



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3734/2
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, Mining Lease 272SA (AM 70/272)
Local Government Area: Shire of Ashburton
Colloquial name: Marandoo Mine Phase 2 Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
70		Mechanical Removal	Mineral production, including dewatering bores and associated infrastructure

1.5. Decision on application

Decision on Permit Application:

Decision Date:

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area (GIS Database; Shepherd, 2007):

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

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

The application area was surveyed by Biota Environmental Sciences staff between 6 and 9 March 2007, 18 and 26 May 2007 and 21 and 28 April 2008 (Biota Environmental Sciences, 2008a). The following vegetation types were identified within the application area.

Broad Drainage Areas and Basins

1c - *Triodia melvillei* hummock grassland: Low open woodland of *Acacia aneura* (typically var. *pilbarana*), usually with *Acacia pruinocarpa*, over scattered hummocks to a hummock grassland of *Triodia melvillei* or *Triodia schinzii*. The understorey tends to be extremely variable and species rich. Shrub species typically included *Ptilotus obovatus* and *Solanum lasiophyllum*. Other associated species included *Abutilon otocarpum* (acute leaf form), *Aristida contorta*, *Aristida holathera* var. *holathera*, *Aristida ingrata*, *Cheilanthes sieberi* subsp. *sieberi*, *Chrysopogon fallax*, *Cymbopogon obtectus*, *Digitaria brownii*, *Duperreya commixta*, *Enneapogon polyphyllus*, *Evolvulus alsinoides* var. *villosicalyx*, *Panicum effusum*, *Paraneurachne muelleri* and *Ptilotus exaltatus* var. *exaltatus*;

Major Flowlines and Creeks

2a - *Acacia aneura* - *Acacia pruinocarpa* woodland: This vegetation unit occurs in or adjacent to creek lines on floodplains. The vegetation typically comprised a low open forest of *Acacia aneura* (typically var. *pilbarana*), with substantial amounts of *Acacia pruinocarpa*, over a tussock grassland dominated by species such as *Chrysopogon fallax*, *Eulalia aurea* and *Themeda triandra*. Shrub species typically included *Eremophila forrestii* subsp. *forrestii*, *Indigofera georgei*, *Ptilotus obovatus* and *Sida* sp. spiciform panicles. Other associated species included *Abutilon otocarpum* (acute leaf form), *Alternanthera nana*, *Aristida contorta*, *Aristida ingrata*, *Dipteracanthus australasicus* subsp. *australasicus*, *Duperreya commixta*, *Enneapogon polyphyllus*, *Euphorbia biconvexa*, *Evolvulus alsinoides* var. *villosicalyx*, *Mukia maderaspatana*, *Pterocaulon sphacelatum* and *Rhynchosia minima*;

2b - *Eucalyptus xerothermica* - *Acacia aneura* woodland: This vegetation type occurs within relatively broad loamy flowlines and is comprised of *Eucalyptus xerothermica*, *Acacia aneura* var. *pilbarana* low open forest over *Acacia bivenosa*, *Santalum lanceolatum* open shrubland over *Triodia longiceps* hummock grassland and *Themeda triandra*, *Eulalia aurea* very open tussock grassland. Other associated species included *Acacia pruinocarpa*,

Alternanthera nana, *Aristida latifolia*, *Capparis lasiantha*, *Cheilanthes sieberi* subsp. *sieberi*, *Dichanthium sericeum* subsp. *humilius*, *Dipteracanthus australasicus* subsp. *australasicus*, *Duperreya commixta*, *Enneapogon lindleyanus*, *Enneapogon polyphyllus*, *Eragrostis cumingii*, *Eragrostis tenellula*, *Eremophila longifolia*, *Goodenia stellata*, *Panicum decompositum*, *Phyllanthus maderaspatensis*, *Pterocaulon serrulatum*, *Ptilotus obovatus* and *Rhynchosia minima*;

Minor Creeks

3a - Acacia species shrubland: typical dominant shrub species include *Acacia atkinsiana* and *Acacia maitlandii*, and scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* are also usually present. The composition of the hummock grassland is similarly variable, but owing to the position of these flowlines through the stony hills, the most common dominant species are *Triodia wiseana* and *Triodia* sp. Shovelanna Hill. Other associated species included *Abutilon dioicum*, *Acacia aneura* var. *pilbarana*, *Acacia pruinocarpa*, *Cassia glutinosa*, *Cassia oligophylla* x *helmsii*, *Cymbopogon ambiguus*, *Duperreya commixta*, *Eriachne mucronata*, *Evolvulus alsinoides* var. *villosicalyx*, *Gompholobium karjini*, *Hibiscus sturtii* var. *campylochlamys*, *Keraudrenia velutina* subsp. *elliptica*, *Panicum effusum*, *Paraneurachne muelleri*, *Solanum sturtianum* and *Themeda triandra*;

Ridges and Erosional Spurs

5d - *Eucalyptus gamophylla* scattered low mallees over *Acacia* spp. scattered tall shrubs over *Triodia* sp. Shovelanna Hill, (*Triodia wiseana*) hummock grassland: This vegetation unit occurred mainly on lower foothills. It is comprised of a small component of *T. wiseana* in the hummock grassland layer. Other associated species included *Acacia ancistrocarpa*, *Acacia atkinsiana*, *Gompholobium karjini*, *Goodenia stobbsiana*, *Keraudrenia velutina* subsp. *elliptica*, *Ptilotus calostachyus* var. *calostachyus* and *Solanum lasiophyllum*;

5h - *Triodia wiseana* hummock grassland with mixed *Acacia* spp. emergent shrubs: This vegetation unit occurs on low stony hills. The dominant overstorey shrub species vary with location, however the hummock grassland is consistently dominated by *Triodia wiseana*. Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* are often present. Other associated species include *Acacia bivenosa*, *Acacia pruinocarpa*, *Acacia tenuissima*, *Amphipogon sericeus*, *Aristida holathera* var. *holathera*, *Cassia* spp., *Cymbopogon ambiguus*, *Eremophila latrobei* subsp. *filiformis*, *Eriachne mucronata*, *Gomphrena kanisii*, *Paraneurachne muelleri*, *Ptilotus* spp. and *Solanum sturtianum*; and

Low Foothills and Escarpments

6a - Mixed *Triodia* spp. hummock grassland on upper slopes and ridges of small foothills and escarpments: This vegetation unit comprised a low woodland of *Acacia aneura* var. *pilbarana* with *Eucalyptus leucophloia* subsp. *leucophloia* over an open shrubland dominated by *Petalostylis labicheoides* and *Acacia maitlandii* over a closed hummock grassland of *Triodia brizoides* and *Triodia wiseana*. Other associated species include *Acacia tenuissima*, *Acacia xiphophylla*, *Anthobolus leptomerioides*, *Aristida contorta*, *Bulbostylis barbata*, *Capparis lasiantha*, *Cassia* spp., *Cymbopogon ambiguus*, *Dodonaea pachyneura*, *Dodonaea petiolaris*, *Dysphania rhadinostachya*, *Enneapogon caeruleus*, *Enneapogon polyphyllus*, *Eremophila cuneifolia*, *Eremophila latrobei* subsp. *filiformis*, *Eriachne mucronata*, *Gompholobium karjini*, *Grevillea wickhamii* subsp. *hispidula*, *Indigofera monophylla*, *Keraudrenia velutina* subsp. *elliptica*, *Mukia maderaspatana*, *Panicum effusum*, *Paraneurachne muelleri*, *Perotis rara*, *Polycarpaea holtzei*, *Polycarpaea longiflora*, *Psudras suaveolens*, *Ptilotus* spp., *Rhagodia eremaea*, *Sida* spp., *Solanum ferocissimum*, *Solanum lasiophyllum* and *Trichodesma zeylanicum* var. *zeylanicum* (Biota Environmental Sciences, 2008a).

Clearing Description The applicant has applied to clear up to 70 hectares of native vegetation within a 534.1 hectare area for the purpose of establishing dewatering and monitoring bores, associated infrastructure and access tracks.

The proposed works will include:

- Maintaining and establishing tracks;
- Clearing access tracks, approximately 20kilometres x 5metres; and
- Creation of 60 drill pads, up to 100metres x 100metres (containing one production bore, two monitoring bores and 2 sumps 10metres x 5metres x 1.5metres) (Hamersley Iron, 2010).

Once constructed, the disturbance footprint of each drill pad will be rehabilitated through the return of the stockpiled topsoil and vegetation from the original clearing and then ripped to remove the effects of compaction. The rehabilitation works will be undertaken to the extent that will still allow for vehicle access for servicing and monitoring of the production and monitoring bores (Hamersley Iron, 2010).

Vegetation Condition Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994);
To
Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

Comment The application area is located in the Pilbara region, approximately 36 kilometres east-north-east of Tom Price (GIS Database). The vegetation condition was derived from a vegetation survey conducted by Biota Environmental Sciences (2008a).

Clearing permit CPS 3734/1 for the Marandoo Mine Phase 2 Project was originally granted on 29 July 2010. This clearing permit is being amended to redescribe the purpose for which the permit was issued. Clearing permit CPS 3734/1 was issued for the purpose of dewatering bores and associated infrastructure while the amended permit will be issued for the purpose of mineral production, including dewatering bores and associated infrastructure. The amount of clearing will remain unchanged.

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) sub-region of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This sub-region is characterised by sedimentary ranges and plateaux, dissected by gorges (CALM, 2002). At a broad scale, vegetation can be described as Mulga low woodlands over bunch grasses on fine textured soils in valley floors and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

Karijini National Park comprises a complete north-south transverse section of the Hamersley Ranges (Australian Heritage Database, 2010). Karijini National Park shows considerable biological diversity and is especially rich in species of the genus *Acacia*, with forty-six of the fifty-four *Acacia* species which occur in the Pilbara region (Australian Heritage Database, 2010). Many flora and fauna species of special significance occur within Karijini National Park. The area is scenically outstanding and the landscape is characterised by naturalness, ruggedness and diversity (Australian Heritage Database, 2010). The application area is approximately 1.25 kilometres from the boundary of Karijini National Park at its nearest point (GIS Database). Karijini National Park is listed on the Register of the National Estate as an Environmentally Sensitive Area as it is a representative example of the Hamersley Ranges enhanced by most of the area being relatively unmodified by pastoralism or large scale mining operations (Australian Heritage Database, 2010; GIS Database).

A vegetation survey of the application area identified seven intact vegetation types occurring within the application area (Biota Environmental Sciences, 2008a; Rio Tinto, 2010). During the vegetation survey, 64 native flora species from 49 genera and 30 families were recorded from within the application area (Biota Environmental Sciences, 2008a). The number of flora species recorded within the application area is considered diverse. This is likely to reflect the variety of vegetation units encompassed by the area (Biota Environmental Sciences, 2008a). However, this is considered typical of the floristic diversity for similar landform features which are widespread throughout the Pilbara region.

The proposed clearing area is known to contain one Priority Flora species: *Rhagodia* sp. Hamersley (P3) (Biota Environmental Sciences, 2008a). This species is routinely collected in Mulga (*Acacia aneura*) and Snakewood (*Acacia xiphophylla*) vegetation in the Hamersley subregion and the southern Chichester subregion. *Rhagodia* sp. Hamersley has previously been recorded from various areas including Nammuldi, Mt Lionel rail corridor, proposed Wildflower construction camp, West Angelas, Juna Downs, Yandi and at various points along the Fortescue Metals Group (FMG) Stage A and Stage B rail corridors (Biota Environmental Sciences, 2008a). The presence of Priority Flora within the proposed clearing area increases its biodiversity significance. According to Shepherd (2007) approximately 100% of the Beard vegetation associations within the application area remain within the Pilbara bioregion, therefore it is not expected that the proposed clearing will threaten the conservation status of any Priority Flora species.

Six alien weed species were recorded within the application area (Biota Environmental Sciences, 2008a). These were: Bipinnate Beggartick (*Bidens bipinnata*), Spiked Malvastrum (*Malvastrum americanum*), Mimosa Bush (*Vachellia farnesiana*), Couch (*Cynodon dactylon*), Ruby Dock (*Acetosa vesicaria*) and Purslane (*Portulaca oleracea*) (Biota Environmental Sciences, 2008a). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. None of these species are listed as a 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food (DAFWA). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Four broad habitat types were recorded within the application area;

- Small drainage lines vegetated with *Acacia aneura* over tussock grasses on loamy substrates;
- Stony hillslopes vegetated with *Acacia* shrubs over *Triodia* on stony loam substrates;
- Flat outwash plains vegetated with *Acacia* shrubs on loamy substrates; and
- Rocky gorges (Biota Environmental Sciences, 2008b).

The vegetation communities within the application area are not likely to be considered rare, geographically restricted or of significant conservation value. The vegetation communities and potential fauna habitats within the application area are considered common within the Pilbara region, and are unlikely to be of higher biodiversity than the surrounding areas.

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

Methodology Australian Heritage Database (2010)
Biota Environmental Sciences (2008a)
Biota Environmental Sciences (2008b)
CALM (2002)
Rio Tinto (2010)
Shepherd (2007)
GIS Database
- DEC Tenure
- Register of National Estate
- IBRA WA (regions - subregions)

(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 may be at variance to this Principle

The application area contained four primary habitat types identified on the basis of vegetation structure and landforms. These were:

- Small drainage lines vegetated with *Acacia aneura* over tussock grasses on loamy substrates;
- Stony hillslopes vegetated with *Acacia* shrubs over *Triodia* on stony loam substrates;
- Flat outwash plains vegetated with *Acacia* shrubs on loamy substrates; and
- Rocky gorges (Biota Environmental Sciences, 2008b).

From these four habitat types a total of 125 fauna species were recorded during two survey phases, including four species of conservation significance. The species recorded from the Marandoo Mine Phase 2 survey area (approximately 5,000 hectares), while comparatively low for the Pilbara bioregion, is representative of both the relatively small total area encompassed by the study, and the consequently low degree of habitat diversity available to fauna (Biota Environmental Sciences, 2008b).

The fauna species of conservation significance recorded were;

- Northern Quoll (*Dasyurus hallucatus*) listed as endangered under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*;
- Rainbow Bee-eater (*Merops ornatus*) listed as migratory and marine species under the *EPBC Act 1999*;
- Ghost Bat (*Macroderma gigas*) listed as Priority 4 - DEC Priority Fauna List; and the
- Western Pebble-mound Mouse (*Pseudomys chapmanii*) listed as Priority 4 - DEC Priority Fauna List.

The conservation status of these species is unlikely to be altered either at the local or regional level (Biota Environmental Sciences, 2008b).

The rocky gorges and vegetation associated with small drainage lines within the application area may provide significant fauna habitat. The fauna habitats identified in the study area appear typical of the area surrounding the Marandoo Mine Site and are well represented across the Pilbara (Biota Environmental Sciences, 2008b). The fauna habitats identified within the application area are not considered as necessary for the on-going maintenance of any significant fauna habitat. It is likely that equal or higher quality vegetation and fauna habitats would exist throughout the surrounding area, and Pilbara region. Furthermore, the habitat types described by Biota Environmental Sciences (2008b) are well represented within Karijini National Park, which provides potentially important contemporary refugia for many species.

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

Methodology Biota Environmental Sciences (2008b)

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

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

A flora survey was conducted over the application area by Biota Environmental Sciences between 6 and 9 March 2007, 18 and 26 May 2007 and 21 and 28 April 2008 (Biota Environmental Sciences, 2008a). This survey involved establishing 35 standard 50metre x 50metre floristic survey quadrats within the major vegetation units of the application area (Biota Environmental Sciences, 2008a).

No DRF were recorded during the flora survey (Biota Environmental Sciences, 2008a).

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

Methodology Biota Environmental Sciences (2008a)
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 available databases reveals that there are no Threatened Ecological Communities (TECs) within the application area (GIS Database; Biota Environmental Sciences, 2008). The nearest TEC is located approximately 26 kilometres north-west of the application area (Themeda Grasslands). At this distance there is little likelihood of any impact to the TEC from the proposed clearing.

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

Methodology Biota Environmental Sciences (2008a)
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). Shepherd (2007) reports that approximately 99.95% of the pre-European vegetation remains in this bioregion.

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

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

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

According to Shepherd (2007) approximately 100% of these Beard Vegetation Associations remain within the Pilbara bioregion (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,188	17,794,645	~99.95%	Least Concern	~6.32%
Beard veg assoc. – State					
18	19,892,305	19,890,195	~100%	Least Concern	~2.1%
82	2,565,901	2,565,901	~100%	Least Concern	~10.2%
Beard veg assoc. – Bioregion					
18	676,557	676,557	~100%	Least Concern	~16.8%
82	2,563,583	2,563,583	~100%	Least Concern	~10.2%

* Shepherd (2007)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2007)
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 at variance to this Principle

According to available GIS Databases, there are numerous ephemeral drainage lines within the application area (GIS Database).

Based on vegetation mapping conducted by Biota Environmental Sciences (2008a) four of the seven vegetation

associations found within the application area are associated with drainage areas. These are;

1c: *Triodia melvillei* hummock grassland;

2a: *Acacia aneura* - *Acacia pruinocarpa* woodland;

2b: *Eucalyptus xerothermica* - *Acacia aneura* woodland; and

3a: *Acacia* species shrubland (Biota Environmental Sciences, 2008a).

The riparian vegetation of the application area is likely to be disturbed due to the construction of access tracks crossing the drainage lines which may alter the watercourses natural regime. To minimise the impact and ensure the natural water flow is maintained it is recommended that culverts and floodways be installed where access tracks intersect drainage lines.

Based on the above, the proposed clearing is at variance to this Principle. However, the proposed clearing is not likely to significantly impact on the conservation of vegetation growing in association with permanent watercourses or wetlands due to the absence of these within the application area. The proposed clearing of approximately 70 hectares of native vegetation is unlikely to significantly impact on vegetation communities growing in association with these drainage channels. Should any watercourses be disturbed the proponent should liaise with the Department of Water to determine whether a Bed and Banks permit is necessary for the proposed works.

Methodology Biota Environmental Sciences (2008a)
GIS Database
- Hydrography - Linear

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

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

The application area has been surveyed by the Department of Agriculture and Food (Van Vreeswyk et al., 2004), and is comprised of the Boolgeeda Land System (GIS Database).

The Boolgeeda Land System is described as stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). An analysis of aerial photography for the application area reveals the application area is most likely to fall within the 'stony lower plains' land unit (GIS Database; Biota Environmental Sciences, 2008a). The soils of this land unit (red loamy earths) are not susceptible to erosion due to surface mantle of very abundant pebbles of ironstone and other rocks.

Based on the above, the proposed clearing is not likely to be at variance to this Principle. Potential land degradation impacts as a result of the proposed clearing may be minimised by the implementation of a rehabilitation condition.

Methodology Biota Environmental Sciences (2008a)
Van Vreeswyk et al (2004)
GIS Database
- Mount Bruce Orthomosaic - Landgate 2004
- 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

Approximately 10.4 hectares of the application area is located within the C-Class conservation corridor adjacent to Karijini National Park (GIS Database).

Karijini National Park is approximately 620,000 hectares in size and represents considerable biodiversity (Australian Heritage Database, 2010). The area is considered to be scenically outstanding, with views from a series of hills such as Mount Vigors, Mount Barricade and Mount Bruce (Australian Heritage Database, 2010). Karijini National Park comprises a complete north-south transverse section of the Hamersley Ranges (Australian Heritage Database, 2010). The application area is approximately 1.25 kilometres from the boundary of Karijini National Park at its nearest point (GIS Database).

Karijini National Park is a representative example of the Hamersley Ranges enhanced by most of the area being relatively unmodified by pastoralism or large scale mining operations (Australian Heritage Database, 2010). It is on the Register of the National Estate for its considerable biological diversity with many flora and fauna species of special significance occurring there (Australian Heritage Database, 2010; GIS Database).

The National Park is especially rich in species of the genus *Acacia*, with forty-six of the fifty-four *Acacia* species which occur in the Pilbara region (Australian Heritage Database, 2010). The twenty-nine species of native mammal which inhabit Karijini National Park include three small mammals which are endemic to the Pilbara,

which are the Little Red Antechinus (*Antechinus rosamondae*), Pilbara Ninguai (*Ninguai timealeyi*) and the Western Pebble-mound Mouse (*Pseudomys chapmanii*) (Australian Heritage Database, 2010). In addition to this, Karijini National Park contains an unusually large number of raptor species (twenty-nine) in the total of 133 species of birds (Australian Heritage Database, 2010).

The application area contains vegetation types and habitats which are well represented and conserved within Karijini National Park (GIS Database; Australian Heritage Database, 2010). The area under application is highly unlikely to be acting as an important buffer for, or significant ecological linkage to, Karijini National Park given that the area surrounding Karijini National Park is largely uncleared.

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

Methodology Australian Heritage Database (2010)
GIS Database
- DEC Tenure
- Pre-European Vegetation
- Register of National Estate

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

The application area is located within a *Rights in Water and Irrigation Act 1914* (RIWI Act) Groundwater Management Area (GIS Database). The proponent is required to obtain permits to abstract groundwater in this area (DoW, 2010).

The groundwater salinity within the application area is approximately 500 - 1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be potable water. Given the size of the area to be cleared (70 hectares) compared to the size of the Hamersley Groundwater Province (10,166,833 hectares) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

The application area is located in a semi-desert-tropical region, with an average annual rainfall of approximately 455.2 millimetres recorded from the nearest weather station at Wittenoom approximately 47 kilometres north-north-east of the application area (BoM, 2010; CALM, 2002). The size of the proposed clearing area within the above climate is unlikely to result in significant changes to surface water flows.

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

Methodology BoM (2010)
CALM (2002)
DoW (2010)
GIS Database
- Groundwater - Provinces
- Groundwater Salinity
- Public Drinking Water Source Areas (PDWSA)
- RIWI Act, Groundwater Areas

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

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

The application area experiences a semi-desert, tropical climate with an average annual rainfall of 455.2 millimetres (CALM, 2002; BoM, 2010). Rainfall is usually experienced during summer months and can be either cyclonic or thunderstorm events (CALM, 2002). It is likely that during times of intense rainfall there may be some localised flooding in adjacent areas. Local flooding occurs seasonally within the Pilbara region as a result of cyclonic activity and sporadic thunderstorm events. The proposed clearing of 70 hectares is unlikely to significantly alter the intensity of flooding within the application area and surrounding areas.

The application area is located within the Ashburton River catchment area (GIS Database). However, the size of the area to be cleared (70 hectares) in relation to the size of the Ashburton River catchment area (7,877,743 hectares) (GIS Database) is not likely to increase the potential for flooding within the application area, local area or within the catchment (GIS Database).

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

Methodology BoM (2010)
CALM (2002)
GIS Database
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim (WC97/089) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are numerous registered Aboriginal sites of significance in close proximity to the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal sites of significance are damaged through the clearing process.

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

Hamersley Iron Pty Ltd referred the Marandoo Mine Phase 2 (MMP2) proposal to the Environmental Protection Authority (EPA) on 3 July 2007. The EPA provided the following recommendation on 26 July 2007 - "Formal Assessment - Public Environmental Review". Following the assessment and subsequent appeal periods the Minister for Environment; Youth determined on the 7 July 2010 that the proposal may be implemented subject to conditions and procedures.

The clearing permit application was advertised on 24 May 2010 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received stating no objection to the proposed clearing.

Clearing permit CPS 3734/1 for the Marandoo Mine Phase 2 Project was originally granted on 29 July 2010. This clearing permit is being amended to redescribe the purpose for which the permit was issued. Clearing permit CPS 3734/1 was issued for the purpose of dewatering bores and associated infrastructure while the amended permit will be issued for the purpose of mineral production, including dewatering bores and associated infrastructure. The amount of clearing will remain unchanged.

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

4. References

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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.