



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3609/2
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)
Miscellaneous Licence 52/108
Local Government Area: Shire of East Pilbara
Colloquial name: Jimblebar ANSF Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 3 November 2011

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 useful to look at vegetation extent in a regional context. Two Beard Vegetation Associations are located within the proposed clearing area (GIS Database):

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

-Beard Vegetation Association 216: Low woodland; mulga (with spinifex) on rises.

A flora and vegetation assessment was undertaken by ENV Australia on 17 September and 4 to 6 November 2009. During the survey, there were 19 vegetation associations recorded within the application area (ENV Australia, 2009b):

Vegetation Association THG01:

Hummock grassland of *Triodia basedowii* with shrubland of *Acacia ancistrocarpa*, *Acacia tenuissima*, *Acacia aneura* and *Acacia stowardii* with scattered low trees of *Corymbia hamersleyana* and *Corymbia deserticola* subsp. *deserticola* on red-brown loam on plains/floodplains.

Vegetation Association THG02:

Open hummock grassland of *Triodia basedowii* with low open shrubland of *Bonamia rosea*, *Indigofera georgei* and *Ptilotus obovatus* with scattered low trees of *Corymbia hamersleyana* and *Eucalyptus gamophylla* (mallee) on red-brown loam on plains.

Vegetation Association THG03:

Hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia basedowii* and *Triodia brizoides* with low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* with scattered shrubs of *Acacia bivenosa*, *Grevillea berryana* and *Eremophila latrobei* subsp. *latrobei* on red-brown loam on hills.

Vegetation Association THG04:

Hummock grassland of *Triodia brizoides* with open shrubland of *Acacia aneura* (mostly burnt) with very open tussock grassland of *Eriachne mucronata* on red-brown loam on ridge.

Vegetation Association THG05:

Hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia wiseana* and *Triodia pungens* with low open shrubland of *Eremophila fraseri* subsp. *fraseri*, *Senna ferraria* and *Senna artemisioides* subsp. *oligophylla* x *helmsii* with scattered shrubs of *Grevillea wickhamii* subsp. *hispidula* on red-brown loam on plains.

Vegetation Association THG06:

Hummock grassland of *Triodia pungens* and *Triodia angusta* with high shrubland of *Acacia paraneura*, *Acacia aneura* and *Acacia tetragonophylla* with scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus trivalva* on red-brown loam on minor drainage lines.

Vegetation Association THG07:

Hummock grassland of *Triodia brizoides* with open shrubland of *Acacia bivenosa* and *Senna glutinosa* subsp. *pruinosa* with low scattered shrubs of *Eremophila cuneifolia* on red-brown loam on hill slope.

Vegetation Association THG08:

Hummock grassland of *Triodia brizoides* with high open shrubland of *Acacia bivenosa* and *Acacia aneura* with low open shrubland of *Scaevola acacioides* with very open tussock grassland of *Eriachne mucronata* on red-brown loam on steep hill slope.

Vegetation Association TCHG01:

Closed hummock grassland of *Triodia basedowii* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with high shrubland of *Acacia stowardii*, *Acacia pruinocarpa* and *Acacia aneura* on red-brown loam on plains.

Vegetation Association TCHG02:

Closed hummock grassland of *Triodia pungens* with shrubland of *Acacia coriacea* subsp. *coriacea*, *Acacia ancistrocarpa* and *Acacia bivenosa* with very open mallee of *Eucalyptus trivalva* and *Eucalyptus gamophylla* on red-brown sandy loam on drainage lines.

Vegetation Association TOHG01:

Open hummock grassland of *Triodia brizoides* with open shrubland of *Senna glutinosa* subsp. *pruinosa* and *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* on red-brown loam on rocky plains.

Vegetation Association COTG01:

Open tussock grassland of *Cymbopogon obtectus*, *Paraneurachne muelleri* and *Aristida inaequiglumis* with open shrubland of *Acacia ancistrocarpa*, *Solanum sturtianum* and *Ptilotus obovatus* on red-brown loamy sand on floodplains.

Vegetation Association TTG01:

Tussock grassland of *Themeda triandra*, *Chrysopogon fallax* and *Aristida holathera* var. *holathera* with shrubland of *Acacia ancistrocarpa*, *Trichodesma zeylanicum* and *Acacia elachantha* with scattered low trees of *Corymbia hamersleyana* on red-brown sandy loam on drainage lines.

Vegetation Association AHS01:

High shrubland of *Acacia aneura* (burnt) over open tussock grassland of *Themeda triandra* and *Chrysopogon fallax* (hayed-off) with low open woodland of *Corymbia hamersleyana* on red-brown loam on plains.

Vegetation Association THG1:

Hummock grassland of *Triodia lanigera* and *Triodia pungens* with open shrubland of *Acacia dictyophleba* and *Acacia trudgeniana* with scattered tall shrubs of *Hakea lorea* subsp. *lorea* on red-brown loam on floodplains.

Vegetation Association TOHG:

Open hummock grassland of *Triodia pungens* with open shrubland of *Gossypium robinsonii* and *Grevillea wickhamii* subsp. *hispidula* on red-brown loam on drainage lines.

Vegetation Association TCHG:

Closed hummock grassland of *Triodia wiseana* with open shrubland of *Acacia ancistrocarpa*, *Acacia tetragonophylla* and *Acacia aneura* var. *macrocarpa* with scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* on red-brown loam on hill slopes.

Vegetation Association ELS:

Low shrubland of *Eremophila fraseri* subsp. *fraseri*, *Senna ferraria* and *Senna artemisioides* subsp. *oligophylla* over scattered hummock grass of *Triodia wiseana* and *Triodia pungens* on red-brown loam on quartz rises/plains.

Vegetation Association AHS:

High shrubland of *Acacia aneura* var. *macrocarpa* with open hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) on red-brown loam on drainage lines.

Clearing Description

BHP Billiton Iron Ore have applied to clear up to 83 hectares within a 216.9 hectare purpose permit boundary. The proposed clearing is for the purpose of constructing an ammonium nitrate storage facility, above ground water supply pipeline and associated access tracks, temporary site offices, laydown areas, borrow pits and stockpiling of topsoil and vegetative matter (BHP Billiton Iron Ore, 2010).

The application area is located approximately four kilometres to the north-west of the Jimblebar mine site and approximately 40 kilometres east of Newman (GIS Database).

Native vegetation clearing will be undertaken via mechanical means. Topsoil and vegetation removed during clearing operations will be stockpiled for future rehabilitation works of areas not required for permanent infrastructure (BHP Billiton Iron Ore Pty, 2010).

Vegetation Condition

Pristine: No obvious signs of disturbance (Keighery, 1994), to

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Comment

The majority of the application area was sighted as being in a 'pristine' to 'excellent' condition, whilst a small portion associated with previous vehicle tracks was in a 'good' condition (ENV Australia, 2009b).

Clearing permit CPS 3609/1 was granted by the Department of Mines and Petroleum on 8 April 2010 and was valid from 8 May 2010 to 8 May 2015. The clearing permit authorised the clearing of 80 hectares of native

vegetation within an application area of 210 hectares. BHP Billiton Iron Ore has requested an amendment to increase the amount of clearing to 83 hectares within an application area of 216.9 hectares. The additional clearing is not likely to have any significant environmental impacts.

3. Assessment of application against clearing principles

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

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

The application area is located within the Hamersley sub-region of the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Vegetation of the region can be broadly described as Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (Kendrick, 2001). Known rare features of the region include the Gorges of Hamersley Range (particularly those of Karijini National Park), Palm Springs, Duck Creek and the *Themeda* grasslands (Kendrick, 2001).

A fauna habitat survey of the application area concluded that the majority of the habitat types occurring within the application area were well represented in the Pilbara region and were not of specific conservation significance (ENV Australia, 2009a). One habitat type named 'Hill Tops/Breakaways' had moderate habitat value, it provided attributes such as caves and crevices which are suitable habitat for ground-dwelling fauna. It was also noted as being disjointed with regional ridge lines of the wider region, therefore, it is locally significant (ENV Australia, 2009a). BHP Billiton Iron Ore (2010) have committed to avoid clearing within this habitat type during the life of the project.

A flora and vegetation assessment of the application area was undertaken by ENV Australia on the 17 September and 4 to 6 November 2009. As a result of the flora and vegetation assessment, there were 213 taxa comprising 38 families and 91 genera recorded in the project area. The floristic composition of the Project area is considered to be typical of the Pilbara region (ENV Australia, 2009b).

Three introduced flora species were recorded in the Project area including Buffel Grass (*Cenchrus ciliaris*), Spiked Malvastrum (*Malvastrum americanum*) and Purslane (*Portulaca oleracea*) (ENV Australia, 2009b). The proposed vegetation clearing has the potential to introduce further weed species into the local area should adequate hygiene practices not be put in place. Weeds can affect biodiversity in a number of ways, including out competing native species for resources and increasing the fire risk. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Most of the application area had vegetation in a 'Pristine' to 'Very Good' condition, including the low hills, plains, floodplains and drainage lines (ENV Australia, 2009b). However, the application area is partially located on the Koondra pastoral station (GIS Database), and ENV Australia (2009b) have stated that some areas within the application area showed signs of disturbance from cattle and fire. The vegetation most degraded being in a 'Good' to 'Very Good' condition was along the Orebody 18 to Wheelara Hill mine site access road (ENV Australia, 2009b). It is unlikely the vegetation of the application area is likely to exhibit a higher level of floristic diversity than other areas in the bioregion.

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

Methodology BHP Billiton Iron Ore (2010)
ENV Australia (2009a)
ENV Australia (2009b)
Kendrick (2001)
GIS Database:
- IBRA WA (Regions - Sub Regions).
- Pastoral Leases

(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 application area was undertaken by ENV Australia on 17 September 2009 and 4 - 6 November 2009. The fauna assessment included a detailed desktop review and a reconnaissance survey which included a habitat assessment and targeted search to document and map evidence of Western Pebble-mound Mouse (*Pseudomys chapmani*) (ENV Australia, 2009a).

The habitat assessment identified four habitat types in the application area, which included:

1. Low Hills/Stony Plains;
2. Hill Tops/Breakaways;

3. Alluvial Plains/Drainage Lines; and

4. Completely Degraded/Cleared Habitats

Of the habitat types recorded the 'Low Hills/Stony Plains' and 'Completely Degraded/Cleared Habitats' were sighted as having low habitat value, whilst the 'Alluvial Plains/Drainage Lines' and the 'Hill Tops/Breakaways' had a moderate habitat value (ENV Australia, 2009a). There were no significant habitat features such as deep caves, gorges or gullies recorded within the application area. ENV Australia (2009a) have stated that three of the habitats of the application area are considered widespread in the Pilbara region and in the local area.

The 'Hill Tops/Breakaways' habitat was rated as having a moderate habitat value because it provides attributes such as caves and crevices which provide suitable habitat for ground-dwelling fauna (ENV Australia, 2009a). This habitat type was noted as being in good condition and was disjointed from regional ridgelines of the wider region, meaning it is locally significant fauna habitat (ENV Australia, 2009a). This habitat type is found in pockets in the west of the application area near the proposed water pipeline corridor. BHP Billiton Iron Ore (2010) have committed to avoid clearing within the 'Hilltop/Breakaways' habitat during the life of the project. Potential impacts to the 'Hilltop/Breakaways' habitat as a result of the proposed clearing may be minimised by the implementation of a fauna management condition.

During the fauna assessment, the entire application area was searched for the Western Pebble-mound Mouse. As a result, one pebble-mound was recorded near the western boundary of the application area (ENV Australia, 2009a). However, this pebble-mound had characteristics that were typical of a 'recently inactive' pebble-mound which included the presence of living plants on the mound, moderate structural complexity and an absence of cleared defined access holes (ENV Australia, 2009a). Therefore, whilst habitat present in the application area may be suitable for the Western Pebble-mound Mouse to forage, shelter and breed it currently does not appear to reside in the application area. Start et al. (1980) have stated that this species is widespread through the central and eastern Pilbara and abundant in at least five large conservation reserves found in the region. Based on this, it is unlikely that the proposed clearing will significantly reduce the overall habitat of the Western Pebble-mound Mouse.

As a result of the desktop review, there were thirteen conservation significant fauna species which were highlighted as having the potential to occur within the application area. These include: Lerista Skink (*Lerista macropisthopus remota*), Blind Snake (*Ramphotyphlops ganei*), Pilbara Olive Python (*Liasis olivaceus barroni*), Peregrine Falcon (*Falco Peregrinus*), Australian Bustard (*Ardeotis australis*), Bush Stone-curlew (*Burhinus grallarius*), Fork-tailed Swift (*Apus pacificus*), Rainbow Bee-eater (*Merops ornatus*), Star Finch (Western subspecies) (*Neochmia rifcauda clarescens*), Long-tailed Dunnart (*Sminthopsis longicaudata*), Ghost Bat (*Macroderma gigas*), Pilbara Leaf-nosed Bat (*Rhinonycteris aurantia*) and the Western Pebble-mound Mouse (*Pseudomys chapmani*).

There are no significant habitats features such as deep caves, abandoned mine shafts, rocky gorges or gullies, permanent water holes and hollow trees which may provide nesting habitat for the fauna species noted above (ENV Australia, 2009a). Further to this, the majority of the fauna species above are highly mobile and would be able to vacate the area at the onset of disturbance (ENV Australia, 2009a). Three of the fauna species listed above are ground-dwelling and have small home ranges. Consequently, these species are likely to be vulnerable to localised clearing, having poor dispersal powers (ENV Australia, 2009a). These species are:

The Lerista Skink (*Lerista macropisthopus remota*) (Department of Environment and Conservation (DEC) - Priority 2) is known from a single location 30 kilometres away at Mount Whaleback where it was recorded in an 'Alluvial Plains/Drainage Lines' habitat (ENV Australia, 2009a). Given that this habitat is found in the application area it is possible that it could frequent the application area. However, there have been many fauna surveys near the project area and it has never been recorded. Furthermore, habitat suitable for this species is widespread in the local area; therefore, it is unlikely the proposed clearing will significantly reduce the overall habitat of this species (ENV Australia, 2009a).

The Blind Snake (*Ramphotyphlops ganei*) (DEC - Priority 1) has been collected at opposite ends of the Pilbara, implying that the species may occur over a substantial geographic range (Aplin, 1998). This species is typically associated with moist microhabitats which exist in many of the deeper, better shaded gorges throughout the Pilbara region (Aplin, 1998), although it has been recorded in an alluvial floodplain habitat close to the project area. This habitat occurs in the application area, so whilst this species is unlikely to forage, shelter or breed in the application area, it may disperse through it at times (ENV Australia, 2009a). Given that there were no deep gorge or gullies within the application area, it is unlikely the proposed clearing will significantly impact on the preferred habitat of this species.

The Long-tailed Dunnart (*Sminthopsis longicaudata*) (DEC - Priority 4) is a small carnivorous marsupial which occurs in rocky country such as breakaways or rocky outcrops (ENV Australia, 2009a). Given its habitat preferences, it is possible that this species may inhabit the 'Hill Tops/Breakaways' habitat. However, it is unlikely that there will be any significant impacts to this species, as BHP Billiton Iron Ore (2010) have made a commitment to avoid clearing within the 'Hill Tops/Breakaways' habitat within the application area.

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

Methodology Aplin (1998)
BHP Billiton Iron Ore (2010)
ENV Australia (2009a)
Start et al. (1980)

(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

A flora and vegetation assessment of a larger project area which included the application area was undertaken by ENV Australia on the 17 September and 4 to 6 November 2009. This included a desktop study which involved reviews of literature, database searches and aerial photography and map interpretation relating to landforms likely to be found in the area (ENV Australia, 2009b). There was also a field survey of the project area, which included 23 quadrats and 8 relevés which were selected as being representative of the flora and vegetation of the Project area. Additionally, habitats within the Project area that potentially support Declared Rare Flora (DRF) and Priority flora species identified by the Department of Environment and Conservation (DEC) database search were targeted and searched (ENV Australia, 2009b).

As a result of the field survey, there were no DRF or Priority flora species recorded in the application area (ENV Australia, 2009b).

There were twenty one Priority flora species which were listed as potentially occurring in the application area from the DEC database search (ENV Australia, 2009b). Six of these were annual Priority flora species, which may have been not recorded due to the timing of the survey as there had been minimal rain prior to the survey being undertaken. However, ENV Australia (2009b) have stated that habitat suitable for these species was not recorded within the application area, therefore it is unlikely the application area comprises significant habitat for these species.

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

Methodology ENV Australia (2009b)

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

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

There are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is the Ethel Gorge aquifer stygobiont community which is located approximately 7 kilometres west of the application area (GIS Database). ENV Australia (2009b) have reported that no TECs were identified during the flora survey of the application area.

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

Methodology ENV Australia (2009b)
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 application area falls within the IBRA Pilbara Bioregion (GIS Database). Shepherd (2009) reports that approximately 99.9% of the pre-European vegetation still exists in this Bioregion. The vegetation in the application area is recorded as:

- Beard Vegetation Association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and
- Beard Vegetation Association 216: Low woodland; mulga (with spinifex) on rises (GIS Database).

According to Shepherd (2009) there is approximately 100% of these vegetation types remaining at both a state and bioregion level. Although large scale mining operations 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	17,804,193	17,785,001	~99.9	Least Concern	6.3
Beard Vegetation Associations - WA					
82	2,565,901	2,565,901	~100	Least Concern	10.2
216	280,759	280,759	~100	Least Concern	
Beard Vegetation Associations - Pilbara Bioregion					
82	2,563,583	2,563,583	~100	Least Concern	10.2
216	26,670	26,670	~100	Least Concern	

* 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:
- Pre-European Vegetation
- IBRA WA (Regions – Subregions)

(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

Six minor seasonal drainage lines dissect the application area, forming part of the Fortescue River Upper catchment (GIS Database). These ephemeral creeklines are dry for most of the year, only flowing briefly immediately following significant rainfall.

There were no riparian vegetation associations recorded during the flora and vegetation assessment undertaken by ENV Australia (2009b). None of the watercourses to be impacted by this clearing proposal are Ramsar Wetlands or wetlands listed on the Directory of Important Wetlands in Australia (GIS Database).

BHP Billiton Iron Ore (2010) have stated that clearing will be required within the minor drainage lines for the water pipeline corridor, access tracks and part of the ANSF. However, it should be noted that the vegetation within these drainage tracts is well represented on a local and regional level (ENV Australia, 2009). Analysis of aerial photography indicates that ephemeral drainage lines are a common feature both locally (within a 50 kilometre radius) and regionally (within the Pilbara bioregion) (GIS Database).

Given that this clearing proposal involves clearing of vegetation growing in, or in association with, an environment associated with a watercourse or wetland, the proposed clearing is at variance to this Principle. However, the vegetation associations of these drainage lines are well represented locally and in the Pilbara region, therefore, it is unlikely the proposed clearing will significantly reduce the overall distribution of these vegetation associations.

Methodology BHP Billiton Iron Ore (2010)
ENV Australia (2009b)
GIS Database:
- Hydrography, Linear
- Ramsar, Wetlands

(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 majority of the application area is made up of the Boolgeeda and McKay land systems with a very small section of the water pipeline corridor mapped as the Jamindie land system (GIS Database).

The Boolgeeda land system consists of stony lower slopes and plains below hill systems, supporting hard and soft spinifex grasslands and mulga shrublands. This land system is generally not susceptible to erosion (Van

Vreeswyk et al., 2004).

The McKay land system consists of hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting predominantly hard spinifex grasslands. This land system is not prone to degradation or soil erosion (Van Vreeswyk et al., 2004).

The Jamindie land system is described as stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey. The majority of this land system is resistant to erosion; however, the drainage lines are moderately susceptible to erosion (Van Vreeswyk et al., 2004).

Given the land systems present, it is unlikely that there will be a large risk of erosion occurring within the application area from the proposed clearing. However, the central part of the application area (where the water pipeline will be installed) intersects a significant area of drainage (GIS Database). There is already an access track intersecting this area which has culverts and rip rap protection. BHP Billiton Iron Ore (2010) have stated that the pipeline will be installed above ground so it is the same vertical height as the access road (above the culvert which crosses the drainage line). It is possible some temporary erosion may result from the disturbance proposed within this drainage line. However, this disturbance is likely to be minimal given that surface flows will be maintained by the culvert and that rip rap will provide protection from erosion.

In other areas of the application area where drainage may be intersected, BHP Billiton Iron Ore (2010) have stated that the following management measures will be implemented during the project to mitigate the potential for erosion:

- Where necessary surface drainage structures, including culverts and diversion drains, will be incorporated to minimise impacts to surface water;
- Where the potential for erosion is high, appropriate infrastructure such as gabions, rip rap rock protection or reno mattresses will be installed;
- Table drains will flow to a sedimentation pond with overflow structures incorporated for larger, sporadic rainfall events;
- The ammonium nitrate storage facility will be situated away from major watercourses; and
- Catch drains will be installed around the ammonium nitrate storage facility.

Approximately 70 hectares (88%) of the disturbance associated with the proposed clearing will be for the construction of permanent infrastructure, such as the ammonium nitrate storage facility and access tracks. BHP Billiton Iron Ore (2010) have stated that they will rehabilitate disturbance areas not required for ongoing operations (approximately 10 hectares or 12% of the application area).

Based on the above, the proposed clearing may be at variance to this Principle. However, the mitigation measures outlined above should adequately manage the risk of significant soil erosion occurring within the drainage tracts.

Methodology BHP Billiton Iron Ore (2010)
Van Vreeswyk et al. (2004)
GIS Database:
- Hydrography, Linear
- Rangeland Land System Mapping

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

Comments **Proposal is not likely to be at variance to this Principle**
The closest conservation area to the application area is Collier Range National Park, located approximately 125 kilometres south-west of the application area (GIS Database). Given the large distance between the application area and the Collier Range National Park, it is unlikely that the proposed clearing will compromise the environmental values of this area.

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 may be at variance to this Principle**
The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database).

There are six minor ephemeral drainage lines which run through the application area (GIS Database). The application area is located in an arid region, with an average annual rainfall of approximately 310 millimetres falling mainly during the summer months, and an average annual evaporation rate of approximately 3,700 millimetres (ENV Australia, 2009b; GIS Database), hence the presence of surface water resulting from significant rain events is relatively short-lived. It is likely that clearing within the drainage lines of the application area is likely to initiate some temporary erosion. BHP Billiton Iron Ore (2010) have stated that the following management measures will be implemented to mitigate the potential for sedimentation of watercourses within the application area:

- Where necessary surface drainage structures, including culverts and diversion drains, will be incorporated to minimise impacts to surface water;
- Where the potential for erosion is high, appropriate infrastructure such as gabions, rip rap rock protection or reno mattresses will be installed;
- Table drains will flow to a sedimentation pond with overflow structures incorporated for larger, sporadic rainfall events;
- The ammonium nitrate storage facility will be situated away from major watercourses; and
- Catch drains will be installed around the ammonium nitrate storage facility.

The application area is characterised by groundwater of between 500-1,000 milligrams/Litre Total Dissolved Solids (GIS Database). There is a large portion of of vegetation surrounding the application area which remains uncleared (GIS Database). It is unlikely the removal of 83 hectares of native vegetation is likely to significantly alter the existing groundwater depth or quality of groundwater within the application area.

Given the risk of erosion occurring and thus a reduction of surface water quality, the proposed clearing may be at variance to this Principle. However, the mitigation measures outlined above should adequately manage the risk of significant soil erosion occurring.

Methodology BHP Billiton Iron Ore (2010)
ENV Australia (2009b)
GIS Database:
- Evapotranspiration, Point Potential
- Groundwater Salinity, Statewide
- 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

The application area is located in an arid region, with an average annual rainfall of approximately 310 millimetres falling mainly during the summer months (ENV Australia, 2009b). The application area drains into the Fortescue River Upper catchment area (GIS Database). Natural flooding occurs occasionally within the catchment area during the wet season following significant rainfall events (ENV Australia, 2009b). However, the relatively small area to be cleared (83 hectares) in relation to the size of the catchment area (2,975,192 hectares) (GIS Database) is unlikely to exacerbate the incidence or intensity of flooding.

The clearing of native vegetation is likely to result in an increase in surface water runoff; however, the proposed clearing is not likely to significantly increase the incidence or intensity of flooding.

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

Methodology ENV Australia (2009b)
GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim (WC05/6) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenure have been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the 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 throughout 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.

Clearing permit CPS 3609/1 was granted by the Department of Mines and Petroleum on 8 April 2010 and was valid from 8 May 2010 to 8 May 2015. The clearing permit authorised the clearing of 80 hectares of native vegetation within an application area of 210 hectares. BHP Billiton Iron Ore has requested an amendment to increase the amount of clearing to 83 hectares within an application area of 216.9 hectares. The additional clearing is not likely to have any significant environmental impacts.

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

4. References

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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	Environmental 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.