



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4509/1
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 Goldsworthy) Agreement Act 1964, Mineral Lease 281SA (AML 70/281)
Local Government Area:
Colloquial name: Area C West Exploration Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
265		Mechanical Removal	Mineral Exploration and Hydrological Investigations

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 20 October 2011

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 for the whole of Western Australia and are useful to look at vegetation in a regional context. Two Beard vegetation associations have been mapped within the application area:

Beard vegetation association 18: Low woodland; mulga (*Acacia aneura*); and
Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database; Shepherd, 2009).

ENV Australia (2010) conducted a flora survey of the application area and surrounding areas during March 2010, and described ten vegetation communities of the application area:

- **Triodia Hummock Grassland** – Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* with Scattered Shrubs of *Acacia bivenosa*, *A. maitlandii* and *A. hamersleyensis* on Red-Brown Loam on Hillslopes;
- **Triodia Hummock Grassland** – Open Hummock Grassland of *Triodia wiseana*, *T. sp.* Shovelanna Hill (S. van Leeuwen 3835) and *Triodia pungens* with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia*, *E. gamophylla* (mallee) and *Corymbia deserticola* subsp. *deserticola* with Scattered Shrubs of *Acacia dictyophleba*, *A. pruinocarpa* and *A. ancistrocarpa* on Red-Brown Loam on Foothills;
- **Triodia Hummock Grassland** – Open Hummock Grassland of *Triodia wiseana* and *T. melvillei* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia deserticola* subsp. *deserticola* with Very Open Tussock Grassland of *Cymbopogon ambiguus*, *Eriachne mucronata* and *C. procerus* on Skeletal Red-Brown Loam in Gorges;
- **Triodia Hummock Grassland** – Open Hummock Grassland of *Triodia wiseana* and *T. pungens* with Open Shrubland of *Acacia aneura* var. *aneura*, *Eremophila macmillaniana* and *Dodonaea pachyneura* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia deserticola* and *C. ferritcola* subsp. *ferritcola* on Skeletal Red-Brown Loam in Gorges;
- **Triodia Hummock Grassland** – Open Hummock Grassland of *Triodia pungens* and *T. wiseana* with Low Open Woodland of *Corymbia hamersleyana*, *Eucalyptus leucophloia* subsp. *leucophloia* and *E. gamophylla* (mallee) with open Shrubland of *Petalostylis labicheoides*, *Gossypium robinsonii* and *Senna glutinosa* subsp. *glutinosa* on Red-Brown Loam in Drainage Lines;
- **Acacia High Shrubland** – High Open Shrubland of *Acacia aneura* var. *microcarpa*, *A. aneura* var. *aneura* and *A. aneura* var. *pilbara* with Very Open Tussock Grassland of *Themeda triandra*, *Aristida contorta* and *Chrysopogon fallax* with Scattered Shrubs of *Acacia dictyophleba*, *A. pruinocarpa* and *A. pachyacra* on Red-Brown Loam on Plains;
- **Acacia High Shrubland** – High Open Shrubland of *Acacia aneura* var. *microcarpa*, *A. aneura* var. *aneura* and *A. pruinocarpa* with Very Open Tussock Grassland of *Eulalia aurea*, *Eriachne flaccida* and *Themeda triandra* with scattered Shrubs of *A. tetragonophylla* and *Hakea lorea* var. *lorea* on Red-Brown Loam on Plains;
- **Acacia Low Woodland** – Low Open Woodland of *Acacia aneura* var. *pilbarana*, *A. aneura* var. *microcarpa* and *A. pruinocarpa* with Open Shrubland of *A. pachyacra*, *A. tetragonophylla* and *Hakea lorea* subsp. *lorea* with Very Open Hummock Grassland of *Triodia melvillei* on Red-Brown Loam on Plains;

- **Acacia Low Woodland** – Low Open Woodland of *Acacia aneura* var. *pilbarana*, *A. aneura* var. *macrocarpa* and *Eucalyptus victrix* with Open Shrubland of *Muehlenbeckia florulenta*, *A. pachyacra* and *A. tetragonophylla* with Very Open Tussock Grassland of *Eriachne flaccid*, *Eulalia aurea* and *Aristida inaequiglumis* on Red-Brown Clay Loam on Plains; and
- **Themeda Tussock Grassland** – Tussock Grassland of *Themeda triandra*, *Chrysopogon fallax* and *Eriachne mucronata* with Low Open Woodland of *Eucalyptus xerothermica* with Very Open Shrubland of *Acacia aneura* var. *pilbarana*, *A. pyrifolia* and *Petalostylis labichneoides* on Red-Brown Loam in Major Drainage Line.

Clearing Description

BHP Billiton Iron Ore is proposing to clear up to 265 hectares of native vegetation within a 8,061 hectare application area for the Area C West Exploration Project (BHP Billiton Iron Ore, 2011). The clearing of vegetation is required for exploration drilling, hydrological investigations and supporting infrastructure.

The vegetation will be cleared using a dozer and excavator. The vegetation and topsoil will be stockpiled separately for use in rehabilitation.

Vegetation Condition

Pristine: No obvious signs of disturbance (Keighery, 1994);

To:

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The application area is located in the Hamersley subregion of Western Australia and is situated approximately 100 kilometres south-east of the Tom Price town site (GIS Database).

The vegetation condition was derived from a vegetation survey conducted by ENV Australia (2010).

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The application area occurs within the Hamersley (PIL3) subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by mulga low woodland over bunch grasses on fine textured soils in valley floors and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

The vegetation within the application area consists of Beard vegetation associations 18 and 82, which are common and widespread throughout the Pilbara bioregion with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database). A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases revealed that no Declared Rare Flora (DRF) species and five Priority species may potentially occur within a 20 kilometre radius of the application area (DEC, 2011). ENV Australia (2010) identified no DRF and five Priority flora species within the application area. A targeted survey was undertaken for the DRF species *Lepidium catapycnon* as suitable habitat to support the DRF species was present in the survey area. *Lepidium catapycnon* was not located within the application area (ENV Australia, 2010). The Priority 3 species found within the application area; *Eremophila magnifica* subsp. *velutina*, *Rhagodia* sp. Hamersley, *Sida* sp. Barlee Range and *Triodia* sp. Mt Ella are not locally constrained and occur outside the application area (ENV Australia, 2010). Drill sites and access tracks will be relocated to avoid Priority Flora (BHP Billiton Iron Ore, 2011). A vegetation survey by ENV Australia (2010) during March 2010 of the application area and surrounding vegetation identified 526 species of flora taxa belonging to 53 Families and 171 Genera. ENV Australia (2010) identified 10 vegetation communities within the application area, with the condition of these vegetation types classified from 'completely degraded' to 'pristine' (Keighery, 1994).

No Threatened Ecological Communities were recorded or identified within the application area (GIS Database). The application area sits within the buffer zone of one Priority Ecological Community (PEC) with two sub-types; Coolibah-lignum flats: *Eucalyptus victrix* over *Muehlenbeckia* community, and the Lake Robinson PEC with Coolibah woodlands over lignum (*Muehlenbeckia florulenta*) over swamp wandiree (Lake Robinson is the only known occurrence) (ENV Australia, 2010; BHP Billiton Iron Ore, 2011). A section of this PEC overlaps the eastern side of the application area. BHP Billiton Iron Ore (2011) intends to exclude the Coolibah lignum PEC from the proposed exploration activities, and will ensure that their exploration activity in no way disrupts any potential overland recharge pathways leading to the Coolibah lignum PEC.

Eight weed species were identified during the survey: Kapok Bush (*Aerva javanica*), Bipinnate Beggartick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*), Feathertop Rhodes Grass (*Chloris virgata*), Spiked Malvastrum (*Malvastrum americanum*), Whorled Pigeon Grass (*Setaria verticillata*), Indian Weed (*Sigesbeckia orientalis*) and Common Sowthistle (*Sonchus oleraceus*) (ENV Australia, 2010). None of these species are listed by the Western Australian Department of Agriculture and Food as Declared Plants. Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to the biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The fauna habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (ENV Australia, 2010). Several habitat types are of high ecological significance however the clearing of 265 hectares of native vegetation within an 8,061 hectare application area is unlikely to have a significant impact in a regional and local context.

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

Methodology BHP Billiton Iron Ore (2011)
CALM (2002)
DEC (2011)
ENV Australia (2011)
Keighery (1994)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- Pre-European Vegetation
- 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**
No targeted fauna surveys have been conducted over the application area. A fauna survey conducted by ENV Australia (2010) identified seven broad fauna habitat types within the application area;

1. Plains;
2. Hill Crest and Stony;
3. Hill Slope;
4. Alluvial Plain;
5. Minor Drainage Line;
6. Breakaway;
7. Gorge/Gully.

ENV Australia (2010) identified the vegetation condition to be 'very good' (Keighery, 1994). The landforms and habitat found within the application areas are considered as being well represented in the Pilbara bioregion (ENV Australia, 2010; BHP Billiton Iron Ore, 2011). The application areas do contain habitats or faunal assemblages that are ecologically significant, but it is unlikely that any species of conservation significance will be significantly impacted by the clearing of native vegetation in the application areas. The high value fauna habitat types in the application area (gorge/gullies and breakaways) are not locally constrained and occur extensively throughout the Pilbara region. These habitat types represent 4.5% of the application area (ENV Australia, 2010). No caves, rock ledges, waterholes or nesting hollows were reported in the survey (ENV Australia, 2010). The 265 hectares of native vegetation within an 8,061 hectare application area proposed for clearing is not likely to contain significant habitat for fauna.

There is approximately 100% of the pre-European vegetation remaining within the Pilbara bioregion (Shepherd, 2009; GIS Database). Given the extent of the native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological link.

ENV Australia (2010) conducted a level one fauna survey of the application areas during March 2010. Data from a previous report at Area C West (ENV Australia, 2008) was incorporated into the ENV Australia (2010) report. ENV Australia (2010) recorded three species of conservation significance within the application area. Three of these species; the Western Pebble-Mound Mouse (*Pseudomys chapmani*), Australian Bustard (*Ardeotis australis*) and Rainbow Bee Eater (*Merops ornatus*) may use the study area for foraging as part of a larger territory area. The habitat present within the application areas is not considered significant habitat for these species (ENV Australia, 2008; ENV Australia, 2010).

The fauna habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (ENV Australia, 2010). Several habitat types are of high ecological significance however the clearing of 265 hectares of native vegetation within an 8,061 hectare application area is unlikely to have a significant impact in a regional and local context.

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

Methodology BHP Billiton Iron Ore (2011)
ENV Australia (2008)
ENV Australia (2010)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)

- Pre-European Vegetation
- Governor 50cm Orthomosaic - Landgate 2004
- Munjina 50cm Orthomosaic - Landgate 2004

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

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

According to available databases, there are no records of Declared Rare Flora (DRF) within the application area (GIS Database). A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases identified no DRF species as occurring within a 20 kilometre radius of the application area (DEC, 2011).

ENV Australia (2010) conducted a vegetation and flora survey of the application area during March 2010. No DRF were recorded within the survey area.

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

- Methodology** DEC (2011)
 ENV Australia (2010)
 GIS Database:
 - Declared Rare and Priority Flora List

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

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

A search of the available databases shows that there are no Threatened Ecological Communities situated within 100 kilometres 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:
 - 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 IBRA bioregion (GIS Database). The vegetation within the application area is recorded as:

Beard vegetation association 18: Low woodland; mulga (*Acacia aneura*); and

Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database; Shepherd, 2009).

According to Shepherd (2009), Beard vegetation associations 18 and 82 retain approximately 100% of their pre-European extent. Therefore, the areas proposed to be cleared are not a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,193.01	17,785,000.82	~99.98	Least Concern	6.32
Beard vegetation associations - State					
18	19,890,663.25	19,889,916.06	~99.99	Least Concern	2.13
82	2,565,901.28	2,565,901.28	~100	Least Concern	10.24
Beard vegetation associations - Bioregion					
18	676,556.72	676,556.72	~100	Least Concern	2.13
82	2,563,583.23	2,563,583.23	~100	Least Concern	10.25

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- 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 not likely to be at variance to this Principle

There are no permanent watercourses or wetlands within the application area (ENV Australia, 2010; GIS Database). According to available databases there are several minor drainage lines which traverse the application area (GIS Database). These drainage lines only flow after major rainfall events. Based on vegetation mapping by ENV Australia (2010), there is one significant riparian vegetation type associated with the drainage lines; the Coolibah lignum PEC:

- **Acacia Low Woodland** - Low Open Woodland of *Acacia aneura* var. *pilbarana*, *A. aneura* var. *macrocarpa* and *Eucalyptus victrix* with Open Shrubland of *Muehlenbeckia florulenta*, *A. pachyacra* and *A. tetragonophylla* with Very Open Tussock Grassland of *Eriachne flaccid*, *Eulalia aurea* and *Aristida inaequiglumis* on Red-Brown Clay Loam on Plains.

ENV Australia (2010) identified this vegetation type most likely to be a groundwater dependent community based on the presence of *Eucalyptus victrix* (a partial phreatophyte). The low lying topography of the application area acts as a catchment basin and *Eucalyptus victrix* is a reliant on recharge from overland runoff (ENV Australia, 2010). BHP Billiton Iron Ore (2011) has excluded this PEC from the application area and will ensure that their exploration activity does not disrupt any potential overland recharge pathways leading to this PEC. BHP Billiton Iron Ore (2011) have stated that in relation to minor drainage lines, wherever practicable, drilling programs will avoid drainage lines that are considered significant in relation to local and/or regional surface flow.

The condition of the riparian vegetation type is classified as 'very good' (Keighery, 1994; GIS Database) and the clearing of some riparian vegetation is unlikely to result in any significant impact to vegetation growing in association with a watercourse or wetland.

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

Methodology BHP Billiton Iron Ore (2011)
ENV Australia (2010)
GIS Database:
- Geodata, Lakes
- Hydrography, Linear

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

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

According to available databases, the application area is comprised of the:

Boolgeeda land system: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands. Vegetation is generally not prone to degradation and the system is not susceptible to erosion;

Newman land system: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands; and

Wannamunna land system: Hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasionally eucalypt woodlands). Generally the system has a low susceptibility to erosion (van Vreeswyk et al., 2004; GIS Database).

All three land systems are generally not susceptible to erosion (van Vreeswyk et al., 2004).

Any compaction that may occur will be confined to the tracks developed for the project and will be remedied upon completion as per the rehabilitation practices stated within the exploration environmental management plan (EEMP) (BHP Billiton Iron Ore, 2011).

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

Methodology BHP Billiton Iron Ore (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 area (GIS Database). The nearest conservation area is Karijini National Park, adjacent to the western boundary of the application area (GIS Database).

BHP Billiton Iron Ore Pty Ltd has stated that the exploration programme has been designed to ensure that there are no cross-boundary impacts (BHP Billiton Iron Ore, 2011). Given the low impact nature of the proposed exploration drilling activities, it is unlikely that there will be any impacts on the Karijini National Park. The proposed clearing is not likely to provide a significant ecological linkage or fauna movement corridor and is not likely to impact the environmental values of the conservation area.

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

Methodology BHP Billiton Iron Ore (2011)
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 is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

There are no permanent watercourses or water bodies within the application area (GIS Database). Any surface water within the application area is likely to only remain for short periods following significant rainfall events as the annual evaporation rate exceeds rainfall (BoM, 2011). The proposed clearing is not likely to cause deterioration in the quality of any surface water within or outside of the application area.

Surface and underground water quality is unlikely to be affected by the proposed exploration. The low impact nature of the proposed exploration drilling activities is unlikely to cause deterioration in the quality of surface or underground water. All drilling waters will be contained to site in sumps (BHP Billiton Iron Ore, 2011).

BHP Billiton Iron Ore has stated that it will not drill in major drainage channels. Minor drainage lines, wherever practicable, will be avoided. Drill sites will be chosen where there is a low level of vegetation and is a suitable distance from any natural watercourse or drainage line (BHP Billiton Iron Ore, 2011). All water intercepted from drilling activities will be contained within an earthen bund (BHP Billiton Iron Ore, 2011).

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

Methodology BoM (2011)
BHP Billiton Iron Ore (2011)
GIS Database:
- Geodata, Lakes
- RIWI Act, Groundwater Areas
- 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 areas experience a semi-desert tropical climate with summer cyclonic or thunderstorm events, with an annual average rainfall of approximately 457.9 millimetres per year (CALM, 2002; BoM, 2011). Based on an average annual evaporation rate of 3,600 - 4,000 millimetres (BoM, 2011), any surface water resulting from rainfall events is likely to be relatively short lived.

Given the size of the area to be cleared (265 hectares) compared to the size of the Ashburton catchment area (7,877,743 hectares) (GIS Database) it is not likely that the proposed clearing will lead to an appreciable increase in run off, and subsequently cause or exacerbate the incidence or intensity of flooding.

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

Methodology BoM (2011)
CALM (2002)
GIS Database:
- Hydrographic Catchments - Catchments
- Hydrography, Linear

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

Comments

There are two Native Title claims (WC96/61 and WC10/15) over the area under application. 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*.

There are five registered Aboriginal Sites of Significance within the application area (Site IDs: 11221, 8247, 8248, 8249 and 21166) (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 1 August 2011 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to the proposed clearing, stating no objection to the application.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims - Registered with the NNTT

4. References

- BHP Billiton Iron Ore (2011) Area C West Exploration Project, Purpose Permit, Vegetation Clearing Permit Application Supporting Documentation, Prepared in July 2011.
- BoM (2011) Climate Statistics for Australian Locations. A Search for Climate Statistics for Wittenoom, Australian Government Bureau of Meteorology, viewed 29 September 2011, <http://reg.bom.gov.au/climate/averages/tables/cw_005026.shtml>.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Pilbara 3 (PIL3 - Hamersley subregion) Department of Conservation and Land Management, Western Australia.
- DEC (2011) NatureMap - Mapping Western Australia Biodiversity, Department of Environment and Conservation, viewed 30 September 2011, <<http://naturemap.dec.wa.gov.au>>.
- 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.
- ENV Australia (2008) Area C West Fauna Assessment. Unpublished report for BHP Unpublished report prepared by ENV Environment Australia Ltd for BHP Billiton Iron Ore Pty Ltd.
- ENV Australia (2010) Flora Area C West NVCP Flora, Vegetation and Fauna Assessment. Area C West Project. Prepared for BHP Billiton Iron Ore Pty Ltd, June 2010.
- 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. (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., Leighton, K.A & Hennig, P. (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.