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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 6658/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Hamersley Iron – Yandi Pty Ltd**

1.3. Property details

Property: *Iron Ore (Yandicoogina) Agreement Act 1996*, Mining Lease 274SA (AM 70/274)
Local Government Area: Shire of East Pilbara
Colloquial name: Yandicoogina Pocket and Billiard South Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
80		Mechanical Removal	Pipeline, Powerline, Bypass Track, Administrative Facilities and Associated Access Track Construction

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 1 October 2015

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. Two Beard vegetation associations have been mapped within the application area (GIS Database):

Beard vegetation association 29: Sparse low woodland; mulga, discontinuous in scattered groups; and
Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*.

Numerous vegetation surveys have been undertaken over the application area and its surrounds. Rio Tinto (2015) has consolidated these vegetation surveys into one report, and has identified eighteen vegetation associations across four major landforms as being present within the application area:

Vegetation of Stony Plains
P1: ElEgAprAbAaAdTwTpTsps: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *E. gamophylla* scattered low mallees over *Acacia pruinocarpa* scattered tall shrubs over *A. bivenosa, A. ancistrocarpa, A. dictyophleba* shrubland over *Triodia wiseana, T. pungens, T*. sp Shovelanna Hill (S. van Leeuwen 3835) hummock grassland;

P2: ChAprAiAsclApaTp: *Corymbia hamersleyana, Acacia pruinocarpa* scattered low trees over *A. inaequilatera, A. sclerosperma* subsp. *sclerosperma*, *A. pachyacra* tall open shrubland over *Triodia pungens* hummock grassland;

P3: AprAciAiAsclTlo: *Acacia pruinocarpa* low open woodland over *A. citrinoviridis, A. inaequilatera, A. sclerosperma* subsp. *sclerosperma* open shrubland over *Triodia longiceps* hummock grassland;

P4: AprAsyAiTw: *Acacia pruinocarpa* low open woodland over *A. synchronicia*, *A. inaequilatera* scattered tall shrubs over *Triodia wiseana* open hummock grassland;

P5: ElEgAbAaTb: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *E. gamophylla* scattered low mallees over *Acacia bivenosa*, *A. ancistrocarpa* open shrubland over *Triodia basedowii* open hummock grassland;

P6: AapERfoERI/g: *Acacia aptaneura* low open forest over *Eremophila forrestii* subsp. *forrestii* open Shrubland over *E. lanceolata* low open shrubland over mixed very open grassland;

Vegetation of Hills, Ridges and Breakaways
H1: ElHcAiGwTsps: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Hakea chordophylla, Acacia inaequilatera, Grevillea wickhamii* tall open shrubland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland;

H2: ElAiTwTsps: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana*, (*T*. sp. Shovelanna Hill (S. van Leeuwen 3835)) open hummock grassland;

H4: ChAarTspsTw: *Corymbia hamersleyana* scattered low trees over *Acacia arida* open shrubland over *Triodia* sp.

Shovelanna Hill (S. van Leeuwen 3835), *T. wiseana* hummock grassland;

H5: ElCfERImTHspp: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia ferriticola* scattered low trees over *Eremophila latrobei* subsp. *filiformis*, *Senna* spp. scattered shrubs over *Cymbopogon ambiguus, Eriachne mucronata, Themeda* sp. Mt Barricade (M.E. Trudgen 2471), *T. triandra* open tussock grassland;

Vegetation of Major Creeklines and Tributaries
C1: EcEvMaMgAc: *Eucalyptus camaldulensis* subsp. *refulgens, E. victrix* woodland over *Melaleuca argentea, M. glomerata, Acacia coriacea* subsp. *pendens* low open woodland;

C2: EvChAtuGwTErCYpERItTHt: *Eucalyptus victrix,* (*Corymbia hamersleyana*) scattered low trees over *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* tall shrubland over *Tephrosia rosea* var. Fortescue Creeks (M.I.H. Brooker 2186) low shrubland over *Cymbopogon ambiguus*, *C. procerus, Eriachne tenuiculmis, Themeda triandra* very open tussock grassland;

C3: EvAciAcMgCEc: *Eucalyptus victrix* scattered trees over *Acacia citrinoviridis*, *A. coriacea* subsp. *pendens*, *Melaleuca glomerata* tall open shrubland over **Cenchrus ciliaris* scattered tussock grasses;

C4: EvAciAprAThCEc: *Eucalyptus victrix* open woodland over *Acacia citrinoviridis*, *A. pruinocarpa, Atalaya hemiglauca* low woodland over **Cenchrus ciliaris* tussock grassland;

Minor Creeklines, Floodplains and Valleys
F1: ChAtuGwTp: *Corymbia hamersleyana* scattered low trees to low open woodland over *Acacia tumida* var. *pilbarensis, Grevillea wickhamii* tall open shrubland over *Triodia pungens* hummock grassland;

F2: AprAciCEc: *Acacia pruinocarpa, A. citrinoviridis* tall open shrubland over **Cenchrus ciliaris* tussock grassland;

F3: ElChAtuAaAbGwTspp: *Eucalyptus leucophloia, Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis*, *A. ancistrocarpa, A. bivenosa, Grevillea wickhamii* tall open scrub over mixed *Triodia* hummock grassland;

F5: ChAciAaAiSENsppTp: *Corymbia hamersleyana* scattered low trees over *Acacia citrinoviridis, A. ancistrocarpa, A. inaequilatera* tall open shrubland over *Senna* spp. open shrubland over *Triodia pungens* open hummock grassland.

Clearing Description

Yandicoogina Pocket and Billiard South Project

Hamersley Iron – Yandi Pty Ltd proposes to clear up to 80 hectares of native vegetation within a total boundary area of approximately 3,684.9 hectares for the purposes of pipelines, powerlines, bypass track, administrative facilities and associated access track construction. The proposal is located approximately 75 kilometres north west of Newman in the Shire of East Pilbara.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (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 Biota (2015a; 2015b; 2014).

3. Assessment of application against clearing principles

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

Comments

Proposal may be at variance to this Principle

The application area occurs within the Hamersley and Fortescue subregions of the Pilbara Interim Biogeographic Regionalisation of Australia bioregion (GIS Database). The Fortescue subregion is described as consisting of alluvial plains and river frontage (CALM, 2002). Extensive salt marsh, mulga-bunch grass and short grass communities occur on alluvial plains in the east (CALM, 2002). River gum woodlands fringe the drainage lines (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).

Numerous vegetation surveys have been undertaken over the application area and the surrounding area. Rio Tinto (2015) has consolidated these vegetation surveys into one report and identified eighteen vegetation communities within the application area, with the condition of these vegetation types being 'excellent to 'degraded' (Keighery, 1994). A search of the Department of Parks and Wildlife (DPaW) Declared Rare and Priority Flora databases revealed that several Threatened and Priority flora species as potentially occurring within a 10 kilometre radius of the application area (DPaW, 2015). Rio Tinto (2015) identified one Threatened and two Priority flora species within the application area. The native vegetation associations within the application area are not considered to have a higher genetic diversity than the native vegetation within the surrounding area (Rio Tinto, 2015). Rio Tinto (2015) has advised that locations of Threatened and Priority flora will be avoided and additional searches will be undertaken in potential habitat before works are conducted. If there is a need to clear individuals or soil likely to contain soil stored seed, a Licence to Take will be applied for (Rio Tinto, 2015).

There are no known Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) mapped within the application area (GIS Database). During a flora and vegetation survey, no TECs or PECs were recorded within the application area (Rio Tinto, 2015). The nearest Threatened or Priority Ecological Community is the Fortescue Valley Sand Dunes (PEC 3), which is located approximately seven kilometres to the east of the application area (GIS Database).

Nineteen non-endemic species were identified during the flora surveys (Rio Tinto, 2015). The Major Creeklines and Tributaries and Minor Creeklines, Floodplains and Valleys landforms are known to be substantially infested with weeds (particularly *Cenchrus ciliaris*) and have been heavily grazed by cattle (Rio Tinto, 2015). One of the species identified within the application area (*Argemone ochroleuca* subsp. *ochroleuca*) is a declared plant under the *Biosecurity and Agriculture Management Act 2007*. Rio Tinto (2015) has advised that strict weed hygiene protocols will be implemented during clearing of vegetation and subsequent earthworks to minimise the introduction and spread of weeds to or from the study area. Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to the biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

There were four faunal habitat types recorded within the application with these being well represented within the regional area (Rio Tinto, 2015; GIS Database). Whilst a number of fauna species indigenous to Western Australia are expected to use habitat within the application area, this is not considered significant habitat (Biota, 2014a; Rio Tinto, 2015). It has been noted that there is the potential for the Pilbara Olive Python to utilise the Major and Minor Drainage habitats. Rio Tinto (2015) has advised that disturbance within the Major and Minor Drainage habitats will be minimised where possible. Potential impacts to the Major and Minor Drainage habitat may be minimised by the implementation of a fauna management condition.

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

Methodology

Biota (2014a)
CALM (2002)
DPaW (2015)
Keighery (1994)
Rio Tinto (2015)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- 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 is at variance to this Principle

Numerous fauna surveys have been undertaken over the application area including Level 2 fauna surveys, Level 1 fauna habitat surveys and targeted surveys for conservation listed fauna (Rio Tinto, 2015). Based on these previous surveys, four habitat types have been identified within the application area:

P1: Alluvial Plains habitat consists of an area of land adjacent to a drainage line that stretches from the banks of its channel to the base of the enclosing valley walls. Mulga woodlands occur within areas of this habitat type (383.86 hectares);
H1: Hills and Slopes habitat consists of a number of landform elements, notably (from highest to lowest elevation): crests, free faces, breakaways (not always present), transitional slopes and foot slopes (including pediment slope) (2,459.20 hectares);
D1: Major Drainage habitat consists of a linear, sinuous open depression forming the floor of the major drainage channel (Weeli Wolli Creek) that is eroded or aggraded (built up) by stream flow. Supports taller eucalypts, dense shrublands and reedbeds around water pools that are semi-permanent (535.86 hectares);
M1: Minor Drainage habitat consists of minor drainage channels, usually adjacent to Major Drainage habitat or within Hills and Slopes habitat. This fauna habitat type was only delineated for regions of the study area mapped by Biota (2005) (50.18 hectares);
CL: Previously cleared areas (298.07 hectares).

The proposed works may result in habitat removal and fragmentation due to vegetation clearing and the linear nature of the proposed infrastructure. The habitat types within the clearing footprint are common in a local and regional context and the impact of this loss on fauna species is considered to be minimal (Rio Tinto, 2015).

The surveys undertaken across the application area have resulted in four fauna species of conservation significance being recorded from within the application area (Rio Tinto, 2015):

- Pilbara Olive Python (*Liasis olivaceus barroni*) (Endangered, *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act); Schedule 1, *Wildlife Conservation Act* 1950 (WC Act));
- Rainbow Bee-eater (*Merops ornatus*) (Migratory, EPBC Act; Schedule 3, WC Act);
- Fork-tailed Swift (*Apus pacificus*) (Migratory, EPBC Act; Schedule 3, WC Act);
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4, DPAW).

The Pilbara Olive Python inhabits rocky escarpments, deep gullies and gorges within the Pilbara region and is often recorded near water holes and riverine habitats (Wilson and Swan, 2010). Observations from the Robe River locality indicated the Pilbara Olive Python spends the cooler winter months hiding in caves and rock crevices away from water sources. In the hotter months, they may move widely and shelter in a range of sites associated with riparian areas (Doughty *et al.,* 2011). A single Pilbara Olive Python swimming upstream of the study area in Weeli Wolli Creek was recorded opportunistically during a nocturnal search during a Biota (2014a) survey. The Major Drainage habitat (comprising Weeli Wolli and Marilliana Creeks) has been identified as core habitat for the Pilbara Olive Python. This habitat has been altered by mining activity with perennial flow, potentially increasing the utilisation of this habitat for this species, however the Pilbara Olive Python is not restricted to this habitat. Although a small amount of Major Drainage habitat will be disturbed, the proposed clearing is not expected to directly impact individuals, given its high mobility (Rio Tinto, 2015). The Minor Drainage habitats also represent dispersal and hunting habitat for the species. The Hills and Slopes habitat is likely to contain suitable shelter sites for the species (Rio Tinto, 2015). Potential impacts to the Pilbara Olive Python may be minimised by the implementation of a fauna management condition.

The Rainbow Bee-eater is a common and widespread species in Western Australia, except in the drier interior of the State and the far southwest (Rio Tinto, 2015). It occurs in lightly wooded, often sandy country, preferring areas near water. As this species is common and widespread the potential impact on this species is low. This species is likely to forage within the application area, however is not likely to be reliant on this area as suitable habitat in the same or better condition is widespread in the region (Rio Tinto, 2015).

The Fork-tailed Swift utilises a wide range of habitats and is a common migrant throughout the Pilbara between October and April (Morcombe 2007). An opportunistic observation of nine Fork-tailed Swift individuals flying overhead of the application area was recorded on one occasion (Biota, 2014b). It is expected to be a transient visitor to the application area, and is unlikely to rely on any terrestrial habitats present because it is exclusively aerial in Australia, occurring here as a non-breeding visitor (Johnstone and Storr, 1998). It is therefore considered unlikely that the proposed clearing will affect the conservation status of this species.

The Western Pebble-mound Mouse is restricted to the Pilbara, where it is recognised as an endemic species. The Western Pebble-mound Mouse construct extensive pebble mounds, built from small stones, which typically cover areas from 0.5 to 9.0 square metres. Mounds are restricted to suitable class stones, and are usually found on gentle slopes and spurs (van Dyck and Strahan, 2008). The Western Pebble-mound Mouse was the most frequently recorded mammal during surveys in the application area, with pebble mounds recorded at 15 locations and an individual trapped in the Hills and Slopes habitat (Rio Tinto, 2015). The majority of mounds appeared active (Biota, 2015b). There are additional records of this species within close proximity to the application area and in the wider locality (DPaW, 2015). Given the number of records for this species in the wider area and across the Pilbara region, the study area is not considered significant habitat and it is unlikely that the proposed clearing would impact upon the conservation status of the Western Pebble-mound Mouse (Rio Tinto, 2015).

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

Methodology

Biota (2005)
Biota (2014a)
Biota (2014b)
DPaW (2015)
Doughty *et al. (*2011)
Johnstone and Storr (1998)
Morcombe (2007)
Rio Tinto (2015)
van Dyck and Strahan (2008)
Wilson and Swan (2010)

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

Comments

Proposal is at variance to this Principle

According to available databases, there are no known records of Threatened Flora species within the application area (GIS Database). A search of DPaWs NatureMap databases identified one Threatened Flora species as occurring within a 10 kilometre radius of the application area (DPaW, 2015).

Numerous vegetation surveys have been undertaken over the application area and its surrounds. Rio Tinto (2015) has consolidated these vegetation surveys into one report. Based upon these surveys, one Threatened Flora species has been recorded within the application area.

The Threatened flora species, *Lepidium catapycnon*, was observed in 48 locations within the study area, with more than 1,030 individuals recorded (Rio Tinto, 2015). There are an additional 36 records, with more than 3,000 individuals recorded within 10 km of the application area (Rio Tinto, 2015). *Lepidium catapycnon* has a range of approximately 300 kilometres on NatureMap within the Pilbara region (DPaW, 2015) and 250 kilometres from the Rio Tinto database (Rio Tinto, 2015). This species has a total population count of 27,449

plants, from 1,342 records, within the Rio Tinto database (Rio Tinto, 2015).

Lepidium catapycnon is well known across its extent and is widespread throughout the locality. Additionally, this species has recently been nominated by DPaW to the Threatened Species Scientific Community for delisting as a Threatened/Declared Rare plant in Western Australia (Rio Tinto, 2015).

Rio Tinto (2015) has advised that locations of Threatened flora (*Lepidium catapycnon*) will be avoided and additional searches conducted in potential habitat before works are conducted. It has also been advised that if there is a need to clear individuals or soil likely to contain soil stored seed, a Licence to Take will be applied for as per normal procedures. Due to the wide range and numerous records of this species in Pilbara region, the conservation significance of this species is considered unlikely to be impacted by the Proposal. Potential impacts to *Lepidium catapycnon* may be minimised by the implementation of a flora management condition.

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

Methodology DPaW (2015)
Rio Tinto (2015)
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**
According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is approximately 74 kilometres south east of the application area (GIS Database).

No TECs were recorded during the vegetation survey (Rio Tinto, 2015).

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

Methodology Rio Tinto (2015)
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 application area lies within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 99.58% of the pre-European vegetation remains (see table) (Government of Western Australia, 2014; GIS Database).

The vegetation in the application area is broadly mapped as Beard Vegetation Associations 29 and 82 (GIS Database):

Beard vegetation association 29: Sparse low woodland; mulga, discontinuous in scattered groups; and

Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over Triodia wiseana.

These vegetation associations have not been extensively cleared as over 99% remains at a State, and 99% at a bioregional level for all vegetation associations (see table) (Government of Western Australia, 2014). There has not been extensive clearing in the local region and the vegetation within the application area is not a remnant nor does it form part of any remnants within the local area (GIS Database).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DPAW Managed Lands
IBRA Bioregion - Pilbara	17,808,657	17,733,584	~99.58	Least Concern	~8.4
Beard vegetation associations - State					
29	7,903,991	7,900,200	~99.95	Least Concern	~5.22
82	2,565,901	2,553,217	~99.51	Least Concern	~10.52
Beard vegetation associations - Bioregion					

29	1,133,220	1,132,940	~99.98	Least Concern	~1.98
82	2,563,583	2,550,899	~99.51	Least Concern	~10.53

* Government of Western Australia (2014)
** 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 Western Australia (2014)
GIS Database:
- IBRA WA (regions – subregions)
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

There are numerous minor, non-perennial watercourses within the application area (GIS Database). It is expected that these would only flow after heavy or prolonged rainfall, as short-duration floods with rapid peaks and slightly less rapid decline (Rio Tinto, 2015; GIS Database). Marillana Creek intersects the western portion of the application area, with the Marillana and Weeli Wolli Creek confluence also located within the application area. Due to surplus water discharge from nearby mine sites (specifically the existing Yandi Operations, BHP Billiton Iron Ore Marillana Creek (Yandi) operations and Rio Tinto's Hope Downs 1 project), these historically ephemeral systems have been modified by the approved operations in the area, temporarily shifting parts of the creeks to a perennial system (Rio Tinto, 2014a).

Several of the vegetation communities within the application area have been identified as being associated with major creeklines, tributaries, minor creeklines and floodplains**.** These are:

- C1: EcEvMaMgAc: *Eucalyptus camaldulensis* subsp. *refulgens*, *E. victrix* woodland over *Melaleuca argentea*, *M. glomerata*, *Acacia coriacea* subsp. *pendens* low open woodland;
- C2: EvChAtuGwTErCYpERItTHt: *Eucalyptus victrix*, (*Corymbia hamersleyana*) scattered low trees over *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* tall shrubland over *Tephrosia rosea* var. Fortescue Creeks (M.I.H. Brooker 2186) low shrubland over *Cymbopogon ambiguus*, *C. procerus*, *Eriachne tenuiculmis*, *Themeda triandra* very open tussock grassland;
- C3: EvAciAcMgCEc: *Eucalyptus victrix* scattered trees over *Acacia citrinoviridis*, *A. coriacea* subsp. *pendens*, *Melaleuca glomerata* tall open shrubland over **Cenchrus ciliaris* scattered tussock grasses;
- C4: EvAciAprAThCEc: *Eucalyptus victrix* open woodland over *Acacia citrinoviridis*, *A. pruinocarpa*, *Atalaya hemiglauca* low woodland over **Cenchrus ciliaris* tussock grassland;
- F1: ChAtuGwTp: *Corymbia hamersleyana* scattered low trees to low open woodland over *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* tall open shrubland over *Triodia pungens* hummock grassland;
- F2: AprAciCEc: *Acacia pruinocarpa*, *A. citrinoviridis* tall open shrubland over **Cenchrus ciliaris* tussock grassland;
- F3: ElChAtuAaAbGwTspp: *Eucalyptus leucophloia*, *Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis*, *A. ancistrocarpa*, *A. bivenosa*, *Grevillea wickhamii* tall open scrub over mixed *Triodia* hummock grassland;
- F5: ChAciAaAiSENsppTp: *Corymbia hamersleyana* scattered low trees over *Acacia citrinoviridis*, *A.*
- *ancistrocarpa*, *A. inaequilatera* tall open shrubland over *Senna* spp. open shrubland over *Triodia pungens* open hummock grassland.

Vegetation association C1 is considered representative of "All major ephemeral water courses" and covered 30.7 ha (0.83 %) only in the southern end of the application area. Vegetation associations C2 and C3, while not satisfying the criteria for an Ecosystem at Risk, were considered to hold local significance as they comprise riparian vegetation around major creek systems (Rio Tinto, 2015). None of the species or vegetation associations representing Ecosystems at Risk are restricted to the application area. All other vegetation associations are considered to be widely distributed both locally and throughout the Hamersley and Fortescue subregions (Rio Tinto, 2015).

Although the proposed clearing has been designed to avoid, where practicable, drainage lines, Marillana and Weeli Wolli Creek, there have been a number of modifications to the surface water flow within the application area that has placed further stress on the vegetation in the area (GIS Database). Clearing of areas which contain drainage line associated native vegetation have the potential to cause localised erosion and degrade faunal habitats. Provided disturbance to riparian habitats is avoided or minimised where possible, and weed hygiene procedures are followed, the proposed works are not expected to substantially impact these vegetation units. Potential impacts to riparian vegetation may be minimised through the implementation of a vegetation management condition.

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

Methodology Rio Tinto (2014a)
Rio Tinto (2015)
GIS Database:
- Hydrography, linear

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments **Proposal is not likely to be at variance to this Principle**
The application area has been mapped as occurring on the Boolgeeda, River, McKay, Newman, and Robe land systems (GIS Database).

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

The Robe Land System is characterised by low limonite mesas and buttes supporting soft spinifex (and occasionally hard spinifex) grasslands (Van Vreeswyk et al., 2004). The system is not generally susceptible to vegetation degradation or 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. The system is largely stabilised by buffel and spinifex and accelerated erosion is uncommon. However, susceptibility to erosion is high or very high if vegetative cover is removed (Van Vreeswyk et al., 2004).

The Newman land system is characterised by undulating stony plains and hills supporting hard Spinifex grasslands and mulga shrublands with soft Spinifex (Van Vreeswyk et al., 2004). Much of the system supports Spinifex vegetation which is not highly preferred by livestock. Generally the system has a low susceptibility to erosion.

The McKay land system is characterised by hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands (Van Vreeswyk et al, 2004). This land system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The average annual evaporation rate is over 11 times the average annual rainfall, so it is unlikely the proposed clearing will result in increased groundwater recharge causing raised saline water tables (GIS Database; BoM, 2015).

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

Methodology BoM (2015)
Van Vreeswyk et al. (2004)
GIS Database:
- IBRA WA (Regions – Sub Regions)

(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 does not lie within any conservation areas or DPaW managed lands (GIS Database). The nearest conservation reserve is Karijini National Park, located approximately 60 kilometres west of the application area (GIS Database). Based on the distance between the application area and Karijini National Park, the proposed clearing is not likely to impact the environmental values of any conservation area.

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

Methodology GIS Database:
- DPaW Tenure

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

Comments **Proposal is not likely to be at variance to this Principle**
According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). There are no permanent waterbodies or watercourses within the application area, however, there are numerous minor, non-perennial watercourses that occur within the application area (GIS Database). It is expected that these would only flow after heavy or prolonged rainfall, as short-duration floods with rapid peaks and slightly less rapid decline (Rio Tinto, 2015).

The annual average rainfall for Newman is 315.8 millimetres and the average annual evaporation rate for the

application area is between 3,400 and 3,600 millimetres (BoM, 2015; GIS Database). Based on these averages, surface water is likely to evaporate quickly with surface sheet flow and higher sediment levels generally occurring during larger rainfall events. Therefore, during normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within the application area.

According to available databases, groundwater salinity within the application area is between 500 and 1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered fresh to marginal. The proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no known groundwater dependent ecosystems within the application area (GIS Database).

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

Methodology

BoM (2015)
Rio Tinto (2015)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Satewide
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)

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

Comments

Proposal is not likely to be at variance to this Principle

The application area is located within the Fortescue River catchment area (GIS Database). Given the size of the area to be cleared (80 hectares) in relation to the size of the catchment area (2,975,192 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

With an average annual rainfall of 315.8 millimetres and an average annual evaporation rate of between 3,400 and 3,600 millimetres there is likely to be little surface flow during normal seasonal rains (BoM, 2015; GIS Database). Whilst large rainfall events may result in flooding of the area, the proposed clearing is not likely to lead to an increase in incidence or intensity of flooding.

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

Methodology

BoM (2015)
GIS Database:
- Evaporation Isopleths
- Hydrography, linear

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

Comments

There are two native title claims over the area under application: WC005/006 and WC2011/006 (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*.

According to available databases, there are several 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 the proponent's responsibility to liaise with the Department of Environment Regulation, Department of Parks and Wildlife 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 24 August 2015 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

Methodology

DAA (2015)
GIS Database:
- Aboriginal Sites of Significance

4. References

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora
DotE	Department of the Environment, Australian Government
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotE)
EPA	Environmental Protection Authority, Western Australia
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
PEC	Priority Ecological Community, Western Australia
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:

{DPaW (2013) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T **Threatened species:**
Specially protected under the *Wildlife Conservation Act 1950,* listed under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna or the Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened Fauna and Flora are further recognised by the Department according to their level of threat using IUCN Red List criteria. For example Carnaby's Cockatoo *Calyptorynchus latirostris* is specially protected under the *Wildlife Conservation Act 1950* as a threatened species with a ranking of Endangered.

Rankings:
CR: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild.
EN: Endangered - considered to be facing a very high risk of extinction in the wild.
VU: Vulnerable - considered to be facing a high risk of extinction in the wild.

X **Presumed Extinct species:**
Specially protected under the *Wildlife Conservation Act 1950,* listed under Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).

IA **Migratory birds protected under an international agreement:**
Specially protected under the *Wildlife Conservation Act 1950,* listed under Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Birds that are subject to an agreement between governments of Australia and Japan, China and The Republic of Korea relating to the protection of migratory birds and birds in danger of extinction.

S **Other specially protected fauna:**
Specially protected under the *Wildlife Conservation Act 1950,* listed under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice.

P1 **Priority One - Poorly-known species:**
Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, rail reserves and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

P2 **Priority Two - Poorly-known species:**
Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.

P3 **Priority Three - Poorly-known species:**
Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

P4 **Priority Four - Rare, Near Threatened and other species in need of monitoring:**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

P5 **Priority Five - Conservation Dependent species:**
Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.