



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2725/2
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: Iron Ore (Mt Bruce) Agreement Act 1972, Mineral Lease 252SA (AML70/252)
Local Government Area: Shire of Ashburton & Shire of East Pilbara
Colloquial name: Koodaideri Exploration Project

1.4. Application

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

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 at a 1:250,000 scale for the whole of Western Australia and are useful to look at vegetation extent in a regional context. Two Beard vegetation associations are located within the application area (GIS Database):

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

111: Hummock grasslands, shrub steppe; *Eucalyptus gamophylla* over hard spinifex (Shepherd, 2007).

A vegetation survey was conducted over the application area by Pilbara Iron staff and Biota Environmental Sciences over a five month period in 2007. As a result of this survey, 34 vegetation types were identified within the survey area (Pilbara Iron, 2007). These are:

VEGETATION OF STONEY HILLS:

- 1. Stony ridge:** *Eucalyptus leucophloia* open low trees over *Acacia hamersleyensis* scattered tall shrubs over *Grevillea wickhamii* scattered shrubs, over *Triodia wiseana* hummock grasslands over *Eriachne mucronata*, *E. lanata* tussock grasslands on skeletal red clay soil with stony surface.
- 2. Stony ridge:** *Eucalyptus leucophloia*, *Acacia pruinocarpa* scattered low trees over *Triodia basedowii* hummock grassland on skeletal clay soil with rocky surface layer.
- 3. Rocky sloping outcrop:** *Eucalyptus leucophloia* low woodland over *Acacia monticola* scattered tall shrubs over *Acacia spondylophylla* low shrubs over *Triodia wiseana* hummock grasslands over *Eriachne mucronata* tussock grassland on skeletal clay soil with surface boulders.
- 4. Steep stony slopes:** *Corymbia ferritcola* scattered low trees over *Acacia inaequilatera*, *Grevillea wickhamii* tall shrubs over *Acacia bivenosa* scattered shrubs over *Triodia basedowii*, *T. wiseana* closed hummock grassland on skeletal clay soils with stony surface.
- 5. Gentle sloping flat hills:** *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii* scattered shrubs over *Tephrosia arenicola*, *Acacia arida* low shrubs over *Triodia wiseana*, *T. basedowii* hummock grassland on skeletal clay soils overlying ironstone bedrock.
- 6. Rocky slopes:** *Eucalyptus leucophloia*, *Acacia pruinocarpa* over open low trees over *Acacia tumida* scattered shrubs over *Themeda triandra* tussock grassland on skeletal clay soils with surface of rocks and boulders < 1m.
- 7. Burnt hilltops:** *Eucalyptus leucophloia*, *Corymbia hamersleyana* scattered low trees over *Petalostylis labicheoides*, *Acacia pruinocarpa* scattered low shrubs over *Tephrosia arenicola*, *Gompholobium karjini* scattered shrubs on skeletal clay soils overlying ironstone bedrock.

8. **Gentle sloping hilltops:** *Eucalyptus leucophloia*, *E. gamophylla* low scattered trees over *Acacia arida* scattered shrubs over *Acacia arida*, *A. spondylophylla* scattered low shrubs over *Triodia basedowii* hummock grassland on skeletal clay soils overlying ironstone bedrock.
9. **Gentle sloping broad valley:** *Eucalyptus leucophloia*, *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii* tall shrubland over *Acacia spondylophylla*, *Indigofera monophylla* open low shrubland over *Triodia basedowii* hummock grassland on skeletal clay soils with stony surface layer.
10. **Flat hilltops:** *Eucalyptus leucophloia*, *Corymbia hamersleyana*, *Acacia pruinocarpa* scattered low trees over *Acacia marramamba* scattered tall shrubs over *Eremophila forrestii* scattered shrubs over *Triodia epactia* hummock grassland on skeletal clay soils with stony surface layer.
11. **Burnt gullies:** *Eucalyptus leucophloia* scattered low trees over *Gompholobium karjini* scattered low shrubs over herb strata including *Trachymene oleracea*, *Dampiera candidans* and *Goodenia cusackiana*.
12. **Flowline:** *Corymbia hamersleyana* scattered low trees over *Acacia tumida*, *Petalostylis labicheoides* closed low shrubs (thicket) on sandy clay with thin loam surface.
13. **Stony valley:** *Eucalyptus leucophloia*, *Corymbia hamersleyana* scattered low trees over *Sida arenicola* open tall shrubs over *Gossypium australe* open shrubs over *Triodia basedowii* hummock grassland on skeletal clay soil with surface layer of boulders <1m.
14. **Burnt stony slopes:** *Eucalyptus leucophloia*, *Corymbia ferritcola* scattered low trees over *Grevillea wickhamii*, *Acacia inaequilatera* scattered low shrubs over *Trachymene oleracea* herbs on skeletal clay soil overlying ironstone bedrock.
15. **Edge of gorge:** *Acacia aneura*, *A. pruinocarpa* scattered low trees over *Eremophila latrobei* ssp. *latrobei*, *Tephrosia arenicola* scattered shrubs over *Triodia epactia* hummock grassland on skeletal clay soil overlying ironstone bedrock.
16. **Steep gullies, burnt:** *Eucalyptus leucophloia* scattered low trees over *Acacia hamersleyensis* scattered tall shrubs over *Trachymene oleracea* herbs on skeletal clay soil with surface layer of boulders <1m.
17. **Broad stony valley:** *Grevillea wickhamii*, *Acacia tumida* scattered low shrubs over *Triodia basedowii* scattered hummock grassland on skeletal clay soil with stony surface layer.
18. **Stony plain:** *Triodia basedowii* hummock grassland on stony clay.
19. **Gentle slope:** *Eucalyptus leucophloia* low open woodland over *Grevillea wickhamii* scattered tall shrubs over *Acacia arida*, *Tephrosia arenicola* shrubs over *Acacia spondylophylla* scattered low shrubs over *Triodia basedowii* hummock grassland on stony clay.
20. **Flow line, burnt:** *Eucalyptus gamophylla* scattered low trees over *Dicrasyllis georgei* scattered shrubs over *Acacia tumida* low shrubs over *Scaevola parvifolia* scattered herbs on stony clay with surface bulldust layer.

VEGETATION OF GORGES:

1. **Gorge:** *Corymbia ferritcola*, *Acacia aneura*, *A. pruinocarpa* scattered low trees over *Themeda triandra*, *Eriachne mucronata* tussock grassland on skeletal sandy clay soil with surface of boulders.
2. **Gorge:** *Corymbia ferritcola*, *Acacia pruinocarpa*, *A. aneura* low open woodland over *Acacia tumida*, *Clerodendrum floribundum* scattered tall shrubs over *Triumfetta leptacantha* scattered shrubs over *Themeda triandra* tussock grassland on red-brown sand with surface layer of boulders <5m.
3. **Permanent creek:** *Eucalyptus camaldulensis* var. *obtusa* closed forest over *Typha domingensis*, *Cyperus vaginatus* scattered herbs sedgeland over *Cenchrus ciliaris* closed tussock grassland over *Rhynchosia bungarensis* scattered herbs on red-brown clay loam.

VEGETATION OF MAJOR DRAINAGE PLAINS:

1. **Gently undulating upper broad flood plain:** *Corymbia deserticola* open low woodland over *Hakea chordophylla* scattered tall shrubland over *Grevillea wickhamii*, *Dicrasyllis georgei* open low shrubland over (alternating) low lying *Acacia tumida*, *Senna notabilis* and *Goodenia stobbsiana* and slightly raised *Gompholobium karjini*, *Ptilotus calostachyus*, *Indigofera monophylla* on clay; slightly elevated areas with stony surface, low lying areas clayey sand.
2. **Lower drainage plain:** *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii*, *Acacia inaequilatera* scattered shrubs over various ephemeral herb layer on stony clay.

3. **Broad flood plain:** *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii*, *Acacia inaequilatera*, *Clerodendrum floribundum* scattered shrubs over *Cenchrus ciliaris* closed tussock grassland over stony clay.
4. **Burnt flood plain:** *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii* tall shrubs over *Cenchrus ciliaris* closed tussock grassland over *Bidens bipinnata* scattered herbs on red-brown stony clay.
5. **Unburnt flood plain:** *Acacia marramamba*, *Grevillea wickhamii* scattered tall shrubs over *Senna artemisioides* ssp. *oligophylla*, *S. artemisioides* ssp. *helmsii* scattered shrubs over *Tephrosia rosea* var. *glabrior*, *Corchorus lasiocarpus* scattered low shrubs over *Triodia epactia* hummock grassland over *Bidens bipinnata* scattered herbs on red-brown stony clay.
6. **Major drainage gully:** *Corymbia hamersleyana*, *Acacia tumida* open low trees over *Acacia tumida*, *Grevillea wickhamii*, *Petalostylis labicheoides* open tall shrubs over *Acacia dictyophleba*, *Gossypium australe* open shrubs over *Eremophila longifolia* open low shrubs over *Triodia epactia* open hummock grassland over *Cenchrus ciliaris* closed tussock grassland on red-brown sandy clay.
7. **Flood plain:** *Grevillea wickhamii* tall shrubs over *Clerodendrum floribundum* scattered shrubs over *Acacia inaequilatera*, *Grevillea wickhamii* low shrubs over *Cenchrus ciliaris* tussock grassland on stony clay.

VEGETATION OF PLAINS:

1. **Stony plain:** *Eucalyptus leucophloia*, *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera*, *A. tumida* scattered shrubs over *Triodia basedowii* hummock grassland over *Aristida contorta* scattered tussock grassland on stony clay.
2. **Gently sloping plain:** *Grevillea wickhamii* tall shrubs over *Triodia epactia* hummock grassland on stony clay.

VEGETATION OF BROAD VALLEYS:

1. **Dry Stony Creek:** *Corymbia hamersleyana* scattered low trees over *Acacia tumida*, *Grevillea wickhamii* tall shrubs over *Gossypium robinsonii* scattered shrubs over *Triodia epactia* hummock grassland over *Cenchrus ciliaris* tussock grassland on stony clay.
2. **Broad Valley:** *Corymbia hamersleyana* scattered low trees over *Grevillea wickhamii* tall shrubs over *Cenchrus ciliaris* closed tussock grassland on stony clay.

Clearing Description	Hamersley Iron Pty Ltd (Hamersley Iron) has applied to clear up to 693 ha for the purpose of Mineral Exploration. Vegetation will be cleared by dozer or excavator. A total of approximately 10,500 drill holes will be cleared at a density of 50m x 50m.
Vegetation Condition	Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994) To Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994) To Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).
Comment	Vegetation condition was rated 'good' overall by Biota Environmental Services (Biota, 2007). Biota considered vegetation condition on the lower plains as 'poor', but did not give a rating for vegetation condition of upper slopes and hills/ranges (Biota, 2007). Biota (2007) stated that between 60-90% of the vegetation had been impacted by fire of varying ages. A site inspection was undertaken by the assessing officer on 5 January 2009. It appeared that no fires had occurred within the application area for at least 12-18 months. Vegetation condition on the lower slopes and plains was considered to be in 'good' (Keighery, 1994) condition, with some tracks, old campsites and weeds present. Vegetation condition on the majority of the upper slopes, crests, hills and gorges was considered to be in 'very good' (Keighery, 1994) condition and in some areas would be considered 'excellent' (Keighery, 1994). Some evidence of historical drilling was evident but did not significantly impact the ability of the vegetation to regenerate. Rehabilitation efforts by Rio Tinto Iron Ore had further enhanced the ability of the vegetation to repair any impact caused by historical drilling. Indeed, some historical drill lines could not be located during the inspection. Clearing Permit CPS 2725/1 was granted by the Department of Mines and Petroleum (DMP) on 5 February 2009 and authorised the clearing of up to 693 hectares of native vegetation within an area totalling approximately 4966 hectares. Hamersley Iron Pty Ltd applied to DMP on 1 February 2010 to amend clearing permit CPS 2725/1 to extend the timeframe to complete rehabilitation activities from 6 months to 12 months following clearing. The area of authorised clearing and the clearing area boundary that was approved under clearing permit CPS 2725/1 will remain unchanged.

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 Iron (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) sub-bioregion (GIS Database). This sub-bioregion is characterised by 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). The vegetation described within the application area (Biota, 2007) is typical of the bioregion.

A vegetation survey of the application area and surrounding vegetation identified 314 flora species from 50 Families (Biota, 2007). This is considered to be very biologically diverse, although the survey area is quite large (>693 ha). Poaceae (50 spp), Papilionaceae (28 spp), Malvaceae (27 spp), Mimosaceae (25 spp) and Amaranthaceae (22 spp) families show highest speciation within the application area (Biota, 2007). This is typical of the floristics of the Pilbara IBRA Region. The survey also recorded three Priority flora species as occurring within the survey area (Biota, 2007). The recording of these species within the survey area suggests that the vegetation within the area has a high diversity of vegetation habitat types such as hill crests and ridges, deep gullies and gorges, drainage lines, sloping plains and breakaways. The presence of diverse habitat types is a precursor to high biological diversity. The assessing officer conducted a site visit of the application area in January 2009 and noted these diverse habitat types, likely to support high biological diversity.

An area search of the Western Australian Museum's Faunabase conducted by the assessing officer suggests that the application area is diverse in reptile species (Western Australian Museum, 2009). The search found 101 reptile species from 8 Families as potentially occurring within the application area, or within 50 km of the application area. A total of 30 avian fauna species from 15 Families have also been recorded within 50 km of the application area, reflecting the diverse range of habitats available.

Ten alien weed species were recorded within the vegetation survey area (Biota, 2007). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and further loss of biodiversity through repeated fires. No major infestations were observed, except within some watercourses where buffel grass (*Cenchrus ciliaris*) occurs in large numbers, to the exclusion of under-storey species. Whorled Pigeon Grass (*Setaria verticillata*) and Beggartick (*Bidens bipinnata*) were also recorded in large numbers in favourable conditions (Biota, 2007). It is not expected that the clearing of vegetation will lead to an infestation of weeds within the application area or surrounding vegetation should appropriate hygiene measures be implemented.

Although the application areas are high in floral and faunal diversity, they are not likely to have greater diversity than similar areas within the region.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that should a permit be granted, conditions be placed in the permit requiring rehabilitation of disturbed areas and weed hygiene measures.

Methodology

CALM (2002)
Biota (2007)
Western Australian Museum (2009)
GIS Database:
- IBRA WA (subregion - region)

(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

Biota Environmental Sciences (Biota, 2008) conducted a desktop fauna assessment of the application area and surrounding vegetation. This involved an area search of the Department of Environment and Conservation's (DEC) threatened fauna database, and an area search of the Protected Matters search tool maintained by the Department of Environment, Water, Heritage and the Arts. Fauna habitats were assessed during a site visit by Biota in 2007 (Biota, 2008).

As a result of this desktop survey, the following fauna species of conservation significance have previously been recorded within the survey area (Biota, 2008):

Northern Quoll (*Dasyurus hallucatus*), Bilby (*Macrotis lagotis*), Mulgara (*Dasyercus cristicauda*), Pilbara Orange Leaf-nosed Bat (*Rhinonictis aurantius*), Night Parrot (*Pezoporus occidentalis*), Pilbara Olive Python (*Liasis olivaceus barroni*), Peregrine Falcon (*Falco peregrinus*), a blind snake (*Ramphotyphlops ganei*), a skink (*Ctenotus uber johnstonei*), Fortescue Grunter (*Leiopotherapon aheneus*), Lake Downs Mouse (*Leggadina lakedownensis*), Western Pebble-mound Mouse (*Pseudomys chapmani*), Ghost Bat (*Macroderma gigas*), Long-tailed Dunnart (*Sminthopsis longicaudata*), Star Finch (*Neochima ruficauda subclarescens*), Grey Falcon (*Falco hypoleucos*), Australian Bustard (*Ardeotis australis*) and the Bush Stone-curlew (*Burhinus grallarius*).

Of these species, based on preferred habitat type, the following are likely to occur within the application area:

The Northern Quoll (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is known to occur in a range of habitats, including Eucalyptus open forest, monsoon rainforest and savannah woodland, but is most abundant (and apparently with less fluctuation) in rocky environments close to free water in creekline areas (Braithwaite et al, 1994). It has undergone substantial decline in the Pilbara and is now known to occur in geographically isolated populations (Firestone, 1999). Rocky outcrops and gorges exist within the application area, and permanent water is found in a gorge located within the application area. However, the rocky outcrops and gorges found within the application area are present throughout most of the Hamersley Ranges and it is unlikely that the vegetation within the application area is significant habitat for this species.

The Orange Leaf-nosed Bat (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is described as preferring warm humid caves for roosting, although some have been found in tree hollows (Australian Museum Online, 2007a). They are known to hunt flying prey close to roosts, and glean from foliage and the ground in riparian vegetation in gorges, and in open hummock grasslands and sparse tree and shrub savannah (Department of Environment, Water, Heritage and the Arts, 2008a). Known colonies in the Pilbara occupy abandoned, deep and partially flooded mines that trap pockets of warm, humid air in the mine's constant temperature zone. For at least part of the year, the species is thought to also occupy smaller, less complex mines nearby. There are no known natural roosting sites in the Pilbara (Department of Environment, Water Heritage and the Arts, 2008a). There are no abandoned mine shafts or substantial caves within the application area, although shallow caves and overhangs within the breakaway areas may provide short term roosting sites for this species. Therefore, the vegetation within the application area is not significant habitat for this species.

The Pilbara Olive Python (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) prefers deep gorges and water holes in the ranges of the Pilbara region (Pearson, 1993 as cited in Department of Environment, Water Heritage and the Arts, 2008b). Radio-telemetry has shown that individuals are usually in close proximity to water and rock outcrops (Pearson, 2001, in Department of Environment, Water, Heritage and the Arts, 2008b). This species was observed by Biota staff during a site visit in 2007 within the application area (Biota, 2008). This species is common throughout the Hamersley Ranges in suitable habitat. The vegetation within the application area is not likely to be significant habitat for this species.

The Peregrine Falcon (Schedule 4 - Other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is known to inhabit most areas in Australia and utilise cliffs, tall trees and granite outcrops for nesting (Australian Museum Online, 2007b). The Peregrine Falcon was observed during the flora survey as a pair of birds within high cliff habitat. It is likely that this pair use the large hills, cliffs and rocky outcrops as potential nesting sites. However, the clearing of vegetation within the application area is not likely to remove significant habitat for this species.

The Blind snake (*Ramphotyphlops ganeii*) (DEC - Priority 1) has been collected at opposite ends of the Pilbara uplands, hence the species may occur over a substantial geographic range (Aplin, 1998). Four specimens have been recorded from Newman, approximately 100 km from the application area. However, the fact that it has not previously been collected in other biological surveys implies either a general scarcity or a very discontinuous distribution. Aplin (1998) suggests that the species is associated with the moist microhabitats which exist in many of the deeper, better shaded gorges throughout the region. Based on this description, suitable habitat for this species may occur within the application area. However, these deep gorges are usually not accessible for exploration drilling. Given the extensive amount of gorge type habitat within the Hamersley Ranges, the vegetation within the application area is not likely to be significant habitat for this species.

The Western Pebble-mound Mouse (DEC - Priority 4) is described as constructing pebble mounds on slopes composed of stony soils, near sharply incised drainage lines (Start et al, 2000). Mounds are built in vegetation dominated by hard spinifex (*Triodia basedowii* or *T. wiseana*) (Start et al, 2000). Biota identified at least 146 active mounds during a flora survey over the application area (Biota, 2007). This species is widespread throughout the Hamersley Ranges. The vegetation within the application area is not likely to be significant habitat for the Western Pebble-mound Mouse. Pebble-mounds are easily avoided during exploration activities.

The Ghost Bat (DEC Priority 4) has been recorded from a number of sites across the Pilbara Region, mainly from abandoned mine shafts close to permanent water. Shallow caves and overhangs found within the application area may provide temporary roosting habitat for this species. However, it is not likely to constitute significant habitat for this species.

The Star Finch (DEC - Priority 4) has a patchy distribution within the Pilbara and at low densities where it occurs (Garnett et al, 2000). There are occasional concentrations at Exmouth and Millstream (Garnett et al, 2000). Star Finch inhabits grasslands and eucalypt woodland close to water, where they feed on seeds (Hall, 1974, Immelmann, 1982, M. Todd as cited in Garnett et al, 2000). Birds tend to be resident in large flocks during the dry season, and disperse to breed during the wet season (Garnett et al, 2000). The Star Finch is likely to be present within the application area following heavy rain when water is likely to pool within creeks. However, this vegetation type is widespread throughout the Pilbara region and it is unlikely that the vegetation to be cleared represents significant habitat for this species.

The Australian Bustard (DEC Priority 4) prefers tussock grassland, Triodia hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). This species was observed during the flora survey (Biota, 2007). Given the widespread distribution of this species and the abundant amount of suitable habitat within the Hamersley Ranges, the vegetation within the application area is not significant habitat for this species.

The Bush Stone-curlew (DEC - Priority 4) is known to frequent lightly timbered open woodlands. Given the widespread distribution of this species, and the degraded nature of vegetation to be cleared, the vegetation within the application area is not significant habitat for this species.

The Koodaideri Hills are characteristic of the Hamersley Ranges, with fauna habitats including hilltops, slopes, stony plains and small to moderate watercourses. Biota notes that there are no caves within the application area (Biota, 2008). However, a permanent freshwater spring occurs within the application area. The habitat provided by this spring is unique within the Koodaideri Hills and is not common within the Hamersley Ranges. It is a significant fauna habitat, providing refuge for fauna species during dry conditions and a permanent water source. Hamersley Iron have committed to avoiding this permanent spring and the vegetation surrounding it during the exploration program.

Based on the above, the proposed clearing may be at variance to this Principle. Should a permit be granted, the assessing officer recommends that a condition be placed on the permit preventing clearing within a buffer area around the freshwater spring.

Methodology Aplin (1998)
Australian Museum Online (2007a)
Australian Museum Online (2007b)
Biota (2007)
Biota (2008)
Braithwaite et al (1994)
Department of Environment, Water, Heritage and the Arts (2008a)
Department of Environment, Water, Heritage and the Arts (2008b)
Firestone (1999)
Garnett et al (2000)
Start et al (2000)

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

Comments Proposal may be at variance to this Principle

According to available databases, no Declared Rare flora species occur within the application area (GIS Database; DEC, 2007-2009). Two Priority flora species have previously been recorded within the application area, *Rhynchosia bungarensis* (P3) and *Sida* sp. Barlee Range (P3) (DEC, 2007-2009).

A vegetation and rare flora survey was conducted over the application area and surrounding vegetation by Biota Environmental Sciences (Biota, 2007) between April and September 2007. As a result of this survey, a total of six Priority flora species were identified within the application area (Biota, 2007). Subsequent changes to the conservation status of these species have resulted in some of these species being removed from the Priority flora list. Three of these species remain on the Priority flora list. They are:

Eremophila magnifica spp. *magnifica* (P4)

Rhynchosia bungarensis (P3)

Sida sp. Barlee Range (P3)

Eremophila magnifica spp. *magnifica* occurs in skeletal soils over ironstone (Western Australian Herbarium, 1998-2009). One individual plant of this species was found within the application area (Biota, 2007). This species has been found from rocky outcrops and hills throughout the Hamersley Ranges (Western Australian Herbarium, 1998-2009). Rocky outcrops and hills are very common within the Hamersley Ranges and it is likely that the species is common throughout its range. A Priority rank of 4 suggests that significant populations of species are found within secure conservation estate. The vegetation within the application area is not likely to be significant habitat for this Priority species.

Rhynchosia bungarensis occurs on pebbly, shingly coarse sand amongst boulders in creek lines and on floodplains, and has also been collected on ironstone slopes in skeletal soil (Western Australian Herbarium, 1998-2009). It has been found across much of the Pilbara region. Within the application area *R. bungarensis* was found in three separate populations, within a gorge adjacent to a permanent spring and within ephemeral watercourses (Biota, 2007). The population within the gorge was in excess of 1000 individual plants. The permanent water in the area of this population is likely to be supporting such a large population and as such it is likely to be significant habitat for this population. Hamersley Iron has advised that the area surrounding the permanent spring will be avoided during the exploration activity.

Sida sp. Barlee Range occurs on skeletal soils on hill slopes and in narrow gorges with steep cliff faces and

scree slopes (Western Australian Herbarium, 1998-2009). It has been found over most of the Hamersley Ranges and extends into the adjoining Gascoyne IBRA Region. Within the application area it was found as two individual plants on a steep sided slope adjacent to an ephemeral watercourse. Given the abundance of suitable habitat within the Pilbara region and the northern parts of the Gascoyne IBRA regions, and the wide range across which this species has been found, it is not likely that the vegetation within the application area is significant habitat for this flora species.

Biota (2007) also identified one individual plant of the flora species *Sauropus* aff. *trachyspermus*. Whilst not under any conservation threat, Biota (2007) suggests that this is a major range extension for this species which has previously been recorded from the Kimberley region (Western Australian Herbarium, 1998-2009), or that it may be a possible new species. Given there remains some unknown factors regarding this population it should be treated as being of conservation significance and should be avoided during exploration activities.

Based on the above, the proposed clearing may be at variance to this Principle. The assessing officer recommends that should a permit be granted, conditions be placed on the permit to avoid clearing within a buffer area surrounding the permanent spring and to avoid the population of *Sauropus* aff. *trachyspermus*.

Methodology Biota (2007)
DEC (2007-2009)
Western Australian Herbarium (1998-2009)
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

There are no known Threatened Ecological Communities (TEC) located within the application area (GIS Database). The West Angeles cracking clay Priority Ecological Communities (PEC) are located approximately 50 km to the south west. At this remote distance there is little likelihood of any impact to this PEC from the proposed clearing.

None of the vegetation communities identified during a flora survey over the application area are considered to be threatened ecological communities, or ecological communities at risk (Biota, 2007).

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

Methodology Biota (2007)
GIS Database:
- Threatened Ecological Sites

(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

According to available databases, the application area falls within the Pilbara IBRA Bioregion (GIS Database). This bioregion's vegetation extent remains at approximately 99.95% of its Pre-European extent (see table). Beard Vegetation Association's 111 and 82 occur within the application area (GIS Database). According to Shepherd (2007), these vegetation associations remain at approximately 100% of their Pre-European extent (see table). Both Beard vegetation associations are represented in conservation estate (see table).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status+	Pre-European % in IUCN Class I-IV Reserves*
IBRA Bioregion – Pilbara	17,804,187.89	17,794,646.75	~99.95%	Least Concern	~6.32%
Beard veg assoc. – State					
82	2,565,901	2,565,901	~100%	Least Concern	~10.2%
111	762,964	762,964	~100%	Least Concern	~5.5%
Beard veg assoc. - bioregion					
82	2,563,583	2,563,583	~100%	Least Concern	~10.2%
111	550,287	550,287	~100%	Least Concern	~1.3%

* Shepherd (2007)
** Department of Natural Resources and Environment (2002)

Therefore, the application area is not part of a remnant of native 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 (2007)
GIS Database:
- IBRA WA (subregions - regions)

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

Comments Proposal is at variance to this Principle

According to available databases there are several minor, non-perennial watercourses within the application area (GIS Database). A site inspection conducted by the assessing officer confirmed that most of these watercourses are dry ephemeral watercourses with no riparian vegetation fringing their banks. These watercourses would experience high, rapid flows during intense rain associated with the wet season, but would be dry for the rest of the year.

However, there is one gorge in which a permanent spring is located. This spring was flowing during the site inspection and supports a Eucalypt forest and fringing riparian vegetation of sedges, bulrushes and grasses. Biota (2007) have described this vegetation type as:

Eucalyptus camaldulensis var. *obtusata* closed forest over *Typha domingensis*, *Cyperus vaginatus* sedgeland over *Cenchrus ciliaris* closed tussock grassland over *Rhynchosia bungarensis* scattered herbs.

Hammersley Iron have advised that a buffer area surrounding the permanent spring will be avoided during the exploration program.

Based on the above, the proposed clearing is at variance to this Principle. The assessing officer recommends that should a permit be granted, a condition be placed on the permit requiring the permit holder to avoid clearing within the permanent spring area.

Methodology Biota (2007)
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

The application area has been surveyed by the Department of Agriculture and Food (Van Vreeswyk et al 2004).

The application area is composed of the following land systems (GIS Database):

1. Newman
2. Boolgeeda

The Newman Land System is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al, 2004). The system is not prone to erosion and has evolved to cope with vegetation loss following frequent fires. An analysis of aerial photography reveals the application area is most likely to consist of the 'Plateau, ridge, mountain and hill', 'Lower slope', 'Stony plain' and 'Narrow drainage floor with channel' land units within this land system. None of these land units are susceptible to erosion due to abundant pebble or cobble mantle (Van Vreeswyk et al, 2004).

The Boolgeeda Land System is described as stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al, 2004). The vegetation within the system is not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al, 2004). An analysis of aerial photography for the area reveals the application area is most likely to consist of the "stony lower plain" and "narrow drainage floor and channel" land unit within this land system. The soil types within these land units have a low susceptibility to erosion (Van Vreeswyk et al, 2004).

The application area experiences low rainfall (311 mm/year) (BoM, 2009), and very high pan evaporation rates (~3400 mm/year) (Luke et al, 1987). Most rainfall will be either utilised by vegetation or lost through evaporation. Subsequently, there is little recharge of groundwater as a result of rain. As a result, the removal

of 43 hectares of vegetation is not likely to lead to a rise in water table, which can lead to waterlogging or salinisation.

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

Methodology BoM (2009)
Luke et al (1987)
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 located approximately 22.6 km to the east of Karijini National Park (GIS Database). At this distance it is not likely that the vegetation within the application area provides a buffer to a conservation area, or is important as an ecological link to a conservation area. The vegetation types within the application areas are well replicated in other land systems within the Pilbara region. Subsequently, their conservation status is under no threat.

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

Methodology GIS Database:
- DEC Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

The application area is located within a *Rights in Water and Irrigation Act, 1914* (RIWI Act) Surface Water Management Area (DoW, 2008). The proponent is required to obtain a Beds and Banks Permit in order to disturb any water course (DoW, 2008). Given the size of the clearing (693 ha) compared with the size of the Fortescue River - Upper Catchment (2,975,192 ha), the proposed clearing is not likely to reduce the quality of surface water in the catchment.

There is one permanent freshwater spring located within the application area. Hamersley Iron have advised that a buffer area surrounding the spring will not be cleared during exploration activities. Clearing outside of this buffer area is not likely to impact the quality of groundwater in the local area, as most clearing will be done high in the landscape well above groundwater levels.

The application area is located within the Pilbara Groundwater Area (DoW, 2008). Any extraction of groundwater in this area will require a groundwater licence (DoW, 2008). The groundwater salinity within the application area is approximately 500 - 1000 mg/L Total Dissolved Solids (TDS) (GIS Database). This is considered to be potable water. Given the size of the area to be cleared (693 ha) compared to the size of the Hamersley groundwater province (10,166,800 ha) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no known Groundwater Dependant Ecosystems within the application area (GIS Database).

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

Methodology DoW (2008)
GIS Database:
- Groundwater Provinces
- Groundwater, Statewide
- Hydrographic Catchments - Catchments
- Public Drinking Water Source Areas (PDWSA's)
- Potential Groundwater Dependent Ecosystems

(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 an arid, tropical climate with a wet summer season and a dry winter season (BoM, 2009). Most rainfall is received during the wet season, but falls can be variable (BoM, 2009). Rain can either be sporadic (local thunderstorms) or heavy and intense (cyclonic events). It is likely that during times of

intense rainfall there may be some localised flooding in adjacent areas. However, given the method of clearing will be linear in nature, spread over 5 years and will be progressively rehabilitated, and the small area to be cleared (693 ha) in relation to the size of the Fortescue River - Upper catchment area (2,975,192 ha) is not likely to lead to an increase in flood height or duration. Flooding is not expected within the application areas as they are located higher in the landscape.

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

Methodology BoM (2009)

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

Comments

There is one native title claim over the area under application (WC98_062 - GIS Database). The claim has been registered with the National Native Title Tribunal. However, the mining tenement 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 Aboriginal sites of significance within the application area. It is the proponent's responsibility to comply with the *Aboriginal Heritage Act, 1972* and ensure that no sites of aboriginal 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 application area is located within a *Rights in Water and Irrigation Act, 1914* (RIWI Act) Surface Water Management Area (GIS Database). The proponent is required to obtain a Beds and Banks Permit in order to disturb any watercourse (DoW, 2008). The application area is located in a RIWI Act Groundwater area. The proponent is required to obtain permits to extract groundwater in this area (DoW, 2008).

Two submissions were received during the advertised public comments period. One submission raised no objections to the proposed clearing.

The second submission raised the following issues to be considered during the assessment:

- Rights of native title claimants to access the area to forage for food and medicinal plants and animals.
- Potential impacts to stygofauna and troglifauna by the proposed clearing.
- Cumulative impacts of all other clearing in the area.

Access to the vegetation within the application area by indigenous groups will not be affected by the proposed clearing. There is vast amounts of vegetation within the application area and surrounding vegetation that will remain uncleared. Furthermore, clearing for tracks may provide easier access to these areas for indigenous peoples.

The proposed clearing is not likely to impact subterranean fauna. Whilst individual holes created by the drilling program may impact subterranean fauna on a localised scale, this is a secondary impact not assessed by the 10 clearing principles. Impacts to the environment caused by drilling are considered through an approval under the *Mining Act, 1978*.

The vegetation extents of the area were assessed within Principle (e). Given the extent of vegetation remaining within the bioregion, it is not considered that the cumulative impacts of the clearing are of any concern.

Clearing Permit CPS 2725/1 was granted by the Department of Mines and Petroleum (DMP) on 5 February 2009 and authorised the clearing of up to 693 hectares of native vegetation within an area totalling approximately 4966 hectares. Hamersley Iron Pty Ltd applied to DMP on 1 February 2010 to amend clearing permit CPS 2725/1 to extend the timeframe to complete rehabilitation activities from 6 months to 12 months following clearing. The area of authorised clearing and the clearing area boundary that was approved under clearing permit CPS 2725/1 will remain unchanged.

Methodology DoW (2008)
GIS Database:
- Native Title Claims
- Aboriginal Sites of Significance
- Groundwater, Statewide

4. Assessor's comments

Comment

The amended proposal has been assessed against the clearing principles and is at variance to Principle (f), may be at variance to Principle (a), (b), and (c), is not likely to be at variance to Principle (d), (g), (h), (i) and (j) and is not at variance to Principle (e).

It is recommended that should a permit be granted, conditions be imposed on the permit with regards to weed management, rehabilitation, record keeping and permit reporting.

5. References

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6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), 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, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
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	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

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.