



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4630/1
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 Goldsworthy) Agreement Act 1964, Mineral Lease 281SA (AML 70/281)
Local Government Area: Shire of East Pilbara
Colloquial name: South Flank Exploration Drilling Program

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 15 December 2011

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
<p>Beard vegetation associations have been mapped for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area:</p> <p>18: Low woodland; mulga (<i>Acacia aneura</i>); and 82: Hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i> (GIS Database).</p> <p>Four flora and vegetation surveys were conducted by botanical consultants between 2007 and 2010 that cover the entire application area and some of the surrounding area (BHPBIO, 2011). ENV (2008b, 2010) and Onshore (2010, 2011) respectively mapped 29, 14, 14 and 34 vegetation associations over sections of the application area during their surveys. BHPBIO (2011) subsequently combined the surveys to create a composite vegetation association map of the application area. The vegetation associations are listed below along with the broad floristic formation they have been categorised into (BHPBIO, 2011).</p>	<p>BHP Billiton Iron Ore Pty Ltd (BHPBIO) has applied to clear up to 280 hectares of native vegetation within an application area of approximately 12,161 hectares for the purpose of mineral exploration, hydrological investigations and supporting infrastructure. Clearing is for an exploration drilling program with 2,500 potential drill targets, six laydown areas and 350 kilometres of access tracks.</p> <p>The exploration drilling program is at South Flank, located approximately 80 kilometres north-east of Newman.</p> <p>The vegetation will be cleared using dozers or excavators. The vegetation and topsoil will be stockpiled and used in rehabilitation activities.</p>	<p>Pristine: No obvious signs of disturbance (Keighery, 1994).</p> <p>To:</p> <p>Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).</p>	<p>The vegetation condition was assessed by botanists from ENV (2008b, 2010) and Onshore (2010, 2011).</p>

Hummock Grasslands

Triodia Hummock Grassland
Triodia Open Hummock Grassland

Tussock Grasslands

Eriachne Tussock Grassland

Shrublands

Acacia High Open Shrubland
Acacia Low Open Shrubland
Acacia Open Scrub

Petalostylis High Shrubland
Petalostylis Open Scrub
Eremophila Shrubland

Woodlands

Acacia Low Closed Woodland
Acacia Low Open Forest
Acacia Low Open Woodland
Acacia Low Woodland
Callitris Low Open Forest
Corymbia Low Open Woodland
Corymbia Low Woodland
Corymbia Open Woodland
Eucalyptus Low Open Woodland
Eucalyptus Low Woodland
Eucalyptus Open Mallee
Eucalyptus Woodland

Completely Degraded

Completely Degraded

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 Hamersley (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) subregion (GIS Database). This 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).

Four flora and vegetation surveys were conducted between 2007 and 2010 that cover the entire application area and some of the surrounding area (BHPBIO, 2011). Level 2 flora and vegetation surveys were by botanists from ENV (2008b, 2010) and Onshore (2010, 2011).

The South Flank flora and vegetation survey by ENV in November and December 2007 covered approximately 7,615 hectares of the current application area (ENV, 2008b). A total of 328 plant taxa were recorded, comprising 53 families and 137 genera (ENV, 2008b). This is a high number of taxa compared to other surveys of the region, although the survey area was much larger than the average survey area (ENV, 2008b). The most frequently represented families in the flora surveys were Poaceae, Fabaceae and Malvaceae which is typical of the Pilbara (ENV, 2008b; BHPBIO, 2011)

The application area contains habitats that support a wide variety of flora species including gorges and gullies, hill slopes, floodplains and major drainage lines (ENV, 2008b). The application area also contains differently aged habitats, with vegetation in different succession stages from young to old (ENV, 2008b). Gorge vegetation associations had only a small extent within the survey area but typically had the most diverse vegetation (ENV, 2008b).

One Declared Rare Flora (DRF) and eleven Priority flora species have been recorded within the application area (BHPBIO, 2011). These are listed below:

- *Lepidium catapycnon* (DRF);
- *Aristida jerichoensis* var. *subspinulifera* (Priority 1);
- *Pilbara trudgenii* Lander ms (Priority 2);
- *Spartothamnella puberula* (Priority 2);
- *Dampiera metallorum* (Priority 3);
- *Rhagodia* sp. Hamersley (M. Trudgen 17794) (Priority 3);
- *Rostellularia adscendens* var. *latifolia* (Priority 3);
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3);
- *Triodia* sp. Mt Ella (M.E. Trudgen 12739) (Priority 3);
- *Acacia bromilowiana* (Priority 4);
- *Eremophila magnifica* subsp. *magnifica* (Priority 4); and
- *Ptilotus mollis* (Priority 4).

Some of these species are geographically restricted or known from few herbarium records while others have a wider distribution (BHPBIO, 2011; Western Australian Herbarium, 2011). BHPBIO (2011) have committed to avoiding all recorded locations of conservation significant flora as part of the exploration activities. Potential impacts to DRF and Priority flora as a result of the proposed clearing may be minimised by the implementation of a flora management condition.

No Threatened Ecological Communities were recorded during the botanical surveys or have previously been

recorded within the application area (BHPBIO, 2011; GIS Database).

The western boundary of the application is directly adjacent to, and within the buffer of, the Priority Ecological Community (PEC) 'Coolibah-lignum flats: *Eucalyptus victrix* over *Muehlenbeckia* community' (BHPBIO, 2011; GIS Database). Two subtypes of this PEC occur immediately to the west of the application area:

- Coolibah woodlands over lignum (*Muehlenbeckia florulenta*) over swamp wandiree (Lake Robinson is the only known occurrence) (Priority 1); and
- Coolibah and mulga (*Acacia aneura*) woodland over lignum and tussock grasses on clay plains (Coondewanna Flats and Wanna Munna Flats) (Priority 3(iii)) (BHPBIO, 2011).

Clearing associated with infrastructure corridors is listed as a threat to this PEC (DEC, 2010). The Coolibah-lignum flats PEC was mapped by Pilbara Flora in 2008 and the application area was designed to exclude the PEC (BHPBIO, 2011). The nearest proposed drill holes are more than 500 metres from the PEC boundary (BHPBIO, 2011). The whole Southern Flank area, including the application area, drains eastwards away from the PEC to Weeli Wolli Creek and Pebble Mouse Creek (BHPBIO, 2011). The application area is therefore in a different drainage system to the Coolibah-lignum flats PEC and the Great Northern Highway provides a physical barrier to reinforce the separate drainage (BHPBIO, 2011). Potential impacts to the PEC as a result of the proposed clearing may be minimised by the implementation of an exclusion zone condition to buffer the PEC.

Three introduced flora species were recorded from the application area (BHPBIO, 2011). These weed species were Bipinnate Beggartick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*) and Spiked Malvastrum (*Malvastrum americanum*) (BHPBIO, 2011). 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.

Fauna surveys have been undertaken over the application area and its surrounds by biologists from ENV, Onshore and Biologic and BHPBIO have combined the results. A total of 161 fauna species have been recorded from the South Flank area consisting of 27 native mammals, six introduced mammals, 68 birds, 58 reptiles and two amphibians (BHPBIO, 2011).

The application area does comprise a relatively high level of biodiversity. However, the amount proposed to be cleared is a small proportion (2.3%) of the application area and substantial effort has been made to avoid the parts of the application area that support the highest levels of biodiversity.

Based on the above, the proposed clearing may be at variance to this Principle. However, it is considered that the potential impacts of the proposed clearing can be adequately managed and minimised by imposing appropriate conditions on the permit and through commitments by BHPBIO.

Methodology BHPBIO (2011)
CALM (2002)
DEC (2010)
ENV (2008b)
ENV (2010)
Onshore (2010)
Onshore (2011)
Western Australian Herbarium (2011)
GIS Database:
- IBRA WA (Regions - Subregions)
- 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

Four fauna surveys have been conducted over the application area from 2008 to 2011 by consultants from ENV (2008a, 2010), Onshore (2010) and Biologic (2011). The fauna surveys involved detailed desktop surveys, fauna habitat assessments, opportunistic observations and searches, an ornithological census and bat recordings.

Based on the results of the fauna habitat assessments from each of the fauna surveys, the application area consists of five broad habitat types:

- Gorge/gully;
- Drainage lines;
- Hill slopes and valleys;
- Alluvial plain; and
- Stony plain (BHPBIO, 2011).

The gorge/gully habitat type is considered to be of high conservation value as it provides the greatest

microhabitat complexity and is likely to support the greatest diversity of fauna (ENV, 2008a; BHPBIO, 2011). Microhabitats include caves, rock crevices, leaf litter and logs (ENV, 2008a). This habitat type provides refuge sites for various conservation significant fauna species and represents potential habitat for the Pilbara Olive Python (*Liasis olivaceus barroni*), Pilbara Orange Leaf-nosed Bat (*Rhinonictes aurantius*), Ghost Bat (*Macroderma gigas*), Northern Quoll (*Dasyurus hallucatus*) and *Ramphotyphlops ganeii* (BHPBIO, 2011). Potential bat roosting locations in the form of large caves are present in the application area and the gorge/gully habitat provides bat foraging habitat (ENV, 2008a). BHPBIO (2011) has committed to protecting the gorge/gully habitats by implementing exclusion zones. In addition, the areas are inaccessible by drilling machinery due to their steepness and will be avoided during exploration activities (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.

The minor drainage lines of the application area are of high conservation importance to vertebrate fauna because of the microhabitats present and the moderate representation of this habitat in the wider region (ENV, 2008a). Such drainage lines provide hollow branches, vegetation build-up from past floods, and soft soils suitable for burrowing reptiles of various sizes as well as arboreal lizards. The drainage line habitat may support migratory bird species such as the Rainbow Bee-eater (*Merops ornatus*), Star Finch (Western) (*Neochmia ruficauda* subsp. *clarescens*), Eastern Great Egret (*Area alba*) and the Eastern Osprey (*Pandion cristatus*) (BHPBIO, 2011). It also provides potential breeding and/or foraging sites for the Grey Falcon (*Falco hypoleucos*), Peregrine Falcon (*Falco peregrinus*) and Bush Stone Curlew (*Burhinus grallarius*), and the Pilbara Olive Python is likely to occur in waterholes along major drainage lines (BHPBIO, 2011). BHPBIO (2011) has designed its exploration programs to avoid watercourses wherever possible and will not drill in major drainage channels.

The hill slopes and valleys habitat type is considered to have moderate conservation value due to the Western Pebble-mound Mouse (*Pseudomys chapmani*) being largely restricted to this habitat type (BHPBIO, 2011). The rock crevices and *Triodia* hummocks in this habitat provide microhabitats for some ground-dwelling reptiles and mammals. However, there is low microhabitat complexity and the rocky substrate and lack of tall shrubs limits the fauna diversity (ENV, 2008a). Western Pebble-mound Mouse mounds have been recorded within the application area and have been loaded into BHPBIO's GIS. Exploration programs are adjusted to ensure Western Pebble-mound Mouse mounds are not disturbed (BHPBIO, 2011).

The alluvial plain habitat is considered to have low conservation value as it is likely to support a limited diversity of fauna and it is associated with very few conservation significant species (ENV, 2008a; BHPBIO, 2011). The low number of trees and tall shrubs and the lack of ground cover and shrubbery limits potential fauna refuge areas (ENV, 2008a). The Australian Bustard (*Ardeotis australis*) can occur here although this species is not restricted to the alluvial plain habitat type (BHPBIO, 2011).

The stony plain habitat type is considered to have low conservation value as it has a low diversity of microhabitats and is associated with very few conservation significant species (ENV, 2010; BHPBIO, 2011). Shrubs and small trees allow a build up of debris, providing fallen timber and leaf litter. Rocky soils provide a less suitable medium for burrowing species while also lacking the cracks and crevices of rockier areas (ENV, 2010). The Western Pebble-mound Mouse and the Australian Bustard can occur here although these species are not restricted to this habitat type (BHPBIO, 2011).

Based on the field and desktop surveys, 13 conservation significant fauna species have been recorded in the Area C Mine locality and four have been recorded within in the application area itself. The four recorded species were all DEC Priority 4 species: the Ghost Bat, Western Pebble-mound Mouse, Grey Falcon and Australian Bustard (BHPBIO, 2011). The occurrence of conservation significant fauna has been discussed above in regards to the fauna habitat types. The Grey Falcon and Australian Bustard are highly mobile birds and the loss of a small area of habitat is unlikely to significantly impact on either species as there are large areas of suitable habitat within the region (BHPBIO, 2011). The gorge/gully habitat of the Ghost Bat will be avoided and BHPBIO have an avoidance procedure for Western Pebble-mound Mouse mounds so it is unlikely that these species will be significantly impacted (BHPBIO, 2011).

The application area contains some vegetation and landforms that are of high conservation value to native fauna, although none of the habitat types are unique to the application area and are found elsewhere in the Pilbara (BHPBIO, 2011). The gorge/gully habitat may be important to a variety of species but this habitat type will be avoided through conditions on the permit and commitments by BHPBIO. Drainage line habitat will be avoided where possible as will Western Pebble-mound Mouse mounds (BHPBIO, 2011). Therefore, while the application area contains significant habitat, the area proposed to be cleared is not likely to contain significant habitat for fauna indigenous to Western Australia.

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

Methodology BHPBIO (2011)
Biologic (2011)
ENV (2008a)
ENV (2010)
Onshore (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 botanists identified the Declared Rare Flora (DRF) species *Lepidium catapycnon* in the south-western part of the application area on Mount Robinson (BHPBIO, 2011; Onshore, 2011). The botanists recorded 182 plants from eleven points on steep hill slopes extending into medium drainage lines (Onshore, 2011).

According to available GIS Databases no additional records of DRF species were identified within the rest of the application area (GIS Database). Flora and vegetation surveys have been undertaken over the whole application area and the DRF species occurrence is confined to the rocky hills of Mount Robinson (BHPBIO, 2011).

BHPBIO will exclude exploration activities from areas where *Lepidium catapycnon* is known to occur (BHPBIO, 2011).

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

Methodology BHPBIO (2011)
Onshore (2011)
GIS Database:
- Threatened and Priority Flora

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

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

A search of available databases revealed there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest recorded TEC, Ethel Gorge aquifer stygobiont community, is located approximately 88 kilometres south-west of the application area (GIS Database).

No TECs were identified during the flora and vegetation surveys conducted by ENV and Onshore botanists (BHPBIO, 2011).

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

Methodology BHPBIO (2011)
GIS Database:
- Threatened Ecological Sites Buffered

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

Comments Proposal is not at variance to this Principle

The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 99.89% of the pre-European vegetation remains (see table) (Shepherd, 2009; GIS Database). This gives it a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

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

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

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

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

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

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

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

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

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

Comments Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the application area (BHPBIO, 2011; GIS Database). However, there are a multitude of minor non-perennial watercourses that cross through the application area (GIS Database). These drainage lines would only intermittently flow after major rainfall events (BHPBIO, 2011).

Four flora and vegetation surveys were conducted between 2007 and 2010 that cover the entire application area and some of the surrounding area (BHPBIO, 2011). One of larger surveys was by ENV botanists and it covered approximately 7611 hectares of the application area. Of the 29 major vegetation types identified by ENV (2008b) within the application area, two are described as being associated with watercourses:

- Drainage Line A: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia hamersleyana* low woodland over *Acacia monticola*, *Grevillea wickhamii*, *Gossypium robinsonii*, *Petalostylis labicheoides*, *Acacia tumida*, *Dodonaea petiolaris* open shrubland over *Triodia pungens* hummock grassland over *Themeda triandra* tussock grassland; and
- Drainage Line B: *Corymbia hamersleyana*, *Eucalyptus xerothermica*, *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Atalaya hemiglauca*, *Acacia hamersleyensis*, *Petalostylis labicheoides*, *Acacia monticola*, *Gossypium robinsonii* shrubland over *Acacia bivenosa*, *Acacia pyrifolia*, *Indigofera monophylla* low open shrubland over *Triodia wiseana*, *Triodia pungens* hummock grassland over *Themeda triandra* open grassland.

BHPBIO (2011) have committed to avoid drilling in major drainage channels and wherever practicable avoid minor drainage lines that are considered significant in relation to local and/or regional surface water flow. BHPBIO exploration activities are planned with drill sites chosen where there is a low level of vegetation and a suitable distance from any natural watercourse or drainage line (BHPBIO, 2011).

Biologists from ENV considered that the 'Coolibah lignum flats' Priority Ecological Community (PEC) was most likely to be a groundwater dependent community on the basis of the presence of *Eucalyptus victrix*, a partial phreatophyte, and the low lying topography acting as a catchment basin and reliant on recharge from overland runoff (BHPBIO, 2011). The PEC is not located within the application area but is directly adjacent to the western boundary (BHPBIO, 2011; GIS Database). BHPBIO will ensure that its exploration activities in no way disrupt any potential overland recharge pathways leading towards the PEC (BHPBIO, 2011). Potential impacts to the PEC as a result of the proposed clearing may be minimised by the implementation of an exclusion zone

condition to buffer the PEC.

Based on the above, the proposed clearing is at variance to this Principle. However, vegetation associated with minor drainage lines is widespread in the Pilbara and due to the low impact nature of the proposed clearing for exploration and hydrological investigations there is unlikely to be significant impacts on any watercourse or wetland.

Methodology BHPBIO (2011)
ENV (2008b)
GIS Database:
- Hydrography, Linear
- Threatened Ecological Sites Buffered

(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 datasets the application area intersects the Boolgeeda, Newman, Pindering, Platform and Wannamunna 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 shrublands (Van Vreeswyk et al., 2004). The 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). 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 Pindering Land System is characterised by gravelly hardpan plains supporting groved mulga shrublands with hard and soft spinifex (Van Vreeswyk et al., 2004). This land system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Platform Land System is characterised by dissected slopes and raised plains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The land forms in this land system generally have surface mantles of very abundant pebbles and cobbles and the system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Wannamunna Land System is characterised by hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasionally eucalypt woodlands) (Van Vreeswyk et al., 2004). Generally the system has low susceptibility to erosion but disturbances to overland flow processes by inappropriate positioning or construction of infrastructure such as roads can have adverse effects on vegetation (Van Vreeswyk et al., 2004).

The proposed exploration activities are low impact and the proposed clearing will not be contiguous, consisting of widely spaced discrete drill pads and access tracks (BHPBIO, 2011). BHPBIO (2011) will make use of existing tracks as far as practicable. Upon completion of exploration activities, all exploration disturbances will be rehabilitated in accordance with BHPBIO's exploration rehabilitation procedures (BHPBIO, 2011). Potential land degradation impacts as a result of the proposed clearing 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 (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 may be at variance to this Principle

The proposed clearing is not located within a current conservation reserve (GIS Database). The nearest conservation area is Karijini National Park, which is located approximately 14 kilometres west of the application area (GIS Database). A large proportion of the vegetation in the Pilbara bioregion remains uncleared, approximately 99.89% (Shepherd, 2009), and in the local area there is still a large proportion of the vegetation remaining to provide a buffer for the national park (GIS Database).

A small proportion of the application area, approximately 4%, is within an area proposed to be part of the Department of Environment 2015 pastoral lease exclusions to be managed for conservation (GIS Database). The 'Coolibah-lignum flats' Priority Ecological Community (PEC) is an important environmental value within the proposed pastoral lease exclusion but the PEC has been excluded from the application area (BHPBIO, 2011). The proposed exploration activities are low impact and very few drill holes have been proposed for the area

that is within the proposed 2015 pastoral lease exclusion (BHPBIO, 2011; GIS Database). Upon completion of exploration activities all exploration disturbances will be rehabilitated in accordance with BHPBIO's exploration rehabilitation procedures (BHPBIO, 2011). Potential impacts to the proposed conservation area may be minimised by the implementation of rehabilitation and weed management conditions.

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

Methodology BHPBIO (2011)
Shepherd (2009)
GIS Database:
- DEC Proposed 2015 Pastoral Lease Exclusions
- DEC Tenure
- Governor 50 cm Orthomosaic - Landgate 2004
- Munjina 50 cm Orthomosaic - Landgate 2004

(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

There are no permanent watercourses or wetlands within the application area (GIS Database). There are several minor ephemeral drainage lines within the application area that would only flow following substantial rainfall events (BHPBIO, 2011; GIS Database). The proposed clearing is unlikely to significantly increase the sediment load of the surface water compared to the surrounding areas due to the low impact nature of the ground disturbances for the proposed exploration activities (BHPBIO, 2011). The proposed clearing is unlikely to cause deterioration in the quality of surface water in the local area.

According to available databases the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is Newman Water Reserve, which is approximately 50 kilometres to the south-east (GIS Database). The proposed clearing is unlikely to affect the water quality of the water reserve due to the large distance between it and the application area.

Although the amount of clearing is relatively large (280 hectares), it is spread over a much larger area (approximately 12,161 hectares) and is non-contiguous and the proposed activities are low impact in nature. BHPBIO has management procedures for exploration activities to minimise the impact on surface and groundwater quality. The procedures include no drilling in major drainage channels, where practicable avoid minor drainage lines that may be considered significant in relation to local and/or regional surface water flow, and choosing drill sites where there is a low level of vegetation and 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:
- 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 intersects the Ashburton River and Fortescue River catchment areas (GIS Database). Given the size of the area to be cleared (280 hectares) in relation to the size of the catchment areas (7,877,743 and 2,975,192 hectares, respectively) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

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

Methodology GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

The clearing permit application was advertised on 3 October 2011 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to the cumulative impacts of clearing in the Shire of East Pilbara. Cumulative impacts have been taken into account under Principle (e).

There are four Native Title Claims over the area under application (WC96/61, WC98/62, WC05/3 and WC10/16) (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups. 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 numerous 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.

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

4. References

- BHPBIO (2011) South Flank Exploration Drilling Program Supporting Documentation for Vegetation Clearing Permit Application. Report Prepared by BHP Billiton Iron Ore, September 2011.
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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.