



## 1. Application details

### 1.1. Permit application details

Permit application No.: 3047/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Robe River Pty Ltd

### 1.3. Property details

Property: Iron Ore (Cleveland-Cliffs) Agreement Act 1964, Mineral Lease 248SA (AML 70/248)  
Local Government Area: Shire Of East Pilbara  
Colloquial name: Angelo River Drilling Project

### 1.4. Application

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

## 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
Vegetation within the application area has been mapped at a 1:250,000 scale as Beard Vegetation Associations:  18: Low woodland; mulga ( <i>Acacia aneura</i> ); and  82: Hummock grasslands, low tree steppe; snappygum over <i>Triodia wiseana</i> .  A botanist from Rio Tinto conducted a flora and vegetation survey over the application area in November 2008. Rio Tinto (2008) described the vegetation types within the application area as:  V7 – <i>Corymbia hamersleyana</i> , <i>Eucalyptus gamophylla</i> and <i>Hakea lorea</i> low open forest over <i>Acacia aneura</i> and <i>Acacia steedmanii</i> high shrubland over <i>Acacia bivenosa</i> , <i>Acacia pyrifolia</i> , <i>Acacia maitlandii</i> and <i>Eremophila longiflora</i> open heath over <i>Triodia basedowii</i> and <i>Triodia pungens</i> hummock grassland over <i>Themeda triandra</i> very open tussock grassland;  V8 – <i>Eucalyptus leucophloia</i> low woodland over <i>Acacia aneura</i> high open shrubland over <i>Acacia maitlandii</i> and <i>Senna oligophylla</i> open heath over <i>Triodia basedowii</i> hummock grassland;  V11 – <i>Corymbia hamerleyana</i> low open forest over <i>Acacia maitlandii</i> open heath over <i>Triodia pungens</i> hummock grassland over <i>Themeda triandra</i> very open tussock grassland;  V12 – <i>Corymbia hamersleyana</i> and <i>Eucalyptus xerothermica</i> low open forest over <i>Acacia steedmanii</i> , <i>Acacia pyrifolia</i> and <i>Acacia cowleana</i> high shrubland over <i>Triodia pungens</i> open hummock grassland over <i>Themeda triandra</i> and <i>Chrysopogon fallax</i> tussock grassland;  V15 – <i>Eucalyptus leucophloia</i> low open woodland over <i>Acacia aneura</i> , and <i>Exocarpos sparteus</i> closed scrub over <i>Eremophila forrestii</i> shrubland over <i>Triodia pungens</i> open hummock grassland.	Robe River has applied to clear up to 2.1 hectares of native vegetation within an application area of approximately 30.7 hectares, for the purpose of mineral exploration. The clearing application area is located approximately 95 kilometres west of Newman (GIS Database).  The proposed clearing is for the establishment and maintenance of tracks, drill lines and drill pads (Rio Tinto, 2008). Clearing will be by mechanical means.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).	The vegetation condition was assessed by a botanist from Rio Tinto. The vegetation conditions were described used a scale based on Trudgen (1988) and have been converted to the corresponding conditions from the Keighery (1994) scale.  There has been no recent fire in the application area and there are no recorded weeds (Rio Tinto, 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 may be at variance to this Principle**  
The application area occurs within the Hamersley (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) sub-region (GIS Database). This sub-region is characterised by Mulga low woodland over bunch

grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002). The vegetation within the application area has been mapped as Beard Vegetation Associations 18 and 82 which are common throughout the region, with approximately 100% of the Pre-European extent remaining (GIS Database; Shepherd et al., 2001).

A vegetation survey of the application and surrounding area identified 15 vegetation communities, five of which are found within the application area (Rio Tinto, 2008). None of these vegetation communities are listed as Threatened Ecological Communities or Priority Ecological Communities (Rio Tinto, 2008). The condition of the vegetation has been described as 'excellent' (Rio Tinto, 2008). However, aerial photography reveals that there is already an access track passing through the application area which may lower the biodiversity values of the vegetation.

The application area is located within File Notation Area 532 vested with the Department of Environment and Conservation (DEC) for the purpose of mulga conservation. The area is of interest due to its high diversity of mulga communities and for the potential diversity of fauna which inhabit these communities (Rio Tinto, 2008). Mulga communities have been recorded within the application area (Rio Tinto, 2008).

A total of 136 flora species from 33 families was recorded from within the application and surrounding areas (Rio Tinto, 2008). The most common families were Mimosaceae (23), Poaceae (21) and Myrtaceae (11) (Rio Tinto, 2008). This is typical of the floristics of the Pilbara IBRA region (Rio Tinto, 2008). No weed species were recorded during the botanical survey (Rio Tinto, 2008).

A search of the DEC's Naturemap database by the Assessing Officer revealed 70 species of fauna recorded within 20 kilometres of the application area. The area appears to be diverse in fauna, particularly mammals (17) and skinks (17). The database search recorded reptiles across 6 families and mammals across 6 families.

Although the application area is potentially high in faunal diversity and is an area noted for the diversity of mulga communities, it is not likely to have greater diversity than similar areas within the region, particularly as parts of the application area have been disturbed by an existing access track.

The proposed clearing of 2.1 hectares within the application area of approximately 30.7 hectares is unlikely to have any significant impact on the biodiversity of the area.

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

**Methodology** CALM (2002)  
Rio Tinto (2008)  
Shepherd et al. (2001)  
GIS Database  
- 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**

No fauna surveys have been conducted over the application area. Robe River conducted a search of the Department of Environment and Conservation's (DEC) database to identify Schedule and Priority listed fauna species that may occur within a 20 kilometre radius of the application area. A search of the Western Australian Museum and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) databases was carried out by the Assessing Officer.

The fauna habitat identified in the area is common within the local area (Rio Tinto, 2008). There were no significant habitat features (e.g. caves, rock crevices, water sources) present within the application area. The vegetation was classed as being in 'excellent' condition, but is not considered significant on a regional level (Rio Tinto, 2008). Given the fauna habitat is common throughout the local area and the small area of proposed clearing, the vegetation is not likely to be significant habitat for the indigenous fauna of the area.

The database searches revealed a total of 13 fauna species of conservation significance that could be located within the application area. Six of the species; White-bellied Sea-eagle (*Haliaeetus leucogaster*), Rainbow Bee-eater (*Merops ornatus*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*), Oriental Plover (*Charadrius veredus*) and Fork-tailed Swift (*Apus pacificus*) are listed as migratory under the *EPBC Act 1999*. These birds may overfly and be occasional visitors to the application area, rather than using the habitats of the project areas regularly. The proposed clearing is not likely to impact critical feeding or breeding habitat for any migratory species.

The Ghost Bat (*Macroderma gigas*) (DEC Priority 4 listing) and the Pilbara Leaf-nosed Bat (*Rhinonictes aurantius*) (Vulnerable under the *EPBC Act 1999*) are both considered unlikely to occur in the application area due to the lack of roosting sites. Given the lack of suitable habitat it is unlikely the proposed clearing will impact significant habitat for these species.

The Australian Bustard (*Ardeotis australis*) (DEC Priority 4 listing) is known to inhabit grasslands, low

shrublands, grassy woodlands as well as altered environments such as croplands and airfields (Department of Environment and Climate Change, 2005). This species is nomadic and may occur in the application area (Johnstone & Storr, 2004). However, given its nomadic nature and the small amount of proposed clearing it is unlikely this species will be impacted by the proposal.

The Grey Falcon (*Falco hypoleucos*) (DEC Priority 4 listing) is scarcely found across the northern half of Western Australia, inhabiting lightly wooded coastal and riverine plains (Johnstone & Storr, 2004). This species nests in eucalypts along rivers, so given this habitat is not present within the application area, it is unlikely to support breeding for this species.

The Pilbara Olive Python (*Liasis olivaceus barroni*) (Schedule 1 - fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* and Vulnerable under the *EPBC Act 1999*) usually inhabits deep gorges and waterholes, where it hunts its prey (DEWHA, 2009a). There are no permanent water sources within the application area (GIS Database). Given the lack of preferred habitat and the small area to be cleared, it is not likely that the Pilbara Olive Python will be significantly impacted by the proposed clearing.

The Northern Quoll (*Dasyurus hallucatus*) is listed in Western Australia as Schedule 1 - fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* and Vulnerable under the *EPBC Act 1999*. The Northern Quoll inhabits a range of habitats including dissected rocky escarpment, open forest of savanna, woodland and occasionally rainforest patches and on beaches (Van Dyck & Strahan, 2008). It makes dens in rock crevices, tree holes or occasionally termite mounds (DEWHA, 2009b). According to available information, there is a lack of suitable habitat for making dens in the application area. Given the small amount of proposed clearing, it is not likely that the Northern Quoll will be significantly impacted by the project.

The Western Pebble-mound Mouse (*Pseudomys chapmani*) (DEC Priority 4 listing) is common to very common in the Pilbara where habitat of scree slopes and stony plains are present (Start et al., 2000). Suitable habitat of stony slopes and plains has been recorded within the application area (Rio Tinto, 2008). Three Western Pebble-mound Mouse mounds have been recorded within the application area (Rio Tinto, 2008). This species has been found to utilise the application area and proposed clearing will result in the loss of habitat for this species. Similar habitat for the Western Pebble-mound Mouse is common throughout the Pilbara and given the small area of the proposed clearing the impact on this species is not likely to be significant.

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

**Methodology** Department of Environment and Climate Change (2005)  
DEWHA (2009a)  
DEWHA (2009b)  
Johnstone & Storr (2004)  
Rio Tinto (2008)  
Start et al. (2000)  
Van Dyck & Strahan (2008)  
GIS Database  
- Hydrography, linear

**(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 there are no known records of Declared Rare Flora (DRF) or Priority flora species within the clearing application area (GIS Database).

A DRF and Priority flora survey was undertaken by a botanist from Rio Tinto in November 2008. No DRF or Priority flora species were recorded within the application area (Rio Tinto, 2008). Several populations of Priority 3 species *Triodia sp. Mt Ella* were recorded within 500 metres of the application area, however the proposal will not impact any of these plants. The proposed clearing is unlikely to have any impact on the continued existence of any Rare or Priority flora.

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

**Methodology** Rio Tinto (2008)  
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**

According to available databases there are no known Threatened Ecological Communities (TEC's) within the application area (GIS Database). There were no TEC's identified during the botanical survey (Rio Tinto, 2008). The nearest known TEC is located approximately 8.5 kilometres north-west of the application area (GIS

Database). Given the distance to the nearest known TEC and the small area proposed to be cleared, it is unlikely that the conservation of any TEC's will be impacted by the proposed clearing.

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

**Methodology** Rio Tinto (2008)  
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 Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region in which approximately 99.9% of the Pre-European vegetation remains (see table) (GIS Database; Shepherd et al., 2001).

The vegetation of the application area has been mapped as;

- Beard Vegetation Association 18 Low woodland; mulga (*Acacia aneura*);
- Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*.

According to Shepherd et al. (2001) approximately 100% of Beard Vegetation Associations 18 and 82 remain at both the state and regional level. Therefore the area proposed to be cleared does not represent a remnant of native vegetation within an area that has been extensively cleared.

While a small percentage of the vegetation types within the Pilbara bioregion are protected within conservation reserves, the bioregion remains largely uncleared. As a result, the conservation of vegetation associations within the bioregion is not likely to be impacted by this proposal.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves (and post clearing %)*
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~99.9	Least Concern	6.3
<b>Beard veg assoc. – State</b>					
18	19,892,436	19,892,436	~100	Least Concern	2.1
82	2,565,929	2,565,929	~100	Least Concern	10.2
<b>Beard veg assoc. – Bioregion</b>					
18	676,561	676,561	~100	Least Concern	16.8
82	2,563,609	2,563,609	~100	Least Concern	10.2

\* Shepherd et al. (2001)

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

Options to select from: Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment 2002)

- Presumed extinct                      Probably no longer present in the bioregion
- Endangered                              <10% of pre-European extent remains
- Vulnerable                                10-30% of pre-European extent exists
- Depleted                                  >30% and up to 50% of pre-European extent exists
- Least concern                            >50% pre-European extent exists and subject to little or no degradation over a majority of this area

Based on the above the proposal 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  
- 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**

According to available databases the application area contains several ephemeral drainage lines (GIS Database). Rio Tinto (2008) have reported two vegetation units associated with a watercourse within the application area:

V11 – *Corymbia hamerleyana* low open forest over *Acacia maitlandii* open heath over *Triodia pungens* hummock grassland over *Themeda triandra* very open tussock grassland; and

V12 – *Corymbia hamersleyana* and *Eucalyptus xerothermica* low open forest over *Acacia steedmanii*, *Acacia pyrifolia* and *Acacia cowleana* high shrubland over *Triodia pungens* open hummock grassland over *Themeda triandra* and *Chrysopogon fallax* tussock grassland.

Vegetation unit V11 was recorded from within a drainage line and V12 was recorded from within a drainage line, creek (Rio Tinto, 2008).

Given the application area includes vegetation growing in association with a watercourse, the proposed clearing is at variance to this Principle.

However, these vegetation types are considered typical of the Hamersley subregion (Rio Tinto, 2008). Given the small scale of the proposed clearing and the low impact nature of the proposal, these vegetation units should not be significantly impacted by the proposed clearing.

**Methodology** Rio Tinto (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**

According to available databases, the application area is comprised of the Boolgeeda and Newman Land Systems (GIS Database).

The Boolgeeda Land System is characterised by stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). The vast majority of the application area occurs within this land system. The landforms of this system in which the application area is found is described as:

Stony lower plains – almost level plains downslope from stony slopes and upper plains, surface mantles vary from few to very abundant ironstone and other pebbles; and

Narrow drainage floors and channels – dendritic and parallel flow zones and creeklines on slopes and plains (Van Vreeswyk et al., 2004).

The soils are described as red loamy earths with minor self-mulching cracking clays present in the drainage floors and channels (Van Vreeswyk et al., 2004). According to Van Vreeswyk et al., (2004) the Boolgeeda Land System is not prone to degradation and is not susceptible to erosion.

The Newman Land system is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The lower slopes landform in which the application area is found, is described as gently inclined concave slopes mostly less than 400 metres in extent with mantles of very abundant pebbles and cobbles of ironstone and other rocks (Van Vreeswyk et al., 2004). The soils of this landform have been described as stony soils on upper margins with red loamy earths on lower margins (Van Vreeswyk et al., 2004). The Newman Land System has a nil to minor erosion potential, which is likely to be due to the surface mantle present which provides protection from erosional forces (Van Vreeswyk et al., 2004).

Soil pH in the application area is 5.5 to 6.0 and there is no known occurrence of acid sulphate soils within the application area (CSIRO, 2009). The application is flat for the most part, however there are some areas of stony slopes within the application area (GIS Database; Rio Tinto, 2008). Clearing in these areas could possibly increase the risk of erosion. The average annual evaporation rate is over 6 times the average annual rainfall, so it is unlikely the proposed clearing will result in increased groundwater recharge causing raising saline tables (GIS Database). Given the landforms represented in the application area and the small scale of the proposed clearing, it is not likely that the proposal will result in appreciable land degradation.

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

**Methodology** CSIRO (2009)  
Rio Tinto (2008)  
Van Vreeswyk et al. (2004)

- GIS Database
- Evaporation Isopleths
- Rainfall, Mean Annual
- 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 likely to be at variance to this Principle**

According to available databases, the application area is not located within a conservation area or any DEC managed lands (GIS Database). The nearest conservation reserve is Karijini National Park located approximately 25 kilometres north-west of the application area (GIS Database). Based on the distance between the proposed clearing and the nearest conservation area, the project is not likely to impact on the conservation values of any conservation areas.

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 waterbodies or watercourses within the application area (GIS Database).

Rainfall in this area is mainly restricted to a wet summer season, where precipitation can be variable. Rain can be either intense falls associated with cyclonic events, or scattered falls associated with local thunderstorms. The average annual evaporation rate for the application area is approximately 3400 millimetres and the average annual rainfall 500 millimetres (GIS Database). Therefore, during normal rainfall events surface water in the application area is likely to evaporate or be utilised by vegetation quickly. However, substantial rainfall events create surface sheet flow which is likely to have a high level of sediments. During normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within and outside the application area.

The groundwater salinity within the application area is approximately 500 – 1000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be potable water. Given the size of the area to be cleared (2.1 hectares) compared to the size of the Hamersley groundwater province (10,166,832 hectares) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

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

- Methodology** GIS Database
- Evaporation Isopleths
  - Rainfall, Mean Annual
  - Groundwater Provinces
  - Public Drinking Water Source Areas (PDWSA's)
  - Hydrography, linear
  - Groundwater Salinity, Statewide

**(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 experiences an arid, tropical climate with a wet summer season and a dry winter season (BoM, 2009). Most rainfall is received during the wet season, but falls can be variable (BoM, 2009). Rain can either be sporadic (local thunderstorms) or heavy and intense (cyclonic events). It is likely during times of intense rainfall there may be some localised flooding in adjacent areas. However, during normal rainfall events given the high annual evaporation to rainfall ratio, surface water in the application area is likely to be evaporated or be utilised quickly by vegetation (GIS Database). Given the small area to be cleared (2.1 hectares) in relation to the size of the Ashburton River catchment area (7,877,743 hectares) the proposed clearing is not likely to lead to an increase in flood height or duration (GIS Database).

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

- Methodology** BoM (2009)
- GIS Database
  - Evaporation Isopleths

- Hydrographic Catchments – Catchments
- Rainfall, Mean Annual

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

### Comments

There is one native title claim over the area under application; WC97/043 (GIS Database). This claim has been registered with the National Native Title Tribunal. However, the mining tenement has 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*.

According to available databases there are no registered Aboriginal Sites of Significance within the application area (GIS Database). It is the proponents' responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of 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.

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

## 4. Assessor's comments

### Comment

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

Should the permit be granted it is recommended that conditions be imposed on the permit for the purpose of weed management, rehabilitation, record keeping and reporting.

## 5. References

- Bureau of Meteorology, (2009) BOM Website - Climate Averages by Number, Averages for Newman. Available online at: [http://www.bom.gov.au/climate/averages/tables/cw\\_007151.shtml](http://www.bom.gov.au/climate/averages/tables/cw_007151.shtml) accessed on 20 April 2009.
- Commonwealth Scientific and Industrial Research Organisation (2009) Australian Soil Resource Information System. Available online at: [http://www.asris.csiro.au/index\\_ie.html](http://www.asris.csiro.au/index_ie.html) Accessed on 20 April, 2009.
- Department of Conservation and Land Management (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions.
- Department of Environment and Climate Change (2005) Australian Bustard - profile. Department of Environment and Climate Change. Available online from: <http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10063>. Accessed 17 April, 2009.
- Department of Environment, Water, Heritage and the Arts (2009a) *Liasis olivaceus barroni* - Olive Python (Pilbara Subspecies). Available online at [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=66699](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66699). Accessed 10 April, 2009.
- Department of Environment, Water, Heritage and the Arts (2009b) *Dasyurus hallucatus* - Northern Quoll. Available online at: [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=331](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=331) Accessed on 17 April 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.
- Johnstone, R.E & Storr, G.M (2004) Handbook of Birds of Western Australia Vol. II, Western Australian Museum, Perth.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Rio Tinto (2008) Botanical Survey for Drilling at E47/1050 in Angelo River AR-08-04041. Unpublished report prepared for Robe River Pty Ltd. Rio Tinto Iron Ore Pty Ltd, Western Australia.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Start, A.N., Anstee, S.D. & Endersby, M. (2000) 'A review of the biology and conservation status of the Ngadji, *Pseudomys chapmani* Kitchener, 1980 (Rodentia: Muridae)', CALMScience, vol. 3, no.2, pp.125-147.
- Trudgen M.E. (1988) A Report on the Flora and Vegetation of the Port Kennedy Area. Unpublished report prepared for Bowman Bishaw and Associates, West Perth.
- Van Dyck, S. & Strahan, R. (eds.) (2008) The Mammals of Australia. Third Edition. New Holland Publisher (Australia) Pty Ltd, Sydney.
- 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.

## 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>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.