Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5991/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Mesa Minerals Limited**

1.3. Property details

Property: Mining Lease 46/238
Local Government Area: Shire of East Pilbara
Colloquial name: Ant Hill Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 27 March 2014

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. One Beard vegetation association has been mapped within the application area (GIS Database):

192: Hummock grasslands, shrub steppe; kanji over *Triodia pulchella* and *Triodia brizioides* on basalt.

Three botanical surveys have been undertaken at the Ant Hill project site since 2009. The latest survey was a Level 2 flora and vegetation survey by botanists from Animal Plant Mineral. The field survey was undertaken in July and August 2013 and covered Mining Lease 46/238 with a focus on the application area. This survey reviewed the previous surveys by MBS (2010) and Animal Plant Mineral (2009). A total of 20 vegetation communities were described in the survey. The vegetation communities are described below and grouped according to their associations with land forms, drainage and geological features (Animal Plant Mineral, 2013).

Vegetation Communities Associated with Minor Drainage Occurring Across Open Plains

mdop1 - *Acacia ancistrocarpa* mid-dense shrubs over *Cenchrus ciliaris* dense tussock grasses with sparse *Triodia wiseana* hummock grasses.

mdop2 - Emergent trees of *Acacia pruinocarpa*, and mid-dense shrubs of *Acacia ancistrocarpa*, and *Acacia fecunda*, over mid-dense hummock grasses of *Triodia lanigera*.

mdop3 - Mid-dense *Acacia aptaneura* (*Acacia ancistrocarpa*) to dense *Aristida latifolia* trees over and sparse to open *Cenchrus ciliaris* tussock grasses.

Vegetation Communities Associated with Minor Drainage through Rolling Hills

mdrh1 - Mid-dense *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia aptaneura* trees over sparse *Acacia ancistrocarpa* shrubs, over mid-dense *Triodia wiseana* and *Triodia longiceps* hummock grasses with occasional mid-dense *Themeda triandra* tussock grasses.

Vegetation Communities Associated with Mid-Sized Creeks

msc1 - Very sparse *Eucalyptus victrix* (*Corymbia candida*) trees, very over sparse *Acacia aptaneura*, *Acacia pyrifolia* var. *pyrifolia* to very sparse *Cenchrus ciliaris* shrubs over mid-dense tussock grasses and mid-dense *Triodia wiseana* hummock grasses.

Vegetation Communities Associated with Breakaways and Plateaus

bm1 - Very sparse to mid-dense *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia aptaneura*, and *Acacia pruinocarpa* trees, over sparse *Ptilotus obovatus* heath, over mid-dense *Eriachne obtusa* or *Eriachne mucronata* tussock grass, with occasional *Triodia longiceps* open hummock grass.

Vegetation Communities Associated with Plateaus, Slopes and Hills

psh1 - Emergent *Eucalyptus leucophloia* subsp. *leucophloia* trees, over mid-dense *Eriachne lanata* tussock grasses, with sparse *Triodia lanigera* hummock grasses.

psh2 - Sparse *Eucalyptus leucophloia* subsp. *leucophloia*/*Acacia aptaneura* trees, over sparse *Acacia bromilowiana* (P4) shrubs, over mid-dense *Triodia wiseana* hummock grasses.

psh3 - Emergent *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* trees, over emergent *Hakea chordophylla* and *Acacia inequilatera* shrubs, over dense *Triodia wiseana* hummock grasses.

psh4 - Sparse *Acacia aptaneura* trees, over very sparse *Grevillia berryana* shrubs, over mid-dense *Eriachne obtusa* tussock grasses, and isolated clumps of *Triodia longiceps* hummock grasses.

Vegetation Communities Associated with Breakaways related to Lateritic Rocks

bl1 - Sparse open *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia aptaneura* and *Acacia pruinocarpa* trees, over very sparse *Ptilotus obovatus* heath, over sparse *Triodia wiseana* (*Triodia longiceps*) hummock grass with mid-dense *Eriachne obtusa* and *Eriachne mucronata* tussock grasses.

Vegetation Communities Associated with Open Plains

op1 - Occasional emergent *Eucalyptus leucophloia* subsp. *leucophloia* trees, over occasional emergent *Senna glutinosa* subsp. *pruinosa* shrubs over mid-dense *Triodia longiceps* (*Triodia wiseana*) hummock grasses.

op2 - Very sparse *Eucalyptus leucophloia* subsp. *leucophloia* trees, over sparse *Acacia retivenea* shrubs, over dense *Triodia wiseana* hummock grasses.

op3 - Sparse *Sida echinocarpa* shrubs, over very sparse *Triodia longiceps* /*Triodia wiseana* hummock grasses with sparse *Aristida contorta* tussock grasses.

op4 - Mid-dense *Acacia ancistrocarpa* shrubs, over very sparse *Sida echinocarpa*, *Cochorus lasiocarpus* subsp. *lasiocarpus* and *Indigofera monofila* heath, over *Triodia wiseana*, mid-dense hummock grasses with sparse *Aristida contorta* tussock grasses.

op5 - Emergent *Acacia inequilatera* shrubs over emergent *Senna glutinosa* subsp. X *luerssenii* shrubs, over mid-dense *Triodia wiseana* hummock grasses.

op6 - Emergent *Acacia aptaneura* and *Acacia bromilowiana* (P4) trees over mid-dense shrubs over sparse *Triodia longiceps* hummock grasses.

op7 - Very sparse *Acacia victoriae*/*Acacia tetragonophylla* shrubs, over dense *Eriachne obtusa* and *Aristida latifolia* tussock grasses.

op8 - Mid-dense *Acacia aptaneura* trees over very sparse *Acacia sibirica* shrubs, over dense *Triodia wiseana* hummock grasses.

op9 - Very sparse *Acacia ancistrocarpa* shrubs, over emergent *Senna glutinosa* subsp. *pruinosa* shrubs, over mid-dense *Triodia wiseana* hummock grasses.

Clearing Description

Ant Hill Project.
Mesa Minerals Limited proposes to clear up to 208 hectares of native vegetation, within a total boundary of approximately 365 hectares, for the purpose of mineral production. The clearing is to develop the Ant Hill manganese deposit. The project is located approximately 52 kilometres south-east of Nullagine.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);
To:
Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

Comment

The vegetation condition was assessed by botanists from Animal Plant Mineral (2013).

The clearing is for manganese mining activities including a pit, waste rock dump, ore processing and beneficiation plant, camp and associated infrastructure.

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The application area occurs within the Chichester subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by plains supporting a shrub steppe of *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (CALM, 2002).

Three biological surveys have been undertaken at the Ant Hill Project; a vegetation and fauna assessment by Animal Plant Mineral in 2009, a targeted search for Threatened and Priority Flora by MBS in 2010 and a Level

1 fauna survey and a Level 2 flora and vegetation survey by Animal Plant Mineral in 2013. The latest survey covered Mining Lease 46/238 with a focus on the application area.

A total of 256 vascular plant taxa, from 108 genera within 36 families were recorded during the 2013 survey (Animal Plant Mineral, 2013). The most speciose families were Fabaceae, Poaceae and Malvaceae (Animal Plant Mineral, 2013).

No Threatened Flora, Threatened Ecological Communities or Priority Ecological Communities were recorded within the application area during the flora and vegetation surveys or have previously been recorded within the application area (Animal Plant Mineral, 2013; GIS Database).

One Priority Flora species, *Acacia bromilowiana* (Priority 4), was recorded within the application area (Animal Plant Mineral, 2013). It was detected at six sites within the Animal Plant Mineral (2013) survey area and formed the dominant strata in two vegetation communities, op6 and psh2. Vegetation communities op6 and psh2 are located within the proposed waste dumps and it is estimated that approximately 100 plants will be impacted (Animal Plant Mineral, 2013). Since 2009 the Priority status of this species has been downgraded from Priority 3 to Priority 4. *Acacia bromilowiana* appears to be restricted to steep shale slopes of the southern Hamersley Ranges. There are 26 records listed on the Western Australian Herbarium which indicates the species is common where it occurs (Animal Plant Mineral, 2013). An additional population of *Acacia bromilowiana* was also detected 2.3 kilometres north-west of Mining Lease 46/238 where it occurs in identical habitat to the population recorded within the application area (Animal Plant Mineral, 2013). The loss of approximately 100 plants is expected to have minimal impact to the reproductive functioning of the regional population (Animal Plant Mineral, 2013).

Six introduced flora species were recorded during the Animal Plant Mineral (2013) flora survey. These weed species were Bipinnate Beggartick (*Bidens bipinnata*), Birdwood Grass (*Cenchrus setiger*), Buffel Grass (*Cenchrus ciliaris*), Kapok Bush (*Aerva javanica*), Speedy Weed (*Flaveria trinervia*) and Spiked Malvastrum (*Malvastrum americanum*) (Animal Plant Mineral, 2013). Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The fauna habitats identified within the application area are well represented in the local area and the region (Animal Plant Mineral, 2013).

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

Methodology

Animal Plant Mineral (2013)
CALM (2002)
GIS Database:
- IBRA WA (Regions - Subregions)
- Threatened and Priority Flora
- Threatened Ecologial Sites Buffered

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

Comments

Proposal is not likely to be at variance to this Principle

A Level 1 fauna survey was undertaken over the application area and its surrounds in Mining Lease 46/238 by Animal Plant Mineral. The desktop review included a previous fauna assessment for the Ant Hill and neighbouring Sunday Hill site in 2009 by Animal Plant Mineral. The on-ground fauna survey was conducted in July - August 2013 and targeted Northern Quoll (*Dasyurus hallucatus*), Pilbara Orange Leaf-nosed Bat (*Rhinonicteris aurantius*) and Ghost Bat (*Macroderma gigas*). A search for potential Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*), Bilby (*Macrotis lagotis*) and Mulgara (*Dasycercus blythii*) habitat was also performed (Animal Plant Mineral, 2013). A follow up survey was conducted in November 2013 targeting Pilbara Orange Leaf-nosed Bat and Pilbara Olive Pythons.

Four fauna habitat types were identified within the application area during the July - August 2013 survey:

- Drainages;
- Mesa breakaway slopes;
- Plateaus, slopes and hills; and
- Low rolling hills (Animal Plant Mineral, 2013).

These fauna habitat types are well represented throughout the local area and throughout the region (Animal Plant Mineral, 2013).

The Northern Quoll trapping regime did not capture any Northern Quolls and no scats or signs of Northern Quoll were found during searches of caves (Animal Plant Mineral, 2013).

Searches for potential Bilby and Mulgara habitat were also conducted in the application area and no suitable habitat was found. Additionally no signs of burrows or scats were found (Animal Plant Mineral, 2013).

Bat detectors were set up at three sites within the application area during the July - August 2013 field survey. The Pilbara Orange Leaf-nosed Bat was detected at one site while the Ghost Bat was not detected (Animal Plant Mineral, 2013). Based on the results of the first field survey, a follow up survey was conducted in November 2013 to determine if there was a diurnal roost of Pilbara Olive Leaf-nosed Bat within the application area. To determine the presence of a Pilbara Orange Leaf-nosed Bat diurnal roost within the application area bat detectors were set up at 21 sites. Low numbers of calls were recorded late at night at five of these sites, a pattern consistent with foraging behaviour. No calls were recorded soon after sunset which would have indicated the presence of a diurnal roost (Animal Plant Mineral, 2013). A concurrent survey to attempt to locate the regional diurnal roost used detectors at an additional 21 sites for a single night at each. Pilbara Orange Leaf-nosed Bat calls were detected at 15 sites at varying activity levels and times across the nights. These detections suggest that a diurnal roost lies to the east of Ant Hill but does not rule out the presence of a second diurnal roost in the local area, but away from the survey area (Animal Plant Mineral, 2013).

Three sloughed skins of the Pilbara Olive Python were found in small caves on the Ant Hill mesa in the application area during the July - August 2013 field survey (Animal Plant Mineral, 2013). The follow up survey in November 2013 included a search adjacent the application area to locate signs of Pilbara Olive Pythons. A further two sloughed skins were found to the south of the application area. This shows that the Pilbara Olive Python is not restricted to the manganese caves inside the application area (Animal Plant Mineral, 2013). Additionally, the cave forming geological feature Mount Cooke is located approximately 5 kilometres south-east. These two land forms are connected via a densely vegetated Mulga woodland and shallow drainage line, likely to offer a suitable corridor for python movement (Animal Plant Mineral, 2013).

Database searches by Animal Plant Mineral (2013) revealed several other conservation significant fauna species with the potential to occur within the application area based on habitats present:

- Australian Bustard (*Ardeotis australis*) (DPaW Priority 4);
- Fork-tailed Swift (*Apus pacificus*) (Migratory under *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act); Schedule 3 of the *Wildlife Conservation Act 1950* (WC Act));
- Grey Falcon (*Falco hypoleucos*) (Schedule 1 of the WC Act);
- Peregrine Falcon (*Falco peregrinus*) (Schedule 4 of the WC Act);
- Pin-striped Fine-snout Skink (*Ctenotus nigeilineatus*) (DPaW Priority 1);
- Rainbow Bee-eater (*Merops ornatus*) (Migratory under EPBC Act; Schedule 3 of the WC Act);
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (DPaW Priority 4) (Animal Plant Mineral, 2013).

The conservation significant birds are mobile and unlikely to be significantly impacted by the proposed clearing. The Rainbow Bee-eater is a common migratory species that has been recorded from the area by Birds Australia (Animal Plant Mineral, 2013). This avifauna species is highly mobile and expected to be seasonally common in the local area. In addition to natural nest sites along drainage lines, Rainbow Bee-Eaters often nest in windrows along roads and in spoil heaps and disturbance associated with mining can increase nesting habitat (Animal Plant Mineral, 2013). Australian Bustards were also recorded from the area by Birds Australia (Animal Plant Mineral, 2013). The Australian Bustard inhabits grasslands and savannah grasslands, moving nomadically in response to the presence of food (Johnstone and Storr, 1998). Consequently, the proposed clearing is unlikely to significantly impact on the species (Animal Plant Mineral, 2013). The Fork-tailed Swift is almost entirely aerial while in Australia so it is unlikely to be affected by the proposed clearing (Animal Plant Mineral, 2013). The Grey Falcon and Peregrine Falcon are both wide ranging and while they may use the application area for foraging, they are unlikely to use to application for nesting as there are no suitable trees or cliffs (Animal Plant Mineral, 2013).

The Western Pebble-mound Mouse possibly occurs within the application area. A very old pebble mound was recorded during the field survey but no active mounds were located within the application area (Animal Plant Mineral, 2013).

The Pin-striped Fine-snout Skink possibly occurs within the application area (Animal Plant Mineral, 2013). It has not been recorded within the application area but has been recorded in the local area. Habitat preferences for this species are not clearly defined but it appears that spinifex is important. Given the lack of information it remains possible the species may occur (Animal Plant Mineral, 2013).

The most significant impact on fauna habitat will be on the mesa breakaway slopes habitat (Animal Plant Mineral, 2013). Six species of conservation significance were identified as potentially occurring in the mesa breakaway slopes habitat. Of these, only two are likely to be impacted by the proposed clearing: the Pilbara Olive Python and the Pilbara Orange Leaf-nosed Bat. However, the follow up survey conducted in November 2013 showed that the Pilbara Olive Python is not restricted to the application area and is using the surrounding landscape and while the Pilbara Orange Leaf-nosed Bat is using the application area as foraging habitat, it is not using the application area as diurnal roosting habitat (Animal Plant Mineral, 2013). Therefore the impact to these two species is considered low as neither is specifically dependent on the application area for their survival (Animal Plant Mineral, 2013).

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

Methodology Animal Plant Mineral (2013)

Johnstone and Storr (1998)

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

Comments

Proposal is not likely to be at variance to this Principle

According to available databases there are no known records of Threatened Flora within the application area (GIS Database).

Three botanical surveys have been undertaken at the Ant Hill project site since 2009. The latest survey was a Level 2 flora and vegetation survey by botanists from Animal Plant Mineral. The field survey was undertaken in July and August 2013 and covered Mining Lease 46/238 with a focus on the application area. This survey reviewed the previous surveys by MBS (2010) and Animal Plant Mineral (2009). No Threatened Flora was recorded within the application area (Animal Plant Mineral, 2013)

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

Methodology

Animal Plant Mineral (2009)
Animal Plant Mineral (2013)
MBS (2010)
GIS Database:
- Threatened and Priority Flora

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

Comments

Proposal is not likely to be at variance to this Principle

A search of available databases revealed there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest recorded TEC is located approximately 150 kilometres south-west of the application area (GIS Database).

No TECs were identified during the flora and vegetation survey conducted by Animal Plant Mineral botanists over the application area (Animal Plant Mineral, 2013).

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

Methodology

Animal Plant Mineral (2013)
GIS Database:
- Threatened Ecological Sites Buffered

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

Comments

Proposal is not at variance to this Principle

The clearing application area falls within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 99.6% of the pre-European vegetation remains (see table) (Government of Western Australia, 2013; GIS Database). This gives it a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

The vegetation of the clearing application area has been broadly mapped as Beard vegetation association 192 'Hummock grasslands, shrub steppe; kanji over *Triodia pulchella* and *Triodia brizioides* on basalt' (Government of Western Australia, 2013; GIS Database). Approximately 100% of this Beard vegetation association remains at the state and bioregional level (Government of Western Australia, 2013). This vegetation association would be given a conservation status of 'Least Concern' at both a state and bioregional level (Department of Natural Resources and Environment, 2002).

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

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,808,657	17,733,584	~99.6	Least Concern	6.3
Beard Veg Assoc. – State					
192	280,692	280,692	~100	Least Concern	-
Beard Veg Assoc. – Bioregion					
192	280,692	280,692	~100	Least Concern	-

* Government of WA (2013)
** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Government of Western Australia (2013)
GIS Database:
- IBRA WA (Regions - Subregions)
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the application area, however, there are a number of minor non-perennial watercourses (GIS Database). Creeks in the application area are dry most of the year with small catchment areas as they are located in the headwaters of major draining systems (Mesa Minerals Limited and Animal Plant Mineral, 2014).

A total of 20 vegetation communities were described and mapped during the flora and vegetation survey by Animal Plant Mineral in August 2013. Three vegetation communities (mdop1, mdop2, mdop3) occur in conjunction with incised minor drainage lines or localised surface patterns of overland flow across open plains. One vegetation community (mdrh1) occurs in conjunction with drainage lines through low hills. The vegetation community msc1 is associated with mid-sized creeks and includes larger drainage lines, supporting groundwater dependent vegetation such as large Eucalyptus trees (Animal Plant Mineral, 2013).

Where possible, the creek and associated drainage lines will be avoided during the development of infrastructure (Animal Plant Mineral, 2013).

Based on the above, the proposed clearing is at variance to this Principle. However, creeks and ephemeral watercourses are common and widespread in the Pilbara bioregion. The proposed clearing associated with watercourses is unlikely to have a significant impact on any watercourse or wetland.

Methodology Animal Plant Mineral (2013)
Mesa Minerals Limited and Animal Plant Mineral (2014)
GIS Database:
- Hydrography, Linear

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

Comments

Proposal may be at variance to this Principle

The application area intersects the Billygoat, McKay and Rocklea Land Systems (GIS Database).

The Billygoat Land System is characterised by dissected plains and slopes supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The system is generally not susceptible to accelerated erosion (Van Vreeswyk et al., 2004).

The McKay Land System is characterised by hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The system is not prone to degradation or soil erosion (Van Vreeswyk et al., 2004).

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

The soils of the application area are scarce and where soil is available it is classified as shallow loam soils, mainly occurring within 10 centimetres of the substrate geology (Mesa Minerals Limited and Animal Plant Mineral, 2014). Areas of deeper soil profile tend to be on the river floodplains where the substrate is alluvium, sand or silt deposited in the drainage channels (Mesa Minerals Limited and Animal Plant Mineral, 2014).

Although the land systems are stable, the amount of proposed clearing is large (208 hectares). Rehabilitation including revegetation of cleared areas will be carried out following completion of mining, minimising the long term impact of land degradation (Mesa Minerals Limited and Animal Plant Minerals, 2014). However, in the short term there is a risk of wind and water erosion if any susceptible areas are left cleared and bare for long periods of time. Potential impacts from erosion may be minimised by the implementation of a staged clearing condition.

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

Methodology Mesa Minerals Limited and Animal Plant Minerals (2014)
Van Vreeswyk et al. (2004)
GIS Database:
- Rangeland Land System Mapping

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

Comments

Proposal is not likely to be at variance to this Principle

The proposed clearing is not located within a conservation reserve (GIS Database). The nearest conservation area is the ex-Meentheena pastoral lease, a former leasehold proposed for conservation, which is located approximately 62 kilometres north of the application area (GIS Database).

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

Methodology GIS Database:
- DEC Tenure

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

Comments

Proposal is not likely to be at variance to this Principle

There are no permanent watercourses or wetlands within the application area, however, the application area does include multiple minor non-perennial watercourses (GIS Database). The application area is situated between two large drainage systems, Coondoon Creek to the north and Davis River to the south. Both are part of the Oakover River drainage basin which drains towards the north coast and only flows during intermittent, seasonal rainfall events (Mesa Minerals Limited and Animal Plant Minerals, 2014). Creeks in the application area are dry most of the year with small catchment areas as they are located in the headwaters of the major draining systems. They are reliant on episodic high rainfall events which result in brief periods of flow, and drain rapidly to the major rivers and creeks away from the site (Mesa Minerals Limited and Animal Plant Minerals, 2014). Large rivers in the district such the Oakover, DeGray and the Nullagine Rivers only flow following these brief, high rainfall summer storms and only flood following a series of these summer storms and occasional cyclonic events (Mesa Minerals Limited and Animal Plant Minerals, 2014).

On a local scale the drainage pattern is away from the mine area which is a localised high. To the south of the mine, drainage is to the east along Poonagarra Creek; water draining the western side of the application area flows southwards before joining the system; water draining the eastern side of the application area flows either southwards to join Poonagarra Creek, eastwards into the Tommyhawk Creek or northwards joining the Coondoon Creek (Mesa Minerals Limited and Animal Plant Minerals, 2014).

Some of the water management strategies Mesa Minerals Limited will employ include:

- Install adequate creek crossings to avoid interruption of significant drainage lines wherever possible;
- Cleared vegetation shall be stockpiled to avoid any interference to surface drainage flows;
- Dumps located to prevent damming or ponding of surface water runoff;
- Stockpiled vegetation shall be placed on rehabilitated areas to reduce erosion or stockpiled for later use in rehabilitation;
- Appropriately designed sediment traps will be installed and monitored for siltation (Mesa Minerals Limited and Animal Plant Minerals, 2014).

If management measures and operating procedures are adhered to then the proposed clearing is not likely to cause deterioration in the quality of surface water (Animal Plant Mineral, 2013).

The application area is not within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is Nullagine Water Reserve which is located approximately 44 kilometres north-west of the application area (GIS Database). The proposed clearing is unlikely to affect the water quality of the water reserve due to the distance between it and the application area.

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

Methodology Animal Plant Mineral (2013)
Mesa Minerals Limited and Animal Plant Minerals (2014)
GIS Database:
- Hydrography, Linear
- Public Drinking Water Source Areas (PDWSAs)

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

Comments

Proposal is not likely to be at variance to this Principle

The application areas are located in an arid region where the average annual evaporation rate greatly exceeds the average annual rainfall (Animal Plant Mineral, 2013; GIS Database). There are no permanent watercourses within the application area, however, numerous ephemeral drainage lines dissect the proposed clearing areas (GIS Database). These drainage lines are expected to be dry for most of the year, and would likely only flow briefly immediately following significant rainfall.

Natural flood events do occur in the Pilbara region following cyclonic activity. However, the proposed clearing is not expected to increase the incidence or intensity of such events given the size of the area to be cleared (208 hectares) in relation to the Oakover River catchment area (2,001,756 hectares) (GIS Database).

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

Methodology Animal Plant Mineral (2013)
GIS Database:
- Evaporation Isopleths
- Hydrographic Catchments - Catchments
- Hydrography, Linear
- Rainfall, Mean Annual

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

Comments

There is one Native Title Claim (WC1999/016) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

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

The clearing permit application was advertised on 24 February 2014 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims - Registered with the NNTT

4. References

Animal Plant Mineral (2009) Aurex Resources Pty Ltd Ant Hill and Sunday Hill: Level 1 Biological Assessment Survey. Unpublished Report Prepared by Animal Plant Mineral.

Animal Plant Mineral (2013) Biological Assessment Ant Hill Project East Pilbara, Western Australia. Report Prepared by Animal Plan Mineral Proprietary Limited for Mesa Minerals Limited as a manager of the Mesa Mining Joint Venture, August 2013.

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5. Glossary

Acronyms:

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

Definitions:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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