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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3793/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Kimberley Metals Group Pty Ltd**

1.3. Property details

Property: Mining Lease 80/599
Mining Lease 80/600
Miscellaneous Licence 80/55
Local Government Area: Shire of Wyndham-East Kimberley
Colloquial name: Ridges Iron Ore Project

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia. Three Beard vegetation associations have been mapped within the application area (GIS Database; Shepherd, 2007).

818: Hummock grasslands, low tree steppe; snappy gum over *Triodia inutilis*;
820: Grasslands, high savanna sparse low tree; snappy gum (*Eucalyptus brevifolia*) over upland tall grass and curly spinifex on granite; and
825: Grasslands, high grass savanna woodland; cabbage gum and *Eucalyptus foelscheana* over upland tall grass and curly spinifex on basalt (GIS Database; Shepherd, 2007).

The application area was surveyed in 2005, 2009 and 2010 by Animal Plant Mineral Pty Ltd (APM) and Ecologia Environment staff (APM, 2010a; KMG, 2010a). The following vegetation types were identified within the application area:

Infrastructure Area
W1: Woodland, low woodland and low forest of *Eucalyptus brevifolia*, *Corymbia grandifolia* and *Corymbia collina* over open scrub of *Terminalia canescens, Grevillea pyramidalis* subsp. *leucadendron* and *Carissa lanceolata* over grassland of *Chrysopogon fallax, Triodia bitextura* and *Eriachne mucronata*;
W2: Woodland and low woodland of *Eucalyptus brevifolia* and *Corymbia collina* over open scrub of *Terminalia canescens* and *Grevillea pyramidalis* subsp. *leucadendron* over grassland of *Chrysopogon fallax* and *Triodia bitextura* with *Euphorbia coghlanii* and *Corchorus sidoides* subsp. *sidoides;*
W3: Low woodland and low forest of *Eucalyptus brevifolia, Corymbia collina* and *Erythrophleum chlorostachys* over open scrub of *Cochlospermum fraseri* over bunch grassland of *Alloteropsis semialata, Chrysopogon fallax* and *Sehima nervosum* with *Galactia tenuiflora* complex;
F1: Low forest of *Lophostemon grandiflorus subsp. riparius, Adansonia gregorii, Flueggea virosa* subsp. *melanthesoides* and *Bauhinia cunninghamii* over bunch grassland of *Arundinella nepalensis* and *Heteropogon contortus;*
F2: Low forest of *Ziziphus quadrilocularis, Exocarpos latifolius* and *Clerodendrum tomentosum* var. *tomentosum* over scrub of *Ficus atricha, Ficus platypoda* and *Pittosporum spinescens* over open bunch grassland of *Pseudochaetochloa australiensis* and *Cymbopogon procerus* with *Tinospora smilacina;* and
F3: Low forest of *Corymbia collina* and *Eucalyptus jensenii* over closed bunch grassland of *Chrysopogon fallax, Alloteropsis semialata* and *Heteropogon contortus* with *Indigofera* sp. A Kimberley Flora.

Mining Area
G1: Low woodland of sparse *Melaleuca nervosa* over dense grassland dominated by *Alloteropsis semialata, Vigna lanceolata, Fimbristylis* sp., *Chrysopogon fallax, Chamaecrista absus, Murdannia graminea, Ipomoea gracilis, Haemodorum ensifolium, Themeda* sp., *Setaria apiculata, Ptilotus fusiformis*, over *Drosera ordensis, Merremia* sp. and *Goodenia sepalosa;*
W4: Woodland and low woodland dominated by *Eucalyptus brevifolia* with *Corymbia dichromophloia, Corymbia cadophora* subsp. *polychroma* (on lower slopes), with scattered *Erythrophleum chlorostachys, Erythroxylum ellipticum, Callitris intratropica, Gardenia* sp., *Cochlospermum fraseri, Brachychiton diversifolius, Terminalia canescens* and occasional *Eucalyptus jensenii* over open scrub of *Petalostigma quadriloculare, Indigofera* sp. A Kimberley Flora, *Grevillea pyramidalis, Grevillea dryandri, Wrightia saligna, Clerodendrum floribundum, Acacia orthocarpa,* over grassland of *Alloteropsis semialata, Triodia bitextura, Cymbopogon* sp., with herbs and vines *Ipomoea gracilis, Jasminum didymum, Hybanthus enneaspermus, Zornia muriculata, Evolvulus alsinoides,*

Phyllanthus exilis, Acacia lycopodiifolia, Polygala longifolia, Jacquemontia sp., *Uraria lagopodioides* and *Goodenia odonnellii;*
W5: Woodland and low woodland dominated by *Corymbia dichromophloia* and *Corymbia collina* with scattered *Erythrophleum chlorostachys, Grevillea pyramidalis, Grevillea heliosperma, Owenia vernicosa, Terminalia canescens,* occasional *Callitris intratropica,* scattered *Buchanania oblongifolia, Cochlospermum fraseri, Persoonia falcata, Santalum lanceolatum,* over open scrub of *Petalostigma quadriloculare, Indigofera* sp. A Kimberley Flora, *Grevillea dryandri, Calytrix achaeta, Haemodorum ensifolium, Clerodendrum floribundum, Sida* sp. A Kimberley Flora, *Marsdenia angustata, Stenocarpus acacioides, Chamaecrista mimosoides, Gompholobium subulatum, Mirbelia spinosa, Calytrix exstipulata* over grassland of *Triodia bitextura, Chrysopogon fallax, Eriachne* sp., with herbs and vines *Evolvulus alsinoides, Hybanthus enneaspermus, Phyllanthus exilis, Zornia muriculata, Tinospora smilacina, Cheilanthes caudata, Cheilanthes brownii, epiphyte Cymbidium canaliculatum* (sparse) and mistletoe *Amyema eburna.*
W5a: As above with insufficient soil to support tree species; and
C1: Sandstone cliff community, tussock grassland of *Triodia* sp. on cliff faces with sparse low woodland or *Eucalyptus* sp. in patches at base and top of cliffs, with *Corymbia aspera, Brachychiton viscidulus, Ficus atricha, Ficus brachypoda*, over tussock grassland of *Triodia racemigera, Triodia bitextura, Triodia* sp., with sub shrubs/herbs/vines *Jacquemontia* sp. Keep River and *Olearia arguta* var. glabrous narrow leaves (APM, 2010a; KMG, 2010a).

Clearing Description Kimberley Metals Group Pty Ltd (KMG) is proposing to clear up to 125.1 hectares of native vegetation for the mining of iron ore and infrastructure for the processing and accommodation at the Ridges Iron Ore Project (RIOP) (KMG, 2010a).The mine site will include two shallow open pits (known as the Sam and Tony deposits), crushing facilities, offices and workshops, camp facilities, and support infrastructure such as production bores, bulk diesel storage, a small powerhouse, access roads and haul roads (KMG, 2010a). Approximately 29.5 hectares of the disturbance footprint will be for infrastructure and roads at the base of the tablelands, while the remaining 95.6 hectares will account for open pits and stockpiles on the tableland itself (KMG, 2010a). Vegetation will be cleared using dozers (KMG, 2010a).

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

Comment The application area is located in the East Kimberley region of Western Australia and is situated approximately 105 kilometres south-west of Kununurra, adjacent to the Great Northern Highway (GIS Database).

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 Ord (OVP1) subregion of the Ord Victoria Plains Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the Victoria Bonaparte (VB1) subregion of the Victoria Bonaparte IBRA bioregion (GIS Database). The Ord subregion is characterised by level to gently undulating plains with scattered hills on Cambrian volcanic and Proterozoic sedimentary rocks; vertosols on plains and predominantly skeletal soils on the hills (CALM, 2002a). The overall vegetation is grassland with scattered bloodwoods and snappy gum with spinifex and annual grasses (CALM, 2002a). While the Victoria Bonaparte subregion is characterised by limited areas of gently undulating terrain in a variety of sedimentary rocks supporting low snappy gum over hummock grasslands and also of gently sloping floodplains supporting *Melaleuca minutifolia* low woodland over annual sorghums (CALM, 2002b).

The vegetation within the application areas consists of Beard vegetation associations 818, 820 and 825 which are common and widespread throughout the Kimberley region, with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2007; GIS Database). APM (2010a) recorded 181 taxa from 46 families and 124 genera during the vegetation survey of the application area. Eight species of Priority flora were recorded within the application area (APM, 2009; APM, 2010a).

P1 - *Corymbia cadophora* subsp. *polychroma, Jacquemontia* sp. Keep River, *Micraira* sp. Purnululu, *Triodia racemigera;*
P2 - *Eucalyptus ordiana*;
P3 - *Phyllanthus aridus, Tephrosia valleculata*; and
P4 - *Grevillea miniata* (APM, 2009; APM, 2010a).

The proposed clearing for the Ridges Iron Ore Project (RIOP) will result in the total removal of several populations of the above Priority Flora and their habitat. The proposed clearing is unlikely to impact on the conservation status of the above Priority Flora, however, given that a large number of individuals will be directly impacted by the proposed clearing activities, the proposal may be at variance to this Principle.

Six broad habitat types were recorded as occurring within the application area;
1. Vertical sandstone cliffs;
2. Sandstone range hill top;
3. Ironstone back slope;
4. Broad alluvial/colluvial gully;
5. Flowing drainage line; and
6. Rocky gorge/gully (APM, 2009).

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 (APM, 2009).

Whilst there are no Threatened Ecological Communities (TECs) within the Ord Victoria Plains or Victoria Bonaparte subregions, twelve ecosystems that are classified as 'other ecosystems at risk' have been identified (CALM, 2002a; CALM, 2002b). One Priority Ecological Community (PEC), "Plant assemblages on vertical sandstone surfaces" (DEC, 2009) occurs on the margin of the impact area (APM, 2010a). This PEC is represented by the vegetation community C1: Sandstone cliff community, tussock grassland of *Triodia* sp. on cliff faces with sparse low woodland or *Eucalyptus* sp. in patches at base and top of cliffs, with *Corymbia aspera, Brachychiton viscidulus, Ficus atricha, Ficus brachypoda*, over tussock grassland of *Triodia racemigera, Triodia bitextura, Triodia* sp., with sub shrubs/herbs/vines *Jacquemontia* sp. Keep River and *Olearia arguta* var. glabrous narrow leaves (APM, 2010a). This PEC has a category ranking of Priority 1, which is defined as "ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist" (DEC, 2007). As this PEC occurs on the margins of the impact area and the processes threatening it are described as "changed fire regimes" (CALM, 2002a), it is not likely that there will be a significant impact on the PEC from the proposed clearing.

The application area has suffered previous disturbance dating back to the 1930's. Iron ore exploration occurred during this time by BHP and continued during the post-war era (1945-1960). In 1961 - 1970, Bell Brothers along with a number of joint venture parties including Western Mining Corporation undertook exploration within the area (Ecologia, 2005). Remnants of this era of exploration are still visible, with the main exploration track running the length of the project area and an abandoned vehicle present at the old exploration camp (Ecologia, 2005).

In 2004 and 2005 Resource Mining Corporation carried out more detailed exploration and delineated the current ore resource. This exploration included establishing a 4WD track to the top of the ridge and carrying out reverse circulation (RC) exploration drilling. The track remains in place, however all previous exploration carried out by Resource Mining Corporation has been rehabilitated and no environmental contamination has occurred (KMG, 2010a).

Eight alien weed species were recorded within the vegetation survey area mostly found along creeks occurring in the application area (APM, 2010a). These were: Buffel Grass (*Cenchrus ciliaris*), Cobbler's Pegs (*Bidens pilosa*), Stinkgrass (*Eragrostis cilianensis*), Asthma Plant (*Euphorbia hirta*), Gomphrena Weed (*Gomphrena celosioides*), Purslane (*Portulaca oleracea*), Verano Stylo (*Stylosanthes hamata*), and *Vigna radiata* var. *setulosa* (APM, 2010a). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This in turn can lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. None of these species are listed as 'Declared Plant' species under the *Agriculture and Related Resources Protection Act 1976* by the Department of Agriculture and Food. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The application area is remote and basically undisturbed, except for a small area disturbed by drill pads and access tracks (APM, 2010a). The vegetation condition of the application was deemed to be pristine, despite minor occurrences of the weeds, Buffel Grass and possibly Stinkgrass on some creeklines (APM, 2009). The vegetation associations existing within the disturbance footprint are well represented throughout the RIOP Mine Site area and are typical of vegetation within the East Kimberley region (KMG, 2010a).

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

Methodology

APM (2009)
APM (2010a)
CALM (2002a)
CALM (2002b)
DEC (2007)
DEC (2009)
Ecologia (2005)
KMG (2010a)
Shepherd (2007)
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 is not likely to be at variance to this Principle

According to Shepherd (2007) approximately 99.99% and 98.77% of the pre-European vegetation remains within the Ord Victoria Plains and Victoria Bonaparte bioregions respectively. 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 2009, a Level 2 (EPA 2004) fauna survey of approximately 450 hectares of land at the site of the Ridges Iron

Ore Project (RIOP) was undertaken by Animal Plant Mineral (APM, 2009). During this survey it was observed that the fauna assemblages are closely aligned with the landforms and vegetation of the application area (APM, 2009).

APM (2009) recorded six broad habitat types as occurring within the application area:
1. Vertical sandstone cliffs;
2. Sandstone range hill top;
3. Ironstone back slope;
4. Broad alluvial/colluvial gully;
5. Flowing drainage line; and
6. Rocky gorge/gully.

As a result of previous surveys at the RIOP, four species of conservation significance have been recorded (APM, 2009; Bat Call WA, 2010). These include:

- Gouldian Finch (*Erythrura gouldiae*) listed as endangered under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*;
- Rainbow Bee-eater (*Merops ornatus*) listed as migratory and marine species under the *EPBC Act 1999*;
- Orange Leaf-nosed Bat (*Rhinonicteris aurantia*) listed as Schedule 1 - *Wildlife Conservation (Specially Protected Fauna) Notice, 2010*; and
- Northern Leaf-nosed Bat (*Hipposideros stenotis*) listed as Priority 2 - DEC Priority Fauna List.

Gouldian Finches have very specific nesting requirements and require robust hollows of a finite diameter in *Eucalyptus brevifolia* and *Corymbia dichromophloia* (APM, 2010b). There appears to be a heavy reliance on feeding habitat located immediately adjacent to breeding habitat. Therefore the presence of Sorghum and *Triodia* grass species in close proximity to nesting hollow is essential. Breeding habitat is characterised by rocky hills with hollow bearing smooth barked gums within 2-4 kilometres of small waterholes or springs that persist through the dry season (APM, 2010b).

The potential for nesting on the RIOP mine site area appears to be low in comparison to other studies (APM, 2010b). The direct impacts from the RIOP mine on potential nesting sites for Gouldian Finch could impact 1031 nest hollows, or 0.2% of hollow-bearing trees in the area (APM, 2010b). It is important to note that within all trees investigated no nesting material was found; however, this is not unusual given that Gouldian Finches nest using very little material and nest deep within hollows (APM, 2010b). KMG has committed to the establishment of a suitable number of artificial nesting hollows for Gouldian Finches to compensate for clearing during RIOP. It is anticipated that nest boxes will be established in the 2010 dry season in preparation for the 2011 breeding season (APM, 2010b).

The Rainbow Bee-eater is moderately common to common in open woodland and near water (APM, 2009). This species has been recorded on numerous occasions, and it is considered to be very likely that this species may be nesting in the soft alluvial/colluvial soil between the main ore bodies and the adjacent, parallel ridgeline to the east (APM, 2009).

The application area includes a number of tropical habitat types that offer a variety of foraging and roosting opportunities for the region's bat assemblage (Bat Call WA, 2010). The RIOP is designed to be a continuous mining operation taking surface overburden and ore deposits. The surface mining operation is not planned to come closer than 60m to the cave near March Fly Creek, nor is it planned to impact March Fly Creek directly by clearing, mining or overburden storage or disposal (Bat Call WA, 2010). Diversion dams are expected to reduce runoff into the creek from the project area to a minimum (Bat Call WA, 2010).

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 (APM, 2009). Consideration should also be given to the retention of fauna microhabitat, including hollow logs and other fallen debris when clearing, as the retention of microhabitat will enhance fauna habitat values of the mine impact area following closure (APM, 2009).

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

Methodology

APM (2009)
APM (2010b)
Bat Call WA (2010)
EPA (2004)
Shepherd (2007)

(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 GIS databases there are no known records of Declared Rare Flora (DRF) within the application area (GIS Database).

A flora survey was conducted over the application area by staff from APM staff on 10-12 August 2009 and 2-7 February 2010 (APM, 2009; APM, 2010a). No DRF or species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) were recorded within the application area (APM, 2009; APM, 2010a).

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

Methodology APM (2009)
APM (2010a)
GIS Database
- Declared Rare and Priority Flora List

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

Comments **Proposal is not likely to be at variance to this Principle**
A search of available databases reveals that there are no Threatened Ecological Communities (TECs) within the application area (GIS Database). There are no TECs within a 100 kilometre radius of the application area (GIS Database).

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

Methodology GIS Database
- 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 falls within the Ord Victoria Plain and the Victoria Bonaparte Interim Biogeographic Regionalisation of Australia (IBRA) bioregions (GIS Database). Shepherd (2007) reports that approximately 99.99% and 98.77% of the pre-European vegetation remains in these bioregions respectively.

The vegetation within the application area is recorded as Beard vegetation associations:
818: Hummock grasslands, low tree steppe; snappy gum over *Triodia inutilis*;
820: Grasslands, high savanna sparse low tree; snappy gum (*Eucalyptus brevifolia*) over upland tall grass and curly spinifex on granite; and
825: Grasslands, high grass savanna woodland; cabbage gum and *Eucalyptus foelscheana* over upland tall grass and curly spinifex on basalt (GIS Database; Shepherd, 2007).

According to Shepherd (2007) approximately 100% of these Beard vegetation associations remain within the Ord Victoria Plain and Victoria Bonaparte bioregions (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Ord Victoria Plain	5,497,881	5,497,162	~99.99%	Least Concern	~15.98%
IBRA Subregion -Ord Victoria Plains	2,164,271	2,164,264	~100%	Least Concern	~37.92%
IBRA Bioregion - Victoria Bonaparte	1,871,372	1,848,352	~98.77%	Least Concern	~5.97%
IBRA Subregion - Western Mallee	1,871,372	1,848,352	~98.77%	Least Concern	~5.97%
Beard vegetation associations - State					
818	33,358	33,358	~100%	Least Concern	
820	59,639	59,639	~100%	Least Concern	
825	77,762	77,764	~99.9%	Least Concern	
Beard vegetation associations - Ord Victoria Plain Bioregion					
818	33,272	33,272	~100%	Least Concern	
820	5,306	5,306	~100%	Least Concern	
Beard vegetation associations - Victoria Bonaparte Bioregion					
818	86	86	~100%	Least Concern	
820	53,191	53,191	~100%	Least Concern	
825	54,880	54,879	~100%	Least Concern	

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

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2007)
GIS Database
- Pre-European Vegetation
- IBRA WA (regions - subregions)

(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 several minor ephemeral watercourses within the application area (GIS Database).

March Fly Creek is an ephemeral river which traverses the valley on the eastern side of the proposed mine pits, however it is not located within the direct disturbance footprint (KMG, 2010a). Within the RIOP mine site there are minor tributaries which flow towards the March Fly Creek catchment (KMG, 2010a). Potential impacts to these watercourses as a result of road and infrastructure construction may be minimised through the use of suitable culverts to mitigate potential impacts to water flow (KMG, 2010a).

Based on vegetation mapping conducted by APM (2010a) two of the ten vegetation associations found within the application area are associated with drainage areas.

W1: This vegetation community was found adjacent to creek-line communities and across valley floors; and
F1: This vegetation community lined creek channels (APM, 2010a).

Within the Ord Victoria Plains and Victoria Bonaparte bioregions "assemblages of permanent/ephemeral

wetlands, damplands, and riparian habitat of the Kimberley region" are considered to be an ecosystem at risk (CALM, 2002a; CALM, 2002b). These ecosystems have a status ranking of "vulnerable" and are threatened by processes such as grazing and changed fire regimes (CALM, 2002a, CALM, 2002b).

Based on the above, the proposed clearing is at variance to this Principle. The Department of Water (DoW, 2010) advised that best practice for erosion and sediment management should be used in high risk areas (i.e. on the sides and top of escarpments and around creeklines). These best practice techniques include;

- Clearing of steeply-sloped areas kept to a minimum;
- Where possible, riparian vegetation should be retained to filter out sediment from surface runoff and minimise erosion;
- Where possible, cleared areas should be rehabilitated before the onset of the wet season;
- Use of appropriate erosion-control structures in creeklines, for example pool-riffle sequences and sediment traps; and
- Appropriate management of rainfall runoff within the mine footprint and on access tracks (DoW, 2010).

Methodology

APM (2010a)
CALM (2002a)
CALM (2002b)
DoW (2010)
KMG (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 landscape surrounding the application area is dominated by rugged mountain and strike ridges, rising to 700 metres above sea level and around 200 – 300 metres above the surrounding valleys and low hills. The ground slopes range from flat to moderate within the application area, with a steep escarpment to the west and south (Aquaterra, 2009). Two ephemeral surface water features drain both north and south through the application area, from a central drainage divide and discharge over abrupt cliffs (Aquaterra, 2009).

According to Soil Water Consultants (SWC) the soil and waste profile throughout the RIOP consists of a surficial cover of a gravelly loamy sand - sandy loam (10-100 centimetres in thickness) overlying a lateritised siltstone to sandstone (SWC, 2009). Over most of the area the unweathered bedrock is close to the surface, resulting in a soil thickness typically <100 centimetres. The surface soils often contain abundant gravels, consisting of alluvial laterite, quartz and unweathered granite fragments (KMG, 2010a).

Aquaterra (2009) recorded skeletal soils from the ridges and hills while alluvial silty and sandy flats were recorded along the main drainage lines. The low-lying areas of the application area are subject to rapid erosion during surface run-off events, with the transport of silts and clays down the main drainage lines during the wet season (Aquaterra, 2009).

KMG (2010a) have indicated that infrastructure and roads will be constructed within the low-lying areas of the application area, while the open pits and stockpiles will be located on the tablelands.

Based on the above, the proposed clearing may be at variance to this Principle. However, in order to minimise the disturbance to native vegetation, which would thereby minimise the risk of land degradation, KMG have developed the following management commitments (KMG, 2010b):

- Sedimentation from the pits, stockpiles and any exposed cleared areas will be controlled with appropriately constructed sediment traps to avoid impacts to the adjacent environment;
- Construct appropriately designed rock gabions or other sediment trapping devices to ensure sediment laden waters do not enter the dry tropical rainforest areas;
- To avoid sediment laden run-off entering the adjacent environment, run-off from stockpiles will be directed to appropriately constructed sediment traps prior to entering natural drainage lines. Surface flows in surrounding areas will be directed away from waste dumps; and
- Establish a monitoring programme for the Dry Tropical Rainforest thickets to ensure there are no significant impacts from the proposed upstream mining activities (KMG, 2010b).

Potential land degradation impacts as a result of the proposed clearing may also be minimised by the implementation of a staged clearing condition.

Methodology

Aquaterra (2009)
KMG (2010a)
KMG (2010b)
SWC (2009)

(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 the Ord River Regeneration Reserve, located approximately 61.5 kilometres south-east (GIS Database).

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

Methodology

GIS Database
- DEC Tenure

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

Comments

Proposal is not likely to be at variance to this Principle

There are no permanent wetlands or watercourses within the application area (GIS Database). Aquaterra (2009) report that within the proposed mine area there are two ephemeral surface water features. These drainage lines drain both north and south through the application area, from a central drainage divide and discharge over abrupt cliffs (Aquaterra, 2009).

Given that the application area receives approximately 796.8 millimetres of rainfall per year and experiences a mean annual evaporation of approximately 2,400 millimetres (BoM, 2010), surface water flows within the RIOP generally only occur during intense cyclonic events, and in response to surface runoff from exposed rock surfaces (KMG, 2010a). However, as there are no permanent or semi-permanent surface water features within the application area, the proposed clearing activities are not likely to cause deterioration in the quality of surface water.

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 Kununurra Water Reserve which is located approximately 102 kilometres north-east of the application area. Given the distance separating the application area and the Kununurra Water Reserve, the proposed clearing is unlikely to impact on the water quality of the Kununurra Water Reserve.

The application area is located within the proclaimed Ord River Catchment and within the proclaimed Canning-Kimberley groundwater area (Dow, 2010; 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 (DoW, 2010).

The application area is characterised by the Ord River_Upper hydrographic catchment area (GIS Database). The application area, which includes the proposed shallow open pits (known as the Sam and Tony deposits), crushing facilities, offices and workshops, camp facilities, and support infrastructure such as production bores, bulk diesel storage, a small powerhouse, access roads and haul roads, is situated within the Ord River_Upper catchment which covers a total area of approximately 4,526,028 hectares (GIS Database).

The topography surrounding the application area is dominated by rugged mountain and strike ridges, rising to 700 centimetres above sea level and around 200-300 metres above the surrounding valleys and low hills. The ground slopes range from flat to moderate within the application area, with a steep escarpment to the west and south (Aquaterra, 2009).

Aquaterra (2009) and KMG (2010a) report that groundwater levels within the application areas vary between 0 metres to 20 metres below the surface. Groundwater salinities within the application area have been measured in the range between 500-1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). Given the depth to groundwater and low rainfall to high evaporation rate, the proposed clearing of 125.1 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 is not likely to be at variance to this Principle.

Methodology

Aquaterra (2009)
BoM (2010)
DoW (2010)
KMG (2010a)
GIS Database
- Groundwater Salinity, Statewide
- Hydrographic Catchments - Catchments
- Public Drinking Water Source Areas (PDWSAs)
- RIWI Groundwater Areas

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

Comments

Proposal is not likely to be at variance to this Principle

The application area experiences a tropical semi-arid climate with two distinct wet and dry seasons, separated by brief transition periods (Aquaterra, 2009). The average annual rainfall of Kununurra, which is situated approximately 105 kilometres north-east of the application area is 796.8 millimetres and the area experiences a mean annual evaporation of approximately 2,400 millimetres (BoM, 2010; GIS Database). Kununurra climate statistics indicate that rainfall in the region is mainly during summer and is typically indicative of a wet and dry season (BoM, 2010).

The application area is located within the Ord River_Upper hydrographic catchment area (GIS Database). The application area, which includes the proposed shallow open pits (known as the Sam and Tony deposits), crushing facilities, offices and workshops, camp facilities, and support infrastructure such as production bores, bulk diesel storage, a small powerhouse, access roads and haul roads, is situated within the Ord River_Upper catchment which covers a total area of approximately 4,526,028 hectares (GIS Database).

Shepherd (2007) vegetation statistics indicate that approximately 100% of the pre-European vegetation extent remains within the Ord Victoria Plain and Victoria Bonaparte Interim Biogeographic Regionalisation for Australia (IBRA) regions. The proposed clearing of up to 125.1hectares of native vegetation constitutes only a very small proportion of the size of the Ord River_Upper catchment (less than approximately 0.003% of the total catchment area) which remains largely uncleared (GIS Database; Shepherd, 2007). 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 Ord Victoria Plains and the Victoria Bonaparte bioregions, as well as the surrounding regions, remain largely uncleared (Shepherd, 2007), the proposed clearing is not likely to impact on the drainage characteristics of the Ord River_Upper catchment area.

Given the highly permeable properties of the surface soils within the application area (i.e. high infiltration rates and gravelly and rocky surface cover materials), the proposed clearing of 125.1 hectares of native vegetation is not expected to increase the incidence or intensity of flooding as vertical infiltration of rainfall and deep recharge of the soil profile can readily occur (KMG, 2010a).

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

Methodology

Aquaterra (2009)
BoM (2010)
KMG (2010a)
Shepherd (2007)
GIS Database
- Hydrographic Catchments - Catchments
- Towns

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

Comments

The clearing permit application was advertised on 21 June 2010 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to this application regarding aboriginal heritage issues. A written response was provided on the matters raised.

There are no Native Title Claims over the area under application. All claims have been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There is one registered Aboriginal Sites of Significance within the application area (ID_14017) (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal sites of significance are damaged through the clearing process.

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

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 (KMG) referred the project to the (Federal) Department of the Environment, Water, Heritage and the Arts (DEWHA) for environmental impact assessment under the EPBC Act. DEWHA deemed the proposed action not to be a controlled action (DEWHA, 2010). This means that the proposed action does not require further assessment and approval under the EPBC Act before it can proceed (DEWHA, 2010).

The application area was referred to the Environmental Protection Authority (EPA) by the proponent (KMG) on the 4 January 2010. The EPA set the level of assessment as 'Not Assessed - Managed under Part V of the

Environmental Protection Act 1986 (Clearing)'. There were no appeals of this decision (OAC, 2010).

Methodology DEWHA (2010)
OAC (2010)
GIS Database
- Aboriginal Sites of Significance
- Native Title Claims

4. Assessor's comments

Comment

The application has been assessed against the clearing principles, planning instruments and other matters in accordance with s.51O of the *Environmental Protection Act 1986*, and the proposed clearing is at variance to Principle (f), may be at variance to Principles (a) and (g), is not likely to be at variance to Principles (b), (c), (d), (h), (i) and (j) and is not at variance to Principle (e).

5. References

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SWC (2009) Soil and Waste Characterisation for the Ridges Iron Ore Deposit - Results Summary. Unpublished report prepared for Kimberley Metals Group, November 2009.

6. Glossary

Acronyms:

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

Definitions:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

EN **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

VU **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

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