Government of **Western Australia**
Department of **Mines and Petroleum**

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4309/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Hamersley Iron Pty Ltd**

1.3. Property details

Property: Miscellaneous Licence 47/153
Miscellaneous Licence 47/185
General Purpose Lease 47/1227
Iron Ore (Hamersley Range) Agreement Act 1963, Mineral Lease 4SA (AML 70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Boolgeeda Aerodrome and Road Upgrade Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 1 July 2011

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 for the whole of Western Australia and are useful to look at vegetation in a regional context. The following Beard vegetation associations have been mapped within the application area: 18: Low woodland; mulga (*Acacia aneura*); and 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Databsae). Three flora and vegetation surveys have been conducted by Biota Environmental Sciences Pty Ltd (Biota) in 2003, 2004 and 2007 of an area called the "Brockman 4" project area (Biota, 2005a; Hamersley Iron, 2011). Based on these surveys the following twelve vegetation units within three landforms were described and mapped for the application area: <u>Vegetation of Stony Hills</u> - *Acacia stowardii* low open woodland over *Eremophila exilifolia* scattered shrubs over *Triodia epactia* mid-dense hummock grassland. <u>Vegetation of Plains</u> - *Eucalyptus leucophloia* scattered low trees over *Acacia aneura* (various forms), *Acacia ayersiana* tall open shrubland over *Triodia epactia*, *Triodia wiseana* mid-dense hummock grassland; - *Corymbia deserticola* scattered low trees over *Acacia atkinsiana*, *Acacia exilis* tall open shrubland over *Triodia wiseana* closed hummock grassland; - Mosaic of: *Corymbia deserticola* scattered low trees over *Acacia atkinsiana*, *Acacia exilis* tall open shrubland over *Triodia wiseana* closed hummock grassland / *Eucalyptus leucophloia* scattered low trees over *Acacia aneura* (various forms), *Acacia ayersiana* tall open shrubland over *Triodia epactia*, *Triodia wiseana* mid-dense hummock grassland / *Corymbia deserticola* scattered low trees over *Acacia atkinsiana*, *Acacia*	Hamersley Iron Pty Ltd (Hamersley Iron) has applied to clear up to 230 hectares of native vegetation within an application area covering approximately 812 hectares. The application area is located approximately 55 kilometres north-west of Tom Price (GIS Database). The purpose of the clearing permit application is to upgrade the aerodrome and associated infrastructure (Hamersley Iron, 2011).	Good: Structure significantly altered by multiple disturbances; retains basic structure/ability to regenerate (Keighery, 1994). To Pristine: No obvious signs of disturbance (Keighery, 1994).	The vegetation condition and description is based on the flora and vegetation surveys conducted by Biota in 2003 and 2004. This was assessed utilising Trudgen's vegetation condition scale and was converted to the Keighery scale for consistency.

exilis tall open shrubland over *Triodia wiseana* closed hummock grassland;

- *Corymbia deserticola* low open woodland over *Acacia atkinsiana* shrubland to tall shrubland over *Triodia epactia*, *Triodia wiseana* mid-dense hummock grassland;

- *Eucalyptus xerothermica* low open woodland over *Eremophila fraseri* scattered shrubs over *Triodia wiseana* mid-dense hummock grassland; and

- *Acacia inaequilatera*, *Acacia exilis*, *Acacia bivenosa* open shrubland over *Triodia epactia* mid-dense hummock grassland.

Vegetation of Drainage Areas
- *Eucalyptus victrix* scattered low trees to open woodland over *Goodenia lamprosperma*, *Pluchea dentex* very open herbland;

- *Acacia pyrifolia*, *Acacia ancistrocarpa*, *Petalostylis labicheoides* shrubland over *Bonamia rosea*, *Tephrosia rosea* var. *glabrior* low open shrubland over *Triodia epactia* hummock grassland and *Themeda triandra* very open tussock grassland;

- *Corymbia hamersleyana* low open woodland over *Triodia epactia* hummock grassland and *Eriachne tenuiculmis*, *Eriachne mucronata*, *Themeda* sp. Mt. Barricade open tussock grassland;

- *Acacia monticola*, *Acacia maitlandii, Acacia atkinsiana* tall open shrubland over *Triodia epactia*, *Triodia wiseana* mid-dense to open hummock grassland; and

- *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* tall shrubland over *Triodia epactia* hummock grassland (Biota, 2005a).

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 lies within the Hamersley sub-region of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The vegetation within this sub-region is characterised as 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).

During the flora and vegetation surveys of the application area and the surrounds, a total of 367 flora taxa from 149 genera and 52 families were recorded (Biota, 2005a). Of these no Declared Rare Flora (DRF) listed under the *Wildlife Conservation Act 1950*, or Threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) were recorded (Hamersley Iron, 2011). A number of Priority Flora were recorded during flora and vegetation surveys in the vicinity of the application area, none of which were recorded within the application area (Hamersley Iron, 2011).

The Biota (2005a) flora and vegetation survey established that twelve vegetation units occur within the application area. Of these, two vegetation units were associated with the ephemeral Boolgeeda Creek which crosses through the application area (Biota, 2005a). These units are considered to have moderate conservation significance as they are known to support numerous species which may be restricted to these habitats (Biota, 2005a). Hamersley Iron (2011) stated that where possible, disturbance to the vegetation within the Boolgeeda Creek will be avoided or activities kept within existing cleared areas.

No vegetation units recorded within the application area or within the Brockman 4 project area represented Threatened Ecological Communities or Priority Ecological Communities (Biota, 2005a).

Seven introduced species were recorded during the flora and vegetation surveys conducted within the broader Brockman 4 project area (Biota, 2007). None of these species were listed as 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food, however Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setiger*) and Ruby Dock (*Acetosa vesicaria*) are all considered to be serious environmental weeds by the Department of Environment and Conservation. It is likely that some of these species occur within the application area. 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. Potential impacts from the spread of weeds as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

A fauna survey was conducted in October 2004 of the Brockman 4 project area (Biota, 2005b). This fauna survey recorded 123 taxa of terrestrial vertebrate fauna belonging to 41 families comprising two frogs, 49 reptiles, 57 birds, seven bats and eight non-volant mammals (Biota, 2005b). On the basis of the results from a

single survey, the vertebrate assemblage is typical for the Hamersley Range sub-region and does not appear to be locally or regionally significant (Biota, 2005b).

Several Short Range Endemic fauna species and eight reptile species of interest have also been recorded within the Brockman 4 project area (Biota, 2005a). The reptile species were of interest as they were either under review or possibly regarded as new species, therefore the conservation significance is unknown. Six of these species could potentially occur within the application area as they were recorded within creekline, Mulga, and Acacia over Triodia associated habitats (Biota, 2005b).

Given the land systems, vegetation and habitats of the application area are common and widely represented both locally and regionally, it is not likely to comprise greater faunal diversity than other nearby areas. However given the uncertainty surrounding the taxonomic status and conservation significance of the six reptile species of interest, the degree of biological diversity found within the application area is speculative.

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

Methodology
Biota (2005a)
Biota (2005b)
Biota (2007)
CALM (2002)
Hamersley Iron (2011)
GIS Database:
- IBRA WA (Regions - Sub-regions)
- Threatened Ecological Sites Buffered

(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

Biota (2005b) conducted a fauna desktop assessment of the Brockman 4 project area which included the application area. The fauna survey established that three fauna habitats: creeklines, Mulga in drainage areas within plains, and *Acacia* species over *Triodia* species all occur within the application area (Biota, 2005b). These vegetation communities were deemed to be well represented throughout the Pilbara region (Biota, 2005b; Shepherd, 2009).

From the results of the desktop assessment, and based on habitat assessment, the following conservation significant species could potentially occur within the application area:

- Australian Bustard (*Ardeotis australis*) (Priority 4);
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4);
- Lakeland Downs Mouse (*Leggadina lakedownensis*) (Priority 4);
- Peregrine Falcon (*Falco peregrinus*) (Schedule 4);
- Long-tailed Dunnart (*Sminthopsis longicaudata*) (Priority 4); and
- Skink (*Notoscincus butleri*) (Priority 4) (Biota, 2005b).

Of the above, only one conservation significant species, *Ardeotis australis* (Australian Bustard) (Priority 4) was recorded during the Biota fauna survey within the application area. The Australian Bustard was observed flying over a creekline habitat within the south-western section of the application area (Biota, 2005b). Some habitat loss is expected by the proposed clearing, however the conservation status of this species will not be impacted as this species is widely distributed.

The proposed clearing could cause potential habitat loss for the above listed species; however it is not likely to affect their conservation significance given these species all have distributions outside of the application area (Biota, 2005b). As such the vegetation within the application area does not represent habitat significant to native fauna.

Three Short Range Endemic (SRE) species were also identified during the fauna survey of the Brockman 4 project area (Biota, 2005b). Of these, one SRE species identified as *Rhagada* sp. (a type of land snail) was recorded in five locations during the wider Biota 2005 fauna survey within two vegetation types (Biota, 2005b). It is likely that this species could potentially occur within the application area as the vegetation types in which this species was associated consisted of *Triodia* spp. mid-dense hummock grassland, which was found throughout the application area (Biota, 2005a). However, given that genera from this species have been recorded outside of the impact area and were collected from a vegetation type that is well represented outside of the application area, the proposed clearing is unlikely to have a significant impact on the conservation status of this species.

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

Methodology
Biota (2005a)
Biota (2005b)
Shepherd (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

A flora and vegetation survey was conducted over the application area by Biota (2005a). This established that no Declared Rare Flora (DRF) as listed under the *Wildlife Conservation Act 1950* or species listed under the *Environment Protection and Biodiversity Conservation Act 1999* were recorded within the application area (Biota, 2005a).

Hamersley Iron conducted a desktop analysis of the application area in 2011 (Hamersley Iron, 2011). This included assessing Biota 2005 and 2007 reports which highlighted that no DRF were recorded within the application area or its surrounds (Hamersley Iron, 2011).

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

Methodology

Biota (2005a)
Hamersley Iron (2011)

(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 records of Threatened Ecological Communities (TECs) located within the application area (GIS Database). The nearest known occurrence is the "Themeda Grasslands" TEC, located approximately 15 kilometres north-east of the application area (GIS Database). At this distance, there is little liklihood of any impact to the TEC as a result of the proposed clearing.

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

Methodology

GIS Database:
- Threatened Ecological Sites Buffered

(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 of Australia (IBRA) bioregion (GIS Database). Shepherd (2009) reports that approximately 99.89% of the pre-European vegetation still exists in this bioregion.

The vegetation within the application area is recorded as Beard vegetation associations:

18: Low woodland; mulga (*Acacia aneura*); and
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Databsae).

According to Shepherd (2009) approximately 100% of these Beard vegetation association remains in the Pilbara bioregion (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,193	17,785,000	~99.89	Least Concern	6.32
Beard vegetation associations - State					
18	19,892,305	19,890,275	~99.99	Least Concern	2.13
82	2,565,901	2,565,901	~100	Least Concern	10.24
Beard vegetation associations - Bioregion					
18	676,557	676,557	~100	Least Concern	16.8
82	2,563,583	2,563,583	~100	Least Concern	10.25

* Shepherd (2009)
** Department of Natural Resources and Environment (2002)

Both Beard vegetation associations 18 and 82 retain approximately 100% of their pre-European extent which is more than the 30% threshold level recommended in the National Objectives Targets for Biodiversity Conservation below which species loss appears to accelerate exponentially at an ecosystem level (EPA, 2000).

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

Methodology

Department of Natural Resources and Environment (2002)
EPA (2000)
Shepherd (2009)
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 may be at variance to this Principle

There are numerous minor, ephemeral drainage lines located within the application area, including the named Boolgeeda Creek which crosses through the middle of the application area (Hamersley Iron, 2011; GIS Database). It is expected that these watercourses will only flow during significant rainfall.

The following five vegetation units are associated with drainage lines or the Boolgeeda Creek:

- *Corymbia hamersleyana* low open woodland over *Triodia epactia* hummock grassland and *Eriachne tenuiculmis*, *Eriachne mucronata*, *Themeda* sp. Mt. Barricade open tussock grassland (C8);

- *Acacia monticola, Acacia maitlandii, Acacia atkinsiana* tall open shrubland over *Triodia epactia*, *Triodia wiseana* mid-dense to open hummock grassland (C12);

- *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* tall shrubland over *Triodia epactia* hummock grassland (C19);

- *Eucalyptus victrix* scattered low trees to open woodland over *Goodenia lamprosperma*, *Pluchea dentex* very open herbland (C1); and

- *Acacia pyrifolia*, *Acacia ancistrocarpa*, *Petalostylis labicheoides* shrubland over *Bonamia rosea*, *Tephrosia rosea* var. *glabrior* low open shrubland over *Triodia epactia* hummock grassland and *Themeda triandra* very open tussock grassland (C2) (Biota, 2005a).

The two vegetation units: C1 and C2 are locally significant for surface drainage and have moderate conservation significance (Biota, 2005a). Hamersley Iron (2011) have estimated that approximately 184.82 hectares and 561.96 hectares of the C1 and C2 vegetation units respectively exist within the application area vicinity. Of this, approximately 1.3 hectares and 3.31 hectares of C1 and C2 respectively is proposed to be cleared (Biota, 2005a). Hamersley Iron (2011) advised that clearing of the vegetation units associated with the Boolgeeda Creek will be avoided where possible, or clearing will be kept to already disturbed areas. Where clearing is unavoidable, Hamersley Iron (2011) stated that sufficient culverting will be installed to maintain surface water flows.

The vegetation unit, C1 contains *Eucalyptus victrix* (Coolibah), the only species in the application area considered to be dependent on the groundwater (termed a phreatophyte). The proposed clearing is not likley to impact upon this species as it will not intercept the groundwater, however Biota (2005a) recommended that hydrological studies should be conducted for other mining activities such as mine pit dewatering and extraction of process water from borefields that could cause groundwater drawdown.

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

Methodology

Biota (2005a)
Hamersley Iron (2011)
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

The application area falls within the Boolgeeda and River land systems of the Pilbara region (GIS Database; Van Vreeswyk *et al*., 2004). These systems occupy approximately 4.3% and 2.3% of the Pilbara region respectively (Van Vreeswyk *et al*., 2004).

The Boolgeeda land system is described as stony lower slopes and plains below hill systems supporting hard and soft Spinifex grasslands and Mulga shrublands (Van Vreeswyk *et al*., 2004). This land system is generally not susceptible to erosion (Van Vreeswyk *et al*., 2004).

The River land system is described as active flood plains and major rivers supporting grassy Eucalypt woodlands, tussock grasslands and soft Spinifex grasslands. This land system has a high to very high susceptibility to erosion if the vegetation cover is removed (Van Vreeswyk *et al*., 2004).

The River land system occurs within the south-western section of the application area. It was observed to be invaded by Buffel Grass (*Cenchrus ciliaris*), and was also subject to cattle grazing and trampling impacts (Hamersley Iron, 2011). The small amount of clearing proposed within the River land system is unlikely to cause further land degradation much beyond the immediate clearing envelope.

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

Methodology
Hamersley Iron (2011)
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 not located within any conservation areas or Department of Environment and Conservation (DEC) managed lands (GIS Database). The closest conservation area, the Karijini National Park, is located approximately 65 kilometres east of the application area (GIS Database). At this distance, it is not likely that the vegetation within the application area would act as a buffer or be important as an ecological linkage to this conservation area.

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

The application area has low salinity levels of between 500 to 1,000 milligrams per litre of Total Dissolved Solids (TDS) (GIS Database). Salinity within this range is considered acceptable for most uses with acceptable drinking water between 500 to 750 milligrams per litre TDS and acceptable irrigation water between 500 to 1,200 milligrams per litre TDS. The application area is not located within a Public Drinking Water Source Area (GIS Database).

There are numerous minor, ephemeral drainage lines located within the application area, including the named Boolgeeda Creek which crosses through the middle of the application area (Hamersley Iron, 2011; GIS Database). With an average annual rainfall of approximately 405 millimetres (BoM, 2011) and an annual evaporation rate of 3,400 millimetres (GIS Database), it is expected that there would be little surface flow during normal seasonal rains.

Given that low impact clearing is proposed, and considering the magnitude of the Hamersley Groundwater Province (approximately 101,000,000 square kilometres) (GIS Database), it is unlikely that the proposed clearing of 230 hectares of native vegetation will have any significant impact on the quality of the regional groundwater.

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

Methodology
BoM (2011)
Hamersley Iron (2011)
GIS Database:
- Evaporation Isopleths
- Groundwater Provinces
- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source Areas

(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 falls within the Duck Creek and Hardey River subcatchments which comprise 153,887 and 168,731 hectares respectively (GIS Database).

There are numerous minor, ephemeral drainage lines located within the application area, including the named Boolgeeda Creek which crosses through the middle of the application area (Hamersley Iron, 2011; GIS Database). Local flooding occurs seasonally in the Pilbara region as a result of cyclonic activity and sporadic thunderstorm activity. It is not anticipated that the proposed clearing of the application area will lead to an increase in flood height or duration.

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

Methodology

Hamersley Iron (2011)
GIS Database:
- Hydrographic Catchments-Subcatchments
- Hydrography, linear

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

Comments

There are three registered Aboriginal Sites 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. Hamersley Iron (2011) advised that these sites will be avoided during the clearing process and stated that they will comply with the *Aboriginal Heritage Act 1972* by completing a Section 18 permit should this be required.

There is one Native Title Claim (WC97/89) over half of the area under application (GIS Database). This claim has been determined by the Federal Court on behalf of the claimant group. There is also one Native Title Claim (WC01/05) registered with the NNTT (GIS Database). However, the mining tenure 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*.

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 18 April 2011 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to this application.

Methodology

Hamersley Iron (2011)
GIS Database:
- Native Title Claims
- Aboriginal Sites of Significance

4. References

Biota (2005a) Biota Environmental Sciences Pty Ltd. A Vegetation and Flora Survey of the Brockman Syncline 4 Project Area, near Tom Price. Prepared for Hamersley Iron Pty Ltd, July 2005.

Biota (2005b) Fauna Habitats and Fauna Assemblage of the Brockman No. 4 Project Area. Prepared for Hamersley Iron Pty Ltd, January 2005.

Biota (2007) Biota Environmental Sciences Pty Ltd. A Flora Survey of the Brockman Syncline 4 Rail and Infrastructure Corridor. Prepared for Pilbara Iron Pty Ltd, February 2007.

BoM (2011) Bureau Of Meteorology Website - Climate averages by number, averages for Tom Price http://reg.bom.gov.au/climate/averages/tables/cw_007178.shtml (Accessed 20 June 2011).

CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions (Pilbara 3 (PIL 3 – Hamersley sub-region). Department of Conservation and Land Management, Bentley.

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.

EPA (2000) Environmental protection of native vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2. December 2000. Environmental Protection Authority, Western Australia.

Hamersley Iron (2011) Hamersley Iron Pty Ltd. Statement Addressing the Ten Clearing Principles, Boolgeeda Aerodrome, March 2011.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Shepherd (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.

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.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
CALM	Department of Conservation and Land Management (now DEC), Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DEC), 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 (now DEC), Western Australia
DoIR	Department of Industry and Resources (now DMP), Western Australia
DOLA	Department of Land Administration, Western Australia
DoW	Department of Water
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
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 Act	Rights in Water and Irrigation Act 1914, Western Australia
s.17	Section 17 of the Environment Protection Act 1986, Western Australia
TEC	Threatened Ecological Community

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.