



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5250/1
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: Orebody 37 Exploration Drilling Program

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
170		Mechanical Removal	Mineral Exploration, Geotechnical and Hydrological Investigations and Supporting Infrastructure

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 6 December 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. Three Beard vegetation associations are located within the area proposed to be cleared (GIS Database). These Beard vegetation associations are:

- 18: Low woodland; mulga (*Acacia aneura*);
- 29: Sparse low woodland; mulga, discontinuous in scattered groups; and
- 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Government of Western Australia, 2011; GIS Database).

Two recent flora and vegetation surveys cover the application area (BHPBIO, 2012). A survey by botanists from Syrinx Environmental Pty Ltd in March 2012 covered the majority of the application area while the remaining northern section of the application area was covered by an ENV survey in April and July 2011. The ENV survey also included the Eastern Ridge orebodies to the north of the application area (ENV, 2012). The Syrinx Environmental Pty Ltd (2012) and ENV (2012) surveys combined recorded 20 vegetation associations within the application area (BHPBIO, 2012). The vegetation associations are described below with the associated landform in brackets.

Syrinx Environmental Pty Ltd (2012)

1b (Stream Channel): Open forest of *Eucalyptus victrix*, *Eucalyptus camaldulensis* subsp. *obtusa* and *Acacia citrinoviridis* over open tussock grassland of **Cenchrus ciliaris*, **Cynodon dactylon* and *Themeda triandra* with high open shrubland of *Petalostylis labicheoides*, *Melaleuca glomerata* and *Acacia pyrifolia* var. *morrisonii*.

2 (Drainage Depression): Open forest of *Acacia aptaneura*, *Acacia citrinoviridis* and *Corymbia candida* subsp. *dipsodes* over tussock grassland of **Cenchrus ciliaris* with high open shrubland of *Acacia tetragonophylla*.

3a (Plain): Low open woodland of *Acacia aptaneura*, *Acacia pruinocarpa* and *Acacia pteraneura* over high open shrubland of *Acacia ?synchronica*, *Acacia sibirica* and *Acacia sclerosperma* subsp. *sclerosperma* over very open hummock grassland of *Triodia pungens*.

3b (Plain): Low open woodland of *Acacia aptaneura*, *Acacia pruinocarpa* and *Hakea lorea* subsp. *lorea* over open tussock grassland of **Cenchrus ciliaris*, *Aristida inaequiglumis* and *Chrysopogon fallax* with low scattered shrubs of *Sida fibulifera*, *Maireana planifolia* and *Eremophila lanceolata*.

4 (Drainage Depression): High shrubland of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia kempeana* with open mallee of *Eucalyptus gamophylla* over open hummock grassland of *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835).

5a (Hillcrest): Hummock grassland of *Triodia wiseana*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia pungens* with shrubland of *Acacia bivenosa*, *Senna glutinosa* subsp. *pruinosa* and *Senna*

glutinosa subsp. *glutinosa* with low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia aptaneura*.

5b (Hillslope): Hummock grassland of *Triodia pungens* with open mallee of *Eucalyptus socialis* subsp. *eucentrica* over open shrubland *Petalostylis labicheoides*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia bivenosa*.

5c (Hillcrest): Hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia pungens* and *Triodia lanigera* with open shrubland of *Acacia bivenosa*, *Senna glutinosa* subsp. *x luerissenii* and *Ptilotus rotundifolius* with low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia*.

5d (Plain): Hummock grassland of *Triodia pungens* with high open shrubland of *Acacia pachyacra* and *Acacia dictyophleba* with low open woodland of *Corymbia candida* subsp. *dipsodes*, *Corymbia hamersleyana* and *Hakea lorea* subsp. *lorea*.

6 (Footslope): Open hummock grassland of *Triodia pungens*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia wiseana* with high shrubland of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia inaequilatera* with very open mallee of *Eucalyptus gamophylla*.

7 (Plain): Very open hummock grassland of *Triodia pungens* with high open shrubland of *Acacia sclerosperma* subsp. *sclerosperma*, *Eremophila longifolia* and *Acacia citrinoviridis* with scattered trees of *Eucalyptus xerothermica* and *Corymbia hamersleyana*.

8 (Plain): Tussock grassland of *Themeda triandra*, *?Eulalia aurea* and **Cenchrus ciliaris* with high open shrubland of *Acacia dictyophleba*, *Acacia ancistrocarpa* and *Acacia macraneura* with low open woodland of *Corymbia hamersleyana*, *Eucalyptus xerothermica* and *Corymbia candida* subsp. *dipsodes*.

D (Disturbed): No vegetation.

ENV (2012)

1b (Stream Channel): Open woodland of *Eucalyptus victrix* and *Acacia citrinoviridis* over low open shrubland of *Tephrosia rosea* var. *glabrior*, and *Corchorus crozophorifolius* over (open) tussock grassland of **Cenchrus ciliaris*, *Themeda* sp. Mt. Barricade (M.E. Trudgen 2471) on coarse sand in major creeks .

2a (Plain): High/open shrubland of *Acacia bivenosa*, *Acacia sibirica*, *Acacia tenuissima* over (very open) hummock grassland of *Triodia pungens*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with scattered low shrubs of *Bonamia rosea*, *Scaevola parvifolia* and *Hibiscus sturtii* var. *grandiflorus* on red sandy loam on depressions of lower slopes and gently undulating stony plains.

2b (Footslope): Low (open) woodland of *Acacia aneura* and related species and *Acacia pruinocarpa*, over open shrubland of *Eremophila forrestii* subsp. *forrestii*, *Acacia tenuissima*, *Senna* spp. over open hummock grassland of *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) on orange brown loam on lower slopes and gently undulating stony plains.

3a (Plain): (Closed) tussock grassland of **Cenchrus ciliaris* (*Themeda* spp., **Cenchrus setiger*) with scattered low trees to low open woodland of *Acacia pruinocarpa*, *Acacia aneura* and *Corymbia candida* subsp. *dipsodes* and scattered (low) shrubs of mixed species on red brown loam to sandy clay on alluvial plains.

7a (Footslope): (Very open) hummock grassland of *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with scattered to very open mallee of *Eucalyptus gamophylla* and high open shrubland of *Acacia bivenosa*, *Acacia inaequilatera* with scattered mixed herbs on red-brown loam and sand on lower slopes and undulating plains.

D: No vegetation.

*indicates introduced species

Clearing Description

BHP Billiton Iron Ore Pty Ltd (BHPBIO) has applied to clear up to 170 hectares of native vegetation, within an application area of approximately 1,745 hectares, for the purposes of mineral exploration, geotechnical and hydrological investigations and supporting infrastructure. The exploration drilling program is located at Orebody 37, approximately 2 kilometres east of Newman.

Clearing will be by dozer or excavators. Vegetation and topsoil will be stockpiled for later use in rehabilitation.

Vegetation Condition

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

To

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The vegetation condition was assessed by botanists from Syrinx Environmental Pty Ltd and ENV (BHPBIO, 2012).

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 may be at variance to this Principle

The application area intersects the Augustus (GAS1) and Hamersley (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) subregions (GIS Database). The Augustus subregion is characterised by rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys (CALM, 2002). Mulga woodland with *Triodia* occur on shallow stony loams on rises, while the shallow earthy loams over hardpan on the plains are covered by Mulga parkland (CALM, 2002). The Hamersley subregion is generally 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 (CALM, 2002).

A flora and vegetation survey by botanists from Syrinx Environmental Pty Ltd in March 2012 covered approximately 83% of the application area, while the remaining area is covered by a survey by ENV botanists (BHPBIO, 2012). Syrinx Environmental Pty Ltd (2012) recorded 310 vascular plant taxa, representing 46 families and 139 genera. Species representation was greatest among *Acacia*, *Ptilotus* and *Sida* (Syrinx Environmental Pty Ltd, 2012). The species richness compares well to species richness for neighbouring project Eastern Ridge, but is higher than that of Orebody 42/43 and other tenements in the area (Syrinx Environmental Pty Ltd, 2012). The increase in species richness is most likely a result of good seasonal conditions during the survey and differences in geology and hydrology in the application area. The surrounding tenements predominantly contain upland communities, which are typically characterised by lower species diversity than that of the plains and drainage tracts (Syrinx Environmental Pty Ltd, 2012).

No Threatened Flora were recorded in the application area during the flora surveys (BHPBIO, 2012). One Priority Flora species, *Goodenia nuda* (Priority 4), was recorded at six locations within the application area (BHPBIO, 2012). Each location had between 15 and 52 plants with a total of 155 plants recorded within the application area (Syrinx Environmental Pty Ltd, 2012). Potential impacts to Priority Flora as a result of the proposed clearing may be minimised by the implementation of a flora management condition.

An additional species of interest was previously identified by ENV in 2009 within the application area, *Rostelluralia ascendens* var. *?latifolia* (Priority 3) (Syrinx Environmental Pty Ltd, 2012). This species was not found during the March 2012 survey by Syrinx Environmental Pty Ltd, although targeted surveys were conducted at the previous known location. The specimen collected by ENV could not be identified to variety level due to the lack of bracts and corollas and the specimen may be *Rostelluralia ascendens* var. *clementii* (no conservation status) or *Rostelluralia ascendens* var. *latifolia* (Priority 3). Both variants occur in the proximity of Newman but neither have previously been recorded in the surrounding tenements (Syrinx Environmental Pty Ltd, 2012).

The north-eastern section of application area is within the 500 metre buffer of the Threatened Ecological Community (TEC) 'Ethel Gorge aquifer stygobiont community' and is approximately 170 metres from the TEC at its closest point (BHPBIO, 2012; GIS Database). The TEC is subterranean and groundwater drawdown is listed as a threatening process for the Ethel Gorge stygofauna (CALM, 2002), however, the proposed clearing is not expected to have an effect on groundwater levels.

No Priority Ecological Communities or other TECs were recorded within the application area during the flora surveys or have previously been recorded within application area (BHPBIO, 2012; GIS Database).

Eighteen introduced flora species were recorded during the Syrinx Environmental Pty Ltd survey of the application area. The most numerous and widely distributed species were *Acetosa vesicaria*, Bipinnate Beggarstick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*), Purslane (*Portulaca oleracea*) and Spiked Malvastrum (*Malvastrum americanum*) (Syrinx Environmental Pty Ltd, 2012). 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.

ENV (2011) conducted a Level One Fauna Assessment within the Eastern Ridge (Orebody 23/24/25) study area in 2011. The survey recorded 46 birds, ten mammals, 13 reptiles and two amphibian species (ENV, 2011). ENV (2011) considered that all habitat types recorded in the study area are widespread within the Pilbara and the fauna assemblage as common and typical of the region.

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

Methodology

BHPBIO (2012)
CALM (2002)
ENV (2011)
Syrinx Environmental Pty Ltd (2012)
GIS Database:
- IBRA WA (Regions - Sub Regions)

(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

The application area and surrounding locality have been the subject of six fauna surveys for BHPBIO mining, railway and infrastructure developments. These surveys have covered different sections of the application area but in total they include the entire area (BHPBIO, 2012). The most recent fauna surveys were undertaken by ENV (2011) and Eco Logical (2012) with the Eco Logical survey covering approximately 83% of the application area (BHPBIO, 2012).

The five broad fauna habitats identified within the application area in the Eco Logical (2012) survey were:

- Plains of open mixed *Acacia* and *Eucalyptus* woodland over mixed low shrubs and *Triodia* hummock grassland on red loamy clay;
- Stony gentle slopes and low hills supporting scattered *Acacia* shrubs and mixed low scattered shrubs on poorly formed rocky red clay;
- Stony/rocky hill tops and ridges on mixed open shrubland of *Eucalyptus* over *Triodia* hummock grassland on poorly formed shallow clay soils;
- River and major creeklines of *Eucalyptus camaldulensis* open woodland and *Acacia* over mixed low native and exotic shrubs and grasses on red alluvial clay loam; and
- Broad alluvial lowlands (including minor creeks and gullies) of *Eucalyptus* woodland over *Acacia* shrubland and mixed grasses on red clay.

The remaining part of the application area covered by the ENV (2011) survey were:

- Low hills;
- Alluvial plain;
- Riverine; and
- Disturbed/infrastructure.

Most of these habitats including open shrubland plains, alluvial lowland and stony hills are considered extensive within the Pilbara bioregion, and also within adjacent areas such as the Gascoyne and Murchison regions (Eco Logical, 2012). The majority of these habitats have low to moderate fauna value (BHPBIO, 2012). The application area lacks rocky caves and gorge/gully habitat that are found elsewhere in the locality (BHPBIO, 2012; Eco Logical, 2012).

Both Eco Logical and ENV identified the 'rivers and major creeklines' and 'riverine' habitat types as having high conservation value (BHPBIO, 2012). These habitats support the majority of bird species occurring within the application area and conservation significant species such as the Pilbara Olive Python (*Liasis olivaceous barroni*) (Eco Logical, 2012). These habitat types were predominantly associated with Homestead and Whaleback Creeks within the application area, and the Fortescue River and Ophthalmia Dam area that occur outside of the application area. The Fortescue River and Ophthalmia Dam have been excluded from the Orebody 37 drilling program. Homestead and Whaleback Creeks occur in the application area but will be avoided under BHPBIO's Exploration Environmental Management Plan (BHPBIO, 2012). Potential impacts to significant fauna habitat as a result of the proposed clearing may be minimised by the implementation of an avoidance condition to avoid clearing vegetation of Homestead Creek.

From the surveys by ENV (2011) and Eco Logical (2012), a list of conservation significant fauna that have been recorded or could potentially occur in the general locality of the application area was compiled. Based on these surveys, database searches, literature reviews and habitat types, 23 conservation significant species were associated with the general locality of the application area (BHPBIO, 2012). Of these 23 species, two species have been recorded within the application area while an additional eight species are considered as being likely to occur or have the potential to occur within the application area. The conservation significant fauna recorded within the application area were:

- Australian Bustard (*Ardeotis australis*) (DEC Priority 4); and
- Rainbow Bee-eater (*Merops ornatus*) (Marine; Migratory under EPBC Act; Schedule 3) (BHPBIO, 2012).

The species that are likely to occur or have the potential to occur are:

- Gane's Blind Snake (*Ramphotyphlops ganei*) (DEC Priority 1);
- Pilbara Olive Python (*Liasis olivaceous barroni*) (Vulnerable; Schedule 1);
- Bush Stone-curlew (*Burhinus grallarius*) (DEC Priority 4);
- Grey Falcon (*Falco hypoleucos*) (DEC Priority 4);
- Peregrine Falcon (*Falco peregrines*) (Schedule 4);
- Star Finch (Western) (*Neochmia ruficauda* subsp. *clarescens*) (DEC Priority 4);
- Long-tailed Dunnart (*Sminthopsis longicaudata*) (DEC Priority 4); and
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (DEC Priority 4) (BHPBIO, 2012).

The avifauna species (Australian Bustard, Rainbow Bee-eater, Bush Stone-curlew, Grey Falcon, Peregrine

Falcon and Star Finch) are highly mobile and capable of evacuating from areas being disturbed (BHPBIO, 2012; Eco Logical, 2012).

Gane's Blind Snake has previously been recorded in the Newman area (Eco Logical, 2012). There are extensive areas of potential habitat within the application area including stony low slopes and rocky hills, which are also extensive outside the application area in the region (Eco Logical, 2012).

The application area lacks gorge and canyon formations that are the preferred habitat for Pilbara Olive Pythons, though the riverine habitat may provide foraging opportunities for the species (BHPBIO, 2012; Eco Logical, 2012).

There are extensive areas of potential habitat for the Long-tailed Dunnart within the application area including stony low slopes and rocky hills (Eco Logical, 2012). The paucity of records in the vicinity suggests this species occurs in low densities or may be absent (Eco Logical, 2012).

No Western Pebble-mound Mouse mounds were recorded within the application area despite of searching areas of suitable habitat (Eco Logical, 2012). Where fauna are located, including pebble mounds, they are recorded and the spatial coordinates then used by BHPBIO geologists to plan exploration access and drill pads in order to avoid conservation significant fauna and their significant habitat types (BHPBIO, 2012).

The low impact nature of the proposed drilling program in relation to the extensive area of undisturbed habitat occurring locally facilitates the capacity for emigration and relocation of conservation significant fauna to adjacent areas. The proposed clearing represents approximately 9.7% of the application area. The actual disturbances will consist of drill pads, laydown areas and access tracks, all widely spaced with extensive areas of undisturbed vegetation remaining between cleared areas (BHPBIO, 2012).

The fauna habitats that are considered to have high conservation value are the 'rivers and major creeklines' and 'riverine' habitat types, which cover approximately 6.5% of the application area (BHPBIO, 2012). These are to be avoided through BHPBIO's exploration environmental management plan and through permit conditions. In addition, BHPBIO has committed to avoiding, where possible, the clearing of mature trees and any other habitat of significance to conservation listed fauna (BHPBIO, 2012).

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

Methodology BHPBIO (2012)
Eco Logical (2012)
ENV (2011)

(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 known records of Threatened Flora within the application area (GIS Database). The nearest known record of Threatened Flora, *Lepidium catapycnon*, is approximately 8 kilometres west of the application area (GIS Database).

A Level 2 flora and vegetation survey by botanists from Syrinx Environmental Pty Ltd in March 2012 covered the majority of the application area and included targeted searches for Threatened and Priority Flora. The remaining part of the application area is covered by a Level 2 flora and vegetation survey by ENV botanists and this also included a targeted survey for conservation significant flora (BHPBIO, 2012). No Threatened Flora were recorded within the application area (BHPBIO, 2012; ENV, 2012; Syrinx Environmental Pty Ltd, 2012).

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

Methodology BHPBIO (2012)
ENV (2012)
Syrinx Environmental Pty Ltd (2012)
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 may be at variance to this Principle

The application area is within the buffer of the Threatened Ecological Community (TEC) 'Ethel Gorge aquifer stygobiont community' (GIS Database). The north-eastern tip of the application area is approximately 170 metres east of the TEC occurrence (BHPBIO, 2012). No exploration activities are planned within a 500 metre buffer of the TEC (BHPBIO, 2012). The TEC is subterranean and groundwater drawdown is listed as a threatening process for the Ethel Gorge stygofauna (CALM, 2002), however, the proposed clearing is not expected to have an effect on groundwater levels. Disturbances to surface water from the proposed clearing

will be minimised by exploration activities being excluded from the 500 metre TEC buffer, creek systems are avoided wherever possible as outlined in BHPBIO's Exploration Environmental Management Plan, and no drill pads are located in major drainage channels (BHPBIO, 2012). Additionally, exploration disturbances will be rehabilitated upon completion of exploration activities (BHPBIO, 2012).

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

Methodology BHPBIO (2012)
CALM (2002)
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 and Gascoyne Interim Biogeographic Regionalisation for Australia (IBRA) bioregions in which over 99% of the pre-European vegetation remains (see table) (Government of Western Australia, 2011; GIS Database). This gives both IBRA regions 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*);
29: Sparse low woodland; mulga, discontinuous in scattered groups; and
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Government of Western Australia, 2011; GIS Database).

Over 99% of each of these vegetation associations remains at a state level and bioregional level (Government of Western Australia, 2011). 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 – Gascoyne	18,075,219	18,067,441	~99.96	Least Concern	1.9
IBRA Bioregion – Pilbara	17,804,427	17,729,352	~99.58	Least Concern	6.3
Beard Veg Assoc. – State					
18	19,892,304	19,843,823	~99.76	Least Concern	2.1
29	7,903,991	7,900,200	~99.95	Least Concern	0.3
82	2,565,901	2,553,217	~99.51	Least Concern	10.2
Beard Veg Assoc. – Gascoyne Bioregion					
29	3,802,460	3,799,636	~99.93	Least Concern	0
Beard Veg Assoc. – Pilbara Bioregion					
18	676,557	672,424	~99.39	Least Concern	16.8
82	2,563,583	2,550,899	~99.51	Least Concern	10.2

* Government of Western Australia (2011)

** 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)
Government of Western Australia (2011)
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**

The application area includes portions of two major ephemeral creeks, Homestead and Whaleback, and the Fortescue River occurs approximately 400 metres south-east of the application area (BHPBIO, 2012; GIS Database). The Whaleback and Homestead Creeks are typical of the Pilbara riparian systems with surface water flows being seasonal and typically occur following cyclonic rainfall events (Ruprecht and Ivanescu, 2000 cited in Syrinx Environmental Pty Ltd, 2012). A number of plant species are dependent on surface water flows, particularly those associated with the drainage channels and swales connecting the Whaleback and Homestead Creeks and Ophthalmia Dam (Syrinx Environmental Pty Ltd, 2012).

Several vegetation associations mapped within the application area are associated with watercourses. Syrinx Environmental Pty Ltd (2012) described their vegetation association 1b as being associated with a stream channel landforms and vegetation associations 2 and 4 with drainage depression landforms. ENV (2012) described their vegetation association 1b as being associated with stream channels and it is congruent with Syrinx Environmental Pty Ltd's vegetation association 1b (Syrinx Environmental Pty Ltd, 2012).

BHPBIO (2012) states it will not drill in major drainage channels and, wherever practicable, drilling programs will avoid minor drainage lines that are considered significant in relation to local and/or regional surface water flow. Drill sites will be chosen where there is a low level of vegetation and are a suitable distance from any natural watercourses or drainage lines, including Homestead Creek. 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 at variance to this Principle.

Methodology BHPBIO (2012)
ENV (2012)
Syrinx Environmental Pty Ltd (2012)
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**

There are four land systems found within the application area. These are Elimunna, McKay, Newman and River (GIS Database). The Elimunna Land System occupies the majority of the application area, approximately 80.4%, while the River Land System has a minor occurrence with approximately 0.1% of the application area (BHPBIO, 2012; GIS Database).

The Elimunna Land System is characterised as stony plains on basalt supporting sparse acacia and cassia shrublands and patchy tussock grasslands (Van Vreeswyk et al., 2004). Some drainage floors are slightly susceptible to erosion but most of the system is inherently resistant (Van Vreeswyk et al., 2004).

The McKay Land System is characterised by hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). This land system is not prone to degradation or soil 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). Each of the landforms in the land system have a mantle of abundant pebbles of ironstone and other rocks, which translates to a low soil erosion risk (Van Vreeswyk et al., 2004).

The River Land System is characterised by active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). Susceptibility to erosion is high or very high if vegetation cover is removed (Van Vreeswyk et al., 2004). The application area has only 1.4 hectares mapped as this land system and BHPBIO will generally be avoiding the River Land System as part of their Exploration Environmental Management Plan (BHPBIO, 2012).

The proposed clearing will not be contiguous, consisting of widely spaced discrete drill pads and access tracks (BHPBIO, 2012). Upon completion of exploration activities, all exploration disturbances will be rehabilitated in accordance with BHPBIO's procedure 'Exploration Site Rehabilitation' (BHPBIO, 2012). Potential impacts from

land degradation may be minimised by the implementation of a rehabilitation condition.

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

Methodology BHPBIO (2012)
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 closest conservation area to the application area is Karijini National Park which is located approximately 120 kilometres to the east (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, a Public Drinking Water Source Area (PDWSA) gazetted under the *Country Areas Water Supply Act 1947* in August 1983. This PDWSA has been assigned a 'Priority 1 (P1)' under the Water Source Protection Classification System (DoW, 2012). Clearing activities associated with mineral production are compatible with conditions in a P1 PDWSA and all activities associated with the clearing including infrastructure, laydown areas, refuelling and topsoil storage should be compatible with the Department of Water (DoW) Land Use Compatibility Tables (DoW, 2012). The DoW advises there are Water Quality Protection Notes and Guidelines for mining and mineral processing that should be followed to reduce the risk the associated activities pose to the Water Reserve (DoW, 2012). The DoW is satisfied that the proposed clearing of 170 hectares is unlikely to have a significant impact on the quality or quantity of groundwater, provided activities are carried out in accordance with DoW advice and BHPBIO's environmental management plans.

There are no permanent waterbodies or watercourses within the application area, however, there are numerous minor non perennial watercourses that pass through the application area (GIS Database). Two larger non-perennial watercourses named Homestead Creek and Whaleback Creek occur within the application area. According to BHPBIO (2012), all creeks in the project area are small and intermittent, flowing only after major rainfall events. Clearing in the vicinity of the creeks may lead to increased erosion and, therefore, sedimentation of the creek. Potential impacts from erosion as a result of the proposed clearing may be minimised by the implementation of a watercourse management condition.

The annual average rainfall for Newman is 322 millimetres and the average annual evaporation rate for the application area is approximately 3,400 - 3,600 millimetres (BoM, 2012; GIS Database). Therefore, during normal rainfall events surface water within the application area is likely to evaporate quickly. However, substantial rainfall events create surface sheet flow which is likely to have a higher level of sediments. During normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within the application area.

According to available databases, groundwater salinity within the application area is between 500 and 1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered fresh to marginal. The proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

BHPBIO (2012) states that the low impact nature of the proposed exploration drilling activities (track grading, drill pads and sumps) is unlikely to create any surface or underground water quality issues and that all drilling waters will be contained to site in sumps. BHPBIO (2012) adds it will not drill in major drainage channels and, wherever practicable, drilling programs will avoid minor drainage lines that are considered significant in relation to local and/or regional surface water flow.

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

Methodology BHPBIO (2012)
BoM (2012)
DoW (2012)

- GIS Database:
- Evaporation Isopleths
 - 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 within the Fortescue River catchment area (GIS Database). Given the size of the area to be cleared (170 hectares) in relation to the size of the catchment area (2,975,192 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

The application area experiences a semi-desert tropical climate with summer cyclonic or thunderstorm rainfall, with an annual average rainfall of approximately 322 millimetres per year (CALM, 2002; BoM, 2012). Based on an average annual evaporation rate of 3,400 - 3,600 millimetres (GIS Database), there is likely to be little surface flow during normal seasonal rains. Whilst large rainfall events may result in flooding of the area, the proposed clearing is not likely to lead to an increase in incidence or intensity of flooding.

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

- Methodology** BoM (2012)
 CALM (2002)
 GIS Database:
 - Evaporation Isopleths
 - Hydrographic Catchments - Catchments

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

Comments

There is one native title claim over the area under application: WC05/6 (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*.

According to available databases, there are multiple registered Aboriginal Sites of Significance in the vicinity of 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 24 September 2012 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

4. References

BHPBIO (2012) Orebody 37 Exploration Drilling Program Supporting Documentation for Vegetation Clearing Permit Application. Report Prepared by BHP Billiton Iron Ore, August 2012.

BoM (2012) Climate Statistics for Australian Locations. A Search for Climate Statistics for Newman Aero, Australian Government Bureau of Meteorology, Viewed 3 December 2012, <<http://www.bom.gov.au/climate/data/>>.

CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management, Western Australia.

Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

DoW (2012) Advice provided to the Department of Mines and Petroleum for Clearing Permit Application CPS 5250/1. September 2012.

Eco Logical (2012) Orebody 37 Level 1 Vertebrate Fauna Assessment. Unpublished Report Prepared by Eco Logical Australia Pty Ltd for BHP Billiton Iron Ore, August 2012.

ENV (2011) Eastern Ridge (OB23/24/25) Fauna Assessment. Unpublished Report Prepared by ENV Australia Pty Ltd for BHP Billiton Iron Ore, December 2011.

- ENV (2012) Eastern Ridge (OB23/24/25) Flora and Vegetation Assessment. Unpublished Report Prepared by ENV Australia Pty Ltd for BHP Billiton Iron Ore, January 2012.
- Government of Western Australia (2011) 2011 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). WA Department of Environment and Conservation, Perth.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Syrinx Environmental Pty Ltd (2012) Orebody 37 Flora and Vegetation Assessment. Unpublished Report Prepared by Syrinx Environmental Pty Ltd for BHP Billiton Iron Ore, July 2012.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Government of Western Australia, Perth, Western Australia.

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.