



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4677/1
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 Authority: Shire of East Pilbara
Colloquial name: Orebody 31 Exploration Drilling Program

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 8 December 2011

2. Background

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 in a regional context. Two Beard vegetation associations have been mapped within the application area:

Beard vegetation association 18: Low woodland; mulga (*Acacia aneura*); and
Beard vegetation association 216: Low woodland; mulga (with spinifex) on rises (GIS Database; Shepherd, 2009).

Syrinx (2011) conducted a flora survey of the application area during February and March 2011, and described 21 vegetation associations within the application area:

Acacia Low Open Forest – 1a – Low open forest of *Acacia aptaneura* and *Corymbia ? aspera* over Very Open Tussock Grassland of *Chrysopogon fallax*, *Aristida inaequiglumis* and *Themeda triandra* over Open Shrubland of *Eremophila ? fraseri* subsp. (indet), *Acacia tetragonophylla* and *Dodonaea petiolaris*;
Acacia Low Woodland – 2a - Low Woodland of *Acacia ayersiana*, *Acacia pruinocarpa* and *Acacia ? aptaneura* over Very Open Hummock Grassland of *Triodia lanigera* and *Triodia epactia* with High Open Shrubland of *Psydrax latifolia*, *Acacia tetragonophylla* and *Gossypium robinsonii*;
Acacia Low Woodland – 2b - Low Open Woodland of *Acacia paraneura*, *Acacia ? aptaneura* and *Acacia pruinocarpa* over Open Shrubland of *Eremophila fraseri* subsp. *fraseri*, *Eremophila forrestii* subsp. *forrestii* and *Acacia tetragonophylla* over Very Open Hummock Grassland of *Triodia epactia*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia lanigera*;
Acacia Low Woodland – 2c - Low Open Woodland of *Acacia aptaneura* and *Corymbia ? hamersleyana* over Very Open Tussock Grassland of *Themeda triandra* and *Aristida inaequiglumis* and *Eulalia aurea* with Scattered Shrubs of *Acacia ancistrocarpa*, *Acacia pachyacra* and *Rulingia luteiflora*;
Acacia Low Woodland – 2d - Low Woodland of *Acacia citrinoviridis*, *Corymbia ? aspera* and *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Tall Shrubs of *Acacia monticola*;
Acacia Closed Scrub – 3a - Closed Scrub of *Acacia monticola* over Open Shrubland of *Santalum lanceolatum*, *Acacia maitlandii* and *Grevillea wickhamii* subsp. (indet) with Scattered Low Trees of *Corymbia deserticola*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana*;
Acacia High Shrubland – 4a - High Shrubland of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta* over Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Acacia ? paraneura* x ? and *Acacia ? aptaneura* hybrid;
Acacia Shrubland – 5a - Shrubland of *Senna stricta*, *Eremophila cuneifolia*, *Acacia synchronicia* and *Scaevola spinescens* with Low Open Woodland of *Acacia ? aptaneura* hybrid over Very Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835);
Acacia Open Shrubland – 6a - Open Shrubland of *Acacia wanyu*, *Senna stricta* and *Eremophila cuneifolia* over Very Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia epactia* with Scattered Low Trees of *Acacia ? aptaneura* hybrid;
Mixed Low Open Heath – 7a - Low Open Heath of *Bonamia rosea/erecta* (indet), *Kennedia prorepens* and *Senna ferraria* with Open Scrub of *Acacia monticola*, *Grevillea wickhamii* subsp. *hispidula* and *Acacia bivenosa*, over Very

Open Tussock Grassland of *Paraneurachne muelleri*, *Aristida holathera* var. *holathera* and *Eragrostis eriopoda*;
Eremophila Low Open Shrubland – 8a - Low Open Shrubland *Eremophila cuneifolia*, *Frankenia* sp. (indet) and *Rhagodia eremaea* with Open Shrubland of *Acacia synchronicia*, *Maireana* ? *tomentosa* subsp. *tomentosa* and *Senna artemisioides* subsp. *x sturtii* with Scattered Low Trees of *Acacia aptaneura*;
Triodia Closed Hummock Grassland – 9a - Closed Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Scattered Shrubs of *Acacia adoxa* var. *adoxo*, *Halgania solanacea* var. *Mt Doreen* (G.M. Chippendale 4206) and *Senna glutinosa* subsp. *x leurrssenii* with Scattered Tall Shrubs of *Grevillea wickhamii* subsp. (indet);
Triodia Hummock Grassland – 10a - Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxo* and *Halgania solanacea* var. *Mt Doreen* (G.M. Chippendale 4206) with High Open Shrubland of *Acacia bivenosa*, *Grevillea wickhamii* subsp. (indet) and *Acacia trudgeniana*;
Triodia Hummock Grassland – 10b - Hummock Grassland of *Triodia lanigera* and *Triodia* ? *epactia* with Scattered Tall Shrubs of *Acacia ancistrocarpa*, *Acacia bivenosa* and *Hakea lorea* over Low Scattered Shrubs of *Bonamia rosea/erecta* (indet), *Hybanthus aurantiacus* and *Sida* sp. (indet.);
Triodia Hummock Grassland – 10c - Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia epactia* with Shrubland of *Acacia wanyu*, *Scaevola spinescens* and *Senna stricta* with Scattered Low Trees of *Acacia* ? *aptaneura* hybrid and *Eucalyptus leucophloia* subsp. *leucophloia*;
Triodia Hummock Grassland – 10d - Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxo* and *Halgania solanacea* var. *Mt Doreen* (G.M. Chippendale 4206);
Triodia Open Hummock Grassland – 11a - Open Hummock Grassland of *Triodia schinzii* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Open Shrubland of *Acacia adsurgens*, *Eremophila longifolia* and *Acacia ancistrocarpa* with Scattered Low Trees of *Corymbia* ? *hamersleyana* and *Acacia aptaneura*;
Triodia Open Hummock Grassland – 11b - Open Hummock Grassland of *Triodia lanigera* and *Triodia epactia* with Open Shrubland of *Acacia ancistrocarpa*, *Acacia atkinsiana* and *Acacia tetragonophylla* with Scattered Low Trees of *Corymbia hamersleyana*;
Triodia Open Hummock Grassland – 11c - Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia epactia* with Open Shrubland of *Senna stricta* and *Grevillea* ? *berryana* with Scattered Low Trees of *Acacia* ? *aptaneura* hybrid;
Triodia Open Hummock Grassland – 11d - Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia lanigera* with High Open Shrubland of *Grevillea wickhamii* subsp. (indet) and *Acacia inaequilatera*; and
Aristida Tussock Grassland – 12a - Tussock Grassland of *Aristida inaequiglumis*, *Paraneurachne muelleri* and *Themeda triandra* with Scattered Low Trees of *Corymbia hamersleyana* over Scattered Shrubs of *Eremophila forrestii* subsp. (indet), *Acacia ancistrocarpa* and *Senna artemisioides* subsp. *helmsii x oligophylla*.

Clearing Description

BHP Billiton Iron Ore (BHPBIO) is proposing to clear up to 102 hectares of native vegetation within a 3039 hectare application area for the Orebody 31 Exploration Drilling Program (BHPBIO, 2011). The clearing of vegetation is required for mineral exploration, hydrological investigations and associated infrastructure.

The Exploration Drilling Program is multi-purpose and designed to meet various objectives including resource and regional drilling, and hydrological drilling, as well as undertaking of mineral exploration activities to fulfil BHPBIO's exploration licence obligations under the *Mining Act 1978*. Specific activities undertaken as part of the Program include:

- Grading of new tracks and re-grading and widening of existing access tracks for safe access to exploration areas;
- Grading of laydown areas;
- Formation of drill pads with water catchment sumps; and
- Various drilling activities.

BHPBIO has developed an Exploration Environmental Management Plan (EEMP) (BHPBIO, 2008). The EEMP sets out the management program for exploration across BHPBIO's tenements.

BHPBIO's application indicates that the clearing involves some 10 metre wide tracks. These are incorporated to accommodate blind crests/spots under BHPBIO's safety considerations and will only be used in limited circumstances. Some 8 metre wide tracks will also be constructed for safe 2-way access for vehicles.

Vegetation Condition

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

To:

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

Comment

The application area is located in the Fortescue Plains subregion of Western Australia and is situated approximately 36 kilometres east of the Newman town site (GIS Database).

The vegetation condition was derived from a vegetation survey conducted by Syrinx (2011).

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 occurs within the Fortescue Plains (PIL2) subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by extensive salt marsh, mulga bunch grass, and short grass communities on alluvial plains in the east; River Gum woodlands fringing drainage lines; and extensive stands of River Gum and cadjeput *Melaleuca* woodlands around numerous permanent wetlands in the central Fortescue (CALM, 2002).

The vegetation within the application area consists of Beard vegetation associations 18 and 216, which are common and widespread throughout the Pilbara bioregion with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database). A vegetation survey by Syrinx (2011) during February and March 2011 of the application area identified 206 species of flora taxa belonging to 36 Families and 96 Genera. Syrinx (2011) identified 21 vegetation communities within the application area, with the condition of these vegetation types classified from 'good' to 'excellent' (Keighery, 1994).

No Threatened Ecological Communities or Priority Ecological Communities were recorded or identified within the application area (GIS Database). The nearest Threatened or Priority Ecological Community is the Ethel Gorge Aquifer Stygobiont (TEC 18), which is located approximately 23 kilometres to the west of the application area (BHP Billiton Iron Ore, 2011).

A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases revealed five Priority Flora species which may potentially occur within a 20 kilometre radius of the application area. This search revealed no potential Declared Rare Flora (DRF) species (DEC, 2011). Syrinx (2011) identified no DRF or Priority Flora species within the application area.

Four weed species were identified during the survey: Bipinnate Beggartick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*), Spiked Malvastrum (*Malvastrum americanum*), and Pigweed (*Portulaca oleracea*) (Syrinx 2011). None of these species are listed by the Western Australian Department of Agriculture and Food as Declared Plants. The highest weed infestations were noted in the large drainage channel to the northwest of the survey area. Other areas affected are the low lying plains or depressions with Mulga woodland where soil moisture and frequent grazing by livestock contribute to greater levels of infestation (BHPBIO 2011). Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to the biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The fauna habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (ENV Australia, 2011). One habitat type is of high ecological significance (Gorge/Gully habitat), however the clearing of 102 hectares of native vegetation within a 3039 hectare application area is unlikely to have a significant impact in a regional and local context. The Gorge/Gully habitat comprises only 0.46% of the application area (14.31 ha) and will be avoided by BHPBIO due to its conservation value and inaccessibility.

Potential impacts to Gorge/Gully habitat as a result of the proposed clearing may be minimised by the implementation of a fauna management condition which excludes clearing from within this habitat type.

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

Methodology BHPBIO (2011)
CALM (2002)
DEC (2011)
Syrinx (2011)
ENV Australia (2011)
Keighery (1994)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- Pre-European Vegetation
- 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

ENV Australia Pty Ltd (ENV) was commissioned by BHPBIO to undertake a Level One Fauna assessment of the Orebody 31 survey area. This identified four broad fauna habitat types within the application area:

- Low Hill (52.01% by area) – low habitat value;
- Alluvial Plain (42.74% by area) – low habitat value;
- Minor Drainage Line (4.79% by area) – moderate habitat value; and
- Gorge/Gully (0.46% by area) – high habitat value.

ENV Australia (2011) identified the vegetation condition to be 'good' to 'excellent' (Keighery, 1994). The landforms and habitat found within the application area are considered as being well represented in the Pilbara bioregion (ENV Australia, 2011; BHPBIO, 2011). The application area does contain habitats or faunal assemblages that are ecologically significant, but it is unlikely that any threatened species will be adversely impacted by the clearing of native vegetation in the application area. The high value fauna habitat type in the application area (Gorge/Gully) is not locally constrained and occurs extensively throughout the Pilbara region (ENV Australia, 2011). It provides a diverse array of microhabitats to be utilised by fauna, from open woodlands to rocky outcrops, with the outcropping of bedrock providing shelter in the form of overhangs, cracks, crevices,

caves and areas for water to pool during the wet season (ENV Australia, 2011).

There is approximately 100% of the pre-European vegetation remaining within the Pilbara bioregion (Shepherd, 2009; GIS Database). Given the extent of the native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological link.

ENV Australia (2011) conducted a level one fauna survey of the application areas during February and March 2011. ENV Australia (2011) recorded three species of conservation significance within the application area. These species were the Western Pebble-Mound Mouse (*Pseudomys chapmani* - DEC Priority 4), Australian Bustard (*Ardeotis australis* - DEC Priority 4) and Fork-tailed Swift (*Apus pacificus* - Migratory). There may be some impact on the habitat of the Western Pebble-Mound Mouse by the clearing proposal, however this impact will be minimised by BHPBIO by recording the location of mounds to avoid disturbing them (BHPBIO, 2011). A further 13 conservation listed fauna were considered as potentially occurring in the survey area. This includes four species that may use the Gorge/Gully habitat type – the Northern Quoll (*Dasyurus hallucatus* - Schedule 1 and Endangered), Peregrine Falcon (*Falco peregrinus* - Schedule 4), Ghost Bat (*Macroderma gigas* - DEC Priority 4), and Pilbara Leaf Nosed Bat (*Rhinonictes aurantia* - Schedule 1 and Vulnerable).

The fauna habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (ENV Australia, 2011). One habitat type is of high ecological significance (Gorge/Gully habitat), however the clearing of 102 hectares of native vegetation within a 3039 hectare application area is unlikely to have a significant impact in a regional and local context. The Gorge/Gully habitat comprises only 0.46% of the application area (14.31 hectares) and will be avoided by BHPBIO due to its conservation value and inaccessibility (BHPBIO, 2011).

Potential impacts to Gorge/Gully habitat as a result of the proposed clearing may be minimised by the implementation of a fauna management condition which excludes clearing from within this habitat type.

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

Methodology BHPBIO (2011)
ENV Australia (2011)
Keighery (1994)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- Pre-European Vegetation

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

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

According to available databases, there are no records of Declared Rare Flora (DRF) within the application area (GIS Database). A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases identified no DRF species as occurring within a 20 kilometre radius of the application area (DEC, 2011).

Syrinx (2011) conducted a vegetation and flora survey of the application area during February and March 2011. No DRF were recorded within the survey area.

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

Methodology DEC (2011)
Syrinx (2011)
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 Proposal is not likely to be at variance to this Principle

A search of the available databases shows that there is one Threatened Ecological Community (TEC), the Ethel Gorge Aquifer Stygoboint (TEC 18), situated 23 kilometres to the west of the application area (GIS Database). The clearing is not likely to negatively impact upon the TEC.

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

Methodology Shepherd (2009)
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 Pilbara IBRA bioregion (GIS Database). The vegetation within the application area is recorded as:

Beard vegetation association 18: Low woodland; mulga (*Acacia aneura*); and

Beard vegetation association 216: Low woodland; mulga (with spinifex) on rises (GIS Database; Shepherd, 2009).

Although several other clearing permits have been granted in the local area, the proposed clearing is not likely to have any significant impact at a regional scale.

According to Shepherd (2009), Beard vegetation associations 18 and 216 retain approximately 100% of their pre-European extent. Therefore, the areas proposed to be cleared are not a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,193.01	17,785,000.82	~99.98	Least Concern	6.32
Beard vegetation associations - State					
18	19,890,663.25	19,889,916.06	~99.99	Least Concern	2.13
216	280,759.39	280,759.39	~100	Least Concern	NA
Beard vegetation associations - Bioregion					
18	676,556.72	676,556.72	~100	Least Concern	2.13
216	26,669.89	26,669.89	~100	Least Concern	NA

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- Pre-European Vegetation

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

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

There are no permanent watercourses or wetlands within the application area (BHPBIO, 2011; GIS Database), however there are several minor drainage lines which traverse the application area (GIS Database). These drainage lines only flow after major rainfall events.

Based on vegetation mapping by Syrinx (2011), there are two vegetation types associated with drainage depressions: Acacia Low Woodland – 2d, and Acacia Closed Scrub – 3a. Syrinx (2011) did not identify these vegetation types as riparian vegetation.

The condition of these vegetation types was classified as 'Very Good' to 'Excellent' (Keighery, 1994; GIS Database), however the clearing is unlikely to result in any significant negative environmental impacts to vegetation growing in association with a watercourse or wetland.

BHPBIO (2011) have stated that in relation to minor drainage lines, wherever practicable, drilling programs will avoid drainage lines that are considered significant in relation to local and/or regional surface flow. Additionally, BHPBIO have developed an Exploration Environmental Management Plan (EEMP – BHPBIO 2008) to address specifically the impacts associated with exploration. This states that drill sites will be chosen where there is a low level of vegetation and are a suitable distance from any watercourse or drainage line.

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

Methodology BHPBIO (2011)
Keighery (1994)
Syrinx (2011)
GIS Database:
- Geodata, Lakes
- 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 available databases, the application area is comprised of the:

Boolgeeda land system: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands;

Newman land system: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands;

Washplain land system: Hardpan plains supporting groved mulga shrublands; and

Divide land system: Sandplains and occasional dunes supporting shrubby hard Spinifex grasslands. (Van Vreeswyk et al., 2004; GIS Database).

The Newman, Boolgeeda and Washplain Land Systems have rocky, stony or hardpan surfaces that are erosion resistant. The Divide Land System is also considered as being relatively erosion resistant (however only 0.51 hectares occurs in the application area (Van Vreeswyk et al., 2004)).

BHPBIO have identified that some soil compaction may occur due to the proposed clearing, however this will be confined to the access tracks developed for the project and will be remedied following rehabilitation (BHPBIO, 2011).

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

Methodology BHPBIO (2011)
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 application area is not located within any conservation area (GIS Database). The nearest conservation area is Collier Range National Park, located approximately 131 km to the southwest of the application area (GIS Database).

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

Methodology BHPBIO (2011)
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 not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Newman Water Reserve, occurring approximately 6 km to the west of the application area.

There are no permanent watercourses or water bodies within the application area (GIS Database). Any surface water within the application area is likely to only remain for short periods following significant rainfall events as the annual evaporation rate exceeds rainfall. The low impact nature of the proposed exploration drilling activities is unlikely to cause deterioration in the quality of surface or underground water.

BHPBIO has stated that it will not drill in major drainage channels. Minor drainage lines, wherever practicable, will be avoided. Drill sites will be chosen where there is a low level of vegetation and which are a suitable distance from any natural watercourse or drainage line (BHPBIO, 2011).

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

Methodology BHPBIO (2011)
GIS Database:
- Geodata, Lakes
- RIWI Act, Groundwater Areas
- Hydrography, Linear
- Public Drinking Water Source 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 summer cyclonic or thunderstorm events, with an annual average rainfall of approximately 310 millimetres per year (CALM, 2002; BoM, 2011). Any surface water resulting from rainfall events is likely to be relatively short lived due to high rates of evaporation. On average, 70% of the annual total, falls in the December to March period, often causing massive surface runoff and localised and regional flooding. The Pilbara surface geology is considered as being extremely erosion resistant and copes with flood events on a regular basis (BHPBIO, 2011).

Given the size of the area to be cleared (102 hectares) compared to the size of the Fortescue River Upper catchment area (2,975,192 hectares) (GIS Database), and the low impact nature of the exploration activities, it is not likely that the proposed clearing will lead to an appreciable increase in run off, and subsequently cause or exacerbate the incidence or intensity of flooding.

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

Methodology BHPBIO (2011)
BoM (2011)
CALM (2002)
GIS Database:
- Hydrographic Catchments - Catchments
- Hydrography, Linear

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, 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 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 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 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 7 November 2011 by the Department of Mines and Petroleum inviting submissions from the public. A submission was received in relation to this application regarding the cumulative impacts of clearing within the Pilbara. A written response was provided on the matters raised.

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

4. References

- BHPBIO (2008) Exploration Environmental Management Plan. Revision 3. BHP Billiton Iron Ore Pty Ltd internal document number PLN-IEN-ENV-003, issued 25/11/2008.
- BHPBIO (2011) Orebody 31 Exploration Drilling Program, Supporting Documentation for Vegetation Clearing Permit Application, Purpose Permit, Prepared in October 2011.
- BoM (2011) Climate Statistics for Australian Locations: 'Newman'. Bureau of Meteorology. Available at: http://www.bom.gov.au/climate/averages/tables/cw_007151.shtml.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Pilbara 2 (PIL2 – Fortescue Plains subregion) Department of Conservation and Land Management, Western Australia.
- DEC (2011) NatureMap - Mapping Western Australia Biodiversity, Department of Environment and Conservation, viewed 18 November 2011, <<http://naturemap.dec.wa.gov.au>>.
- 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.

- ENV Australia (2011) Orebody 31 Fauna Assessment. Unpublished report prepared by ENV Australia Pty Ltd for BHP Billiton Iron Ore, August 2011.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Shepherd, D.P. (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.
- Syrinx (2011) Technical Report, BHPBIO, Orebody 31, Flora and Vegetation Assessment. Unpublished report prepared by Syrinx Environmental Pty Ltd for BHP Billiton Pty Ltd, September 2011.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A & Hennig, P. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia, Department of Agriculture, 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.