



1. Application details

1.1. Permit application details

Permit application No.: 2419/1
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, Lease 3116/3687, Document No I 154279 L (Special Lease for Mining Operations)
Local Government Area: Town Of Port Hedland
Colloquial name: Yule River Project

1.4. Application

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

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
<p>Beard vegetation associations have been mapped at 1:250,000 scale for the whole of WA, and are a useful tool to examine the vegetation extent in a regional context.</p> <p>Two Beard vegetation associations are located within the area proposed to be cleared (GIS Database).</p> <p>These vegetation associations are described as (Shepherd et al., 2001):</p> <ul style="list-style-type: none"> Beard vegetation association 93: Hummock grasslands, shrub steppe; kanji over soft spinifex; and Beard vegetation association 619: Medium woodland; river gum (<i>Eucalyptus camaldulensis</i>). <p>A flora survey of the application area was conducted in January 2008 by ENV Australia. The vegetation of the application area was delineated into three distinct communities, based on species composition and vegetation structure (ENV Australia, 2008a). These are:</p> <p>Plains 1: <i>Acacia pachyacra</i> shrubland over <i>Triodia pungens</i>;</p> <p>Plains 2: Mixed <i>Acacia shrubland</i> over <i>Triodia basedowii</i>; and</p> <p>Riparian 1: <i>Eucalyptus camaldulensis</i> var. <i>obtusa</i> - <i>Malaleuca argentea</i> riparian woodland over <i>Triodia pungens</i> and mixed forbs.</p> <p>Plains 1 and Plains 2 communities occurred on rocky orange sands on plains (ENV Australia, 2008a).</p> <p>Vegetation lining the Yule River banks consisted of</p>	<p>BHP Billiton Iron Ore Pty Ltd (hereafter referred to as BHP Billiton) propose to replace the Yule River bridge on the Mt Newman railway line with a new bridge offset approximately 20 metres to the west of the existing bridge (BHP Billiton, 2008).</p> <p>The clearing of vegetation required for the Yule River replacement bridge totals 20 hectares within a 45 hectare purpose permit boundary. The application area is approximately 5 kilometres in length and 90 metres wide (GIS Database). The application area includes the existing Yule River bridge and the railway corridor immediately north and south of it. BHP Billiton have stated that 20 metres of clearing either side of the current railway is required for the project (BHP Billiton, 2008).</p>	<p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)</p> <p>to</p> <p>Completely Degraded: No longer intact; completely/almost completely without native species (Keighery 1994)</p>	<p>In general, vegetation on the eastern side of the rail line was in poorer condition due to the presence of access tracks and previous soil disturbance (ENV Australia, 2008a). Vegetation on the western side of the application area was rated as 'very good'.</p> <p>Two introduced flora species were recorded within the area proposed to be cleared. These were Buffel Grass (<i>Cenchrus ciliaris</i>) and Mimosa Bush (<i>Vachellia farnesiana</i>) (ENV Australia, 2008a).</p>

community type Riparian 1, occurring on orange alluvial loams (ENV Australia, 2008a).

Plant species richness was fairly similar between the three communities and was more dependant on vegetation condition (ENV Australia, 2008a)

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 clearing permit area is located within the Chichester Interim Biogeographic Regionalisation of Australia (IBRA) subregion (GIS database). The main vegetation and landform features of the region are plains composed of shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick & McKenzie, 2001). High reptile and mammal species diversity within hummock grasslands are described by Kendrick & McKenzie (2001) for the Chichester subregion. The main land uses of the subregion are pastoral activity, Aboriginal lands and Reserves, Unallocated Crown Land (UCL) and Crown Reserves, conservation, and mining.

A flora and vegetation assessment of the application area was undertaken by ENV Australia (2008a) from the 17 - 18 January 2008. During the survey a total of 61 plant species, across 21 families, were recorded in the application area. Dominant families were Mimosaceae (11 taxa), Papilionaceae (7) and Asteraceae (6), with the most common genus being *Acacia* (10). No Declared Rare Flora (DRF) or Priority flora species were recorded within the application area (ENV Australia, 2008a).

It should be noted, that it is possible that application area may be suitable habitat for two annual Priority flora species, namely: *Bulbostylis burbidgeae* (Priority 3) and *Gonocarpus Ephemerus* (Priority 2), which might not have been present because of insufficient rainfall in previous months to the flora survey (ENV Australia, 2008a). Based on this, further information was requested from ENV Australia in regards to the potential impacts to the habitat of these two species. As a result, it was shown that *Bulbostylis burbidgeae* (which is potentially found in granite type habitats of the application area), will not be impacted upon as there are no granite type habitats that will be impacted during the re-alignment of the railway (BHP Billiton, 2008). In regards to the species *Gonocarpus Ephemerus*, it was shown that this species is widespread over several bioregions and it does not rely specifically on drainage line habitats such as the Yule River, therefore impacts to the habitat of this species as a result of the proposed clearing are unlikely to be significant (ENV Australia, 2008a).

The vegetation condition within the application area varied from 'very good' to 'completely degraded' (ENV Australia, 2008a). In general vegetation on the eastern side of the railway line was in poorer condition, due to the presence of access tracks and previous soil disturbance. Vegetation on the western side of the railway line was generally in a better condition, whilst vegetation within Yule River was generally in a 'good' to 'poor' condition (ENV Australia, 2008a).

A fauna assessment comprising both a desktop and ground survey was undertaken by ENV Australia (2008b) from 17-18 January 2008. The desktop survey revealed that there were 284 fauna species potentially occurring in the application area, of these 83 were listed as conservation significant species (ENV Australia, 2008b). During the ground survey, no conservation significant species were recorded within the application area (ENV Australia, 2008b). ENV Australia (2008b) have also noted that the area proposed to be cleared does not comprise significant habitat for any fauna species of conservation significance.

Two weed species were recorded within the application area during the flora survey; Buffel Grass (*Cenchrus ciliaris*) and Mimosa Bush (*Vechellia farnesiana*) (ENV Australia, 2008a). Both of these species were recorded in low densities generally around disturbed areas. Although few occurrences of weeds were recorded, the presence of weeds lowers the biodiversity value of the proposed clearing area. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Should a clearing permit be granted, it is recommended that a condition be imposed on the permit for the purposes of weed management.

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

Methodology

BHP Billiton (2008).
ENV Australia (2008a).
ENV Australia (2008b).
Kendrick & McKenzie (2001).
GIS Databases:
- Interim Biogeographic Regionalisation of Australia
- Interim Biogeographic Regionalisation of Australia (subregions)

(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

A fauna assessment was undertaken by ENV Australia (2008b) from 17-18 January 2008, which covered the entire application area. The fauna assessment involved two processes:

- 1) a desktop assessment to gather background information on the application area and the fauna that it may support.
- 2) a field survey to identify habitat types in the application area and to determine if these habitats support fauna of conservation significance.

The desktop assessment identified 284 fauna species which potentially may occur in the application area, comprising of 31 mammals, 72 reptiles, 8 amphibians and 173 birds (ENV Australia, 2008b). Of the species identified, 83 were listed as being conservation significant species, including 5 mammals, 7 reptiles and 71 birds.

During the ground survey a habitat search of the application area was undertaken, there were two habitat types identified:

- 1) Sandplain habitat: sandplain with occasional granite/calcrete outcrops with mixed *Acacia* shrubs and *Acacia pachyacra* over *Triodia basedowii*, *Triodia pungens* hummock grassland on rocky red sands. The sandplain habitat was considered to be of low habitat value, as there was a lack of vegetation structure present, resulting in limited microhabitats being available for fauna to exploit (ENV Australia, 2008b). Although there were some areas (particularly north of the river) which were in excellent condition, it is considered to be of low habitat value.
- 2) Riverbed habitat: Riverbed with *Eucalyptus camaldulensis* var. *obtus* - *Melaleuca argentea* riparian woodland over *Triodia pungens*, on rocky red loamy sands. The riverbed habitat comprising the Yule River and its banks are considered to be of high habitat value (ENV Australia, 2008b). The majority of this habitat type was degraded, however, it forms a major ecological linkage which runs in a west to east direction and is likely to be used as a fauna movement corridor, particularly in the wet season. This habitat type is also under-represented in the Pilbara and therefore is considered to be of high value (ENV Australia, 2008b). The trees present within this habitat are likely to be utilised by birds for feeding and nesting purposes, however, no tree hollows that may be suitable nesting sites for birds were observed in this area (ENV Australia, 2008b).

During the ground survey there was 4 fauna species recorded in the application area: Ring-tailed Rock Dragon (*Ctenophorus caudicinctus*), Spinifex Pigeon (*Geophaps plumifera*), Black-winged Stilt (*Himantopus himantopus*) and the Zebra Finch (*Taeniophygia guttata*) (ENV Australia, 2008b). None of the species recorded were conservation significant species. Although, there were a low number of fauna species recorded in the application area, ENV Australia (2008b) have stated that a number of conservation significant species may utilise the application area as habitat. Based on habitat preferences and known distributions, the species of conservation significance most likely to be found within the application area are: Northern Quoll (*Dasyurus hallucatus*), Mulgara (*Dasyercus cristicauda*), Woma (*Aspidites ramsayi*), and the skink *Ctenotus nigrilineatus*.

The Northern Quoll (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) has been recorded in a range of vegetation types but prefers areas of open Eucalypt woodland within 200 kilometres of the coast. Although it is known to occur in a range of vegetation types it is only known to den in rocky crevices and tree hollows (ENV Australia, 2008b). The riverine habitat within the application area may represent potential habitat for this species, however, there were no rocky crevices or significant tree hollows sighted. These would provide daytime refuges for this species, and would be a requirement given the lack of vegetation cover within this habitat (ENV Australia, 2008b). Based on this, it is unlikely the Northern Quoll is reliant on this area for habitat, but rather may utilise the area as part of its home range.

The Mulgara (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is found in the deserts of Central and Western Australia (Strahan, 1995). It requires areas that have clayey sand and sandy loam soils with hummock grasses under the influence of paleodrainage or surface drainage systems (Burbidge, 2004). ENV Australia (2008b) have stated that potential areas of potential habitat exist within the project area, specifically loamy soils and hummock grass plains. However, large areas of similar habitat exist in areas surrounding the application area (ENV Australia, 2008b), hence the overall impact to the habitat for this species is likely to be minimal.

In Western Australia, the Woma (Schedule 4 - Other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is known to occur from the Pilbara Coast, north to the Eighty-mile Beach area, and in the south-west, from Cape Peron south and east to the eastern Goldfields, however, there are very few recent records of the woma within the southern parts of its range (NatureBase, 2008). This species occurs in myrtaceous heaths found on sandplains and dune fields, hummock grassland, shrublands or woodlands and shelters in animal burrows, hollow logs or under grass hummocks. Based on this, suitable habitat is present within the application area. However, given that there are extensive similar habitats in the surrounding area, it is

unlikely that this species relies specifically on the vegetation within the application area for habitat.

The skink *Ctenotus nigrilineatus* (Priority 1 - DEC) is known to occur from a few occurrences in the Pilbara at Abydos Plain and Marble Bar (ENV Australia, 2008b). This species occurs in Spinifex type habitat usually near granite outcrops. ENV Australia (2008b) have stated that *Ctenotus nigrilineatus* may specifically occur within the granite outcrops of the sandplain habitat in the application area. Given that this species is not highly mobile, *Ctenotus nigrilineatus* may be dependant on the granite outcrop areas for habitat.

However, it should be noted that the fauna survey assessed the entire application area in terms of habitat value, and not all of the application area is proposed to be cleared. BHP Billiton (2008) have stated that the railway line immediately north and south of the Yule River bridge will be moved up to 20 metres to the west of its current location. Given that there is existing vehicle tracks either side of the railway line, it is likely that the area proposed to be cleared is already disturbed and therefore has reduced habitat values. Areas of high habitat value (granite outcrops of the sandplains) are likely to occur in the application area, however, they are likely to be a larger distance from the existing railway line (at least 40 metres and up to 80 metres away from the existing railway line). Additionally, BHP Billiton (2008) have stated that there are little or no granite outcrops in close proximity to the current railway line. Given that it is likely that areas of high habitat value will not be cleared, overall impacts to *Ctenotus nigrilineatus* habitat are likely to be minimal.

Based on the above, the proposed clearing may be at variance to this principle. However, it should be noted that the area of the riverine habitat which is likely to be impacted during the project is quite small (2.2 hectares), with a large portion of this habitat unvegetated. Furthermore, the vegetation that is present is already degraded (ENV Australia, 2008b). BHP Billiton (2008) advise that clearing activities will be restricted to periods when there are dry conditions, as this is the time when this habitat is utilised the least by fauna species. Based on this, should the permit be granted, it is recommended that a condition be placed on the permit for fauna management.

Methodology BHP Billiton (2008).
Burbidge (2004).
ENV Australia (2008b).
NatureBase (2008).
Strahan (1995).

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

Comments Proposal may be at variance to this Principle

A flora and vegetation assessment of the application area was undertaken by ENV Australia (2008a), from the 17-18 January 2008. The flora assessment involved two processes:

- 1) a desktop assessment to gather background information on the application area and the flora species and vegetation it may support; and
- 2) a field survey to verify the findings of the desktop review.

During the field survey undertaken by ENV Australia (2008a), there were no Declared Rare Flora or readily identifiable Priority flora species recorded within the application area (ENV Australia, 2008a).

Two annual species listed as Priority flora: *Bulbostylis burbidgeae* (Priority 3) and *Gonocarpus ephemerus* (Priority 2), may have been found in the application area, however, there was insufficient rainfall in the months prior to the survey for these species to be identified.

The habitat of *Bulbostylis burbidgeae* is listed as granitic soils, granite outcrops and cliff bases of the Pilbara (FloraBase, 2008). Given that granite outcrops were present within the northern and southern regions of the application area, it is likely that suitable habitat for this species exists within the application area. However, the granite outcrop habitats within the application area are not located within areas in which the railway will be re-aligned, therefore potential impacts to the habitat of this species are likely to be minimal (BHP Billiton, 2008).

According to FloraBase (2008) *Gonocarpus ephemerus* is known to occur in habitats associated with drainage lines. Based on this, it is possible that the Yule River (which is located in the application area), may present suitable habitat for this species. However, further information provided from ENV Australia (2008a) has shown that this species has a wide distribution, including the Pilbara, Gascoyne, Little Sandy Desert and Murchison bioregions. Additionally, ENV Australia (2008a) have stated that *Gonocarpus ephemerus* is not entirely restricted to drainage line habitats. In the greater Yule River-Turner River region it has been recorded from a variety of habitats, including (ENV Australia, 2008a);

- 1) Plain, red silty sandy-clay, closed hummock grassland of *Triodia spp*;
- 2) Granite outcropping, slight elevation, red silty rocky, *Acacia maitlandii* dominated open shrubland to shrubland over open hummock grassland of *Triodia* with mixed herbland on granite outcropping;

3) Brown-red, rocky *Acacia maitlandii* and *Acacia orthocarpa* tall shrubland over an open hummock grassland *Triodia lanigera*; and

4) Edge of rocky outcrop and some drainage lines, brown-red silty, rocky, *Acacia maitlandii* over an open hummock grassland of *Triodia lanigera*.

Based on the above, it is likely that if *Gonocarpus ephemerus* was present within the application area it would not be specifically reliant on the drainage habitat such as is offered by Yule River. In addition to this, it should be noted that DEC conducted a search of the Threatened Flora Database, which indicated that there are 18 known populations of *Gonocarpus ephemerus* in Western Australia, 5 of which are located in National Parks, 6 in Aboriginal Reserves, 4 in Pastoral Leases and 3 in UCL (ENV Australia, 2008a). Given that there are a number of populations protected in secure tenure, and that this species is confirmed across 4 bioregions, it is unlikely that the proposed clearing would significantly impact this species on either a local or regional level.

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

Methodology BHP Billiton (2008).
ENV Australia (2008a).
FloraBase (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 (TECs) within the application area (GIS Database). There are no known TECs found within the Pilbara 1 (PIL1 - Chichester Subregion) IBRA Subregion (Kendrick & Mckenzie, 2001). The flora assessment of the application area did not identify any significant ecological communities within the area proposed to be cleared (ENV Australia, 2008a).

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

Methodology ENV Australia (2008a).
Kendrick & Mckenzie (2001).
GIS Database:
- Threatened Ecological Communities - CALM

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

Comments Proposal is not at variance to this Principle

The area applied to clear is located within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (Shepherd et al., 2001). According to Shepherd et al., (2001) there is approximately 99.9% of Pre-European vegetation remaining within this bioregion.

The vegetation of the application area is classified as Beard vegetation association 93 - Hummock grasslands, shrub steppe; kanji over soft spinifex, and Beard vegetation association 619 - Medium woodland; river gum (*Eucalyptus camaldulensis*). Both of these vegetation associations remain at approximately 100% of pre-European extent within both the state and the Pilbara Bioregion (Shepherd et al., 2001). The area proposed to clear does not represent a significant remnant of vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% of Pre-European area in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Pilbara	17,804,163	17,794,650	~ 99.9	Least Concern	6.3 (6.3)
Beard veg assoc. – State					
93	3,044,326	3,044,267	~ 100	Least Concern	0.4 (0.4)
619	119,159	119,038	~ 99.9	Least Concern	0.2 (0.2)
Beard veg assoc. – Bioregion					
93	3,042,131	3,042,082	~ 100	Least Concern	0.4 (0.4)
619	118,706	118,706	~ 100	Least Concern	0.2 (0.2)

* Shepherd et al., (2001) updated 2005

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002).
Shepherd et al., (2001).
GIS Database:
- Interim Biogeographic Regionalisation of Australia
- Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

There is a large non-perennial watercourse, the Yule River, which intersects the application area (GIS Database). During the flora and vegetation survey, the following vegetation community was described as being of a riparian nature (ENV Australia, 2008a):

Riparian 1- *Eucalyptus camaldulensis* var. *obtusa* - *Malaleuca argentea* riparian woodland over *Triodia pungens* and mixed forbs.

ENV Australia (2008a) have stated that the vegetation within this association was in a 'good' to 'poor' condition, likely the result of previous disturbance during the construction of the Yule River bridge. Despite the condition of this vegetation association, ENV Australia have stated that retention of riparian vegetation should be a priority, as riparian forests play an important role in habitat provision, as well as improving bank stability (ENV Australia, 2008a).

The Yule River bridge will be replaced with a new bridge approximately 20 metres to the west of its existing location, which will require the clearing of approximately 20 mature eucalypts within a 2.2 hectare area of the Yule River (BHP Billiton, 2008). The majority of the 2.2 hectare area which will be impacted during the construction of the Yule River replacement bridge is largely unvegetated and consists of a sandy river bed. BHP Billiton (2008) have stated that all cleared areas within Yule River will be rehabilitated within 6 months of the completion of the Yule River replacement bridge. Should a clearing permit be granted, it is recommended that a condition be imposed on the permit for the proponent to rehabilitate all cleared areas within 6 months of the completion of the Yule River replacement bridge.

It should also be noted that BHP Billiton (2008) have applied to the Department of Water for a Beds and Banks permit under the *Rights in Water and Irrigation (RIWI) Act 1914*.

Based on the above, the proposed clearing is at variance to this principle, however the majority of riparian vegetation present within the application area has been degraded, and only a small amount of riparian vegetation (approximately 20 mature eucalypts) is proposed to be cleared. It is considered that the potential impacts of the proposed clearing can be adequately mitigated through the rehabilitation of riparian zones that are presently largely degraded.

Methodology ENV Australia (2008a).
BHP Billiton (2008).
GIS Database:

- Hydrography, linear (medium scale, 250k GA)
- Hydrography, linear
- Geodata, Lakes

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

Comments Proposal may be at variance to this Principle

The application area is located within the Macroy and River land systems (GIS Database). The Macroy land system covers all areas within the application area which are north and south of the Yule River, whilst the Yule River and its associated bed and banks are described as the River land system. All areas within the Macroy land system are sloping slightly down gradient towards the Yule River (River land system) which is in the centre of the application area (GIS Database). There is a 10 metre gradient between the Yule River and the most northern and southern sections of the application area.

The Macroy land system is described as stony plains and occasional tor fields based on granite supporting hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). The landform within which the application area lies is described as stony plains and interfluves - level to gently undulating plains and interfluves extending up to 4 kilometres between drainage lines in lower parts; surface mantles of few to very abundant grit and pebbles of quartz and granite, with occasional outcrops of granite (Van Vreeswyk et al., 2004). This land system has nil to minor soil erosion potential, likely due to the abundant grit and pebbles of quartz which would provide protection from erosional forces.

The River land system is described as active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). The landform in which the application area lies is described as minor and major channels; channels 30 - 1000 metres wide between sandy banks 1 - 10 metres above channel beds, bedloads of sand, gravel, pebbles and stones (Van Vreeswyk et al., 2004). This system is described as being largely stabilised by Buffel Grass and spinifex and accelerated erosion is uncommon, however, susceptibility to erosion is high or very high if vegetative cover is removed (Van Vreeswyk et al., 2004). Given the above, it is likely the clearing of vegetation located within the Yule River for the construction of the replacement bridge will initiate soil erosion.

In regard to this, BHP Billiton (2008) have committed to undertake all clearing of vegetation during dry conditions, thereby reducing the potential for soil erosion to occur. Additionally, BHP Billiton (2008) have committed to rehabilitate all cleared areas within 6 months of the completion of the Yule River replacement bridge. Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for land degradation management.

Based on the above, the proposed clearing may be at variance to this principle.

- Methodology** BHP Billiton (2008).
 Van Vreeswyk et al., (2004).
 GIS Database:
 - Rangeland Land System Mapping - DA
 - Topographic Contours, Statewide

(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 any known conservation areas (GIS Database). The closest conservation reserve to the application area is the 'A' Class Mungaroon Range Nature Reserve which is approximately 35 kilometres south-west of the area applied to clear. The Mungaroon Range Nature Reserve is not located downstream of the Yule River on which the application area is situated, therefore, it is unlikely there will be any impact to this reserve as a result of this proposal.

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 may be at variance to this Principle

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database).

There is one non-perennial watercourse within the application area, the Yule River (GIS Database). BHP Billiton (2008b) have stated that clearing of vegetation will be required within this watercourse to build a new bridge approximately 20 metres to the west of the existing bridge. Given that clearing is required within this

watercourse, it is likely that the surface water quality may be impacted through increased sediment loads which may result from soil erosion. In regard to this, BHP Billiton (2008) have made a commitment to conduct all clearing activities during dry conditions. This will reduce erosion potential within this watercourse and thereby reduce the chance of increasing sediment loads. Additionally, BHP Billiton (2008) have committed to rehabilitate all areas to be cleared within 6 months of the completion of the new bridge. This commitment will ensure that unvegetated surfaces will only be open to erosional forces for short periods of time in the dry season. Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for the purposes of surface water management.

There are no groundwater-dependant ecosystems located within the application area (GIS Database).

All construction works involved with the building of the new Yule River bridge will be restricted to above the ground, hence it is not expected that the proposed clearing will significantly impact upon groundwater levels or quality within the application area (BHP Billiton, 2008).

Based on the above, the proposed clearing may be at variance to this Principle. However, it is considered that the potential impacts from the proposed clearing can be adequately managed and minimised by imposing appropriate conditions on the permit for surface water management.

Methodology BHP Billiton (2008).
GIS Database:
- Hydrography, linear
- Potential Groundwater Dependant Ecosystems
- Public Drinking Water Source Areas (PDWSAs)

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

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

In a typical year, average rainfall throughout the application area is low, variable and often falls within a small time frame. Average annual rainfall ranges from 250 - 450 millimetres, and years without significant rainfall can occur (Bureau of Meteorology, 2007). The majority of rainfall comes in summer as a result of scattered thunderstorms and the occasional tropical cyclone. A secondary rainfall period occurs in May as a result of rainfall from tropical cloud bands (Bureau of Meteorology, 2007). Flooding is possible during rainfall periods as a result of cyclonic activities where large amounts of water fall within a short time frame.

The most southern and northern sections of the application area are approximately 260 metres in elevation with land undulating towards the Yule River (250 metres in elevation), which is in the centre of the application area (GIS Database). Runoff within the application area is likely to flow down gradient from areas in the north and south towards the Yule River and then along this watercourse. Based on this, it is unlikely that runoff within the application area will collect and flood during normal rainfall events, as it will be moving down gradient towards the Yule River.

In addition, there are high evaporation rates found within the application area, with rates of approximately 3,000 millimetres annually (GIS Database). This is more than 6 times the annual rainfall recorded on average (GIS Database). Although the potential for flooding within the application area exists during extreme rainfall events, there is little likelihood that the potential for flooding will be increased during normal rainfall events as a result of the proposed clearing.

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

Methodology Bureau of Meteorology (2007).
GIS Databases:
- Evaporation Isopleths
- Topographic Contours, Statewide

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

Comments

There are two native title claims in the application area (GIS Database). The claims (WC95_053 and WC99_016) have been registered with the National Native Title Tribunal on behalf of the claimant groups (GIS Database). However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are two registered Sites of Aboriginal Significance located in the area applied to clear (Site ID 8799 and Site ID 6655) (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.

BHP Billiton is committed to the management and protection of Aboriginal heritage sites and consultation with

the appropriate native title claimants (BHP Billiton, 2005). BHP Billiton has a heritage protocol / native title agreement with the Palyku people for the entirety of the BHP Billiton Yule River project area. As per this agreement and BHP Billiton obligations under the *Aboriginal Heritage Act 1972* and other relevant legislation, no new area of land will be disturbed until it has been subject to heritage inspections, both ethnographic and archaeological, with appropriate traditional owners (BHP Billiton, 2008). All heritage sites identified in heritage surveys will be protected and avoided during exploration activity. Management of heritage sites (fences, buffers, etc) will be agreed and decided upon between BHP Billiton heritage staff, heritage consultants and the native title claimants during the heritage surveys (BHP Billiton, 2005).

Additionally, BHP Billiton (2008) have an internal process; the Project Environment and Aboriginal Heritage Review (PEAHR), which is designed to prevent the inadvertent disturbance of Aboriginal heritage sites within BHP Billiton operations as well as ensuring that all areas of proposed disturbance have been subject to adequate ethnographic and archaeological inspection and consultation. Prior to the commencement of any land disturbance activity, a PEAHR must be completed and submitted to BHP Billiton's Indigenous Affairs Department, for assessment. All land disturbance activities must be approved by BHP Billiton's Environment and Aboriginal Heritage staff prior to its commencement (BHP Billiton, 2008).

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.

Methodology BHP Billiton (2005).
BHP Billiton (2008).
GIS Databases:
- Aboriginal Sites of Significance - DIA
- Native Title Claims - DLI

4. Assessor's comments

Comment

The Clearing Principles have been addressed and the proposed clearing is at variance to Principle (f), may be at variance to Principles (b), (c), (g) and (i), is not likely to be at variance to Principles (a), (d), (h), and (j), and is not at variance to Principle (e).

Should the permit be granted, it is recommended that conditions be imposed on the permit for the purposes of weed management, riparian vegetation management, fauna management, land degradation management, surface water management, rehabilitation and permit reporting.

5. References

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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.