Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2668/2
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Hamersley Iron Pty Ltd**

1.3. Property details

Property: *Iron Ore (Hamersley Range) Agreement Act 1963*
Mineral Lease 4SA (AML70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Western Turner Syncline Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
32		Mechanical Removal	Mineral production, mine support infrastructure and associated activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 2 December 2010

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Vegetation within the application area has been mapped at a 1:250,000 scale as the following Beard vegetation associations: (Shepherd, 2007; GIS Database): - 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and - 567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii*. Biota Environmental Sciences were commissioned by Hamersley Iron Pty Ltd to undertake a flora and vegetation assessment for the wider West Turner Section 10 Area and Infrastructure Corridor. The survey area included the vegetation within the application area. Two vegetation units have been identified and described for the application area (Biota Environmental Sciences, 2007; Lycopodium Engineering and KBR, 2008). **Vegetation of Stony Hills and Hillslopes**: 1. ElAarAatAbAmGbTw: *Eucalyptus leucophloia subsp. leucophloia* scattered low trees to low open woodland over combinations of *Acacia arida, A. atkinsiana, A. bivenosa, A. maitlandii, Grevillea berryana* open shrubland to open heath over *Triodia wiseana* hummock to closed hummock grassland.	Hamersley Iron Pty Ltd propose to clear up to 32 hectares of native vegetation within an application area of 49.6 hectares for the purpose of mineral production, mine support infrastructure and associated activities for the greater Western Turner Syncline project. Vegetation will be cleared by a bulldozer with its blade down. The vegetation and topsoil will be collected and stockpiled for use in future rehabilitation (Hamersley Iron, 2008).	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994). To Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).	Vegetation condition was assessed by Biota Environmental Sciences (2007). Clearing permit CPS 2668/1 was granted on 23 October 2008 by the Department of Industry and Resources (now Department of Mines and Petroleum). The permit authorised the clearing of 32 hectares for the purpose of an accommodation village and associated infrastructure. On 14 October 2010, Hamersley Iron Pty Ltd applied to amend clearing permit CPS 2668/1 in order to change the purpose of the approved clearing to mineral production, mine support infrastructure and associated activities, as well as extend the duration of the permit until 31 July 2016. The amount of clearing approved under the permit will remain unchanged.

Vegetation of Broad Drainage Areas:

2. AprAciAanTw: *Acacia pruinocarpa, A. citrinoviridis, A.aneura* (narrow fine veined) tall shrubland over *Triodia wiseana* hummock grassland.

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)

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 is located within the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion which encompasses an area of 17,804,164 hectares (GIS database; Shepherd, 2007). The Hamersley subregion is characterised by sedimentary ranges and plateaux, dissected gorges, low Mulga woodlands over bunch grasses in valley floors and Eucalyptus woodlands over Triodia spp. on skeletal soils of the ranges (Kendrick, 2001). The mountain tops, gorges and upper slopes throughout the subregion provide refuge from fire for a large number of restricted flora species and native fauna species and the extensive ranges comprise of a high diversity of Acacia, Triodia, Ptilotus, Corymbia and Sida species (Kendrick, 2001).

Biota Environmental Sciences were commissioned by Hamersley Iron Pty Ltd to undertake a vegetation and flora survey of the West Turner Syncline project area (Biota Environmental Sciences, 2007). The West Turner Syncline project area comprises of the area surrounding the proposed Section 10 mine site which is located approximately 22 kilometres west, north-west of Tom Price, and an infrastructure corridor which extends from the proposed Section 10 mine site to the existing mining operations at Tom Price (Biota Environmental Sciences, 2007). The Assessing Officer notes that the area under application is situated approximately 1.8 kilometres west of the proposed Section 10 mine site (Biota Environmental Sciences, 2007).

The aim of the flora and vegetation survey was to provide baseline information regarding the vegetation and flora values of the West Turner Syncline project area (Biota Environmental Sciences, 2007). The total area surveyed as part of the West Turner Syncline project area was approximately 4,733 hectares and included the area under application (Biota Environmental Sciences, 2007). A total of ninety-five 50 metre by 50 metre quadrants were assessed within the West Turner Syncline project area (Biota Environmental Sciences, 2007). Locations of the quadrants were chosen to represent the main vegetation types occurring within the project area (Biota Environmental Sciences, 2007).

Biota Environmental Sciences (2007) recorded a total of 28 vegetation types across the West Turner Syncline project area and recorded a total of 272 native vascular flora species from 112 genera and 47 families (Biota Environmental Sciences, 2007; Lycopodium Engineering and KBR, 2008). The number of species recorded within the 4,733 hectare study area appears to be relatively low for a study area of this size in the Tom Price locality (Biota Environmental Sciences, 2007). Biota Environmental Sciences (2007) consider the low species count to be a reflection of the limited sampling throughout the entire 4,733 hectare study area rather than an indication that the project area comprises of low species richness.

Two vegetation types were identified within the application area (Lycopodium Engineering and KBR, 2008; Biota Environmental Sciences, 2008):

1. AprAciAanTw: *Acacia pruinocarpa, A. citrinoviridis* and *A. aneura* (narrow fine veined) tall shrubland over *Triodia wiseana* hummock grassland; and
2. AlAarAat AbAmGbTw: *Eucalyptus leucophloia subsp. leucophloia* scattered low trees to low open woodland over combinations of *Acacia arida, A. atkinsiana, A. bivenosa, A maitlandii, Grevillea berryana* open shrubland to open heath over *Triodia wiseana* hummock to closed hummock grassland.

The vegetation types that have been identified by Biota Environmental Sciences (2007) are considered common and widespread throughout the Hamersley subregion. Lycopodium Engineering and KBR (2008) report that these two vegetation types represent one dominant fauna habitat type for the application area which has been described as: Low open woodland supporting sparse Acacia spp. over Triodia spp. on stony loam substrate (Lycopodium Engineering and KBR, 2008). The condition of the vegetation within the application area ranged from 'Excellent' to 'Very Good' (Biota Environmental Sciences, 2007), however, Lycopodium Engineering and KBR (2008) note that approximately 5 hectares of native vegetation within the application area has been previously disturbed by exploration activities.

The Assessing Officer notes that no information was provided which detailed the species richness for the application area, however, Lycopodium Engineering and KBR (2008) report that no Declared Rare Flora or Priority flora species were recorded within the application area. Given the relatively low species richness for the

entire West Turner Syncline project area, and with consideration to the number of vegetation types that were identified within the application area, it would be expected that the species richness for the application area would be lower than the species richness for the West Turner Syncline project area. The proposed clearing is unlikely to impact on vegetation communities that comprise of floristic diversity.

Biota Environmental Sciences (2007) considered vegetation type AprAciAanTw to be one of eight vegetation types to be of moderate conservation significance. The other seven vegetation types that are considered to be of moderate conservation significance were not recorded within the application area (Biota Environmental Sciences, 2007). The Mulga dominated vegetation type AprAciAanTw was slightly elevated in the topographic profile, and as a result the highly flammable spinifex understorey may increase the risk of frequent and high intensity fires which may kill or adversely impact on the regenerative capacity of the fire sensitive Mulga (Biota Environmental Sciences, 2007; Kendrick 2001).

Approximately 5.42 hectares of vegetation type AprAciAanTw was recorded within the application area, of which approximately 1.62 hectares is proposed to be cleared during the construction of the proposed West Turner Syncline Village and Associated Infrastructure (Lycopodium Engineering and KBR, 2008). Mulga woodlands are common and widely distributed throughout the Hamersley subregion with approximately 100% of the pre-European extent remaining (Shepherd, 2007; Kendrick, 2001). Given the widespread distribution of Mulga woodlands and the abundance of similar vegetation and landform types throughout the Hamersley subregion, the proposed clearing of approximately 1.62 hectares of vegetation type AprAciAanTw is unlikely to significantly reduce the extent this vegetation type within the Hamersley subregion.

The vegetation communities within the application area are not likely to be considered as rare, geographically restricted or of significant conservation value. The floristic diversity of the vegetation communities and the fauna habitat that has been identified within the application area are considered common throughout the Pilbara region. The proposed clearing is unlikely to impact on an area comprises of a high level of biological diversity, or significantly impact on the biological diversity of the Pilbara region.

Biota Environmental Sciences (2007) recorded a total of seven introduced flora species (weeds), Buffel Grass (*Cenchrus ciliaris*), Whorled Pigeon Grass (*Setaria verticillata*), Ruby Dock (*Acetosa vesicaria*), Beggarticks (*Bidens bipinnata*), Spiked Malvastrum (*Malcastrum americanum*), Indian Weed (*Sigesbeckia orientalis*) and Common Sowthistle (*Sonchus oleraceus*), during the flora and vegetation assessment for the West Tuner project area. None of these species recorded are Declared Plants according to the *Agriculture and Related Resources Protection Act 1976*, however, Buffel Grass and Ruby Dock are considered serious environmental weeds (Biota Environmental Sciences, 2007).

The Assessing Officer notes no weed species were recorded within the application area (Lycopodium Engineering and KBR, 2008). Any introduction of weed species into the application area is likely to adversely impact on the biodiversity of the area. There is a risk that the use of vehicles and mechanised clearing equipment may introduce weed species into the application, especially if vehicles or machinery travel through, or have been previously used in weed infested areas and have not been properly cleaned of soil, seed or plant material prior to entering the area under application. The Assessing Officer recommends that should the permit be granted, conditions be imposed on the permit for the purpose of weed management.

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

Methodology

Biota Environmental Sciences (2007)
Kendrick (2001)
Lycopodium Engineering and KBR (2008)
Shepherd (2007)
GIS Database:
- IBRA Australia
- IBRA WA (Regions - Sub-regions)
- Pre-European Vegetation

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments

Proposal may be at variance to this Principle

Biota Environmental Sciences conducted a fauna survey and habitat assessment of the West Turner Syncline project area which included the area under application between 12 July and 23 July 2007 (Lycopodium Engineering and KBR, 2008). The survey was planned and implemented, where practical, in accordance with the Environmental Protection Authority Position Statement No. 3 Terrestrial Biological Surveys as an Element of Biodiversity Protection (Environmental Protection Authority, 2002; Lycopodium Engineering and KBR 2008), and Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (Environmental Protection Authority, 2004; Lycopodium Engineering and KBR 2008).

Lycopodium Engineering and KBR (2008) have reviewed the fauna survey and habitat assessment undertaken by Biota Environmental Sciences and have identified one fauna habitat for the application area. The fauna habitat has been described as (Lycopodium Engineering and KBR, 2008):

1. Low open woodland supporting sparse Acacia spp. over Triodia spp. on stony loam substrate.

Land system information provided by Van Vreeswyk et al. (2004) and subregional information by Kendrick (2001) indicates that the vegetation communities and landform features of the application area appear to be common and widespread throughout the Hamersley subregion. According to Shepherd et al. (2001) approximately 100% of the pre-European vegetation remains within the Hamersley subregion, which covers an area of approximately 5,634,727 hectares. As a result, the vegetation within the application area is not considered as a remnant of vegetation that has been extensively cleared. With consideration to the extent of vegetation remaining within the Hamersley subregion, the proposed clearing is not likely to lead to habitat fragmentation or impact on vegetation that would be considered as an important ecological linkage.

Assessment of topographic information indicates that the application area is located within a valley area that is situated between two ridge lines (GIS Database). Analysis of aerial imagery and photographs submitted with the clearing application indicate that the diversity of landforms within the application area appear low in terms of ranges, ridges, outcrops or caves suitable to provide habitat for fauna. In addition, the vegetation within and adjoining the application area remains largely uncleared. Given the likely widespread distribution of similar landform features and vegetation communities throughout the Hamersley subregion, the fauna habitat that has been identified within the application area is considered as common and widespread in the Tom Price locality and throughout the Pilbara region (Lycopodium Engineering and KBR, 2008).

Prior to undertaking the field survey, Biota Environmental Sciences conducted a search of the Western Australian Museum's online database between the coordinates 22. 239°S, 117.133°E and 22.139°S, 118.111°E (Lycopodium Engineering and KBR, 2008). This search identified 7 Amphibian, 61 Avian, 25 Mammalian and 73 Reptilian species that may occur within the application area (Lycopodium Engineering and KBR, 2008; Western Australian Museum, 2008).

Based on the results of the database search and field survey the following species of conservation significance may occur within the application area (Lycopodium Engineering and KBR, 2008; Western Australian Museum, 2008): Northern Quoll (*Dasyurus hallucatus*), Orange Leaf-nosed Bat (*Rhinonicteris aurantius*), Pilbara Olive Python (*Liasis olivaceus barroni*), Peregrine Falcon (*Falco peregrinus*), Western Pebble-mound Mouse (*Pseudomys chapmani*), Lakeland Downs Mouse (*Leggadina lakedownensis*), Ghost Bat (*Macroderma gigas*), Australian Bustard (*Ardeotis australis*), Bush Stone-curlew (*Burhinus grallarius*), Star Finch (western) (*Neochmia ruficauda subclarescens*), Fork-tailed Swift (*Apus pacificus*) and Rainbow Bee-eater (*Merops ornatus*).

The Northern Quoll - Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; Endangered (*Environment Protection and Biodiversity Conservation Act 1999*), has been recorded in the Pilbara region on the Western Australian Museums online database and has been recorded during past surveys close to West Turner (Lycopodium Engineering and KBR, 2008). The species is known to inhabit a range of habitats, but prefers rocky areas and eucalypt forests (Department of the Environment, Water, Heritage and the Arts, 2008a). This species was not recorded during the survey of the West Turner Syncline project area, however, the vegetation within the application area may represent suitable habitat for the Northern Quoll. Given the widespread distribution of similar landform and vegetation types throughout the Hamersley subregion, the proposed clearing of 32 hectares is unlikely to significantly impact on habitat for this species. It is unlikely that the Northern Quoll would be dependent on the vegetation within the application area for its continued existence in the local area.

The Orange Leaf-nosed Bat - Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; Vulnerable (*Environment Protection and Biodiversity Conservation Act 1999*), are known to prefer warm humid caves and mine shafts for roosting, although some have been found in tree hollows (Department of the Environment, Water, Heritage and the Arts, 2008b Australian Museum Online, 1999). Foraging habitats include grasslands, open woodlands, savannah woodlands and spinifex covered hills, although habitat use may be influenced by roost availability (Department of the Environment, Water, Heritage and the Arts, 2008b; Australian Museum Online 1999). The species is known from less than 10 localities in the Pilbara and from one locality in the Gascoyne. No natural colony sites are known from the Pilbara (Environment Australia, 1999). Known colonies in the Pilbara occupy abandoned, deep and partially flooded mines that trap pockets of warm, humid air in the mines constant temperature zone (Department of the Environment, Water, Heritage and the Arts, 2008b). This species was not recorded during the survey (Lycopodium Engineering and KBR, 2008). The application area appears to lacks the presence of caves or hollows which provide suitable roosting habitat for this species and as a result, the species is unlikely to inhabit the area (Lycopodium Engineering and KBR, 2008). It is unlikely that the vegetation within the application area would be regarded as significant habitat for this species.

Pilbara Olive Pythons - Schedule 1 (Fauna that is rare or is likely to become extinct) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*; Vulnerable (*Environment Protection and Biodiversity Conservation Act 1999*), are endemic to the Pilbara and are known to show preference for rocky habitats near water, particularly rock pools (Department of the Environment, Water, Heritage and the Arts, 2008c; Lycopodium Engineering and KBR, 2008). The species may shelter in deep rock crevices and has a diet that includes birds, reptiles, mammals as well as rock wallabies (Department of the Environment, Water, Heritage and the Arts, 2008c; Lycopodium Engineering and KBR, 2008). The species was recorded approximately 18 kilometres west of the application area during the survey of the West Turner Project area, however, was not recorded within the application area (Lycopodium Engineering and KBR, 2008). The vegetation and landforms associated with the

application area do not appear to represent significant habitat for the Pilbara Olive Python due to the lack of deep rock crevices and rocky habitat (Lycopodium Engineering and KBR, 2008). The proposed clearing is unlikely to impact on key habitat for the Pilbara Olive Python.

The Peregrine Falcon - Schedule 4 (Other specially protected fauna) of the *Wildlife Conservation (Specially Protected Fauna) Notice 2008*, has a ubiquitous distribution throughout mainland Australia and inhabits a wide range of habitats including cliffs along the coastline, rivers and ranges and woodlands surrounding watercourses and lakes (Johnstone and Storr, 1998). Kendrick (2001) states in the biodiversity audit of the Pilbara 3 - Hamersley subregion that the Peregrine Falcon is an uncommon resident, with very little data available regarding the species apart from occasional sightings. Given the widespread habitat availability and wide ranging distribution of the Peregrine Falcon, the proposed clearing is unlikely to impact on significant habitat for this species.

The Western Pebble-mound Mouse - Department of Environment and Conservation - Priority 4, is relatively widespread and abundant throughout much of the Hamersley subregion, and parts of the Gascoyne (Kendrick, 2001; Australian Museum Trust/Queensland Museum, 2008). The species occurs on spinifex covered, gentle colluvial slopes with pebbles of size (approximately 3.5 grams) suitable for the transport and construction of pebble mounds (Australian Museum Trust/Queensland Museum, 2008). Active pebble mounds were recorded during the Biota Environmental Sciences survey of the West Turner project area, however, no active mounds were located within the application area (Lycopodium Engineering and KBR, 2008). The vegetation within the application area may be significant habitat for this species, however, considering that this species is found in many locations throughout the Pilbara region, it is considered unlikely that the Western Pebble-mound Mouse would be dependent upon the vegetation within the application for its continued existence in the local area. The proposed clearing is unlikely to impact on significant habitat for this species.

The Lakeland Downs Mouse - Department of Environment and Conservation - Priority 4, is known from a broad distribution across the Pilbara and Kimberley regions of Western Australia, and its distribution includes Thevenard Island where it occurs naturally and Serrurier Island where it was introduced as a back-up population for those on Thevenard Island (Australian Museum Trust/Queensland Museum, 2008). The species is known to occur on sandy soils and cracking clays that support grasslands (Department of Environment and Conservation, 2008), and its populations are known to fluctuate dramatically annually (Australian Museum Trust/Queensland Museum, 2008). This species was not recorded during the survey for the West Turner project area, and the primary habitat for this species was not recorded within the application area (Lycopodium Engineering and KBR, 2008). The soil types within the application area appear to consist of stony surfaces and mantles which are unlikely to provide suitable habitat for this species (Van Vreeswyk et al., 2004). The proposed clearing is unlikely to impact on significant habitat for the Lakeland Downs Mouse.

The Ghost Bat - Department of Environment and Conservation - Priority 4, is known to show a preference for large, deep caves, crevices and old underground mining workings (Australian Museum Online, 1999), and is distributed in Western Australia, throughout the western half of the Pilbara, and throughout the Kimberley including the Buccaneer Archipelago Islands (Australian Museum Trust/Queensland Museum, 2008). One of the main conservation threats to the Ghost Bat is the loss of feeding habitat by clearing (Australian Museum Online, 1999). The Ghost Bat preys on large insects, frogs, birds, lizards and small mammals including other bats. They swoop on their prey and then fly to a feeding site to eat (Australian Museum Online, 1999). Analysis of aerial imagery, landforms and vegetation communities indicates that the application area may lack suitable caves, deep crevices and mines which would form suitable habitat for root sites (Lycopodium Engineering and KBR, 2008). The proposed clearing is unlikely to impact on suitable root sites for the Ghost Bat.

The Australian Bustard - Department of Environment and Conservation - Priority 4, is known to inhabit open or lightly wooded grasslands including sandplains with Triodia species, and also chenopod flats and plains and low heathland environments (Johnstone and Storr, 1998). The species is known to be nomadic, with irregular widespread movements over long distances (Johnstone and Storr, 1998; Department of Environment and Climate Change NSW, 2008). The Australian Bustard was not recorded within the application area or wider West Turner Project area, however, has been recorded during past surveys close to West Turner (Lycopodium Engineering and KBR, 2008). There is the possibility that this species may utilise the habitat within the application area.

The Bush Stone-curlew - Department of Environment and Conservation - Priority 4, is known to inhabit grassy woodlands, and also partly cleared forests and farmlands (Johnstone and Storr, 1998). This species may occur within the application area, however, given the widespread distribution of this species, it is not likely that the Bush Stone-curlew is solely dependant upon the vegetation within the application area for its continued existence in the local area. Although the vegetation within the application may represent suitable habitat for the Bush Stone-curlew, the proposed clearing is unlikely to significantly impact habitat for this species.

The Star Finch (western) - Department of Environment and Conservation - Priority 4, has a distribution that encompasses the north-west Pilbara, north-east and south-west Kimberleys, and with isolated populations in the north-west Cape Peninsula and lower Gascoyne (Johnstone and Storr, 2004). The Star Finch is known to inhabit long grass and shrubs in swamps, around lagoons and beside permanent water pools (Johnstone and Storr, 2004). The species was not recorded during the survey of the West Turner project area (Lycopodium Engineering and KBR, 2008). The application area appears to lack the presence of known habitat for the Star Finch, and as a result, the proposed clearing is unlikely to impact significant habitat for this species.

A number a migratory bird species that are protected under the CAMBA and JAMBA treaties (China and Japan/ Australia Migratory Bird Agreements) may potentially occur within the application area. These include the Rainbow Bee-eater (*Merops ornatus*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*), Oriental Plover (*Charadrius veredus*) and Fork-tailed Swift (*Apus pacificus*). All of these species may utilise the habitat within and adjoining the application area, for nesting or foraging, at different times throughout the year. The habitat types that have been identified within the application area are not restricted to the application area and there is a widespread distribution of similar, and for some species more suitable, habitat types throughout the Pilbara region. The proposed clearing is unlikely to impact on significant habitat required for the existence of these migratory species.

Based on all of the above, the proposal may be at variance to this Principle as the proposed clearing may impact on vegetation that is used by fauna in the local area. However, given the widespread sub-regional, as well as regional distribution, of similar vegetation communities and landform features, it is likely that the habitat type that has been identified within the application is not restricted to the immediate locality. The proposed clearing within the application area is unlikely to result in any large scale impact on native vegetation that is considered as significant habitat for fauna, or which is necessary for the maintenance of fauna habitat for the local area.

Methodology
Australian Museum Online (1999)
Australian Museum Trust/Queensland Museum (2008)
Biota Environmental Sciences (2007)
Department of Environment and Climate Change NSW (2008)
Department of Environment and Conservation (2008)
Department of the Environment, Water, Heritage and the Arts (2008a)
Department of the Environment, Water, Heritage and the Arts (2008b)
Department of the Environment, Water, Heritage and the Arts (2008c)

(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 datasets there are no known records of Declared Rare Flora (DRF) or Priority flora species within the application area (GIS database).

A flora and vegetation assessment of the application area was undertaken by botanists from Biota Environmental Sciences between August and October 2007 (Biota Environmental Sciences, 2007; Lycopodium Engineering and KBR, 2008). No DRF or Priority flora species were recorded within the application area (Biota Environmental Sciences, 2008; Lycopodium Engineering and KBR, 2008). The proposed clearing is unlikely to impact on any DRF of Priority flora species.

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

Methodology
Biota Environmental Sciences (2007)
Lycopodium Engineering and KBR (2008)
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 application area (GIS database; Lycopodium Engineering, 2008). The nearest known TEC is located approximately 18 kilometres north-east of the application area (GIS database). Given the distance between the proposal and the nearest known TEC, the proposed clearing is not likely to impact on the conservation of that TEC.

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

Methodology
Lycopodium Engineering and KBR (2008)
GIS Database:
- Threatened Ecological Sites Buffered

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments

Proposal is not at variance to this Principle

The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region in which approximately 99.9% of the pre-European vegetation remains (GIS database; Shepherd, 2007).

The vegetation of the clearing application area has been mapped as Beard vegetation association 82: Hummock grasslands, shrub steppe; *Grevillea refracta* & Hakea over soft Spinifex and 567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii* (GIS Database, Shepherd, 2007). According to Shepherd (2007) approximately 100% of each Beard vegetation association remains at both the state and regional level.

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Pilbara Bioregion and Beard vegetation association 82 and 567 is of 'Least Concern' (Department of Natural Resources and Environment, 2002).

While a small to moderate percentage of the vegetation types within the Pilbara bioregion are protected within conservation reserves, the bioregion remains largely uncleared. As a result, the conservation of the vegetation associations within the bioregion is not likely to be impacted on by this proposal.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,164	17,794,646	~99.95	Least Concern	6.32
Beard veg assoc. – State					
82	2,565,901	2,565,901	~100	Least Concern	10.2
567	777,507	777,507	~100	Least Concern	22.3
Beard veg assoc. – Bioregion					
82	2,563,583	2,563,583	~100	Least Concern	10.2
567	776,824	776,824	~100	Least Concern	22.4

* Shepherd (2007)
** 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.

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2007)
GIS Database:
- IBRA WA (Regions - Sub-regions)
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

There are no permanent wetlands or watercourses within the areas applied to clear (GIS database). The proponent has advised that the vegetation to be cleared is not associated with any major watercourses, wetlands or wetland dependent vegetation (Lycopodium Engineering and KBR, 2008; Biota Environmental Sciences, 2007). Several ephemeral creek systems and an upper slope drainage line have been recorded within the application area (GIS database). These creek systems largely act as minor drainage lines and are widespread across the Pilbara region.

As there are watercourses within the application area, the proposed clearing is at variance to this Principle. These watercourses are minor, natural drainage channels that are widespread across the Pilbara landscape (GIS database), and are responsible for quickly dispersing floodwaters after significant rainfall events. The vegetation communities growing in association with the watercourses are not unique and are considered common and widespread in the Pilbara bioregion (Shepherd, 2007; GIS Database). The proposed clearing is unlikely to significantly impact on vegetation communities growing in association with these minor ephemeral creek systems.

Methodology Biota Environmental Sciences (2007)
Lycopodium Engineering and KBR (2008)

Shepherd (2007)
GIS Database:
- Hydrography, linear
- Hydrography, linear (hierarchy)

(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

According to the Department of Agriculture in Technical Bulletin No 62 "An inventory and condition survey of the rangelands in the Ashburton River catchment, Western Australia" (Van Vreeswyk et al., 2004) the application area consists of the Platform and Newman Land System (GIS Database; Lycopodium Engineering and KBR, 2008).

- The Platform Land System occurs as dissected slopes and raised plains supporting hard Spinifex grasslands (Van Vreeswyk et al., 2004). Approximately 80% of the application area is located within the Platform Land System (GIS Database). The landform units of the Platform Land System include stony upper plains, dissected slopes and drainage floors (Van Vreeswyk et al., 2004). The soil types consist of shallow, very stony reddish brown loams, cemented gravels and pebbles, and reddish brown loamy sands on drainage floors. The Platform Land System is not susceptible to erosion due to the stony nature of the surface materials (Van Vreeswyk et al., 2004).

- The Newman Land System consists of rugged jaspilitic ranges, plateaux, ridges and mountains which support hard spinifex grasslands that characterise and typify much of the Pilbara (Van Vreeswyk et al., 2004). Approximately 20% of the application area is located within the Newman Land System (GIS Database). The soils types within the Newman Land System are likely to consist of stony soils, red shallow loams and red loamy earths which mantles of abundant to very abundant pebbles and cobbles of ironstone (Van Vreeswyk et al. 2004). These soils are likely to demonstrate high resistance to erosion due to the stony nature of the surface materials.

For both the Platform and Newman Land System, there is likely to remain a low risk of erosion for areas within and adjoining the application area which will remain undisturbed. The Assessing Officer notes that there may be an increased risk of soil erosion occurring following the clearing of native vegetation and disturbance to the stony surface mantles.

The application area is not associated with any low-lying permanently damp wetlands or watercourses (GIS Database; Lycopodium Engineering and KBR, 2008). With the application area experiencing mean annual rainfall of approximately 283.8 millimetres and mean annual evaporation of approximately 3400 millimetres (Bureau of Meteorology, 2008; GIS Database), it is likely that majority of normal season rainfall would quickly evaporate, or runoff down slope following significant rainfall events. Given the low rainfall to high evaporation rate for the application area, the proposed clearing of 19 hectares of native vegetation is unlikely to significantly increase water infiltration into the soil, or alter groundwater levels. As a result, the proposed clearing is unlikely to cause water logging on or off site.

The application area is situated within the Ashburton River Catchment which covers a total area of approximately 7,877,743 hectares (GIS Database). Groundwater salinities within the application area and adjoining areas have been recorded in the range of 500- 1,000 milligrams/Litre Total Dissolved Solids (GIS Database). With consideration to the low rainfall to high evaporation rate for the application area, as well as the size of the Ashburton River Catchment, the proposed clearing of native vegetation is unlikely to significantly increase groundwater recharge which could otherwise lead to significant rises to ground water levels. As a result, the proposed clearing is unlikely increase land salinisation either on-site or off-site.

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

Methodology

Bureau of Meteorology (2008)
Lycopodium Engineering and KBR (2008)
Van Vreeswyk et al. (2004)
GIS Database:
- Clearing Instruments
- Groundwater Salinity, Statewide
- Hydrography, linear
- Hydrographic Catchments – Catchments
- 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 application area is not located within a Department of Environment and Conservation managed

conservation area (GIS Database; Lycopodium Engineering and KBR, 2008). The nearest conservation area is Karijini National Park which is situated approximately 35 kilometres east of the application area (GIS database). Based on the distance between the proposal and the nearest conservation area, the proposed clearing is not likely to impact on the conservation values of Karijini National Park.

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

Methodology Lycopodium Engineering and KBR (2008)
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 naturally occurring watercourses, drainage systems or wetlands within the application area (GIS Database; Lycopodium Engineering and KBR, 2008). The land systems associated with the application area have high resistance to erosion (Van Vreeswyk et al., 2004), thereby reducing the risk of sediment export which may result in sedimentation and turbidity in any nearby watercourses. The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Millstream Water Reserve which is located approximately 40 kilometres north of the application area (GIS Database). Given the distance separating the application area and the nearest Public Drinking Water Source Area, the proposed clearing is unlikely to impact on the quality of the Millstream Water Reserve.

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

Methodology Lycopodium Engineering and KBR (2008)
Van Vreeswyk et al. (2004)
GIS Database:
- Hydrography, linear

(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 not associated with any permanent wetlands or watercourses (GIS database; Lycopodium Engineering and KBR, 2008). The average annual rainfall of Paraburdoo which is situated approximately 60 kilometres south, south-east of the application area is 283.8 millimetres, with heavy rainfall from tropical cyclones producing a few large rainfall events each year (Bureau of Meteorology, 2008; Lycopodium Engineering and KBR, 2008). As a result, local flooding can often occur seasonally in the Pilbara region between December and March. Numerous non-perennial watercourses are distributed across the landscape, and these are responsible for quickly dispersing floodwaters after significant rainfall events, thereby reducing peak flood heights (GIS database).

The application area is situated within the Ashburton River Catchment which covers a total area of approximately 7,877,743 hectares (GIS Database). The proposed clearing of 32 hectares is unlikely to significantly impact on drainage patterns within the Ashburton River Catchment, or result in an increase in peak flood heights. Furthermore, the proposed clearing of native vegetation is not likely to cause or increase the incidence of flooding within the local area.

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

Methodology Bureau of Meteorology (2008)
Lycopodium Engineering and KBR (2008)
GIS Database:
- Hydrography, linear
- 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; (WC97/089) (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group (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 no registered Sites of Aboriginal Significance within the area applied to clear (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 licence or approvals are required for the proposed works.

Clearing permit CPS 2668/1 was granted on 23 October 2008 by the Department of Industry and Resources (now Department of Mines and Petroleum). The permit authorised the clearing of 20 hectares for the purpose of an accommodation village and associated infrastructure. On 14 October 2010, Hamersley Iron Pty Ltd applied to amend clearing permit CPS 2668/1 in order to change the purpose of the approved clearing to mineral production, mine support infrastructure and associated activities, as well as extend the duration of the permit until 31 July 2016. The amount of clearing approved under the permit will remain unchanged.

Methodology

GIS Database
- Aboriginal Sites of Significance
- Native Title Determined

4. References

Australian Museum Online (1999). Bats in Australia, Ghost bat. An Australian Museum Website, last updated 1999, Australian Museum, viewed 10 October 2008, < http://www.amonline.net.au/bats/records/bat14.htm>.

Australian Museum Trust/Queensland Museum (2008). The Mammals of Australia, 3rd Edition, ed. Van Dyck, S. and Strahan, R., Queensland Government and Queensland Museum, Queensland, Australia, Reed New Holland, Sydney.

Biota Environmental Sciences (2007). A Vegetation and Flora Survey of the West Turner Section 10 Area and Infrastructure Corridor, Prepared for Pilbara Iron, Prepared by Biota Environmental Sciences, December 2007.

Bureau of Meteorology (2008). Climate Statistics for Australian Locations. A Search for Climate Statistics for Paraburdoo, Australian Government Bureau of Meteorology, viewed 1 October 2008. http://www.bom.gov.au/climate/averages/tables/cw_007178.shtml

Department of Environment and Climate Change NSW (2008). Threatened Species - species, populations & ecological communities of NSW, Profile - Australian Bustard, last updated 1 September 2005, viewed 28 July 2008, <http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10063>.

Department of Environment and Conservation (2008). Management and Protection, Fauna Species profiles. Department of Environment and Conservation, Government of Western Australia, Perth, Western Australia, viewed 10 October 2008, <http://www.naturebase.net/index2.php?option=com_docman&task=doc_view&gid=145&Itemid=802>.

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.

Department of the Environment, Water, Heritage and the Arts (2008a). *Dasyurus hallucatus* in Species Profile and Threats Database, Department of the Environment, Water, Heritage and the Arts, Canberra. <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>, Accessed 14 October 2008.

Department of the Environment, Water, Heritage and the Arts (2008b). *Rhinonicteris aurantius* (Pilbara form) in Species Profile and Threats Database, Department of the Environment, Water, Heritage and the Arts, Canberra. <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>, Accessed 14 October 2008.

Department of the Environment, Water, Heritage and the Arts (2008c). *Liasis olivaceus barroni* in Species Profile and Threats Database, Department of the Environment, Water, Heritage and the Arts, Canberra. <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>, Accessed 14 October 2008.

Environment Australia (1999). The Action Plan for Australian Bats, Recovery Outlines and Taxon Summaries - Pilbara Leaf-nosed. Department of Environment, Water, Heritage and the Arts, Australian Government, last updated 3 September 2007, viewed 10 October 2008, http://www.environment.gov.au/biodiversity/threatened/publications/action/bats/14.html.

EPA (2002) Terrestrial Biological Surveys as an element of biodiversity protection. Position Statement No. 3. March 2002. Environmental Protection Authority, Western Australia.

EPA (2004) Guidance for the Assessment of Environmental Factors: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia. Guidance Statement No 56. Environmental Protection Authority, Western Australia.

Hamersley Iron (2008). Application for a Clearing Permit (Purpose Permit) to clear Native Vegetation for: Earthworks, Development and Construction of the Western Turner Syncline Village, Documentation Accompanying Clearing Permit Application for CPS 2668/1, Prepared by Hamersley Iron Pty Ltd, July 2008.

Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds Volume I - Non-Passerines (Emu to Dollarbird), Western Australian Museum, Perth, Western Australia.

Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds Volume II - Passerines (Blue-Winged Pitta to Goldfinch), Western Australian Museum, Perth, 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.

Kendrick, P. (2001). Pilbara 3 (PIL3 Hamersley Subregion). In a Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management, pp 568-580.

Shepherd, D.P. (2007) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.

Van Vreeswyk A.M.E., Payne A.L., Leighton K.A. and Hennig P. (2004). Technical Bulletin - An inventory and condition survey of rangelands in Pilbara Region, Western Australia, No 92, Department of Agriculture, Government of Western

Australia, Perth, Western Australia.
Western Australian Museum (2008). Faunabase - Western Australian Museum, Queensland Museum and Museum & Art Gallery of NT Collections Databases. http://www.museum.wa.gov.au/faunabase/prod/index.htm Accessed 9/10/08. Western Australian Museum.

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.