



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3554/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: **Holcim Australia Pty Ltd**

1.3. Property details

Property: Mining Lease 45/5
Local Government Area: Shire of East Pilbara
Colloquial name: Turner River Quarry Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
3.8		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

Beard Vegetation Associations have been mapped at a 1:250,000 scale for the whole of Western Australia. Two Beard Vegetation Associations have been mapped within the application areas (GIS Database).

589: Mosaic: Short bunch grassland - savannah/grass plain (Pilbara)/Hummock grasslands, grass steppe; soft spinifex;

619: Medium woodland; river gum (*E. camaldulensis*).

Animal Plant Mineral (APM, 2009) on behalf of Holcim Australia Pty Ltd conducted a vegetation survey over the application areas and surrounding vegetation from 18 - 21 October 2009. Four vegetation types were identified within the application areas (APM, 2009). These are:

1) *Corymbia aspera* open woodland over *Acacia tumida*/*A. stellaticeps* tall shrubland and *Triodia epactia* hummock grassland;

2) *Acacia stellaticeps* open heath over *Triodia epactia* hummock grassland;

3) Isolated to very scattered *Corymbia* woodland and *Acacia* shrubland over *Triodia epactia* hummock grassland (Recent low intensity fire);

4) Isolated to very scattered *Corymbia* woodland and *Acacia* shrubland over *Triodia epactia* open hummock grassland (Recent high intensity fire (APM, 2009).

Clearing Description

Holcim Australia Pty Ltd is proposing to clear up to 3.8 hectares of native vegetation (Strategen, 2009). The application area is located approximately 37 kilometres south, south-west of Port Hedland (GIS Database). The proposed clearing is for the purpose of hard rock quarry mining and associated activities including stockpiling, crushing and screening.

Vegetation will be cleared with machinery, mulched and incorporated into topsoil to be stored for rehabilitation purposes.

Vegetation Condition

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

To

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).

Comment

The vegetation descriptions were derived from descriptions by Animal Plant Mineral (2009). The vegetation condition is based on the Keighery (1994) vegetation condition scale, from aerial photography and an assessment by Animal Plant Mineral (2009).

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 Chichester and Roebourne subregions of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). These subregions are described as:

Chichester: Undulating Archaean granite and basalt plains include significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick and McKenzie, 2001).

Roebourne: Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands (Kendrick and Stanley, 2001).

The vegetation within the application areas consists of Beard Vegetation Associations 589 and 619, which are both considered common and widespread throughout the Pilbara region with approximately 100% of these pre-European vegetation types remaining (GIS Database; Shepherd, 2007).

According to available databases, no Declared Rare Flora (DRF) or Priority Flora species occur within the application areas (GIS Database).

A flora survey was conducted over the application area and surrounding vegetation in October 2009 by a botanist from Animal Plant Mineral (APM, 2009). A total of 53 flora species from 32 genera belonging to 21 families were recorded during the vegetation survey (APM, 2009). Each of the vegetation communities recorded below the expected average of 15 flora species per site recorded by Van Vreeswyk (Strategen, 2009). No rainfall had fallen within the vicinity of the vegetation survey area for several months; therefore flora collections made during quadrat sampling were for the purposes of characterising vegetation only (APM, 2009).

No DRF, Threatened Ecological Communities or Threatened Fauna Species were noted across the application areas (APM, 2009; Strategen, 2009). The landform and soil types of the survey area are considered potentially suitable habitat for several priority flora species (APM, 2010).

The introduced flora species *Aerva javanica* (Kapok) was recorded from one site during the vegetation survey (APM, 2009). This species has the potential to be highly invasive and may obtain high densities particularly where ground has been disturbed (APM, 2009). Care must be taken to ensure that the proposed clearing activities do not spread introduced species to non infested areas. Should the permit be granted, it is recommended that the appropriate conditions be imposed on the permit for the purposes of weed management,

In October 2009, a fauna survey was undertaken by Terrestrial Ecosystems involving desktop investigations and a field survey (Strategen, 2009). The application areas do not provide any important ecological linkage or fauna movement corridors (Strategen, 2009). The fauna assemblage within the application areas has been depleted, and the areas are of low ecological value (Strategen, 2009).

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

Methodology

APM (2009)
Kendrick and McKenzie (2001)
Kendrick and Stanley (2001)
Shepherd (2007)
Strategen (2009)
GIS Database:
-Declared Rare and Priority Flora
-IBRA WA (Regions - Sub Regions)
-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

According to available datasets, there are no known records of threatened fauna within the application areas (GIS Database). The assessing officer has conducted a search of the Department of Environment and Conservation's (DEC, 2007) online fauna database NatureMap, centred on the coordinates 20°38'33"S, 118°31'03"E, with a radius of 20 kilometres. Four Amphibian, four Avian, seven Mammalian, and 33 Reptilian species were identified as potentially occurring within the search area (DEC, 2007).

In October 2009 a fauna study was undertaken by Terrestrial Ecosystems involving desktop investigations and

a field survey (Strategen, 2009). The survey area included an area extending one kilometre around the application areas. A number of previous surveys undertaken in the vicinity of the project area since 2002 were also reviewed, including surveys undertaken by Western Wildlife (2007), Biota Environmental Sciences (2002) and Thompson and Thompson (2008).

Five habitat types have been identified within Mining Lease 45/5. These are:

- Areas that were previously vegetated with scattered small trees, low shrubs and mature spinifex to a height of about 1 metre on substrate of red sandy clay and that have been recently burnt;
- Areas that have a few scattered trees and shrubs, spinifex and grasses to about 1 metre on a substrate of red sandy clay. In places the ground cover is over 70% but mostly varies between 30-70%;
- Treed areas with an understorey of grasses and shrubs of varying densities along the banks of the Turner River. During times when the Turner River flows, vegetation that is not well established or protected is washed away. The Turner River bed is comprised of coarse gravel;
- A small woodland to the east of the fork in the main access road near the main tenement boundary. This area contains mature trees with almost no understorey. Because this area is frequented by cattle and kangaroos it has been more heavily grazed and disturbed than adjacent areas. A number of the trees in this area contained hollows that could be used as retreats or nesting sites by vertebrate fauna;
- Disturbed areas where the vegetation has been allowed to re-grow. The success of this rehabilitation varies and in most areas there are still obvious signs of disturbance.

A risk assessment was undertaken by Terrestrial Ecosystems to consider the potential impacts of the project on the biodiversity of the survey area (Strategen, 2009). The results of the risk assessment indicate that the risk of the project significantly affecting native fauna, fauna assemblages and fauna habitat is generally low when placed in a regional context.

The application areas contain habitat that is potentially suitable for the following species of conservation significance:

Schedule 1 - Fauna that is rare or likely to become extinct, Wildlife Conservation (Specially Protected Fauna) Notice 2010: *Dasyurus hallucatus* (Northern Quoll) - listed as 'Endangered' under the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999; *Liasis olivaceus* subsp. *barroni* (Pilbara Olive Python) - listed as 'Vulnerable' under the EPBC Act 1999;

Schedule 4 - Other specially protected fauna, Wildlife Conservation (Specially Protected Fauna) Notice 2010: *Aspidites ramsayi* (Woma).

Based on the Commonwealth Government's (Department of Environment and Heritage 2006) criteria, the proposed additional clearing of vegetation around the existing Holcim quarry is unlikely to have a significant impact on the above species (Strategen, 2009). Strategen (2009) advised that Terrestrial Ecosystems concluded that there is no justification for referring the proposed clearing to the Department of Environment, Water, Heritage and the Arts.

The surrounding vegetation of the application areas contains some areas of unburnt fauna assemblages with high ecological value (Strategen, 2009). These areas will most likely not be directly affected by the removal of native vegetation within the application areas and will be protected from the indirect impacts of quarry activities through the implementation of management measures including:

- Fauna protection measures in inductions;
- Prohibiting access into adjoining high value fauna habitat;
- Manage light, noise and dust to minimise impact on fauna and fauna habitat.

Mine operations currently occur within areas adjacent to the application areas and as such it is unlikely that the proposed clearing contains significant habitat for conservation significant fauna.

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

Methodology DEC (2007)
Strategen (2009)
GIS Database:
-Threatened Fauna

(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 datasets, there are no known records of Declared Rare Flora (DRF) or Priority Flora species within the application areas (GIS Database).

Animal Plant Mineral (APM) conducted a vegetation survey over the application area in October 2009 (APM,

2009). No species of DRF, Priority Flora or *Environmental Protection and Biodiversity Conservation Act 1999* listed threatened species were identified within the application areas (APM, 2009; Strategen, 2009). APM (2009) have advised that seasonal limitations may have precluded the observation of herbaceous and annual species. The landform and soil types of the application area are considered potentially suitable for the Priority 1 species *Abutilon pritzelianum*, *Tephrosia andrewii* and *Acacia glaucocaesia*; Priority 2 species *Gomphena cuculata*; and the Priority 3 species *Goodenia nuda* and *Polymeria distigma*.

The vegetation types present within the application areas are well represented in the River Land System, and are also extensively found in the Bonney, Dollar, Mallina, and Urandy Land Systems. The vegetation types that may contain Priority Flora are well represented within the Pilbara region and within conservation areas (Strategen, 2009).

Due to the disturbed nature of the application areas, the small amount of proposed clearing (3.8 hectares) and the extent of similar vegetation that occurs within the local and regional area, the proposed clearing areas are not necessary for the continued existence of rare flora.

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

Methodology APM (2009)
Strategen (2009)
GIS Database:
-Declared Rare and Priority Flora

(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 areas applied to be cleared or within 100 kilometres of the application areas (GIS Database).

At such a distance from the application areas it is unlikely that the proposed clearing will have an impact on any TEC's.

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

Methodology 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 areas are located within the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Shepherd (2007) report that approximately 99.95% of the pre-European vegetation still exists in the Pilbara Bioregion. The vegetation in the application area is broadly mapped as Beard Vegetation Associations 589: Mosaic: Short bunch grassland - savannah/grass plain (Pilbara)/Hummock grasslands, grass steppe; soft spinifex soft spinifex; and 619: Medium woodland; river gum (*E. camaldulensis*) (GIS Database; Kendrick and McKenzie, 2001). According to Shepherd (2007) there is approximately 100% of these vegetation types remaining in the Pilbara Bioregion and the State (see table below).

According to the Bioregional Conservation Status of Ecological Vegetation Classes the conservation status for Beard Vegetation Associations 589 and 619 within the Pilbara Bioregion is of 'Least Concern' (Department of Natural Resources and Environment, 2002).

Although several large scale mining operations are located within a 50 kilometre radius of the application areas, the Pilbara Bioregion remains largely uncleared (GIS Database). As a result the conservation of the vegetation associations within the bioregion is not likely to be impacted upon by the proposal.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,188	17,794,647	~99.95	Least Concern	6.32
Beard veg assoc. – State					
589	809,754	809,637	~100	Least Concern	1.6
619	119,159	119,050	~99.9	Least Concern	0.2
Beard veg assoc. – Bioregion					
589	730,718	730,683	~100	Least Concern	1.8
619	118,705	118,705	~100	Least Concern	0.2

* Shepherd (2007)

** 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 Development (2002)
Kendrick and McKenzie (2001)
Shepherd (2007)
GIS Database:
-IBRA WA (Regions - Sub Regions)
-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, there are no wetlands or watercourses within the application areas, however; running adjacent to the eastern border of the application areas is the Turner River (GIS Database; Strategen, 2009). The Turner River is described as an ephemeral watercourse with flows occurring in February and March in response to major rainfall events associated with cyclonic activity (JDA, 2009).

The closest parcel of vegetation proposed to be cleared to the Turner River is 80 metres, with the majority of the vegetation being between 500 metres and 1000 metres from the river. The Turner River Water Reserve is located approximately 800 metres north of the northern corner of Mining Lease 45/5 (GIS Database). Quarrying is considered a compatible land use in a Priority 1 area (JDA, 2009).

Strategen (2009) has advised that there are a number of small areas of riparian vegetation that comprise the 3.8 hectares proposed to be cleared.

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

According to Strategen (2009), Holcim Australia has established a buffer of 50 metres between the edge of the riparian vegetation and any mining activities. Should the permit be granted, the Department of Water (2010) has recommended that a condition be imposed reflecting this.

Methodology DoW (2010)
JDA (2009)
Strategen (2009)
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 may be at variance to this Principle

According to the Department of Agriculture's Technical Bulletin No. 92 (Van Vreeswyk et al., 2004), 'An inventory and condition survey of the rangelands of the Pilbara region, Western Australia', the application areas are comprised of the Mallina Land System, River Land System and the Ruth Land System. This land system mapping suggests that the application areas primarily contain the Ruth Land System, with the western and eastern boundaries containing the Mallina and River Land System's respectively (GIS Database).

Animal Plant Mineral (APM) (APM, 2009) conducted a vegetation survey over the Holcim Turner River lease areas (Mining Leases 45/5 and 45/666) and an area of 200 metres to the north, south, east and west of the lease areas between 18 - 21 October 2009. These vegetation surveys suggest the application area would be better described as occurring within the River Land System, being adjoined by the Ruth and Mallina Land Systems to the west (APM, 2009).

The River Land System is described as active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). This system covers approximately 4,088 square kilometres of which approximately 56% is considered to be in very good condition (Van Vreeswyk et al., 2004). According to APM (2009) one landform unit is present within the application areas, this being: Sandy levees and sand sheets - soft Spinifex grassland. The River Land System is largely stabilised by buffel and spinifex and accelerated erosion is uncommon (Van Vreeswyk et al., 2004). However, susceptibility to erosion is high to very high if vegetation cover is removed (Van Vreeswyk et al., 2004).

The vegetation types present within the application areas form part of the site type Plain Soft Spinifex Grassland (PSSG), the second most common type in the Pilbara region that is well represented in conservation reserves at Karijini, Millstream-Chichester National Parks, Cane River Nature Reserve and the Meetheena pastoral lease as well as extensive occurrence on unallocated Crown Land (APM, 2009).

Based on the above, the proposed clearing may be at variance to this Principle. Strategen (2009) has advised that potential degradation to land caused by surface water runoff will be managed through implementation of stormwater management controls.

Methodology APM (2009)
Strategen (2009)
Van Vreeswyk et al. (2004)
GIS Database:
-Rangeland Land System Mapping
-Yule 1.4M Orthomosaic

(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

There are no conservation reserves in close proximity to the proposed clearing areas (GIS Database). The nearest Department of Environment and Conservation managed land is the 'A' Class Mungaroon Range Nature Reserve, located approximately 81 kilometres south-west of the southern-most section of the proposed clearing area (GIS Database).

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

Methodology GIS Database:
-DEC Tenure

(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 Turner River Water Reserve (Public Drinking Water Source Area) is located approximately one kilometre north of the most northern application point (GIS Database).

Holcim Australia are currently licensed under section 5C of the *Rights in Water Irrigation Act 1914* by the Department of Water (DoW) to abstract groundwater for industrial purposes up to 4500 kilolitres per year (JDA, 2009). Groundwater is currently abstracted from two bores at a rate of 10 000 kilolitres/annum and from two sumps located within the quarry pit at a rate of approximately 90 000 kilolitres/annum (JDA, 2009). A groundwater licence amendment application has been submitted to the DoW to increase the licence entitlement and to include dewatering from pit sumps (DoW, 2010; JDA, 2009).

The ground water level calculated from orthophotos and contour plans was estimated to be 41.3 metres Australian Height Datum (AHD) in the riverbed excavation area and 20.79 AHD at the quarry sump (JDA, 2009). This suggests a groundwater gradient sloping approximately east to west from the river towards the quarry. It is likely that this gradient has been induced by evaporative losses from the pit area exceeding the aquifers capability to recover those losses, causing a localised depression in the regional water table (Strategen, 2009). Anecdotal evidence suggests that after a period of no pumping from the two sumps the water levels equalise to levels differing by several metres (Strategen, 2009). This may be due to variations in hydraulic transmissivity within the fractured schist (JDA, 2009).

Jim Davies and Associates (JDA, 2009) collected groundwater samples from two locations; bore WB1 approximately 500 metres north-east and bore WB2 approximately 300 metres north-west, of the most northern corner of the clearing application areas. DoW Statewide Policy No. 19: Hydrogeological reporting associated with a Groundwater Well Licence (2007) would determine WB1 to be saline and WB2 to be brackish. As

groundwater is used for industrial uses only and not discharged outside of the quarry pit or into any surface water courses, water quality will not present any issues relating to the hydrological management of the site (JDA, 2009).

According to Strategen (2009), following the application of mitigation and management measures, the proposal is expected to result in the following outcomes in relation to surface water quantity and quality:

- Water quality within the nearby watercourses/drainage lines will not be affected;
- Flows within the mining area will be locally concentrated by diversion structures. Sediment traps will reduce sediment loads and velocities in local surface water runoff;
- Haul roads will not significantly affect surface water quantity or quality in the area as the installation of culverts will maintain the current sheetflow regime.

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

Methodology DoW (2010)
JDA (2009)
Strategen (2009)

(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 proposed clearing area is located in the Pilbara bioregion, an arid environment characterised by two distinct seasons; a hot summer from October to April and a mild winter from May to September (BoM, 2010; Strategen, 2009). Peak rainfall typically occurs in the summer months and is associated with tropical cyclones (ANRA, 2007). A smaller rainfall peak is experienced between May and June and is associated with cold fronts. The average annual rainfall of the Turner River area is approximately 324.6 millimetres (Strategen, 2009). Annual evaporation rates in the Pilbara bioregion greatly exceed average annual rainfall (ANRA, 2007).

Running adjacent to the eastern boundary of the application areas is the Turner River. The Turner River is an ephemeral watercourse with flows occurring in February and March in response to major rainfall events associated with cyclonic activity (JDA, 2009).

The closest parcel of proposed clearing to the Turner River is approximately 80 metres, with the majority of vegetation being between 500 metres and 1000 metres from the River (Strategen, 2009). During times of heavy cyclonic rain events, overnight rises of four metres have been recorded (Param, 1991). The quarry footprint is approximately five metres higher than the river bed (Strategen, 2009). This difference in elevation offers significant protection from river flood flows. Anecdotal reports suggest that the quarry site is not flooded by river flows.

The quarry drains internally to sumps which require pumping out after heavy rainfall events. The quarry is located on a low ridge and rainfall runoff external to the actual quarry is directed naturally away by the topography so that no artificially constructed drainage is necessary (JDA, 2009). During cyclonic events much of the quarry floods. Before quarrying activities can occur the pit is pumped out, with the water used for dust suppression (Strategen, 2009).

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

Methodology ANRA (2007)
BoM (2010)
JDA (2009)
Param (1991)
Strategen (2009)

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

Comments

There is one Native Title Claim (WC99/003) over the areas under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the 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 is one known Aboriginal Site of Significance within the application area (GIS Database). It is the proponent's 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.

The clearing permit application was advertised on 15 February 2010 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to this 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 proposed clearing is at variance to Principle (f), may be at variance to Principle (g), is not likely to be at variance to Principles (a), (b), (c), (d), (h), (i) and (j), and is not at variance to Principle (e).

Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for the purposes of weed management, vegetation management - watercourse, retention of topsoil and vegetative material, record keeping and permit reporting.

5. References

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- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A., and Hennig, P. (2004) Technical Bulletin: An inventory and condition survey of rangelands in Pilbara Region, Western Australia, No 92. Department of Agriculture, Western Australia.

6. Glossary

Acronyms:

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

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