Government of **Western Australia**
Department of **Mines and Petroleum**

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4094/1
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 (AML70/244)
Local Government Area: Shire of East Pilbara
Colloquial name: Eastern Packsaddles

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
75		Mechanical Removal	Mineral exploration drilling, hydrological investigations and support infrastructure

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 20 January 2011

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetaion associations have been mapped at a 1:250,000 scale for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area (GIS Database).

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

The application area was surveyed by Onshore Environmental (2010) in November 2009, February 2010 and June 2010. Based on these surveys the following 21 vegetation associations were recorded within the application area:

2a: Low Open Forest of *Eucalyptus xerothermica, Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over Tussock Grassland of *Themeda triandra* and *Cymbopogon ambiguus* with Shrubland of *Petalostylis labicheoides, Acacia monticola* and *Santalum lanceolatum*;

3a: Low Open Forest of *Acacia aptaneura* over Tussock Grassland of *Themeda triandra, Chrysopogon fallax* and *Aristida inaequiglumis;*

3b: Low Open Forest of *Acacia catenulata* subsp. *occidentalis, Acacia aptaneura* and *Grevillea* aff. *nematophylla* over Open Shrubland of *Scaevola acacioides* and *Acacia tetragonophylla* over Very Open Tussock Grassland of *Eriachne mucronata*;

4a: Low Woodland of *Corymbia ferriticola, Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Open Tussock Grassland of *Themeda triandra, Cymbopogon ambiguus* and *Eriachne mucronata* and Open Hummock Grassland of *Triodia pungens*;

5a: Low Shrubland of *Acacia spondylophylla* over Open Hummock grassland of *Triodia* sp. Shovelanna (S. van Leeuwen 3835) with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana*;

6a: Open to Closed Scrub of *Acacia tumida* var. *pilbarensis, Petalostylis labicheoides* and *Acacia monticola* over Hummock Grassland of *Triodia pungens* (or Tussock Grassland of *Themeda triandra*) with Low Woodland of *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia;*

6b: Open Scrub of *Acacia bivenosa, Petalostylis labicheoides* and *Rulingia luteiflora* over Hummock Grassland of *Triodia angusta* and *Triodia wiseana* with Scattered Low Trees of *Eucalyptus*

xerothermica;

6c: Open Scrub of *Petalostylis labicheoides, Acacia monticola* and *Grevillea wickhamii* subsp. *hispidula* over Hummock Grassland of *Triodia wiseana* with Low Woodland of *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia;*

7a: Tussock Grassland of *Themeda triandra, Eriachne tenuiculmis* and *Eulalia aurea* with Open Woodland of *Eucalyptus victrix* over Shrubland of *Gossypium robinsonii, Acacia tumida* var. *pilbarensis* and *Acacia pyrifolia* var. *pyrifolia;*

7b: Tussock Grassland of *Themeda triandra, Eriachne mucronata* and *Eriachne tenuiculmis* with Low Woodland of *Corymbia ferriticola, Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over High Shrubland of *Petalostylis labicheoides, Grevillea wickhamii* subsp. *hispidula* and *Acacia tumida* var. *pilbarensis;*

8a: Hummock Grassland of *Triodia pungens* with Very Open Mallee of *Eucalyptus gamophylla* over Open Shrubland of *Acacia bivenosa, Acacia pachyacra* and *Acacia pruinocarpa*;

8b: Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Corymbia deserticola* subsp. *deserticola* and *Eucalyptus leucophloia* subsp. *leucophloia;*

8c: Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia;*

8d: Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* and open Mallee of *Eucalyptus kingsmillii* and *Eucalyptus gamophylla;*

8e: Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Low Shrubland of *Acacia hilliana, Acacia adoxa* var. *adoxa* and *Gompholobium karijini*;

8f: Hummock Grassland of *Triodia wiseana* and *Triodia brizoides* with Open Shrubland of *Acacia bivenosa* and *Acacia inaequilatera* and Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus gamophylla* (mallee);

8g: Hummock Grassland of *Triodia wiseana* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* over Open Shrubland of *Acacia bivenosa, Acacia aneura* var. *aneura* and *Acacia ancistrocarpa;*

8h: Hummock Grassland of *Triodia wiseana, Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia angusta* with Shrubalnd of *Acacia bivenosa* and *Acacia ancistrocarpa* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia, Eucalyptus xerothermica* and *Eucalyptus gamophylla* (mallee);

8i: Hummock Grassland of *Triodia wiseana* with High Open Shrubland of *Acacia bivenosa* and *Acacia pyrifolia* var. *pyrifolia* and Scattered Low Mallee of *Eucalyptus socialis* subsp. *eucentrica;*

9a: Open Hummock Grassland of *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*; and

9b: Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Low Open Shrubland of *Acacia hilliana, Acacia adoxa* var. *adoxa* and *Indigofera monophylla* (Onshore Environmental, 2010).

Clearing Description

BHP Billiton Iron Ore Pty Ltd is proposing to clear up to 75 hectares of native vegetation within a broader application area of 1705 hectares for the purpose of exploration drilling, hydrological investigations and supporting infrastructure.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

Comment

The application area is located in the Pilbara region of Western Australia and is situated approximately 74 kilometres north-west of Newman (GIS Database).

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 occurs within the Hamersley (PIL3) sub-region of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This sub-region is characterised by sedimentary ranges and plateaux, dissected by gorges (CALM, 2002). At a broad scale, vegetation can be described as Mulga low woodlands over bunch grasses on fine textured soils in valley floors and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

A vegetation survey conducted by Onshore Environmental (2010) between November 2009 and June 2010 identified 21 intact vegetation associations occuring within the application area. During the vegetation survey a total of 337 vascular plant taxa were recorded from 133 genera and 50 families within the application area (Onshore Environmental, 2010). While this is considered to be diverse, previous surveys in areas adjacent to the application area show similar diversity. Given the low impact nature of the proposed clearing and the similar diverstiy within adjacent areas it is considered unlikely that the proposed clearing will result in a significant reduction in biodiversity.

Three Priority Flora species, *Aristida jerichoensis* var. *subspinulifera* (Priority 1), *Acacia subtiliformis* (Priority 3) and *Goodenia nuda* (Priority 4) and one species requiring further investigation, *Grevillea* aff. *nematophylla*, were recorded within the application area (BHP Billiton Iron Ore, 2010). BHP Billiton Iron Ore (2010) have committed to avoiding locations of Priority Flora and *Grevillea* aff. *nematophylla* during the exploration drilling program by maintaining a 10 metre radial buffer around the Priority species and a 30 metre radial buffer around *Grevillea* aff. *nematophylla*. Potential impacts to Priority flora as a result of the proposed clearing may be minimised by the implementation of a flora management condition.

The application area is partly located within the buffer zone of a Priority 1 Ecological Community (PEC), Weeli Wolli Spring Community (GIS Database). The application area is located approximately 0.85 kilometres west of the vegetation associated with the PEC (BHP Billiton Iron Ore, 2010). No exploration activities are proposed to occur within the Weeli Wolli Springs PEC or within the Weeli Wolli Springs tributaries (BHP Billiton Iron Ore, 2010). Given the low impact and non-contiguous nature of the proposed clearing it is not likely that it will significantly impact upon the PEC.

Five weed species were recorded within the Eastern Packsaddles survey area (Onshore Environmental, 2010). These are:

- *Bidens bipinnata;*
- *Cenchrus ciliaris*;
- *Malvastrum americanum;*
- *Sigesbeckia orientalis*; and
- *Vachellia farnesiana*.

Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. None of these species are listed as 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

A two part fauna survey of the application area and its surrounds was conducted in October 2009 and March to April 2010 by Biologic. From this survey a total of 110 terrestrial vertebrate fauna taxa comprised of four amphibians, 39 reptiles, 48 birds and 19 mammals (including 2 introduced taxa) were recorded (Biologic, 2010). This survey also identified seven fauna habitats within the application area.

- Mulga Association;
- Major Drainage Line (River with *Eucalyptus camaldulensis/Eucalyptus victrix)*;
- Crest/Slope;
- Gorge/Gully;
- Valley;
- Drainage Area; and
- Calcrete Plain (Biologic, 2010).

All of these fauna habitats are common both locally and regionally, therefore the application area is not likely to comprise greater faunal diversity than other nearby areas.

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

Methodology BHP Billiton Iron Ore (2010)

Biologic (2010)
CALM (2002)
Onshore Environmental (2010)
GIS Database:
- IBRA WA (Regions – Sub regions)
- Threatened Ecological Sites Buffered

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

Comments **Proposal may be at variance to this Principle**

A fauna survey conducted by Biologic of the application area and adjacent areas recorded a total of 110 terrestrial vertebrate fauna taxa comprised of four amphibians, 39 reptiles, 48 birds and 19 mammals (including 2 introduced taxa) (Biologic, 2010).

A total of 22 vertebrate fauna species considered to be of conservation significance potentially occur within the application area, 6 of which have been recorded in or within close proximity to the application area (Biologic, 2010). These are:

- Ghost Bat (*Macroderma gigas*): Priority 4, *Wildlife Conservation (WC) Act 1950*;
- Western Pebble-mound Mouse (*Pseudomys chapmani*): Priority 4 *WC Act 1950*;
- Eastern-Great Egret (*Ardea modesta*): Migratory, *EPBC Act 1999*;
- Eastern Osprey (*Pandion cristatus*): Migratory, *EPBC Act 1999*;
- Peregrine Falcon (*Falco peregrines*): Schedule 4, *WC Act 1950*; and
- Rainbow Bee-eater (*Merops ornatus*): Migratory, *EPBC Act 1999*.

The fauna survey carried out by Biologic (2010) also identified seven fauna habitats occurring within the application area:

- Mulga Association: This habitat forms in flodplains and broad drainage zones in patches of uniform density or as disintegrating groves. Small patches of this habitat occur south of the Packsaddles Range on the west and east of Jirrpalpur Range;
- Major Drainage Line (River with *Eucalyptus camaldulensis/Eucalyptus victrix)*: Minor drainage areas are located in the north-eastern part of the survey area. Heading in a general east west direction this habitat is created by episodic rainfall that scours the landscape when draining;
- Crest/Slope: This habitat is located at Packsaddle, North Jirrpalpur and South Jirrpalpur Range. This habitat is created by the rocky outcrops and gravelly substrate where *Eucalyptus leucophloia* low trees and hummock forming grasses dominate;
- Gorge/Gully: This habitat is located sporadically at Packsaddle, North Jirrpalpur and South Jirrpalpur Range. Gorges here are described as heavily dissected valley with sheer cliff walls and a rocky base that has the ability to hold water for longer periods than the surrounding area;
- Valley: These broad valleys are located in Packsaddle, North Jirrpalpur and South Jirrpalpur Range. Characterised by sloping sides vegetated with thick hummock forming grasses and valley bases dominated by thick *Acacia spp.* Rocky outcropping is common throughout these valleys and crumbling breakaways form boulder piles in some locations;
- Drainage Area: Recorded throughout the study area between Packsaddle Range and Jirrpalpur Range. Characterised by *Eucalyptus xerothermica* and *Corymbia hamersleyana* woodland on sandloam soils sometimes with exposed rocky areas; and
- Calcrete Plain: Located in the east of the study area, this habitat consists of low rounded hills around Weeli Wolli Creek (Biologic, 2010).

These habitat types are common both locally and regionally. Given the size (75 hectares), and the low impact, non-contiguous nature of the proposed clearing as well as the inability to drill within the gorge/gully habitat and the proposed avoidance of drainage lines, it is considered the proposed clearing is unlikely to significantly impact on habitat for fauna indigenous to Western Australia.

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

Methodology BHP Billiton Iron Ore (2010)
Biologic (2010)

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

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

A vegetation survey conducted by Onshore Environmental (2010) identified the Declared Rare Flora (DRF) species *Lepidium catapycnon* at 14 locations within the application area, with populations recorded from steep hill slopes and extending into medium drainage lines associated with the following two vegetation associations (Onshore Environmental, 2010):

8c: Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp.

leucophloia; and

7a: Tussock Grassland of *Themeda triandra, Eriachne tenuiculmis* and *Eulalia aurea* with Open Woodland of *Eucalyptus victrix* over Shrubland of *Gossypium robinsonii, Acacia tumida* var. *pilbarensis* and *Acacia pyrifolia* var. *pyrifolia.*

According to available GIS Databases no additional records of DRF species were identified within the application area (GIS Database).

BHP Billiton Iron Ore (2010) have committed to avoiding locations of *Lepidium catapycnon* during the exploration drilling program, by maintaining a 50 metre radial buffer.

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to Declared Rare Flora as a result of the proposed clearing may be minimised by the implementation of a flora management condition.

Methodology

BHP Billiton Iron Ore (2010)
Onshore Environmental (2010)
GIS Database:
- Declared Rare and Priority Flora List

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

Comments

Proposed clearing is not likely to be at variance to this Principle

According to the available GIS databases there are no known records of Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is located approximately 68 kilometres south-east of the application area (GIS Database). At this distance, there is little likelihood of any impact to the TEC as a result of the proposed clearing.

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

Methodology

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 is located within the Pilbara bioregion of the Interim Biogeographical Regionalisation for Australia (IBRA) (GIS Database). Shepherd (2007) reports that approximately 99.5% of the pre-European vegetation remains in the state and in the Pilbara region.

The vegetation in the application area is broadly mapped as Beard vegetation associations:

18: Low woodland; mulga (*Acacia aneura*); and
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database; Shepherd, 2007).

According to Shepherd (2007) approximately 100% of the Beard associations 18 and 82 remain within the Pilbara bioregion (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,188	17,794,647	99.5	Least Concern	6.32
Beard vegetation associations - State					
18	19,892,305	19,890,195	99.99	Least Concern	2.13
82	2,565,901	2,565,901	100	Least Concern	10.24
Beard vegetation associations - Bioregion					
18	676,557	676,557	100	Least Concern	16.8
82	2,563,583	2,563,583	100	Least Concern	10.25

* Shepherd (2007)
** 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 (2007)
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**
According to available GIS Databases, there are no permanent wetlands or watercourses located within the application area, however there are several minor ephemeral watercourses within the application area (GIS Database).

Based on the vegetation mapping conducted by Onshore Environmental (2010) ten of the twenty one vegetation associations found within the application area are associated with drainage areas:

2a: Low Open Forest of *Eucalyptus xerothermica, Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over Tussock Grassland of *Themeda triandra* and *Cymbopogon ambiguus* with Shrubland of *Petalostylis labicheoides, Acacia monticola* and *Santalum lanceolatum*;

4a: Low Woodland of *Corymbia ferriticola, Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Open Tussock Grassland of *Themeda triandra, Cymbopogon ambiguus* and *Eriachne mucronata* and Open Hummock Grassland of *Triodia pungens*;

6a: Open to Closed Scrub of *Acacia tumida* var. *pilbarensis, Petalostylis labicheoides* and *Acacia monticola* over Hummock Grassland of *Triodia pungens* (or Tussock Grassland of *Themeda triandra*) with Low Woodland of *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia;*

6b: Open Scrub of *Acacia bivenosa, Petalostylis labicheoides* and *Rulingia luteiflora* over Hummock Grassland of *Triodia angusta* and *Triodia wiseana* with Scattered Low Trees of *Eucalyptus xerothermica;*

6c: Open Scrub of *Petalostylis labicheoides, Acacia monticola* and *Grevillea wickhamii* subsp. *hispidula* over Hummock Grassland of *Triodia wiseana* with Low Woodland of *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia;*

7a: Tussock Grassland of *Themeda triandra, Eriachne tenuiculmis* and *Eulalia aurea* with Open Woodland of *Eucalyptus victrix* over Shrubland of *Gossypium robinsonii, Acacia tumida* var. *pilbarensis* and *Acacia pyrifolia* var. *pyrifolia;*

7b: Tussock Grassland of *Themeda triandra, Eriachne mucronata* and *Eriachne tenuiculmis* with Low Woodland of *Corymbia ferriticola, Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over High Shrubland of *Petalostylis labicheoides, Grevillea wickhamii* subsp. *hispidula* and *Acacia tumida* var. *pilbarensis.*

8a: Hummock Grassland of *Triodia pungens* with Very Open Mallee of *Eucalyptus gamophylla* over Open Shrubland of *Acacia bivenosa, Acacia pachyacra* and *Acacia pruinocarpa*; and

8h: Hummock Grassland of *Triodia wiseana, Triodia* sp. Shovelanna Hill and *Triodia angusta* with Shrubalnd of *Acacia bivenosa* and *Acacia ancistrocarpa* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia, Eucalyptus xerothermica* and *Eucalyptus gamophylla* (mallee).

These vegetation communities are common throughout the application area and are not considered to be significant locally or regionally.

The Weeli Wolli Creek system and its tributaries are in close proximity to the project area. It is considered highly unlikely that the proposed exploration drilling activities will have any impact on the Priority Ecological Community (PEC) Weeli Wolli Springs for the following reasons:

- Spatial seperation – there are no proposed activities occuring within the Weeli Wolli PEC and Eastern Packsaddles Vegetation Clearing Permit application area is some distance (approximately 0.85 Kilometres) from the PEC Boundary;
- Minimal ground disturbances – the ground disturbances associated with the Exploration Drilling Program are minimal (116 drill holes, six hydrological drill pads, majority of the access tracks are

existing and will only require maintainance);

- Avoidance of the Weeli Wolli tributaries – no activities are proposed for any watercourses hence the tributaries leading into Weeli Wolli Creek will be unaffected. All drilling sites have a water contamination policy using bunds and sumps to capture drill wastes; and
- Rehabilitation – all exploration sites will be rehabilitated under BHP Billiton Iron Ore Exploration Environmental Management Plan (BHP Billiton Iron Ore, 2010).

Given the low impact nature of the proposed clearing and the proposed measures to be undertaken by the applicant it is not likely that the proposed clearing will significantly impact on the conservation of vegetation growing in association with watercourses.

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to vegetation growing in, or in association with, an environment associated with a watercourse or wetlands may be minimised through the implimentation of mitigation measures proposed by BHP Billiton Iron Ore (2010).

Methodology BHP Billiton Iron Ore (2010)
Onshore Environmental (2010)
GIS Database:
- Hydrography, linear

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

Comments **Proposal is not likely to be at variance to this Principle**
According to the available datasets the application area intersects the Boolgeeda, Newman and Platform land systems (GIS Database).

The Boolgeeda land system is characterised by stony lower slopes and plains below hill systems supporting hard and soft Spinifex grasslands and mulga shrubands (Van Vreeswyk et al, 2004). This vegetation is generally not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al, 2004).

The Newman land system is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard Spinifex grasslands (Van Vreeswyk et al, 2004). This land system is not prone to degradation and has extremely erosion resistant surfaces (BHP Billiton Iron Ore, 2010).

The Platform land system is characterised by dissected slopes and raised plains supporting hard Spinifex grasslands (Van Vreeswyk et al, 2004). This land system is not susceptible to erosion (Van Vreeswyk et al, 2004).

Based on the above, the proposed clearing is not likely to be at variance to this Principle. Potential land degradation impacts as a result of the proposed clearing may be minimised by the implementation of a rehabilitation condition.

Methodology BHP Billiton Iron Ore (2010)
Van Vreeswyk et al (2004)
GIS Database:
- 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 proposed clearing is not located within a conservation reserve (GIS Database). The nearest conservation reserve is Karijini National Park, located approximately 44 kilometres west of the application area (GIS Database). At this distance it is unlikely that the proposed clearing will impact on the environmental values of any conservation areas.

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**
According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Newman Water Reserve located approximately 48 kilometres south east of the application area (GIS Database).Given the distance separating the application area and the nearest water supply, the proposed clearing is not likely to impact on the water quality of the Newman Water Reserve.

The application area has no permanent waterholes, lakes or perennial watercourses (GIS Database). There are however a number of minor, non-perennial drainage lines that run through the application area and drain towards Weeli Wolli Creek (BHP Billiton Iron Ore, 2010). Drilling on or near watercourses can potentially increase the risk of erosion, sedimentation, turbidity and pollution in the catchment waters of the Weeli Wolli Creek System (BHP Billiton Iron Ore, 2010). No drilling activities will occur on any drainage line or watercourse within the application area and BHP Billiton Iron Ore will impose a 10 metre 'no-go' buffer of 10 metres for all drainage lines and watercourses considered significant in relation to local and/or regional surface water flow (BHP Billiton Iron Ore, 2010). Sediment traps/sumps will be constructed at all sites where erosion and sediment release has potential to occur (BHP Billiton Iron Ore, 2010).

The application area is located within a *Rights in Water Irrigation Act 1914* Groundwater Management Area (GIS Database). The proponent is required to obtain permits to abstract groundwater in this area.

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

Methodology BHP Billiton Iron Ore (2010)
GIS Database:
- Hydrography, linear
- Public Drinking Water Source Area (PDWSA)
- RIWI Act, Groundwater Areas

(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 experiences a semi-desert tropical climate with an average annual rainfall of 300 millimetres, usually in summer cyclonic or thunderstorm events (CALM, 2002). Large runoff as well as localised and regional flooding can occur following intense rainfall events (BHP Billiton Iron Ore, 2010).

The incidence or intensity of flooding is not likely to be significantly influenced by the proposed clearing (BHP Billiton Iron Ore, 2010). The rocky substrate of the cleared areas and the surrounding areas of rocky hillsides and stony plains would act to attenuate water velocities and dissipate runoff, therefore reducing the possibility of flooding (BHP Billiton Iron Ore, 2010).

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

Methodology BHP Billiton Iron Ore (2010)
CALM (2002)

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

Comments

There are three Native Title Claims (WC98/62, WC96/61 and WC10/1) over the area under application (GIS Database). These claims have been registered with the National 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 seven 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 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 application was advertised on 6 December 2010 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to the proposed clearing.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Federal
- Native Title 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	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.