Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5874/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Ramelius Resources Limited**

1.3. Property details

Property: Mining Lease 58/30
Mining Lease 58/64
Mining Lease 58/136
Mining Lease 58/143
Mining Lease 58/172
Mining Lease 58/181
Mining Lease 58/185
Mining Lease 58/187
Mining Lease 58/202
Mining Lease 58/205
Mining Lease 58/232
Local Government Area: Shire of Mount Magnet
Colloquial name: Mount Magnet Mine Pit Cutbacks Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
80		Mechanical Removal	Mineral Production and Associated Activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 27 December 2013

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. The following Beard vegetation associations are located within the application area (GIS Database):

312: succulent steppe with very open shrubs; very sparse mulga and *Acacia sclerosperma* over saltbush and bluebush; and
313: succulent steppe with open scrub; scattered *Acacia sclerosperma* and *Acacia victoriae* over bluebush.

The application area is associated with existing open pits at the Mount Magnet mine site known as the Brown Hill, O'Meara, Boomer and Golden Stream pits. The application area consists of three separate areas, one associated with the Brown Hill pit, one with the O'Meara pit and the third with the Boomer and Golden Stream pits. Aerial imagery shows that some of the application area has already been cleared for existing mine infrastructure and that the majority of the vegetated area occurs within the Brown Hill portion of the application area (GIS Database).

Several flora and vegetation surveys have been conducted at the Mount Magnet site and most of the application area has been surveyed at some point. The most relevant appears to be a Level 1 flora and vegetation survey conducted by Outback Ecology on 11 to 13 July 2012 in the Brown Hill portion of the application area (78.3 hectare survey area) (Outback Ecology 2012a). This survey covers a large portion of the vegetated area occurring within the application area. Outback Ecology (2012a) identified the following four vegetation units and four sub units within the application area:

Mulga Scrub in Ephemeral Drainage Lines
1. Tall Open Scrub of *Acacia aneura*, Acacia ?*aptaneura*, *Acacia craspedocarpa* and/or *Acacia grasbyi* over Open Shrubland of *Acacia ramulosa* var. *ramulosa* and scattered *Acacia speckii* (P4) over Open Shrubland of *Thryptomene costata* (patches) with *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei* and *Eremophila latrobei* and/or *E. punicea* over Open Herbland of *Erodium* sp. and Open Grassland of *Aristida contorta* and *Tripogon loliiformis* in ephemeral drainage lines.

Mulga Shrubland
2a. Tall Open Shrubland of *Acacia quadrimarginea* with *Acacia aneura* over Open Shrubland of *Thryptomene costata* and *Eremophila latrobei* over Open Herbland of *Ptilotus schwartzii* var. *schwartzii*, ?*Angianthus* sp. and Open Grassland of *Eriachne* ?*flaccida* on stony red loam flats.

2b. Tall Open Shrubland of *Acacia aneura, Acacia* ?*caesaneura* and Acacia ?*aptaneura* over Shrubland of *Acacia ramulosa* var*. ramulosa* and *Grevillea obliquistigma* over scattered Grasses of *Eragrostis eriopoda* and *Aristida contorta* on stony red loam flats.

2c. Scattered Tall Shrubs of *Acacia aneura, Acacia grasbyi*, *Acacia burkittii* and *Acacia ramulosa* var*. ramulosa* over Open Chenopod shrubland of *Maireana* spp., *Sclerolaena fusiformis and Enchylaena tomentosa* var. *tomentosa* over Open Grassland of *Enneapogon caerulescens* on stony red loam flats.

2d. Tall Open Shrubland of *Acacia aneura*, *Acacia ?aptaneura* and *Acacia grasbyi* over Open Shrubland of *Acacia ramulosa* var. *ramulosa* and *Acacia speckii* (P4) over Open Shrubland of *Thryptomene costata*, *Eremophila punicea* and *Scaevola spinescens* over Open Herbland of *Cheilanthes sieberi* subsp*. sieberi* and *Drosera macrantha* with Scattered *Austrostipa* sp. across rocky quartz outcropping.

Open Stony Plain
3. Scattered Tall Shrubs of *Acacia quadrimarginea* and *Acacia ?aptaneura* over Very Open Shrubland of *Aluta aspera* subsp. *hesperia*, *Thryptomene decussata* and *Ptilotus schwartzii var. schwartzii* with Herbland of ?*Angianthus* sp. and *Drosera macrantha* on stony plains.

Waste Dump (Rehabilitation Area)
4. Scattered *Acacia victoriae* subsp. *victoriae* over low shrubs and grasses including *Maireana triptera*, *Cymbopogon ambiguus* and *Aristida contorta* on waste dump formation.

The remainder of the application area has been mostly covered by a flora and vegetation survey conducted by Outback Ecology in 2007 (Outback Ecology, 2007). This survey was undertaken over sections of the Sirdar and Vicqueries banded ironstone formations (BIFs) from 27 August to 2 September 2007 and focused on BIF ridges within and surrounding the Mount Magnet operation (Outback Ecology, 2007). Vegetation mapping was conducted over a large area, however, interpretative mapping was conducted in areas of non-BIF vegetation. Based on this mapping, the following vegetation types are likely to be present within the application area:

1. OScr2 – *Acacia grasbyi* and *A. quadrimarginea* Open Scrub over *Thryptomene decussata, Philotheca brucei* subsp *brucei* and *Eremophila latrobei* subsp. *latrobei* Low Scrub. Other species recorded in this association included *Ptilotus obovatus* var *obovatus, Acacia aneura* var *aneura, Sida calyxhymenia* and *Eriachne ?mucronata.*

2. LWB1 – *Acacia craspedocarpa* and *Brachychiton gregorii* Low Woodland B Over *A. grasbyi, A aneura* var *aneura* and *Senna glaucifolia* Open Scrub Over *Thryptomene decussata, A. tetragonophylla* and *A. ramulosa* var *ramulosa* Low Scrub B. Other species recorded in this association included *Philotheca brucei* subsp *brucei, Acacia* sp narrow phyllode, *Trachymene ornata, Eremophila exilifolia, Ptilotus schwartzii, Senna glaucifolia.*

3. LWB3 – *Acacia aneura* var *aneura* Low Woodland B Over *A. aneura* var *tenuis* and *A. ramulosa* var *ramulosa* Scrub Over *Eremophila punicea* and *Maireana thesioides* Dwarf Scrub C. Other species recorded in this association included *Acacia speckii, Eremophila galeata, Dianella revoluta, Hakea leucoptera* var *sericipes, Ptilotus schwartzii, A. aneura* var *fuliginea*.

4. OW – *Acacia aneura* var *aneura* and *Eremophila oldfieldii* subsp *angustifolia* Open Woodland Over *A. quadrimarginea, A. craspedocarpa* and *A. grasbyi* Heath A Over *Eremophila punicea* and *Ptilotus obovatus* var *obovatus* Dwarf Scrub. Other species recorded in this association included *Scaevola spinescens, Acacia tetragonophylla, A. speckii, Senna glaucifolia, Solanum lasiophyllum, Senna* sp Austin and *Stylidium longibracteatum.*

5. LWA1 – *Acacia aneura* var *aneura* Open Low Woodland A Over *Philotheca brucei, Thryptomene decussata* and *Grevillea didymbotrya* subsp *didymbotrya* Heath B. Other species recorded in this association included *Aluta aspera* subsp *hersperia, Ptilotus obovatus* var *obovatus, A. quadrimarginea, Dianella revoluta, Eremophila glutinosa, P. schwartzii, E. latrobei* var *latrobei, E. exilifolia, A. ramulosa* var *ramulosa, Philotheca brucei* var *brucei*.

Clearing Description

Mount Magnet Mine Pit Cutbacks Project. Ramelius Resources Limited proposes to clear up to 80 hectares of native vegetation within a total boundary of approximately 262 hectares, for the purpose of undertaking cutback gold mining operations on four existing open pits at the Mount Magnet mine. The project is located approximately 3.5 kilometres west, north west of Mount Magnet, in the Shire of Mount Magnet.

Vegetation Condition

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

To

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The proposed clearing is associated with cutbacks of the existing Boomer, Golden Stream, Brown Hill and O'Meara open pits. This also includes extension or construction of new waste rock landforms at each pit (Cardno, 2013).

Vegetation condition was determined by referring to several flora and vegetation surveys over the Mount Magnet site and reviewing aerial photography. These surveys were conducted by Outback Ecology in August and September 2007 and July 2012 and Niche Environmental Services (Niche) in September 2009 and/or March 2010 (2010a, 2010b). These surveys partially cover the application area.

The Mount Magnet tenements have been subject to more than 100 years of historical mining and pastoral activities (Cardno, 2013).

According to Outback Ecology (2012a), the July 2012 survey was undertaken approximately three weeks after the

last rainfall event in June, therefore, not all ephemeral flora (if any) may have been present at the time of the field survey due to the immature growth stage of the annual assemblage.

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

Several flora and vegetation surveys have been conducted at the Mount Magnet site with approximately 90% of the application area surveyed at some point (Niche, 2010a; Niche 2010b; Outback Ecology, 2007; Outback Ecology, 2012a). A review of aerial imagery and topography shows vegetation of the unsurveyed area is likely to be similar to vegetation of the surveyed areas (GIS Database).

The surveys found that vegetation was generally sparse and disturbed by mining, exploration and grazing impacts. Aerial imagery shows the majority of O'Meara and Boomer/Golden Stream are already covered by existing mining infrastructure (GIS Database). The flora and vegetation survey undertaken by Outback Ecology in August and September 2007 focused on banded ironstone formation (BIF) ridges within and surrounding the Mount Magnet site. Outback Ecology (2007) considered vegetation of the BIF to be comparitively widespread with a general lack of habitat specificity. Level 1 surveys undertaken by Niche in September 2009 and March 2010 found the vegetation was either widespread or in a condition that was not thought to be a representative unit (Niche, 2010a; Niche 2010b).

The Niche and Outback Ecology flora and vegetation surveys recorded between 25 and 120 taxa from between 8 and 33 families and 10 and 67 genera (Niche, 2010a; Niche 2010b; Outback Ecology, 2007; Outback Ecology, 2012a). Several weed species have been recorded at the Mount Magnet mine site. The presence of introduced weed species lowers the biodiversity values of the proposed clearing areas. Potential impacts from weeds as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Available databases show no known Threatened Flora or Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) occur within the application area (GIS Database). No Threatened Flora or TECs have been recorded in previous surveys undertaken at the Mount Magnet site (Cardno, 2013). No PECs were recorded by Outback Ecology in July 2012 (Outback Ecology, 2012a).

Several Priority Flora species have previously been recorded within and surrounding the Mount Magnet site including:

- *Stenanthemum mediale* (Priority 1) – Recorded at two locations between approximately 350 metres and 650 metres outside of the application area (Western Botanical, 2006; Niche, 2010b). It has also been tentatively recorded at another location (insufficient plant matter for a confident identification) (Outback Ecology, 2007). This species occurs on red clayey sands and is known from nine records from the Murchison bioregion (Western Australian Herbarium, 2013).
- *Verticordia jamiesonii* (Priority 3) – Recorded at one location approximately 150 metres outside of the application area (Niche, 2010b). This species occurs on lateritic breakaways and is known from 32 records from the Gascoyne, Gibson Desert, Great Victoria Desert, Murchison and Yalgoo bioregions (Western Australian Herbarium, 2013).
- *Ptilotus astrolasius* var. *luteolus* (more recently known as *Ptilotus luteolus* (Priority 3)) - Recorded at four locations between approximately 750 metres and 6 kilometres outside of the application area (Western Botanical, 2006). This species is known from 14 records from the Carnarvon, Gascoyne and Murchison bioregions (Western Australian Herbarium, 2013).
- *Acacia speckii* (Priority 4) – Recorded within the application area and at numerous locations outside the application area (Outback Ecology, 2012a; Cardno, 2013). This species occurs on rocky soils over granite, basalt or dolerite and rocky hills or rises and is known from 28 records from the Gascoyne, Murchison and Yalgoo bioregions (Western Australian Herbarium, 2013).
- *Dodonaea* sp. Ninghan (H. Demarz 5121) (more recently known as *Dodonaea amplisemina* (Priority 4)) – Recorded at three locations between approximately 750 metres and 3 kilometres outside of the application area (Western Botanical, 2006). This species occurs on red-brown sandy clay on basalt and gabbro and banded ironstone or on dolerite and quartzite and rocky hills and is known from 31 records from the Avon Wheatbelt, Gascoyne, Murchison and Yalgoo bioregions (Western Australian Herbarium, 2013).
- *Acacia burrowsiana* and *Alyxia tetanifolia* (both Priority 3) - According to Naturemap (DEC, 2013), these species have been recorded within five kilometres of the approximate centrepoint of the application area.

The proposed clearing will likely impact on *Acacia speckii*, however, this species has been recorded at numerous locations outside the application area and has a widespread distribution. The remainder of the abovementioned Priority Flora species were not detected within the surveyed areas of the application area and are unlikely to occur within the unsurveyed areas given vegetation is considered to be similar to the surveyed areas. Based on the above, the proposed clearing is unlikely to have a significant impact on Priority Flora species.

Given the application area has not been completely covered by exisiting surveys there may be other Priority Flora species present that may be impacted by the proposed clearing. However, given the majority of the vegetated areas have been surveyed and the disturbed nature of the application area, it is unlikely the proposed

clearing will have a significant impact on Priority Flora species.

According to Naturemap, seven mammal, 80 bird, five amphibian, 14 invertebrate and 32 reptile species have been recorded within a 20 kilometre radius of the approximate centrepoint of the application area (DEC, 2013). However, the application area has been disturbed by mine infrastructure, tracks and drilling disturbance and grazing by goats and rabbits and is located in close proximity to active mining areas. Based on this, the application area is not expected to support a high level of faunal diversity.

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

Methodology

Cardno (2013)
DEC (2013)
Niche (2010a)
Niche (2010b)
Outback Ecology (2007)
Outback Ecology (2012a)
Western Australian Herbarium (2013)
Western Botanical (2006)
GIS Database:
- Mount Magnet 1.4m Orthomosaic - Landgate 2003
- Threatened and Priority Flora
- Threatened Ecological Sites Buffered
- Topographic Contours, Statewide

(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 fauna survey has not been conducted over the application area, however, two fauna desktop studies have been conducted by Outback Ecology. Portions of the application area have also been subject to a targeted Malleefowl survey undertaken by Outback Ecology on 6 and 7 February 2012 for clearing permit CPS 3713/1 (Outback Ecology, 2012b). Ecologists also searched for Malleefowl mounds and tracks in areas of suitable habitat during the July 2012 flora and vegetation survey in the Brown Hill area (Outback Ecology, 2012a).

The first fauna desktop study was undertaken in November 2009 and was conducted for ten mining tenements, six of which occur within the application area (Outback Ecology, 2010). The second was conducted as part of the July 2012 flora and vegetation survey in the Brown Hill area (Outback Ecology, 2012a).

The 2012 fauna desktop study used vegetation mapping from the flora and vegetation survey to determine broad fauna habitats. The following four broad fauna habitats were identified and mapped within the application area (Outback Ecology, 2012a):

- Mulga Shrubland – Open *Acacia aneura* or *A. quadrimarginea* over scattered low shrubs over scattered grasses on stony red loam flats;
- Drainage Depression – Tall open scrub of *Acacia aneura* and other *Acacia* species over open shrubland of *Eremophila* and *Thryptomene* over open herbland in drainage lines;
- Open Stony Plain – Scattered Tall Shrubs of *Acacia quadrimarginea* over Very Open Mixed Shrubland with Herbland on stony plains; and
- Disturbed Area – cleared areas and waste landforms.

According to Outback Ecology (2012a), these habitats are widespread and typical of the Murchison bioregion. The 2010 fauna desktop study identified the following seven fauna habitats over ten mining tenements (Outback Ecology, 2010):

- Mixed *Acacia* and *Eucalyptus* species rehabilitation;
- Mixed *Acacia* woodlands;
- Breakaways;
- Hillcrests and slopes;
- Minor drainage lines;
- Shrub plains; and
- Claypans.

Habitats such as mixed *Acacia* woodlands, hillcrests and slopes, minor drainage lines, shrub plains and claypans are widely represented throughout the Murchison region (ANRA, 2007) (cited in Outback Ecology, 2010). South facing breakaways have the potential to support short range endemic species, however, these breakaways appear to occur outside the application area to the north west (Outback Ecology, 2010).

Outback Ecology (2012a) identified several conservation significant fauna as possible or likely to occur within the application area. These include the Malleefowl (*Leipoa ocellata*) (Vulnerable, Migratory; Schedule 1), Gilled Slender Blue-tongue (*Cyclodomorphus branchialis*) (Schedule 1), Western Spiny-tailed Skink (*Egernia stokesii badia*) (Vulnerable; Schedule 1), Peregrine Falcon (*Falco peregrinus*) (Schedule 4), Good-legged Lerista (*Lerista eupoda*) (Priority 1), Australian Bustard (*Ardeotis australis*) (Priority 4), Bush Stone-curlew (*Burhinus*

grallarius) (Priority 4), Fork-tailed Swift (*Apus pacificus*) (Marine, Migratory; Schedule 3) and Rainbow Bee-eater (*Merops ornatus*) (Marine, Migratory; Schedule 3).

The Malleefowl may occur in relatively dense patches of vegetation that may provide suitable cover (understorey) and mound-building material (leaf litter) (Outback Ecology, 2012b). One long inactive Malleefowl mound (inactive for at least 10 to 20 years and possibly decades) was identified during the targeted Malleefowl survey. This was identified approximately 630 metres from the application area amongst mixed *Acacia* spp. in a relatively densely vegetated drainage depression and is likely to be a relic from an old Malleefowl population that persisted when the area was less disturbed (Outback Ecology, 2012b). No Malleefowl or Malleefowl mounds or tracks were identified during the July 2012 flora and vegetation survey (Outback Ecology, 2012a). The targeted survey concluded there was no Malleefowl within the survey area primarily because of the lack of suitable habitat within and surrounding the survey area. Outback Ecology (2012b) adds that with the current level of mining activity and the scarcity of suitable Malleefowl habitat, it is highly unlikely the survey area would be of utility to Malleefowl in the future. Given the generally sparse and disturbed nature of the application area and presence of higher quality vegetation surrounding the mine site, it is unlikely the application area comprises significant habitat for the Malleefowl.

According to Outback Ecology (2012a), the study area contains marginal habitat for the Western Spiny-tailed Skink and suitable habitat for the Common Slender Blue-tongue, Peregrine Falcon, Good-legged Lerista, Australian Bustard, Bush Stone-curlew, Fork Tailed Swift and Rainbow Bee-eater. However, given that large amounts of better quality habitat is available outside of the application area, vegetation within the application area is not likely to represent significant habitat for these species.

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

Methodology Outback Ecology (2010)
Outback Ecology (2012a)
Outback Ecology (2012b)

(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 Threatened Flora species within the application area (GIS Database).

According to Cardno (2013), no Threatened Flora species have been recorded during previous surveys undertaken at the Mount Magnet site.

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

Methodology Cardno (2013)
GIS Database:
- Threatened and Priority Flora

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

Comments **Proposal is not likely to be at variance to this Principle**
According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is located approximately 200 kilometres south west of the application area (GIS Database).

According to Cardno (2013), no TECs have been recorded during previous surveys undertaken at the Mount Magnet site.

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

Methodology Cardno (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 application area is located within the Murchison Interim Biogeographical Regionalisation for Australia (IBRA) bioregion (GIS Database). Approximately 99.73% of the pre-European vegetation remains within the Murchison bioregion (Government of Western Australia, 2013).

The vegetation of the application area has been mapped as Beard vegetation associations 312 and 313 (GIS Database). Over 90% of these Beard vegetation associations remain at both a state and bioregional level

(Government of Western Australia, 2013). Therefore, the area proposed to be cleared does not represent a significant remnant of native vegetation within an area that has been extensively cleared. A review of aerial imagery also shows that vegetation within the application area is not a significant remnant as vegetation remains intact in the surrounding local area (i.e. surrounding ten kilometres) (GIS Database). Flora and vegetation surveys conducted at the Mount Magnet site have not identified any vegetation communities as being significant as a remnant of vegetation (Niche, 2010a; Niche 2010b; Outback Ecology, 2007; Outback Ecology, 2012a).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Extent in DEC Managed Lands %*
IBRA Bioregion - Murchison	28,120,587	28,044,823	~99.73	Least Concern	~7.71
Beard vegetation associations - State					
312	41,502	39,528	~95.24	Least Concern	0
313	68,844	65,261	~94.80	Least Concern	0
Beard vegetation associations - Bioregion					
312	41,502	39,528	~95.24	Least Concern	0
313	68,844	65,261	~94.80	Least Concern	0

* Government of Western Australia (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)
Niche (2010a)
Niche (2010b)
Outback Ecology (2007)
Outback Ecology (2012a)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Mount Magnet 1.4m Orthomosaic - Landgate 2003
- 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 several minor, non-perennial watercourses that intersect the application area (GIS Database). The majority of these occur in the Brown Hill application area with one occuring in the O'Meara application area and one occuring in the Boomer/Golden Stream application area (GIS Database). Aerial imagery shows existing mine infrastructure over the watercourses in the O'Meara and Boomer/Golden Stream application areas (GIS Database).

Rainfall is unreliable and highly variable with an average rainfall of 258 millimetres and an evaporation rate of 2,800 millimetres (Cardno, 2013). Based on the low rainfall and high evaporation rate of the region, watercourses are expected to be dry for the majority of the year and only flow following heavy rainfall (Niche, 2010b).

A review of aerial imagery indicates vegetation is growing in assocation with watercourses in the Brown Hill application area (GIS Database). Outback Ecology (2012a) mapped some of this vegetation as mulga scrub in ephemeral drainage lines and notes the vegetation species composition is similar to the Mulga Shrubland, however, the increased water availability supports denser vegetation with *Acacia* spp. being taller than that occurring elsewhere within the survey area. Niche (2010a) also surveyed one of the watercourses and mapped it as 'low open woodland of *Acacia* spp. in an ephemeral drainage line'. Niche (2010a) notes that this vegetation was not groundwater dependent vegetation, but was commonly occurring species growing at higher densities than on the surrounding plains and ridges. Aerial imagery shows these watercourses have been fragmented by tracks and intersected by mining infrastructure further downstream of the application area (GIS Database). It is, therefore, unlikely the proposed clearing will have a significant impact on watercourses in the area.

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

Methodology Cardno (2013)
Niche (2010a)
Niche (2010b)
Outback Ecology (2012a)
GIS Database:
- Hydrography, linear
- Mount Magnet 1.4m Orthomosaic - Landgate 2003

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

Comments

Proposal may be at variance to this Principle

The application area has been mapped as occurring on the Austin, Gabanintha, Jundee, Violet and Wiluna land systems (GIS Database). These are described as follows (Curry et al, 1994):

- Austin land system: Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean, below greenstone hill systems.
- Gabanintha land system: Ridges, hills and footslopes of various metamorphosed volcanic rocks (greenstones), supporting sparse acacia and other mainly non-halophytic shrublands.
- Jundee land system: Hardpan wash plains with variable dark gravelly mantling and weakly groved vegetation; minor sandy banks; supports scattered mulga shrublands. Concentrated drainage zones and hardpan are mildly susceptible to accelerated erosion when degraded or severely degraded.
- Violet land system: Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supports mulga and bowgada-dominated shrublands, with dense mulga groves and patchy halophytic shrublands. Drainage tracts and sandy surfaced gravelly plains are slightly to moderately susceptible to accelerated erosion if vegetation is degraded or the soil surface is disturbed.
- Wiluna land system: Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supports sparse mulga shrublands with patches of halophytic shrubs. Sandy surfaced gravelly plains, alluvial fans and plains and drainage floors are mildly to moderately susceptible to accelerated erosion when degraded.

Based on the above there is potential for erosion to occur particularly given the degraded nature of the application area. Potential impacts from erosion as a result of the proposed clearing 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 Curry et al (1994)
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 application area does not lie within any conservation areas or Department of Parks and Wildlife (DPAW) (formerly the Department of Environment and Conservation) managed lands (GIS Database). The nearest conservation area is the former Lakeside pastoral lease located approximately 45 kilometres north of the application area (GIS Database). Based on the distance between the application area and the former pastoral lease, the proposed clearing is not likely to impact the environmental values of any conservation area.

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

Methodology GIS Database:
- 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 waterbodies or watercourses within the application area, however, there are several minor non perennial watercourses within the application area (GIS Database). Aerial imagery shows these have been modified within and/or further downstream of the application area by mining infrastructure (GIS Database). Surface water harvesting is undertaken at the mine site by diverting creeks into adjacent open pits where mining has been completed (Cardno, 2013). No diversions are currently in place for the Boomer, Golden Stream and O'Meara pits and these projects are not part of the surface water harvesting network (Cardno, 2013).

The nearest Public Drinking Water Source Area (PDWSA) is the Priority 2 Mount Magnet (Genga) Water Reserve located approximately 300 metres west of the application area (GIS Database). The surface water diversions installed by the mine are considered to effectively remove the risk of contaminant transport lower down the catchment where the production bores are located, as surface water which represents the primary

source of recharge to the borefield will be captured in mine pits (DoE, 2005) (cited in Cardno, 2013).

According to Outback Ecology (2012a), secondary salinisation due to groundwater is not considered a risk due to the depth to groundwater. Given that the application area is disturbed and located within an active minesite, the further clearing of 80 hectares of native vegetation is unlikely to have a significant impact on surface or underground water quality.

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

Methodology

Cardno (2013)
Outback Ecology (2012a)
GIS Database:
- Hydrography, linear
- Mount Magnet 1.4m Orthomosaic - Landgate 2003
- Public Drinking Water Source Areas (PDWSAs)

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

Comments

Proposal is not likely to be at variance to this Principle

The application area is located within the Yarra Monger catchment area (GIS Database). Given the size of the area to be cleared (80 hectares) in relation to the size of the catchment area (4,182,476 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

With an average annual rainfall of 258 millimetres and an average annual evaporation rate of 2,800 millimetres there is likely to be little surface flow during normal seasonal rains (Cardno, 2013). Whilst large rainfall events may result in flooding of the area, the proposed clearing is not likely to lead to an increase in incidence or intensity of flooding.

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

Methodology

Cardno (2013)
GIS Database:
- Hydrographic Catchments – Catchments

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

Comments

The clearing permit application was advertised on 18 November 2013 by the Department of Mines and Petroleum inviting submissions from the public. Two submissions were received. The first submission advises there are no objections to the clearing permit application. The second submission outlines concerns relating to clearing of native vegetation and aboriginal related matters including heritage. A response was sent to the submitting party.

There are two native title claims over the area under application: WC1996/098 and WC2012/005 (GIS Database). One claim has been filed at the federal court and the other registered with the Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there is one registered Aboriginal Site 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 (formerly 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.

Methodology

GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims – Filed at the Federal Court
- Native Title Claims – Registered with the NNTT

4. References

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Western Botanical (2006) Preliminary Assessment of Conservation Values of Flora and Vegetation on Banded Ironstone Formations Surrounding Harmony Gold Operations, Mt Magnet. Unpublished report for Harmony Gold Mt Magnet by Western Botanical, dated October 2006.

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.