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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3108/1
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)
Local Government Area: Shire Of East Pilbara
Colloquial name: Jinayri North Hydrological Drilling Programme

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
2.4		Mechanical Removal	Hydrological drilling, and associated works.

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. One Beard Vegetation Association is located within the application area (GIS Database):

Beard Vegetation Association 18 - Low woodland; mulga (*Acacia aneura*) (Shepherd et al, 2001).

Pilbara Flora (2009a) undertook a flora and vegetation survey of the proposed Jinayri North Hydrological Drilling Programme survey area during the summer rainfall season between the 11 and 13 March 2009. Information was collected from 27 quadrats and 29 GPS survey points. A total of 113 vascular taxa from 62 genera and 32 families were recorded from the vegetation survey areas. Sixteen vegetation communities were described from eight different types of topography within three landforms.

Landform: Hills

Vegetation Topography 1: Calcrete low hills.

1. *Corymbia* low open woodland over *Triodia* hummock grasslands with isolated *Eucalyptus* trees.
2. *Eucalyptus* low open woodland over *Triodia* hummock grasslands.
3. *Corymbia* low open woodland on *Triodia* hummock grasslands.
4. *Corymbia* low open woodland over *Petalostylis* shrubland over *Triodia* hummock grasslands.
5. *Corymbia* low open woodland over *Triodia* low sparse hummock grassland.
6. *Corymbia* low open woodland over *Acacia* low sparse shrubland over *Triodia* low sparse grassland.

Landform: Slopes

Vegetation Topography 2: Colluvial low slopes.

7. *Corymbia* low open woodland over *Acacia* shrubland over *Triodia* hummock grassland.
8. *Eucalyptus* mallee woodland over *Triodia* hummock grasslands.
9. *Triodia* hummock grassland.
10. *Eucalyptus* low open mallee woodland over *Triodia* hummock grassland.

Landform: Watercourses

Vegetation Topography 3: Major creek system.

11. *Eucalyptus* woodland.

Vegetation Topography 4: Broad creek calcrete hillsides.

12. *Eucalyptus* mid open woodland over *Themeda* open tussock grassland.

Vegetation Topography 5: Narrow creek colluvial slopes.

13. *Eucalyptus* low open mallee woodland over *Triodia* hummock grassland.

Vegetation Topography 6: Drainage line calcrete hillsides.

14. *Corymbia* low open woodland over *Triodia* low sparse hummock grassland.

Vegetation Topography 7: Broad alluvial drainage area.

15. *Eucalyptus* mid open woodland over *Themeda* open tussock grassland.

Vegetation Topography 8: Broad colluvial drainage area.

16. *Eucalyptus* low mid open mallee woodland over *Acacia* tall open shrubland.

Clearing Description BHP Billiton Iron Ore Pty Ltd (hereafter referred to as BHPBIO) have applied for a Purpose Permit to clear up to 2.4 hectares of native vegetation within an application area of approximately 40 hectares. The proposed clearing would allow the proponent to conduct the Jinayri North Hydrological Drilling Programme, and associated works. Five holes will be drilled for the Jinayri North Hydrological Drilling Programme with associated sumps and access tracks. The access tracks and monitoring wells will be retained for an ongoing monitoring program. They are unlikely to be rehabilitated during the life of the clearing permit.

Vegetation clearing will be undertaken using mechanical means, with cleared topsoil and vegetation to be left in-situ for use during rehabilitation (BHPBIO, 2009a).

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

Comment The vegetation condition rating is derived from information provided by Pilbara Flora (2009a).

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 is located approximately 72 kilometres northwest of Newman, occurring within the Shire of East Pilbara and the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) (GIS Database). The Hamersley subregion is characterised by 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 proposed clearing areas are located adjacent to (but not within) the Priority One Weeli Wolli Creek priority ecological community (PEC) (DEC, 2009a). The biodiversity values of Weeli Wolli Spring are high, with an excess of 120 native plants species and several species of conservation interest (DEC, 2009a).

Pilbara Flora conducted a one season Level 2 flora and vegetation survey over the proposed clearing areas during the summer rainfall period in March 2009, encountering a total of 113 vascular taxa from 62 genera and 32 families and a total of 16 vegetation types over three main landform units (Pilbara Flora, 2009a). The topography types consisted of calcrete low hills; colluvial slopes; and creek systems, consisting of drainage lines, creeks and drainage areas. No Declared Rare Flora (DRF) were recorded during the survey. One Priority Flora species, *Goodenia* sp. East Pilbara (AA Mitchell PRP 727) (calcrete form) (P1), was recorded during the survey. Although no Declared Weeds (under the *Agriculture and Related Resources Protection Act 1976*) were discovered within the proposed clearing areas, two introduced species were recorded during the survey; Mimosa Bush (*Vachellia farnesiana*) and Bipinnate Beggartick (*Bidens bipinnata*) (Pilbara Flora, 2009a). Should a clearing permit be granted, it is recommended that a condition be imposed for the purposes of weed management.

Pilbara Flora concluded that the 113 taxa collected during the survey over a small survey area consisting of very few landscape types reflected the high species diversity of the Pilbara region (Pilbara Flora, 2009a). The landform units were considered to be either locally or regionally widespread, and no landform units were considered rare, restricted or unique. As such, the high species diversity was not restricted to the survey area (Pilbara Flora, 2009a).

Pilbara Flora (2009b) undertook a desktop vertebrate fauna assessment of the proposed clearing area and a reconnaissance survey which consisted of identifying and mapping fauna habitat types. The proposed clearing areas consist of three general landform types and nine fauna habitat types. The surveys by Ecologia Environment (Ecologia) and ENV Australia Pty Ltd (ENV) conducted adjacent to the proposed clearing area yielded five species under State and Commonwealth conservation listings and eight migratory bird species (Pilbara Flora, 2009b). However, all of the described fauna habitat types are common throughout the Pilbara region (Pilbara Flora, 2009b).

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

Methodology

CALM (2002).
DEC (2009a).
Pilbara Flora (2009a).
Pilbara Flora (2009b).
GIS Database:
- Interim Biogeographic Regionalisation for Australia.

- Interim Biogeographic Regionalisation for Australia (subregions).
- Pre-European Vegetation.
- Rangeland Land System Mapping.

(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

Pilbara Flora (2009b) undertook a desktop vertebrate fauna assessment of the proposed clearing area and a reconnaissance survey which consisted of identifying and mapping fauna habitat types. A review of fauna survey reports by Ecologia (2006) and ENV (2008) and the results of these surveys were included in the fauna habitat assessment (Pilbara Flora, 2009b). Pilbara Flora (2009b) consulted the Department of Environment, Water, Heritage and the Arts (DEWHA's) Protected Matters Search Tool in addition to the information displayed in the reports.

Desktop studies identified 322 species of vertebrate fauna as potentially occurring in the area. A total of 153 vertebrate fauna species (consisting of one amphibian species, 60 reptile species, 65 bird species and 27 mammal species) were recorded in the ENV report (this also included vertebrate fauna data from the Ecologia (2006) report) (Pilbara Flora, 2009b).

Five species under State and Commonwealth conservation listings and eight migratory species were recorded in the Jinayri area by Ecologia and ENV (Pilbara Flora, 2009b). The Pilbara Leaf-nosed Bat, *Rhinonicteris aurantia* (VU; Schedule 1) is listed as a threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as a specially protected fauna under the *Wildlife Conservation Act 1950* (Pilbara Flora, 2009b). A blind snake, *Ramphotyphlops ganei* (P1); Western Pebble-mound Mouse, *Pseudomys chapmani* (P4); Ghost Bat, *Macroderma gigas* (P4); and Australian Bustard, *Ardeotis australis* (P4) are listed on the Department of Environment and Conservation (DEC) Priority Fauna list of poorly known fauna (Pilbara Flora, 2009b). The Black-shouldered Kite, *Elanus caeruleus* (Migratory); Black-breasted Buzzard, *Hamirostra melanosternon* (Migratory); Brown Goshawk, *Accipiter fasciatus* (Migratory); Collared Sparrowhawk, *Accipiter cirrhocephalus* (Migratory); Little Eagle, *Hieraaetus morphnoides* (Migratory); Brown Falcon, *Falco berigora* (Migratory); Rainbow Bee-eater, *Merops ornatus* (Migratory); and Fork-tailed Swift, *Apus pacificus* (Marine) are listed as either migratory or marine under the EPBC Act (Pilbara Flora, 2009b).

Of the conservation-significant vertebrate fauna species above, the Australian Bustard was sighted adjacent to the eastern-most proposed clearing area (Pilbara Flora, 2009b). The Australian Bustard is a nomadic species capable of utilising a range of different habitats (Pilbara Flora, 2009b). This species occurs across all mainland states but populations are concentrated for the semi-arid areas of Western Australia, Northern Territory and Queensland. Given the widespread nature of the species, the proposed clearing is unlikely to have any significant impact to the habitat for this species (Pilbara Flora, 2009b).

Pilbara Flora determined that there were three general landform types within the proposed clearing areas. These included calcrete platforms; colluvial slopes; and watercourses (Pilbara Flora, 2009b). Within these landform types, nine fauna habitat types were determined within the proposed clearing areas (Pilbara Flora, 2009b).

Pilbara Flora determined that the majority of the fauna habitat assessment areas consisted of calcrete low hills dissected by shallow valleys and creeklines and that none of those habitat types were considered as having any particularly unique or specialised features required for the conservation of rare or endangered fauna. Additionally, Pilbara Flora identified habitat types that could be potentially utilised by rare and endangered fauna. These habitat types included:

1. Scree pebble slopes for Western Pebble-mound Mouse mound construction;
2. Potential for avifauna roosting sites in tall trees;
3. Potential for avifauna nesting sites in branch hollows; and
4. Potential fauna shelter areas amongst creekline foliage and hummock grassland (Pilbara Flora, 2009b).

All of the described habitat types are common throughout the Pilbara region, with the last three habitat types being recorded from the creekline systems (Pilbara Flora, 2009b). No fauna of conservation significance were recorded within the proposed clearing areas, however active pebble mounds were sighted at five locations (Pilbara Flora, 2009b). Although the habitat within the proposed clearing areas was considered to be less than ideal for the Western Pebble-mound Mouse as the stone sizing was either too small or too large and the stones occurred at a relatively low level of abundance compared to surrounding areas, the presence of the Western Pebble-mound Mouse was inferred to occur within the proposed clearing areas (Pilbara Flora, 2009b). The Western Pebble-mound Mouse is deemed to be widespread throughout the Pilbara and the range extends into the Upper Gascoyne (Pilbara Flora, 2009b). Overall, it was considered highly unlikely that the Jinayri North Hydrological Drilling Programme would have any impact on the overall conservation significance of the Western Pebble-mound Mouse due to the species' widespread regional distribution compared to the relatively small area of proposed impact, and the commitment from BHPBIO to avoid recorded Western Pebble-mound Mouse mounds (BHP Billiton, 2009a; Pilbara Flora, 2009b).

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

Methodology BHPBIO (2009a).
Ecologia (2006).
ENV (2008).
Pilbara Flora (2009b).

(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

Pilbara Flora (2009a) conducted a desktop survey using the DEWHA Protected Matters Search Tool, a DRF and Priority Flora search conducted by the DEC and requested by ENV (2008), and review of literature to produce a list of DRF and Priority Flora species that could potentially occur in the Jinayri area (Pilbara Flora, 2009a). The DEWHA search was conducted over the broader application area centred on the vegetation survey area mid-point (-22.92944 E,119.1986 S) with a 50 kilometre buffer (Pilbara Flora, 2009a).

Pilbara Flora (2009a) determined from their desktop survey that there were two DRF and 38 Priority Flora species identified as potentially occurring within the survey area. A targeted flora field survey by Pilbara Flora (2009a) was conducted and no DRF species were located during the survey; however the P1 species, *Goodenia* sp. East Pilbara (AA Mitchell PRP 727) (calcrete form) was located within seven quadrats (ranging from single individuals to up to 20 plants). This species has been recently determined as a separate form of *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) that occurs on calcrete. *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (calcrete form) has also been recorded in the wider Jinayri area from a survey conducted by ENV in 2008. *Goodenia* sp. East Pilbara (AA Mitchell PRP 727) (calcrete form) is considered as being moderately common and widespread on the calcrete areas at Jinayri North, therefore it is unlikely that the removal of these plants will impact on the conservation significance of this species (Pilbara Flora, 2009a). BHPBIO have committed to avoid the plants wherever possible (BHPBIO, 2009a).

There are six locations of the DRF species *Lepidium catapycnon* located between approximately 2 kilometres and 33 kilometres from the proposed clearing areas (Pilbara Flora, 2009a; GIS Database). The two nearest locations of *L. catapycnon* (located approximately 2 kilometres northwest of the proposed clearing areas) are found within vegetation associations classified by Beard as pre-European vegetation association 82 (characterised by hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*) and is within the Newman land system (GIS Database).

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

Methodology ENV (2008).
Pilbara Flora (2009a).
GIS Database:
- Declared Rare and Priority Flora List.
- Pre-European Vegetation.
- Rangeland Land System Mapping.

(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 threatened ecological communities (TECs) located around or within the proposed clearing areas (GIS Database). The closest TEC is TEC 78: Ethel Gorge aquifer stygobiont community, located approximately 78 kilometres to the southeast of the proposed clearing areas (Pilbara Flora, 2009a).

The Weeli Wolli Creek PEC is located adjacent to the proposed clearing areas (directly adjacent to two of the proposed clearing areas) (Pilbara Flora, 2009a). The next-closest PEC is PEC 16: Coolibah-lignum flats: *Eucalyptus vitrix* over *Muehlenbeckia* Community, located 39 kilometres to the west southwest of the proposed clearing areas (Pilbara Flora, 2009a). PECs are not protected by State or Commonwealth legislation as they do not meet the criteria to be listed as a TEC, yet they are earmarked as areas of relatively high ecological values that are rare but not currently threatened (DEC, 2009b).

The Weeli Wolli Creek PEC is categorised as a Priority One PEC as it is a poorly known ecological community, with all or most of the area not actively managed for conservation (i.e., within active mineral leases) and for which current threats exist. Weeli Wolli Spring has been and continues to be impacted by the groundwater abstraction and discharge associated with the Rio Tinto Iron Ore Hope Downs mine. As a result of the environmental and cultural heritage values of the spring, the DEC will establish a reserve at Weeli Wolli in 2015 (DEC, 2009a).

Pilbara Flora conducted a survey of the proposed clearing areas and determined that the proposed clearing was adjacent to the PEC. A shapefile showing the approximate location of the Weeli Wolli Creek PEC was obtained from the DEC and the extent of the PEC was re-mapped by Pilbara Flora using orthophotos and observations taken during their March 2009 field survey. The Pilbara Flora boundaries were similar to the DEC

boundaries but more aligned with creek line vegetation and landform (Pilbara Flora, 2009a).

During the Level 2 flora and vegetation flora survey of the proposed clearing areas, Pilbara Flora encountered a total of 113 vascular taxa from 62 genera and 32 families and a total of 16 vegetation types over three main landform units (Pilbara Flora, 2009a). The DEC information sheet discussing the Weeli Wolli Creek PEC mentions that there are 120 or more native plant species occurring within the PEC (DEC, 2009a). As such, it seems that both areas experience a comparably high level of biodiversity. Additionally, Pilbara Flora stated that the results of the survey reflected the high species diversity of the Pilbara region, therefore the high species diversity was not restricted to the survey area and clearing directly adjacent to the Weeli Wolli Creek PEC is not likely to diminish the high biodiversity values of the area (Pilbara Flora, 2009a).

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

Methodology

DEC (2009a).
DEC (2009b).
Pilbara Flora (2009a).
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 proposed clearing areas are located 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 proposed clearing areas is classified as:

Beard Vegetation Association 18: Low woodland; Mulga (*Acacia aneura*) (GIS Database).

There is approximately 100% of the pre-European vegetation remaining of the Beard Vegetation Association 18 at the state and bioregional level (Shepherd et al, 2001). The proposed clearing areas do not represent a significant remnant of vegetation in the wider regional area (Shepherd et al, 2001). Apart from some infrastructure corridors (roads and railways) and various iron ore mines, the landscape surrounding the proposed clearing areas is largely uncleared (BHPBIO, 2009a). The proposed clearing will not reduce the extent of Beard Vegetation Association 18 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 (hectares)*	Current extent (hectares)*	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	676,561	676,561	~100	Least Concern	16.8
Beard veg assoc. – Pilbara Bioregion					
18	19,892,437	19,890,348	~100	Least Concern	2.1

* Shepherd et al. (2001) updated 2007.
** Department of Natural Resources and Environment (2002).

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

Methodology

BHPBIO (2009a).
Department of Natural Resources and Environment (2002).
EPA (2000).
Shepherd et al (2001).
GIS Database:

- Interim Biogeographic Regionalisation of Australia.
- Interim Biogeographic Regionalisation of Australia (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

No named watercourses or wetlands occur within the proposed clearing areas (GIS Database). Numerous minor ephemeral drainage lines run into major and minor, non-perennial watercourses, including the Weeli Wolli Creek system (a major, non-perennial river that contains natural pools fed by a perennial spring) and its tributaries (DEC, 2009a; GIS Database). Weeli Wolli Creek occurs directly north of the proposed clearing areas and the drainage lines occurring within the proposed clearing areas flow into the creek and its tributaries (BHPBIO, 2009a).

The proposed clearing areas (and its drainage lines and watercourses) are a part of the Fortescue River - Upper catchment and the Weeli Wolli/Marillana sub-catchment (GIS Database). Given that Weeli Wolli Creek is listed by the DEC (2009a) as a priority ecological community, the watercourses in the proposed clearing area may be considered environmentally significant.

Of the 16 major vegetation types identified within the Jinayri survey area, six are described as being associated with watercourses and drainage lines:

1. Major creek system: *Eucalyptus* woodland;
2. Broad creek calcrete hillsides: *Eucalyptus* mid open woodland over *Themeda* open tussock grassland;
3. Narrow creek colluvial slopes: *Eucalyptus* low open mallee woodland over *Triodia* hummock grassland;
4. Drainage line calcrete hillsides: *Corymbia* low open woodland over *Triodia* low sparse hummock grassland;
5. Broad alluvial drainage area: *Eucalyptus* mid open woodland over *Themeda* open tussock grassland; and
6. Broad colluvial drainage area: *Eucalyptus* low mid open mallee woodland over *Acacia* tall open shrubland.

The vegetation assemblages associated with the drainage lines and watercourses are well represented in the Pilbara (Pilbara Flora, 2009a).

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

However, BHPBIO will not undertake drilling activities in any of the Weeli Wolli Creek tributaries (BHPBIO, 2009a). As per the BHPBIO Exploration Environmental Management Plan (EEMP), drilling sites will be chosen where there is a low level of vegetation and the drill site is a suitable distance away from any drainage line (BHPBIO, 2009b). Should a permit be granted, it is recommended that a condition be imposed for the purposes of the rehabilitation of areas no longer required within twelve months following the initial clearing occurring within the proposed clearing areas, thereby minimising the amount of ground disturbance.

Methodology

BHPBIO (2009a).
BHPBIO (2009b).
DEC (2009a).
Pilbara Flora (2009a).
GIS Database:
- ANCA Wetlands.
- Hydrographic Catchments - Catchments.
- Hydrographic Catchments - Subcatchments.
- Hydrography, linear.
- RAMSAR Wetlands.
- RIWI Act, Rivers.
- Wild Rivers (Priority).

(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 and Food 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 areas include three different land systems (GIS Database). A broad description of each land system is given below:

The Newman land system is characterised by rugged jaspilite plateaux, ridges and mountains 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). A small proportion of the proposed clearing areas have been mapped as

the Newman land system (GIS Database).

The Oakover land system is characterised by breakaways, mesas, plateaux and stony plains of calcrete supporting hard spinifex grasslands. Overall the relief above drainage lines is up to 60 metres. The Oakover land system is generally not prone to degradation or susceptible to soil erosion (Van Vreeswyk et al, 2004). A large proportion of the proposed clearing areas have been mapped as the Oakover land system (GIS Database).

The Platform land system is characterised by dissected slopes and raised plains supporting hard spinifex grasslands. Relief is mostly up to about 30 metres but occasionally considerably greater. The Platform land system is not susceptible to erosion (Van Vreeswyk et al, 2004). A small proportion of the proposed clearing areas have been mapped as the Platform land system (GIS Database).

BHPBIO (2009a) identified that the primary sources of land degradation will be the surface earthworks and clearing for the formation of access tracks and drill pads. To minimise the risk of land degradation, BHPBIO (2009a) will:

1. Avoid exploration within in watercourse areas; and
2. Ensure drill sites will have sediment traps/sumps as required to prevent erosion and the release of sedimentation into the environment.

The applied area for clearing associated with the Jinayri North Hydrological Drilling Programme is relatively small and given the activity is for hydrological drilling purposes, rehabilitation of unrequired areas is likely to be completed within twelve months of the clearing occurring (although the disturbance is planned to occur between June 2009 and June 2014). It is likely that the disturbance associated with the access tracks and monitoring bores will be retained for the monitoring program and it is unlikely that these areas would be rehabilitated during the life of the clearing permit. Should a permit be granted, it is recommended that a condition be imposed for the purposes of the rehabilitation of areas no longer required within twelve months following the initial clearing occurring within the proposed clearing areas.

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

Methodology BHPBIO (2009a)
Van Vreeswyk et al (2004).
GIS Database:
- Rangeland land system mapping.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

The proposed clearing areas are not located within, or in close proximity to, any conservation areas (GIS Database). According to available databases, the nearest conservation reserve is the Karijini National Park, located approximately 55 kilometres west of the proposed clearing areas (GIS Database).

Based on the above, the proposed clearing is not likely to be 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 areas are not located within a proclaimed, gazetted or declared management areas or catchments (GIS Database). There are no named watercourses within the proposed clearing areas; however the area contains a number of minor ephemeral drainage lines which flow into Weeli Wolli Creek and one of its unnamed main tributaries (GIS Database). As Weeli Wolli Creek is directly north of and adjacent to the proposed clearing areas, care must be taken when clearing to prevent large volumes of sediment entering into the perennial creek.

However, BHPBIO will not undertake drilling activities in any of the Weeli Wolli Creek tributaries (BHPBIO, 2008a). As per the BHPBIO EEMP, drilling sites will be chosen where there is a low level of vegetation and the drill site is a suitable distance away from any drainage line and all drilling water will be contained on site in sumps (BHPBIO, 2009a; 2009b). Given that the hydrogeological drilling will be isolated from Weeli Wolli Creek, clearing is unlikely to significantly increase sediment loading in the creek. Approximately 2.4 hectares will be cleared for the Jinayri North Hydrological Drilling Programme, so it is unlikely that there would be a significant increase in sediment loading above naturally-occurring levels in the creek during high rainfall events.

No investigations have been carried out to assess the potential for vegetation clearing to affect groundwater

levels or quality; however the proposed clearing of 2.4 hectares is for five widely-spaced drill pads and access tracks within the 40-hectare application area for the purposes of hydrogeological drilling (BHPBIO, 2009a). Therefore it is unlikely to result in significant impacts to the quality or quantity of groundwater.

It is uncertain whether the Weeli Wolli Creek wetland is a groundwater dependent ecosystem, however the presence of permanent pools has created an arid zone wetland (CALM, 2002; DEC, 2009a). The Jinayri North Hydrological Drilling Programme and associated groundwater monitoring is considered to be a low impact activity; therefore, it is unlikely to impact upon the Weeli Wolli Creek wetland.

Should a clearing permit be granted, it is recommended that a condition be imposed for the purposes of rehabilitation, thereby averting the permanent loss of vegetation.

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

Methodology

BHPBIO (2009a).
BHPBIO (2009b).
CALM (2002).
DEC (2009a).
GIS Database:
- ANCA Wetlands.
- Hydrography, linear.
- Public Drinking Water Source Areas.
- RIWI Act, Rivers.
- Surface Water Management Areas.
- Surface Water Management Subareas.

(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 proposed clearing areas are located within land systems which feature high levels of topographic relief (between 60 to 450 metres) on soils that are generally not prone to degradation or susceptible to soil erosion (Van Vreeswyk et al, 2004). On average, the annual evaporation rate is ten times greater than the annual rainfall rate in the Pilbara region (Van Vreeswyk et al, 2004). The drainage lines and watercourses in the vicinity of the proposed clearing areas (with the exception of the Weeli Wolli Spring and associated pools) are ephemeral in nature and flow as a result of heavy rainfall (DEC, 2009a; GIS Database).

Rainfall in the Pilbara is unpredictable and erratic; it depends on cyclonic activity and thunderstorms that occur mainly during the wet season/summer months (Van Vreeswyk et al, 2004). The rocky-sloping topography of much of the upper catchments often produces considerable runoff, and widespread flooding naturally occurs in the major river systems (Van Vreeswyk et al, 2004).

The proposed clearing areas are located within the Fortescue River - Upper catchment (covering an area of 2,975,192 hectares) and directly adjacent to the non-perennial Weeli Wolli Creek (GIS Database). This catchment experiences natural flooding occasionally and, as such, the clearing of approximately 2.4 hectares for the Jinayri North Hydrological Drilling Programme is unlikely to cause or exacerbate flooding within the greater catchment area.

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

Methodology

DEC (2009a).
Van Vreeswyk et al (2004).
GIS Database:
- Hydrographic Catchments - Catchments.
- Hydrography, linear.
- RIWI Act, Rivers.

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

Comments

There are three native title claims over the area under application; WC96/061; WC98/062 and WC99/004 (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (GIS Database). However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e., the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are three registered Site of Aboriginal Significance within the proposed clearing area, and another twelve 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 have been received by the Department of Mines and Petroleum for this application.

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 with Principle (f), not likely to be at variance with Principle (a), (b), (c), (d), (g), (h), (i) or (j), and is not at variance to Principle (e).

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

BHPBIO (2009a) Hydrological drilling programme. Jinayri North. Application to clear native vegetation (purpose permit). Supporting documentation. BHP Billiton Iron Ore Pty Ltd, Western Australia.

BHPBIO (2009b) Exploration environmental management plan. Revision 3. PLN-IEN-ENV-003. BHP Billiton Iron Ore Pty Ltd, Western Australia.

CALM (2002) A biodiversity audit of Western Australia's 53 biogeographical subregions in 2002. Department of Conservation and Land Management, Western Australia.

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DEC (2009b) WA's threatened ecological communities. Accessed at http://www.dec.wa.gov.au/management-and-protection/threatened-species/wa-s-threatened-ecological-communities.html. Accessed 25/05/2009. Department of Environment and Conservation, 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 (2006) Jirridi terrestrial vertebrate fauna survey. Ecologia Environment, Western Australia.

ENV (2008) Jinayri vertebrate fauna assessment. ENV Australia Pty Ltd, Western Australia.

EPA (2000) Environmental protection of native vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2. December 2000. Environmental Protection Authority, Western Australia.

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

Pilbara Flora (2009a) Flora and vegetation survey of hydrological drill targets at Jinayri North. Pilbara Flora, Western Australia.

Pilbara Flora (2009b) Fauna habit assessment of hydrological drill targets at Jinayri North. Pilbara Flora, Western Australia.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Van Vreeswyk, A.M., Payne, A.L., Leighton, K.A. & Hennig, P. (2004) Technical bulletin no. 92: An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture, South Perth, Western Australia.

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.
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.