Government of **Western Australia**
Department of **Mines and Petroleum**

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4032/1
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, Mineral Lease 4SA (AML 70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Eastern Range Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 17 March 2011

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Vegetation within the application areas has been mapped at a 1:250,000 scale as the following Beard vegetation associations: (Shepherd, 2009; GIS Database).

- 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and
- 181: Shrublands; mulga and snakewood scrub.

A total of 53 vegetation associations were identified across the application area (Rio Tinto, 2010a).

VEGETATION OF THE NORTH FACE OF THE RANGE INCLUDING FOOTSLOPES AND ADJACENT VALLEY FLOOR HABITATS.

(1) **NFE-1** *Acacia aneura* and *Acacia tetragonophylla* scattered tall shrubs over *Acacia tetragonophylla Eremophila phyllopoda* and *Scaevola acacioides* open shrubland over *Eremophila phyllopoda* and *E. cuneifolia* low open shrubland over *Triodia epactia* hummock grassland.

(2) **NFW-1** *Grevillea nematophylla, Acacia aneura* and *Acacia tetragonophylla* tall open shrubland over *Acacia tetragonophylla, Scaevola acacioides* and *Eremophila cryptothrix* shrubland over *Eremophila cuneifolia* and *Maireana georgei* low open shrubland over *Triodia epactia* open hummock grassland.

(3) **NFW-2** *Acacia pruinocarpa* and *Acacia aneura* tall open shrubland, over *Acacia tetragonophylla, Scaevola acacioides, Acacia synchronicia* and *Eremophila cryptothrix* open shrubland, over *Eremophila cuneifolia* low open shrubland over *Triodia epactia* hummock grassland.

(4) **NF-Aw1** *Acacia wanyu* and *Acacia aneura* tall shrubland, over *Acacia wanyu* and *Acacia tetragonophylla* shrubland over *Eremophila cuneifolia* and *Senna glutinosa* subsp. *chatelainiana* low open shrubland over *Triodia epactia* very open hummock grassland.

(5) **NF-Aw2** *Acacia aneura* low open woodland over *Acacia wanyu* tall shrubland over *Eremophila phyllopoda* shrubland over *Triodia epactia* scattered hummock grasses.

(6) **P-XIP-HS** *Acacia xiphophylla* tall shrubland over *Acacia xiphophylla, Acacia tetragonophylla* and S*enna glutinosa* subsp. *x luerssenii* open shrubland over *Eremophila cuneifolia, Scaevola acacioides* and *Maireana georgei* low open shrubland, over *Triodia epactia*, scattered hummock grasses.

(7) **NFM** *Acacia aneura* low woodland over *A. aneura* and *A. rhodophloia* tall open shrubland, over *A. tetragonophylla, Eremophila cuneifolia* open shrubland over *Eremophila cuneifolia*, *Tribulus suberosus*, and *Maireana georgei* low open shrubland.

(8) **N/S-SIL** Aca*cia pruinocarpa* tall shrubland over *Acacia tetragonophylla, Scaevola acacioides* and *Eremophila cryptothrix* open shrubland, over *Eremophila cuneifolia* and *E. platycalyx* subsp. p*ardalota* low open shrubland over *Triodia epactia* open hummock grassland.

(9) **P-XIP** *Acacia synchronicia* and *A. aneura* scattered tall shrubs over *Acacia xiphophylla* shrubland over *Frankenia* cf. *ambita, Maireana carnosa* and mixed chenopods low open shrubland.

(10) **SCREE** Steep scree slopes with little to negligible vegetation. Often positioned below significant breakaway features.

(11) **NFD-1** *Acacia aneura* low woodland over *A. aneura* and *Acacia tetragonophylla* tall open shrubland over *Acacia tetragonophylla, Eremophila latrobei* and *E. cryptothrix* open shrubland over *Corchorus crozophorifolius* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Triodia epactia* open hummock grassland.

(12) **NFD-1-EL** *Eucalyptus leucophloia* and Acac*ia aneura* low woodland over *Acacia aneura* and *A. tetragonophylla* tall open shrubland over *Acacia tetragonophylla, Eremophila latrobei* and *Eremophila cryptothrix* open shrubland *Corchorus crozophorifolius* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* open hummock grassland.

(13) **NFD-2** *Acacia citrinoviridis* low open woodland over *Acacia wanyu, Grevillea nematophylla* and *Acacia tetragonophylla* open scrub, over *Eremophila latrobei* and mixed *Senna* spp. open shrubland (with scattered *Acacia xiphophylla*) over *Eremophila cuneifolia* low open shrubland over *Triodia epactia* hummock grassland.

(14) **NFD-3** *Acacia citrinoviridis, Grevillea berryana* and *G. nematophylla* low woodland over *Acacia citrinoviridis* and *Grevillea nematophylla* tall shrubland over *Santalum lanceolatum*, *Senna artemisioides* subsp. *oligophylla* and *Acacia xiphophylla* open shrubland over *Triodia epactia* very open hummock grassland.

(15) **NFD-4** *Acacia pruinocarpa* tall shrubland with scattered *A. tetragonophylla* over *Eremophila cryptothrix*, *Acacia synchronicia* and *Scaevola acacioides* shrubland over *Eremophila cryptothrix, Ptilotus obovatus* and *Maireana georgei* low open shrubland over *Triodia epactia* open hummock grassland.

VEGETATION OF THE WEST FACE OF THE RANGE INCLUDING UPPER, MID AND LOWER RANGE STEEP TO MODERATE SLOPES.

(16) **WF-1** *Acacia pyrifolia* open shrubland (with scattered mixed *Eremophila* spp. and *Senna* spp.) over scattered mixed *Eremophila* and *Senna* spp. low shrubs over *Triodia epactia* hummock grassland.

(17) **WF-2** Hake*a lorea* scattered low trees over *Acacia pyrifolia* and *A. pruinocarpa* scattered tall shrubs over *Acacia pyrifolia* and mixed *Senna* spp. open shrubland (to scattered shrubs) *Scaevola spinescens* and scattered mixed *Eremophila* spp. low open shrubland over *Triodia epactia* open hummock grassland.

(18) **WFD-1** *Acacia pyrifolia* open shrubland with scattered *Acacia tetragonophylla* and *Senna artemisioides* subsp. *oligophylla* over *Acacia pyrifolia* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* open hummock grassland over *Eriachne mucronata* and *Cymbopogon ambiguus* very open tussock grassland.

(19) **WFD-2** *Acacia pyrifolia* and *A. citrinoviridis* tall open shrubland over *Acacia pyrifolia* and *Senna artemisioides* subsp. *oligophylla* shrubland over *Senna helmsii, Scaevola spinescens* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* very open hummock grassland over *Cenchrus ciliaris* open tussock grassland.

VEGETATION OF THE MID TO LOWER SLOPES OF THE SOUTH FACE OF THE RANGE.

(20) **RLow1** *Acacia pruinocarpa*, *A. aneura* and *Grevillea berryana* tall open shrubland over *Acacia tetragonophylla, Eremophila fraseri* and mixed *Senna* spp. open shrubland over *Eremophila phyllopoda* and *E. fraseri* scattered low shrubs over *Triodia epactia* hummock grassland.

(21) **NSHG** *Acacia aneura, A. pruinocarpa* and *Grevillea berryana* scattered tall shrubs over *Eremophila exilifolia* and *E. fraseri* low open shrubland, over *Triodia epactia* open hummock grassland.

(22) **SF-AcAr** *Grevillea berryana* and *Acacia aneura* low open woodland over *Acacia rhodophloia* and *A. citrinoviridis* tall shrubland over *Acacia tetragonophylla, A. rhodophloia* and *Eremophila phyllopoda* open shrubland over *Triodia epactia* open hummock grassland.

(23) **SSEP1** Acac*ia aneura, A. pruinocarpa* and *Eucalyptus leucophloia* scattered low trees over *Acacia pruinocarpa* tall shrubland over *Eremophila phyllopoda, Senna glutinosa, Acacia tetragonophylla* and *Eremophila latrobei* open shrubland over Eremop*hila exilifolia, E. fraseri* and *E. jucunda* low shrubland over *Triodia epactia* hummock grassland.

(24) **SSAC** *Acacia citrinoviridis* and *A. pruinocarpa* tall shrubland, over *Senna glutinosa, Acacia tetragonophylla* and *Eremophila latrobei* open shrubland, over *Eremophila exilifolia, E. fraseri* and *E. jucunda* low shrubland, over *Triodia epactia* hummock grassland.

(25) **PC-o1** *Acacia pyrifolia* tall open shrubland over *Acacia pyrifolia, Corchorus crozophorifolius* and *Senna artemisioides* subsp. *oligophylla* open shrubland over *Indigofera monophylla* and *Jasminum didymum* low open shrubland over *Triodia epactia* hummock grassland.

(26) **PC-o2** *Acacia citrinoviridis, A. pyrifolia* and *A. aneura* scattered low trees over *Eremophila longifolia, Acacia citrinoviridis,* and *Santalum lanceolatum* tall open shrubland over *Eremophila longifolia, Jasminum didymum* and *Corchorus crozophorifolius* shrubland, over *Triodia epactia* open hummock grassland.

(27) **BigC-2** *Acacia citrinoviridis* and *Eucalyptus leucophloia* open woodland, over *Acacia citrinoviridis* and *A. pruinocarpa* tall shrubland, over *Dodonaea pachyneura*, *Eremophila latrobei* and *Jasminum didymum* shrubland, over *Ptilotus obovatus* and *Corchorus crozophorifolius* low open shrubland, over *Triodia epactia* very open hummock grassland.

(28) **ML-D** *Acacia citrinoviridis* and *A. aneura* low open woodland over *Acacia citrinoviridis, A. rhodophloia* and *A. tetragonophylla* tall shrubland over *Hibiscus haynaldii, Eremophila latrobei* and *Dodonaea pachyneura* open shrubland over *Triodia epactia* open hummock grassland.

VEGETATION OF THE DETRITALS PLAIN ADJACENT TO THE SOUTHERN SLOPES OF THE RANGE (includes the transition zone from detritals plain to southern footslopes).

(29) **PM-HG** *Acacia aneura* and *A. rhodophloia* tall shrubland over *Acacia rhodophloia*, *A. tetragonophylla* and *Eremophila latrobei* shrubland over mixed *Eremophila* spp. low open shrubland over *Triodia epactia* open hummock grassland.

(30) **PM1** *Acacia aneura* tall shrubland (with scattered *A. rhodophloia* and *Grevillea berryana*) over *Acacia tetragonophylla, Eremophila fraseri* and *E. phyllopoda* open shrubland over *Tribulus suberosus* and *Ptilotus schwartzii* low open shrubland, over *Triodia epactia* scattered hummock grasses.

(31) **BRW-2** *Acacia aneura* and *A. rhodophloia* tall open shrubland, over *Eremophila latrobei, Dodonaea petiolaris* and *Acacia tetragonophylla* shrubland over *Dodonaea petiolaris, Senna glutinosa* subsp. *chatelainiana* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* scattered hummock grasses.

(32) **PC-o3** *Acacia citrinoviridis, A. aneura* and *Corymbia ferriticola* low woodland over *Acacia citrinoviridis* tall shrubland over *Eremophila latrobei, Senna oligophylla*, and *Jasminum didymum* open shrubland over *Corchorus crozophorifolius* and *Tephrosia rosea* low open shrubland over *Triodia epactia* open hummock grassland over mixed very open tussock grassland.

(33) **TEV** *Acacia citrinoviridis* tall open shrubland over *A. citrinoviridis* and mixed spp. open shrubland over *Indigofera monophylla* and Tep*hrosia rosea* low open shrubland over *Triodia epactia* hummock grassland.

(34) **PC2** *Acacia citrinoviridis* and *A. aneura* low woodland over *Acacia citrinoviridis, A. aneura* and *A. rhodophloia* tall shrubland over *Dodonaea petiolaris, Hibiscus haynaldii* and *Eremophila latrobei* shrubland

over *Eremophila exilifolia* low open shrubland over *Triodia epactia* open hummock grassland.

(35) **BigC** *Corymbia ferriticola* and *Acacia citrinoviridis* low woodland *over A. citrinoviridis, Clerodendrum floribundum* and *Acacia pyrifolia* tall open scrub over C*orchorus crozophorifolius, Rhagodia eremaea* and *Hibiscus haynaldii* shrubland over mixed low open shrubland over *Triodia epactia* open hummock grassland.

VEGETATION OF THE ROLLING SLOPES, STEEP SLOPES, AND GULLIES OF THE UPPER PARTS OF THE RANGE

(36) **Hm1** *Acacia aneura* and *A. rhodophloia* tall shrubland (with scattered mixed low trees) over *A. rhodophloia* and *Eremophila fraseri* open shrubland over *E. fraseri, Tribulus suberosus*, *Ptilotus schwartzii*, low open shrubland over *Triodia epactia* Scattered hummock grasses.

(37) **UR/RSS-1** *Acacia rhodophloia, A. aneura* and *Grevillea berryana*, tall shrubland (with scattered low trees) over *Eremophila fraseri* and *E. latrobei* open shrubland over *Eremophila jucunda* and *E. exilifolia* low shrubland over *Triodia epactia* open hummock grassland.

(38) **UR/RS-Ap** *Grevillea berryana* and *Acacia pruinocarpa* scattered low trees over *Acacia pruinocarpa*, *Grevillea berryana* and *Acacia rhodophloia* tall open shrubland over *Acacia pruinocarpa, A. rhodophloia, A. tetragonophylla* and *Eremophila phyllopoda* open shrubland over mixed *Eremophila* spp. low open shrubland, over *Triodia epactia* hummock grassland.

(39) **UR-RSSG-Aa** *Acacia aneura* low open woodland over *A. aneura, A. rhodophloia* and *A. pruinocarpa* tall shrubland over *A. aneura, Grevillea berryana* and *Eremophila latrobei* open shrubland over *Eremophila jucunda* low open shrubland over *Triodia epactia* open hummock grassland.

(40) **UR/RS-ApEl** *Eucalyptus leucophloia* and *Grevillea berryana* scattered low trees over *Acacia citrinoviridis* and *A. pruinocarpa* tall open shrubland over *A. citrinoviridis, Grevillea berryana* and *Senna glutinosa* open shrubland over *Eremophila fraseri* and *Eremophila jucunda* low open shrubland over *Triodia epactia* hummock grassland.

(41) **UR/RSS-2** *Eucalyptus leucophloia* scattered low trees over *Acacia pruinocarpa, A. pyrifolia* and *Petalostylis labicheoide*s tall open shrubland over *P. labicheoides, Acacia pyrifolia* and *Senna glutinosa* open shrubland over *Triodia epactia* hummock grassland.

(42) **UR/RS-El** *Eucalyptus leucophloia* and *Acacia aneura* low woodland over *A. aneura* and *A. pruinocarpa* tall open shrubland over *Eremophila phyllopoda* and *E. latrobei* open shrubland over *Eremophila jucunda* low open shrubland over *Triodia epactia* hummock grassland.

(43) **BRW-1** *Acacia pruinocarpa, A. citrinoviridis* and *Astrotricha hamptonii* tall open shrubland over *Eremophila cryptothrix, Dodonaea pachyneura* and *Eremophila latrobei* open shrubland over *Ptilotus obovatus*, *Scaevola acacioides* and *Eremophila cryptothrix* low open shrubland over *Triodia epactia* very open hummock grassland

(44) **SNS-HG-1** *Acacia pruinocarpa* and *Grevillea berryana* scattered tall shrubs over *Eremophila cryptothrix, E. phyllopoda* and *Scaevola acacioides* open shrubland over mixed *Eremophila* spp. low open shrubland over *Triodia epactia* hummock grassland.

(45) **SNS-HG-2** *Acacia pruinocarpa* scattered tall shrubs over *A. pruinocarpa, Eremophila latrobei* and *E. fraseri* open shrubland over *Eremophila fraseri* and *E. jucunda* low open shrubland over *Triodia epactia* hummock grassland.

(46) **CDV1** *Acacia pruinocarpa* and *Acacia citrinoviridis* scattered tall shrubs (to tall open shrubland) over *Eremophila phyllopoda, E. fraseri* and *Dodonaea pachyneura* open shrubland over *Eremophila phyllopoda* and *E. fraseri* low open shrubland over *Triodia epactia* hummock grassland.

(47) **SSEL** *Acacia aneura* and *Eucalyptus leucophloia* low open woodland over *Acacia citrinoviridis, A. rhodophloia* and *A. aneura* tall shrubland over *Eremophila phyllopoda, E. latrobei* and *Dodonaea pachyneura* shrubland over *Eremophila phyllopoda* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* open hummock grassland.

(48) **E/La** *Eucalyptus leucophloia* low open woodland over *Acacia aneura* scattered tall shrubs over *Senna glutinosa, Acacia tetragonophylla* and *Scaevola acacioides* open shrubland over *Eremophila fraseri, E. phyllopoda, E. cuneifolia* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* hummock grassland.

(49) **UR-DG-o1** *Acacia citrinoviridis* low open woodland over *A. citrinoviridis* and *A. pruinocarpa* tall shrubland over *Hibiscus haynaldii, Eremophila phyllopoda* and *Dodonaea pachyneura* open shrubland / low open shrubland over *Triodia epactia* very open hummock grassland.

(50) **UR-DG-o2 & UR-DGl-o2** *Acacia citrinoviridis* and *Corymbia ferriticola* low woodland over *Acacia citrinoviridis* tall open shrubland over *Hibiscus haynaldii, Dodonaea pachyneura* and *Eremophila latrobei* shrubland over mixed low open shrubland over *Triodia epactia* open hummock grassland over mixed very open tussock grassland.

(51) **UR-DG-Aa-o1** *Acacia aneura* and *A. rhodophloia* low woodland over *A. citrinoviridis, A. aneura* and *A. rhodophloia* tall shrubland over *Dodonaea pachyneura, Eremophila* latrobei and *Hibiscus haynaldii* shrubland over mixed low open shrubland over *Triodia epactia* very open hummock grassland.

(52) **UR-DG-Elb** *Eucalyptus leucophloia* low open woodland, over *Acacia citrinoviridis* tall open shrubland, over *Santalum lanceolatum, Acacia pyrifolia* and *Jasminum didymum* open shrubland, over *Ptilotus obovatus* and *Corchorus crozophorifolius* low open shrubland, over *Triodia epactia* very open hummock grassland.

HEAVILY DISTURBED VEGETATION TYPES - CLEARED OR PREVIOUSLY DISTURBED GROUND

(53) **HD-BG** Essentially devoid of vegetation. Only scattered low shrubs and tussock grasses present in some places.

Clearing Description

Hamersley Iron Pty Ltd has applied to clear up to 450 hectares of native vegetation within an application area totalling approximately 1,738 hectares for the purpose of mineral production. The proposed clearing will enable the ongoing mining operations at the Eastern Range Project. Vegetation will be cleared for open pits, waste dumps, stockpiles, haul roads and other related infrastructure (Hamersley Iron, 2010).

Topsoil and vegetation from cleared areas will be stockpiled for use in later rehabilitation (Hamersley Iron, 2010).

Vegetation Condition

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994);

To

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

Comment

The application area is located in the Pilbara region of Western Australia and is situated approximately 5 kilometres south of Paraburdoo (GIS Database).

The vegetation condition was converted from Trudgen (1988) to Keighery (1994).

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 is not likely to be at variance to this Principle

The application area occurs within the Hamersley (PIL3) subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (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 vegetation within the application areas consists of Beard vegetation associations 82 and 181 which are common and widespread throughout the Pilbara region, with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database).

Hamersley Iron Pty Ltd conducted a review of previous vegetation surveys conducted within and in close proximity to the application area, as well as a desktop survey of the application area (Rio Tinto, 2010a). The review and desktop survey identified one Priority flora species (Sida sp. Barlee Range P3) as being previously recorded within the application area (Rio Tinto, 2010a).

The proposed clearing is unlikely to impact on the conservation status of the above Priority Flora; however, a large number of individuals may be directly impacted by the proposed clearing activities.

The broad fauna assemblages of the application area are very much intact and representative of a natural ecosystem. The fauna habitats that occur within the proposed impact footprint clearly also occur beyond the impact footprint (Rio Tinto, 2010a).

The application area has suffered previous disturbance dating back to the 1990's. The area surrounding the application area has been previously cleared for mineral production and is currently being mined as part of Hamersley Iron's Eastern Ranges Project.

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

Methodology

CALM (2002)
Rio Tinto (2010a)
Shepherd (2009)
GIS Database:
- IBRA WA (Regions - subregions)
- Pre-European vegetation

(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

According to Shepherd (2009) approximately 100% of the pre-European vegetation remains within the Hamersley bioregion. Given the extent of native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological linkage.

In 2010, a targeted fauna survey of approximately 450 hectares of land at the site of the Eastern Ranges Project was undertaken by Biota Environmental Sciences (Biota Environmental Sciences, 2010). During this survey it was observed that the fauna assemblages are closely aligned with the landforms and vegetation of the application area (Biota Environmental Sciences, 2010).

Biota Environmental Sciences (2010) recorded 4 broad habitat types as occurring within the project area:

- **Hilltops and Slopes:** vegetated primarily with *Acacia* species over *Triodia* and comprised the greater part of the application area;
- **Deeply Incised Rocky Gorges:** gorges, typically vegetated with *Acacia* species over *Triodia,* dissected the hilltops and slopes and represented a relatively small spatial portion of the project area. It should be noted that several small rock pools were located in the eastern end of the project area, however it could not be determined whether these pools were semi-permanent or permanent in nature;

- **Low Rolling Hills and Shallow Drainage Lines:** vegetated with Eucalypt and/or *Acacia* species over *Triodia,* these habitats predominated to the south of the Eastern Ranges project area; and
- **Disturbance Areas:** included active mining and infrastructure areas within the project area. Characterised by little vegetation and representing little to no value to the target fauna species. A large proportion of the Eastern Ranges project area has been disturbed to some extent (Biota Environmental Sciences, 2010).

As a result of previous surveys conducted at the Eastern Ranges Project area, four species of conservation significance have the potential to occur within the application area (Rio Tinto, 2010a; Mattiske Consulting Pty Ltd & Ninox Wildlife Consulting, 2010; Specialised Zoological, 2010). These include:

- Northern Quoll (*Dasyurus hallucatus*) listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Schedule 1 - *Wildlife Conservation (Specially Protected Fauna) Notice, 2010(2);*
- Pilbara Orange Leaf-nosed Bat (*Rhinonicteris aurantius*) listed as Vulnerable under the *EPBC Act 1999* and Schedule 1 - *Wildlife Conservation (Specially Protected Fauna) Notice, 2010(2*);
- Pilbara Olive Python (*Liasis olivaceus barroni*) listed as Vulnerable under the *EPBC Act 1999* and Schedule 1 - *Wildlife Conservation (Specially Protected Fauna) Notice, 2010(2);* and
- Ghost Bat (*Macroderma gigas*) listed as Priority 4 - DEC Priority Fauna List.

The deeply incised rocky gorges habitat is recognised as primary habitat for all four conservation significant species. The gorges and their associated breakaways provide both foraging habitat, and more importantly, significant shelter in terms of caves, crevices and boulder piles. The gorges are considered as important refugia in a local context.

Several rock pools have also been identified within the deeply incised rocky gorges habitat within the eastern end of the project area (Biota Environmental Sciences, 2010). Although the permanence of these pools has not been established, they represent important foraging areas for many fauna species, particularly mammals and the Pilbara Olive Python.

According to Biota Environmental Sciences (2010), the fauna habitats available within the Eastern Ranges Project Area are not restricted in the local area, at a subregional scale or a bioregional scale. Therefore it is considered unlikely that the proposed clearing activities to expand the Eastern Ranges Project Area would have a significant detrimental effect on the habitat values of the area. However, the rock pools identified as occurring within the deeply incised rocky gorges habitat within the eastern end of the Project area represent primary habitat for the four conservation significant species listed above. It is therefore possible, that any deterioration in the quality of these rock pools may have a significant impact on these species.

Based on the above, the proposed clearing may be at variance to this Principle. Potential impacts to significant rock pool habitat as a result of the proposed clearing may be minimised by the implementation of a management condition minimising the clearing of vegetation in and around these pools and maintaining an ecological linkage to the intact fauna habitat outside of the application area.

Methodology

Biota Environmental Sciences (2010)
Mattiske Consulting Pty Ltd & Ninox Wildlife Consulting (2010)
Rio Tinto (2010a)
Shepherd (2009)
Specialised Zoological (2010)

(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 Declared Rare Flora (DRF) species within the application area (GIS Database).

Rio Tinto and Pilbara Flora Pty Ltd undertook a desktop study and a botanical field survey of the vegetation and flora of the Eastern Ranges Project Area on 21-30 July 2010 (Rio Tinto, 2010a).

Prior to the field survey, Rio Tinto (2010a) conducted a review of the previous flora and vegetation surveys which had been conducted within the Eastern Ranges application area and nearby surrounding areas between 1995 and 2008. Rio Tinto (2010a) conducted a search of databases maintained by the Western Australian Department of Environment and Conservation (DEC), Western Australian Herbarium and Western Australian Museum in order to identify DRF and Priority Flora species which have the potential to occur with application areas. The database searches were undertaken within a radius of approximately 40 kilometres from 117 40'53"E and 23 15'29"S (Rio Tinto, 2010a).

Based on the results of the database search, the two DRF species, *Lepidium catapycnon* and *Thryptomene wittweri*, as listed by DEC, have not been recorded within the Paraburdoo area (Rio Tinto, 2010a).

Rio Tinto conducted a field survey of the application area on 21-30 July 2010 (Rio Tinto, 2010a). Within the

Eastern Ranges project area a total of 102 quadrats and releves were surveyed, with an additional 135 vegetation survey points also recorded (Rio Tinto, 2010a). The flora and vegetation surveys encompassed only the vegetation within the clearing application area.

Rio Tinto (2010a) indicate that there is no suitable habitat for *T. wittweri* within the application area. *T. wittweri* prefers steep slopes, breakaways and scree slopes of high mountain crests of greater than 1,000 metres in elevation (Rio Tinto, 2010a). Furthermore, the known distribution of *T. wittweri* is further inland, namely on the summits of Mount Meharry, with the closest known record being approximately 110 kilometres north-east of the application area.

Rio Tinto (2010b) indicate that the stony slopes of the Eastern Ranges may provide suitable habitat for *L. catapycnon*, as this species is typically found on skeletal soils on hillsides of the Hamersley Ranges. However, the closest known records of *L. catapycnon* lay approximately 60 kilometres north of the application area (Rio Tinto, 2010b). The current known distribution of *L. catapycnon* encompasses an area which correlates relatively well with the Uplands of the Hamersley Range Plateau, and while it is not known whether *L. catapycnon* is restricted to this area, the current knowledge points towards such a distribution (Rio Tinto, 2010b).

Furthermore, the relatively high species richness within the *Eremophila* genus recorded during the field survey is more characteristic of the flora of the Ashburton subregion than of the Hamersley subregion and reflects the proximity of the application area to the boundary between the Pilbara and Gascoyne bioregions. This boundary positioning dictates that the flora of this area is transitional between the more *Acacia*, *Senna* and Malvaceae dominated floras of the Pilbara to the *Acacia*, *Eremophila* and *Senna* dominated floras of the Ashburton (Rio Tinto, 2010b).

The transitional nature of flora in this area combined with the different topographical position compared to the typical distribution zone of *L. catapycnon* and the absence of records in an extensively surveyed area, means that despite the suitable habitats provided, the likelihood of occurrence of *L. catapycnon* within the Eastern Ranges application area is very low (Rio Tinto, 2010b).

No species of DRF were recorded within the application area (Outback Ecology Services, 2007). While the rainfall received in the Eastern Ranges and most of the Pilbara for the 2010 summer/winter rainfall season was well below average, the rainfall received in the years of the previous surveys was average (Rio Tinto, 2010b). Furthermore, the distinctive zig zag stems of *L. catapycnon* can be distinguished from other species relatively easily, even when dead. This means that even in very dry years this species can still be detected if populations of a significant size are present (Rio Tinto, 2010b).

Given the absence of records of *L. catapycnon* in the greater Paraburdoo area and the failure to record the species during extensive searches of the Eastern Ranges area, and within the greater Paraburdoo area, it is unlikely that *L. catapycnon* inhabits the application area (Rio Tinto, 2010b).

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

Methodology Rio Tinto (2010a)
Rio Tinto (2010b)
GIS Database:
- Declare 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 Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest TEC (Themeda Grasslands) is located approximately 72 kilometres north of the application area (GIS Database). At this distance there is little likelihood of any impact to the TEC from the proposed clearing.

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

Methodology GIS Database:
- Threatened Ecological Sites Buffered

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

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

The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 99.95% of the pre-European vegetation remains (GIS database; Shepherd, 2009).

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* and 181: Shrublands; mulga & snakewood scrub (GIS Database, Shepherd, 2009). According to Shepherd (2009) approximately 100% of Beard vegetation associations 82 and 181 remain at both the state and regional level (see table).

According to the Bioregional Conservation Status of Ecological Vegetation Classes, the conservation status for the Pilbara Bioregion and Beard vegetation associations 82 and 181 is of "Least Concern" (see table) (Department of Natural Resources and Environment, 2002).

Only a small percentage of Beard vegetation associations 82 and 181 are protected within conservation reserves, however, the bioregion remains largely uncleared. As a result, the conservation of the vegetation associations within the bioregion is not likely to be impacted on by this proposal.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,193	17,785,001	~99.89%	Least Concern	~6.32%
Beard vegetation associations - State					
82	19,892,305	19,890,275	~99.99%	Least Concern	~2.13%
181	1,697,291	1,697,291	`100%	Least Concern	~2.39%
Beard vegetation associations - Bioregion					
82	2,563,583	2,563,583	~100%	Least Concern	~10.2%
181	65,091	65,091	~100%	Least Concern	~4.9%

* Shepherd (2009)
** Department of Natural Resources and Environment (2002)

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

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

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

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

Comments

Proposal is at variance to this Principle

According to available GIS Databases, there are no permanent wetlands or watercourses within the application area, however there are numerous minor ephemeral watercourses within the application area (GIS Database).

Based on vegetation mapping conducted by Rio Tinto (2010a) seventeen of the fifty-three vegetation associations found within the application area are associated with drainage areas.

(1) **NFD-1** *Acacia aneura* low woodland over *A. aneura* and *Acacia tetragonophylla* tall open shrubland over *Acacia tetragonophylla, Eremophila latrobei* and *E. cryptothrix* open shrubland over *Corchorus crozophorifolius* and *Ptilotus obovatus* var*. obovatus* low open shrubland over *Triodia epactia* open hummock grassland (2.5 hectares);

(2) **NFD-1-EL** *Eucalyptus leucophloia* and *Acacia aneura* low woodland over *Acacia aneura* and *A. tetragonophylla* tall open shrubland over *Acacia tetragonophylla*, *Eremophila latrobei* and *Eremophila cryptothrix* open shrubland *Corchorus crozophorifolius* and *Ptilotus obovatus* low open shrubland over *Triodia epactia* open hummock grassland (1.8 hectares);

(3) **NFD-2** *Acacia citrinoviridis* low open woodland over *Acacia wanyu, Grevillea nematophylla* and *Acacia tetragonophylla* open scrub, over *Eremophila latrobei* and mixed *Senna* spp. open shrubland (with scattered *Acacia xiphophylla*) over *Eremophila cuneifolia* low open shrubland over *Triodia epactia* hummock grassland (3.1 hectares);

(4) **NFD-3** *Acacia citrinoviridis, Grevillea berryana* and *G. nematophylla* low woodland over *Acacia citrinoviridis* and *Grevillea nematophylla* tall shrubland over *Santalum lanceolatum*, *Senna artemisioides* subsp. *oligophylla* and *Acacia xiphophylla* open shrubland over *Triodia epactia* very open hummock grassland (1.6 hectares);

(5) **NFD-4** *Acacia pruinocarpa* tall shrubland with scattered *A. tetragonophylla* over *Eremophila cryptothrix*,

Acacia synchronicia and *Scaevola acacioides* shrubland over *Eremophila cryptothrix, Ptilotus obovatus* and *Maireana georgei* low open shrubland over *Triodia epactia* open hummock grassland (0.5 hectares);

(6) **PC-o1** *Acacia pyrifolia* tall open shrubland over *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Senna artemisioides* subsp. *oligophylla* open shrubland over *Indigofera monophylla* and *Jasminum didymum* low open shrubland over *Triodia epactia* hummock grassland (4.8 hectares);

(7) **PC-o2** *Acacia citrinoviridis, A. pyrifolia* and *A. aneura* scattered low trees over *Eremophila longifolia*, *Acacia citrinoviridis*, and *Santalum lanceolatum* tall open shrubland over *Eremophila longifolia, Jasminum didymum* and *Corchorus crozophorifolius* shrubland, over *Triodia epactia* open hummock grassland (3.03 hectares);

(8) **BigC-2** *Acacia citrinoviridis* and *Eucalyptus leucophloia* open woodland, over *Acacia citrinoviridis* and *A. pruinocarpa* tall shrubland, over *Dodonaea pachyneura*, *Eremophila latrobei* and *Jasminum didymum* shrubland, over *Ptilotus obovatus* and *Corchorus crozophorifolius* low open shrubland, over *Triodia epactia* very open hummock grassland (2.4 hectares);

(9) **ML-D** *Acacia citrinoviridis* and *A. aneura* low open woodland over *Acacia citrinoviridis, A. rhodophloia* and *A. tetragonophylla* tall shrubland over *Hibiscus haynaldii, Eremophila latrobei* and *Dodonaea pachyneura* open shrubland over *Triodia epactia* open hummock grassland (6.37 hectares);

(10) **PC-o3** *Acacia citrinoviridis, A. aneura* and *Corymbia ferriticola* low woodland over *Acacia citrinoviridis* tall shrubland over *Eremophila latrobei, Senna oligophylla*, and *Jasminum didymum* open shrubland over *Corchorus crozophorifolius* and *Tephrosia rosea* low open shrubland over *Triodia epactia* open hummock grassland over mixed very open tussock grassland (12.1 hectares);

(11) **TEV** *Acacia citrinoviridis* tall open shrubland over *A. citrinoviridis* and mixed spp. open shrubland over *Indigofera monophylla* and *Tephrosia rosea* low open shrubland over *Triodia epactia* hummock grassland (2.8 hectares);

(12) **PC2** *Acacia citrinoviridis and A. aneura* low woodland over *Acacia citrinoviridis, A. aneura* and *A. rhodophloia* tall shrubland over *Dodonaea petiolaris, Hibiscus haynaldii* and *Eremophila latrobei* shrubland over *Eremophila exilifolia* low open shrubland over *Triodia epactia* open hummock grassland (16.9 hectares);

(13) **BigC** *Corymbia ferriticola* and *Acacia citrinoviridis* low woodland over *A. citrinoviridis, Clerodendrum floribundum* and *Acacia pyrifolia* tall open scrub over *Corchorus crozophorifolius, Rhagodia eremaea* and *Hibiscus haynaldii* shrubland over mixed low open shrubland over *Triodia epactia* open hummock grassland (5.9 hectares);

(14) **UR-DG-o1** *Acacia citrinoviridis* low open woodland over *A. citrinoviridis* and *A. pruinocarpa* tall shrubland over *Hibiscus haynaldii, Eremophila phyllopoda* and *Dodonaea pachyneura* open shrubland / low open shrubland over *Triodia epactia* very open hummock grassland (12.5 hectares);

(15) **UR-DG-o2 & UR-DGI-o2** *Acacia citrinoviridis* and *Corymbia ferriticola* low woodland over *Acacia citrinoviridis* tall open shrubland over *Hibiscus haynaldii*, *Dodonaea pachyneura* and *Eremophila latrobei* shrubland over mixed low open shrubland over *Triodia epactia* open hummock grassland over mixed very open tussock grassland (17.8 hectares);

(16) **UR-DG-Aa-o1** *Acacia aneura* and *A. rhodophloia* low woodland over *A. citrinoviridis, A. aneura* and *A. rhodophloia* tall shrubland over *Dodonaea pachyneura*, *Eremophila latrobei* and *Hibiscus haynaldii* shrubland over mixed low open shrubland over *Triodia epactia* very open hummock grassland (3.6 hectares); and

(17) **UR-DG-Elb** *Eucalyptus leucophloia* low open woodland, over *Acacia citrinoviridis* tall open shrubland, over *Santalum lanceolatum, Acacia pyrifolia* and *Jasminum didymum* open shrubland, over *Ptilotus obovatus* and *Corchorus crozophorifolius* low open shrubland, over *Triodia epactia* very open hummock grassland (2.7 hectares) (Rio Tinto, 2010a).

Of the seventeen vegetation units associated with drainage areas, two are considered to be of high conservation significance, while two are considered to be restricted.

The vegetation unit NFD-4 is restricted to one drainage system which terminates in *Acacia xiphophylla* shrublands while the vegetation unit NFD-3 is restricted to the north-east corner of the study area (Rio Tinto, 2010a).

The vegetation unit UR-DG-o1 is of high conservation significance due to both the riparian elements of the vegetation and the fauna habitats provided by the rugged habitats it contains (Rio Tinto, 2010a).

The vegetation unit UR-DG-o2 contains some sections which are deeply incised forming gorges which may hold permanent or semi-permanent water. These incised sections have been mapped as a separate vegetation unit (UR-DGI-o2). During the vegetation survey two permanent/semi-permanent water holes were identified within the application area, while a third semi-permanent waterhole has been noted during previous surveys of the application area (Rio Tinto, 2010a). This vegetation unit is considered to represent riparian vegetation of moderate species richness with over 58 flora species recorded under dry conditions. In conjunction with the significant fauna habitats it provides, this vegetation unit represents the most conservation significant of the vegetation units within the application area (Rio Tinto, 2010a).

Threats to the viability of these features exist in the form of catchment reduction and unnatural sedimentation due to upstream mining activity, as well as dust and rock fall.

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to riparian vegetation as a result of the proposed clearing may be minimised by the implementation of a management condition minimising the clearing of vegetation in and around these pools.

Methodology Rio Tinto (2010a)
GIS Database:
- Hydrography, Linear
- Geodata, Lakes

(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). According to available datasets the application area intersects the Newman and Platform land systems (GIS Database).

The Newman land system consists of rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The Newman land system covers approximately 1586 hectares of the application area (91.3%). Some parts of this land system may be slightly susceptible to erosion if vegetative cover is lost (Van Vreeswyk et al., 2004). While the Platform land system is comprised of dissected slopes and raised plains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The Platform land system covers approximately 152 hectares of the application area (8.7%) and is not susceptible to erosion (Rio Tinto, 2010a; Van Vreeswyk et al., 2004).

Rio Tinto (2010a) described the topography of the application area as dominated by a banded ironstone range which runs in a north-west to south-east direction, through the Paraburdoo area. The application area is also characterised by ridges, crests, steep scree slopes, gullies, gorges, gently inclined lower slopes and narrow drainage floors (Rio Tinto, 2010a).

The soils within the application area consist of shallow to skeletal stony soils with deeper alluvial derived silty loam soils adjacent to larger creeklines in the south of the application area (Rio Tinto, 2010a). The actively eroding steep scree slopes along the western and northern boundaries of the application area typically lack any discernable soil layer (Rio Tinto, 2010a).

The proposed clearing of up to 450 hectares of native vegetation within the application areas for the purpose of expanding the Eastern Range mine site which includes pits, waste dumps, stockpiles, haul roads and other supporting infrastructure is likely to permanently impact on large areas across the application area. It appears likely that the clearing of native vegetation may increase the risk of soil erosion occurring. However, the majority of the clearing is for the purpose of establishing mine site infrastructure that is likely to become permanent or long-term features within the application area. As the cleared area will be utilised by various pieces of large-scale mine infrastructure, the risk of erosion occurring on these particular land units will be minimised. It is most likely that the cleared area will be particularly susceptible to erosion immediately after the native vegetation has been cleared, and during the period that the cleared areas are left exposed. Potential erosion impacts as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition to ensure large areas are not void of vegetative cover for extended periods.

According to GIS Databases there are no permanent wetlands or watercourses within the application area; however, numerous ephemeral drainage lines pass through the application area (GIS Database). Three permanent/semi-permanent water holes have also been identified within the application area (Rio Tinto, 2010a). There is the potential for unnatural sedimentation and catchment reduction as a result of the proposed clearing.

The proposed clearing activities will involve significant disturbance to a large area of native vegetation, and in addition the proposed clearing is likely to disturb the structure of surface soils and the underlying mantles. The use of heavy machinery, and also light vehicles, during clearing activities is likely to cause some degree of soil compaction, which may adversely impact soil structure.

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

Methodology Rio Tinto (2010a)
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 proposed clearing is not located within a conservation reserve (GIS Database). The nearest known conservation reserve is Karijini National Park, located approximately 30 kilometres east-north-east of the application area (GIS Database). At this distance there is little likelihood of any impact to Karijini National Park from the proposed clearing.

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

There are three permanent/semi-permanent wetlands or watercourses within the application area (Rio Tinto, 2010a). The major drainage system of Paraburdoo is Turee Creek. Additional creeks including Seven Mile Creek, Pirraburdu Creek, Bellary Creek and Tableland Creek, which are all tributaries of the Ashburton River (located approximately 53 kilometres to the south-west of the application area); ephemerally flow around and throughout Paraburdoo. Numerous minor flowlines drain water from the hills and ridges of the application area south toward Turee Creek or north toward Seven Mile Creek (Rio Tinto, 2010a).

Given that the application area receives approximately 283.8 millimetres of rainfall per year and experiences a mean annual evaporation of approximately 3,600 millimetres (BoM, 2010; GIS Database), surface water flows within the application area generally only occur during intense cyclonic events, and in response to surface runoff from exposed rock surfaces.

Two small permanent pools are located within the incised gorge sections of vegetation unit UR-DGI-o2. These pools appear to be replenished via surface water flows through the gullies in which they occur (Rio Tinto, 2010a). A third semi-permanent waterhole has also been noted during previous surveys of the application area (Rio Tinto, 2010a). The proposed clearing activities have the potential to impact the quality of surface water through increased sedimentation and reduced catchment potential.

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Millstream Water Reserve which is located approximately 104 kilometres north of the application area. Given the distance separating the application area and the Millstream Water Reserve, the proposed clearing is unlikely to impact on the water quality of the Millstream Water Reserve.

The application area is located within the proclaimed Pilbara groundwater area under the *Rights in Water and Irrigation Act 1994* (RIWI) (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for the purposes other than domestic and/or stock watering is subject to licence by the Department of Water.

The application area is characterised by the Ashburton River hydrographic catchment area (GIS Database). The application area, which includes the proposed pits, waste dumps, stockpiles, haul roads and other associated infrastructure, is situated within the Ashburton River catchment which covers a total area of approximately 7,877,743 hectares (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 low rainfall to high evaporation rate, the proposed clearing of 450 hectares of native vegetation is not likely to significantly increase groundwater recharge which could otherwise lead to significant rises in ground water levels. The proposed clearing is not likely to cause deterioration in the quality of groundwater in the local area.

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

Methodology BoM (2010)
Rio Tinto (2010a)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Statewide
- Hydrographic Catchments - Catchments
- Public Drinking Water Source Areas
- RIWI Groundwater Areas
- Hydrography, Linear

(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 may be at variance to this Principle

The application area experiences a tropical semi-desert climate (CALM, 2002). The average annual rainfall of Paraburdoo, which is situated approximately 5 kilometres north of the application area is 283.8 millimetres and the area experiences a mean annual evaporation of approximately 3,600 millimetres (BoM, 2010; GIS Database). Paraburdoo climate statistics indicate that rainfall in the region is mainly during summer and is typically experienced as cyclonic events (BoM, 2010; CALM, 2002).

Given the low rainfall to high evaporation ratio of the application areas and considering the infrequency of significant rainfall events in the region (BoM, 2010; GIS Database), it would be expected that any normal rainfall would quickly evaporate or infiltrate the soil. The proposed clearing of 450 hectares within the application area is unlikely to cause or exacerbate flooding during normal rainfall events. It is considered that any localised flooding is only likely to occur as a result of any infrequent significant rainfall events.

Shepherd (2009) vegetation statistics indicate that approximately 100% of the pre-European vegetation extent remains within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region. The proposed clearing of up to 450 hectares of native vegetation constitutes only a very small proportion of the size of the Ashburton River catchment (less than approximately 0.006% of the total catchment area) which remains largely uncleared (GIS Database; Shepherd, 2009). Vegetation is considered an important ground cover as it slows surface water flows, and enables rainwater to infiltrate the soil to depths where it can be utilised by vegetation. Given that the Pilbara bioregion, as well as the surrounding regions, remain largely uncleared (Shepherd, 2009), the proposed clearing is not likely to impact significantly on the drainage characteristics of the Ashburton River catchment area.

Hamersley Iron Pty Ltd has applied to clear up to 450 hectares within a broader area of approximately 1,738 hectares. Therefore there is potential for the broad distribution and clearing of disjunct areas rather than clearing concentrated within a single large clearing area. The clearing of up to 450 hectares within the application area has the potential to create a localised catchment area that may cause or exacerbate local flooding within or adjacent to the cleared area, mainly following significant rainfall events.

According to Rio Tinto (2010a) the application area is characterised by ridges, crests, steep scree slopes, gullies, gorges, gently inclined lower slopes and narrow drainage floors. The proposed clearing has the potential to cause increased runoff which may increase the risk of local flooding in lower lying, downstream or adjacent areas.

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

Methodology

BoM (2010)
CALM (2002)
Rio Tinto (2010a)
Shepherd (2009)
GIS Database:
- Evaporation Isopleths
- Hydrographic Catchments - Catchments
- Towns

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

Comments

There are two Native Title Claims (WC96/61 and WC97/43) over the area under application (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

It is noted that the proposed clearing may impact on a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent may be required to refer the project to the (Federal) Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) for environmental impact assessment under the *EPBC Act*. The proponent is advised to contact the SEWPAC for further information regarding notification and referral responsibilities under the *EPBC Act*.

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 1 November 2010 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to the proposed clearing.

Methodology

GIS Database:
- Aboriginal Sites of Significance
- Native Title NNTT

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5. Glossary

Acronyms:

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

Definitions:

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

P1 **Priority One - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands.

Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P2 **Priority Two - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P3 **Priority Three - Poorly Known taxa**: taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

P4 **Priority Four – Rare taxa**: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

R **Declared Rare Flora – Extant taxa** *(= Threatened Flora = Endangered + Vulnerable)*: taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

X **Declared Rare Flora - Presumed Extinct taxa**: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

Schedule 1 **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.

Schedule 2 **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.

Schedule 3 **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.

Schedule 4 **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

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

P1 **Priority One: Taxa with few, poorly known populations on threatened lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P2 **Priority Two: Taxa with few, poorly known populations on conservation lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P3 **Priority Three: Taxa with several, poorly known populations, some on conservation lands**: Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P4 **Priority Four: Taxa in need of monitoring**: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

P5 **Priority Five: Taxa in need of monitoring**: Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

EX **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

EX(W) **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

CR **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

EN **Endangered:** A native species which:
(a) is not critically endangered; and

(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

VU **Vulnerable:** A native species which:

(a) is not critically endangered or endangered; and

(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

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