



1. Application details

1.1. Permit application details

Permit application No.: 2887/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: Iron Ore (Hamersley Range) Agreement Act 1963, Mineral Lease 4SA (AML 70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Marra Mamba 4 Pit Extension

1.4. Application

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

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. One Beard Vegetation Association has been mapped within the application area (GIS Database; Shepherd et al., 2001).

567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedownii*

The application area was surveyed by Keith Lindbeck and Associates staff between 6 and 10 November 2006, 30 November and 1 December 2006, 29 January and 2 February 2007, 27 February and 2 March 2007 and during an opportunistic visit on 22 June 2007 (Keith Lindbeck and Associates, 2007). The following vegetation types were identified within the application area.

Marra Mamba West Ridge:

Ranges and Hills Landscape Unit (H):

H1.1 - Hilltops with gently rounded slopes: *Eucalyptus leucophloia* and *E. gamophylla* scattered low trees over *Acacia hamersleyensis* and *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland;

H8.1 - Undulating rocky hillocks: *Acacia aneura* and *A. pruinocarpa* low open woodland over open shrubland over *Triodia wiseana* hummock grassland;

Marra Mamba Central and East Ridges:

Two vegetation associations described within the proposed clearing area on the west ridge were also recorded on the central and east ridges. These associations were: H1.1 and H8.1. The following vegetation association was found within the proposed clearing area on the central and east ridges (but was not recorded on the west ridge):

Ranges and Hills Landscape Unit (H):

H8.2 - Undulating rocky hillocks: *Eucalyptus leucophloia*, *Acacia aneura* and *A. pruinocarpa* low open woodland (low open forest in parts) over *A. hamersleyensis* and other *Acacia* spp. open scrubland over *Triodia wiseana* hummock grassland.

Clearing Description

This clearing permit application is for a Purpose Permit to clear up to 4.3 hectares of native vegetation to allow for the continuous development of the Tom Price Iron Ore Mine, located approximately nine kilometres south of the Tom Price town site (GIS Database).

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994) to Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The proposed clearing area is within an operating mine site and is adjacent to haul roads, waste dumps and exploration areas (Keith Lindbeck and Associates, 2007). Consequently, some areas within the clearing application boundary are highly disturbed.

The vegetation condition was derived from a vegetation survey conducted by Keith Lindbeck and Associates (2007). A large proportion of the proposed clearing area had been burnt by fire in the past 2 - 5 years. Vegetation was reported to be in a healthy regrowth stage, most likely due to the favourable climatic conditions experienced in the area during 2006 (Keith Lindbeck and Associates, 2007).

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

The proposed clearing area forms part of the Hamersley Ranges and is located on a banded ironstone formation ridge colloquially referred to as the Marra Mamba Ridge. This is separated into three sections described as the Marra Mamba West Ridge, Marra Mamba Central Ridge and the Marra Mamba East Ridge (adjoining an upland platform in the north east) (Keith Lindbeck and Associates, 2007). The Marra Mamba Ridge is located immediately south of the existing Tom Price Iron Ore Mine (Keith Lindbeck and Associates, 2007).

As a consequence of the proximity to the Tom Price Iron Ore Mine, some areas within the clearing permit application boundary are completely degraded and contain roads, access tracks and evidence of historic mineral exploration (Keith Lindbeck and Associates, 2007). These areas should therefore be considered to have limited or no significance in terms of biological diversity. However, a large proportion of the application area has been classified as in excellent vegetation condition (Keith Lindbeck and Associates, 2007).

A vegetation survey of the application area and surrounding vegetation identified 295 native flora species belonging to 112 genera from 49 families (Keith Lindbeck and Associates, 2007). This constitutes a high level of biological diversity in comparison to other vegetation and flora surveys undertaken in the bioregion. It is acknowledged that the Keith Lindbeck and Associates (2007) flora and vegetation survey was conducted over two seasons, including the unusually wet year of 2006 where more than 700 millimetres of rainfall was recorded (Keith Lindbeck and Associates, 2007). Such favourable conditions can most likely account for the high number of plant taxa recorded. Keith Lindbeck and Associates (2007) also point out that the floristic communities at Tom Price are generally different to the other studies mentioned above due to physiographic differences.

The proposed clearing area is known to contain two Priority Flora species: *Olearia mucronata* (P3) and *Eremophila magnifica* subsp. *magnifica* ms (P4) (Keith Lindbeck and Associates, 2007). The presence of Priority Flora within the proposed clearing area increases its biodiversity significance; however Priority Flora were found in small numbers. It is not expected that the proposed clearing will threaten the conservation status of any Priority Flora species.

Five alien weed species were recorded within the vegetation survey area (Keith Lindbeck and Associates, 2007). These were: Buffel Grass (*Cenchrus ciliaris*), Ruby Dock (*Acetosa vesicaria*), Bipinnate Beggartick (*Bidens bipinnata*), Spiked Malvastrum (*Malvastrum americanum*) and Native Thornapple (*Datura leichhardtii*). Apart from three localized alluvial areas which were infested with Buffel Grass, there were no major weed infestations (Keith Lindbeck and Associates, 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 if the area is subject to repeated fires. None of these species are listed as a 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food (DAFWA). Should the permit be granted, it is recommended that appropriate conditions be imposed on the permit for the purpose of weed management.

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, particularly Skinks (26) (Western Australian Museum, 2009). The database search found 83 reptile species from 9 families as potentially occurring within the application area, or within a 50 kilometre radius of the application area. From a faunal perspective, no detailed surveys have been undertaken to measure the species richness of the proposed clearing area. It is acknowledged that the Pilbara bioregion is known to support a diversity of arid zone reptiles. However, based on an assessment of fauna habitat it is not likely that the area applied to clear would support a higher level of fauna species diversity than any other area in the Hamersley Ranges. Biota Environmental Sciences Pty Ltd (2007) point out that habitats within the application area are typical of those within the Central Hamersley Ranges and land systems of the bioregion. The application area is contiguous with the surrounding landscape and is not an isolated landscape feature where fauna could have become restricted over time (Biota Environmental Sciences Pty Ltd, 2007).

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

Methodology Biota Environmental Sciences Pty Ltd (2007).
CALM (2002)
Keith Lindbeck and Associates (2007)
Western Australian Museum (2009)
GIS Database
- Interim Biogeographic Regionalisation of Australia

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

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

The assessing officer has conducted a search of the Western Australian Museum's online fauna database between the co-ordinates 118.2823°E, 22.3173°S and 117.2930°E, 23.2317°S, representing a 50 kilometre radius around the application area.

This search identified 7 Amphibian, 29 Mammalian, 77 Avian and 83 Reptilian species that may occur within the application area (Western Australian Museum, 2009). Of these, the following species of conservation significance have previously been recorded within the search area: Partridge Pigeon (*Geophaps smithii smithii*), Star Finch (*Neochmia ruficauda clarescens*), Night Parrot (*Pezoporos occidentalis*), Long-tailed Dunnart (*Sminthopsis longicaudata*), Orange Leaf-nosed Bat (*Rhinonictus aurantius*) and the Pilbara Olive Python (*Liasis olivaceus barroni*).

Keith Lindbeck and Associates (2007) conducted a desktop search of the Department of Environment and Conservation (DEC) threatened fauna database to identify species of conservation significance that had been recorded within the area specified. The co-ordinates used were similar to those used by the assessing officer above. In addition to those species listed above, the following fauna species of conservation significance were identified through this database search: Lakeland Downs Mouse (*Leggadina lakedownensis*), Western Pebble-mound Mouse (*Pseudomys chapmanii*), Peregrine Falcon (*Falco peregrinus*) and the Australian Bustard (*Ardeotis australis*).

Based on habitat requirements, the following species are most likely to occur within the application area:

The Pilbara Olive Python (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is restricted to ranges within the Pilbara region of north-western Western Australia, such as the Hamersley Range (Environment, 2009a). This species is known to occur at 17 locations with the Pilbara, including 4 populations occurring at Pannawonica, Millstream, Tom Price and Burrup Peninsula (Environment, 2009a). The Pilbara Olive Python prefers deep gorges and water holes with radio-telemetry showing that individuals are usually in close proximity to water and rock outcrops (Environment, 2009a). Whilst it is possible that this species may occur within the application area, it is unlikely that the proposed clearing will result in a loss of significant habitat for the Pilbara Olive Python given that a large portion of its habitat is conserved in Karijini National Park.

There are very few confirmed records of the Night Parrot (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*). This species occurs in arid and semi-arid regions of Western Australia with its habitat consisting of *Triodia* grasslands in stony or sandy environments, and of samphire and chenopod shrublands on floodplains and claypans and on the margins of salt lakes, creeks or other sources of water (Environment, 2009b). It is speculated that the Night Parrot is nomadic, or to be sedentary when conditions are suitable and to only undertake movements when food or water becomes scarce (Environment, 2009b). The vegetation within the application area provides suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (4.3 hectares) in relation to the size of the sub-region (6,215,092 hectares) it is unlikely that the application area contains significant habitat for this species.

It is possible that the Peregrine Falcon (Schedule 4 - 'Other Specially Protected Fauna' of the *Wildlife Conservation (Specially Protected Fauna) Act 1950*) may use habitat within the proposed clearing area, this species is wide ranging and mobile (Keith Lindbeck and Associates, 2007) and it is therefore unlikely that the proposed clearing will result in a loss of significant habitat for this species.

The Long-tailed Dunnart (P3 - DEC Priority Fauna List) is a specialist rock-dwelling species and is known to frequent areas within rugged rocky landscapes that support a low open woodland or shrubland of Acacias with an understorey of Spinifex hummocks (Northern Territory Government, 2009). The vegetation within the application area provides suitable habitat for this species, however given that the vegetation type is well represented throughout the bioregion and the small area proposed to clear (4.3 hectares) in relation to the size of the sub-region (6,215,092 hectares) it is unlikely that the application area contains significant habitat for this species.

Suitable habitat for the Western Pebble-mound Mouse (P4 - DEC Priority Fauna List) typically consists of

sloping land, between 2° and 6° (Start et al, 2000). Soils are stony, often shallow and skeletal (Start et al, 2000). *Triodia basedownii* or *Triodia wiseana* dominate the understorey vegetation (Start et al, 2000). The presence of the Western Pebble-mound Mouse within the proposed clearing area was inferred by the discovery of distinctive pebble mounds within the proposed clearing area during a vegetation and flora survey (Keith Lindbeck and Associates, 2007). Mounds were not found in dense colonies; nevertheless it is possible that a local population exists in the area. If present, the proposed clearing will most likely result in mortality of individuals of this species. However, Start et al (2000) reports that the Western Pebble-mound Mouse is much more widespread than first thought, and is in fact abundant in many areas of suitable habitat. The species is known from at least five large conservation reserves, including the Karijini, Collier Range, Millstream-Chichester and Rudall River National Parks; and the Barlee Range Nature Reserve (Start et al, 2000). Mounds can commonly be found on colluvial slopes throughout the Hamersley Ranges (Start et al, 2000). It is therefore unlikely that the proposed clearing will result in a loss of significant habitat at the subregional or bioregional level. Similarly, mortality of individuals within the proposed clearing area is not likely to threaten the conservation status of the Western Pebble-mound Mouse.

The Australian Bustard (P4 - DEC Priority Fauna List) is a nomadic species, typically moving in response to rainfall (Pizzey & Knight, 1997). The Australian Bustard is known to inhabit grassland and woodland habitats throughout much of Australia (Pizzey & Knight, 1997). Whilst it is possible that this species may forage within the application area, it is unlikely that the proposed clearing will result in a loss of significant habitat for the Australian Bustard given its mobility.

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

Methodology Environment (2009a)
 Environment (2009b)
 Keith Lindbeck and Associates (2007)
 Northern Territory Government (2009)
 Pizzey & Knight (1997)
 Start et al. (2000)
 Western Australian Museum (2009)

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

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

There are no known Declared Rare Flora (DRF) species within the proposed clearing area (Keith Lindbeck and Associates, 2007; GIS Database). The DRF species *Lepidium catapycnon* does occur at the Tom Price Iron Ore Mine, including one population on a steep hillside near the Tom Price Minesite Mining Operations Centre and another north of the tailings storage facility (Keith Lindbeck and Associates, 2007). No other populations of DRF have been found at the Tom Price Ore Iron Mine or its surrounds despite a massive flora survey effort by Pilbara Iron botanists over a four year period between 2003 - 2006 (Keith Lindbeck and Associates, 2007).

According to the Pilbara Iron Declared Rare and Priority Species Database, nine Priority Flora species have previously been recorded within the Tom Price Iron Ore Mine lease area. These are: *Sida* sp. Pilbara (P1), *Olearia mucronata* (P2), *Indigofera ixocarpa* (P2), *Triumfetta leptacantha* (P3), *Sida* sp. Wittenoom (P3), *Dampiera anonyma* (P3), *Eremophila magnifica* subsp. *velutina* ms (P3), *Cynanchum* sp. Hamersley (P3) and *Eremophila magnifica* subsp. *magnifica* ms (P4). The total number of known Priority Flora species within the Tom Price Iron Ore Mine lease area increased from nine to 10, following the discovery of *Sida* sp. Barlee Range (P3) at four locations within the mining lease area (Keith Lindbeck and Associates, 2007).

Of the above listed Priority Flora species, the following were recorded by Keith Lindbeck and Associates (2007) within the proposed clearing area: *Olearia Mucronata*, *Sida* sp. Wittenoom and *Eremophila magnifica* subsp. *magnifica* ms (Keith Lindbeck and Associates, 2007).

Eremophila magnifica subsp. *magnifica* ms is known to occur over a 180 kilometre range from southeast of Tom Price to northwest of Newman to the Karijini National Park (Western Australian Herbarium, 2007, cited in Keith Lindbeck and Associates, 2007). Approximately 20 plants of *E. magnifica* subsp. *magnifica* ms were recorded within the proposed clearing area by Keith Lindbeck and Associates (2007). More than 3,650 individual plants of this species have been recorded in the Pilbara Iron Rare and Priority Flora Database from numerous locations, with more than 600 of these from the Tom Price Iron Ore Mine lease area (Keith Lindbeck and Associates, 2007). Based on these figures, it is unlikely that this clearing proposal will significantly threaten *E. magnifica* subsp. *magnifica* ms.

According to the Pilbara Iron Rare and Priority Flora Database, *Olearia mucronata* has previously been recorded from 19 sites (17 of these within the mine lease area) (Keith Lindbeck and Associates, 2007). This species shows a preference for rocky hillsides and slopes and disturbed ground (Keith Lindbeck and Associates, 2007). Approximately 100 plants of *Olearia mucronata* have previously been located within the mine lease area by Pilbara Iron (Keith Lindbeck and Associates, 2007). Given that this species has been found in the vicinity of Laverton, Cue, Paraburdoo, Tom Price, Wittenoom and northwest of Newman (Western Australian Herbarium, cited in Keith Lindbeck and Associates, 2007), it is unlikely the vegetation to be cleared is significant habitat for this species. The Assessing Officer carried out a search for *Olearia mucronata* on

FloraBase on 29 January 2009 which noted that the conservation status of this species has been altered from P2 to P3 (Western Australian Herbarium, 2009).

According to the Pilbara Iron Rare and Priority Flora Database, there are over 850 records of *Sida* sp. Wittenoom (Keith Lindbeck and Associates, 2007). This species has previously been recorded from locations such as Mesa A, Mesa G, Pannawonica, Bungaroo, Warrambo, Green Pool, Brockman and Deepdale with population sizes ranging from scattered individuals to over 1,000 plants (Keith Lindbeck and Associates, 2007). Given that this species is widespread and has a range of 600 kilometres from the Ashburton to the East Pilbara (Western Australian Herbarium, cited in Keith Lindbeck and Associates, 2007) it is unlikely the vegetation to be cleared is significant habitat for this species. The Assessing Officer carried out a search for *Sida* sp. Wittenoom on FloraBase on 29 January 2009 which noted that the conservation status of this species has been altered to Not Threatened (Western Australian Herbarium, 2009).

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

Methodology Keith Lindbeck and Associates (2007)
Western Australian Herbarium (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

A search of available databases reveals that there are no known Threatened Ecological Communities (TEC's) within, or in close proximity to, the proposed clearing area (GIS Database; Keith Lindbeck and Associates, 2007). The nearest known TEC to the area applied to clear is the Themeda Grasslands, located approximately 38 kilometres north-northeast (GIS Database; Keith Lindbeck and Associates, 2007).

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

Methodology Keith Lindbeck and Associates (2007)
GIS Database
- Threatened Ecological Communities

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

Comments Proposal is not at variance to this Principle

The application area falls within the IBRA Pilbara Bioregion (GIS Database). Shepherd et al. (2001) report that approximately 100% of the pre-European vegetation still exists in this Bioregion (see table below). The vegetation in the application area is recorded as Beard Vegetation Association 567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedownii* (GIS Database; Shepherd et al., 2001). According to Shepherd et al. (2001) approximately 100% of Beard Vegetation Association 567 remains within the Pilbara Bioregion.

Therefore the vegetation within the application area is not a significant remnant of native vegetation within an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~99.9%	Least Concern	~6.3%
Beard veg assoc. – State					
567	776,833	776,833	~100.00	Least Concern	~22.3%
Beard veg assoc. – Bioregion					
567	776,833	776,833	~100.0%	Least Concern	~22.3%

* Shepherd et al. (2001) updated 2005

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd et al. (2001)
GIS Database
- Pre-European Vegetation
- Interim Biogeographic Regionalisation for Australia

(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 is one minor non-perennial watercourse running through the western section of the application area with several other minor non-perennial watercourses surrounding the application area (GIS Database).

Vegetation mapping of the application area by Keith Lindbeck and Associates (2007) indicates that the native vegetation proposed to be cleared is not riparian vegetation.

Based on the above, the proposed clearing is at variance to this Principle. However, as the minor watercourse located within the application area is only likely to flow following significant rainfall, the proposed clearing is unlikely to result in any significant impact to any watercourse or wetland.

Methodology Keith Lindbeck and Associates (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 may 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 system (GIS Database);

Newman Land System

The Newman Land System is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The Newman land system is comprised of four land units (Van Vreeswyk et al, 2004). These are:

- plateau, ridge, mountain and hill;
- lower slope;
- stony plain; and
- narrow drainage floor with channel (Van Vreeswyk et al, 2004).

An analysis of aerial photography for the application area reveals the application area is most likely to fall within the 'plateaux, ridges, mountains and hills' and 'lower slopes' land units. Soils were generally described as stony and gravelly, interspersed with large ironstone rocks, boulders or outcrops (Keith Lindbeck and Associates, 2007). Soils with a surface mantle of pebbles are also present within the proposed clearing area (Keith Lindbeck and Associates, 2007). Non-erosive chert and banded ironstone formation outcrops are present within the application area; however there are also colluvial talus slopes and stony plains which are susceptible to erosion (Keith Lindbeck and Associates, 2007).

Based on the above, the proposed clearing may be at variance to this Principle. It is recommended that should a permit be granted, a condition be imposed on the permit with regard to stockpiling of all cleared topsoil and vegetation for future use in rehabilitation.

Methodology Keith Lindbeck and Associates (2007)
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 11.5 kilometres to the west of Karijini National Park (Keith Lindbeck and Associates, 2007; GIS Database). The area between the Tom Price Iron Ore mine and the Karijini National Park is uncleared pastoral rangeland that acts as a buffer (Keith Lindbeck and Associates, 2007). It is therefore unlikely that the proposed clearing will have adverse impacts upon the Karijini National Park.

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

Methodology Keith Lindbeck and Associates (2007)
GIS Database
- CALM Managed Lands and Waters

(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).

There are no permanent water bodies or watercourses within the application area; however there is one minor ephemeral creek within the application area and others within close proximity (GIS Database). Following clearing, this creek may be removed during the mining operations (Hamersley Iron Pty Ltd, 2007). It is the proponent's responsibility to liaise with the Department of Water to determine whether the proposed works require a Bed and Banks Permit, in accordance with section 17 of the *Rights in Water and Irrigation Act 1914*.

The application area is located in a semi-desert-tropical region, with an average annual rainfall of approximately 300 millimetres falling mainly during the summer months (CALM, 2002). Rainfall can be either intense falls associated with cyclonic events or scattered falls associated with thunderstorm events. The application area experiences an average annual evaporation rate of approximately 2,500 millimetres (Luke et al., 1987). Therefore, during normal rainfall events, surface water within the application area is likely to evaporate or be utilised by vegetation quickly.

The application area is located within the Hamersley Groundwater Province (GIS Database). The groundwater salinity within the application area is approximately 500 - 1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be potable water. Given the size of the area to be cleared (4.3 hectares) compared to the size of the Hamersley Groundwater Province (10,166,832 hectares) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no known Groundwater Dependent 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 CALM (2002)
Hamersley Iron Pty Ltd (2007)
Luke et al. (1987)
GIS Database
- Hydrography - Linear
- Public Drinking Water Source Area
- Groundwater - Provinces
- Groundwater Salinity
- 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 is located within the Ashburton River catchment area (GIS Database). The size of the area to be cleared (4.3 hectares) in relation to the size of the Ashburton River catchment area (7,877,743 hectares) is not likely to lead to an increase in flood height or duration (GIS Database).

Flood events are naturally associated with the Pilbara bioregion following cyclonic downpours (Keith Lindbeck and Associates, 2007). Most of the proposed clearing area is located in an elevated environment, approximately 100 metres vertical height above the surrounding plain (Keith Lindbeck and Associates, 2007). Precipitation falling in this area naturally runs off into the surrounding valleys and plains (Keith Lindbeck and Associates, 2007). The proposed clearing (and subsequent mining) operations will alter natural surface water flow patterns; however it is not likely that the incidence or intensity of natural flood events will be increased.

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

Methodology CALM (2002)
Keith Lindbeck and Associates (2007)
Luke et al. (1987)
GIS Database
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim (WC97_089) over the area under application. This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the 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 is one registered Aboriginal Site of Significance located within the application area (GIS Database). 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 applicant has been granted other clearing permits in the vicinity. One of these, the Marra Mamba Project, was referred to the Environmental Protection Authority in accordance with section 38 Part IV of the *Environmental Protection Act 1986*. Subsequently it was determined that the proposal could be managed under the provisions of Part V of the *Environmental Protection Act 1986*.

No public submissions were received in regard to this Permit application.

Methodology GIS Database
- Aboriginal Sites of Significance
- Native Title Claims

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles, and the proposal is at variance to Principle (f), may be at variance to Principles (a) and (g), is not likely to be at variance to Principles (b), (c), (d), (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, stockpiling of all cleared topsoil and vegetation, recording the areas cleared and reporting.

5. References

- Biota Environmental Sciences Pty Ltd (2007) Summary of findings from Fauna Survey conducted from 5 - 7 September 2007. Unpublished preliminary information.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land management, Western Australia.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Environment (2009a) http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66672 (Pilbara Olive Python) (Accessed 29 January 2009)
- Environment (2009b) http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59350 (Night Parrot) (Accessed 29 January 2009)
- Hamersley Iron Pty Ltd (2007) EPA Referral Form - Referral of a Proposal to the Environmental Protection Authority under Section 38(1) of the Environmental Protection Act 1986. Referral by the Proponent. 19 July 2007.
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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.
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.