



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5090/1
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 246SA (AML 70/246); Iron Ore (Hamersley Range) Agreement Act 1963, General Purpose Leases 4SA (AG70/4), 14SA (AG 70/14)

Local Government Area: Shire of Ashburton

Colloquial name: Paraburdoo Mine Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 1 November 2012

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard vegetation associations have been mapped for the whole of Western Australia. Four Beard vegetation associations have been mapped within the application area:

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

163: Shrublands; *Eremophila* and *Cassia* dwarf scrub;

181: Shrublands; mulga and snakewood scrub; and

567: Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex and *Triodia basedowii* (GIS Database).

Botanists from Ecologia conducted a flora and vegetation survey over the application area in July and August 2011. Previous vegetation mapping by Biota over parts of the application area were incorporated into the results (Ecologia, 2012). Twenty-two vegetation communities were described for the application area (Ecologia, 2012).

Vegetation of Hills and Ridges

AanAprAteTe: *Acacia aptaneura*, *A. pruinocarpa* tall open shrubland to low woodland over *A. tetragonophylla* scattered shrubs over *Triodia epactia* hummock grassland.

AprGbERsppTe: *Acacia pruinocarpa*, *Grevillea berryana* tall open shrubland over *Eremophila fraseri* subsp. *fraseri*, *E. canaliculata*, *E. cuneifolia* scattered low shrubs over *Triodia epactia* hummock grassland.

DpERCrTe: *Dodonaea pachyneura*, *Eremophila cryptothrix* tall shrubland over *Triodia epactia* hummock grassland.

AteAsyERcTe: *Acacia tetragonophylla*, *A. synchronicia* scattered tall shrubs over *Eremophila cuneifolia* scattered shrubs over *Triodia epactia* hummock grassland.

AteERfTw: *Acacia tetragonophylla* scattered tall shrubs over *Eremophila fraseri* subsp. *fraseri* scattered shrubs over *Triodia wiseana* hummock grassland.

AteTw: *Acacia tetragonophylla* tall open shrubland over *Triodia wiseana* hummock grassland.

AanSoERsppARc: *Acacia aneura* tall open scrub over *Senna oligophylla*, *Eremophila* spp. open heath over *Aristida contorta* open bunch grassland.

AtEttSglSsTe: *Acacia tetragonophylla* open shrubland over *Enchylaena tomentosa* var. *tomentosa*, *Senna glutinosa* subsp. *luerssenii*, *Senna stricta* over *Triodia epactia* hummock grassland.

Vegetation of Stony Plains

AxAteERcSspp: *Acacia xiphophylla* tall open shrubland over *A. tetragonophylla* open shrubland over *Eremophila cuneifolia*, *Senna* spp. scattered low shrubs.

AanAteSspp: *Acacia aneura*, *A. tetragonophylla* tall open shrubland over *Senna* spp. scattered low shrubs.

AanAteTe: *Acacia aneura*, *A. tetragonophylla* tall shrubland over *Triodia epactia* open hummock grassland.

AcAjSsppCc: *Acacia citrinoviridis* tall open scrub over *Aerva javanica* and mixed *Senna* spp. open shrubland over *Cenchrus ciliaris* open tussock grassland.

AaAsAtEspPoSa: *Acacia aptaneura*, *A. synchronicia*, *A. tetragonophylla* tall open shrubland over mixed *Eremophila* spp. and *Ptilotus obovatus* over *Sporobolus australasicus*.

ApAtAxEcSsTe: *Acacia aptaneura*, *A. tetragonophylla*, *A. xiphophylla* tall open shrubland over *Eremophila cuneifolia* and *Senna stricta* over *Triodia epactia* hummock grasslands.

AtSaoTsTp: *Acacia tetragonophylla* low open shrubland over *Senna artemisioides* subsp. *oligophylla* over *Triodia schinzii* and *Trachymene pilbarensis*.

Vegetation of Drainage Lines

EcEvAamMgCYPv: *Eucalyptus camaldulensis*, *E. victrix* open forest over *Acacia amplexiceps*, *Melaleuca glomerata* tall shrubland over *Cyperus vaginatus* open sedgeland to sedgeland.

EvAcMgCE: *Eucalyptus victrix* woodland to scattered trees over *Acacia coriacea* subsp. *pendens*, *Melaleuca glomerata* tall shrubland over *Cenchrus* spp. open tussock grassland.

EvTER: *Eucalyptus victrix* scattered trees over *Tephrosia rosea* var. *glabrior* scattered low shrubs.

AciAanCE: *Acacia citrinoviridis*, *A. aneura* tall shrubland to low open forest over *Cenchrus* species open tussock grassland to tussock grassland.

AanTxTe: *Acacia aneura*, *A. xiphophylla* tall open scrub over mixed open shrubland over *Triodia epactia* open hummock grassland.

CfAciDpERcrTe: *Corymbia ferritcola* low open woodland over *Acacia citrinoviridis*, *Dodonaea pachyneura*, *Eremophila cryptothrix* tall shrubland over *Triodia epactia* open hummock grassland.

AxAsAtSaCc: *Acacia xiphophylla*, *Acacia synchronicia*, *A. tetragonophylla* tall open shrubland over *Sporobolus australasicus* and *Cenchrus ciliaris* tussock grasslands.

Clearing Description

Hamersley Iron Pty Ltd has applied to clear up to 595 hectares within an application area of approximately 5,655 hectares for the purposes of mineral production and mineral exploration. The clearing is to enable on-going operational mining activities at the Paraburdoo mine site.

Hamersley Iron Pty Ltd currently holds 15 clearing permits over the Paraburdoo mine site. The current clearing permit application incorporates the outstanding balance of all these clearing permits as well as the medium term clearing requirements for the site. A site based clearing permit for Paraburdoo will simplify reporting requirements and remove minor inconsistencies in conditions between clearing permits. Hamersley Iron Pty Ltd will surrender the previously granted clearing permits located within the current application area if this application is granted.

The application area represents the boundary of the Paraburdoo mine site, located approximately 4 kilometres south-west of Paraburdoo townsite.

Vegetation will be cleared by dozers. Topsoil and vegetative material will be stockpiled for use in rehabilitation.

Vegetation Condition

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

To:

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

Comment

The vegetation condition was assessed by botanists from Ecologia. The vegetation conditions were described using a scale based on Trudgen (1988) and have been converted to the corresponding conditions from the Keighery (1994) scale.

3. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments

Proposal may be at variance to this Principle

The application area intersects the Ashburton (GAS1) and Hamersley (PIL3) Interim Biogeographic Regionalisation of Australia (IBRA) subregions (GIS Database). The Ashburton subregion is characterised by mountainous range country divided by broad flat valleys (CALM, 2002). Mulga/snake wood low woodland occur on shallow earthy loams over hardpan on the plains, with mulga scrub and *Eremophila* shrublands on the shallow stony loams of the ranges. Low mixed shrublands occur on hills with other areas supporting large areas of *Triodia* (CALM, 2002). The Hamersley subregion is generally described as Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on

skeletal soils of the ranges (CALM, 2002).

The vegetation within the application area is broadly mapped as Beard vegetation associations 82, 163, 181 and 567; all of which have over 99% of their Pre-European vegetation extent remaining (Government of WA, 2011; GIS Database). A flora and vegetation survey of the application area was conducted by Ecologia botanists in July and August 2011. Twenty-two vegetation communities were mapped in the application area and, based on regional distribution, it is considered that the vegetation communities recorded in the application area are likely to be widespread in the Pilbara bioregion (Ecologia, 2012). A total of 294 vascular flora taxa, belonging to 130 genera from 48 families, were recorded during the survey. Species representation was greatest among Fabaceae, Poaceae and Malvaceae (Ecologia, 2012). The species richness of vegetation communities was generally high, as reflected by a relatively high total number of species recorded within the relatively small area surveyed (Ecologia, 2012).

No Threatened Flora, Threatened Ecological Communities or Priority Ecological Communities were recorded within the application during the Ecologia vegetation survey or have previously been recorded within the application area (Ecologia, 2012; GIS Database).

Three Priority Flora species have been recorded within the application area: *Aluta quadrata* (Priority 1), *Goodenia* sp. East Pilbara (Priority 3) and *Ptilotus trichocephalus* (Priority 4) (Ecologia, 2012). *Aluta quadrata* was recorded at one location on a ridge slope north of Pirraburdu Creek (Ecologia, 2012). This species has limited collections and is isolated to the ranges around Paraburdo, therefore any disturbance could have a significant effect on the population (Ecologia, 2012). Hamersley Iron Pty Ltd has recognised this population as having elevated conservation significance and has developed an avoidance area around it (Hamersley Iron Pty Ltd, 2012b). *Goodenia* sp. East Pilbara has previously been recorded at one location in the application area but was not recorded during the 2011 Ecologia survey (Ecologia, 2012). Two substantial populations of *Ptilotus trichocephalus* occur within the application area, one in the south-east corner and the other in the south-west corner (Ecologia, 2012). This species is known from limited locations between Paraburdo and Tom Price and Ecologia (2012) recommend these populations be avoided wherever possible. Hamersley Iron Pty Ltd have also placed avoidance areas around the two *Ptilotus trichocephalus* populations (Hamersley Iron Pty Ltd, 2012b). Potential impacts to Priority Flora as a result of the proposed clearing may be minimised by the implementation of an avoidance area condition.

Fourteen introduced flora species were recorded within the application area during the 2011 flora and vegetation survey. Sites closer to active pits and infrastructure typically had more weeds at higher densities (Ecologia, 2012). Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

A desktop search and database review and a fauna habitat assessment of the application area was undertaken by fauna specialists from Ecologia in July 2011. The application area contains habitat types that are important for fauna, specifically 'riparian - permanent' and 'rocky outcrop and breakaways' (Ecologia, 2012). This may indicate that these areas could contain a relatively high diversity of fauna. The 'riparian - permanent' and 'rocky outcrop and breakaways' habitat types both covered small sections of the application area, 1.6% and 0.8% respectively, and Hamersley Iron Pty Ltd has implemented avoidance areas covering a large portion of these areas (Ecologia, 2012; Hamersley Iron Pty Ltd, 2012b).

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

Methodology CALM (2002)
Ecologia (2012)
Government of WA (2011)
Hamersley Iron Pty Ltd (2012b)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Pre-European Vegetation
- Threatened and Priority Flora
- Threatened Ecological Sites Buffered

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

Comments Proposal may be at variance to this Principle

A desktop search and database review and a fauna habitat assessment of the application area was undertaken by fauna specialists from Ecologia in July 2011. Opportunistic sampling methods were also employed during the survey such as bird surveying, hand searching for reptiles and mammals, spotlighting and recording bat calls with an Anabat system (Ecologia, 2012).

Six broad fauna habitats were identified within the application area on the basis of vegetation and landforms:

- Acacia shrubland over spinifex;
- Mulga and Snakewood on clay pan;
- Riparian - Ephemeral;

- Riparian - Permanent Water;
- Rocky outcrop and breakaways;
- Cleared (Ecologia, 2012).

The 'Acacia shrubland over spinifex' habitat was the most widespread habitat within the application area and it occupied most of the low rocky hills, hill slopes and ridge tops (Ecologia, 2012). 'Mulga and Snakewood on clay pan' was the other dominant natural habitat type with it covering the floodplains and flats in the south of the application area and at the foot of some of the northern hill slopes (Ecologia, 2012). Each of these habitat types covered approximately 30% of the application area. The 'cleared' habitat was also covered approximately 30% of the application area with no fauna habitat remaining in the active mine areas in the east (Ecologia, 2012).

The 'riparian - permanent' and 'rocky outcrop and breakaways' habitat types both covered small sections of the application area, 1.6% and 0.8% respectively, but are considered important habitat for many species (Ecologia, 2012). Pirraburdu Creek contains permanent pools and springs for a 3 kilometre stretch in the west of the application area, where it cuts between the ranges. The permanent water provides very important habitat for many fauna species as a refuge from the arid conditions (Ecologia, 2012). The rocky outcrops and breakaways consists of a few granitic boulder piles in the low hills to the north but mostly along ridgelines where there are bare rocky faces with some containing caves and deep crevices (Ecologia, 2012). Hamersley Iron Pty Ltd (2012b) has recognised the elevated conservation significance of these fauna habitats and have placed avoidance areas around the northern section of Pirraburdu Creek and a section of 'rocky outcrop and breakaways' habitat that contains caves. Potential impacts to significant fauna habitat as a result of the proposed clearing may be minimised by the implementation of avoidance area and vegetation management conditions.

Five conservation significant fauna species have been recorded within the application area with a further eight species deemed to have a medium to high likelihood of occurring within the application area based on habitat assessment and database search results (Ecologia, 2012). The conservation significant species recorded were:

- Pilbara Olive Python (*Liasis olivaceus barroni*) - Schedule 1 *Wildlife Conservation Act 1950 (WC Act)* and Vulnerable *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*;
- Pilbara Orange Leaf-nosed Bat (*Rhinonictis aurantia*) - Schedule 1 *WC Act* and Vulnerable *EPBC Act*;
- Rainbow Bee-eater (*Merops ornatus*) - Migratory *EPBC Act*;
- Star Finch (*Neochmia rufescens subclaescens*) - DEC Priority 4; and
- Grey Falcon (*Falco hypoleucos*) - DEC Priority 4 (Ecologia, 2012).

The Rainbow Bee-eater and Grey Falcon are highly mobile species that utilise a variety of habitats and no significant impacts to either species are expected (Ecologia, 2012).

Star Finches were recorded from ephemeral riparian habitat in Seven Mile Creek and both permanent and ephemeral riparian areas are important habitat (Ecologia, 2012). This species is sensitive to habitat clearing and development and clearing of denser vegetation in the riparian areas may result in some loss of important local habitat. However, the Star Finches recorded in the survey were living in close proximity to active mining areas, suggesting that so long as the dense riparian vegetation is not disturbed, this species will persist in the area (Ecologia, 2012). Hamersley Iron Pty Ltd (2012a) do not propose significant vegetation in the vicinity of Seven Mile Creek with the clearing mainly consisting of maintaining existing tracks that intercept the creek. A section of Seven Mile Creek with elevated conservation significance had avoidance conditions imposed on previously granted clearing permits CPS 3557/2 and CPS 4594/1 and Hamersley Iron Pty Ltd designated areas to be avoided except for low impact activities as necessary. The low impact activities include monitoring, access tracks, remedial, safety and rehabilitation activities (Hamersley Iron Pty Ltd, 2012a). Potential impacts to significant fauna habitat in Seven Mile Creek may be minimised by the implementation of a vegetation management condition.

Pilbara Olive Pythons are likely to be found in the rocky outcrops throughout the application area, particularly surrounding the riparian zones with permanent water (Ecologia, 2012). Pilbara Olive Pythons may be impacted on a local scale by the loss of rocky outcrop habitat, especially outcrops that border on riparian zones. However, individuals are capable of moving away from disturbance and there are contiguous areas of suitable habitat outside the application area so no impacts are anticipated on a regional scale (Ecologia, 2012).

A potential roost cave for the Pilbara Orange Leaf-nosed Bat occurs within the application area and bats in the area are likely to forage along the nearby riparian zones (Ecologia, 2012). Previous Anabat recordings by Biota suggests that a small local population may be present but no Pilbara Orange Leaf-nosed Bats were detected during the current survey which suggests that any populations present do not reside in the area permanently (Ecologia, 2012). Hamersley Iron Pty Ltd (2012b) have placed an avoidance area around the potential roost cave to avoid local scale impacts on the species.

The avoidance of the 'riparian - permanent' habitat type, sections of 'rocky outcrop and breakaways' habitat and sections of good quality 'riparian - ephemeral' will reduce the impact of the proposed clearing on conservation significant species.

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

provide habitat to a variety of fauna species including conservation significant species. However, the important 'riparian - permanent' and 'rocky outcrop and breakaways' habitat types and the northern section of Seven Mile Creek are avoided through permit conditions and commitments by Hamersley Iron Pty Ltd.

Methodology Ecologia (2012)
Hamersley Iron Pty Ltd (2012a)
Hamersley Iron Pty Ltd (2012b)

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

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

According to available databases there are no known records of Threatened Flora within the application area (GIS Database). The nearest known record of Threatened Flora, *Lepidium catapycnon*, is approximately 55 kilometres north-east of the application area (GIS Database). A flora and vegetation survey of the application area was conducted by Ecologia botanists in July and August 2011 and no Threatened Flora were recorded (Ecologia, 2012).

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

Methodology Ecologia (2012)
GIS Database:
- Threatened and Priority Flora

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

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

A search of available databases revealed there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest recorded TEC, Themeda grasslands on cracking clays, is located approximately 67 kilometres north of the application area (GIS Database).

No TECs were identified during the flora and vegetation survey conducted by Ecologia botanists (Ecologia, 2012).

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

Methodology Ecologia (2012)
GIS Database:
- Threatened Ecological Sites Buffered

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

Comments Proposal is not at variance to this Principle

The clearing application area falls within the Pilbara and Gascoyne Interim Biogeographic Regionalisation for Australia (IBRA) bioregions in which over 99% of the pre-European vegetation remains (see table) (Government of WA, 2011; GIS Database). This gives both IBRA regions a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

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

82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*;
163: Shrublands; *Eremophila* and *Cassia* dwarf scrub;
181: Shrublands; mulga and snakewood scrub; and
567: Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex and *Triodia basedowii* (Government of WA, 2011; GIS Database).

According to Government of WA (2011), over 99% of all of these vegetation associations remain at a state level and over 97% remain at a bioregional level. These vegetation associations would be given a conservation status of 'Least Concern' at both a state and bioregional level (Department of Natural Resources and Environment, 2002).

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

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Gascoyne	18,075,219	18,067,441	~99.96	Least Concern	1.9
IBRA Bioregion – Pilbara	17,804,427	17,729,352	~99.58	Least Concern	6.3
Beard Veg Assoc. – State					
82	2,565,901	2,553,217	~99.51	Least Concern	10.2
163	641,918	641,848	~99.99	Least Concern	-
181	1,697,291	1,695,241	~99.88	Least Concern	2.4
567	777,507	774,896	~99.66	Least Concern	22.4
Beard Veg Assoc. – Gascoyne Bioregion					
163	640,581	640,516	~99.99	Least Concern	-
181	1,632,078	1,631,914	~99.99	Least Concern	2.3
Beard Veg Assoc. – Pilbara Bioregion					
82	2,563,583	2,550,899	~99.51	Least Concern	10.2
163	236	231	~98.10	Least Concern	-
181	65,090	63,205	~97.10	Least Concern	4.9
567	776,824	774,213	~99.66	Least Concern	22.4

* Government of WA (2011)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Government of WA (2011)
GIS Database:
- IBRA WA (Regions - Subregions)
- Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

The application area contains many drainage lines that drain from the hills and ridgelines in the area (Ecologia, 2012; GIS Database). These drainage lines typically join to form a network of channels that then connect to the Seven Mile or Pirraburdu Creeks. The drainage lines and minor creeks are ephemeral and only flow following heavy rains. The major creeks in the application area are also ephemeral, except a natural spring that occurs in Pirraburdu Creek which is the only source of permanent water on site (Ecologia, 2012).

Seven of the 22 vegetation communities mapped within the application area are associated with drainage lines. These vegetation communities are EcEvAamMgCYPv, EcAcMgCE, EvTEr, AciAanCE, AanTxTe, CfAciDpERcrTe, AxAsAtSaCc (Ecologia, 2012).

The ephemeral watercourses and springs of Seven Mile Creek and Pirraburdu Creek have been identified as ecosystems at risk within the Hamersley and Ashburton subregions (CALM, 2002; Ecologia, 2012). Feral animal and weeds such as Buffel Grass and Ruby Dock are the biggest threats to these ecosystems (CALM, 2002). Both of these weed species occur throughout the mine area and many of the drainage lines are already degraded with a high abundance of Buffel Grass. Ecologia (2012) recommended that drainage lines that are still of higher vegetation condition, such as the northern areas of Pirraburdu Creek should be prioritised for management to maintain the current condition of the vegetation. Hamersley Iron Pty Ltd have placed an

avoidance zone around the northern section of Pirraburdu Creek and a portion Seven Mile Creek to avoid further disturbance to the creek and riparian vegetation (Hamersley Iron Pty Ltd, 2012a, 2012b). Clearing will be avoided in these creekline areas except for necessary low impact activities such as monitoring, access tracks, remedial, safety and rehabilitation activities (Hamersley Iron Pty Ltd, 2012a). Potential impacts to riparian vegetation as a result of the proposed clearing may be minimised by the implementation of weed management and vegetation management conditions.

Based on the above, the proposed clearing is at variance to this Principle. However, clearing of higher quality riparian vegetation associated with Pirraburdu and Seven Mile Creeks will be avoided through permit conditions and Hamersley Iron Pty Ltd's commitments. Other vegetation associated with minor ephemeral drainage lines is widespread in the Pilbara and Gascoyne regions.

Methodology CALM (2002)
Ecologia (2012)
Hamersley Iron Pty Ltd (2012a)
Hamersley Iron Pty Ltd (2012b)
GIS Database:
- Hydrology, 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 intersects the Boolgeeda, Capricorn, Dollar, Ethel, Marandoo, Newman, Paraburdoo, Platform, River and Rocklea Land Systems (GIS Database).

The Boolgeeda Land System is characterised by stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands (Van Vreeswyk et al., 2004). The vegetation is generally not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Capricorn Land System is characterised by hills and ridges of sandstone and dolomite supporting shrubby hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). The stony surfaces of the landforms in this land system provide resistance to erosion (Van Vreeswyk et al., 2004).

The Dollar Land System is characterised by stony plains supporting acacia shrublands (Van Vreeswyk et al., 2004). Most units in this land system are inherently resistant to erosion (Van Vreeswyk et al., 2004).

The Marandoo Land System is characterised by basalt hills and restricted stony plains supporting grassy mulga shrublands (Van Vreeswyk et al., 2004). Soil erosion was not detected in this land system during the land system assessment by Van Vreeswyk et al., 2004).

The Newman Land System is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). Each of the landforms in the land system have a mantle of abundant pebbles of ironstone and other rocks, which translates to a low soil erosion risk (Van Vreeswyk et al., 2004).

The Paraburdoo Land System is characterised by basalt derived stony gilgai plains supporting snakewood and mulga shrublands with spinifex and tussock grasses (Van Vreeswyk et al., 2004). Much of this land system is inherently resistant to erosion except for drainage zones which are moderately susceptible (Van Vreeswyk et al., 2004).

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

The River Land System is characterised by active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). Susceptibility to erosion is high or very high if vegetation cover is removed (Van Vreeswyk et al., 2004). Much of the River Land System within the application area is covered by Hamersley Iron Pty Ltd's clearing exclusion zones around Pirraburdu and Seven Mile Creeks.

The Rocklea Land System is characterised by basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004). Van Vreeswyk et al. (2004) report that this system has a very low erosion risk.

Paraburdoo Mine Site operates under the Paraburdoo Operation Environmental Management Plan which forms the basis of operation control procedures for mining activities. Some of the key erosion control measures include:

- Minimise land clearing activities as far as practicable and progressive clearing of vegetation to limit exposure of un-vegetated areas;
- Progressive rehabilitation of cleared areas that are no longer required to stabilise the land surface and

- promote vegetation cover with local native flora species;
- Using raised blade clearing methods for exploration and other low impact activities;
- All surface water drainage will conform with the following:
Where practicable, (installation of) stabilising diversion structures and drains to reduce erosion and associated water quality impacts;
Where practical, ensuring that natural or artificial drainage channels do not cross areas of active mining, or any locations where there is potential for hazardous materials contamination;
Installing settling ponds and sediment traps/basins where appropriate to reduce sediment loads in runoff from the mining area.
- Prior to engagement on site, all staff will be inducted on the potential for drainage and stormwater management to affect vegetation, fauna and surface water values; and drainage and stormwater management procedures;
- Captured surface water runoff (excluding stormwater) in sediment traps/basins will be returned to the environment through designated discharge locations (based on the existing hydrological regime) using rock-lined spillways to reduce erosion (Hamersley Iron Pty Ltd, 2012a).

The majority of the land systems within the application area have inherent resistance to erosion and Hamersley Iron Pty Ltd have control measures in place to reduce the risk of land degradation from the proposed clearing. However, the amount of proposed clearing is large and if large areas are cleared then left exposed for long periods of time then degradation may be a risk. Potential impacts from land degradation may be minimised by the implementation of a stage clearing condition.

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

Methodology Hamersley Iron Pty Ltd (2012a)
Van Vreeswyk et al. (2004)
GIS Database:
- Rangeland Land System Mapping

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

The application area is not located within any conservation areas (GIS Database). The nearest Department of Environment and Conservation managed land is Karijini National Park which is located approximately 36 kilometres east of the application area (GIS Database).

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 may be at variance to this Principle

The application area contains many drainage lines that drain from the hills and ridgelines in the area (Ecologia, 2012; GIS Database). These drainage lines typically join to form a network of channels that then connect to the Seven Mile or Pirraburdu Creeks. The drainage lines and minor creeks are ephemeral and only flow following heavy rains. The major creeks in the application area are also ephemeral, except a natural spring that occurs in Pirraburdu Creek which is the only source of permanent water on site (Ecologia, 2012). Hamersley Iron Pty Ltd have avoidance zones around the northern sections of Seven Mile and Pirraburdu Creeks to limit degradation of the creeklines and their associated riparian vegetation (Hamersley Iron Pty Ltd, 2012a, 2012b). Clearing will be avoided in these creekline areas except for necessary low impact activities such as monitoring, access tracks, remedial, safety and rehabilitation activities (Hamersley Iron Pty Ltd, 2012a).

Paraburdoo Mine Site operates under the Paraburdoo Operation Environmental Management Plan which includes control measures for erosion control, which in turn reduces sedimentation in nearby surface water. Some of the control measures include

- Minimise land clearing activities as far as practicable and progressive clearing of vegetation to limit exposure of un-vegetated areas;
- Progressive rehabilitation of cleared areas that are no longer required to stabilise the land surface and promote vegetation cover with local native flora species;
- All surface water drainage will conform with the following:
Where practicable, (installation of) stabilising diversion structures and drains to reduce erosion and associated water quality impacts;
Where practical, ensuring that natural or artificial drainage channels do not cross areas of active mining, or any locations where there is potential for hazardous materials contamination;
Installing settling ponds and sediment traps/basins where appropriate to reduce sediment loads in runoff from the mining area.

- Prior to engagement on site, all staff will be inducted on the potential for drainage and stormwater management to affect vegetation, fauna and surface water values; and drainage and stormwater management procedures;
- Captured surface water runoff (excluding stormwater) in sediment traps/basins will be returned to the environment through designated discharge locations (based on the existing hydrological regime) using rock-lined spillways to reduce erosion (Hamersley Iron Pty Ltd, 2012a).

According to available databases the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest water reserve is Marandoo Water Reserve, a proposed PDWSA, which is approximately 82 kilometres north-east of the application area (GIS Database). The proposed clearing is unlikely to affect the water quality of the water reserve due to the distance between it and the application area.

Given the large amount of clearing and the presence of two significant creeklines within the application area, the proposed clearing may have some impact on the quality of surface water in the local area. However, surface water management controls are in place to minimise the impact on surface water.

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

Methodology Ecologia (2012)
Hamersley Iron Pty Ltd (2012a)
Hamersley Iron Pty Ltd (2012b)
GIS Database:
- Hydrology, Linear
- Public Drinking Water Source Areas (PDWSAs)

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

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

The Pirraburdu and Seven Mile Creeks are the main drainage lines in the application area that flood during high rainfall events (Ecologia, 2012). If the riparian zones of these creeks are maintained and do not become heavily eroded they are likely to support seasonal flooding events and some increased runoff resulting from clearing (Ecologia, 2012). Hamersley Iron Pty Ltd (2012a, 2012b) have avoidance zones around sections of both Pirraburdu and Seven Mile Creek that contain riparian vegetation in good condition. Therefore, the proposed clearing is unlikely to cause or exacerbate flooding on a local scale.

The application area is within the Ashburton River catchment area (GIS Database). Given the size of the area to be cleared (595 hectares) in relation to the size of the catchment area (7,877,743 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

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

Methodology Ecologia (2012)
Hamersley Iron Pty Ltd (2012a)
Hamersley Iron Pty Ltd (2012b)
GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

There are two Native Title Claims (WC10/16 and WC10/11) over the area under application (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are multiple registered Aboriginal Sites of Significance in the vicinity of the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The clearing permit application was advertised on 18 June 2012 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received.

Methodology GIS Database:
- Aboriginal Sites of Significance

4. References

- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management, Western Australia.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Ecologia (2012) Rio Tinto Paraburdoo Mine Area Botanical and Vertebrate Fauna Survey. Report Prepared by Ecologia Environment, May 2012.
- Government of WA (2011) 2011 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). WA Department of Environment and Conservation, Perth.
- Hamersley Iron Pty Ltd (2012a) Additional Supporting Information for Clearing Permit Application CPS 5090/1. Prepared by Hamersley Iron Pty Ltd, October 2012.
- Hamersley Iron Pty Ltd (2012b) Supporting Information for Clearing Permit Application CPS 5090/1. Prepared by Hamersley Iron Pty Ltd, June 2012.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Trudgen, M.E. (1988) A Report on the Flora and Vegetation of the Port Kennedy Area. Unpublished Report Prepared for Bowman Bishaw and Associates, West Perth.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Government of Western Australia, Perth, Western Australia.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
CALM	Department of Conservation and Land Management (now DEC), Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DEC), Western Australia
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DoE	Department of Environment (now DEC), Western Australia
DoIR	Department of Industry and Resources (now DMP), Western Australia
DOLA	Department of Land Administration, Western Australia
DoW	Department of Water
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI Act	Rights in Water and Irrigation Act 1914, Western Australia
s.17	Section 17 of the Environment Protection Act 1986, Western Australia
TEC	Threatened Ecological Community

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which

are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4** **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). Priority Codes for Fauna. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4** **Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5** **Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (Environment Protection and Biodiversity Conservation Act 1999)

- EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)** **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN** **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

CD

Conservation Dependent: A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.