



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4976/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Millennium Minerals Limited

1.3. Property details

Property:

- Mining Lease 46/3
- Mining Lease 46/47
- Mining Lease 46/129
- Mining Lease 46/163
- Mining Lease 46/164
- Mining Lease 46/186
- Mining Lease 46/200
- Mining Lease 46/261
- Mining Lease 46/262
- Mining Lease 46/265
- Mining Lease 46/266
- Mining Lease 46/273
- Mining Lease 46/274
- Mining Lease 46/282
- Mining Lease 46/302
- Mining Lease 46/431
- Mining Lease 46/433
- Mining Lease 46/441
- Mining Lease 46/444
- Mining Lease 46/446
- Miscellaneous Licence 46/89
- Miscellaneous Licence 46/90
- Miscellaneous Licence 46/91
- Miscellaneous Licence 46/92
- Miscellaneous Licence 46/98

Local Government Area: Shire of East Pilbara
Colloquial name: Nullagine Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 12 July 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. One Beard Vegetation Association has been mapped within the application area (GIS Database):

190: Hummock grasslands, sparse shrub steppe; *Acacia bivenosa* and *Acacia trachycarpa* over hard spinifex *Triodia wiseana*, very poor rocky country on gneiss.

Botanists from Mattiske Consulting undertook flora and vegetation surveys over parts of the application area and its surrounds in July 2005 and April 2006. Additional surveys were undertaken in May 2010 and April 2011 of the remaining satellite deposits and proposed haul roads and the results were consolidated (Mattiske Consulting,

2012). Seventeen vegetation types were defined and mapped within the survey area and twelve of these occur within the application area (Mattiske Consulting, 2012):

C1 - Open Woodland of *Eucalyptus victrix*, *Eucalyptus camaldulensis* subsp. *obtusa* and *Melaleuca argentea* with occasional *Corymbia hamersleyana* over mixed *Acacia* spp. over sedges and reeds, occasional pools on deep sandy creekbeds.

C2 - Hummock Grassland of *Triodia angusta*, *Triodia pungens* and *Triodia longiceps* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus lucasii* over *Rulingia luteiflora*, *Acacia trachycarpa* and *Acacia bivenosa* over *Corchorus walcottii*, *Eriachne mucronata* and other herbs in broad, shallow drainage lines and depressions.

C3 - Shrubland of mixed *Acacia elachantha*, *Acacia bivenosa*, *Acacia acradenia*, *Acacia arrecta* with *Petalostylis labicheoides* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* over *Triodia longiceps*, *Triodia brizoides* and *Cymbopogon* spp. in narrow creeklines.

C4 - Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia candida* subsp. *dipsodes*, *Corymbia hamersleyana*, *Corymbia opaca* and *Eucalyptus lucasii* over *Acacia holosericea*, *Acacia inaequilatera*, *Acacia trachycarpa* and *Grevillea wickhamii* over *Petalostylis labicheoides* and *Gossypium robinsonii* with *Corchorus walcottii* and *Triodia* spp. on sandy clays on broad flow lines and flats.

C5 Hummock Grassland of *Triodia angusta* and *Triodia longiceps* with emergent *Corymbia opaca* over *Acacia trachycarpa*, *Acacia sclerosperma* subsp. *sclerosperma*, *Hakea lorea* subsp. *lorea* and *Eriachne mucronata* on red sandy-loam to sandy clay soils of broader flats.

C7 - Hummock Grassland of *Triodia angusta* with patches of *Eragrostis dielsii*, *Aristida contorta* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia synchronicia*, *Acacia trachycarpa* and *Senna glutinosa* subsp. *x luerssenii* on quartz and calcrete soils on floodplains.

D - Shrubland of *Acacia bivenosa* with *Acacia synchronicia* and *Acacia trachycarpa* over mixed *Triodia* spp. and other annual species on disturbed sites.

HG1 - Hummock Grassland of mixed *Triodia wiseana* and *Triodia* spp. with mixed emergent shrubs of *Acacia aphanoclada*, *Acacia hilliana*, *Acacia arrecta*, *Acacia bivenosa*, *Melaleuca eleuterostachya* and *Senna* spp. over mixed herbs on shallow gravelly and rocky hills with outcropping.

HG3 - Hummock Grassland of *Triodia wiseana* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia aphanoclada*, *Acacia bivenosa*, *Acacia trachycarpa*, *Fimbristylis dichotoma* and *Indigofera monophylla* on shallow gravelly soils on mid and upper slopes.

HG4 - Hummock Grassland of *Triodia pungens* and *Triodia wiseana* with patches of tussock grasses and emergent *Grevillea pyramidalis*, *Acacia inaequilatera* and *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia bivenosa* on low hills and slopes with quartz and gravels on pale brown soils.

HG5 - Hummock Grassland of *Triodia wiseana* and *Triodia longiceps* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia aphanoclada*, *Acacia hilliana*, *Melaleuca eleuterostachya* and *Fimbristylis dichotoma* on shallow and rocky slopes.

HG8 - Hummock grassland of *Triodia longiceps*, *Triodia angusta* and *Triodia wiseana* with emergent *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia trachycarpa*, *Acacia pyrifolia*, *Senna glutinosa* subsp. *x luerssenii*, *Solanum sturtianum* and *Acacia bivenosa* over *Stemodia grossa* and mixed herbs on sandy-clays on broad eroded flats.

Clearing Description

Millennium Minerals Limited has applied to clear up to 190 hectares of native vegetation for the purpose of mineral production and associated activities. Clearing is to develop a series of satellite deposits that comprise the Golden Eagle Satellite Deposit Project. The satellite deposits in the application area are Barton, Condor, Crow, Falcon, Golden Gate, G Reef, Harrier, Otways and Shearers. The project will include thirteen open cut pits, waste rock landforms, haul roads, laydown areas, temporary buildings and an extension of the current airport.

The application area is located in a 40 kilometre corridor north-east of Millennium Minerals Limited's Golden Eagle Project. It is approximately 8 kilometres 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 Mattiske Consulting (2012).

3. Assessment of application against clearing principles

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

Comments

Proposal is at variance to this Principle

The application area 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 the ranges (CALM, 2002).

Botanists from Mattiske Consulting undertook flora and vegetation surveys over parts of the application area in July 2005 and April 2006. Additional surveys were undertaken in May 2010 and April 2011 of the remaining satellite deposits and proposed haul roads and the results were consolidated (Mattiske Consulting, 2012). A total of 295 vascular plant taxa from 107 genera and 40 families were recorded within the survey area (Mattiske Consulting, 2012). The most common families were Fabaceae, Poaceae, Malvaceae and Chenopodiaceae; which is typical of the Pilbara (Mattiske Consulting, 2012).

One Threatened Flora species, *Lepidium catapycnon*, was recorded within the application area (Mattiske Consulting, 2012). *Lepidium catapycnon* was recorded in the Barton satellite deposit area in 2005 but no plants were recorded when the Barton location was resurveyed in May 2010 despite extensive searching (Mattiske Consulting, 2012; Millennium Minerals Limited, 2012).

One confirmed and two unconfirmed Priority Flora species have been recorded within the application area (Mattiske Consulting, 2012). *Acacia aphanoclada* (P1) was recorded in 2005 and 2006 but was not able to be confirmed due to the sterile specimen collected during the survey (Mattiske Consulting, 2012). During the 2005 surveys thousands of plants were identified across the Mosquito Creek Formation and the number of *Acacia aphanoclada* plants to be cleared for mining activities is minimal (Millennium Minerals Limited, 2011). *Acacia glaucocaesia* (P3) was noted in the Golden Eagle project area but also could not be confirmed due to the sterile collections at the time (Mattiske Consulting, 2012). Advice from the Western Australian Herbarium suggested that this species was unlikely to grow in the survey area (Millennium Minerals Limited, 2011). *Ptilotus mollis* (P4) was recorded during the 2005 survey in the Golden Eagle project area and only one population of five plants is likely to be impacted by the proposed mining operations (Millennium Minerals Limited, 2011; Mattiske Consulting, 2012). Another species, *Abutilon trudgeonii*, was recognised as a P3 species at the time it was recorded but has since been delisted as a conservation significant species (Mattiske Consulting, 2012).

Six introduced flora species were recorded during the flora and vegetation surveys by Mattiske Consulting. These weed species were Birdwood Grass (*Cenchrus ciliaris*), Buffel Grass (*Cenchrus ciliaris*), Gomphrena Weed (*Gomphrena celosiodes*), Mexican Poppy (*Argemone ochroleuca* subsp. *ochroleuca*), Mimosa Bush (*Vachellia farnesiana*) and *Pennisetum pedicellatum* (Mattiske Consulting, 2012). Care must be taken to ensure that the proposed clearing activities do not 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 application area is within the buffer of two occurrences of the Priority Ecological Community (PEC) 'Stony saline plains of the Mosquito Land System' (GIS Database). This PEC is described as a saltbush community of the duplex plains of the Mosquito Creek series (Nullagine) and it is known to contain two endemic Acacias (DEC, 2010). One occurrence is known on stony plains and one is on rocky ground (DEC, 2010). None of the vegetation communities mapped within the application area correspond to a saltbush community on plains but several endemic Acacias occur (Mattiske Consulting, 2012). In regards to the PEC, Mattiske Consulting (2012) report that one PEC is known to occur in the area and has been defined for large sections of the Mosquito land-system by DEC. Despite the listing by DEC for this extensive PEC, the description indicates that it is restricted to the 'Stony saline clay plains of the Mosquito Land System' which are restricted to the lower slopes and plains within the wider Nullagine area. Therefore the potential impacts will be minimal and if at all only occur near the haul roads (not the mining areas). DEC (2012) have advised that two plant communities described by Mattiske, HG1 and HG5, do have similarities to the PEC with a high proportion of overlap of flora species recorded overlapping with the PEC description, however HG1 and HG5 were described as being present on gravelly and rocky hills or rocky slopes. The PEC occurs on stony plains, not ridges and hills. Therefore based on the information supplied, the PEC 'Stony saline clay plains of the Mosquito land system' is likely to be present in the wider Nullagine area but appears unlikely to be present in the area under application (DEC, 2012).

A total of 113 vertebrate fauna species were recorded within the Golden Eagle Satellite Deposits area during the detailed fauna surveys undertaken by Ninnox Wildlife Consulting in 2010 and Rapallo in 2007. The fauna comprised of 50 bird, 19 native mammal, four introduced mammal and 40 reptile species (Millennium Minerals Limited, 2012). Eight conservation significant fauna species have been recorded within the application area (Ninnox Wildlife Consulting, 2011).

The proposed thirteen satellite deposits have historically been heavily prospected, explored, cleared and burnt (Millennium Minerals Limited, 2012). The Nullagine area is a known gold prospecting area and primary disturbance at each satellite deposit includes extensive drill lines and sizable mullock dumps and small scale prospector excavations (Millennium Minerals Limited, 2012). The extent of disturbance at each deposit ranges from few obvious signs e.g. Golden Gate to the plant communities being significantly modified by historical mining activities e.g. Otways (Millennium Minerals Limited, 2012).

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

Methodology CALM (2002)
DEC (2010)
DEC (2012)

DSEWPaC (2012a)
Mattiske Consulting (2012)
Millennium Minerals Limited (2011)
Millennium Minerals Limited (2012)
Ninox Wildlife Consulting (2011)
GIS Database:
- IBRA WA (Regions - Subregions)
- 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 at variance to this Principle

Vertebrate fauna surveys have been undertaken by zoologists from Ninox Consulting over the Golden Eagle satellite deposits that constitute the application area. A Level 2 detailed survey was undertaken over the Shearers, Barton, Falcon and Golden Gate deposits in autumn and spring 2010; while Level 1 reconnaissance surveys were carried out at All Nations, Otways and Little Wonder during May to December 2011 and April 2011 (Ninox Wildlife Consulting, 2011). An initial fauna survey of the Golden Gate area was also undertaken in April 2007 (Ninox Wildlife Consulting, 2011).

Broad fauna habitat types were not explicitly described during the fauna survey but were based on vegetation mapping by Mattiske Consulting (2012). Traplines for mammals and reptiles were established on representative vegetation types in Shearers, Barton, Falcon and Golden Gate deposits. To supplement trapping results, each habitat was hand-foraged for inactive or cryptic species. Birds were sampled in all areas and signs of fauna such as scats, tracks and diggings were also noted wherever they were observed. Anabat units were placed in various locations during the survey to detect the presence of bats (Ninox Wildlife Consulting, 2011).

A total of 113 vertebrate fauna species were recorded within the Golden Eagle Satellite Deposits area during the detailed fauna surveys undertaken by Ninox Wildlife Consulting in 2010 and Rapallo in 2007. The fauna comprised of 50 bird, 19 native mammal, four introduced mammal and 40 reptile species (Millennium Minerals Limited, 2012).

While no fauna habitat types were identified as being regionally significant, some areas of habitat have been identified as being important for conservation significant fauna. The HG8 vegetation type is of particular importance, given the number of conservation significant species present within the Barton satellite deposit sand plain and its dissimilarity to other habitats (Ninox Wildlife Consulting, 2011).

Eight conservation significant fauna species have been recorded within the application area, comprising:

- Greater Bilby (*Macrotis lagotis*) listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Schedule 1 of the Western Australian *Wildlife Conservation Act 1950* (WC Act);
- Pilbara Leaf-nosed Bat (*Rhinonictis aurantia*) - listed as Vulnerable under the EPBC Act and Schedule 1 of the WC Act;
- *Ctenotus nigrilineatus* - listed as DEC Priority 1;
- Brush-tailed Mulgara (*Dasyercus blythi*) - listed as DEC Priority 4;
- Ghost Bat (*Macroderma gigas*) - listed as DEC Priority 4;
- Australian Bustard (*Ardeotis australis*) - listed as DEC Priority 4;
- Western Pebble-mound Mouse (*Pseudomys chapmani*) - listed as DEC Priority 5; and
- Rainbow Bee-eater (*Merops ornatus*) - listed as Migratory under the EPBC Act (Ninox Wildlife Consulting, 2011).

Millennium Minerals Limited has developed a Significant Species Management Plan, to be used in conjunction with their Fauna Management Plan, to minimise impact on conservation significant species. Consultation with the Department of Conservation (DEC) and Environment occurred during the development of the plan (Millennium Minerals Limited, 2011).

DSEWPaC Approval

The Golden Eagle Satellite Deposits Development project was referred to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) under the EPBC Act, due to the presence of EPBC Act listed fauna species within the project area. The project was deemed a 'controlled action' and required assessment under the EPBC Act with the level of assessment being set at Preliminary Documentation. Final approval for the project was given on 17 January 2012 and was subject to 13 conditions. One of the conditions involved the preparation of a bi-annual report detailing of progress of commitments made in the preliminary documentation regarding measures to manage and mitigate impacts to EPBC Act listed threatened species (DSEWPaC, 2012a). These measures are described in the Significant Species Management Plan. Other conditions of approval related to the protection of the Greater Bilby.

Greater Bilby

The Greater Bilby was noted by fresh tracks in the sand at Barton satellite deposit during September 2010. Targeted searches were subsequently conducted but no burrow systems of this species were found and no animals were captured (Ninox Wildlife Consulting, 2011). Additional signs of this species were recorded during December 2010 within the survey area for the proposed extensions to the Nullagine airstrip, which is located adjacent to the current application area. These diggings were considered to be old. Further investigations during April 2011, following rainfall in the area, revealed an increase in activity of Greater Bilbies with fresh burrows and diggings in several locations, mainly in sandy river flats adjacent to Five Mile Creek. The field investigations showed the animals were digging into the base of *Acacia trachycarpa* plants, possibly to search out and feed on Cossid Moth larvae. The diggings were only found where *Acacia trachycarpa* occurred on sandy substrates and all diggings and burrow systems were recorded (Ninox Wildlife Consulting, 2011).

As part of the DSEWPaC approval for the project, the following conditions were imposed to protect the Greater Bilby:

- Prior to construction commencing within the Barton activity area or the Nullagine Airstrip extension, the areas must be surveyed for the presence of the Greater Bilby. If the Greater Bilby is physically present then a Greater Bilby Management Plan must be prepared and approved;
- Fauna friendly culverts should be provided at locations where they benefit the Greater Bilby;
- Financial contributions to DEC for research into the Greater Bilby; and
- Funding the preparation of a Greater Bilby Protected Areas Report to coordinate habitat protection in the Pilbara Bioregion (DSEWPaC, 2012a).

Millennium Minerals Limited have proposed additional management measures to protect the Greater Bilby including an exclusion zone that has been set aside to the west of Barton. This 15 hectare conservation area was defined in consultation with Ninox Wildlife Consulting and will provide good supporting habitat for any Greater Bilby populations that may move into the area (Millennium Minerals Limited, 2011; 2012).

Pilbara Leaf-nosed Bat

The Pilbara Leaf-nosed Bat was recorded at Barton in the vicinity of both the ruined crusher and adjacent mine shaft during May and August 2010. The recorded bats were most likely passing through the Barton area with the likelihood that the Barton location provides a roosting area being low. However, the roosting area will be within a few kilometres (Millennium Minerals Limited, 2011; Ninox Wildlife Consulting, 2011). It is known that this species is best suited to a moist/humid habitat at depth near a water table and the application area is not conducive to this (Millennium Minerals Limited, 2011).

Ctenotus nigrilineatus

The small skink *Ctenotus nigrilineatus* was recorded in 2006 in the Golden Eagle lease, adjacent to the current application area, and this was only the third confirmed locality for the species (Ninox Wildlife Consulting, 2011). Further surveys of the original Golden Eagle project area during 2007 confirmed a population of this reptile within a proposed conservation zone in the Golden Eagle mining area (Ninox Wildlife Consulting, 2011). In 2007 two skinks were recorded within the Golden Gate deposit while in 2010 ten skinks were recorded in Barton and six in Falcon, bringing the known distribution to six areas (Ninox Wildlife Consulting, 2011). An assessment of habitat preferences of this species in the Golden Eagle area was conducted in May 2007. Based on the flora and vegetation surveys and fauna surveys of the satellite deposits area, a conservation zone has been defined in the Falcon lease area (Millennium Minerals Limited, 2011). This 1.54 hectare exclusion is in addition to the 191 hectare conservation zone that was defined for the original Golden Eagle deposit area (Millennium Minerals Limited, 2011).

Brush-tailed Mulgara

Three individual Brush-tailed Mulgara were captured in Barton deposit, all females with small unfurred pouch joeys (Ninox Wildlife Consulting, 2011). The distinctive footprints of the Brush-tailed Mulgara were common in the Barton area (Ninox Wildlife Consulting, 2011). A joint Greater Bilby and Brush-tailed Mulgara conservation area has been set aside west of Barton where suitable habitat is excluded from clearing (Millennium Minerals Limited, 2011; 2012).

Ghost Bat

The Ghost bat was recorded in Barton in 2006 and was also recorded in the Nullagine area in earlier studies in the 1950s and 1960s (Ninox Wildlife Consulting, 2011). A maternity colony was present in the All Nations satellite deposit during those earlier studies but it has probably been abandoned since due to additional mining activities in the following decades (Ninox Wildlife Consulting, 2011). The species was not recorded in Barton deposit, or elsewhere in the application area, during the 2010 survey (Ninox Wildlife Consulting, 2011).

Australian Bustard

The Australian Bustard was observed in Shearers in 2010 and adjacent to proposed haul road in the vicinity of Shearers in 2007 (Ninox Wildlife Consulting, 2011). The Australian Bustard is highly mobile with a widespread distribution (Garnett and Crowley, 2000) and the proposed clearing is unlikely to significantly impact on the species.

Western Pebble-mound Mouse

A single Western Pebble-mound Mouse mound was recorded in Golden Gate in 2010 but it was not apparent whether this mound was still active (Ninox Wildlife Consulting, 2011). The mound will be avoided during the proposed clearing and monitored for activity for 18 months by the site environmental officer (Millennium Minerals Limited, 2011).

Rainbow Bee-eater

Small flocks of the Rainbow Bee-eater were observed in Shearers, Barton and Falcon deposits with the largest flock being eight birds observed flying over the Barton area in May 2010 (Ninox Wildlife Consulting, 2011). This is a common species that is distributed across much of mainland Australia (DSEWPaC, 2012b). The proposed clearing will not disturb or fragment critical habitat of this species and is not expected to impact the species (Millennium Minerals Limited, 2011).

Stygofauna

A two phase stygofauna survey of the application area was conducted by Ecologia Environment in April and July 2010. Two stygobitic worms, *Envhytraeus* Pilbara sp. 2 and *Insulodrilus* sp., were identified at Barton deposit and a potential stygobitic insect specimen was collected and is awaiting identification (Millennium Minerals Limited, 2012). It is unlikely that stygofauna from this locality is restricted in its distribution as the two worm species are both widespread species in the Pilbara region (Millennium Minerals Limited, 2012). In addition, hydrogeological data indicates that the Mosquito Creek aquifer is interconnected within itself and therefore stygofauna are likely to be distributed through the aquifer and not restricted to areas that will be impacted by mining operations (Millennium Minerals Limited, 2012).

Troglofauna

A two phase baseline troglofauna survey was undertaken over the application area in April to May and June to July 2010. The survey yielded over 500 invertebrate specimens representing ten orders. Only species belonging to six orders and ten morpho-species showed adaptations to the subterranean environment (Millennium Minerals Limited, 2012).

Short Range Endemics (SRE)

Rapallo undertook a SRE survey over the application area in May 2010 utilising methods such as hand foraging, habitat assessment and pitfall traps. Four potential SRE taxa were recorded within the application area: the mygalomorph spiders *Synothele* 'MYG193' and *Aname* 'MYG001', the millipede *Antichiropus* sp. and scorpion *Urodacus* 'Nullagine pale' (Millennium Minerals, 2012). Each of the species has also been recorded outside the development impact area which lowers the risk of the proposed clearing negatively impacting any SRE species (Millennium Minerals, 2012).

Conclusion

Millennium Minerals Limited consulted with DEC and DSEWPaC during the development of the project and their Significant Species Management Plan. Further consultation will occur during the research contributions and providing DEC with the results of future fauna monitoring (Millennium Minerals, 2011; 2012).

The HG8 vegetation type in the Barton satellite deposit is of local significance to vertebrate fauna, specifically conservation significant species. The implementation of the conditions imposed by the DSEWPaC approval and Millennium Minerals Limited's fauna management plans will minimise and mitigate the impact of the clearing on conservation significant fauna species and the landforms with which they are associated.

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

Methodology DSEWPaC (2012a)
DSEWPaC (2012b)
Garnett and Crowley (2000)
Mattiske Consulting (2012)
Millennium Minerals Limited (2011)
Millennium Minerals Limited (2012)
Ninox Wildlife Consulting (2011)

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

Comments Proposal is at variance to this Principle

Botanists from Mattiske Consulting undertook flora and vegetation surveys the application area in July 2005, April 2006, May 2010 and April 2011 (Mattiske Consulting, 2012). One Threatened Flora species, *Lepidium catapycnon*, was recorded in July 2005 at several locations within the application area at the Bartons satellite deposit (Mattiske Consulting, 2012). Four *Lepidium catapycnon* plants were recorded during the 2005 survey but no plants were recorded when the Bartons location was resurveyed in May 2010 despite extensive searching (Mattiske Consulting, 2012; Millennium Minerals Limited, 2012). As this species is a short lived opportunistic species it is often difficult to detect in drier seasonal conditions (Mattiske Consulting, 2010). An application to take Threatened Flora under the Wildlife Conservation Act 1950 has been submitted to the Department of Environment and Conservation (DEC) for *Lepidium catapycnon* (Millennium Minerals Limited

(2012).

Observations by Matiske suggest this species acts as a disturbance opportunistic species. Consequently there is a chance that this species may arise following disturbance in some of the lease areas (Matiske Consulting, 2010).

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

Methodology Matiske Consulting (2010)
Matiske Consulting (2012)
Millennium Minerals Limited (2012)

(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 140 kilometres west of the application area (GIS Database).

No TECs were identified during the flora and vegetation surveys conducted by Matiske Consulting botanists (Matiske Consulting, 2012).

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

Methodology Matiske Consulting (2012)
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 WA, 2011; 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 190 'Hummock grasslands, sparse shrub steppe; *Acacia bivenosa* and *Acacia trachycarpa* over hard spinifex *Triodia wiseana*, very poor rocky country on gneiss' (GIS Database). According to Government of WA (2011) approximately 99.9% of Beard vegetation association 190 remains at the state and bioregional level. 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	17,804,427	17,729,352	~99.6	Least Concern	6.3
Beard Veg Assoc. – State					
190	169,200	169,051	~99.9	Least Concern	-
Beard Veg Assoc. – Bioregion					
190	169,200	169,051	~99.9	Least Concern	-

* Government of WA (2011)

** 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 WA (2011)
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 no major or permanent watercourses or wetlands within the application area (Millennium Minerals Limited, 2012; GIS Database). There are three main ephemeral creeks that cross the proposed haul road in the application area; namely Five Mile Creek, Twenty Mile Creek and a Middle Creek tributary (Millennium Minerals Limited, 2012). These creeks have wide, well defined, sandy drainage channels (Millennium Minerals Limited, 2012).

Mattiske Consulting (2012) identified twelve vegetation types within the application area and four of these are associated with drainage lines or creeklines: C1, C2, C3 and C4.

Direct impact to the creeklines will come from the widening of an existing road that crosses all three creeklines and the construction of floodways for vehicular crossings (Millennium Minerals Limited, 2012). Millennium Minerals Limited will be constructing floodways as they are considered to have less impact on waterway vegetation and bank integrity than culverts. Floodways will be sited at right angles to the direction of the water flow and level with the existing stream bottom to minimise interference to the natural creek flow and to reduce bank erosion (Millennium Minerals Limited, 2012). Millennium Minerals Limited (2012) anticipate that impacts to vegetation due to changes in surface water flows as a result of the construction of these additional floodways will be minor. The condition of the vegetation around the satellite deposits will be visually monitored on a regular basis to determine if impacts on the vegetation are occurring due to change in surface water road crossings (Millennium Minerals Limited, 2012). Potential impacts to riparian vegetation may be minimised by the implementation of a watercourse management condition.

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

Methodology Mattiske Consulting (2012)
Millennium Minerals Limited (2012)
GIS Database:
- Geodata, Lakes
- Hydrography, Linear

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

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

According to available datasets, the application area intersects the Mosquito and River Land Systems (GIS Database). The majority of the application area, approximately 98%, is within the Mosquito Land System (GIS Database).

The Mosquito Land System is characterised by stony plains and prominent ridges of schist and other metamorphic rocks supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). Most of the system has low susceptibility to erosion except for some drainage floor units which are moderately susceptible if vegetation cover is lost (Van Vreeswyk et al., 2004).

The River Land System is characterised by active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). Susceptibility to erosion is high or very high if vegetation cover is removed (Van Vreeswyk et al., 2004).

The proposed clearing is to be staggered between 2012 and 2021 with only one or two pits operational at any one time (Millennium Minerals Limited, 2012). Limiting the area exposed reduces the risk of erosion. Other commitments from Millennium Minerals Limited (2012) that reduce the risk of land degradation include stockpiling of topsoil and vegetation and rehabilitation of the site. Potential impacts from land degradation 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 is not likely to be at variance to this Principle.

Methodology Millennium Minerals Limited (2012)
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 application area is not situated within a Department of Environment and Conservation managed conservation area (GIS Database). The nearest conservation area is the ex-Meentheena pastoral lease, which is former leasehold proposed for conservation, located approximately 33 kilometres north of the application area (GIS Database). Given the distance between the application area and the nearest conservation area, the proposed clearing is not likely to impact on the conservation values of the former leasehold.

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

Methodology GIS Database:
- DEC Tenure (Category)

(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 major or permanent watercourses or wetlands within the application area (Millennium Minerals Limited, 2012; GIS Database). There are three main ephemeral creeks that cross the proposed haul road in the application area; namely Five Mile Creek, Twenty Mile Creek and a Middle Creek tributary (Millennium Minerals Limited, 2012). These creeks have wide, well defined, sandy drainage channels (Millennium Minerals Limited, 2012). Millennium Minerals Limited (2012) plan to use appropriate engineering solutions and surface water controls to prevent sediments and other contaminants from entering natural flow paths, including diversion and dispersion mechanisms and erosion and sedimentation controls.

Part of the application area is within the Nullagine Water Reserve, a Public Drinking Water Source Area (PDWSA) classified as Priority 3 (GIS Database). A Drinking Water Source Protection Plan was prepared for the Nullagine Water Reserve in 1999. The aquifer is unconfined and recharged directly by rainfall and river flows and therefore highly vulnerable to contamination (DoW, 2012). The Department of Water (DoW) have advised that all activities associated with the proposed clearing should be compatible with DoW's Land Use Compatibility Tables and all acceptable activities should be managed using current best practices (DoW, 2012). Mining is considered a compatible land use in Priority 3 PDWSAs with conditions (DoE, 2004). DoW (2012) is satisfied the proposed clearing is unlikely to have a significant impact on the quality or quantity of groundwater, provided activities are carried out in accordance with DoW advice.

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

Methodology DoE (2004)
DoW (2012)
Millennium Minerals Limited (2012)
GIS Database:
- Geodata, Lakes
- 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

Periodic flooding is known to occur in the Pilbara following cyclonic activity. The proximity of a number of ephemeral watercourses within and adjacent to the application area poses a risk of flooding following large rainfall events (Millennium Minerals Limited, 2012). It is unlikely that the clearing of vegetation will cause or exacerbate the incidence of flooding as Millennium Minerals Limited will be implementing appropriate drainage designs including all surface water flows through the application area being diverted or flowing through floodways at creek crossings (Millennium Minerals Limited, 2012).

The application area is located within the Nullagine River catchment area (GIS Database). Given the size of the area to be cleared (190 hectares) in relation to the size of the catchment area (711,583 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a catchment scale.

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

Methodology Millennium Minerals Limited (2012)
GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

There are two native title claims over the application area (WC99/8 and WC99/16) (GIS Database). These claims have 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 proponents' 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 Golden Eagle Satellite Deposits Development was referred to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on 22 February 2011, due to the presence of EPBC Act listed fauna and flora species within the project area. The project was deemed a 'controlled action' and required assessment under the EPBC Act with the level of assessment being set at Preliminary Documentation. Final approval for the project was given on 17 January 2012 and was subject to 13 conditions.

The clearing permit application was advertised on 30 April 2012 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to this application.

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

4. References

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- Ninox Wildlife Consulting (2011) A Vertebrate Fauna Survey of Proposed Satellite Mining Areas, Near Nullagine Western Australia. Report Prepared by Ninox Wildlife Consulting for Millennium Minerals Limited, May 2011.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Government of Western Australia, Perth, Western Australia.

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	Environmental 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.