



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3398/1
Permit type: Purpose Permit

1.2. Proponent details

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

1.3. Property details

Property: *Iron Ore (Hamersley Range) Agreement Act 1963*; Mineral Lease 4SA (AML 70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Brockman 2 drilling program pits 8, 9 and 10

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
6		Mechanical Removal	Mineral Exploration and Access Tracks

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard Vegetation Associations have been mapped at a 250,000 scale for the whole of Western Australia. One Beard Vegetation Association has been mapped within the application area (GIS Database):

B2: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Shepherd, 2007).

A flora and vegetation survey of the wider Brockman 2 area, which included the vegetation within the application areas, was undertaken by Halpern Glick Maunsell between 28 August and 7 September 1998 (HGM, 1999a). A total of four vegetation communities have been identified within the application area (HGM, 1999a; Hamersley Iron Pty Ltd, 2009a). These are:

A2: *Eucalyptus leucophloia* over *Triodia wiseana*;

A3: *Eucalyptus leucophloia* and mixed shrubs over *Triodia wiseana* and *T. pungens*.

A5: Open tall shrubs dominated by *Acacia exilis* over *Triodia wiseana*; and

B8: Dense *Acacia ancistrocarpa*, *A. atkinsiana* and *A. exilis* tall shrubland.

Clearing Description

Hamersley Iron Pty Ltd has applied to clear up to 6 hectares of native vegetation within an application area of 35.2 hectares. The proposal is situated at the Brockman 2 project area, located approximately 50 kilometres north-west of Tom Price (Hamersley Iron Pty Ltd, 2009a). Clearing will be required for access tracks, drill pads and sumps.

Clearing will be done using the raised blade technique where practicable or scrub rake in level terrain. Where already cleared tracks require maintenance, the track may be graded using blade down.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994)

Comment

The vegetation descriptions were derived from descriptions by Hamersley Iron Pty Ltd (2008) and HGM (1999a).

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 Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). This subregion is characterised by sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite), with 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 (Kendrick, 2001).

The vegetation within the application area consists of Beard Vegetation Association 82 which is common and widespread throughout the Pilbara region, with approximately 100% of the pre-European vegetation remaining (Shepherd, 2007; GIS Database).

Halpern Glick Maunsell (HGM) (1999a) carried out a flora and vegetation survey of the Nammuldi and Silvergrass iron ore leases near the Brockman 2 mine site, which included the vegetation under application. A total of 20 vegetation communities were recorded within the survey area and these comprised of a total of 358 native flora species, belonging to 162 genera and 56 families (HGM, 1999a). The large number of species recorded is a reflection of both the variety of landforms and the survey timing, and compares well to similar sized surveys in the local area (HGM, 1999a). The vegetation within the application area comprised of only 4 of the 20 vegetation communities that were recorded during the survey by HGM. As a result of the reduced number of vegetation communities and landforms within the application area compared to the wider survey area, the species richness is likely to be less than the Nammuldi and Silvergrass iron ore lease survey area. HGM (1999a) state that the species diversity of the vegetation within the application area, and surrounding survey area is considered typical of the local area and representative of the Pilbara region.

No Declared Rare Flora, Priority Flora or Threatened Ecological Communities have been recorded within the application area (GIS Database; Hamersley Iron Pty Ltd, 2009a; Hamersley Iron Pty Ltd, 2009b). The vegetation communities within the application area are not likely to be considered as rare, geographically restricted or of significant conservation value.

HGM have carried out a fauna survey across the Nammuldi and Silvergrass iron ore lease near the Brockman 2 mine site, and this survey included the vegetation within the application area (HGM, 1999b). A total of 76 avian species, 21 mammalian species, 66 reptilian species were recorded over 14 nights of trapping and collecting (HGM, 1999b). These results indicate that the vegetation within the application area as well as the surrounding lease area may comprise suitable habitat for a high diversity of avian and reptile species.

The vegetation communities within the application area are considered common within the Pilbara region, and are unlikely to be of higher biodiversity than the surrounding areas (HGM 1999a; Shepherd, 2007; GIS Database). The proposed clearing for exploration activities and access tracks is unlikely to have a significant impact on the biological diversity of the local area or region.

Seven introduced flora species have been identified within the application area or surrounding vegetation. These being: *Cenchrus ciliaris* (Buffel Grass), *Cenchrus setigerus* (Birdwood Grass), *Setaria verticillata* (Whorled Pigeon Grass), *Malvastrum americanum* (Spiked Malvastrum), *Bidens bipinnata* (Bipinnate Beggartick); *Portulaca oleracea* (Purslane); and *Cynodon dactylon* (Couch Grass) (Hamersley Iron Pty Ltd, 2009a; Hamersley Iron Pty Ltd, 2009b, HGM, 1999). Care must be taken to ensure that the proposed clearing activities do not spread or introduce the above listed introduced species to non infested areas. Should the permit be granted, it is recommended that appropriate conditions be imposed on the permit for the purpose of weed management.

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

Methodology

Hamersley Iron Pty Ltd (2009a)
Hamersley Iron Pty Ltd (2009b)
HGM (1999a)
HGM (1999b)
Kendrick (2001)
Shepherd (2007)
GIS Database
- Declared Rare and Priority Flora List
- Interim Biogeographic Regionalisation of Australia
- Pre European Vegetation

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

Comments

Proposal is not likely to be at variance to this Principle

The assessing officer has conducted a search of the Western Australian Museum's online fauna database, centred on the coordinate 22°25'31"S, 117°23'00"E, with a radius of 40 kilometres. Two amphibian, 25 avian, 19

mammalian and 65 reptilian species have been identified as potentially occurring in the search area (Western Australian Museum, 2009).

HGM have carried out a fauna survey across the Nammuldi and Silvergrass iron ore lease near the Brockman 2 mine site, and this survey included the vegetation within the application area (HGM, 1999b). The vertebrate fauna survey was undertaken in November 1998 and May 1999. A total of 76 avian species, 21 mammalian species, and 66 reptilian species were recorded over 14 nights of trapping and collecting (HGM, 1999b). The number of faunal species recorded during this survey compares well with the results from the Western Australian Museum's online fauna database for the local area, however, indicates that the vegetation within the application and surrounding lease area may comprise of habitat for a high number of avian and reptile species.

Hamersley Iron Pty Ltd (2009a) also conducted a desktop search of the Department of Environment and Conservation's (DEC) Threatened Fauna Database.

After consideration of the results of the Western Australian Museum's online fauna database search, HGM (1999b) fauna survey of the application area and surrounding lease area and the Department of Environment and Conservation's (DEC) Threatened Fauna Database search, the following species of conservation significance could potentially utilise the application area:

- *Amytornis striatus* subsp. *striatus* (Striated Grasswren) listed DEC Priority Four;
- *Ardeotis australis* (Australian Bustard) listed DEC Priority Four;
- *Burhinus grallarius* (Bush Stone-curlew) listed DEC Priority Four;
- *Lagorchestes conspicillatus* subsp. *leichardti* (Spectacled Hare-wallaby) listed DEC Priority Three;
- *Leggadina lakedownensis* (Lakeland Downs Mouse) listed DEC Priority Four;
- *Macroderma gigas* (Ghost Bat) listed DEC Priority Four;
- *Pseudomys chapmani* (Western Pebble-mound Mouse) listed DEC Priority Four;
- *Sminthopsis longicaudata* (Long-tailed Dunnart) listed DEC Priority Four; and
- *Notoscincus butleri* listed DEC Priority Four.

Three broad terrestrial fauna habitat types have been identified within the application area and surrounding vegetation based on information provided by HGM (1999b), as well as the assessment of aerial imagery and topographic information. These are: Alluvial plains and outwash areas; Stony hilltops and slopes of ridges; and Plains dominated by spinifex and minor creeklines (HGM, 1999b). These habitat types are both common and widespread in the Pilbara bioregion and would not be considered to be under threat by the proposed low impact exploration works. It is likely that equal or higher quality vegetation and fauna habitats would exist throughout the surrounding area, and Pilbara bioregion which remains largely uncleared. The close proximity to existing mine infrastructure could also be considered to act as a deterrent to many native fauna species, minimising the probability that they would frequent the area.

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

Methodology Hamersley Iron Pty Ltd (2009a)
HGM (1999b)
Western Australian Museum (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

According to available datasets, there are no known records of Declared Rare Flora (DRF) or Priority Flora species within the application area (GIS Database). There are no records of any DRF or Priority Flora within 75 kilometres of the application area (GIS Database).

A flora and vegetation survey was undertaken by HGM across the Nammuldi iron ore lease near the Brockman 2 mine site, and this survey included the vegetation within the application area (HGM, 1999a). The majority of the north-east portion of the application area was also subject to a rare flora survey by botanists from Pilbara Iron and Biota Environmental Sciences (Hamersley Iron Pty Ltd, 2009a). The results from these surveys indicate that no DRF or Priority Flora have been recorded within the application area (HGM, 1999a; Hamersley Iron Pty Ltd, 2009a).

The following Priority Flora species have been recorded in close proximity to the application area during previous surveys commissioned by Hamersley Iron (HGM, 1999a; Hamersley Iron Pty Ltd, 2009), and as a result potentially may occur within the application area.

- *Sida* sp. Hamersley Range (Priority 1);
- *Tephrosia* sp. Cathedral Gorge (Priority 3);
- *Acacia bromilowiana* (Priority 3);
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3); and

- *Indigofera gilesii* subsp. *gilesii* (Priority 3).

Sida sp. Hamersley Range is found in skeletal red stony soil and ironstone on cliffs and summits or in shady locations around the Hamersley Ranges (Hamersley Iron Pty Ltd, 2009b; Western Australian Herbarium, 1998-2009). Eight populations were recorded within a 34 hectare vegetation study area situated immediately west, south-west of the application area. Each population contained between one to four individuals (Hamersley Iron, 2009b). A further 35 populations have been recorded during Rio Tinto Iron Ore surveys from the Tom Price/Channar area (eight populations ranging in size from one to five individuals) and the Brockman 2 and 3 regions (27 populations in total containing between one to 20 individuals) (Hamersley Iron Pty Ltd, 2009b). Although this species is not prolific, it seems to be distributed in most rocky outcrops, below cliffs in the general Brockman area and is therefore not restricted to the application area, if present.

Tephrosia sp. Cathedral Gorge is known to inhabit clay-sand and pebbles on ridges or stony undulating plains (Western Australian Herbarium, 1998-2009; HGM, 1999a). This species was only recorded at one location within the Nammuldi iron ore lease during the survey by HGM. Taking into consideration the abundance of similar landform features and vegetation types throughout the Pilbara region, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Acacia bromilowiana is a tree or shrub reaching up to 12 metres high, and is found on skeletal stony loam, orange-brown pebbly, gravel loams, laterites, banded ironstone formations and basalt on rocky hills, breakaways, scree slopes, gorges and creek beds (Western Australian Herbarium, 1998-2009). Pilbara Iron recorded approximately 20 individuals of this species during the flora survey undertaken approximately 1.5 kilometres south-west of the application area (Hamersley Iron Pty Ltd, 2008). Additional information provided by Hamersley Iron Pty Ltd in relation to CPS 2446/1 indicates that the species has also been recorded by Pilbara Iron at the Mount Tom Price and Hope Downs sites (Hamersley Iron Pty Ltd, 2008). Given the widespread distribution of records for *Acacia bromilowiana* and taking into consideration the abundance of similar landform features and vegetation types throughout the Pilbara region, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Sida sp. Barlee Range is a spreading shrub to 0.5 metres high and is found on skeletal red soils and on cliffs and summits or in shady locations around the Hamersley Ranges (Western Australian Herbarium, 1998-2009). Pilbara Iron has recorded approximately 137 individuals of *Sida* sp. Barlee Range from 20 populations during a flora survey undertaken approximately 1.5 kilometres south-west of the application area (Hamersley Iron Pty Ltd, 2008). A distribution map for *Sida* sp. Barlee Range indicates that the species has been recorded from a wide ranging distribution across the Hamersley Ranges of the Pilbara region (Western Australian Herbarium, 1998-2009). Additional information provided by the applicant indicates that Pilbara Iron have recorded *Sida* sp. Barlee Range at locations that include Tom Price, Koodaideri and Western Turner (Hamersley Iron Pty Ltd, 2008). Given the widespread distribution of the records for *Sida* sp. Barlee Range and taking into consideration the abundance of similar landform features and vegetation types that may provide suitable habitat for this species, the vegetation within the application area is not likely to be necessary for the continued existence of this species.

Indigofera gilesii subsp. *gilesii* is found generally in pebbly loam amongst boulders/outcrops and hills (Hamersley Iron Pty Ltd, 2009b; Western Australian Herbarium, 1998-2009). Four populations containing four to 30 individuals were recorded in a 34 hectare vegetation study area situated immediately west, south-west of the application area. These are the first recordings of this species in the Brockman locality by Rio Tinto, having only been recorded previously in the West Angelas and Rhodes Ridge region (Hamersley Iron Pty Ltd, 2009b). Taking into consideration the abundance of similar landform features and vegetation types throughout the Pilbara region, the vegetation within the application area is not likely to be necessary for the continued existence of this species

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

Methodology Hamersley Iron Pty Ltd (2008)
Hamersley Iron Pty Ltd (2009a)
Hamersley Iron Pty Ltd (2009a)
HGM (1999a)
Western Australian Herbarium (1998-2009)
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**
There are no known Threatened Ecological Communities (TEC's) within the application area (GIS Database; HGM, 1999a; Hamersley Iron Pty Ltd, 2009a). The nearest known TEC is located approximately 14 kilometres north-east of the application area (GIS Database). Given the distance between the proposal and the nearest known TEC, the proposed clearing is not likely to impact on the conservation of that TEC.

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

Methodology Hamersley Iron Pty Ltd (2009a)
 HGM (1999a)
 GIS Database:
 - Clearing Regulations - Environmentally Sensitive Areas
 - Threatened Ecological Boundaries

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The application areas falls within the Pilbara IBRA bioregion (GIS Database). Shepherd (2007) report that approximately 99.95% of the pre-European vegetation remains in this bioregion.

The vegetation in the application areas has been mapped as Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database).

According to Shepherd (2007) approximately 100% of Beard Vegetation Association 82 remains within the Pilbara bioregion (see table below).

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Pilbara Bioregion and Beard vegetation association 82 is of "Least Concern" (Department of Natural Resources and Environment, 2002) (see table).

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

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,187	17,794,646	~99.95%	Least Concern	~6.32%
Beard veg assoc. - State					
82	2,565,901	2,565,901	~100%	Least Concern	~10.2%
Beard veg assoc. - Bioregion					
82	2,563,583	2,563,583	~100%	Least Concern	~10.2%

* Shepherd (2007)

** Department of Natural Resources and Environment (2002)

The vegetation under application is not a remnant of vegetation in an area that has been extensively cleared.

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

Methodology Department of Natural Resources and Environment (2002)
 Shepherd (2007)
 GIS Database:
 - Interim Biogeographic Regionalisation of Australia
 - Pre European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is at variance to this Principle

According to available GIS databases there are no permanent wetlands or watercourses within the application area (GIS Database). The proponent has advised that the vegetation to be cleared is not associated with any major watercourses, wetlands or wetland dependant vegetation (Hamersley Iron Pty Ltd, 2009a). Several ephemeral creek systems and flow lines traverse the application area (GIS Database). These watercourses are minor natural drainage channels that are widespread across the Pilbara landscape and are responsible for quickly dispersing floodwaters after significant rainfall events

As there are watercourses within the application area, the proposed clearing is at variance to this Principle. However, the vegetation communities growing in association with the watercourses are not unique and are

considered common and widespread in the Pilbara bioregion (GIS Database; Shepherd, 2007). The proposed clearing is unlikely to significantly impact on vegetation communities growing in association with these minor ephemeral creek systems.

Methodology Hamersley Iron Pty Ltd (2009a)
Shepherd (2007)
GIS Database:
- Hydrography, linear_1

(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 Geographic Information System rangeland mapping, the application area is comprised of the Newman Land System and the Boolgeeda Land System (GIS Database; Van Vreeswyk et al., 2004).

The Newman Land System consists of rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands which typify much of the Pilbara (Van Vreeswyk et al., 2004). The majority of the vegetation present appears to occur on the landform units: 'Plateaux, ridges, mountains and hills'; and 'Lower slopes' (GIS Database; 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 (Van Vreeswyk et al., 2004). An analysis of aerial photography for the application area reveals it is most likely to occur within the 'Stony lower plains' and 'Groves' land units.

Both land systems within the application area have a high resistance to soil erosion due to the stony surface materials and red loamy earths present within the soils. According to Van Vreeswyk et al. (2004), approximately 99% of the Newman Land System and 100% of the Boolgeeda Land System is not affected by soil erosion. These landscapes are at the end point of millions of years of erosion and withstand massive rainfall events on an annual basis without any appreciable land degradation or erosion.

The proposed clearing will be undertaken using the raised blade methods where practicable (Hamersley Iron Pty Ltd, 2009a), which minimises disturbance to the root stock and soil, thereby minimising the potential for erosion. The small scale of the proposed clearing is unlikely to result in appreciable land degradation.

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

Methodology Hamersley Iron Pty Ltd (2009a)
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 situated within a Department of Environment and Conservation managed conservation area (GIS Database). The nearest conservation estate is Karijini National Park, which is situated approximately 56 kilometres east, south-east of the application area (GIS Database). Based on the distance between the proposal and the nearest conservation area, the proposed clearing is not likely to impact on the conservation values of Karijini National Park.

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

There are no permanent watercourses, drainage systems or wetlands within the application area (GIS Database). The land systems associated with the application area has high resistance to erosion (Van Vreeswyk et al., 2004), thereby reducing the risk of sediment export which may result in sedimentation and turbidity in any nearby watercourses. The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Millstream Water Reserve which is located approximately 16 kilometres north of the application area (GIS Database). The proposed clearing activities will involve clearing 6 hectares of native vegetation for the purposes of access tracks, sumps and drill pads across an application area of approximately 35.2 hectares (Hamersley Iron Pty, 2009). Given the distance separating the application area and the nearest

water supply area, the proposed clearing is unlikely to impact on the quality of the Millstream Water Reserve.

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

Methodology Hamersley Iron Pty Ltd (2009)
Van Vreeswyk et al., (2004)
GIS Database:
- Hydrography, linear_1
- Public Drinking Water Source Area (PDWSA's)

(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**
Numerous ephemeral watercourses are distributed across the landscape, and these are responsible for quickly dispersing floodwaters after significant rainfall events, thereby reducing peak flood heights (GIS database). It is unlikely that the proposed clearing for exploration drilling and access tracks will impact on the drainage patterns in the local area. The proposed clearing of native vegetation is unlikely to cause or increase the incidence of flooding or result in an increase in peak flood height.

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

Methodology GIS Database:
- Hydrography, linear_1

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

Comments
There is one native title claim over the area under application: WC97/089. This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (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*.

There are no known 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 Sites of Aboriginal Significance are damaged through the clearing process.

One submission was received on 11 November 2009 stating no objection to the proposed clearing.

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water, to determine whether a Works Approval, Water licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

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

4. Assessor's comments

Comment

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

It is recommended that should a permit be granted, conditions be imposed on the permit for the purpose of weed management, retention of topsoil and vegetation, rehabilitation, record keeping and permit reporting.

5. References

- 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.
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- Hamersley Iron Pty Ltd (2009a). Supplementary Information for Clearing Permit Application CPS 3398/1. Information for assessing officer, Native Vegetation Assessment Branch, Department of Mines and Petroleum (DMP), received 23 October 2009, Rio Tinto Iron Ore.
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- HGM (1999b). Nammuldi/Silvergrass Exploration Project, Biological Survey Report November 1998 – May 1999, prepared for Hamersley Iron Pty Ltd, Prepared by Halpern Glick Maunsell, August 1999.
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- Shepherd, D.P. (2007). 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. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.
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- Western Australian Museum (2009) NatureMap - Mapping Western Australia's Biodiversity - Department of Environment and Conservation. Available online from: <http://naturemap.dec.wa.gov.au/default.aspx>. Accessed 30 November 2009.

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DMP	Department of Mines and Petroleum, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst

being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

- R** **Declared Rare Flora – Extant taxa** (= *Threatened Flora = Endangered + Vulnerable*): taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa**: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct**: being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct**: being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement**: being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4** **Schedule 4 – Other specially protected fauna**: being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands**: Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4** **Priority Four: Taxa in need of monitoring**: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5** **Priority Five: Taxa in need of monitoring**: Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999*)

- EX** **Extinct**: A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)** **Extinct in the wild**: A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR** **Critically Endangered**: A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN** **Endangered**: A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable**: A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD** **Conservation Dependent**: A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

