



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2871/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Saracen Gold Mines Pty Ltd

### 1.3. Property details

Property: Mining Lease 31/220  
Mining Lease 28/245  
Mining Lease 28/166  
Local Government Area: City of Kalgoorlie-Boulder & Shire of Menzies  
Colloquial name: Whirling Dervish Project

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
85		Mechanical Removal	Mineral Production

## 2. Site Information

### 2.1. Existing environment and information

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

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard Vegetation Associations have been mapped at a 1:250,000 scale for the whole of Western Australia. One Beard Vegetation Association has been mapped within the application area (GIS Database; Shepherd et al., 2001).  20: Low woodland; mulga mixed with <i>Allocasuarina cristata</i> & <i>Eucalyptus</i> sp.	Saracen Gold Mines has applied to clear up to 85 hectares of native vegetation within a boundary of approximately 175 hectares for the purposes of open pit mining and development of associated works (Saracen Gold Mines, 2008). Saracen Gold Mines intend to clear using bulldozers and graders and the topsoil and vegetation is to be stockpiled for use in rehabilitation.	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).	The vegetation condition was derived from a vegetation survey conducted by Alexander Holm and Associates (Saracen Gold Mines, 2008).

The application area was surveyed by Alexander Holm and Associates staff in August 2006 and July 2008 (Saracen Gold Mines, 2008). The following vegetation types were identified within the application area.

**Acacia casuarina shrubland (CCAS):**  
Very gently undulating plains to level plains with shallow calcareous red earths over calcrete supporting scattered to moderately close tall shrublands or woodlands of *Casuarina pauper (cristata)* with *Acacia aneura* and *A. burkittii* (Saracen Gold Mines, 2008).

**Plains mixed halophyte low shrublands (PXHA):** Broad alluvial plains with texture contrasting soils, often hardpan with generally scattered low shrublands of *Acacia aneura* and other *Acacia* spp. over mosaics of sometimes dense mid shrubs including *Cratystylis subspinescens*, *Maireana pyramidata* and other chenopods (Saracen Gold Mines, 2008).

## 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 area occurs within the Eastern Murchison (MUR1) sub-region of the Murchison Interim

Biogeographic Regionalisation of Australia (IBRA) (GIS Database). This sub-region is characterised by internal drainage, and extensive areas of elevated red desert sand plains with minimal dune development (CALM, 2002). It contains salt-lake systems associated with the occluded Paleodrainage system (CALM, 2002). This sub-region has broad plains of red-brown soils and breakaway complexes as well as red sand plains (CALM, 2002). The vegetation is dominated by Mulga woodlands often rich in ephemerals, hummock grasslands, saltbush shrub lands and Halosarcia shrub lands (CALM, 2002). The vegetation described within the application area (Saracen Gold Mines, 2008) is typical of the bioregion.

A vegetation survey of the application area and surrounding vegetation identified 52 native flora species belonging to 34 genera from 27 families (Saracen Gold Mines, 2008). This is not considered to be biologically diverse. One alien weed species was recorded within the vegetation survey area (Saracen Gold Mines, 2008). This was Ruby Dock (*Acetosa vesicaria*), which has previously been recorded in the south Laverton region on rehabilitated minesites (Saracen Gold Mines, 2008). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. This species is not listed as a 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food (DAFWA). Should the permit be granted, it is recommended that appropriate conditions be imposed on the permit for the purpose of weed management.

An area search of the Western Australian Museum's Faunabase conducted by the assessing officer suggests that the application area is diverse in reptile species, particularly Skinks (16) (Western Australian Museum, 2009). The database search found 40 reptile species from 7 families as potentially occurring within the application area, or within a 50 kilometre radius of the application area. From a faunal perspective, no detailed surveys have been undertaken to measure the species richness of the proposed clearing area, however the application area is contiguous with the surrounding landscape and is not an isolated landscape feature where fauna could have become restricted over time.

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

**Methodology** CALM (2002)  
Saracen Gold Mines (2008)  
Western Australian Museum (2009)  
GIS Database  
- Interim Biogeographic Regionalisation of Australia

**(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**

The assessing officer has conducted a search of the Western Australian Museum's online fauna database between the co-ordinates 122.9078°E, 29.6663°S and 121.8055°E, 30.6138°S, representing a 50 kilometre radius around the application area.

This search identified 1 Fish, 2 Amphibian, 4 Avian, 19 Mammalian and 40 Reptilian species that may occur within the application area (Western Australian Museum, 2009). No species of conservation significance have previously been recorded within the search area (Western Australian Museum, 2009).

Saracen Gold Mines (2008) conducted a desktop search of the Department of Environment and Conservation (DEC) threatened fauna database to identify species of conservation significance that had been recorded within the area specified. The following fauna species of conservation significance were identified through this database search: Peregrine Falcon (*Falco peregrinus*), Slender-billed Thornbill (*Acanthiza iredalei iredalei*), Alexandra's Parrot (*Polytelis alexandrae*), Malleefowl (*Leipoa ocellata*), Rainbow Bee-eater (*Merops ornatus*), Cattle Egret (*Ardea ibis*), Great Egret (*Ardea alba*), Fork-tailed Swift (*Apus pacificus*), Oriental Plover (*Charadrius veredus*), Thick-billed Grass-wren (*Amytornis textilis textilis*), Hooded Plover (*Charadrius rubricollis*), Mulgara (*Dasyercus cristicauda*), Southern Marsupial Mole (*Notoryctes typhiops*), Greater Bilby (*Macrotis lagotis*), Sandhill Dunnart (*Sminthopsis psammophila*) and the Great Desert Skink (*Egernia kintorei*).

Based on habitat requirements, the following species are most likely to occur within the application area:

Sandhill Dunnarts (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) have been recorded from the Eyre Peninsula (South Australia) and the Great Victoria Desert (South Australia and Western Australia) (Northern Territory Government, 2009). Sandhill Dunnarts occur in sandy environments, with vegetation consisting of low woodland or low open woodland with a diverse shrub understorey and a ground cover of at least 20% Spinifex hummocks (Northern Territory Government, 2009). The vegetation within the application area provides suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (85 hectares) in relation to the size of the sub-region (7,847,996 hectares) it is not likely to be significant habitat.

Malleefowl (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) are largely confined to arid and semi-arid woodland that is dominated by mallee

eucalypts on sandy soils, with less than 430 millimetres of rainfall annually (DEC, 2009). However, they can also occur in habitats of Acacia, paperbark, Sheoak and other scrubs, as well as Eucalypt woodland and coastal heaths with an abundant layer of leaf litter for use in nest mounds (Garnett & Crowley, 2000). It is possible that the Malleefowl may inhabit the application area, as there have been unconfirmed sightings within the general area, however no nesting sites have been found within the application area and so it is unlikely that the application area would provide significant habitat for this species.

It is possible that the Peregrine Falcon (Schedule 4 - Other Specially Protected Fauna of the *Wildlife Conservation Fauna Notice, 2008*) may use habitat within the proposed clearing area, this species is wide ranging and mobile (Birds in Backyards, 2009a) and it is therefore unlikely that the proposed clearing will result in a loss of significant habitat for this species.

Alexandra's Parrot (P4 - DEC Priority Fauna List) is confined to the arid regions of Western Australia, the Northern Territory and South Australia (Environment, 2009a). This species inhabits sand dunes and sand flats in the arid zone of western and central Australia, preferring open savanna woodlands and shrublands that usually consist of scattered stands of Eucalyptus, Casuarina or Allocasuarina trees, an understorey of shrubs such as Acacia (especially *A. aneura*), Cassia, Eremophila, Grevillea, Hakea and Senna and a ground cover dominated by Triodia species (Environment, 2009a). It is possible that Alexandra's Parrot may inhabit the application area, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (85 hectares) in relation to the size of the Eastern Murchison sub-region (7,847,996 hectares) it is unlikely that the application area contains significant habitat for this species.

The Oriental Plover (migratory - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) is generally found in inland areas in open grasslands in arid and semi-arid zones (Birds in Backyards, 2009b). This species prefers flat inland plains and sparsely vegetated short grass with hard bare ground including claypans (Birds in Backyards, 2009b). The vegetation within the application area provides suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (85 hectares) in relation to the size of the sub-region (7,847,996 hectares) it is unlikely that the habitat within the application area is significant.

Rainbow Bee-eater (migratory - JAMBA international agreement) occurs in various habitat types including open forests, woodlands, shrublands, inland and coastal sand dune systems and mangroves (Environment, 2009b). This species may occur within the application area, however given the widespread representation of this habitat type throughout the Murchison region it is unlikely that the application area contains significant habitat for this species.

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

**Methodology** Birds in Backyards (2009a)  
Birds in Backyards (2009b)  
DEC (2009)  
Environment (2009a)  
Environment (2009b)  
Garnett and Crowley (2000)  
Northern Territory Government (2009)  
Western Australian Museum (2009)

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

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

According to available databases, three Declared Rare Flora (DRF) species and 20 Priority flora species may occur within the application area (Saracen Gold Mines, 2008). These are:

**DRF** - *Conospermum toddii*, *Eucalyptus articulata* and *Thryptomene wittweri*;

**P1** - *Eremophila annosocaulis*, *E. eversa*, *Grevillea phillipsiana*, *Halosarcia flabelliformis*, *H. sp.* Angel Fish Island and *Ptilotus tetrandrus*;

**P2** - *Micromyrtus serrulata*, *Olearia mucronata* and *Thryptomene eremaea*;

**P3** - *Acacia eremophila*, *Calytrix praecipua*, *Eucalyptus pimpiniana*, *Gunniopsis propinqua* and *Hybanthus floribundus* subsp. *chloroxanthus*; and

**P4** - *Eucalyptus kruseana*, *E. nigrifunda*, *E. x brachyphylla*, *Hemigenia exilis* and *Lepidobolus deserti* (Saracen Gold Mines, 2008).

A flora survey was conducted over the application area by Alexander Holm & Associates on August 23, 2006 and July 31, 2008 (Saracen Gold Mines, 2008). The 2006 survey followed a reasonable winter season and there was a reasonable cover of annual species, while the 2008 survey followed a drier winter. However, in both surveys many perennial species were flowering or had fruits allowing for identification (Saracen Gold Mines, 2008). This survey involved on foot traverses between twelve grid points, distributed across the application area (Saracen Gold Mines, 2008). Different vegetation groups encountered during the survey were described and the vegetation associations were examined for the presence or absence of any Declared Rare Flora and Priority

Flora species (Saracen Gold Mines, 2008). No species of Declared Rare or Priority flora were recorded during the flora survey.

The Assessing Officer carried out a search for *Halosarcia flabelliformis*, *H. sp.* Angel Fish Island, *Micromyrtus serrulata* and *Olearia mucronata* on FloraBase on 12 February 2009 which noted that the conservation status of *Halosarcia flabelliformis* and *H. sp.* Angel Fish Island have been altered to Not Threatened, while the conservation status of *Micromyrtus serrulata* and *Olearia mucronata* have been altered from P2 to P3 (Western Australian Herbarium, 2009).

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

**Methodology** Saracen Gold Mines (2008)  
Western Australian Herbarium (2009)  
GIS Database  
- 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**

A search of available databases reveals that there are no Threatened Ecological Communities (TEC's) within the application area (GIS Database). There are no TEC's located within the East Murchison IBRA sub-region (CALM, 2002).

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

**Methodology** CALM (2002)  
GIS Database  
- Threatened Ecological Communities

**(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 application area falls within the Murchison IBRA Bioregion (GIS Database). Shepherd et al. (2001a) report that approximately 100% of the pre-European vegetation still exists in this Bioregion (see table below). The vegetation in the application area is recorded as Beard Vegetation Association 20: Low woodland; mulga mixed with *Allocasuarina cristata* & *Eucalyptus* sp. (GIS Database; Shepherd et al., 2001a).

According to Shepherd et al. (2001a) approximately 100% of Beard Vegetation Association 20 remains within the Murchison Bioregion.

Therefore the vegetation within the application area is not a significant remnant of native vegetation within an area that has been extensively cleared.

	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					
20	1,295,105	1,295,105	~100%	Least Concern	~13.3%
Beard veg assoc. – Bioregion					
20	1,174,262	1,174,262	~100%	Least Concern	~8.9%

\* Shepherd et al. (2001) updated 2005

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

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. (2001a) updated 2005  
GIS Database  
- Pre-European Vegetation  
- Interim Biogeographic Regionalisation for Australia

**(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**

According to available GIS datasets, there are no known permanent watercourses or water bodies within the application area (GIS Database). However, there are numerous minor non-perennial watercourses running through the application area (GIS Database).

Vegetation mapping of the application area by Saracen Gold Mines (2008) indicates that the native vegetation proposed to be cleared is not riparian vegetation.

Based on the above, the proposed clearing is at variance to this Principle. However, as the minor watercourses located within the application area are only likely to flow following significant rainfall, the proposed clearing is unlikely to result in any significant impact to any watercourse or wetland. Should a permit be granted, it is recommended that if any watercourses are to be disturbed the proponent should liaise with the Department of Water to determine whether a Bed and Banks permit is necessary for the proposed works

**Methodology** Saracen Gold Mines (2008)  
GIS Database  
- Hydrography - Linear

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

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

The application area has been surveyed by the Department of Agriculture and Food (Van Vreeswyk et al., 2004). The application area is composed of the following land system (GIS Database);

Deadman Land System

The Deadman Land System is described as calcareous plains adjacent to salt lake systems, supporting accacia shrublands with black oak overstoreys (Van Vreeswyk et al., 2004). The Deadman land system is comprised of six land units (Van Vreeswyk et al, 2004). These are:

- calcrete plains;
- loamy plains;
- alluvial plains;
- sand sheets;
- drainage lines; and
- drainage foci (Van Vreeswyk et al, 2004).

An analysis of GIS databases for the application area reveals the application area is most likely to fall within the 'calcrete plains' and 'alluvial plains' land units. Soils were generally described as shallow calcareous red earths over calcrete or texture contrasting soils often on hardpan (Saracen Gold Mines, 2008). The soils of the Deadman Land System are generally considered not to be susceptible to soil erosion (Van Vreeswyk et al., 1994). The vegetation described by Van Vreeswyk et al. (1994) accurately reflects the vegetation types described in vegetation surveys conducted over the area (Saracen Gold Mines, 2008).

Based on the above, the proposed clearing is not likely to be at variance to this Principle. It is recommended that should a permit be granted, a condition be imposed on the permit with regard to stockpiling of all cleared topsoil and vegetation.

**Methodology** Saracen Gold Mines (2008)  
Van Vreeswyk et al. (2004)  
GIS Database  
- Rangeland Land System Mapping

**(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 likely to be at variance to this Principle**

The application area is located approximately 59 kilometres to the east-south-east of Goongarrie National Park (GIS Database). At this distance it is not likely that the vegetation within the application area provides a buffer to a conservation area, or is an important ecological linkage to a conservation area. The vegetation types within the application area are well replicated in other land systems within the Murchison region. Consequently, their conservation status is under no threat.

Based on the above, the proposed clearing is not likely to be 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**

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

There are no permanent water bodies or watercourses within the application area (GIS Database). The application area is located in an arid region, with mainly winter rainfall (CALM, 2002). With an average rainfall of approximately 232.4 millimetres/year (BoM, 2009) and an annual pan evaporation rate of 2,800 millimetres (BoM, 2009), there is little surface flow during normal seasonal rains and surface water within the application area is likely to evaporate or be utilised by vegetation quickly. The proposed clearing is not likely to cause the quality of surface water to deteriorate.

The groundwater tables at Whirling Dervish have been stable since monitoring recommenced in March 2007, with groundwater salinity varying from 84,000 to 156,000 parts per million Total Dissolved Solids (ppm/TDS) at approximately 16 - 21 metres below the surface (Saracen Gold Mines, 2008). The proposed open pit mining will require de-watering, however it is unlikely that vegetation within the application area is dependent on groundwater due to the high salinity levels and so is unlikely to be affected. Extracted water will be used in the processing plant or stored in nearby mining voids with none being discharged to the environment (Saracen Gold Mines, 2008). The application area is located within the Yilgarn-goldfields Groundwater Province (GIS Database). Given the size of the area to be cleared (85 hectares) compared to the size of the Yilgarn Goldfields Groundwater Province (29,644,596 hectares) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no known Groundwater Dependent Ecosystems within the application area (GIS Database).

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

**Methodology** BoM (2009)  
CALM (2002)  
Saracen Gold Mines (2008)  
- Public Drinking Water Source Area  
- Groundwater - Provinces  
- Groundwater Salinity  
- Potential Groundwater Dependent Ecosystems

**(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 is not likely to be at variance to this Principle**

The application area is located within the Raeside-Ponton catchment area (GIS Database). The size of the area to be cleared (85 hectares) in relation to the size of the Raeside-Ponton catchment area (11,589,833 hectares) is not likely to lead to an increase in flood height or duration (GIS Database).

Low annual rainfall (approximately 232.4 millimetres) (BoM, 2009), high evaporation rates (2800 millimetres/year) (BoM, 2009) and the absence of permanent water bodies and watercourses in the application area (GIS Database) would suggest that this area is not prone to flooding under normal rainfall conditions. The application area has no incised drainage and all water movement is by overland sheet flow, with water flow being slightly more concentrated in a broad wash zone east of the proposed pit which directs overland flow to enter Lake Raeside approximately 8 kilometres north of the proposed pit (Saracen Gold Mines, 2008).

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

**Methodology** BoM (2009)  
Saracen Gold Mines (2008)  
GIS Database  
- Hydrographic Catchments - Catchments

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

**Comments**

There is one native title claim (WC99\_001) over the area under application. This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. 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 four registered Aboriginal Sites of Significance (ID\_16706, ID\_16707, ID\_16805 and ID\_16806) located within the application area (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.

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 licences or approvals are required for the proposed works.

No public submissions were received in regard to this Permit application.

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

#### 4. Assessor's comments

##### Comment

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

It is recommended that should a permit be granted, conditions be imposed on the permit for the purpose of weed management, stockpiling of all cleared topsoil and vegetation, record keeping and permit reporting.

#### 5. References

- BoM (2009) Bureau of Meteorology Website - Climate Averages by Number, Averages for KANOWNA. [www.bom.gov.au/climate/averages/tables/cw\\_012040.shtml](http://www.bom.gov.au/climate/averages/tables/cw_012040.shtml) (Accessed 18 January 2009)
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land management, Western Australia
- DEC (2009) NatureBase - Fauna Species Profiles - Malleefowl (*Leipoa ocellata*) [www.dec.wa.gov.au/index2.php?option=com\\_docman&task=doc\\_view&gid=118&Itemid=1](http://www.dec.wa.gov.au/index2.php?option=com_docman&task=doc_view&gid=118&Itemid=1) - (Accessed 20 January 2009)
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Environment (2009a) [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=758](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=758) (Alexandra's Parrot) (Accessed 18 February 2009)
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- Northern Territory Government (2009) Threatened Species of the Northern Territory - Department of Natural Resources, Environment and the Arts. [www.nt.gov.au/nreta/wildlife/animals/threatened/pdf/mammals/lstrandhill\\_dunart\\_vu.pdf](http://www.nt.gov.au/nreta/wildlife/animals/threatened/pdf/mammals/lstrandhill_dunart_vu.pdf) (Accessed 19 February 2009)
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- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001a) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia (updated 2005).
- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia, Department of Agriculture, Western Australia
- Western Australian Herbarium (2009) - FloraBase - The Western Australian Flora. Department of Environment and Conservation. <http://florabase.calm.wa.gov.au/> (Accessed 18 February 2009)
- Western Australian Museum (2009) Faunabase - Western Australian Museum, Queensland Museum and Museum and Art Gallery of NT Collections Databases. <http://www.museum.wa.gov.au/faunabase/prod/index.htm>. Accessed 10 February 2009. Western Australian Museum

#### 6. Glossary

##### Acronyms:

**BoM** 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>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.