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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3042/1
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*, ML 244SA, (AML 70/244)
Local Government Area: Shire of East Pilbara
Colloquial name: Jinayri Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
65		Mechanical Removal	Mineral Exploration

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 and are useful to look at vegetation extent in a regional context. Two Beard Vegetation Associations are located within the application area (GIS Database):

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

82: Hummock grasslands, low tree steppe; Snappy Gum over *Triodia wiseana*.

ENV Australia (2009) undertook a Level 2 flora and vegetation survey of the Jinayri Mineral Lease (244SA) between 4 and 20 March 2008. A total of 324 quadrats, each 50 metres x 50 metres (the standard size used for flora surveys in the Pilbara bioregion) were surveyed.

The area subject to this clearing permit application represents a smaller section of the area surveyed by ENV Australia (2009). A total of 88 quadrats were established in the proposed clearing area, and the following 11 vegetation communities were described from five overarching vegetation types:

Woodland

W1 (Major drainage line) - *Eucalyptus victrix*, *Corymbia hamersleyana* and *E. xerothermica* woodland over *Acacia pruinocarpa* high open shrubland over *A. pyrifolia* and *Petalostylis labicheoides* open shrubland over *Tephrosia rosea* low open shrubland over *Triodia longiceps* and *T. pungens* very open hummock grassland over *Chrysopogon fallax* and *Themeda triandra* open tussock grassland over *Cleome viscosa* very open herbland;

Low Woodland

LW1 (Secondary drainage line) - *Eucalyptus xerothermica*, *Corymbia hamersleyana* and *Acacia aneura* low woodland over *Petalostylis labicheoides* and *Rulingia luteiflora* shrubland over *Dipteracanthus australasicus subsp. australasicus* and *Senna notabilis* low open shrubland over *Triodia pungens* very open hummock grassland over *Chrysopogon fallax*, *Paspalidium clementii* and *Sporobolus australasicus* tussock grassland;

LW2 (Drainage line/floodplain) - *Corymbia hamersleyana*, *Eucalyptus xerothermica* and *Acacia aneura var. intermedia* low woodland over *A. catenulata subsp. occidentalis*, *A. pruinocarpa* and *Eremophila longifolia* high shrubland over *A. bivenosa*, *A. pachyacra*, *A. ancistrocarpa* and *Eremophila forrestii subsp. forrestii* shrubland over *Triodia pungens* and *T. sp. Shovelanna Hill* (S. van Leeuwen 3835) hummock grassland over *Themeda triandra* and *Chrysopogon fallax* tussock grassland;

LW3 (Gorge/steep gully) - *Corymbia ferriticola* and *Eucalyptus leucophloia subsp. leucophloia* low woodland over *Ficus brachypoda*, *Grevillea wickhamii subsp. hispidula* and *Dodonaea viscosa subsp. mucronata* open shrubland over *Acacia arida*, *Ptilotus obovatus* and *Astrotricha hamptonii* low open shrubland over *Triodia pungens* hummock grassland over *Themeda triandra* and *Cymbopogon procerus* very open tussock grassland;

LW4 (Minor drainage line) - *Corymbia hamersleyana* and *Eucalyptus leucophloia subsp. leucophloia* low woodland over *Acacia tumida var. pilbarensis* and *Petalostylis labicheoides* open shrub over *A. monticola*, *A. ancistrocarpa* open shrubland over *Triodia pungens* and *T. sp. Shovelanna Hill* (S. van Leeuwen 3835) open hummock grassland over *Themeda triandra* tussock grassland;

Low Open Woodland

LOW1 (Drainage levee) - *Corymbia hamersleyana*, *Eucalyptus xerothermica* and *Acacia catenulata subsp. occidentalis* low open woodland over *Petalostylis labicheoides* high open shrubland over *A. bivenosa*, *Rulingia luteiflora* and *Gossypium robinsonii* shrubland over *Triodia pungens* open hummock grassland over *Themeda triandra* and **Cenchrus ciliaris* open tussock grassland;

LOW4 (Hill crests and slopes) - *Eucalyptus Leucophloia subsp. leucophloia* low open woodland over *Hakea chordophylla* scattered tall shrubs over *Acacia arida*, *Goodenia stobbsiana*, *Indigofera monophylla* and *Gompholobium karijini* low shrubland over *Triodia sp. Shovelanna Hill* (S. Van Leeuwen 3835) hummock grassland;

LOW5 (Hill crests and slopes) - *Eucalyptus leucophloia subsp. leucophloia* low open woodland over *Hakea chordophylla* scattered tall shrubs over *Acacia hilliana*, *A. adoxa var. adoxa*, *Goodenia stobbsiana* and *Gompholobium karijini* low shrubland over *Triodia sp. Shovelanna Hill* (S. Van Leeuwen 3835) hummock grassland;

LOW6 (Undulating low hills) - *Eucalyptus leucophloia subsp .leucophloia* low open woodland over *Hakea chordophylla* scattered high shrubs over mixed species scattered shrubs over *Triodia sp. Shovelanna Hill* (S. Van Leeuwen 3835) scattered hummock grasses over *Eriachne mucronata* very open tussock grassland;

Scattered Low Trees

SLT1 (Calcrete undulating plain) - *Eucalyptus leucophloia subsp. leucophloia* and *Corymbia hamersleyana* scattered low trees over *Hakea chordophylla* scattered tall shrubs over *Acacia spondylophylla*, *A. arida* and *A. hilliana* low shrubland over *Triodia sp. Shovelanna Hill* (S. van Leeuwen 3835) hummock grassland;

High Shrubland

HS1 (Breakaway cliff slopes) - *Acacia catenulata subsp. occidentalis*, *A. aneura var. intermedia* and *A. aneura var. pilbarana*, *Grevillea berryana* high shrubland over *Eremophila latrobei subsp. aff. filiformis*, *Dodonaea petiolaris* and *Scaevola acacioides* shrubland over *Triodia pungens* and *Triodia wiseana* open hummock grassland.

* = introduced flora species

Clearing Description

BHP Billiton Iron Ore Pty Ltd (hereafter referred to as BHP Billiton Iron Ore) have applied for a Purpose Permit to clear up to 65 hectares of native vegetation within an application area of approximately 3,833 hectares (GIS Database). The proposed clearing will allow the proponent to undertake the second phase of an exploration drilling program (colloquially named the Jinayri project) approximately 60 kilometres north-west of Newman. Vegetation clearing will be necessary to establish access tracks and drill pads for the exploration program (BHP Billiton Iron Ore, 2009).

Vegetation Condition

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994);

to

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

Comment

The vegetation condition rating is derived from information provided by ENV Australia (2009). A majority of the proposed clearing area was rated as being in very good condition as the area is largely inaccessible to vehicles and cattle. Disturbance was limited to very few sites and included the presence of access tracks, weed invasion and/or damage by fire (ENV Australia, 2009).

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 proposed clearing area is located approximately 60 kilometres north west of Newman in the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). 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). Rare features of the subregion include gorges of the Hamersley Ranges (particularly those within Karijini National Park), Palm Spring, Duck Creek and Themeda grasslands (CALM, 2002). Permanent spring systems such as Weeli Wolli are also listed for their importance as refugia (CALM, 2002).

The proposed clearing area forms part of the catchment for the Weeli Wolli Creek (located approximately 2.8 kilometres north-west at its nearest point), but supports no springs or permanent watercourses or wetlands (BHP Billiton Iron Ore, 2009; GIS Database).

ENV Australia (2009) surveyed 88 quadrats (50 metres x 50 metres) within the proposed clearing area, as part of a larger flora and vegetation survey of the Jinayri Mining Lease that included 324 quadrats. A total of 286 plant taxa from 42 families and 117 genera were identified within the proposed clearing area. Few annuals and ephemerals were present during the survey due to low rainfall in the months preceding the survey. A number of taxa were not in flower which hampered identification. These factors are likely to have impacted upon the survey findings (ENV Australia, 2009). Nevertheless, the number of taxa recorded in the proposed clearing

area compares well with other larger project areas surveyed in the surrounding area. For example, 395 plant taxa were recorded in the larger Jinayri Mining lease survey (which included 324 quadrats), 328 plant taxa were recorded from a 7,615 hectare survey area at South Flank and 422 plant taxa were recorded from the 20,000 hectare survey area as part of the original Area C survey (ENV Australia, 2009).

A total of 11 vegetation communities were identified as occurring within the proposed clearing area (ENV Australia, 2009). No Threatened Ecological Communities or Priority Ecological Communities were recorded. No Declared Rare Flora species were recorded. Four Priority Flora species were recorded, all in low numbers (ENV Australia, 2009). The presence of Priority Flora increases the conservation value attributed to the proposed clearing area.

ENV Australia (2009) identified one of the 11 vegetation communities within the proposed clearing area as being of interest (Scattered low trees on a calcrete undulating plain). This vegetation community is restricted to the north-west corner of the proposed clearing area, occupying an area of approximately 286 hectares (ENV Australia, 2009; BHP Billiton Iron Ore, 2009). Vegetation of this community differs to surrounding vegetation communities, and ENV Australia (2009) explains that this is most likely attributed to the soil being derived from calcrete. The calcrete platform underlying this vegetation community is associated with the Oakover Land System which forms a small part of the Pilbara bioregion (152,900 hectares, or 0.8% of the total land area of the Pilbara). The Priority 1 flora species *Goodenia sp. East Pilbara* was recorded from this vegetation community, preferring low undulating plains with calcrete pebbles (ENV Australia, 2009). ENV Australia (2009) considers this particular vegetation community to be under represented in a local and regional sense.

BHP Billiton Iron Ore (2009) compiled information to support assessment of this clearing permit application, including an analysis of potential impacts to the vegetation community noted as of interest by ENV Australia (2009). BHP Billiton Iron Ore reports that the vegetation community of interest is noted as such due to its association with calcrete, a typical feature of the Oakover Land System. Van Vreeswyk et al (2004), cited in BHP Billiton Iron Ore (2009) has mapped approximately 2,928 hectares of the Oakover Land System in the Jinayri area, and in excess of 150,000 hectares at the bioregional level. This information would suggest that the vegetation type associated with calcrete plains and soils derived from calcrete in the proposed clearing area is unlikely to be significantly impacted in a local or regional sense by this proposal.

Five introduced flora species were recorded within the proposed clearing area: Buffel Grass (*Cenchrus ciliaris*), Spiked Malvastrum (*Malvastrum americanum*), Whorled Pigeon Grass (*Setaria verticillata*), Bipinnate Beggartick (*Bidens bipinnata*) and Purslane (*Portulaca oleracea*). Weeds were not recorded in large numbers, therefore it is important that earth moving machinery brought into the proposed clearing area does not introduce or spread weeds to non-infested areas. The most effective way of achieving this is to ensure that all machinery is thoroughly cleaned to remove soil, plant matter and propagules prior to entering the lease subject to this clearing permit application. In addition, vigilant hygiene practices will minimise the risk of weed seeds or weed-affected soil material being transported off site. Should a clearing permit be granted, it is recommended that appropriate conditions be imposed with respect to weed management.

A dual season terrestrial vertebrate fauna survey of the Jinayri area yielded a total of 142 species comprising 22 species of mammals (including four introduced mammals), 70 species of bird, 48 species of reptile and two amphibian species (Ecologia Environment Pty Ltd, 2006). The species richness is comparable with other surveys of similar size and scope which have been undertaken surrounding the project area (Ecologia Environment Pty Ltd, 2006). The number of bird species recorded within the proposed clearing area (70) would suggest that the area is species-rich in bird fauna, however this is to be expected in the Pilbara bioregion where fauna are generally highly mobile and have a “boom or bust” life cycle (Ecologia Environment Pty Ltd, 2006). Post-cyclonic conditions during the 2nd phase of the fauna survey can also account for some unusual bird recordings (Ecologia Environment Pty Ltd, 2006). Similarly, the number of reptile species recorded (48) would suggest that the area is species-rich in reptiles. This finding is not unexpected given that the 1st phase of the fauna survey was conducted to coincide with peak reptile activity (Ecologia Environment Pty Ltd, 2006).

Whilst the proposed clearing area includes a range of landforms, vegetation communities (most of which are in excellent condition) and fauna habitat types, biological information presented in support of this clearing permit application and other information gathered by the Assessing Officer, DMP, would suggest that the area is characteristic of other areas of native vegetation in the local and regional area and not of high biodiversity value.

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

Methodology

BHP Billiton Iron Ore (2009).
CALM (2002).
Ecologia Environment Pty Ltd (2006).
ENV Australia (2009).
GIS Database:
- Hydrography, linear.

(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

Ecologia Environment Pty Ltd (2006) conducted a Level 2 fauna survey of the Jinayri area in accordance with the Environmental Protection Authority (EPA) Position Statement No. 3: *'Terrestrial Biological Surveys as an element of biodiversity protection*' (EPA, 2002) and Position Statement No. 56: *'Guidance for the Assessment of Environmental Factors - terrestrial fauna for Environmental Impact Assessment in Western Australia'* (EPA, 2004).

Prior to undertaking a field survey, Ecologia Environment Pty Ltd (2006) conducted a desktop search in order to compile a list of species expected to occur in the project area. This involved a search of available databases and literature on fauna surveys undertaken in the local area. A dual season terrestrial vertebrate fauna survey of the proposed clearing area was undertaken by Ecologia Environment Pty Ltd (2006) between 17 - 31 October 2006 and 27 March - 5 April 2007. A variety of systematic and non-systematic sampling techniques were employed during the survey. These included (Ecologia Environment Pty Ltd, 2006):

- cage trapping (216 trap nights);
- pit traps (1,080 trap nights);
- funnel traps (1,062 trap nights);
- elliot traps (2,160 trap nights);
- bird censusing (40 hours);
- opportunistic searching (62.5 hours);
- bat recording (16.5 hours); and
- night searching (33 hours).

Six sites were selected for the fauna survey, representing a broad cross-section of the habitat types within the proposed clearing area. These included (Ecologia Environment Pty Ltd, 2006):

- ridge top and scree slope;
- minor drainage gully;
- stony plain with mulga and eucalypts over spinifex mounds;
- alluvial plain supporting mulga woodland;
- rocky scree slope supporting mulga and spinifex; and
- mesa top supporting open snappy gum woodland over spinifex.

A total of 142 species were recorded from the fauna survey, comprising 22 species of mammals (including four introduced mammals), 70 species of bird, 48 species of reptile and two amphibian species (Ecologia Environment Pty Ltd, 2006). The total of 142 species included two bird species listed under Schedule 1 of the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* as 'Migratory' and 'Marine' (Ecologia Environment Pty Ltd, 2006). These were the Rainbow-bee Eater (*Merops ornatus*) and the Fork-tailed Swift (*Apus pacificus*). No species listed as rare or endangered under the *Wildlife Conservation Act 1950* were recorded (Ecologia Environment Pty Ltd, 2006). Three species listed on the Department of Environment and Conservation (DEC) Priority Fauna list were also included in the total number of species recorded. These were: Australian Bustard (*Ardeotis australis*), Western Pebble-mound Mouse (*Pseudomys chapmani*) and Ghost bat (*Macroderma gigas*).

Impacts to fauna species as a result of the proposed clearing are likely to include:

- direct mortality of fauna during vegetation clearing or vehicle strike;
- minor loss of habitat for foraging, shelter and/or nesting;
- habitat fragmentation;
- noise pollution;
- direct and indirect impacts associated with dust; and
- increased risk of fire.

The proposed clearing area is large (3,833 hectares) and includes a range of landforms including low parallel ridges, gorges, gullies, breakaway cliffs, minor and major drainage lines, undulating plains, hilltops and hill slopes (ENV Australia, 2009). A total of 11 vegetation communities were recorded within the proposed clearing area (ENV Australia, 2009). Landforms and their associated vegetation communities comprise fauna habitat.

Ecologia Environment Pty Ltd (2006) note that the Jinayri area is largely made up of the Newman land system (one of the largest land systems in the Pilbara and the most dominant of the Hamersley Ranges). Landforms, soils, vegetation and drainage patterns within the proposed clearing area are therefore well represented elsewhere in the Pilbara and across the Hamersley Ranges (Ecologia Environment Pty Ltd, 2006).

It is acknowledged that clearing will be non-contiguous and will occur within an application area of approximately 3,833 hectares. The proposed clearing of up to 65 hectares represents approximately 1.7% of the application area. Widespread clearing will not take place. Significant impacts to fauna or fauna habitat are unlikely.

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

Methodology Ecologia Environment Pty Ltd (2006).
ENV Australia (2009).
EPA (2002).
EPA (2004).

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

Comments

Proposal is not likely to be at variance to this Principle

According to available GIS databases, there are no known records of Declared Rare Flora (DRF) within the proposed clearing area (GIS Database). However, *Lepidium catapycnon* (R) has been recorded from within 6 kilometres of the proposed clearing area at Box Gorge and north of Gorge Rockhole (GIS Database). According to the Western Australian Herbarium (2009), *Lepidium catapycnon* is known to occur on skeletal soils on hillsides in the Pilbara bioregion. ENV Australia (2009) did not locate *Lepidium catapycnon* or any other DRF species during a flora and vegetation survey of the proposed clearing area in March 2008.

ENV Australia (2009) located four Priority Flora species within the proposed clearing area:

1. *Goodenia sp. East Pilbara* (P1) – This species was recorded from seven quadrats, with one individual plant at each site. ENV Australia (2009) report that these records are the only ones documented from the entire Jinayri Mineral Lease (ML 244SA), therefore the proposed clearing may potentially impact on the local representation of this species.

2. *Goodenia nuda* (P3) – This species was recorded from two floodplain quadrats, with one individual plant present at each site. ENV Australia (2009) report that these records are the only ones documented from the entire Jinayri Mineral Lease (ML 244SA), therefore the proposed clearing may potentially impact on the local representation of this species.

3. *Indigofera gilesii subsp. gilesii* (P3) – This species was recorded from two rocky hilltop locations, with one individual plant at each site; and

4. *Tephrosia sp. Pilbara Ranges* (P3) – This species was recorded from two hillslope locations, with one individual plant at each site (ENV Australia, 2009).

The Assessing Officer, DMP, notes that it is possible that more individuals of these Priority Flora taxa occur in the proposed clearing area that were not recorded by ENV Australia (2009).

BHP Billiton Iron Ore (2009) report that a suitably qualified botanist will be employed to traverse proposed access tracks, drill lines and drill pads prior to clearing to search for conservation significant flora taxa. Where these are identified they will be avoided wherever possible.

The proposed clearing is non-contiguous in nature and will consist of discrete drill pads and access tracks over an area of approximately 3,833 hectares. The proposed clearing (65 hectares) represents approximately 1.7% of the application area, therefore there is scope for the proponent to avoid conservation significant flora taxa where they occur.

Should a clearing permit be granted, it is recommended that conditions be imposed for the purpose of minimising impacts to conservation significant flora taxa.

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

Methodology BHP Billiton Iron Ore (2009).
ENV Australia (2009).
Western Australian Herbarium (2009).
GIS Database:
- Declared Rare and Priority Flora List.

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

Comments

Proposal is not likely to be at variance to this Principle

There are no known Threatened Ecological Communities (TEC's) within the proposed clearing area (ENV Australia, 2009; GIS Database). The nearest known TEC is the Ethel Gorge aquifer stygobiont community, located approximately 65 kilometres to the south-east (BHP Billiton Iron Ore, 2009).

No Priority Ecological Communities (PEC's) were located within the proposed clearing area (ENV Australia, 2009). The nearest known PEC is the Weeli Wolli Spring Community, located approximately 3.8 kilometres north/north-west from the proposed clearing area. This community is an arid zone wetland supporting a unique community of flora and fauna, some of which are endemic to Weeli Wolli Spring (BHP Billiton Iron Ore, 2009).

Given the distance between the proposed clearing and the Weeli Wolli Springs Community, and the low impact, non-contiguous nature of the clearing, it is unlikely that the proposed clearing will significantly impact upon the PEC.

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

Methodology BHP Billiton Iron Ore (2009).
ENV Australia (2009).
GIS Database:
- Threatened Ecological Communities.

(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 area applied to clear is within the Interim Biogeographic Regionalisation of Australia (IBRA) Pilbara bioregion (GIS Database). According to Shepherd et al (2001) there is approximately 99.9% of the pre-European vegetation remaining in the Pilbara bioregion.

The vegetation of the application area is classified as Beard Vegetation Association 18: Low woodland; Mulga (*Acacia aneura*) and Beard Vegetation Association 82: Hummock grasslands, low tree steppe; Snappy Gum over *Triodia wiseana* (GIS Database). There is approximately 100% of the pre-European vegetation remaining of both Beard Vegetation Associations 18 and 82 in the Pilbara bioregion (Shepherd et al, 2001).

Beard Vegetation Associations 18 and 82 are both represented in conservation reserves within the Pilbara bioregion (16.8 and 10.2% of the pre-European vegetation extent respectively), and the area proposed to clear does not represent a significant remnant of vegetation in the wider regional area. The proposed clearing will not reduce the extent of Beard Vegetation Associations 18 or 82 below the current recognised threshold level of 30% of the pre-clearing extent of the vegetation type (below which species loss accelerates exponentially at an ecosystem level) (EPA, 2000).

It is acknowledged that iron ore mining activities in the Pilbara have resulted in an increase in native vegetation clearing at the bioregional scale in recent years. This trend is expected to continue with proposed BHPBIO and Rio Tinto Iron Ore expansion projects. It will therefore become increasingly important in the future to consider the cumulative impacts of native vegetation clearing both locally and regionally.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~99.9	least concern	6.3
Beard veg assoc. – State					
18	19,892,437	19,890,348	~100	least concern	2.1
82	2,565,930	2,565,930	~100	least concern	10.2
Beard veg assoc. – Bioregion					
18	676,561	676,561	~100	least concern	16.8
82	2,563,610	2,563,610	~100	least concern	10.2

* Shepherd et al. (2001) updated 2005
** 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).
EPA (2000).
Shepherd et al (2001).
GIS Databases:
- Interim Biogeographic Regionalisation of Australia.
- Pre-European Vegetation.

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

Comments

Proposal is at variance to this Principle

Five of the eleven vegetation communities that ENV Australia (2009) identified within the proposed clearing area are associated with watercourses:

- W1 (Major drainage line);
- LW1 (Secondary drainage line);
- LW2 (Drainage line/floodplain) ;
- LW4 (Minor drainage line); and
- LOW1 (Drainage levee).

It is likely that the proposed clearing will result in minor clearing of vegetation growing in, or in association with, an environment associated with a watercourse or wetland.

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

BHP Billiton Iron Ore (2009) note that there are no permanent waterholes, lakes or perennial watercourses in the proposed clearing area which are considered significant. Analysis of available GIS Databases supports this claim (GIS Database). In addition, ENV Australia (2009) note that all of the vegetation communities associated with watercourses in the proposed clearing area are well represented throughout the Pilbara bioregion. It is therefore considered unlikely that the proposed clearing will result in impacts to significant watercourses or wetlands.

Methodology BHP Billiton Iron Ore (2009).
ENV Australia (2009).
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

Land system mapping by the Department of Agriculture Western Australia has mapped a variety of land systems for the Pilbara bioregion. Land systems are mapped based on biophysical features such as soil and landform type, geology, geomorphology and vegetation type (Van Vreeswyk et al, 2004). The proposed clearing area includes five land systems (GIS Database). A broad description of each land system is given below:

Newman Land System - This land system is characterised by hills and ranges, supporting hard spinifex grasslands. Relief can be up to 450 metres. The Newman land system is generally not prone to erosion (Van Vreeswyk et al, 2004).

Platform Land System - This land system is characterised by dissected slopes and raised plains supporting hard spinifex grasslands. This land system is not susceptible to erosion (Van Vreeswyk et al, 2004).

Boolgeeda Land System - This land system is characterised by stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and Mulga shrublands. Vegetation is generally not prone to degradation and this land system is not susceptible to erosion (Van Vreeswyk et al, 2004).

Oakover Land System - This land system is characterised by breakaways, mesas, plateaux and stony plains of calcrete supporting hard Spinifex grasslands. This land system is not generally prone to degradation or soil erosion.

McKay Land System - This land system is characterised by hills, ridges, plateaux remnants and breakaways supporting hard Spinifex grasslands. This land system is not prone to degradation or soil erosion.

Based on the presence of rocky and stony erosion resistant surfaces within the proposed clearing area, the risk of the proposed clearing causing appreciable land degradation is considered low. Notwithstanding, it is recommended that conditions be imposed to ensure that progressive rehabilitation is undertaken throughout the life of the drilling program, should a clearing permit be granted. This will minimise the potential for land degradation of cleared areas and assist natural regeneration.

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 at variance to this Principle

There are no conservation reserves in close proximity to the proposed clearing area (GIS Database). The nearest conservation reserve is the Karijini National Park, located approximately 70 kilometres north-west (GIS Database).

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

Methodology GIS Database:
- CALM Managed Lands and Waters.

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

Comments

Proposal is not likely to be at variance to this Principle

The proposed clearing area is located in an upper catchment above Weeli Wolli Creek (BHP Billiton Iron Ore, 2009). A number of minor, non-perennial drainage lines and creeks occur in the proposed clearing area which feed into the Weeli Wolli Creek, which is approximately 2.8 kilometres from the proposed clearing area at its nearest point (BHP Billiton Iron Ore, 2009). Given the non-contiguous nature of the proposed clearing it is unlikely that the quality of surface water would be compromised by this proposal. As a precaution, BHP Billiton Iron Ore (2009) will construct sediment traps and/or sumps at all sites where erosion and sediment release can occur.

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database). No investigations have been carried out to assess the potential for vegetation clearing to affect groundwater levels or quality, however the proposed clearing of widely spaced drill pads and access tracks within an application area in excess of 3,800 hectares is unlikely to have significant impacts upon the water table (BHP Billiton Iron Ore, 2009).

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

Methodology BHP Billiton Iron Ore (2009).
GIS Database:
- Public Drinking Water Source Areas.

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

Comments

Proposal is not likely to be at variance to this Principle

The average annual rainfall of Newman is 310 millimetres (BHP Billiton Iron Ore, 2009). Rainfall in the Pilbara is highly erratic and variable, with intense rainfall events typically associated with thunderstorms and cyclonic activity (BHP Billiton Iron Ore, 2009). Localised flooding is known to occur following intense rainfall events, however the incidence or intensity of flooding is not likely to be significantly influenced by the proposed vegetation clearing. Furthermore, much of the proposed clearing is planned to take place on a low relief plateau which forms part of the Hamersley Range (BHP Billiton Iron Ore, 2009). Rainfall in the area is therefore likely to run off into the broad valleys and drainage systems lower in the landscape.

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

Methodology BHP Billiton Iron Ore (2009).

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

Comments

There is one native title claim over the area under application (GIS Database). This claim (WC99/004) has been registered with the National Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining 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 is one registered Site of Aboriginal Significance within the proposed clearing area, and another two sites within 2 kilometres of the proposed clearing area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

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.

No submissions were received from direct interest parties or members of the public when the clearing permit application was advertised for comment.

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

4. Assessor's comments

Comment

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

Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for the purposes of weed management, rehabilitation, record keeping and permit reporting.

5. References

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Western Australian Herbarium (2009). Florabase - The Western Australian Flora. Department of Environment and Conservation. http://florabase.calm.wa.gov.au/

6. Glossary

Acronyms:

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

Definitions:

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

P1 **Priority One - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P2 **Priority Two - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P3 **Priority Three - Poorly Known taxa**: taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

P4 **Priority Four – Rare taxa**: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

R **Declared Rare Flora – Extant taxa** *(= Threatened Flora = Endangered + Vulnerable)*: taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

X **Declared Rare Flora - Presumed Extinct taxa**: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

Schedule 1 **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.

Schedule 2 **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.

Schedule 3 **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.

Schedule 4 **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

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

P1 **Priority One: Taxa with few, poorly known populations on threatened lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P2 **Priority Two: Taxa with few, poorly known populations on conservation lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P3 **Priority Three: Taxa with several, poorly known populations, some on conservation lands**: Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P4 **Priority Four: Taxa in need of monitoring**: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

P5 **Priority Five: Taxa in need of monitoring**: Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

EX **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

EX(W) **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past

range; or

(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

CR **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

EN **Endangered:** A native species which:

(a) is not critically endangered; and

(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

VU **Vulnerable:** A native species which:

(a) is not critically endangered or endangered; and

(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

CD **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.