low Grass:** This association was present on low hills with a mid-dense to dense cover of ironstone gravel (and granite in some areas). A sparse over storey was provided by *Acacia aneura* var. *aneura* and *A. aneura* var. *intermedia* with *A. craspedocarpa*, *A. ramulosa* var. *linophylla* and *A. quadrimarginea* occurring in some areas. A very sparse mid storey was present with occasional shrubs of *Eremophila latrobei* ssp. *latrobei*, *E. punctata* and *Senna* sp. Meekatharra. *Baeckea* sp. Melita Station (P4) occurred in a number of sites but was not common. *Eriachne mucronata* dominated the lower storey ranging from very sparse to mid-dense in cover.

#### Clearing Description

Regis Resources Limited has applied to clear up to 233 hectares of native vegetation within two disjunct application areas which total approximately 713 hectares for the purpose of mineral production. The proposed clearing will facilitate the development of the Duketon Gold Project which comprises of three project areas (Moolart Well, Dogbolter and Erlistoun) which are located in close proximity to the application areas. Under this proposal the vegetation will be cleared for an accommodation camp, airstrip, access roads, borefield and other related infrastructure (Regis Resources, 2008; Coffey Natural Systems, 2008).

The northern-most application area is for the proposed borefield, access roads and associated infrastructure, whilst the southern-most application area is for the proposed accommodation camp, airstrip, access roads and associated infrastructure.

Topsoil and vegetation from cleared areas will be stockpiled for use in later rehabilitation (Coffey Natural Systems, 2008).

#### Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

to

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

#### Comment

The condition of the vegetation ranged from 'excellent' to 'degraded' (Coffey Natural Systems, 2008). Areas of vegetation that were considered to be in 'excellent' condition were those located on low hills or ridgelines where palatable grass and shrub species were less common (Coffey Natural Systems, 2008; Outback Ecology Services, 2007). Outback Ecology Services (2007) assessed the vegetation within the immediate vicinity of the drilling programmes at both sites as 'degraded' due to disturbance. Cattle grazing had also adversely impacted on vegetation within the Moolart Well project application area (Outback Ecology Services, 2007).

### 3. Assessment of application against clearing principles

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

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

The application areas are located within the East Murchison subregion of the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) bioregion which encompasses an area of 28,120,558 hectares (GIS Database; Shepherd et al., 2001). The East Murchison subregion is characterised by internal drainage, extensive areas of elevated red desert sandplains with minimal dune development, salt lake systems associated with the occluded paleodrainage system, broad plains of red-brown soils and breakaway complexes, as well as red sandplains (Cowan, 2001). Vegetation is dominated by Mulga woodlands which are often rich in ephemerals; hummock grasslands, saltbush shrublands and *Halosarcia* shrublands (Cowan, 2001).

The vegetation within the application areas consists of Beard Vegetation Association 18 which is common and widespread throughout the Murchison IBRA region, with approximately 100% of the pre-European vegetation extent remaining (Shepherd et al., 2001; GIS Database).

A total of 34 vegetation associations were identified across the Duketon Gold Project Area which encompassed an area of approximately 2,384 hectares (Outback Ecology Services, 2007; GIS Database). Seven vegetation associations were identified within the two disjunct application areas which cover an area of approximately 713 hectares (Outback Ecology Services, 2007). The number of vegetation associations identified by Outback

Ecology Services (2007) is considered low given the total size of the application areas and distances separating the two project application areas. The total number of vegetation associations identified throughout the adjoining Duketon Gold Project Area is also considered relatively low given the size of the area (2,384 hectares).

None of the vegetation associations identified within the application areas comprised of Threatened Ecological Communities (TEC's) (Outback Ecology Services, 2007). All of the vegetation associations and landforms identified across the application areas are considered as characteristic of the Murchison IBRA region, and are well represented outside of the proposed areas of disturbance (Outback Ecology Services, 2007).

A total of 174 flora taxa (including subspecies and varieties) from 83 genera and 35 families were identified within the wider Duketon Gold Project Area (Outback Ecology Services, 2007). The number of species recorded is considered relatively low for a survey area which totalled in excess of approximately 2,384 hectares.

No species of Declared Rare Flora (DRF) were recorded within the application areas (Outback Ecology Services, 2007). Five Priority Flora species, *Phyllanthus baeckeoides*, *Baeckea* sp. Melita Station, *Calytrix praecipua*, *Microcorys macredieana* and *Eremophila pungens*, were recorded during the survey of the Duketon Gold Project Area which included the vegetation under application (Outback Ecology Services, 2007). None of these Priority Flora species are restricted to the vegetation communities or landforms that have been identified within the application areas and adjoining areas, and all have demonstrated wide ranging distributions throughout the surrounding local and regional area (Outback Ecology Services, 2007).

Coffey Environments (2008) determined that the application areas were characterised by one major fauna habitat. This has been described by Coffey Environments (2008) as:

**1. Mulga woodland with a sparse under storey of grasses on a sandy-clay substrate.**

Coffey Environments (2008) considers that the fauna habitat identified within the application areas is abundant throughout the adjacent areas. Shepherd et al. (2001) vegetation statistics indicates that approximately 100% of the pre-European vegetation extent remains within the Murchison IBRA region. It is considered that the destruction of these habitats will not have a significant impact on the availability of similar habitat in a bioregional context (Coffey Environment, 2008). Coffey Environments (2008) believe that on a regional scale the proposed clearing is unlikely to result in a significant loss of fauna habitat.

Outback Ecology Services (2007) report that no weed species were recorded within the application areas. The introduction of weed species into the application areas has the potential to decrease the floristic diversity of the application area as they compete with native flora for resources. To minimise the risk of introducing introduced flora species into the application areas the Assessing Officer recommends that should the permit be granted, conditions be imposed on the permit for the purpose of weed management.

The landform features, floristic diversity and vegetation communities that have been recorded within the application areas are considered widespread and typical within the Murchison IBRA region (Outback Ecology Services, 2007). The proposed clearing of 233 hectares within an application area of approximately 713 hectares is unlikely to impact on an area that comprises of a high level of biological diversity, or significantly impact on the biological diversity of the Murchison IBRA region.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Coffey Environments (2008)  
Cowan (2001)  
Outback Ecology Services (2007)  
Shepherd et al. (2001)  
GIS Database:  
- Interim Biogeographic Regionalisation of Australia (subregions)  
- Interim Biogeographic Regionalisation of Australia  
- Pre-European Vegetation

**(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.**

**Comments** **Proposal is not likely to be at variance to this Principle**  
A level 2 fauna assessment for the entire Duketon Gold Project Area, which included the areas under application, was undertaken by Coffey Environments (Coffey Environments, 2008). The objectives of the level 2 fauna assessment were to (Coffey Environments, 2008):

- Identify and assess the values and significance of the vertebrate fauna assemblage in the project area and to describe these values in a local and regional context;
- Describe and assess the potential direct and indirect impacts that may result from any proposed use or development on the vertebrate fauna assemblage and species of conservation significance in the project area;

- If conservation significance vertebrate fauna and fauna assemblages will be impacted, then describe measures to be implemented to ensure that the abundance, diversity, geographic distribution and productivity of these fauna are maintained.

Coffey Environments carried out the following scope of works in order to achieve the abovementioned objectives (Coffey Environments, 2008):

- A search of the Western Australian Museum (FaunaBase) to develop a list potential vertebrate fauna in the area. The search area was bounded by the latitudes 26.5° to 28.5°S and longitudes 121.5° to 123°E (Coffey Environments, 2008);
- A search of the Commonwealth Government's Department of Environment, Water, Heritage and the Arts (DEWHA) *Environment Protection and Biodiversity Conservation Act 1999* on-line database to identify potential vertebrate fauna in the area. The search area was also bounded by the latitude 26.5° to 28.5°S and longitude 121.5° to 123°E (Coffey Environments, 2008);
- A review of the Department of Environment and Conservation's (DEC) Threatened and Priority species database for species of conservation significance likely to be in the area;
- A review of published and unpublished literature that Coffey Environments could access to provide a list of fauna that have potential to occur in the region;
- A field survey incorporating trapping, spotlighting, bat echolocation recordings and opportunistic observations;
- An inventory of vertebrate fauna species recorded in the project area during the survey period, including conservation significant species;
- Comparison of the fauna assemblage in the project area within other survey sites in the region;
- Discussion of the potential impacts of the development on fauna and fauna habitat; and
- Management recommendations to minimise potential impacts of the development on the fauna.

Based on the review of existing information and the results of the database searches, the following species of conservation significance have the potential to occur within the application areas (Coffey Environments, 2008).

- Mulgara (*Dasyercus cristicauda*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Numbat (*Myrmecobius fasciatus*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Bilby (*Macrotis lagotis*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Malleefowl (*Leipoa ocellata*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Great Desert Skink (*Egernia kintorei*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Banded Hare-wallaby (*Lagostrophus fasciatus fasciatus*): Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*. The DEC Threatened species database lists *Lagostrophus fasciatus fasciatus* as being seen near Laverton, but no data provided (Coffey Environments, 2008). This species, as well as the mainland species *Lagostrophus fasciatus albipilis* is extinct on the mainland (Coffey Environment, 2008; Department of the Environment, Water, Heritage and the Arts, 2009a);
- Peregrine Falcon (*Falco peregrinus*): Schedule 4 (Other specially protected fauna) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*;
- Australian Bustard (*Ardeotis australis*): Priority 4 on the DEC's Priority Fauna List;
- Slender-billed Thornbill (western) (*Acanthiza iredalei iredalei*): 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Princess Parrot (*Polytelis alexandrae*): 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Rainbow Bee-eater (*Merops ornatus*): 'Migratory' under the *Environment Protection and Biodiversity Conservation Act 1999*;
- Oriental Plover (*Charadrius veredus*): 'Migratory' under the *Environment Protection and Biodiversity Conservation Act 1999*; and
- Fork-tailed Swift (*Apus pacificus*): 'Migratory' under the *Environment Protection and Biodiversity Conservation Act 1999*.

A search across the entire Duketon Gold Project Area identified three major fauna habitats (Coffey Environments, 2008). These are (Coffey Environments, 2008):

1. **Mulga woodland with a sparse under storey of grasses on a sandy-clay substrate;**
2. **Spinifex with an over storey of shrubs and small trees on a sandy substrate; and;**
3. **Spinifex with an over storey of eucalypts and shrubs.**

No threatened fauna communities were identified within any of the project application areas (Coffey Environments, 2008).

Assessment of the vegetation mapping provided by Outback Ecology Services (2007) indicates that there is an absence of spinifex dominated vegetation communities within the application area. Given the absence of any spinifex dominated vegetation communities within the application areas, it is considered that the vast majority of the two application areas, as well as the wider Duketon Gold Project Application Area, comprises of the fauna habitat '**Mulga woodland with a sparse under storey of grasses on a sandy-clay substrate**'.

The Assessing Officer notes that the fauna habitats were identified when the Duketon Gold Project application area included a proposed bore field area which originally extended north from the current application area by approximately 30 kilometres, and encompassed an area totalling approximately 17,181 hectares. Regis Resources Limited has subsequently modified their proposed disturbance footprint and has significantly reduced the size of the proposed bore field (Regis Resources Limited, 2008; GIS Database). The current borefield application area encompasses a total area of approximately 444 hectares and is the northern most area under this clearing permit application (GIS Database).

Coffey Environments (2008) consider that the fauna habitats within the application areas and adjoining areas are abundant throughout surrounding areas. Shepherd et al. (2001) vegetation statistics indicate that approximately 100% of the pre-European vegetation extent remains within the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) region. It is considered that the destruction of the habitat within the application areas will not have a significant impact on the availability of similar habitat in a regional context (Coffey Environments, 2008). Coffey Environments (2008) believe that on a regional scale the proposed clearing is unlikely to result in a significant loss of fauna habitat.

A trapping program was undertaken between 8 and 16 December 2007, and repeated between 8 and 17 January 2008 (Coffey Environments, 2008). In addition to the trapping program, avifauna and bat surveys were undertaken, as well as spotlighting surveys in order to target nocturnal reptiles, mammals and birds that often are not readily captured or seen by other means (Coffey Environments, 2008).

Five survey sites throughout the wider Duketon Gold Project Area were and these selected as representative areas to be impacted (Coffey Environments, 2008). The survey sites have been described as (Coffey Environments, 2008):

1. **Spinifex with an over storey of shrubs (SS):** In most places the spinifex was mature, shrubs were up to 2 metres and there were scattered Eucalypts on a red sandy soil.
2. **Spinifex with an over storey of Eucalypts and shrubs (ES):** This habitat was quite variable, with patches of grasses in the under storey. The larger trees were old well established Eucalypts, but there were areas with shrubs and small trees to 3 metres, often in localised dense patches.
3. **Open Spinifex with sparsely distributed shrubs (OS):** This was a hard, flat sandy area vegetated with hummocks of spinifex and a few scattered small shrubs. The spinifex in this area was mature enough to have seeded after the last substantial rains.
4. **Mulga woodland with a sparse under storey of grasses - Moolart Well (MW):** The substrate was sandy-clay, often with a layer of scattered small stones. The sparse understorey consisted mainly of small shrubs and occasional patches of dead annual grasses, with an over storey of Mulga.
5. **Mulga woodland with a sparse under storey of grasses - Dogbolter (DB):** This habitat was generally similar to the Mulga woodland at Moolart Well.

As the survey sites were selected when the Duketon Gold Project Application Area included a large proposed bore field, survey sites **SS**, **ES** and **OS** are located outside of the clearing application areas (Coffey Environments, 2008; GIS Database).

The application areas comprise of the fauna habitat 'Mulga woodland with a sparse under storey of grasses on a sandy-clay substrate' (Coffey Environments, 2008). Survey sites **MW** and **DB** were located in similar vegetation types and close proximity to the clearing application areas (GIS Database).

A total of four trapping sites were established at each of the survey sites (Coffey Environments, 2008). Each trapping site contained four trap lines. Each trap line contained three 20 litre PVC buckets, three 150 by 500 millimetre deep PVC pipes as pit-traps and three pairs of funnel traps evenly spaced along a 30 metre fly-wire drift fence (Coffey Environments, 2008). Three Elliot traps were set adjacent to each drift fence (Coffey Environments, 2008). Coffey Environments (2008) report that the trapping effort used during the survey generally far exceeded that accepted as adequate by the Environmental Protection Authority, and that adequate trapping was undertaken to represent the terrestrial fauna assemblage of the area.

A summary of the types of herpetofauna assemblages and the number of species recorded during the trapping program for the entire Duketon Gold Project Area is provided (Coffey Environments, 2008):

- Sixty one species of reptile were recorded within the project application areas including six agamids, 14 geckoes, 22 skinks, three legless lizards, six goannas, three blind snakes and seven front-fanged snakes (Coffey Environments, 2008). Reptiles were species rich and abundant in areas that had an understorey of spinifex (Coffey Environments, 2008). In Mulga woodlands reptiles were less abundant and species rich (Coffey Environments, 2008);
- Forty seven avifauna species were recorded during the surveys (Coffey Environments, 2008). Birds

were most abundant in the Eucalypt over an under storey of spinifex habitat (Coffey Environments, 2008). Species richness was high in both the Eucalypt over an under storey of spinifex and the Mulga woodland habitats, especially around the proposed Moolart Well accommodation camp site (Coffey Environments, 2008);

- Fourteen species of mammals including six species of bats and one introduced species were trapped within the application areas (Coffey Environments, 2008). In addition, the Euro (*Macropus robustus*) and Red Kangaroo (*M. rufus*) were frequently seen throughout the application areas, and feral cats were observed during the spotlight searches (Coffey Environments, 2008). The majority of the species were present in the Open spinifex with sparsely distributed shrubs habitat, with the least number of species found in the Mulga Woodland with a sparse understorey of grasses habitat; and
- At least three amphibian species were recorded from callings from a 'turkeys nest' (water storage area) near the proposed Moolart Well accommodation camp (Coffey Environments, 2008). Coffey Environments (2008) report that these were most probably *Neobatrachus sutor*, *Cyclorana maini* and possibly *N. kunapalari*. All three species have a widespread distribution and are abundant (Coffey Environments, 2008).

The following outlines the likelihood of conservation significance fauna occurring within the application areas.

The Mulgara inhabits the arid regions of Australia and is most commonly found on sandy soils vegetated with spinifex (Coffey Environments, 2008). Individual Mulgara are mostly solitary, utilising 3 to 5 burrows each night within an activity area of 1.0 to 14.4 hectares (Masters, 2003; Coffey Environments, 2008). One Mulgara was caught during the survey in the open spinifex with sparsely distributed shrubs site (**OS**), and a recently active burrow was found in the spinifex with an over storey of shrubs site (**SS**). These two survey sites are outside of the proposed clearing application areas. Coffey Environments (2008) consider that the Mulgara is likely to occur in any of the sand plain habitats that have a relatively dense cover of spinifex. Vegetation mapping by Outback Ecology Services (2007) demonstrates that spinifex dominated vegetation communities are located outside of the application areas, apart from a very small portion that is located along the north-west boundary of the borefield application area (Outback Ecology Services, 2007; GIS Database). The proposed clearing is not likely to have any significant impact on habitat for the Mulgara.

The Numbat was originally widespread across southern semi-arid and arid Australia (Coffey Environments, 2008). There are currently two remnant native populations at Dryandra and Perup and several reintroduced populations including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve (Coffey Environments, 2008). There are no recent records of the Numbat in the general area (Coffey Environment, 2008). It is considered that the Numbat is unlikely to occur within the application areas (Coffey Environments, 2008).

Bilbies are largely restricted to the inland sandy deserts in two broad habitat types; Mulga woodlands with lateritic red earth and spinifex grassland with high fire frequency with red earth (Coffey Environments, 2008). Bilbies are omnivorous with their diet including termites, insects, seeds, vegetation and fungi (Coffey Environments, 2008). Bilby burrows observed in the Gibson desert were located in a raised mound not unlike a large rabbit warren on red sandy soils in a spinifex meadow with the occasional tree (Coffey Environments, 2008). Bilbies were not identified in the search of the DEHWA or DEC databases, however, there is anecdotal evidence that Bilbies are present in the sand plains vegetated with spinifex approximately 90 kilometres north of Moolart Well (Coffey Environments, 2008). There is the potential for this species to occur in the mature spinifex habitat in the proposed borefield (Coffey Environments, 2008). However, given that vegetation mapping by Outback Ecology Services (2007) demonstrates that there is an absence of spinifex dominated vegetation communities within the application areas, the proposed clearing is not likely to impact on habitat for the Bilby. Coffey Environments (2008) report that no burrows were identified within the application areas.

Malleefowl have been found in mallee regions of southern Australia, however, are now only found throughout these regions in fragmented patches due to clearing of habitat for agriculture, increased fire frequency, competition with exotic herbivores (sheep, rabbits, cattle, goats) and predation by foxes and cats (Coffey Environments, 2008). Malleefowl prefer mainly scrubs and thickets of mallee; *Eucalyptus* spp., *Melaleuca lanceolata* and *Acacia linophylla*, and also other dense litter forming shrublands (Johnstone and Storr, 1998). The breeding habitat of the Malleefowl is characterised by light soil and an abundant leaf litter, which is used in the construction of nesting mounds (Frith, 1959; Marchant and Higgins, 1993; Department of Environment, Water, Heritage and the Arts, 2009b). Coffey Environments (2008) state that there are few sites within the Duketon Gold Project area where the habitat was suitable for Malleefowl, and DEC records show the only recorded observation was near Leonora in 1998. During the survey of the Duketon Gold Project Area Coffey Environments (2008) found no evidence of recent mound building activity and none were seen in the area. Coffey Environments (2008) consider that the Malleefowl is unlikely to occur within the application areas, or wider Duketon Gold project area.

The Great Desert Skink is a large burrowing lizard that can grow up to 44 centimetres long and weigh up to 350 grams (Department of Environment, Water, Heritage and the Arts, 2009c). The species is found in the sandy desert regions of Western Australia, Northern Territory and South Australia and is found on sand-flats and clay, or loamy soils vegetated with spinifex (*Triodia basedowii*, *T. pungens* and *T. schinzi*) (Coffey Environments, 2008; Department of Environment, Water, Heritage and the Arts, 2009c). The DEC Threatened species database shows a record for the species in Laverton in 1967, so it is possible that this species may occur in the vicinity of the project area. The Great Desert Skink was not recorded during the survey of the application areas, or within the surrounding vegetation (Coffey Environments, 2008). Given the absence of spinifex dominated vegetation communities within the application areas, the proposed clearing is not likely to impact on

habitat for the Great Desert Skink.

The Peregrine Falcon is uncommon, although widespread throughout much of Australia excluding the extremely dry areas and has a wide and patchy distribution (Coffey Environments, 2008). Its preferred habitat includes cliffs along coasts, rivers and ranges and within wooded watercourses and lakes (Johnstone and Storr, 1998; Coffey Environments, 2008). Nesting sites include ledges along cliffs, granite outcrops and quarries, hollow trees near wetlands and old nests of other large bird species (Coffey Environments, 2008). Coffey Environments (2008) assessment is that the Peregrine Falcon may infrequently utilise the habitat within the application area. The species was not recorded during the fauna survey of the Duketon Gold Project Area (Coffey Environments, 2008). The proposed clearing activities are unlikely to significantly impact on this species as the Peregrine Falcon would be able to move away to other areas outside of the disturbed areas (Coffey Environments, 2008). Given the widespread habitat and distribution of the Peregrine Falcon, the proposed clearing is unlikely to impact on significant habitat for this species.

The Australian Bustard is known to occur within open rangeland habitats such as *Triodia* hummock grassland, grassy woodland, sandplains with spinifex, chenopod flats and low shrublands (Johnstone and Storr, 1998). During their breeding season the species can show preference for open grassland areas which border protective shrubland or woodlands (Australian Wildlife Conservancy, 2008). The species is known to be nomadic, with irregular widespread movements over long distances (Johnstone and Storr, 1998; Department of Environment and Climate Change NSW, 2008). This species was recorded within the application area by Coffey Environments (2008), and has been recorded in the bioregion in numerous other surveys (Coffey Environments, 2008). Coffey Environments (2008) report that this species will readily move to other areas if they are disturbed, and as a result are unlikely to be impacted by the proposed clearing activities given the abundance of similar and high quality habitat in areas outside of the application area (Coffey Environments, 2008).

The Slender-billed Thornbill is sparsely distributed across semi-arid southern Western Australia and western South Australia (Coffey Environments, 2008). The species preferred habitat includes chenopod shrub steppe, treeless or sparsely wooded flatlands and saline flats associated with salt lakes (Coffey Environments, 2008; Johnstone and Storr, 1998). The Slender-billed Thornbill populations are under threat because of habitat reduction due to sheep grazing and ringbarking of trees by rabbits (Coffey Environments, 2008). This species was not seen during the surveys of the application areas and adjacent areas (Coffey Environments, 2008). Coffey Environments (2008) consider that the Slender-billed Thornbill is unlikely to occur within the application areas, largely due to the lack of large salt lakes and the adjacent saline flats. The proposed clearing is not likely to impact on habitat for this species.

The Princess Parrot is thought to be nomadic, and is scarce or uncommon and patchily distributed throughout the central desert regions of Australia (Coffey Environments, 2008; Johnstone and Storr, 1998). The species occupies arid shrub lands, particularly those dominated by Mulga, Desert Oak and spinifex (Coffey Environments, 2008). It is likely that this species is threatened by habitat loss to agricultural practices and altered fire regimes (Coffey Environments, 2008). The Princess Parrot has been sighted in the Wanjarri Nature Reserve which is located approximately 20 kilometres north-east of the application area (Coffey Environments, 2008). Coffey Environments (2008) report that the species may occasionally be seen in the general area. Given the large expanses of similar habitat surrounding the application area the Princess Parrot is likely to move away to other areas with the onset of any disturbance (Coffey Environments, 2008).

A number a migratory bird species that are protected under the CAMBA and JAMBA treaties (China and Japan/ Australia Migratory Bird Agreements) may potentially occur within the application area. These include the Rainbow Bee-eater (*Merops ornatus*), Great Egret (*Ardea alba*), Oriental Plover (*Charadrius veredus*) and Fork-tailed Swift (*Apus pacificus*). All of these species may utilise the habitat within and adjoining the application area, for nesting or foraging, at different times throughout the year. The habitat types that have been identified within the application area are not restricted to the application area and there is a widespread distribution of similar, and for some species more suitable, habitat types throughout the Murchison region. The proposed clearing is unlikely to impact on significant habitat required for the existence of these migratory species.

It is considered that the destruction of the habitat within the application areas will not have a significant impact on the availability of similar habitat in a regional context (Coffey Environments, 2008). Coffey Environments (2008) believe that on a regional scale the proposed clearing is unlikely to result in a significant loss of fauna habitat.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

#### Methodology

Australian Wildlife Conservancy (2009)  
Coffey Environments (2008)  
Department of Environment and Climate Change NSW (2009)  
Department of Environment, Water, Heritage and the Arts (2009a)  
Department of Environment, Water, Heritage and the Arts (2009b)  
Department of Environment, Water, Heritage and the Arts (2009c)  
Frith (1959)  
Marchant and Higgins (1993)  
Masters (2003)

Johnstone and Storr (1998)  
Outback Ecology Services (2007)  
Regis Resources Limited (2008)  
Shepherd et al. (2001)  
GIS Database:  
- Clearing Instruments

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

**Comments Proposal may be at variance to this Principle**

According to available datasets there are no known records of Declared Rare Flora (DRF) or Priority Flora species within the application area (GIS Database).

Outback Ecology Services were commissioned by Regis Resources NL to undertake a desktop study and a botanical field survey of the vegetation and flora of the Moolart Well, Dogbolter and Eristoun project application areas in September 2006 (Outback Ecology Services, 2007). In September 2007, a second round of surveying was undertaken across the proposed borefield to the north and east of the Moolart Well project area, along proposed haul road locations and across proposed disturbance footprints at each of the three project areas (Outback Ecology Services, 2007).

Prior to the field survey, Outback Ecology Services (2007) conducted a search of the Western Australian Herbarium Specimen database and the Department of Environment and Conservation's Threatened (Declared Rare) Flora database in order to identify DRF and Priority Flora species which have the potential to occur within application areas. The database searches were undertaken within a radius of approximately 110 kilometres from the Moolart Well project application area (Outback Ecology Services, 2007).

Based on the results of the database search a total of two DRF and 33 Priority Flora species may potentially occur within the application areas (Outback Ecology Services, 2007).

Outback Ecology Services (2007) indicate that the species *Acacia eremophila* numerous-nerved variant (A.S. George 11924) (P3), *Baeckea* sp. Great Victoria Desert (As Weston 1481) (P2), *Conospermum todii* (DRF), *Dampiera eriantha* (P1), *Daviesia purpurascens* (P4), *Dicrastylis nicholasii* (P2), *Eucalyptus nigrifunda* (P4), *Goodenia lyrata* (P1), *Lechenaultia aphylla* (P1), *Olearia arida* (P2) and *Triglochin protuberans* (P3) have the potential to occur within the borefield (located in the north of the project area) in areas which are characterised by the Bullimore Land System. Following the flora and vegetation survey, Regis Resources Limited has significantly reduced the size of borefield area and as a result, the Bullimore Land System is located outside of the clearing application area (GIS Database). Whilst there is potential for these species to occur within areas characterised by the Bullimore Land System (Outback Ecology Services, 2007), it is considered unlikely that these species would occur within the application areas given the likely lack of preferred habitat.

Cowan (2001) lists an additional DRF species, *Eucalyptus articulata*, which occurs within the East Murchison Interim Biogeographic Regionalisation for Australia (IBRA) subregion. *Eucalyptus articulata* has been described as a low, straggly mallee up to 3 metres high that is found on red sand, sandy loam and arkose rubble (Western Australian Herbarium, 1998 - 2009). The Western Australian Herbarium's Florabase has 10 records for this species, all located within the Great Victoria Desert IBRA region (Western Australian Herbarium, 1998 - 2009). Based on the species preferred habitat type and given that Florabase records indicate that it has only been recorded within the Great Victoria Desert IBRA region, it is considered unlikely that *Eucalyptus articulata* would be located within the application areas.

Within the Moolart Well and Dogbolter project areas (including the haul road and the bore field) a total of 143 floristic survey sites were selected to represent the various geographical, geomorphologic and floristic variations within the project areas (Outback Ecology Services, 2007). At the Eristoun site, twenty sites were assessed during the botanical field survey (Outback Ecology Services, 2007). The flora and vegetation surveys encompassed the vegetation within the clearing application areas, as well as the surrounding vegetation.

No species of DRF were recorded within the application areas, or surrounding vegetation (Outback Ecology Services, 2007).

Five Priority Flora species were recorded during the flora and vegetation survey of the application areas and surrounding vegetation (Outback Ecology Services, 2007). The Priority Flora species were recorded within the application areas for the Moolart Well and Dogbolter project areas. These are (Outback Ecology Services, 2007):

- *Phyllanthus baeckeoides* (Priority 1);
- *Baeckea* sp. Melita Station (Priority 3);
- *Microcorys macredieana* (Priority 3);
- *Calytrix praecipua* (Priority 3); and
- *Eremophila pungens* (Priority 4).



### **Phyllanthus baeckeoides**

*Phyllanthus baeckeoides* is a shrub species that grows between 0.5 to 1.5 metres high, favours red lateritic and sandy clay soils as well as granite outcrops and flowers between July and September (Western Australian Herbarium, 1998 - 2009; Outback Ecology Services, 2007). The Department of Environment and Conservation's Florabase indicates that the conservation status for *Phyllanthus baeckeoides* has been downgraded to 'Priority Three' (Western Australian Herbarium, 1998 - 2009). Florabase this species is distributed throughout the Great Victoria Desert and Murchison IBRA regions (Western Australian Herbarium, 1998 - 2009). A single population of two *Phyllanthus baeckeoides* plants were identified during the September 2007 survey at Moolart Well. This population was located on the southern face of a low hill covered with ironstone and lateritic gravel (Outback Ecology Services, 2007). At the time of the survey, it was proposed that the accommodation camp would be located to the west of this hill, necessitating an access road within the vicinity of the population (Outback Ecology Services, 2007). However, Regis Resources Limited has relocated the camp adjacent to the proposed airstrip and as a result, this population is located outside of the application area and will not require disturbance (Outback Ecology Services, 2007).

### **Baeckea sp. Melita Station**

*Baeckea* sp. Melita Station is an upright shrub growing between 2.2 to 2.5 metres with a distinctive hooked leaf (Western Australian Herbarium, 1998 - 2009). The species preferred habitat is dark red rocky soil over ironstone amongst Mulga shrubland (Western Australian Herbarium, 1998 - 2009; Outback Ecology Services, 2007). Florabase records reveal that this species is distributed throughout the Murchison and Yalgoo IBRA regions (Western Australian Herbarium, 1998 - 2009). *Baeckea* sp. Melita Station was identified within or near six floristic sites across three vegetation associations at Moolart Well and Dogbolter, with a further eight populations recorded opportunistically (Outback Ecology Services, 2007). Outback Ecology Services (2007) estimate the total number of individuals of *Baeckea* sp. Melita Station to be in excess of 300. The largest of the recorded populations was estimated to contain in excess of 100 individuals, and this population was located outside of the proposed disturbance area (GIS Database).

*Baeckea* sp. Melita Station has been recorded during other surveys that have occurred throughout the locality. The species was recorded from four populations totalling 61 plants during the Rosemount survey in 1998, and this included one population within the Duketon Gold Project survey area and a further three that were located as a result of a targeted search (Outback Ecology Services, 2007). In total approximately 480 individual plants were recorded (Outback Ecology Services, 2007). Previous survey work in 1999 within the vicinity of the Bronzewing mine site, which is located approximately 135 kilometres west of the Moolart Well project application area, identified between 1500 and 2000 plants (Outback Ecology Services, 2007).

Outback Ecology Services (2007) report that approximately 29 individual plants may require removal during the upgrade of the road from Moolart Well to the airstrip and accommodation camp, and for the road between the Dogbolter and Moolart Well project areas. The possible removal of 29 plants represents approximately 10% of the known population within the immediate vicinity of the clearing application areas (Outback Ecology Services, 2007). Given *Baeckea* sp. Melita Station has a wide ranging distribution across two IBRA regions, is known to occur across a variety of vegetation associations and has been recorded in relatively high numbers during the survey by Outback Ecology Services (2007), the proposed disturbance to these individuals is not likely to significantly impact on the conservation status of this species.

### **Microcorys macredieana**

*Microcorys macredieana* is a shrub species that grows between 0.2 to 1.5 metres high, and favours dunes and sandplains (Western Australian Herbarium, 1998 - 2009; Outback Ecology Services, 2007). Florabase records reveal that this species is distributed throughout the Coolgardie, Central Ranges, Great Victoria Desert and Little Sandy Desert IBRA regions (Western Australian Herbarium, 1998 - 2009). According to the Department of Environment and Conservation Threatened (Declared Rare) Flora database search, no specimens of this plant have been lodged with the Western Australian Herbarium from within approximately 150 kilometres of Moolart Well (Outback Ecology Services, 2007).

This species was identified from two locations during the survey by Outback Ecology Services (2007), however, these were recorded within sand dune and sandplain areas that are located outside of the application areas. As a result, these populations will not be impacted on by the proposed clearing activities (Outback Ecology Services, 2007). *Microcorys macredieana* is not expected to occur within the application area due to the lack of sand dune or sandplain habitat.

### **Calytrix praecipua**

*Calytrix praecipua* is a flowering (June to November) shrub species that grows from 0.3 to 0.7 metres high and is found on skeletal sandy soils over granite or laterite, and also on breakaways and outcrops (Western Australian Herbarium, 1998 - 2009). Two populations of *Calytrix praecipua* were identified during the September 2007 survey (Outback Ecology Services, 2007). One population of 12 plants was identified within the Dogbolter Project application area in an area that has been severely disturbed by exploration drilling activities, and Outback Ecology Services (2007) has confirmed that this area will require clearing during the development of the Dogbolter open pit. A second population of approximately 30 plants was identified adjacent to the Moolart Well Project application area, however, this population is located outside of the clearing application area and will not be impacted on by the proposed clearing activities (Outback Ecology Services,

2007).

Florabase records reveal that this species is distributed throughout the Gascoyne, Great Victoria Desert, Little Sandy Desert and Murchison IBRA regions (Western Australian Herbarium, 1998 - 2009). Given the relatively widespread distribution of these records, the species does not appear restricted to the application area, or the local area. It is considered that the proposed clearing of 12 plants of *Calytrix praecipua* is not likely to impact on the conservation status for this species (Outback Ecology Services, 2007).

### **Eremophila pungens**

*Eremophila pungens* is described as an erect viscid shrub, 0.5 -1.5 metres in height which is found on sandy loam, clayey sand over laterite and also on plains, ridges and breakaways (Western Australian Herbarium, 1998 - 2009). Given its preferred habitat, the species has the potential to be located across a diverse range of landform features.

*Eremophila pungens* was recorded within or near twelve survey sites across six vegetation associations at the Moolart Well and Dogbolter project areas, and in addition 46 populations were identified opportunistically (Outback Ecology Services, 2007). *Eremophila pungens* was recorded on soil types which ranged from sandy loam to clayey sand with most areas containing a cover of ironstone or lateritic gravel (Outback Ecology Services, 2007). Many of the populations were recorded alongside various vehicle tracks that are to be upgraded to haul roads, as well as along a number of drainage lines, on low hills and undulating plains (Outback Ecology Services, 2007). Outback Ecology Services (2007) note that the number of plants and the variety of habitats it occurred across made counting this species difficult. However, Outback Ecology Services (2007) have estimated the total number of individuals of *Eremophila pungens* within the application area and adjoining areas to be in the thousands.

Florabase records reveal that this species is distributed throughout the south-eastern Gascoyne and north-eastern Murchison IBRA regions (Western Australian Herbarium, 1998 - 2009). In addition, previous survey work around the Bronzewing mine site, which is located approximately 135 kilometres to the west of Moolart Well project application area, indicate a population size well in excess of 5000 individuals (a conservative estimate) (Outback Ecology Services, 2007).

The proposed clearing for the development of the Moolart Well and Dogbolter mine sites will result in the total removal of several populations of *Eremophila pungens*, and their habitat. Regis Resources Limited has advised that the removal of any populations will be restricted to areas that are required for mine site infrastructure, therefore, any populations that are outside of the mine infrastructure area, but within the application area, are unlikely to be impacted on by the proposed clearing. The Assessing Officer acknowledges that the final disturbance to *Eremophila pungens* may be somewhat higher than the estimated figure, due to any changes which may arise during mine site infrastructure planning. However, Outback Ecology Services (2007) have demonstrated that *Eremophila pungens* has been recorded in relatively large numbers and across a range of vegetation communities outside of the application area. Given that *Eremophila pungens* has been recorded in high numbers (both populations and individuals) across a variety of vegetation associations outside of the application areas, and has a broad distribution that encompasses two IBRA regions (Outback Ecology Services, 2007; Western Australian Herbarium, 1998 - 2009), it is considered that the proposed clearing is not expected to have a significant impact on the conservation status of the species (Outback Ecology Services, 2007).

The proposed clearing activities are unlikely to significantly impact on the conservation status of the Priority Flora species outlined above given the distribution of the species in the local and regional area. Regis Resources Limited has developed the following rare flora management objectives in order to minimise disturbance to any DRF or Priority Flora during mine site development. These are (Coffey Natural Systems, 2008a):

- To limit the loss of native vegetation and plant habitats;
- To protect Priority Flora species occurring within the project area; and
- To prevent, where possible, the introduction and spread of noxious weeds within the project area.

Regis Resources aim to meet these objectives by implementing and adhering to the following procedures (Coffey Natural Systems, 2008a):

- Vegetation clearance and disturbance protocols will be developed and implemented;
- Vegetation clearing will be minimised, with the preferential use of previously disturbed or degraded areas where possible;
- Priority Flora located within the mine site but not authorised for disturbance will be clearly delineated and protected from direct or inadvertent impacts;
- Removal and fragmentation of minor areas of vegetation associated with watercourses will be avoided where possible;
- Site inductions will ensure that personnel have an awareness of conservation significant flora, and where these flora occur or may be expected to occur within the project area; and
- Vegetation and flora monitoring will be undertaken where required as a component of the Department of Industry and Resources (now Department of Mines and Petroleum) annual environmental reporting procedure.

Based on the above, the proposed clearing may be at variance to this Principle.

**Methodology** Coffey Natural Systems (2008a)  
Outback Ecology Services (2007)  
Western Australian Herbarium (1998 - 2009)  
GIS Database:  
- Clearing Instruments  
- Declared Rare and Priority Flora List

**(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.**

**Comments** **Proposal is not likely to be at variance to this Principle**  
There are no known Threatened Ecological Communities (TEC's) within the application areas (GIS database). The nearest known TEC is located approximately 225 kilometres west, south-west of the Moolart Well project application area (GIS database). Given the distance between the proposal and the nearest known TEC, the proposed clearing is not likely to impact on the conservation of that TEC.

Whilst there are no TEC's within the East Murchison subregion, Cowan (2001) has identified eighteen ecosystems that are classified as 'other ecosystems at risk'.

1. **Plain mixed halophyte low shrublands of the north-east Goldfields (PXHS);**
2. **Stony bluebush (*Maireana* spp.) mixed shrublands of the north-east Goldfields (SBMS); and**
3. **Stony ironstone mulga (*Acacia aneura*) shrublands of the north-east Goldfields (SIMS).**

Based on the vegetation communities that have been recorded within the application area, Outback Ecology Services (2007) consider that one of these 'other ecosystems at risk' occur within the application area - **SIMS**.

**SIMS** occurs across seven land systems through-out the north-eastern Goldfields area and is found in Wanjarri Nature Reserve, however, is considered to be in poor condition (Outback Ecology Services, 2007). Outback Ecology Services (2007) consider that vegetation types **H1, H2, H4, H5** and **H6** are representative of the **SIMS** ecosystem type. Although vegetation mapping indicates that small portions of these vegetation types are located within the application areas, the **SIMS** ecosystem type is considered relatively widespread across the north-eastern Goldfields. The proposed clearing is not likely to impact on vegetation that is considered necessary for the on-going maintenance, or conservation of the **SIMS** ecosystem.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Cowan (2001)  
Outback Ecology Services (2007)  
GIS Database:  
- Threatened Ecological Communities  
- CALM Managed Lands and Waters

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

**Comments** **Proposal is not at variance to this Principle**  
The clearing application area falls within the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) region in which approximately 100% of the pre-European vegetation remains (GIS database; Shepherd et al., 2001).

The vegetation of the clearing application area has been mapped as Beard Vegetation Association 18: Low woodland; Mulga (*Acacia aneura*) (GIS Database, Shepherd et al., 2001). According to Shepherd et al., (2001) approximately 100% of Beard Vegetation Association 18 remains at both the state and regional level (see table).

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Murchison Bioregion and Beard Vegetation Association 18 is of "Least Concern" (see table) (Department of Natural Resources and Environment, 2002).

Only a small percentage of Beard Vegetation Association 18 is protected within conservation reserves, however, the bioregion remains largely uncleared. As a result, the conservation of the vegetation association within the bioregion is not likely to be impacted on by this proposal.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves
IBRA Bioregion – Murchison	28,120,558	28,120,558	~100	Least Concern	1.1
Beard veg assoc. – State					
18	19,892,437	19,890,348	~100	Least Concern	2.1
Beard veg assoc. – Bioregion					
18	12,403,248	12,403,248	~100	Least Concern	0.4

\* Shepherd et al. (2001)

\*\* Department of Natural Resources and Environment (2002)

The vegetation under application is not a remnant of vegetation in an area that has been extensively cleared.

Based on the above, the proposed clearing is not at variance to this Principle.

**Methodology** Department of Natural Resources and Environment (2002)  
Shepherd et al. (2001)  
GIS Database:  
- Interim Biogeographic Regionalisation of Australia (subregions)  
- Pre-European Vegetation

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

**Comments Proposal is at variance to this Principle**

There are no permanent wetlands or watercourses within or adjoining any of the clearing application areas (Outback Ecology Services, 2007; GIS Database).

Vegetation mapping by Outback Ecology Services (2007) as well as Geographic Information System hydrography data indicates that a narrow drainage line intercepts the eastern portion of the borefield application area (GIS Database). The Assessing Officer notes that all of the drainage lines that have been identified within the application areas are common and widely distributed landform features throughout much of the Murchison IBRA region (GIS Database). The proposed clearing activities for mine site development is not likely to adversely impact any significant drainage features.

The vegetation growing in association with this drainage line and nearby drainage lines has been described by Outback Ecology Services (2007) as:

- **D1** - Mulga Low Forest A over Mixed Open Scrub to Dwarf Scrub over Mixed Open Low Grasses.

Vegetation association **D1** was characterised by a mid-dense upper storey of *Acacia aneura* var. *aneura* and *A. aneura* var. *intermedia*, as well as less common *Acacia* species including *A. craspedocarpa* and *A. ramulosa* var. *linophylla*. Mid-storey shrub species varied in density and diversity across the sites with cover generally being very sparse to sparse. Dominant species included *Eremophila punctata*, *E. spectabilis* ssp. *brevis*, *E. forrestii* ssp. *forrestii*, *E. pungens* and *Sida calyxhymentia*. A very sparse to mid-dense cover of grasses was recorded with dominant species including *Eragrostis eriopoda*, *Aristida contorta*, *Eriachne pulchella* and *E. flaccida*, the latter occurring in the larger drainage lines (Outback Ecology Services, 2007).

Vegetation association **D1** is considered common and widespread within similar drainage features throughout the Murchison IBRA region and was the common vegetation association found within drainage lines throughout the adjoining Duketon Gold Project Area which covered in excess of 20,556 hectares (Outback Ecology Services, 2007; GIS Database). Outback Ecology Services (2007) note that the drainage line vegetation is likely to have a distribution across five land systems and is present in Wanjarri Nature Reserve. Vegetation association **D1** is not considered to represent a vegetation association of conservation significance (Outback Ecology Services, 2007).

As Outback Ecology Services (2007) has identified drainage lines within the application area, the proposed clearing is at variance to this Principle. However, the drainage line that intercepts the borefield application area is a minor, ephemeral drainage channel that is common and widespread throughout the Murchison IBRA region. In addition, the vegetation communities growing in association within these drainage lines are considered common and widespread. The proposed clearing is not likely to impact on any significant wetland, watercourse or drainage feature in the local area.

**Methodology** Outback Ecology Services (2007)  
GIS Database:  
- Clearing Instruments  
- Hydrography, linear\_1

**(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

**Comments** **Proposal may be at variance to this Principle**

According to the Department of Agriculture's Technical Bulletin No. 87 "An inventory and condition survey of the north-eastern Goldfields, Western Australia", the application areas are characterised by the Ararak, Bevon and Violet Land Systems (Pringle et al., 1994).

- The Ararak Land System is characterised by broad plains with mantles of ironstone gravel supporting mulga shrublands with wanderrrie grasses (Pringle et al., 1994). The land system comprises of extensive level to gently undulating plains subject to very diffuse sheet flow, more concentrated flow zones, isolated rises within Limonite (<5 metre relief) and higher plains with pebble mantles (Pringle et al., 1994). This land system was recorded across the western and eastern portion of the bore field application area (Outback Ecology Services, 2007), and occurs across the majority of the Moolart Well application area (GIS Database). As a result of the low slopes, protective soil mantles and very diffuse sheet flow, this land system is generally not susceptible to soil erosion, although it is considered mildly susceptible to water starvation problems (Pringle et al., 1994). Although the Ararak Land System comprises of protective soil materials that are resilient to erosion, it is considered that the clearing of native vegetation and the disturbance of the protective surface mantles has the potential to increase the risk of soil erosion (DAFWA, 2009).

- The Bevon Land System is characterised by irregular low ironstone hills with stony lower slopes supporting Mulga shrublands (Pringle et al., 1994). The land system comprises of irregular low hills capped with limonite, plateaux, and small breakaways with short footslopes, extensive lower colluvial, very gently inclined plains with mantles of ferruginous gravel and narrow drainage tracts (Pringle et al., 1994). This land system occurs across the north-western portion of Miscellaneous Licence 38/133 (Outback Ecology Services, 2007; GIS Database). Most of the vegetation communities identified within this land system occur on undulating plains or low hills that comprise of a sparse to dense cover of ironstone gravel with some small amounts of quartz gravels (Outback Ecology Services, 2007). Given the flat topography and stony surface mantles for these areas (GIS Database; Outback Ecology Services, 2007; Pringle et al., 1994), there is likely to be low risk of erosion for these areas. Whilst most of the land within the application area (characterised by the Bevon Land system) comprise of surface mantles that are resilient to soil erosion, the proposed clearing within this land system is likely to cause significant disturbance to the surface mantles which usually provide protection against soil erosion (DAFWA, 2009). As a result, there is likely to be a moderate risk of soil erosion in areas where clearing occurs (Pringle et al., 1994; DAFWA, 2009).

- The Violet Land System is characterised by extensive, gently undulating to level plains and low rises with mantles of ironstone pebbles and level to very gently inclined plains subject to sheet flow within mantles of fine ironstone gravel (Pringle et al., 1994). This land system has been recorded in the central portion of the bore field application area (Outback Ecology Services, 2007; GIS Database). The vegetation communities identified within this land system occur on undulating plains or low hills that comprise of a sparse/mid to dense cover of ironstone gravel with some occasional quartz gravels (Outback Ecology Services, 2007). Abundant mantles provide effective protection against soil erosion over most of the land system, except where the soil surface has been disturbed in which case the soil becomes moderately susceptible to water erosion (Pringle et al., 1994). Narrow drainage tracts are mildly susceptible to water erosion (Pringle et al., 1994). Most of the land within the areas characterised by the Violet Land System comprise of surface mantles which are resilient to soil erosion.

The proposed clearing of up to 233 hectares of native vegetation within two disjunct project application areas for the purpose of mineral production, is likely to have a long-term impact on a relatively large area across the two application areas. The clearing of native vegetation may increase the risk of soil erosion occurring, particularly in areas identified by Pringle et al. (2004) as susceptible to erosion. It is most likely that the cleared areas will be particularly susceptible to erosion immediately after the native vegetation has been cleared, and during the period that the cleared areas are left exposed. The Assessing Officer recommends should a permit be granted, that conditions are placed on the permit for the purposes of progressive clearing and for the retention of topsoil and vegetation. A progressive clearing approach will reduce the duration that cleared areas are exposed, unvegetated or unutilised thereby minimising the risk of wind or water erosion occurring.

The Assessing Officer notes that any adverse environmental impacts associated with the construction, or on-going operation of mine site infrastructure will be managed under the *Mining Act 1978*.

The application areas are located within the Leemans Sandplain Soil-Landscape Zone of the Murchison Province as described by Tille (2006) (cited within Coffey Natural Systems, 2008a; Coffey Natural Systems, 2008b). Soils of this zone are typically either red sandy or red loamy earths and generally have low nutrient content, low electrical conductivity and slightly acidic to neutral pH (Coffey Natural Systems, 2008a; Coffey Natural Systems, 2008b). Three broad land types occur across the two disjunct project application areas: flats

and plains, hills and slopes and drainage lines (Outback Ecology Services, 2007; Coffey Natural Systems, 2008a). Table 2 below outlines the physical and chemical characteristics of the soils found within the Moolart Well project application area. Given that similar land types and vegetation communities have been recorded throughout the borefield application area, it could be expected that these areas may experience similar soil physical and chemical properties.

**Table 2: Soil physical and chemical characteristics of the Moolart Well project application area (Coffey Natural Systems, 2008b).**

Characteristic	Land Types		
	Flats and Plains	Hills and Slopes	Drainage Lines
<b>Depth to hardpan (cm)</b>	50 to greater than 100	10 to 80	60 to 80
<b>Soil texture</b>	Loamy sand (5% clay) to sandy clay (25% clay)	Sand (less than 5% clay) to sandy clay loam (25% clay)	Loamy sand (5% clay) to clay loam, sandy (30% clay)
<b>Soil structure</b>	Single grained to strong aggregates	Single grained to very strong aggregates	Single grained to moderate aggregates
<b>Coarse Material (%)</b>	5 to 90	5 to 90	5 to 75
<b>Soil pH</b>	5.0 to 6.4	5.1 to 8.1	5.4 to 6.8
<b>Electrical conductivity (dS/m)</b>	0.01 to 0.17 non-saline	Non-saline to slightly saline	Non-saline to slightly saline

Based on the data obtained within the Moolart Well project application area, soil pH across the application areas is likely to be within the range of 'slightly acidic' to 'neutral'. Soil acidity has the potential to impact on land capability and heightens the risk of land degradation. None of the land types recorded within the application areas are likely to demonstrate pH levels less than 4.5, which would otherwise restrict clearing activities due to the presence of soil acidity.

The average annual rainfall of Laverton, which is situated approximately 105 kilometres south of the Moolart Well, is 232.5 millimetres and the areas experience mean annual evaporation of approximately 3600 millimetres (Bureau of Meteorology, 2009; GIS Database). Monthly rainfall data indicates that rainfall is sporadic, and that the area is infrequently subject to significant rainfall events (Bureau of Meteorology, 2009).

The Assessing Officer notes that no permanent wetlands or watercourses occur within the application areas, however, an ephemeral drainage line intercepts the borefield application area (Outback Ecology Services, 2007; GIS Database). The ephemeral drainage line is a shallow and common drainage feature throughout the Murchison region, and is not associated with any low-lying drainage basins or valley floors (GIS Database; Outback Ecology Services; 2007). Analysis of Geographic Information System (GIS) topographic information for the application areas and surrounding landscape indicates that the application areas are located on a broad, undulating flat plain which is characterised by an overall topographic gradient of less than approximately 2% (GIS Database).

Coffey Natural Systems (2008a) and Coffey Natural Systems (2008b) report that groundwater levels within the application areas vary between 15 metres to 20 metres below the surface. Groundwater salinities within the application areas have been measured in the range between 1,000 and 3,000 milligrams per litre Total Dissolved Solids (TDS) (GIS Database; Coffey Natural Systems, 2008b). Given the relatively high sand content and the average depth to hardpan of the soils across each of the three broad land types (see table 2 above), the majority of the soils are likely to be considered as well, or moderately draining soils under normal rainfall events. Areas on 'hills and slopes' may be characterised by shallow depth to hardpan, however, these areas are generally not associated with flooding or water-logging. The broad undulating plain which characterises most of the application areas is likely to assist to evenly diffuse any surface water that may result during rainfall events. The absence of low-lying drainage basins or valley floors within the application areas is likely to minimise the risk that groundwater recharge may cause localised flooding or water-logging in low lying areas.

Water logging occurs when the soil surface area becomes saturated, and has the potential to occur during periods of heavy rainfall, with poor drainage, and/or a rising watertable. With consideration to the depth to groundwater, absence of low-lying areas and low rainfall to high evaporation rate, the proposed clearing of 233 hectares of native vegetation within an application area of approximately 713 hectares is not likely to significantly increase groundwater recharge which could otherwise lead to significant rises in ground water levels. The proposed clearing is not likely to lead to water logging or salinisation occurring within or adjacent to the application areas.

The proposed clearing activities will involve significant disturbance to a relatively large area of native vegetation, and in addition the proposed clearing is likely to disturb the structure of surface soils and the underlying mantles. The use of heavy machinery, and light vehicles during clearing activities is likely to cause some degree of soil compaction which may adversely impact soil structure. It is acknowledged that proposed clearing activities has the potential to cause or increase the incidence of water logging in localised hardpan environments, especially in areas where vegetation once assisted infiltration.

Based on the above, the proposed clearing may be at variance to this Principle. However, in order to minimise the disturbance to native vegetation, which would thereby minimise the risk of land degradation, Regis Resources Limited have developed the following management objectives (Coffey Natural Systems, 2008a):

- To avoid the clearing of native vegetation where possible;
- To limit the amount of vegetation cleared;
- To undertake project activities in a manner that minimises adverse impact to vegetation communities;
- To conserve and re-use cleared vegetation and stripped topsoil (which contains seeds, nutrients, organic matter, and micro-organisms) in site rehabilitation;
- To encourage the re-establishment of self-sustaining ecosystems compatible with the surrounding undisturbed areas; and
- To meet all legislative requirements relating to the rehabilitation of disturbed areas and to liaise closely with Government bodies to ensure compliance.

**Methodology** Bureau of Meteorology (2009)  
 Coffey Natural Systems (2008a)  
 Coffey Natural Systems (2008b)  
 DAFWA (2009)  
 Outback Ecology Services (2007)  
 EPA (2004)  
 Pringle et al. (1994)  
 Regis Resources Limited (2008)  
 GIS Database:  
 - Evaporation Isopleths  
 - Groundwater Salinity, Statewide  
 - Hydrography, linear\_1  
 - Rangeland Land System Mapping  
 - Topographic Contours, Statewide

**(h) 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.**

**Comments Proposal is not at variance to this Principle**

The application areas are not located within a Department of Environment and Conservation managed conservation area (GIS Database). The nearest conservation area is De La Poer Range Nature Reserve which is situated approximately 20 kilometres north-east of the Moolart Well project application area at its closest point (GIS database). Based on the distance between the proposal and the nearest conservation area, the proposed clearing is not likely to impact on the conservation values of De La Poer Range Nature Reserve.

Based on the above, the proposed clearing is not at variance to this Principle.

**Methodology** GIS Database:  
 - CALM Managed Lands and Waters

**(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

**Comments Proposal is not likely to be at variance to this Principle**

There are no permanent wetlands or watercourses within or adjoining any of the clearing application areas (GIS Database). Outback Ecology Services (2007) report that one drainage line passes through the application area for the borefield.

This drainage line is considered a common drainage feature throughout the Murchison IBRA region (GIS Database). Given that the application areas receive approximately 232.5 millimetres of rainfall per year and experience mean annual evaporation of approximately 3,600 millimetres (Bureau of Meteorology, 2009; GIS Database), it is likely that this drainage line would only flow, or support water for short periods following significant rainfall events (Outback Ecology Services, 2007). However, as there are no permanent or semi-permanent surface water features within the vicinity of the application areas, the proposed clearing activities are not likely to cause deterioration in the quality of surface water.

The application is not located within a Public Drinking Water Source Area (GIS Database). The nearest PDWSA is the Laverton Water Reserve which is located approximately 78 kilometres south of the Moolart Well application area (southern most project application area). Given the distance separating the project application areas and the Laverton Water Reserve, the proposed clearing is unlikely to impact on the water quality of the Laverton Water Reserve.

The application areas are situated within the Lake Carnegie catchment which covers a total area of approximately 6,867,525 hectares (GIS Database). Although Regis Resources Limited has applied to clear up to 233 hectares under this application, the Assessing Officer is aware that the application areas are located immediately adjacent to the Moolart Well mine project area which Regis Resources Limited propose to clear up to 870 hectares under Clearing Permit CPS 2799/1 for the development of mine site infrastructure (Clearing Permit CPS 2799/1 was issued by the Department of Mines and Petroleum on 19 March 2009). Total clearing for the development of the Moolart Well mine site will total approximately 1,103 hectares within an application

area of 3,113 hectares (these figures take into account the amount of vegetation applied to clear and the size of the application areas for CPS 2799/1 and CPS 2801/1). The clearing of up to 1,103 hectares represents approximately 0.02% of the size of the Lake Carnegie catchment which remains largely uncleared (Shepherd et al., 2001). Given the size of the Lake Carnegie catchment the cumulative impact of the proposed clearing activities is unlikely to impact on the drainage characteristics of the lake Carnegie catchment.

Coffey Natural Systems (2008a) and Coffey Natural Systems (2008b) report that groundwater levels within the application areas vary between 15 metres to 20 metres below the surface. Groundwater salinities within the application area have been measured in the range between 1,000 and 3,000 milligrams per litre Total Dissolved Solids (TDS) (GIS Database; Coffey Natural Systems, 2008b). With consideration to the depth to groundwater, catchment size, absence of low-lying areas and low rainfall to high evaporation rate, the proposed clearing of 1,103 hectares of native vegetation within a total application area of approximately 3,113 hectares is not likely to significantly increase groundwater recharge which could otherwise lead to significant rises in ground water levels. The proposed clearing is not likely to cause deterioration in the quality of groundwater in the local area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Coffey Natural Systems (2008a)  
Coffey Natural Systems (2008b)  
Outback Ecology Services (2007)  
Shepherd et al. (2001)  
GIS Database:  
- Evaporation Isopleths  
- Hydrographic Catchments - Catchments  
- Hydrography, linear\_1  
- Hydrography, linear (hierarchy)  
- Public Drinking Water Source Areas (PDWSAs)  
- Rainfall, Mean Annual

**(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

**Comments Proposal may be at variance to this Principle**

The application areas are located within a region described as an arid zone (Outback Ecology Services, 2007). The average annual rainfall of Laverton, which is situated approximately 105 kilometres south of the application areas, is 232.5 millimetres and the areas experience mean annual evaporation of approximately 3,600 millimetres (Bureau of Meteorology, 2009; GIS Database). Laverton climate statistics indicate that rainfall in the region is sporadic and is not confined to certain seasons or months (Bureau of Meteorology, 2009). The application area is not located in a region that is subject to regular or significant rainfall events.

The application areas are situated within the Lake Carnegie catchment which covers a total area of approximately 6,867,525 hectares (GIS Database). Shepherd et al. (2001) vegetation statistics indicate that approximately 100% of the pre-European vegetation extent remains within the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) region.

The potential cumulative size of clearing for the Moolart Well mine site by clearing an additional 233 hectares of native vegetation (in addition to 1,170 hectares approved under Clearing Permit CPS 2799/1) constitutes only a very small proportion of the size of the Lake Carnegie catchment (approximately 0.02%) which remains largely uncleared (GIS Database; Shepherd et al., 2001). Vegetation is considered an important ground cover as it slows surface water flows, and enables rainwater to infiltrate the soil to depths where it can be utilised by vegetation. Given that the Murchison, as well as the surrounding regions, remain largely uncleared (Shepherd et al., 2001), the proposed clearing is not likely to impact on the drainage characteristics of either the Lake Carnegie catchment area.

Outback Ecology Services (2007) recorded various landform characteristics of each of the survey sites during the flora and vegetation assessment which included topography and slope. The Assessing Officer notes that the majority of the survey sites occurred on slopes classed as 'Flat' (0° - 5°), with some classed as 'Gentle' (5° - 15°) (Outback Ecology Services, 2007). Several localised areas associated with outcrops or breakaways were classed as 'Moderate' (15° - 45°) (Outback Ecology Services, 2007). Analysis of Geographic Information System (GIS) topographic information for the application areas and surrounding landscape indicates that the application areas are located on a broad and relatively flat plain which is characterised by an overall topographic gradient of less than approximately 2% (GIS Database). There is no evidence of any extensive hills or range systems which could otherwise cause increased runoff which may increase the risk of local flooding in lower lying, downstream or adjacent areas (GIS Database; Outback Ecology Services, 2007).

Given the low rainfall to high evaporation ratio of the application areas and considering the infrequency of significant rainfall events in the region (Bureau of Meteorology, 2009; GIS Database), it would be expected that any normal rainfall would quickly evaporate or infiltrate the soil. The proposed clearing of an additional 233 hectares of native vegetation is unlikely to cause or exacerbate flooding during normal rainfall events. The Assessing Officer considers that any localised flooding is only likely to occur as a result of any infrequent significant rainfall events. However, the broad and flat plain that characterises the application area and



surrounding landscape may assist to evenly diffuse any surface water that may result following significant rainfall events.

Based on the above, the proposed clearing may be at variance to this Principle.

- Methodology** Bureau of Meteorology (2009)  
Coffey Natural Systems (2008a)  
Outback Ecology Services (2007)  
Shepherd et al. (2001)  
GIS Database:
- Evaporation Isopleths
  - Hydrographic Catchments – Catchments
  - Topographic Contours, Statewide

#### **Planning instrument, Native Title, Previous EPA decision or other matter.**

##### **Comments**

There are two native title claim over the area under application; (WC99/001 and WC99/010) (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (GIS Database). However, the tenements have been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Sites of Aboriginal Significance within the area applied to clear (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

Regis Resources Limited referred the proposal to the Environmental Protection Authority (EPA) on 21 September 2007. The EPA provided the following recommendation on 1 November 2007 – "Not Assessed - Managed under Part V of the Environmental Protection Act 1986".

Regis Resources Limited originally applied to clear up to 260 hectares of native vegetation under clearing permit application CPS 2801/1. On 27 March 2009 Regis Resources Limited amended their application to remove Miscellaneous Licences 38/132, 38/143 and 38/151 as these tenements are no longer required for the development of the Duketon Gold Project. Under the revised application area Regis Resources Limited has applied to clear 233 hectares of native vegetation.

No public submissions were received in relation to the proposal.

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licence or approvals are required for the proposed works.

- Methodology** GIS Database
- Native Title Claims
  - Sites of Aboriginal Significance DIA

#### **4. Assessor's comments**

##### **Comment**

The proposal has been assessed against the Clearing Principles and is not at variance to Principle (e), is not likely to be at variance to Principles (a), (b), (d), (h), and (i), may be at variance to Principles (c), (g) and (j), and is at variance to Principles (f).

It is recommended that should a permit be granted, conditions be placed on the permit with regards to weed management, progressive clearing, retention of topsoil and vegetation, recording areas cleared and permit reporting.

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## 6. Glossary

### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government.
<b>CALM</b>	Department of Conservation and Land Management, Western Australia.
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia.
<b>DA</b>	Department of Agriculture, Western Australia.
<b>DEC</b>	Department of Environment and Conservation
<b>DEH</b>	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
<b>DEP</b>	Department of Environment Protection (now DoE), Western Australia.
<b>DIA</b>	Department of Indigenous Affairs
<b>DLI</b>	Department of Land Information, Western Australia.
<b>DMP</b>	Department of Mines and Petroleum.
<b>DoE</b>	Department of Environment, Western Australia.

<b>DoIR</b>	Department of Industry and Resources, Western Australia.
<b>DOLA</b>	Department of Land Administration, Western Australia.
<b>DoW</b>	Department of Water
<b>EP Act</b>	Environment Protection Act 1986, Western Australia.
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
<b>GIS</b>	Geographical Information System.
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia.
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>RIWI</b>	Rights in Water and Irrigation Act 1914, Western Australia.
<b>s.17</b>	Section 17 of the Environment Protection Act 1986, Western Australia.
<b>TECs</b>	Threatened Ecological Communities.

### Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005. Department of Conservation and Land Management, Como, Western Australia*} :-

- 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, 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 on protected lands. 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 are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several 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 need of 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.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** 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, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- 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, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4** **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna. Department of Conservation and Land Management, Como, Western Australia*} :-

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4** **Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed,

or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

**P5** **Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

**Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999*)**

**EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

**EX(W)** **Extinct in the wild:** A native species which:  
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or  
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

**CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

**EN** **Endangered:** A native species which:  
(a) is not critically endangered; and  
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

**VU** **Vulnerable:** A native species which:  
(a) is not critically endangered or endangered; and  
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

**CD** **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.