



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4841/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Jabiru Metals Limited

1.3. Property details

Property: Mining Lease 37/44
Mining Lease 37/1132
Mining Lease 37/1153
Mining Lease 37/1230
Mining Lease 37/1257
Mining Lease 37/1290
Exploration Licence 37/258
Local Government Area: Shire of Leonora
Colloquial name: Jaguar Operations

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 8 March 2012

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):

18: Low woodland; Mulga (*Acacia aneura*); and
28: Open low woodland; Mulga.

Several vegetation surveys have been conducted within the application area. These were conducted by Jims Seeds, Weeds & Trees (2004), Ecotec (2007a) and Outback Ecology Services (2009).

Outback Ecology Services (2009) states that the survey area was dominated by Mulga woodlands, shrubs and ephemeral creek lines. Typical vegetation would be described as: "Low (Open) Woodland of *Acacia aneura* over Open Shrubland of *Acacia* and *Eremophila* spp. over Low Open Shrubland of *Eremophila* spp.". *Acacia aneura* and *Eremophila* species were present in virtually every quadrat and relevé with *Eremophila margarethae* dominating the understorey over much of the survey area (Outback Ecology Services, 2009).

Ecotec (2007a) described the main vegetation type as acacia shrubland associated primarily

Clearing Description

Jabiru Metals Limited (Jabiru) has applied to clear 100 hectares within an application area of approximately 3,882 hectares (GIS Database). The application area is located approximately 45 kilometres north, north west of Leonora (GIS Database).

A clearing permit for the application area has previously been granted (CPS 686/3) and expired on 18 November 2011. Jabiru is seeking a new permit to replace CPS 686/3. Like the previous permit, the clearing area is for 100 hectares and the purpose of the application is for mineral production, infrastructure and exploration. Clearing will be by mechanical means and topsoil and vegetative material will be stockpiled for rehabilitation purposes (Jabiru, 2012a).

Vegetation Condition

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

To

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

Comment

The vegetation condition is based on aerial photography and the flora and vegetation surveys conducted by Jims Seeds Weeds & Trees (2004) and Outback Ecology Services (2009).

The application area includes the former Teutonic Bore mine site and Jabiru's Jaguar and Bentley mine sites. According to Jabiru (2012a), the area in the vicinity of these mines has been impacted by rangeland grazing of livestock and feral animals plus a long history of exploration and extractive industry activities (Jabiru, 2012a).

The previous clearing permit for the application area, CPS 686/3, was granted on 19 October 2006 and expired on 18 November 2011. Approximately 23.9 hectares was cleared under CPS 686/3 with approximately 6.4 hectares rehabilitated.

Ecotec (2007a) notes that due to the timing of the survey there

with clay-loam soils which tends toward acacia woodland where deep clay-loam soils are present (Ecotec, 2007a). In addition to many of the flora species found elsewhere in the study area, the creek lines support *Eucalyptus camaldulensis* and often a dense understorey of predominately *Acacia* species (Ecotec, 2007b). Smaller creek lines and drainage channels tend to be densely vegetated with acacias (Ecotec, 2007b). Rocky hills in the area characteristically have very little topsoil and sparse vegetation with flora species present generally consistent with the surrounding low lying areas, comprising predominately *Acacia* and *Eremophila* species. Ecotec (2007a) also noted the presence of mulga "groves" at the foot of drainage lines descending from the hills.

were very few annual species apparent and the survey area would also support a range of annual species in spring and summer, most of which would not have been recorded during the survey (conducted 29 January to 1 February 2007).

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 East Murchison subregion of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by internal drainage, and extensive areas of elevated red desert sandplains with minimal dune development (CALM, 2002). The salt-lake systems are associated with the occluded Paleodrainage system (CALM, 2002). The vegetation is dominated by Mulga Woodlands often rich in ephemerals; hummock grasslands, saltbush shrublands and Halosarcia shrublands (CALM, 2002).

Three flora and vegetation surveys and a targeted rare flora survey have been conducted within the application area. Jims Seeds, Weeds & Trees (2004) conducted a broad survey across the application area in May and September 2004. During this survey a Priority 1 Flora species was recorded within the application area. IRC Environment (2005) subsequently conducted a rare flora survey in May 2005 to determine the extent and distribution of this species within and surrounding the project area. Ecotec (2007a) conducted a Level 1 flora and vegetation survey across a large area including the application area and surrounding Jabiru tenements from 29 January to 1 February 2007. Outback Ecology Services (2009) conducted a Level 2 flora and vegetation survey of the Bentley mine project area from 21 to 25 September 2009 (covers the southern portion of the application area).

The vegetation surveys recorded between 101 and 151 taxa from between 27 and 39 families (Jims Seeds, Weeds & Trees, 2004; Ecotec, 2007a; Outback Ecology Services, 2009). Jims Seeds, Weeds & Trees (2004) recorded a diverse ephemeral community along the drainage lines and Ecotec (2007a) noted that most of the species identified during the survey are common throughout the northern Goldfields region.

Jims Seeds, Weeds & Trees (2004) recorded several introduced species including a *Sonchus* sp, Prickly Paddy Melon (*Cucumis myriocarpus*), Mintweed (*Salvia reflexa*), Double Gee (*Emex australis*), Ruby Dock (*Rumex vesicarius*), Pimpernel (*Anagallis arvensis*) and Black Berry Nightshade (*Solanum nigrum*). In addition to some of these weeds, Outback Ecology Services (2009) also recorded *Anagallis arvensis* var. *caerulea* and Pie Melon (*Citrullus lanatus*). Mintweed is a 'Declared Plant' under the *Agriculture and Related Resources Protection Act 1976* as a P1 and P3 category for the whole of the State (DAFWA, 2012). Double Gee is a 'Declared Plant' under the *Agriculture and Related Resources Protection Act 1976* as a P1, P3, P4 or P5 category for various locations in the State excluding the Shire of Leonora (DAFWA, 2012). Potential impacts from weeds as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Ecotec (2007a) notes the surveyed area is predominately flat plains with a series of north-south trending rocky hills dominating the area around the existing Jaguar and Teutonic Bore mine sites. Lateritic breakaways and low hills are scattered throughout the region and numerous ephemeral creek lines exist in the surveyed area (Ecotec, 2007a). Acacia shrubland/woodland was identified as the main vegetation type with *Eucalyptus camaldulensis* dominating creek lines in the area (Ecotec, 2007a). This is consistent with the vegetation in the Murchison bioregion which remains largely uncleared (Shepherd, 2009).

Ecotec (2007b) states that much of the area has been degraded to some degree by grazing (sheep and feral goats) and there is considerable historic and recent mining disturbance throughout the region. According to Outback Ecology Services (2009), heavy grazing by goats, rabbits and other animals have reduced the understorey and shrub layers, leading to a dominance of *Eremophila margarethae* within the understorey. Other disturbances such as sediment runoff, tracks, drilling and other mineral exploration related activities have resulted in localised impacts (Outback Ecology Services, 2009).

According to available databases (GIS Database), no Declared Rare Flora (DRF), Priority Ecological Communities (PEC) or Threatened Ecological Communities (TEC) have been located within the application area. Where reported, no DRF, TECs or PECs were recorded during the vegetation surveys.

Five Priority Flora species have previously been identified during the vegetation surveys, however, a review of the conservation status of these species shows only two are now listed as Priority species. These include two Priority 3 Flora species, *Phyllanthus baeckeoides* and *Calytrix uncinata*.

Phyllanthus baeckeoides was previously a Priority 1 species and was mapped during a rare flora survey conducted in May 2005. This survey found the species occurs on rocky hills where it generally grows in association with *Acacia aneura* and *Acacia quadrimarginea* (IRC Environment, 2005). It covered an area of approximately 209 hectares and was estimated to have an average population density of approximately 2,370 plants/hectare (IRC Environment, 2005). The species was observed in disturbed areas where it did not appear to be adversely affected by disturbance (IRC Environment, 2005). Ecotec (2007a) also observed individuals in some of the mulga "groves" at the foot of drainage lines descending from the hills. This species was also recorded on a rocky hill in the southern part of the application area by Outback Ecology Services (2009). Maps provided by Jabiru shows this species primarily occurs in the rocky hills in the vicinity of the Teutonic Bore mine site (northern part of the application area) (Jabiru, 2012b). Two populations have also been identified approximately two kilometres north west of the application area. Given this species has a wide distribution across the Murchison bioregion, the proposed clearing of 100 hectares is unlikely to have a significant impact on this species.

Calytrix uncinata was recorded during the 2004, 2005 and 2007 surveys on the rocky hills located near the Jaguar and Teutonic Bore mine sites. Maps provided by Jabiru shows this species has been recorded in four locations outside of the application area, with three of these located adjacent to a proposed gas pipeline extending from the Jaguar mine site (Jabiru, 2012b). This species is widespread throughout the Murchison bioregion and the proposed clearing is not expected to have a significant impact on this species.

The assessing officer conducted a search of the Department of Environment and Conservation's (DEC's) NatureMap and found that in addition to the two Priority species listed above, a Priority 1 Flora species (*Stenanthemum patens*) and two Priority 4 Flora species (*Grevillea inconspicua* and *Hemigenia exilis*) have been recorded within a 20 kilometre radius of the application area (DEC, 2012a). *Stenanthemum patens* occurs on rocky hillsides (Western Australian Herbarium, 2012a) and given the survey coverage of rocky hills for *Phyllanthus baeckeoides* the likelihood of this species occurring in the application area is considered low. *Grevillea inconspicua* and *Hemigenia exilis* have been recorded in numerous locations in the Murchison bioregion and are therefore unlikely to be significantly impacted by the proposed clearing.

Jabiru (2012a) states that known populations of Priority flora species are well documented and that a Priority Flora Management Plan (dated June 2006) is utilised to ensure these priority species will not be adversely impacted by any clearing.

Biota Environmental Sciences (Biota) (2005) conducted a fauna survey in the Jaguar project area from 29 November to 6 December 2004. The survey included trapping and recorded a total of 58 vertebrate species including 36 birds, 10 mammals, 11 reptiles and 1 frog (Biota, 2005). One conservation significant fauna species, the Peregrine Falcon (*Falco peregrinus*) (Schedule 4), was recorded at the former Teutonic Bore mine pit. Biota (2005) notes that the number of vertebrate taxa recorded in the project area was relatively low and that this could have been due to the degraded condition of the habitat, with the possible additional influence of low local rainfall over the past few years. According to Ecotec (2009), the surveyed area is typical of much of the northern Goldfields in terms of fauna habitat and diversity. The application area is, therefore, unlikely to support a higher level of fauna diversity than the surrounding area.

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

Methodology

- Biota (2005)
- CALM (2002)
- DAFWA (2012)
- DEC (2012a)
- Ecotec (2007a)
- Ecotec (2007b)
- Ecotec (2009)
- IRC Environment (2005)
- Jabiru (2012a)
- Jabiru (2012b)
- Jims Seeds, Weeds & Trees (2004)
- Outback Ecology Services (2009)
- Shepherd (2009)
- Western Australian Herbarium (2012a)
- GIS Database:
 - IBRA WA (Regions – Sub Regions)
 - Threatened and Priority Flora
 - Threatened Ecological Sites Buffered

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

Comments Proposal is not likely to be at variance to this Principle

Three fauna surveys have been conducted in the application area. Biota (2005) conducted a fauna survey of the proposed Jaguar mine site from 29 November to 6 December 2004. Ecotec (2007b) conducted a Level 1 fauna survey across a large area including the application area and surrounding Jabiru tenements in January 2007. Ecotec (2009) conducted a fauna habitat assessment of the Bentley mine project area in September 2009. Biota (2005) sampled the fauna habitats using a total of six intensive trapping grids with five trap nights for most sampling sites.

Biota (2005) identified three fauna habitat types including drainage lines, flats and stony hills. Large trees and dense vegetation along creek lines is considered the most significant fauna habitat present in the area as this habitat is likely to provide shelter, nesting sites and sources of food and water for a range of animals (Ecotec, 2007b). Although creeks and drainage lines are ephemeral, soaks in creeks can hold water throughout the year providing an important resource for fauna (Ecotec, 2009). The surveys found that most areas had minimal understorey and/or ground cover providing little cover for ground-dwelling animals (Biota, 2005; Ecotec, 2007b). The soil was either stony or very hard, precluding many burrowing species, although reptiles and a number of small mammals are likely to be well suited to this habitat and creek lines provide softer soils (Ecotec, 2007b). According to Ecotec (2007b), some rocky outcrops may provide small caves and crevices that are utilised by fauna. Ecotec (2007b) also states that the dense groves of mulga found at the foot of drainage lines descending from the hills may provide shelter for animals.

Biota (2005) recorded a total of 58 vertebrate species including 36 birds, 10 mammals, 11 reptiles and 1 frog. One conservation significant fauna species, the Peregrine Falcon (Schedule 4), was recorded during the survey. Two individuals were observed each day of the survey hunting in and above the former Teutonic Bore mine pit (Biota, 2005). These were not observed during subsequent surveys, however, Ecotec (2009) notes that there were recent sightings reported by site personnel. Biota (2005) states this species occurs across most of Australia in a wide variety of habitats and has a large home range, typically of 20 – 1,500 square kilometres. Ecotec (2007b) notes that large trees (i.e. *Eucalyptus camaldulensis*) within the creek lines may provide suitable nesting sites for these and bird species, and should therefore be avoided where possible. Biota (2005) also recorded a Wedge-tailed Eagle (*Aquila audax*) nest approximately one kilometre south of the Jaguar Camp in a planted eucalypt. Additionally, Ecotec (2009) observed an active bower (believed to belong to a Western Bowerbird) during the survey and notes that although not considered threatened, they are uncommon and the survey area is at the southern extent of the range of the species.

Although not recorded during the surveys, several other conservation significant species were identified as having the potential to occur in the survey areas. However, the majority of these species are either mobile or able to utilise surrounding vegetation, the application area is outside the species recorded distribution, does not represent preferred habitat or is unsuitable due to its degraded nature. Ecotec (2007b) noted that an inactive Malleefowl (*Leipoa ocellata*) (Vulnerable; Schedule 1) mound was recorded approximately 5 kilometres north of the Jaguar Camp (outside the application area) during previous survey work and stated that no active Malleefowl mounds are known to exist in the vicinity. Both the Biota (2005) and Ecotec (2009) surveys state the Jaguar and Bentley project areas are unlikely to represent suitable habitat for nesting mounds, with Biota (2005) stating this is likely due to the degraded nature of the site and almost complete absence of mound building material. Biota (2005) adds that their home ranges are typically large, so foraging habitat would be negligibly affected. A search on DEC's Naturemap shows there are no records of Malleefowl within a 40 kilometre radius of the application area (DEC, 2012b). Ecotec (2007b) also notes that the Woma (*Aspidites ramsayi*) (Schedule 4), South West Carpet Python (*Morelia spilota imbricata*) (Schedule 4) and Major Mitchell Cockatoo (*Cacatua leadbeateri*) (Schedule 4) may utilise large trees in the area and recommended avoiding destruction of large trees.

Given vegetation in the application area has been impacted by grazing and is considered well represented on a regional basis, it is unlikely that the application area represents significant fauna habitat. However, potential impacts to large *Eucalyptus camaldulensis* trees may be minimised by the implementation of a flora management condition.

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

Methodology Biota (2005)
DEC (2012b)
Ecotec (2007b)
Ecotec (2009)

(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 records of Declared Rare Flora (DRF) within the application area (GIS Database). The nearest record of DRF is located approximately 140 kilometres south west of the application area (GIS Database).

No DRF was recorded during the vegetation surveys undertaken by Jims Seeds, Weeds & Trees (2004) in May

and September 2004, Ecotec (2007a) from 29 January to 1 February 2007 and Outback Ecology Services (2009) from 21 to 25 September 2009.

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

Methodology Ecotec (2007a)
 Jims Seeds, Weeds & Trees (2004)
 Outback Ecology Services (2009)
 GIS Database:
 - Threatened and Priority Flora

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

Comments **Proposal is not likely to be at variance to this Principle**
 According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is approximately 110 kilometres north west of the application area (GIS Database).

No TECs were recorded during the vegetation surveys undertaken by Ecotec (2007a) from 29 January to 1 February 2007 and Outback Ecology Services (2009) from 21 to 25 September 2009.

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

Methodology Ecotec (2007a)
 Outback Ecology Services (2009)
 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 falls within the Murchison Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 100% of the pre-European vegetation remains (see table) (GIS Database; Shepherd, 2009).

The vegetation of the application area has been mapped as the following Beard vegetation associations (GIS Database):

18: Low woodlands; mulga (*Acacia aneura*); and
 28: Open low woodland; Mulga.

According to Shepherd (2009) approximately 100% of these Beard vegetation associations remain at both a state and bioregional level. Therefore the area proposed to be cleared does not represent a significant remnant of native vegetation within 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 – Murchison	28,120,587	28,120,587	~100	Least Concern	1.06
Beard veg assoc. – State					
18	19,892,304	19,890,275	~100	Least Concern	2.1
28	395,895	395,895	~100	Least Concern	-
Beard veg assoc. – Bioregion					
18	12,403,172	12,403,172	~100	Least Concern	0.37
28	224,292	224,292	~100	Least Concern	-

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
 Shepherd (2009)

GIS Database:
- IBRA WA (Regions – Sub Regions)
- Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

There are numerous minor, non-perennial watercourses within the application area (GIS Database). These drain in a southerly direction, with several converging within the application area (GIS Database). Five water reservoirs are shown in the application area, however, aerial photography shows these are located in the Teutonic Bore mine site disturbance footprint. There are numerous non-perennial watercourses in the vicinity of the application area (GIS Database).

Jabiru (2012a) describes drainage in the mine area as braided drainage lines running south to Sullivan Creek, which are often wide with variably defined and incised channels. No permanent or semi-permanent sources of water are located in the vicinity of the mine (Jabiru, 2012a). Ecotec (2007a) notes creek lines are located throughout the survey area ranging from small water courses to large ephemeral creek lines that periodically carry extremely large volumes of water. These water ways support large Eucalypts, predominately *Eucalyptus camaldulensis* (River Red Gum), which are considered locally significant for fauna habitat and cultural purposes (Ecotec, 2007a; Jabiru, 2012a). According to Jims Seeds, Weeds & Trees (2004) the vegetation in the shallow drainage lines is similar to the surrounding vegetation, however, the drainage lines also support River Red Gum, a rich and diverse ephemeral community and an increase in *Acacia* species. *Eucalyptus camaldulensis* has a widespread distribution across Australia and is found growing along watercourses and billabongs (Western Australian Herbarium, 2012b).

Jabiru (2012a) states that the areas of likely disturbance avoid the principal water courses in the area and that where infrastructure is likely to cross creek-lines or water ways Jabiru is committed to causing minimal impact on the associated sensitive creek-line vegetation due to its ecological and heritage values. Jabiru (2012a) adds that minor works in relation to broad creek crossings (which are already cleared) will be managed to ensure there is little impact on the vegetation bordering the principal creek systems in the area. Potential impacts to *Eucalyptus camaldulensis* as a result of the proposed clearing may be minimised by the implementation of a flora management condition.

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

Methodology Ecotec (2007a)
Jabiru (2012a)
Jims Seeds, Weeds & Trees (2004)
Western Australian Herbarium (2012b)
GIS Database:
- Hydrography, linear
- Leonora 1.4m Orthomosaic – Landgate 2003
- Rivers
- Weebo 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 Bevon, Jundee, Monk, Nubev, Teutonic, Violet and Wyarri land systems with the Jundee and Violet land systems covering most of the application area (GIS Database).

The Bevon land system is described as irregular low ironstone hills, with stony lower slopes supporting mulga shrublands (Pringle et al., 1994). Within this land system the soils on breakaway slopes and drainage tracts are susceptible to soil erosion, particularly if perennial shrub cover is substantially reduced or the soil surface is disturbed (Pringle et al., 1994).

The Jundee land system is described as hardpan plains with ironstone gravel mantles, supporting mulga shrublands (DAWA, 2005). Soil erosion can be initiated where tracks and diversion structures harvest water on sloping land (DAWA, 2005). Widespread shrub death can be caused by water starvation where flow regimes are altered by roads and other earthworks (DAWA, 2005).

The Violet land system is described as undulating stony and gravelly plains and low rises, supporting mulga shrublands (DAWA, 2005). This land system has abundant mantles which provide effective protection against soil erosion over most of the land system (Pringle et al., 1994). In areas which have been disturbed the soil becomes moderately susceptible to water erosion (Pringle et al., 1994). The narrow drainage tracts within this system are also mildly susceptible to soil erosion if disturbed (DAWA, 2005).

The Teutonic land system is described as hills and stony plains on acid volcanic rocks, supporting acacia shrublands (Pringle et al., 1994). This land system is generally not susceptible to soil erosion, partly as a consequence of extensive stone mantles (Pringle et al., 1994).

The Monk land system is described as low greenstone rises and stony plains, supporting chenopod shrublands with patchy eucalypt overstoreys (Pringle et al., 1994). Slopes of low rises without protective stone mantles, alluvial plains and narrow drainage tracts are moderately susceptible to water erosion, particularly if perennial shrub cover is substantially reduced or the soil surface is disturbed (Pringle et al., 1994). This system is susceptible to water starvation and consequent loss of vigour in vegetation if natural water flow is impeded (Pringle et al., 1994).

The Nubev land system is described as gently undulating stony plains, minor limonitic low rises and drainage floors, supporting mulga and halophytic shrublands (Pringle et al., 1994). Drainage zones in this land system are moderately susceptible to soil erosion, particularly where perennial shrub cover is substantially reduced or the soil surface is disturbed (Pringle et al., 1994). Disturbance of the protective stone mantle on saline stony plains is also likely to initiate water erosion (Pringle et al., 1994).

The Wyarri land system is described as granite domes, hills and tor fields with gritty-surfaced fringing plains supporting mulga and granite wattle shrublands (Pringle et al., 1994). This land system is generally not susceptible to soil erosion, partly as a consequence of heavy, protective soil mantles (Pringle et al., 1994).

Jabiru (2012a) states that water erosion is active in the drainage lines and the site of any proposed clearing will be such that it avoids impacts on the principal creek lines in the area. Jabiru (2012a) adds that exposure to wind and water erosion will be avoided through minimising the clearing required, managing silt runoff and ongoing rehabilitation works during the life of the mine. Topsoil and vegetative material from clearing activities will be stockpiled for closure and rehabilitation purposes (Jabiru, 2012a).

The Commissioner for Soil and Land Conservation provided advice in relation to the application area during the previous clearing permit application (CPS 686/1). The Commissioner advised that accelerated soil erosion is liable to occur on the red sands and earthy soils where protective stone or gravel mantles are disturbed (DAWA, 2005). The Commissioner notes that accelerated soil erosion is unlikely to occur if sensitive areas such as drainage lines are avoided or adequate provision is made to maintain the natural surface flow regime (DAWA, 2005). The Commissioner recommended that conditions be imposed to avoid sensitive areas and mitigate and prevent soil erosion and loss of vegetation (DAWA, 2005). 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 DAWA (2005)
Jabiru (2012a)
Pringle 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 Environment and Conservation (DEC) managed lands (GIS Database). The nearest conservation area is the former Bulga Downs Pastoral Lease which is now managed by DEC and is located approximately 80 kilometres west of the application area (GIS Database). Based on the distance between the application area and the nearest conservation area, 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**
According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). There are no permanent waterbodies or watercourses within the application area, however, there are numerous minor non perennial watercourses that pass through the application area (GIS Database). It is expected that these would only flow after or during significant seasonal rainfall events, or substantial localised falls. Clearing in the vicinity of these may lead to soil erosion resulting in increased sedimentation in watercourses within the area. Potential impacts from erosion as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

The annual average rainfall for Leonora is 236.7 millimetres and the average annual evaporation rate for the application area is approximately 3,400 millimetres (BoM, 2012; GIS Database). Therefore, during normal rainfall events surface water within the application area is likely to evaporate quickly. However, substantial rainfall events create surface sheet flow which is likely to have a higher level of sediments. During normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within the application area.

According to available databases, groundwater salinity within the application area is between 1,000 and 3,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be brackish but still suitable for livestock. The proposed clearing is not likely to cause salinity levels within the application area to alter.

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

Methodology BoM (2012)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)

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

Comments Proposal is not likely to be at variance to this Principle

The application area is located within the Raeside-Ponton catchment area (GIS Database). Given the size of the area to be cleared (100 hectares) in relation to the size of the catchment area (11,589,533 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 236.7 millimetres and an average evaporation rate of approximately 3,400 millimetres there is likely to be little surface flow during normal seasonal rains (BoM, 2012; GIS Database). Given the likelihood of little surface flow, the proposed clearing is not likely to cause or increase the incidence or intensity of flooding.

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

Methodology BoM (2012)
GIS Database:
- Evaporation Isopleths
- Hydrographic Catchments - Catchments

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

Comments

There are no native title claims over the area under application (GIS Database). The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there are 12 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 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.

The clearing permit application was advertised on 6 February 2012 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

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

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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.

