Department of Industry and Resources

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2160/1

Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BHP Billiton Iron Ore Pty Ltd**

1.3. Property details

Property: *Iron Ore (Mount Newman) Agreement Act 1964*, Mineral Lease 244 SA (AML 70/244)

Local Government Area: Shire of East Pilbara

Colloquial name: Ninga exploration project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
105		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
The vegetation of the application area is broadly mapped as Beard Vegetation Associations 18: low woodland; mulga (*Acacia aneura*); 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and 216: Low woodland; mulga (with spinifex) on rises (GIS Database).	BHP Billiton Iron Ore Pty Ltd (BHP Billiton) have applied to clear up to 105 hectares (ha) of native vegetation within a total application area of approximately 1776 ha, for the purposes of the Ninga exploration drilling project.	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).	The application area is roughly rectangular in shape, approximately 10 km long and 2 km wide. The western end of the application area is located approximately 20 km north-east of Newman, in the Pilbara region (GIS Database).
Ecologia Environment (Ecologia) conducted a flora survey of the Eastern Ophthalmia Range, including the application area, in March-April 2004 (Ecologia, 2004). The survey included 46 vegetation quadrats, representing all the main vegetation associations within the application area (Ecologia, 2004).	Clearing will be for approximately 1536 drill pads, and associated sumps and access tracks. Each drill pad will be approximately 20 metres x 20 metres, each sump will be approximately 5m x 2m x 1m deep, and access tracks will be approximately 4m wide (BHP Billiton, 2007a).	to Pristine: No obvious signs of disturbance (Keighery, 1994).	The vegetation condition was derived from a vegetation survey conducted by Ecologia Environment (2004).
The following eight vegetation types were identified within the application area, broadly associated with topographic features: 1) Range crests; 2) Range slopes; 3) Gorges and Gullies; 4) Breakaways; 5) Foothills; 6) Minor Drainage Channels; 7) Valley Plains; and 8) Flood Plains. (Ecologia, 2004).	Existing tracks and other previously disturbed areas will be utilised wherever possible. Where new tracks are required, they will be established using raised blade clearing techniques wherever practicable (BHP Billiton, 2007b). Drill pads and sumps will be mechanically cleared using earth moving equipment with a lowered blade. All topsoil and vegetation will be stockpiled for later use in rehabilitation. All drill pads and sumps will be rehabilitated within twelve months.		
Two weed species were recorded within the application area: Buffel Grass, *Cenchrus ciliaris* and Bipinnate Beggartick, *Bidens bipinnata* (Ecologia, 2004).			

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The application area is located within the Fortescue sub-region of the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database).

Flora and fauna surveys of the Eastern Ophthalmia Range, including the application area, were conducted by Ecologia in March-April 2004. The flora survey recorded 248 plant taxa from 94 genera and 41 families (Ecologia, 2004). The fauna survey recorded 114 species of vertebrate fauna, including two introduced mammal species (Ecologia, 2004). Ecologia (2004) considered this to represent a moderate level of diversity, comparable to other recent surveys in surrounding areas. No vegetation communities of conservation significance were recorded during the survey and all the vegetation types found within the application area are well represented in the Pilbara Region (Ecologia, 2004; GIS Database).

Approximately 95% of the application area falls within either the Ethel Creek or Sylvania Pastoral Leases (GIS Database) and disturbance from cattle grazing was evident in some quadrats (Ecologia, 2004).

Two weed species: *Cenchrus ciliaris* (Buffel Grass), and *Bidens bipinnata* (Bipinnate Beggartick), were recorded during the survey (Ecologia, 2004). Buffel Grass was widespread throughout the survey area and locally abundant in some areas (Ecologia, 2004). The presence of introduced flora species is likely to reduce the biological diversity of the proposed clearing area. Buffel Grass has been given a high weed rating by the WA Environmental Weed Strategy due to its invasiveness (Ecologia, 2004). The vegetation is some parts of the application area was considered to be in pristine condition (Ecologia, 2004). Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Should a clearing permit be granted, it is recommended that a condition be imposed for the purposes of weed management.

A fauna survey of the application area concluded that the habitat types occurring within the application area were well represented in the Pilbara Region, and were not of specific conservation significance (Ecologia, 2004). Some fauna of conservation significance are known to occur within the application area, but none are restricted to the application area (Ecologia, 2004).

The landforms, vegetation types and fauna habitats in the application area are well represented in the Pilbara Region, including within the Karijini and Chichester Range National Parks (BHP Billiton, 2007b; Ecologia, 2004; GIS Database). Some flora and fauna of conservation significance are known to occur within the application area, however these species are not expected to be impacted as a consequence of the proposed clearing. The sparse nature of the proposed clearing for exploration drill pads and access tracks is unlikely to have any significant impact on the biological diversity of the region.

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

Methodology

BHP Billiton (2007b).
Ecologia (2004).
GIS Database:
- Pre-European Vegetation - DA 01/01.
- IBRA Regions

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

Comments

Proposal is not likely to be at variance to this Principle

A fauna survey of the application area was conducted by Ecologia in March-April 2004 (Ecologia, 2004). The survey consisted of a combination of fauna trapping (Elliot traps and pit traps), bird observations, bat recordings and opportunistic sightings. The survey recorded a total of 114 fauna species, including 17 native and two introduced mammals, 59 bird species, 30 reptiles species, four amphibians and two fishes (Ecologia, 2004).

Five main fauna habitat types were identified within the application area: ridge top; scree slope; gorge; mulga woodland; and valley plain, and each habitat type was represented in the survey (Ecologia, 2004).

Four fauna species of conservation significance were recorded within the survey area: Fork-tailed swift, (*Apus pacificus*); Rainbow Bee-eater, (*Merops ornatus*); Ghost Bat (*Macroderma gigas*); and Western Pebble-mound Mouse (*Pseudomys desertor*).

The Fork-tailed swift and the Rainbow Bee-eater are migratory birds listed under the JAMBA and CAMBA international agreements (Ecologia, 2004). These two species are highly mobile, and the small areas of proposed clearing scattered over a large area are unikely to have any significant impact on the habitat for these species.

The Ghost Bat is listed as Vulnerable on the International Union for the Conservation of Nature and Natural Resources (IUCN) list of rare and endangered species. The Ghost Bat is known to roost in caves and mine shafts. Although a number of caves occur along the ridgelines within the application area, none of these were considered deep enough to be suitable roost sites (Ecologia, 2004). The application area is likely to be used by Ghost Bats as foraging ground (Ecologia, 2004), however the sparse nature of the proposed clearing is unlikely to have any significant impact on the available foraging habitat.

The Western Pebble-mound Mouse (P4) is listed on the Department of Environment and Conservation (DEC) Priority Fauna list of poorly known fauna. The Western Pebble-mound Mouse constructs mounds from small pebbles, and occurs in hummock grassland areas of Triodia, Cassia, Acacia and Ptilotus on skeletal soils which contain suitable sized pebbles (Ecologia, 2004). This species was recorded on two occasions during the survey, and one active mound was observed within the scree slope habitat (Ecologia, 2004). This species is widespread throughout the Pilbara region and the proposed clearing is unlikely to have a significant impact on this species. Any active pebble mounds sighted during the exploration programme will be avoided (BHP Billiton, 2007a).

Although Petrogale sp. were recorded at three sites within the application area, it is unclear whether the individuals sighted were the Black-footed Rock Wallaby, (*Petrogale lateralis lateralis*) (VU), or the more common Rothschild's Rock Wallaby, (*Petrogale rothschildi*), as the ranges of these two species appear to overlap, and they are difficult to distinguish from each other (Ecologia, 2004). In any case, the proposed clearing for mineral exploration activities is unlikely to have any significanct impact on rock-wallaby habitat.

Several other fauna species of conservation significance have the potential to occur within the project area, based on known ranges, habitat preferences, and previous sightings in surrounding areas (Ecologia, 2004). The following species are listed on the Wildlife Conservation (Specially Protected Fauna) Notice 2006(2) and are protected under the *Wildlife Conservation Act 1950*: Orange Leaf-nosed Bat, *Rhinonicteris aurantius*; Night Parrot, *Pezoporus occidentalis;* Pilbara Olive Python, *Liasis olivaceus barroni*; Peregrine Falcon, *Falco peregrinus;* and Greater Bilby, *Macrotis lagotis*. The Unpatterned Robust Lerista, *Lerista macropisthropus remota* (P2), and the Australian Bustard, *Ardeotis australis*, (P4) are listed on the DEC Priority Fauna list (Ecologia, 2004).

None of the abovementioned species are likely to be specifically dependant on habitats found within the application area, although some taxa may utilize the project area as part of a foraging ground (Ecologia, 2004). The fauna habitats occurring within the application area are well represented within the Karijini and Chichester Range National Parks, and in the Pilbara region generally (Ecologia, 2004). Prior to commencing any clearing, the areas proposed to be cleared will be inspected by an Environmental Advisor, to identify any significant fauna habitat (eg. large trees, Pebble Mound Mouse mounds), and these sites will be avoided (BHP Billiton, 2007b).

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

Methodology BHP Billiton (2007a).
BHP Billiton (2007b).
Ecologia (2004).

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

Comments

Proposal may be at variance to this Principle

The nearest known Declared Rare Flora are six populations of *Lepidium catapycnon* which occur approximately 28-31km west/north-west of the application area (GIS Database). Department of Environment and Conservation (DEC) databases have no records of any other populations of Declared Rare or Priority flora within a 50km radius of the areas applied to clear (GIS Database).

Based on known distributions Ecologia (2004) considered that one species of Declared Rare Flora (L. catapycnon) and twenty four species of Priority Flora had the potential to occur within the application area. Suitable habitat for most of these species occurs within the application area, however none of these species were recorded during the flora survey (Ecologia, 2004).

No species of Declared Rare Flora were recorded during the flora survey (Ecologia, 2004). One species of Priority Flora, *Isotropis winneckei* (P1) was recorded during the survey (Ecologia, 2004). Florabase records show previous collections of this species from the Central Ranges IBRA Region, in the vicinity of the WA/SA/NT border (WA Herbarium, 2008). In addition to the WA Herbarium records, Australia's Virtual Herbarium (a database amalgamating the records from all the major herbaria in Australia) shows several records of this species from the southern half of the Northern Territory and one record from the Pilbara IBRA Region of WA, on the eastern edge of the Karijini National Park (AVH, 2008). BHP Billiton have also recorded this species in the vicinity of the Yandi mine-site, approximately 90 km north-west of Newman (BHP Billiton, 2007b).

Isotropis winneckei was recorded from only one location during the flora survey of the application area (Ecologia, 2004). As this population represents the only known record of this species in the immediate area,

this population should be conserved, until sufficient survey work has been conducted in surrounding areas to determine the true distribution of this species.

Two other flora species recorded within the application area during the 2004 survey were considered to be of conservation significance: a new species of Eremophila, and a specimen of Aenictophyton similar to *Aenictophyton reconditum*. Both these taxa were recorded as uncommon within the survey area and having restricted distributions (Ecologia, 2004).

At the time of the survey, the Eremophila species was previously undescribed. It has subsequently been given the phrase name of *Eremophila* sp. Ophthalmia Range (P1) and has been listed as a Priority 1 species (WA Herbarium, 2008). The WA Herbarium has only one other known collection of this species, also from the Newman area (WA Herbarium, 2008).

The taxonomy of the Aenictophyton collection remains unclear, and to date this collection has not been attributed a new species name. *Aenictophyton reconditum* has a wide distribution in the Pilbara and Great Sandy Desert IBRA regions and is listed as not threatened (WA Herbarium, 2008).

Based on the above, the proposed clearing may be at variance to this Principle. It is recommended that a condition be imposed on any permit granted, for the purposes of rare flora management.

Methodology
AVH (2008).
BHP Billiton (2007b).
Ecologia (2004).
WA Herbarium (2008).
GIS Database:
- Declared Rare and Priority Flora List - CALM 01/07/05.

(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 area applied to clear (GIS Database). The nearest known TEC is the Ethel Gorge aquifer stygobiont community which is located approximately 8 km west of the western end of the application area (GIS Database). Groundwater drawdown is listed as a threatening process for the Ethel Gorge stygofauna (CALM, 2002), however the proposed clearing is not expected to have any effect on groundwater levels.

Ecologia (2004) reported that no threatened ecological communities were identified during the flora survey of the application area.

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

Methodology
CALM (2002).
Ecologia (2004).
GIS Database:
- Threatened Ecological Communities - CALM 12/04/05.

(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 IBRA Pilbara Bioregion. Shepherd et al. (2001) report that approximately 99.9% of the pre-European vegetation still exists in this Bioregion. The vegetation in the application area is recorded as Beard Vegetation Associations 18: low woodland; mulga (*Acacia aneura*); 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and 216: Low woodland; mulga (with spinifex) on rises (GIS Database). According to Shepherd et al., (2001) there is approximately 100% of these vegetation types remaining.

Although large scale mining operations are located in close proximity to the application area, the region in which the clearing is proposed to occur has not undergone broad scale clearing. Hence the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% of Pre-European area in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,164	17,794,164	~99.9	Least Concern	6.3
Beard vegetation associations - WA					
18	19,892,437	19,890,348	~100	Least Concern	2.1
82	2,565,930	2,565,930	~100	Least Concern	10.2
216	280,760	280,760	~100	Least Concern	0
Beard vegetation associations - Pilbara Bioregion					
18	676,561	676,561	~100	Least Concern	16.8
82	2,563,610	2,563,610	~100	Least Concern	10.2
216	476	476	~100	Least Concern	0

* Shepherd et al. (2001) updated 2005
** Department of Natural Resources and Environment (2002)

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

Methodology Dept of Natural Resources and Environment (2002).
Shepherd et al. (2001).
GIS Database:
- Pre-European Vegetation - DA 01/01.

(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**
Several minor seasonal drainage lines cut through the application area, forming part of the Fortescue River catchment (GIS Database). These ephemeral creeklines are dry for most of the year, only flowing briefly immediately following significant rainfall (GIS Database).

As there are watercourses within the application area, the proposal is at variance to this Principle. However, the proposed clearing is unlikely to result in any significant impact any watercourse or wetland. No drilling will occur within major drainage lines or within 20m of associated riparian vegetation (BHP Billiton, 2007b). Minor drainage lines will be avoided where practicable (BHP Billiton, 2007b). Any minor drainage lines that are considered significant for local surface water flows will be given a 10m wide buffer (BHP Billiton, 2007b).

Methodology BHP Billiton (2007b).
GIS Database:
- Hydrography, Linear - DOE 01/02/04.
- Lakes, 1M - GA 01/06/00.
- Rivers 250K - GA.

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

Comments **Proposal is not likely to be at variance to this Principle**
The northern section of the application area is broadly mapped as the Newman Land System, while the southern section of the application area falls within the Boolgeeda Land System (GIS Database).

The Newman Land System consists of jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands. This land system is not prone to erosion (Van Vreeswyk et al., 2004).

The Boolgeeda Land System consists of stony lower slopes and plains below hill systems, supporting hard and soft spinifex grasslands and mulga shrublands. This land system is generally not susceptible to erosion (Van

Vreeswyk et al., 2004).

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

Methodology Van Vreeswyk et al. (2004).
GIS Database:
- Rangeland Land System Mapping - DA.

(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 areas in the vicinity of the application area. The nearest DEC managed lands are the Collier National Park, approximately 125km south/south-west of the application area; and the Karijini National Park, approximately 135km west/north-west of the application area (GIS Database).

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 - CALM 1/07/05.

(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 majority of the application area is located within the Newman Water Reserve, a Public Drinking Water Source Area (PDWSA) (GIS Database). All activities conducted within the PDWSA, should be in accordance with the Department of Water (DoW) Land Use Compatibility Tables (DoW, 2007). The proponent is advised to follow the Water Quality Protection Guidelines for the mining and mineral industry, produced by the DoW, to minimise any risk that the proposed clearing and associated activities may pose to the Water Reserve (DoW, 2007).

The application area is located within the Pilbara Groundwater Area, as proclaimed under the *Rights in Water and Irrigation Act 1914*. Any groundwater abstraction within this area will require a Water Licence from the Department of Water (DoW, 2007). The Department of Water has advised that the proposed clearing is unlikely to have any significant impact on groundwater levels or quality (DoW, 2007).

Several minor seasonal drainage lines occur within the application area. These drainage lines feed into the Shovelanna Creek, and eventually into the Fortescue River. As there are no permanent watercourses or waterbodies within the application area, the proposed clearing is unlikely to result in increased sedimentation of any of the watercourses. Surface water quality is monitored at several sites along the Fortescue River (BHP Billiton, 2007b).

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

Methodology BHP Billiton (2007b).
DoW (2007).
GIS Database:
- Hydrography, Linear - DOE 1/02/04.
- Public Drinking Water Source Areas - DOE 09/08/05.

(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**
There are no permanent watercourses within the application area. Natural flooding occurs occasionally during the wet season (November to March) following significant rainfall events (BHP Billiton, 2007b).

The proposed clearing of 105 ha spread over a total area of approximately 1776 ha is not likely to cause or exacerbate the incidence or intensity of flooding (DoW, 2007).

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

Methodology BHP Billiton (2007b).
DoW (2007).

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

Comments

One public submission was received for this clearing permit application. The submission suggested that the vegetation proposed to be cleared should be considered as a significant remnant of native vegetation in an area that has been extensively cleared. This issue has been addressed under Principle (e). The submission further suggested that because a previously granted clearing permit application (CPS 2073/1) located within the same Mining Lease had been found to be at variance to Principle (f) (associated with a watercourse), that this application should also be found to be at variance to Principle (f). The application area for CPS 2073/1 is located approximately 72km north-west of this application area, and there is no direct connection between the two application areas. While nearby sites may share some of the same environmental issues, there may also be substantial differences. Hence, each clearing permit application is individually assessed against the Clearing Principles.

The submission also raised concerns regarding potential impacts of the proposed clearing on Aboriginal Heritage sites and Native Title Rights within the application area. Aboriginal Sites of Significance are protected under the *Aboriginal Heritage Act 1972*. The proponent is committed to the management and protection of Aboriginal heritage sites (BHP Billiton, 2005). BHP Billiton has a heritage protocol agreement with the Nyiyaparli people (traditional owners of the Newman area), and regularly consult with the Nyiyaparli people to undertake Aboriginal heritage surveys in and around Newman (BHP Billiton, 2007b). BHP Billiton also has an internal process; the Project Environment and Aboriginal Heritage Review (PEAHR), which is designed to prevent inadvertent disturbance of Aboriginal heritage sites within BHP Billiton operations. Prior to the commencement of any land disturbance activity, a PEAHR must be completed and submitted to BHP Billiton's Aboriginal Affairs Department, for assessment. All land disturbance activities must be approved by BHP Billiton's Environment and Aboriginal Heritage staff (BHP Billiton, 2005).

There are two Aboriginal sites of significance within the eastern end of the application area, and three other sites within close proximity to the eastern end of the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

There is one native title claim over the area under application. This claim (WC99-004) has been registered with the National Native Title Tribunal on behalf of the claimant group. 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 (ie. 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*.

The majority of the application area (approximately 90%) is located within the Newman Water Reserve, a Public Drinking Water Source Area (PDWSA) (GIS Database). The Department of Water (DoW) has advised that activities conducted within the PDWSA should comply with the DoW's Land Use Compatibility Tables (DoW, 2007). The proponent is advised to seek further advice from the DoW to ensure compliance in this regard.

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

BHP Billiton (2005).
BHP Billiton (2007b).
DoW (2007).
GIS Database:
- Aboriginal Sites of Significance - DIA 04/07/02.
- Native Title Claims - DLI 19/12/04.
- Public Drinking Water Source Areas - DOE 09/08/05.

4. Assessor's comments

Comment

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

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

5. References

AVH (2008) Australia's Virtual Herbarium. The Council of Heads of Australasian Herbaria. http://www.chah.gov.au/avh/avh.html

BHP Billiton (2005) Aboriginal Heritage Induction Handbook. BHP Billiton Iron Ore Pty Ltd, Western Australia.

BHP Billiton (2007a) Exploration Environmental Management Plan, Revision 1. BHP Billiton Iron Ore Pty Ltd, Western Australia.

BHP Billiton (2007b) Ninga. Purpose Permit Vegetation Clearing Permit Application. Supporting Documentation, Revision 1. BHP Billiton Iron Ore Pty Ltd, Western Australia.

CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.

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.

DoW (2007) Public Drinking Water Source Area (PDWSA) Advice. Advice to Assessing Officer, Native Vegetation Assessment Branch, Department of Industry and Resources (DoIR). Department of Water, Western Australia.

Ecologia (2004) Eastern Ophthalmia Range Expansion Biological Survey. Ecologia Environment, Western Australia.

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, 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 (updated 2005).

Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture, Western Australia.

Western Australian Herbarium (1998-2008) FloraBase - The Western Australian Flora. Department of Conservation and Land Management, 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.
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.