Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5414/1
Permit type: Purpose Permit

1.2. Proponent details

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

1.3. Property details

Property: *Iron Ore (Goldsworthy-Nimingarra) Agreement Act 1972*, Mining Lease 263SA (AM 70/263)
Iron Ore (Mount Goldsworthy) Agreement Act 1964, Mineral Lease 249SA (AML 70/249)
Iron Ore (Goldsworthy-Nimingarra) Agreement Act 1972, Mineral Lease 251SA (AML 70/251)
Local Government Area: Shire of East Pilbara
Colloquial name: Midnight Ridge and Shay Gap Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 7 February 2013

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 a useful tool to examine the vegetation extent in a regional context. Three Beard vegetation associations are located within the area proposed to be cleared (GIS Database). These Beard vegetation associations are:

93: Hummock grasslands, shrub steppe; kanji over soft spinifex;
117: Hummock grasslands, grass steppe; soft spinifex; and
171: Hummock grasslands, low tree steppe; snappy gum over soft spinifex and *Triodia brizioides* (Government of Western Australia, 2011; GIS Database).

A flora and vegetation survey was undertaken of the application area and its surrounds in March and April 2011 by botanists from Astron. The survey covered approximately 12,495 hectares over the Nimingarra, Sunrise Hill and Shay Gap ridgelines (Astron, 2012). The survey described 14 broad floristic communities with 37 vegetation associations. Nine of the broad floristic communities and 22 vegetation associations occur within the application area (Aston, 2012; BHPBIO, 2012). These vegetation associations are listed below under their respective broad floristic community.

Melaleuca Woodland

Vegetation Association 2: Woodland of *Eucalyptus victrix*, *Melaleuca argentea* and *Ficus aculeata* var. *indecora* over Scattered Tall Shrubs of *Atalaya hemiglauca* and *Ficus aculeata* var. *indecora* over Scattered Hummock Grasses of *Triodia biflora*, Very Open Tussock Grassland of **Chloris barbata*, **Digitaria ciliaris* and **Echinochloa colona* with Scattered Sedges of *Cyperus vaginatus*.

Acacia Low Closed Forest

Vegetation Association 5: Low Closed Forest of *Acacia colei* var. *colei* and *A. tumida* var. *pilbarensis* over Tall Open Scrub of *A. colei* var. *colei*, *A. tumida* var. *pilbarensis* and *A. synchronicia* over Scattered Hummock Grasses of *Triodia epactia* and *T. biflora*.

Acacia Tall Open Scrub

Vegetation Association 6a: Low Open Woodland of *Corymbia hamersleyana* and *C. flavescens* over Tall Open Scrub of *Acacia tumida* var. *pilbarensis*, *A. ancistrocarpa*, *A. colei* var. *colei* and *Petalostylis labicheoides* over Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia epactia* and *T. schinzii* over Very Open Tussock Grassland of *Chrysopogon fallax* and *Paraneurachne muelleri*.

Vegetation Association 6b: Scattered Low Trees of *Corymbia flavescens* and *C. hamersleyana* over Tall Open Scrub of *Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *hispidula* over Open Hummock

Grassland of *Triodia epactia* with Open Tussock Grassland of *Chrysopogon fallax*.

Vegetation Association 6c: Scattered Low Trees of *Corymbia hamersleyana* over Tall Open Scrub of *Acacia tumida* var. *pilbarensis* over Low Open Shrubland of *Acacia adoxa* and *A. hilliana* over Hummock Grassland of *Triodia epactia*.

Vegetation Association 6d: Low Open Woodland of *Corymbia flavescens* and *C. hamersleyana* over Tall Open Scrub of *Acacia ancistrocarpa*, *A. tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* over Open Shrubland of *Tephrosia rosea* var. *clementii* over Very Open Hummock Grassland of *Triodia epactia* and *T. schinzii* and Open Herbland of *Bonamia* species.

Acacia Tall Shrubland

Vegetation Association 7a: Tall Shrubland of *Acacia tumida* var. *pilbarensis* over Open Shrubland of *Petalostylis labicheoides* over Open Hummock Grassland of *Triodia schinzii* and *T. epactia* and Very Open Herbland of *Jasminum didymum* subsp. *lineare*.

Acacia Low Open Heath

Vegetation Association 8a: Low Open Heath of *Acacia stellaticeps*, *A. ptychophylla* and *Indigofera monophylla* over Hummock Grassland of *Triodia wiseana*.

Vegetation Association 8b: Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia flavescens* over Scattered Tall Shrubs of *Acacia inaequilatera* and *A. ancistrocarpa* over Shrubland of *Acacia adoxa*, *A. hilliana* and *Senna symonii* over Hummock Grassland of *Triodia epactia* and *T. wiseana*.

Triodia Hummock Grassland

Vegetation Association 10a: Scattered Low Trees of *Corymbia hamersleyana* over Tall Open Shrubland of *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* over Low Open Shrubland of *Acacia adoxa* and *A. hilliana* over Hummock Grassland of *Triodia epactia* over Very Open Sedgeland of *Fimbristylis oxystachya* and Scattered Tussock Grasses of *Eriachne mucronata* and *E. lanata*.

Vegetation Association 10b: Tall Shrubland of *Grevillea wickhamii* subsp. *hispidula* over Low Open Shrubland to Open Heath of *Acacia hilliana* and *A. adoxa* over Hummock Grassland of *Triodia epactia*.

Vegetation Association 10d: Low Open Woodland of *Corymbia hamersleyana* over Tall Shrubland of *Grevillea wickhamii* subsp. *hispidula* and *Acacia tumida* var. *pilbarensis* over Low Shrubland of *Acacia hilliana*, *A. ptychophylla* and *A. adoxa* over Hummock Grassland of *Triodia epactia*.

Vegetation Association 10e: Low Open Woodland of *Corymbia hamersleyana* over Tall Open Shrubland of *Grevillea wickhamii* subsp. *hispidula* and *Acacia inaequilatera* over Low Shrubland of *Acacia adoxa* and *A. ptychophylla* over Closed Hummock Grassland of *Triodia epactia* and *T. wiseana*.

Vegetation Association 10f: Low Open Woodland of *Corymbia flavescens* over Tall Open Shrubland of *Acacia tumida* var. *pilbarensis* and *A. colei* var. *colei* over Low Shrubland of *Indigofera monophylla*, *Isotropis atropurpurea* and *Corchorus elachocarpus* over Hummock Grassland of *Triodia epactia* over Scattered Tussock Grasses of *Chrysopogon fallax* and *Sporobolus australasicus*.

Vegetation Association 10h: Low Open Woodland of *Corymbia hamersleyana* over Shrubland of *Grevillea wickhamii* subsp. *hispidula*, *Acacia tumida* var. *pilbarensis* and *A. inaequilatera* over Low Open Heath of *Acacia adoxa* and *A. hilliana* over Hummock Grassland of *Triodia epactia*.

Vegetation Association 10l: Scattered Low Trees of *Corymbia hamersleyana* over Open Shrubland of *Acacia inaequilatera*, *A. tumida* var. *pilbarensis* and *A. ancistrocarpa* over Hummock Grassland of *Triodia epactia* and *T. wiseana*.

Vegetation Association 10m: Low Open Woodland of *Corymbia hamersleyana* and *C. flavescens* over Tall Shrubland of *Acacia orthocarpa* and *A. ancistrocarpa* over Low Shrubland of *Grevillea wickhamii* subsp. *hispidula*, *Acacia adoxa* and *A. hilliana* over Hummock Grassland of *Triodia epactia* and *T. schinzii* over Scattered Sedges to Very Open Sedgeland of *Fimbristylis oxystachya* and *Cyperus conicus*.

Vegetation Association 10o: Scattered Low Trees of *Corymbia hamersleyana* over Scattered Tall Shrubs of *Acacia ancistrocarpa* over Open Shrubland of *Grevillea wickhamii* subsp. *hispidula*, *Acacia tumida* var. *pilbarensis* and *A. monticola* over Low Open Shrubland of *Acacia hilliana* and *A. adoxa* over Hummock Grassland of *Triodia epactia* with Scattered Tussock Grasses of *Eriachne lanata* over Scattered Sedges of *Fimbristylis oxystachya*.

Vegetation Association 10p: Tall Open Shrubland of *Acacia tumida* var. *pilbarensis*, *A. inaequilatera* and *A. synchronicia* over Low Open Shrubland of *Acacia hilliana* and *A. adoxa* over Hummock Grassland of *Triodia epactia* and *T. wiseana*.

Vegetation Association 10r: Low Open Woodland of *Corymbia hamersleyana* over Tall Open Scrub of *Acacia ancistrocarpa*, *A. synchronicia* and *A. tumida* var. *pilbarensis* over Open Heath of *Acacia stellaticeps* over Hummock Grassland of *Triodia epactia*.

Vegetation Association 10s: Low Open Woodland of *Grevillea pyramidalis* subsp. *leucadendron* and *Acacia inaequilatera* over Open Shrubland of *Acacia ancistrocarpa*, *A. inaequilatera* and *A. synchronicia* over Hummock Grassland of *Triodia epactia*.

Triodia Open Hummock Grassland

Vegetation Association 11: Low Woodland of *Corymbia hamersleyana* and *Acacia tumida* var. *pilbarensis* over Low Shrubland of *Tephrosia* sp. Bungaroo Creek, *Acacia adoxa* and *A. stellaticeps* over Open Hummock Grassland of *Triodia epactia* and *T. wiseana*.

Eriachne Tussock Grassland

Vegetation Association 13: Low Open Shrubland of *Acacia tumida* var. *pilbarensis*, *A. adoxa* and *A. hilliana* over Scattered Low Shrubs of *Hybanthus aurantiacus*, *Goodenia stobbsiana* and *Corchorus sidoides* subsp. *vermicularis* over Tussock Grassland of *Eriachne lanata*.

*indicates introduced species

Clearing Description

BHP Billiton Iron Ore Pty Ltd (BHPBIO) has applied to clear up to 150 hectares of native vegetation, within an application area of approximately 4,310 hectares, for the purposes of mineral exploration, geotechnical investigations and associated activities. The clearing will include access tracks, drill pads and sumps. The application area includes the Nimingarra, Midnight Ridge, Sunrise Hill and Shay Gap mining areas and is located approximately 85 kilometres north of Marble Bar.

Clearing will be by mechanical means.

Vegetation Condition

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

To

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

Comment

The vegetation condition was assessed by botanists from Astron (BHPBIO, 2012).

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 intersects the Chichester subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the McLarty subregion of the Great Sandy Desert IBRA bioregion (GIS Database). The Chichester subregion is characterised by plains supporting a shrub steppe of *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on the ranges (CALM, 2002). The McLarty subregion is mainly tree steppe grading to shrub steppe in the south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and Bloodwoods, and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Armadeus Basins (CALM, 2002). Desert Oak (*Casuarina decalsneana*) occurs in the far east of the region while gently undulating laterised uplands support shrub steppe such as *Acacia pachycarpa* shrublands over *Triodia pungens* hummock grass (CALM, 2002).

A flora and vegetation survey was undertaken of the application area and its surrounds in March and April 2011 by botanists from Astron. The survey covered approximately 12,495 hectares over the Nimingarra, Sunrise Hill and Shay Gap ridgelines (Astron, 2012). A total of 344 vascular flora species, from 49 families and 153 genera, were recorded in the survey area (Astron, 2012). The total number of flora species recorded is comparable, and mostly higher, than the total number of flora species recorded in previous surveys in the locality (Astron, 2012).

No Threatened Flora, Threatened Ecological Communities or Priority Ecological Communities were recorded during the flora and vegetation survey by Aston botanists, or have previously been recorded within the application area (Astron, 2012; GIS Database).

Three Priority Flora species were recorded during the Astron survey: *Rothia indica* subsp. *australis* (P1), *Croton aridus* (P3) and *Nicotiana umbratica* (P3) (Astron, 2012). All populations identified in the Astron survey have been excluded from the application area (BHPBIO, 2012). *Euphorbia inappendiculata* (P3) was previously recorded in the survey area by botanists from Ecologia in three locations but each of these have also been excluded from the application area (BHPBIO, 2012). One other Priority Flora species, *Euphorbia clementii* (P2), was previously recorded within the application area but this area was cleared as part of previous mining and is now devoid of vegetation (BHPBIO, 2012).

Seventeen introduced flora species were recorded during the Astron survey with four species recorded within the application area: Buffel Grass (*Cenchrus ciliaris*), Calotrope (*Calotropis procera*), Purslane (*Portulaca oleracea*) and Summer Grass (*Digitaria ciliaris*) (Astron, 2012; BHPBIO, 2012). 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.

ENV conducted Phase 1 of a Level 2 fauna survey across Nimingarra, Shay Gap and Sunrise Hill; covering the application area and its surrounds (ENV, 2011). ENV (2011) identified a total of 107 native vertebrate fauna species during the survey comprising of 16 mammals, 42 birds, 42 reptiles and seven amphibian species.

Parts of the application area have been disturbed by previous mining activities. Approximately 13% of the Astron (2012) survey area was mapped as disturbed or cleared. The rest of the vegetation varied from very good to excellent condition (Astron, 2012).

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

Methodology

Astron (2012)
BHPBIO (2012)
CALM (2002)
ENV (2011)
GIS Database:
- IBRA WA (Regions - Subregions)
- 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

ENV conducted Phase 1 of a Level 2 fauna survey across Nimingarra, Shay Gap and Sunrise Hill; covering the application area and its surrounds (ENV, 2011). The survey included a vertebrate fauna habitat assessment, a trapping program to document species richness, recording of opportunistic fauna sightings, and a targeted approach for Threatened and Priority Fauna (ENV, 2011). In addition, zoologists from Ecologia conducted a Level 1 fauna survey over Yarrie, Cattle Gorge, Nimingarra and Sunrise Hill areas, including the application area (BHPBIO, 2012). The field surveys of Nimingarra and Sunrise Hill by Ecologia were undertaken in November and December 2004 (Ecologia, 2005).

Seven fauna habitats were identified in the greater survey area and two of these occur within the application area: alluvial plains and low hills (ENV, 2011; BHPBIO, 2012). Gorge/gully habitat occurs adjacent to the application area (BHPBIO, 2012).

Five species of conservation significance were recorded during the ENV fauna survey (ENV, 2011). The following species were recorded within 50 metres of the application area:

- Northern Quoll (*Dasyrus hallucatus*) - listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Schedule 1 under the *Wildlife Conservation Act 1950* (WC Act);
- Pilbara Orange Leaf-Nosed Bat (*Rhinonicteris aurantius*) - listed as Vulnerable under the EPBC Act and Schedule 1 under the WC Act;
- Ghost Bat (*Macroderma gigas*) - listed as Priority 4;
- Bush Stone-curlew (*Burhinus grallarius*) - listed as Priority 4; and
- Rainbow Bee-Eater (*Merops ornatus*) - listed as Migratory under the EPBC Act and Schedule 3 under the WC Act (BHPBIO, 2012).

The Pilbara Orange Leaf Nosed Bat, Northern Quoll and Bush Stone-curlew were also recorded within 250 metres of the application area in the Ecologia survey (BHPBIO, 2012). The Ecologia survey recorded an additional conservation significant species, the Marsh Sandpiper (*Tringa stagnatilis*). This species was recorded more than 100 metres from the application area and is listed as Migratory under the EPBC Act and Schedule 3 of the WC Act (BHPBIO, 2012)

There were two records of Northern Quoll adjacent to the application area (BHPBIO, 2012). No natural denning habitat occurs within the application area (BHPBIO, 2012). Suitable denning and foraging habitat is available in the surrounding area and Northern Quolls are unlikely to be reliant on any natural habitats occurring within the application area (BHPBIO, 2012).

No suitable roosts for either the Pilbara Orange Leaf-Nosed Bat or the Ghost Bat are located within the application area (BHPBIO, 2012). Both species have been recorded from two nearby caves during the fauna surveys. BHPBIO have excluded these caves and both are more than 50 metres from the application area (BHPBIO, 2012). Long term monitoring of these caves since 2007 found the caves are only used by Ghost Bats at night by foraging individuals. Pilbara Orange Leaf Nosed Bats likely use the caves as night roosts for night time visitation by foraging individuals (Specialised Zoological, 2012 as quoted in BHPBIO, 2012). Both species may forage over the habitats within the application and also in the surrounding area (BHPBIO, 2012).

The Bush Stone-curlew was recorded during the ENV survey in minor drainage habitat approximately 250 metres from the application area (BHPBIO, 2012). While suitable breeding and foraging habitat is available in the application area, it is also widely available in the surroundings, and this species is unlikely to rely just on habitats within the application area (BHPBIO, 2012).

The Rainbow Bee-eater was recorded in the vicinity of the application area and is expected to forage within the alluvial plain habitat within the application area (BHPBHIO, 2012). This species is common and widespread in the Pilbara and no breeding/nesting habitat is present within the application area (BHPBIO, 2012). Therefore, the Rainbow Bee-eater is not likely to be reliant on habitat within the application area.

Given the potentially significant fauna habitat types, such as gorge/gullies and drainage lines, have been excluded from the application area it is unlikely to comprise significant habitat for fauna indigenous to Western Australia.

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

Methodology BHPBIO (2012)
Ecologia (2005)
ENV (2011)

(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 or within 150 kilometres of the application area (GIS Database).

A flora and vegetation survey was conducted over the application area by botanists from Astron in March and April 2011 and no Threatened Flora were recorded (Astron, 2012).

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

Methodology Astron (2012)
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 nearest recorded TEC is located approximately 285 kilometres north-east of the application area (GIS Database).

No TECs were identified during the flora and vegetation survey conducted by Aston botanists (Astron, 2012).

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

Methodology Astron (2012)
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 and Great Sandy Desert Interim Biogeographic Regionalisation for Australia (IBRA) bioregions in which over 99% of the pre-European vegetation remains (see table) (Government of Western Australia, 2011; GIS Database). This gives both IBRA regions 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:

93: Hummock grasslands, shrub steppe; kanji over soft spinifex;
117: Hummock grasslands, grass steppe; soft spinifex; and
171: Hummock grasslands, low tree steppe; snappy gum over soft spinifex and *Triodia brizioides* (Government of Western Australia, 2011; GIS Database).

Over 95% of all of these vegetation associations remain at a state level and over 99% of each remains at a bioregional level (see table) (Government of Western Australia, 2011). 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 – Great Sandy Desert	29,538,801	29,535,815	~99.99	Least Concern	2.7
IBRA Bioregion – Pilbara	17,804,427	17,729,352	~99.58	Least Concern	6.3
Beard Veg Assoc. – State					
93	3,044,310	3,040,641	~99.88	Least Concern	0.4
117	919,519	879,981	~95.70	Least Concern	12.9
171	331,952	330,643	~99.61	Least Concern	-
Beard Veg Assoc. – Great Sandy Desert Bioregion					
117	467,579	467,122	~99.9	Least Concern	0.2
Beard Veg Assoc. – Pilbara Bioregion					
93	3,042,114	3,038,472	~99.88	Least Concern	0.4
171	331,307	330,026	~99.61	Least Concern	-

* Government of Western Australia (2011)
** 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 (2011)
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 watercourses or wetlands within the application area (GIS Database). The De Grey River is a major river system in the locality and one of its tributary creeks, Egg Creek, is 15 metres from the application area at one point, although it is generally more than 250 metres from the application area (BHPBIO, 2012). Several minor non-perennial watercourses cross the application area (GIS Database).

The Astron flora and vegetation survey identified several vegetation associations present in watercourse habitat and three of these occur within the application area. Vegetation association 3 is present in a wide flowline on the eastern side of the application area, vegetation association 5 is recorded in a series of flow lines on the west side of the application area, and vegetation association 6a is recorded in creek lines within pindan soils in the west of the application area (Astron, 2012).

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

Methodology Astron (2012)
BHPBIO (2012)
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, Callawa, Capricorn, Nita and Uaroo 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 Callawa Land System is characterised by highly dissected low hills, mesas and gravelly plains of sandstone and conglomerate supporting soft and hard spinifex grasslands (Van Vreeswyk et al., 2004). The system is not prone to degradation or erosion and is subject to fairly regular burning (Van Vreeswyk et al., 2004).

The Capricorn Land System is characterised by hills and ridges of sandstone and dolomite supporting shrubby hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). The stony surfaces of the landforms in this land system provide resistance to erosion (Van Vreeswyk et al., 2004).

The Nita Land System is characterised by sandplains supporting shrubby soft spinifex grasslands with occasional trees (Van Vreeswyk et al., 2004). This land system has very low occurrences of erosion (Van Vreeswyk et al., 2004).

The Uaroo Land System is characterised by broad sandy plains supporting shrubby hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). There is occasionally some erosion but generally the system is not susceptible to erosion (Van Vreeswyk et al., 2004).

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

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

(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-Meentheena pastoral lease, a former leasehold proposed for conservation, which is located approximately 63 kilometres south-east 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 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 or wetlands within the application area (GIS Database). The De Grey River is a major river system in the locality and one of its tributary creeks, Egg Creek, is 15 metres from the application area at one point, although it is generally more than 250 metres from the application area (BHPBIO, 2012). Several minor non-perennial watercourses cross the application area (GIS Database). Egg Creek and the minor ephemeral drainage lines are generally dry and sandy and only flow during sustained high intensity rainfall events associated with cyclones and rain depressions (BHPBIO, 2012).

The application area is covered by BHPBIO's Goldsworthy Iron Ore Mining Operations Environmental Management Plan Revision 4 and appropriate surface water management practices will be implemented to minimise erosion and minimise potential impacts on the quality of surface water (BHPBIO, 2012). Erosion and sediment control measures and clean water diversions (e.g. culverts, bunds/windrows, diversion channels) will be designed and installed where required in the vicinity (BHPBIO, 2009). The clearing is unlikely to cause deterioration in the quality of surface or underground water (BHPBIO, 2012).

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the De Grey River Water Reserve which is located approximately 26 kilometres west of the application area (GIS Database).

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

Methodology BHPBIO (2009)
BHPBIO (2012)
GIS Database:
- Hydrography, Linear
- Public Drinking Water Source 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 located within the De Grey River and Coastal catchment areas of the De Grey River basin, and the Sandy Desert - Lake Dora catchment of the Sandy Desert basin (GIS Database). The majority of the application area is within the De Grey River catchment, which has an area of 845,936 hectares, while small parts of the application area are within the Coastal catchment, 333,630 hectares, and the Sandy Desert - Lake Dora catchment, 29,276,950 hectares (GIS Database). Give the size of the area to be cleared (150 hectares) in relation to the size of the catchment areas, 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:
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim over the area under application: WC99/8 (GIS Database). This claim has been registered with the 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*.

According to available databases, there are multiple 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 and Conservation and the Department of Water to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The clearing permit application was advertised on 14 January 2013 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received concerned about the cumulative impacts of clearing. This is addressed in Principle (e).

Methodology

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

4. References

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

Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

Ecologia (2005) Goldworthy Extension Project Biological Assessment Survey. Report Prepared by Ecologia Environment for BHP Billiton Iron Ore, May 2005.

ENV (2011) Nimingarra and Shay Gap Vertebrate Fauna Survey - Interim Summary Report. Report Prepared by ENV Australia for BHP Billiton Iron Ore, June 2011.

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Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

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, 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.