



1. Application details

1.1. Permit application details

Permit application No.: 1978/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Robe River Mining Co Pty Ltd

1.3. Property details

Property: Exploration License E47/731
Local Government Area: Shire Of Ashburton
Colloquial name: Kangeenarina Well

1.4. Application

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

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, and are useful to look at vegetation extent in a regional context. One Beard vegetation association is located within the application area, being 175 - Short bunch grasslands - savannah/grass plain (Pilbara).

According to the Shared Land Information Platform (SLIP, 2007), Beard vegetation association 175 is dominated by Tussock Grasses *Astrebla pectinata*, *Aristida latifolia*, *Chrysopogon fallax* and *Eragrostis setifolia*, with a herb layer of *Angianthus sp.*, *Calotis multicaulis*, *Rhodanthe floribunda*, *Ptilotus astrolasius* and *Ptilotus gomphrenoides*.

A vegetation survey was conducted over the application area and other areas by Keith Limbeck and Associates (KLA) between 2 and 6 September 2006. A total of thirteen vegetation types were identified of which five occur within the application area (KLA, 2007). These are:

Type 3: Open hummock grassland of primarily *Themeda sp.* Hamersley Station with minor herbaceous layer and no shrub or tree. Self mulching cracking clays.

Type 4: Open grassland (*Themeda sp.* Hamersley Station) with tall open shrubland (*Acacia victoriae*, *A synchronisia*, *Hakea lorea ssp. lorea*). Red/brown non-cracking clays.

Type 6: Open grassland (*Aristida sp.*, *Themeda sp.* and *Chrysopogon fallax*) with tall open shrubland and low open woodland. Calcerous shallow loamy soils.

Type 8: Open woodland dominated by *Eucalyptus victrix* with open shrubland (*Acacia victoriae* and *A synchronisia*) over heavily grazed open grassland (mixed sp.), (near 8 Mile Well). Red/brown non-cracking clays. Complete absence of shrub or tree strata.

Type 9: Open hummock grassland (*Astrebla sp.*) on crabhole country (self mulching soil) with very open herbland. Self mulching cracking clays. Complete absence of shrub and tree strata.

Clearing Description Robe River Mining Company Pty Ltd has applied to clear 2.4 hectares within an application area of approximately 11.2 hectares for the purpose of mineral exploration. The application area is located approximately 40 km North of Tom Price.

Vegetation Condition Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)

Comment The application area occurs within Threatened Ecological Community (TEC) 46 - *Themeda* grasslands on cracking clays (Hamersley Station, Pilbara). Grassland plains dominated by the perennial *Themeda* (kangaroo grass) and many annual herbs and grasses.

Some of the exploration drill lines to be cleared have been previously disturbed by past exploration activities. Clearing activities are mostly confined to either driving over grass or blade up clearing. Only drill pads are required to be cleared of all vegetation. Pilbara Iron have committed to rehabilitating all areas cleared within six months of clearing.

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 at variance to this Principle**

The application area is located within the Pilbara IBRA Bioregion. Where the application area occurs within the Bioregion, vegetation is characterised by 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). Rare features include *Themeda* grasslands of Pilbara Region - Grassland plains dominated by the perennial *Themeda* (kangaroo grass) and many annual herbs and grasses (Hamersley Station grass plain) (CALM, 2002). The application area occurs within the *Themeda* grassland Threatened Ecological Community (TEC).

Several DEC listed Priority flora species occur within the application area, including *Themeda* sp. Hamersley Station. Whilst most of the priority species occur over a wide range within the Pilbara, *Themeda* sp. Hamersley Station is likely to be largely confined to the TEC, although it has been recorded on creek lines outside of TEC areas. However, where it occurs in the TEC, it is often found in large numbers (>5000 plants, KLA, 2007). Therefore, it is likely that the application area occurs in an area that is of significance to the ecology of the bioregion.

Many fauna species are endemic to the Bioregion, including Western Pebble-mound Mouse (*Pseudomys chapmani*) (CALM, 2002). Several fauna species of conservation significance may occur within the application area. However, they are not likely to be impacted by the proposed clearing.

The application area occurs within Hamersley pastoral station and has been subject to grazing pressures. Its conservation value may have been compromised by grazing.

The Assessment Coordination Section (ACS) of the Department of Environment and Conservation (DEC) have advised that based on the information provided, the assessing officer's conclusions with respect to Principle A are justified (DEC, 2007).

Based on the above, the proposed clearing is at variance to this Principle. However, the method of clearing is low impact and conditions placed on the permit requires the permit holder to rehabilitate the areas cleared within six months of clearing.

Methodology CALM (2002)
DEC (2007)
KLA (2007)

(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 available databases, there is no record of conservation significant fauna occurring within the application area (GIS Database). The closest record of conservation significant taxa is a record of a DEC listed Priority 4 Mammal species approximately 2.5km east of the application area. This is likely to be either the Lakelands Downs Mouse (*Leggadina lakedownensis*) or Western Pebble Mound Mouse (*Pseudomys chapmani*).

The assessing officer has conducted a search of the Western Australian Museum Fauna database between the coordinates 117.0, 21.5 and 118.5, 23.0, which includes the application area and approximately 50 km surrounds (Western Australian Museum, 2007). This revealed the following conservation significant fauna species: Northern Quoll (*Dasyurus hallucatus*), Orange Leaf-nosed Bat (*Rhinionictes aurentius*), Pilbara Olive Python (*Liasis olivaceus barroni*), Rainbow Bee-eater (*Merops ornatus*), Australian Bustard (*Ardeotis australis*), Crested Bellbird (*Oreoica gutturalis*) and Night Parrot (*Pezoporus occidentalis*).

Keith Lindbeck and Associates (KLA) conducted a Level 1 Desktop Fauna Assessment of those conservation significant species that may occur within the application area (KLA, 2007). This Level 1 survey adequately meets the requirements of Guidance Statement 56 'Guidance for the Assessment of Environmental Factors - Terrestrial Fauna for Environmental Impact Assessment in Western Australia' (EPA, 2004a). This involved a database search of DEC Threatened and Priority Fauna Database, and a risk assessment of the likelihood of those species occurring within the application area based on known habitat preference. As a result, KLA identified 4 conservation significant species that may occur within the application area. These are Peregrine Falcon (*Falco peregrinus*), Lakeland Downs Mouse, Western Pebble-mound Mouse and Australian Bustard (KLA, 2007).

The Northern Quoll (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially*

Protected Fauna) Notice, 2006) is described as inhabiting a range of habitats, but prefer rocky areas and Eucalypt forests (Department of Environment and Water Resources, 2007a). It dens in hollow logs, rock crevices and caves, and in tree hollows. Most foraging is on the ground, but it is also an adept climber (Department of Natural Resources, Environment and the Arts, 2007). Northern Quolls tend to be most successful near creek lines (Western Wildlife, 2007). The application area does not contain suitable habitat for the Northern Quoll and it is not likely that the species occurs there.

The Orange Leaf-nosed Bat (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) is described as preferring warm humid caves for roosting, although some have been found in tree hollows (Australian Museum Online, 2007a). The Orange Leaf-nosed Bat hunts food during slow manoeuvrable flight. They are known to hunt flying prey close to roosts, and glean from foliage and the ground in riparian vegetation in gorges, and in open hummock grasslands and sparse tree and shrub savannah. (Department of Environment and Water Resources, 2007b). Known colonies in the Pilbara occupy abandoned, deep and partially flooded mines that trap pockets of warm, humid air in the mine's constant temperature zone. For at least part of the year, the species is thought to also occupy smaller, less complex mines nearby. There are no known natural roosting sites in the Pilbara (Department of Environment and Water Resources, 2007b). There are no abandoned mines within the application area or nearby and it is unlikely that the Orange Leaf-nosed Bat is present within the application area at any time.

The Pilbara Olive Python (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) prefers deep gorges and water holes in the ranges of the Pilbara region (Pearson, 1993 in Department of Environment and Water Resources, 2007c). Radio-telemetry has shown that individuals are usually in close proximity to water and rock outcrops (Pearson, 2001, in Department of Environment and Water Resources, 2007c). The application area does not provide suitable habitat for the Pilbara Olive Python and it is unlikely to occur there.

The Rainbow Bee-eater (Migratory species under the *Environmental Protection and Biodiversity Conservation Act 1999*) is able to utilise a wide range of habitat types and nests in sandy soils. This species may be an occasional visitor to the application area but is not likely to utilise the application area for nesting.

The Australian Bustard (DEC Priority 4) prefers tussock grassland, *Triodia* hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). This species is likely to occur within the application area, however, the temporary and low impact nature of the clearing is not likely to significantly impact the conservation of this species.

The Crested Bellbird (DEC Priority 4) is known to inhabit the shrub-layer of eucalypt woodland, mallee, *Acacia* shrubland, *Triodia* hummock grassland, saltbush and heath. It is particularly sensitive to habitat fragmentation (Garnett et al, 2000). This species may occur within the application area, however, the temporary and low impact nature of the clearing is not likely to significantly impact the conservation of this species.

The Night Parrot (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) is a very seldom seen bird that occupies dense, low vegetation, which provides them shelter during the day (Australian Museum Online, 2007b). Most records come from hummock grasslands with spinifex (porcupine grass, *Triodia* sp.) or from areas dominated by samphire. It has been suggested that birds move into the grasslands when *Triodia* is seeding (Australian Museum Online, 2007b). They have also been reported in low chenopod shrublands with saltbush and bluebush, and from areas of Mitchell grass, *Astrelba* sp. with scattered chenopods (Australian Museum Online, 2007b). Many records have come from waterholes, and almost all reports from areas of *Triodia* have noted the presence of nearby water (Australian Museum Online, 2007b). As this species is very rare, and little is known of its distribution, it is difficult for the assessing officer to determine what impact if any the proposed clearing will have on this species. However, given the lack of permanent water in the area (nearby creek lines were wet at time of KLA survey), the possibility of the species occurring within the application area is unlikely.

The Peregrine Falcon (Schedule 4 - Other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) is known to inhabit most areas in Australia and utilise cliffs, tall trees and granite outcrops for nesting (Australian Museum Online, 2007c). The Peregrine Falcon is likely to occur sporadically within the application area, but is not likely to nest in the area due to an absence of tall trees or rocky outcrops.

The Lakeland Downs Mouse (DEC - Priority 4) is known to occur on sandy soils and cracking clays in Western Australia that support native grasses (DEC, 2006). It is known that this species experiences great fluctuations in population size depending on seasonal factors, reaching plague proportions in good years (DEC, 2006). The vegetation types identified within the application area during KLA's survey (2007) is likely to support populations of this species. However, the amount of habitat to be cleared is minimal compared with the amount of habitat available to this species in the local area and on a regional scale. The population is also likely to experience a population boom due to favourable seasonal conditions.

The Western Pebble-mound Mouse (DEC - Priority 4) is described as constructing pebble mounds on slopes composed of stony soils, near sharply incised drainage lines (Start et al, 2000). Mounds are built in vegetation dominated by hard spinifex (*Triodia basedowii* or *T. wiseana*) (Start et al, 2000). The application area is located in tussock grasslands on self mulching soils, cracking clays and red/brown non-cracking clays and is not suitable habitat for the Western Pebble-mound Mouse.

Therefore, no species of conservation significance are likely to be significantly impacted by the proposed clearing.

According to KLA (2007), all vegetation habitat types located within the application area are common and extensive throughout the local area and the Bioregion. KLA (2007) also stated that there were no unique, restricted or fauna specific habitats within the application area. Therefore, the application area does not contain significant fauna habitat on a regional scale.

The Assessment Coordination Section (ACS) of the Department of Environment and Conservation (DEC) have advised that based on the information provided, the assessing officer's conclusions with respect to Principle B are justified (DEC, 2007).

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

Methodology Australian Museum Online (2007a)
Australian Museum Online (2007b)
Australian Museum Online (2007c)
DEC (2006)
DEC (2007)
Department of Environment and Water Resources (2007a)
Department of Environment and Water Resources (2007b)
Department of Environment and Water Resources (2007c)
Department of Natural Resources, Environment and the Arts (2007)
EPA (2004a)
Garnet et al (2000)
KLA (2007)
Start et al (2000)
Western Wildlife (2007)
GIS Database:
- Threatened Fauna - CALM 30/9/05

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

Comments Proposal may be at variance to this Principle

According to available databases there are no records of Declared Rare Flora (DRF) or DEC listed Priority flora species within 100 km of the application area (GIS Database).

A flora and vegetation survey over the application area and surrounding vegetation was conducted by Keith Lindbeck and Associates (KLA) in September 2006 (KLA, 2007). This involved a desktop search of the DEC's threatened flora database to determine whether DRF and Priority flora species were likely to occur within the survey area. KLA also searched Pilbara Iron's threatened flora database for records of Rare or Priority flora species within the survey area. A search was then made for these species in the field (KLA, 2007). The survey and subsequent report adequately meets the requirements of EPA Guidance Statement 51 - Guidance for the Assessment of Environmental Factors - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia. Report by the EPA under the Environmental Protection Act 1986 (EPA, 2004b).

KLA's desktop survey identified 2 DRF and 40 Priority species potentially occurring within the survey area (KLA, 2007).

Following the field based component of the flora and vegetation survey, a total of five priority flora species were identified within the survey area. These are *Themeda* sp. Hamersley Station (P3), *Goodenia aff. pascua* (P3), *Phyllanthus ?aridus* (P3), *Plantago* sp. Hamersley Station (P3) and *Rostelluria adscendens var. latifolia* (P3) (KLA, 2007). However, *P. ?aridus* and *R. adscendens var. latifolia* do not occur within the application area (KLA, 2007). No DRF species were located within the application area (KLA, 2007).

Themeda sp. Hamersley Station has been recorded over a wide area within Pilbara Region (Western Australian Herbarium, 1998a-). It occurs as either individual plants in creek lines or in dense grasslands on cracking clays. Within the application area, it occurs as grassland vegetation and population numbers may be in excess of 5000 plants at each location if the grasses are homogenous (KLA, 2007). Given the method of clearing, and the large population size, the proposed clearing will have little impact on the conservation of this species.

Goodenia aff. pascua has been recorded over a wide area within the Pilbara Region (Western Australian Herbarium, 1998b-). Pilbara Iron's flora database records indicate that there are many populations within their lease areas, some populations greater than 100 plants (KLA, 2007). Within the application area, a total of eight plants will be impacted by clearing (KLA, 2007). The proposed clearing will have little impact on the conservation of this species.

Plantago sp. Hamersley occurs on crabhole plains in the Pilbara (Western Australian Herbarium, 1998c-). This species was commonly encountered during the flora survey and Pilbara Iron has recorded the species from seven other locations (KLA, 2007). Seven plants will be impacted by clearing (KLA, 2007). The proposed clearing will have little impact on the conservation of this species.

Therefore, whilst the vegetation to be cleared does provide habitat for threatened flora species, the impact from clearing the vegetation to these species conservation is not likely to be significant. KLA (2007) quote advice from the Regional DEC office (Karratha) to the effect that there are no special management requirements for the exploration program in relation to the management of these priority species other than to ensure compacted soils are ripped and brush respread as part of rehabilitation.

The Assessment Coordination Section (ACS) of the Department of Environment and Conservation (DEC) have advised that based on the information provided, the assessing officer's conclusions with respect to Principle C are justified (DEC, 2007).

Based on the above, the proposed clearing may be at variance to this Principle. However, the proposed clearing is not likely to cause significant impact to the conservation of any Rare or Priority flora species.

Methodology DEC (2007)
EPA (2004b)
KLA (2007)
Western Australian Herbarium (1998a-)
Western Australian Herbarium (1998b-)
Western Australian Herbarium (1998c-)
GIS Database:
- Declared Rare and Priority Flora List - CALM 1/7/05

(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 at variance to this Principle

The application area occurs within TEC No. 46 "*Themeda* grasslands on cracking clays (Hamersley Station, Pilbara). Grassland plains dominated by the perennial *Themeda* (Kangaroo grass) and many annual herbs and grasses" (KLA, 2007). The DEC considers this to be a rare vegetation type (KLA, 2007).

TEC No. 46 is thought to have an extent approximately 34,600 hectares in size over six separate areas (KLA, 2007). The proposed clearing is for 2.4 hectares of this ecological community (KLA, 2007), which represents a very small proportion of the overall extent of this community.

The DEC has listed TEC No. 46 as "Vulnerable Category A". Ecological communities with an "A" rating exist largely as modified occurrences which are likely to be capable of being substantially restored or rehabilitated (CALM, 2001).

Pilbara Iron (Robe River) is committed to rehabilitating the area disturbed within six months (KLA, 2007). Pilbara Iron operates under an environmental management plan that ensures that environmental impacts are minimised (KLA, 2007).

The Assessment Coordination Section (ACS) of the Department of Environment and Conservation (DEC) have advised that based on the information provided, the assessing officer's conclusions with respect to Principle D are justified (DEC, 2007).

Based on the above, the proposed clearing is at variance to this Principle. However, the impacts are likely to be minimal and temporary as the clearing will be managed in accordance with Pilbara Iron's Operation Control Procedures for environmental management and due to the nature of the clearing (low impact, small area of disturbance).

Methodology CALM (2001)
DEC (2007)
KLA (2007)

(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

At a regional level, the Pilbara IBRA Bioregion remains at approximately 99.9% of its pre-European vegetation extent (Shepherd et al, 2001). According to the "Bioregional Conservation Status of Ecological Vegetation Classes" (Department of Natural Resources and Environment, 2002), this value gives the region a Conservation Status of "Least Concern". See table below.

Whilst only 6.3% of this Bioregion is located within conservation estate, given that the region remains 99.9% uncleared, it is unlikely that the conservation status of vegetation within this Bioregion is at risk.

One Beard vegetation association is located within the application area (175). Approximately 96% of Beard vegetation association 175 is located within the Pilbara IBRA Bioregion. Within the Pilbara IBRA Bioregion, this vegetation association remains at approximately 100% of its pre-European vegetation extent (Shepherd et al, 2001). According to the "Bioregional Conservation Status of Ecological Vegetation Classes" (Department of Natural Resources and Environment, 2002), these values give the vegetation types a Conservation Status of "Least Concern".

Whilst only 4.4% of vegetation association 175 is located within conservation estate, given that the vegetation association remains 100% uncleared, it is unlikely that the conservation status of this vegetation association is at risk.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves*
IBRA Bioregion - Pilbara	17,804,164	17,794,651	99.9	Least Concern	6.3
Beard veg assoc. - State					
- 175	525,129	524,029	99.8	Least Concern	4.2
Beard veg assoc. - Bioregion					
- 175	507,038	507,008	100	Least Concern	4.4

* Shepherd et al. (2001) updated 2005

** Department of Natural Resources and Environment (2002)

Options to select from: Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment 2002)

Presumed extinct Probably no longer present in the bioregion
 Endangered* <10% of pre-European extent remains
 Vulnerable* 10-30% of pre-European extent exists
 Depleted* >30% and up to 50% of pre-European extent exists
 Least concern >50% pre-European extent exists and subject to little or no degradation over a majority of this area

* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

* Shepherd et al. (2001) updated 2005

** Department of Natural Resources and Environment (2002)

Options to select from: Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment 2002)

Presumed extinct Probably no longer present in the bioregion
 Endangered* <10% of pre-European extent remains
 Vulnerable* 10-30% of pre-European extent exists
 Depleted* >30% and up to 50% of pre-European extent exists
 Least concern >50% pre-European extent exists and subject to little or no degradation over a majority of this area

* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

Therefore, the vegetation within the application area is not a significant remnant of native vegetation.

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

Methodology Department of Natural Resources and Environment (2002)
 Shepherd et al (2001) updated 2005.
 GIS Database:
 - Pre-european vegetation - DA 01/01

(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 not likely to be at variance to this Principle

According to available databases, there are no watercourses or wetlands within the application area (GIS database).

However, an analysis of orthophoto imagery suggests that there is a minor, non-perennial drainage line which has its origins at the very tip of the north-west corner of the application area. It is likely that surface run-off within the application area would enter this drainage line. As such it could be considered as a buffer area for this drainage line. The vegetation in this area is described as "Open hummock grassland of primarily *Themeda* sp. Hamersley Station with minor herbaceous layer and no shrub or tree" (KLA, 2007).

The method of clearing in this area (driving over vegetation or blade up clearing) is not likely to cause an increase in surface run-off, increased sedimentation or turbidity in the nearby drainage line.

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

Methodology KLA (2007)
GIS Database:
- Hydrography, Linear - DoE 1/2/04

(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 surveyed by the Department of Agriculture and Food (Van Vreeswyk et al 2004).

The application area is composed of the following land systems (GIS Database):

Brockman
Calcrete

The Brockman land system is described as depositional surfaces; level, non-saline alluvial plains with clay soils and gilgai microrelief and flanked by slightly more elevated hardpan wash plains, sluggish internal drainage zones on plains and occasional through-going trunk channels (Van Vreeswyk et al, 2004). Tussock grasslands on this system are susceptible to overgrazing and erosion. Soil erosion can occur if native vegetation cover is severely depleted (Van Vreeswyk et al 2004). The Brockman land system is composed of six land units (Van Vreeswyk et al 2004). An analysis of orthophotos for the application area reveals the application area is comprised of the "Gilgai plains" land unit within the Brockman land system. The Gilgai plains land unit is described as level plains with gilgai microrelief, self-mulching cracking-clay soil and some red/brown non-cracking clay soil supporting tussock grass grassland with few shrubs or trees (Van Vreeswyk et al, 2004). This accurately describes the soil and vegetation types described in the KLA vegetation survey (2007).

The Calcrete land system is described as depositional surfaces; valley fill deposits - stony plains as a mosaic of calcrete tables and low rises elevated up to ten metres above the surrounding surfaces of narrow inter-table drainage areas and restricted sandy plains; drainage patterns absent to sparse tributary tracts and occasional through going trunk channels (Van Vreeswyk et al 2004). The Calcrete Land System is described as having a low erosion risk (Van Vreeswyk et al, 2004). The Calcrete Land System is comprised of five land units (Van Vreeswyk et al, 2004). An analysis of orthophotos for the application area reveals the application area is comprised of the "Calcrete plains, platforms and low rises" land unit within the Calcrete land system. The "Calcrete plains, platforms and low rises" land unit is described as level to very gently inclined plains, slightly raised platforms and low rises up to ten kilometres in extent but usually much smaller; outcropping calcrete and surface mantles of many to abundant pebbles and cobbles of calcrete; relief up to ten metres but usually much less, calcrete shallow loams supporting hummock grasslands with Acacia shrubs and occasional trees (Van Vreeswyk et al, 2004). This accurately describes the soil and vegetation types described in the KLA vegetation survey (2007).

Therefore potential for land degradation is very low except where vegetation is severely denuded. The method of clearing in this instance is low impact (driving over vegetation, blade up clearing) and is not likely to lead to a severe loss of vegetation.

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

Methodology KLA (2007)
Van Vreeswyk et al (2004)
GIS Database:
- Rangeland Land System Mapping - DA

(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 at variance to this Principle

According to available databases, the nearest conservation area is Karijini National Park, located approximately 15 km east of the application area (GIS Database).

Karijini National Park is recognised as a representative example of the Hamersley Ranges and is enhanced by most of the area being relatively unmodified by pastoralism or large scale mining operations. There are five large identified wilderness areas within the park. The area shows considerable biological diversity, being especially rich in species of the genus *Acacia*, with forty-six of the fifty-four *Acacia* species which occur in the Pilbara region. Many flora and fauna species of special significance occur at Karijini National Park. The area contains populations of eight species of flora considered as rare, poorly known or of restricted distribution at either the National or State level. Two mammals recorded from Karijini National Park, the Pebble-mound mouse and the Bilby, are considered vulnerable at the national level. These species, along with a further four mammals and birds, are gazetted as rare and endangered under the Western Australia (WA) Wildlife Conservation Act (Australian Heritage Database, 2007).

However, at this distance (15km), the low impact method of clearing is not likely to impact the environmental values of the Karijini National Park.

The Assessment Coordination Section (ACS) of the Department of Environment and Conservation (DEC) have advised that based on the information provided, the assessing officer's conclusions with respect to Principle H are justified (DEC, 2007).

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

Methodology Australian Heritage Database (2007)
DEC (2007)
GIS Database:
- CALM Managed Lands and Waters - CALM 1/7/05

(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

The application area lies immediately south and east of Public Drinking Water Source Area (PDWSA) - Millstream Water Reserve (GIS Database). This water reserve is gazetted P2 (GIS Database) - areas managed to ensure there is no increased risk of water source contamination/pollution (DoE, 2004). Mineral exploration is 'compatible, with conditions' in these areas. Such conditions are likely to be placed via a DoIR mineral tenement lease (DoE, 2004). Condition 2 of Exploration License E47/731 states "All costeans and other disturbances to the surface of the land made as a result of exploration, including drill pads, grid lines and access tracks, being backfilled and rehabilitated to the satisfaction of the Environmental Officer, Department of Industry and Resources (DoIR). Backfilling and rehabilitation being required no later than 6 months after excavation unless otherwise approved in writing by the Environmental Officer, DoIR".

Therefore the exploration proposal is compatible with the Millstream Water Reserve.

Rainfall in this area is mainly restricted to a wet summer season, where precipitation can be variable (KLA, 2007). Rain can be either intense falls associated with cyclonic events or scattered falls associated with local thunderstorms (KLA, 2007). Average rainfall for Tom Price is 405 ml/year (Bureau of Meteorology, 2007). Water is only likely to flow through this area following intense rainfall events that are likely to carry large sediment loads. Therefore, the proposed clearing is unlikely to decrease the quality of surface water either within the application area or within the Millstream Water Reserve.

Groundwater in the area is approximately 500-1000 mg/L Total Dissolved Solids (TDS). Ground water aquifers in this region are described as - HAMERSLEY - Fractured rock. The Precambrian rocks of the Hamersley Basin are principally volcanics, shales and iron formation. Groundwater is contained within fractures within these rocks. The groundwater level may be deep below the surface, and is generally fresh. This is considered to be potable water (DoW, 2007). The small amount of vegetation to be cleared and the low impact method of clearing are not likely to increase recharge into the aquifer.

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

Methodology Bureau of Meteorology (2007)
DoE (2004)
DoW (2007)
KLA (2007)
GIS Databases:
- Groundwater, Statewide - DoW

(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 an arid tropical climate with a wet summer season and a dry winter season (Bureau of Meteorology, 2007). Most rainfall is received during the wet season, but falls can be variable (Bureau of Meteorology, 2007). Rain can either be sporadic (local thunderstorms) or heavy and intense (cyclonic events). It is likely that during times of intense rainfall there may be some localised flooding in this area. However, the method of clearing and the small area to be cleared are not likely to lead to an increase in flood height or duration.

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

Methodology Bureau of Meteorology (2007).

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

Comments

There is a native title claim over the area under application (WC97_098) (GIS Database). The claim has been registered with the National Native Title Tribunal. However, the mining 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.

The following Aboriginal Sites of Significance fall within a two kilometre radius of the application area: 19035, 20437 and 20754 (GIS Database). It is the proponent's responsibility to comply with the Aboriginal Heritage Act 1972 and ensure that no sites of aboriginal significance are damaged through the clearing process. However, none of these sites are located within the application area and Pilbara Iron have advised that under their Program of Works application for the proposed exploration, they are not required to consult with DIA if aboriginal heritage sites do not intersect with drilling.

A submission was received from the Yamatji Land and Sea Council. They were concerned that adequate heritage survey had not been conducted and that use by traditional owners for bush tucker may be interrupted. Yamatji were advised that the applicant conducted heritage surveys prior to conducting any ground disturbance and all heritage site located were recorded and avoided. In this instance no heritage sites were recorded. A condition has been placed on the permit requiring the permit holder to rehabilitate areas cleared by respreading topsoil and vegetation removed during clearing. This will promote regrowth and enable traditional uses to continue.

Methodology GIS Database:
 - Aboriginal Sites of Significance - DIA 04/07/02
 - Native Title Claims - DLI 19/12/04

4. Assessor's recommendations

Purpose	Method	Applied area (ha)	Comment / recommendation
Mineral Exploration	Mechanical Removal	2.4	<p>The proposal has been assessed against the Clearing Principles and the proposal has been found to be at variance to Principles A and D, may be at variance to principle C not likely to be at variance to Principles B, F, G, I and J and is not at variance to Principles E and H.</p> <p>It is concluded that potential impacts to the environment can be mitigated by conditions imposed on the permit. Therefore it is recommended that the permit be granted subject to the following conditions:</p> <ol style="list-style-type: none"> 1. Permit Holder must record the following for each instance of clearing: <ol style="list-style-type: none"> (a) the location where clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system; (b) the area cleared in hectares; (c) the dates cleared; (d) the method of clearing; (e) the purpose of clearing; and (f) the area rehabilitated in hectares. 2. The Permit Holder shall provide a report to the Director, Environment, DoIR by 30 April 2008 setting out the records required under condition 1 of this permit in relation to the clearing activities carried out between 6 October 2007 and 30 March 2008. 3. The Permit Holder shall retain the vegetative material and topsoil removed by clearing in accordance with this Permit.

4. For each instance of clearing recorded under Condition 1, the Permit Holder must, within 6 months of the completion of exploration activities, rehabilitate all cleared areas by re-shaping the surface so that it is consistent with the surrounding 5 metres of uncleared land, and re-spreading the topsoil and vegetative material stockpiled under Condition 3 over each cleared area.

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6. Glossary

Acronyms:

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

Definitions:

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

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and

birds in danger of extinction, are declared to be fauna that is need of special protection.

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

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

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

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

- EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)** **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN** **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD** **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.