



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4768/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: BHP Billiton Iron Ore Pty Ltd

1.3. Property details

Property: Iron Ore (Mount Newman) Agreement Act 1964, Mineral Lease 244SA (AML 70/244)
Local Government Area: Shire of East Pilbara
Colloquial name: Myopic Exploration Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
290		Mechanical Removal	Mineral Exploration, Borrow Pit Excavation, Water Bore Construction and Maintenance, Pipelines and Associated Activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 5 January 2012

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 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). These vegetation associations are (Shepherd, 2009):

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 2,707 hectare purpose permit boundary as part of the Myopic exploration project. The project will include clearing for the installation of drill pads, sumps, borrow pits, water bores and pipelines and vehicle tracks.</p> <p>The Myopic application area is located between 3-11 kilometres north-east of the Newman township.</p>
Vegetation Condition	<p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994);</p> <p>To:</p> <p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).</p>
Comment	<p>The vegetation condition was assessed by botanists from GHD.</p> <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 <i>Themeda</i> 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>There were two Priority flora species named <i>Brunonia</i> sp. Long hairs and <i>Triumfetta leptacantha</i> recorded within the application area during the flora survey (GHD, 2008). In the time since the survey <i>Triumfetta leptacantha</i> has been removed from the Priority flora list but <i>Brunonia</i> sp. Long hairs remains a Priority 1 species (Western Australian Herbarium, 2011). BHP Billiton (2008) have committed to avoid clearing within 10 metres of all locations where Priority flora species were recorded. Potential impacts to Priority Flora as a result of the proposed clearing may be minimised by the implementation of a flora management condition.</p> <p>There were 14 weed species recorded within 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. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.</p> <p>During the 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</p>
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(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.

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)
Western Australian Herbarium (2011)
GIS Database:
- IBRA WA (Regions - 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. During the fauna assessment a total of 50 fauna taxa were recorded within 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 (*Pseudomys chapmani*) 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 (DSEWPac, 2011). 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 (DSEWPac, 2011). 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 (DSEWPac, 2011); 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 18 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 - 15 metres in height it is unlikely Peregrine Falcons would choose to nest at this site; and
- 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:

- 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 provides 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 that 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 areas 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)
DSEWPaC (2011)
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 is not likely to be at variance to this Principle

According to available databases, there are no records of Threatened Flora within the application area (GIS Database). A flora survey undertaken by GHD (2008) did not record any flora species listed as Threatened

Flora.

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

Methodology GHD (2008)
GIS Database:
- Threatened and Priority Flora

(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**
According to available databases, approximately half of the application area falls within the buffer zone of the Threatened Ecological Community (TEC) known as the Ethel Gorge aquifer stygobiont community (GIS Database). Ethel Gorge is located approximately seven kilometres east of the application area. Given this distance and that the TEC is a stygobiont community, the proposed clearing is not expected to impact this TEC.

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

Methodology GIS Database:
- Threatened Ecological Sites Buffered

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

Comments **Proposal is not at variance to this Principle**
The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 99.9% of the pre-European vegetation remains (see table) (Shepherd, 2009; GIS Database). This gives it a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

The vegetation of the clearing application area has been mapped as Beard vegetation associations:

18: Low woodland; mulga (*Acacia aneura*); and
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Shepherd, 2009; GIS Database).

According to Shepherd (2009), over 99% of both of these vegetation associations remain at a state level and 100% of vegetation remains at a bioregional level (see table). These vegetation associations would be given a conservation status of 'Least Concern' at both a state and bioregional level (Department of Natural Resources and Environment, 2002).

The vegetation under application is not a remnant of vegetation in an area that has been extensively cleared.

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,193	17,785,001	~99.89	Least Concern	6.32
Beard Veg Assoc. – State					
18	19,892,305	19,890,275	~99.99	Least Concern	2.13
82	2,565,901	2,565,901	~100	Least Concern	10.24
Beard Veg Assoc. – Bioregion					
18	676,557	676,557	~100	Least Concern	16.80
82	2,563,583	2,563,583	~100	Least Concern	10.25

* Shepherd (2009)
** 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 (2009)
GIS Database:
- IBRA WA (Regions - Subregions)
- Pre-European Vegetation

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

Comments **Proposal is at variance to this Principle**

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. Potential impacts to Homestead Creek as a result of the proposed clearing may be minimised by the implementation of a watercourse management condition.

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.

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

Methodology BHP Billiton (2008)
GIS Database:
- Hydrography, Linear
- Rivers

(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 Homestead 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 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 as 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, Eliumunna 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, 2011) 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. Potential impacts of erosion may be minimised by the successful implementation of a staged clearing and rehabilitation condition.

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

Methodology BoM (2011)
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 likely to be 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 likely to be at variance to this Principle.

Methodology GIS Database:
- DEC Tenure

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

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

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 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 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. Potential impacts to Homestead Creek as a result of the proposed clearing may be minimised by the implementation of a watercourse management condition.

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 application 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, 2011). The nearby Newman town site has an average annual rainfall of 313 millimetres per year (BoM, 2011). 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 (313 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.

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

Methodology BoM (2011)
GIS Database:
- Evaporation Isoleths
- Hydrography, Linear
- IBRA WA (Regions – Subregions)

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

Comments

There is one Native Title claim (WC05/6) over the areas under application (GIS Database). This claim has been registered with the Native Title Tribunal on behalf of the claimant group. However, the mining tenure 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 a number of registered Aboriginal Sites of Significance located within the clearing permit application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The clearing permit was advertised on 26 December 2011 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims – Registered with the NNTT

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
CALM	Department of Conservation and Land Management (now DEC), Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DEC), Western Australia
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DoE	Department of Environment (now DEC), Western Australia
DoIR	Department of Industry and Resources (now DMP), Western Australia
DOLA	Department of Land Administration, Western Australia
DoW	Department of Water
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI Act	Rights in Water and Irrigation Act 1914, Western Australia
s.17	Section 17 of the Environment Protection Act 1986, Western Australia
TEC	Threatened Ecological Community

Definitions:

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

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in

need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

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

- Schedule 1 Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2 Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3 Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4 Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

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

- P1 Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2 Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3 Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4 Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5 Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

- EX Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W) Extinct in the wild:** A native species which:
- (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
 - (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN Endangered:** A native species which:
- (a) is not critically endangered; and
 - (b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU Vulnerable:** A native species which:
- (a) is not critically endangered or endangered; and
 - (b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.