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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5926/1
Permit type: Purpose Permit

1.2. Proponent details

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

1.3. Property details

Property: *Iron Ore (Mount Newman) Agreement Act 1964,* Mineral Lease 244SA (AML 70/244)
Iron Ore (McCamey's Monster) Agreement Authorisation Act 1972, Mining Lease 266SA (AM 70/266)
Local Government Area: Shire of East Pilbara
Colloquial name: Western Ridge Exploration Drilling Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
220		Mechanical Removal	Mineral Exploration, Hydrogeological Investigations, Geotechnical Investigations and Associated Works

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 1 May 2014

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:

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

A large-scale flora and vegetation survey was conducted over the application area and its surrounds in May and August 2010. A total of 22 vegetation associations from ten broad floristic formations were mapped within the larger survey area (GHD, 2011). Sixteen vegetation associations from nine broad floristic formations were mapped within the application area (BHP Billiton Iron Ore, 2013). These vegetation associations are listed below with the broad floristic formation in brackets.

1a. (*Acacia* Low Open Forest to Low Woodland) - Low Open Forest of *Acacia catenulate* subsp. *occidentalis*, *Acacia aneura* var. ?*microcarpa* and *Acacia* ?*ancistrocarpa* with scattered *Grevillea berryana* over Open Shrubland of *Acacia sibirica*, *Eremophila forrestii* subsp. *forrestii* and *Senna glutinosa* subsp. *luerssenii* over Open Hummock Grassland of *Triodia pungens* and *Triodia brizoides*.

2a. (*Acacia* Low Open Shrubland) - Scattered Low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over a Low Open Shrubland of *Petalostylis labicheoides*, *Acacia catenulata* subsp. *occidentalis* and *Acacia monticola* over Very Open Hummock Grassland of *Triodia pungens* and Very Open Tussock Grassland of *Themeda triandra* and *Eriachne mucronata*.

3a. (*Acacia* Low Open Woodland to Low Woodland) - Scattered Low Trees of *Eucalyptus xerothermica*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus gamophylla* over Low Open Woodland of *Acacia aneura* var. ?*microcarpa* , *Acacia ayersiana* and *Acacia catenulata* subsp. *occidentalis* over Open Hummock Grassland of *Triodia pungens* with Scattered Tussock Grass of *Themeda triandra*.

3b. (*Acacia* Low Open Woodland to Low Woodland) - Low Open Woodland of *Acacia aptaneura* and *Acacia aneura* var. ?*pilbarana* over Open Shrubland of *Acacia tetragonophylla*, *Acacia rhodophloia* and *Acacia synchronicia* over Very Open Tussock Grassland and herbs of *Eragrostis xerophila*, *Sclerolaena densiflora* and *Enchylaena tomentosa*.

4a. (*Acacia* Low Woodland) - Low Open woodland of *Eucalyptus xerothermica*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus gamophylla* over Low Woodland of *Acacia aneura* var. ?*microcarpa*, *Acacia pruinocarpa* and *Acacia pyrifolia* over Open Hummock grassland of *Triodia brizoides* and Very Open Tussock Grassland of *Themeda triandra*.

4b. (*Acacia* Low Woodland) - Low Woodland of *Acacia aneura* var. ?*pilbarana*, *Acacia catenulata* subsp.

occidentalis and *Acacia pruinocarpa* over an Open shrubland of *Eremophila exilifolia*, *Eremophila forrestii* subsp. *forrestii*, and *Eremophila latrobei* over Open Hummock Grassland of *Triodia brizoides* and *Triodia pungens*.

4c. (*Acacia* Low Woodland) - Low Woodland of *Acacia pruinocarpa*, *Acacia aneura* var. ?*pilbarana* and *Eucalyptus gamophylla* over Low Scattered Shrubs of *Anthobolus leptomerioides* over Hummock Grassland of *Triodia brizoides* and *Triodia pungens* with Scattered Herbs of *Goodenia stobbsiana*.

5a. (*Acacia* Open Scrub) - Scattered Low Trees of *Corymbia hamersleyana* and *Eucalyptus camaldulensis* over Open Scrub of *Acacia tumida* var. *pilbarensis*, *Eremophila longifolia*, *Acacia dictyophleba* and *Santalum lanceolatum* over Open Tussock Grassland of **Cenchrus ciliaris*.

6a. (*Acacia* Open Shrubland) - Scattered Low Trees of *Corymbia hamersleyana*, *Eucalyptus leucophloia* subsp. *leucophloia* over Open Shrubland of *Acacia bivenosa*, *Eremophila jucunda* subsp. *pulcherrima* and *Ptilotus obovatus* Very Open Hummock Grasslands of *Triodia pungens*, *Triodia epactia* and *Triodia brizoides* with Scattered Tussock Grass.

7a. (*Eucalyptus* Low Open Woodland) - Low Open woodland of *Corymbia ferriticola*, *Ficus brachypoda* and *Acacia catenulata* subsp. *occidentalis* Over scattered Shrubs of *Dodonaea pachyneura*, *Acacia hamersleyensis* and *Prostanthera albiflora* and Scattered Hummock and Tussock Grasses including *Triodia* ?*pungens*, *Eriachne mucronata* and *Aristida contorta*.

7b. (*Eucalyptus* Low Open Woodland) - Low Open Woodland of *Eucalyptus xerothermica*, *Corymbia ferriticola* and *Corymbia hamersleyana* over Shrubland of *Acacia aptaneura*, *Acacia tenuissima* and *Acacia tetragonophylla* over Open Hummock grassland of *Triodia pungens* and *Triodia angusta*.

8a. (*Eucalyptus* Low Woodland) - Low Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia ferriticola* and *Corymbia hamersleyana* over High Open Shrubland of *Acacia catenulata* subsp. *occidentalis*, *Acacia rhodophloia* and *Acacia pruinocarpa* over Hummock Grassland of *Triodia brizoides* and *Triodia pungens*.

10a. (*Triodia* Hummock Grassland) - High Open Shrubland *Acacia dictyophleba*, *Acacia bivenosa* and *Acacia adsurgens* over Hummock Grassland of *Triodia wiseana*, *Triodia pungens* and *Triodia brizoides*.

10b. (*Triodia* Hummock Grassland) - Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Shrubs of *Acacia maitlandii*, *Acacia pruinocarpa* and *Petalostylis labicheoides* Over Hummock Grassland of *Triodia wiseana*, *Triodia pungens* and *Triodia brizoides*.

10c. (*Triodia* Hummock Grassland) - Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus gamophylla* Over Scattered Shrubs of *Acacia maitlandii* and *Hakea lorea* over Hummock Grassland of *Triodia wiseana*, *Triodia pungens* and *Triodia brizoides*.

10f. (*Triodia* Hummock Grassland) - Low Open Woodland of *Eucalyptus gamophylla*, *Eucalyptus kingsmillii* subsp. *kingsmillii* and *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Shrubs of *Acacia pruinocarpa*, *Senna glutinosa* subsp. *glutinosa* and *Ptilotus obovatus* over Hummock Grasslands of *Triodia pungens*, *Triodia epactia* and *Triodia brizoides* and Very Open Tussock Grass of *Eriachne mucronata* and *Cymbopogon ambiguous*.

*indicates introduced species

Clearing Description

Western Ridge Exploration Drilling Project.
BHP Billiton Iron Ore Pty Ltd (BHP Billiton Iron Ore) has applied to clear up to 220 hectares of native vegetation within a total boundary of approximately 3,660 hectares for the purposes of mineral exploration, hydrogeological investigations, geotechnical investigations and associated works. The application area is located immediately south-west of BHP Billiton Iron Ore's existing Mount Whaleback mining operations, approximately 8 kilometres south-west of Newman.

Vegetation Condition

Pristine: No obvious signs of disturbance (Keighery, 1994);
To:
Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Comment

The vegetation condition was assessed by botanists from GHD (2011).

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) Interim Biogeographic Regionalisation of Australia (IBRA) subregion (GIS Database). This subregion is generally described as Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

The vegetation within the application area is broadly mapped as Beard vegetation associations 18 and 82, both of which have over 99% of their Pre-European vegetation extent remaining in the bioregion (Government of Western Australia, 2013; GIS Database). A large-scale Phase 1 of a Level 2 flora and vegetation survey was conducted over the application area and its surrounds in May and August 2010 by GHD botanists. A total of 347 vascular plant taxa, belonging to 159 genera from 48 families, were recorded from the survey area (GHD, 2011). Below average rainfall resulted in many annual and short-lived species being absent or under-represented; therefore the species list is regarded as indicative rather than exhaustive (GHD, 2011). Dominant

families in the survey area were Fabaceae, Poaceae and Malvaceae (GHD, 2011) which is typical of the Pilbara. The survey area, although showing visible signs of disturbance from historical grazing, previous drilling, recent fire and weed infestation, displayed moderate to high degree of floristic diversity (GHD, 2011).

No Threatened Flora, Threatened Ecological Communities or Priority Ecological Communities were recorded within the application area during the GHD vegetation survey or have previously been recorded within the application area (GHD, 2011; GIS Database). Three Priority Flora species were recorded during the GHD survey: *Gymnanthera cunninghamii* (Priority 3), *Indigofera* sp. Gilesii ms (Priority 3) and *Goodenia nuda* (Priority 4) (GHD, 2011). These populations have been excluded from the application area with a minimum 10 metre buffer (BHP Billiton Iron Ore, 2013).

Eight introduced flora species were recorded within the application area. These weed species were Bipinnate Beggartick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*), Couch (*Cynodon dactylon*), Kapok (*Aerva javanica*), Mimosa Bush (*Vachellia farnesiana*), Ruby Dock (*Acetosa vesicaria*), Spiked Malvastrum (*Malvastrum americanum*) and Ulcardo Melon (*Cucumis melo* subsp. *agrestis*) (BHP Billiton Iron Ore, 2013). Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Six broad fauna habitat types were identified within the application area and one of these, gorge systems, was identified as having high conservation value because it supports or provides core habitat for a number of conservation significant species (Biologic, 2011). The vast majority of the gorge habitat type has been excluded from the application area because of its high conservation value, with only a small section in the eastern edge of the application area remaining (BHP Billiton Iron Ore, 2013). Other important habitat types were identified during the survey but are outside or have been excluded from the application area. These include major drainage lines (Whaleback Creek), caves and permanent water sources (Biologic, 2011; BHP Billiton Iron Ore, 2013). The other fauna habitats identified with the application area are considered to be of medium habitat value and are found throughout the application area and its surrounds (Biologic, 2011; BHP Billiton Iron Ore, 2013).

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

Methodology

BHP Billiton Iron Ore (2013)
Biologic (2011)
CALM (2002)
GHD (2011)
Government of Western Australia (2013)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Pre-European Vegetation
- Threatened and Priority Flora
- 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

A level 2 fauna survey of the Orebody 35 Project Area, which includes the application area, was undertaken by zoologists and ecologists from Biologic. The study comprised of a desktop survey and literature review, a two season baseline vertebrate fauna survey over the survey area, and a habitat assessment with a particular emphasis on habitats considered likely to support conservation significant fauna. The field survey was conducted in March and August 2010 using trapping, opportunistic and targeted fauna survey techniques (Biologic, 2011).

Six broad fauna habitat types were identified within the application area:

- Ironstone Hills and Ridges - includes hill crests and slopes supporting Hummock grasslands, scattered shrubs and trees including *Acacia* and *Senna* spp., *Grevillea wickhamii*, *Eucalyptus leucophloia* and other Eucalypts;
- Stony Lower Slopes and Plains Below Hill Slopes - supporting Spinifex grasslands, *Acacia* shrublands, minor drainage lines, and minor areas supporting samphire; or *Senna* and *Eremophila* spp. shrublands and tussock grasslands;
- Basalt Hills, Lower Slopes and Minor Stony Plains - supporting Hummock grasslands with isolated to very scattered shrubs such as *Acacia inaequilatera*, small areas of Gilgai with cracking clay soils;
- Mulga (*Acacia aneura*) Woodland on Hard Pan Plains;
- Valley and Gully Systems - comprising vegetated slopes within hills and ridges; and
- Gorge Systems - gorges contain *Corymbia ferreticola*, *Ficus* spp. areas of permanent water (creeks, seepages, rock holes) supporting *Typha* sp. and *Cyperus* sp. (BHP Billiton Iron Ore, 2013).

The gorge habitat type was considered to be of high significance because it supports or provides core habitat for a number of conservation significant species (Biologic, 2011). The vast majority of the gorge habitat type has been excluded from the application area because of its high conservation value, with only a small section

in the eastern edge of the application area remaining (BHP Billiton Iron Ore, 2013). Other important habitat types were identified during the survey but are outside or have been excluded from the application area. These include major drainage lines (Whaleback Creek), caves and permanent water sources (Biologic, 2011; BHP Billiton Iron Ore, 2013).

The other fauna habitats identified with the application area are considered to be of medium habitat value and are found throughout the application area and its surrounds (Biologic, 2011; BHP Billiton Iron Ore, 2013).

Three fauna species of conservation significance were recorded within the application area during the Biologic fauna survey (BHP Billiton Iron Ore, 2013):

- Peregrine Falcon (*Falcon peregrinus*) (Schedule 4 of the *Wildlife Conservation Act 1950* (WC Act));
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (DPaW Priority 4); and
- Ghost Bat (*Macroderma gigas*) (DPaW Priority 4).

There are no suitable breeding sites for the Peregrine Falcon within the application area as any large cliffs and major drainage lines have been excluded (BHP Billiton Iron Ore, 2013). The species may forage in the application area as part of its wider home range (BHP Billiton Iron Ore, 2013).

The basalt hills, lower slopes and minor stony plains provides suitable habitat for the Western Pebble-mound Mouse and its mounds were recorded from a number of locations within the application area (BHP Billiton Iron Ore, 2013). The mounds will be avoided where possible (BHP Billiton Iron Ore, 2013).

There are no suitable caves within the application area for the Ghost Bat (BHP Billiton Iron Ore, 2013). There are a number of suitable caves adjacent to the application area and these have been excluded with a minimum 100 metre buffer (BHP Billiton Iron Ore, 2013). The Ghost Bat was recorded foraging in the southern portion of the application area and while the proposed clearing will impact some foraging habitat, the foraging habitat extends beyond the application area (BHP Billiton Iron Ore, 2013)

Based on the occurrence of the habitat types and conservation significant fauna species previously recorded in the vicinity, an additional 13 species are considered to potentially occur within the application area (BHP Billiton Iron Ore, 2013):

- Australian Bustard (*Ardeotis australis*) (DPaW Priority 4);
- Bush Stone-curlew (*Burhinus grallarius*) (DPaW Priority 4);
- Eastern Great Egret (*Ardea modesta*) (Migratory under *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act); Schedule 3 of the WC Act);
- Fork-tailed Swift (*Apus pacificus*) (Migratory under EPBC Act; Schedule 3 of the WC Act);
- Long Tailed Dunnart (*Smithopsis longicaudatus*) (DPaW Priority 4):
- Pilbara Olive Python (*Liasis olivaceus barroni*) (Vulnerable under the EPBC Act; Schedule 1 of the WC Act);
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantius*) (Vulnerable, EPBC Act; Schedule 1, WC Act);
- Rainbow Bee-eater (*Merops ornatus*) (Migratory under the EPBC Act; Schedule 3 of the WC Act);
- Pilbara Flat-headed Blind Snake (*Ramphotyphlops ganei*) (DPaW Priority 1);
- Short-tailed Mouse (*Leggadina lakedownensis*) (DPaW Priority 4); and
- Wood Sandpiper (*Tringa glareola*) (Migratory under the EPBC Act; Schedule 3 of the WC Act).

Each of these species may utilise the application area but the habitats found within the application area are well represented outside the application area and it is unlikely that any of the species are reliant on the application area (BHP Billiton Iron Ore, 2013). In addition, the conservation significant birds are mobile and most are able to utilise a wide variety of habitat types (BHP Billiton Iron Ore, 2013). The Pilbara Olive Python was recorded from adjacent gorge/gully habitat that has been excluded from the application area (BHP Billiton Iron Ore, 2013).

The fauna habitat type with high conservation value, gorge habitat, has mostly been excluded from the application area. The fauna habitat types within the application area have medium value and while they are likely to provide foraging habitat for a range of species, including conservation significant species, they are not critical habitat for fauna indigenous to Western Australia.

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

(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 known records of Threatened Flora within the application area (GIS Database). The Threatened Flora species *Lepidium catapycnon* has been recorded at several locations within 5 kilometres of the application area (GIS Database).

A large-scale flora and vegetation survey was conducted over the application area and its surrounds in May and August 2010 by GHD botanists. Targeted searches were undertaken within habitat considered suitable for Threatened and Priority Flora identified during the desktop assessment. No Threatened Flora were recorded

during the survey (GHD, 2011).

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

Methodology GHD (2011)
GIS Database:
- Threatened and Priority Flora

(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 revealed there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The buffer of the nearest recorded TEC, Ethel Gorge aquifer stygobiont community, is located approximately 6 kilometres east of the application area (GIS Database).

No TECs were identified during the flora and vegetation survey conducted by GHD botanists (GHD, 2011).

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

Methodology GHD (2011)
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 clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 99.6% of the pre-European vegetation remains (see table) (Government of Western Australia, 2013; GIS Database). This gives it a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

The vegetation of the clearing application area has been mapped as Beard vegetation associations:

18: Low woodland; mulga (*Acacia aneura*); and
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Government of Western Australia, 2013; GIS Database).

Over 99% of both of these vegetation associations remain at a state and at a bioregional level (see table; Government of Western Australia, 2013). These vegetation associations would be given a conservation status of 'Least Concern' at both a state and bioregional level (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.

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,808,657	17,733,584	~99.6	Least Concern	6.3
Beard Veg Assoc. – State					
18	19,892,305	19,843,727	~99.8	Least Concern	2.1
82	2,565,901	2,553,217	~99.5	Least Concern	10.2
Beard Veg Assoc. – Bioregion					
18	676,557	672,424	~99.4	Least Concern	16.8
82	2,563,583	2,550,899	~99.5	Least Concern	10.3

* Government of Western Australia (2013)
** 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)
Government of Western Australia (2013)
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

There are no permanent wetlands or watercourses within the application area, however there are numerous minor, non-perennial watercourses (GIS Database).

Sixteen vegetation associations from nine broad floristic formations were mapped within the application area during a flora and vegetation survey by botanists from GHD (BHP Billiton Iron Ore, 2013). The location and landform description of several of these vegetation associations were associated with minor non-perennial watercourses (GHD, 2011).

- 1a - valley floors/incised drainage;
- 1b - upper drainage lines;
- 5a - upper drainage lines;
- 6a - drainage floors with channels;
- 7a - deep incised ironstone gullies; and
- 7b - narrow drainage floors with channels.

Existing tracks will be used to cross water features where possible (BHP Billiton Iron Ore, 2013). Where it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (BHP Billiton Iron Ore, 2013).

Based on the above, the proposed clearing is at variance to this Principle. However, vegetation associated with minor drainage lines is widespread in the region and due to the temporary and low impact nature of the proposed clearing for exploration activities and geotechnical investigations there is unlikely to be significant impacts on any watercourse or wetland.

Methodology BHP Billiton Iron Ore (2013)
GHD (2011)
GIS Database:
- Hydrography, Linear

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

Comments

Proposal is not likely to be at variance to this Principle

The application area intersects the Boolgeeda, Egerton, Newman and Rocklea Land Systems (GIS Database).

The Boolgeeda Land System is characterised by stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). The vegetation is generally not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Egerton Land System is characterised by dissected hardpan plains supporting mulga shrublands and hard spinifex hummock grasslands (Van Vreeswyk et al., 2004). The system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Newman Land System is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). Each of the landforms in the land system have a mantle of abundant pebbles of ironstone and other rocks, which translates to a low soil erosion risk (Van Vreeswyk et al., 2004).

The Rocklea Land System is characterised by basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004). Van Vreeswyk et al. (2004) report that this system has a very low erosion risk.

Although the land systems are considered stable, the amount of clearing proposed is large (220 hectares). Potential impacts from land degradation may be minimised by the implementation of a staged clearing condition to ensure large areas are not exposed of vegetative cover for extended periods.

The proposed exploration activities are low impact and the proposed clearing will not be contiguous, consisting of up to 220 hectares within an application area of approximately 3,660 hectares. BHP Billiton Iron Ore (2009) will make use of existing tracks as far as practicable. Upon completion of exploration activities, all exploration disturbances will be rehabilitated in accordance with BHP Billiton Iron Ore's exploration rehabilitation procedures (BHPBIO, 2009). Potential land degradation impacts as a result of the proposed clearing may be minimised by the implementation of a rehabilitation condition.

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

Methodology BHP Billiton Iron Ore (2009)
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 proposed clearing is not located within a conservation reserve (GIS Database). The nearest conservation area is the ex-Roy Hill Station pastoral lease, a former leasehold proposed for conservation, which is located approximately 70 kilometres north 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:
- DEC Proposed 2015 Pastoral Lease Exclusions
- 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 wetlands or watercourses within the application area, however there are numerous minor, non perennial watercourses (GIS Database). The climate of the area is semi-desert tropical with an average of 300 millimetres of rainfall that is usually from summer cyclonic or thunderstorm events (CALM, 2002). The application area has an average annual evaporation rate of between 3,400 and 3,600 millimetres (GIS Database), therefore, any surface flows are likely to be short lived.

Existing tracks will be used to cross water features where possible (BHP Billiton Iron Ore, 2013). Where it is necessary for new crossings to be installed clearing will be kept to a bare minimum and will be constructed flat level to the surface (BHP Billiton Iron Ore, 2013). The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

The application area is located within the Newman Water Reserve (GIS Database). All activities conducted within the Public Drinking Water Supply Area should be in accordance with the Department of Water (DoW) Land Use Compatibility Tables (DoW, 2014). The proponent is advised to follow the Water Quality Protection Guidelines produced by the DoW, to minimise any risk that the proposed clearing and associated activities may pose to the Newman Water Reserve (DoW, 2014). The DoW is satisfied that the proposed clearing of 220 hectares is unlikely to have a significant impact on the quality or quantity of groundwater (DoW, 2014).

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

Methodology BHP Billiton Iron Ore (2013)
CALM (2002)
DoW (2014)
GIS Database:
- Evaporation Isopleths
- Hydrography, Linear
- Public Drinking Sources Areas (PDWSAs)

(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 is within the Fortescue River Upper catchment area of the Fortescue River basin (GIS Database). Given the size of the area to be cleared (220 hectares) in relation to the size of the catchment area (2,975,192 hectares), the proposed clearing is not likely to increase the potential of flooding on a catchment scale.

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

Methodology GIS Database:
- Hydrogrphic Catchments - Catchments

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

Comments

There is one Native Title Claim (WC2005/06) 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 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 several registered Aboriginal Sites of Significance in the vicinity of 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 Regulation, Department of Parks and Wildlife 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 30 December 2013 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received.

Methodology

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

4. References

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Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Government of Western Australia, Perth, 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.