



1. Application details

1.1. Permit application details

Permit application No.: 2779/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: BHP Billiton Iron Ore Pty Ltd

1.3. Property details

Property: Mineral Lease 244SA (AML70/244) Iron Ore (Mt Newman) Agreement Act 1964
Local Government Area: Shire Of East Pilbara
Colloquial name: Myopic Project

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped at 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. Two Beard vegetation associations are located within the area proposed to be cleared (GIS Database, 2007). These vegetation associations are (Shepherd et al., 2001):

Beard Vegetation Association 18: Low woodland; mulga (*Acacia aneura*); and

Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*.

A flora and fauna assessment of the application area was conducted by GHD in November 2008. The vegetation assessment identified nine vegetation communities within the application area (GHD, 2008). These are:

Vegetation Type 1: Mixed Shrubs over Mixed (Hummock) Grasslands with Mixed Emergent species: *Acacia* species (dominated by *Acacia bivenosa*), *Petalostylis labicheoides*, *Keraudrenia velutina* subsp. *elliptica*, *Senna artemisioides* subsp. *oligophylla* x *helmsii*, *Sida cardiophylla*, over *Triodia pungens* with *Triodia wiseana*, *Aristida inaequiglumis*, *Eragrostis eriopoda*, **Cenchrus ciliaris*, with scattered emergent *Corymbia hamersleyana*, *Codonocarpus cotinifolius*.

Vegetation Type 2: Low Open Mixed Woodlands with Mixed Shrublands over Mixed Grasses (includes minor flowlines): *Eucalyptus gamophylla* over *Petalostylis labicheoides*, *Acacia bivenosa*, *Acacia ancistrocarpa*, *Acacia tenuissima*, *Acacia* species, over *Bonamia erecta*, over *Triodia pungens*, *Triodia basedowii* with *Paraneurachne muelleri* and *Aristida inaequiglumis*.

Vegetation Type 3: Open Mulga Woodland over Mixed Shrubs with Mixed Grasses: *Acacia aneura* var. *conifera*, *Acacia pruinocarpa*, *Acacia wanyu* over *Dipteracanthus australasicus*, *Bonamia erecta*, over **Bidens bipinnata*, over **Cenchrus ciliaris*, *Aristida inaequiglumis*, **Pennisetum setaceum*, *Triodia pungens*, with *Digitaria brownii*.

Vegetation Type 4: Mulga Grove over Mixed Shrublands over Mixed Grasses (Includes Mulga Grove interzone): *Acacia aneura*, *Acacia pruinocarpa*, *Acacia xiphophylla* over *Eremophila forrestii*, over *Ptilotus* spp. over *Triodia pungens*, **Pennisetum setaceum*, **Cenchrus ciliaris*, *Aristida inaequiglumis*, with *Aristida contorta*, *Digitaria brownii*, and *Eragrostis eriopoda*.

Vegetation Type 5: Hummock Grasslands with Emergent Mixed Shrubs and Tree species (Density of emergent species variable): *Triodia* spp. (dominated by *T. wiseana*, *T. basedowii*, *T. pungens*, *T. epactia*) with *Iseilema membranaceum*, *Paraneurachne muelleri*, *Eriachne obtusa*, with Low Shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxo*, *Gompholobium polyzygum*, with *Halgania gustafsenii*, *Acacia monticola*, *Corchorus lasiocarpus*, *Mirbelia viminalis*, with emergent *Eucalyptus leucophloia*, *Acacia bivenosa*, *Acacia rhodophloia*, *Grevillea wickhamii*, *Petalostylis labicheoides*, *Senna* spp. and *Acacia* spp.

Vegetation Type 6: Low Open Woodlands with Mixed Shrublands over Mixed (hummock) Grasses (Typically Gullies and Southfacing Slopes): *Eucalyptus leucophloia* over *Acacia bivenosa*, *Petalostylis labicheoides*, *Acacia aneura*, *Acacia tenuissima*, over *Senna* spp., over *Triodia* spp. (*T. basedowii*, *T. epactia*, *T. pungens*, *T. wiseana*) with *Paraneurachne muelleri*, *Themeda triandra*.

Vegetation Type 7: Open Riparian Woodland over Mixed Shrublands over Mixed (tussock) Grasses:

Eucalyptus camaldulensis with *Acacia citrinoviridis* over *Acacia pyrifolia*, *Petalostylis labicheoides*, over *Tephrosia rosea* over *Triodia pungens*, **Cenchrus ciliaris*, *Cymbopogon obtectus*, *Themeda triandra*, **Pennisetum setaceum*.

Vegetation Type 8: Mixed Open Woodland over Mixed Shrubland over Mixed Grassland (Typically on Broad Floodplain):

Eucalyptus xerothermica, *Corymbia candida*, *Corymbia hamersleyana*, with occasional *Eucalyptus gamophylla*, over *Petalostylis labicheoides*, *Acacia pachyacra*, *Acacia pyrifolia*, over *Dipteracanthus australasicus*, *Sida fibulifera*, over *Euphorbia australis* over **Cenchrus ciliaris*, *Triodia pungens*, *Themeda triandra*, *Eulalia aurea*, *Chrysopogon fallax*, *Eragrostis eriopoda*, **Pennisetum setaceum*, *Paraneurachne muelleri*, *Aristida inaequiglumis*.

Vegetation Type 9: Cleared Areas (borrow pits, etc):

Typically cleared with scattered native and weed species, including: *Acacia bivenosa*, *Petalostylis labicheoides*, *Ptilotus exaltatus*, **Cenchrus ciliaris*.

*denotes weed species

Clearing Description	<p>BHP Billiton Iron Ore Pty Ltd (here after referred to as BHP Billiton) have applied to clear 290 hectares within a 2,716 hectare purpose permit boundary as part of the Myopic exploration project. The project will include clearing for the installation of drill pads, sumps and vehicle tracks (BHP Billiton, 2008).</p> <p>The Myopic application area is located between 3-11 kilometres north-east of the Newman townsite.</p>
Vegetation Condition	<p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)</p> <p>To</p> <p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994)</p>
Comment	<p>There are a number of vehicle tracks which intersect the application area. The majority of vegetation within the application area is intact, with the main disturbance resulting from mining activities and cattle grazing. There is some further fragmentation from roads and railways which intersect the application area (GHD, 2008).</p>

3. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments	<p>Proposal is not likely to be at variance to this Principle</p> <p>The clearing permit area is located within the Hamersley Interim Biogeographic Regionalisation of Australia (IBRA) subregion (GIS database). Vegetation of the subregion is described by Kendrick (2001) as being composed of mulga low woodland over bunch grasses on fine textured soils in valley floors, and <i>Eucalyptus leucophloia</i> over <i>Triodia brizoides</i> on skeletal soils of the ranges. Known features of the region with special value include the gorges and waterfalls of Hamersley Range, particularly those of Karijini National Park, spectacular exposures of Banded Iron Formations, the Themeda Grasslands of the Pilbara region and the Red Hill Station mulga stands (Kendrick, 2001). The dominant land uses within this subregion are grazing, UCL and Crown reserves, native pastures, conservation and mining (Kendrick, 2001).</p> <p>A flora and fauna assessment of the application area was undertaken in November 2008 by GHD. As a result, GHD recorded approximately 321 flora taxa from 52 families in the application area. GHD (2008) have stated that this reflects a medium to high diversity of total species, which is attributed to the diversity of landforms within the application area. GHD (2008) also stated that the vegetation associations and flora species recorded in the application area are typical of the Pilbara region.</p> <p>During the flora and fauna assessment there were two Priority flora species named <i>Brunonia</i> sp. Long hairs and <i>Triumfetta leptacantha</i> which were recorded in the application area (GHD, 2008). BHP Billiton (2008) have committed to avoid clearing within 10 metres of all locations where these Priority flora species were recorded. Based on this, it is recommended that should the permit be granted, conditions be placed on the permit for flora management.</p> <p>During the flora and fauna assessment there were two conservation significant fauna species recorded within the application area: the Rainbow Bee-eater (<i>Merops ornatus</i>) and Peregrine Falcon (<i>Falco peregrinus</i>). GHD (2008) have acknowledged that suitable habitat for the Peregrine Falcon occurs in the application area, however, higher quality habitat exists in the Ophthalmia Ranges which are located adjacent to the northern boundary of the application area. In regard to the Rainbow Bee-eater, the habitat of this species is well represented in the general Pilbara region (GHD, 2008). Based on this, it is unlikely that the proposed clearing will significantly reduce the overall habitat of either of these species.</p> <p>As a result of the flora and fauna assessment, 14 weed species were recorded in the application area, which makes up approximately 4% of the total flora taxa (GHD, 2008). 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.</p>
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GHD (2008) have noted there was evidence (tracks and cow pats) of use of the site by domestic cattle, which has led to the degradation of some areas from grazing and trampling. Additionally, GHD (2008) noted that there were small areas of disturbance related to the impacts from material pit extraction, access track construction and maintenance, as well as vegetation clearing for historic exploration pads and tracks. These activities have resulted in a reduced biodiversity value, especially in comparison to surrounding areas which have not been subject to such disturbance.

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

Methodology BHP Billiton (2008).
GHD (2008).
Kendrick (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 is not likely to be at variance to this Principle

A fauna assessment of the Myopic project area was undertaken by GHD in November 2008. The following methods were used during the survey (GHD, 2008):

- Database Search; before undertaking a ground survey, a list of vertebrate species previously recorded or likely to occur in the application area was prepared. The list was compiled based on a search of the following databases: the Western Australian Museum Fauna Database named FaunaBase; the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* database and the Department of Environment and Conservation's (DEC) Threatened Fauna Database;
- Hand foraging for mammals and reptiles – opportunistically searching for terrestrial vertebrates, including overturning logs, dozer spoil, leaf litter, searching under bark and tree stumps, and recording all individuals observed;
- Secondary evidence - tracks, diggings, scats, burrows and nests were recorded where observed; and
- Habitat assessment - all habitat types encountered were assessed as to their suitability and likelihood of supporting vertebrate fauna.

During the fauna assessment a total of 50 fauna taxa were recorded in the application area including 36 birds, six reptiles, and eight mammal species (GHD, 2008). The low number of species is likely to be due to the brevity of the survey, the time of the survey (during the day) and the weather conditions (very hot). It should also be noted that the application area would support a much higher level of reptile species than that was recorded, especially around rocky outcrop areas (GHD, 2008).

As a result of the fauna assessment, two fauna species of conservation significance were recorded within the application area: the Rainbow Bee-eater (*Merops ornatus*) and the Peregrine Falcon (*Falco peregrinus*). Further to this, there were three pebble mounds discovered in the application area by GHD which indicate that the Western Pebble-mound Mouse species inhabits the application area.

The Rainbow Bee-eater (Migratory and Marine species - *EPBC Act 1999*) is a medium sized bird, and the only species of Bee-eater in Australia (Department of Environment and Water Resources (DEWR), 2008). The Rainbow Bee-eater is widespread and a common migrant to many parts of Australia including the Pilbara, and on several near shore islands. It occurs in a range of habitats, but in arid and semi-arid environments it commonly occurs in riparian floodplain vegetation assemblages (DEWR, 2008). During the fauna survey the Rainbow Bee-eater was recorded in the application area (GHD, 2008). However, this species is noted as having a wide distribution and habitat range (DEWR, 2008); therefore it is unlikely that the application area is representative of significant habitat for this species.

The Western Pebble-mound Mouse (Priority 4 - DEC) is found in rocky hummock grasslands and is endemic to the Pilbara (Start et al., 2000). Three pebble mounds were recorded within the application area. GHD (2008) have stated that they are uncertain whether the mounds were active. Given the presence of the pebble mounds, it is likely that the Western Pebble-mound Mouse exists within the application area. This species has been recorded in many surrounding sites to the Myopic application area, and its habitat is well represented throughout the Pilbara (Start et al., 2000). Additionally this species is abundant in at least five large conservation reserves found in the Pilbara (Start et al., 2000).

It should be noted that as part of BHP Billiton's flora and fauna commitments, a flora and fauna specialist will be walking the drill lines before clearing in the search for DRF and Priority flora species. As part of this process the flora and fauna specialist will also inspect the drill lines for pebble mounds, and any pebble mounds sighted will be flagged, recorded, mapped through GIS and subsequently avoided (BHP Billiton, 2008). Based on this, it is unlikely that the habitat of the Western Pebble-mound Mouse will be significantly impacted from the proposed clearing.

The Peregrine Falcon (Schedule 4, other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is widespread across Australia including some continental islands but absent from most deserts and the Nullarbor Plain (Johnstone & Storr, 1998). Its habitat consists of areas such as cliffs along coasts, rivers and ranges, and about wooded watercourses and lakes (Johnstone & Storr, 1998). During the fauna survey one Peregrine Falcon was observed flying in the application area. GHD (2008) have stated that suitable nesting habitat in the form of a cliff (approximately 5-15 metres in height and approximately 100 metres in length), is found in the north of the application area.

Given the presence of potential Peregrine Falcon habitat, BHP Billiton employed Biologic Environmental Science to undertake a targeted habitat search of the cliff found in the north of the application area. The targeted habitat search was undertaken on the 18 of December 2008 and involved fauna specialists searching the cliff face for any signs of Peregrine Falcon activity including signs of nesting, scats, and individual birds (Biologic Environmental Science, 2008). The results of the habitat search showed that the cliff is not likely to provide nesting habitat for the Peregrine Falcon and is unlikely to do so for the following reasons (Biologic Environmental Science, 2008):

- Peregrine Falcons generally prefer to nest in much taller cliff faces. For example the average height of nesting cliffs in Canberra is 25 metres, 29 metres in Victoria, 48.6 metres in Tasmania and 50 metres in South Australia.
- Peregrine Falcons seem to prefer a decent distance from the top of cliff faces to their nests. This would be a ground dwelling predator deterrent as access to the nest would be nearly impossible. In Victoria nests had an average of 13 metres from the top of a cliff. Given that the cliff is only 5 – 12 metres in height it is unlikely Peregrine Falcons would choose to nest at this site.
- Ledges and rock crevices at the study site are unlikely to be large enough for a nesting Peregrine Falcon. In Tasmania the area of nesting sites averaged 2.4 square metres.

Peregrine Falcons may nest in low cliffs if they have no choice, however, taller cliffs occur to the north and west of the application areas in the Ophthalmia Ranges which would provide more appropriate nesting sites (Biologic Environmental Science, 2008). Based on the above it is unlikely that the application area contains suitable nesting habitat for the Peregrine Falcon.

During the Fauna Assessment undertaken by GHD (2008) a general habitat search was completed, as a result there were four habitat types recorded in the application area, including:

- Ridges and scree slopes;
- Breakaways, cliff faces, gullies and gorges;
- Mixed woodlands and shrublands; and
- Drainage lines.

GHD (2008) have stated that of the habitats recorded, the rocky outcrops of the breakaways, cliff faces, gullies and gorges provide the highest habitat value in the application area. In particular, this area is well dissected by gorges, gullies and cliff faces which provide optimal habitat for a number of reptile, mammal and bird species. Cracks and exfoliating rock along gullies and cliff faces provide excellent refuge for a large number of species, in particular geckoes (GHD, 2008). It should be noted although this habitat type is of high value, it is well represented in the Ophthalmia Ranges which are located to the north and west of the application area (GHD, 2008). Furthermore, it is unlikely that this habitat type will be significantly impacted as these areas are generally rugged and are logistically difficult to undertake exploration drilling within. As a result, it is likely that these areas would be avoided during the life of the project.

It is acknowledged that the proposed clearing is for a large area (290 hectares) and the loss of habitat and fauna displacement are inevitable consequences of clearing activity. However, clearing will be non-contiguous, consisting of discrete drill pads (maximum size of 400 square metres) and access tracks (maximum width of 4 metres) (BHP Billiton, 2007). This clearing proposal is likely to have localised impacts to fauna species and their associated habitat given the nature of the proposal. Many of the bird species and larger reptile species within the proposed clearing area are mobile and will be able to move to adjacent habitat at the onset of disturbance.

It is relevant to note that habitat loss as a result of the proposed clearing will be temporary. BHP Billiton (2007) commit to rehabilitating drill pads and access tracks within six months of completion of each stage of the program, and/or before the commencement of the next phase of drilling (whichever comes first). GHD (2008) have stated that clearing in the project area is unlikely to cause any significant breaks to habitat linkages, as the project area is completely surrounded by relatively unaltered rangeland. Furthermore, the habitats present are well represented in the Ophthalmia Ranges which are found adjacent to the north of the application area.

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

Methodology BHP Billiton (2007).
BHP Billiton (2008).

Biologic Environmental Science (2008).
DEWR (2008).
(GHD) 2008.
Johnstone & Storr (1998).
Start et al., (2000).

(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 assessment of the application area was undertaken by GHD in May 2008. This involved a detailed database search of the application area and an on ground survey to document and describe the presence of all flora species, vegetation associations and species of conservation significance within the application area (GHD, 2008).

During the flora assessment there were no Declared Rare Flora (DRF) species recorded in the application area, however, two Priority flora species were recorded: *Brunonia* sp. 'long hairs' and *Triumfetta leptacantha*.

Brunonia sp. 'long hairs' (Priority One – DEC) is an erect herb up to 0.07 metres in height, which is usually found along creeklines and is distributed across the Eremean, Pilbara and the Central Ranges. GHD (2008) have stated that during the flora and vegetation survey a population of approximately 25 plants was recorded in a location described as a sandy loam type habitat which receives runoff from an adjacent low rocky hill. In regards to this species, BHP Billiton (2008) have committed to avoid the location where this species was recorded. Based on this, it is recommended that should the permit be granted a condition be placed on the permit for flora management.

Triumfetta leptacantha (Priority Three – DEC) is a small spreading shrub approximately 0.25 – 0.6 metres in height which occurs in stony red loam type habitats usually amongst boulders or stony hillsides (Western Australian Herbarium, 2008). A total of 10 plants of this species were recorded from two locations in the north side of the ridgeline immediately below rocky outcrops. The presence of this taxon appears to be related to macropod resting areas, as seed cases are covered in hooked hairs easily able to latch on to fur (GHD, 2008). According to BHP Billiton (2008), this species is well represented in the adjacent Orebody 25 project area, and is subject of a Significant Species Management Plan (BHP Billiton, 2008). In regards to the management of this species in the application area, BHP Billiton have committed to avoid the two locations where this species was recorded. Based on this, it is recommended that should the permit be granted, a condition be placed on the permit for flora management.

GHD (2008) have stated that the flora assessment was undertaken at a time when there had been little rainfall in previous months, and as a result it is likely that a number of annual species would have been missed due to the lack of flowering material for identification. Based on known records around the area, it is likely that no annual DRF species would have been present within the application area, however, one Priority species named *Gonocarpus ephemerus* may have been present (GHD, 2008).

Gonocarpus ephemerus (Priority Two – DEC) is a procumbent annual or perennial herb, approximately 0.07 metres in height, which is usually found in sandy habitats along drainage lines (Western Australian Herbarium, 2008). GHD (2008) have stated that suitable habitat for this species is present within the application area. However, it is unlikely that there would be significant impacts to the habitat of this species as there are similar areas of habitat which are in better condition in the areas surrounding the application area (GHD, 2008).

Based on the above, the proposed clearing may be at variance to this Principle. However, BHP Billiton have committed to undertake targeted flora searches for Priority flora before any clearing takes place, and if any Priority flora species are identified they will be flagged and disturbance areas will be redesigned to avoid these species. Furthermore, BHP Billiton have committed to avoid the known locations where Priority flora species were recorded in the application area. Consequently it is recommended that should the permit be granted, conditions be placed on the permit for the purposes of flora management.

Methodology BHP Billiton (2008).
GHD (2008).
Western Australian Herbarium (2008).

(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) found within the application area (GIS Database). The closest known TEC to the application area is Ethel Gorge which is found approximately 6 kilometres to the east of the application area. Given the distance between the closest known TEC and the application area, it is unlikely that any TECs will be compromised from the proposed clearing.

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

Methodology GIS Database:

(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 application area falls within the IBRA Pilbara Bioregion (GIS Database). Shepherd et al. (2001) report that approximately 100% of the pre-European vegetation still exists in this Bioregion. The vegetation in the application area is recorded as Beard vegetation associations 18: Low woodland; mulga (*Acacia aneura*); and 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database). According to Shepherd et al., (2001) there is approximately 100% of these vegetation types remaining on both a State and bioregion level.

Although large scale mining operations (Mount Whaleback Mine) are located in close proximity to the application area, the region in which the clearing is proposed to occur has not undergone broad scale clearing. Hence the application area does not represent a significant remnant of native 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
IBRA Bioregion – Pilbara	17,804,164	17,794,164	~ 99.9	Least Concern	6.3
Beard vegetation associations – State					
18	19,892,437	19,890,348	~ 100	Least Concern	2.1
82	2,565,930	2,565,930	~ 100	Least Concern	10.2
Beard vegetation associations – Pilbara Bioregion					
18	676,561	676,561	~ 100	Least Concern	16.8
82	2,563,610	2,563,610	~ 100	Least Concern	10.2

* Shepherd et al. (2001)

** 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 one major watercourse named Homestead Creek which is situated within the application area and flows in an easterly direction to join the Fortescue River above the Ophthalmia Dam (GIS Database). BHP Billiton (2008) have committed to avoid clearing within 10 metres of Homestead Creek and will utilise existing tracks and crossings. Based on this, should the permit be granted, it is recommended that a condition be placed on the permit to avoid clearing within Homestead Creek.

There are also a number of small watercourses which traverse the project area (GIS Database). These watercourses are non-perennial and would only flow after major rainfall events (GIS Database). In regard to minor drainage lines, wherever practicable BHP Billiton (2008) will not encroach within 10 metres of minor watercourses that may be considered significant in relation to local and/ or regional surface flow.

It is the proponent's responsibility to liaise with the Department of Water to determine whether a Bed and Banks permit is required for the proposed works.

Based on the above, the proposed clearing is at variance to this Principle, however, BHP Billiton have committed to avoid clearing within 10 metres of Homestead Creek (BHP Billiton, 2008). As a result, it is recommended that should the permit be granted, a condition be placed on the permit for watercourse

management.

Methodology BHP Billiton (2008).
GIS Database:
- Geodata, Lakes
- Hydrography, Linear
- Rivers 250K

(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 topography of the application area comprises a low ridge line located in the centre of the application area, which is intersected by a major drainage line called Ephemeral Creek (GHD, 2008). GHD (2008) have described the soils of the application area as patchy with some areas having no soil profile. The soils that are present are described as porous loamy soils with a shallow profile.

There are five land systems found within the application area (GIS Database). These are:

- Boolgeeda
- Elimunna
- Newman
- River; and
- Wannamunna

The Boolgeeda land system is described as stony lower plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). The landform of this system in which the application area is found is described as stony slopes and upper plains - very gently inclined slopes and upper interfluvies immediately down slope from adjacent hill systems. The soils are described as red shallow loams or red loamy earths with surface mantles of common to abundant pebbles or chert ironstone and quartz (Van Vreeswyk et al., 2004). According to Van Vreeswyk et al., (2004) the Boolgeeda land system is not susceptible to soil erosion which is likely to be due to the presence of a stony mantle.

The Elimunna land system is described as stony plains on basalt supporting sparse acacia and cassia shrublands and patchy tussock grasslands (Van Vreeswyk et al., 2004). The landform in which the application area lies is stony plains – level to gently undulating plains extending up to four kilometres, mantles of abundant pebbles of basalt, quartz and ironstone. This system is generally not susceptible to erosion (Van Vreeswyk et al., 2004).

The Newman land system is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The landform in which the application area lies is plateaux, ridges, mountains and hills - up to 400 metres; level or rounded plateaux summits and mountain crests, ridges and indented escarpments with vertical upper cliff faces and moderately inclined to very steep upper scree slopes; surface mantles of abundant to very abundant pebbles, cobbles and stones of ironstone, jaspilite, chert and other rocks. Also outcrop of parent rock (Van Vreeswyk et al., 2004). The Newman land system has a nil to minor erosion potential, which is likely to be due to the surface mantle present which provides protection from erosional forces (Van Vreeswyk et al., 2004).

The Wannamunna land system is described as hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (Van Vreeswyk et al., 2004). The hardpan plains landform is made up of red-brown shallow loams with surface mantles of few pebbles of ironstone and is subject to sheetflows. According to Van Vreeswyk et al., (2004) this system is not particularly susceptible to soil erosion, likely to be a result of the stony mantle present.

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 minor and major 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) has stated that this system is 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.

The majority of the application area (including the Newman, Boolgeeda, Elimunna and Wannamunna land systems) in its current form are protected from erosional forces as a stony mantle is present (Van Vreeswyk et al., 2004). However, low lying areas (floodplains and drainage lines) of the River land system, are likely to be a lot more susceptible to erosional forces due to the sandy nature of soils within this system. Given the intense summer rainfall events associated with cyclonic activities (BoM, 2008) and sandy soils present, it is likely that soil erosion may occur from the proposed clearing in the River land system. Some other parts of the application area may also be subject to some erosion once the stony mantle is removed during the clearing process.

In regards to the management of erosion it should be noted that progressive rehabilitation will be undertaken throughout the life of the project. BHP Billiton (2008) have committed to rehabilitating drill pads and access tracks within 6 months of the completion of each stage of the program, and/or before the commencement of the

next phase of drilling (whichever comes first). All disturbance to the land surface made as a result of the exploration program will be rehabilitated as per BHP Billiton's 'Exploration Environmental Management Plan' (BHP Billiton, 2007).

Based on the above, the proposed clearing may be at variance to this Principle. However, the potential for erosion is likely to be minimised as BHP Billiton (2008) have committed to undertake progressive rehabilitation. Additionally, BHP Billiton (2008) have made a commitment to avoid any clearing within 10 metres of major drainage lines (Homestead Creek). Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for the purpose of mitigating the potential for land degradation.

Methodology BHP Billiton (2007).
BHP Billiton (2008).
BoM (2008).
GHD (2008).
Van Vreeswyk et al., (2004).
GIS Database:
- Rangeland Land System Mapping
- 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 at variance to this Principle**
The closest conservation area to the application area is Karijini National Park which is located approximately 110 kilometres to the west (GIS Database). Given the large distance between these two areas it is unlikely that the environmental values of Karijini National Park will be compromised from the proposed clearing.

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

Methodology GIS Database:
- CALM Managed Lands and Waters - CALM

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

Comments **Proposal is not likely to be at variance to this Principle**
The southern half of the application area is located within the Newman Water Reserve (GIS Database). All activities conducted within the Public Drinking Water Supply Area, should be in accordance with the Department of Water (DoW) Land Use Compatibility Tables (DoW, 2008). The proponent is advised to follow the Water Quality Protection Guidelines for the mining produced by the DoW, to minimise any risk that the proposed clearing and associated activities may pose to the Newman Water Reserve (DoW, 2008). The DoW is satisfied that the proposed clearing of 290 hectares is unlikely to have a significant impact on the quality or quantity of groundwater (DoW, 2008).

The proposed clearing will be non-contiguous, and will consist of discrete drill pads and access tracks (BHP Billiton, 2008). It is not expected that the proposed clearing will significantly impact upon groundwater levels or quality within the application area.

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

There is one major watercourse named Homestead Creek (a major tributary of the Fortescue River) which intersects the the application area (GIS Database). BHP Billiton (2008) have committed to avoid clearing within 10 metres of this watercourse, thereby reducing the potential for sedimentation of this watercourse. In addition to Homestead Creek, there are a number of minor non-perennial watercourses which are located within the application area. Care must be taken to ensure that the proposed clearing activities do not cause or increase sedimentation, erosion or turbidity to watercourses on or off site. BHP Billiton (2008) have advised that sediment traps and sumps will be constructed in areas assessed as high risk in relation to erosion and sedimentation release to the environment beyond disturbed areas. Should the permit be granted, it is recommended that a condition be imposed on the permit to avoid clearing within 10 metres of Homestead Creek.

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

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

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

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

There are no perennial watercourses or wetlands within the application areas (GIS Database).

The project area is located within the Pilbara region of Western Australia (GIS Database). This region is subject to an arid tropical climate with two distinct seasons, a hot summer (October – April) and a mild winter (May – September) (BoM, 2008). The nearby Newman town site has an average annual rainfall of 310.2 millimetres per year (BoM, 2008). Intense rainfall events generally associated with cyclonic activity during the summer months are known to occur in the area, and these often result in localised flooding (BoM, 2008).

The application area experiences a high annual evaporation rate of approximately 2,400 millimetres (GIS Database). Given the low level of annual rainfall (310.2 millimetres) in relation to the high evaporation rate (2,400 millimetres), it is likely that any water that collects and pools during heavy rainfall periods will evaporate quickly.

The application area is situated within the Fortescue River – Upper Catchment which covers an area of approximately 2,975,192 hectares (GIS Database). Given the scale of the proposed clearing (290 hectares) in relation to the size of the Yarra Monger Catchment (2,975,192 hectares), it is unlikely that the proposed clearing will significantly increase the incidence or intensity of flooding within the application areas (GIS Database).

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

Methodology BoM (2008).

GIS Database:

- Evapotranspiration, Point Potential
- Hydrographic Catchments - Catchments.

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

Comments

There is one native title claim over the application area (GIS Database). The claim (WC99_004) has been registered with the National Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are 27 registered Sites of Aboriginal Significance located within the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

It is standard practice for BHP Billiton exploration activities to adopt a strategy of site avoidance (BHP Billiton, 2008). Proposed drill-holes are relocated away from identified sites and potential access tracks re-routed where necessary. If disturbance to an Aboriginal Site or potential Aboriginal Site is unavoidable then an application under section 18 of the *Aboriginal Heritage Act 1972* would need to be made and the project would not proceed unless the Minister for Indigenous Affairs grants consent (BHP Billiton, 2008).

Additionally, BHP Billiton (2005) has 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, 2005).

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
- Native Title Claims

4. Assessor's comments

Comment

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

Should the permit be granted, it is recommended that conditions be imposed on the permit for the purposes of mitigating the potential for land degradation, flora management, weed management and permit reporting.

5. References

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- Western Australian Herbarium (1998?). FloraBase? The Western Australian Flora. Department of Environment and Conservation. <http://florabase.dec.wa.gov.au/>

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
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.